ASSESSMENT OF DAM SAFETY OF COAL COMBUSTION SURFACE IMPOUNDMENTS – FINAL REPORT

Gulf Power
Plant Scholz
Sneads, Florida

Prepared for
U.S. Environmental
Protection Agency
Washington, D.C.

May 2014
Revised July 10, 2014

CDM Smith Project No.:
93083.1801.044.SIT.SCHOL

CDM Smith

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Section 1

Introduction, Summary Conclusions and Recommendations

1.1 Introduction

Following the December 22, 2008 dike failure at the Tennessee Valley Authority's Kingston, Tennessee coal combustion waste (CCW) ash pond dredging cell that resulted in a spill of over 1 billion gallons of coal ash slurry, covered more than 300 acres and impacted residences and infrastructure, the United States Environmental Protection Agency (USEPA) is embarking on a initiative to prevent the catastrophic failure from occurring at other facilities located at electrical utilities in an effort to protect lives and property from the consequences of a dam failure or the improper release of impounded slurry.

This assessment of the stability and functionality of the Gulf Power Company Plant Scholz's CCW impoundments is based on a review of available documents, site assessments conducted by CDM Smith on August 22, 2012, and technical information provided subsequent to the site visit. CCW impoundments assessed included the Upper Pond, comprised of the Upper East Pond, Upper Middle Pond, and Upper West Pond; the Middle Pond; and the Lower Pond. In summary, the Plant Scholz's Upper and Lower Ponds are classified as **FAIR** for continued safe and reliable operation. No existing dam safety deficiencies are recognized for the Upper East Pond and Lower Pond under normal loading conditions. Liquefaction analyses of the Upper East Pond and Lower Pond exhibit factors of safety between 0.9 and 1.4. This suggests some soft pockets may liquefy and other portions of the embankment may lose strength due to earthquake-induced pore pressure buildup. Gulf Power Company's Plant Scholz Middle Pond embankments are classified as **POOR** for continued safe and reliable operation because static and seismic engineering studies following the best professional engineering practice to support acceptable factors of safety have not been presented.

It is critical to note that the condition of the embankment(s) depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the embankment(s) will continue to represent the condition of the embankment(s) at some point in the future. Only through continued care and inspection can there be any chance that unsafe conditions be detected.

1.2 Purpose and Scope

CDM Smith was contracted by the USEPA to perform site assessments of selected surface impoundments. As part of this contract, CDM Smith conducted site assessments of the Upper Pond, Middle Pond, and Lower Pond, at the Plant Scholz site owned by Gulf Power Company, a division of Southern Company. The Upper Pond is comprised of three (3) separate Ash Decant/Settling ponds (Upper East Pond, Upper Middle Pond, and Upper West Pond) that have been formed through construction of divider embankments within the Upper Pond. The divider embankments appear to be constructed of a mixture of soil and ash. The Upper Pond and Middle Pond are located on the west side of the plant site and the Lower Pond is on the southwest side of the site. The purpose of this report is to provide the results of the assessments and evaluations of the conditions and potential for waste release from the CCW impoundments.

A site visit was conducted by CDM Smith representatives on August 22, 2012 to collect relevant information, inventory the impoundments, and perform visual assessments of the impoundments.

1.3 Conclusions and Recommendations

1.3.1 Conclusions

Conclusions are based on visual observations during site assessment on August 22, 2012 and review of technical documentation provided by Gulf Power and Southern Company.

1.3.1.1 Conclusions Regarding Structural Soundness of the CCW Impoundments

The CCW impoundments appear to be structurally sound based on visual observations of the structural element components (i.e. inlet structures, earth embankments, and outlet structures). Slope stability analyses, performed by Southern Company Services on February 9, 2011 and October 18, 2012, of the Upper Pond and Lower Pond embankments are well documented, and in general, satisfactory factors of safety are reported for the different loading conditions analyzed. Slope stability analyses of the Middle Pond were not provided.

Southern Company Services February 9, 2011report for the north and east embankments of the Upper East Pond showed a factor of safety of 1.2, under rapid drawdown loading, that did not meet the required factor of safety of 1.3. Southern Company indicates in their October 18, 2012 submittal that revised stability analyses found the upstream (interior) slopes of the pond are subject to shallow sloughing with rapid changes in water level or seismic loads. Southern Company further states the shallow depth of sloughing does not represent a hazard to the embankments, but will require prompt maintenance attention. The calculated factor of safety of 1.3 presented in Southern Company Services October 18, 2012 report for the Upper East Pond's north embankment interior slope, under the rapid drawdown case reflects acceptance by Southern Company of this condition. CDM Smith is in agreement with Southern Company Services' evaluation of the adequacy of the Upper East Pond's north and east embankments under rapid drawdown conditions, given Southern Company's commitment to prompt maintenance attention to shallow sloughing.

1.3.1.2 Conclusions Regarding the Hydrologic/Hydraulic Safety of CCW Impoundments

The hydrologic/hydraulic (H & H) safety of Plant Scholz's CCW impoundments is inadequate. FEMA guidelines recommend impoundments to have the capacity to pass and/or store some percentage of the Probable Maximum Precipitation (PMP) for a 6-hour storm event over a 10-square-mile area in the vicinity of the site. Significant hazard structures are required to store the 50% PMP, 6-hour rainfall event. Gulf Power did not provide an H & H analysis of the CCW impoundments' capacity to pass and/or store the 50% PMP, 6-hour rainfall event. Gulf Power did provide an H & H analysis, dated October 18, 2013, of the CCW impoundments' capacity to pass and/or store the 50% PMP, 24-hour rainfall event, rather than the 50% PMP, 6-hour rainfall event and an H & H analysis of the CCW impoundments' capacity to pass 25- and 100-year, 24-hour storm events.

Gulf Power's calculations of October 18, 2013, DC-FP-FPC34572-101 show that the Middle Pond's south embankment will be overtopped by approximately 21 inches during the 50%PMP, 24-hour storm event. Gulf Power's H & H analyses of the CCW impoundments' capacity to pass 25- and 100-year, 24-hour storm events indicate the impoundments have adequate capacity to withstand these 24-

hour storm events without overtopping the perimeter embankments. Freeboard for the Upper East Pond for a 100-year, 24-hour storm event was approximately one foot.

CDM Smith performed a comparative review of the Middle Pond's performance for the 50% PMP, 6-hour storm event. Hydrometeorological Report No. 51 (HMR 51) published by the U.S. Department of Commerce, National Oceanic and Atmospheric Administration, U.S. Department of the Army Corps of Engineers indicates the PMP for the 6-hour storm event at Plant Scholz is 31 inches. The 50% PMP associated with this event is 15.5 inches of rain over a 6-hour period. CDM Smith's comparative review indicated a total increase in the Middle Pond's water surface elevation of about 29 inches. Based on the assumption the Middle Pond water surface is at Gulf Power's stated target elevation (two feet of freeboard) at the start of the event, it appears that the Middle Pond embankment will be overtopped by approximately 5 inches. CDM Smith concludes that Plant Scholz's CCW impoundments have inadequate combined storage capacity to pass and/or store the 50% PMP, 6-hour rainfall event.

CDM Smith cautions that we did not perform a detailed H & H analysis of Plant Scholz's CCW impoundments for the 50% PMP, 6-hour rainfall event.

1.3.1.3 Conclusions Regarding Adequacy of Supporting Technical Documentation

Supporting Technical Data provided by Gulf Power and reviewed by CDM Smith is inadequate. Gulf Power did not provide slope stability analyses of the Middle Pond.

The stability analyses provided for the north and east embankments of the Upper East Pond and the south embankment of the Lower Pond show the required factors of safety for required loading conditions are met in all instances. Liquefaction analyses of the Upper East Pond and Lower Pond exhibit factors of safety between 0.9 and 1.4. This suggests some soft pockets may liquefy and other portions of the embankment may lose strength due to earthquake-induced pore pressure buildup. Gulf Power states in their August 22, 2012 report, they believe there is a very low likelihood of an earthquake scenario of the magnitude used for the analyses occurring over the life of Plant Scholz.

Southern Company indicates in their October 18, 2012 submittal that the stability analyses indicate the upstream (interior) slopes of the pond are subject to shallow sloughing with rapid changes in water level or seismic loads. Southern Company states the shallow depth of sloughing does not represent a hazard to the embankments, but will require prompt maintenance attention. The higher factor of safety presented above reflects acceptance by Southern Company of this condition. CDM Smith is in agreement.

1.3.1.4 Conclusions Regarding Description of the CCW Impoundments

The description of the CCW impoundments provided by Gulf Power and Plant Scholz representatives appears to be consistent with the visual observations by CDM Smith during site assessment. However, record drawings were not provided to assess discrepancies against the intended design of the CCW impoundments.

1.3.1.5 Conclusions Regarding Field Observations

Upper East Pond: The Upper East Pond's normal pool elevation is approximately 128.0 feet, approximately 3.7 feet above the normal pool of the Upper Middle Pond. Some areas on the east embankment appear to be recently backfilled and repaired. Based on plant personnel comments, shallow erosion rills have occurred in these areas. Some areas of dampness were observed at the toe of exterior slope of the east embankment. It was difficult to determine if these wet areas were caused by seepage or the previous day's rain. An animal burrow was observed on the north embankment.

Upper Middle Pond: The Upper Middle Pond's normal pool elevation is 124.3 feet, approximately 2.2 feet above the normal pool of the Upper West Pond and 13.3 feet above normal pool of the Middle Pond. Signs of heavy equipment traffic were present on the crest of the east divider embankment. Shallow erosion rills were observed along the interior slope of the west embankment with an approximate frequency of one every 50 feet. Areas of surface erosion were observed on the west interior embankment and at the northwest corner of the pond around the 18-inch-diameter corrugated HDPE inlet pipe.

Upper West Pond: The Upper West Pond's normal pool elevation is 122.1 feet, approximately 11.1 feet above normal pool of the adjacent Middle Pond. Shallow erosion rills and scarps were observed on the west embankment interior slope. An approximately 30-foot-long erosion/depressed area was also observed at the west embankment.

Middle Pond: The Middle Pond's normal pool elevation is 111.0 feet, approximately 12.8 feet above normal pool of the adjacent Lower Pond. The interior slopes of the pond embankments appear to be in fair condition. Erosion rills observed along the north embankment interior slope appeared to only extend into the haul road fill materials. Erosion rills and scarps were observed northeast embankment, adjacent to the Ash Dry Stack. Grass on the inside of the embankment was approximately 8 to 12 inches tall and was recently mowed. The west embankment interior slope appeared to be in satisfactory condition, well vegetated with grass, typically less than 6 inches in height. The Ash Dry Stack appears to cover the Middle Pond north divider embankment.

Lower Pond: The exterior slopes of the south and southwest embankments are covered with trees and dense vegetation. During the visual assessment, areas of erosion, erosion rills, and scarps were observed on the exterior slopes of the south and southeast embankments of the Lower Pond. An area of standing water or possible seepage was observed at the toe of the exterior slope of the southwest embankment. Maintenance of these areas is encouraged. Signs of erosion rills and shallow scarps were observed on the interior slopes of all CCW impoundment embankments.

1.3.1.6 Conclusions Regarding Adequacy of Maintenance and Methods of Operation

Current maintenance and operation procedures appear to be adequate. There was no evidence of previous spills and release of impounded coal ash slurry within or outside the plant property. Repairs on the Upper East Pond north embankment to mitigate seepage discovered during a regular inspection were performed in October, 2010 and appear to have mitigated the condition. Seepage in any other areas has not been reported by Gulf Power.

1.3.1.7 Conclusions Regarding Adequacy of Surveillance and Monitoring Program

Gulf Power's monitoring program is inadequate. Areas of possible seepage were observed on exterior slope of the east embankment of the Upper East Pond. Although no detrimental conditions or indications of potential embankment failure were observed during CDM Smith's visual assessment, regular monitoring is essential to detect and monitor seepage and to reduce the potential for failure.

Groundwater monitoring, surveillance program, recording, and report preparation for Florida Department of Environmental Protection (FDEP) under the National Pollutant Discharge Elimination System (NPDES) Permit appear to be adequate and complying with FDEP requirements.

1.3.1.8 Conclusions Regarding Suitability for Continued Safe and Reliable Operation

The CCW impoundment embankments do not show evidence of unsafe conditions requiring immediate remedial efforts, although maintenance to correct deficiencies noted above is required.

Currently the State of Florida does not require Emergency Action Plans (EAPs) for CCW impoundments. Gulf Power has an EAP for the CCW impoundments.

1.3.2 Recommendations

Based on CDM Smith's visual assessment of the CCW impoundments and review of documentation provided by Gulf Power and Southern Company, CDM Smith offers the following recommendations for consideration.

1.3.2.1 Recommendations Regarding the Hydrologic/Hydraulic Safety

CDM Smith recommends that a detailed H & H analysis be performed to determine the adequacy of Plant Scholz CCW impoundments to pass and/or store the 50% PMP, 6-hour rainfall event.

1.3.2.2 Recommendations Regarding the Technical Documentation for Structural Stability

It is recommended that Gulf Power have a qualified engineer evaluate the stability of the Middle Pond embankments.

1.3.2.3 Recommendations Regarding Field Observations

The following recommendations for maintenance repairs, monitoring, and studies are offered to help improve the condition of the Plant Scholz's CCW impoundments.

Animal Activity: Animal burrows were observed in several locations. Although not seen in other areas, vegetation cover may have hidden additional animal burrows. CDM Smith recommends documenting areas disturbed by animal activity, removing the animals and backfilling the burrows with compacted structural fill to protect the integrity of the embankments.

Erosion rills, scarps, and rutting: CDM Smith recommends that structural fill be placed and compacted in the rills and scarps and the repaired areas graded to meet the adjacent existing contours. After slope restoration, it is recommended that the exposed surface of the embankment be stabilized with sod or hydroseeded to restore vegetation cover on exterior embankment slopes. After slope restoration of the interior embankment slopes, it is recommended to stabilize the exposed surface of the embankment with riprap consisting of a heterogeneous mixture of irregular-shaped rocks placed over the compacted fill and a geotextile fabric.

Seepage: Areas of possible seepage were observed on exterior slope of the east embankment of the Upper East Pond. Regular monitoring is essential to detect and monitor seepage and to reduce the potential for failure. To monitor the nature of the possible seepage conditions, CDM Smith recommends Gulf Power develop a regular surveillance program to monitor areas of seepage and potential seepage to evaluate the rate, volume, and turbidity of flow emerging from the embankment slopes.

Trees and dense vegetation: The removal of trees, shrubs, and bushes on or near the embankments is recommended. The greatest density of this vegetation was observed along the south embankment of the Lower Pond. Trees and dense vegetation should be removed and embankments slopes restored to the original contours by placing select structural fill in 12-inch lifts and compacting as recommended by a professional engineer.

