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Coal Combustion Residue Impoundment

Round 9 - Dam Assessment Report

Miller Steam Plant

Coal Combustion Residue Impoundment Dike
Alabama Power Company
West Jefferson, Alabama

Prepared for:

United States Environmental Protection Agency
Office of Resource Conservation and Recovery

Prepared by:

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INTRODUCTION, SUMMARY CONCLUSIONS AND RECOMMENDATIONS

The release of over five million cubic yards of coal combustion waste from the Tennessee Valley Authority's Kingston, Tennessee facility in December 2008, flooded more than 300 acres of land, damaging homes and property. In response the U.S. EPA is assessing the stability and functionality of the coal combustion ash impoundments and other management units across the country and, as necessary, identifying units, then quickly take any needed corrective measures.

This assessment of the stability and functionality of the Miller Steam Plant Coal Combustion Residue impoundment is based on a review of available documents and on the site assessment conducted by Dewberry personnel on March 1, 2011. We found the supporting technical documentation adequate (Section 1.1.3). As detailed in Section 1.2.1, there are no recommendations based on field observations that may help to maintain a safe and trouble-free operation.

In summary, the Miller Steam Plant Coal Combustion Residue impoundment 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 February 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**. 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 Miller Steam Plant Coal Combustion Residue impoundment that was reviewed and used in preparation of this report.

Factors considered in determining the hazard potential classification of the management units(s) include 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, March 1, 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/Probable Maximum Precipitation design storm without overtopping the dikes.

1.1.3 Conclusions Regarding the Adequacy of Supporting Technical Documentation

The supporting technical documentation is adequate. Technical 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 filed 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 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 main dam is instrumented with piezometers and elevation monuments. The smaller saddle dike is instrumented with piezometers. Based on the size of the dikes, the portion of the impoundment currently used to store wet coal combustion residue and stormwater, the history of satisfactory performance and the current inspection program, installation of additional dike monitoring systems 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 Continued Safe and Reliable Operation

No recommendations appear warranted at this time.

1.3 PARTICIPANTS AND ACKNOWLEDGEMENT

1.3.1 List of Participants

Tommy Ryals – Alabama Power
Greg Blake – Alabama Power
Brandon Patrick – Alabama Power
Laura Berry – Alabama Power
Jim Pegues – Southern Company
Jake Jordan – Southern Company
Steven Burns – Balch & Bingham
Shane Lovett – Alabama Department of Environmental Management
Frank 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 March 1, 2011

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

Frank Lockridge, P.E.

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

2.1 LOCATION AND GENERAL DESCRIPTION

The James Miller Steam Plant is located along the Locust Fork of the Warrior River in Jefferson County, Alabama. The plant is located about 1.5 miles southeast of West Jefferson, Alabama. The plant is operated by Alabama Power Company, an operating unit of Southern Company. The Coal Combustion Residue impoundment is located about 0.4 miles south of the main plant. The site location is shown in Figure 2.1-1. A site aerial photograph and topographic map are provided (See Appendix A - Docs 01 and 02).

Figure 2.1-1 James Miller Steam Plant Site Locations

The Miller Coal Combustion Residue (CCR) management unit is impounded by two dikes: the main dam located along the west side of the impoundment, and the saddle dike located along the eastern side of the impoundment.

Table 2.1: Summary of Dam Dimensions and Size		
	Main Dike	**Saddle Dike**
Dam Height (ft)	170	25
Crest Width (ft)	45	45
Length (ft)	3,300	1,000
Side Slopes (upstream) H:V	2.5:1	2.5:1
Side Slopes (downstream) H:V	2.5:1	2.5:1

The 170-foot high main dam impounds an area of approximately 341 acres and has a capacity of about 22 million cubic yards.

2.2 COAL COMBUSTION RESIDUE HANDLING

Fly ash is collected at the base of each stack by electrostatic precipitators. The collected ash is stored in hoppers and conveyed pneumatically to a silo. From the silo the fly ash is conveyed pneumatically to a feed hopper and loaded into trucks for transportation to offsite beneficial users or dry storage and the filled in portions of the CCR impoundment. Bottom ash is slurried to the CCR impoundment. Dewberry was provided flowcharts for the fly ash and bottom ash handling systems. (See Appendix A – Docs 03 – 07).

The fly ash handling equipment is located inside the plant fence and requires visitors be accompanied by personnel not available at the time of Dewberry's site visit. As a result, the Dewberry assessment team could not physically observe the ash handling equipment. The CCR impoundment is located outside the plant fence.

2.3 SIZE AND HAZARD CLASSIFICATION

The classification for size, based on the height of the embankments and the impoundment storage capacity, is "Large" according to the *USACOE Recommended Guidelines for Safety Inspection of Dams,* ER 1110-2-106

Table 2.2a: USACE ER 1110-2-106 Size Classification		
	Impoundment	
Category	**Storage (Ac-ft)**	**Height (ft)**
Small	50 and < 1,000	25 and < 40
Intermediate	1,000 and < 50,000	40 and < 100
Large	> 50,000	> 100

Alabama did not have a State Dam Safety program at the time Dewberry conducted this assessment. Therefore the impounding dike system does not have an established hazard classification. Dewberry conducted a qualitative hazard classification based on the 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 location of the impoundment, loss of human life is not probable in the event of a catastrophic failure of either the Main Dam or the Saddle Dike. Failure of the Main Dam is expected to have significant economic and environmental impacts. Therefore, Dewberry evaluated the Main Dam as a significant hazard. Failure of the Saddle Dike is not expected to have significant environmental or economic impacts. Therefore Dewberry evaluated the Saddle Dike as a low hazard potential

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: Miller Steam Plant Ash Pond	
Surface Area (acre)[1]	341
Current Storage Capacity (cubic yards)[1]	2,332,450
Current Storage Capacity (acre-feet)	1,445
Total Storage Capacity (cubic yards)[1]	21,951,362
Total Storage Capacity (acre-feet)	12,740
Crest Elevation (feet)	426[2]
Normal Pond Level (feet)	420.5.

[1] Estimates provided by Alabama Power based on available information.

2 Design crest elevation is 425 ft. without gravel roadway required by Southern Company Dam Procedures manual.

2.5 PRINCIPAL PROJECT STRUCTURES

2.5.1 Earth Embankments

The main dam design is a 170-foot high embankment constructed of an impermeable clay core and random fill embankment with a chimney drain on the downstream side of the clay core. The design crest width is 45 feet. Exterior and interior slopes are 2.5(H):1(V). The up-gradient slope has a rip-rap cover as protection from wind-blown wave erosion. The down-gradient slope is vegetated with grass and low growing weeds.

The saddle dike, located in the southwest corner of the impoundment is a 25-foot high, earth fill embankment constructed across a topographic low

area, or saddle within the up-gradient perimeter of the impoundment. The saddle dike has a design crest width of 45 feet and side slopes of 2.5(H):1(V). The up-gradient slope has a rip-rap cover as protection from wind-blown wave erosion. The down-gradient slope is vegetated with grass and low growing weeds.

2.5.2 Outlet Structures

The CCR impoundment primary spillway consists of a concrete decant riser approximately 8 feet in diameter with an overflow elevation of about +420 Ft. and an invert elevation of +400 ft. The riser feeds a 96-inch concrete pipe spillway located in natural ground beneath the south abutment of the main dike. The primary spillway discharges into an excavated drainage ditch that flows to the Locust Fork of the Warrior River. Access to the decant riser is provided by a fixed, steel frame, steel grate walkway.

The CCR impoundment does not have an emergency spillway.

2.6 CRITICAL INFRASTRUCTURE WITHIN FIVE MILES DOWN GRADIENT

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

Based on available topographic maps, surface drainage in the area of the CCR impoundment is to the west and southwest toward the Locust Fork of the Warrior River (See Appendix A Doc. 02). Based on available aerial photographs and a brief driving tour of the area, Dewberry did not identify critical infrastructure assets 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 internal corporate dam safety inspections conducted by Southern Company engineers. The reports provided included:

- *Miller Steam Plant Ash Pond Dam, Biennial Inspection Observations*, October 25, 2006 (See Appendix A – Doc 08)
- *Miller Steam Plant Ash Pond Dam, Dam Safety Inspection,* April 7, 2009 (See Appendix A – Doc 09)
- *Miller Steam Plant Ash Pond Dam, Dam Safety Inspection,* July 12, 2010 (See Appendix A – Doc 10)
- *Miller Steam Plant Ash Pond Dam, Dam Safety Inspection,* November 11, 2010 (See Appendix A –Doc 11)

The 2006 inspection included recommendations for few minor repairs but there were no conditions observed that affected the continued safe and reliable operation of the impoundment. The report noted that the impoundment adjacent to the saddle dike was being filled with ash thus diminishing the importance of the saddle dike as a water retaining structure.

The 2009 inspection also includes recommendations for minor repairs and maintenance but there were no conditions observed that affected the continued safe and reliable operating of the impoundment. The recommendations in the report were:

- Continue inspections of the saddle dike even though the impoundment in the area of the dike has been filled with ash.
- The area round the spring outlets should continue to be kept free of brush, and access to the area should be maintained.
- Vegetation in the riprap along the upstream side of the main ash pond crest should be removed and controlled by spraying herbicide.

The July 2010 inspection also includes recommendations for minor repairs and maintenance but there were no conditions observed that affected the continued safe and reliable operating of the impoundment. The recommendations in the report were:

- Current level of embankment vegetation maintenance at the main ash pond should be maintained

- Surface erosion to the ash pond embankment tow access road should be repaired as noted in the plant's regular dam safety inspections.
- Continue inspections of the saddle dike even though the impoundment in the area of the dike has been filled with ash.

The November, 2010 inspection also includes recommendations for minor repairs and maintenance but that there were not conditions observed that affected the continued safe and reliable operating of the impoundment. The recommendations in the report were:

- Current level of embankment vegetation maintenance at the main ash pond as well as the saddle dike should be maintained
- Plant personnel clear debris from the drainage ditches along the embankment toe of both the main pond dam and the saddle dike.

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 local or state permit for the ash pond.

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 0027146 was issued January 25, 2007 and is effective from February 1, 2007 through January 31, 2012. (See Appendix A – Doc 14).

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 Miller Steam Plant CCR impoundment was designed and constructed in the mid 1970s and placed into service in 1978. The initial phase constructed the main dam and saddle dike to a crest elevation of 425 ft. A Planned Phase 2 construction to raise the crest elevation of 450 ft. was not implemented. A partial set of project plan and section drawings were made available for Dewberry Review (See Appendix A Docs 15 through 19)

4.1.2 Significant Changes/Modifications in Design since Original Construction

Neither the CCR impoundment main dam nor the saddle dike has been changed significantly since original construction.

4.1.3 Significant Repairs/Rehabilitation since Original Construction

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

4.2 SUMMARY OF OPERATIONAL PROCEDURES

4.2.1 Original Operational Procedures

The CCR impoundment was designed and operated for coal combustion residue sedimentation and control. The impoundment originally received plant process water, slurried coal combustion waste, and storm-water runoff from impoundment embankments.

4.2.2 Significant Changes in Operational Procedures and Original Startup

The eastern portion of the impoundment has been filled with ash, and is currently being used to process dry stacked ash for beneficial reuse.

4.2.3 Current Operational Procedures

Currently bottom ash is the only coal combustion waste slurried to the impoundment.

4.2.4 Other Notable Events since Original Startup

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

5.0 FIELD OBSERVATIONS

5.1 PROJECT OVERVIEW AND SIGNIFICANT FINDINGS

Dewberry personnel Joseph P. Klein, III and Frank B. Lockridge, P.E. performed a site visit on Tuesday March 1, 2011 in company with the participants.

The site visit began at 8:30 AM. Please refer to the Dam Inspection Checklist in Appendix B. The weather was sunny and mild. Dewberry personnel took photographs of conditions observed. Selected photographs are included in this report for visual reference.

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

5.2 MAIN DAM

5.2.1 Crest

The crest of the CCR impoundment main dam had 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 crest of the main dam. Figure 5.2.1-1 shows the condition of the main dam crest.

Figure 5.2.1-1: Crest of Main Dam

5.2.2 Upstream/Inside Slope

The inside slope of the CCR impoundment main dam is armored with rip-rap to protect the slope from erosion caused by wind generated waves. Grass was observed growing in the rip-rap along the water line. 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 upstream slope of the main dam.

Figure 5.2.2-1 Main Dam Inside Slope

5.2.3 Downstream/Outside Slope and Toe

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

Figure 5.2.3-1 Main Dam Outside Slope

Widely scattered, small erosion rills were observed in the downstream slope. Figures 5.2.3-2 shows an erosion rill.

Figure 5.2.3-2 Main Dam Outside Slope Small Erosion Rill

Stormwater runoff from the main dam outside slope is captured by a concrete lined ditch located along the abutments and toe of the slope. The drain discharges to a riprap lined ditch that empties into a creek in the woods beyond the toe of the dam embankment. Figures 5.2.3-3 and 5.2.3-4 show the concrete-lined ditch and the discharge drain, respectively.

Figure 5.2.3-3 Main Dam Surface Runoff Toe Drain Ditch

Figure 5.2.3-4 Main Dam Surface Water Toe Drain Discharge

A few isolated wet areas were observed near the outside toe of the dam (see Figure 5.2.3-5). No evidence of flowing water was observed. It could not be determined if the source of water was minor seepage through the embankment or residual precipitation from recent storms.

Figure 5.2.3-5 Wet Area Outside Slope of Main Dam Toe

5.2.4 Abutments and Groin Areas

Erosion or uncontrolled seepage was not observed along the abutments. The abutments appeared to be in good condition. Figures 5.2.4-1 and 5.2.4-2 show the north and south abutments, respectively.

Figure 5.2.4-1 Main Dam North Abutment

Figure 5.2.4-2 Main Dam South Abutment

5.3 SADDLE DIKE

5.3.1 Crest

The crest of the CCR impoundment saddle dike had no signs of depressions, tension cracks, or other signs of settlement or shear failure. Previous inspection reports reviewed by Dewberry did not indicate issues concerning the crest of the main dam. Figure 5.3.1-1 shows the condition of the saddle dike crest.

Figure 5.3.1-1 Crest of Saddle Dike

5.3.2 Upstream/Inside Slope

The upstream slope of the CCR impoundment saddle dike is armored with rip-rap, originally to protect the slope from erosion caused by wind generated waves. The impoundment in the area of the saddle dike has been filled with ash such that the embankment inside slope is no longer exposed to wave action. There were no observed scarps, sloughs, bulging, cracks, depressions, or other indications of slope instability or signs of erosion. Figure 5.3.2-1 shows a section of the upstream slope of the saddle dike.

Figure 5.3.2-1 Saddle Dike Inside Slope on Right and Impoundment Ash Fill on Left.

5.3.3 Downstream/Outside Slope and Toe

The downstream or outside slope of the CCR impoundment saddle is protected by several species of grass and weeds. There were no observed scarps, sloughs, bulging, cracks, depressions, or other indications of slope instability or signs of erosion. Figure 5.3.3-1 shows a section of the outside slope of the main dam.

Stormwater runoff from the saddle outside slope is captured by a concrete lined ditch located along the abutments and toe of the slope. The drain is routed to a low laying area in the woods beyond the toe of the dam embankment. Figure 5.3.3-2 shows the discharge drain.

A small area of standing water was observed along the outside toe of the saddle dike. Figure 5.3.3-3 shows the observed wet area. Since the impoundment in the area of the saddle dike has been filled with ash it is expected that the observed wet area was the result of recent precipitation events.

Figure 5.3.3-1 Saddle Dike Outside Slope

Figure 5.3.3-2 Saddle Dike Outside Slope Toe Drain Discharge

Figure 5.3.3-3 Small Wet Area Along Outside Toe of Saddle Dike

5.3.4 Abutments and Groin Areas

Erosion or uncontrolled seepage was not observed along the abutments. The abutments appeared to be in good condition. Figure 5.3.4-1 shows the south abutment.

Figure 5.3.4-1 Saddle Dike South Abutment

5.4 OUTLET STRUCTURES

5.4.1 Overflow Structure

The impoundment overflow structure is located along the eastern side of the impoundment near the north abutment of the main dam. The CCR impoundment overflow structure consists of a concrete decant riser approximately 8 feet in diameter with an overflow elevation of about 420 Ft. and an invert elevation of 400 ft. The riser discharges to a 96-inch concrete pipe spillway located in natural ground beneath the south abutment of the main dike. The spillway discharges into an excavated drainage ditch that flows to the Locust Fork of the Warrior River. Access to the decant riser is provided by a fixed, steel frame, steel grate walkway. Figure 5.4.1-1 shows the overflow structure.

Figure 5.4.1-1 CCR Impoundment Overflow Structure

5.4.2 Outlet Conduit

The outlet conduit appeared to be in good conditions and operating normally with no sign of clogging. Water flowing from the outlet was clear. Figure 5.4.2-1 shows the water discharging from the outlet conduit.

Figure 5.4.2-1 Water Flowing from Impoundment Overflow Discharge Conduit

5.4.3 Emergency Spillway

The CCR impoundment does not have an emergency outlet.

5.4.4 Low Level Outlet

The 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 12). The design storm was a 100 year (1 percent probability of occurrence in a given year), 24-hour event with an intensity of 8.5 inches. The report estimates that the 1 percent probability storm can be retained by the impoundment, raising the pond water elevation to about 424 feet, leaving a freeboard of about 1-foot above the design crest elevation and about 2 feet above the current crest elevation.

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 study (See Appendix A Doc 12) the CCR impoundment can retain the 1 percent probability design storm event with a freeboard safety of about 2 feet. Hence dam failure by overtopping seems improbable.

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 main dam. The results of the analyses were presented in a report dated February 21, 2011 (See Appendix A Doc 13). The analyses were conducted following the general guidelines of the U. S. Army Corps of Engineers slope stability manual. The analyses were based on historical boring log data. The analyses used soil properties and shear strength data for the plant storage pond dam which was reportedly designed and constructed concurrently with the CCR impoundment dam.

The stability analyses included the results of three loading conditions:

- Long-term, steady state conditions based on ground water elevations based on piezometer data
- Steady state seepage with seismic loading
    - A horizontal acceleration of 0.13g was used for seismic loading
- Design storm event impoundment water level and rapid drawdown
- Submerged toe with rapid drawdown using Locust Fork of Warrior River Probable Maximum Flood Elevation of 305 Feet.

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

7.1.2 Design Parameters and Dam Materials

Documentation provided to Dewberry for review was the February 21, 2011 Plant Miller Ash Pond Slope Stability Analyses of Ash Pond (See Appendix A Doc 13). The documentation indicated the stability analyses assumed nine material strata. 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 Analysis

Soil Strata	Moist Unit Weight (pcf)	Cohesion c'(psf)	Friction Φ
Impervious Core	126	630 (2115)	19 (21)
Random Gravel Fill	132	100 (3450)	32 (23)
Fine Filter	120	0	35
Course Filter	120	0	35
Riprap Bedding	120	0	38
Riprap	140	0	38
Ash	100	0	15
Weathered Rock	Impenetrable Rock		
Residuum Clay	135	1000	28

7.1.3 Uplift and/or Phreatic Surface Assumptions

No documentation of uplift calculations were provided to Dewberry for review. Based on the stability analyses (See Appendix A Doc 13) the analyses were based on ground water elevation data from piezometers installed on the main dam embankment. Ground water elevations for the saddle dike appear to have been based on historic boring data.

7.1.4 Factors of Safety and Base Stresses

Table 7.1.4 Factors of Safety for Miller Steam Plant

Embankment Name: Main Dam		
Loading Condition	Required Safety Factor (US Army Corps of Engineers)	Computed Minimum Safety Factor
Downstream -Steady State	1.5	1.5
Downstream -Steady State with Seismic Loading	1.1	1.5
Downstream – Design Storm Water Elev.	1.4	1.5
Downstream – Submerged Toe w/ Rapid Drawdown	1.3	1.4
Upstream – Steady State	1.5	1.4
Upstream - Seismic	1.1	1.4
Upstream – Rapid Drawdown	1.3	1.5
Downstream-Steady State	1.5	2.2
Downstream - Seismic	1.1	1.8

Embankment Name: Saddle Dike		
Loading Condition	Required Safety Factor (US Army Corps of Engineers)	Computed Minimum Safety Factor
Downstream-Steady State	1.5	2.2
Downstream - Seismic	1.1	1.8

7.1.5 Liquefaction Potential

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

7.1.6 Critical Geological Conditions

The Miler Stream Plant site is underlain by the upper part of the Pottsville formation. The Pottsville formation consists of interbedded shale, siltstone, sandstone and coal in cyclic sequences.

A mine map of the area provided to Dewberry for review (See Appendix A Doc 20) indicates that underground coal mining was conducted at the Miller Steam Plant CCR impoundment site in the 1940s. Elevation data on the mine map indicates the coal was mined at depths of 220 to 280 feet below ground. The presence of historic coal mines greater than 200 feet below the impoundment is not expected to impact the stability of the either the main dam or the saddle dike.

The stability analyses indicate a peak ground acceleration of 0.13g was selected for the seismic analysis. The peak ground acceleration was the 2 percent probability of exceedance in 50 years based on the U.S. Geological Survey Seismic Risk Map the Central and Eastern United States.

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 facility is operated for the storage of both wet and dry ash deposits. Currently only bottom ash is sluiced to the impoundment. The sluiced ash discharges into the northern end of the CCR impoundment, is routed along the eastern side of the impoundment through the dry stacked ash and into the eastern portion of the impoundment (See Appendix A Doc. 01).

Fly ash and economizer ash is collected in hoppers and transported pneumatically to storage silos for beneficial reuse or disposal. (See Appendix A Docs 03 – 07)

8.2 MAINTENANCE OF THE DAM AND PROJECT FACILITIES

The 2009 Safety Procedure for Dams and Dikes (See Appendix A - Doc. 21) 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 is described in various dam inspection reports, including Southern Company Dam Inspection Reports dated October 25, 2006, April 7, 2009, July 12, 2010, and November 11, 2010 (See Appendix A Docs 08, 09, 10 and 11, respectively). The November 11, 2010 Southern Company Dam Inspection Report included recommendations for continued maintenance of the main dam and saddle dike 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 22). Inspection reports are submitted to the plant manager for review and appropriate corrective actions.

9.2 INSTRUMENTATION MONITORING

The Miller Steam Plant CCR impoundment main dam and saddle dike each have a monitoring system of groundwater piezometers and ground surface survey points. Groundwater elevations and survey point coordinate readings are made annually and the data reviewed as part of the annual inspection program.

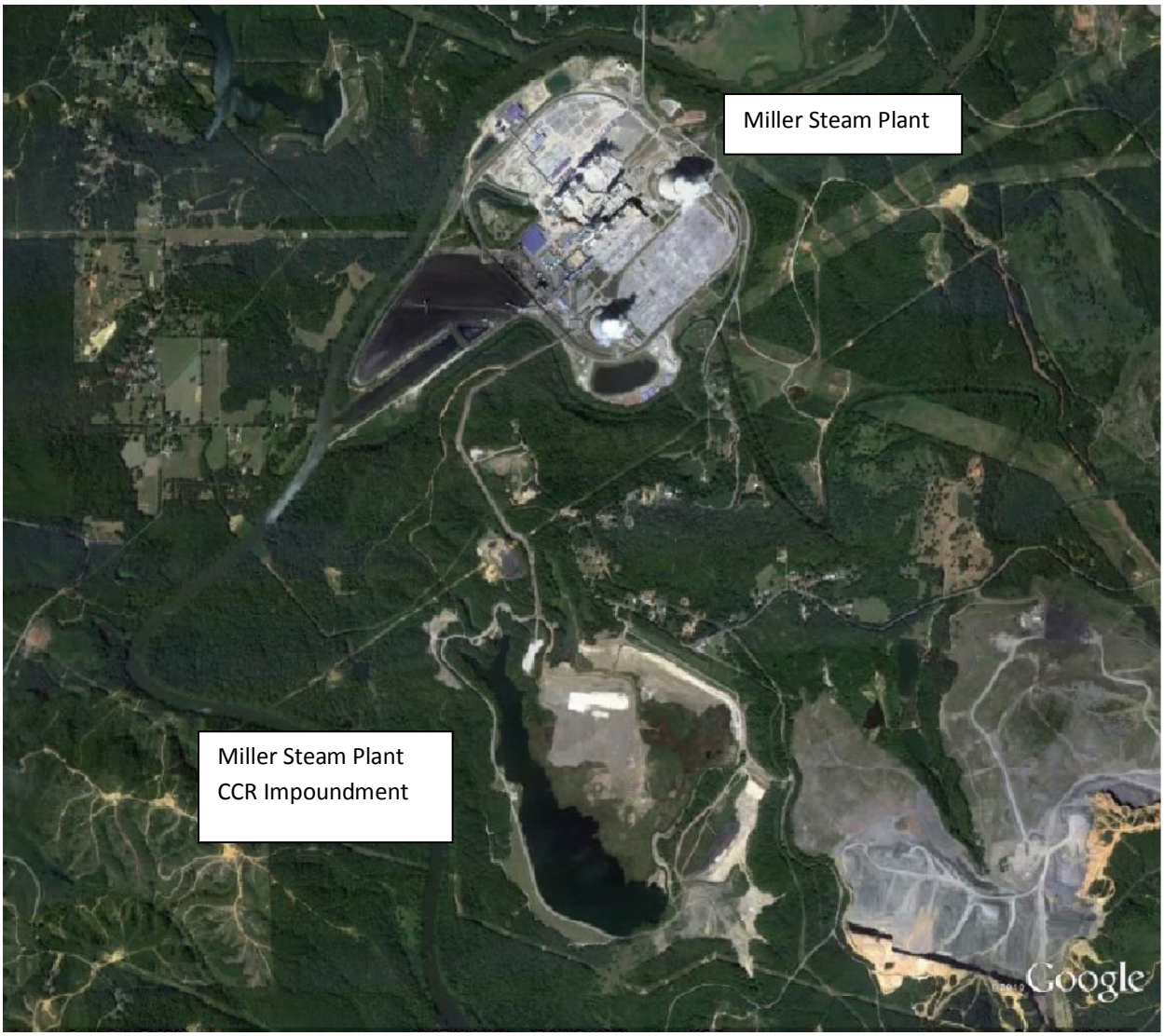
9.3 ASSESSMENT OF SURVEILLANCE AND MONITORING PROGRAM

9.3.1 Adequacy of Inspection Program

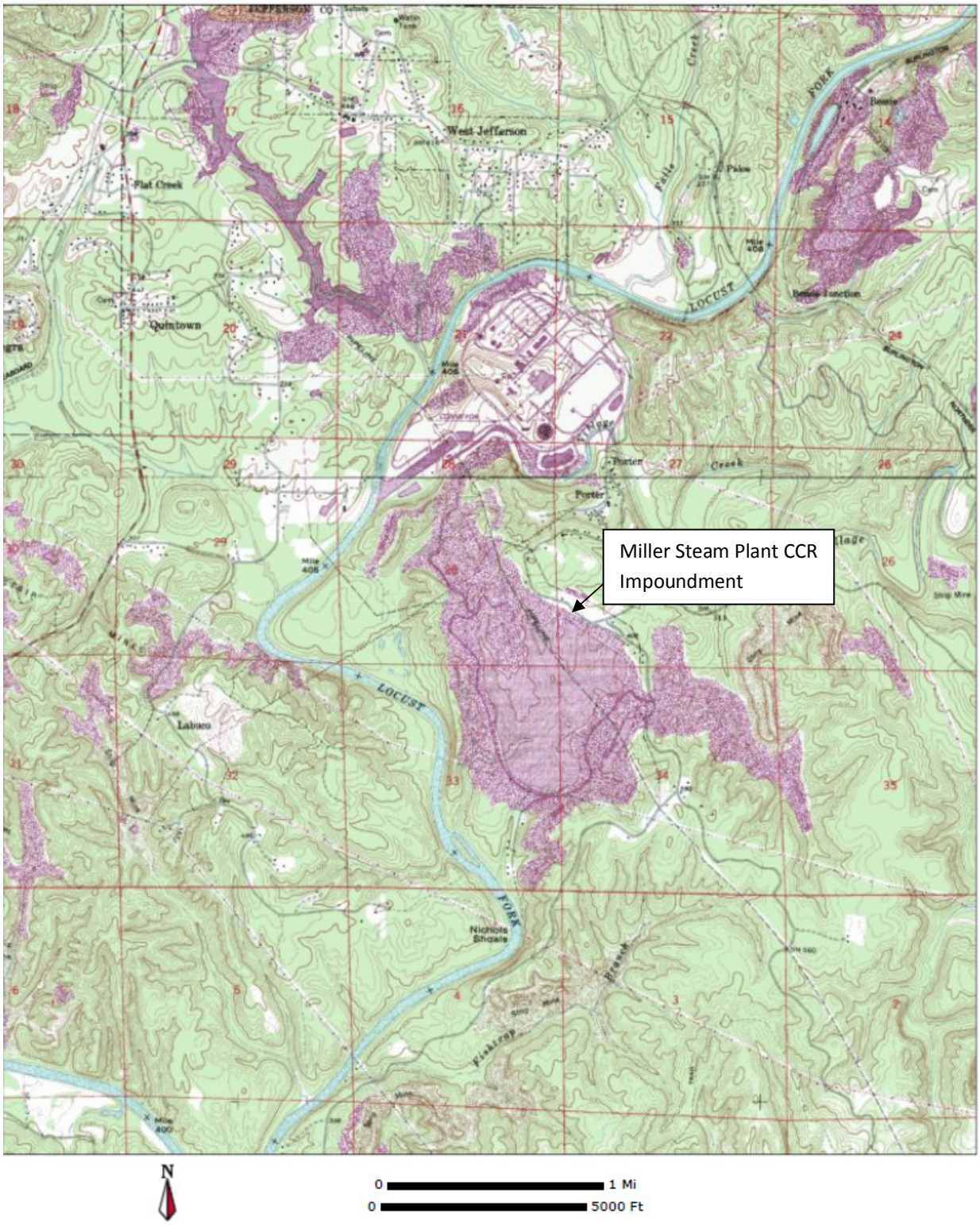
Based on the data reviewed by Dewberry, including observations during the site visit, the inspection program is adequate/

9.3.2 Adequacy of Instrumentation Monitoring Program

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

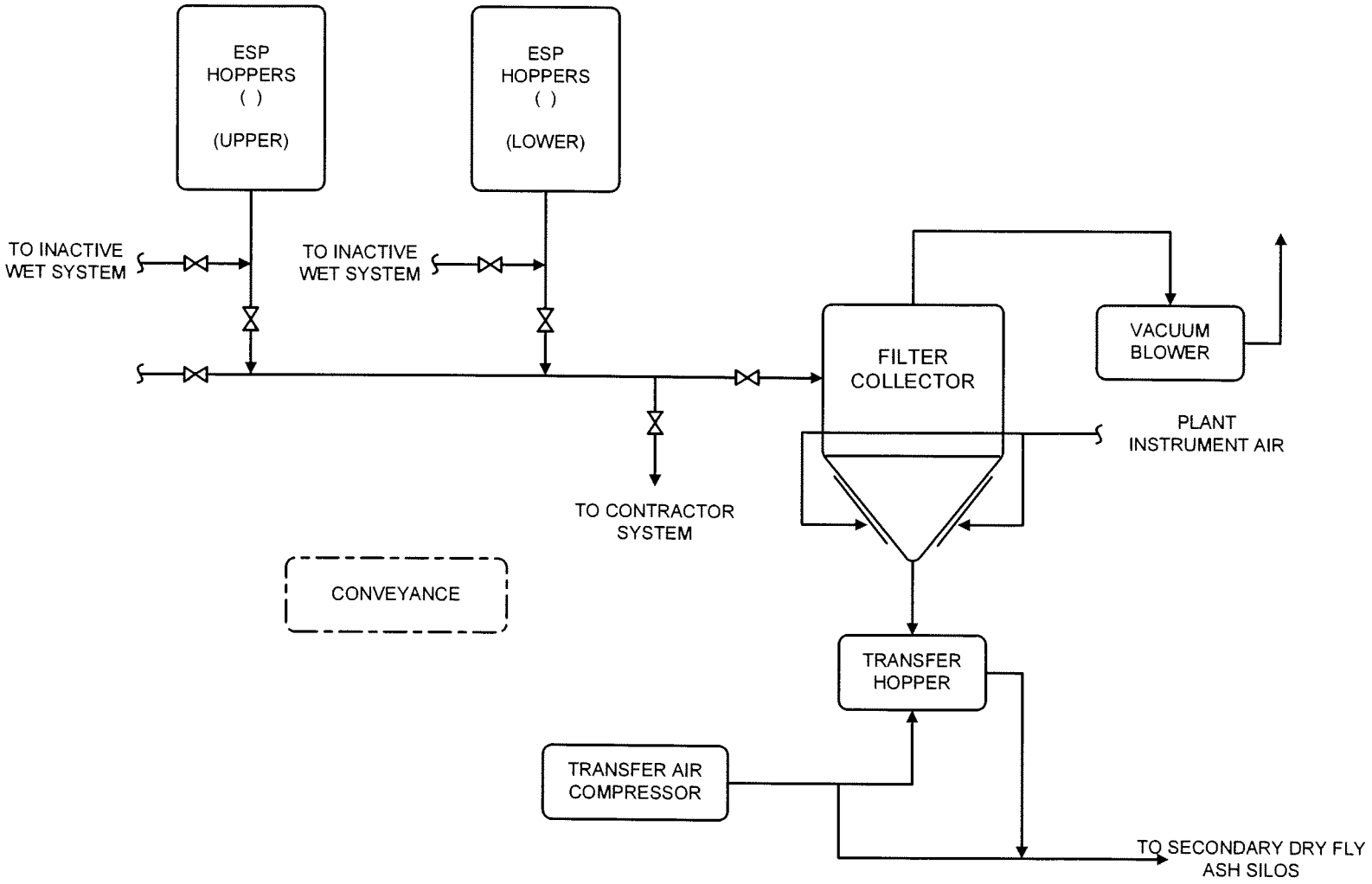


Doc 01 Miller Steam Plant Aerial Site Photograph



Doc 02 Miller Steam Plant Topographic Map

Alabama Power
James H. Miller Jr.
001493
Secondary Dry Fly
Ash Handling
SE Unit 1



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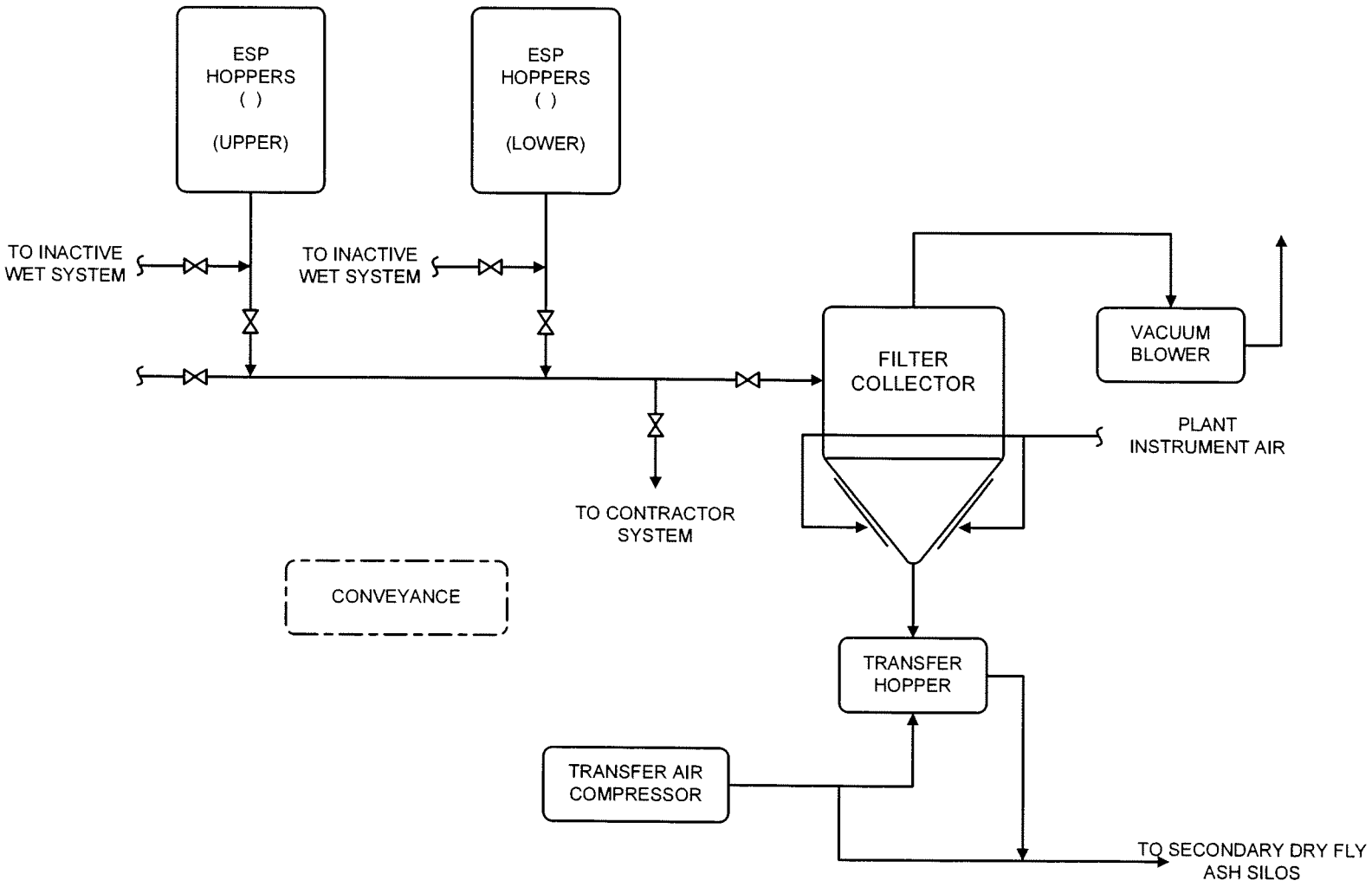
Alabama Power
James H. Miller Jr.
001493
Secondary Dry Fly
Ash Handling
SE Unit 2



