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Coal Combustion Residue Impoundment
Round 9 - Dam Assessment Report

Plant Gadsden

Fly Ash Dike
Alabama Power Company
Gadsden, Alabama

Prepared for:

United States Environmental Protection Agency
Office of Resource Conservation and Recovery

Prepared by:

Dewberry & Davis, LLC
Fairfax, Virginia

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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 flooded more than 300 acres of land, damaging homes and property. To prevent such catastrophic failure and damage, the U.S. EPA is assessing the stability and functionality of ash impoundments and other units nationwide, and quickly taking any needed corrective measures.

This assessment of the stability and functionality of the Plant Gadsden Ash Pond is based on a review of available documents and on the site assessment conducted by Dewberry personnel on Monday February 28, 2011. We found the supporting technical documentation adequate (Section 1.1.3). As detailed in Section 1.2.5, there is one recommendation based on field observations that may help to maintain a safe and trouble-free operation.

In summary, the Gadsden Steam Plant Ash Pond is **SATISFACTORY** for continued safe and reliable operation, with no recognized existing or potential management unity 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 early 2009, the EPA sent its first wave of 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 residue. 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.

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EPA requested that utility companies identify all management units including surface impoundments or similar diked or bermed management units or management units designated as landfills that receive liquid-borne material used for the storage or disposal of residuals or by-products from the combustion of coal, including, but not limited to, fly ash, bottom ash, boiler slag, or flue gas emission control residuals. Utility companies provided information on the size, design, age and the amount of material placed in the units. The EPA used the information received from the utilities to 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 residue release from management units and to identify the hazard potential classification**. This evaluation included a site visit. Prior to conducting the site visit, a two-person team reviewed the information submitted to EPA, reviewed any relevant publicly available information from state or federal agencies regarding the unit hazard potential classification (if any) and accepted information provided via telephone communication with the management unit owner. Also, after the field visit, additional information was received by Dewberry & Davis LLC about the Gadsden Steam Plant Ash Pond that were reviewed and used in preparation of this report.

Factors considered in determining the hazard potential classification of the management unit(s) included the age and size of the impoundment, the quantity of coal combustion residuals or by-products that were stored or disposed 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 residue management unit(s). Qualified Dewberry engineering personnel performed the field observations and review and made the assessment in conformance with the required scope of work and in accordance with reasonable and acceptable engineering practices. No other warranty, either written or implied, is made with regard to our assessment of dam safety.

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1.0 CONCLUSIONS AND RECOMMENDATIONS

1.1 CONCLUSIONS

Conclusions are based on visual observations from a one-day site visit on February 28, 2011, and review of technical documentation provided by the Alabama Power Company.

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 analyses provided to Dewberry indicate adequate impoundment capacity to contain the 1-percent probability/24-hour precipitation design storm without overtopping the embankment.

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 the owner 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 unit required to conduct a thorough field observation. The visible parts of the embankment dikes and outlet structure were observed to have no signs of overstress, significant settlement, shear failure, or other signs of instability. Embankments appear structurally sound. There are no apparent 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 significant embankment repairs or prior releases observed during the field inspection.

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 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.

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 Field Observations

Based on observations made during Dewberry's site visit, it is recommended that riprap blocking the outlet conduit of the emergency spillway be removed and that the outlet be kept free of obstructions.

1.3 PARTICIPANTS AND ACKNOWLEDGEMENT

1.3.1 List of Participants

Tommy Ryals, Alabama Power Company
Tracy L. Scully, Alabama Power Company
Billy R. Zemo, Alabama Power Company
Holly Riley, Alabama Power Company
Jim Pegues, Southern Company
Steven Burns, Balch & Bingham
Frank B. Lockridge, Dewberry
Joseph P. Klein, III, Dewberry

1.3.2 Acknowledgement and Signature

We acknowledge that the management unit referenced herein has been assessed on February 28, 2011.

Joseph P. Klein, III, P.E. (AL 25976)

Frank B. Lockridge, P.E.

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

2.1 LOCATION AND GENERAL DESCRIPTION

The Gadsden Electric Generating Plant is located along the south bank of the Coosa River in Gadsden, Alabama. The plant is operated by Alabama Power Company, an operating unit of Southern Company. The fly ash impoundment is located on the north side of Henry Neely Lake opposite the plant site. Henry Neely Lake is a dammed section of the Coosa River. A project aerial photograph is provided in Appendix A Doc. 01. A project area topographic map is provided in Appendix A Doc 02.

The original CCR impoundment was constructed in the 1940s. The impoundment was expanded in the 1970s by the addition of a larger impoundment on the west side of the original. The expansion included raising the crest of the original embankment from elevation 515 ft. to 525 ft. to match the new embankment. The original impoundment is designated the upper pond and the new impoundment designated the lower pond.

The long axis of the impoundment is southeast – northwest. For convenience, the long axis is referenced as east – west in this report.

Table 2.1: Summary of Dam Dimensions and Size

	Gadsden Plant Ash Pond
Dam Height (ft)	19 (Maximum)
Crest Width (ft)	15
Length (ft)	5,200
Side Slopes (upstream) H:V	3:1
Side Slopes (downstream) H:V	3:1

2.2 COAL COMBUSTION RESIDUE HANDLING

Fly ash is collected in hoppers and processed either pneumatically through a series of filters and intermediate hoppers for loading into trucks, or sluiced to the CCR impoundment. Bottom ash is sluiced to the CCR impoundment. Dewberry was provided flowcharts of the fly ash handling system (See Appendix A Doc 03) and the Gadsden Steam Plant Water Use Diagram flow charts (See Appendix A Doc 04).

The ash handling equipment is located inside the plant fence line across the Coosa River from the CCR impoundment. Visitor access to the plant requires escort by plant personnel that was not available at the time of Dewberry's site visit.

2.3 SIZE AND HAZARD CLASSIFICATION

The 19-foot high dam impounds an area of about 74 acres and has a capacity of about 753 acre-feet. The classifications for size, based on the maximum height of the embankment and the impoundment storage capacity, is "Small" according to the *USACE Recommended Guidelines for Safety Inspection of Dams,* ER 1110-2-106.

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

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

Alabama did not have a State Dam Safety Program at the time Dewberry conducted this assessment. Therefore the impoundment dike system does not have an established hazard classification. Dewberry conducted a qualitative hazard classification based on Federal Guidelines for Dam Safety, dated April 2004.

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

	Loss of Human Life	Economic, Environmental, Lifeline Losses
Low	None Expected	Low and generally limited to owner
Significant	None Expected	Yes
High	Probable. One or more expected	Yes (but not necessary for classification)

Based on the size of the impoundment, loss of human life is not probable in the event of a catastrophic failure of the embankment. However, due to being located near the central business district of Gadsden, Alabama, failure of the embankment is expected to have significant environmental and economic impacts. Therefore Dewberry evaluated the Gadsden Steam Plant CCR impoundment dike as a Significant hazard.

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

Table 2.3: Maximum Capacity of Unit	
Ash Pond Name: Gadsden Steam plant Ash Pond	
Surface Area (acre)[1]	74
Current Storage Capacity (cubic yards)[2]	1,067,968
Current Storage Capacity (acre-feet)	662
Total Storage Capacity (cubic yards)[2]	1,214,471
Total Storage Capacity (acre-feet)	753
Crest Elevation (feet)	525
Normal Pond Level (feet)	523.3

[1]*Impoundment surface area data from "Hydrologic and Hydraulic Considerations"*
[2]*Gadsden Steam Plant Ash Pond (See Appendix A Doc. 05)*

Estimate provided by Alabama Power based on available data.

2.5 PRINCIPAL PROJECT STRUCTURES

2.5.1 Earth Embankment

The Gadsden Steam Plant CCR impoundment is formed by an earth fill embankment with a maximum height to about 19 feet. Exterior and interior slopes are 3(H):1(V). The interior slope has a riprap cover as protection from wind-generated wave erosion. The exterior slope is vegetated with grass and low weeds.

2.5.2 Outlet Structures

The primary overflow spillway consists of a 48-inch diameter, reinforced concrete riser located in the southeast corner of the lower ash pond. The spillway outlet is a 36-inch diameter, reinforced concrete pipe that discharges to a partially riprap, lined drainage way that empties into the Coosa River.

An emergency spillway with a configuration similar to the primary spillway is located at the north end of the pond.

2.6 CRITICAL INFRASTRUCTURE WITHIN FIVE MILES DOWN GRADIENT

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

Based on a review of available topographic maps, surface drainage in the area of the CCR impoundment is to the south and west toward the Coosa River (See Appendix A Doc. 02). Based on aerial photographs and a brief driving tour of the area, much of downtown Gadsden, Alabama is within 5 miles down-gradient of the CCR impoundment.

3.0 SUMMARY OF RELEVANT REPORTS, PERMITS, AND INCIDENTS

Summary of Reports on the Safety of the Management Unit

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

- "Gadsden Steam Plant Ash Pond Biennial Inspection", October 24, 2006
- "Gadsden Steam Plant Dam Safety Inspection", April 7, 2009
- "Gadsden Steam Plant, Dam Safety Inspection", April 29, 2010
- "Gadsden Steam Plant Dam Safety Inspection", November 2, 2011

Each report, as detailed below, cited the need for minor repairs and maintenance, but none of the reports encountered conditions that affected the continued safe and reliable operation of the impoundment.

The 2006 inspection report included recommendations for minor repairs and maintenance items (See Appendix A Doc 06).

The 2009 inspection (See Appendix A Doc 07) recommendations were:

- Add riprap protection to areas of the upstream embankment crest eroded due to wave action
- Clear vegetation to a distance of at least 5 feet past the downstream toe
- Continue efforts to control ant mounds along the crest of the embankment.

The April 2010 inspection report (See Appendix A Doc 08) recommendations included:

- Add riprap protection to areas of the upstream embankment crest eroded due to wave action
- Clear the area downstream of the 1979 extension dike to a distance of 20 feet beyond the toe
- Repair damage to the northwest corner of the embankment caused by tracked construction equipment
- Continue efforts to control ant mounds along the crest of the embankment.

The November 2010 inspection report (See Appendix A Doc 09) recommendations included:

- Remove trees along the upstream and downstream embankments of the original (upper) pond and remove trees to a distance of 20 feet from the downstream toe
- Improve drainage along the upstream face of the upper pond

- Clear woody debris from the transmission line to provide unobstructed view of downstream face
- Continue a level of maintenance observed along the 1979 Extension dike structure to all ash impoundment structures at the plant
- Remove stumps observed along the western edge of the 1979 Extension dike.

Alabama Power provided two packages of engineering calculations. The packages included:

- "Hydrologic and Hydraulic Considerations, Gadsden Steam Plant Ash Pond, Alabama Power Company, Gadsden, Alabama", January 28, 2011 (See Appendix A Doc 05)
- "Geotechnical Studies and Stability Analyses, Plant Gadsden Ash Pond Perimeter Dike Assessment", January 6, 2011 (See Appendix A Doc 10).

The results of those reports are discussed in Sections 6.0 and 7.0, respectively of this report.

3.1 SUMMARY OF LOCAL, STATE, AND FEDERAL ENVIRONMENTAL PERMITS

The State of Alabama has not implemented a dam safety program; therefore, there is no state or local permit.

Discharge from the impoundment is regulated by the Alabama Department of Environmental Management, and the impoundment has been issued a National Pollutant Discharge Elimination System Permit. Permit No AL 0002887 was issued January 14, 2003. The NPDES permit expired on January 31, 2008. Alabama Power submitted the application for permit renewal on May 17, 2007. The renewal has not been issued by the Alabama Department of Environmental Management.

3.2 SUMMARY OF SPILL/RELEASE INCIDENTS

Data reviewed by Dewberry did not indicate any spills, unpermitted releases, 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 Gadsden Steam Plant original CCR impoundment, now designated the upper pond, was constructed in the mid to late 1940s and put into service in about 1949. The impoundment was constructed as an earth fill dike with a crest elevation of 515 ft.

4.1.2 Significant Changes/Modifications in Design since Original Construction

The impoundment was extended westward in the mid to late 1970s with the addition of the lower pond. The lower pond was added to the west end of the upper pond. The lower pond was also constructed as an earth fill dike. As part of the extension, the crest of the combined ponds was raised to elevation 525 ft. A partial set of project plans and section drawings was made available for Dewberry review (See Appendix A Docs 11 – 13).

In the early 2000s the east portion of the upper pond was filled to store and process dry ash. The change included construction of a new primary overflow structure and raising the inlet elevation of the 1978 overflow structure to make it an emergency spillway. A partial set of project plans and section drawings was made available for Dewberry review (See Appendix A Docs 14 – 16).

In 2010 a new access road was constructed along the toe of the upper pond south dike, and a new toe drainage system installed along the toe of the embankment slope. The toe drainage system included a new subsurface, geotextile lined under drain overlain by a newly configured surface ditch. The roadway and drainage system are separated by a short wall of precast concrete blocks (See Appendix A Doc 17).

4.1.3 Significant Repairs/Rehabilitation since Original Construction

A crushed stone drainage blanket and toe drain was added to the west end of the lower pond north embankment to address surface drainage concerns at the toe and potential embankment seepage.

No other information was provided regarding major repairs or rehabilitation. No evidence of prior releases, failures, or patchwork repairs of the embankments was observed during the site visit, and no documents or statements were provided to the dam assessors that indicate prior releases or failures.

4.2 SUMMARY OF OPERATIONAL PROCEDURES

4.2.1 Original Operational Procedures

The upper pond was designed and operated for coal combustion residue sedimentation and control.

4.2.2 Significant Changes in Operational Procedures and Original Startup

In the mid to late 1970s the original pond was extended by adding a new lower pond at the west end of the upper pond. The larger pond systems received slurried coal combustion waste, plant process water waste, and storm water runoff.

A new primary discharge structure for the combined impoundment was constructed at the north end of the lower pond.

4.2.3 Current Operational Procedures

Currently, sluiced fly ash, boiler blowdown water, metal cleaning waste water, coal pile runoff and plant service cooling water is conveyed across the Coosa River into the upper pond. Water from the plant is discharged to the center of the upper pond which uses internal ash dikes to provide a serpentine flow path westward to the lower pond. The serpentine flow path provides a longer settling time for ash in the upper pond. The western portion of the upper pond has been filled in with ash and is used to store and handle dry ash. As a result of filling the east end and both sides of the upper ash pond to support storage and handling of dry ash, there is no water stored against the upper pond embankment.

Water from the upper pond drains through a stilling basin into the northeast corner of the lower pond and then into the eastern portion of the pond which serves as a secondary settling area. The north and south portions of the lower pond are separated by a permeable full depth filter to further reduce migration of ash southward.

A pump station added to the southeast corner of the lower pond re-circulates water to the plant for service cooling water and dust control. A drop inlet installed near the pump station serves as the primary spillway. The spillway installed at the south end of the lower pond currently serves as an emergency spillway.

4.2.4 Other Notable Events since Original Startup

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

5.0 FIELD OBSERVATIONS

5.1 PROJECT OVERVIEW AND SIGNIFICANT FINDINGS

Dewberry personnel Joseph P. Klein, III, P.E. and Frank B. Lockridge, P.E. performed a site visit on Monday, February 28, 2011 in company with the participants.

The site visit began at 8:30 AM. The weather was cloudy and mild. Photographs were taken of conditions observed. Selected photographs are included here for ease of visual reference. All pictures were taken by Dewberry personnel during the site visit. Please refer to the Dam Inspection Checklist in Appendix B for additional information collected 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 EARTH EMBANKMENT

5.2.1 Crest

The crest of the impoundment embankment has no signs of depressions, tension cracks, or other indications of settlement or shear failure. Previous inspection reports reviewed by Dewberry did not indicate issues concerning the embankment crest. Figure 5.2.1-1 shows the condition of the lower pond crest.

Figure 5.2.1-1: Lower Pond Crest West End of North Dike

Filling the east end and both sides of the upper ash pond to support storage and handling of dry ash has resulted in there being no water stored against the upper pond embankment. Figure 5.2.1-2 shows the upper pond south embankment crest and inside slope.

Figure 5.2.1-2: Upper Pond Crest and Inside Slope with Ash Fill along Foreground Inside Slope and Stockpiled in Background.

5.2.2 Upstream/Inside Slope

The inside slope of the CCR impoundment lower pond is armored with riprap to protect against wind generated waves. There were no observed scarps, sloughs, bulging, cracks, depressions, or other indications of slope instability or signs of erosion. Figure 5.2.2-1 shows a section of the inside slope of the lower pond.

Figure 5.2.2-1: Lower Pond Interior Slope

5.2.3 Downstream/Outside Slope and Toe

The downstream or outside slope of the CCR impoundment lower pond is generally protected by several species of grass and weeds. There were no observed scarps, sloughs, bulging, cracks, depressions or other indications of slope instability or slope erosion. Figure 5.2.3-1 shows a section of the outside slope of the lower pond embankment.

Figure 5.2.3-1: Lower Pond Exterior Slope

Storm water runoff from the exterior slope of the lower pond generally flows overland to adjacent low-lying areas or, on the west side of the impoundment, to the Coosa River.

To address an area of potential embankment seepage and poor surface drainage near the toe area at the west end of the lower pond north dike, a riprap filter blanket and riprap lined toe ditch were constructed. Figure 5.2.3-2 shows the slope filter blanket and toe drain ditch. The filter blanket design consisted of a course riprap at the east end and finer riprap to the west as shown in Figure 5.2.3-2.

Water observed in the toe drain ditch was observed to be coming from up-gradient of the filter blanket and appeared to be surface runoff from recent storms in the area.

Figure 5.2.3-2: Lower Pond Exterior Slope Filter Blanket and Riprap Lined Toe Drain

The exterior slope of the upper pond embankment is vegetated with various species of grass and short weeds. A new geotextile lined, subsurface toe drain and gravel ditch had been added along a new roadway constructed to access the ash stockpile. Figure 5.2.3-2 shows the outside slope of the south embankment outside slope, the gravel line toe ditch and the short concrete barrier separating the ditch from the stockpile access roadway.

Figure 5.3.2-1: Upper Pond South Embankment Outside Slope, Gravel Lined Toe Ditch and Concrete Barrier Separating Ditch and Ash Stockpile Access Road

5.2.4 Abutments and Groin Areas

Erosion or uncontrolled seepage was not observed along embankment groins and abutments. Figure 5.2.4-1 shows the interior groin in the northwest corner of the lower pond north embankment. Figure 5.2.4-2 shows the area of the upper pond east abutment of the south dike.

Figure 5.2.4-1: Lower Pond East Embankment Interior North Groin

Figure 5.2.4-4: Upper Pond South Embankment Abutment Area

5.3 OUTLET STRUCTURES

5.3.1 Overflow Structure

The impoundment primary overflow structure is located in the southeastern corner of the lower pond. The overflow consists of a 48-inch diameter reinforced concrete pipe with an overflow elevation of 523 ft and an invert elevation of about 512 ft. The overflow spillway discharge is a 36-inch diameter concrete pipe that discharges into a partially riprap-lined channel that flows a short distance to the Coosa River. Figure 5.3.1-1 shows the overflow riser and Figure 5.3.1-2 shows the discharge channel to the Coosa River.

Figure 5.3.1-1: Gadsden Plant CCR Impoundment Primary Overflow Riser

Figure 5.3.1-2: Gadsden Plant CCR Impoundment Primary Spillway Outfall Area.

5.3.2 Outlet Conduit

The outlet conduit appeared to be in good condition and operating normally with no signs of clogging. Water flowing from the outlet was clear. Figure 5.3.2-1 shows water discharging from the outlet conduit.

Figure 5.3.2-1: Gadsden Plant CCR Impoundment Primary Spillway Outlet Conduit Discharge

5.3.3 Emergency Spillway

The spillway constructed in conjunction with the lower pond was converted to an emergency spillway around 2001 when the new primary spillway was constructed. The emergency spillway consists of a 48-inch diameter concrete pipe with an overflow elevation of 524.5 ft. and an invert elevation of about 510 ft. The spillway outlet conduit is a 36-inch diameter concrete pipe. No water was observed entering the riser or leaving the spillway outlet during the Dewberry site inspection visit. The outlet conduit was covered by riprap which had to be moved to observe the end of the pipe. Figure 5.3.3-1 shows the emergency spillway riser and Figure 5.3.3-2 shows the outlet conduit.

Figure 5.3.3-1 Gadsden Plant CCR Impoundment Emergency Spillway Riser

Figure 5.3.3-1: Gadsden Plant CCR Impoundment Emergency Spillway Outlet Conduit

5.3.4 Low Level Outlet

The Gadsden CCR Impoundment does not have a low level outlet.

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 hydraulic capacity analysis of the CCR impoundment for the design storm event (See Appendix A Doc 05). The design storm was a 100-year (1-percent probability of occurrence in any given year), 24-hour event with an intensity of 8 inches. The report estimates that the 1-percent probability storm can be retained by the impoundment, raising the pond water elevation to about 524.6 feet, leaving a freeboard of about 4 inches above the crest elevation.

The hydraulic analysis was based on the following assumptions:

- All process waters from the plant enter the ash pond normally
- All rainfall within the embankment perimeter flows into the pond
- No infiltration occurs
- No evaporation occurs
- All rainwater is conveyed to the clear pool (lower pond) and the upper pond provides no storage
- No discharge occurs from either of the two impoundment spillways

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 hydraulic analysis (See Appendix A Doc 05) the CCR impoundment can retain the 1-percent probability design storm event with a freeboard of about 4 inches. The relatively small calculated freeboard is of some concern in that the impoundment may not have the capacity to hold the design storm without overtopping the embankment. However, the assumption that no water is stored in the upper pond and that no discharge through either spillway occurs during the event indicates the calculated freeboard is a conservative estimate. The analysis implies that dam failure by overtopping is unlikely, but that some damage caused by waves across the crest may be expected.

7.0 STRUCTURAL STABILITY

7.1 SUPPORTING TECHNICAL DOCUMENTATION

7.1.1 Stability Analyses and Load Cases Analyzed

Southern Company Engineering and Construction Services conducted slope stability analyses for the CCR impoundment dikes. The results of the analyses were presented in a report dated January 6, 2011 (See Appendix A Doc 10). The analyses used soil properties and shear strength values based on geotechnical borings and laboratory testing conducted in conjunction with the analyses.

The stability analyses included results from four loading conditions:

- Long-term steady state loading
- Seismic loading
- Design storm event impoundment and rapid drawdown
- Submerged toe resulting from flooding of the Coosa River.

Based on the results of the analyses (See Table 7.1.4 below) it was concluded that the embankments have a stability safety factor at or above the minimum recommended values.

7.1.2 Design Parameters and Dam Materials

Documentation provided to Dewberry for review were the January 6, 2011 Geotechnical Studies and Stability Analyses, Plant Gadsden Ash Pond Perimeter Dike Assessment (See Appendix A Doc 10). The documentation indicated the stability analyses assumed two soil strata: one for the lower pond south dike and upper pond dike, and one for the lower pond east dike. The assumed soil strata and properties used for the stability analyses are shown in Table 7.1.2.

Table 7.2.1 Summary of Soil Strata and Properties Used in Stability Analyses

Soil Strata	Moist Unit Weight (pcf)	Cohesion C (psf)	Friction Φ (degrees)
Low plasticity SILT (ML)	130.56	C'= 0 C = 500	Φ' = 36° Φ = 29°
High Plasticity SILT (MH)	126.44	C' = 28.8 C = 562	Φ' = 29° Φ = 19°

The low plasticity silt stratum was used in the analyses for the lower pond south dike and upper pond dike. The high plasticity silt stratum was used for the lower pond east dike.

7.1.3 Uplift and/or Phreatic Surface Assumptions

No documentation of uplift calculations was provided to Dewberry for review. Per the stability report (See Appendix A Doc 10) the analyses were based on groundwater elevations recorded in soil borings.

7.1.4 Factors of Safety and Base Stresses

Table 7.1.4 Factors of Safety for Gadsden Steam Plant

Soil Strength - Lower Pond South Dike and Upper Pond Dike		
Loading Condition	**Required Safety Factor (US Army Corps of Engineers)**	**Gadsden Plant Computed Average Safety Factor**
Steady State	1.5	3.3
Steady State with Seismic Loading	1.1	1.7
High Water Conditions/Rapid Drawdown	1.4	2.1
Downstream Toe Submerged	1.3	2.6

Soil Strength - Lower Pond East Dike		
Loading Condition	**Required Safety Factor (US Army Corps of Engineers)**	**Gadsden Plant Computed Average Safety Factor**
Steady State	1.5	4.8
Steady State with Seismic Loading	1.1	2.3
High Water Conditions/Rapid Drawdown	1.4	3.9
Downstream Toe Submerged	1.5	4.0

Loading Condition	**Soil Strength**	**Required Safety Factor (US Army Corps of Engineers)**	**Gadsden Plant Computed Average Safety Factor**
Steady State	Lower Pond South Dike and Upper Pond Dike	1.5	3.3
Steady State with Seismic Loading		1.1	1.7
High Water Conditions/Rapid Drawdown		1.4	2.1
Downstream Toe Submerged		1.3	2.6
Steady State	Lower Pond East Dike	1.5	4.8
Steady State with Seismic Loading		1.1	2.3
High Water Conditions/Rapid Drawdown		1.4	3.9
Downstream Toe Submerged		1.5	4.0

7.1.5 Liquefaction Potential

The documentation reviewed by Dewberry did not include an evaluation of liquefaction potential. Soil conditions indicated on the boring logs provided with the stability analyses (See Appendix A Doc 10) do not appear to be susceptible to liquefaction.

7.1.6 Critical Geological Conditions

The Gadsden Steam Plant is located near the Gadsden Fault and is underlain by a complex series of undifferentiated shale, siltstone, dolomite and limestone. Surficial deposits consist of sandy and clayey silts, and clayey sand alluvium.

The stability analyses did not indicate the peak ground acceleration value used for the seismic load condition. Based on the U.S. Geologic Survey Seismic Risk Map of the Central and Eastern United States, the peak ground acceleration for the 2-percent probability of exceedance in 50 years is 0.1g. Based on our review of other Alabama Power CCR impoundments, the Gadsden Steam Plant seismic slope stability analyses results are consistent with having used 0.1g as the peak ground acceleration.

7.2 ADEQUACY OF SUPPORTING TECHNICAL DOCUMENTATION

Structural stability documentation is adequate.

7.3 ASSESSMENT OF STRUCTURAL STABILITY

Overall, the structural stability of the dam appears to be satisfactory.

8.0 ADEQUACY OF MAINTENANCE AND METHODS OF OPERATION

8.1 OPERATING PROCEDURES

The Gadsden Stream Plat CCR impoundment is configured with an upper pond that receives sluiced ash from the plant. Sluice water and ash flow along a serpentine drainage pattern to allow a large portion of the ash to settle within the upper pond.

Water discharges from the upper pond to the abutting lower pond for additional ash deposition. Discharge from the lower pond is from a permitted structure near the southeast corner of the lower pond. Much of the water from the lower pond is recycled to the Gadsden Plant.

8.2 MAINTENANCE OF THE DAM AND PROJECT FACILITIES

The 2009 Safety Procedure for Dams and Dikes (See Appendix A Doc 19) established inspection and maintenance requirements for impoundment dikes. The required procedures include:

- Weekly inspection by plant personnel
- Annual inspections by Southern Company Generation Hydro Services dam safety engineers
- Dam crests 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 Operating Procedures

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

8.3.2 Adequacy of Maintenance

Maintenance activities are described in various dam inspection reports, including Southern Company dam inspection reports dated October 24, 2006; April 7, 2009; April 29, 2010; and November 2, 2010 (See Appendix A Docs 06, 07, 08 and 09 respectively). The November 2, 2010 Southern Company dam inspection report included recommendations for continued maintenance of the dikes, but none of the recommendations are considered critical. Prior recommendations for other than continued maintenance were reported as having been completed.

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

9.0 ADEQUACY OF SURVEILLANCE AND MONITORING PROGRAM

9.1 SURVEILLANCE PROCEDURES

Weekly Inspections

Weekly inspections are conducted by plant personnel. Inspection observations are documented on the Miller Steam Plant – Ash Pond Dam Surveillance Visual Inspection Check List and Report (See Appendix A Doc 18). 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 has increased from biannual to annual as stated in the 2009 Safety Procedure for Dams and Dikes (See Appendix A – 19). The 2010 inspection report was submitted November 2, 2010 (See Appendix A – 09).

9.2 INSTRUMENTATION MONITORING

The Gadsden Steam Plant CCR impoundment dikes do not have an instrumentation monitoring system.

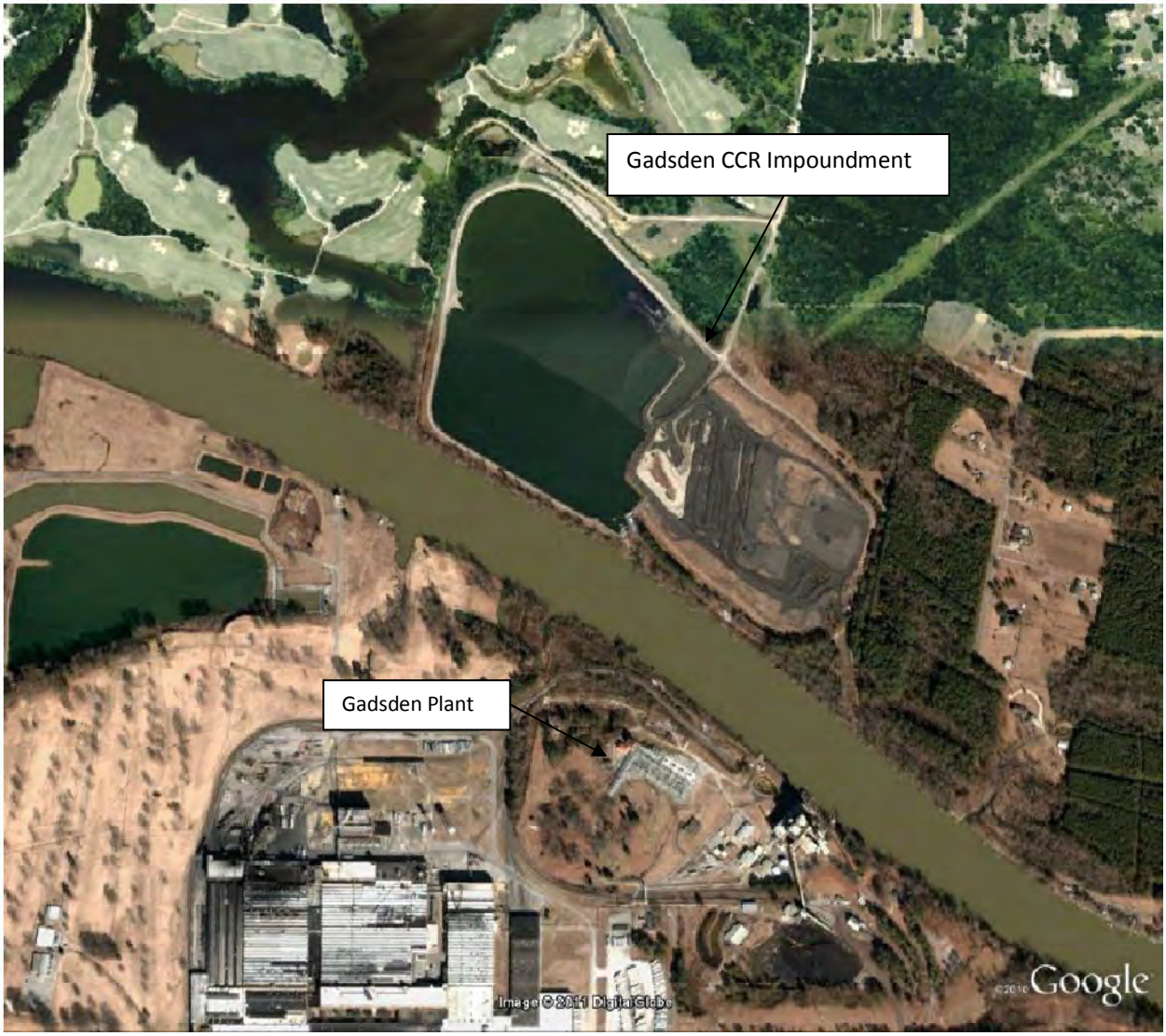
9.3 ASSESSMENT OF SURVEILLANCE AND MONITORING PROGRAM

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.