1.3.2.4 Recommendations Regarding Surveillance and Monitoring Program

Areas of possible seepage were observed on exterior slope of the east embankment of the Upper East Pond. CDM Smith recommends that Gulf Power develop a regular surveillance program to monitor areas of seepage and potential seepage to evaluate the rate, volume, and turbidity of flow emerging from the embankment slopes.

1.3.2.5 Recommendations Regarding Continued Safe and Reliable Operation

Inspections should be made following periods of heavy and/or prolonged rainfall and/or high water events on the Apalachicola River, and the occurrence of these events should be documented. Inspection records should be retained at the facility for a minimum of three years.

Plant personnel should inspect the interior slope following major storm or earthquake events and anytime water level in the cell has decreased more than 6 inches over a period of 24 hours. None of the conditions observed require immediate attention or remediation; however the above recommendations should be implemented during a reasonable time frame to maintain continued safe and reliable operation of the CCW impoundments.

1.4 Participants and Acknowledgment

1.4.1 List of Participants

CDM Smith representatives William Fox, P.E. and Eduardo Gutiérrez-Pacheco, P.E. were accompanied at all times during visual assessment by representatives from Gulf Power and Southern Company, which included the following individuals:

Company	Name and Title
Gulf Power	James O. Vick, Environmental Affairs Director
Gulf Power	Michael Markey, Land and Water Programs Manager
Southern Company	Jim Pegues, P.E., Geotechnical Engineer, Principal
Hopping Green & Sims	Mike Petrovich, Legal Consultant
Beggs & Lane	Russell A. Badders, Legal Consultant

1.4.2 Acknowledgement and Signature

CDM Smith acknowledges that the CCW impoundments referenced herein were assessed by William L. Fox, P.E. and Eduardo Gutiérrez-Pacheco, P.E. Based on the documentation provided, Plant Scholz's Upper and Lower Ponds are rated **FAIR**, and the Middle Pond is rated **POOR**. Minor deficiencies exist that require remedial measures.

We certify that the CCW impoundments referenced herein have been assessed on August 22, 2012.

Stephen L. Whiteside

Stephen L. Whiteside, P.E.
Vice President
Florida Registration No. 55002

STEPHEN LONG WHITESIDE
No. 55002

Stephen L. Whiteside
7/10/14

Section 2

Description of the Coal Combustion Waste Impoundments

2.1 Location and General Description

Plant Scholz is located in Jackson County, Florida, approximately 3.5 miles southeast of the City of Sneads, Florida (Latitude: 30^0 40’ 10.73” N, Longitude: 84^0 53’ 25.09” W). The plant is located along the west bank of the Apalachicola River as shown on **Figure 2-1.** Critical infrastructure within approximately five miles downgradient of Plant Scholz is shown on **Figure 2-2.**

Plant Scholz’s CCW impoundments consist of the Upper Pond, the Middle Pond, and the Lower Pond. The Upper Pond is comprised of three (3) separate Ash Decant/Settling ponds, designated as the Upper East Pond, Upper Middle Pond, and Upper West Pond. An aerial view of Plant Scholz including the CCW impoundments is shown on **Figure 2-3.**

The total surface area of Plant Scholz’s CCW impoundments is approximately 28 acres. **Table 2-1** shows a summary of the approximate size and dimensions of the CCW impoundments.

Table 2-1 – Summary of Ash Pond Approximate Dimensions and Size

	CCW Impoundments				
	Upper Pond			Middle Pond	Lower Pond
	Upper East	Upper Middle	Upper West		
Embankment Height (ft)	35	8	8	13	30
Average Crest Width (ft)	25	22	25	25	30
Embankment Length (ft)*	2,600	2,100	1,800	2,900	3,000
Interior Slopes H:V	2:1	2:1	2:1	2:1	2:1
Exterior Slopes H:V	2.5:1	2:1	4:1	4:1	2:1

*Length was measured along the perimeter embankment crest of each impoundment.

2.1.1 Horizontal and Vertical Datum

Site surveys provided by Gulf Power to CDM Smith used the horizontal and vertical control network established by the National Geodetic Survey (NGS) District. Horizontal survey data in this study reference the North Zone of the Florida State Plane Coordinate System based on North American Datum (NAD) of 1983, 2007 adjustment. Elevations noted herein are in feet and are referenced to 1988 North American Vertical Datum (NAVD 88), unless otherwise noted.

2.1.2 Site Geology

Plant Scholz is located along the western bank of the Apalachicola River. Based on review of the USGS Topographic Map, natural ground surface elevations in the area of the CCW impoundments range from approximately El. 60 to El. 120. According to the Geologic Map of Florida, Plant Scholz is located on terraces or marine deposits west of the Apalachicola River floodplain that consist of undifferentiated surficial deposits of Oligocene sediments. These deposits consist of clayey sand, sand and gravel that

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0 1,500 3,000 6,000 9,000 12,000 Feet

FIGURE 2-1
LOCUS PLAN
GULF POWER - PLANT SCHOLZ
SNEADS, FLORIDA

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0 1,500 3,000 6,000 9,000 12,000 Feet

FIGURE 2-2

CRITICAL INFRASTRUCTURE PLAN

GULF POWER - PLANT SCHOLZ

SNEADS, FLORIDA

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FIGURE 2-3
AERIAL PLAN
GULF POWER - PLANT SCHOLZ
SNEADS, FLORIDA

vary laterally and vertically within short distances. Most deposits are cross-bedded, and the sands and gravels are locally cemented into hard, dense, ferruginous sandstone.

Boring logs, dated October 2009, provided by Gulf Power indicate that existing soils present within and below the south and southeast embankments of the Lower Pond consist of loose to medium dense clayey and silty sand underlain by soft to stiff sandy clay, with varying amounts of gravel and rock fragments. Boring logs, dated March 2010, provided by Gulf Power indicate that existing soils present within and below the east embankments of the Upper East Pond consist of loose to medium dense silty sand underlain by poorly graded very loose to medium dense sand. Boring logs, dated March 2010, provided by Gulf Power indicate that existing soils present within and below the north embankments of the Upper East Pond consist of medium dense silty sand underlain by very loose to medium dense clayey and silty sand. Boring logs and locations for the October 2009 and March 2010 investigations are included in **Appendix A**.

2.2 Coal Combustion Residue Handling

Plant Scholz uses a CCW impoundment divided into three separate settling ponds (Upper Pond, Middle Pond, and Lower Pond) to handle the coal combustion waste (CCW) that includes bottom ash and fly ash. Sluiced Ash enters the Upper Pond and then moves in sequence through a series of three settling chambers before moving through the Middle Pond to the Lower Pond. Ash dredged from the Upper Pond is deposited in the ash storage area located in the Middle Pond. The CCW impoundments also receive low-volume wastes that include, but are not limited to:

- Ash sluice waste,
- Flue gas desulphurization gypsum,
- Water softener regeneration wastewater,
- Boiler blowdown and boiler slag,
- Air preheater wash,
- Coal pile runoff, and
- Treated domestic wastewater.

Overflow from the CCW impoundments discharges through a 24-inch-diameter steel pipe (morning glory-type riser) located near the south end of the Lower Pond to the on-site discharge canal, and then into the Apalachicola River.

2.3 Size and Hazard Classification

According to the United States Army Corps of Engineers (USACE) Guidelines for Safety Inspection of Dams (1979), impoundments are categorized per **Table 2-2.**

Table 2-2 – USACE ER 1110-2-106 Size Classification

Category	Impoundment	
	Storage (Ac-ft)	Embankment Height (Ft)
Small	50 to < 1000	25 to < 40
Intermediate	1000 to < 50,000	40 to < 100
Large	> 50,000	> 100

Based on the combined total storage capacity of approximately 200 acre-feet and maximum embankment height of 35 feet, Plant Scholz's CCW impoundments (both individually and combined) are considered SMALL. The storage capacity of Plant Scholz's CCW impoundments was estimated using the "2008 Ash Pond Certification for Plant Scholz (NPDES Permit FL0002283)" to FDEP by Gulf Power dated December 17, 2007.

It is not known if Plant Scholz impoundments currently have a Hazard Potential Classification. Based on the USEPA classification system as presented on Page 2 of the USEPA checklist (**Appendix B**) and our review of the site and downstream areas, recommended hazard ratings have been assigned to the impoundments as summarized in **Table 2-3**:

Table 2-3 – Recommended Impoundment Hazard Classification Ratings

CCW impoundment	Recommended Hazard Rating	Basis
Upper Pond	Significant Hazard	▪ Failure or miss-operation could result in economic loss and damage to plant infrastructure, operations and utilities, and environmental damage to adjacent waterways and downstream areas. ▪ Loss of human life as a result of failure or miss-operation is not anticipated.
Middle Pond	Significant Hazard	▪ Failure or miss-operation could result in economic loss and damage to plant infrastructure, operations and utilities, and environmental damage to downstream areas. ▪ Loss of human life as a result of failure or miss-operation is not anticipated.
Lower Pond	Significant Hazard	▪ Failure or miss-operation could result in economic loss and damage to plant infrastructure, operations and utilities, and environmental damage to adjacent waterways and downstream areas. ▪ Loss of human life as a result of failure or miss-operation is not anticipated.

2.4 Amount and Type of Residuals Currently Contained in the Impoundment(s) and Maximum Capacity

CDM Smith was not provided information on the amounts of residuals currently stored in the impoundments. The pool areas of the Upper East Pond, Upper Middle Pond, and Upper West Pond are approximately 2.5, 3.5, and 4.5 acres respectively. The pool area Middle Pond is approximately 6.3 acres and the pool area of the Lower Pond is approximately 11.4 acres. Decant water from the Lower Pond exits through a monitored National Pollutant Discharge Elimination System (NPDES) discharge point into a concrete-lined on-site canal that flows into the Apalachicola River.

2.5 Principal Project Structures

Principal structures of the CCW impoundments include the following:

- Three 18-inch-diameter HDPE culverts, one at each chamber of the Upper Pond,
- Two 18-inch-diameter steel riser pipes, one at the southwest corner of the Upper West Pond and one at the east corner of the Middle Pond,
- One 24-inch-diameter steel riser pipe, at the south corner of the Lower Pond,
- Earthen perimeter embankments composed of compacted soil and ash mix, and
- A 27-inch-diameter concrete pipe that runs under the Lower Pond south embankment to a concrete discharge v-notch weir structure.

2.6 Critical Infrastructure within Five Miles Downgradient

Based on available topographic maps, surface drainage in the vicinity of Plant Scholz appears to be to the south and southeast toward Apalachicola River. Critical infrastructure, including schools, hospitals, waterways, roadways and bridges, and other major facilities, identified within five miles downgradient of Plant Scholz includes the following:

- Shaddy Grove United Methodist Church
- Electric substation
- Interstate 10 Bridge over Apalachicola River

Discharge will flow into the Apalachicola River. There is no critical infrastructure between the impoundments and this waterway.

A breach of the impoundment embankments would most likely impact low-lying lands surrounding the plant and is not expected to result in loss of human life.

Section 3

Summary of Relevant Reports, Permits and Incidents

3.1 Summary of Reports on the Safety of the CCW Impoundments

On October 2, 2010, during routine observations, an area of seepage was found near the toe of the Upper East Pond's north embankment. A disturbance in the surface water of the pond indicated the location of the seepage area. The plant personnel immediately utilized on-site equipment to place ash on the interior slope, which reportedly stopped the seepage. After visual inspection by Southern Company Services (SCS), the recommended final repair was to install a reverse filter consisting of sand overlain by #89 and #57 Stone in the area where the seepage emerged on the toe of the exterior slope. SCS performed subsequent seepage modeling to evaluate the benefits of adding a toe berm at the toe of slope of the north embankment. Based on the results of the analysis, SCS concluded that a toe berm would provide little or no benefit and that the cost of such remedial work was unnecessary.

SCS reminded Plant Scholz personnel responsible for the CCW impoundment inspections of the potential for flow concentrations due to animal burrows, roots, and other surface imperfections. SCS also recommended that routine maintenance be directed to address surface imperfections as recommended by Federal Emergency Management Agency (FEMA) Publication No. 534.

Plant Scholz personnel reported there was no release of CCW outside the plant property during this incident.

3.2 Summary of Local, State, and Federal Environment Permits

Currently, the CCW impoundments are regulated by FDEP.

Plant Scholz was issued a permit under the National Pollutant Discharge Elimination System (NPDES) authorizing discharge to the Apalachicola River in accordance with effluent limitations, monitoring requirements, and other conditions set forth in the permit. The Plant's permit was issued on September 24, 2010. The permit number is FL0002283.

3.3 Summary of Spill/Release Incidents

According to plant representatives, there have been no known spills or releases related to the impoundment. No documentation was available to confirm this statement.

Section 4

Summary of History of Construction and Operation

4.1 Summary of Construction History

4.1.1 Impoundment Construction and Historical Information

Scholz Generating Station began operation in 1953. The coal combustion waste (CCW) is currently generated by two coal-fired steam electric generating units (Unit 1 and 2), each of which generates 49 megawatts of power.

Historical information on the CCW impoundment was not readily available in the documentation provided by Gulf Power. Based on our understanding and available data, the CCW impoundments appear to be constructed as a side-hill configuration using the natural slope of the terrain towards the Apalachicola River. Perimeter embankment crest elevation decreases towards the south, with the crest of the north embankment the highest at approximately El. 134, and the crest of the south embankment at approximately El. 104. Reportedly, interior slopes were originally constructed at 2.5H:1V. Exterior slopes were constructed at 2.5H:1V. Original design drawings for the CCW impoundments were not available, however embankment stability calculations provided by Gulf Power reference SCS Drawing E-7058, Flue Gas Desulfurization Sludge Ponds (1974) and SCS Drawing E-PS-4038-15, Plant Scholz General Arrangement Site Plan (1975). Accordingly, it seems the existing impoundments were constructed between 1974 and 1975. Based on information provided by Gulf Power and visual observations, the embankment crest width varies from approximately 20 to 30 feet.

The four soil boring logs provided to us and attached in Appendix A depict the embankment soils as primarily comprised of loose to medium dense clayey and silty sands, underlain by soft to stiff sandy clays. We do not know whether these four logs are representative of all embankment conditions.

4.1.2 Significant Changes/Modifications in Design since Original Construction

The Upper Pond, originally constructed as a single CCW impoundment, was divided into three (3) separate impoundments (Upper East Pond, Upper Middle Pond, and Upper West Pond) for solids waste management and water treatment. Reportedly, there have been no other significant changes or modifications in the design.

4.1.3 Significant Repairs/Rehabilitation since Original Construction

Information regarding major repairs or rehabilitation to the embankments of the CCW impoundments was not provided. Reportedly, the only repair that has been done is on the north embankment of the Upper East Pond as described below and in Section 3.1 of this report.