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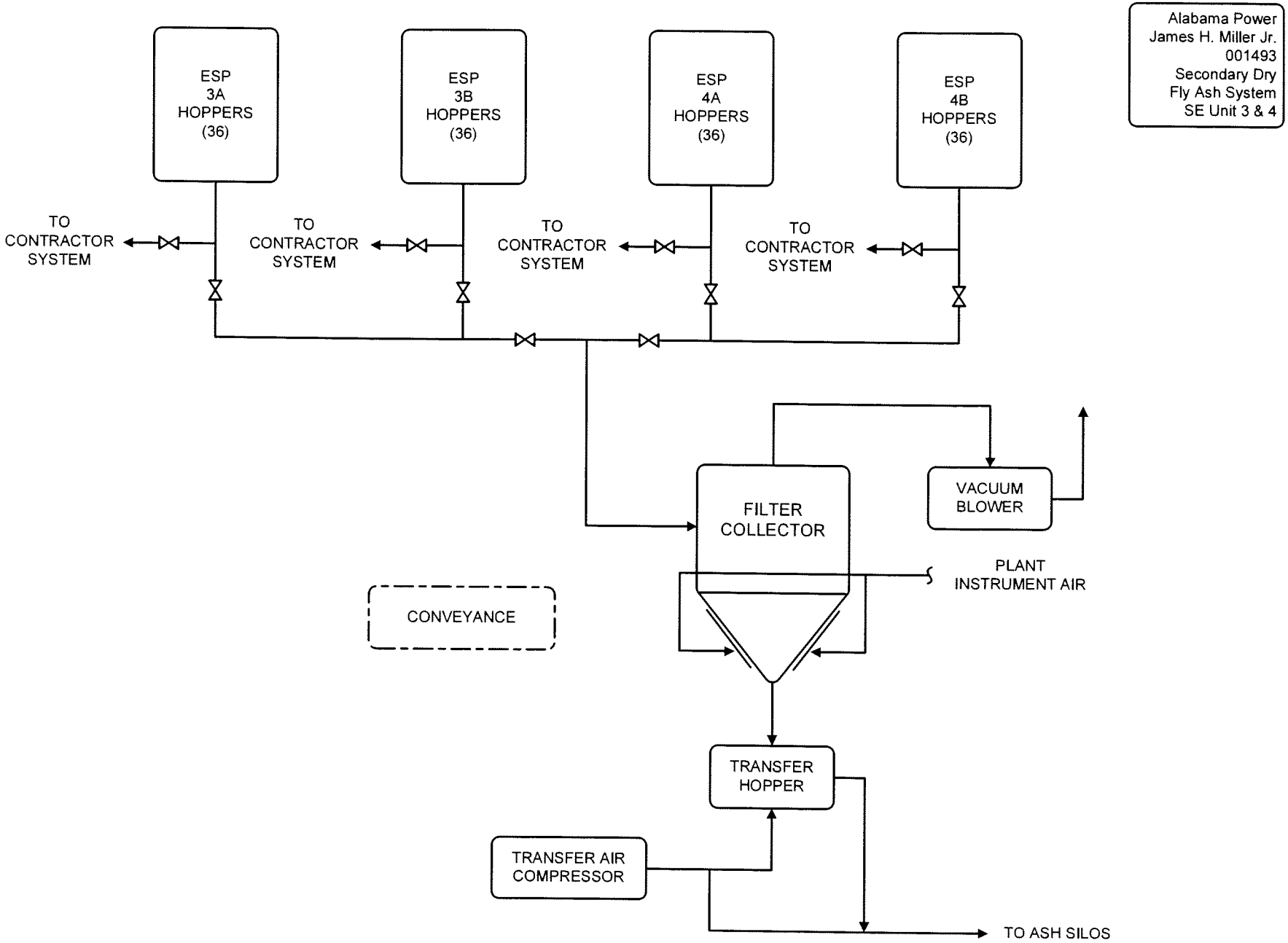

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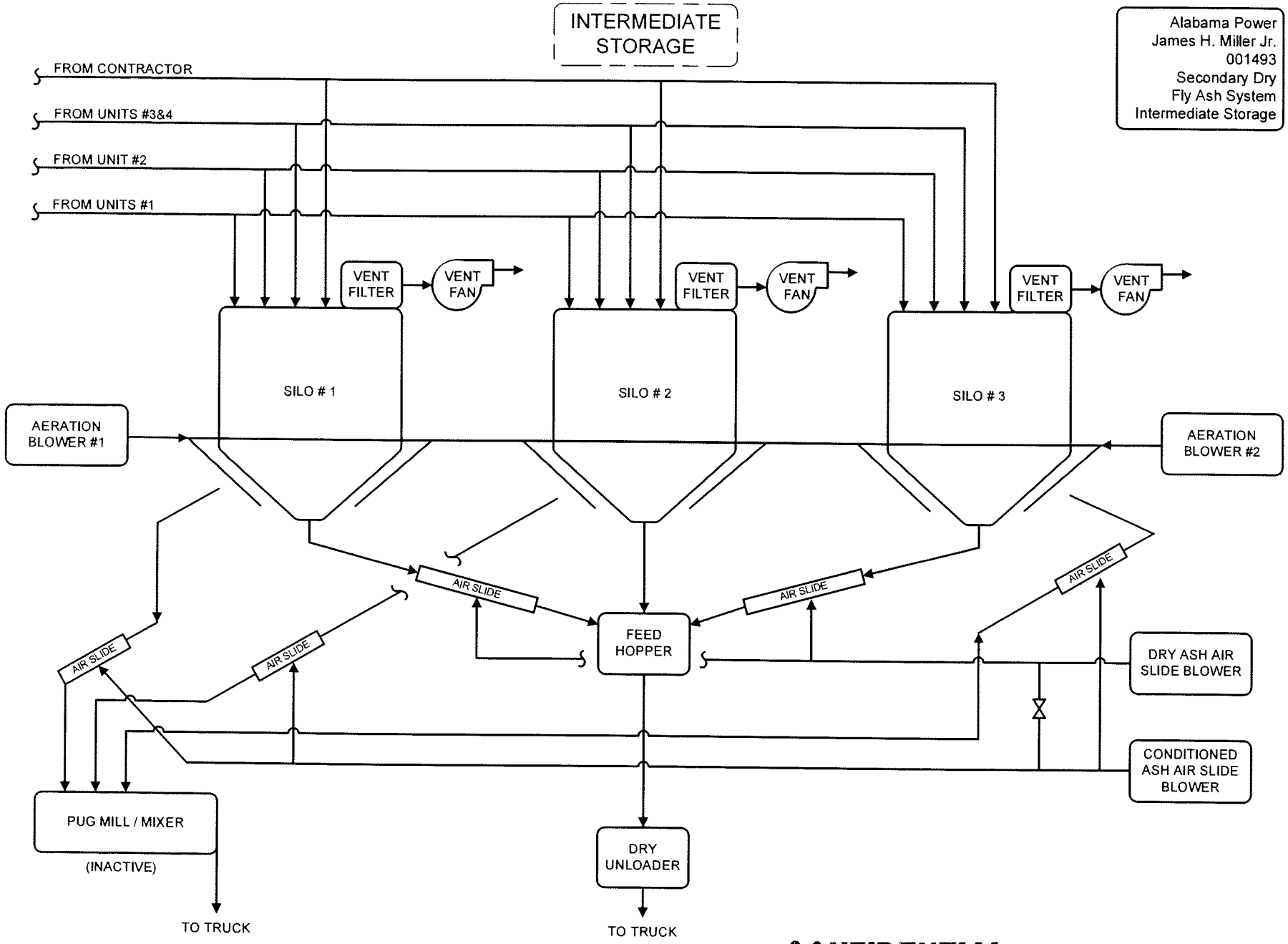

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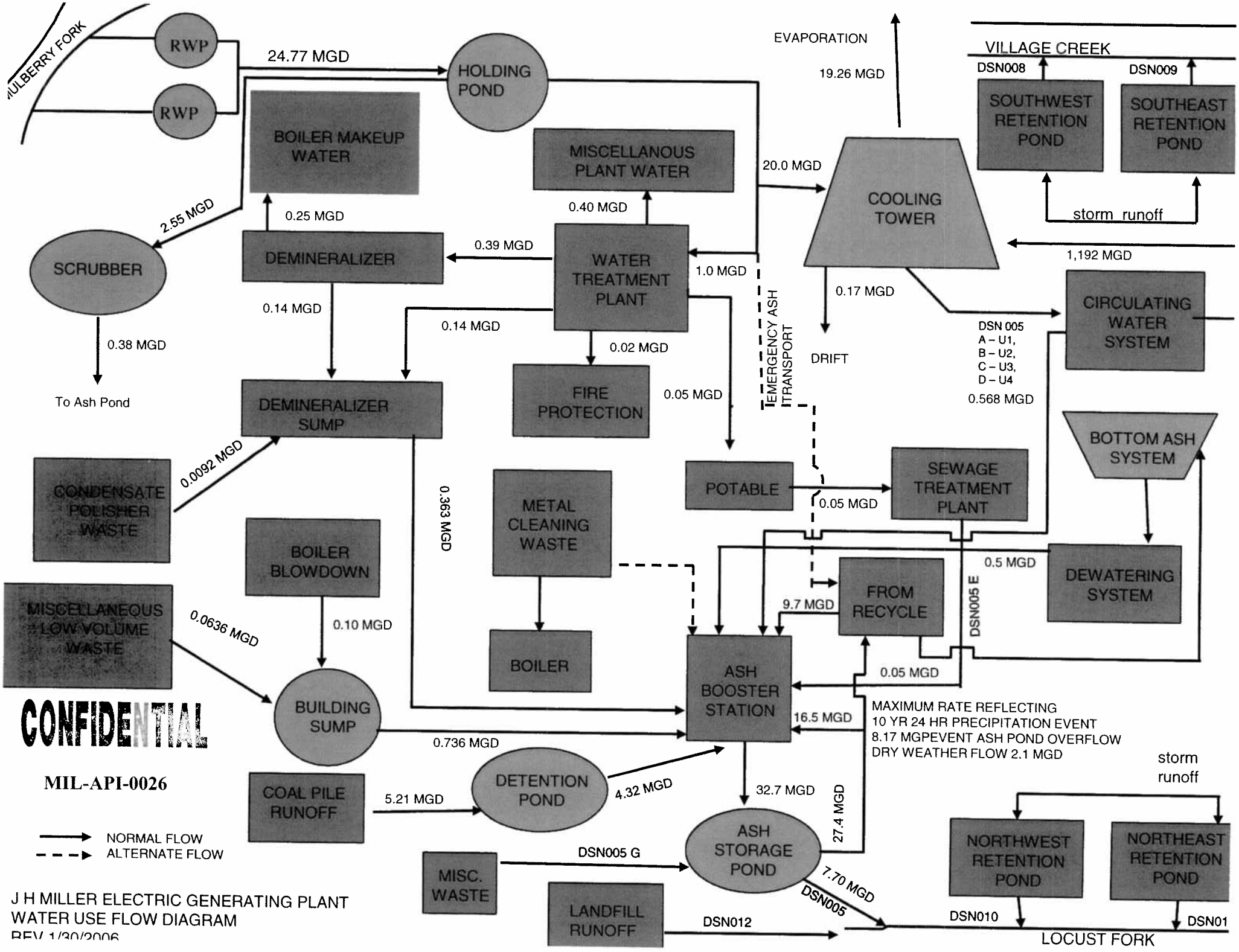


J H MILLER ELECTRIC GENERATING PLANT
WATER USE FLOW DIAGRAM
REV 1/30/2006

Miller Steam Plant
Ash Pond Dam
Biennial Inspection Observations
October 25, 2006

General

Inspection of the Miller Steam Plant ash pond dam was conducted on October 25, 2006. All areas of the main dam, the saddle dam, and spillway were included in the inspection. Weather conditions were overcast and cool. The inspection team consisted of Larry Dunlap and Richard Mickwee. The inspection team was accompanied by Will McEntyre of the plant staff.

Ash Pond Dike

The inspection was started at the southern edge of the embankment, near Station 125+00. The downstream slope in this area, which is the maximum embankment section, was observed to be in good condition with a reasonably maintained cover of grass (see Photos 1 and 2). The small trees observed during the previous inspection had been removed. The concrete-lined toe ditches were reasonably clear but had accumulated some dead vegetation. The spring drainage system installed downstream of Station 121+00 was inspected and no problems were noted. The outlets were in good condition and flowing freely (Photo 3). The area around the outlets was maintained free of brush. Based on a review of photographs from the 2004 inspection, the flow through the outlets appeared to be similar to previous inspections.

The inspection team then traveled along the access road which generally follows the toe of the dam. Along this route, inspection was made of Weir #1, located near station 107+00 (Photo 4), and Weir #2, located near Station 103+00 (Photo 6). Along the road between the two weirs, flow was surfacing at a point estimated to be about in line with Station 105+00 (Photo 5). Flow has been observed in this area in prior inspections and, although difficult to estimate, it was judged to be about the same as previously noted.

The inspection team then observed the discharge structure at 96+18 of the main dam. There was flow through the structure at the time of the inspection (Photos 7 and 8). No problems were noted at either the inlet or the outlet. Following the observation of the discharge structure, the crest of the dam was inspected. The wide crest road and the upstream riprap were observed to be in excellent condition. Vegetation was observed in portions of the riprap (Photo 9). It is recommended that this vegetation be removed by spraying.

Saddle Dike

The saddle dam adjacent to Porter Road (northeast of the main dam) was also inspected. Operations have resulted in most of the pond in the area being filled with ash. The saddle dam appears to be performing adequately, but dense vegetation and trees were observed on the downstream face of the dike (Photos 10 and 11).

The filling of the pond in the area of the saddle dam has diminished its importance as a water retaining structure. However, it is recommended that this structure continue to be inspected and that vegetation be removed from the slope to allow adequate inspection. No other problems or unusual conditions were noted. Drainage in the area just downstream of the saddle dam, which has been a problem in the past due to beaver activity, appeared to be satisfactory at the time of the inspection.

Instrumentation

Dam instrumentation was reviewed in conjunction with the inspection. Plots of readings from piezometers at the maximum dam section and deformation monuments are attached. No problems, unusual conditions, or adverse trends (apart from P-6, discussed below) were indicated by the instrumentation data.

Due to unusual water levels observed in piezometer P-6 (a rise of 20 feet over the past year), a supplemental site visit was performed by Richard Mickwee on December 19, 2006 during the monthly reading of the project instrumentation. Based on observation of the areas adjacent to P-6 and the relatively shallow height of the dam at this point, the piezometric rise is not believed to be the result of increased seepage. The sound of water dripping was noted in the piezometer, and could be the result of water entering the pipe through a crack or break. This additional water could explain the piezometer's recent rise. Piezometer P-6 appears to have stabilized, but will continued to be monitored for change.

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

CONFIDENTIAL

PHOTO LOCATIONS

NOTE: Photos 9 and 10
taken at Saddle Dam

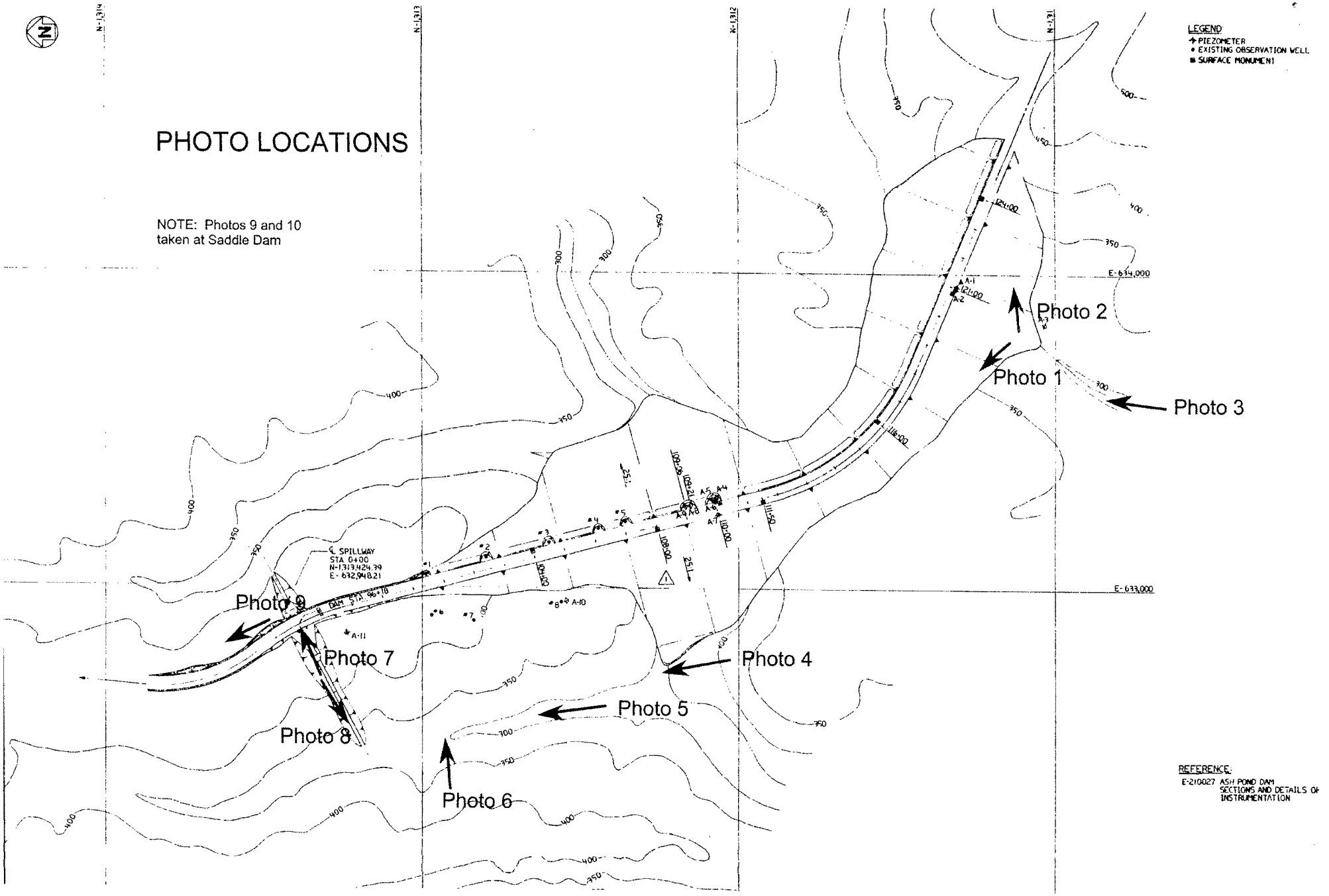


Photo 1: Maximum Section with Concrete-Lined Ditch at Toe

Photo 2: Downstream Slope at Maximum Section, N to S

Photo 3: Spring Outlets Downstream of STA 121+00

Photo 4: Weir 1

Photo 5: Seepage Along Edge of Roadway

Photo 6: Weir 2

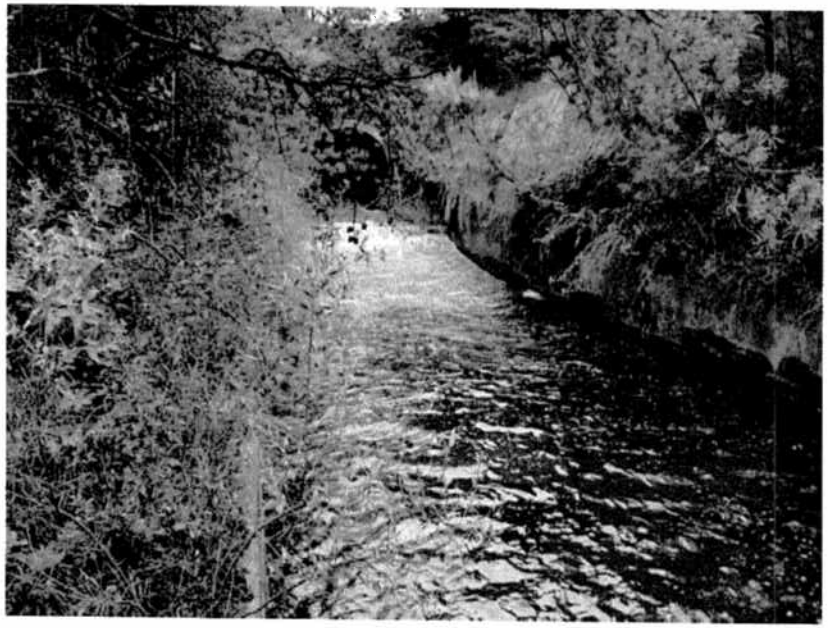


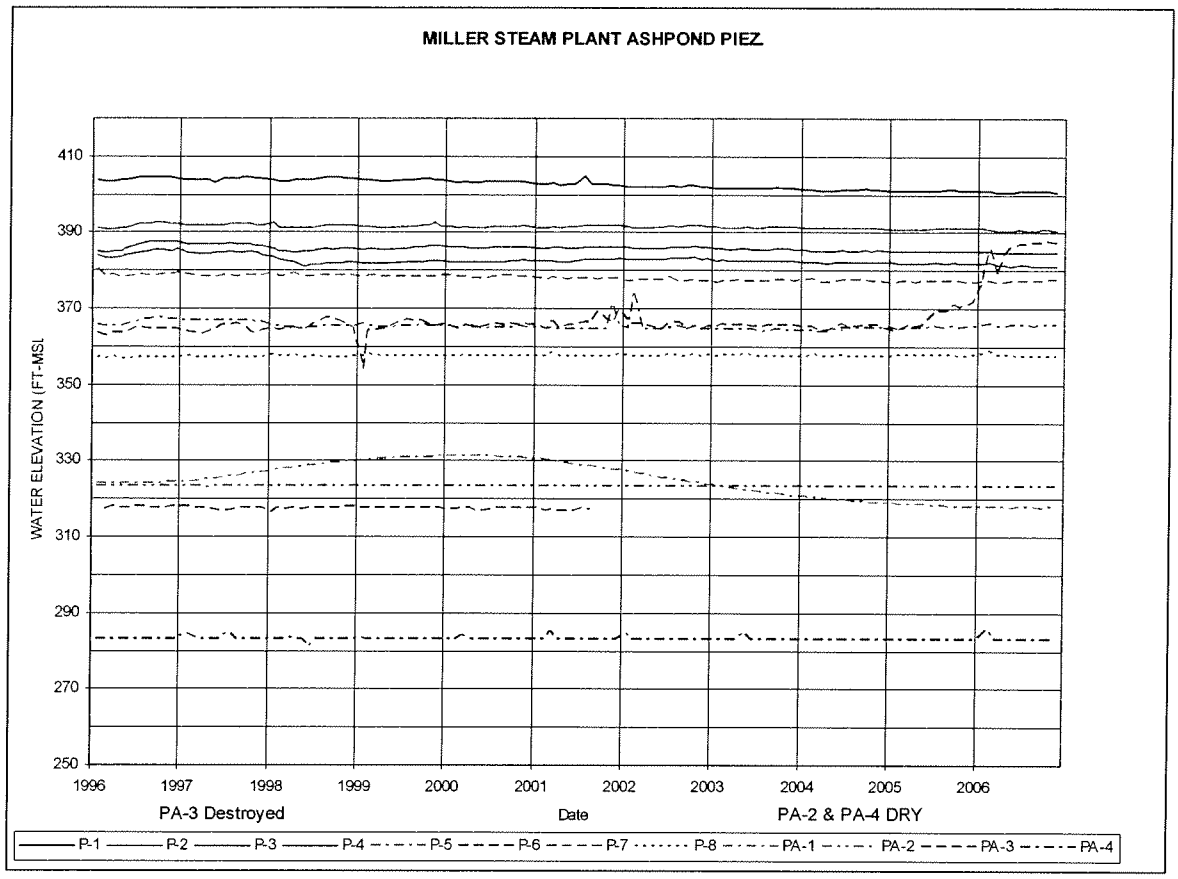
Photo 7: Outlet Discharge from Ash Pond

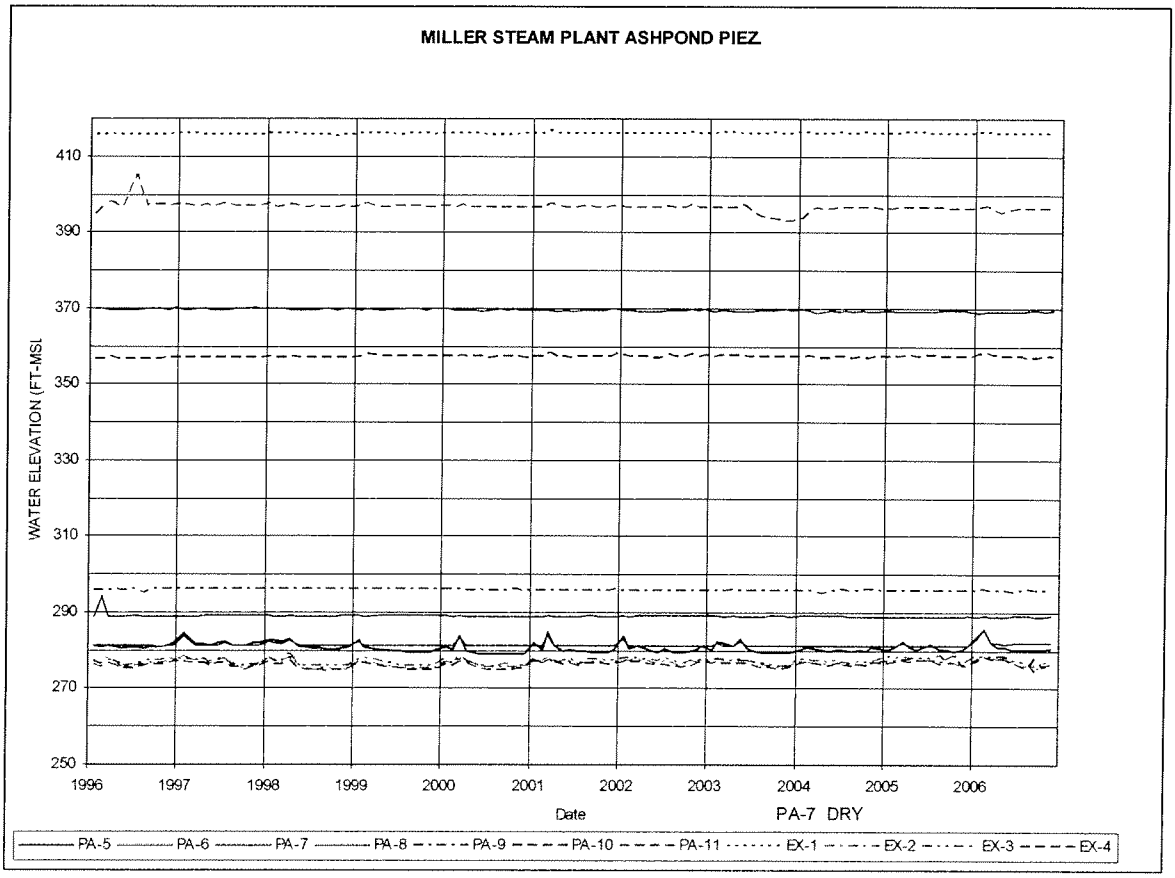
Photo 8: Outlet Discharge Flow, Looking Downstream

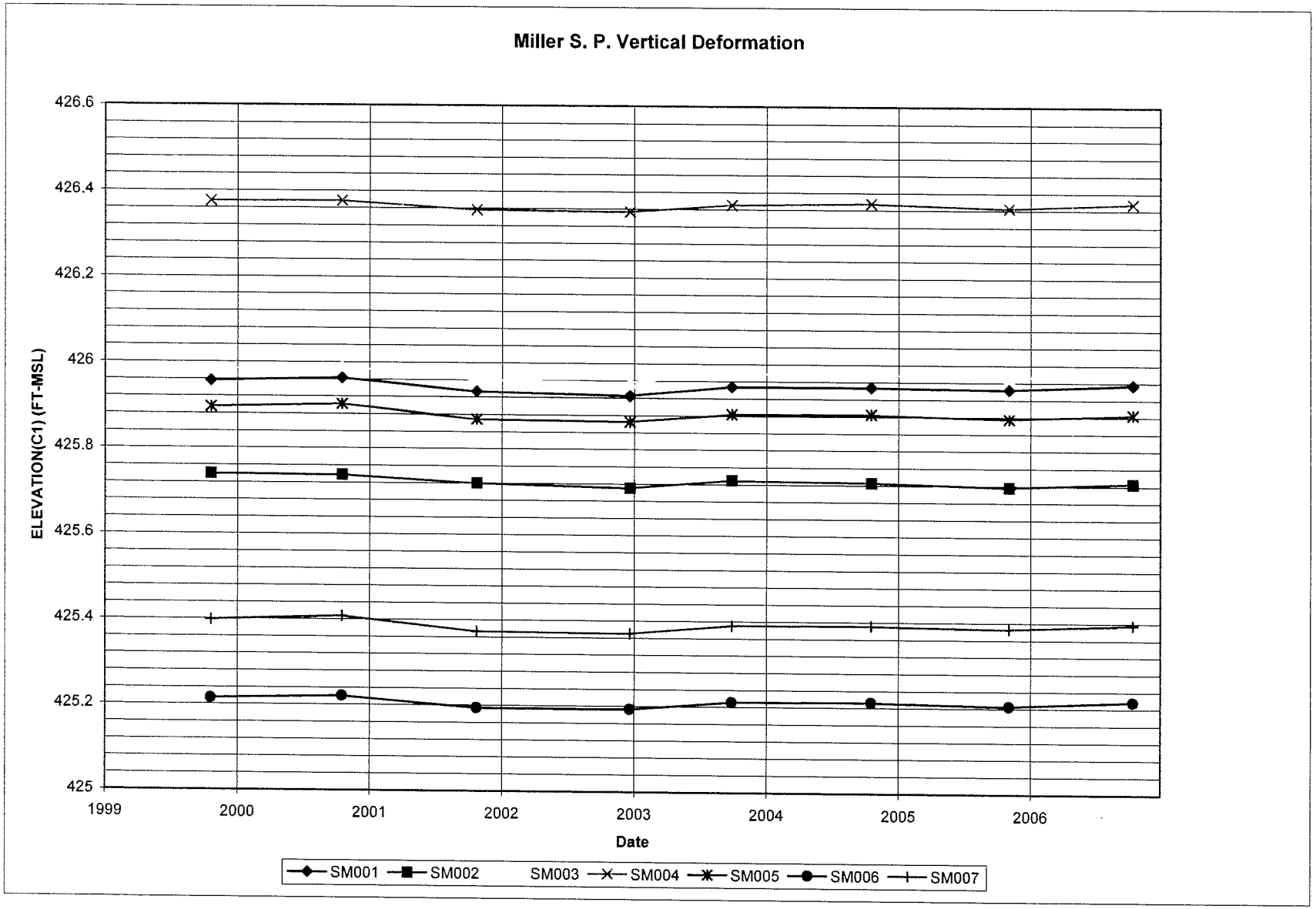
Photo 9: Typical Condition of Upstream Slope of Ash Pond Embankment

Photo 10: Vegetation on Downstream Slope of Saddle Dike 1

Photo 11: Vegetation Downstream Slope of Saddle Dike 2






Miller S. P. Vertical Deformation
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ELEVATION(C1) (FT-MSL)
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600 18th Street North
Birmingham, AL 35203

205/257-1000

SOUTHERN COMPANY
Energy to Serve Your World™

April 7, 2009

Miller Steam Plant Ash Pond Dam
Dam Safety Inspection

Mr. Perry Boren
Plant Manager
Miller Steam Plant
Alabama Power Company

Dear Mr. Boren,

Enclosed please find the Report of Annual Dam Safety Inspection for the Miller Steam Plant Ash Pond Dam based on the inspection performed on November 13, 2008. The inspection team, consisting of myself and Richard Mickwee, appreciate the support provided by Mr. Shane McCray and Mr. Joe Sprigg 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.

The inspection was greatly enhanced by the work done on clearing brush and other maintenance prior to the inspection. This practice should continue. During the inspection, no conditions were noted that posed an immediate threat, or that would affect the continued safe operation of the facilities inspected. There are, however, some recommendations in the report for maintenance and monitoring related actions to reduce the likelihood of future problems:

- Even though the filling of the pond in the area of the saddle dike has most likely reduced the loading on the structure, it is recommended that the saddle dike continue to be inspected and the vegetation on the embankment continue to be controlled.

- The area around the spring outlets (Ash Pond Station 121+00) should continue to be kept free of brush and access to this area should be maintained. This facilitates future inspection of this area.

- Vegetation in the riprap along the upstream side of the ash pond dike crest should be removed and controlled by spraying herbicide.

Details of the inspection were discussed in an exit meeting with Mr. McCray and Mr. Sprigg 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. Shane E. McCray

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

MILLER STEAM PLANT ASH POND DAM
REPORT OF ANNUAL DAM SAFETY INSPECTION
NOVEMBER 13, 2008

GENERAL

Inspection of the Miller Steam Plant ash pond dam was conducted on November 13, 2008. All areas of the main dam, the saddle dam, and spillway were included in the inspection. Weather conditions were overcast and cool with intermittent light rain. The inspection team consisted of Larry Dunlap and Richard Mickwee. The inspection team was accompanied by Joe Sprigg of the plant staff. Following the inspection, the findings were discussed with the plant compliance Team Leader, Shane McCray.

The inspection teams recommendations have been summarized on the attached Table 1, and approximate photo locations are illustrated on the attached Figures 1 and 2.

SADDLE DIKE

The inspection was started at the saddle dam adjacent to Porter Road (northeast of the main dam). Operations have resulted in most of the pond in the area being filled with ash. The saddle dam appears to be performing adequately. The dense vegetation and trees observed on the downstream face of the dike during the 2006 inspection had been cleared, and this work facilitated the inspection of the embankment (Photos 1 and 2). The efforts to clear the embankment face are appreciated by the inspection team.

The filling of the pond in the area of the saddle dam has likely reduced the loading on the structure. However, it is recommended that this structure continue to be inspected and that vegetation continue to be controlled on the slope to allow adequate inspection. No other problems or unusual conditions were noted. Drainage in the area just downstream of the saddle dam, which has been a problem in the past due to beaver activity, appeared to be satisfactory at the time of the inspection.