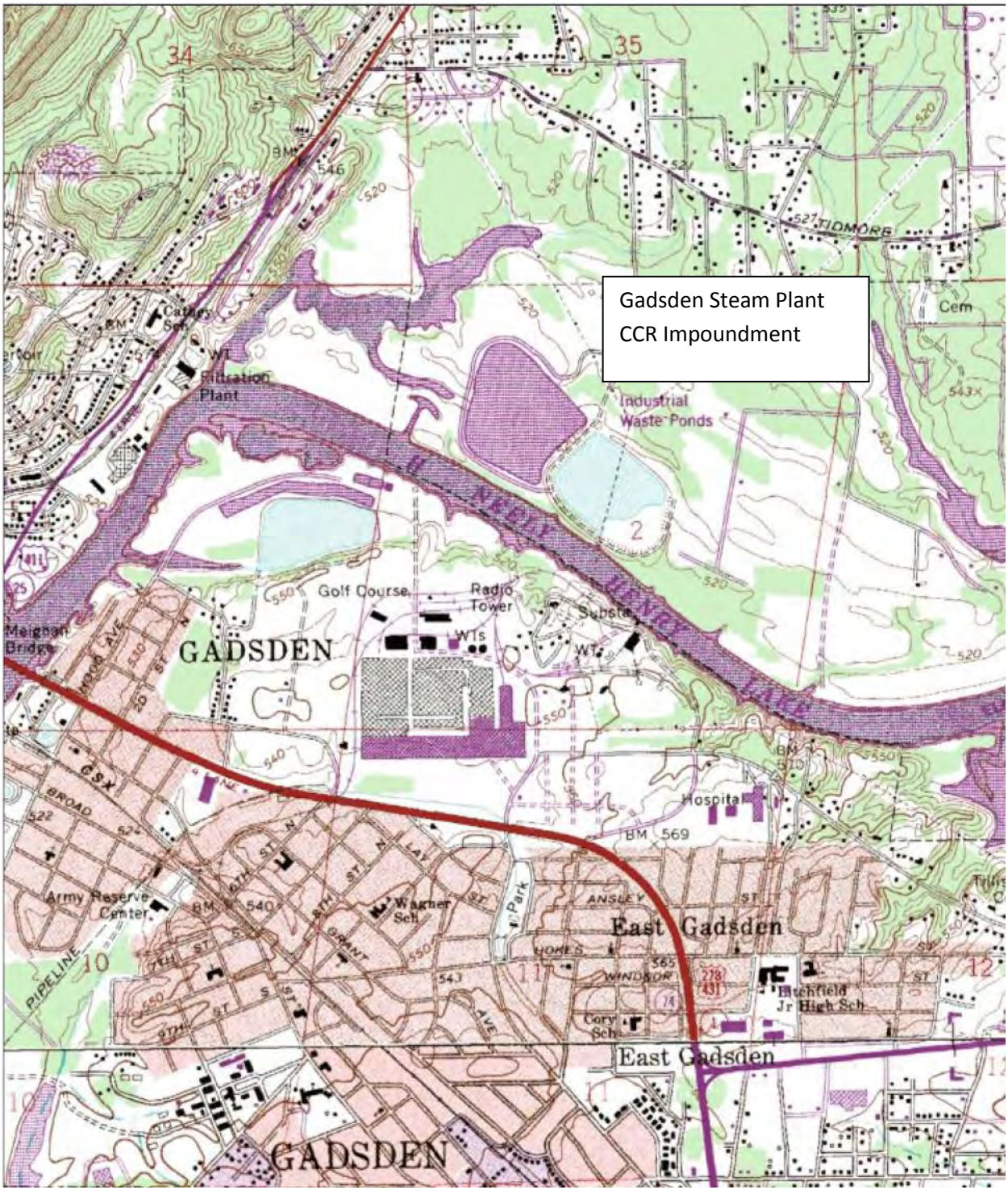
9.3.2 Adequacy of Instrumentation Monitoring Program

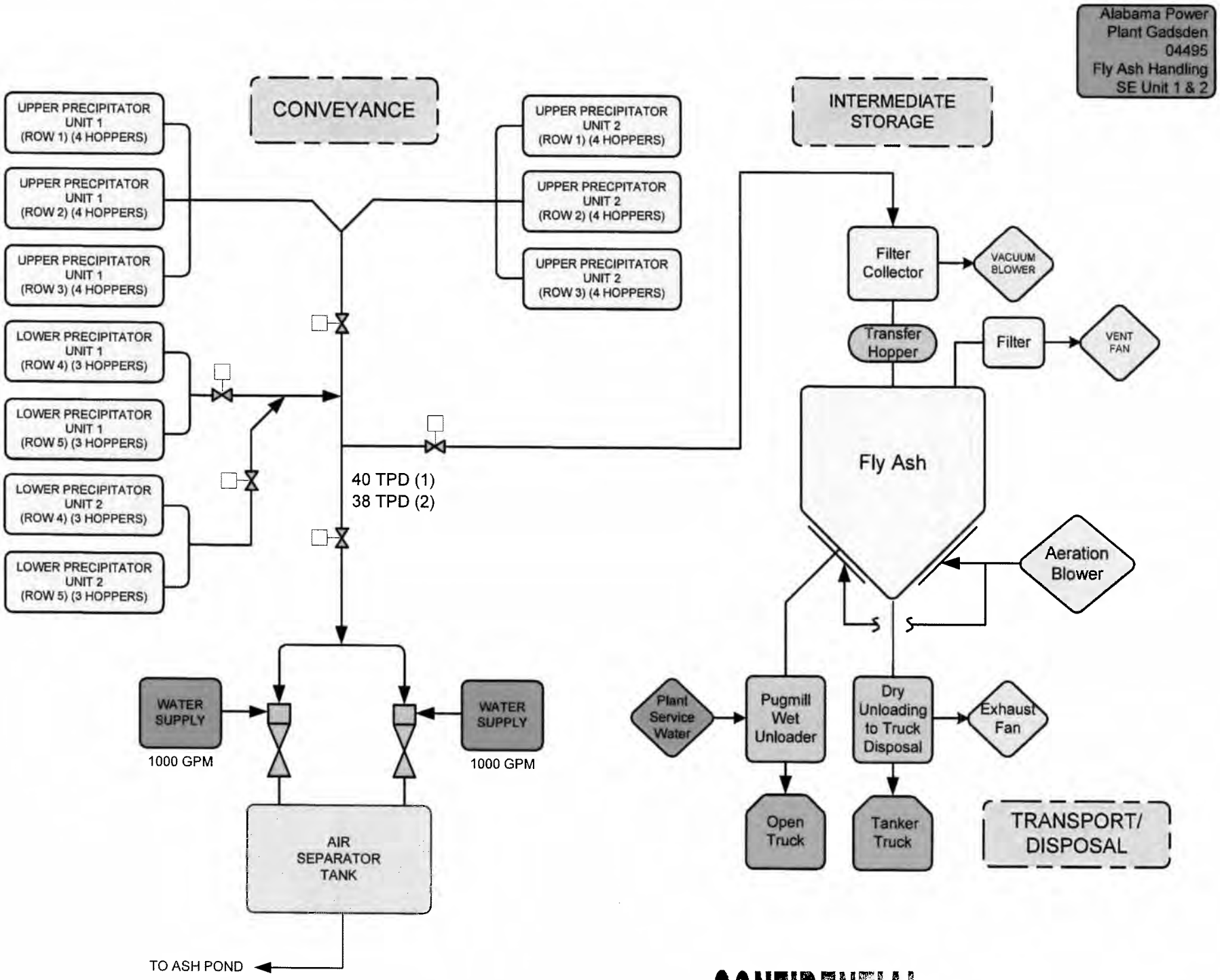
No instrumentation is present at the Gadsden Steam Plant CCR impoundment. Based on the size of the impoundment and observations during Dewberry's site visit, a monitoring system is not considered necessary at this time.



Doc 01 Gadsden Plant Aerial Photograph

Appendix A Doc 2: Gadsden Steam Plant Topographic Map





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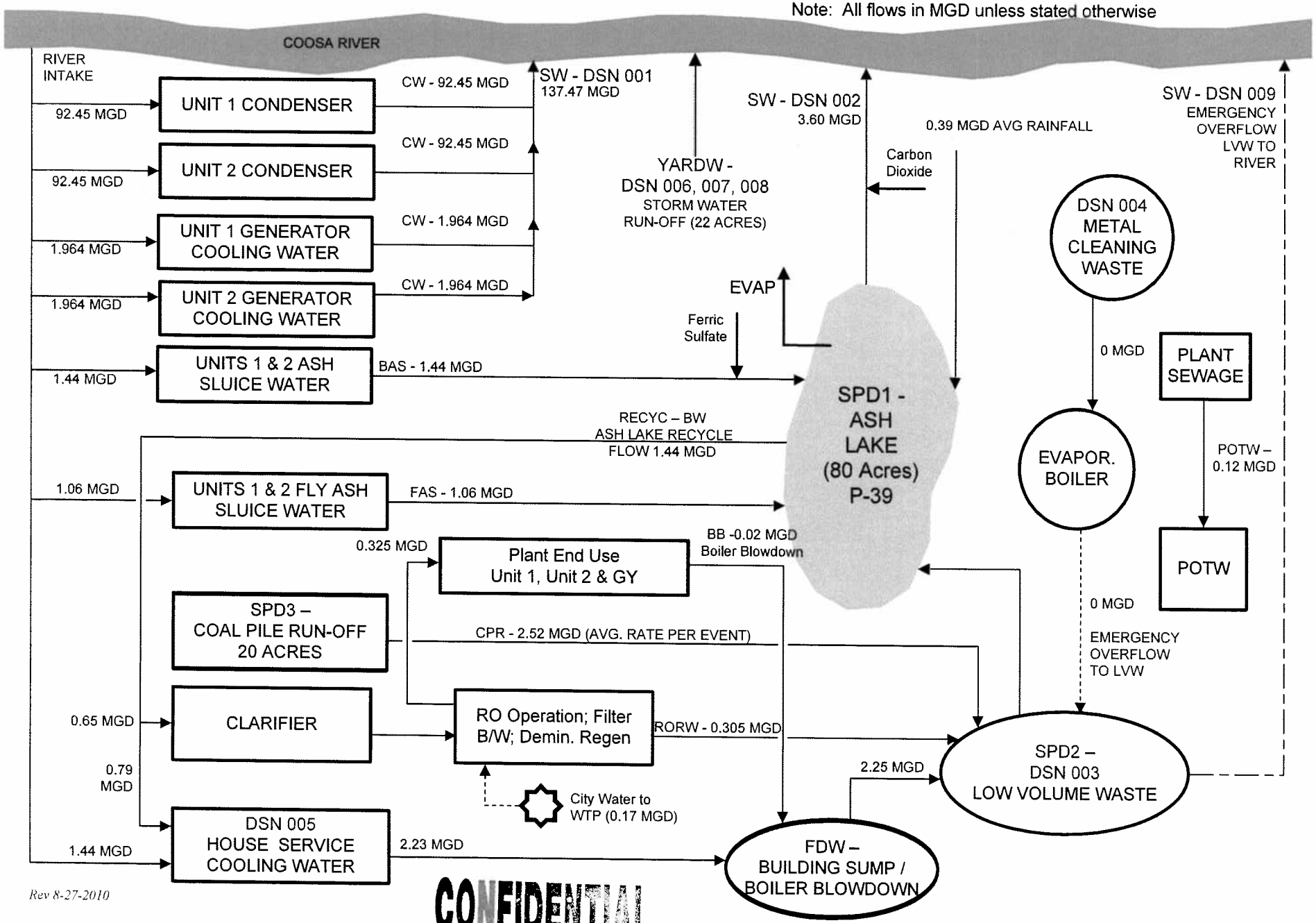
GADS-API-0028

GADSDEN STEAM PLANT WATER USE FLOW DIAGRAM

Company Name: Alabama Power Company
Plant Name: Plant Gadsden
Plant ID: 04495
Diagram: WB-1
Note: All flows in MGD unless stated otherwise



Rev 8-27-2010

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GADS-API-0029

HYDROLOGIC AND HYDRAULIC CONSIDERATIONS
GADSDEN STEAM PLANT ASH POND
ALABAMA POWER COMPANY
GADSDEN, ALABAMA

This document has been prepared to support the hydrologic/hydraulic calculations for storm water management at the Gadsden Steam Plant ash pond (Calculation No. TV-GD-ECS10331-001).

The Plant Gadsden ash pond is configured with an "upper" pond that receives sluiced ash from the plant. The ash slurry is allowed to meander through this upper pond to allow deposition of a large portion of the ash within the upper pond. Ash is managed within this upper pond, and is eventually placed and compacted in a "dry stack" manner for storage.

Water from this upper pond discharges to the lower pond for additional ash deposition. The water eventually discharges from a permitted discharge structure located near the southeast corner of the lower pond. This discharge structure was constructed in about 2001, and replaced an original discharge structure of comparable design that is located on the west end of the lower pond. While this older, original discharge structure is not used for normal discharges, it remains open and serves as an "emergency spillway" for storm events that exceed the design storm of the operational discharge structure.

Calculations for the capacity of the two discharge structures cannot be located at this time. Therefore, to support the EPA ash pond inspection program, a calculation (referenced above and attached) was performed to determine the storage capacity of the lower pond. As outlined in the attached calculation, the following assumptions were made:

- All process waters transferred to the pond from the plant and all rainfall landing within the entire ash pond (from the 100-yr/24-hr event) would flow to the lower pond (i.e. no storage within the upper portion of the ash pond)
- No discharge would occur from either discharge structure

As can be seen from the calculation, the lower pond currently has sufficient freeboard to safely contain the 100-yr/24-hr event. The calculated freeboard is only 4 inches, and is not sufficient for normal operational conditions. However, as stated in the assumptions above, the calculation assumed no storage in the upper portion of the pond, and no discharge at all from the existing discharge structures. Neither of these events accurately reflects the operation of the pond.

Therefore, it has been shown that the lower pond embankments will not be overtopped by a 100-yr/24-hr storm event.

SOUTHERN COMPANY

Engineering and Construction Services Calculation

Calculation Number: TV-GD-ECS10331-001

Project/Plant: Plant Gadsden Ash Pond	**Unit(s):**	**Discipline/Area:** ES&EE
Title/Subject: Ash Pond Storm Event Hydraulic Capacity		
Purpose/Objective: Evaluate the ability of the ash pond to store water from the design storm event		
System or Equipment Tag Numbers: NA	**Originator:** Gerrad Wilson, E.I.T.	

Contents

Topic	Page	Attachments (Computer Printouts, Tech. Papers, Sketches, Correspondence)	# of Pages
Purpose of Calculation	2	A - Rainfall Frequency Atlas, page 56	1
Methodology	2	B – Topographic Map of Gadsden Ash Pond	1
Assumptions	2		
Summary of Conclusions	2		
Design Inputs/References	3		
Body of Calculation	3		
Total # of pages including cover sheet & attachments:	5		

Revision Record

Rev. No.	Description	Originator Initial / Date	Reviewer Initial / Date	Approver Initial / Date
0	Issued for Information	GWW-1/28/10	BJG-1/28/2011	JCP-2/21/2011

Notes:

Confidential Business Information

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Purpose of Calculation

Plant Gadsden is a coal-fired and natural gas steam plant that produces ash as a combustion residual. Presently, the facility sluices fly ash to the pond, dewaters the ash, and stores the ash in a stack. The pond is approximately 73.9 acres in area. The pond has an NPDES permit to discharge to the Coosa River.

The purpose of this calculation is to confirm the ability of the ash pond to contain a 100-year/24-hour storm event without overtopping the dike.

Methodology

The 100-year/24-hour design rainfall event was determined from the rainfall frequency map in *Rainfall Frequency Atlas of the United States*. The topography and layout of the ash pond was obtained from the December 2009 "Topographic Map of Gaston Ash Pond". Volumes within the pond were determined using a digital model of the mapped topography in AutoCAD Civil 3D 2010. The rainfall runoff calculations were performed using the rational method.

Criteria and Assumptions

This calculation is based upon the following assumptions:

1. All process waters from the plant enter and exit the ash pond normally.
2. All rainfall within the dike perimeter flows into the pond.
3. No infiltration occurs.
4. No evaporation occurs.
5. Rainwater does not leave the pond during the event.
6. All rainwater is conveyed to the clear pool, and the upper pond provides no storage.

For the purpose of this calculation, freeboard volume is defined at the space in the lower pond between the elevation of the normal pool and the low point of dike crest (Elev. 525).

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 lower pond has present freeboard volume of 101,370 cubic yards. The rainwater volume that accumulates during a 100-year/24-hour design rainfall event is approximately 79,490 cubic yards.

The normal pool is Elev. 523.3. After a 100-year/24-hour event, water will reach approximately Elev. 524.6. Approximately 4 inches of freeboard would remain assuming no discharge of rainwater occurs during the event. As such, rainfall from a 100-year/24-hour event should 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

Topographic Map of Gaston Ash Pond, Southern Company Services, December 2009

Body of Calculation

Present freeboard volume of ash pond, determined using a digital model of the mapped topography in AutoCAD Civil 3D 2010, is 101370 yd^3

The design 100-year/24-hour rainfall event for Etowah County, Alabama is approximately 8 inches. Over a catchment area of 73.9 acres, the runoff is:

(8 inches * 73.9 acres)/12 = 49 (acre-ft)

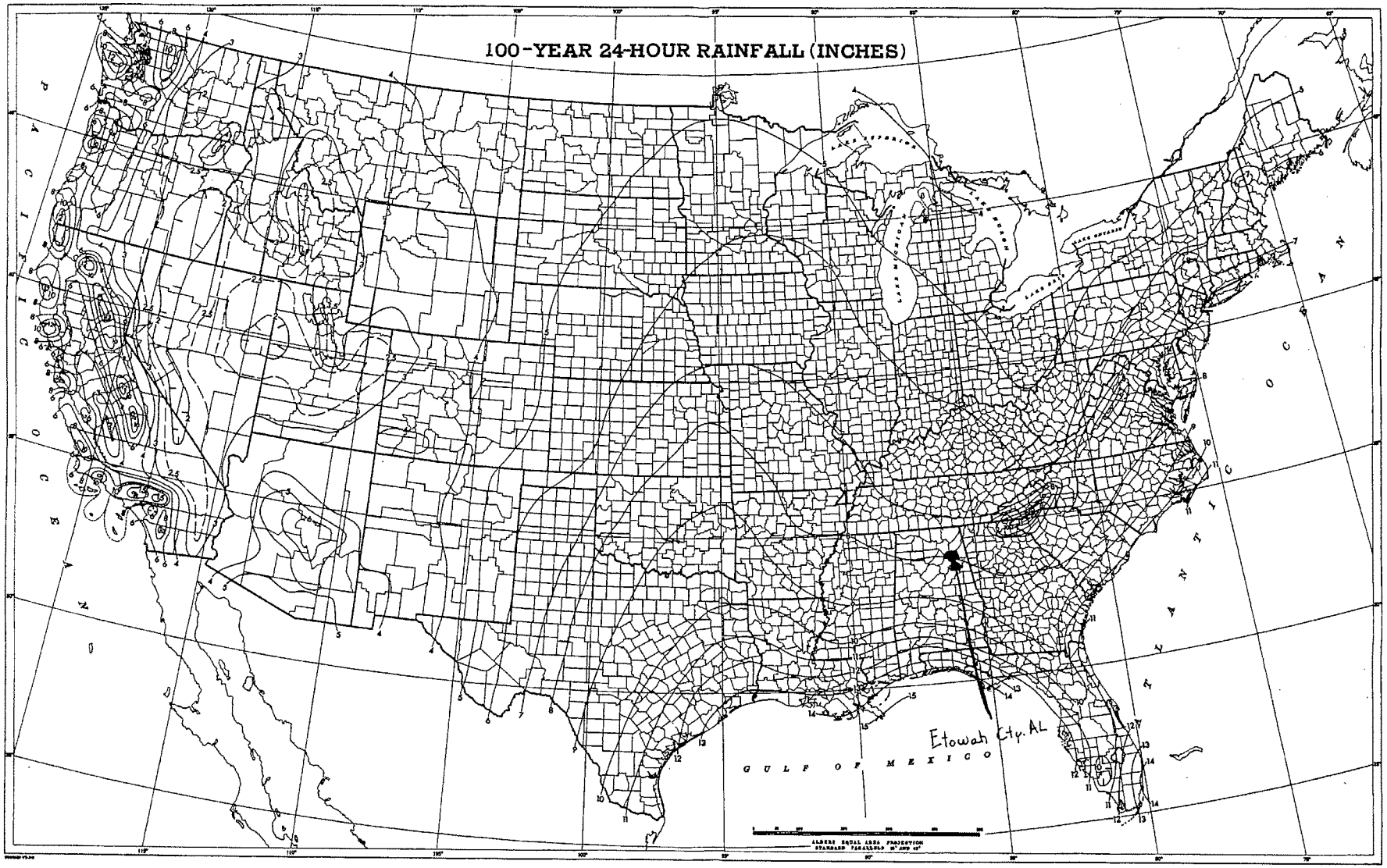
Conversion to yd^3 = (49.27*43560)/27 = <u>79490 yd^3</u>

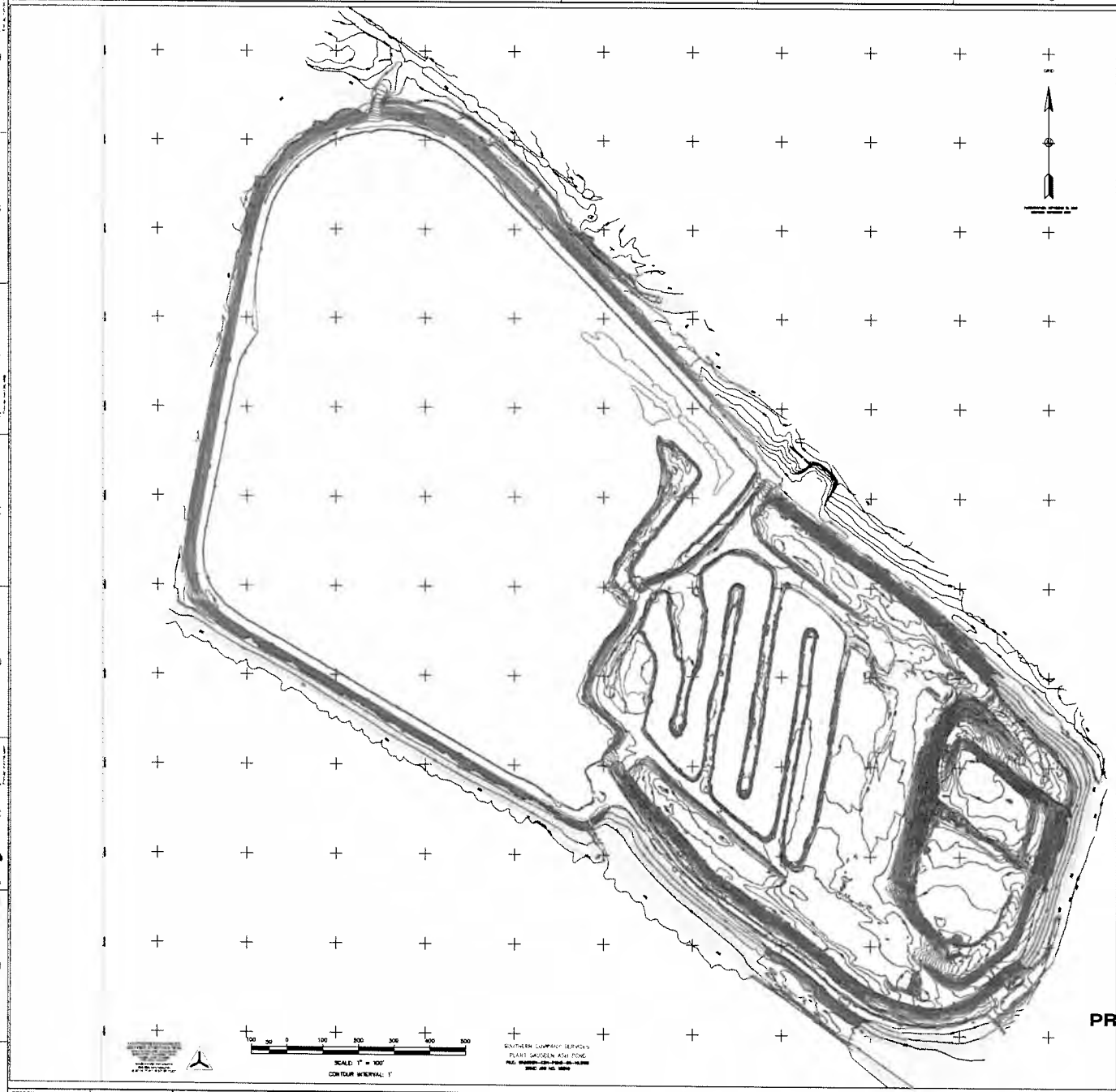
Freeboard volume remaining after the 100-year/24-hour rainfall event:

101370 yd^3 - 79490 yd^3 = <u>21880 yd^3</u>

The 49 acre-feet of storm water will fill the pond to approximately Elev. 524.6 based on the digitial topographic model. The remaining freeboard after the storm event is:

Elev. 525 – Elev. 524.6 = <u>4" of freeboard</u>





PRELIMINARY-NOT FOR CONSTRUCTION

REVISION	DATE	BY	CHK'D	CIVIL APPR	ELECT APPR	I/C APPR	MECH APPR	NUC SSC
0	10-15-10	CSM	RCB	RCB				JBS

Southern Company Generation
Engineering and Construction Services
FOR
Alabama Power Company

PLANT GADSDEN
ASH POND DRAINAGE
AND DIKE REMEDIATION

SCALE	ORIGINAL SHEET	SHEET	SHEETS	REV
AS SHOWN	CSK101510	-	-	0

ANSI D 44x34 Acad2008

Gadsden Steam Plant
Ash Pond Biennial Inspection
October 24, 2006

General

Inspection of the Gadsden Steam Plant Ash Pond was performed on October 24, 2006. The inspection team consisted of Larry Dunlap and Richard Mickwee. Robert Trimble and Harry Gaither accompanied the inspection team, and the team's findings and recommendations were discussed at that time. Weather conditions were sunny and cool on the day of the inspection.

1979 Extension

The inspection began by walking around the entire length of the extension dike. The riprap on the upstream slope (with some minor exceptions, discussed below) and the grass cover on the downstream slope appeared to be in good condition (for typical conditions, see Photos 1 and 2). There was no evidence of seepage or erosion in areas that were accessible.

A fair number of sizable ant mounds were observed along the embankment crest (Photo 3). It is recommended that these mounds be destroyed using pesticides.

The need to continue efforts to keep the area around the toe of the dike free from brush and trees was discussed. At the northwestern corner of the dike, fairly dense vegetation was observed near the embankment toe (Photo 4). It is recommended that this vegetation be removed by bush-hogging (where accessible) or spraying.

Some minor sloughing and washing of the upstream embankment, most likely due to wave action, were observed (Photos 5 and 6). It is recommended that these areas, where observed, receive some attention. It may be necessary to place additional riprap armor at these locations.

The discharge structure was observed. It appeared to be in good condition at both the release (Photo 7) and intake (Photo 8), and no unusual conditions were noted.

Aside from the minor maintenance issues discussed above, no other indications of problems or other unusual conditions were noted on the dike.

Original Dike Section

The original dike sections were also inspected over their full length and no problems were observed. The roadway on top of the dike was in good condition.

Conclusions

This report gives the inspection team's recommendations regarding a few minor conditions noted during the site visit. Otherwise, there were no conditions observed that, in the opinion of the inspection team, would affect the continued safe and reliable operation of the project.

Larry Dunlap

Richard Mickwee

Photo 1: Downstream of Western Edge of Ash Pond (View North to South)

Photo 2: Upstream of Western Edge of Ash Pond (View South to North)

Photo 3: Ant Mounds on Upstream Side of Ash Pond Embankment (typical)

Photo 4: Vegetation on Northwest Corner of Pond Embankment

Photo 5: Minor Sloughing of Upstream Bank on East Side of Pond

Photo 6: Scour Noted Near Northwestern Side of Pond

Photo 7: Pond Discharge Point to the Coosa River / Lake Henry

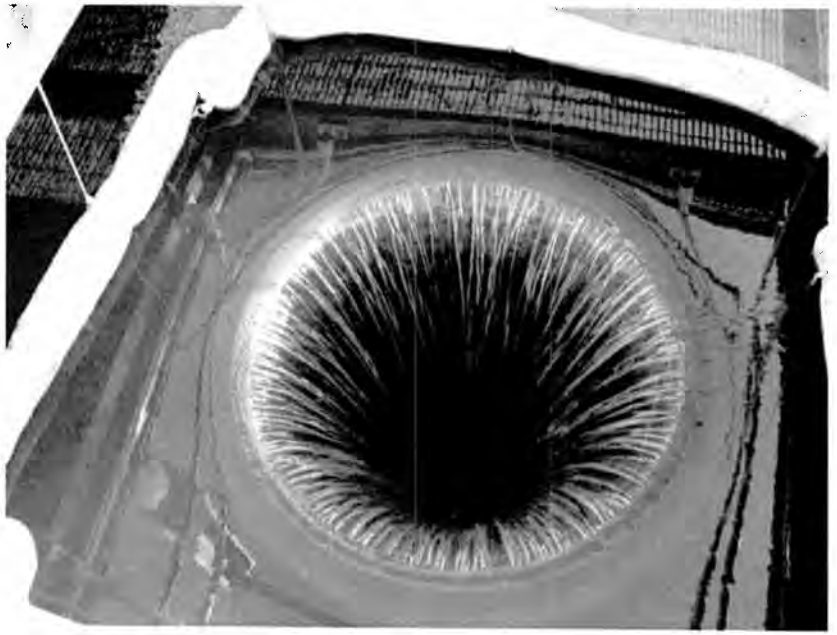


Photo 8: Discharge Pipe in Ash Pond

600 18th Street North
Birmingham, AL 35203

205/257-1000

SOUTHERN COMPANY
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April 7, 2009

Gadsden Steam Plant
Dam Safety Inspection

Mr. Wayne Edwards
Plant Manager
Gadsden Steam Plant
Alabama Power Company

Dear Mr. Edwards,

Enclosed please find the Report of Annual Dam Safety Inspection for the Gadsden Steam Plant Ash Pond Dam based on the inspection performed on November 19, 2008. The inspection team, consisting of myself and Richard Mickwee, appreciate the support provided by Mr. Gene Phifer and Ms. 'Roo' White 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 related actions to reduce the likelihood of future problems:

- Some minor sloughing and washing of the upstream embankment crest, most likely due to wave action, was observed. It is recommended that the affected portion of the embankment be protected with riprap. While this condition is not a critical need at the moment, if not remediated it could become of greater concern in the future.

- The inspection team recommended that the downstream area of the dam be cleared and maintained to a distance of at least 5 feet past the toe. Based on conversations with Ms. White since the inspection date, we understand that this clearing has already been completed.

- At the northernmost corner of the dike, fairly dense vegetation was observed on the embankment and at the toe. This vegetation should be removed by bush-hogging or spraying herbicide.

- A number of sizable ant mounds were observed along the embankment crest. The plant should continue efforts to control these with pesticides.

Details of the inspection were discussed with Ms. White at the conclusion of our 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. Henry E. Phifer
Mr. Robert E. Trimble
Ms. Rohi (Roo) White

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

GADSDEN STEAM PLANT ASH POND DAM
REPORT OF ANNUAL DAM SAFETY INSPECTION
NOVEMBER 19, 2008

GENERAL

Inspection of the Gadsden Steam Plant Ash Pond was performed on November 19, 2008. The inspection team consisted of Larry Dunlap and Richard Mickwee. Rohi "Roo" White of the plant staff accompanied the inspection team, and the team's findings and recommendations were discussed at that time. Weather conditions were sunny and cool on the day of the inspection. Recommendations are summarized on the attached Table 1, and photograph locations are illustrated on the attached Figure 1.

1979 EXTENSION

The inspection began by walking around the entire length of the extension dike. The riprap on the upstream slope (with some exceptions, discussed below) and the grass cover on the downstream slope appeared to be in good condition (for typical conditions, see Photos 1 and 2). There was no evidence of seepage in areas that were accessible, and no erosion of the downstream face of the dam was noted.

A fair number of sizable ant mounds were observed along the embankment crest (noted on Photo 3). It is recommended that efforts continue to control these mounds using pesticides.

Some minor sloughing and washing of the upstream embankment, most likely due to wave action, were observed (Photo 4). This condition is noted fairly uniformly on the entire upstream side of the dam near the waterline. As the washing currently appears to be affecting only the upper 2 to 3 feet of the embankment, repair is not a critical need but attention to this condition is recommended. Should the washing continue further into the slope crest, the upper 2 to 3 feet of embankment will need to be protected using riprap.

The riprap armoring could be performed in stages as maintenance funds become available, starting with the most severely affected portions of the dam. Considering the progress of the erosion since the 2006 inspection, it is anticipated that this issue is likely to require some degree of remediation in the future.

The need to continue efforts to keep the downstream slope and the area around the toe of the dike free from brush and trees was discussed (Photo 5). It is the recommendation of the inspection team that the downstream area of the dam be cleared and maintained to a distance of at least 5 feet past the toe. Any large trees in this area (greater than about 4 inches in diameter) could be left at this time due to the difficulties associated with their removal, but any shrubs or other small plants should be cleared. At the northernmost corner of the dike, fairly dense vegetation was observed on the embankment and at the toe (Photo 6). It is recommended that this vegetation be removed by bush-hogging (where accessible) or spraying herbicide.

The discharge structure was observed. It appeared to be in good condition at both the release (Photo 7) and intake (Photo 8), and no unusual conditions were noted.

ORIGINAL DIKE SECTION

The original dike sections were also inspected over their full length and no problems were observed. The roadway on top of the dike was in good condition.

CONCLUSIONS

This report gives the inspection team's recommendations regarding a few minor conditions noted during the site visit. Otherwise, there were no conditions observed that, in the opinion of the inspection team, would affect the continued safe and reliable operation of the facility.

Larry F. Dunlap, P.E.

Richard L. Mickwee II, P.E.

TABLE 1: RECOMMENDATIONS FROM 2008 ASH POND INSPECTION – GADSDEN STEAM PLANT

No.	Description	Location
1	Eradicate all ant mounds on the embankments using pesticides.	1979 Extension Embankment (Photo 3)
2	Armor the upstream side of the crest of the embankment structures to protect against wave action induced erosion. The armoring can be achieved using riprap.	1979 Extension Embankment (Photo 4)
3	Clear vegetation and trees to a distance of 5 feet beyond the downstream toe of water-retaining embankments. At this time, large trees (i.e. greater than 4 inches in diameter) may be left in-place.	1979 Extension Embankment (Photo 5)
4	Remove fairly dense vegetation from northernmost corner of 1979 Extension Embankment (see Photo 6). The removal should be performed by bush-hogging (where accessible) or use of herbicides.	1979 Extension Embankment (Photo 6)

Photo 1: Downstream of Southern Portion of Ash Pond (View SE to NW)

Photo 2: Upstream of Western Side of Ash Pond (View North to South)

Photo 3: Ant Mounds on Upstream Side of Ash Pond Embankment (typical)

Photo 4: Typical Sloughing on Upstream Side of Dam

2008 Gadsden SP Ash Pond Inspection Photographs

Photo 6: Dense Shrubs on Dam Toe at Northern Corner of Dam

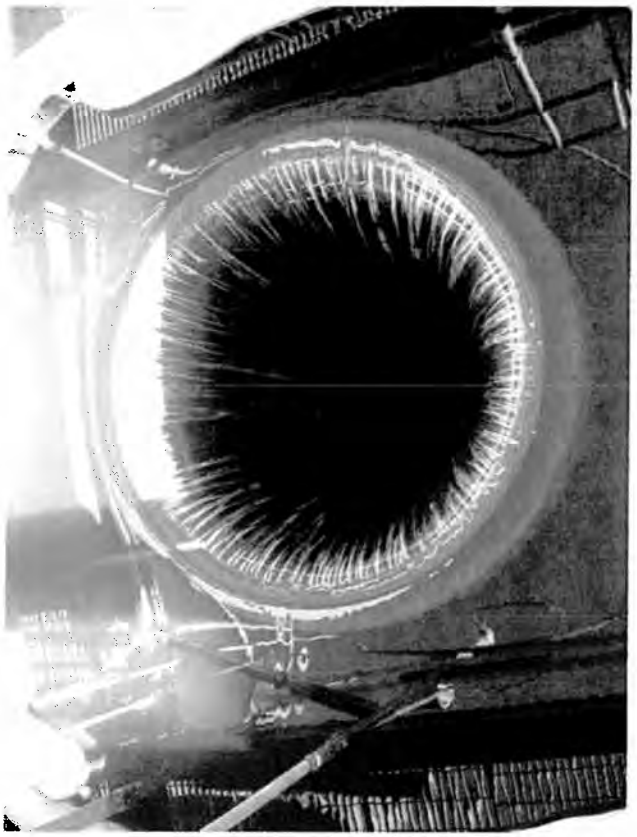

Photo 8: Discharge Pipe in Ash Pond

Photo 5: Typical Vegetation Encroachment on Downstream Toe

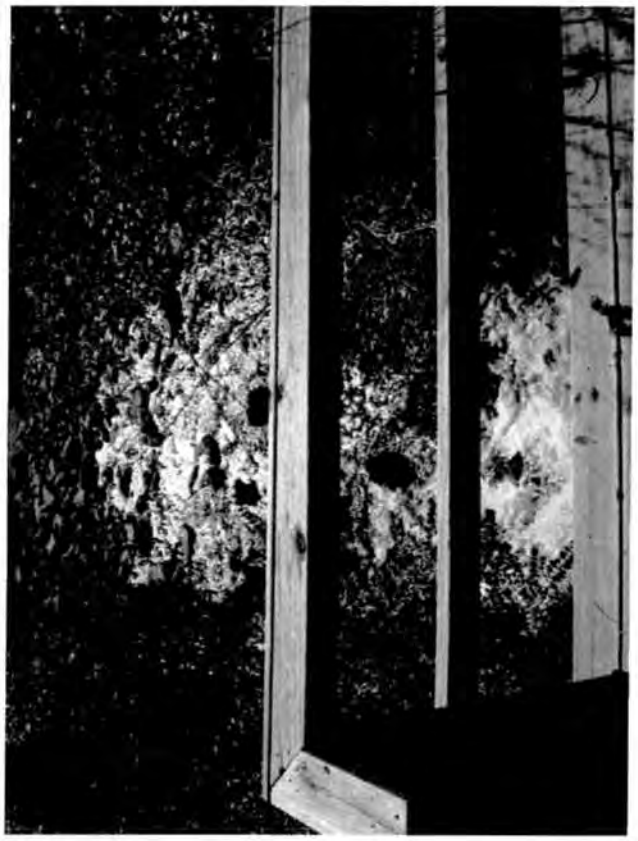

Photo 7: Pond Discharge Point to the Coosa River / Lake Henry

N

Figure 1

600 18th Street North
Birmingham, AL 35203

205/257-1000

SOUTHERN COMPANY
Energy to Serve Your World™

April 29, 2010

Gadsden Steam Plant
Dam Safety Inspection

Mr. Wayne Edwards
Plant Manager
Gadsden Steam Plant
Alabama Power Company

Dear Mr. Edwards,

Enclosed please find the Report of Annual Dam Safety Inspection for the Gadsden Steam Plant Ash Pond Dam based on the inspection performed on October 6, 2009. The inspection team, consisting of myself and Richard Mickwee, appreciate the support provided by the plant staff 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 related actions to reduce the likelihood of future problems:

- Some minor sloughing and washing of the upstream embankment crest, most likely due to wave action, was observed. It is recommended that the affected portion of the embankment be protected with riprap. While this condition is not a critical need at the moment, if not remediated it could become of greater concern in the future.