Routine observations found an area of seepage near the toe of the Upper East Pond’s north embankment in October 2010. Repairs were made to the embankment including installation of a reverse filter consisting of sand overlain by #89 and #57 stone. Southern Company Services performed subsequent seepage modeling to evaluate the condition and determined no further remedial work was required. No indication or documentation was provided by Gulf Power of other prior stability or seepage issues. Detrimental conditions or indications of potential embankment failure were not observed during CDM Smith’s visual assessment.

4.2 Summary of Operational Procedures

4.2.1 Original Operating Procedures

The CCW impoundments at Plant Scholz have historically been used as settling ponds for CCW and other plant wastes. Wastewater streams that are discharged into the CCW impoundments and whose decant water is ultimately released into the Apalachicola River include:

- Ash sluice water
- Water softener regeneration wastewater
- Boiler blowdown
- Air preheater wash
- Auxiliary equipment cooling water
- Coal pile runoff
- Yard sump runoff
- Treated domestic water
- Stormwater

4.2.2 Significant Changes in Operational Procedures and Original Startup

No significant changes in operational procedures have been made to the CCW impoundments. There was no documentation provided that indicates different.

4.2.3 Current CCW Impoundment Configuration

Current operational procedures of the CCW impoundments are consistent with the original operating procedures.

As previously described and as shown on Figure 2-3, Plant Scholz's CCW impoundments consist of the Upper Pond, the Middle Pond, and the Lower Pond. The Upper Pond is comprised of three (3) separate Ash Decant/Settling Ponds, designated as the Upper East Pond, Upper Middle Pond, and Upper West Pond.

The approximate crest elevations of the embankments and impoundment surface areas are shown in **Table 4-1.**

Table 4-1, Approximate Crest Elevations and Surface Areas

Ash Pond	Approximate Embankment Crest Elevation (Feet)	Approximate Impoundment Surface Area (Acres)
Upper East Pond	131	2.5
Upper Middle Pond	128	3.5
Upper West Pond	123	4.5
Middle Pond	112	6.3
Lower Pond	104	11.4

During normal plant operations, most of the ash sedimentation occurs in the three upper ponds. Ash sluice water is discharged into the Upper East Pond, which is hydraulically connected by two 18-inch-diameter corrugated High Density Polyethylene (HDPE) equalizer pipes to the Upper Middle Pond. Water from the Upper Middle Pond flows into the Upper West Pond through two 18-inch-diameter corrugated HDPE equalizer pipes, and then decant water flows into the Middle Pond through an 18-inch-diameter morning glory-type drop inlet. The Lower Pond receives decant water from the Middle Pond through an 18-inch-diameter morning glory-type drop inlet located at the east corner of the pond and then is discharge by a 24-inch-diameter steel pipe morning glory-type drop inlet into a monitored NPDES discharge outlet structure at the toe of slope of the south embankment. Water is released through a v-notch weir structure into a concrete-lined trapezoidal canal that discharges into Apalachicola River.

4.2.4 Other Notable Events since Original Startup

No additional information was provided to CDM Smith regarding other notable events that impacted operations and/or regular maintenance and inspection of the CCW impoundments.

Section 5

Field Observations

5.1 Project Overview and Significant Findings (Visual Observations)

CDM Smith performed visual assessments of the CCW impoundments at the Gulf Power Company's Plant Scholz site. Impoundments assessed included the Upper Pond, comprised of the Upper East Pond, Upper Middle Pond, and Upper West Pond; the Middle Pond; and the Lower Pond. The Upper Pond is located on the west side of the site and the Lower Pond is located on the south side of the site. The perimeter embankments of the Upper East Pond are approximately 2,600 feet long and vary from approximately 15 feet to 35 feet in height, the perimeter embankments of the Upper Middle Pond are approximately 2,100 feet long and vary from approximately 8 feet to 20 feet in height, and the perimeter embankments of the Upper West Pond are approximately 1,800 feet long and vary from approximately 8 feet to 15 feet in height. The perimeter embankments of the Middle Pond are approximately 2,900 feet long and vary from approximately 8 feet to approximately 13 feet in height. The perimeter embankments of the Lower Pond are approximately 3,000 feet long and vary from approximately 8 feet to approximately 35 feet in height. The divider embankment between the Lower Pond and the Middle Pond is approximately 900 feet long. The normal pool elevations, target freeboard, and embankment crest elevations for each pond are shown in **Table 5-1**.

Table 5-1, Impoundment Data

Impoundment Name	Normal Pool Elevation (feet)	Target Freeboard (feet)	Crest Elevation (feet)
Upper East Pond	128.0	3.0	131.0
Upper Middle Pond	124.3	3.7	128.0
Upper West Pond	122.1	0.9	123.0
Middle Pond	111.0	2.0	113.0
Lower Pond	98.16	5.84	104.0

The assessments were completed following the general procedures and considerations contained in Federal Emergency Management Agency's (FEMA's) Federal Guidelines for Dam Safety (April 2004) to make observations concerning settlement, movement, erosion, seepage, leakage, cracking, and deterioration. A Coal Combustion Dam Inspection Checklist and Coal Combustion Waste (CCW) Impoundment Inspection Form, developed by USEPA, were completed for each of the aforementioned CCW impoundments. Copies of these forms are included in **Appendix B**. Photograph locations are shown on **Figure 5-1**, and photographs are included in **Appendix C**. Photograph locations were logged using a handheld GPS device. The photograph coordinates are also listed in **Appendix C.**

CDM Smith visited the plant on August 22, 2012, to conduct visual assessments of the impoundments. The weather was generally cloudy with a daytime high temperature of approximately 80 degrees

CDM Smith

FIGURE 5-1

PHOTOGRAPH LOCATION PLAN

GULF POWER - PLANT SCHOLZ

SNEADS, FLORIDA

Fahrenheit. The daily total precipitation prior to the site visit is shown in **Table 5-2**. The data were recorded at USGS Station 02358000, located on the Apalachicola River at Chattahoochee, Florida, approximately 2.8 miles northwest of the Plant.

Table 5-2 – Approximate Precipitation Prior to Site Visit

Date of Site Visit – August 22, 2012		
Day	**Date**	**Precipitation (inches)**
Sunday	August 21	0.40
Saturday	August 20	0.61
Friday	August 19	0.02
Thursday	August 18	0.0
Wednesday	August 17	0.56
Tuesday	August 16	0.00
Monday	August 15	0.21
Sunday	August 14	0.55
Total	**(August 1 - 21, 2012)**	**4.34**
Total	**Month Prior to Site Visit (July, 2012)**	**4.37**

Note: Precipitation data from www.waterdata.usgs.gov. Station Location: Apalachicola River (02358000), Chattahoochee, FL Lat. 30.701; Lon. -84.859; EL. 40.58 (ft-NGVD29).

5.2 Upper Pond

The Upper Pond includes three Ash Decant/Settling ponds: the Upper East Pond, Upper Middle Pond, and Upper West Pond. These ponds have been formed through construction of divider embankments within the Upper Pond. At the time of the assessment, the Upper East Pond contained ash and water with approximately 5 feet of freeboard. It was indicated by plant personnel that this pond is dredged as necessary to remove accumulated ash. Assessments of the three ponds located within the Upper Pond are presented below.

5.2.1 Upper East Pond

The Upper East Pond is situated between the Coal Stockpile, to the east, and the Upper Middle Pond, to the west, sharing a common divider embankment with the Upper Middle Pond. The Upper East Pond contained standing water and ash at the time of this assessment, with approximately 5 feet of freeboard.

5.2.1.1 Crest

The crest of the Upper East Pond embankments appeared to be in satisfactory condition (Photographs 54, 59 and 60). The crest ranged from 20 to 30 feet wide. The crest of the embankment consists of compacted granular soils and gravel and is exposed to minimal vehicle traffic. No depressions or evidence of settlement were observed on the crest. Minor rutting was observed (Photograph 60).

5.2.1.2 Interior Slopes

The interior slopes appear to be in fair condition. Reportedly, the interior slopes are 2H:1V, but a portion of the slopes on the east embankment seem to be around 1.5H:1V. Sparse vegetation covers the interior slopes. Discontinuities and eroded areas (Photographs 57, 86, and 91) were observed along the interior slopes.

Inlet pipes are located at the south corner of the Upper East Pond (Photograph 43).

5.2.1.3 Exterior Slopes

The exterior slopes appear to be in satisfactory condition. The exterior slopes of the embankment are approximately 2.5H:1V. They are covered with short grass, approximately 4 to 6 inches tall at the time of the visual assessment (Photographs 45 to 47). Some areas on the east embankment appear to be recently backfilled and repaired. Based on plant personnel comments, shallow erosion rills have occurred in these areas (Photographs45 and 48). Some saturation was observed at the toe of slope (Photograph 49 to 51) of the east embankment. It was difficult to determine if these wet areas were caused by seepage or the previous day's rain. Based on the embankment height, these areas have the potential to have seepage.

The repaired area, previously described in Section 3 of this report, located on the exterior slope of the north embankment was identified (Photographs 61 and 62). No signs of further seepage were observed in the area. An animal burrow was observed on the north embankment (Photograph 66).

5.2.1.4 Outlet Structures

The outlet pipe consists of an 18-inch-diameter corrugated HDPE pipe (Photograph 90). The pipe was submerged at the time of visual assessment and is located near the northwest corner of the Upper East Pond. The pipe appears to be functioning satisfactorily.

5.2.2 Upper Middle Pond

The Upper Middle Pond is situated between the Upper East Pond, the Upper West Pond, and the Middle Pond, sharing common divider embankments with these adjacent ponds. The Upper Middle Pond contained standing water and ash at the time of this assessment, with approximately 5 feet of freeboard. It was indicated by plant personnel that this pond is also dredged as necessary to remove accumulated ash.

5.2.2.1 Crest

The crests of the Upper Middle Pond embankments appear to be in satisfactory condition. The average crest width is approximately 22 feet. Slight depressions and ruts with standing water (Photographs 79 80, 83 and 85) were observed on the crest of the west divider embankment between the Upper Middle Pond and the Upper West Pond. No evidence of settlement or cracks was observed on the crests. Signs of heavy equipment traffic were present on the crest of the east divider embankment (Photographs 93 to 95 and 104).

5.2.2.2 Interior Slopes

The interior slopes appear to be in fair condition. The interior slopes appear to be approximately 2H:1V. Short grass covers the interior slopes. Shallow erosion rills (Photographs 101 and 102) were observed along the interior slope of the west divider embankment with an approximate frequency of one every 50 feet. Areas of surface erosion were observed on the west divider embankment (Photograph 86 and 87) and also were observed at the northwest corner of the pond (Photograph 89) around the 18-inch-diameter corrugated HDPE inlet pipe. Water was flowing through the pipe from the Upper East Pond.

5.2.2.3 Exterior Slopes

The Upper Middle Pond is situated between the Upper East Pond, the Upper West Pond, and the Middle Pond, sharing common divider embankments with these adjacent ponds as shown on Figure 2-3. The exterior slopes of the Upper Middle Pond are the interior slopes for the Upper East and Upper West ponds at the north, east, and west respectively. Exterior slopes at the south are the interior slopes of the Middle Pond beyond the Ash Dry Stack. The Ash Dry Stack area ground surface is approximately at crest elevation. The slopes of the Ash Dry Stack area towards the Middle Pond were not accessible to visual assessment due to the dense vegetation at the Middle Pond surface.

5.2.2.4 Outlet Structures

The outlet from the Upper Middle Pond consists of an 18-inch-diameter corrugated HDPE pipe located near the southwest corner of the pond (Photograph 82). The pipe appears to be in satisfactory condition.

5.2.3 Upper West Pond

The Upper West Pond contained standing water and ash at the time of this assessment with approximately 2 ½ feet of freeboard at the outlet area. The south portion of the pond is covered by vegetation (i.e. cattails). It was indicated by plant personnel that this pond is dredged as necessary to remove accumulated ash. The Upper West Pond is located adjacent to and west of the Upper Middle Pond and adjacent to and north of the Middle Pond, sharing common divider embankments with these ponds.

5.2.3.1 Crest

The crest of the Upper West Pond appears to be in fair condition, with some areas of rutting and signs of heavy equipment traffic on the west divider embankment between the Upper Middle Pond and the Upper West Pond (Photographs 79 and 80). The average crest width is approximately 25 feet. The crest of the west embankment is gravel-covered without vegetation. The east divider embankment crest is surfaced with compacted gravel and is used as an access road. Sparse vegetation was growing in the middle and on both sides of the roadway (photo 88).

5.2.3.2 Interior Slopes

The interior slopes appear to be in fair condition. The interior slopes of the embankments were approximately 2H:1V. The interior slopes were generally covered with grassy vegetation approximately 3 to 6 inches tall. Shallow erosion and scarps were observed on the west interior slope (Photographs 71 and 72). An approximately 30-foot-long erosion/depressed area (Photograph 73) was also observed at the west embankment. An 18-inch-diameter corrugated HDPE inlet pipe is located near the southeast corner of the pond. Water was flowing through the pipe from the Upper Middle Pond.

5.2.3.3 Exterior Slopes

In general, the exterior slopes of the Upper West Pond appear to be in satisfactory condition (Photographs 69 and 70). The embankment slopes are approximately 3H:1V with a flattening tendency towards the southwest corner of the embankment. Exterior slopes are covered with grassy vegetation about 4 to 6 inches tall. The alignment and slopes appear to be relatively uniform and consistent.

5.2.3.4 Outlet structures

The Upper West Pond outlet structure consists of an 18-inch-diameter morning glory-type steel pipe located at the southwest corner of the pond (Photograph 74). The riser appeared to be free of debris and in satisfactory operating condition.

5.3 Middle Pond

The Middle Pond is located adjacent to and south of the Upper West Pond and the Upper Middle Pond and adjacent to and northwest of the Lower Pond, sharing common divider embankments with these ponds. The Middle Pond contained standing water and ash during the assessment, with approximately 2 feet of freeboard. The pond's interior surface is heavily vegetated (Photograph 39). Middle Pond has a dog-leg shape and borders the west, south, and southeast limits of the Ash Dry Stack as shown on Figure2-3. Surface runoff from the Ash Dry Stack apparently flows into the Middle Pond.

5.3.1 Crest

The crest of the Middle Pond appeared to be in satisfactory condition (Photographs 115 and 116). The average crest width is approximately 25 feet. The southwest and west crests are gravel-covered with sparse short grass. The crest of the divider embankment between the Middle Pond and the Lower Pond appeared to be in satisfactory condition. The crest of the west embankment of the pond is nearly level with the natural ground elevation west of the pond area. The crest of the north and southeast divider embankments was surfaced with a soil and ash mix; no gravel was observed on the crests. No depressions or evidence of settlement were observed on the crests. Ruts and tire tracks were observed on the southeast divider embankment crest (Photographs 28, 109 and 110).