ASH POND DIKE

The inspection of the main ash pond dike was started at the southern edge of the embankment, near Station 125+00. The downstream slope in this area, which is the maximum embankment section, was observed to be in good condition with a reasonably maintained cover of grass (see Photos 3 and 4). The concrete-lined toe ditches were reasonably clear. The spring drainage system installed downstream of Station 121+00 was inspected and no problems were noted. The outlets were in good condition and flowing freely (Photo 5). The area around the outlets was maintained free of brush. This should continue, along with clearing necessary to allow access to these outlets for inspection. Based on a review of photographs from the 2004 and 2006 inspection, the flow through the outlets appeared to be similar.

The inspection team then traveled along the access road which generally follows the toe of the dam. Along this route, inspection was made of Weir #1, located near station 107+00 (Photo 6), and Weir #2, located near Station 103+00 (Photo 7). Prior to taking readings, each weir should be cleaned of any leaves or pinestraw that may have collected in the box. Along the road between the two weirs, flow was surfacing at a point estimated to be about in line with Station 105+00 (Photo 8). Flow has been observed in this area in prior inspections and, although difficult to estimate, it was judged to be about the same as previously noted.

The inspection team then observed the discharge structure at 96+18 of the main dam. There was flow through the structure at the time of the inspection (Photos 9 and 10). No problems were noted at either the inlet or the outlet. Following the observation of the discharge structure, the crest of the dam was inspected. The wide crest road and the upstream riprap were observed to be in excellent condition. Vegetation was observed in portions of the riprap (Photo 11). It is recommended that this vegetation be removed and controlled by spraying.

INSTRUMENTATION

Dam instrumentation was reviewed in conjunction with the inspection. Plots of readings from deformation monuments as well as piezometers at the maximum dam section are attached.

The unusual rise in piezometer P-6 noted in 2006 has continued to be monitored. Since the initial rise in the piezometric levels, the water level in P-6 appears to have stabilized and since 2006 has remained generally within 1 foot of its current level. No other problems, unusual conditions, or adverse trends were indicated by the instrumentation data.

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 was greatly enhanced by the work done on clearing brush and other maintenance prior to the inspection. This practice should be continued.

Larry F. Dunlap, P.E.

Richard L. Mickwee II, P.E.

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

No.	Description	Location
1	The saddle dike should continue to be inspected and the vegetation on the embankment controlled.	Saddle Dike
2	The area around the spring outlets (Ash Pond STA 121+00) should continue to be kept free of brush and access to this area should be maintained	Ash Pond Dike (Photo 5)
3	Vegetation in the riprap along the upstream side of the ash pond dike crest should be removed and controlled by spraying herbicide.	Ash Pond Dike (Photo 11)

PHOTOGRAPH LOCATION PLAN, SADDLE DAM

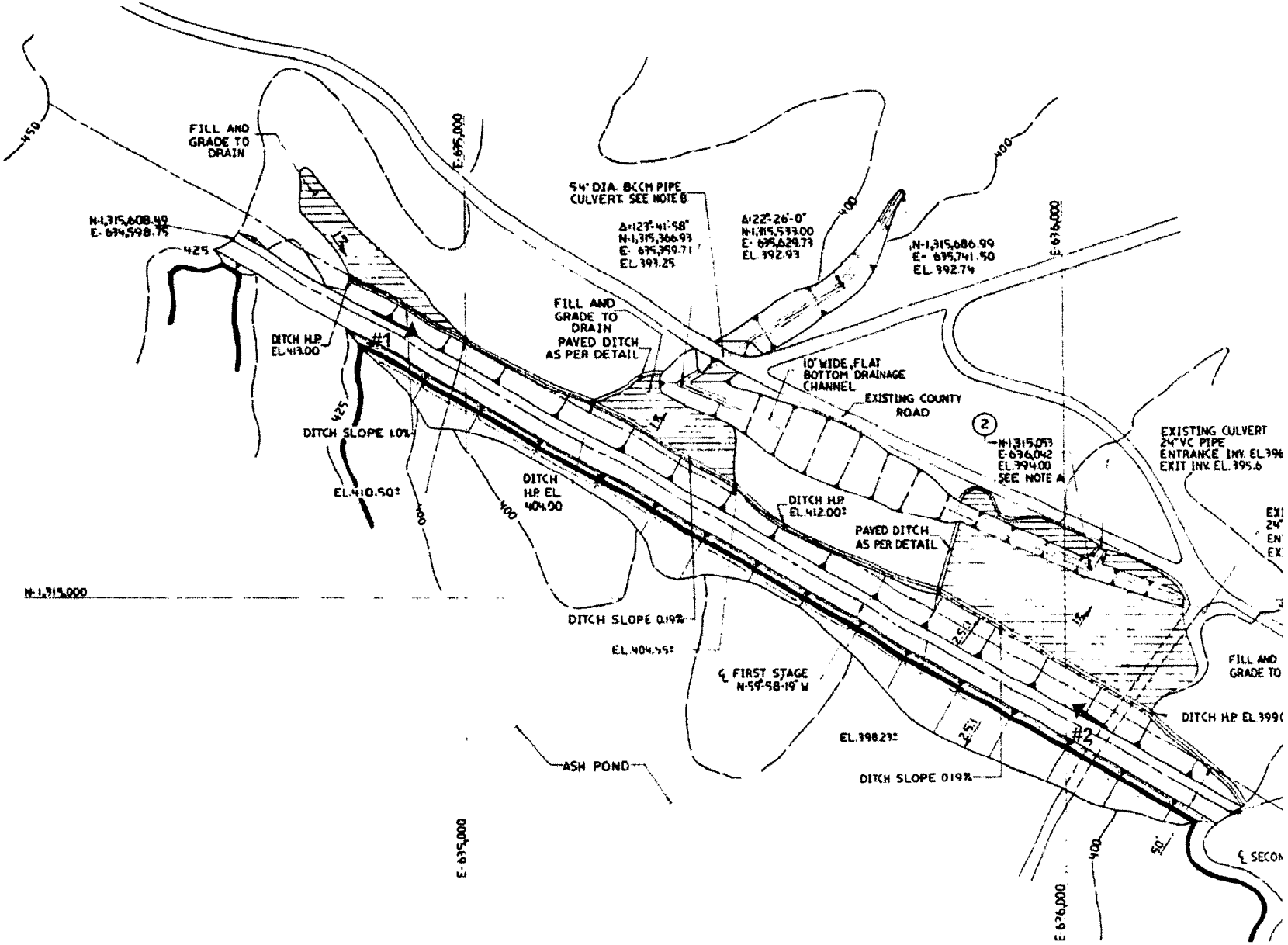


FIGURE 1

PHOTOGRAPH LOCATION PLAN, MAIN ASH POND DAM

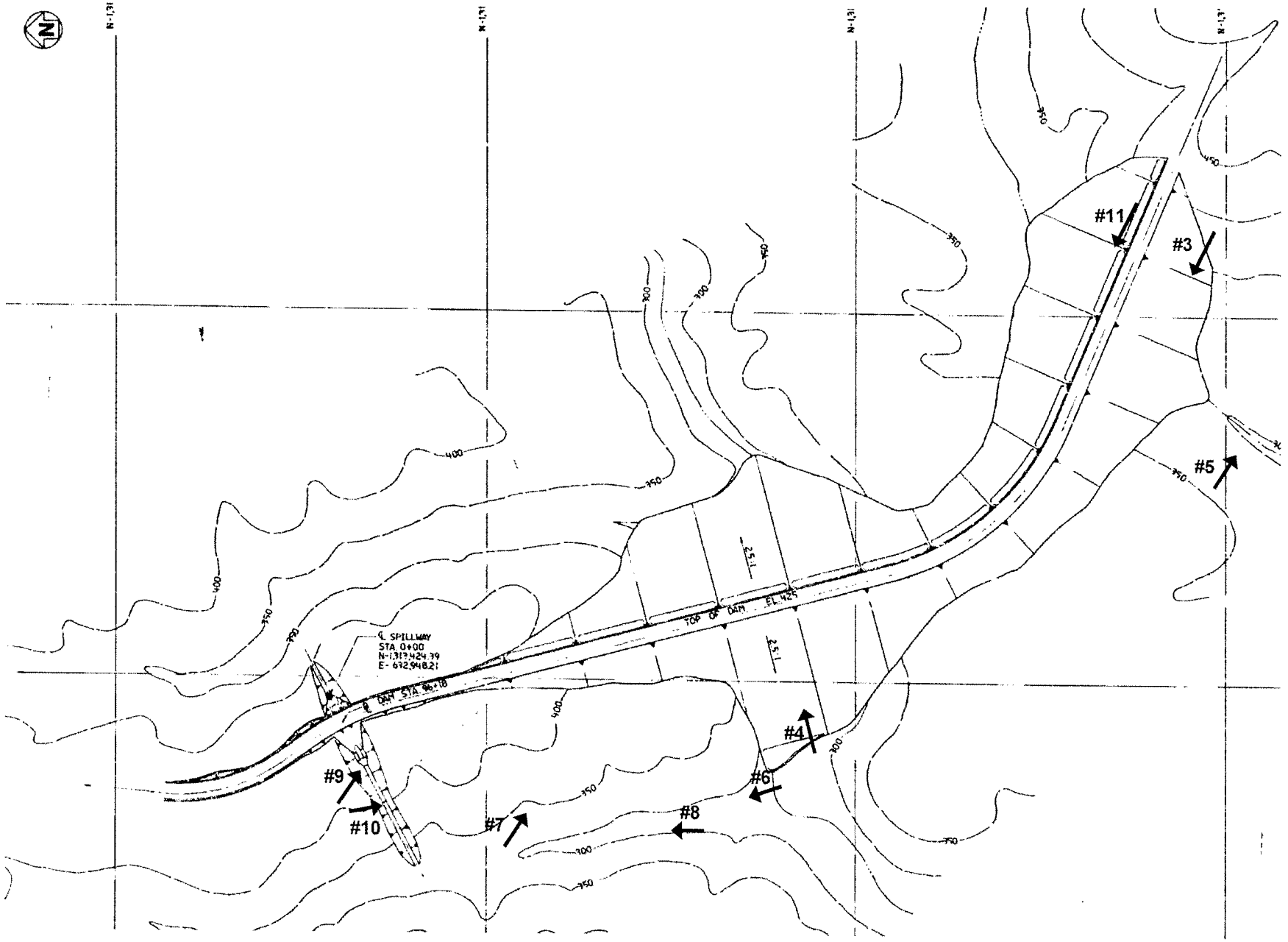


FIGURE 2

Photo 1: Condition of Saddle Dike Embankment, NW End Looking SE

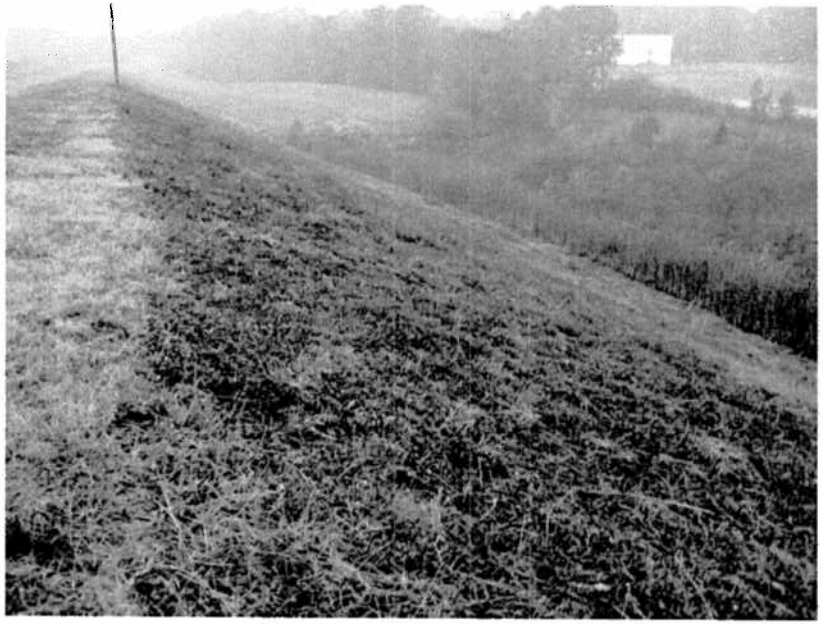


Photo 2: Condition of Saddle Dike Embankment, SE End Looking NW

Photo 3: Condition of Main Ash Pond Dike, Near S End Looking N

Photo 4: Condition of Main Ash Pond Dam Near Maximum Section

Photo 5: Spring Relief System Drain

Photo 6: Weir 1

Photo 7: Weir 2

Photo 8: Seepage Along Edge of Access Roadway

Photo 9: Outlet Discharge from Ash Pond

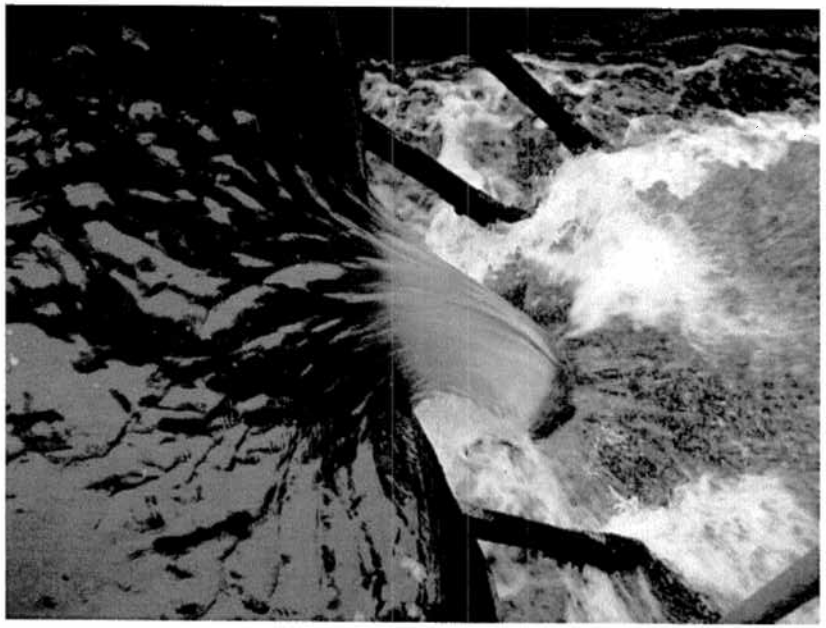
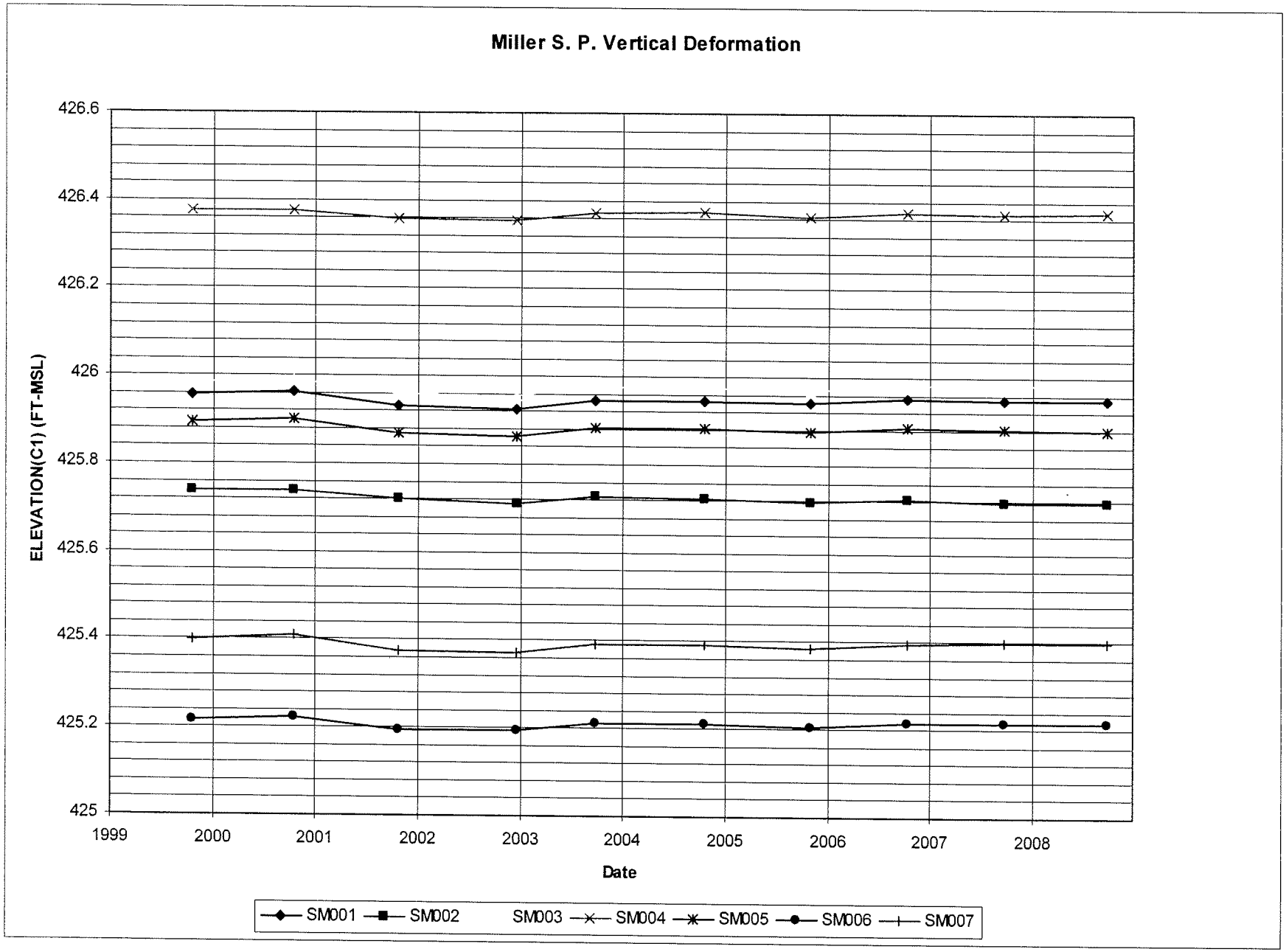


Photo 10: Outlet Discharge Flow Over Weir Blade

Photo 11: Typical Condition of Upstream Slope of Ash Pond Embankment


Miller S. P. Vertical Deformation
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ELEVATION(C1) (FT-MSL)
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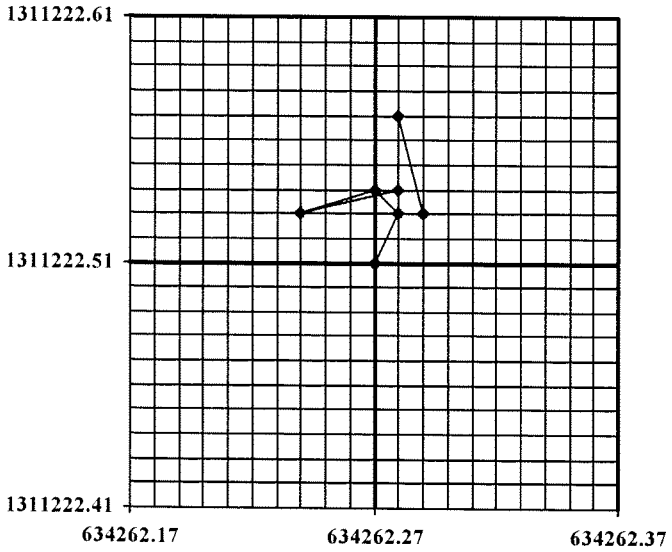
MILLER S. P. ASHPOND DAM

Horizontal Deformation



SM001

◇ – Most Recent Data Point

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10/01/2003

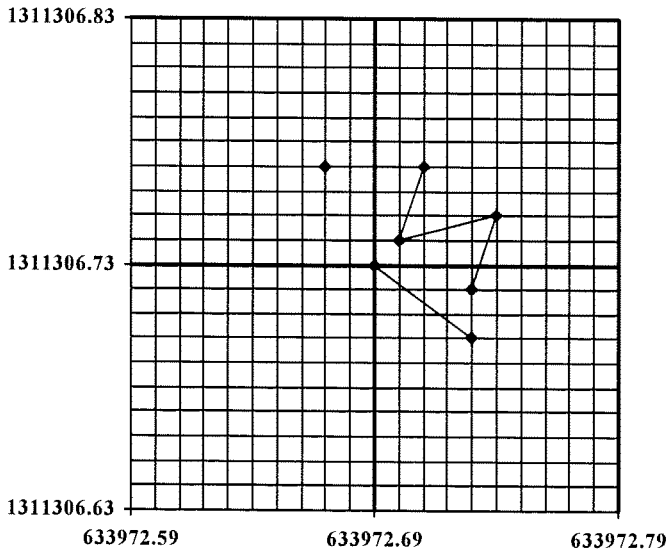
10/14/2004

11/10/2005

10/16/2006

09/26/2007

09/30/2008



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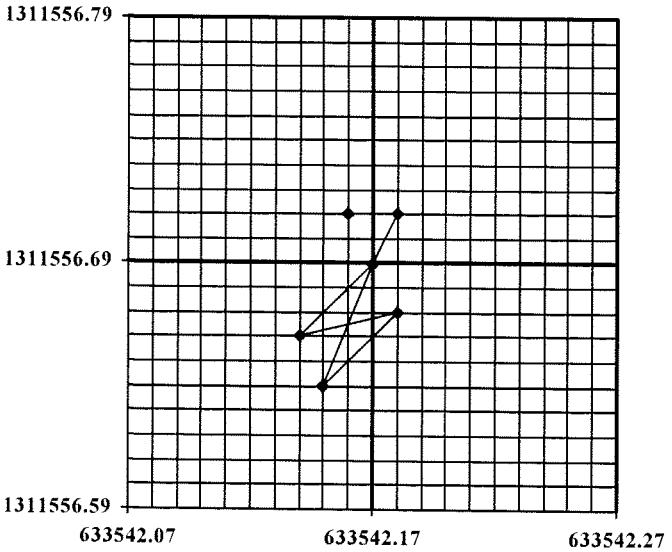

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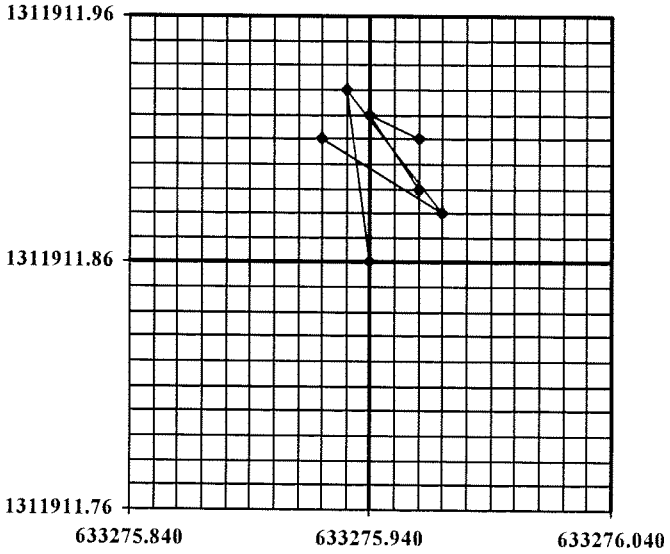
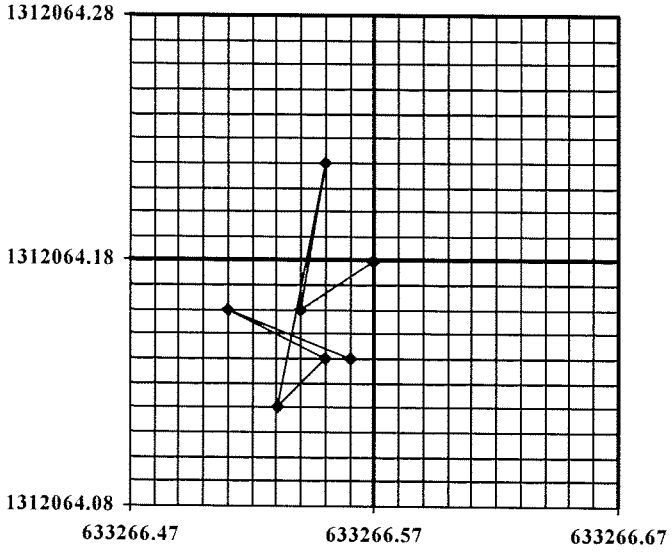


SM004

Adjusted original to 10/01/2003 As per 11/09/2004 re-check

MILLER S. P. ASHPOND DAM
Horizontal Deformation



SM005

Adjusted original to 10/01/2003 As per 11/09/2004 re-check

◇ – Most Recent Data Point

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10/01/2003

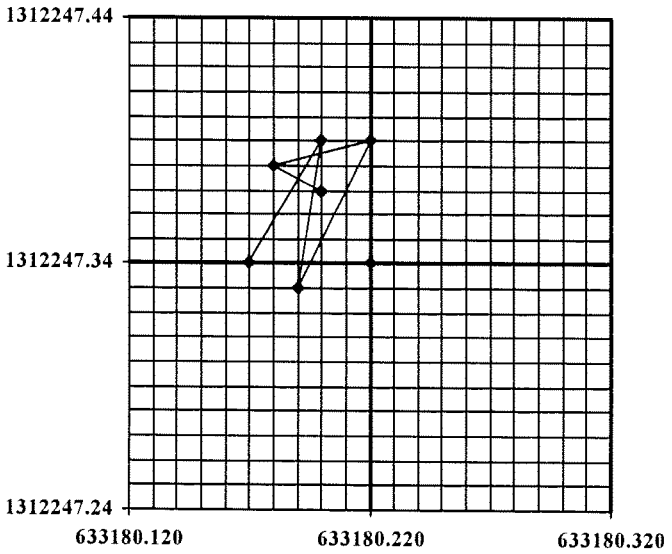
10/14/2004

11/10/2005

10/16/2006

09/26/2007

09/30/2008



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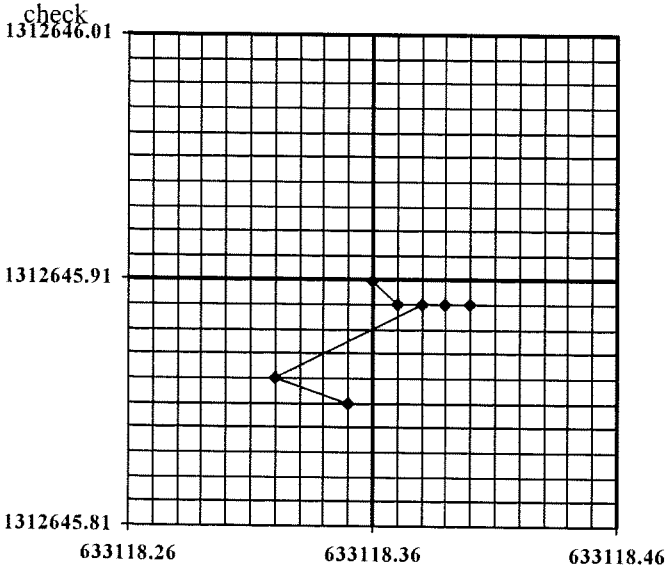

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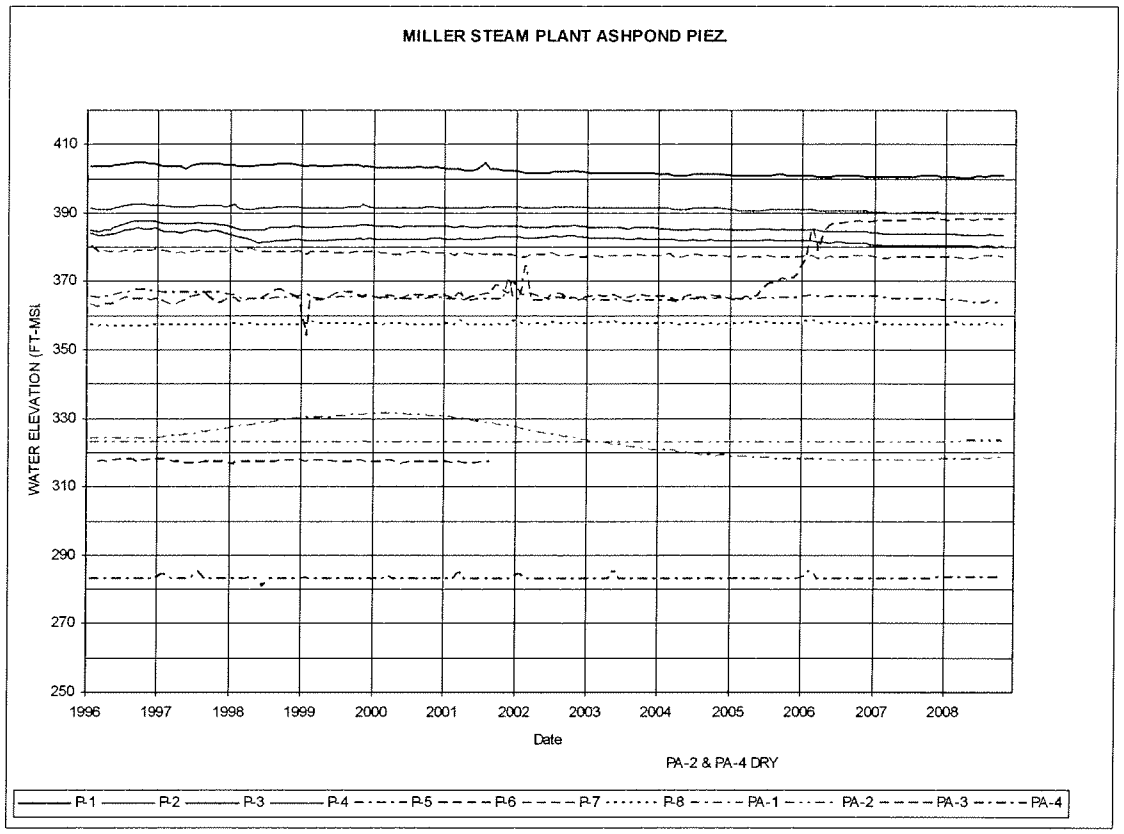
MILLER STEAM PLANT ASHPOND PIEZ.
WATER ELEVATION (FT-MSL
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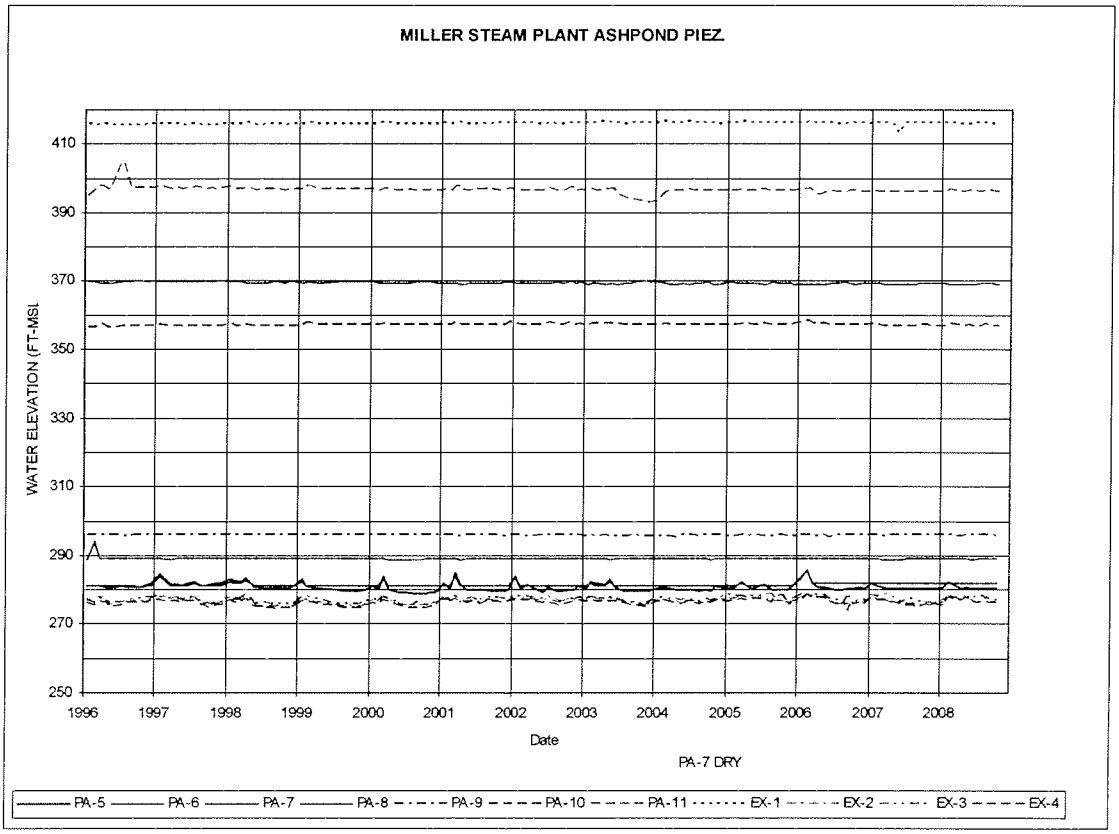
MILLER STEAM PLANT ASHPOND PIEZ.
WATER ELEVATION (FT-MSL
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EX-3
EX-4

600 18th Street North
Birmingham, AL 35203

205/257-1000

SOUTHERN COMPANY
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July 12, 2010

Miller Steam Plant Ash Pond Dam
2009 Dam Safety Inspection

Mr. Perry Boren
Plant Manager
Miller Steam Plant
Alabama Power Company

Dear Mr. Boren,

Enclosed please find the Report of Annual Dam Safety Inspection for the Miller Steam Plant Ash Pond Dam based on the inspection performed on December 10, 2009. The inspection team, consisting of myself and Richard Mickwee, appreciate the support provided by Mr. Brandon Patrick and Ms. Lisa Martindale 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.

As mentioned in the 2008 inspection, the plant staff should be commended on their continued effort put forth on clearing brush and other maintenance of the ash pond structures. This practice should continue. During the inspection, no conditions were noted that posed an immediate threat, or that would affect the continued safe operation of the facilities inspected. There are, however, some recommendations in the report for maintenance and monitoring related actions to reduce the likelihood of future problems:

- The current level of embankment vegetation maintenance at the main ash pond dam should be maintained.

- Surface erosion to the ash pond embankment toe access road should be repaired as it is noted in the plant's regular dam safety inspections.

- Even though the filling of the pond in the area of the saddle dike has most likely reduced the loading on the structure, it is recommended that the saddle dike continue to be inspected and the vegetation on the embankment continue to be controlled.

Details of the inspection were discussed in an exit meeting with Mr. Patrick and Ms. Martindale 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**
Ms. Lisa Martindale
Mr. Brandon Patrick

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

MILLER STEAM PLANT ASH POND DAM
REPORT OF ANNUAL DAM SAFETY INSPECTION
DECEMBER 10, 2009

GENERAL

Inspection of the Miller Steam Plant ash pond dam was conducted on December 10, 2009. All areas of the main dam, the saddle dam, and spillway were included in the inspection. Weather conditions were clear and cold. The inspection team consisted of Larry Dunlap and Richard Mickwee. The inspection team was accompanied by Brandon Patrick of the plant staff. Following the inspection, the findings were discussed with the plant Compliance and Support Manager, Lisa Martindale.

The inspection team's recommendations provided in this report are highlighted in ***italics***, and have been summarized on the attached Table 1. Approximate photo locations are illustrated on the attached Figure 1 (Main Ash Pond Dam) and Figure 2 (Saddle Dike).

OBSERVATIONS AND RECOMMENDATIONS

Main Ash Pond Dike

The inspection of the main ash pond dam started along the dam crest. The roadway along the crest was in excellent condition, and the embankments appeared to be very well maintained along both upstream (see Photo #1) and downstream (see Photo #2) faces. Also worthy of note is the effort taken to keep vegetation clear from the interface between the embankment upstream face and the pond waterline. ***It is recommended that this level of embankment maintenance (on both the upstream and downstream slopes) be continued.*** The downstream toe of the dike was inspected starting along the southern edge of the embankment near Station 125+00. This portion of the dam is the maximum height section. As was noted from the crest, the embankment vegetation appeared to be well-maintained and the concrete lined toe ditch was reasonably clear (see Photo #3). Along the toe of the embankment in this area, the plant emergency filter material stockpile was noted (see Photo #4).