- The inspection team recommended that the downstream area of the 1979 extension dike be cleared and maintained to a distance of up to 20 feet beyond the toe to the extent allowed by the constraints of APC property ownership.

- At the northernmost corner of the dike, a portion of the embankment had been damaged by tracked equipment passing over wet surficial soils. It was recommended that this area be repaired and the weighted filter be extended to this area.

- A number of sizable ant mounds were observed along the embankment crest. The plant should continue efforts to control these with pesticides.

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Details of the inspection were discussed with the plant staff at the conclusion of our 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. Robert E. Trimble
Ms. Rohi (Roo) White

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

GADSDEN STEAM PLANT ASH POND DAM
REPORT OF ANNUAL DAM SAFETY INSPECTION
OCTOBER 6, 2009

GENERAL

Inspection of the Gadsden Steam Plant Ash Pond was performed on October 6, 2009. The inspection team consisted of Larry Dunlap and Richard Mickwee. Prior to the inspection, annual dam safety training was performed with members of the plant staff, and these staff accompanied the inspection team. The team's findings and recommendations were discussed at the conclusion of the inspection. Weather conditions were overcast and cool on the day of the inspection. Recommendations are summarized on the attached Table 1, and photograph locations are illustrated on the attached Figure 1. The sign in sheet for the annual dam safety training has been attached as Figure 2.

1979 EXTENSION

The inspection began by walking around the entire length of the extension dike. The riprap (see Photo 1) on the upstream slope (with exceptions discussed below) and the grass cover on the downstream slope appeared to be in good condition (for typical conditions, see Photos 2 and 3). There was no evidence of excessive seepage in areas that were accessible, and no erosion of the downstream face of the dam was noted.

East of the crushed rock weighted filter (on the northern portion of the extension dike) the embankment had been damaged by tracked equipment passing over wet surficial soils. A small amount of ponded water, possibly resulting from previous heavy rainfall, was observed (see Photo 4) in the exposed soil. At the time of the inspection it was recommended that this damage be repaired and, as a preventative measure, that the weighted filter be extended to this area. The weighted filter would prevent any possible future embankment material loss if excessive seepage occurred, and protect the surface from future tracked equipment traffic. The existing weighted filter (Photo 5) appeared to be performing well.

As has been noted in past inspections, a fair number of sizable ant mounds were observed along the embankment crest. It is recommended that efforts continue to control these mounds using pesticides.

Some minor sloughing and washing of the upstream embankment, most likely due to wave action, were observed on portions of the extension dike (see Photo 6). As the washing currently appears to be affecting only the upper 2 to 3 feet of the embankment, repair is not a critical need but attention to this condition is recommended. We recommend that the upper 2 to 3 feet be protected with riprap.

The need to continue efforts to keep the downstream slope and the area around the toe of the dike free from brush and trees was discussed. In response to the recommendations in the 2008 report, a considerable amount of brush and small trees had been cleared from along the toe. The effort involved in this work facilitates the inspection and is appreciated.

In accordance with the new Southern Company Dam and Dike Safety Procedure it is the recommendation of the inspection team that the downstream area of the 1979 extension dike be cleared and maintained to a distance of up to 20 feet beyond the embankment toe. However we understand that clearing to this distance is not possible along the full extent of the 1979 extension dike due to limits of APC property ownership. In those areas, primarily along the west and south sides (visible on Photo 3), clearing and maintaining to the fence line at the toe is adequate. In the 2008 inspection, the inspection team indicated that larger trees could be left in-place with the brush cleared from around them (such as shown on Photo 7), but it was discussed during the 2009 inspection that it would be a best practice to remove the larger trees from the extension dike as well.

During the inspection, evidence of small animal activity, most likely beavers, was noted (see Photo 8). At this time the animal activity does not appear to be having any negative effect on the ash pond, but this should be monitored by the plant staff during their regular inspections.

The discharge structure was observed. It appeared to be in good condition at both the release and intake and no unusual conditions were noted.

ORIGINAL DIKE SECTION

The original dike sections were also inspected by walking over their full length and no problems were observed. The roadway on top of the dike was in good condition. As can be observed in the aerial photo of Figure 1, the area within the original dike is almost completely filled in with ash and fill material. As a result, its significance as a water retaining structure is greatly diminished.

CONCLUSIONS

This report gives the inspection team's recommendations regarding a few minor conditions noted during the site visit. Otherwise, there were no conditions observed that, in the opinion of the inspection team, would affect the continued safe and reliable operation of the facility.

Larry F. Dunlap, P.E.

Richard L. Mickwee II, P.E.

TABLE 1: RECOMMENDATIONS FROM 2009 ASH POND INSPECTION – GADSDEN STEAM PLANT

No.	Description	Location
1	Treat ant mounds on the embankments using pesticides.	1979 Extension Embankment
2	Armor the upstream side of the crest of the embankment structures to protect against wave action induced erosion. The armoring can be achieved using riprap.	1979 Extension Embankment (Photo 6)
3	Clear vegetation and trees to a distance up to 20 feet (depending on available APC property) beyond the downstream toe of water-retaining embankments.	1979 Extension Embankment (Photos 3 and 7)
4	Repair portion of 1979 extension dike that was damaged by tracked equipment, and considering extending the weighted filter to this area for protective measures.	1979 Extension Embankment (Photo 4)

2009 Gadsden SP Ash Pond Inspection Photographs

Photo 1: Riprap on Upstream Portion of 1979 Extension Dam (typ.)

Photo 2: Downstream of Eastern Side of Ash Pond (Looking Southeast)

Photo 3: Downstream of Northwest Side of Ash Pond (Looking South)

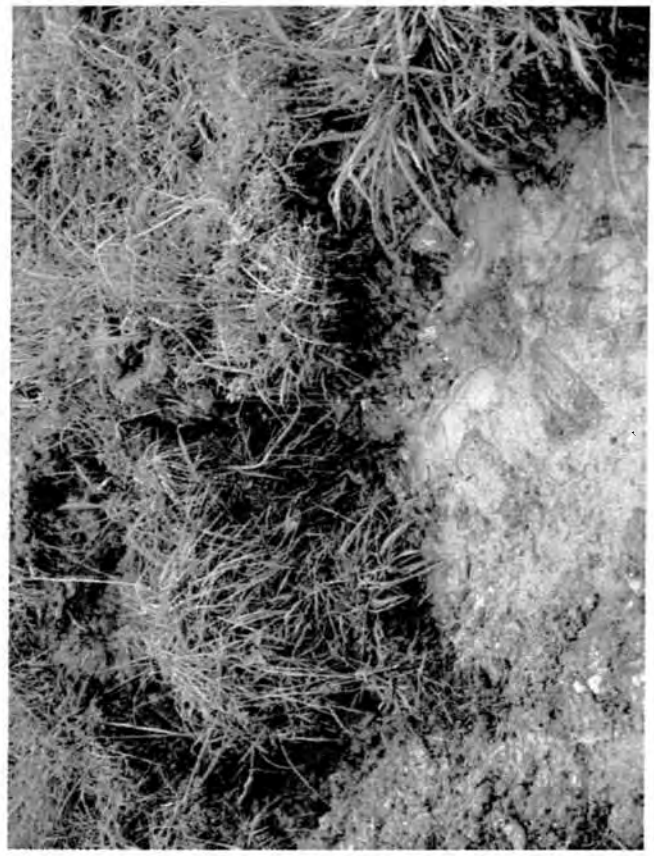

Photo 4: Damage to Embankment by Tracked Equipment

2009 Gadsden SP Ash Pond Inspection Photographs

Photo 6: Minor Erosion on Upstream Side of Embankment

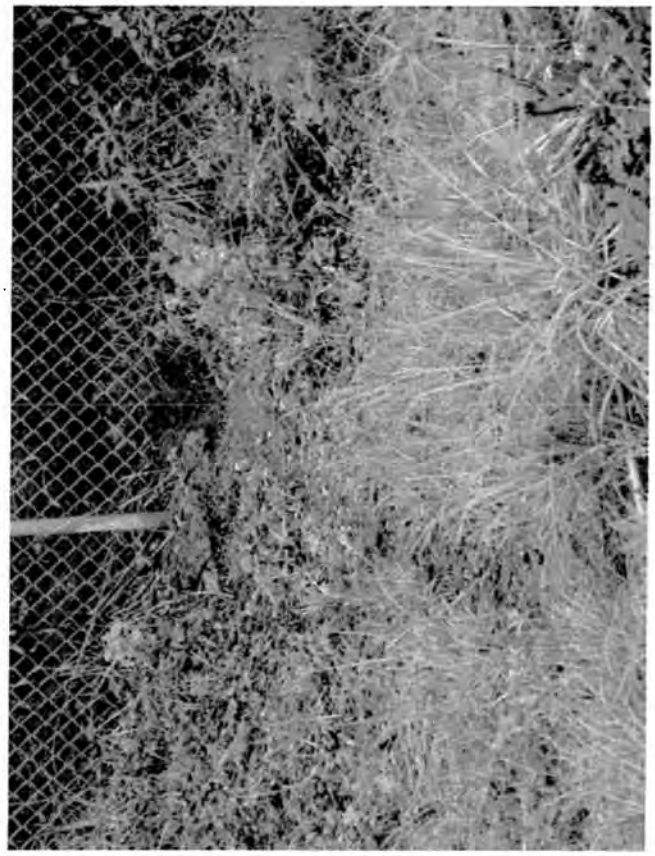

Photo 8: Evidence of Beaver Activity in the Dam Area

Photo 5: Photo of Weighted Filter on North Edge of Embankment

Photo 7: Trees along Toe of Embankment left after Brush Clearing

Figure 1

2009 DAM AND DIKE INSPECTION TRAINING

GADSDEN STEAM PLANT – OCTOBER 6, 2009

ATTENDEE	EMAIL ADDRESS	PHONE OR LINC #
1) [signature]	[illegible]@Southernco.com	282-5131 / 1*15* 18212
2) Dayton Vann	DRVANN@SOUTHERNCO.COM	282-5107
3) Bob Trimble	retrimblesouthernco.com	8-282-5134
4) Harry Gaither	hggaithe@SouthernCO.com	288-0520
5) BILLY R ZEMO	TORZEMO@SOUTHERNCO.COM	288-5108
6) Wayne Aldridge	KWAILDRE@Southernco.com	N/A
7) Roo White	rooWhite@southernco.com	19014
8)		
9)		
10)		
11)		
12)		
13)		

Figure 2

600 18th Street North
Birmingham, AL 35203

205/257-1000

SOUTHERN COMPANY
Energy to Serve Your World℠

November 2, 2010

Gadsden Steam Plant
Dam Safety Inspection

Mr. Wayne Edwards
Plant Manager
Gadsden Steam Plant
Alabama Power Company

Dear Mr. Edwards,

Enclosed please find the Report of Annual Dam Safety Inspection for the Gadsden Steam Plant Ash Pond Dam based on the inspection performed on October 13, 2010. The inspection team, consisting of myself and Richard Mickwee, appreciate the support provided by the plant staff 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 related actions to reduce the likelihood of future problems:

- The trees along the original (or upper) ash pond embankment (upstream and downstream) should be removed. The trees on the downstream face should be removed to a distance of 20 feet downstream of the toe where practical.

- Drainage in the drainage ditch along the upstream face of the original ash pond embankment should be improved. We understand that the plant is working with SCG Civil Design and SCG Earth Sciences departments to remedy this issue. As plans progress, the plant should continue to keep SCG Hydro Services informed.

- The woody debris noted beneath the transmission line should be cleared to provide an unobstructed view of the embankment downstream face.

- It is recommended that the level of maintenance observed along the 1979 Extension dike structure be continued for all ash impoundment structures at Gadsden SP.

- Stumps observed along the western edge of the 1979 Extension dike should be removed.

CONFIDENTIAL

Details of the inspection were discussed with the plant staff at the conclusion of our field visit, and summarized in an email dated October 21. 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**
Ms. Tracy L. Scully
Mr. Billy R. Zemo
Mr. Roosevelt Rush

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

GADSDEN STEAM PLANT ASH POND DAM
REPORT OF ANNUAL DAM SAFETY INSPECTION
OCTOBER 13, 2010

GENERAL

Inspection of the Gadsden Steam Plant Ash Pond was performed on October 13, 2010. The inspection team consisted of Larry Dunlap and Richard Mickwee. Prior to the inspection, a meeting was held to discuss drainage issues that the plant had been experiencing in portions on the upper (older) ash pond. This meeting included members of the plant staff, SCG Civil Design, and SCG Earth Sciences and Environmental Engineering. These staff accompanied the inspection team during a portion of the inspection of the Gadsden ash pond.

The team's findings and recommendations were discussed at the conclusion of the inspection with the plant and SCG personnel. An email summarizing the inspection team's preliminary recommendations was also forwarded to Mr. Roosevelt Rush and Mr. Billy Zemo with the plant staff. Weather conditions were clear and warm on the day of the inspection. Recommendations are provided in the text of this report in ***italics***, and also summarized on the attached Table 1. Photograph locations are illustrated on the attached Figure 1.

OBSERVATIONS AND RECOMMENDATIONS

Original Dike Section

The inspection began at the original or upper dike section. This portion of the ash pond was inspected by walking over its full length. For the most part, the upper dike appeared to be in good condition and maintained adequately. As has been observed in past inspections, trees and/or brush are present on much of the downstream face of the original dike section and some portions of the upstream face (see Photos 1, 2, and 3). Some of the trees are of significant diameter.

As can be observed in the aerial photo of Figure 1, the area within the original dike is almost completely filled in with ash and fill material. As a result, its significance as a water retaining structure is greatly diminished. Considering this, as well as the potential problems associated with the removal of trees and stumps, the Dam Safety inspection team has not previously recommended that the trees be cut. ***At this time, however, it is the opinion of the inspection team that it is prudent, and best engineering practice, for the trees to be removed.***

During removal of the trees, the plant staff (or their contractor), should take great care to minimize disturbance of the structure. Small trees can be cut flush with the embankment, but trees of larger diameter should have their stumps removed. Following the removal of the stumps (and associated rootballs), any disturbed embankment soils or holes should be repaired with structural-quality backfill that is placed in lifts and compacted properly. Any exposed embankment soil should be seeded to allow for a cover of grass. Tree stumps, branches, and trunks should be removed from the embankment area to facilitate future inspections of the dike.

The removal of the trees and brush should include the entirety of the exposed upstream face, and would optimally extend to a distance of a least 20 feet downstream of the embankment toe. We understand, however, that due to property line extents and dust suppression concerns clearing to this distance may not be uniformly achievable. In this case, it is recommended that the plant endeavor to clear to a distance such that the entirety of the downstream toe is clear of trees and can be easily inspected.

As noted above, issues with ponded water have been noted in a drainage ditch along the upstream face of the original dike section (see Photo 4). ***It is recommended that the drainage in this area be improved.*** The inspection team understands that the plant staff is working with SCG Civil Design and ES&EE staff to develop a plan to improve this problem. It seems that this condition is limited to the southern portion of the original dike. As plans to improve the drainage progress, the plant should continue to keep SCG Hydro Services informed.

During the inspection, fallen trees and brush were observed on and downstream of a portion of the dike that is beneath transmission lines (see Photo 5). ***It is recommended that the woody debris be removed so that the embankment can be observed without interference.***

1979 Extension

The 1979 Extension (or lower pond) was inspected by walking the dike's full length, starting at the discharge structure and ending at the northeast end of the lower pond. The discharge structure (see Photo 6) appeared to be in good condition at both the release and intake, and no unusual conditions were noted.

The 1979 Extension dike was found to be in excellent condition and is being well-maintained (see Photo 7). Vegetation maintenance along the dike is satisfactory. ***It is recommended that a similar level of maintenance be continued.*** The upstream face of the dam has been almost fully armored with riprap (see Photo 8), which appears to have remedied past issues with erosion of the upstream face of the crest.

During the inspection, evidence of animal trails to the pond, most likely made by beavers, was noted (see Photo 9). At this time the animal activity does not appear to be having any negative effect on the ash pond, but this should be monitored by the plant staff during their regular inspections.

On the far western edge of the lower pond, a few large stumps from past tree removal were observed in the dam toe (see Photo 10). ***While the plant staff (or their contractor) is mobilized to clear trees on the original dike section, it is recommended that these stumps be removed.*** Disturbed embankment soils and/or holes resulting from the stump removal should be treated as recommended above, and exposed embankment soils should be seeded after they are compacted.

While at the plant, the inspection team verified the type and proper storage of the plant's emergency filter stockpile materials (see Photo 11).

STATUS OF PREVIOUS RECOMMENDATIONS

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

1) Treat ant mounds on the embankments using pesticides. **Status: Completed. Large ant mounds, as have been noted in past inspections, were not noted in the 2010 inspection and it appears that the ants are being properly controlled.**

2) Armor the upstream side of the crest of the embankment structures to protect against wave action induced erosion. The armoring can be achieved using riprap. **Status: Completed. It appears that most, if not all, of the upstream face of the embankment has been riprapped, and erosion of the upstream face appears to have been remedied.**

3) Clear vegetation and trees to a distance up to 20 feet (depending on available APC property) beyond the downstream toe of water-retaining embankments. **Status: Ongoing. The 2009 inspection report did not include the clearing of the original ash dike, which is now a recommendation of this report. As noted above, the inspection team has revised this recommendation considering our understanding that the 20-foot clearing distance may not be uniformly achievable at Gadsden SP ash pond.**

4) Repair portion of 1979 extension dike that was damaged by tracked equipment, and considering extending the weighted filter to this area for protective measures. **Status: Completed. No sign of the past disturbance/damage was observed, and it appears that the weighted filter has been extended as recommended by the 2009 inspection team.**

CONCLUSIONS

This report gives the inspection team's recommendations regarding a few minor conditions noted during the site visit. Otherwise, there were no conditions observed that, in the opinion of the inspection team, would affect the continued safe and reliable operation of the facility. The inspection team would especially like to thank Mr. Roosevelt Rush and Mr. Billy Zemo for their assistance during the inspection and their continued commitment to dam safety at the Gadsden ash handling facilities.

Larry F. Dunlap, P.E.

Richard L. Mickwee II, P.E.

TABLE 1: RECOMMENDATIONS FROM 2010 ASH POND INSPECTION – GADSDEN STEAM PLANT

No.	Description	Location
1	The trees along the original ash pond embankment (upstream and downstream) should be removed. The trees on the downstream face should be removed to a distance of 20 feet downstream of the toe where practical.	Original Dike (see Photos 1, 2, and 3)
2	Drainage in the drainage ditch along the upstream face of the original ash pond embankment should be improved. As plans progress, the plant should continue to keep SCG Hydro Services informed.	Original Dike (see Photo 4)
3	The woody debris noted beneath the transmission line should be cleared to provide an unobstructed view of the embankment downstream face.	Original Dike (see Photo 5)
4	It is recommended that the level of maintenance observed along the 1979 Extension dike structure be continued for all ash handling structures at Gadsden SP.	All Structures
5	Stumps observed along the western edge of the 1979 Extension dike should be removed.	1979 Extension Dike (see Photo 9)

Photo 1 – Trees on Downstream Face of Original Dike, Typical

Photo 2 – Brush on Upstream Face of Original Dike, Typical

Photo 3 – Large Tree on Upstream Face of Original Dike

Photo 4 – Drainage Ditch Along Upstream Face of Original Dike

Photo 5 – Woody Debris Beneath Transmission Lines, Original Dike

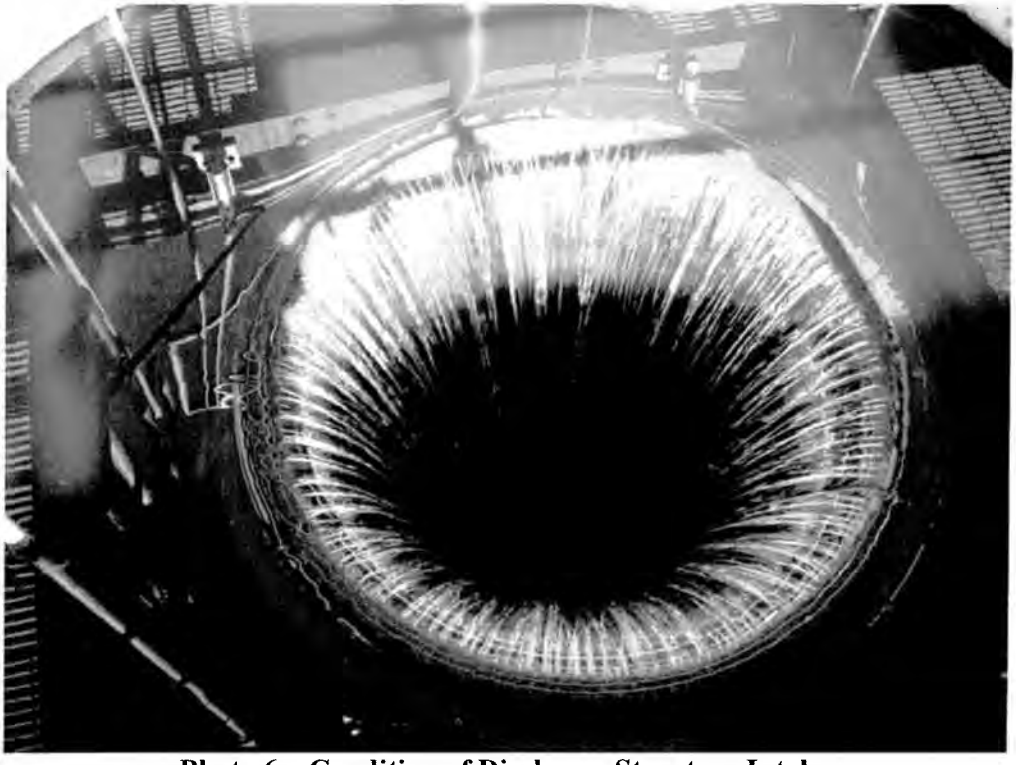

Photo 6 – Condition of Discharge Structure Intake

Photo 7 – Condition of Downstream Face of 1979 Extension Embankment, Typical

Photo 8 – Riprap Armoring on Upstream Face of 1979 Extension Embankment

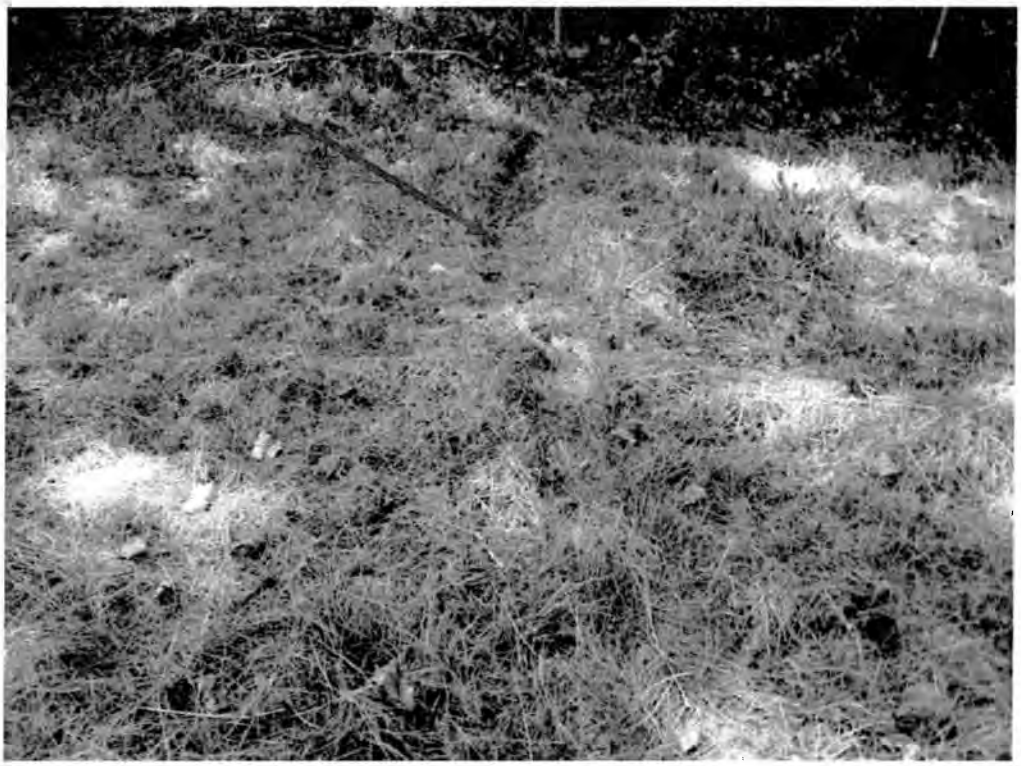

Photo 9 – Beaver Activity (Trail) at 1979 Extension Embankment

Photo 10 – Stump Along West End of 1979 Extension Embankment, Typical

Photo 11 – Condition of Emergency Filter Stockpiles

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Figure 1

Intracompany Correspondence

SOUTHERN COMPANY
Energy to Serve Your World®

Date: January 6, 2011

To: Tracey Scully

From: Gerrad Wilson and Jim Pegues

Subject: Geotechnical Studies and Stability Analyses
Plant Gadsden Ash Pond Perimeter Dike Assessment

The Earth Science & Environmental Engineering Department (ES&EE) of Southern Company Generation Technical Services has prepared this report of geotechnical findings and analyses for the assessment of the existing ash pond dike at Gadsden Steam Plant, located in Gadsden, Alabama. This summary details the geotechnical exploration and findings, laboratory test results and stability analysis results.

In summary, our study and analyses did not find indications of stability issues related to the perimeter embankments at the Plant Gadsden ash facility.

Field Investigation Results

Borings were performed by the Southern Company Civil Field Services (CFS) Drilling Department in late October and early November of 2010.

The general subsurface conditions were explored by drilling twelve soil test borings, designated B-1 through B-12, on the crest of the upper and lower dike. Borings were extended to depths of 41 to 61 feet below ground surface at the approximate locations shown on the attached sketch. Boreholes were grouted after all drilling was completed and groundwater levels were obtained.

In some instances, relatively intact Shelby tube samples were collected during drilling immediately after selected split-spoon samples were taken. Selected Shelby tube samples were later utilized for the lab testing portion of this assessment.

The soils were visually classified by a geotechnical engineer. The geotechnical engineer attempted to note the interface between fill materials used to construct the embankments and the natural, or residual, soils. However, it should be noted that since native soils were used to construct the embankments, it is sometimes difficult to distinguish between fill materials and residual soils and the noted depth of interface should be considered approximate.

Discussion of the findings of the borings is presented in the following paragraphs for the three general embankment portions.

Upper Dike

Borings B8 through B12 were drilled in the upper dike to depths of 41 to 51 feet below ground surface. In each boring, the depth of embankment fill ranged from 2 feet to 10 feet below the surface.

Borings B8 and B9 were drilled along the northern embankment of the upper dike. Very little fill material was present within B8. The crest of the dike was approximately 2 feet above the surrounding ground surface. Red micaceous sandy clay, visually classified CL, was encountered to a depth of 14.5 feet below ground surface. Standard penetration test (SPT) N-values, were found to be 11 blows per foot (bpf), indicating a stiff material. A Shelby tube was attempted at 7 feet below ground surface, but would not advance. Below the clay, a brown clayey gravel was encountered, extending from 14.5 feet to 34.5 feet below ground surface. This material was visually classified as a GC. SPT N-values ranged from 18 to 50 bpf, increasing with depth, indicating a medium dense to very dense material. Following the gravel, a gray weathered shale, visually classified CL, was encountered to the boring terminated depth of 51 feet.

Materials encountered in B9 were very similar in visual characteristic to B8, but with lower plasticity in the upper 14.5 feet. This material was visually classified as brown silt (ML).

Borings B10, B11, and B12 were drilled along the southern embankment of the upper dike. The subsurface conditions were relatively consistent in these three borings. Fill material extended approximately 10 feet below ground surface and visually classified as a stiff, brown micaceous silt (ML). Below the fill, residual soils similar in visual characteristic to the fill soils were present and extended to depths ranging from 35 to 40 feet below ground surface. SPT N-values decreased with depth, indicating stiff to very soft consistency soils. Below the silt, a gray weathered shale, was encountered to depths ranging from 41 to 51 feet below ground surface. SPT N-Values were over 50 bpf.

Lower Dike

Borings B1 through B7 were drilled in the lower dike to depths ranging from 41 to 61 feet below ground surface. In each boring, the depth of embankment fill was judged to extend 10 to 15 feet below the crest's ground surface.

In borings B1 and B4 through B7, fill depths ranged from 10 to 15 feet below the ground surface and was visually classified as silt (ML). SPT N-values ranged from 2 bpf to 18 bpf and generally decreased with depth. One undisturbed sample was advanced in this material. Below the fill, the boring encountered brown micaceous clayey sand (SC). SPT N-values ranged from 0 to 13 bpf and generally decreased with depth. Please note the brown micaceous clayey sand layer was not encountered in B7. Below the sand, brown sandy gravel (GC) was encountered. SPT N-values ranged from 0 to 50 bpf and generally increased with depth. Weathered shale, sampled as a clay (CL) was present below the gravel and extended to the terminated depth of the borings. SPT N-values were greater than 50 bpf in the weathered shale.

The subsurface conditions in borings B2 and B3 were similar to boring B1 with the exception that there was no gravel layer between the clay and weathered shale.

Water Levels

Water levels were measured after the completion of the drilling and, in most instances, several days after the completion of drilling. Water levels in the embankment are expected to be directly impacted by water levels in the ash pond or in the adjoining river.

Measured water levels, and their corresponding elevations, are summarized in Table 1.

Table 1
Groundwater Depths

Boring Number	Water level elevation (ft)	Delayed time (hrs)
B1	511.6	120
B2	506.6	120
B3	512.3	144
B4	509.6	144
B5	512	144
B6	511.1	168
B7	511.3	168
B8	513.8	168
B9	509	96
B10	511	24
B11	509.1	24
B12	508	24

Laboratory Testing Results

Ten Shelby tube samples were obtained during drilling. The tubes were waxed sealed on both ends and securely stored in a controlled temperature environment prior to extrusion.

Shelby tubes from borings B1 and B2 contained samples that were judged suitable and representative for strength testing. These samples were tested using the consolidated undrained (CU) triaxial shear strength testing procedure, ASTM D 4767. The laboratory testing results can be found in the appendix of this report. The strength properties determined from the laboratory testing (see Table 2) were used in the stability analyses discussed in the next section.

Table 2
Shelby Tube Sample Descriptions

Boring	Depth (ft)	Comments
B1	12-14	Classified as an ML. CU testing was preformed on this sample. Parameters used in SSA: C = 576 psf, Φ = 29°, C' = 0, Φ' = 36°
B2	5-7	Classified as an MH. CU testing was preformed on this sample. Parameters used in SSA: C = 562 psf, Φ = 19°, C' = 28.8 psf, Φ' = 29

Stability Analyses

The stability analysis cross-sections that were analyzed were selected based on what are considered the critical (and representative) sections of both the upper and lower ash pond perimeter dikes. For the lower dike, stability analyses focused on the west embankment cross-section A), and the south embankment (cross-section C). For the upper perimeter dike, a single cross-section through the west embankment (cross-section D) was evaluated. The cross-sections used were developed from the September 2010 aerial topographic survey performed by Southern Company's Civil Field Services Surveying Department. A map of each cross section can be found on the attached sketch.

Laboratory testing was limited to samples of embankment fill material at boring B1 and B2. It is assumed that the embankment fill properties are consistent across the embankments. Laboratory testing was not performed on the dry-stacked ash within the upper pond. Strength parameters used in the stability analyses for this material were based on prior experience with other ash stacks within the Southern Company system.

Stability analyses were performed on each cross-section for normal pool (steady state) conditions, full pool conditions, seismic loading, and rapid drawdown (lower pond only). Furthermore, only downstream analyses were performed on the upper embankments due to the presence of ash against the upstream slopes.

Table 3 summarizes the minimum factors of safety obtained for each model at each cross-section.

Table 3
Summary of Minimum Slope Stability Factors of Safety
(Using original laboratory test strength data)

Cross Section	Factor of Safety					
	Downstream		Upstream		Rapid Drawdown (Upstream)	High Water Level (Downstream)
	Steady State	Seismic	Steady State	Seismic		
A	3.4	2	2.6	1.3	2.1	2.6
C	4.8	2.3	7.1	2.1	3.9	4
D	3.3	1.7	N/A	N/A	N/A	N/A

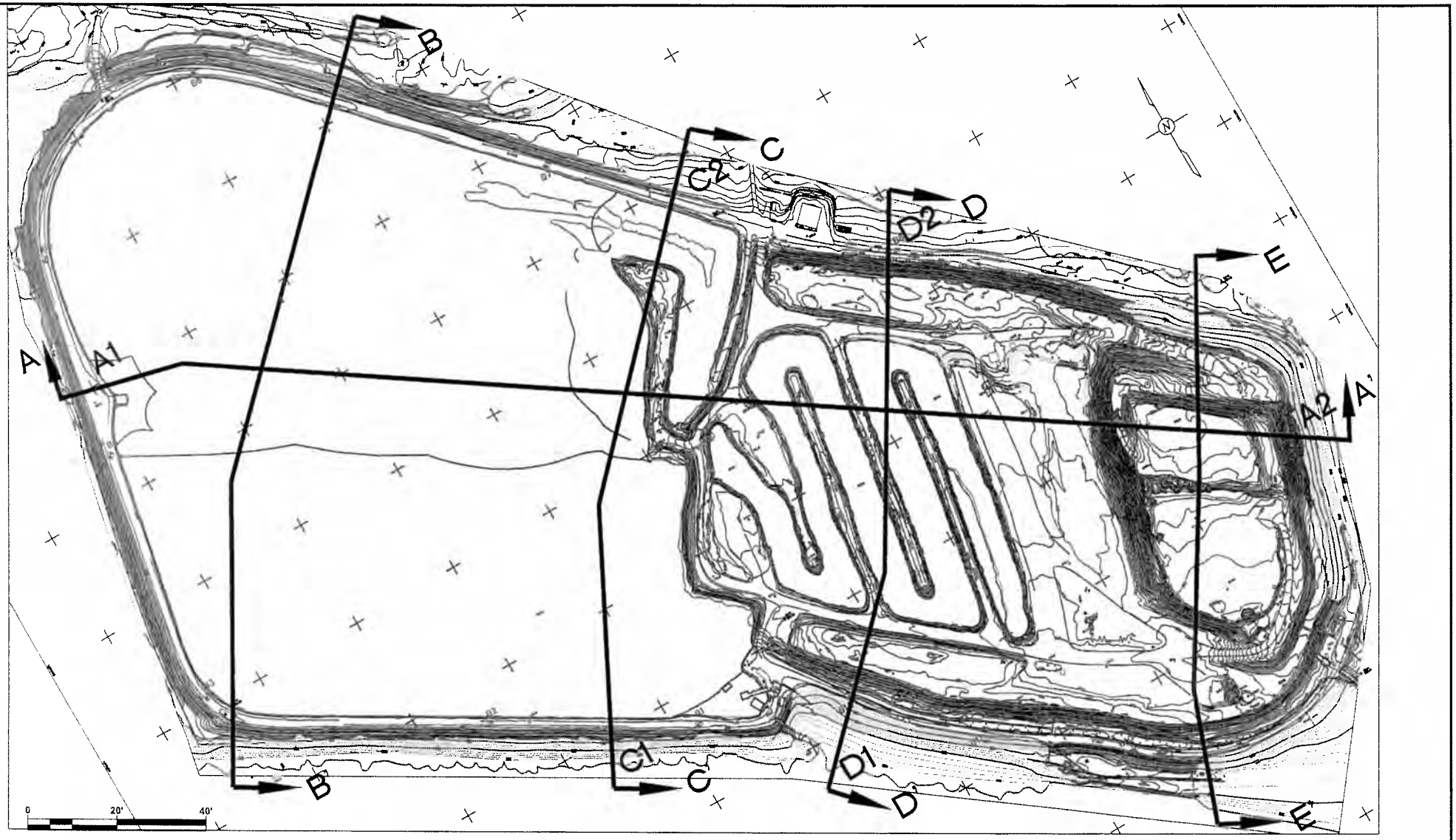
Summary

The Earth Science & Environmental Engineering Department of Southern Company Technical Services was asked to perform an assessment of the perimeter dikes at Alabama Power Company's Plant Gadsden ash storage facility. Twelve borings were drilled in October and November of 2010 and at the time of the borings, relatively intact Shelby tube samples were collected and selected tubes were submitted for laboratory testing.