5.3.2 Interior Slopes

The interior slopes of the pond appear to be in fair condition. Portions of the north and northeast interior slope were not visible due to the presence of ash fill placed for an access/haul road. Erosion rills observed along the north embankment interior slope appeared to only extend into the haul road fill materials (Photographs 40, 41 and 42). Erosion rills and scarps (Photographs 37 and 38) were observed on the northeast embankment, adjacent to the Ash Dry Stack. Grass on the inside of the embankment was approximately 8 to 12 inches tall (Photographs 31, 76 and 78) and was recently mowed. The west embankment interior slope appeared to be in satisfactory condition, well vegetated with grass, typically less than 6 inches in height (Photographs 115 and 117).

5.3.3 Exterior Slopes

Exterior slopes of the Middle Pond appear to be in satisfactory condition. Slopes are approximately 4H:1V. Exterior slopes are covered with grassy vegetation about 4 to 6 inches tall (Photograph 116).

Alignment and slopes appears to be relatively uniform and consistent. No signs of bulging, sloughing, or slope failure were observed. No animal burrows were readily apparent.

As previously described, the southeast embankment is a divider embankment between the Middle Pond and the Lower Pond.

5.3.4 Outlet Structures

The Middle Pond outlet structure consists of an 18-inch-diameter morning glory-type steel pipe located near the east corner of the pond (Photograph 33). The riser appeared to be free of debris and in satisfactory operating condition.

5.4 Lower Pond

The Lower Pond is located adjacent to and south of the Middle Pond, sharing a common divider embankment with the Middle Pond. The Lower Pond contained standing water during the assessment, with approximately 6 ½ feet of freeboard and an embankment height of about 30 feet on the south and southeast sides. The north and northwest embankment height is about 6 feet. The pond receives water from the Middle Pond near the north corner of the pond. The pond surface is densely vegetated with cattails (Photograph 20).

5.4.1 Crest

The crests appeared to be in satisfactory condition (Photographs 2 and 6). The average crest width is approximately 30 feet. The crest widens to approximately 40 feet near the south corner near the NPDES discharge area and a chemical storage building (Photograph 8). Crests are gravel-covered without vegetation (Photos 2, 5, 6 and 26). No depressions or evidence of settlement were observed on the crest.

5.4.2 Interior Slopes

The interior slopes appear to be in satisfactory condition and are approximately 2.5H:1V (Photographs 6, 22 and 26). Some erosion and scarps along the interior slopes (Photograph 7) on the southeast embankment were observed. Erosion rills were also observed on the divider embankment between the Middle Pond and the Lower Pond (Photograph 29).

Water was being discharged into the pond from the Middle Pond through the north corner inlet pipe.

5.4.3 Exterior Slopes

Exterior slopes of the south and southeast embankments appear to be in poor condition. Irregular slope faces are approximately 2H:1V with some areas at 1.5H:1V (Photographs 4, 16 and 17). The exterior slopes of the south and southwest embankments are covered with trees and dense vegetation (Photographs 1, and 3). Erosion rills and scarps were observed on the exterior slope of the southeast embankment within the dense vegetation.

An area of standing water or possible seepage was observed at the toe of the southwest embankment (Photograph 25). Trees and dense vegetation extend beyond the toe of the embankment in this area. Animal burrows were not observed during visual assessment of this area.

A concrete-lined canal conveying the discharge water from the Lower Pond runs parallel to the toe of slope of the southeast embankment (Photograph 18).

Two monitoring wells were observed beyond the toe of the south embankment (Photograph 24).

5.4.4 Outlet Structures

The Lower Pond outlet structure consists of a 24-inch-diameter morning glory-type steel pipe riser with a 48-inch trash rack pipe located near the south corner of the pond (Photograph 9 and 10). The riser appeared to be free of debris and in satisfactory operating condition. A concrete outlet structure located at the toe of the southeast embankment’s exterior slope appeared to be in satisfactory condition (Photographs 11 to 15). Discharge flow from a 27-inch-diameter reinforced concrete pipe (RCP), flows through a v-notch weir, to a concrete-lined canal (Photograph 18) that discharges to the

Apalachicola River. Details on the connection between the 24-inch-diameter steel pipe riser and the 27-inch-diameter RCP are not available.

According to Scholz Plant personnel, discharge water from the Lower Pond is monitored on a daily basis as required by the FDEP - NPDES Permit No. 0002283. Daily records were not provided to CDM Smith.

Section 6

Hydrologic/Hydraulic Safety

6.1 Impoundment Hydraulic Analysis

The State of Florida does not currently have requirements related to the hydrologic or hydraulic design of coal ash impoundments. FEMA guidelines recommend impoundments to have the capacity to pass and/or store some percentage of the Probable Maximum Precipitation (PMP) for a 6-hour storm event over a 10-square-mile area in the vicinity of the site. Significant hazard structures are required to store the 50% PMP, 6-hour rainfall event. Gulf Power did not provide a hydrologic and hydraulic (H & H) analysis of the CCW impoundments' capacity to pass and/or store the 50% PMP, 6-hour rainfall event. Gulf Power provided a H & H analysis of the CCW impoundments' capacity to pass and/or store the 50% PMP, 24-hour rainfall event. Gulf Power also provided H & H analyses of the CCW impoundments' capacity to pass 25- and 100-year, 24-hour storm events.

6.2 Adequacy of Supporting Technical Documentation

Gulf Power did not provide a H & H analysis of the CCW impoundments' capacity to pass and/or store the 50% PMP, 6-hour rainfall event. Accordingly, the H & H safety supporting technical documentation of Plant Scholz's CCW impoundments is considered inadequate.

6.3 Assessment of Hydrologic/Hydraulic Safety

The hydrologic/hydraulic safety of Plant Scholz's CCW impoundments is inadequate. CDM Smith's conclusion is based on the following:

- Gulf Power's calculations of October 18, 2013, DC-FP-FPC34572-101 show that the Middle Pond's south embankment will be overtopped by approximately 21 inches during the 50%PMP, 24-hour storm event. The calculated total overflow volume from the Middle Pond to the Lower Pond is 84.7 acre-feet. Gulf Power's calculations indicate the Lower Pond will have approximately 3 feet of freeboard during the 50% PMP, 24-hour storm event, without flood flows from the Middle Pond. Because the available storage capacity of the Lower Pond is only 35 acre-feet, the Lower Pond's embankment will also be overtopped during the 50% PMP, 24-hour storm event.

- CDM Smith performed a comparative review of the Middle Pond's performance for the 50% PMP, 6-hour storm event. Hydrometeorological Report No. 51 (HMR 51) published by the U.S. Department of Commerce, National Oceanic and Atmospheric Administration, U.S. Department of the Army Corps of Engineers indicates the PMP for the 6-hour storm event at Plant Scholz is 31 inches. The 50% PMP associated with this event is 15.5 inches of rain over a 6-hour period. CDM Smith's comparative review indicated a total increase in the Middle Pond's water surface elevation of about 29 inches. Based on the assumption the Middle Pond water surface is at Gulf Power's stated target elevation (two feet of freeboard) at the start of the event, it appears that the Middle Pond embankment will be overtopped by approximately 5 inches. CDM Smith concludes that Plant Scholz's CCW impoundments have inadequate combined storage capacity to pass and/or store the 50% PMP, 6-hour rainfall event. CDM Smith cautions that we did not perform a detailed H & H analysis of Plant Scholz's CCW impoundments for the 50% PMP, 6-hour rainfall event.

- Gulf Power also provided H & H analyses of the CCW impoundments' capacity to pass 25- and 100-year, 24-hour storm events. These analyses indicate the impoundments have adequate capacity to withstand these 24-hour storm events without overtopping the perimeter dikes. Freeboard for the Upper East Pond for a 100-year, 24-hour storm event was approximately one foot.

Section 7

Structural Stability

7.1 Supporting Technical Documentation

Gulf Power Company and Southern Company provided CDM Smith slope stability analyses performed for the north and east embankments of the Upper East Pond dated February 9, 2011 and October 18, 2012. The analyses were performed by Southern Company Services. The submittal dated October 18, 2012 also included stability analyses for the south embankment of the Lower Pond. The slope stability analyses are based on recent and historical geotechnical information. The soil properties used for the analyses were determined on the basis of recent laboratory tests, recent field Standard Penetration Test (SPT) data, and a compilation of historical field and laboratory data and previous experience with engineering properties of those soils as stated by Southern Company in their analyses. Gulf Power did not provide stability analyses of the Upper Middle Pond, Upper West Pond, and Middle Pond embankments.

The analyses of Upper East Pond embankments were based on survey data (April and May 2010) with actual slopes ranging from 1.5H:1V to 2.9H:1V. The analyses of the Lower Pond were based on survey data (September 2012 and December 2012) with actual slopes ranging from 1.5H:1V to 2.9H:1V.

7.1.1 Stability Analyses and Load Cases Analyzed

Currently the State of Florida does not have regulations regarding coal ash impoundments. Procedures established by the United States Army Corps of Engineers (USACE), the United States Bureau of Reclamation, the Federal Energy Regulatory Commission, and the Natural Resources Conservation Service are generally accepted engineering practice. Minimum required factors of safety outlined by the USACE in EM 1110-2-1902, Table 3-1 and seismic factors of safety by FEMA Federal Guidelines for Dam Safety, Earthquake Analyses and Design of Dams (pgs. 31, 32 and 38, May 2005) are provided in **Table 7-1**.

Table 7-1, Minimum Factors of Safety

Load Case	Minimum Required Factor of Safety
Steady-State Condition at Normal Pool or Maximum Storage Pool Elevation	1.5
Rapid Drawdown Condition from Normal Pool Elevation	1.3
Maximum Surcharge Pool (Flood) Condition	1.4
Seismic Condition at Normal Pool Elevation	1.0
Liquefaction	1.3

Note: Based on required factors of safety published by USACE. Stability analyses are currently not required in the State of Florida for coal ash impoundments.

The USACE EM 1110-2-1902 identifies an “End of Construction” load case for earthen dams. Gulf Power did not evaluate the End of Construction case indicating the end of construction case is applicable to new facilities where full effective stress strength parameters have not been established and pore pressures have not reached long-term steady-state conditions. Gulf Power indicates that the

CCW impoundments were constructed decades ago and “short-term” construction cases were not applicable. CDM Smith is in agreement with Gulf Power.

7.1.2 Design Parameters and Dam Materials

General soil properties and soil parameters used for the slope stability analyses are presented in **Table 7-2.**

Table 7-2, Soil Parameters for the Subsurface Soil Profiles

Soil Description	Moist Unit Weight (psf)	Effective Stress Parameters		Total Stress Parameters	
		Φ’ (degrees)	C’ (psf)	Φ (degrees)	C (psf)
Upper East Pond (North and East Embankments)					
Sluiced Ash	80	27	0	24	100
Compacted Ash (Dike)	90	34	0	28	100
Sand (Foundation)	125	35	0	22	500
Clay (Foundation)	120	28	50	N/A	N/A
Marl (Foundation)	125	38	0	N/A	N/A
Lower Pond (South Embankment)					
Sluiced Ash	80	27	0	24	100
Dike Fill	120	32	400	28	600
Residual Sandy Clay/Clayey Sand	120	22	300	N/A	N/A
Residual Silty Clay	120	20	600	N/A	N/A
Marl	125	38	0	N/A	N/A

7.1.3 Uplift and/or Phreatic Surface Assumptions

Upper East Pond: The stability analyses provided by Gulf power considered steady-state seepage through the embankments, surcharge water, and rapid drawdown conditions. The normal operating pool El. 129 was used for free water in the pond. Water levels within the embankment were estimated.

Pond water levels used in the analysis for surcharge water and rapid drawdown were based on an October 2013 hydrologic and hydraulic analysis of the ponds for a 50% PMP storm event. For the purpose of the downstream slope stability analysis, surcharge water was conservatively assumed to reach the interior top of the dike (zero freeboard).

Lower Pond: The stability analyses provided by Gulf Power considered steady-state seepage through the embankments and foundation soils. The normal operating pool El. 98 was used for free water in the pond. Water levels within the embankment were estimated. The rapid drawdown analyses assumed the initial water surface at the south embankment crest El. 104 and the final water surface level of the sluiced ash at El. 96.

Pond water levels used in the analysis for surcharge water were based on an October 2013 hydrologic and hydraulic analysis of the ponds for a 50% PMP storm event. For the purpose of the downstream slope stability analysis, surcharge water was conservatively assumed to reach the interior top of the dike (zero freeboard).

7.1.4 Factors of Safety and Base Stresses

A summary of factors of safety computed for the different load cases is included in **Table 7-3.**

Table 7-3, Factors of Safety Computed for Various Stability Conditions(1)

Condition	Required Factor of Safety	Factor of Safety
Upper East Pond, East Embankment		
Downstream, Steady-State	1.5	1.5
Downstream, Seismic	1.0	1.3
Downstream, Surcharge	1.4	1.4
Upstream, Steady-State	1.5	1.7
Upstream, Seismic	1.0	1.3
Upstream, Rapid Drawdown	1.3	1.3
Upper East Pond, North Embankment		
Downstream, Steady-State	1.5	1.6
Downstream, Seismic	1.0	1.4
Downstream, Surcharge	1.4	1.5
Upstream, Steady-State	1.5	1.8
Upstream, Seismic	1.0	1.2
Upstream, Rapid Drawdown	1.3	1.3
Lower Pond, South Embankment		
Downstream, Steady-State	1.5	1.5
Downstream, Seismic	1.0	1.2
Downstream, Surcharge	1.4	1.4
Upstream, Steady-State	1.5	3.2
Upstream, Seismic	1.0	2.3
Upstream, Rapid Drawdown	1.3	2.5

(1) Source: Engineering and Construction Services Calculation, Rev. 2 – Slope Stability Analyses of Ash Pond Dikes, prepared by Southern Company, October 19, 2013.

The factors of safety referenced in the second column of the above table, are the minimum required factors of safety by USACE in EM 1110-2-1902, Table 3-1. The factors of safety calculated by Southern Company Services are shown in the third column. These meet the criteria listed by USACE. Previous analyses performed by Southern Company Services in 2011 found that under the rapid drawdown case the Upper East Pond north embankment interior slope factor of safety of 1.2 did not meet the required factor of safety of 1.3. Southern Company indicates in their October 18, 2012 submittal that the stability analyses indicate the upstream (interior) slopes of the pond are subject to shallow sloughing with rapid changes in water level or seismic loads. Southern Company states the shallow depth of sloughing does not represent a hazard to the embankments, but will require prompt maintenance attention. The higher factor of safety presented above reflects acceptance by Southern Company of this condition. CDM Smith is in agreement.