The spring drainage system installed downstream of Station 121+00 was inspected, and no problems were noted. The outlets were in good condition and flowing freely (see Photo #5). The area around the outlets was maintained and free of brush. Based on a review of photographs from previous inspections, the flow through the outlets appeared to be similar.

As a result of concentrated surface flows, significant rilling of the embankment toe access road was observed (see Photo #6). At the time of the inspection, it was recommended that the rilling be repaired to maintain the access for inspection, and it is the inspection team's understanding that this work has been completed. ***It is recommended that future surface erosion of the access road be repaired as it is noted during the plant's regular dam safety inspections.***

The inspection team completed the inspection along the toe, noting the conditions of Weir #1 (see Photo #7) and Weir #2 (see Photo #8). No problems were noted, and flows appeared to be similar to those noted in past inspections. Along the road between the two weirs, flow was surfacing at a point estimated to be about in line with Station 105+00 (see Photo 9). Flow has been observed in this area in prior inspections, and it was judged to be about the same as previously noted.

The discharge inlet and outlet structures were inspected (outlet on Photo #10), and no problems were noted.

Saddle Dike

The saddle dike adjacent to Porter Road was inspected, starting at the southeastern end and moving to the northwest. As has been mentioned in previous inspection reports, the operations at the plant have resulted in most of the pond in the area being filled with ash, so the loading on the saddle dam as a water-retaining structure is likely reduced. At the time of the 2009 inspection, the embankment appeared to be in excellent condition (see Photos #11 and #12).

As was noted in the 2008 inspection report, the embankment maintenance at the saddle dam continues to be significantly improved over years past, and this effort by the plant staff is appreciated. ***It is recommended that this level of embankment vegetation maintenance be continued at the saddle dike, and inspection of the saddle dike should continue to be a part of the plant's regular dam safety inspections.***

No problems or unusual conditions were noted at the saddle dike. As reported in 2008, beaver activity along the toe of the saddle dike (which in years past has been a problem) was not observed.

Instrumentation

Dam instrumentation was reviewed in conjunction with the inspection. Plots of readings from deformation monuments as well as piezometers at the maximum dam section are attached.

The unusual rise in piezometer P-6 noted in 2006 continues to appear to have stabilized at its current level. No other problems, unusual conditions, or adverse trends are indicated by the instrumentation data.

STATUS OF PREVIOUS RECOMMENDATIONS

The following summarizes the recommendations from the 2008 inspection report, and their status:

1) The saddle dike should continue to be inspected and the vegetation on the embankment controlled. **Status: Satisfied. This recommendation is repeated in the 2009 inspection report, and the plant's efforts in maintaining this area are appreciated.**

2) The area around the spring outlets (Ash Pond STA 121+00) should continue to be kept free of brush and access to this area should be maintained. **Status: Satisfied. Access to the spring outlets has been maintained, but will require continued effort.**

3) Vegetation in the riprap along the upstream side of the ash pond dike crest should be removed and controlled by spraying herbicide. **Status: Satisfied. As noted above and illustrated in Photo #1, the vegetation control in this area has been achieved. As with other issues associated with vegetation control, continued effort will be required.**

CONCLUSION

The project structures appear to be performing adequately. There were no conditions that, in the opinion of the inspection team, would affect the continued safe operation of the facilities inspected. The inspection team would like to extend its appreciation to the plant staff, Mr. Patrick in particular, for their cooperation and efforts in regard to dam safety over the past year.

Larry F. Dunlap, P.E.

Richard L. Mickwee II, P.E.

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

No.	Description	Location
1	The current level of embankment maintenance (on both the upstream and downstream slopes) at the main ash pond dam should be continued.	Ash Pond Dike (see Photos #1, #2, and #3)
2	It is recommended that future surface erosion of the access road be repaired as it is noted during the plant's regular dam safety inspections.	Ash Pond Dike (see Photo #6)
3	The current level of embankment vegetation maintenance at the saddle dike should be continued, and inspection of the saddle dike should reamin a part of the plant's regular dam safety inspections.	Saddle Dike (see Photos #11 and #12)

Photo 1: Upstream Face of Main Ash Pond Dam

Photo 2: Downstream Face of Main Ash Pond Dam

Photo 3: Typical Condition of Downstream Toe of Main Ash Pond Dam

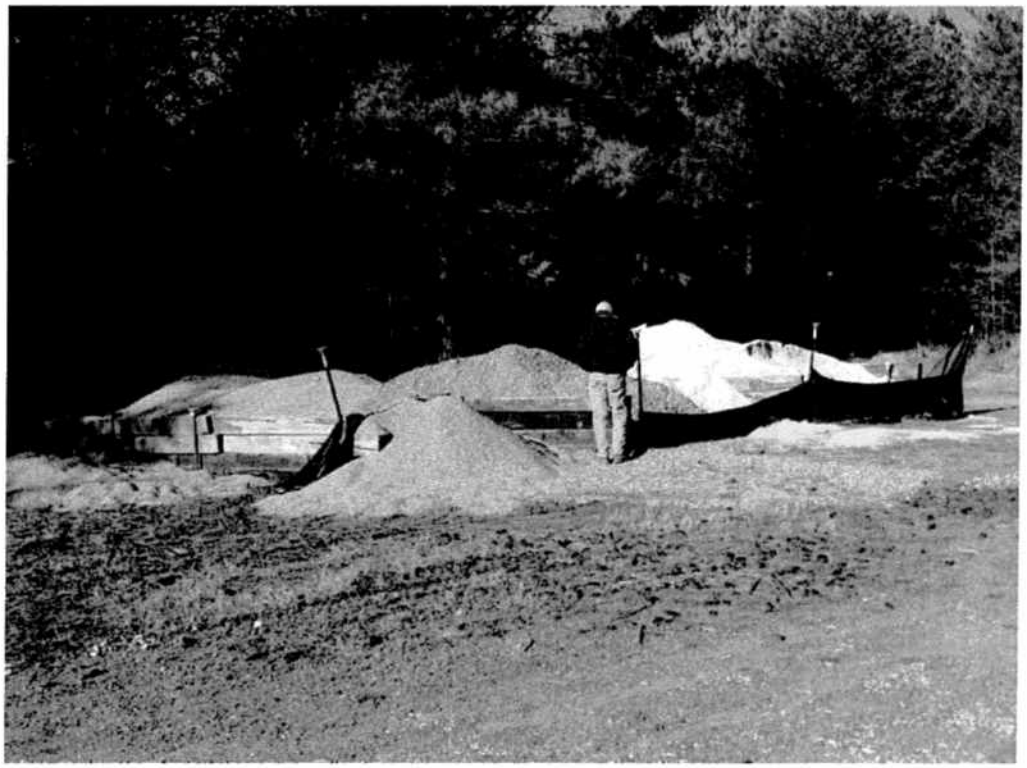


Photo 4: Emergency Filter Material Stockpile

Photo 5: Spring Relief Drain Outlet Downstream of Main Ash Pond Dam

Photo 6: Erosion Along Ash Pond Dam Toe Access Road

Photo 7: Condition of Weir 1

Photo 8: Condition of Weir 2

Photo 9: Seepage Along Access Roadway

Photo 10: Discharge Outlet Structure

Photo 11: Saddle Dike Crest, Looking NW

Photo 12: Saddle Dike Toe, Looking SE

PHOTOGRAPH LOCATION PLAN, MAIN ASH POND DAM

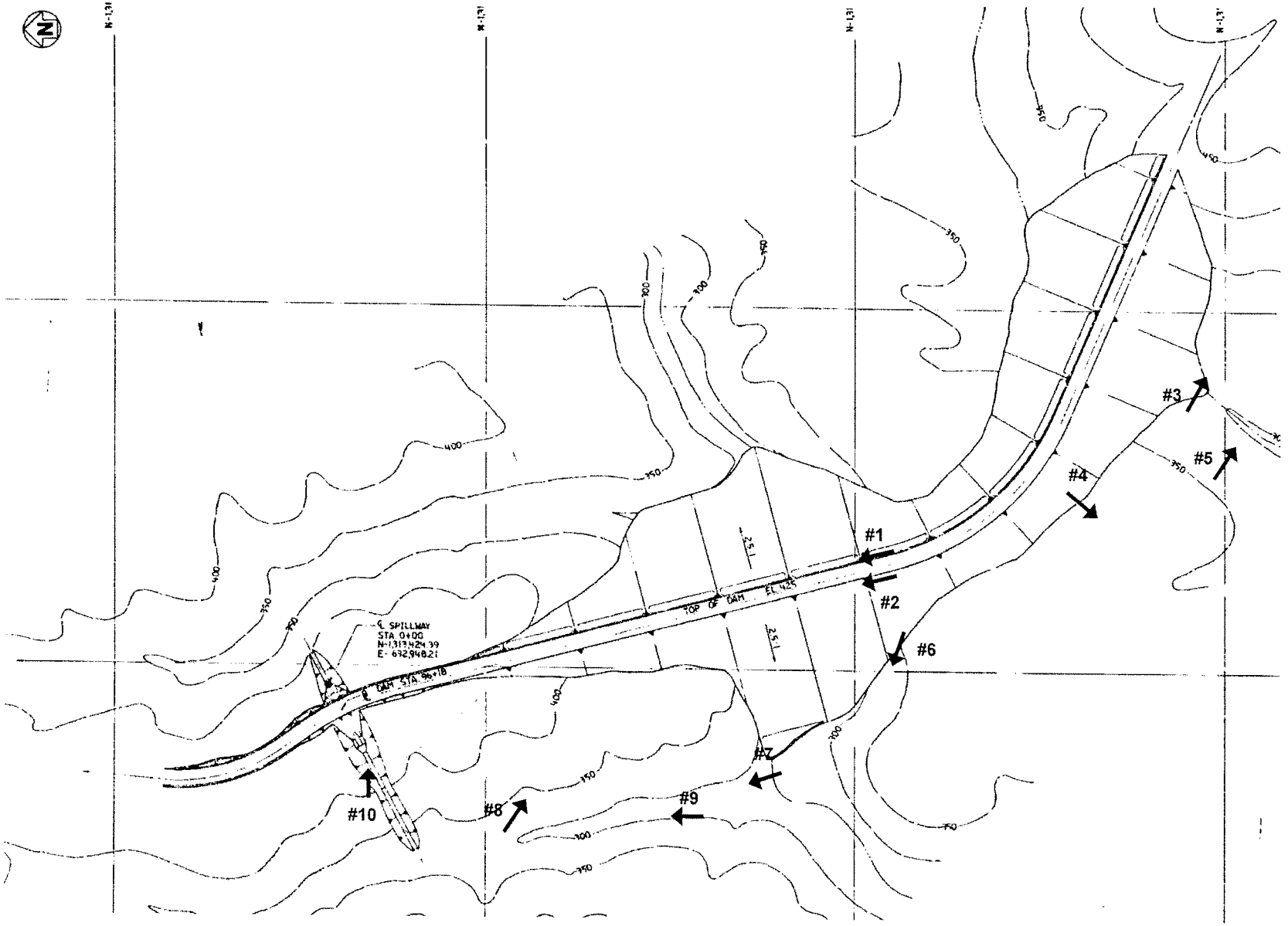


FIGURE 1

PHOTOGRAPH LOCATION PLAN, SADDLE DAM

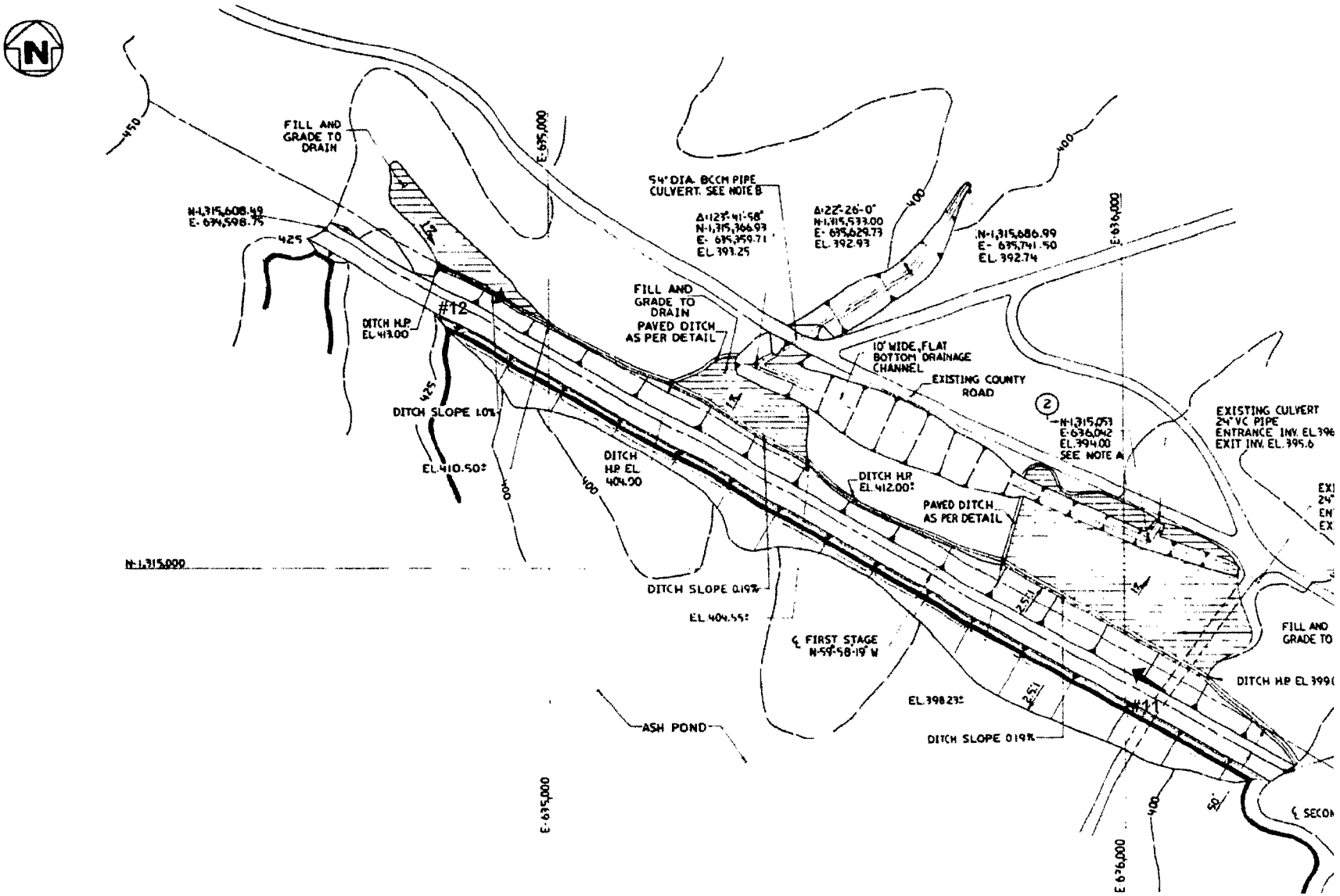
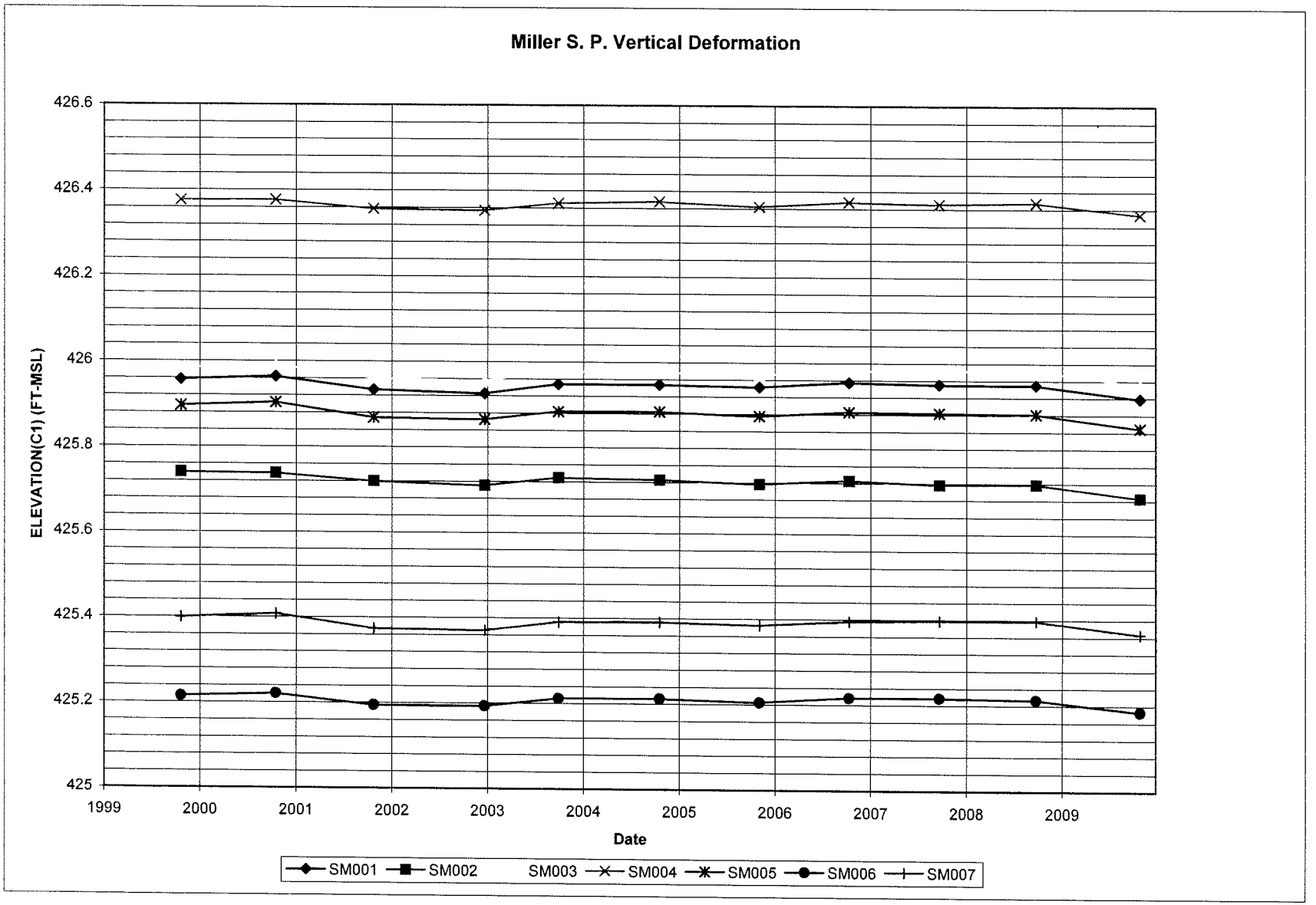
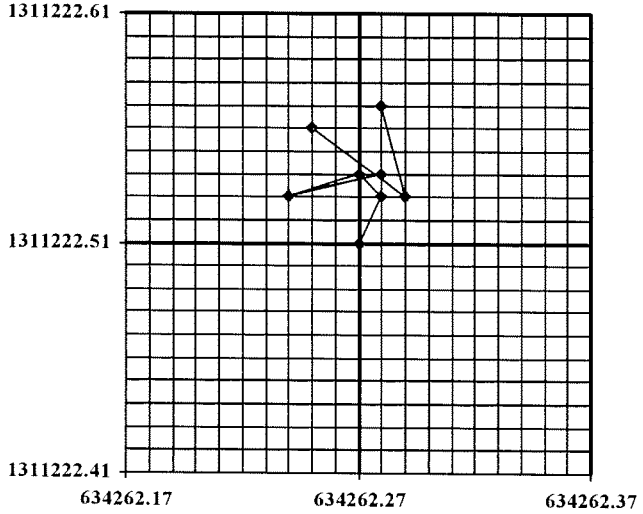


FIGURE 2


Miller S. P. Vertical Deformation
ELEVATION(C1) (FT-MSL)
426.6
426.4
426.2
426
425.8
425.6
425.4
425.2
425
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
Date
SM001
SM002
SM003
SM004
SM005
SM006
SM007

MILLER S. P. ASHPOND DAM
Horizontal Deformation



SM001

◆ – Most Recent Data Point

DATES:

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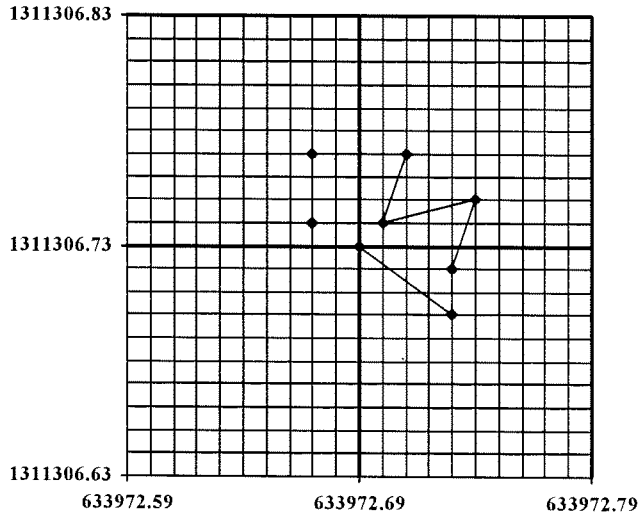
10/01/2003
10/14/2004
11/10/2005
10/16/2006
09/26/2007
09/30/2008
10/06/2009



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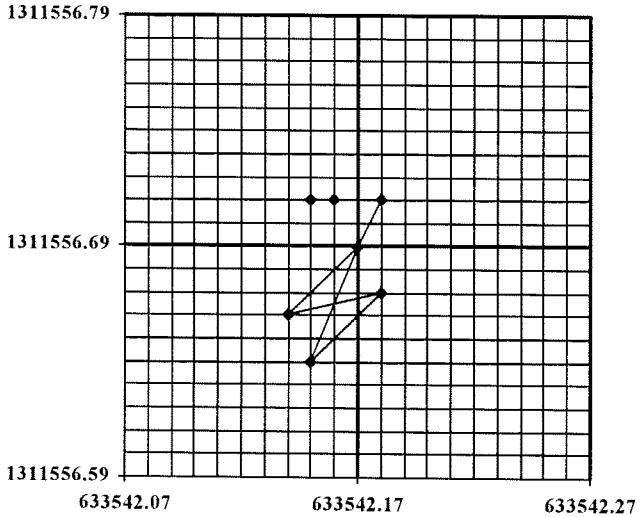

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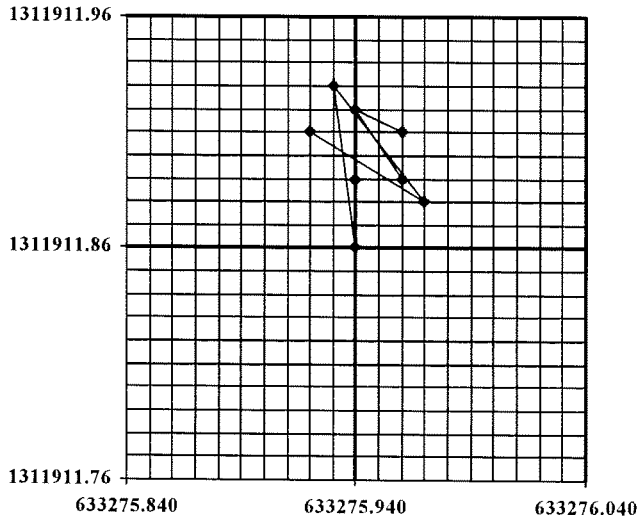
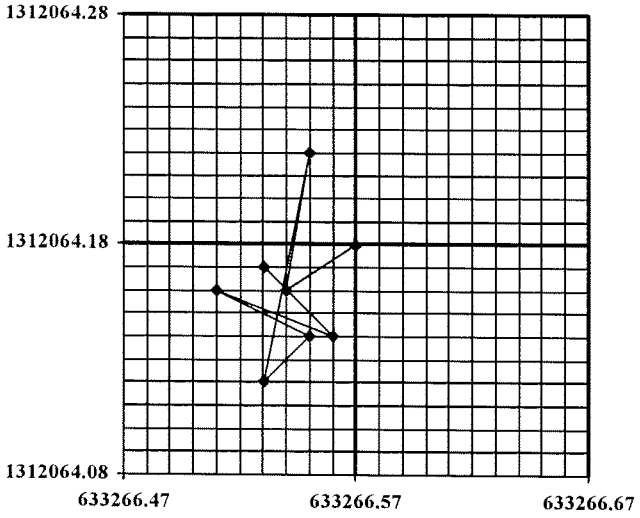


SM004

Adjusted original to 10/01/2003 As per 11/09/2004 re-check

MILLER S. P. ASHPOND DAM
Horizontal Deformation



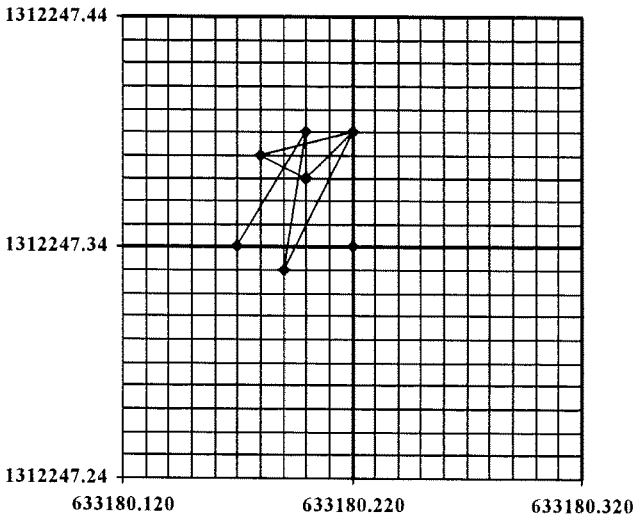
SM005

Adjusted original to 10/01/2003 As per 11/09/2004 re-check

◆ – Most Recent Data Point

DATES:

10/29/2002
10/01/2003
10/14/2004
11/10/2005
10/16/2006
09/26/2007
09/30/2008
10/06/2009



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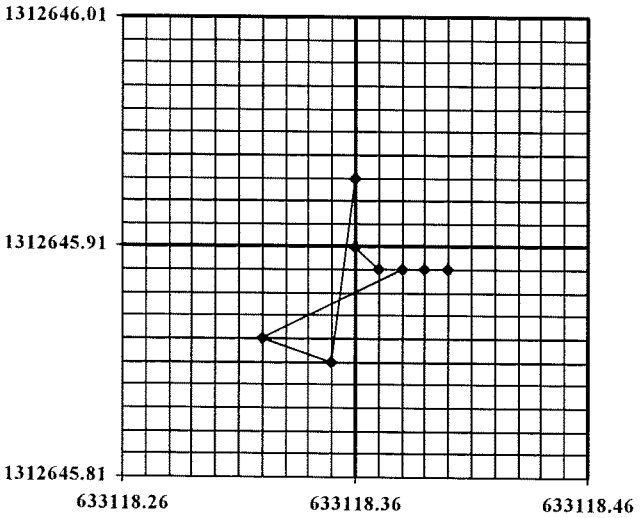
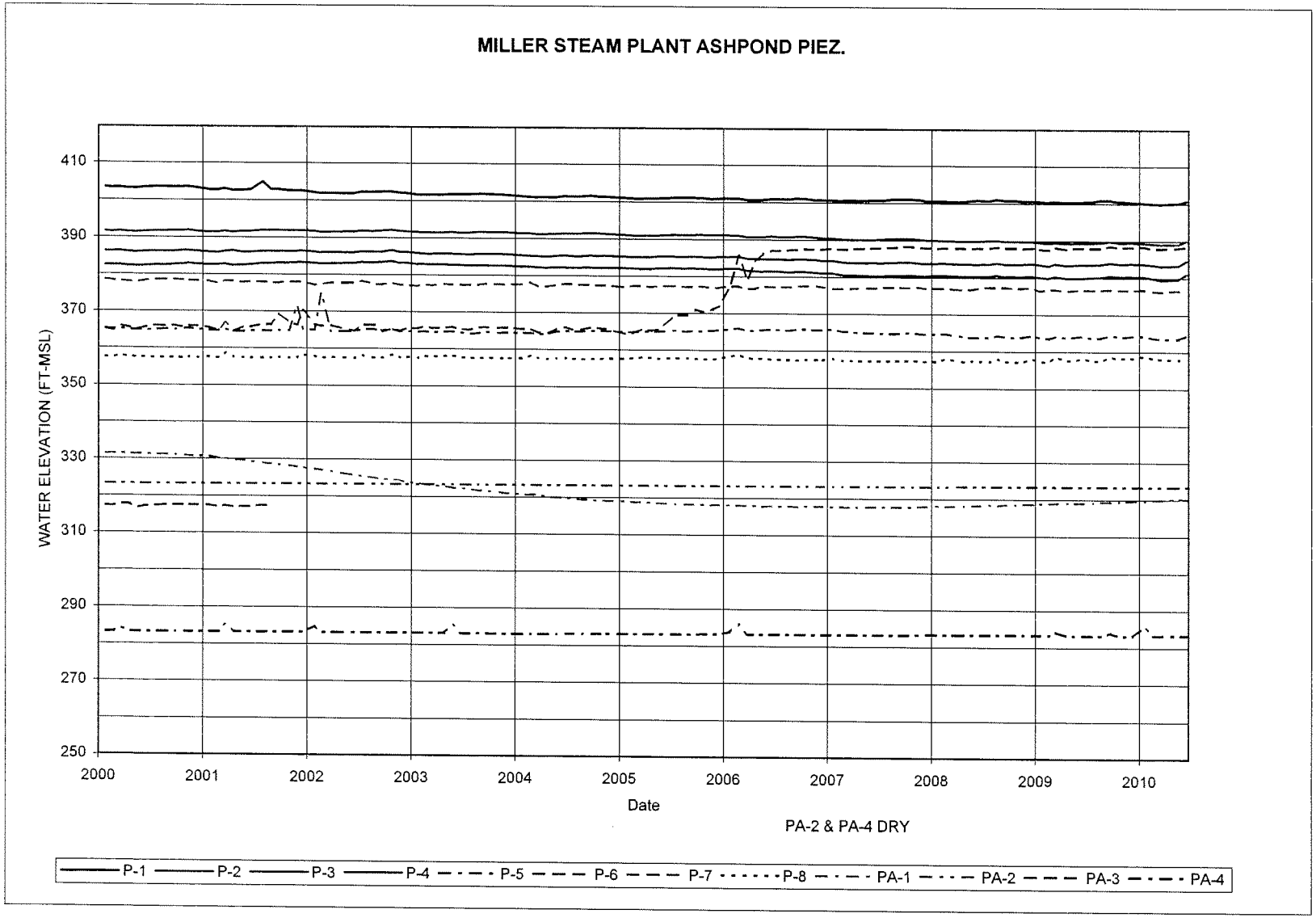
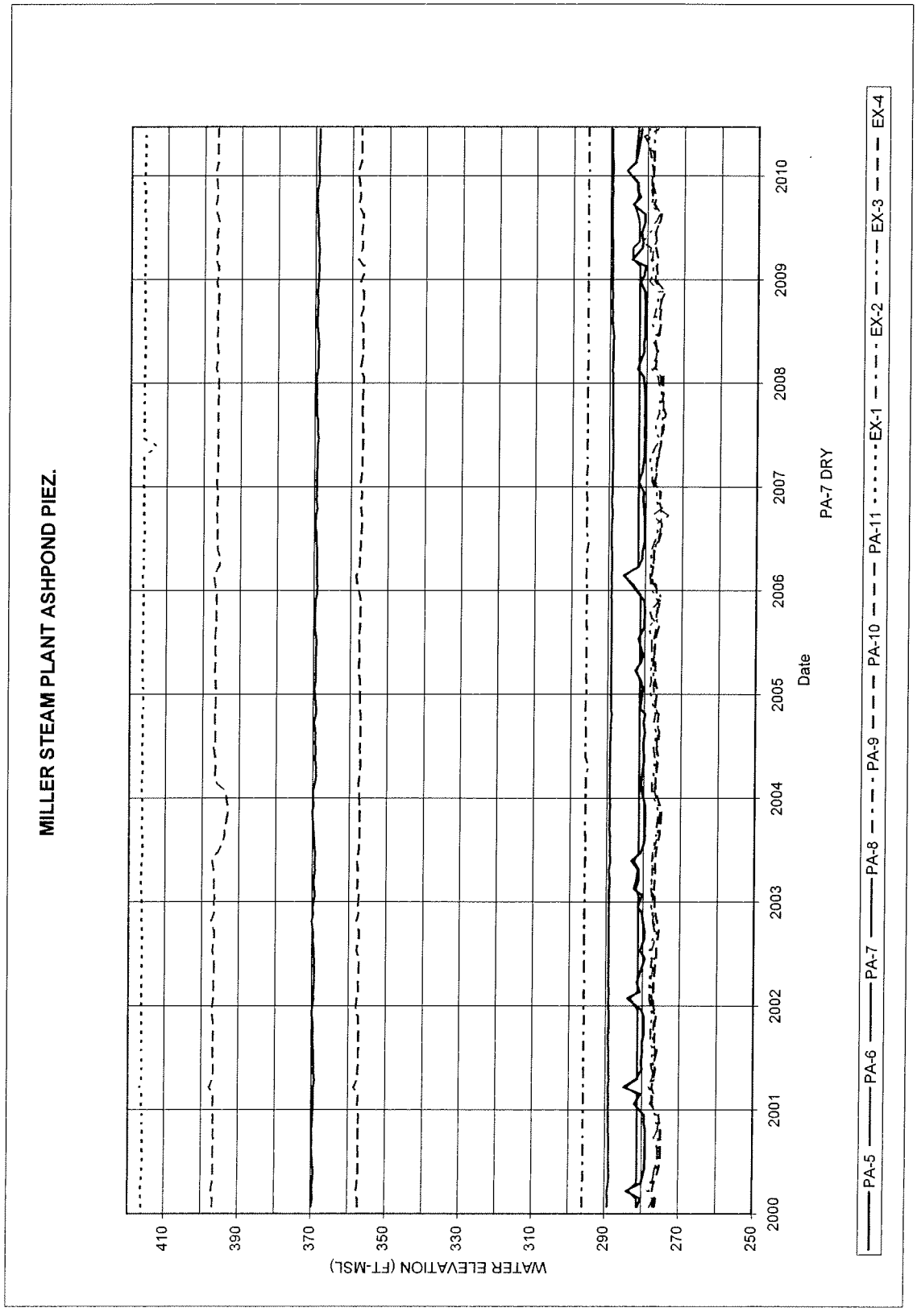


SM007


MILLER STEAM PLANT ASHPOND PIEZ.
WATER ELEVATION (FT-MSL)
410
390
370
350
330
310
290
270
250
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
Date
PA-2 & PA-4 DRY
P-1
P-2
P-3
P-4
P-5
P-6
P-7
P-8
PA-1
PA-2
PA-3
PA-4



600 18th Street North
Birmingham, AL 35203

205/257-1000

SOUTHERN COMPANY
Energy to Serve Your World™

November 11, 2010

Miller Steam Plant Ash Pond Dam
2010 Dam Safety Inspection

Mr. Perry Boren
Plant Manager
Miller Steam Plant
Alabama Power Company

Dear Mr. Boren,

Enclosed please find the Report of Annual Dam Safety Inspection for the Miller Steam Plant Ash Pond Dam based on the inspection performed on October 20, 2010. The inspection team, consisting of myself and Richard Mickwee, appreciate the support provided by Mr. Brandon Patrick and Ms. Lisa Martindale 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.

As mentioned in recent inspections, the plant staff should be commended on their continued effort put forth in maintenance and care of the ash pond structures. This practice should continue. During the inspection, no conditions were noted that posed an immediate threat, or that would affect the continued safe operation of the facilities inspected. There are, however, some recommendations in the report for maintenance and monitoring related actions to reduce the likelihood of future problems:

- The current level of embankment vegetation maintenance at the main ash pond dam as well as the saddle dikes should be maintained.

- It is recommended that the plant staff clear the debris from the drainage ditches along the embankment toe of both the main ash pond dam as well as the saddle dike so that the ditches are allowed to flow freely. Future maintenance efforts should include provisions to keep them clear.