Using the geotechnical information obtained from the borings and the laboratory testing on the Shelby tube samples, stability analyses were performed by ES&EE. The analyses indicate the minimum factors of safety against sliding of the perimeter embankments meet or exceed the minimum factors of safety considered acceptable by the industry. No issues or problems associated with the perimeter dikes were identified during our site visits, by the findings of our field exploration or the results of our stability analyses.

We recognize that minor modifications to the upper pond embankment were made after the drilling was performed. These modifications primarily included a slight crest raise and improvements to the drainage ditch which runs along and adjacent to the interior slope. While these modifications are not reflected in these analyses, we do not believe they will adversely impact our findings.

If you have any questions or need additional information, please do not hesitate to contact either Gerrad Wilson or Jim Pegues.



Southern Company Generation **Engineering and Construction Services**		**Plant Gadsden** Ash Pond Drawing and Dike Remediation	Alabama Power Company			
			SCALE	DRAWING NUMBER	SHEET	CONT'D	REV
			SHOWN	**GASGPOND**	1	FINAL	0

ANSI D 17x11 CAD

CONFIDENTIAL

BORING B1
PAGE 1 OF 2
ECS10331

SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Gadsden Ash Pond Inspection
LOCATION Plant Gadsden

DATE STARTED 10/27/2010 **COMPLETED** 10/27/2010 **SURF. ELEV.** 525.0 **COORDINATES:** Lat. N34.017675 Long. W-85.974272
CONTRACTOR SCS Field Services **EQUIPMENT** CME-550 **METHOD** Mud Rotary
DRILLED BY T. Milam **LOGGED BY** G. Wilson **CHECKED BY** _____ **ANGLE** _____ **BEARING** _____
BORING DEPTH 61 ft. **GROUND WATER DEPTH: DURING** _____ **COMP.** _____ **DELAYED** 13.4 ft. after 120 hrs.
NOTES Heavy rains on 10-25. Ground surface elevations are approximate.

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		- Brown SILT, moist, stiff. (ML)						
5				SS -1	4.5-6.0	5-5-7 (12)	100	
10		- Soft		SS -2	9.5-11.0	3-1-3 (4)	100	
				UD -3	12.0-14.0		100	UD taken.
15		- Brown micaceous clayey SAND, moist, loose. (SC)	510.5	SS -4	14.5-16.0	3-4-4 (8)	100	
20		- Very loose		SS -5	19.5-21.0	WH-2-2 (4)	100	
25		- Fine sand particles		SS -6	24.5-26.0	2-2-3 (5)	100	
30		- Gray micaceous SILT, moist, very soft. (MH)	495.5	SS -7	29.5-31.0	WH-WH-WH (0)	100	
				UD -8	32.0-34.0		100	UD taken.
35		- Medium stiff		SS -9	34.5-36.0	WH-1-2 (3)	100	
40			485.5					

(Continued Next Page)

SOUTHERN COMPANY

LOG OF TEST BORING

BORING B1
PAGE 2 OF 2
ECS10331

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Gadsden Ash Pond Inspection
LOCATION Plant Gadsden

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		- Gray weathered SHALE, moist, very stiff. (CL) *(con't)*		SS -10	39.5-41.0	7-12-12 (24)	100 100	
45		- Hard		SS -11	44.5-46.0	13-50 (50)	56	
50				SS -12	49.5-51.0	21-50 (50)	44	
55				SS -13	54.5-56.0	50 (0)	27	
60			464.0	SS -14	59.5-61.0	50 (0)	20	
		Bottom of borehole at 61.0 feet.						
65								
70								
75								
80								
85								

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SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Gadsden Ash Pond Inspection
LOCATION Plant Gadsden

DATE STARTED 10/27/2010 **COMPLETED** 10/27/2010 **SURF. ELEV.** 525.0 **COORDINATES:** Lat. N34.018353 Long. W-85.975728
CONTRACTOR SCS Field Services **EQUIPMENT** CME-550 **METHOD** Mud Rotary
DRILLED BY T. Milam **LOGGED BY** G. Wilson **CHECKED BY** _____ **ANGLE** _____ **BEARING** _____
BORING DEPTH 61 ft. **GROUND WATER DEPTH: DURING** _____ **COMP.** _____ **DELAYED** 18.4 ft. after 120 hrs.
NOTES Heavy rains on 10-25. Ground surface elevations are approximate.

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		- Brown SILT, moist, soft. (MH)						
5				UD -1	5.0-7.0		100	UD taken.
10				SS -2	9.5-11.0	2-2-2 (4)	100	
15		- Medium stiff		SS -3	14.5-16.0	2-4-5 (9)	100	Mica in Sample.
20		- Soft		SS -4	19.5-21.0	2-2-3 (5)	100	
25				UD -5	22.0-24.0		100	UD taken.
				SS -6	24.5-26.0	3-2-2 (4)	100	
30				SS -7	29.5-31.0	1-2-2 (4)	100	
35		- Medium stiff		SS -8	34.5-36.0	3-3-3 (6)	100	Sandy CLAY.
40			485.5					

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SOUTHERN COMPANY

LOG OF TEST BORING

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SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Gadsden Ash Pond Inspection
LOCATION Plant Gadsden

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		- Gray weathered SHALE, moist, hard. (CL) *(con't)*		SS -9	39.5-41.0	9-50 (50)	56 56	
45				SS -10	44.5-46.0	8-50 (50)	56	
50				SS -11	49.5-51.0	50 (0)	22	
55				SS -12	54.5-56.0	14-50 (50)	50	
60			464.0	SS -13	59.5-61.0	50 (0)	22	
65		Bottom of borehole at 61.0 feet.						
70								
75								
80								
85								

GEOTECH ENGINEERING LOGS - ESEE DATABASE.GDT - 12/16/10 16:06 - T:\ESEE MAJOR PROJECTS\PROJECTS\GADSDEN\GADSDEN 2010\ASH POND INSPECTION\BORINGS\GADSDEN ASH POND INSPECTION 11-4-10.GPJ

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SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Gadsden Ash Pond Inspection
LOCATION Plant Gadsden

DATE STARTED 10/26/2010 **COMPLETED** 10/26/2010 **SURF. ELEV.** 525.0 **COORDINATES:** Lat. N34.019311 Long. W-85.977322
CONTRACTOR SCS Field Services **EQUIPMENT** CME-550 **METHOD** Mud Rotary
DRILLED BY T. Milam **LOGGED BY** G. Wilson **CHECKED BY** _____ **ANGLE** _____ **BEARING** _____
BORING DEPTH 56 ft. **GROUND WATER DEPTH: DURING** _____ **COMP.** _____ **DELAYED** 12.7 ft. after 144 hrs.
NOTES Heavy rains on 10-25. Ground surface elevations are approximate.

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		- Brown micaceous SILT, moist, medium stiff. (ML)						
5				SS -1	4.5-6.0	3-4-5 (9)	100	
				UD -2	7.0-9.0		100	UD taken.
10				SS -3	9.5-11.0	3-4-6 (10)	100	
		▼						
15		- Soft		SS -4	14.5-16.0	2-2-3 (5)	100	
20		- Medium stiff		SS -5	19.5-21.0	3-3-4 (7)	100	
25		- Stiff		SS -6	24.5-26.0	5-5-6 (11)	100	
30		- Medium stiff		SS -7	29.5-31.0	4-5-5 (10)	100	
35		- Stiff		SS -8	34.5-36.0	3-5-8 (13)	100	River gravel in sample.
			485.5					
40								

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SOUTHERN COMPANY

LOG OF TEST BORING

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SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Gadsden Ash Pond Inspection
LOCATION Plant Gadsden

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		- Gray weathered SHALE, moist, hard. (CL) *(con't)*		SS -9	39.5-41.0	15-50 (50)	53 53	
45				SS -10	44.5-46.0	18-50 (50)	47	
50				SS -11	49.5-51.0	50 (0)	20	
55			469.0	SS -12	54.5-56.0	50 (0)	13	
		Bottom of borehole at 56.0 feet.						
60								
65								
70								
75								
80								
85								

GEOTECH ENGINEERING LOGS - ESEE DATABASE.GDT - 12/16/10 16:06 - T:\ESEE MAJOR PROJECTS\PROJECTS\GADSDEN\GADSDEN 2010\ASH POND INSPECTION\BORINGS\GADSDEN ASH POND INSPECTION 11-4-10.GPJ

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SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Gadsden Ash Pond Inspection
LOCATION Plant Gadsden

DATE STARTED 10/26/2010 **COMPLETED** 10/26/2010 **SURF. ELEV.** 525.0 **COORDINATES:** Lat. N34.020917 Long. W-85.977042
CONTRACTOR SCS Field Services **EQUIPMENT** CME-550 **METHOD** Mud Rotary
DRILLED BY T. Milam **LOGGED BY** G. Wilson **CHECKED BY** _____ **ANGLE** _____ **BEARING** _____
BORING DEPTH 51 ft. **GROUND WATER DEPTH: DURING** _____ **COMP.** _____ **DELAYED** 15.4 ft. after 144 hrs.
NOTES Heavy rains on 10-25. Ground surface elevations are approximate.

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		- Brown SILT, moist, medium stiff. (ML)						
5				SS -1	4.5-6.0	2-3-4 (7)		
			515.5					
10		- Brown micaceous clayey SAND, moist, medium dense. (SC)		SS -2	9.5-11.0	3-7-6 (13)		
				UD -3	12.0-14.0			UD taken.
			510.5					
15		▼ - Brown micaceous fine sandy SILT, moist, soft. (ML)		SS -4	14.5-16.0	3-2-2 (4)		
20				SS -5	19.5-21.0	WH-2-3 (5)		
				UD -6	22.0-24.0			UD taken.
25		- Stiff		SS -7	24.5-26.0	3-6-7 (13)		
30		- Medium stiff		SS -8	29.5-31.0	4-4-6 (10)		
			490.5					
35		- Brown clayey river GRAVEL, moist, medium dense. (GC)		SS -9	34.5-36.0	4-6-7 (13)		Small % of clay fines.
40								

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SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Gadsden Ash Pond Inspection
LOCATION Plant Gadsden

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		(con't)		SS -10	39.5-41.0	8-7-7 (14)		
45		- Very dense		SS -11	44.5-46.0	24-50 (50)	53	Larger % of clay fines.
50			475.5					
		- Gray weathered SHALE, moist, hard. (CL)	474.0	SS -12	49.5-51.0	50 (0)	20	
		Bottom of borehole at 51.0 feet.						
55								
60								
65								
70								
75								
80								
85								

GEOTECH ENGINEERING LOGS - ESEE DATABASE.GDT - 12/16/10 16:06 - T:\ESEE MAJOR PROJECTS\PROJECTS\GADSDEN\GADSDEN 2010\ASH POND INSPECTION\BORINGS\GADSDEN ASH POND INSPECTION 11-4-10.GPJ

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SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Gadsden Ash Pond Inspection
LOCATION Plant Gadsden

DATE STARTED 10/26/2010 **COMPLETED** 10/26/2010 **SURF. ELEV.** 525.0 **COORDINATES:** Lat. N34.022114 Long. W-85.976758
CONTRACTOR SCS Field Services **EQUIPMENT** CME-550 **METHOD** Mud Rotary
DRILLED BY T. Milam **LOGGED BY** G. Wilson **CHECKED BY** _____ **ANGLE** _____ **BEARING** _____
BORING DEPTH 47.5 ft. **GROUND WATER DEPTH: DURING** _____ **COMP.** _____ **DELAYED** 13 ft. after 144 hrs.
NOTES Heavy rains on 10-25. Ground surface elevations are approximate.

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		- Brown micaceous fine sandy SILT, moist, stiff. (ML)						
5				SS -1	4.5-6.0	5-6-8 (14)	100	
10		- Medium stiff		SS -2	9.5-11.0	4-4-6 (10)	100	
			510.5					
15		- Brown micaceous clayey SAND, moist, medium dense. (SC)		SS -3	14.5-16.0	4-6-5 (11)	100	
20		- Loose		SS -4	19.5-21.0	3-4-4 (8)	100	
				UD -5	22.0-24.0		100	UD taken.
25				UD -6	24.0-26.0		100	UD taken.
			498.5					
		- Gray micaceous SILT, moist, loose. (MH)		SS -7	26.5-28.0	2-4-4 (8)	100	
30				UD -8	28.0-30.0			UD taken.
			495.0					
		- Brown well graded river GRAVEL, moist, very dense. (GC)		SS -9	30.0-31.5	50 (0)	20	
35		- Medium dense		SS -10	34.5-36.0	11-12-6 (18)	100	
			485.5					
40								Sheets of mica in sample.

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SOUTHERN COMPANY

LOG OF TEST BORING

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SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Gadsden Ash Pond Inspection
LOCATION Plant Gadsden

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		- Gray weathered SHALE, moist, hard. (CL) *(con't)*		SS -11	39.5-41.0	14-50 (50)	40 40	
45				SS -12	44.5-46.0	50 (0)	13	
			477.5					
		Bottom of borehole at 47.5 feet.						
50								
55								
60								
65								
70								
75								
80								
85								

GEOTECH ENGINEERING LOGS - ESEE DATABASE.GDT - 12/16/10 16:06 - T:\ESEE MAJOR PROJECTS\PROJECTS\GADSDEN\GADSDEN 2010\ASH POND INSPECTION\BORINGS\GADSDEN ASH POND INSPECTION 11-4-10.GPJ

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SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Gadsden Ash Pond Inspection
LOCATION Plant Gadsden

DATE STARTED 10/25/2010 **COMPLETED** 10/25/2010 **SURF. ELEV.** 525.0 **COORDINATES:** Lat. N34.022681 Long. W-85.975042
CONTRACTOR SCS Field Services **EQUIPMENT** CME-550 **METHOD** Mud Rotary
DRILLED BY T. Milam **LOGGED BY** G. Wilson **CHECKED BY** _____ **ANGLE** _____ **BEARING** _____
BORING DEPTH 51 ft. **GROUND WATER DEPTH: DURING** _____ **COMP.** _____ **DELAYED** 13.9 ft. after 168 hrs.
NOTES Heavy rains on 10-25. Ground surface elevations are approximate.

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		- Brown SILT, moist, stiff. (ML)						
5				SS -1	4.5-6.0	4-7-6 (13)	100	
10		- Very stiff		SS -2	9.5-11.0	3-7-11 (18)	100	
		▼	510.5					
15		- Brown micaceous clayey SAND, moist, medium dense. (SC)		SS -3	14.5-16.0	3-4-7 (11)	100	
20		- Very loose		SS -4	19.5-21.0	WH-WH-WH (0)	100	Attempted to take UD at 21', UD would not advance.
			500.5					
25		- Brown river GRAVEL, moist, dense. (GC)		SS -5	24.5-26.0	8-14-17 (31)	100	
			495.5					
30		- Gray weathered SHALE, moist, hard. (CL)		SS -6	29.5-31.0	10-17-22 (39)	100	
35				SS -7	34.5-36.0	17-50 (50)	53	
40								

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SOUTHERN COMPANY

LOG OF TEST BORING

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SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Gadsden Ash Pond Inspection
LOCATION Plant Gadsden

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		(con't)		SS -8	39.5-41.0	50 (0)	20 20	
45				SS -9	44.5-46.0	50 (0)	20	
50				SS -10	49.5-51.0	50 (0)	20	
			474.0					
		Bottom of borehole at 51.0 feet.						
55								
60								
65								
70								
75								
80								
85								

GEOTECH ENGINEERING LOGS - ESEE DATABASE.GDT - 12/16/10 16:06 - T:\ESEE MAJOR PROJECTS\PROJECTS\GADSDEN\GADSDEN 2010\ASH POND INSPECTION\BORINGS\GADSDEN ASH POND INSPECTION 11-4-10.GPJ

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SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Gadsden Ash Pond Inspection
LOCATION Plant Gadsden

DATE STARTED 10/25/2010 **COMPLETED** 10/25/2010 **SURF. ELEV.** 525.0 **COORDINATES:** Lat. N34.021011 Long. W-85.973044
CONTRACTOR SCS Field Services **EQUIPMENT** CME-550 **METHOD** Mud Rotary
DRILLED BY T. Milam **LOGGED BY** G. Wilson **CHECKED BY** _____ **ANGLE** _____ **BEARING** _____
BORING DEPTH 51 ft. **GROUND WATER DEPTH: DURING** _____ **COMP.** _____ **DELAYED** 13.7 ft. after 168 hrs.
NOTES Heavy rains on 10-25. Ground surface elevations are approximate.

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		- Brown SILT, moist, stiff. (ML)						
5				SS -1	4.5-6.0	4-7-8 (15)	100	
10		- Medium stiff		SS -2	9.5-11.0	5-4-3 (7)	100	
15				SS -3	14.5-16.0	3-3-3 (6)	100	
20		- Very soft		SS -4	19.5-21.0	1-1-1 (2)	100	Large % of river gravel.
25		- Brown river GRAVEL with clay fines, moist, medium dense. (GC)	500.5	SS -5	24.5-26.0	7-7-5 (12)	100	
30		- Gray weathered SHALE, moist, hard. (CL)	495.5	SS -6	29.5-31.0	10-50 (50)	20	
35				SS -7	34.5-36.0	3-50 (50)	20	
40								

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SOUTHERN COMPANY

LOG OF TEST BORING

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SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Gadsden Ash Pond Inspection
LOCATION Plant Gadsden

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		(con't)		SS -8	39.5-41.0	50 (0)	20 20	
45				SS -9	44.5-46.0	50 (0)	20	
50				SS -10	49.5-51.0	50 (0)	20	
			474.0					
		Bottom of borehole at 51.0 feet.						
55								
60								
65								
70								
75								
80								
85								

GEOTECH ENGINEERING LOGS - ESEE DATABASE.GDT - 12/16/10 16:06 - T:\ESEE MAJOR PROJECTS\PROJECTS\GADSDEN\GADSDEN 2010\ASH POND INSPECTION\BORINGS\GADSDEN ASH POND INSPECTION 11-4-10.GPJ

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SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Gadsden Ash Pond Inspection
LOCATION Plant Gadsden

DATE STARTED 10/28/2010 **COMPLETED** 10/28/2010 **SURF. ELEV.** 525.0 **COORDINATES:** Lat. N34.019739 Long. W-85.971522
CONTRACTOR SCS Field Services **EQUIPMENT** CME-550 **METHOD** Mud Rotary
DRILLED BY T. Milam **LOGGED BY** G. Wilson **CHECKED BY** _____ **ANGLE** _____ **BEARING** _____
BORING DEPTH 51 ft. **GROUND WATER DEPTH: DURING** _____ **COMP.** _____ **DELAYED** 11.2 ft. after 168 hrs.
NOTES Heavy rains on 10-25. Ground surface elevations are approximate.

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		- Red micaceous sandy CLAY, moist, stiff. (CL)						
5				SS -1	4.5-6.0	4-5-6 (11)	100	
								Attempted to push a UD at 7', would not advance.
10		▼		SS -2	9.5-11.0	3-4-4 (8)	100	
			510.5					
15		- Brown well graded river GRAVEL, moist, medium dense. (GC)		SS -3	14.5-16.0	7-8-10 (18)	100	
20				SS -4	19.5-21.0	8-9-12 (21)	100	Larger % of clay fines in sample. Last ~ 2"-3" was weathered SHALE.
25				SS -5	24.5-26.0	8-12-14 (26)	100	
30		- Very dense		SS -6	29.5-31.0	15-50 (50)	53	
			490.5					
35		- Gray weathered SHALE, moist, hard. (CL)		SS -7	34.5-36.0	50 (0)	27	
40								

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SOUTHERN COMPANY

LOG OF TEST BORING

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SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Gadsden Ash Pond Inspection
LOCATION Plant Gadsden

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		(con't)		SS -8	39.5-41.0	50 (0)	20 20	
45				SS -9	44.5-46.0	5-50 (50)	53	
50			474.0	SS -10	49.5-51.0	50 (0)	20	
		Bottom of borehole at 51.0 feet.						
55								
60								
65								
70								
75								
80								
85								

GEOTECH ENGINEERING LOGS - ESEE DATABASE.GDT - 12/16/10 16:06 - T:\ESEE MAJOR PROJECTS\PROJECTS\GADSDEN\GADSDEN 2010\ASH POND INSPECTION\BORINGS\GADSDEN ASH POND INSPECTION 11-4-10.GPJ

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SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Gadsden Ash Pond Inspection
LOCATION Plant Gadsden

DATE STARTED 10/28/2010 **COMPLETED** 10/28/2010 **SURF. ELEV.** 526.5 **COORDINATES:** Lat. N34.017956 Long. W-85.969092
CONTRACTOR SCS Field Services **EQUIPMENT** CME-550 **METHOD** Mud Rotary
DRILLED BY T. Milam **LOGGED BY** G. Wilson **CHECKED BY** _____ **ANGLE** _____ **BEARING** _____
BORING DEPTH 51 ft. **GROUND WATER DEPTH: DURING** _____ **COMP.** _____ **DELAYED** 17.5 ft. after 96 hrs.
NOTES Heavy rains on 10-25. Ground surface elevations are approximate.

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		- Brown SILT, moist, stiff. (ML)						
5				SS -1	4.5-6.0	5-6-8 (14)	100	
10				SS -2	9.5-11.0	4-7-8 (15)	100	
15			512.0					
		- Brown well graded river gravel, moist, dense. (GC)		SS -3	14.5-16.0	8-15-17 (32)	100	Large % of clay fines.
20		- Medium dense		SS -4	19.5-21.0	5-10-12 (22)	100	
25				SS -5	24.5-26.0	11-15-18 (33)	100	
30				SS -6	29.5-31.0	8-15-19 (34)	100	
35			492.0					
		- Gray weathered SHALE, moist, hard. (CL)		SS -7	34.5-36.0	17-50 (50)	100	
40								

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SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Gadsden Ash Pond Inspection
LOCATION Plant Gadsden

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		(con't)		SS -8	39.5-41.0	50 (0)	53 53	
45				SS -9	44.5-46.0	50 (0)	20	
50			475.5	SS -10	49.5-51.0	50 (0)	20	
		Bottom of borehole at 51.0 feet.						
55								
60								
65								
70								
75								
80								
85								

GEOTECH ENGINEERING LOGS - ESEE DATABASE.GDT - 12/16/10 16:06 - T:\ESEE MAJOR PROJECTS\PROJECTS\GADSDEN\GADSDEN 2010\ASH POND INSPECTION\BORINGS\GADSDEN ASH POND INSPECTION 11-4-10.GPJ

BORING B10
PAGE 1 OF 2
ECS10331

SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Gadsden Ash Pond Inspection
LOCATION Plant Gadsden

DATE STARTED 11/1/2010 **COMPLETED** 11/1/2010 **SURF. ELEV.** 525.5 **COORDINATES:** Lat. N34.032822 Long. W-85.971503
CONTRACTOR SCS Field Services **EQUIPMENT** CME-550 **METHOD** Mud Rotary
DRILLED BY T. Milam **LOGGED BY** G. Wilson **CHECKED BY** _____ **ANGLE** _____ **BEARING** _____
BORING DEPTH 51 ft. **GROUND WATER DEPTH: DURING** _____ **COMP.** _____ **DELAYED** 14.5 ft. after 24 hrs.
NOTES Heavy rains on 10-25. Ground surface elevations are approximate.

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		- Brown micaceous SILT, moist, stiff. (ML)						
5				SS -1	4.5-6.0	4-5-6 (11)	100	
10		- Medium stiff		SS -2	9.5-11.0	3-4-5 (9)	100	
15		- Stiff		SS -3	14.5-16.0	3-4-7 (11)	100	
20		- Medium stiff		SS -4	19.5-21.0	2-4-4 (8)	100	
25				SS -5	24.5-26.0	2-2-2 (4)	100	
30				SS -6	29.5-31.0	2-2-3 (5)	100	Fine sand particles in sample.
35		- Brown sandy CLAY, moist, medium stiff. (CL)	491.0	SS -7	34.5-36.0	2-3-3 (6)	100	
40								River gravel in sample.

(Continued Next Page)

SOUTHERN COMPANY

LOG OF TEST BORING

BORING B10
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SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Gadsden Ash Pond Inspection
LOCATION Plant Gadsden

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		- Soft *(con't)*		SS -8	39.5-41.0	4-4-4 (8)	100 100	
			481.0					
45		- Gray weathered SHALE, moist, hard. (CL)		SS -9	44.5-46.0	50 (0)	27	
50			474.5	SS -10	49.5-51.0	50 (0)	20	
		Bottom of borehole at 51.0 feet.						
55								
60								
65								
70								
75								
80								
85								

GEOTECH ENGINEERING LOGS - ESEE DATABASE.GDT - 12/16/10 16:06 - T:\ESEE MAJOR PROJECTS\PROJECTS\GADSDEN\GADSDEN 2010\ASH POND INSPECTION\BORINGS\GADSDEN ASH POND INSPECTION 11-4-10.GPJ

BORING B11
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SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Gadsden Ash Pond Inspection
LOCATION Plant Gadsden

DATE STARTED 11/1/2010 **COMPLETED** 11/1/2010 **SURF. ELEV.** 525.0 **COORDINATES:** Lat. N34.016869 Long. W-85.972625
CONTRACTOR SCS Field Services **EQUIPMENT** CME-550 **METHOD** Mud Rotary
DRILLED BY T. Milam **LOGGED BY** G. Wilson **CHECKED BY** _____ **ANGLE** _____ **BEARING** _____
BORING DEPTH 47.8 ft. **GROUND WATER DEPTH: DURING** _____ **COMP.** _____ **DELAYED** 15.9 ft. after 24 hrs.
NOTES Heavy rains on 10-25. Ground surface elevations are approximate.

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		- Brown micaceous SILT, moist, very stiff. (ML)						
5				SS -1	4.5-6.0	7-9-9 (18)	100	
10		- Stiff		SS -2	9.5-11.0	8-6-7 (13)	100	Small roots in sample.
15		- Medium stiff		SS -3	14.5-16.0	4-3-4 (7)	100	
20		- Soft		SS -4	19.5-21.0	2-3-2 (5)	100	Attempted to push a UD at 22', unable to advance.
25		- Very soft		SS -5	24.5-26.0	WH-1-2 (3)	100	
30				SS -6	29.5-31.0	WH-WH-2 (2)	100	
35		- Medium stiff		SS -7	34.5-36.0	1-4-2 (6)	100	
40								River gravel in sample.

(Continued Next Page)

BORING B11
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SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Gadsden Ash Pond Inspection
LOCATION Plant Gadsden

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		- Very stiff *(con't)*		SS -8	39.5-41.0	3-7-10 (17)	100 100	
			480.5					
45		- Gray weathered SHALE, moist, hard. (CL)		SS -9	44.5-46.0	50 (0)	20	Organics in sample.
			477.2					
		Bottom of borehole at 47.8 feet.						
50								
55								
60								
65								
70								
75								
80								
85								

GEOTECH ENGINEERING LOGS - ESEE DATABASE.GDT - 12/16/10 16:06 - T:\ESEE MAJOR PROJECTS\PROJECTS\GADSDEN\GADSDEN 2010\ASH POND INSPECTION\BORINGS\GADSDEN ASH POND INSPECTION 11-4-10.GPJ

BORING B12
PAGE 1 OF 2
ECS10331

SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Gadsden Ash Pond Inspection
LOCATION Plant Gadsden

DATE STARTED 11/1/2010 **COMPLETED** 11/1/2010 **SURF. ELEV.** 525.0 **COORDINATES:** Lat. N34.017397 Long. W-85.973206
CONTRACTOR SCS Field Services **EQUIPMENT** CME-550 **METHOD** Mud Rotary
DRILLED BY T. Milam **LOGGED BY** G. Wilson **CHECKED BY** _____ **ANGLE** _____ **BEARING** _____
BORING DEPTH 41 ft. **GROUND WATER DEPTH: DURING** _____ **COMP.** _____ **DELAYED** 17 ft. after 24 hrs.
NOTES Heavy rains on 10-25. Ground surface elevations are approximate.

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		- Brown micaceous SILT, moist, stiff. (ML)						
5				SS -1	4.5-6.0	4-6-7 (13)	100	
10		- Medium stiff		SS -2	9.5-11.0	3-4-5 (9)	100	
15				SS -3	14.5-16.0	3-3-4 (7)	100	
		▼		UD -4	17.0-19.0		100	UD taken.
20		- Very soft		SS -5	19.5-21.0	1-1-2 (3)	100	
25				SS -6	24.5-26.0	1-1-1 (2)	100	
30				UD -7	29.0-31.0		100	UD taken.
35		- Mottled brown/gray		SS -8	34.5-36.0	WH-WH-1 (1)	100	
40								

(Continued Next Page)

SOUTHERN COMPANY

LOG OF TEST BORING

BORING B12
PAGE 2 OF 2
ECS10331

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

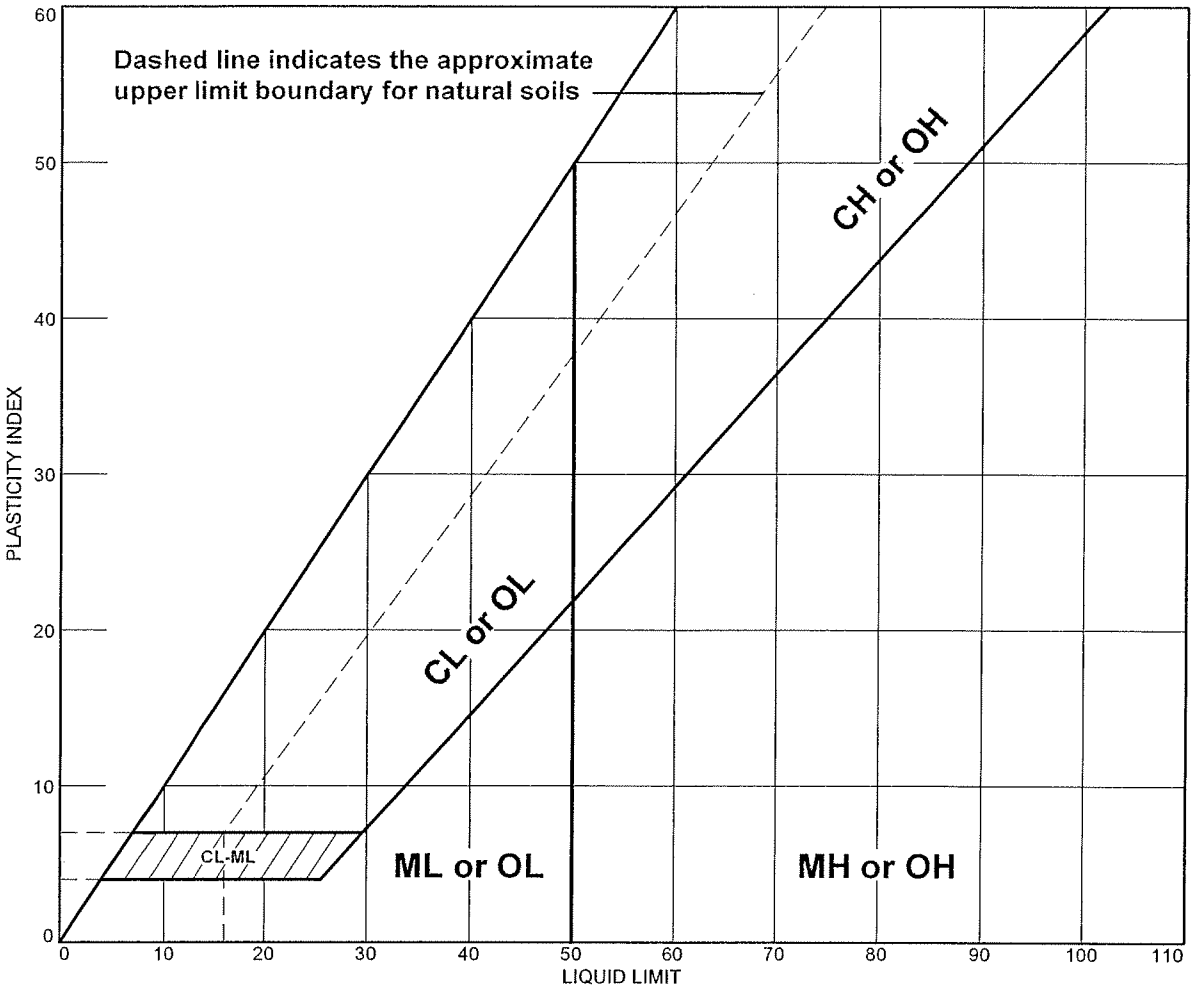
PROJECT Gadsden Ash Pond Inspection
LOCATION Plant Gadsden

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		- Gray weathered SHALE, moist, hard. (CL) *(con't)*	484.0	SS -9	39.5-41.0	19-50 (50)	44 44	
		Bottom of borehole at 41.0 feet.						