Southern Company Services seismic analyses of the embankments were based on the USGS “Map for Peak Acceleration with 2% Probability of Exceedance in 50 Years (2% PE/50 years)”. The following general inputs were utilized in Southern Company Services’ stability analyses.

- Probabilistic earthquake acceleration - The 2002 probabilistic earthquake acceleration mapped by the USGS for the vicinity of Plant Scholz is 0.161g for short-period structures on Site Class D soil profile (2% PE/50 years).

- Pseudostatic acceleration coefficient - A corresponding pseudostatic acceleration coefficient (K_h) of 0.072g was utilized, based on an allowable crest displacement of 2 inches using the Bray and Travasarou procedure.

7.1.5 Liquefaction Potential

Gulf Power provided CDM Smith with liquefaction potential analyses for the north and east embankments of the Upper East Pond and the south embankment of the Lower Pond, dated August 22, 2012. Gulf Power did not provide liquefaction potential analyses for the Upper Middle Pond, Upper West Pond, and Middle Pond embankments. The soil properties used for the analyses were obtained from blow counts from Standard Penetration Tests performed in 2009 and 2010. The analyses evaluated the liquefaction potential of the two ponds when subjected to loading associated with a seismic event having a 2-percent exceedance over a 50-year period, considering seismic hazards derived from both the Central and Eastern U.S. random faulting source (CEUS) and the Charleston Source Zone (CSZ). According to the report submitted, nearly 75 percent of the seismic hazard for Plant Scholz is derived from the CEUS and about 18 percent of the hazard is attributed to the CSZ. The analyses evaluated embankment liquefaction potential for an average earthquake of magnitude 5.8 at 100km (CUES source) and an average earthquake of magnitude 7.4 at 435km (CSZ source). The site modified zero-period accelerations ZP(ZPA) used in the liquefaction analyses of the CCW impoundments were .060g (CEUS) and 0.048g (CSZ). Summary of factors of safety computed for the CCW impoundments are included in **Table 7-4** and **Table 7-5**.

The analysis indicates liquefaction of the foundation soils does not appear to be a threat during the CEUS scenario earthquake. During the CSZ scenario earthquake, softer soils within and immediately below the embankments exhibit factors of safety between 0.9 and 1.4. This result suggests some soft pockets may liquefy and other portions of the embankment and foundation soils may lose strength due to earthquake-induced pore pressure buildup.

Table 7-4– Summary of Computed Factors of Safety for Liquefaction Potential, Upper East Pond

Upper East Pond, North and East Embankments									
Depth	EDB-2			EDB-6			NDB-4		
	SPT N- value	Factor of Safety, CEUS	Factor of Safety, CSZ	SPT N- value	Factor of Safety, CEUS	Factor of Safety, CSZ	SPT N- value	Factor of Safety, CEUS	Factor of Safety, NMSZ
5	10	>5	>5	3	4.6	3.0	5	>5	3.8
10	7	>5	3.3	0	2.2	1.4	0	2.2	1.4
15	4	2.6	1.6	2	2.8	1.7	0	2.0	1.2
20	2	2.6	1.5	7	4.6	2.7	8	4.6	2.7
25	0	1.9	1.0	0	1.9	1.0	97	>5	>5
30	3	2.8	1.4	1	2.2	1.1	77	>5	>5
35	5	3.4	1.7	2	2.5	1.2	50	>5	>5
40	2	2.6	1.2	14	>5	2.8			
45	2	2.2	0.9	88	>5	>5			
50	20	>5	>5						
55	50	>5	>5						

Table 7-5– Summary of Computed Factors of Safety for Liquefaction Potential, Lower Pond

Lower Pond, South Embankment									
Depth	SDB-3			SDB-4			SDB-5		
	SPT N-value	Factor of Safety, CEUS	Factor of Safety, CSZ	SPT N- value	Factor of Safety, CEUS	Factor of Safety, CSZ	SPT N- value	Factor of Safety, CEUS	Factor of Safety, NMSZ
5	21	>5	>5	13	>5	>5	22	>5	>5
10	7	3.7	2.4	3	2.3	1.5	2	2.0	1.3
15	2	2.8	1.7	3	3.2	1.9	3	2.2	1.3
20	0	1.9	1.1	3	2.9	1.7	19	>5	>5
25	0	1.8	1.0	1	2.2	1.2	1	2.2	1.2
30	7	4.1	2.1	2	2.3	1.2	43	>5	>5
35	12	>5	3.5	39	>5	>5	100	>5	>5
40	12	>5	3.2	100	>5	>5	100	>5	>5
45	100	>5	>5	100	>5	>5	31	>5	>5
50	100	>5	>5				100	>5	>5

7.1.6 Critical Geological Conditions

Based on the Geological Survey Map by the Florida Department of Natural Resources, Bureau of Geology, the state is characterized by four areas of sinkhole occurrence. Plant Scholz is located in Area III where soil covering the limestone is between 30 and 200 feet thick and consists mainly of cohesive clayey sediments of low permeability. Sinkholes of varying size, which may develop abruptly, can occur in this geologic setting. Cover-collapse sinkholes predominate in this area. Examination of topographic maps shows no closed depressions in the immediate vicinity of the plant site.

Based on geographic location and the 2008 USGS National Seismic Hazard Map, Peak Ground Acceleration (PGA) for 2% probability of exceedance in 50 years, Florida is located in the lowest hazard potential area for seismic activity.

7.2 Adequacy of Supporting Technical Documentation

Analyses of the Upper Middle Pond, Upper West Pond, and Middle Pond embankments have not been provided. As such, the supporting technical documentation for Plant Scholz is inadequate.

7.3 Assessment of Structural Stability

Current conditions and visual observations would yield a POOR rating for structural stability of the Middle Pond based on the following:

- Slope stability analyses and liquefaction potential analyses were not provided for the Middle Pond embankments.

Current conditions and visual observations yield a FAIR rating for structural stability of the Upper Pond, Lower Pond based on the following:

- Slope stability analyses and liquefaction potential analyses, performed by Southern Company Services on February 9, 2011 and October 18, 2012, of the Upper East Pond and Lower Pond embankments are well documented, and in general, satisfactory factors of safety are reported for the different loading conditions analyzed.

- During CDM Smith’s site assessment, dense vegetation, large diameter trees, scarps and erosion rills were observed on the south embankment exterior slope of the Lower. Subsequent to CDM Smith’s site assessment, Gulf Power removed the dense vegetation and trees from the Lower Pond’s south embankment, backfilled areas of erosion, and established a healthy grass cover on the embankment.

- Areas of possible seepage were observed on exterior slope of the east embankment of the Upper East Pond. No other indications of seepage along the exterior slopes of the CCW impoundment embankments were observed.

Section 8

Adequacy of Maintenance and Methods of Operation

8.1 Operating Procedures

As described in Section 2, the CCW impoundments are currently divided into three primary units: Upper Pond, Middle Pond, and Lower Pond. The Upper Pond consists of three sections, the Upper East Pond, the Upper Middle Pond, and the Upper West Pond. The sections of the Upper Pond are hydraulically connected with a series of 18-inch-diameter corrugated HDPE pipes. The main purpose of the three ponds is to act as settling chambers and to convey decant water into the Middle Pond for final filtration performed by vegetation (i.e. cattails) before discharge into the Lower Pond and then into the monitored NDPES discharge point located at the south corner of the Lower Pond.

8.2 Maintenance of the Dam and Project Facilities

Gulf Power and Southern Company provided CDM Smith with a copy of their guidelines and procedures for routine maintenance and inspection of the CCW impoundments described in this report. Also, they provided a copy of "Safety Procedures for Dams and Dikes" by Southern Company reviewed and approved by Southern Company's Executive Vice President on April 30, 2012, and a copy of "Plant Scholz Ash Pond Dike Emergency Response Plan".

It was indicated by Plant Scholz personnel during the site visual assessment by CDM Smith on August 22, 2012, that visual dam inspections are performed at all CCW impoundments every week, and Southern Company performs one general detailed inspection every year. Copies of the annual inspection reports for the last 3 years previous to this assessment were provided to CDM Smith for reference.

8.3 Assessment of Maintenance and Methods of Operations

8.3.1 Adequacy of Operating Procedures

Based on CDM Smith's visual observations and review of documents provided by Gulf Power and Southern Company, operating procedures appear to be generally adequate for Plant Scholz. There is no readily available indication that suggests that the CCW impoundments' primary purpose is not being accomplished.

8.3.2 Adequacy of Maintenance

Generally, no major maintenance issues were identified that compromise the structural stability and operation of the CCW impoundments in the short term. There was no evidence of previous spills and release of impounded coal ash slurry within or outside the plant property. Repairs on the Upper East Pond north embankment to mitigate seepage discovered during a regular inspection were performed in October, 2010 and appear to have mitigated the condition. Current maintenance and operation procedures appear to be generally adequate.

Section 9

Adequacy of Surveillance and Monitoring Program

9.1 Surveillance Procedures

Gulf Power is required by Florida Department of Environmental Protection (FDEP) under National Pollutant Discharge Elimination System (NPDES) Permit No. FL0002283 to monitor discharge of wastewater into Apalachicola River, and groundwater in the vicinity of the CCW impoundments described in previous sections of this report. Surveillance procedures should be in accordance with the FDEP – NPDES Permit.

Gulf Power indicated that they inspect the embankments for structural stability on a weekly basis and Southern Company does as well once a year. CDM Smith was provided with copy of the last three inspection reports by Southern Company, and one blank copy of "Plant Scholz Weekly Dike Inspection Log".

Gulf Power is required to maintain records and make them available for FDEP inspection for at least three years after report preparation.

9.2 Instrumentation Monitoring

Based on the documents reviewed by CDM Smith, fifteen (15) piezometers/ monitoring wells are installed in the vicinity of the CCW impoundments. Gulf Power submits to FDEP groundwater readings, daily rainfall, and analytical data for groundwater sampling in a semi-annual Groundwater Report. CDM Smith was provided with the Groundwater Reports submitted to FDEP on 2008, 2009, 2011, and 2012.

The CCW impoundment embankments do not have an instrumentation monitoring system to monitor structural stability, seepage, or ground displacement.

9.3 Assessment of Surveillance and Monitoring Program

9.3.1 Adequacy of Inspection Programs

Based on the documents reviewed by CDM Smith and visual observations during the site assessment, the inspection program appears to be adequate. No conditions that needed immediate remedial actions were observed.

The annual reports for the last three years provided by Gulf Power did not identify any detrimental conditions needing remedial actions. However, regular maintenance issues were reported and most of those issues were already addressed.

9.3.2 Adequacy of Instrumentation Monitoring Program

Gulf Power's monitoring program is inadequate. Instrumentation is not present within the CCW impoundment embankments. Areas of possible seepage were observed on the exterior slope of the east embankment of the Upper East Pond. Although no detrimental conditions or indications of potential embankment failure were observed during CDM Smith's visual assessment, regular monitoring is essential to detect and monitor seepage and to reduce the potential for failure. To monitor the nature of the possible seepage conditions, CDM Smith recommends that Gulf Power develop a regular surveillance program to monitor areas of seepage and potential seepage to evaluate the rate, volume, and turbidity of flow emerging from the embankment slopes.

Based on visual observations and the documentation reviewed by CDM Smith, groundwater instrumentation monitoring program appears to be adequate for compliance with FDEP in the vicinity of the CCW impoundments. A series of monitoring wells has been installed for compliance with FDEP in the vicinity of the CCW impoundments. A summary of the water level readings, analytical data and potentiometric maps were included in the Groundwater Report by Gulf Power to FDEP dated July 30, 2012. Based on information provided by Gulf Power, Groundwater Reports are delivered semi-annually to FDEP.

Section 10

Reports and References

The following is a list of reports and drawings that were provided by Gulf Power and Southern Company and were used during the preparation of this report and the development of the conclusions and recommendations presented herein. Gulf Power and Southern Company requested this information were considered as Confidential Business information (CBI).

1. Plant Scholz Hydrologic and Hydraulic Study of the Ash Pond to perform a stormwater routing analysis, prepared by Gulf Power to EPA, August 2011
2. Ash Pond Certification Letter for Plant Scholz, prepared by Gulf Power to Florida Department of Environmental Protection, December 17, 2007
3. Ash Pond Certification Letter for Plant Scholz, prepared by Gulf Power to Florida Department of Environmental Protection, December 23, 2009
4. Ash Pond Certification Letter for Plant Scholz, prepared by Gulf Power to Florida Department of Environmental Protection, January 28, 2011
5. Ash Pond Certification Letter for Plant Scholz, prepared by Gulf Power to Florida Department of Environmental Protection, January 25, 2012
6. Drawing of Plant Scholz North and East Dike Boring Locations, prepared by Southern Company Generation Engineering and Construction Services for Gulf Power Company, Figure 1, 2010
7. Intra-company Correspondence to Chris Miller of Southern Company from Ben Gallagher, Plant Scholz Ash Pond Cell 1 Seepage Modeling, November 18, 2010
8. Intra-company Correspondence to Chris Miller of Southern Company from Ben Gallagher, Field Observations –Plant Scholz Ash Pond Cell 1 Seepage Event, October 11, 2010
9. Aerial of Plant Scholz
10. Solid Waste Inspection Report, prepared by Florida Department of Environmental Protection for Gulf Power-Scholz Electric Generating Plant, February 5, 2009
11. Engineering and Construction Services Calculation – No. TV-SZ-4161AK-001 prepared by Southern Company, Plant Scholz Ash Pond Dikes, February 9, 2011
12. Drilling Log Geological Services, prepared by Southern Company for Plant Scholz Ash Pond, October 29, 2009
13. Groundwater Monitoring Reports for Sampling at Plant Scholz – Permit FL 0002283, prepared by Gulf Power to Florida Department of Environmental Protection, August 22, 2008

14. Groundwater Monitoring Reports for Sampling, Daily Rainfall Log, Potentiometric Maps and Sample Logs at Plant Scholz – Permit FL 0002283, prepared by Gulf Power to Florida Department of Environmental Protection, July 30, 2012

15. Groundwater Monitoring Reports for Sampling, Daily Rainfall Log, Potentiometric Maps and Sample Logs at Plant Scholz – Permit FL 0002283, prepared by Gulf Power to Florida Department of Environmental Protection, August 4, 2011

16. Groundwater Monitoring Reports for Sampling at Plant Scholz – Permit FL 0002283, prepared by Gulf Power to Florida Department of Environmental Protection, January 20, 2011

17. Groundwater Monitoring Reports for Sampling at Plant Scholz – Permit FL 0002283, prepared by Gulf Power to Florida Department of Environmental Protection, July 28, 2009