Details of the inspection were discussed in an exit meeting 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**
Ms. Lisa Martindale
Ms. Laura P. Berry
Mr. Brandon Patrick

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

MILLER STEAM PLANT ASH POND DAM
REPORT OF ANNUAL DAM SAFETY INSPECTION
OCTOBER 20, 2010

GENERAL

Inspection of the Miller Steam Plant ash pond dam was conducted on October 20, 2010. All areas of the main dam, the saddle dam, and spillway were included in the inspection. Weather conditions were clear and cold. The inspection team consisted of Larry Dunlap and Richard Mickwee with SCG Hydro Services. The inspection team was accompanied by Brandon Patrick of the plant staff and Jacob Jordan with SCG Earth Sciences & Environmental Engineering. Following the inspection, the findings were discussed in an exit meeting.

The inspection team's recommendations provided in this report are highlighted in ***italics***, and have been summarized on the attached Table 1. Approximate photo locations are illustrated on the attached Figure 1 (Main Ash Pond Dam) and Figure 2 (Saddle Dike).

OBSERVATIONS AND RECOMMENDATIONS

Main Ash Pond Dike

The inspection of the main ash pond dam started at the discharge structure. Mr. Patrick indicated that the plant personnel were having issues with maintenance of vegetation in the discharge channel upstream of the V-notch weir blade (see Photo #1). The plant was planning on excavating a bench along the western edge of the channel that would allow access to a long-reach trackhoe that could be used periodically to clear the vegetation. Considering that the area to be excavated is located in natural ground, and the ash pond embankment will not be disturbed, the Dam Safety team does not have any issues with the plant's proposed plan. We request that the plant continue to keep Hydro Services informed as the plans and work in this area progresses.

The discharge intake structure (see Photo #2) was inspected, and no problems were noted.

The crest of the main ash pond dike was observed to be in excellent condition, and the gravel driving surface was well-maintained (see Photo #3). The riprap along the upstream face was being adequately maintained, and vegetation along the interface between the embankment and the waterline was being properly controlled.

The downstream face of the embankment was inspected, and it was noted that the vegetation is being well-maintained (see Photo #4). ***It is recommended that this level of embankment maintenance (on both the upstream and downstream slopes) be continued.***

It was noted that at several locations the concrete-lined drainage ditch along the dam toe had accumulated some debris. ***It is recommended that the plant staff clear the debris from the drainage ditches so that they are allowed to flow freely, and future maintenance efforts should include provisions to keep them clear.*** This is not a major concern at this time, but one that needs to be addressed.

Since the 2009 inspection, a project to modify seepage handling was completed at the Miller ash pond. This included collection of groundwater and seepage flows from springs referred to in previous reports as the 'spring drainage system' as well as flow measured at Weirs 1 and 2. These flows are now collected and pumped back into the ash pond reservoir.

The small spring seepage noted along the dam toe access road in past inspections was observed in the 2010 inspection (see Photo #5). The amount of flow observed appeared to be similar to that noted in past inspections. This point was included in the project discussed above, but had apparently found another outlet. We understand that repairs will be made so that this flow will again be routed to the collection point.

The emergency filter stockpiles were observed and noted to be stored adequately (see Photo #6).

Saddle Dike

The saddle dike adjacent to Porter Road was inspected, starting at the southeastern end and moving to the northwest. As has been mentioned in past reports, the operations at the plant have resulted in most of the pond in the area being filled with ash, so the loading on the saddle dam as a water-retaining structure is likely reduced. At the time of the 2010 inspection the embankment appeared to be in excellent condition (see Photo #7). ***It is recommended that this level of embankment maintenance be maintained at the saddle dike.***

A portion of the concrete-lined drainage ditch had become clogged with debris (see Photo #8). ***As discussed above, it is recommended that the plant clear the debris from the drainage ditch so that it flows freely.*** It should be noted that this is not an urgent concern, but is suggested as a best practice.

Instrumentation

Dam instrumentation was reviewed in conjunction with the inspection. Plots of readings from piezometers at the maximum dam section are attached (2010 deformation data was not available as of the date of this report). No problems, unusual conditions, or adverse trends are indicated by the instrumentation data.

STATUS OF PREVIOUS RECOMMENDATIONS

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

1) It was recommended that the 2009 level of embankment maintenance (on both the upstream and downstream slopes) at the main ash pond dam should be maintained. **Status: Ongoing. Based on conditions observed in the 2010 inspection, this recommendation has been met. Persistent efforts in maintenance will be required, but the inspection team continues to be impressed by the attention being paid to the embankment maintenance.**

2) It was recommended that future surface erosion of the access road along the embankment toe be repaired as it is noted during the plant's dam safety inspections. **Status: Completed. The deep rills noted in the roadway during the 2009 inspection were not observed during the 2010 inspection.**

3) It was recommended that the 2009 level of embankment vegetation maintenance at the saddle dike should be continued, and inspection of the saddle dike should remain a part of the plant's regular dam safety inspections. **Status: Ongoing. The excellent maintenance program for the main ash dam is extended to the saddle dike, and it is recommended that this level of maintenance continue.**

CONCLUSION

The project structures appear to be performing adequately. There were no conditions that, in the opinion of the inspection team, would affect the continued safe operation of the facilities inspected. The inspection team would like to extend its appreciation to the plant staff, Mr. Patrick in particular, for their commitment and efforts in regard to dam safety over the past year.

Larry F. Dunlap, P.E.

Richard L. Mickwee II, P.E.

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

No.	Description	Location
1	It is recommended that the current level of embankment maintenance at the main ash pond dam (on both the upstream and downstream slopes) be continued.	Main Ash Pond Dike (see Photo #4)
2	It is recommended that the plant staff clear the debris from the drainage ditches along the main ash pond dam embankment toe so that they are allowed to flow freely, and future maintenance efforts should include provisions to keep them clear.	Main Ash Pond Dike
3	It is recommended that the current level of embankment maintenance be maintained at the saddle dike.	Saddle Dike (see Photo #7)
4	It is recommended that the plant clear the debris from the drainage ditch along the saddle dike embankment toe so that it flows freely.	Saddle Dike (see Photo #8)

Photo 1: Vegetation in Discharge Channel Upstream of Weir Blade

Photo 2: General Condition of Discharge Intake Structure

Photo 3: Condition of Main Ash Pond Dam Crest, Typical

Photo 4: Condition of Main Ash Pond Dam Embankment Downstream Slope, Typical

Photo 5: Small Seep Along Access Roadway

Photo 6: Emergency Filter Stockpile

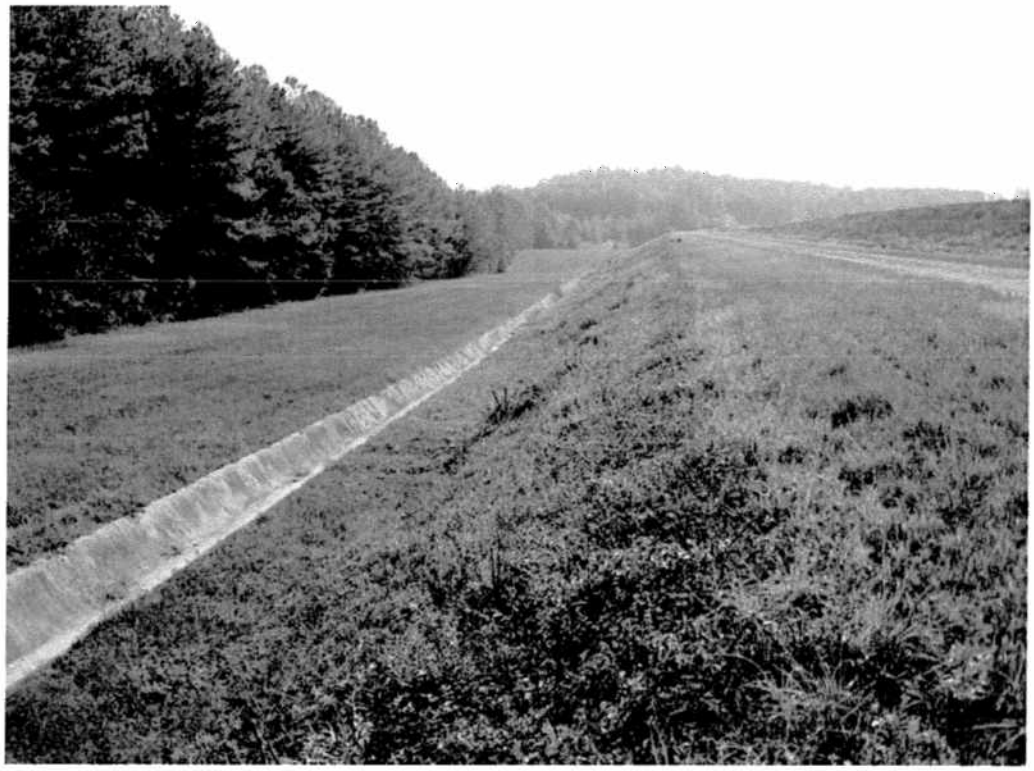


Photo 7: Condition of Saddle Dam, Typical

Photo 8: Debris in Concrete Lined Drainage Ditch Along Saddle Dam Toe

PHOTOGRAPH LOCATION PLAN, MAIN ASH POND DAM

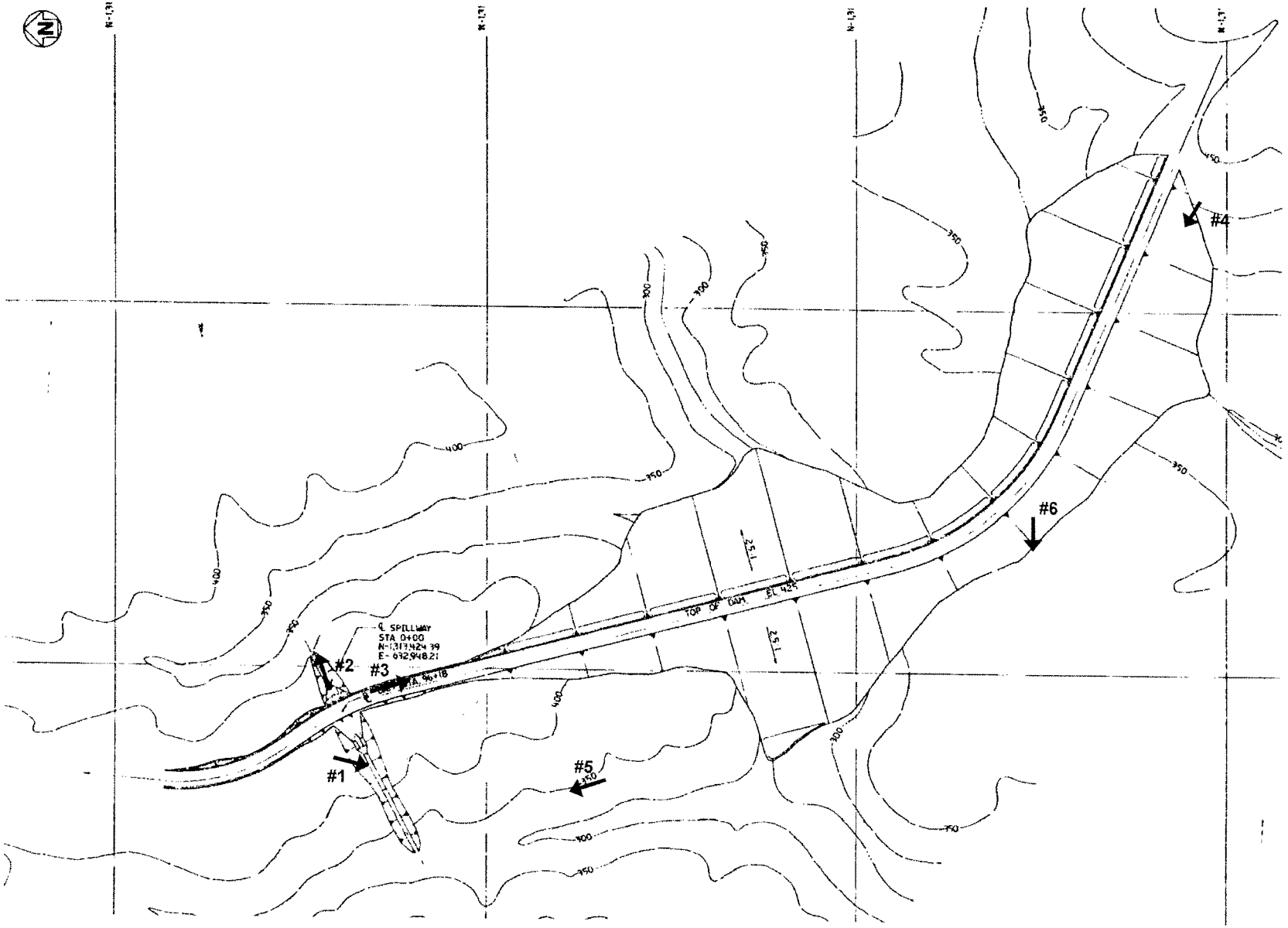


FIGURE 1

PHOTOGRAPH LOCATION PLAN, SADDLE DAM

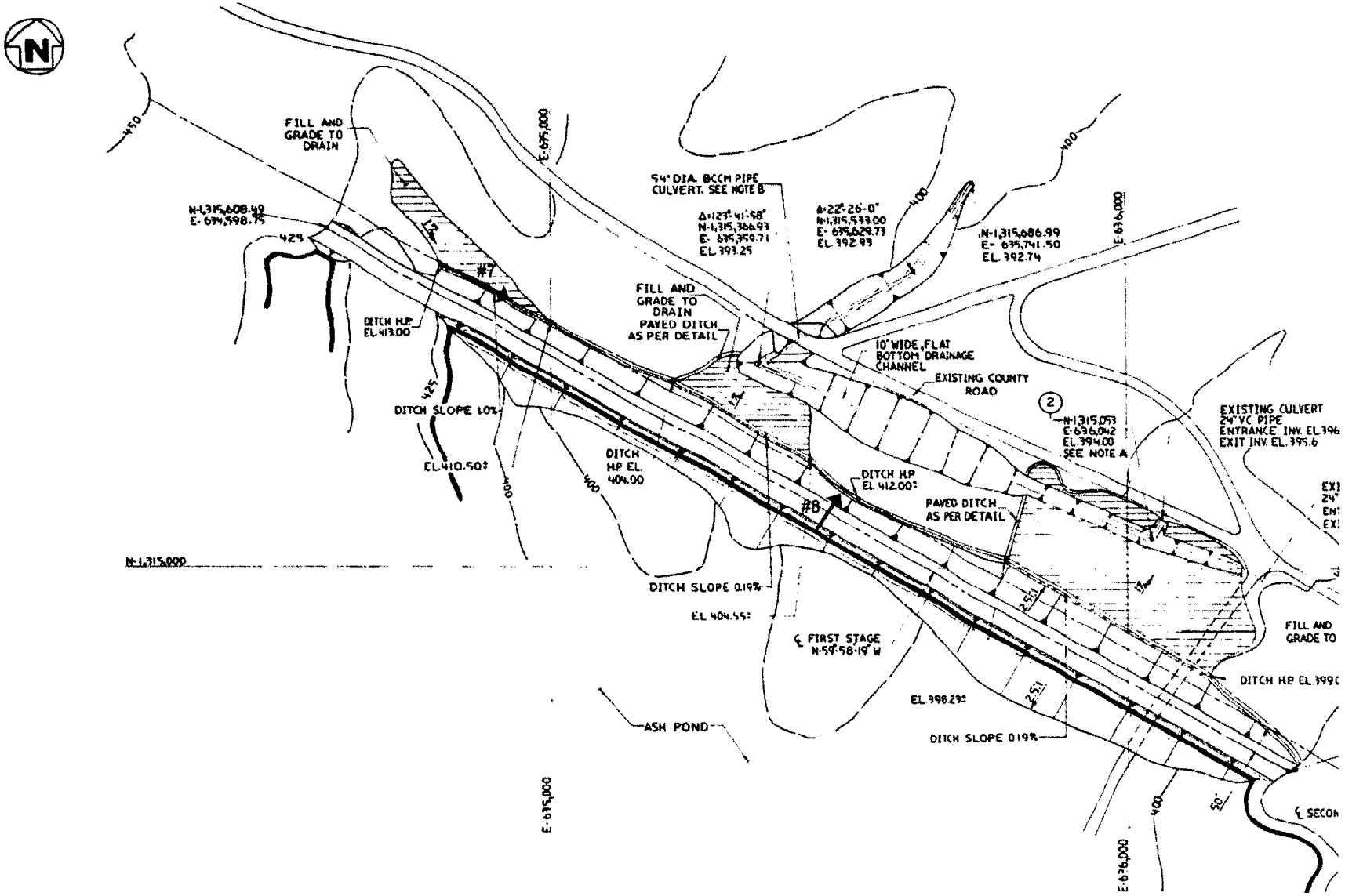
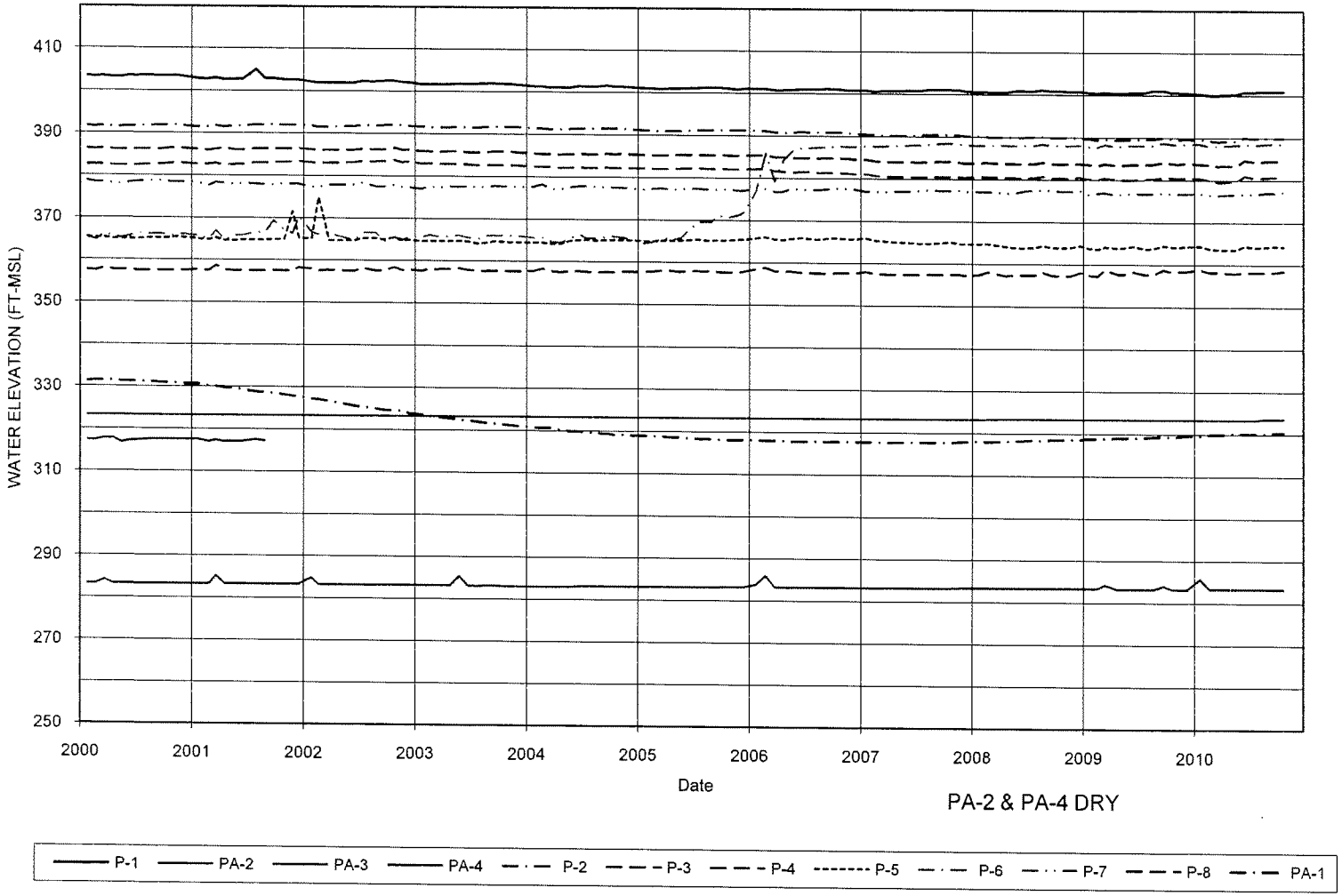


FIGURE 2

MILLER STEAM PLANT ASHPOND DAM PIEZOMETERS



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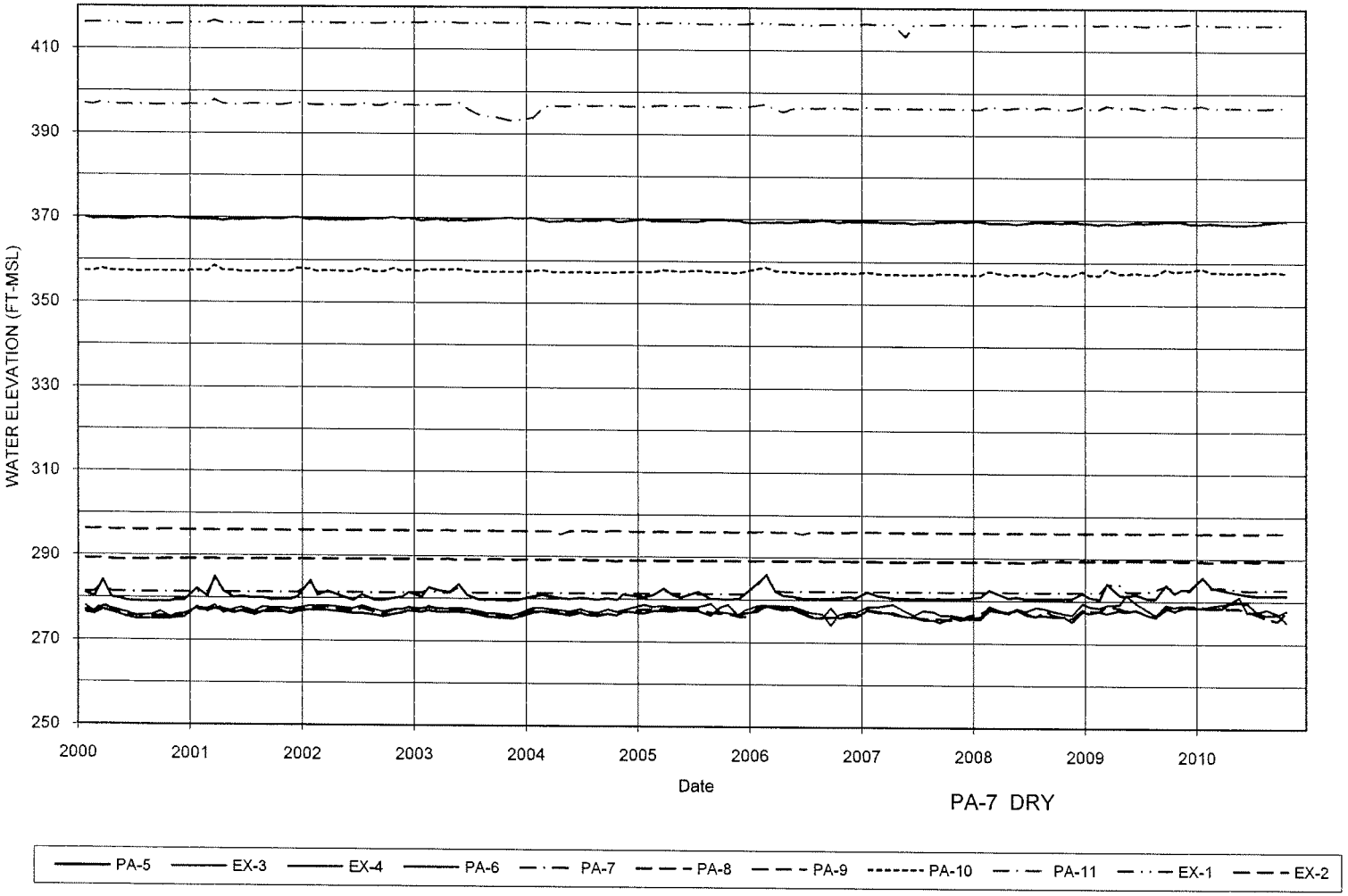
10/27/2010

MILLER STEAM PLANT ASHPOND DAM PIEZOMETERS



SOUTHERN COMPANY

Engineering and Construction Services Calculation

Calculation Number: TV-ML-ECS8661-002

Project/Plant: Plant Miller Ash Pond	**Unit(s):** 1 -4	**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:** Jacob Jordan	

Contents

Revision Record

Rev. No.	Description	Originator Initial / Date	Reviewer Initial / Date	Approver Initial / Date
0	Issued for Information	JAJ / 2/23/11		

Notes:

Confidential Business Information

CONFIDENTIAL

Purpose of Calculation

Plant Miller is a coal-fired steam plant that produces ash as combustion residual. Presently, the facility sluices ash from the economizer to the pond. The majority of the fly ash is sold for beneficial reuse. Bottom ash is stacked just south of the ash pond in an area formally operated as a strip mine. During 2010, the scrubbers were put into operation, producing gypsum as a byproduct. Gypsum that is not sold is dewatered and transported to the dry part of the ash pond and stacked. The pond is approximately 389.6 acres in area. The pond has an NPDES permit to discharge to the Locust Fork of the Warrior 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 November 2006 "Miller Ash Pond, Plan View Topo Map". 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.

For the purpose of this calculation, freeboard volume is defined at the space in the pond between the elevation of the normal pool and the low point of dike crest (EL 426).

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 normal pool is EL 420.5. After a 100-year/24-hour event, water will reach approximately EL 424. Approximately 24 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

Miller Ash Pond, Plan View Topo Map, Southern Company Services, November 2006.

Body of Calculation

Present freeboard volume of ash pond, determined using a digital model of the mapped topography in AutoCAD Civil 3D 2010, is 684217 yd^3.

The design 100-year/24-hour rainfall event for northern Jefferson County, Alabama is approximately 8.5 inches. Over a catchment area of 389.6 acres, the runoff is:

(8.5 inches * 389.6 acres)/12 = 276.0 (acre-ft)

Conversion to yd^3 = (276.0*43560)/27 = 445280 yd^3

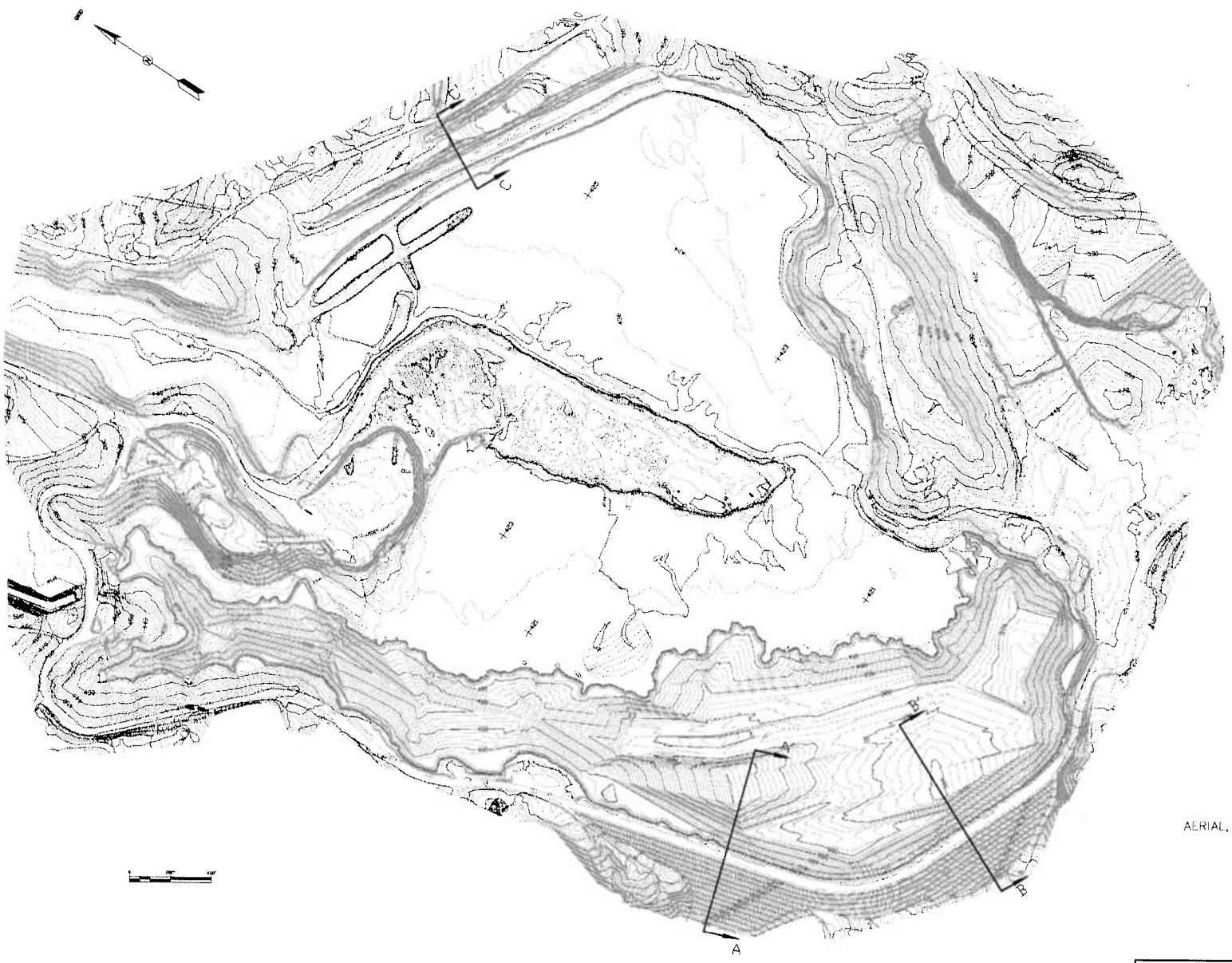
Freeboard volume remaining after the 100-year/24-hour rainfall event:

684217 yd^3 - 445280 yd^3 = 238937 yd^3

The storm will fill the pond to approximately EL 424.1 based on the digital topographic model. The remaining freeboard after the storm event is:

EL 426 – Elev. 424.1 = 1.9 ft of freeboard

MILLER ASH POND



GRID COORDINATES NAD 27

ALABAMA STATE PLANE
WEST ZONE

NOTES:

1) AERIAL PHOTOGRAPHY BY GEOGRAPHIX INC. SEP. 8, 2006
2) SOUNDING DATA COLLECTED SEP. 23, 2006
3) GROUND SURVEY DATA COLLECTED OCT. 10, 2006
4) CONTOUR INTERVAL 2 FEET
5) CONTOURS WERE PRODUCED BY DIGITAL TERRAIN MODEL
6) WATER LEVEL AT TIME OF SOUNDING 420.48 MSL
7) DRAWING IS ACCURATE ONLY AT ORIGINAL SCALE.

AERIAL, HYDROGRAPHIC & GROUND SURVEY

DRAWING PRODUCED BY SCGEM
SURVEY AND MAPPING
600 NORTH 18TH STREET
BIRMINGHAM, ALABAMA 35291
(205)664-6106

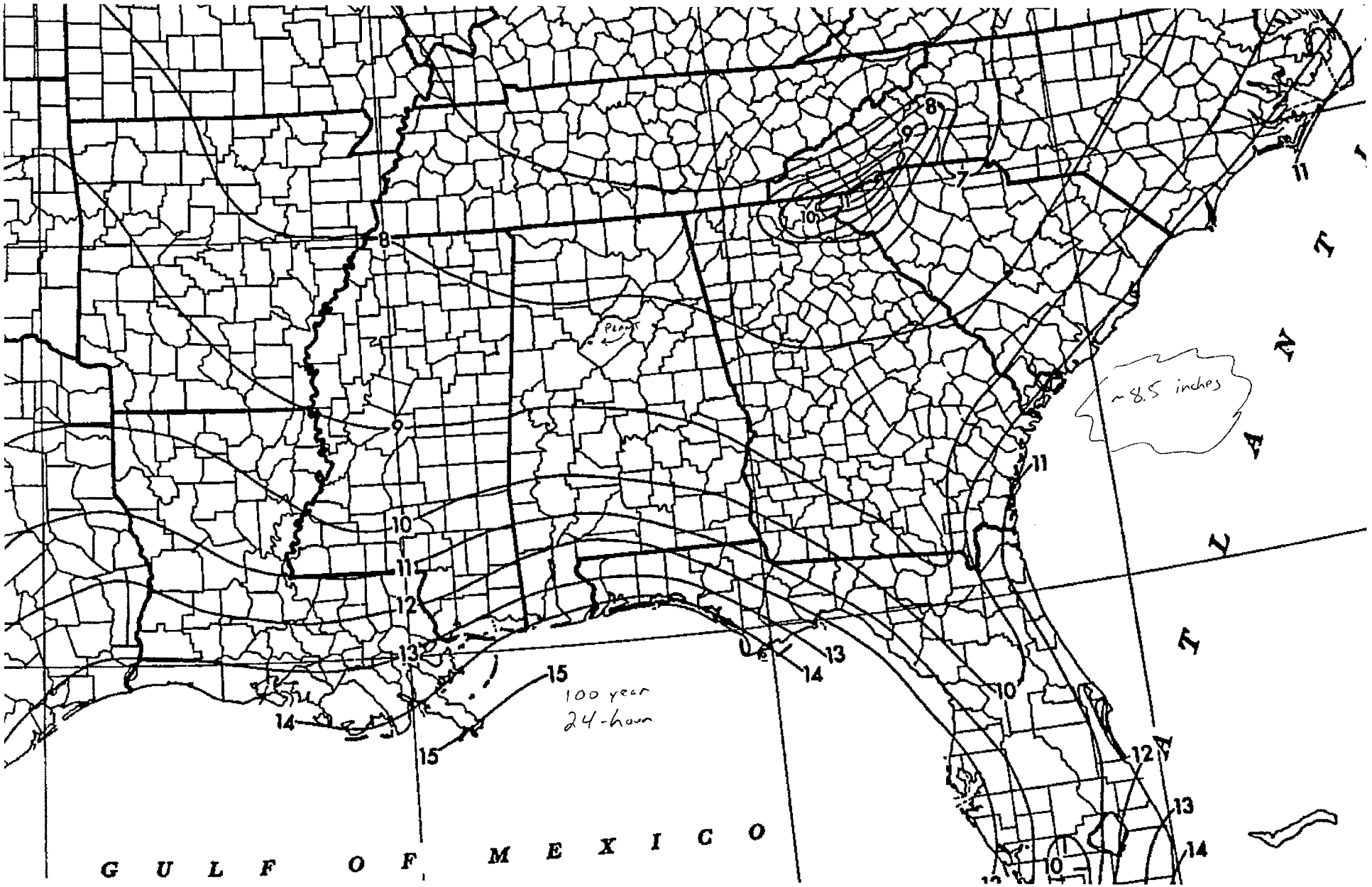
Southern Company Services, Inc.
for
Alabama Power Company

JOB	MILLER ASH POND
DETAIL	PLAN VIEW TOPO MAP
SCALE	AS NOTED
SHEET	OF SHEETS
REVISED	REV 0

REV	DATE:

DRAWN: ENT CHECKED: DESIGNED:
APPROVED: DATE: 11/15/2006
APPROVED: DATE:

Drawing Path: S:\USERS\MAJOR PROJECTS\PROJECTS\Miller\Miller 2010\ES1918_CONFIDENTIAL\Ash Pond Study\drawings\SECTIONS FOR 3195JRH-ASHPOND-AERIAL-TOPO-NAD27-EX.dwg Feb 22, 2011 - 11:07am



CONFIDENTIAL

SOUTHERN COMPANY

Engineering and Construction Services Calculation

Calculation Number: TV-ML-ESC8661-001

Project/Plant: Plant Miller Ash Pond	**Unit(s):** Units 1 - 4	**Discipline/Area:** ES&EE
Title/Subject: Slope Stability Analyses of Ash Pond		
Purpose/Objective: Analyze slope stability of Ash Pond Dikes		
System or Equipment Tag Numbers: NA	**Originator:** Jacob Jordan	

Contents

Topic	Page	Attachments (Computer Printouts, Tech. Papers, Sketches, Correspondence)	# of Pages
Purpose of Calculation	1	Section Location Drawing	1
Methodology	1	Slope Stability Analyses Printouts	9
Criteria & Assumptions	1		
Summary of Conclusions	4		
Design Inputs/References	5		
Section Location Drawing	7		
Body of Calculation (print outs)	8 - 16		
Total # of pages including cover sheet & attachments:			

Revision Record

Rev. No.	Description	Originator Initial / Date	Reviewer Initial / Date	Approver Initial / Date
0	Issued for Information	JAJ/2-23-11		

Notes:

Purpose of Calculation

Background Information

Construction of the pond began in 1976. The dam and saddle dike were completed during the period from 1976 to early 1978. Plant Miller Unit One's initial startup date was July 1978 which is when the pond began to receive ash. The crests of the dikes were finished at EL 426 feet, with a pool at EL 420.5 feet. The initial design drawings indicate plans for a second stage of construction, raising the dikes and pool to EL 450 ft and EL 445 ft, respectively, but were never warranted.