45
50
55
60
65
70
75
80
85

GEOTECH ENGINEERING LOGS - ESEE DATABASE.GDT - 12/16/10 16:06 - T:\ESEE MAJOR PROJECTS\PROJECTS\GADSDEN\GADSDEN 2010\ASH POND INSPECTION\BORINGS\GADSDEN ASH POND INSPECTION 11-4-10.GPJ

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Tan brown fine sandy SILT (ML)	NV	NP	NP	98.6	58.2	ML

Project No. AT10SOC03- **Client:** Southern Company

Project: Plant Gadsden Ash Pond

● **Location:** B-1 **Depth:** 12-14' **Sample Number:** B-1

Remarks:

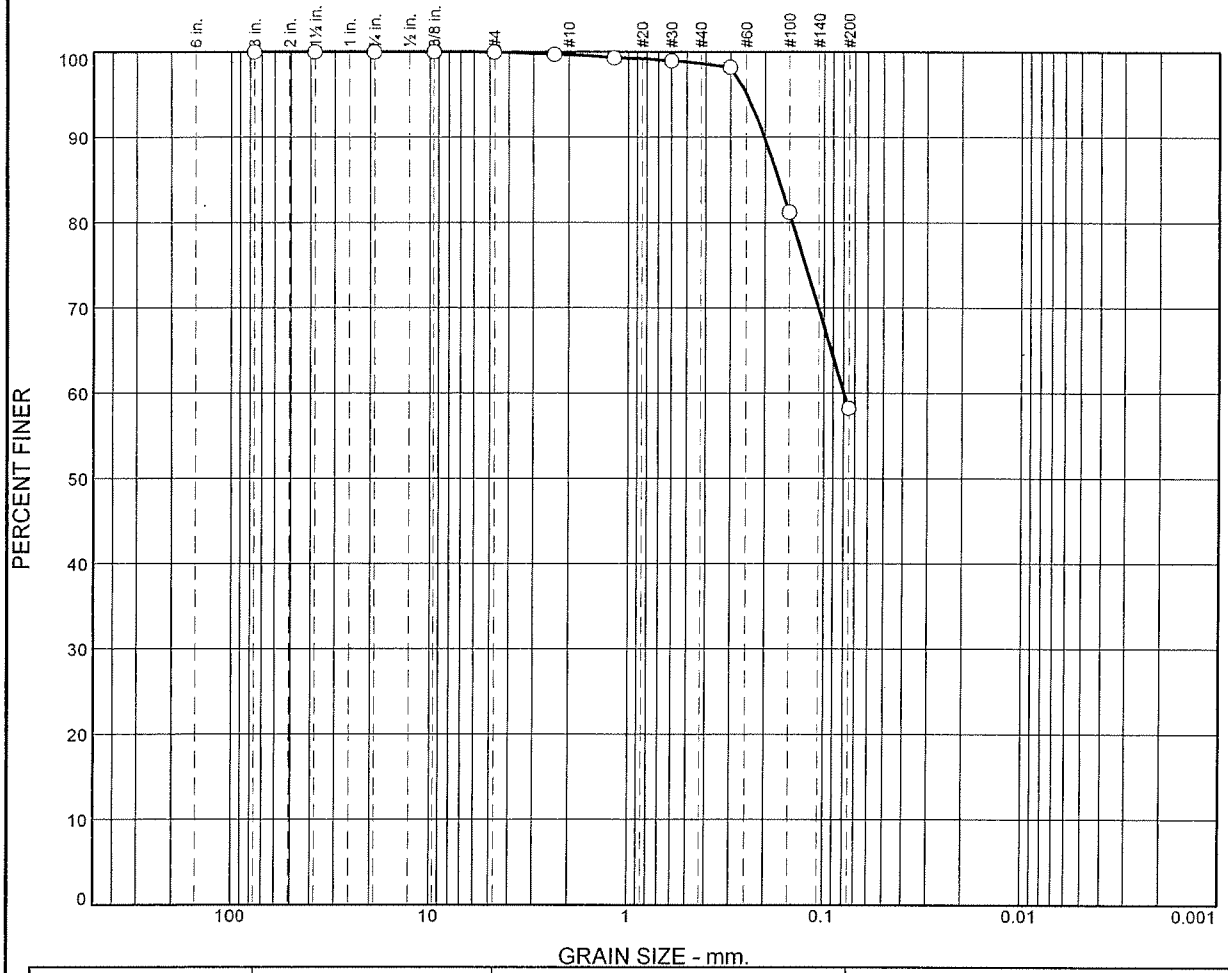
Contour Engineering, LLC

Kennesaw, GA

Figure

CONFIDENTIAL

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.3	1.1	40.4	58.2	

	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○		NV	NP	0.1692	0.0790						

Material Description	USCS	AASHTO
○ Tan brown fine sandy SILT (ML)	ML	A-4(0)

Project No. AT10SOC03- **Client:** Southern Company

Project: Plant Gadsden Ash Pond

○ **Location:** B-1 **Depth:** 12-14' **Sample Number:** B-1

Date: ○

Contour Engineering, LLC

Kennesaw, GA

Remarks:

Figure

Contour Engineering

Consolidated Undrained Triaxial Test (ASTM D4767)

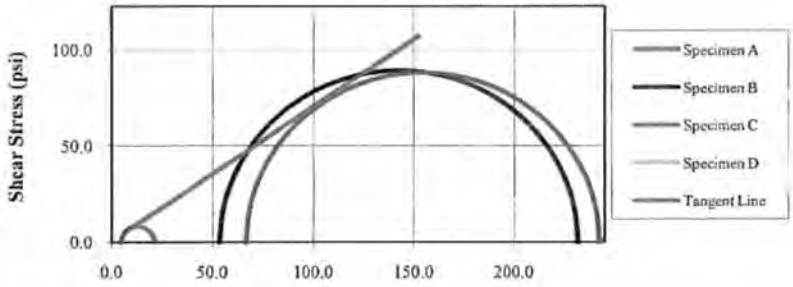
Date:

Checked By:

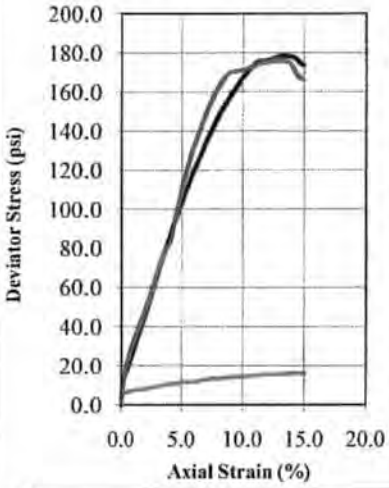
Date :

Tested By:

Effective Stress at Maximum Deviator Stress Criterion



Deviator Stress Vs. Axial Strain



Initial	Specimen A	B	C	D
Water Content (%)	22.2	21.0	15.1	
Dry Density (pcf)	102.3	111.8	113.9	
Saturation (%)	92.89	112.71	85.96	
Void Ratio	0.639	0.499	0.471	
Diameter (in)	2.867	2.851	2.879	
Height (in)	5.846	5.734	5.806	
Specific Gravity	2.69	2.69	2.69	
Liquid Limit	0	0	0	
Plastic Limit	0	0	0	
After Consolidation	**A**	**B**	**C**	**D**
B-Value	0.95	0.95	0.95	
Water Content (%)	25.8	16.7	16.6	
Dry Density (pcf)	102.29	119.76	117.58	
Saturation (%)	100.00	100.00	100.00	
Void Ratio	0.642	0.402	0.428	
Effective Stress (psi)	7.0	20.7	34.7	
Back Press. (psi)	50.0	50.1	50.0	
Rate of Strain	0.015	0.015	0.015	

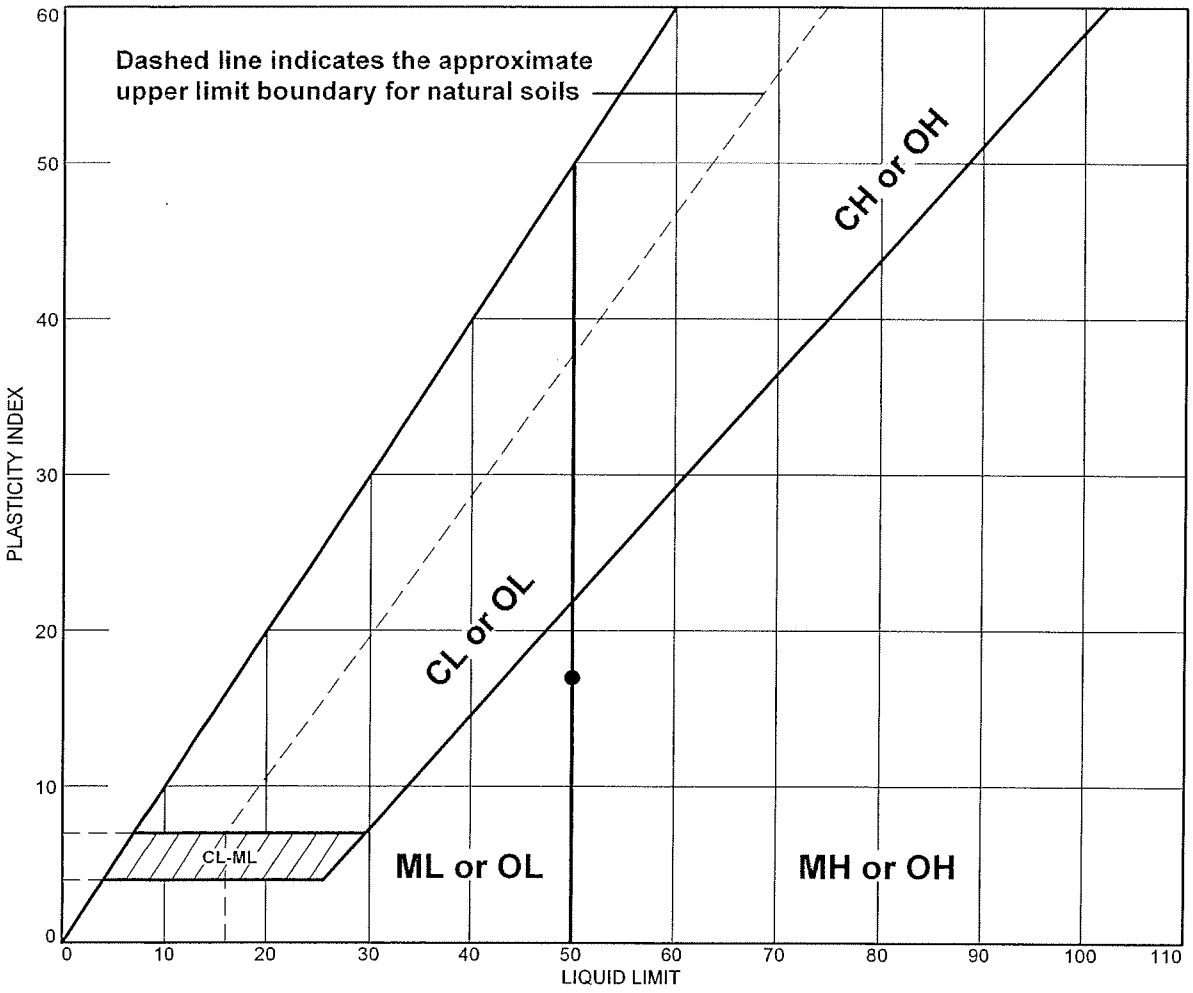
Maximium Deviator Stress Criterion	
C (psi)	-1.4
C' (psi)	0.4
Ø (deg)	42.7
Ø' (deg)	34.9

After Shear	A	B	C	D
σ'1 at Failure (psi)	21.38	232.18	242.79	
σ'3 at Failure (psi)	5.14	53.86	66.84	

Project:	Plant Gadsen
Location:	B-1 12-14'
Project Number:	AT10SOC03-G
Boring Number:	B-1
Sample Number:	B-1
Depth:	12-14'
Sample Type:	Undisturbed
Description:	Tan sandy SILT (ML)
Test Type	Consolidated Undrained
Remarks	Top 11" of shelby tube void.

N/A	N/A	N/A	N/A
Failure Photographs			

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Brown tan sandy SILT (MH)	50	33	17	97.8	86.8	MH

Project No. AT10SOC03- **Client:** Southern Company

Project: Plant Gadsden Ash Pond

● **Location:** B-2 **Depth:** 5-7' **Sample Number:** B-2

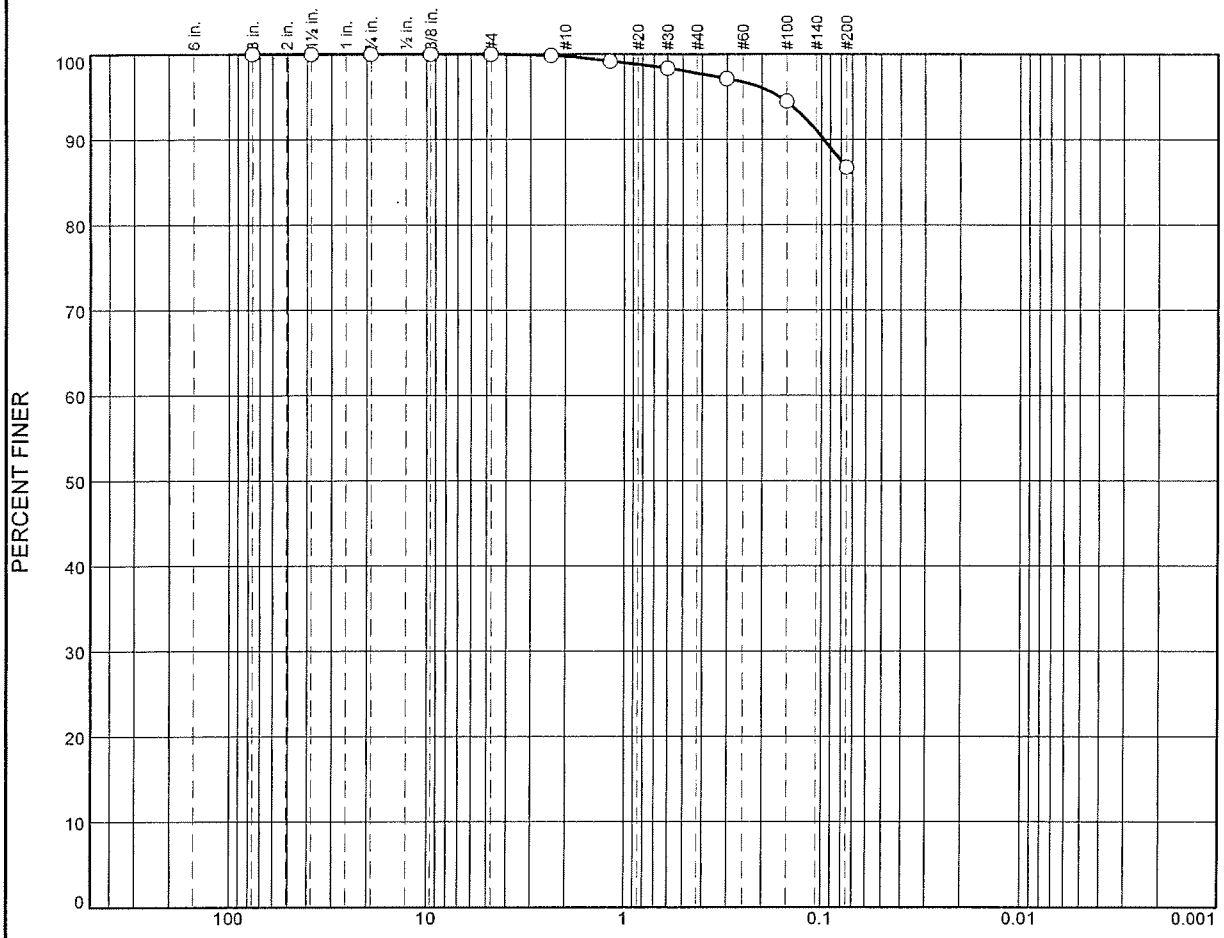
Remarks:

Contour Engineering, LLC

Kennesaw, GA

Figure

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.3	1.9	11.0	86.8	

	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_C	C_U
○		50	33								

Material Description	USCS	AASHTO
○ Brown tan sandy SILT (MH)	MH	A-7-5(18)

Project No. AT10SOC03- **Client:** Southern Company

Project: Plant Gadsden Ash Pond

○ **Location:** B-2 **Depth:** 5-7' **Sample Number:** B-2

Date: ○

Remarks:

Contour Engineering, LLC

Kennesaw, GA

Figure

Contour Engineering

Consolidated Undrained Triaxial Test (ASTM D4767)

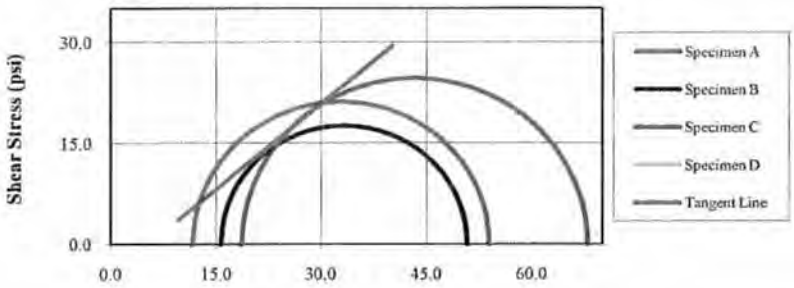
Date:

Checked By:

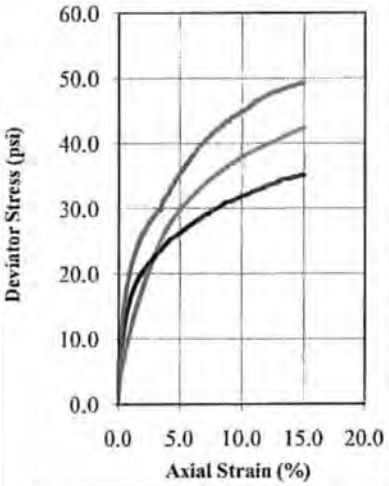
Date :

Tested By:

Effective Stress at Maximum Deviator Stress Criterion



Deviator Stress Vs. Axial Strain

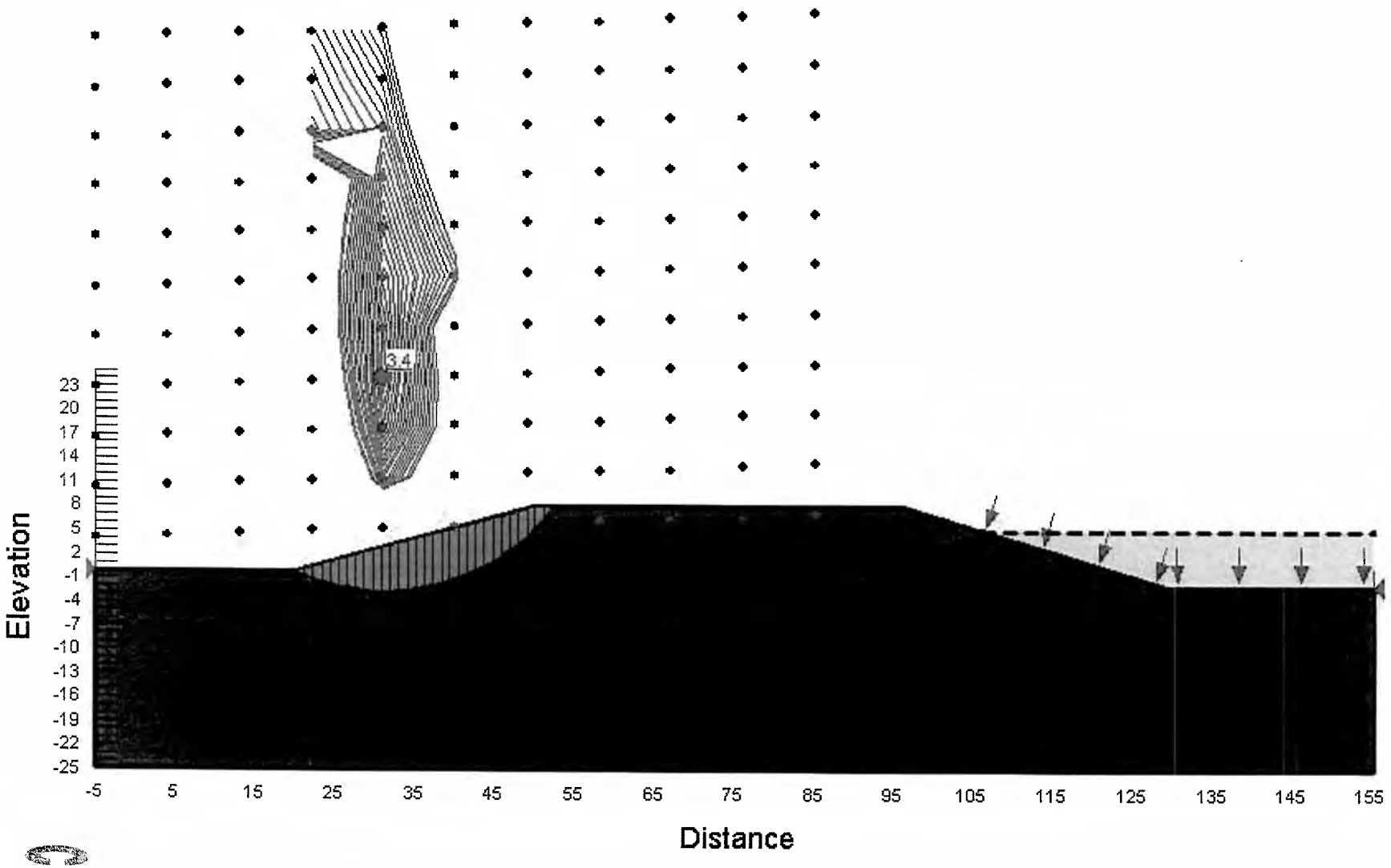


Initial	Specimen A	B	C	D
Water Content (%)	25.1	23.4	27.0	
Dry Density (pcf)	103.4	100.4	99.3	
Saturation (%)	110.60	95.78	107.31	
Void Ratio	0.598	0.645	0.664	
Diameter (in)	2.870	2.867	2.866	
Height (in)	5.834	5.715	5.616	
Specific Gravity	2.65	2.65	2.65	
Liquid Limit	50	50	50	
Plastic Limit	33	33	33	
After Consolidation	**A**	**B**	**C**	**D**
B-Value	0.95	0.95	0.95	
Water Content (%)	27.4	24.5	25.8	
Dry Density (pcf)	103.98	100.26	101.18	
Saturation (%)	100.00	100.00	100.00	
Void Ratio	0.591	0.650	0.635	
Effective Stress (psi)	7.0	21.0	35.0	
Back Press. (psi)	65.0	65.0	65.0	
Rate of Strain	0.015	0.015	0.015	

Maximium Deviator Stress Criterion		After Shear	A	B	C	D
C (psi)	4.6	σ'1 at Failure (psi)	54.07	50.93	68.10	
C' (psi)	-4.6	σ'3 at Failure (psi)	11.68	15.74	18.78	
Ø (deg)	20.1					
Ø' (deg)	40.2					

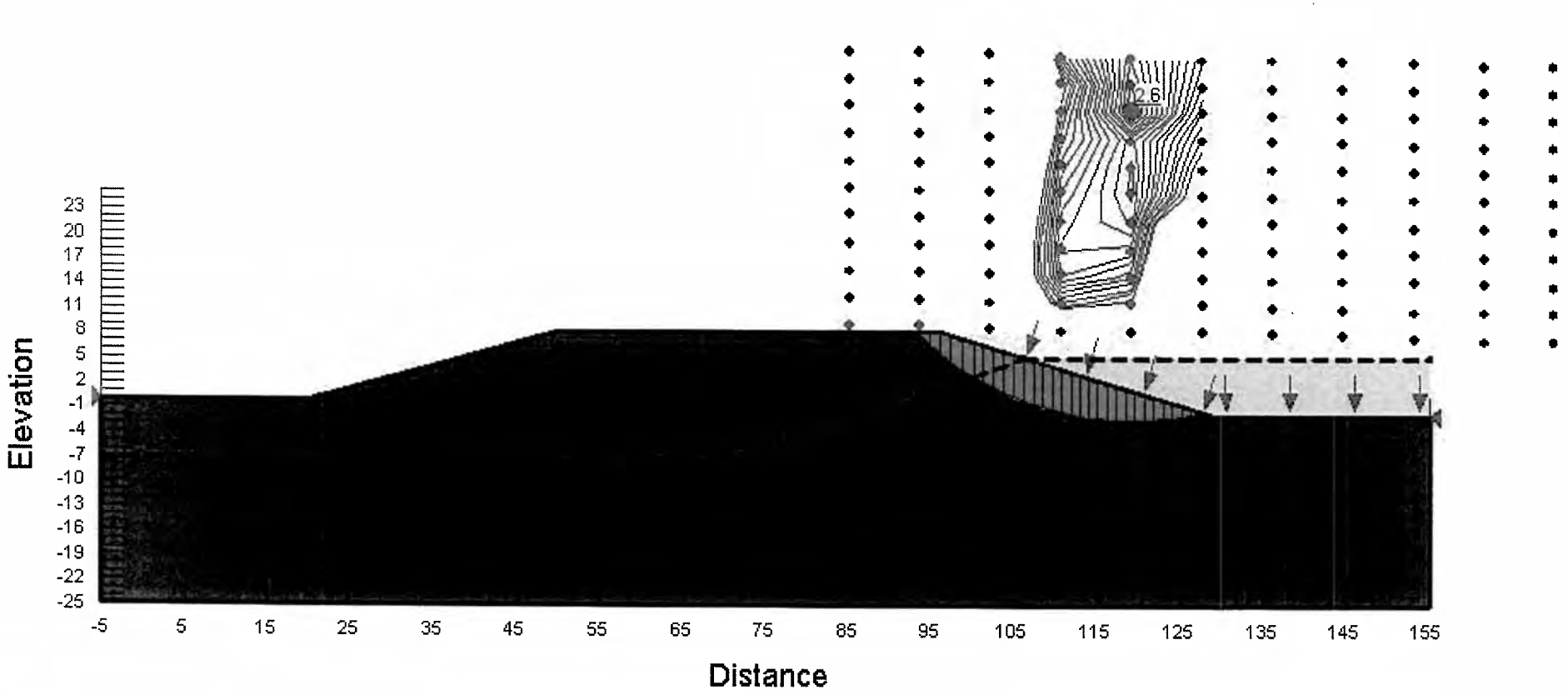
Project:	Plant Gadsden	N/A	N/A	N/A	N/A
Location:	B-2 5-7'				
Project Number:	AT10SOC03-G				
Boring Number:	B-2				
Sample Number:	B-2				
Depth:	5-7'				
Sample Type:	Undisturbed	Failure Photographs			
Description:	Tan sandy SILT (MH)				
Test Type	Consolidated Undrained				
Remarks					

Cross Section A Steady State, Downstream

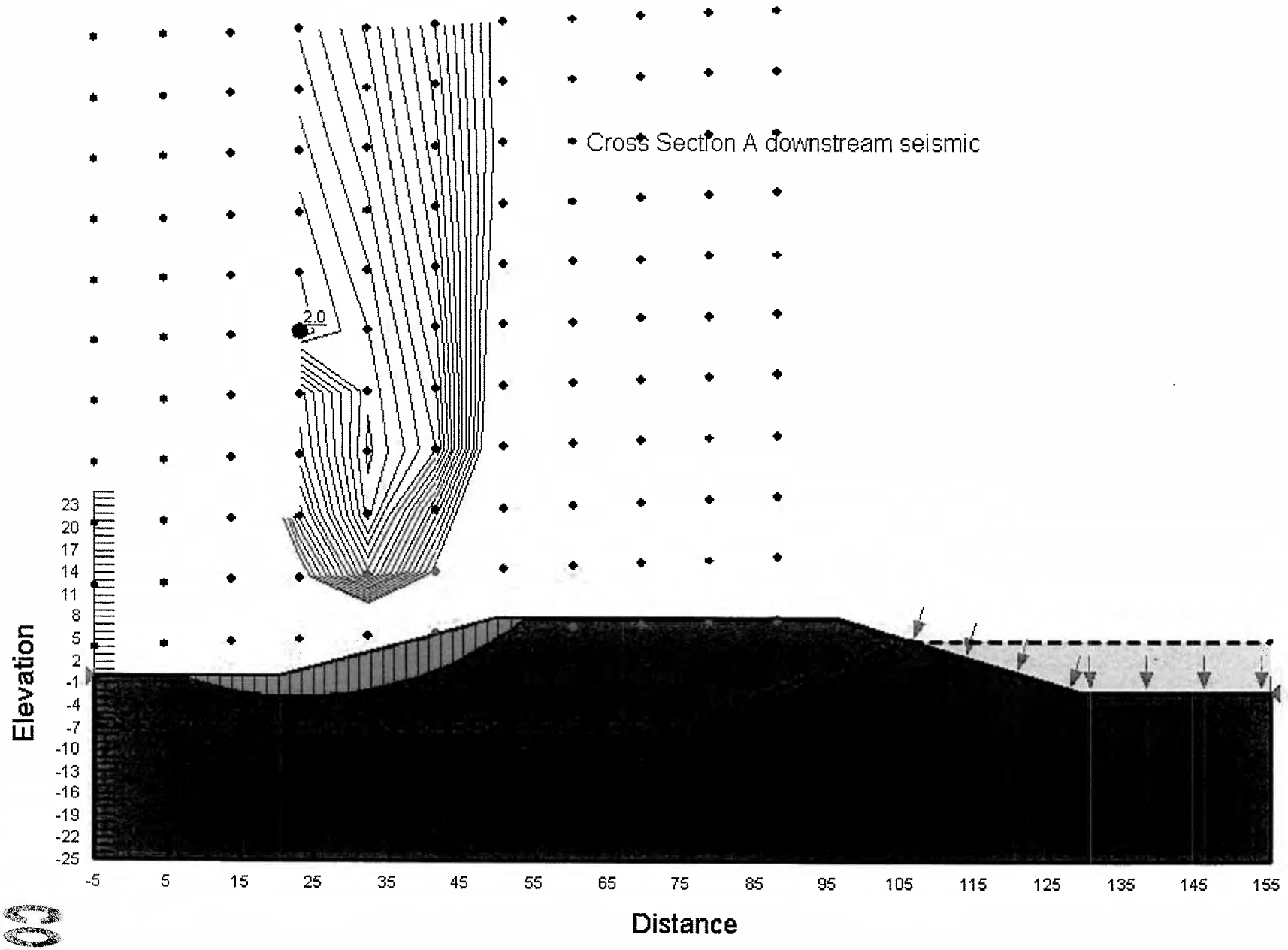


Name: Sandy SILT (ML)
Unit Weight: 130.56 pcf
Cohesion: 0 psf
Phi: 36 °

Cross Section A Steady State upstream

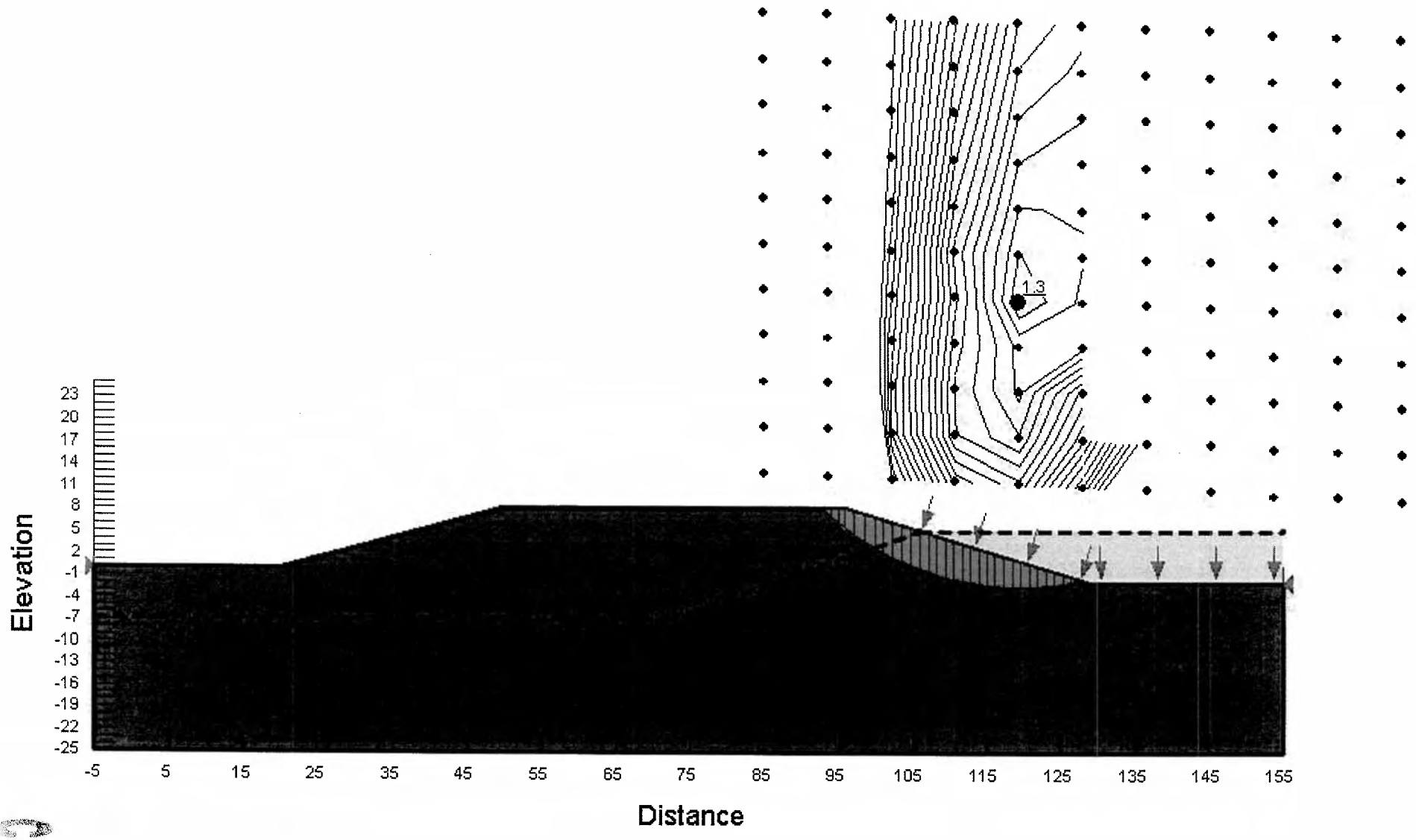


Name: Sandy SILT (ML)
Unit Weight: 130.56 pcf
Cohesion: 0 psf
Phi: 36 °



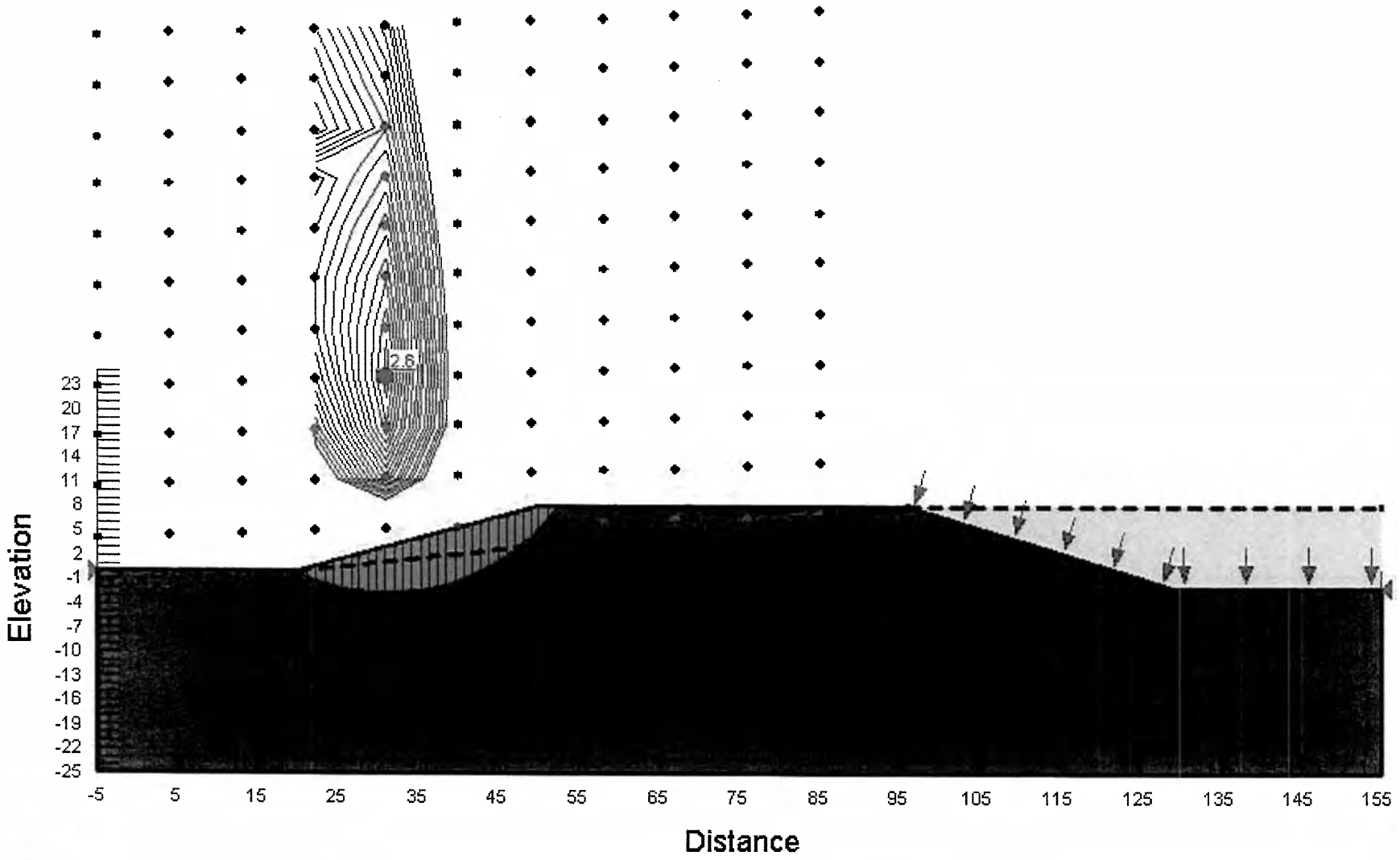
Name: Sandy SILT (ML)
Unit Weight: 130.56 pcf
Cohesion: 0 psf
Phi: 36 °