18. Groundwater Monitoring Reports for Sampling at Plant Scholz – Permit FL 0002283, prepared by Gulf Power to Florida Department of Environmental Protection, prior report submittals several errors were noticed, and this update serves to correct the errors, December 8, 2009

19. Notice of Permit FL0002283-004-IWIS, prepared by Florida Department of Environmental Protection to Gulf Power Company to operate the Scholz Electric Generating Plant, September 24, 2010

20. Bearing Reference – North Based on state Plane Coordinate System (Grid North) Topographic Survey of a portion of ash ponds, Scholz Plant, Sneads, FL, Section 12, T-3N, R-07 W, prepared by Pittman, Glaze and Associates, Inc., March 18, 2010

21. Dam Safety Inspection Ash Pond Dike Report for Plant Scholz, performed by R.D. Wood and H. H Armitage of the SCG Hydro Services Group on February 11, 2010, report includes a checklist and photographs of observations of site conditions, report dated March 22, 2010

22. Dam Safety Inspection Ash Pond Dike Report for Plant Scholz, performed by R.D. Wood of the SCG Hydro Services Group on April 13, 2011, report includes a checklist and photographs of observations of site conditions, report dated April 27, 2011

23. Dam Safety Inspection Ash Pond Dike Report for Plant Scholz, performed by R.D. Wood of the SCG Hydro Services Group on March 15, 2012, report includes a checklist and photographs of observations of site conditions, report dated April 24, 2012

24. Plant Scholz Ash Pond Dike Emergency Response Plan prepared by Southern Company Generation Safety Procedure for Dams and Dikes (GEN-1003)

25. Bearing Reference – Magnetic North Topographic Survey of a portion of ash ponds, Scholz Plant, Sneads, FL, Section 12, T-3N, R-07 W, prepared by Pittman, Glaze and Associates, Inc., December 30, 2009

26. Bearing Reference – North Based on State Plane Coordinate System (Grid North) Topographic Survey of a portion of ash ponds, Scholz Plant, Sneads, FL, Section 12, T-3M, R-07 W, prepared by Pittman, Glaze and Associates, Inc., March 18, 2010

27. Plant Scholz Weekly Dike Inspection Log – Blank Form

28. Engineering and Construction Services Calculation – No. TV-SZ-FPC33667-001 prepared by Southern Company, Plant Scholz Ash Pond Dikes, September 7, 2012

29. Engineering and Construction Services Calculation – No. TV-SZ-FPC33667-002 prepared by Southern Company, Plant Scholz Ash Pond Dikes, October 197, 2013

30. Pittman Glaze & Associates, Inc. Topographic Survey, December 20, 2012

31. Sequential Plan for Tree Removal and Embankment Improvements Ash Pond South Dike Embankment, 2012

32. Ash Pond Maintenance Plan, Plant Scholz, August 2012

33. Exhibit 37, Photographic Documentation

Appendix A

Documentation from Gulf Power

Document 1

Boring Logs


Gulf Power- Scholz Plant
Gulf Power Rd
B-1
B-2
B-3
B-5
Image U.S. Geological Survey
© 2012 Google
Google earth
Google Earth Pro
feet
2000
meters
700

CDM Smith

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DRILLING LOG
GEOLOGICAL SERVICES

Hole No. B-1
Sheet 1 of 2

SITE **Plant Scholz Ash Pond** HOLE DEPTH 50' SURF.ELEV. NA
LOCATION Sneads, Florida GPS coordinates N 30 40.008 W 084 53.296
DRILLING METHOD H.S.A. NO. SAMPLES NA NO. U.D. SAMPLES NA
CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA
WATER TABLE DEPTH NA ELEV. NA TIME AFTER COMP. NA DATE TAKEN NA
TYPE GROUT NA QUANTITY NA MIX NA DRILLING START DATE 10/29/2009
DRILLER Universal RECORDER M. Boatright APPROVED B. Coates DRILLING COMP. DATE 10/29/2009

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From To	Blows	N			
0									
1									
2									
3									
4									
5		tan to olive brown clayey silty fine to medium SAND (SM-SC)		3.5-5.0	25-12-16	28			
6									
7									
8									
9									
10		white gravelly CLAY (CL)		8.5-10	2-4-6	10	med plastic		
11									
12									
13									
14									
15		white to tan gravelly CLAY w/ coarse sand (CL)		13.5-15	4-4-8	12			
16									
17									
18									
19									
20		white to tan gravelly CLAY w/ coarse sand (CL)		18.5-20	4-5-6	11			
21									
22									
23									
24									
25		white lean CLAY few gravel		23.5-25	2-4-3	7			

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DRILLING LOG
GEOLOGICAL SERVICES

Hole No. B-2
Sheet 1 of 2

SITE Plant Scholz Ash Pond
HOLE DEPTH 50'
SURF.ELEV. NA
LOCATION Sneads, Florida
GPS coordinates N 30 39.992
W 084 53.316
DRILLING METHOD H.S.A.
NO. SAMPLES NA
NO. U.D. SAMPLES NA
CASING SIZE NA
LENGTH NA
CORE SIZE NA
TOTAL % REC. NA
WATER TABLE DEPTH NA
ELEV. NA
TIME AFTER COMP. NA
DATE TAKEN NA
TYPE GROUT NA
QUANTITY NA
MIX NA
DRILLING START DATE 10/29/2009
DRILLER Universal
RECORDER M. Boatright
APPROVED B. Coates
DRILLING COMP. DATE 10/29/2009

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From To	Blows	N			
0									
1									
2									
3									
4									
5		orange clayey fine to medium SAND (SP-SC)		3.5-5.0	5-8-10	18			
6									
7									
8									
9									
10		light brown clayey fine SAND (SP-SC)		8.5-10	1-1-2	3	wet		
11									
12									
13									
14									
15		light brown clayey fine SAND (SP-SC)		13.5-15	2-1-3	4			
16									
17									
18									
19									
20		tan sandy CLAY-clay SAND mix (SC)		18.5-20	0-0-1	1			
21									
22									
23									
24									
25		olive grey fine sandy CLAY w/ gravel (CH)		23.5-25	3-4-4	8	limestone frags		

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DRILLING LOG
GEOLOGICAL SERVICES

Hole No. B-3
Sheet 1 of 2

SITE Plant Scholz Ash Pond HOLE DEPTH 50' SURF.ELEV. NA
LOCATION Sneads, Florida GPS coordinates N 30 39.964 W 084 53.350
DRILLING METHOD H.S.A. NO. SAMPLES NA NO. U.D. SAMPLES NA
CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA
WATER TABLE DEPTH NA ELEV. NA TIME AFTER COMP. NA DATE TAKEN NA
TYPE GROUT NA QUANTITY NA MIX NA DRILLING START DATE 10/29/2009
DRILLER Universal RECORDER M. Boatright APPROVED B. Coates DRILLING COMP. DATE 10/29/2009

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From To	Blows	N			
0									
1									
2									
3									
4									
5		orange clayey SAND (SC)		3.5-5.0	5-7-14	21			
6									
7									
8									
9									
10		light to dark brown silty clayey SAND (SM-SC)		8.5-10	6-4-3	7			
11									
12									
13									
14									
15		olive grey fine sandy CLAY (CH)		13.5-15	1-1-1	2			
16									
17									
18									
19									
20		olive grey fine sandy CLAY (CH)		18.5-20	WOH	0			
21									
22									
23									
24									
25		olive grey clayey SAND- SAND CLAY mix (SC)		23.5-25	WOH	0			

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DRILLING LOG
GEOLOGICAL SERVICES

Hole No. B-4

Sheet 2 of 2

SITE Plant Scholz Ash Pond   TOTAL DEPTH 47'   SURF.ELEV. NA

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From To	Blows	N			
26									
27									
28									
29									
30		No Recovery		28.5-30	1-1-1	2			
31									
32									
33									
34									
35		light grey clayey SILT (ML) w/ rock fragments		33.5-35	7-18-21	39			
36									
37									
38									
39									
40		white to bluish CLAY to silty CLAY (CL)		38.5-40	13-14-50/3	ref			
41									
42									
43									
44									
45		rock fragments		43.5-45	50/1	ref			
46									
47									
48		Refusal @ 47'							
49									
50									
51									
52									
53									
54									
55									
56									
57									

Form GS9901 7-26-2004

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DRILLING LOG
GEOLOGICAL SERVICES

Hole No. B-5
Sheet 1 of 2

SITE Plant Scholz Ash Pond HOLE DEPTH 50' SURF.ELEV. NA
LOCATION Sneads, Florida GPS coordinates N 30 39.943 W 084 53.420
DRILLING METHOD Mud rotary NO. SAMPLES NA NO. U.D. SAMPLES NA
CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA
WATER TABLE DEPTH NA ELEV. NA TIME AFTER COMP. NA DATE TAKEN NA
TYPE GROUT NA QUANTITY NA MIX NA DRILLING START DATE 10/30/2009
DRILLER Universal RECORDER M. Boatright APPROVED B. Coates DRILLING COMP. DATE 10/30/2009

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From To	Blows	N			
0									
1									
2									
3									
4									
5		grey brown silty fine SAND (SP) trace clay		3.5-5.0	8-11-11	22			
6									
7									
8									
9									
10		olive grey clayey silty fine SAND (SP)		8.5-10	1-1-1	2			
11									
12									
13									
14									
15		grey to dark brown clayey fine to med SAND (SP-SC)		13.5-15	3-1-2	3			
16									
17									
18									
19									
20		orange brown clayey fine to med SAND (SP-SC)		18.5-20	9-9-10	19			
21									
22									
23									
24									
25		white to yellowish brown silty CLAY (CH)		23.5-25	0-0-1	1			

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GRAPHIC SCALE

(IN FEET)
1 inch = 250 ft.

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PLANT SCHOLZ
North and East Dike
Boring Locations

Southern Company Generation
Engineering and Construction Services
FOR

Gulf Power Company

SCALE	PROJ I.D.	DRAWING NUMBER	SHEET	CONT'D	REV
AS SHOWN		**FIGURE 1**	1	FINAL	0

BORING EDB-1
PAGE 1 OF 2

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LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Dike Evaluation
LOCATION Plant Scholz - Sneads, FL

DATE STARTED 3/3/2010 **COMPLETED** 3/3/2010 **SURF. ELEV.** 134.7 **COORDINATES:** N 606,932.81 E 1,846,006.49
CONTRACTOR SCS Field Services **EQUIPMENT** **METHOD** Hollow Stem Auger
DRILLED BY S. Denty **LOGGED BY** G. Wilson **CHECKED BY** **ANGLE** **BEARING**
BORING DEPTH 61 ft. **GROUND WATER DEPTH: DURING** **COMP.** **DELAYED**
NOTES

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		Coal Combustion Byproduct (ASH) - black, damp, no plasticity						
				SS -1	2.5-4.0	2-3-2 (5)	100	
5								
				SS -2	4.5-6.0	2-2-2 (4)	100	
				SS -3	7.5-9.0	3-4-3 (7)	100	
10								
				SS -4	9.5-11.0	1-3-5 (8)	100	
15								
				SS -5	14.5-16.0	6-7-9 (16)	100	
20								
				SS -6	19.5-21.0	6-7-6 (13)	100	
25								
				SS -7	24.5-26.0	2-3-3 (6)	100	
30								
				SS -8	29.5-31.0	3-2-3 (5)	100	
35								
				SS -9	34.5-36.0	3-2-2 (4)	100	

(Continued Next Page)

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LOG OF TEST BORING

BORING EDB-1

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Dike Evaluation
LOCATION Plant Scholz - Sneads, FL

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
40		**Silty Sand (SM)** - brown, moist, loose, low plasticity	95.2	SS -10	39.5- 41.0	2-1-2 (3)	100	
45		**Coal Combustion Byproduct (ASH)** - black, wet, very loose, no plasticity, with fine sand	90.2	SS -11	44.5- 46.0	WH-WH-1 (1)	100	(MC = 23.5%; PL=NP; FC = 92.3%)
50		**Poorly-graded Sand (SP)** - brown, wet, loose to medium dense, fine grain	85.2	SS -12	49.5- 51.0	2-1-4 (5)	100	(MC = 16.4%; PL=NP; FC = 28.2%)
55				SS -13	54.5- 56.0	3-4-7 (11)	100	
60			73.7	SS -14	59.5- 61.0	24-26-35 (61)	100	(MC = 33%; LL=53; PI=32; FC = 48.8%)
		Bottom of borehole at 61.0 feet.						
65								
70								
75								
80								

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SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Dike Evaluation
LOCATION Plant Scholz - Sneads, FL

DATE STARTED 3/3/2010 **COMPLETED** 3/3/2010 **SURF. ELEV.** 134.1 **COORDINATES:** N 607,047.50 E 1,845,988.23
CONTRACTOR SCS Field Services **EQUIPMENT** **METHOD** Hollow Stem Auger
DRILLED BY S. Denty **LOGGED BY** G. Wilson **CHECKED BY** **ANGLE** **BEARING**
BORING DEPTH 56 ft. **GROUND WATER DEPTH: DURING** **COMP.** **DELAYED**
NOTES

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		Coal Combustion Byproduct (ASH) - black, damp, no plasticity						
				SS -1	2.5-4.0	4-7-8 (15)	100	
5				SS -2	4.5-6.0	4-5-5 (10)	100	
				SS -3	7.5-9.0	3-4-4 (8)	100	
10				SS -4	9.5-11.0	2-2-5 (7)	100	
15		**Poorly-graded Sand (SP)** - dark br, very moist, loose, no plasticity	119.6	SS -5	14.5-16.0	2-2-2 (4)	100	
20		**Coal Combustion Byproduct (ASH)** - blackish gray, wet, loose, no plasticity	114.6	SS -6	19.5-21.0	1-1-1 (2)	100	
25				SS -7	24.5-26.0	WH-WH-WH (0)	100	(MC = 36.6%; PL=NP; FC = 74.7%)
30				SS -8	29.5-31.0	1-1-2 (3)	100	
35				SS -9	34.5-36.0	2-2-3 (5)	100	

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LOG OF TEST BORING

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

PROJECT Ash Pond Dike Evaluation
LOCATION Plant Scholz - Sneads, FL

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
40		**Coal Combustion Byproduct (ASH)***(con't)*		SS -10	39.5-41.0	WH-WH-2 (2)	100	
45		**Silty Sand (SM)** - tan, wet, loose, no plasticity, fine to medium grain	89.6	SS -11	44.5-46.0	WH-WH-2 (2)	100	(MC = 15.8%; FC = 12.2%)
50		**Poorly-graded Sand (SP)** - tan, wet, dense, fine to medium grain	84.6	SS -12	49.5-51.0	5-5-15 (20)	100	
55			78.1	SS -13	54.5-56.0	13-50 (50)	56	
		Bottom of borehole at 56.0 feet.						
60								
65								
70								
75								
80								