Purpose

The purpose of this calculation is to determine the stability of the Ash Pond dams, including the main dam comprising the western edge of the pond and the Saddle Dike located along the eastern side. .

Methodology

The calculation was performed using the following methods and software:

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

The stability analysis under seismic load was performed using the pseudostatic method and Geostudio 2007 software. Because the pseudostatic method applies the earthquake acceleration as a constant force, unrealistic stability analyses can result if the peak ground acceleration or spectral seismic acceleration is directly applied as the pseudostatic acceleration (K_h). In this calculation, the mapped, site-modified, spectral seismic acceleration was used to calculate the pseudostatic acceleration (K_h) following the procedure described in *Pseudostatic Coefficient for use in Simplified Seismic Slope Stability Evaluation* (2009) by Bray and Travasarou.

The stability analysis under rapid drawdown was performed in Geostudio 2007 using the staged method described by Duncan. This type of analysis incorporates two piezometric surfaces and uses evaluates both the effective stress and total stress stability.

Criteria and Assumptions

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

- The 2002 probabilistic earthquake acceleration mapped by the USGS for the vicinity of Plant Miller is 0.13 g for short-period structures on Site Class D soil profile (2% PE/50years). The corresponding pseudostatic acceleration coefficient (K_h) is 0.072g based on an allowable crest displacement of 2 inches using the Bray and Travasarou procedure.

- The cross-sections of main dike and the saddle dike were created using an aerial, hydrographic & ground survey conducted in 2006, section drawings created during the design phase, and topographic maps of the area prior to construction.

- The current required minimum criteria (factors of safety) were taken from US Corps of Engineers Manual EM 1110-2-1902, October 2003. The state of Alabama does not have an established set of criteria for the safety of earthen dams.

- The soil properties of unit weight, phi angle, and cohesion for the impervious core and random fill were estimated from historical data. Engineering parameters of the filter, riprap, and bedding material were taken from a slope stability analysis of the Storage Pond Dam. The storage pond dam was designed and constructed concurrently with the Ash Pond Dam and used the same materials with the exception of the core and random fill soils.

- Soil stratigraphy was estimated using historic boring logs.

- Piezometric data was estimated using recent records from the series of piezometers located at the dam.

- The Saddle Dike is located on the southeast edge of the pond. That area does not impound water as it has filled in with ash to the elevation of the dike. Therefore, only downstream steady state and seismic cases were evaluated for that dike.

The following material properties were used in the analyses:

Material Description	Moist Unit Weight, pcf	c', psf*	Φ', degrees*
Impervious Core – Sandy Silt (ML)	126	630 (2115)	19 (21)
Random Fill – Silty Clayey Gravel (GM-GC)	132	100 (3450)	32 (23)
Fine Filter – Sand (SP)	120	0	35
Course Filter – Gravel (GP)	120	0	35
Bedding for Riprap	120	0	38
Riprap	140	0	38
Ash	100	0	15
Weathered Rock	Impenetrable Bedrock		
Residuum – Stiff Sandy Clay (CL)	135	1000	28

*Total strength parameters in parentheses where applicable

Summary of Conclusions

Criteria

The State of Alabama does not have specific design criteria for earthen dike ash ponds. A commonly referenced document, the US Corps of Engineers Manual EM 1110-2-1902, October 2003, identifies the following criteria for earthen dams:

1. End of Construction Minimum Factor of Safety - 1.3
2. Steady State Seepage Minimum Factor of Safety - 1.5
3. Steady State Seepage with Seismic Loading Minimum Factor of Safety - 1.1
4. Surcharge Water Conditions Minimum Factor of Safety – 1.4
5. Rapid Drawdown (Upstream) Minimum Factor of Safety - 1.3
6. Submerged Toe with Rapid Drawdown Minimum Factor of Safety - 1.3

Analyses

Based on the previously referenced manual EM 110-2-1902, a several cases for slope stability analysis were selected.

End of Construction

The end of construction case is applicable to new facilities where full effective stress strength parameters have not been established, and porewater pressures have not reached long-term steady state conditions. The structures were constructed decades ago and "short-term" construction cases were not applicable.

Steady State Seepage and Steady State Seepage with Seismic Loading

The steady state seepage and seismic loading cases are applicable. The normal operating water at EL 420.5 was used for free water in the pond. Water levels within the dikes were estimated from piezometer data.

Surcharge Water and Upstream Rapid Drawdown

A hydraulic analysis of the pond indicated the 100-year 24-hour flood event would result in maximum a pool elevation of EL 424.1, assuming no discharge during the event. That elevation was used in the stability analysis for the downstream surcharge case.

Alabama Power does not operate its ponds using rapid drawdown procedures, nor are the ponds susceptible to that condition except in the case of a total failure of the dam. The discharge structure at Plant Miller consists of a vertical drop inlet connected to a nearly horizontal pipe that carries the discharge to a concrete flume on the downstream side of the dam. The only scenario that would result in a rapid lowering of the head would be the development of a leak in the discharge structure. In such a case the head level in the pond would drop to the invert

elevation of the pipe, which is EL 400 ft. The rapid drawdown case was analyzed with a drop from EL 420.5 to EL 400.

Submerged Toe with Rapid Drawdown

The tailwater elevation is EL 305 for PMF on Locust Fork. There is no tailwater under normal conditions.

Summary of Conclusions

The results of the slope stability analyses for the dikes of Cell 1 are presented in the following table:

Condition	Referenced Factor of Safety	Present Factor of Safety
Section A-A'		
Downstream, Steady State	1.5	1.5
Downstream, Seismic	1.1	1.5
Downstream, Surcharge	1.4	1.5
Downstream, Submerged Tow w/ Rapid Drawdown	1.3	1.4
Upstream, Steady State	1.5	1.4
Upstream, Seismic	1.1	1.4
Upstream, Rapid Drawdown	1.3	1.5
Saddle Dike		
Downstream, Steady State	1.5	2.2
Downstream, Seismic	1.1	1.8

The stability analyses indicate that both dikes meet the criteria listed in the US Corps of Engineers Manual EM 1110-2-1902, October 2003, for computed factors of safety.

Design Inputs/References

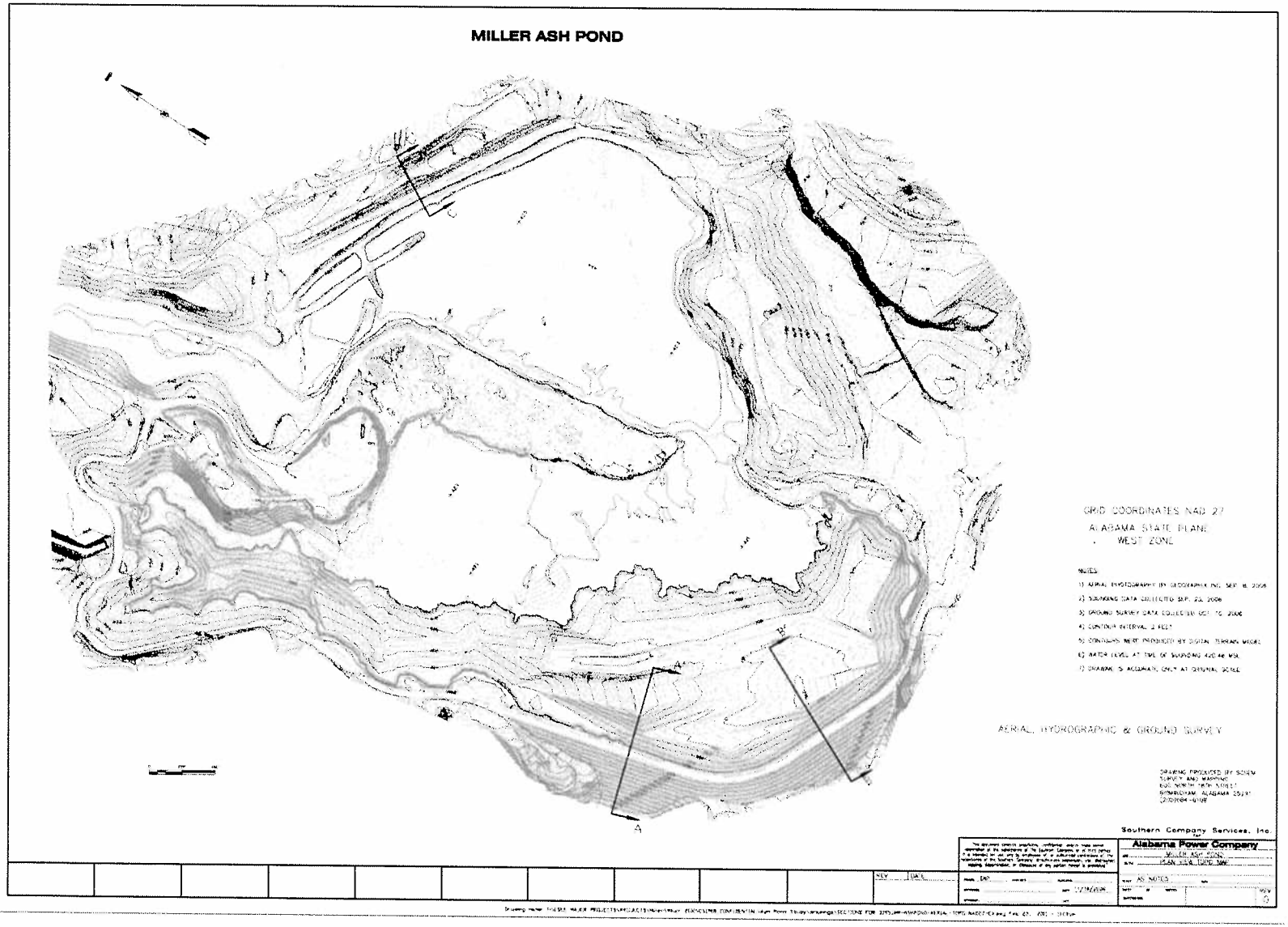
USGS Earthquake Hazards website, http://www.usgs.gov/hazards/earthquakes/.
Plant Miller Historical Files, Southern Company and/or Alabama Power.
US Corps of Engineers Manual EM 1110-2-1902, October 2003

Body of Calculation

Calculation consists of Slope-W modeling attached.

Attachments

Section Location Drawing

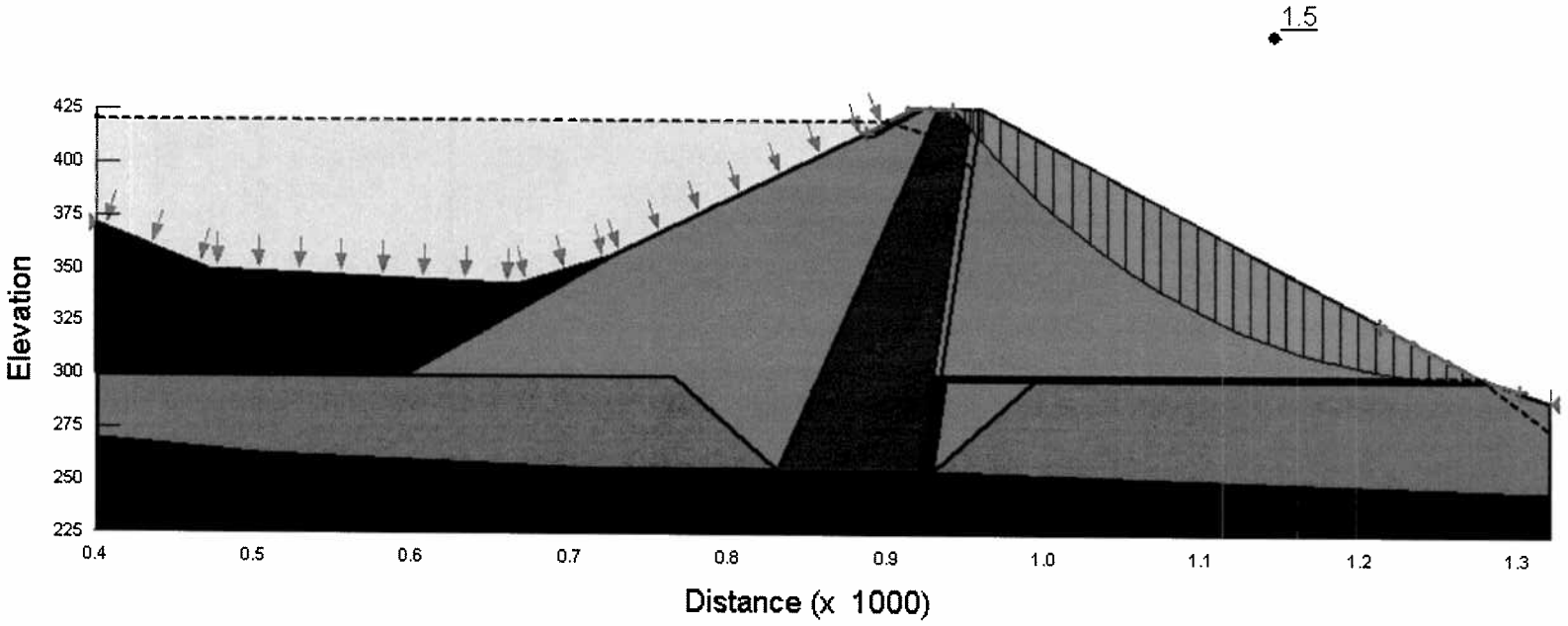


PLANT MILLER ASH POND

Section A - A'
Downstream Steady State

MATERIALS:

Impervious Core - Sandy Silt (ML)	131 pcf	630 psf	19 °
Random Fill - Silty Clayey Gravel (GM-GC)	131 pcf	100 psf	32 °
Fine Filter - Sand (SP)	120 pcf	0 psf	35 °
Coarse Filter - Gravel (GP)	120 pcf	0 psf	35 °
Bedding for Riprap	120 pcf	0 psf	38 °
Riprap	140 pcf	0 psf	38 °
Ash	100 pcf	0 psf	15 °
Weathered Rock (Sandstone or Shale)			
Residuum	135 pcf	1000 psf	28 °

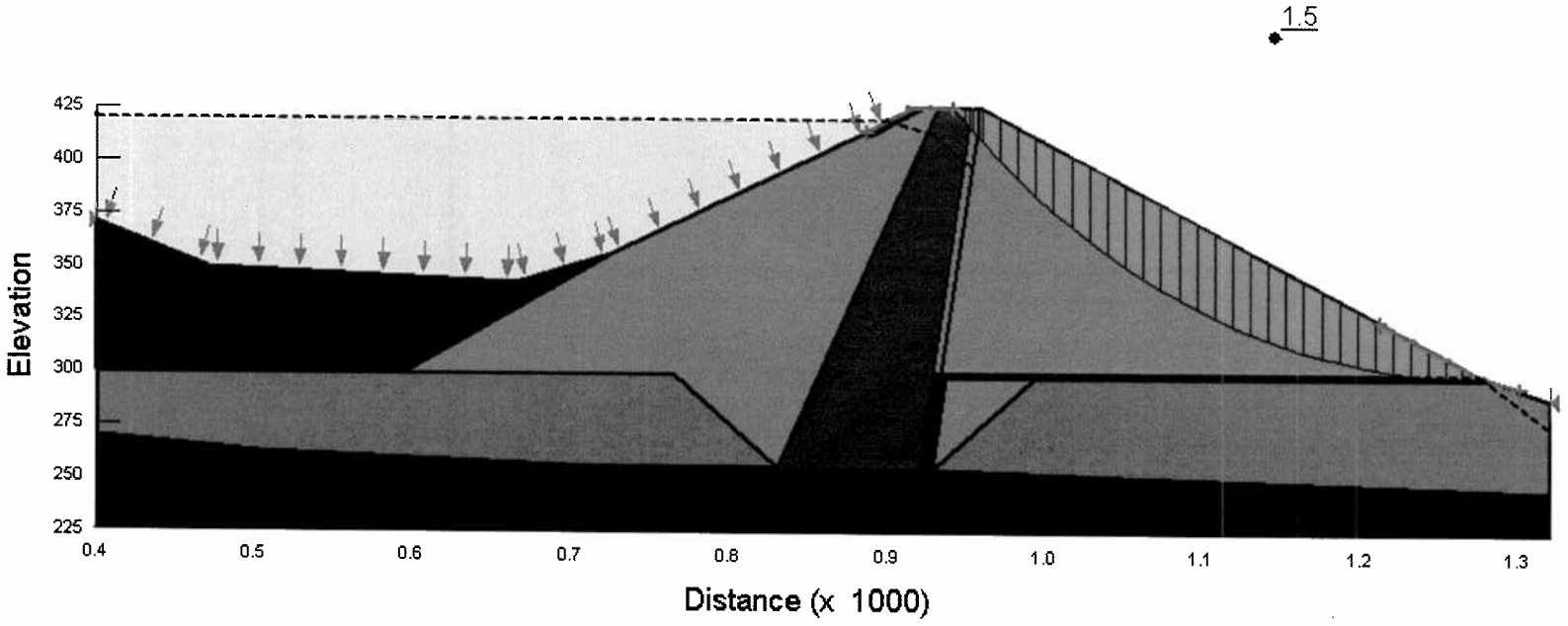


PLANT MILLER ASH POND

Section A - A'
Downstream Seismic

MATERIALS:

Impervious Core - Sandy Silt (ML)	131 pcf	630 psf	19 °
Random Fill - Silty Clayey Gravel (GM-GC)	131 pcf	100 psf	32 °
Fine Filter - Sand (SP)	120 pcf	0 psf	35 °
Coarse Filter - Gravel (GP)	120 pcf	0 psf	35 °
Bedding for Riprap	120 pcf	0 psf	38 °
Riprap	140 pcf	0 psf	38 °
Ash	100 pcf	0 psf	15 °
Weathered Rock (Sandstone or Shale)			
Residuum	135 pcf	1000 psf	28 °

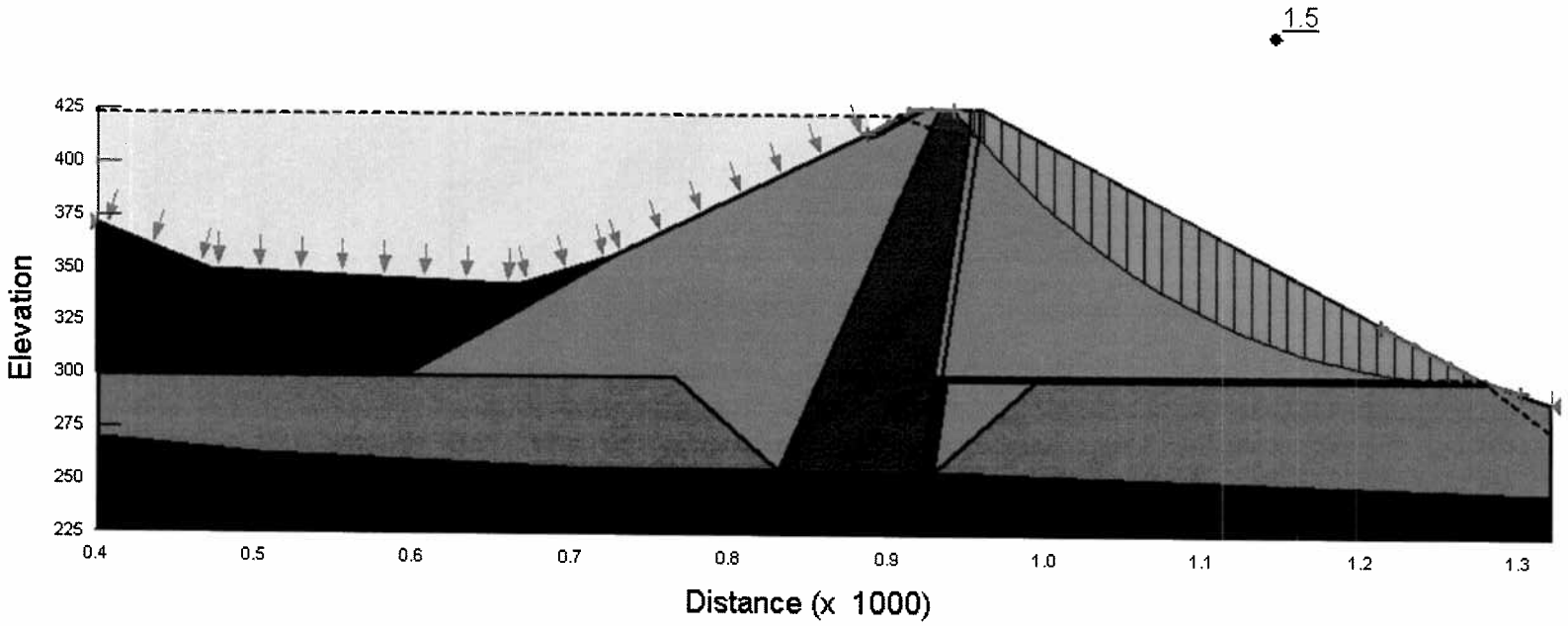


PLANT MILLER ASH POND

Section A - A'
Downstream PMF

MATERIALS:

Impervious Core - Sandy Silt (ML)	131 pcf	630 psf	19 °
Random Fill - Silty Clayey Gravel (GM-GC)	131 pcf	100 psf	32 °
Fine Filter - Sand (SP)	120 pcf	0 psf	35 °
Coarse Filter - Gravel (GP)	120 pcf	0 psf	35 °
Bedding for Riprap	120 pcf	0 psf	38 °
Riprap	140 pcf	0 psf	38 °
Ash	100 pcf	0 psf	15 °
Weathered Rock (Sandstone or Shale)			
Residuum	135 pcf	1000 psf	28 °

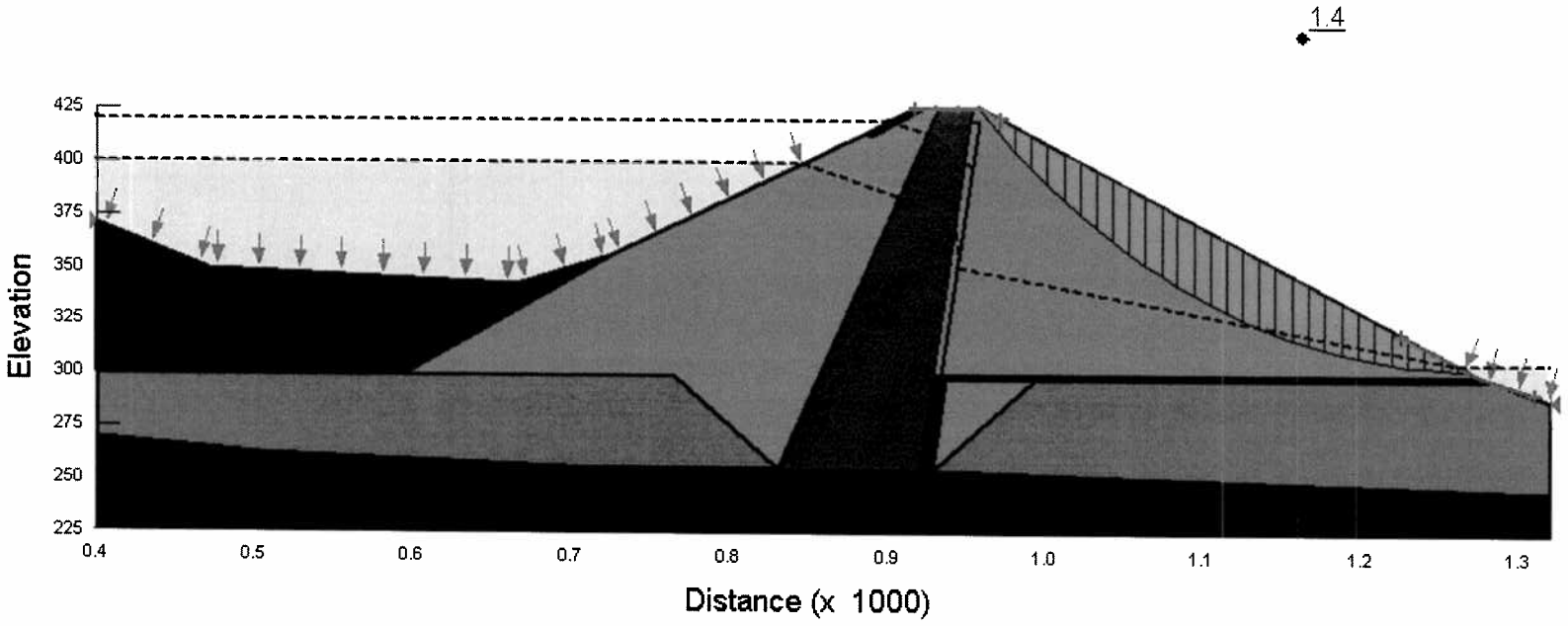


PLANT MILLER ASH POND

Section A - A'
Rapid Drawdown w/submerged toe

MATERIALS:

Impervious Core - Sandy Silt (ML)	131 pcf	630 psf	19 °
Random Fill - Silty Clayey Gravel (GM-GC)	131 pcf	100 psf	32 °
Fine Filter - Sand (SP)	120 pcf	0 psf	35 °
Coarse Filter - Gravel (GP)	120 pcf	0 psf	35 °
Bedding for Riprap	120 pcf	0 psf	38 °
Riprap	140 pcf	0 psf	38 °
Ash	100 pcf	0 psf	15 °
Weathered Rock (Sandstone or Shale)			
Residuum	135 pcf	1000 psf	28 °

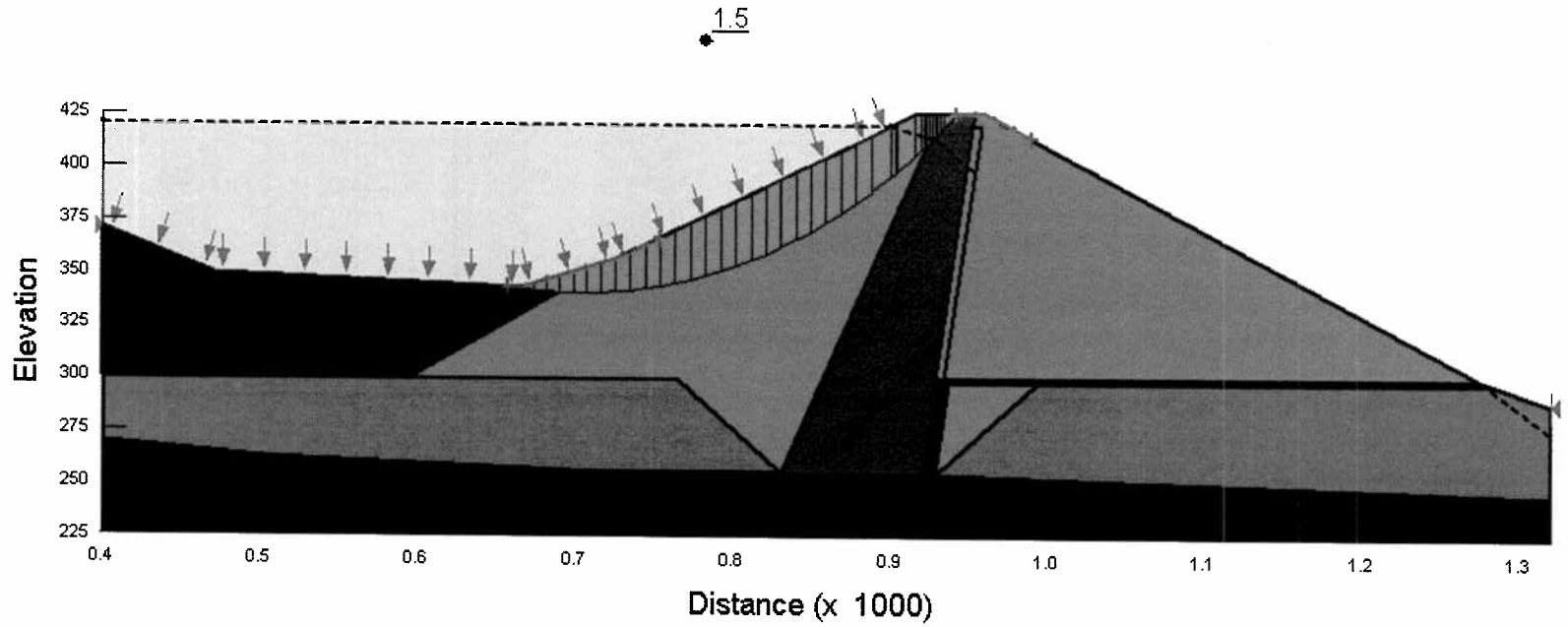


PLANT MILLER ASH POND

Section A - A'
Upstream Steady State

MATERIALS:

Impervious Core - Sandy Silt (ML)	131 pcf	630 psf	19 °
Random Fill - Silty Clayey Gravel (GM-GC)	131 pcf	100 psf	32 °
Fine Filter - Sand (SP)	120 pcf	0 psf	35 °
Coarse Filter - Gravel (GP)	120 pcf	0 psf	35 °
Bedding for Riprap	120 pcf	0 psf	38 °
Riprap	140 pcf	0 psf	38 °
Ash	100 pcf	0 psf	15 °
Weathered Rock (Sandstone or Shale)			
Residuum	135 pcf	1000 psf	28 °

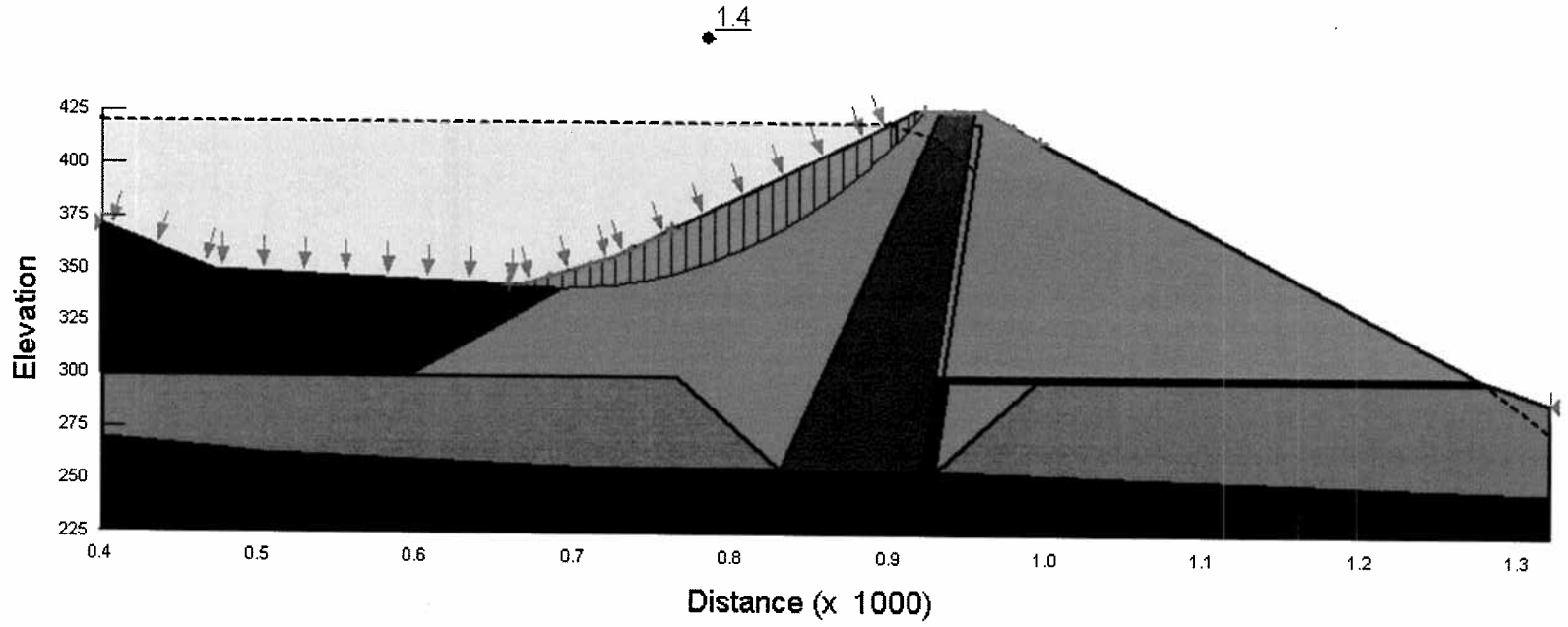


PLANT MILLER ASH POND

Section A - A'
Upstream Seismic

MATERIALS:

Impervious Core - Sandy Silt (ML)	131 pcf	630 psf	19 °
Random Fill - Silty Clayey Gravel (GM-GC)	131 pcf	100 psf	32 °
Fine Filter - Sand (SP)	120 pcf	0 psf	35 °
Coarse Filter - Gravel (GP)	120 pcf	0 psf	35 °
Bedding for Riprap	120 pcf	0 psf	38 °
Riprap	140 pcf	0 psf	38 °
Ash	100 pcf	0 psf	15 °
Weathered Rock (Sandstone or Shale)			
Residuum	135 pcf	1000 psf	28 °

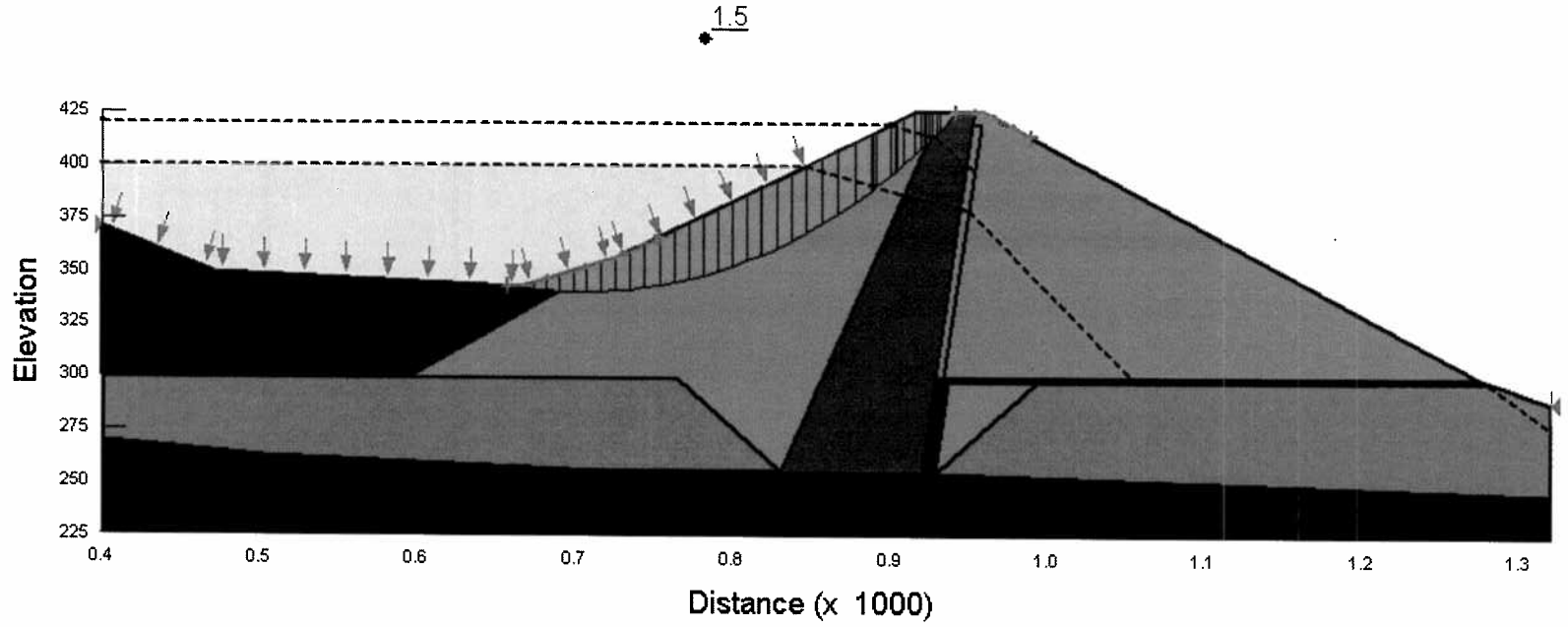


PLANT MILLER ASH POND

Section A - A'
Rapid Drawdown

MATERIALS:

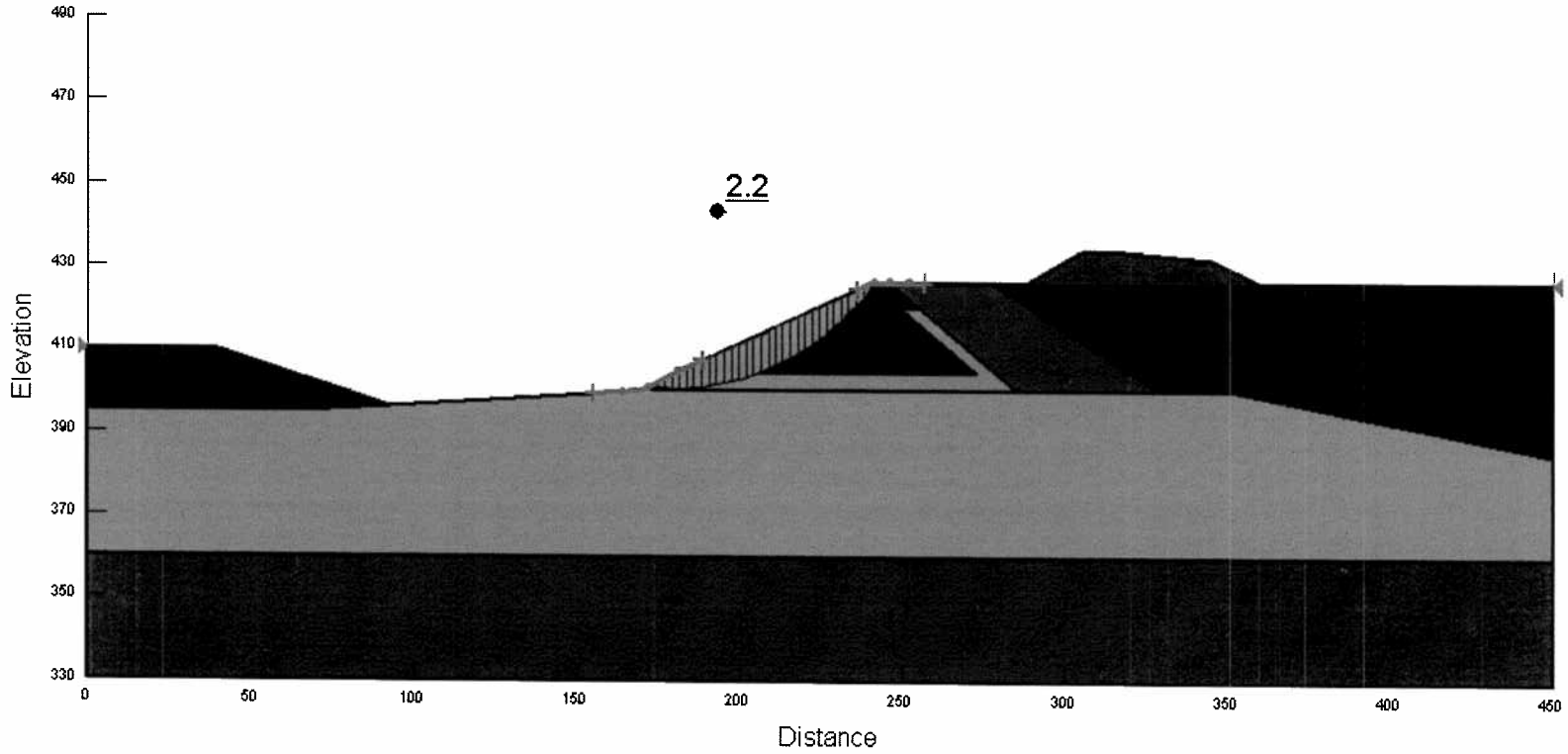
Impervious Core - Sandy Silt (ML)	131 pcf	630 psf	19 °
Random Fill - Silty Clayey Gravel (GM-GC)	131 pcf	100 psf	32 °
Fine Filter - Sand (SP)	120 pcf	0 psf	35 °
Coarse Filter - Gravel (GP)	120 pcf	0 psf	35 °
Bedding for Riprap	120 pcf	0 psf	38 °
Riprap	140 pcf	0 psf	38 °
Ash	100 pcf	0 psf	15 °
Weathered Rock (Sandstone or Shale)			
Residuum	135 pcf	1000 psf	28 °



Plant Miller Ash Pond
Saddle Dike

Downstream Steady State

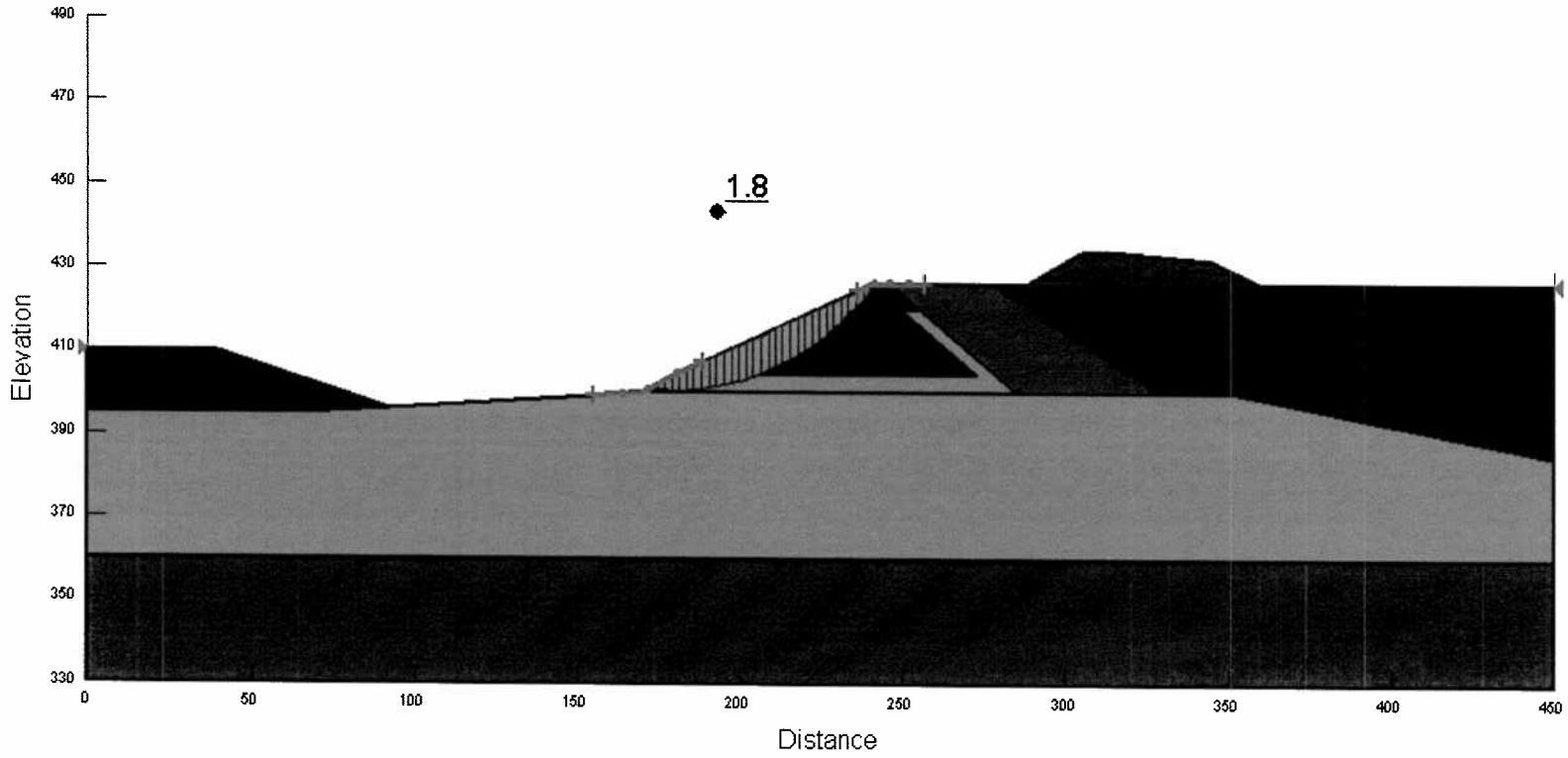
Residual Sandy Clay (CL)	135 pcf	1000 psf	28 °
Impervious Core - Sandy Silt (ML)	126 pcf	630 psf	19 °
Random Fill - Silty Clayey Gravel (GM-GC)	132 pcf	100 psf	32 °
Fine Filter - Sand (SP)	120 pcf	0 psf	35 °
Weathered Rock			
Ash	100 pcf	0 psf	15 °
Miscellaneous Fill	110 pcf	100 psf	25 °



Plant Miller Ash Pond
Saddle Dike

Downstream Seismic

Residual Sandy Clay (CL)	135 pcf	1000 psf	28 °
Impervious Core - Sandy Silt (ML)	126 pcf	630 psf	19 °
Random Fill - Silty Clayey Gravel (GM-GC)	132 pcf	100 psf	32 °
Fine Filter - Sand (SP)	120 pcf	0 psf	35 °
Weathered Rock			
Ash	100 pcf	0 psf	15 °
Miscellaneous Fill	110 pcf	100 psf	25 °



ADEM

ALABAMA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

POST OFFICE BOX 301463 36130-1463 • 1400 COLISEUM BLVD. 36110-2059
MONTGOMERY, ALABAMA
WWW.ADEM.STATE.AL.US
(334) 271-7700

ONIS "TREY" GLENN, III, P.E.
DIRECTOR

BOB RILEY
GOVERNOR

Facsimiles: (334)
Administration: 271-7950
General Counsel: 394-4332
Communication: 394-4383
Air: 279-3044
Land: 279-3050
Water: 279-3051
Groundwater: 270-5631
Field Operations: 272-8131
Laboratory: 277-6718
Mining: 394-4326

JANUARY 25, 2007

MR JOHN D GROGAN
MANAGER ENVIRONMENTAL AFFAIRS
APCO MILLER STEAM PLANT
P O BOX 2641
DEPARTMENT 12N-0830
BIRMINGHAM AL 35291-0830

JAN 2007
Received
Environmental
Affairs
Department

RE: Final Permit
NPDES Permit Number: **AL0027146**

Dear Mr. Grogan:

Attached is the issued copy of the above referenced permit.

We will look forward to receiving monitoring data in accordance with the conditions of your permit. Please see PART I.C., Page 3 for your reporting requirements. In order to minimize the paperwork burden on both of us, we ask that when submitting the required Discharge Monitoring Reports (DMR's), please **do not submit** lab worksheets, logs, reports or other paperwork, not specifically required by the permit unless requested to do so by ADEM staff.

If there are questions or comments in reference to the permit or related monitoring requirements, please contact Brian Marshall of this office (334) 271-7895.

Sincerely,

Eric Sanderson, Chief
Industrial Section
Water Division

/sh

Enclosure: Final Permit

pc: EPA Region IV: Final Permit

Mike McCary, P & S: Final Permit

Montgomery Field Office: Final Permit

Birmingham Branch
110 Vulcan Road
Birmingham, Alabama 35209-4702
(205) 942-6168
(205) 941-1603 [Fax]

Decatur Branch
2715 Sandlin Road, S.W.
Decatur, Alabama 35603-1333
(256) 353-1713
(256) 340-9359 [Fax]

Mobile Branch
2204 Perimeter Road
Mobile, Alabama 36615-1131
(251) 450-3400
(251) 479-2593 [Fax]

Mobile - Coastal
4171 Commanders Drive
Mobile, Alabama 36615-1421
(251) 432-6533
(251) 432-6598 [Fax]

ADEM

ALABAMA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

POST OFFICE BOX 301463 36130-1463 • 1400 COLISEUM BLVD. 36110-2059
MONTGOMERY, ALABAMA
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ONIS "TREY" GLENN, III, P.E.
DIRECTOR

BOB RILEY
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Facsimiles: (334)
Administration: 271-7950
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Air: 279-3044
Land: 279-3050
Water: 279-3051
Groundwater: 270-5631
Field Operations: 272-8131
Laboratory: 277-6718
Mining: 394-4326

JANUARY 25, 2007

JOHN GROGAN
ENVIRONMENTAL COMPLIANCE
ALABAMA POWER CO
P O BOX 2641
BIRMINGHAM AL 35291

RE: APCO Miller Steam Plant
Draft Permit AL 0027146

Dear Mr. Grogan:

The Department has reviewed your comments to the draft NPDES permit AL 0027146 dated October 3, 2006, and offers the following response:

Comment 1 DSN005: For the oil and grease and TSS effluent characteristics, a footnote should be included to state, "To be monitored twice during the same month. Sampling events should be at least ten days apart."

Response 1 DSN005: The footnote was modified to read, "If sampling occurs during one month, sample events shall be at least 10 days apart."

Comment 1 DSN005a-d: Attachment I is referenced but was not part of the draft permit.

Response 1 DSN005a-d: Attachment I was added to Part IV of the permit.

Comment 1 Best Management Practices Plant Requirements: Item B.2.e states that the BMP plan shall prevent or minimize stormwater contact with material stored on site. The following should be added to the end of the sentence, "*where practicable*". While we agree with the concept to prevent or minimize storm water contact with the material stored on site, it is not always practicable to do so. For example, it is not practicable to cover the coal pile to prevent or minimize storm water contact, we do collect the runoff from the coal pile and pump it to the Ash Pond for treatment prior to discharge.

Response 1 Best Management Practices Plant Requirements: The requested change was made.

General Comment: As Alabama Power generates is own DMRs to parallel ADEM's preprinted DMRs, we ask that a copy of the draft DMRs be submitted as an integral part of the draft permit so that comments can be made not only about the permit but also about the DMR to reflect intent of permit negotiations. This is especially true for seasonal limits, etc. which cause the DMRs printed layout to change during the course of the year.

Response: The PCS DMR tracking system utilized by the Department does not allow for pre-printed DMRs to be created until a permit is finalized. However, the Department will work diligently with Alabama Power to ensure the final DMRs correspond to the final permit.

Please feel free to contact me at (334) 271-7895 if you have any questions or comments.

Sincerely,

Brian Marshall
Industrial Section
Water Division

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM PERMIT

PERMITTEE: ALABAMA POWER COMPANY – MILLER STEAM PLANT

FACILITY LOCATION: 4250 PORTER ROAD
QUINTON, AL

PERMIT NUMBER: AL 0027146

RECEIVING WATERS: DSN005 AND DSN010-012: LOCUST FORK OF WARRIOR RIVER
DSN008 -009: VILLAGE CREEK

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

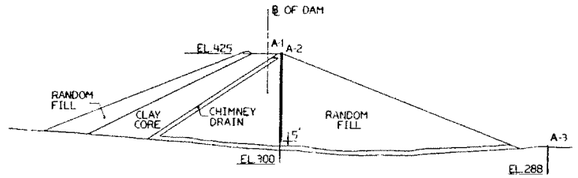
ISSUANCE DATE: JANUARY 25, 2007

EFFECTIVE DATE: FEBRUARY 1, 2007

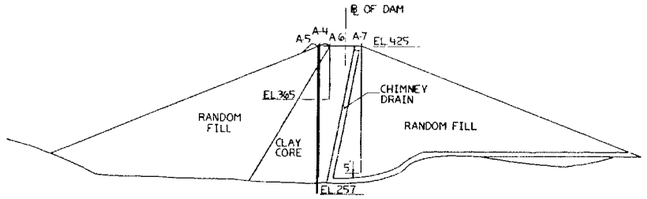
EXPIRATION DATE: JANUARY 31, 2012

James E. McLindon
Alabama Department of Environmental Management

E-210027



STATION 121+00
SCALE: 1"=50'



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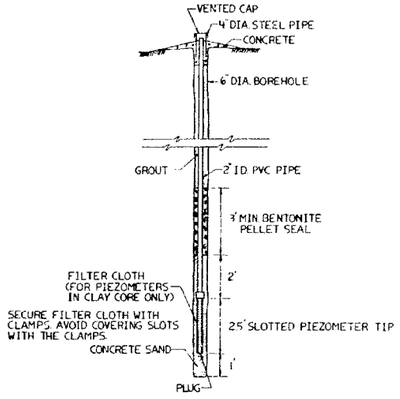
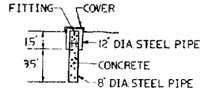
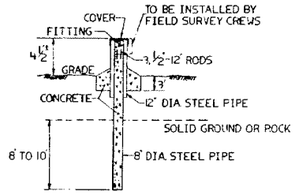


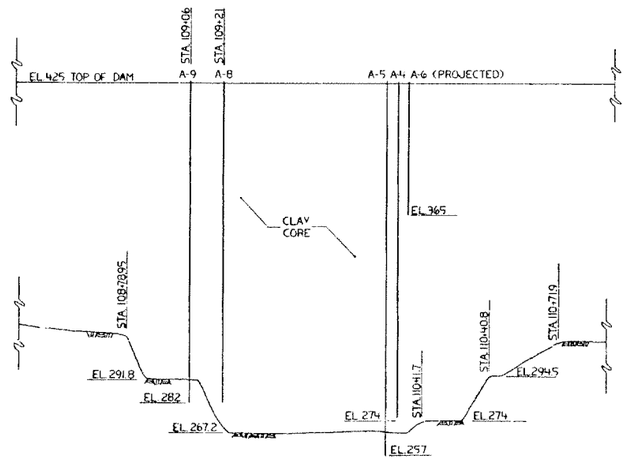
OPEN STANDPIPE PIEZOMETER
SCALE: 1"=2'



SURFACE MONUMENT
NO SCALE



CONTROL MONUMENT (COLUMN)
NO SCALE



PROFILE THROUGH CORE ALONG LINE OF PIEZOMETERS
SCALE: 1"=20'

PIEZ.	STA.	APPROX. TIP ELEVATION-ZONE
A-1	121+00	EL 300-FOUNDATION
A-2	121+00	EL 325-RANDOM FILL
A-3	121+00	EL 288
A-4	110+00	EL 274-CLAY CORE
A-5	110+00	EL 257-FOUNDATION
A-6	110+00	EL 365-CLAY CORE
A-7	110+00	EL 282-RANDOM FILL
A-8	109+21	EL 282-CLAY CORE
A-9	109+06	EL 282-FOUNDATION
A-10	104+50	EL 352-SANDSTONE-SHALE CONTACT
A-11	97+50	EL 375

NOTES:

1. OPEN STANDPIPE PIEZOMETERS SHALL BE INSTALLED AT THE LOCATIONS SHOWN ON THE PLAN VIEW (DWG. E-210094).
2. THE PIEZOMETERS SHALL BE INSTALLED TO DETERMINE THE PHREATIC LINE, TO MONITOR THE EFFECTIVENESS OF THE CHIMNEY DRAIN, AND TO MONITOR PORE PRESSURES IN THE FOUNDATION ZONES.
3. ADDITIONAL PIEZOMETERS CAN BE ADDED TO PROVIDE MORE INFORMATION ON THE FOUNDATION PORE PRESSURES.
4. THE DEPTHS OF THE TIPS OF THE PIEZOMETERS MAY CHANGE ACCORDING TO THE ACTUAL FIELD CONDITIONS.
5. SURFACE MONUMENTS SHALL BE INSTALLED AT THE LOCATIONS SHOWN ON THE PLAN VIEW (DWG. E-210094). THE MONUMENTS CAN BE ADAPTED TO MEASURE BOTH VERTICAL AND HORIZONTAL MOVEMENTS.
6. CONTROL MONUMENTS (COLUMN) USED TO MONITOR MOVEMENT OF SURFACE MONUMENTS SHOULD BE LOCATED BY FIELD FORCES IN NATURAL GROUND OR ROCK SUFFICIENTLY AWAY FROM THE INFLUENCE OF EXISTING STRUCTURES AND EXCAVATIONS.
7. THE FITTING FOR THE DEFORMATION MONUMENTS IS A ONE INCH SELF CENTERING PLUG THAT IS THREADED FOR THE ATTACHMENT OF A FLUSH MOUNTING PLATE. THE PLATE PROVIDES PRECISE INTERCHANGEABILITY OF INSTRUMENTS ON THE PILLAR SUCH AS THEODOLITES, TARGETS, OPTICAL PLUMMETS AND DISTANCE-MEASURING EQUIPMENT.
8. MARKERS SHALL BE PLACED AT THE DOWNSTREAM TOE TO SHOW THE LOCATION OF THE PERFORATED PIPE DRAINS.
9. THE FIELD FORCES ARE TO OBTAIN THE MATERIALS FOR THE MONUMENTS AND PIEZOMETERS.

REFERENCES:

E-210094 ASH POND DAM
PLAN VIEW OF INSTRUMENTATION

REVISION	DATE
0	7-11-79

APPROVED

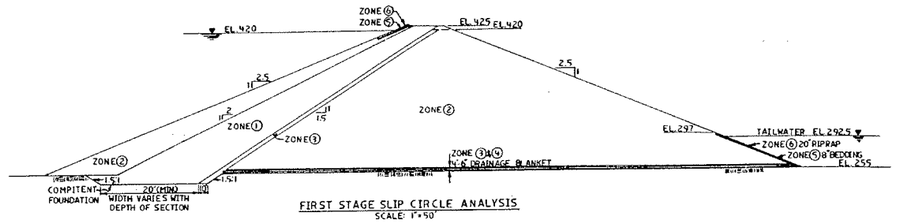
Southern Company Services, Inc.
Alabama Power Company
MILLER STEAM PLANT
ASH POND DAM
SECTIONS AND DETAILS OF INSTRUMENTATION

DESIGNED BEW | DRAWN BJB | CHECKED BEW
SCALE AS SHOWN | PROJECT # 111.2084 | DRAWING NUMBER E-210027 | REV. 0

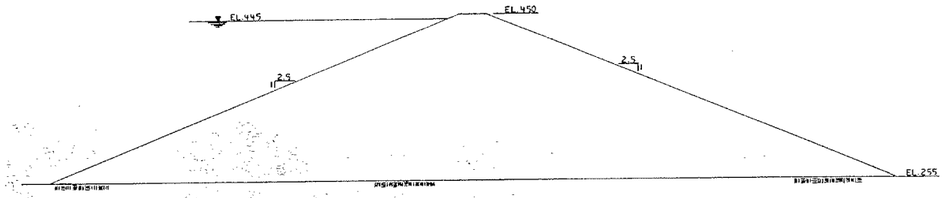
CONFIDENTIAL

MIL-API-0003

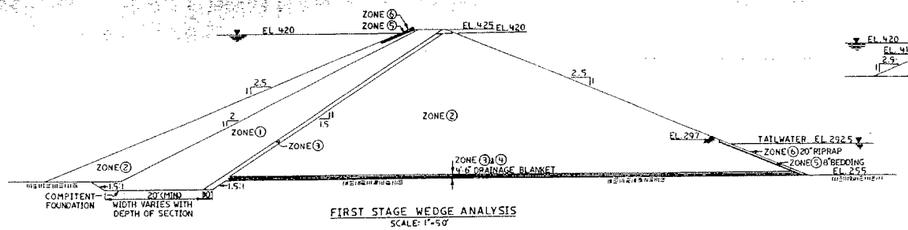
E-210028



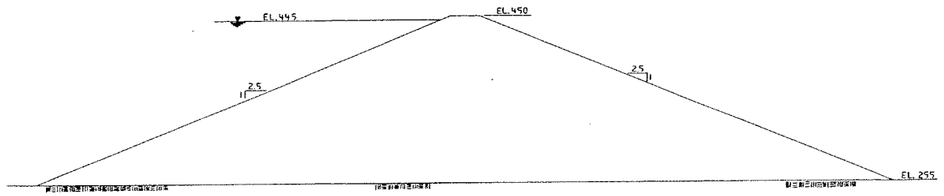
FIRST STAGE SLIP CIRCLE ANALYSIS
SCALE: 1"=50'



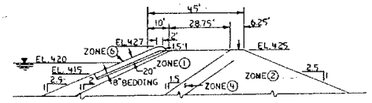
SECOND STAGE SLIP CIRCLE ANALYSIS
SCALE: 1"=50'



FIRST STAGE WEDGE ANALYSIS
SCALE: 1"=50'



SECOND STAGE WEDGE ANALYSIS
SCALE: 1"=50'



FIRST STAGE CREST DETAIL
SCALE: 1"=20'

LINE LEGEND

- SOIL BOUNDRY
- SLIP CIRCLE
- WEDGE FAILURE
- PIEZOMETRIC SURFACE
- FIRST STAGE CONFIGURATION

SUMMARY TABLES

FIRST STAGE

CASE	DESIGN CONDITION	SHEAR STRENGTH	SLOPE ANALYZED	CALCULATED F. S.	REMARKS
1	END OF CONSTRUCTION	TOTAL STRESS	DOWNSTREAM		SLIP CIRCLE ANALYSIS BY SIMPLIFIED BISHOP METHOD
2	TAILWATER AT EL. 305 PMF LOCUST FORK CREEK	EFFECTIVE STRESS	DOWNSTREAM		-DO-
3	STEADY STATE SEEPAGE WITH POOL AT EL. 420	EFFECTIVE STRESS	UPSTREAM		-DO-
4	END OF CONSTRUCTION	TOTAL STRESS	UPSTREAM		-DO-
5	EARTHQUAKE (0.1_g) STEADY STATE POOL AT EL. 420	EFFECTIVE STRESS	UPSTREAM		WEDGE ANALYSIS BY MORGENSTERN-PRICE METHOD
6	STEADY STATE SEEPAGE WITH POOL AT EL. 420	EFFECTIVE STRESS	UPSTREAM		-DO-
7	EARTHQUAKE (0.1_g) STEADY STATE POOL AT EL. 420	EFFECTIVE STRESS	DOWNSTREAM		-DO-
8	STEADY STATE SEEPAGE WITH POOL AT EL. 420	EFFECTIVE STRESS	DOWNSTREAM		-DO-
9	EARTHQUAKE (0.1_g) STEADY STATE POOL AT EL. 420	EFFECTIVE STRESS	UPSTREAM		WEDGE ANALYSIS BY MORGENSTERN-PRICE METHOD OF TYPICAL HILLSIDE SECTION.
10	STEADY STATE SEEPAGE WITH POOL AT EL. 420	EFFECTIVE STRESS	UPSTREAM		

SECOND STAGE

CASE	DESIGN CONDITION	SHEAR STRENGTH	SLOPE ANALYZED	CALCULATED F. S.	REMARKS
1	END OF CONSTRUCTION	TOTAL STRESS	DOWNSTREAM		SLIP CIRCLE ANALYSIS BY SIMPLIFIED BISHOP METHOD
2	TAILWATER AT EL 305 PMF LOCUST FORK CREEK	EFFECTIVE STRESS	DOWNSTREAM		-DO-
3	STEADY STATE SEEPAGE WITH POOL AT EL. 445	EFFECTIVE STRESS	UPSTREAM		-DO-
4	END OF CONSTRUCTION	TOTAL STRESS	UPSTREAM		-DO-
5	EARTHQUAKE (0.1_g) STEADY STATE POOL AT EL. 445	EFFECTIVE STRESS	UPSTREAM		WEDGE ANALYSIS BY MORGENSTERN-PRICE METHOD
6	STEADY STATE SEEPAGE WITH POOL AT EL. 445	EFFECTIVE STRESS	UPSTREAM		-DO-
7	EARTHQUAKE (0.1_g) STEADY STATE POOL AT EL. 445	EFFECTIVE STRESS	DOWNSTREAM		-DO-
8	STEADY STATE SEEPAGE WITH POOL AT EL. 445	EFFECTIVE STRESS	DOWNSTREAM		-DO-
9	EARTHQUAKE (0.1_g) STEADY STATE POOL AT EL. 445	EFFECTIVE STRESS	UPSTREAM		WEDGE ANALYSIS BY MORGENSTERN-PRICE METHOD OF TYPICAL HILLSIDE SECTION.
10	STEADY STATE SEEPAGE WITH POOL AT EL. 445	EFFECTIVE STRESS	UPSTREAM		

SOIL PROPERTY TABLE

ZONE DESIG	SOIL TYPE	DENSITY		EFFECTIVE STRESS		TOTAL STRESS	
		γ MOIST LB./FT.^{3}	γ SATURATED LB./FT.^{3}	ϕ' - DEG.	c' - LB./FT.^{2}	ϕ - DEG.	C - LB./FT.^{2}
①	IMPERVIOUS CORE	126	131				
②	RANDOM FILL	132	138				
③	FINE FILTER						
④	DRAIN						
⑤	BEDDING FOR RIPRAP						
⑥	RIPRAP	140	140				

REVISION	DATE	BY	CHK'D	APPR'D 1	APPR'D 2	APPR'D 3	APPR'D 4	APPR'D 5
1	10/5/76	RT						

RELEASED FOR CONSTUCTION

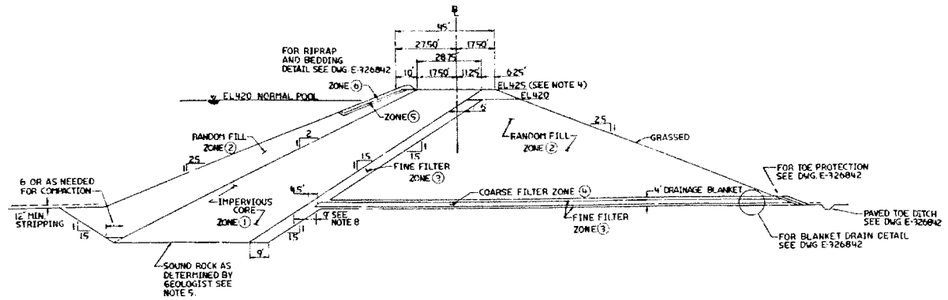
Southern Services, Inc.
Alabama Power Company
MILLER STEAM PLANT
STABILITY ANALYSIS OF THE ASH POND DAM.

DESIGNED R.P. DRAWN D.H.D. CHECKED R.P.
SCALE AS SHOWN SHEET NUMBER ON SHEET
CLASSIFICATION 311.2084 DRAWING NUMBER E-210028 SHEET REV.

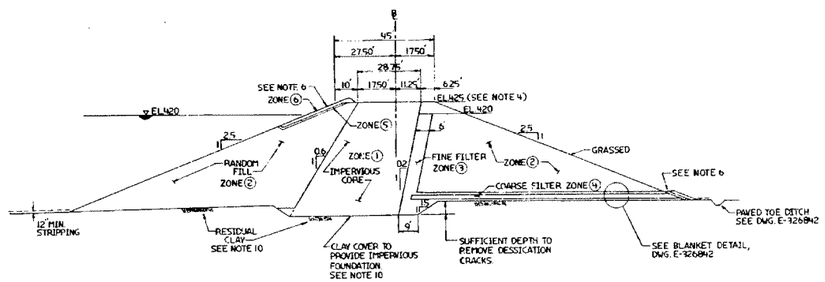
MIL-API-0004

CONFIDENTIAL

E-210030



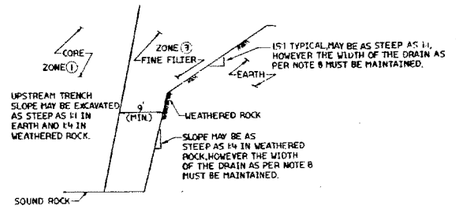
TYPICAL SECTION
STA 118+00 FORWARD
SCALE 1"=20'



TYPICAL SECTION WITH
CLAY COVER FOR FOUNDATION
STA. 104+00 BACK
4A SCALE 1"=20'

STA.	UPSTREAM SLOPE OF CORE	DOWN-STREAM SLOPE OF CORE
118+00	2.00	1.50
117+50	1.94	1.42
117+00	1.86	1.34
116+50	1.76	1.24
116+00	1.65	1.13
115+50	1.54	1.02
115+00	1.41	0.91
114+50	1.29	0.79
114+00	1.15	0.66
113+50	0.97	0.51
113+00	0.78	0.35
112+50	0.60	0.20

CORE SLOPES DURING TRANSITION
STA.112+50 TO STA.118+00



EXCAVATION IN ROCK DETAIL
NO SCALE

NOTES:
1. FIRST STAGE CREST WIDTH IS 45' WIDE IN ORDER FOR THE SECOND STAGE TO BE ADDED LATER.(MAIN & SADDLE DAM)
2. FOR COMPACTION REQUIREMENTS SEE SPECIFICATIONS.
3. FOR FOUNDATION TREATMENT SEE SPECIFICATIONS.
4. TOP OF EMBANKMENT ELEVATIONS SHOWN ARE NOMINAL ELEVATIONS. FOR CREST DETAILS SEE DRAWING E-326842 (RIPRAP DETAIL), DRAWINGS E-210008 AND E 210013 (RECYCLE LINE ACCESS ROAD EMBANKMENT) AND DRAWING E-326844 (ACCESS ROAD ACROSS DAM).
5. FOUNDATION JOINTS AND CRACKS WILL BE CLEANED AND SURFACE GROUTED WHEREVER CORE MATERIAL IS PLACED.
6. FOR DETAILS AND DIMENSIONS OF RIPRAP AND TOE PROTECTION NOT SHOWN SEE DRAWING E-326842 (ASH POND DAM TYPICAL DRAIN AND RIPRAP DETAILS).
7. FOR DETAILS AND DIMENSION OF INTERNAL DRAINS NOT SHOWN SEE DRAWINGS E-326842 (TYPICAL DRAIN AND RIPRAP DETAILS) AND E-326843 (INTERNAL DRAINS PLAN AND SECTIONS).
8. THE FINE FILTER DRAIN IN THE CORE TRENCH SHALL BE NOT LESS THAN 9' WIDE THE FULL DEPTH OF THE EXCAVATED CORE TRENCH.
9. CORE TRENCH TOLERANCE SHOWN IN CORE TRANSITION SECTION APPLIES FROM STA 118+00 BACK IN SECTIONS HAVING SOUND ROCK FOUNDATION.
10. THE TYPICAL SECTION WITH CLAY COVER FOR FOUNDATION MAY BE USED FROM STA 104+00 BACK AND ONLY IF THE CLAY COVER, AS ESTIMATED FROM BORING RECORDS, IS APPROXIMATELY 5' THICK AFTER FOUNDATION PREPARATION, EXTENDS APPROXIMATELY 10' BEYOND THE UPSTREAM TOE OF THE DAM, PROVIDES FULL CORE CONTACT, AND IS IMPERVIOUS (THAT IS MATERIAL SIMILAR TO THAT FOUND IN BORING CH-78 DATED 7-6-77, FROM EL 384.2 TO EL 374.2). IN ALL OTHER CASES THE TYPICAL SECTION WITH SOUND ROCK AS FOUNDATION SHALL BE USED.