Cross Section A upstream seismic



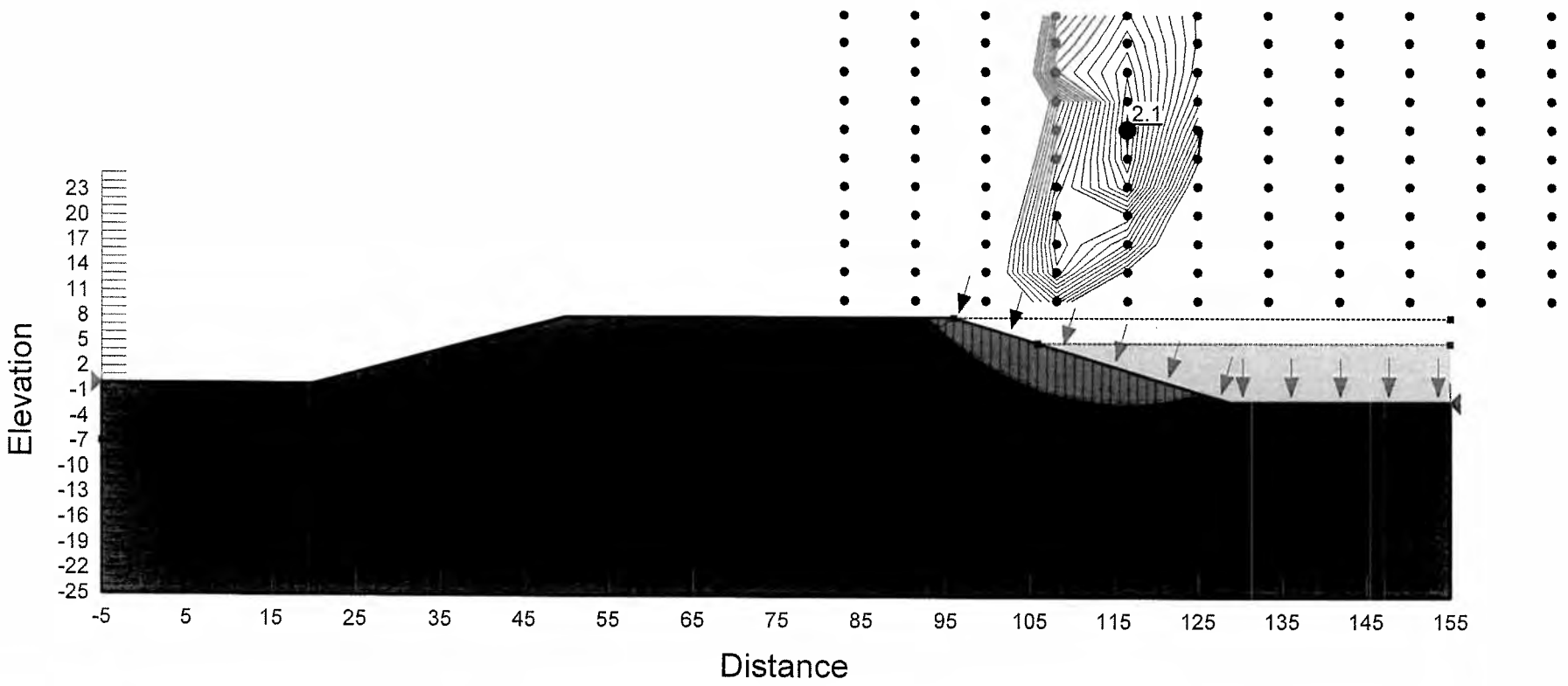
Name: Sandy SILT (ML)
Unit Weight: 130.56 pcf
Cohesion: 0 psf
Phi: 36 °

Cross Section A high water level



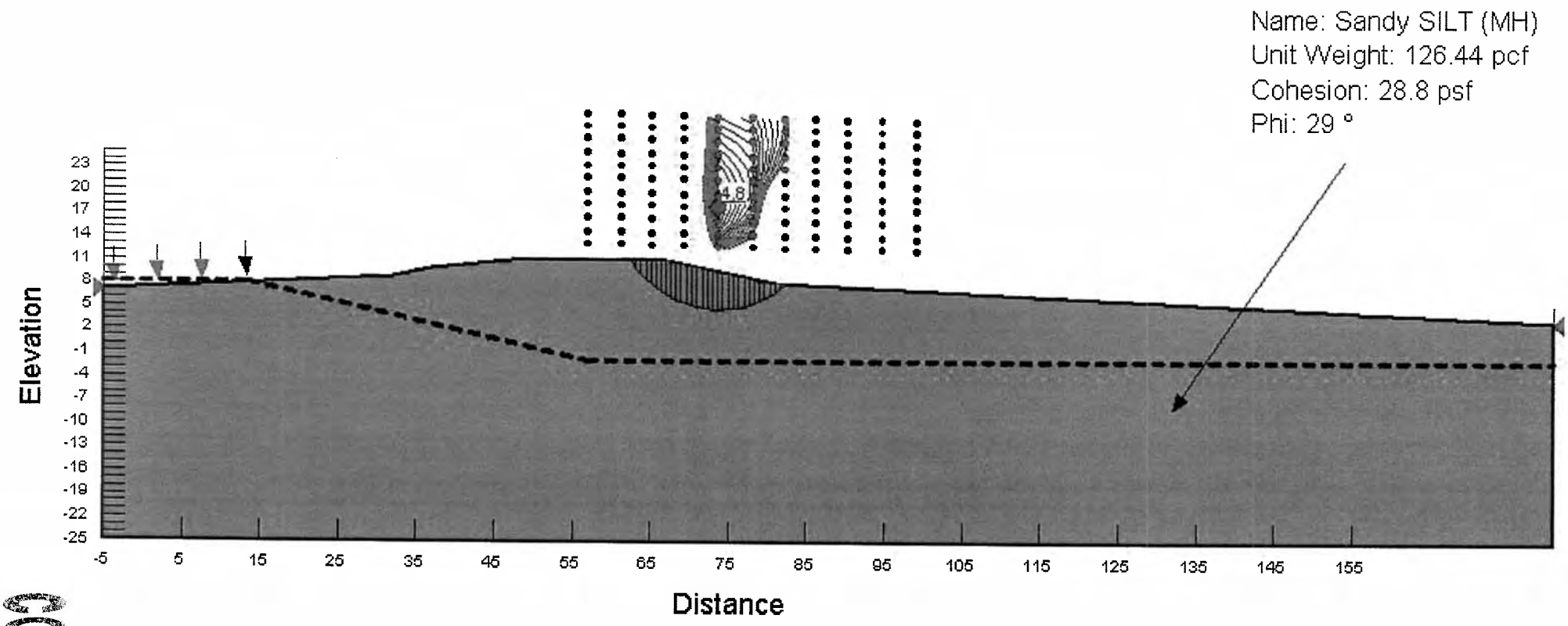
Name: Sandy SILT (ML)
Unit Weight: 130.56 pcf
Cohesion: 0 psf
Phi: 36 °

Cross Section A Rapid drawdown

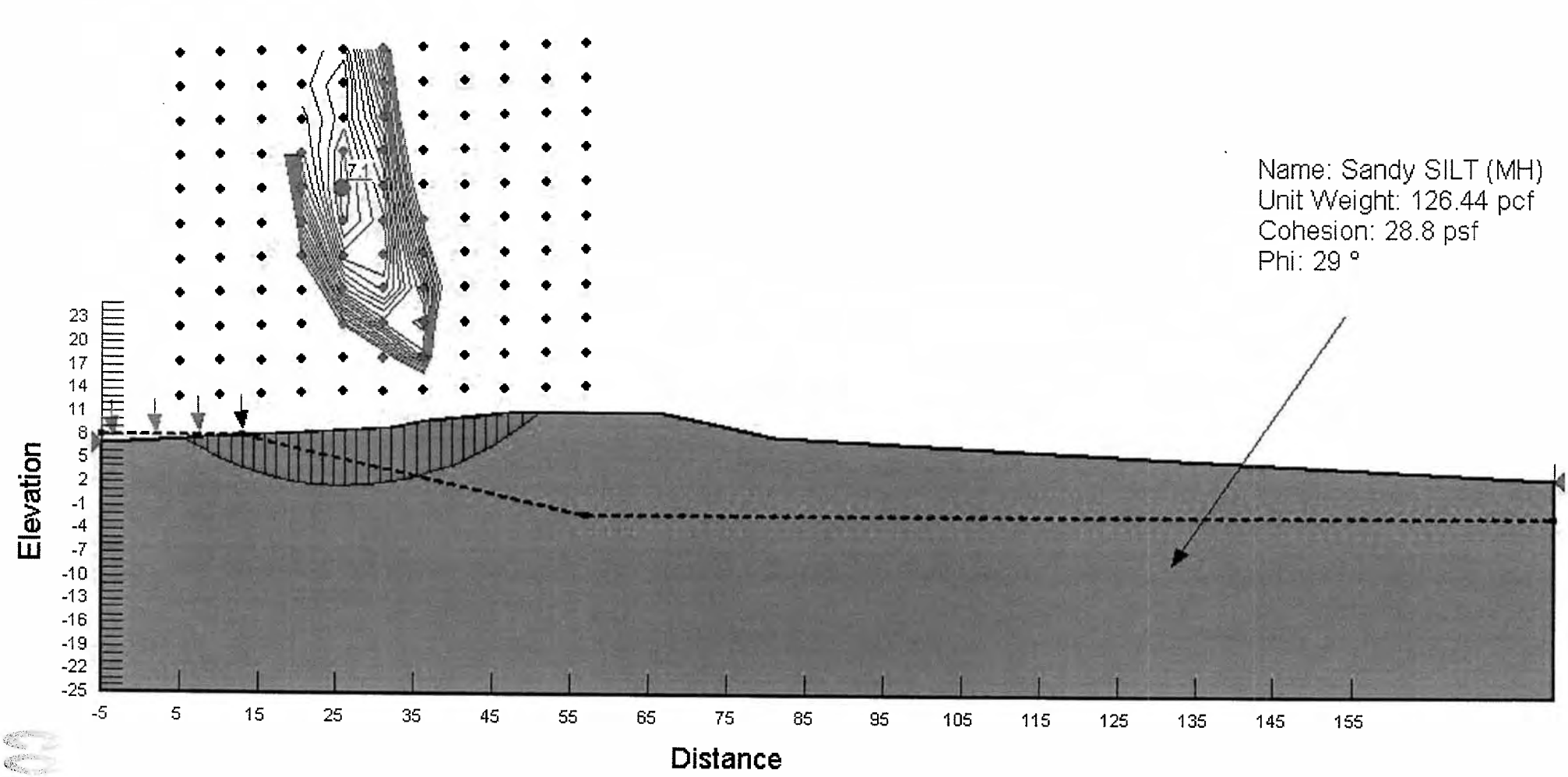


Name: Sandy SILT (ML)
Unit Weight: 130.56 pcf
Cohesion: 0 psf
Phi: 36 °
Drawdown Total Cohesion: 500 psf
Drawdown Total Phi: 29 °

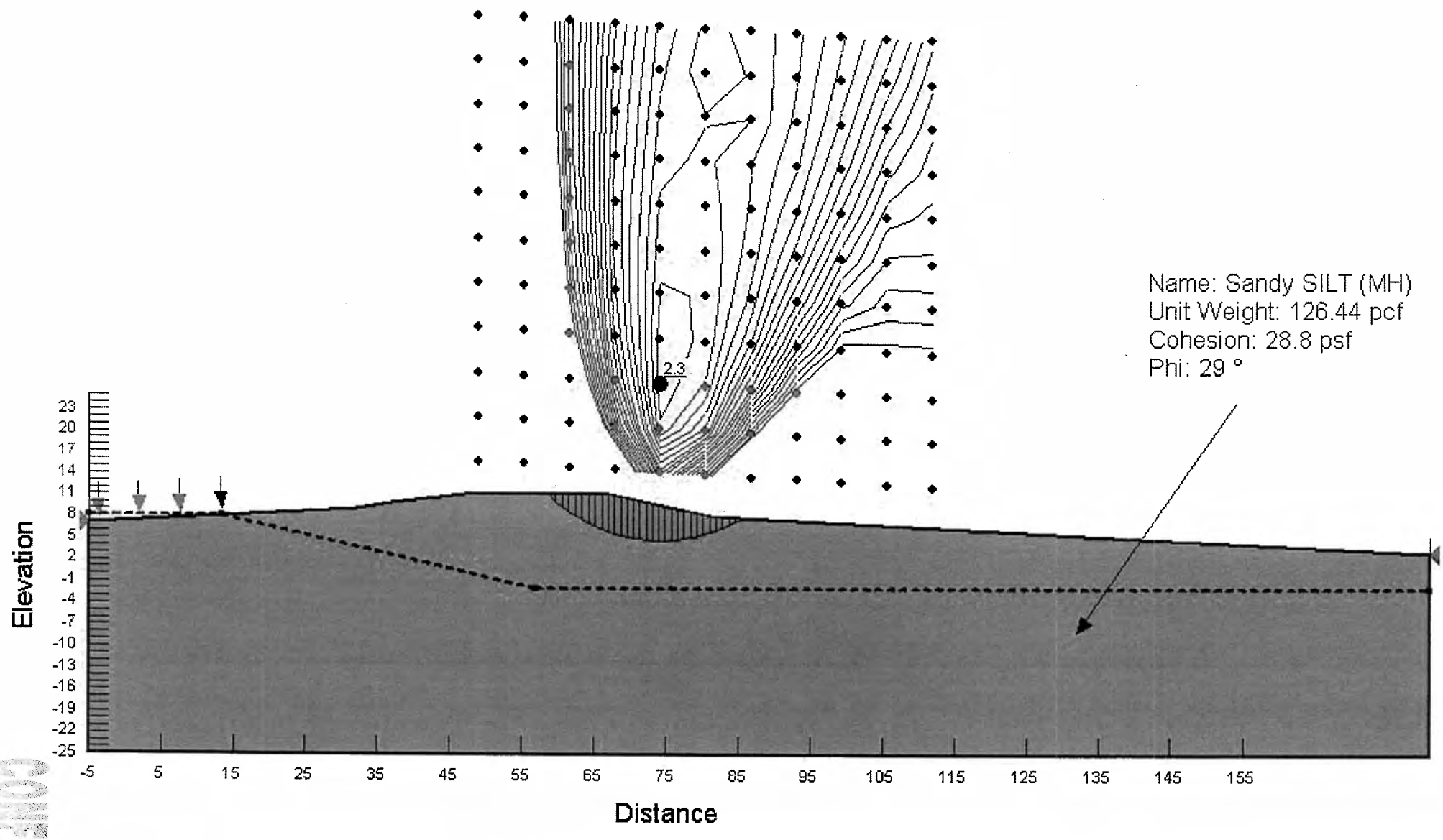
Cross Section C Steady State, Downstream



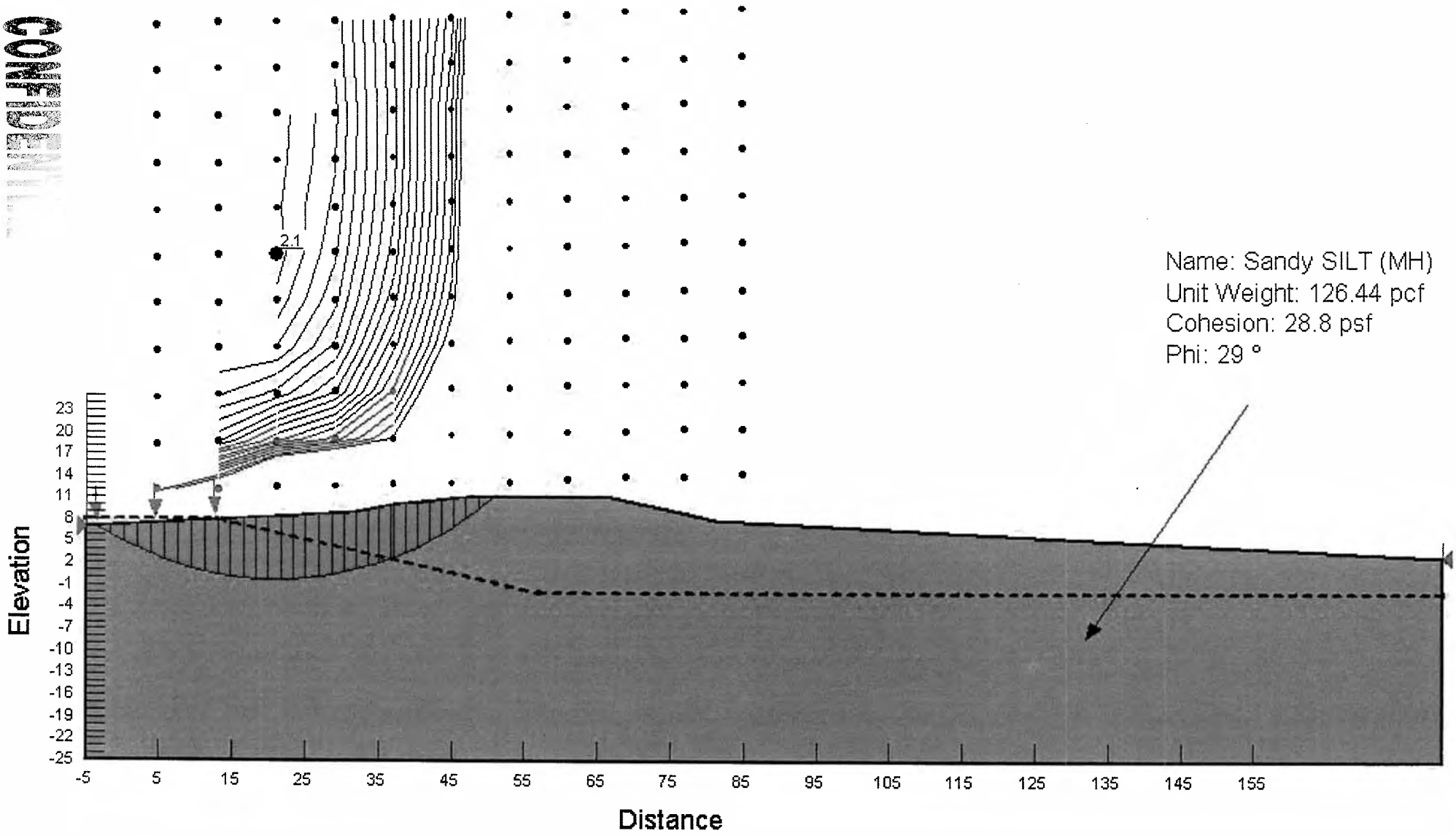
Cross Section C Steady State, Upstream



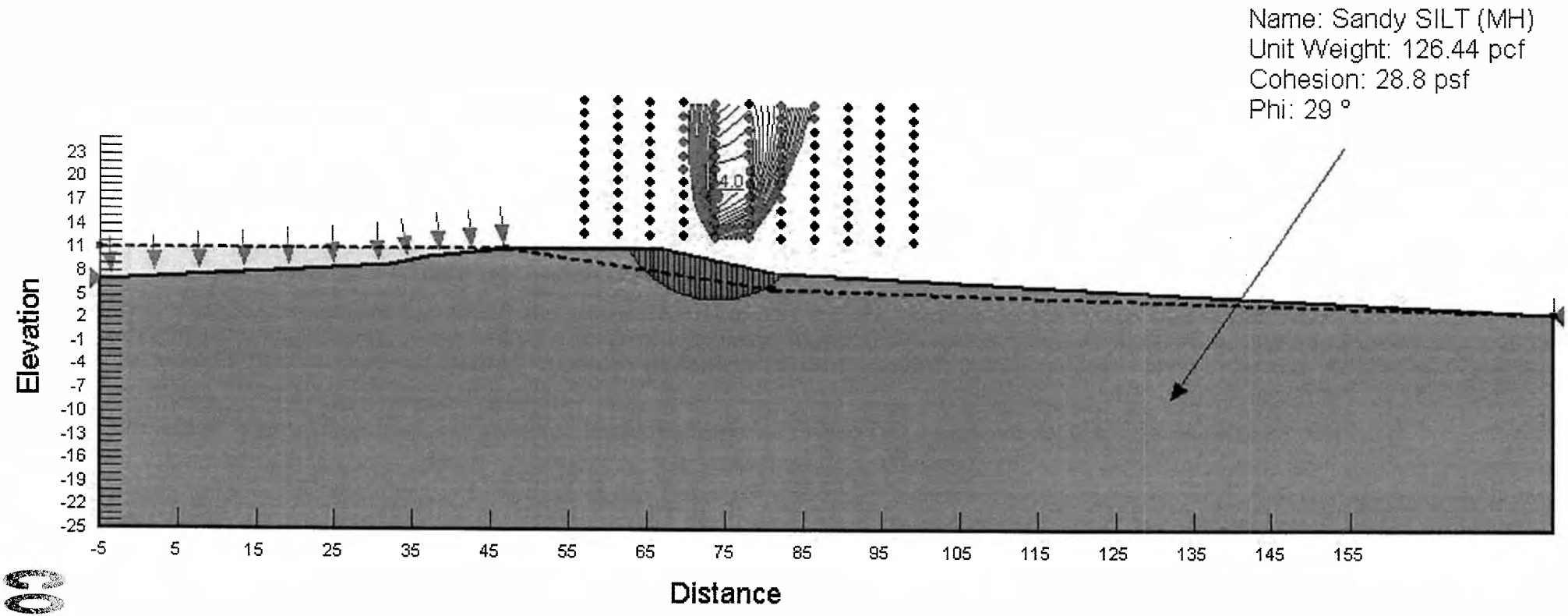
Cross Section C Downstream Seismic



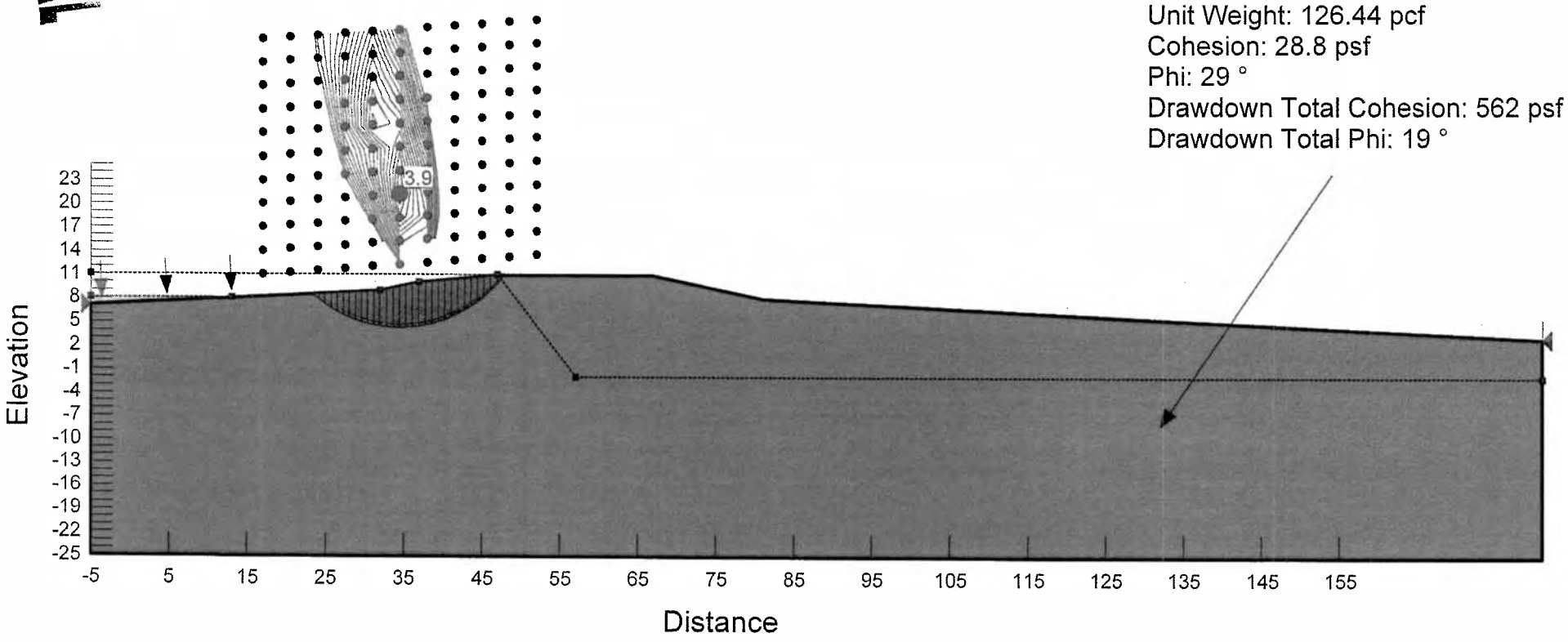
Cross Section C, Upstream Seismic



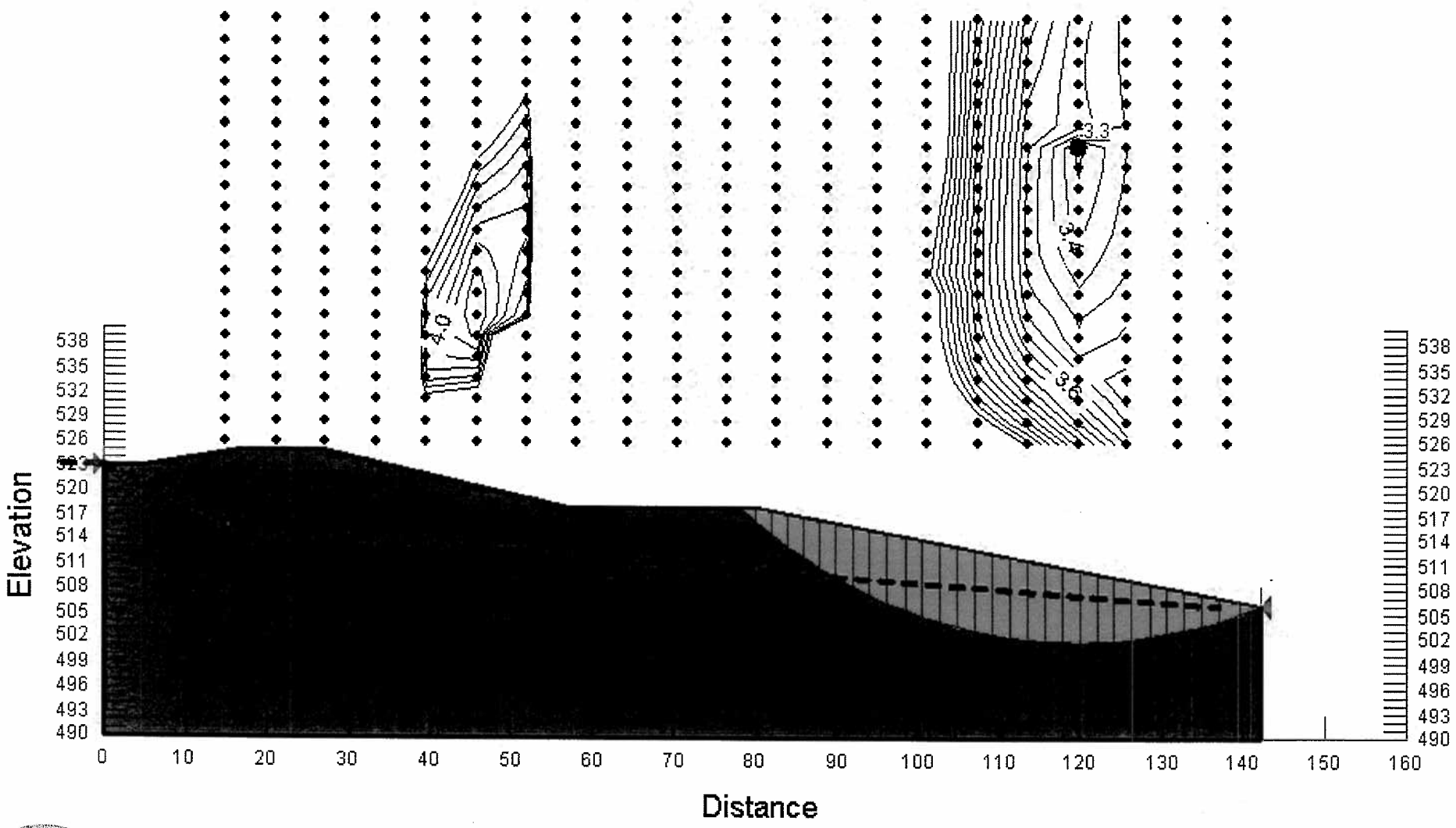
Cross Section C high water level



Cross Section C Rapid drawdown

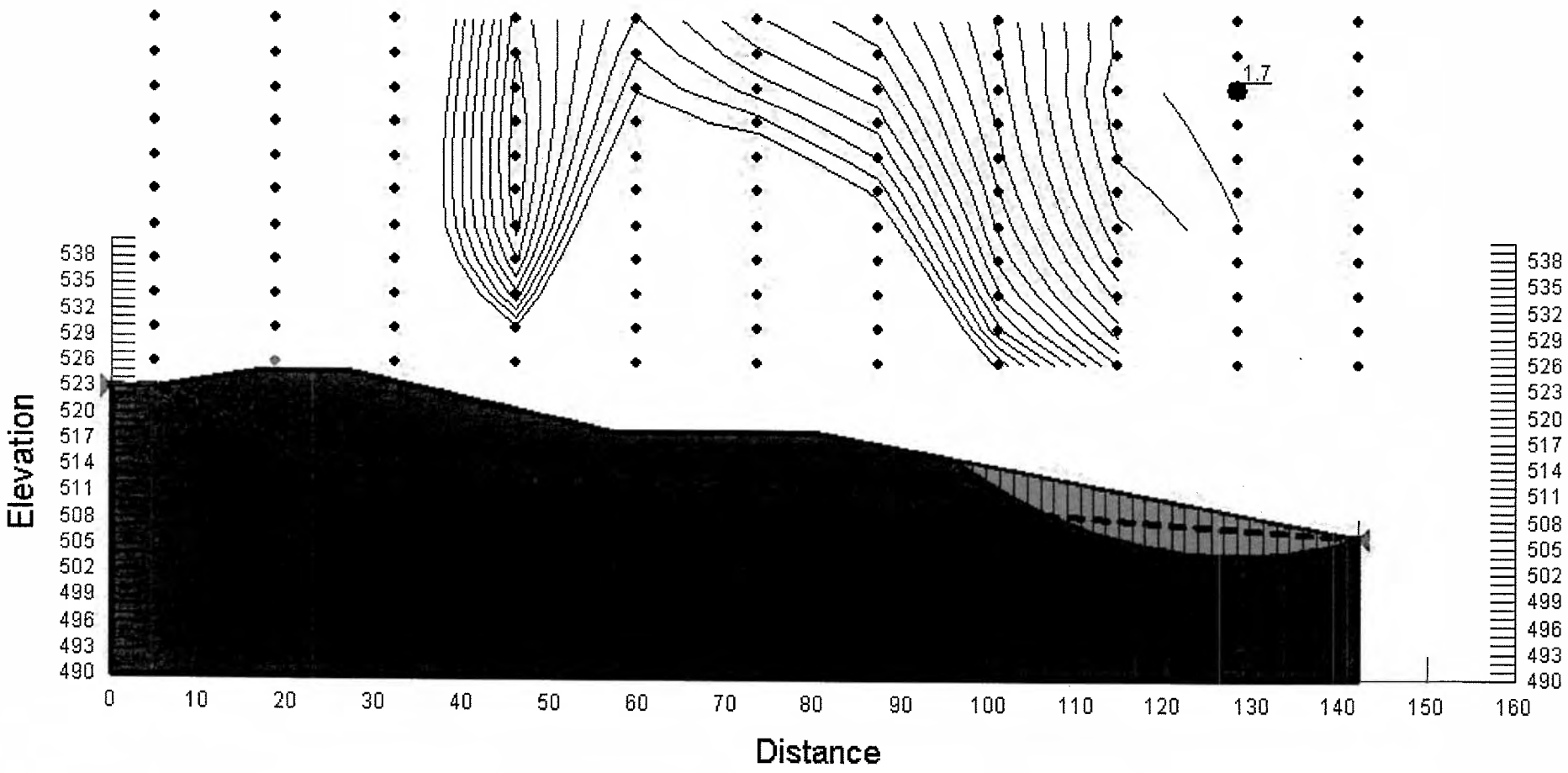


Cross Section D, Steady State

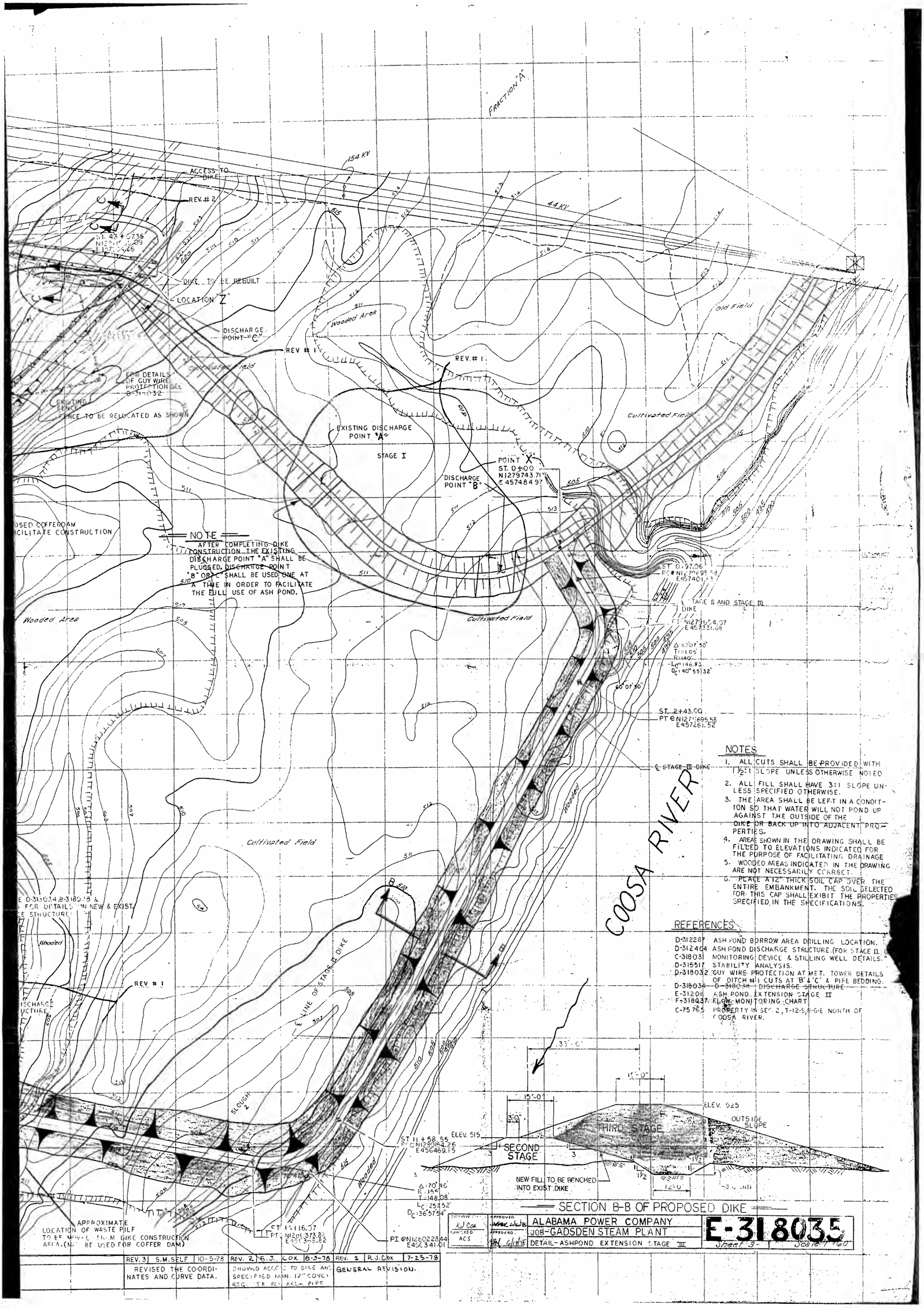


Name: Sandy SILT (ML)
Unit Weight: 130.56 pcf
Cohesion: 0 psf
Phi: 36 °

Cross Section D seismic



Name: Sandy SILT (ML)
Unit Weight: 130.56 pcf
Cohesion: 0 psf
Phi: 36 °



NOTES

1. ALL CUTS SHALL BE PROVIDED WITH 1½:1 SLOPE UNLESS OTHERWISE NOTED
2. ALL FILL SHALL HAVE 3:1 SLOPE UNLESS SPECIFIED OTHERWISE.
3. THE AREA SHALL BE LEFT IN A CONDITION SO THAT WATER WILL NOT POND UP AGAINST THE OUTSIDE OF THE DIKE OR BACK UP INTO ADJACENT PROPERTIES.
4. AREAS SHOWN IN THE DRAWING SHALL BE FILLED TO ELEVATIONS INDICATED FOR THE PURPOSE OF FACILITATING DRAINAGE
5. WOODED AREAS INDICATED IN THE DRAWING ARE NOT NECESSARILY CORRECT.
6. PLACE A 12" THICK SOIL CAP OVER THE ENTIRE EMBANKMENT. THE SOIL SELECTED FOR THIS CAP SHALL EXIBIT THE PROPERTIES SPECIFIED IN THE SPECIFICATIONS.