BORING EDB-3

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SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Dike Evaluation
LOCATION Plant Scholz - Sneads, FL

DATE STARTED 3/2/2010 **COMPLETED** 3/2/2010 **SURF. ELEV.** 134.3 **COORDINATES:** N 607,167.33 E 1,845,960.46
CONTRACTOR SCS Field Services **EQUIPMENT** **METHOD** Hollow Stem Auger
DRILLED BY S. Denty **LOGGED BY** G. Wilson **CHECKED BY** **ANGLE** **BEARING**
BORING DEPTH 55 ft. **GROUND WATER DEPTH: DURING** **COMP.** **DELAYED** 22 ft. after 24 hrs.
NOTES

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
	▨	**Coal Combustion Byproduct (ASH)** - black, damp, no plasticity						
	▨			SS -1	2.5-4.0	3-3-3 (6)	100	
5	▨			SS -2	4.5-6.0	2-3-3 (6)	100	
	▨			SS -3	7.5-9.0	2-2-2 (4)	100	
10	▨			SS -4	9.5-11.0	3-2-3 (5)	100	
15	▨			SS -5	14.5-16.0	4-5-7 (12)	100	
20	▨			SS -6	19.5-21.0	4-6-8 (14)	100	
	▨ ▽							
25	▨			SS -7	24.5-26.0	1-1-3 (4)	100	
30	▨			SS -8	29.5-31.0	1-1-2 (3)	100	
35	▨			SS -9	34.5-36.0	2-3-2 (5)	100	

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SOUTHERN COMPANY

LOG OF TEST BORING

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SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Dike Evaluation
LOCATION Plant Scholz - Sneads, FL

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
40		**Well-graded Sand with Silt (SW-SM)** - black, tan and brown, moist, v. loose to dense, no plasticity, fine to medium grain	94.8	SS -10	39.5-41.0	WH-WH-2 (2)	100	(MC = 39.2%; FC = 11.3%)
45				SS -11	44.5-46.0	10-23-24 (47)	100	
50		**Poorly-graded Sand with Silt (SP-SM)** - black, tan and brown, moist, very loose, no plasticity, with gravel	84.8	SS -12	49.5-51.0	WH-10-2 (12)	100	(MC = 13.8%; FC = 9.9%)
55		**Poorly-graded Sand (SP)** - gray, moist, very dense	79.8 79.3	SS -13	54.5-56.0	5-10-50 (60)	89	
60								
65								
70								
75								
80								

Bottom of borehole at 55.0 feet.

LOG OF TEST BORING

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

PROJECT Ash Pond Dike Evaluation
LOCATION Plant Scholz - Sneads, FL

DATE STARTED 3/2/2010 **COMPLETED** 3/2/2010 **SURF. ELEV.** 135.1 **COORDINATES:** N 607,287.08 E 1,845,929.45
CONTRACTOR SCS Field Services **EQUIPMENT** **METHOD** Hollow Stem Auger
DRILLED BY S. Denty **LOGGED BY** G. Wilson **CHECKED BY** **ANGLE** **BEARING**
BORING DEPTH 51 ft. **GROUND WATER DEPTH: DURING** **COMP.** **DELAYED**
NOTES

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		Coal Combustion Byproduct (ASH) - black, damp, no plasticity						
				SS -1	2.5-4.0	3-5-6 (11)	100	
5				SS -2	4.5-6.0	3-3-2 (5)	100	
				SS -3	7.5-9.0	2-2-2 (4)	100	
10				SS -4	9.5-11.0	3-6-7 (13)	100	
15				SS -5	14.5-16.0	2-2-2 (4)	100	
20				SS -6	19.5-21.0	3-4-4 (8)	100	
25				SS -7	24.5-26.0	3-4-4 (8)	100	
30				SS -8	29.5-31.0	1-1-2 (3)	100	
35				SS -9	34.5-36.0	WH-1-2 (3)	100	

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SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Dike Evaluation
LOCATION Plant Scholz - Sneads, FL

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
40		**Silty Sand (SM)** - black, wet, loose to medium dense, no plasticity	95.6	SS -10	39.5- 41.0	WH-WH-4 (4)	100	(MC = 37.2%; PL=NP; FC = 29.2%)
45				SS -11	44.5- 46.0	4-6-8 (14)	100	
50		**Poorly-graded Sand (SP)** - tan/br, very damp, dense	85.6 84.1	SS -12	49.5- 51.0	3-16-24 (40)	100	
55								
60								
65								
70								
75								
80								

Bottom of borehole at 51.0 feet.

SOUTHERN COMPANY

LOG OF TEST BORING

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SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Dike Evaluation
LOCATION Plant Scholz - Sneads, FL

DATE STARTED 3/2/2010 **COMPLETED** 3/2/2010 **SURF. ELEV.** 135.2 **COORDINATES:** N 607,400.29 E 1,845,898.98
CONTRACTOR SCS Field Services **EQUIPMENT** ______ **METHOD** Hollow Stem Auger
DRILLED BY S. Denty **LOGGED BY** G. Wilson **CHECKED BY** ______ **ANGLE** ______ **BEARING** ______
BORING DEPTH 46 ft. **GROUND WATER DEPTH: DURING** ______ **COMP.** ______ **DELAYED** ______
NOTES ______

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		Coal Combustion Byproduct (ASH) - black, damp to wet, no plasticity						
				SS-1	2.5-4.0	3-5-4 (9)	100	
5								
				SS-2	4.5-6.0	2-1-2 (3)	100	
				SS-3	7.5-9.0	1-2-2 (4)	100	
10								
				SS-4	9.5-11.0	2-2-3 (5)	100	
15								
				SS-5	14.5-16.0	2-1-1 (2)	100	
20								
				SS-6	19.5-21.0	2-3-3 (6)	100	
25								
				SS-7	24.5-26.0	2-3-5 (8)	100	
30								
				SS-8	29.5-31.0	1-1-1 (2)	100	(MC = 48.8%; FC = 85.6%)
35								
				SS-9	34.5-36.0	1-2-3 (5)	100	

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LOG OF TEST BORING

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

PROJECT Ash Pond Dike Evaluation
LOCATION Plant Scholz - Sneads, FL

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
40		**Poorly-graded Sand with Silt (SP-SM)** - brown, very damp, medium dense, low plasticity	95.7	SS -10	39.5- 41.0	6-9-12 (21)	100	(MC = 14.8%; LL=28; PI=5; FC = 8.9%)
45		**Coal Combustion Byproduct (ASH)** - tannish black, moist, medium dense, no plasticity	90.7 89.2	SS -11	44.5- 46.0	1-3-13 (16)	100	(MC = 22.2%; FC = 90.9%)

Bottom of borehole at 46.0 feet.

SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Dike Evaluation
LOCATION Plant Scholz - Sneads, FL

DATE STARTED 3/1/2010 **COMPLETED** 3/1/2010 **SURF. ELEV.** 134.1 **COORDINATES:** N 607,518.54 E 1,845,865.70
CONTRACTOR SCS Field Services **EQUIPMENT** **METHOD** Hollow Stem Auger
DRILLED BY S. Denty **LOGGED BY** G. Wilson **CHECKED BY** **ANGLE** **BEARING**
BORING DEPTH 46 ft. **GROUND WATER DEPTH: DURING** **COMP.** **DELAYED**
NOTES

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		Coal Combustion Byproduct (ASH) - black, damp, no plasticity						
				SS-1	2.5-4.0	1-1-2 (3)	100	
5								
				SS-2	4.5-6.0	1-2-2 (4)	100	
				SS-3	7.5-9.0	WH-WH-WH (0)	100	(MC = 66.5%; FC = 90%)
10		- wet below 9.5 ft.						
				SS-4	9.5-11.0	1-2-1 (3)	100	
15								
				SS-5	14.5-16.0	1-1-1 (2)	100	(MC = 38.4%; FC = 79.4%)
20								
				SS-6	19.5-21.0	2-4-3 (7)	100	
25								
				SS-7	24.5-26.0	WH-WH-WH (0)	100	(MC = 63.8%; FC = 87.1%)
30								
				SS-8	29.5-31.0	WH-WH-1 (1)	100	
35								
				SS-9	34.5-36.0	WH-WH-2 (2)	100	

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SOUTHERN COMPANY

LOG OF TEST BORING

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SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Dike Evaluation
LOCATION Plant Scholz - Sneads, FL

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
40		**Poorly-graded Sand (SP)** - brown, very damp, med dense to very dense	94.6	SS -10	39.5-41.0	3-6-8 (14)	100	
45			88.1	SS -11	44.5-46.0	35-38-50 (88)	87	
		Bottom of borehole at 46.0 feet.						
50								
55								
60								
65								
70								
75								
80								

SOUTHERN COMPANY

LOG OF TEST BORING

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SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Dike Evaluation
LOCATION Plant Scholz - Sneads, FL

DATE STARTED 3/3/2010 **COMPLETED** 3/3/2010 **SURF. ELEV.** 132.9 **COORDINATES:** N 607,668.59 E 1,845,828.53
CONTRACTOR SCS Field Services **EQUIPMENT** **METHOD** Hollow Stem Auger
DRILLED BY S. Denty **LOGGED BY** G. Wilson **CHECKED BY** **ANGLE** **BEARING**
BORING DEPTH 41 ft. **GROUND WATER DEPTH: DURING** **COMP.** **DELAYED** 23.5 ft. after 24 hrs.
NOTES

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		Coal Combustion Byproduct (ASH) - black, damp, loose, no plasticity						
				SS -1	2.5-4.0	2-2-2 (4)	100	
5				SS -2	4.5-6.0	1-1-2 (3)	100	
				SS -3	7.5-9.0	1-1-1 (2)	100	
10				SS -4	9.5-11.0	2-2-2 (4)	100	
15				SS -5	14.5-16.0	2-2-2 (4)	100	
20				SS -6	19.5-21.0	1-1-3 (4)	100	
		▽						
25				SS -7	24.5-26.0	WH-1-1 (2)	100	
30				SS -8	29.5-31.0	WH-1-1 (2)	100	(MC = 53.2%; FC = 83.5%)
35		**Poorly-graded Sand (SP)** - red/white, very damp, medium dense	98.4	SS -9	34.5-36.0	4-7-8 (15)	100	

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SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Dike Evaluation
LOCATION Plant Scholz - Sneads, FL

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
40	⁘	**Poorly-graded Sand (SP)***(con't)*	91.9	⧗ SS -10	39.5-41.0	4-5-10 (15)	100	
		Bottom of borehole at 41.0 feet.						
45								
50								
55								
60								
65								
70								
75								
80								

SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Dike Evaluation
LOCATION Plant Scholz - Sneads, FL

DATE STARTED 2/17/2010 **COMPLETED** 2/17/2010 **SURF. ELEV.** 133.5 **COORDINATES:** N 607,816.08 E 1,845,792.45
CONTRACTOR SCS Field Services **EQUIPMENT** **METHOD** Hollow Stem Auger
DRILLED BY S. Denty **LOGGED BY** G. Wilson **CHECKED BY** **ANGLE** **BEARING**
BORING DEPTH 36 ft. **GROUND WATER DEPTH: DURING** **COMP.** **DELAYED**
NOTES

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		Coal Combustion Byproduct (ASH) - black, damp, loose, no plasticity						
				SS -1	2.5-4.0	4-4-5 (9)	100	
5				SS -2	4.5-6.0	1-1-4 (5)	100	
		Poorly-graded Sand (SP) - brown, damp, medium dense, no plasticity, fine to coarse grain, trace gravel	126.0	SS -3	7.5-9.0	5-7-9 (16)	100	
10		**Coal Combustion Byproduct (ASH)** - black, damp, loose, no plasticity	124.0	SS -4	9.5-11.0	2-2-3 (5)	100	
15				SS -5	14.5-16.0	8-5-6 (11)	100	
20		**Silty Sand (SM)** - tan and brown, wet, medium dense, no plasticity	114.0	SS -6	19.5-21.0	7-6-8 (14)	100	(MC = 11.6%; PL=NP; FC = 32.8%)
25		**Clayey Sand (SC)** - brown, wet, loose, low plasticity	109.0	SS -7	24.5-26.0	3-2-2 (4)	100	(MC = 18.4%; LL=24; PI=13; FC = 31.9%)
30		**Silty Sand (SM)** - tannish red, moist, medium dense, no plasticity	104.0	SS -8	29.5-31.0	6-6-8 (14)	100	(MC = 18.4%; PL=NP; FC = 43.4%)
35		**Poorly-graded Sand (SP)** - tan and brown, very damp, loose	99.0 97.5	SS -9	34.5-36.0	6-5-4 (9)	100	
		Bottom of borehole at 36.0 feet.						

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LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Dike Evaluation
LOCATION Plant Scholz - Sneads, FL

DATE STARTED 2/17/2010 **COMPLETED** 2/17/2010 **SURF. ELEV.** 135.1 **COORDINATES:** N 607,905.14 E 1,845,697.72
CONTRACTOR SCS Field Services **EQUIPMENT** **METHOD** Hollow Stem Auger
DRILLED BY S. Denty **LOGGED BY** G. Wilson **CHECKED BY** **ANGLE** **BEARING**
BORING DEPTH 36 ft. **GROUND WATER DEPTH: DURING** **COMP.** **DELAYED**
NOTES

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
	▨	**Clayey Sand (SC)** - red, moist, loose, low plasticity						
	▨		130.6	SS -1	2.5-4.0	4-2-2 (4)	100	
5	■	**Coal Combustion Byproduct (ASH)** - black, wet, very loose	127.6	SS -2	4.5-6.0	WH-1-1 (2)	100	(MC = 51.1%; PL=NP; FC = 62.5%)
	░	**Poorly-graded Sand (SP)** - white and tan, wet, medium dense	125.6	SS -3	7.5-9.0	3-5-6 (11)	100	
10	■	**Coal Combustion Byproduct (ASH)** - black, wet, loose	120.6	SS -4	9.5-11.0	4-4-4 (8)	100	
15	░	**Poorly-graded Sand (SP)** - tan and red, wet, medium dense		SS -5	14.5-16.0	7-9-9 (18)	100	
20	░		110.6	SS -6	19.5-21.0	10-13-14 (27)	100	
25	▨	**Clayey Sand (SC)** - tan and red, wet, very loose, medium plasticity	106.1	SS -7	24.5-26.0	1-2-2 (4)	100	
30	▧	**Sandy Fat Clay (CH)** - reddish gray, moist, stiff, low plasticity	100.6	SS -8	29.5-31.0	6-5-7 (12)	100	(MC = 19.4%; LL=51; PI=29; FC = 67.4%)
35	▨	**Clayey Sand (SC)** - red and brown, moist, medium dense, no plasticity	99.1	SS -9	34.5-36.0	6-9-8 (17)	100	

Bottom of borehole at 36.0 feet.