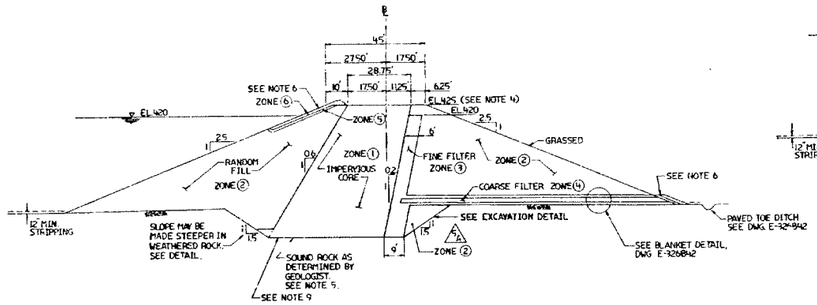
4A

LEGEND

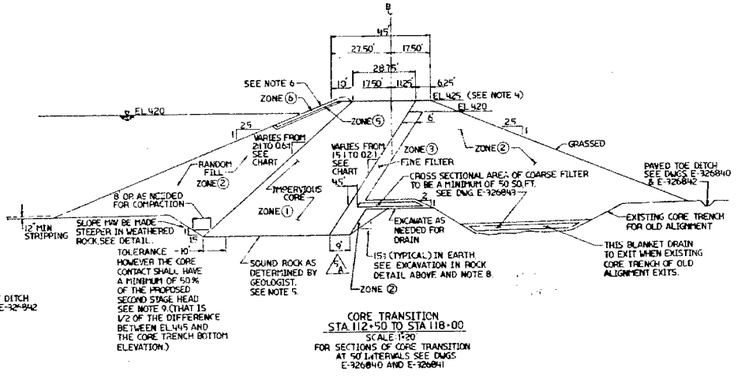
ZONE ① - IMPERVIOUS CORE
ZONE ② - RANDOM FILL
ZONE ③ - FINE FILTER
ZONE ④ - COARSE FILTER
ZONE ⑤ - BEDDING FOR RIPRAP
ZONE ⑥ - RIPRAP

REFERENCES:

E-210010	RECYCLE LINE-PLAN AND PROFILE
E-210011	RECYCLE LINE-TYPICAL EXCAVATION, EMBANKMENT AND BACKFILL SECTIONS.
E-210012	RECYCLE LINE INTAKE STRUCTURE EXCAVATION AND GRADING.
E-210013	ASH POND DAM ACCESS ROAD-PLAN AND PROFILE.
E-326832	ASH POND DAMS-ALIGNMENT.
E-326840	MAIN ASH POND DAM-CORE TRANSITION SECTIONS-STA 112+50 TO STA 116+00.
E-326841	MAIN ASH POND DAM-CORE TRANSITION SECTIONS-STA 116+50 TO STA 118+00.
E-326842	ASH POND DAM-TYPICAL DRAIN AND RIPRAP DETAILS.
E-326843	ASH POND DAM-INTERNAL DRAINS-PLAN AND SECTIONS.
E-326844	ASH POND DAM ACCESS ROAD-TYPICAL SECTION ACROSS DAM.
E-326845	ASH POND DAM-MISCELLANEOUS SECTIONS AND DETAILS.
E-210008	ASH POND DAM ACCESS ROAD AND ASH HAUL ROAD-TYPICAL SECTIONS.



TYPICAL SECTION WITH
SOUND ROCK AS FOUNDATION
STA.112+50 BACK
SCALE 1"=20'



CORE TRANSITION
STA 112+50 TO STA 118+00
SCALE 1"=20'
FOR SECTIONS OF CORE TRANSITION AT 50' INTERVALS SEE DWGS E-326840 AND E-326841

REVISION	DATE
A. B4, B3, REVISED CHIMNEY DRAIN AS PER DCR 10125	
B. ADDED APPROPRIATE DCR NUMBERS IN REVISION BLOCKS.	
A. G2, D6. STA 104+00 BACK WAS STA.101+00 BACK, PER DCR 10108.	3-8-78
A DRAWING E-210030, REV 2, DATED 3-3-77, REDRAWN WITH EXTENSIVE REVISION.	7-14-77

Southern Services, Inc.
FOR
ALABAMA POWER COMPANY
MILLER STEAM PLANT
ASH POND DAM
TYPICAL SECTIONS AND DETAILS

DESIGNED RP DRAWN RMW CHECKED JBM
SCALE AS SHOWN COPYRIGHT BY SHELBY
CLASSIFICATION DRAWING NUMBER E-210030 SHEET 1/1 REV. 4
311.2084
SCANNED 8/20/97

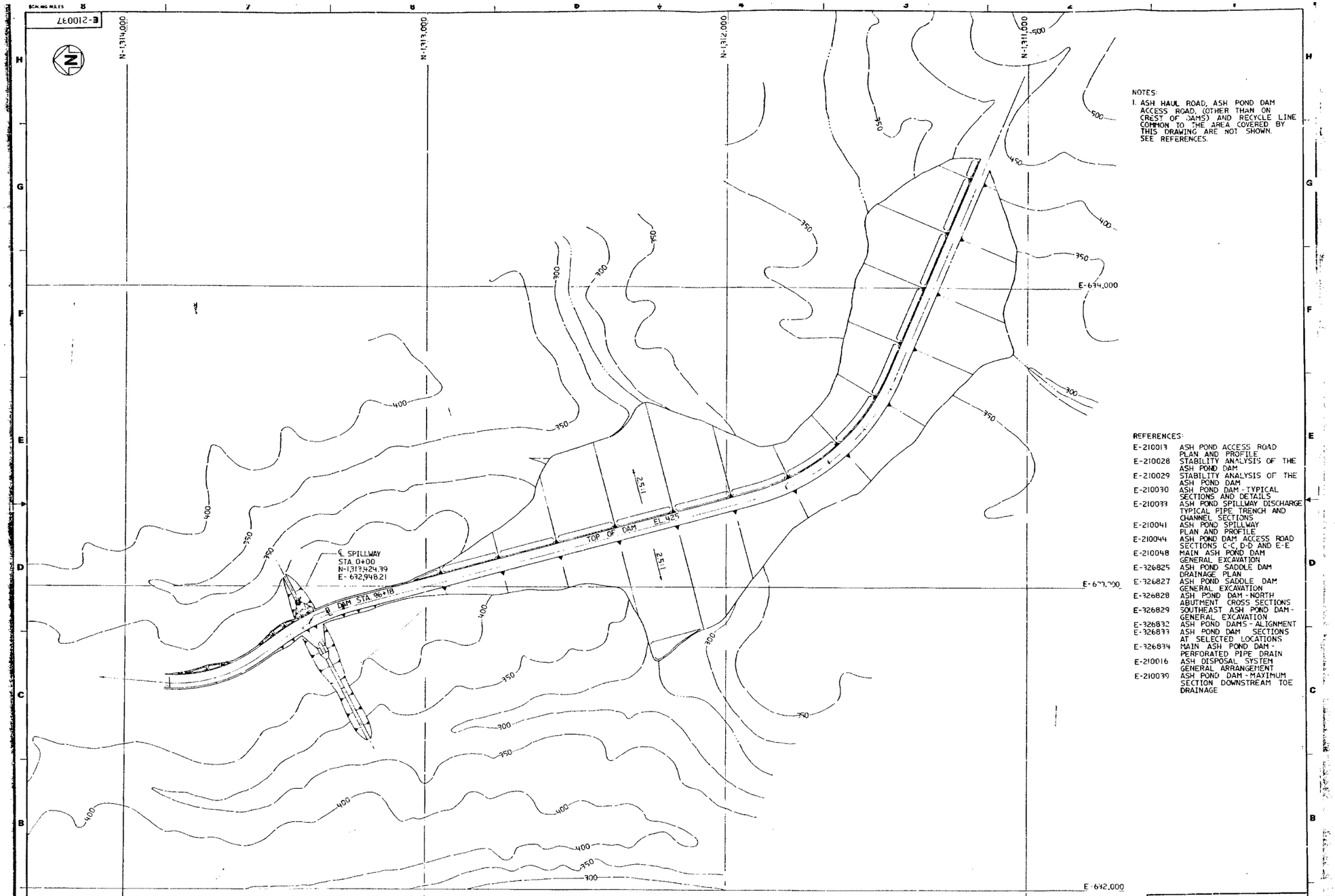
CONFIDENTIAL

MIL-API-0006

E-210037

N-1,314,000 N-1,313,000 N-1,312,000 N-1,311,000

E-634,000 E-633,000 E-632,000



NOTES:

1. ASH HAUL ROAD, ASH POND DAM ACCESS ROAD, (OTHER THAN ON CREST OF DAMS) AND RECYCLE LINE COMMON TO THE AREA COVERED BY THIS DRAWING ARE NOT SHOWN. SEE REFERENCES.

REFERENCES:

E-210013	ASH POND ACCESS ROAD PLAN AND PROFILE
E-210028	STABILITY ANALYSIS OF THE ASH POND DAM
E-210029	STABILITY ANALYSIS OF THE ASH POND DAM
E-210030	ASH POND DAM - TYPICAL SECTIONS AND DETAILS
E-210033	ASH POND SPILLWAY DISCHARGE TYPICAL PIPE TRENCH AND CHANNEL SECTIONS
E-210041	ASH POND SPILLWAY PLAN AND PROFILE
E-210044	ASH POND DAM ACCESS ROAD SECTIONS C-C, D-D AND E-E
E-210048	MAIN ASH POND DAM GENERAL EXCAVATION
E-326825	ASH POND SADDLE DAM DRAINAGE PLAN
E-326827	ASH POND SADDLE DAM GENERAL EXCAVATION
E-326828	ASH POND DAM - NORTH ABUTMENT CROSS SECTIONS
E-326829	SOUTHEAST ASH POND DAM - GENERAL EXCAVATION
E-326832	ASH POND DAMS - ALIGNMENT
E-326833	ASH POND DAM SECTIONS AT SELECTED LOCATIONS
E-326834	MAIN ASH POND DAM - PERFORATED PIPE DRAIN
E-210016	ASH DISPOSAL SYSTEM GENERAL ARRANGEMENT
E-210039	ASH POND DAM - MAXIMUM SECTION DOWNSTREAM TOE DRAINAGE

REVISION	DATE
A	APPROVED
B	THIS DRAWING SUPERSEDES DRAWING E-326830 DATED 10-6-76
0	9-14-78

Southern Company Services, Inc.

Alabama Power Company

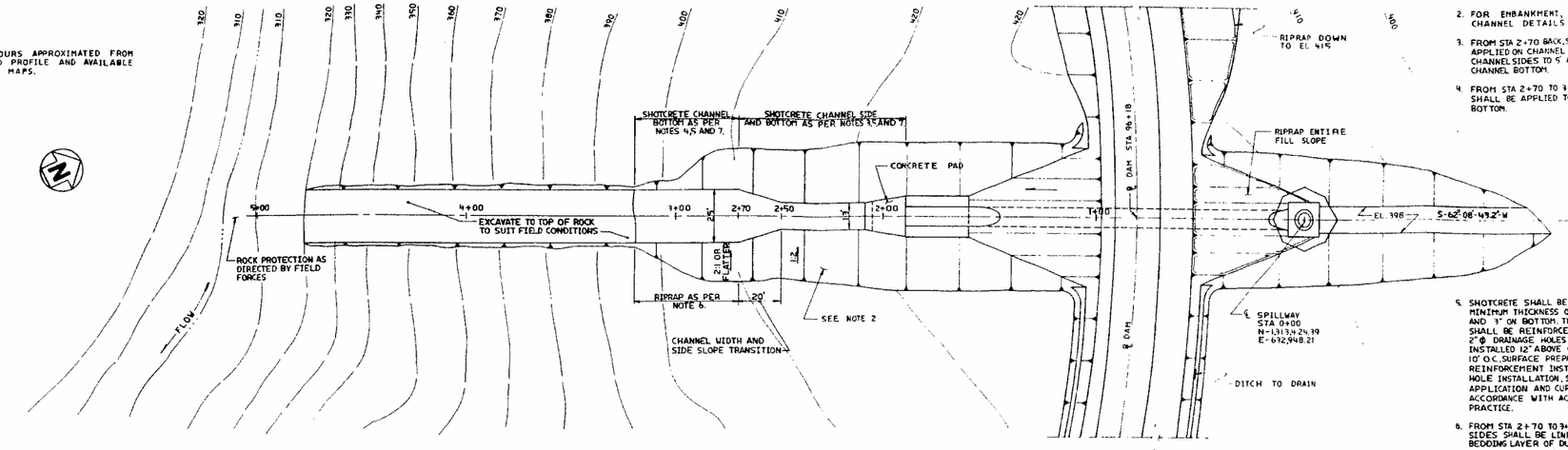
MILLER STEAM PLANT
MAIN ASH POND DAM
GENERAL ARRANGEMENT

DESIGNED PBP | DRAWN CC | CHECKED BDP | SCALE 1"=100' | PROJECT # 31-2081 | DRAWING NUMBER E-210037 | REV 0

SCANNED DATE 2/24/94

E-326850

CONTOURS APPROXIMATED FROM FIELD PROFILE AND AVAILABLE TOPO MAPS.

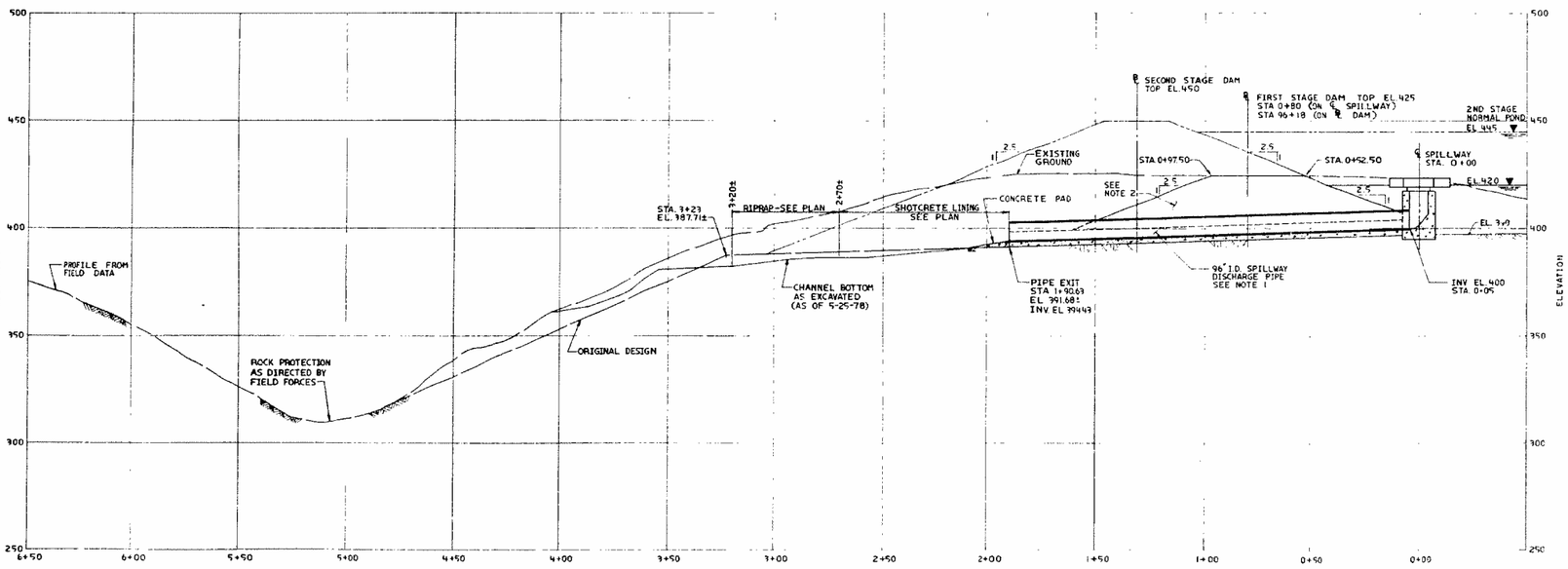


PLAN

SCALE: 1"=20'

NOTES:

1. FOR PIPE DETAIL REFERENCES SEE DWG. E-326849.
2. FOR EMBANKMENT, TRENCH AND CHANNEL DETAILS SEE DWG. E-326849.
3. FROM STA 2+70 BACK, SHOTCRETE SHALL BE APPLIED ON CHANNEL BOTTOM AND ON CHANNEL SIDES TO 5' ABOVE FINISHED CHANNEL BOTTOM.
4. FROM STA 2+70 TO 3+20±, SHOTCRETE SHALL BE APPLIED TO THE CHANNEL BOTTOM.
5. SHOTCRETE SHALL BE APPLIED WITH MINIMUM THICKNESS OF 2" ON THE SIDES AND 3" ON BOTTOM. THE SHOTCRETE SHALL BE REINFORCED WITH WWF 6x6-W2.9xW10. 2"ø DRAINAGE HOLES SHALL BE INSTALLED 12" ABOVE CHANNEL BOTTOM 10' O.C. SURFACE PREPARATION, REINFORCEMENT INSTALLATION, DRAINAGE HOLE INSTALLATION, SHOTCRETE APPLICATION AND CURING SHALL BE IN ACCORDANCE WITH ACCEPTED SHOTCRETE PRACTICE.
6. FROM STA 2+70 TO 3+20±, THE CHANNEL SIDES SHALL BE LINED WITH A THIN BEDDING LAYER OF DURABLE ROCK SPALLS COVERED WITH A 2' THICK LAYER OF ROCK HAVING AN AVERAGE DIAMETER OF NOT LESS THAN 12".
7. 6" MINIMUM THICKNESS OF CONCRETE MAY BE SUBSTITUTED FOR SHOTCRETE AS DIRECTED BY APCO FIELD PERSONNEL.



PROFILE ALONG ℄ OF CHANNEL

SCALE: 1"= 20'

REFERENCES:

FOR GENERAL REFERENCES SEE DWG E-326845

REVISION	DATE	BY	CHK'D	APPR 1	APPR 2	APPR 3	APPR 4	APPR 5
A. E1, ADDED NOTE ALLOWING SUBSTITUTION OF CONCRETE FOR SHOTCRETE	8-25-78	BRL	[illegible]	[illegible]	[illegible]	[illegible]		
C. C7, ADDED ROCK PROTECTION NOTE. D. F7, ADDED ROCK PROTECTION NOTE. E. F1, ADDED NOTES 3,4,5 AND 6.	6-26-78	BRL	[illegible]	[illegible]	[illegible]	[illegible]		
A. C5, CHANGED CHANNEL EXCAVATION AND LINING TO FIT FIELD CONDITIONS. B. G5, CHANGED CHANNEL EXCAVATION AND LINING TO FIT FIELD CONDITIONS.								
DRAWING E-210CN1, REV. 1, DATED 10-6-75 REDRAWN A. STA 0+00 AT N-1,313,424.39, E-632,948.21 WAS N-1,314,121.13, E-632,207.62	1-13-78	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		

Southern Services, Inc.
Alabama Power Company

MILLER STEAM PLANT
ASH POND DAM SPILLWAY
PLAN AND PROFILE

DESIGNED MLG DRAWN CC CHECKED MLG
SCALE AS SHOWN CONTRACT OR SHEET

CLASSIFICATION	DRAWING NUMBER	SHT	REV
311 2084	E-326850	1	4

CONFIDENTIAL

MIL-API-0008

CONFIDENTIAL

MIL-API-0027

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.

CONFIDENTIAL

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

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

Inspection Date: _____ Time: _____ Reservoir Pool Level: _____ ft. msl

Rainfall Since Last Inspection: _____ inches Weather Conditions: _____

Conditions Noted During Inspection	Yes	No	Conditions Noted During Inspection	Yes	No
UPSTREAM SLOPE			**DAM CREST**		
Slumping or Sliding			Cracks		
Sinks or Depressions			Differential Settlement		
Significant Erosion			**DOWNSTREAM AREA**		
Disturbance of Riprap (if any)			Changes in Seepage Volume or Location		
Cracks			Heaving		
Animal Burrows			Sinks or Depressions		
Fire Ant Hills			**DISCHARGE STRUCTURE**		
DOWNSTREAM SLOPE			Changes in Concrete Cracking		
Slumping or Sliding			Changes in Concrete Spalling		
Sinks or Depressions			Seepage at Concrete/Soil Contact		
Significant Erosion			**SADDLE DIKE**		
Wet Zones on Slope			Excessive Vegetation		
Seepage on Slope			Significant Erosion		
Shrinkage Cracks			Seepage on Slope		
Animal Burrows			**OTHER CONDITIONS OF NOTE**		
Excessive Vegetation					
Fire Ant Hills					

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 Signature: _____

Site Name:	**James Miller Plant**	**Date:**	1 March 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)?	**420.5**		19. Major erosion or slope deterioration?		X
3. Decant inlet elevation (operator records)?	**420.0**		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)?	**425**		Is water exiting outlet, but not entering inlet?		X
6. If instrumentation is present, are readings recorded (operator records)?	X		Is water exiting outlet flowing clear?	X	
7. Is the embankment currently under construction?		X	21. Seepage (specify location, if seepage carries fines, and approximate seepage rate below):		
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
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*
18	Small bulges observed on embankment slope. Observations indicate bulges likely surficial sloughs caused by maintenance equipment operating on the slope.
21	Isolated wet areas observed on the main dike embankment. Observations indicate water may be surface runoff from thunderstorms on the afternoon prior to the site visit.

Coal Combustion Waste (CCW)

Impoundment Inspection

Impoundment NPDES Permit AL 0027146 **INSPECTOR** Joe Klein, P.E. & Frank Lockridge, P.E.

Date February 1, 2007 (Effective Date)
Impoundment Name Miller 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 Miller 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: Port Birmingham, AL

Distance from the impoundment: ➢ 5 miles

Location:

Latitude	33	Degrees	36	Minutes	19.5	Seconds	**N**
Longitude	87	Degrees	3	Minutes	41.5	Seconds	**W**

State Alabama **County** Jefferson

	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.

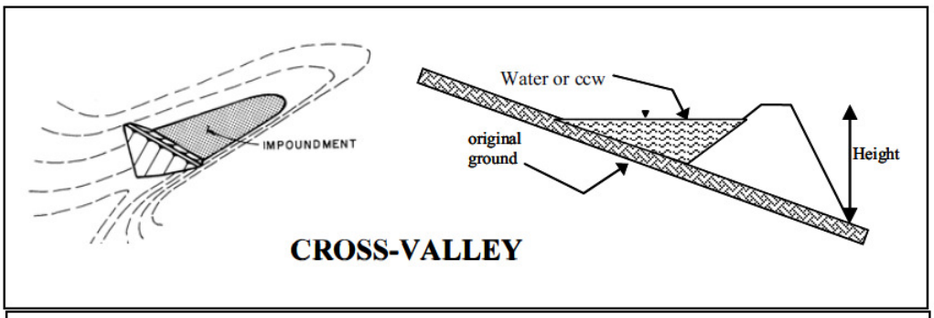
☒ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns.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

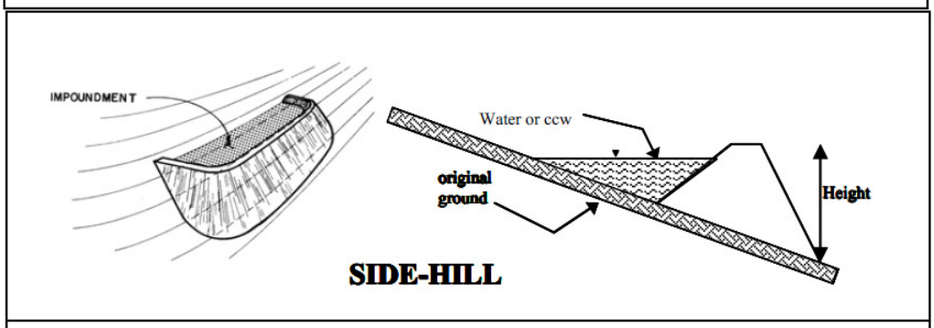
☐ **HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

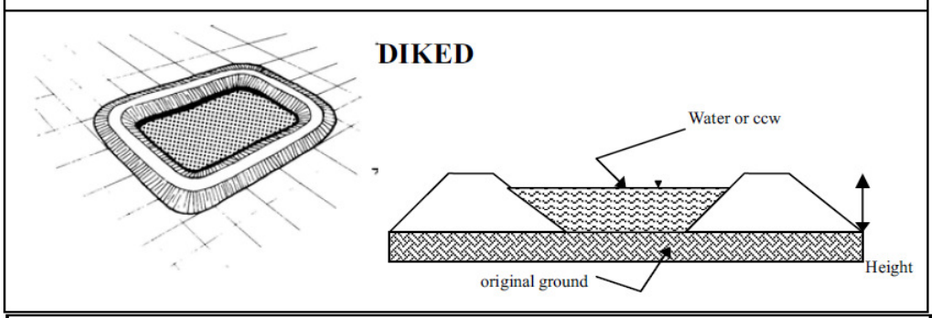
DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

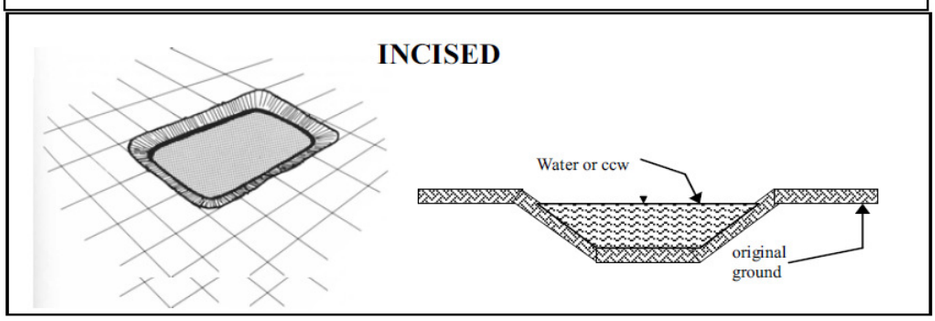
The relatively remote location of the impoundment indicates a loss of life is not probable in the event of a failure or misoperation of the dam. As the dam is approximately 170 feet high, a failure or misoperation has the potential to result in a significant economic or environmental loss.

CONFIGURATION:









☒ Cross-Valley ☐ Side-Hill ☐ Diked

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

Embankment Height (ft)	170	**Embankment Material**	Clay core and random earth fill
Pool Area (ac)	341	**Liner**	N/A
Current Freeboard (ft)	4.5	**Liner Permeability**	N/A

TYPE OF OUTLET (Mark all that apply)

☐ **Open Channel Spillway**

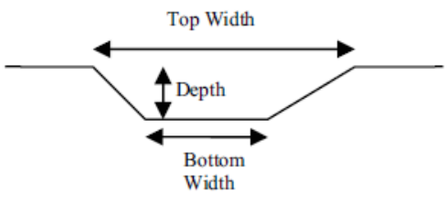
- ☐ Trapezoidal
- ☐ Triangular
- ☐ Rectangular
- ☐ Irregular

depth (ft)

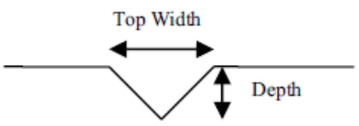
average bottom width (ft)

top width (ft)

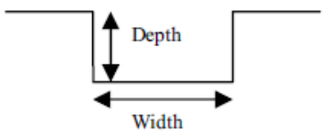
TRAPEZOIDAL



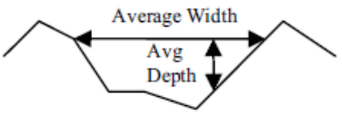
TRIANGULAR



RECTANGULAR

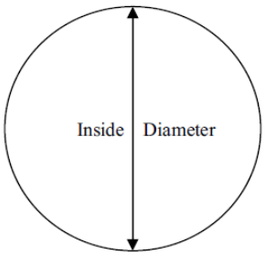


IRREGULAR



☒ **Outlet**

96-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?		

If So Please Describe :

	Yes	No
Has there ever been any measures undertaken to monitor/lower Phreatic water table levels based on past seepages or breaches at this site?	☐	☒
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.

Site Name:	**James Miller Plant**	**Date:**	1 March 2011
Unit Name:	**Ash Pond Saddle Dike**	**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)?	**N/A**		19. Major erosion or slope deterioration?		**X**
3. Decant inlet elevation (operator records)?	**N/A**		20. Decant Pipes:		
4. Open channel spillway elevation (operator records)?	**N/A**		Is water entering inlet, but not exiting outlet?	N/A	
5. Lowest dam crest elevation (operator records)?	**425**		Is water exiting outlet, but not entering inlet?	N/A	
6. If instrumentation is present, are readings recorded (operator records)?		**X**	Is water exiting outlet flowing clear?	**N/A**	
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?	N/A	
9. Trees growing on embankment? (If so, indicate largest diameter below)		**X**	At isolated points on embankment slopes?	**N/A**	
10. Cracks or scarps on crest?		**X**	At natural hillside in the embankment area?	**N/A**	
11. Is there significant settlement along the crest?		**X**	Over widespread areas?	N/A	
12. Are decant trashracks clear and in place?	**N/A**		From downstream foundation area?	N/A	
13. Depressions or sinkholes in tailings surface or whirlpool in the pool area?		**X**	"Boils" beneath stream or ponded water?	N/A	
14. Clogged spillways, groin or diversion ditches?		**X**	Around the outside of the decant pipe?	N/A	
15. Are spillway or ditch linings deteriorated?	N/A		22. Surface movements in valley bottom or on hillside?		**X**
16. Are outlets of decant or underdrains blocked?	N/A		23. Water against downstream toe?		**X**
17. Cracks or scarps on slopes?		**X**	24. Were Photos taken during the dam inspection?	**X**	

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

Issue #	Comments
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*
2, 3, 4, 12, 15 and 16	The saddle dike is located at the upstream side of the impoundment to close a local low area. As the saddle dike is at the "top" of the impoundment, no spillway was incorporated in to the design.
21	Impoundment area around saddle dike has been filled and is being used for storage and processing dry ash. There is no water

	impounded against the inside slope or abutment of the saddle dike.

Coal Combustion Waste (CCW)

Impoundment Inspection

Impoundment NPDES Permit AL 0027146 **INSPECTOR** Joe Klein, P.E. & Frank Lockridge, P.E.

Date February 1, 2007 (Effective Date)
Impoundment Name Miller Steam Plant

Impoundment Company Alabama Power Company
EPA Region 4

State Agency Alabama Department of Environmental Management
(Field Office) Address Birmingham Branch
110 Vulcan Road
Birmingham, AL
Name of Impoundment Miller 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: Port Birmingham, AL

Distance from the impoundment: ➢ 5 miles

Location:

Latitude	33	Degrees	36	Minutes	53.02	Seconds	**N**
Longitude	87	Degrees	3	Minutes	20.13	Seconds	**W**

State Alabama **County** Jefferson

	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.

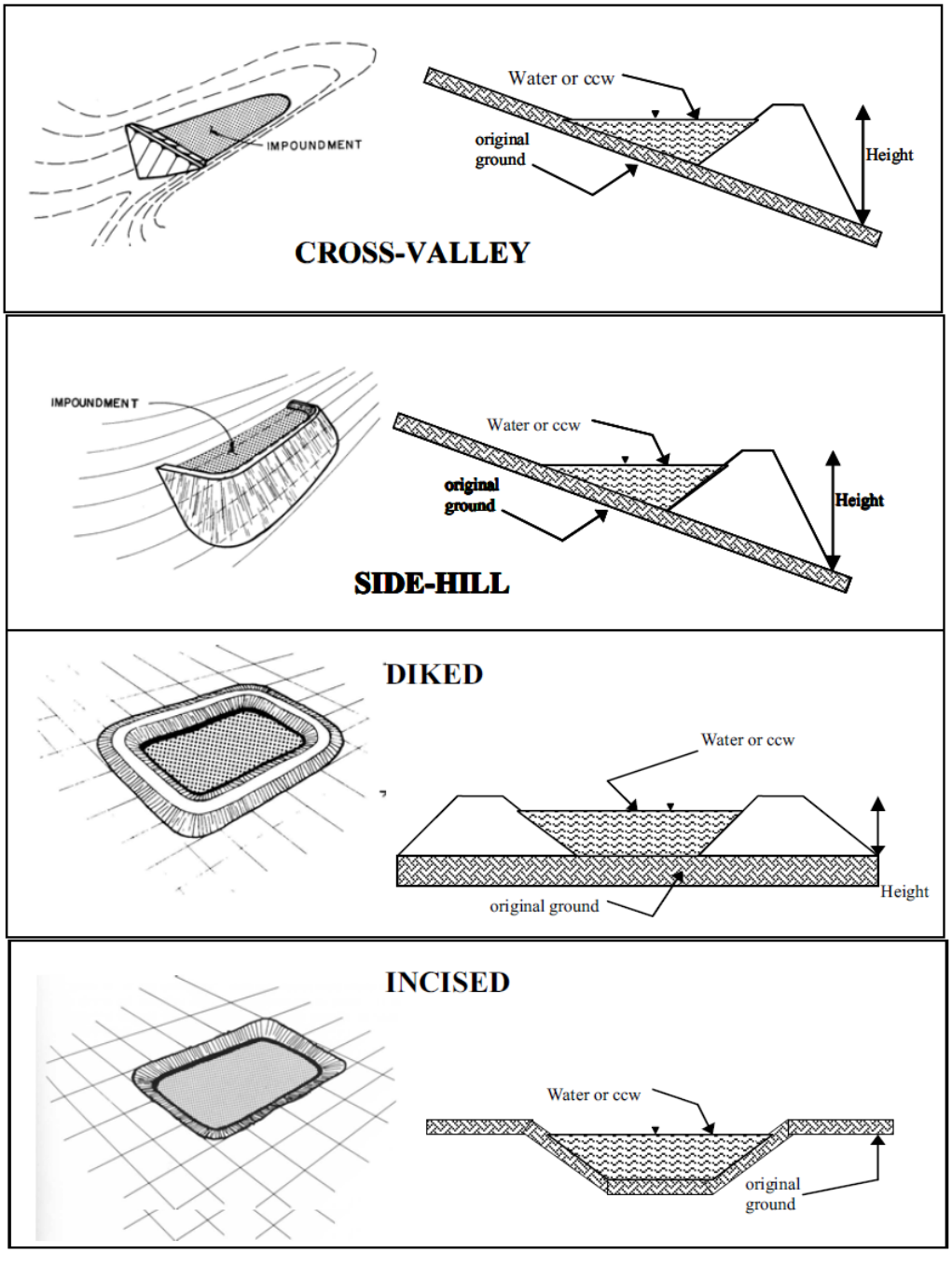
☐ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns.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

The impoundment area adjacent to and in the area of the saddle dike has been filled with ash and graded to provide storage and handling area for dry ash. As there is no water stored against the saddle dike, and as the land adjacent to the saddle dike is owned by the operator, the Dewberry evaluated the saddle dike as a "Low Hazard Potential".

CONFIGURATION:



☒ Cross-Valley ☐ Side-Hill ☐ Diked

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

Embankment Height (ft)	25	**Embankment Material**	Clay core and random earth fill
Pool Area (ac)	N/A	**Liner**	N/A
Current Freeboard (ft)	N/A	**Liner Permeability**	N/A

TYPE OF OUTLET (Mark all that apply)

☐ **Open Channel Spillway**

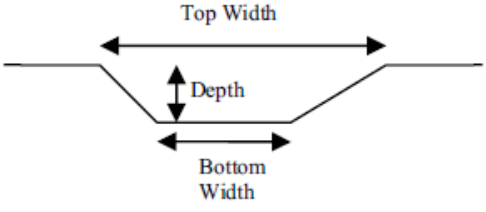
- ☐ Trapezoidal
- ☐ Triangular
- ☐ Rectangular
- ☐ Irregular

depth (ft)

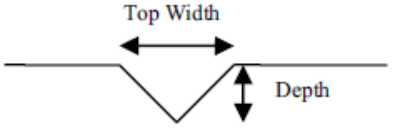
average bottom width (ft)

top width (ft)

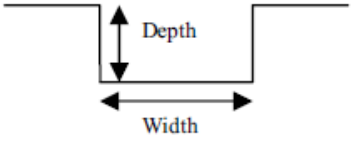
TRAPEZOIDAL



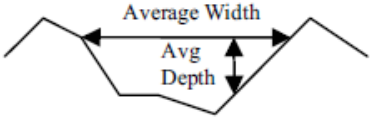
TRIANGULAR



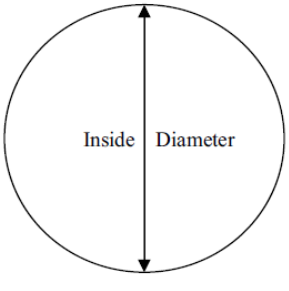
RECTANGULAR



IRREGULAR



☐ **Outlet**



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?		

If So Please Describe :

	Yes	No
Has there ever been any measures undertaken to monitor/lower Phreatic water table levels based on past seepages or breaches at this site?	☐	☒
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.