REFERENCES

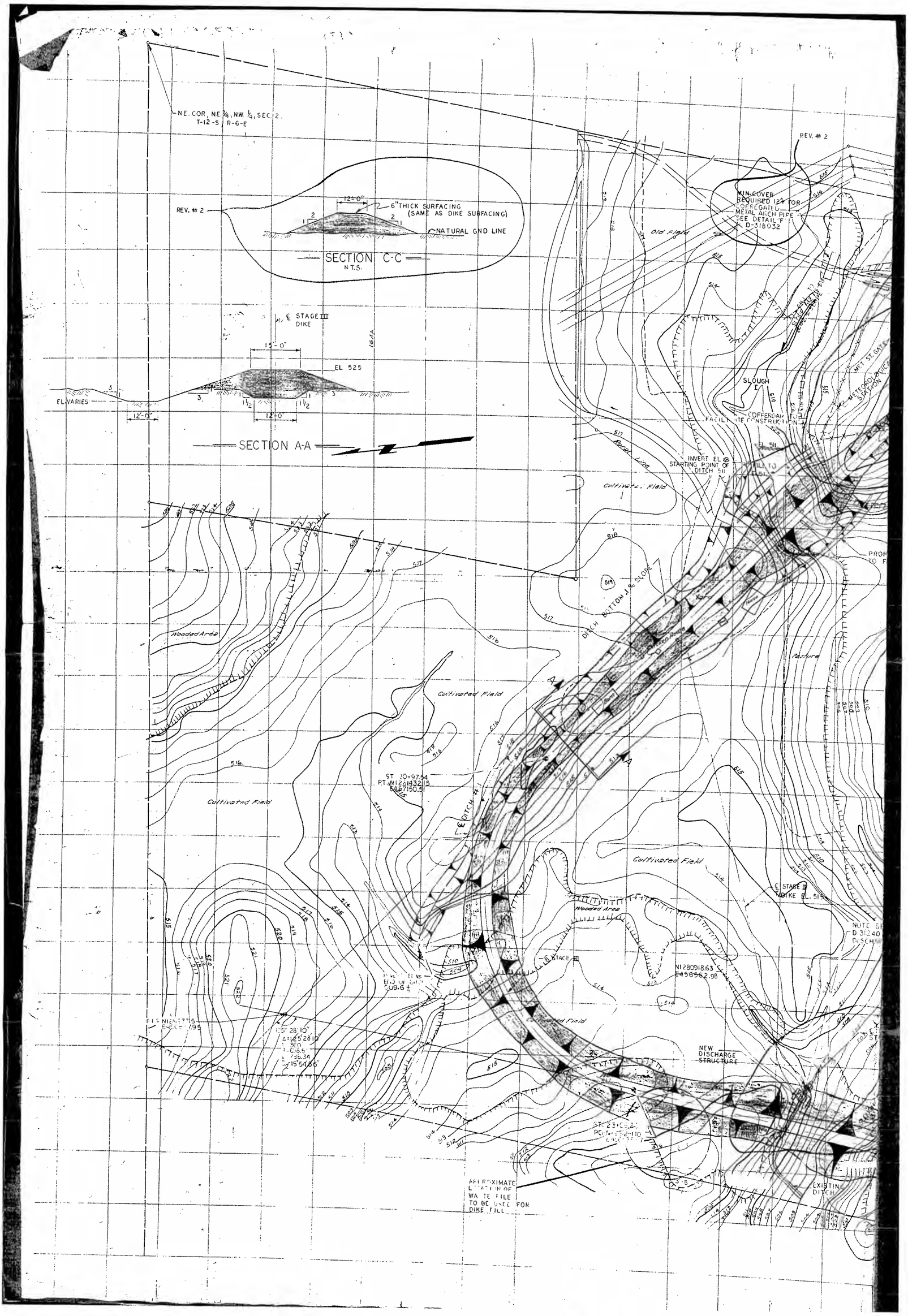
D-312287 ASH POND BORROW AREA DRILLING LOCATION.
D-312404 ASH POND DISCHARGE STRUCTURE (FOR STAGE II)
C-31803 MONITORING DEVICE & STILLING WELL DETAILS.
D-315517 STABILITY ANALYSIS.
D-318032 GUY WIRE PROTECTION AT MET. TOWER DETAILS OF DITCH CUTS AT 'B' & 'C' & PIPE BEDDING.
D-318034 - D-318038 DISCHARGE STRUCTURE
E-31201 ASH POND EXTENSION STAGE II
F-318037 FLOW MONITORING CHART
C-75785 PROPERTY IN SEC 2, T-12-S, R-6E NORTH OF COOSA RIVER.

REV. 3	S.M.SELF	10-5-78	REV. 2	R.J. COX	8-3-78	REV. 1	R.J.COX	7-25-78
REVISED THE CO-ORDINATES AND CURVE DATA.			SHOWED ACCESS TO DIKE AND SPECIFIED MIN. 12" COVER REQ. FOR RCP ASSM. PIPE			GENERAL REVISION.		

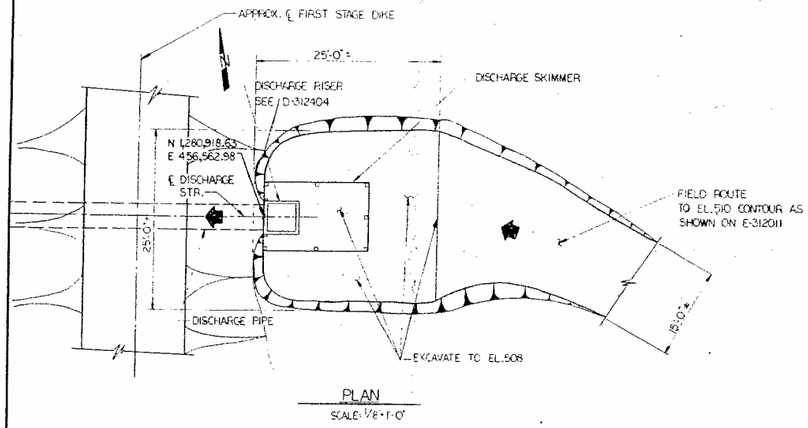
DESIGNED RJ Cox
APPROVED
DRAWN
CHECKED ACS
APPROVED

ALABAMA POWER COMPANY
JOB-GADSDEN STEAM PLANT
DETAIL-ASHPOND EXTENSION STAGE III

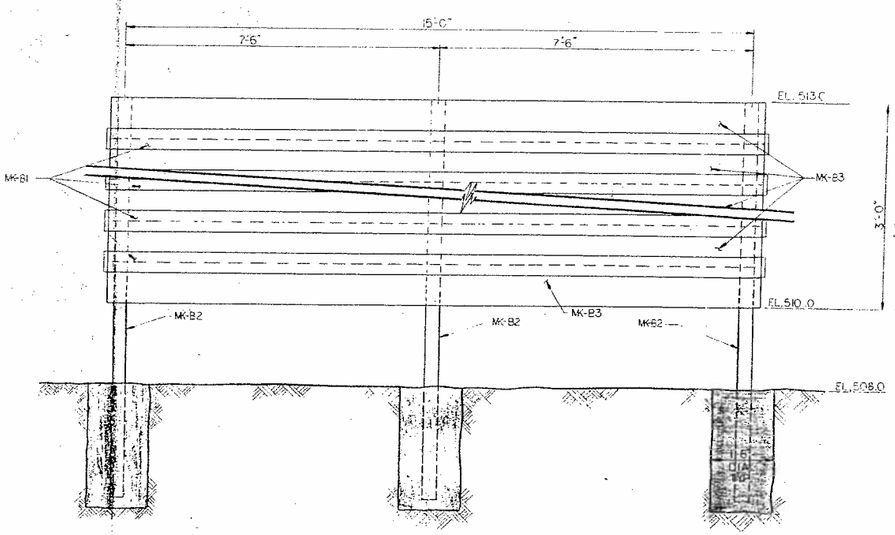
E-318035
Sheet 3 Scale 1"=60'



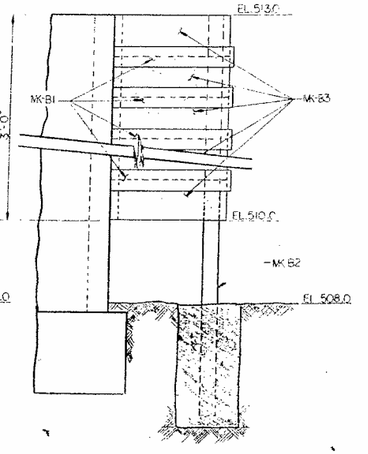
CONFIDENTIAL



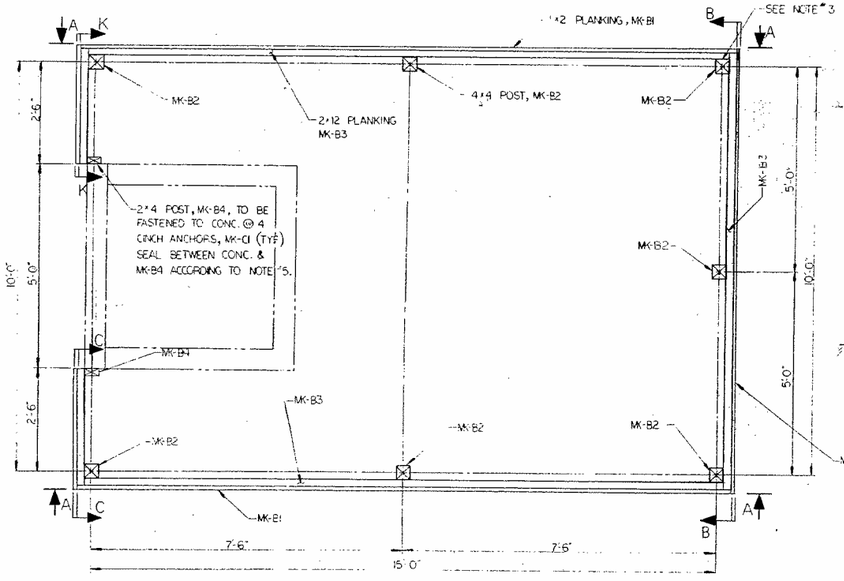
PLAN
SCALE: 1/8"=1'-0"



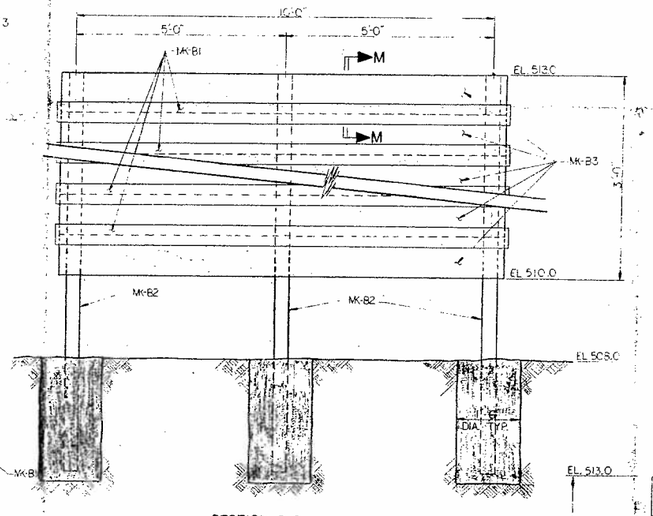
SECTION A-A
NTS



SECTION C-C
SECTION K-K, OPP. HAND
NTS

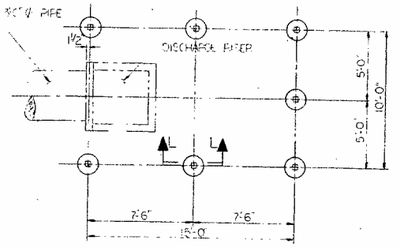


PLAN-DISCHARGE SKIMMER
SCALE: 3/4"=1'-0"



SECTION B-B
NTS

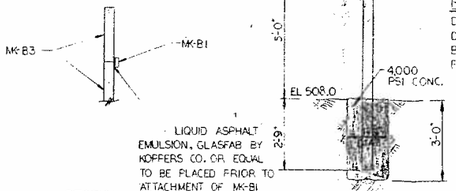
NOTES:
1. ALL TIMBER SHALL BE CELLON TREATED SOUTHERN PINE NO."1 DENSE S4S.
2. ALL CONNECTIONS SHALL BE NAILED UNLESS OTHERWISE NOTED (GALV. NAILS).
3. ALL TIMBER ATTACHED TO POSTS SHALL BE ATTACHED WITH GALVANIZED LAG SCREWS.
4. ALL CORNERS & JOINTS TO BE SEALED WITH A LIQUID ASPHALT EMULSION, GLASFAB BY KOPPERS CO. OR EQUAL.
5. DISCHARGE SKIMMER SHALL BE LOCATED PER PARA. E 312011.



FOOTING PLAN
SCALE: 1/4"=1'-0"

REFERENCES:

D-312404	HEAT LINES & REINF. FOR RISER PIPE & DIAPHRAGMS
D-312405	ASH POND DISCHARGE ELEVATION & BEDDING DETAILS
B-312406	BILL OF MATERIALS
E-312011	ASH POND LAYOUT



SECTION M-M
TYP.

SECTION L-L
NTS

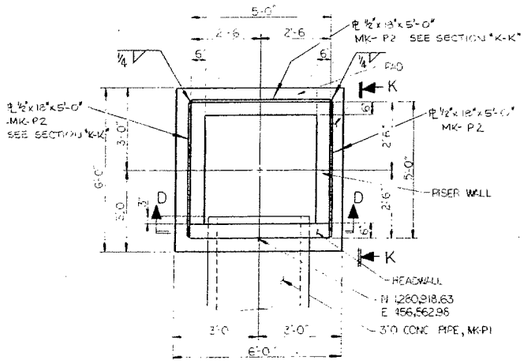
REV.	BY	DATE	DESCRIPTION
1	D. CREEL	5-12-76	GENERAL REVISION

ALABAMA POWER COMPANY
JOB: GADSDEN STEAM PLANT
DETAIL: DISCHARGE SKIMMER PLAN & DETAILS @ ASH POND DISCH. STR.
SCALE: AS NOTED
DRAWN: D. CREEL 3-17-76 CHECKED TRACED
APPROVED: DATE 5/18/76
APPROVED: DATE 5/17/76
B/M: B-312406
SHEET 1 OF 1 SHEETS
SUPERSEDES
D-312403

DRAWING 24064

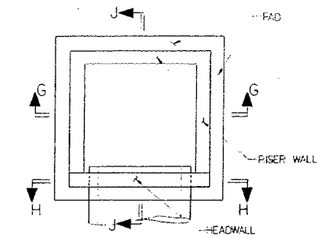
CONFIDENTIAL

GADS-API-0007



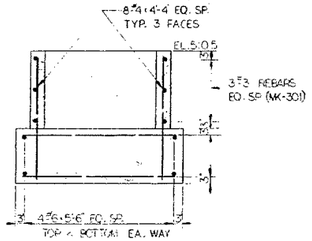
PLAN

DISCHARGE RISER & PAD
NEAT LINES
1 REQ'D
EST. TOT. CONC. = 3.4 CU. YDS.



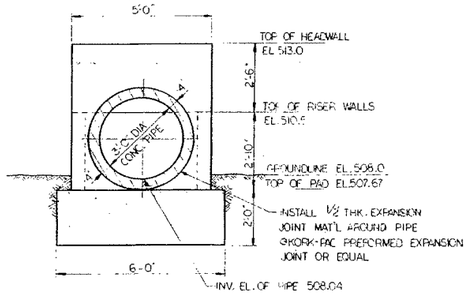
REINF. PLAN

DISCHARGE RISER & PAD



SECTION G-G

REINFORCING

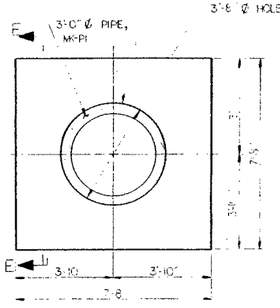


SECTION D-D

NEAT LINES

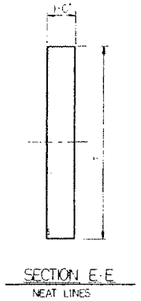
PIPE TO BE COATED @ A LIQUID ASPHALT EMULSION PRIOR TO POURING OF DIAPHRAGM

3'-8" Ø HOLE



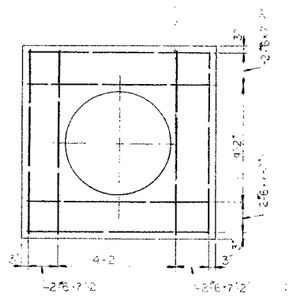
DIAPHRAGM - ELEVATION

NEAT LINES
5 REQ'D
EST. TOT. CONC. PER DIAPHRAGM = 1.8 CU. YDS.
TO BE FORMED IN PLACE



SECTION E-E

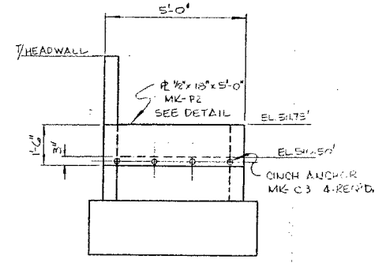
NEAT LINES



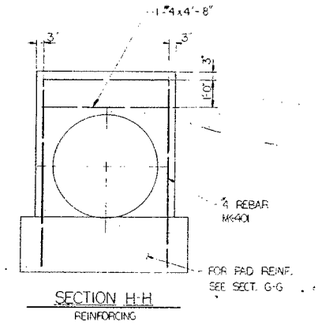
DIAPHRAGM - ELEVATION

REINFORCING

NOTE: DIAPHRAGM REINF. SHALL HAVE A MIN. OF 4" CL. UNLESS NOTED OTHERWISE.

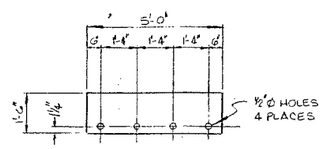


SECTION "K-K"

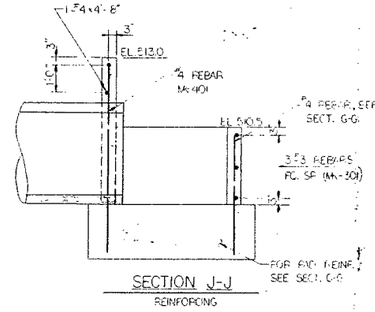


SECTION H-H

REINFORCING



DETAIL MK-P2



SECTION J-J

REINFORCING

NOTES:

1. BEVEL EXPOSED EDGES OF CONC. 1".
2. CONC. TO DEVELOP 4,000 PSI COMPRESSIVE STRENGTH IN 28 DAYS.
3. IF READY-MIX CONC. IS TO BE USED FROM A SUPPLIER APPROVED BY THE PURCHASER, ALL CONC. IS TO BE PLACED IN THE STR. WITHIN 1½ HRS. AFTER MIXING, UNLESS LONGER TIME IS PERMITTED BY THE PURCHASER.
4. ALL REINF. STL. SHALL CONFORM TO ASTM A-615-66 STD. SPECS. FOR DEFORMED BILLET STL. BARS GRADE 60.
5. SEE APCO DWG E-312011 FOR LOCATION OF DISCH. & SEE D-312405 FOR DIAPHRAGM LOCATION.
6. THE EXPANSION JOINT MAT'L AROUND THE CONC. PIPE SHALL BE PROVIDED WHERE THE PRECAST PIPE COMES IN CONTACT WITH THE POURED-IN-PLACE CONC. AT THE RISER.

REFERENCES

D-312402	DISCHARGE SWIMMER PLAN & DETAILS
D-312405	ASH POND DISCHARGE ELEVATION & BEDDING DETAILS
BR-312407	FILL OF REINFORCING
E-312011	ASH POND DIKE LAYOUT
B-312406	BALL VALVE MATCH MARK

REV. #	DATE	DESCRIPTION	BY
3	7/14/78	DASH TYPE FILLED W/ CONC. FOR NEW DIKE	
2	7/14/77	ADDED STEEL PLATE TO RISER	D.M.
1	5-12-76	GENERAL REVISION	D. CREEL

DRAWN D. CREEL CHECKED TRACED
APPROVED DATE 5/12/76
APPROVED DATE 5/12/76

ALABAMA POWER COMPANY

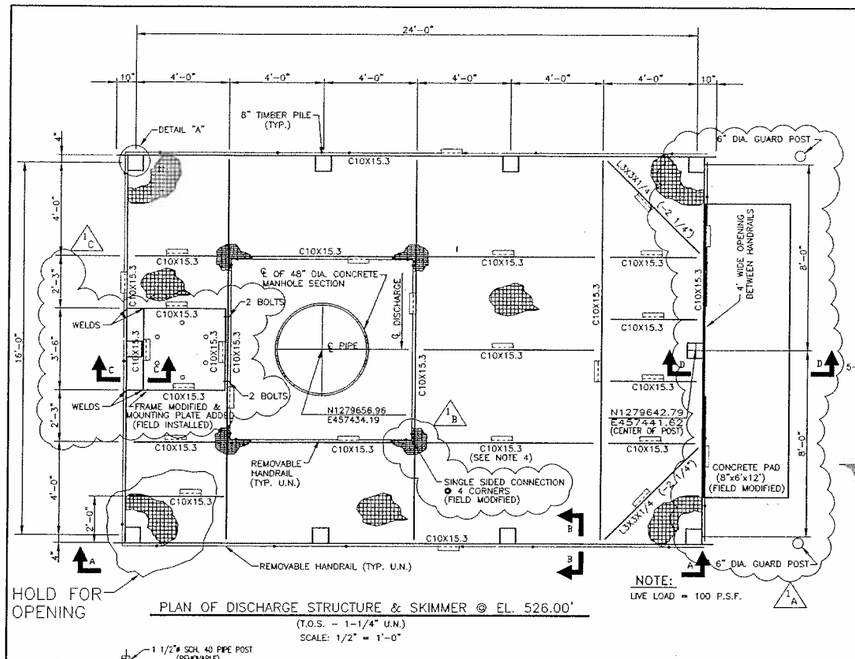
JOB GADSDEN STEAM PLANT
DETAIL NEAT LINES - REINF. FOR RISER, PAD, & DIAPHRAGMS - ASH POND DISCH. STR.
SCALE 1/2"=1'-0" B/M B-312406
SHEET 1 OF 1 SHEETS
SUPERSEDES

D-312404

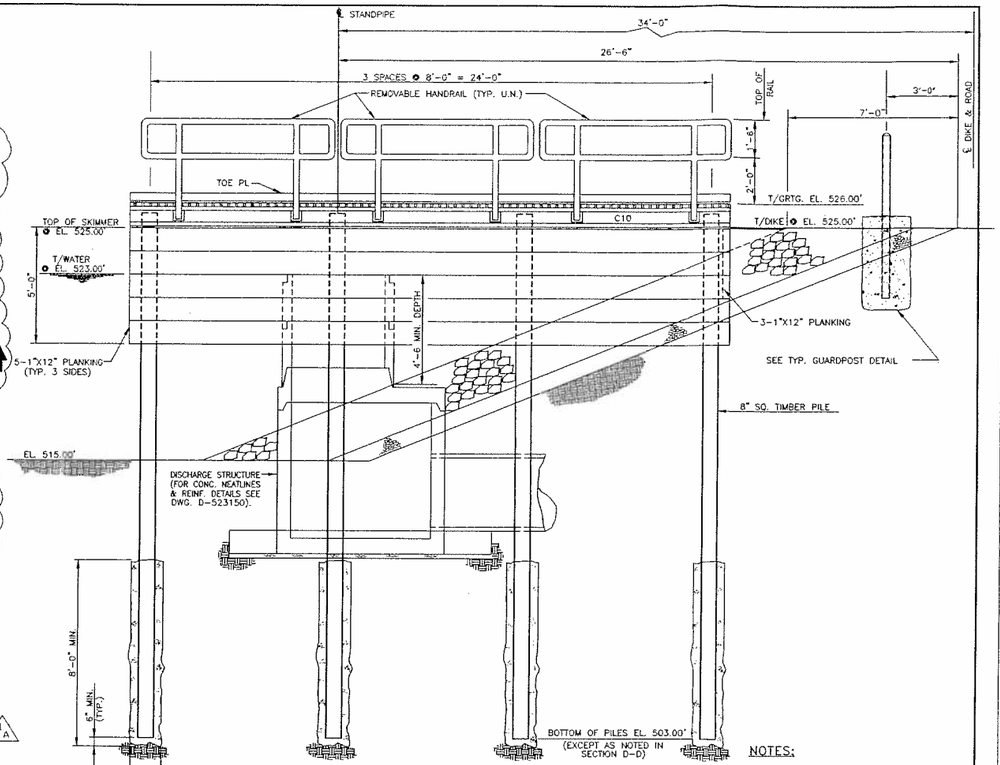
CONFIDENTIAL

GADS-API-0008

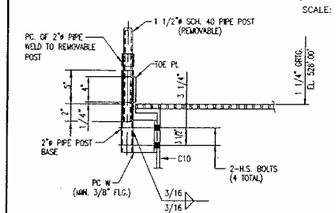
BRUNING 2-6064



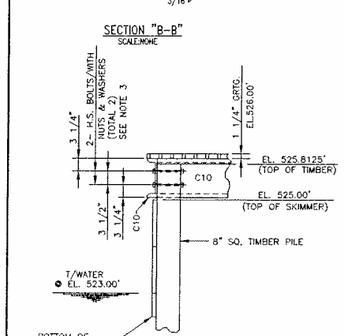
PLAN OF DISCHARGE STRUCTURE & SKIMMER @ EL. 526.00'
(T.O.S. - 1-1/4" U.N.)
SCALE: 1/2" = 1'-0"



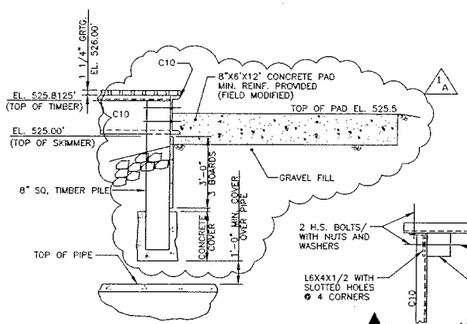
SECTION "A-A"
SCALE: = 1/2" =1'-0"



SECTION "B-B"
SCALE:NONE

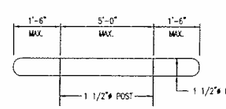


SECTION "C-C"
SCALE: 1" = 1'-0"



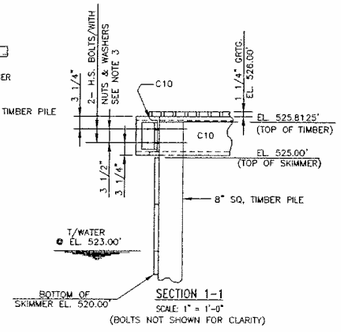
SECTION "D-D"
SCALE 1" = 1'-0"
(BOLTS NOT SHOWN FOR CLARITY)

DETAIL "A"
SCALE: 1" = 1'-0"
(BOLTS NOT SHOWN FOR CLARITY)

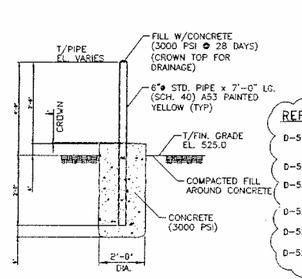


TYP. HANDRAIL DETAIL
SCALE: NONE

NOTE:
LIMIT THE NUMBER OF DIFFERENT DIMENSIONAL HANDRAIL SECTIONS WHERE POSSIBLE.
FOR VERTICAL DIMENSIONS OF HANDRAIL SEE SECTION A-A.



SECTION 1-1
SCALE: 1" = 1'-0"
(BOLTS NOT SHOWN FOR CLARITY)



TYP. GUARDPOST DETAIL
SCALE:1/2"=1'-0"

NOTES:

1. FOR NOTES AND SPECIFICATIONS PERTAINING TO CONCRETE,STEEL,GRATING,HANDRAIL, TIMBER AND EARTH WORK. SEE DWG. D-523147.
2. FOR DRAWING REFERENCES SEE DWG. D-523147.
3. BOLT HOLES IN C10's AT THE TIMBER PILES SHALL BE FIELD DRILLED TO MATCH HOLES IN THE PILES. ALL BOLTS THRU TIMBER PILES SHALL USE 3/8"X2 1/2"X2 1/2" PLATE WASHERS. SEE DETAIL "1" FOR CORNER POST BOLTING ARRANGEMENT.
4. INTERNAL C10's SHALL HAVE ONE END CONNECTION SLOTTED FOR FIELD ADJUSTMENT.

REFERENCES:

D-523147	NEW ASH POND DISCHARGE STRUCTURE DRAWING INDEX, NOTES, AND SPECIFICATIONS
D-523148	NEW ASH POND DISCHARGE STRUCTURE GENERAL PLAN AND SECTION
D-523150	NEW ASH POND DISCHARGE STRUCTURE CONCRETE NEATLINES AND REINFORCING DETAILS
D-523151	NEW ASH POND DISCHARGE STRUCTURE PHASES OF CONSTRUCTION
D-523152	NEW ASH POND DISCHARGE STRUCTURE MISC. BACKFILL SECTIONS AND DETAILS
D-523153	NEW ASH POND DISCHARGE STRUCTURE GENERAL PLAN OF ASH POND

CAB D523149
ACAD2000 | RLJ-09

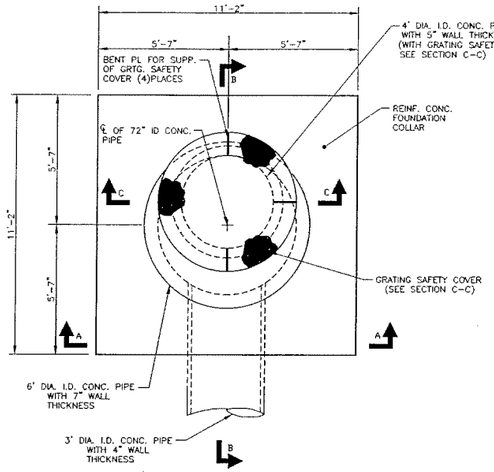
WORK THIS DWG. WITH D-523150

NO.	DESCRIPTION	BY	CHK	APP	DATE
C.	FRAME MODIFIED & ADDED MOUNTING PLATE	RJ	RMP	JRK	5-24-01
D.	ADDED REFERENCES	RJ	RMP	JRK	5-24-01

REFLECTS AS-BUILT CONDITION	REV. 0	DATE: 5-24-01	DRAWN R.JARVIS	CHECKED CNS/PMG	DESIGNED P. GORDON
A. REVISED CONC PAD	ISSUED FOR CONSTRUCTION		APPROVED RMP	JRK	PLY
B. REVISED CONNECTION	JOB NO. GD-500-00		APPROVED		

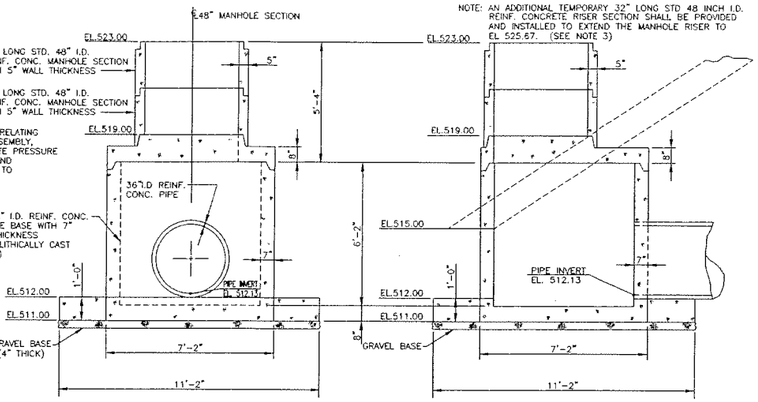
Southern Company Services, Inc.
for
Alabama Power Company
JOB GADSDEN STEAM PLANT
DESN NEW ASH POND DISCHARGE STRUCTURE
ACCESS PLATFORM AND SKIMMER
SCALE AS NOTED D/R
SHEET 1 OF 1 SHEETS
SUPERSEDES
D-523149 | REV 1

CONFIDENTIAL



DISCHARGE STRUCTURE – MANHOLE ASSEMBLY AND CONCRETE FOUNDATION COLLAR

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

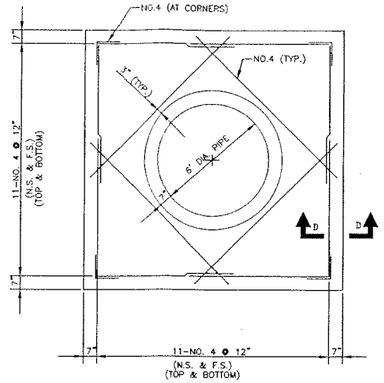


NOTE:
FOR SPECIFICATIONS RELATING TO THE MANHOLE ASSEMBLY, REINFORCED CONCRETE PRESSURE PIPE, JOINT SEALS, AND CONNECTIONS REFER TO DWG. E-523147.

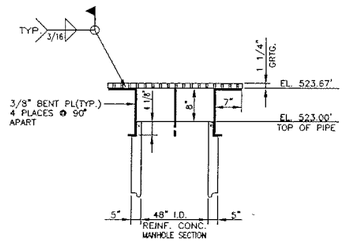
DISCHARGE STRUCTURE – MANHOLE ASSEMBLY
SECTION A-A
NEATLINE
SCALE: 1/2" =1'-0"

NOTE: AN ADDITIONAL TEMPORARY 32" LONG STD 48 INCH I.D. REINF. CONCRETE RISER SECTION SHALL BE PROVIDED AND INSTALLED TO EXTEND THE MANHOLE RISER TO EL 525.67. (SEE NOTE 3)

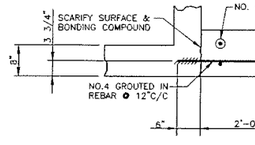
DISCHARGE STRUCTURE – MANHOLE ASSEMBLY
SECTION B-B
NEATLINE
SCALE: 1/2" =1'-0"



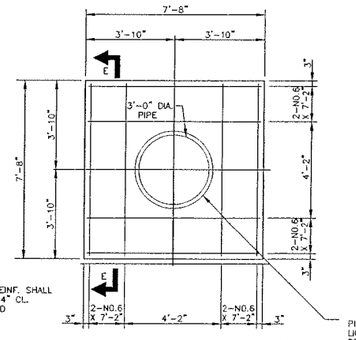
CONCRETE FOUNDATION COLLAR
REINFORCING PLAN
SCALE: 1" =1'-0"



GRATING SAFETY COVER
SECTION C-C
NEATLINE
SCALE: 1/2" =1'-0"



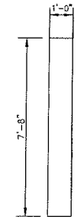
SECTION D-D
NEATLINE
SCALE: 1" =1'-0"



NOTE:
DIAPHRAGM REINF. SHALL HAVE A MIN. 4" CL. UNLESS NOTED OTHERWISE.

DISCHARGE PIPE DIAPHRAGM –ELEVATION
3 REQ'D @ 18' APART
EST.TOT. CONC. PER DIAPHRAGM = 1.8 CU. YDS.
TO BE FORMED IN PLACE
NEATLINE & REINFORCING
SCALE: 1/2" =1'-0"

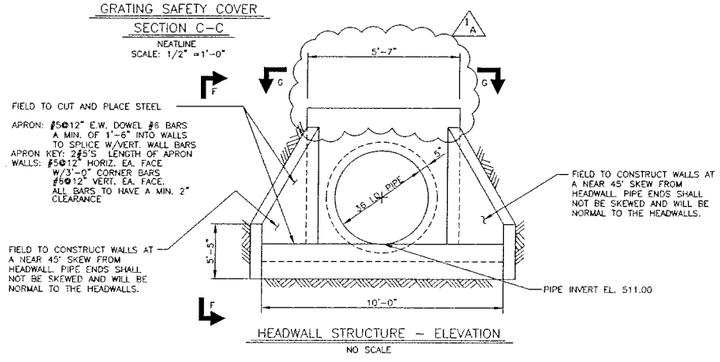
PIPE TO BE COATED WITH A LIQUID ASPHALT EMULSION PRIOR TO POURING OF DIAGHRAGM



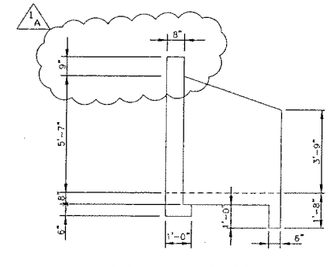
SECTION E-E
NEATLINE
SCALE: 1/2" =1'-0"

NOTES:

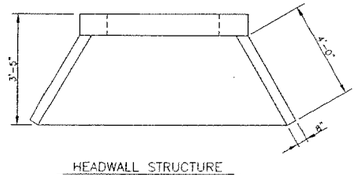
1. FOR NOTES AND SPECIFICATIONS PERTAINING TO CONCRETE,STEEL,GRATING,HANDRAIL,PIPE TIMBER, AND EARTH WORK. SEE DWG. D-523147.
2. FOR DRAWING REFERENCES SEE DWG. D-523147.
3. THE JOINT SEALANT AND GASKET OF THE TEMPORARY RISER SECTION SHALL BE WELL LUBRICATED AS NECESSARY AT TIME OF ITS INSTALLATION TO FACILITATE THE REMOVAL OF THIS SECTION WHEN THIS NEW DISCHARGE STRUCTURE IS PLACED IN OPERATION. CARE SHALL BE EXERCISED WHEN REMOVING THIS TEMPORARY SECTION SO AS NOT TO DAMAGE THE JOINT OF THIS SECTION OR THE JOINTS OF THE SECTIONS BELOW IT.
4. AN 18 INCH LONG 48 INCH I.D. RISER EXTENSION SHALL ALSO BE PROVIDED AND INSTALLED AT THE EXISTING DISCHARGE STRUCTURE THAT WILL EXTEND THE TOP OF THAT STANDPIPE FROM EL 523.0 TO EL 524.5. (SEE DWG D-523147, MISCELLANEOUS – NOTE 2)



HEADWALL STRUCTURE – ELEVATION
NO SCALE



HEADWALL STRUCTURE
SECTION F-F
NO SCALE



HEADWALL STRUCTURE
SECTION G-G
NO SCALE

REFERENCES:

D-523147	NEW ASH POND DISCHARGE STRUCTURE DRAWING INDEX, NOTES, AND SPECIFICATIONS
D-523148	NEW ASH POND DISCHARGE STRUCTURE GENERAL PLAN AND SECTION
D-523149	NEW ASH POND DISCHARGE STRUCTURE ACCESS PLATFORM AND SKIMMER
D-523151	NEW ASH POND DISCHARGE STRUCTURE PHASES OF CONSTRUCTION
D-523152	NEW ASH POND DISCHARGE STRUCTURE MISC. BACKFILL SECTIONS AND DETAILS
D-523153	NEW ASH POND DISCHARGE STRUCTURE GENERAL PLAN OF ASH POND

NO.	BY	DATE	CHK	APP'D	DESCRIPTION
0	RWJ	5-24-01	CNS	PMG	ISSUED FOR CONSTRUCTION
A	RWJ	7-31-01	CNS	PMG	REVISED AND ADDED NOTES
B	RWJ	9-13-01	CNS	PMG	ADDED REFERENCES

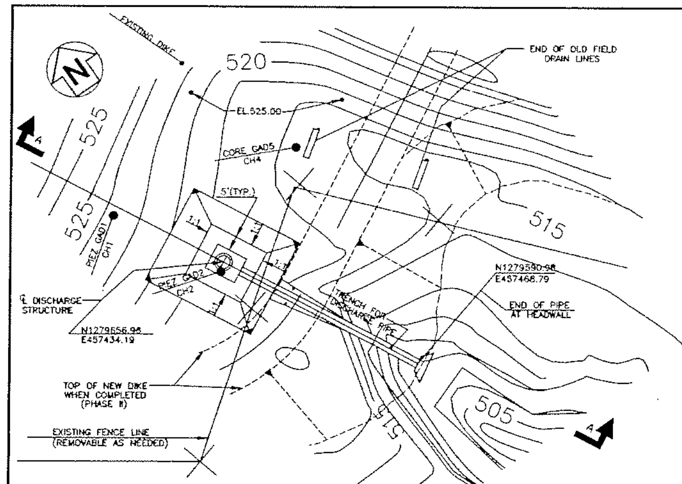
REV 0 DATE: 5-24-01
ISSUED FOR CONSTRUCTION
A. REVISED AND ADDED NOTES
JOB NO. GD-500-00
REFLECTS AS-BUILT CONDITION
A. TOP OF HEADWALL MODIFIED
B. ADDED REFERENCES

DRAWN RWJ CHECKED CNS RELEASED PMG
APPROVED PMP JRK PLY
APPROVED

CAD DS23150
ACAD2000 RLJ-04

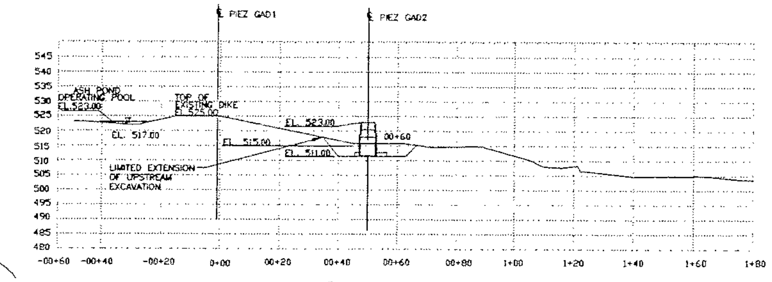
Southern Company Services, Inc.
for
Alabama Power Company
GADSDEN STEAM PLANT
NEW ASH POND DISCHARGE STRUCTURE
CONCRETE NEATLINES & REINFORCING DETS.
SCALE AS NOTED
SHEET 1 OF 1 SHEETS
D-523150 REV 1

CONFIDENTIAL



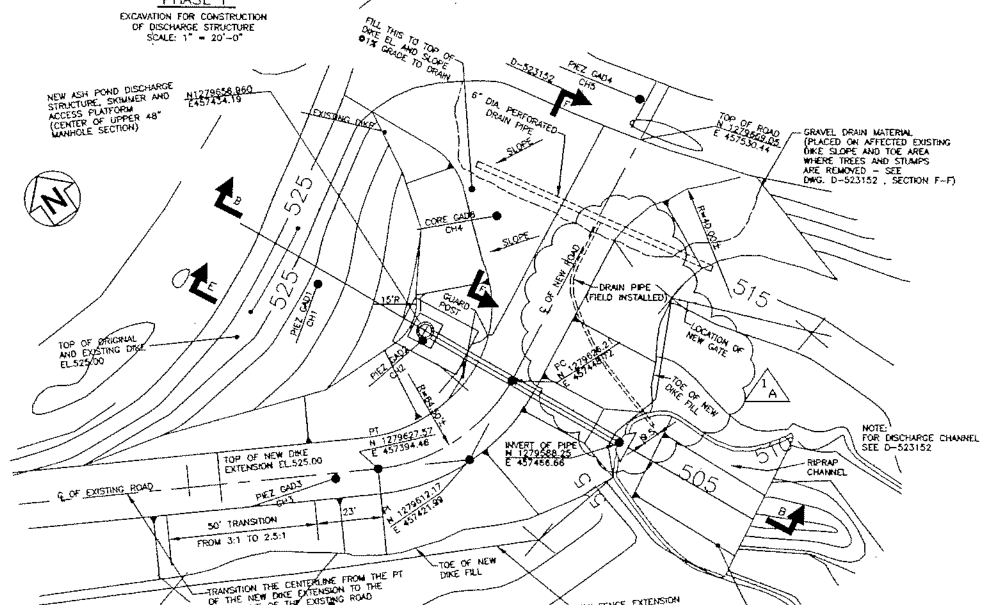
PHASE I

EXCAVATION FOR CONSTRUCTION OF DISCHARGE STRUCTURE
SCALE: 1" = 20'-0"



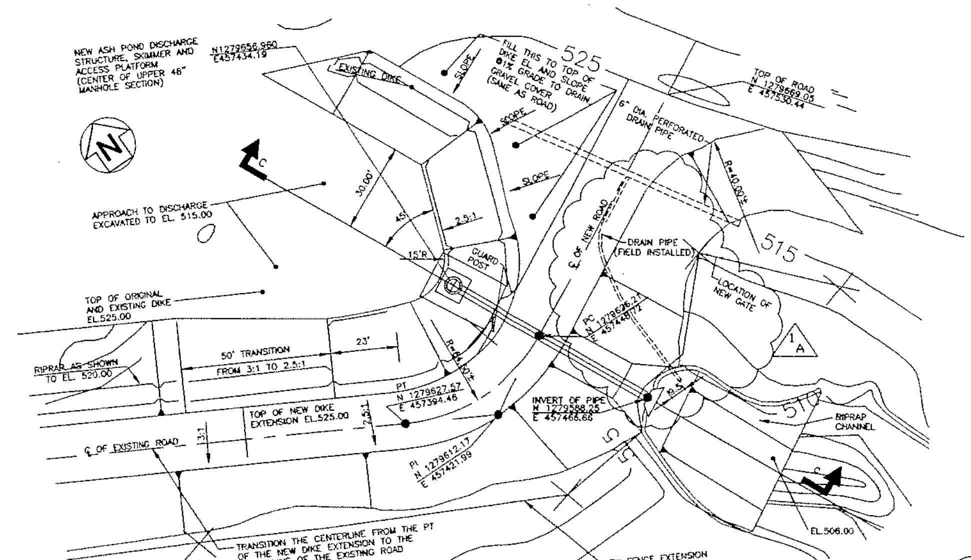
PHASE I
SECTION A–A
SCALE: 1" =20'-0"

NOTE:
LIMITED EXTENSION OF UPSTREAM EXCAVATION



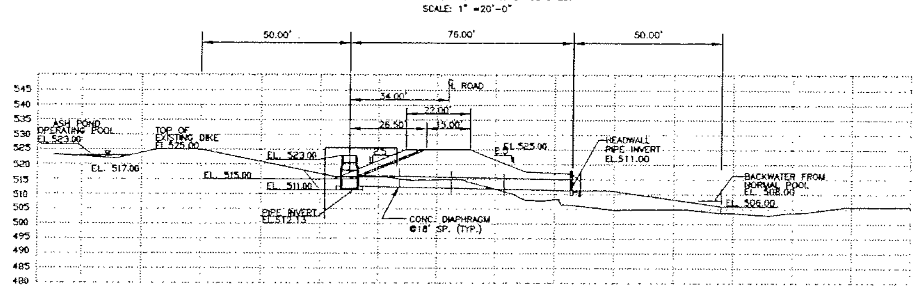
PHASE II

CONSTRUCTION OF NEW DIKE EXTENSION, ACCESS PLATFORM,SKIMMER,DISCHARGE PIPE AND OTHER PERTAINANT STRUCTURES.
SCALE: 1" =20'-0"

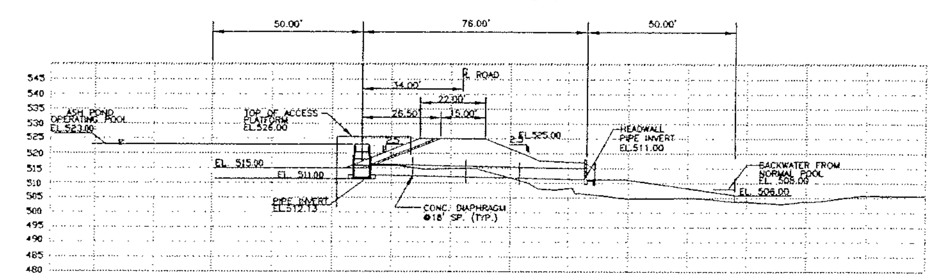


PHASE III

COMPLETION OF EARTHWORK AND CONSTRUCTION OF APPROACH CHANNEL
SCALE: 1" =20'-0"



PHASE II
SECTION B–B
SCALE: 1" =20'-0"



PHASE III
SECTION C–C
SCALE: 1" =20'-0"

REFERENCES:

D-523147	NEW ASH POND DISCHARGE STRUCTURE DRAWING INDEX, NOTES, AND SPECIFICATIONS
D-523148	NEW ASH POND DISCHARGE STRUCTURE GENERAL PLAN AND SECTION
D-523149	NEW ASH POND DISCHARGE STRUCTURE ACCESS PLATFORM AND SKIMMER
D-523150	NEW ASH POND DISCHARGE STRUCTURE CONCRETE NEATLINES & REINFORCING DETAILS
D-523152	NEW ASH POND DISCHARGE STRUCTURE MISC. BACKFILL SECTIONS AND DETAILS
D-523153	NEW ASH POND DISCHARGE STRUCTURE GENERAL PLAN OF ASH POND

1 B

CAD D-523151
ACAD2000 | RLJ-09

Southern Company Services, Inc.
for
Alabama Power Company

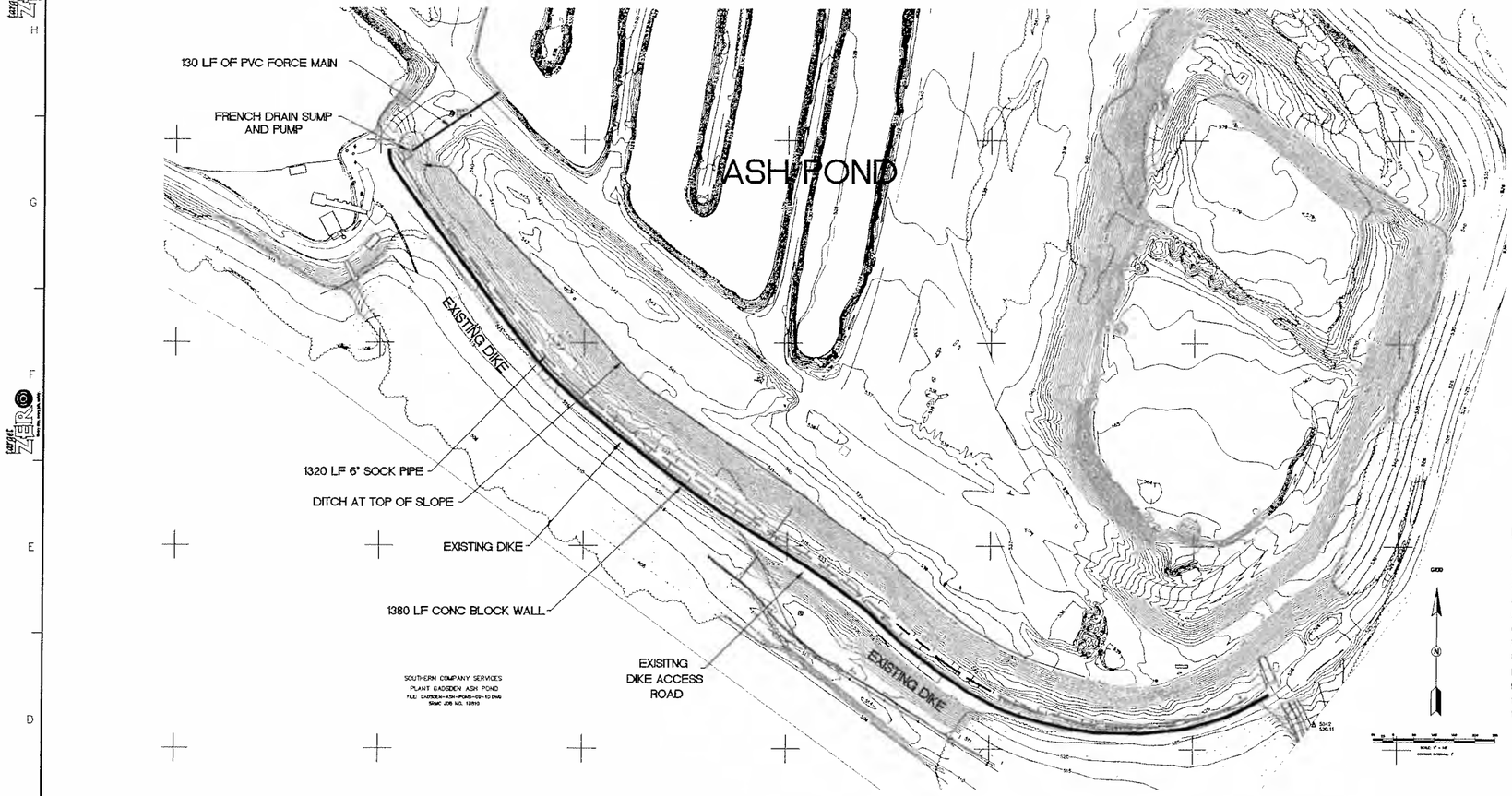
JOB: GADSDEN STEAM PLANT
DETAIL: NEW ASH POND DISCHARGE STRUCTURE
PHASES OF CONSTRUCTION
SCALE: AS NOTED

D-523151 REV 1

REV 1 — REFLECTS AS-BUILT CONDITION
A. ADDED DRAIN BY FIELD
B. ADDED REFERENCES

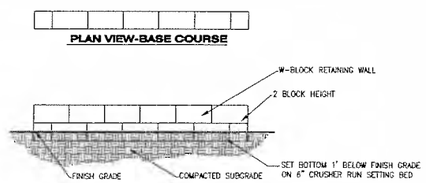
REV 0 DATE: 5-24-01
ISSUED FOR CONSTRUCTION
JOB NO. GD-500-00

DRAWN: RLJ CHECKED: JPM/PMG DESIGNED: PMG
APPROVED: RMP JRK PLY

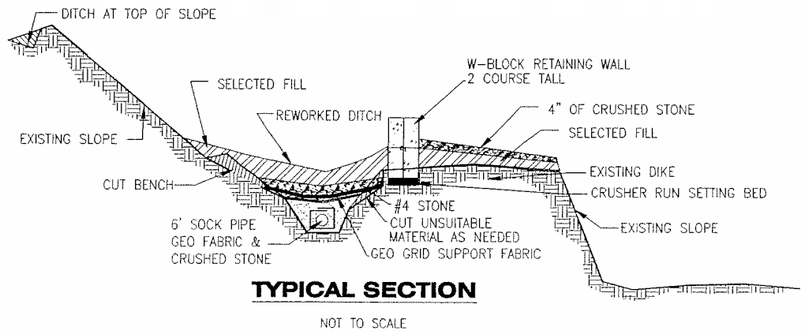


BILL OF MATERIALS

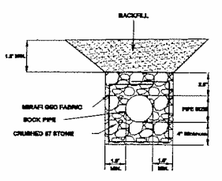
1. 500 2X2X6 CONC BLOCKS
2. 1320 LF OF 6" SOCK PIPE CONC BLOCKS
3. 1500 SY OF GEO GRID SUPPORT FABRIC
4. 1200 SY OF 8 OZ. NON-WOVEN GEO FABRIC
5. 90 CY OF CRUSHED STONE FINES FOR WALL BASE
6. 1200 CY OF CRUSHED #57 STONE FOR SOCK PIPE
7. 400 CY OF #4 STONE
8. 325 CY OF CRUSHED STONE FOR THE DIKE ROAD ITEMS THAT NEED TO BE SIZED FOR FLOW
9. PRECAST CONC. SUMP
10. PUMP W/ APPURTENANCES AND ELEC.
11. 130 LF OF PVC FORCE MAIN



W-BLOCK DETAILS
NOT TO SCALE



TYPICAL SECTION
NOT TO SCALE



TYP. FRENCH DRAIN SECTION
NTS

PRELIMINARY-NOT FOR CONSTRUCTION

REVISION	DATE	BY	CHK'D	CIVIL APPR	ELECT APPR	I/C APPR	MECH APPR	ENVIR APPR
0	10-14-10	CSM	RCB	RCB				JBS

RELEASED FOR COMMENTS

Southern Company Generation
Engineering and Construction Services
FOR
Alabama Power Company

PLANT GADSDEN
ASH POND DRAINAGE
AND DIKE REMEDIATION

SCALE	DRAWING NUMBER	SHEET	CONT'D	REV
AS SHOWN	CSK101410	–	–	0

ANSI E 44x34 Acad2008

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GADS-API-0018

GADSDEN STEAM PLANT - ASH POND DAM SURVEILLANCE
VISUAL INSPECTION CHECK LIST AND REPORT

Inspection Date: _____ **Time:** _____ **Pond Water Level:** _____ **ft. msl**

Rainfall Since Last Inspection: _____ **inches** **Weather:** _____

Conditions Noted During Inspection	Yes	No
UPSTREAM SLOPE AND CREST - LOWER DAM		
Slumping or Sliding		
Sinks or Depressions		
Erosion or Soil Cracking		
Disturbance of Riprap (if any)		
Excessive Vegetation		
Animal Burrows / Fire Ant Hills		
Differential Settlement		
DOWNSTREAM SLOPE AND TOE - LOWER DAM		
Slumping or Sliding		
Sinks or Depressions		
Significant Erosion		
Wet Zones / Seepage		
Shrinkage Cracks		
Excessive Vegetation		
Animal Burrows / Fire Ant Hills		
Heaving of Toe		
Beaver Dam Activity		

Conditions Noted During Inspection	Yes	No
DOWNSTREAM SLOPE AND TOE - UPPER DAM		
Significant Erosion		
Wet Zones / Seepage		
OTHER DAM SAFETY CONDITIONS OF NOTE		

OTHER ASH LAKE STRUCTURES	Inspected?
Main Gate	
Lower Lake Boom Divider	
Lower Lake Discharge Structure, Skimmer	
Re-Circulation Pumps and Lines	
Ditch around Upper Lake Dike	
Roads around Upper Lake Dike	
Ash Lines	
Ash Lines Entering Upper Lake	
Ash Lines Discharging in Upper Lake	
Upper Lake Discharge to Lower Lake	
Alignment of Upper-to-Lower Lake Discharge	
Ferric Sulfate Flow	
Turbidity of Discharge to Lower Lake	
Carbon Dioxide Tank	
CO_2 Pressure (PSI)	
CO_2 Contents (lbs)	
Ferric Tank Observed for Leaks and Condition	
Amount of Ferric on hand (gallons)	
Off-Road Diesel Tank Checked for Leaks	
Fugitive Dust Concerns	
Safety or Security Concerns	

If any conditions noted 'Yes", provide comments below (including locations, attach location plan):

NOTE: If any observations noted during the inspection represent a notable change in condition, SCG Hydro Services should be contacted immediately.

Inspector: _____

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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.

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Table of Contents

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

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

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.

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.

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)

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

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.

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.

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

Site Name:	**Plant Gadsden**	**Date:**	28 February 2011
Unit Name:		**Operator's Name:**	Alabama Power
Unit I.D.:		**Hazard Potential Classification:**	**High** ☐ **Significant** ☒ **Low** ☐
	Inspector's Name:	Joe Klein, P.E. and Frank Lockridge, P.E.	

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

	Yes	No		Yes	No
1. Frequency of Company's Dam Inspections?	**X** See Note Below		18. Sloughing or bulging on slopes?		**X**
2. Pool elevation (operator records)?	**523.3**		19. Major erosion or slope deterioration?		**X**
3. Decant inlet elevation (operator records)?	**523.0**		20. Decant Pipes:		
4. Open channel spillway elevation (operator records)?	**N/A**		Is water entering inlet, but not exiting outlet?		**X**
5. Lowest dam crest elevation (operator records)?	**525.0**		Is water exiting outlet, but not entering inlet?		**X**
6. If instrumentation is present, are readings recorded (operator records)?	**N/A**		Is water exiting outlet flowing clear?	**X**	
7. Is the embankment currently under construction?		**X**	21. Seepage (specify location, if seepage carries fines, and approximate seepage rate below):		
8. Foundation preparation (remove vegetation, stumps, topsoil in area where embankment fill will be placed)?	**N/A**		From underdrain?		**X**
9. Trees growing on embankment? (If so, indicate largest diameter below)		**X**	At isolated points on embankment slopes?		**X**
10. Cracks or scarps on crest?		**X**	At natural hillside in the embankment area?		**X**
11. Is there significant settlement along the crest?		**X**	Over widespread areas?		**X**
12. Are decant trashracks clear and in place?	**X**		From downstream foundation area?		**X**
13. Depressions or sinkholes in tailings surface or whirlpool in the pool area?		**X**	"Boils" beneath stream or ponded water?		**X**
14. Clogged spillways, groin or diversion ditches?		**X**	Around the outside of the decant pipe?		**X**
15. Are spillway or ditch linings deteriorated?		**X**	22. Surface movements in valley bottom or on hillside?		**X**
16. Are outlets of decant or underdrains blocked?		**X**	23. Water against downstream toe?	**X** See Note Below	
17. Cracks or scarps on slopes?		**X**	24. Were Photos taken during the dam inspection?	**X**	

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

Issue #	Comments
1	Impoundment inspected weekly by Plant personnel and annually by Southern Company Generation (SCG) Hydro Services dam safety engineer. Inspections conducted in accordance with SCG *Safety Procedures for Dams and Dikes*
23	Observed isolated areas of surface ponding along toe of slope. May be the results of precipitation on the day prior to the site visit.

Coal Combustion Waste (CCW)

Impoundment Inspection

Impoundment NPDES Permit AL 0002887 **INSPECTOR** Joe Klein, P.E. & Frank Lockridge, P.E.

Date February 1, 2003 (Effective Date)
Impoundment Name Gadsden Steam Plant

Impoundment Company Alabama Power Company
EPA Region 4

State Agency (Field Office) Address Alabama Department of Environmental Management
Birmingham Branch
110 Vulcan Road
Birmingham, AL

Name of Impoundment Gadsden Steam Plant

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

New ☒ **Update** ☐

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

IMPOUNDMENT FUNCTION: Storage of sluiced fly ash

Nearest Downstream Town Name: Gadsden, AL

Distance from the impoundment: < 1 mile

Location: Impoundment is located across the Coosa River from the plant site. Latitude and longitude are different than the plant site itself.

Latitude	34	Degrees	1	Minutes	12.3	Seconds	**N**
Longitude	85	Degrees	58	Minutes	20.2	Seconds	**W**

State Alabama **County** Calhoun

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

If So Which State Agency? Alabama Department of Natural Resources

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.

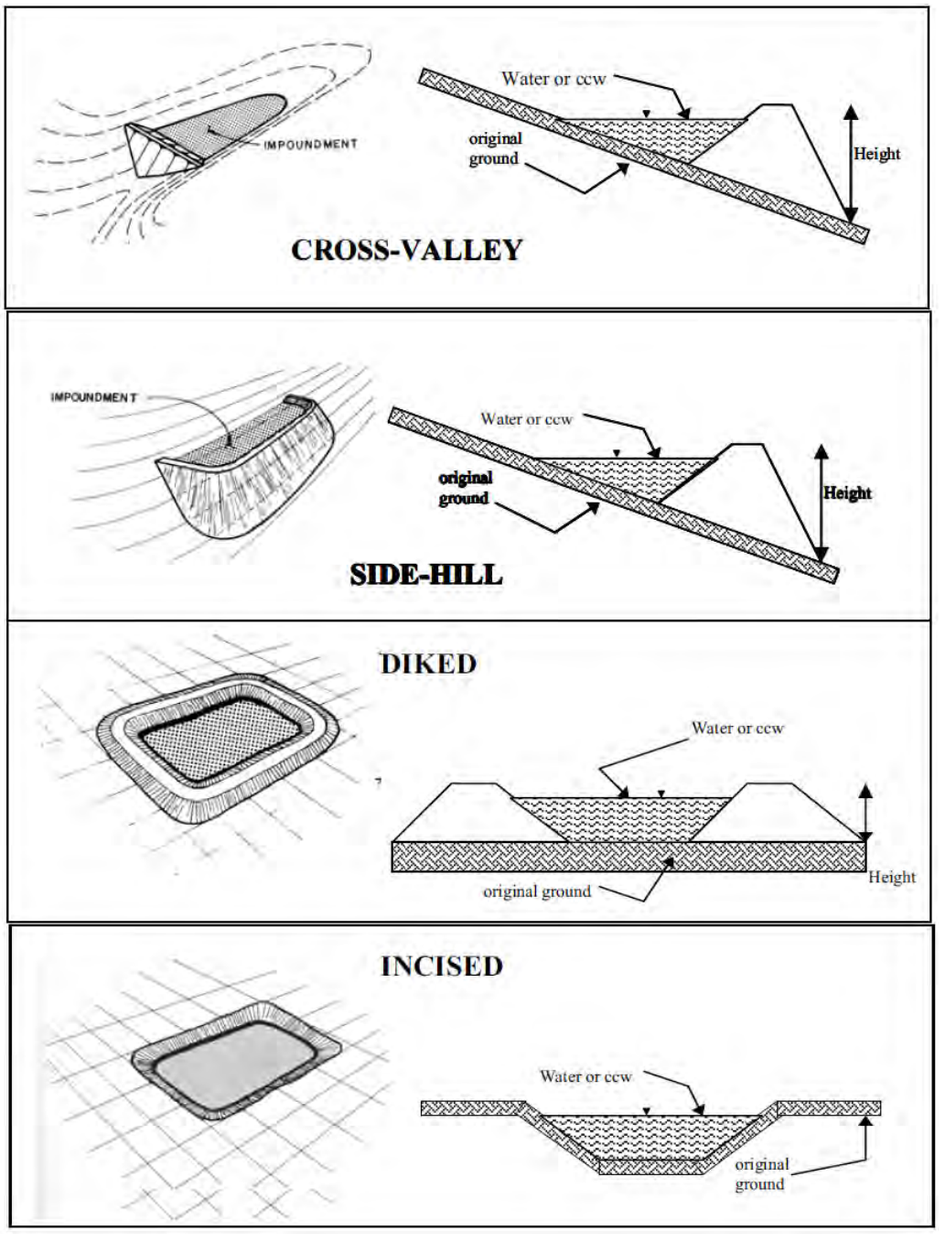
☒ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. 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:

Limited development in the vicinity of the impoundment and the height of the dam indicates a loss of life is not probable in the event of a failure or misoperation of the dam. It's location along the Coosa River less than 1 mile upstream indicates a potentially significant economic and environmental impact in the event of a failure or misoperation of the dam.

CONFIGURATION:



☐ Cross-Valley ☐ Side-Hill ☒ Diked

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

Embankment Height (ft)	15 to 18	**Embankment Material**	None
Pool Area (ac)	73.9	**Liner**	N/A
Current Freeboard (ft)	1.7	**Liner Permeability**	N/A

TYPE OF OUTLET (Mark all that apply)

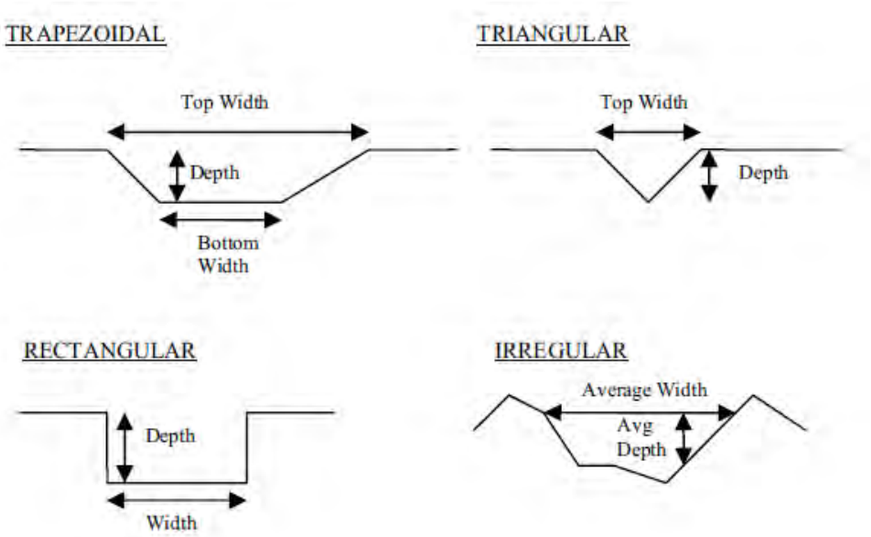
☐ **Open Channel Spillway**

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

depth (ft)

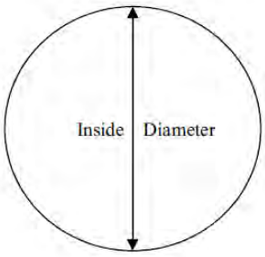
average bottom width (ft)

top width (ft)



☒ **Outlet**

36-inch diameter



Material

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

	Yes	No
Is water flowing through the outlet?	☒	☐

- ☐ **No Outlet**
- ☐ **Other Type of Outlet** (specify):

The Impoundment was Designed By Design firm data not available.

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

If So When?

If So Please Describe :

	Yes	No
Has there ever been significant seepages at this site?	☒	☐
If So When?	Mid to late 1990s	

If So Please Describe :

Seepage was reportedly observed in the 1990s in the area of the northwest corner of the embankment. An inverted filter blanket drain was constructed to repair the slope.

No evidence of seepage was observed during the site visit.

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

If So Please Describe :

ADDITIONAL INSPECTION QUESTIONS

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

Available construction drawings provided as part of the site visit indicate the embankment is supported on natural ground.

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

No.

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

Neither the observations during the site visit nor photographic documentation showed evidence of prior releases, failures of patchwork repairs of the dike.