SOUTHERN COMPANY

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

LOG OF TEST BORING

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PROJECT Ash Pond Dike Evaluation
LOCATION Plant Scholz - Sneads, FL

DATE STARTED 2/17/2010 **COMPLETED** 2/17/2010 **SURF. ELEV.** 134.5 **COORDINATES:** N 607,867.70 E 1,845,565.08
CONTRACTOR SCS Field Services **EQUIPMENT** **METHOD** Hollow Stem Auger
DRILLED BY S. Denty **LOGGED BY** G. Wilson **CHECKED BY** **ANGLE** **BEARING**
BORING DEPTH 36 ft. **GROUND WATER DEPTH: DURING** **COMP.** **DELAYED** 10.9 ft. after 24 hrs.
NOTES

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
	■	**Coal Combustion Byproduct (ASH)** - red and black, moist						
	■			SS-1	2.5-4.0	1-1-1 (2)	100	
5	■	- black		SS-2	4.5-6.0	1-2-2 (4)	100	
	■	- tan and black	125.0	SS-3	7.5-9.0	2-3-4 (7)	100	
10	▨	**Silty Sand (SM)** ▼ - red, moist, medium dense, fine to medium grain		SS-4	9.5-11.0	3-5-5 (10)	100	
15	▨	- tan and brown		SS-5	14.5-16.0	11-12-13 (25)	100	(MC = 12.2%; FC = 19.3%)
20	▨		110.0	SS-6	19.5-21.0	10-11-14 (25)	100	
25	▨	**Clayey Sand (CL)** - red, brown and gray, wet, medium dense, low plasticity, fine to medium grain		SS-7	24.5-26.0	5-6-6 (12)	100	(MC = 16.1%; LL=46; PI=27; FC = 47.2%)
30	▨		100.0	SS-8	29.5-31.0	4-3-5 (8)	100	
35	▨	**Poorly-graded Sand (SP)** - white and tan, moist, dense	98.5	SS-9	34.5-36.0	15-40-49 (89)	100	

Bottom of borehole at 36.0 feet.

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Dike Evaluation
LOCATION Plant Scholz - Sneads, FL

DATE STARTED 2/16/2010 **COMPLETED** 2/16/2010 **SURF. ELEV.** 133.8 **COORDINATES:** N 607,841.00 E 1,845,475.95
CONTRACTOR SCS Field Services **EQUIPMENT** _____ **METHOD** Hollow Stem Auger
DRILLED BY S. Denty **LOGGED BY** G. Wilson **CHECKED BY** _____ **ANGLE** _____ **BEARING** _____
BORING DEPTH 36 ft. **GROUND WATER DEPTH: DURING** _____ **COMP.** _____ **DELAYED** _____
NOTES _____

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		Coal Combustion Byproduct (ASH) - dark gray, damp, loose						
				SS -1	2.5-4.0	2-2-3 (5)	100	
5				SS -2	4.5-6.0	2-3-4 (7)	100	
			126.3					
		Clayey Sand (SC) - red, wet, medium dense, low plasticity, fine to medium grain		SS -3	7.5-9.0	4-7-8 (15)	100	(MC = 30.8%; LL=28; PI=10; FC = 29.5%)
			124.3					
10		**Poorly-graded Sand (SP)** - red/tan/br, moist, medium dense		SS -4	9.5-11.0	5-7-8 (15)	100	
15				SS -5	14.5-16.0	9-13-15 (28)	100	
			114.3					
20		**Silty Sand (SM)** - gray, moist, medium dense, fine to medium grain		SS -6	19.5-21.0	8-9-10 (19)	100	(MC = 11.3%; PL=NP; FC = 16.5%)
			109.3					
25		**Poorly-graded Sand (SP)** - white/tan/br/gray, moist, loose		SS -7	24.5-26.0	5-3-3 (6)	100	
			104.3					
30		**Sandy Silt (ML)** - brown, moist, very dense		SS -8	29.5-31.0	17-30-50 (80)	83	(MC = 13.9%; FC = 54.5%)
35			97.8	SS -9	34.5-36.0	15-33-50 (83)	87	

Bottom of borehole at 36.0 feet.

BORING NDB-4
PAGE 1 OF 1

SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Dike Evaluation
LOCATION Plant Scholz - Sneads, FL

DATE STARTED 2/16/2010 **COMPLETED** 2/16/2010 **SURF. ELEV.** 132.2 **COORDINATES:** N 607,784.60 E 1,845,394.55
CONTRACTOR SCS Field Services **EQUIPMENT** **METHOD** Hollow Stem Auger
DRILLED BY S. Denty **LOGGED BY** G. Wilson **CHECKED BY** **ANGLE** **BEARING**
BORING DEPTH 36 ft. **GROUND WATER DEPTH: DURING** **COMP.** **DELAYED**
NOTES

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
	■	**Coal Combustion Byproduct (ASH)** - black, wet		SS -1	2.5-4.0	3-4-5 (9)	100	
5	■			SS -2	4.5-6.0	2-2-3 (5)	100	
	■			SS -3	7.5-9.0	WH-WH-WH (0)	100	
10	■			SS -4	9.5-11.0	WH-WH-WH (0)	100	(MC = 69.7%; PL=NP; FC = 92.9%)
15	■		112.7	SS -5	14.5-16.0	WH-WH-WH (0)	100	(MC = 61.1%; PL=NP; FC = 95.6%)
20	▨	**Clayey Sand (SC)** - tan and brown, very damp, loose, low plasticity	107.7	SS -6	19.5-21.0	3-3-5 (8)	100	
25	░	**Poorly-graded Sand (SP)** - tan, moist, very dense		SS -7	24.5-26.0	15-47-50 (97)	87	
30	░			SS -8	29.5-31.0	10-27-50 (77)	87	
35	░		96.2	SS -9	34.5-36.0	29-50 (50)	60	

Bottom of borehole at 36.0 feet.

Document 2

Hydrologic and Hydraulic Study

SOUTHERN COMPANY

Engineering and Construction Services Calculation

Calculation Number:
DC-FP-FPC34572-101

Project/Plant: Plant Scholz Ash Ponds	**Unit(s):** 1	**Discipline/Area:** Civil

Title/Subject:
Hydrologic and Hydraulic Study

Purpose/Objective:
Determine the maximum pool elevations in the ash pond cells using the ½ PMP event.

System or Equipment Tag Numbers:	**Originator:** Jim Minor

Contents

Topic	Page	Attachments (Computer Printouts, Tech. Papers, Sketches, Correspondence)	# of Pages
Purpose of Calculation	1		1
Summary of Conclusions	2		1
Methodology	1		1
Assumptions	1-3		3
Criteria	1-3		3
Design Inputs/References	4-32		29
Body of Calculation	4-32		29
Total # of pages including cover sheet & attachments:	33		

Revision Record

Rev. No.	Description	Originator Initial / Date	Reviewer Initial / Date	Approver Initial / Date
0	Issued for review	JWM/10-2013	PMG/10-2013	KAM/10/18/13

Notes:

Design Calculations

SOUTHERN COMPANY

Project PLANT SCHOLZ	Prepared By JWM	Date 10/16/13
Subject/Title ASH POND HYDROLOGIC & HYDRAULIC ANALYSIS	Reviewed By	Date 10/2013
	Calculation Number DC-FP-FPC34572-101	Sheet 1 of 32

TASK

ANALYZE THE ASH POND CAPACITY DURING THE PROBABLE MAXIMUM PRECIPITATION - 24 HR STORM EVENT.

ASSUMPTIONS & CRITERIA

- SCHOLZ IS IN JACKSON COUNTY
- RAINFALL DISTRIBUTION IS TYPE III
- HSG → C, D, & A (SEE SOIL REPORT)
- PMP IS 47" FOR JACKSON COUNTY (½ PMP IS 23.5")
- USE SCS TR-55 METHOD TO DETERMINE PEAK FLOW & MAX. ELEVATIONS IN CELLS.

DRAINAGE BASIN AREAS ARE LISTED ON SHT 11-12 OF 38 IN CALCULATION DC-FP-FPC34572-100.

CURVE NO. INFORMATION CAN BE FOUND ON SHT 11-12 OF 38 IN CALCULATION DC-FP-FPC34572-100.

TIME OF CONCENTRATION

BECAUSE RAIN FALLS DIRECTLY ON PONDS, THE MINIMUM T_c WILL BE USED, 0.1 HR OR 6 min.

Design Calculations

Project PLANT SCHOLZ	Prepared By JWM	Date 10/16/13
Subject/Title ASH POND HYDROLOGIC & HYDRAULIC	Reviewed By DMB	Date 10/2013
ANALYSIS	Calculation Number DC-FP-FPL34572-101	Sheet 2 of 32

STAGE STORAGE DATA FOR EACH CELL

THE STAGE STORAGE DATA IS SHOWN ON SHEETS 13 & 14 OF 38 IN CALCULATION DC-FP-FPL34572-100.

SUMMARY OF CELL MAXIMUM POOL ELEVATIONS FOR EACH CELL

	EAST UPPER POND (CFS)	CENTRAL UPPER POND (CFS)	WEST UPPER POND (CFS)	MIDDLE POND (CFS)	LOWER POND (CFS)
1/2 PMP PEAK FLOW	87.00	76.37	170.77	235.75	172.63
1/2 PMP MAX POOL ELEVATION	127.97	125.61	122.10	112.00	100.98
TOP OF DIKE ELEVATION	131.00	128.00	123.00	112.00	104.00
FREEBOARD	3.03	2.39	1.50	OVERTOPS	3.02
FREEBOARD @ NORMAL POOL	3.00	3.69	0.9	2.00	5.84
NORMAL POOL	128.00	124.31	122.10	110.00	98.16

REFER TO SHEETS 4 THROUGH 10 FOR SOFTWARE OUTPUT.

SOUTHERN COMPANY

Design Calculations

Project PLANT SCHOLZ	Prepared By JWM	Date 10/16/13
Subject/Title ASH POND HYDROLOGIC & HYDRAULIC	Reviewed By PMG	Date 10/2013
ANALYSIS	Calculation Number DC-FP-FPC345TZ-101	Sheet 3 of 32

SINCE MIDDLE POND OVERTOPS, CONSIDER RAISING TOP OF DIKE TO INCREASE STORAGE USING STAGE STORAGE ASSUMPTION BELOW:

EL	AREA	VOL	
106	576	—	
107	2839	1708	
108	9583	7919	
109	40,545	32983	
110	80,203	93,357	(CURRENT W.S.E.)
111	118,360	192,638	
112	154,649	329,143	
113	154,649	483,792	
114	154,649	638,441	

USING ABOVE DATA MAX WATER SURFACE ELEVATION IS <u>113.73</u>

REFER TO SHEETS 11 THRU 17. FOR SOFTWARE OUTPUT.

Prep By JWM Date 10/17/13
Rev By Date 10/2013
Calc No. DC-FP-FGC34SD-001 Sheet 4 of 32

```
                                       Plant Scholz Half PMP
  Autodesk® Storm and Sanitary Analysis 2013 - Version 7.1.2186 (Build 1)
----------------------------------------------------------------------------------
-----

  *******************
  Project Description
  *******************
  File Name ................ Plant Scholz Ash Cell 10-08-13.SPF


  ****************
  Analysis Options
  ****************
  Flow Units ............... cfs
  Subbasin Hydrograph Method. SCS TR-55
  Time of Concentration...... User-Defined
  Link Routing Method ....... Kinematic Wave
  Storage Node Exfiltration.. None
  Starting Date ............. JUN-14-2011 00:00:00
  Ending Date ............... JUN-15-2011 00:00:00
  Report Time Step .......... 00:05:00


  *************
  Element Count
  *************
  Number of rain gages ...... 1
  Number of subbasins ....... 5
  Number of nodes ........... 8
  Number of links ........... 11


  ****************
  Raingage Summary
  ****************
  Gage                    Data                    Data        Recording
  ID                      Source                  Type         Interval
                                                                          min
  ------------------------------------------------------------------------
  Design Storm            1/2 PMP                 CUMULATIVE       6.00


  ****************
  Subbasin Summary
  ****************
  Subbasin                     Total
                                Area
  ID                           acres
  ------------------------------
  Central Upper Cell               4.37
  East Upper                    4.70
  Lower                        11.92
  Middle                       12.90
  West Upper Cell               7.16


  ************
  Node Summary
  ************
  Node                    Element                Invert   Maximum     Ponded    External
  ID                      Type                Elevation     Elev.       Area      Inflow
```

Prep By	JWM	Date	10/17/13
Rev By	PMB	Date	10/2013
Calc No.	DC-FP-FER31572-101	Sheet	5 of 32

```
                                 Plant Scholz Half PMP
                                              ft                        ft
  -------------------------------------------------------------------------------------
  Junction 1           JUNCTION              102.03     109.74      0.00
  Junction 2           JUNCTION               78.31      97.57      0.00
  Outlet               OUTFALL                71.16      74.16      0.00
  Central Cell         STORAGE               112.00     128.00      0.00
  East Cell            STORAGE               116.00     131.00      0.00     Yes
  Lower Cell           STORAGE                92.00     104.00      0.00     Yes
  Middle Cell          STORAGE               106.00     112.00      0.00
  West Cell            STORAGE               102.00     123.00      0.00     Yes


  ************
  Link Summary
  ************
  Link            From Node       To Node         Element         Length     Slope
Manning's
  IO                                              Type              ft          %
Roughness

-------------------------------------------------------------------------------------
--------
  Central Pipe    Central Cell    West Cell       CONOUIT           58.0    4.6207
   0.0120
  East Cell Pipe  East Cell       Central Cell    CONOUIT           44.0    0.5000
   0.0110
  East Pipe 1     West Cell       Middle Cell     CONOUIT           66.0    0.7424
   0.0110
  East Pipe 2     West Cell       Middle Cell     CONOUIT           39.0    7.9487
   0.0110
  East Pipe 3     West Cell       Middle Cell     CONOUIT           66.0    0.5000
   0.0110
  East Pipe 4     West Cell       Middle Cell     CONOUIT           38.0   11.5526
   0.0110
  Middle Pipe     Middle Cell     Lower Cell      CONDUIT           49.0   19.7959
   0.0150
  Middle Riser PipeJunction 1      Lower Cell      CONOUIT           66.0    4.0000
   0.0120
  Outlet Pipe     Junction 2      Outlet          CONOUIT          173.0    4.1329
   0.0120
  Riser           Lower Cell      Junction 2      ORIFICE
  Riser at Middle CellMiddle Cell     Junction 1      ORIFICE


  *********************
  Cross Section Summary
  *********************
  Link              Shape           Depth/         Width        No. of       Cross
 Full Flow        Oesign
  IO                              Oiameter                     Barrels   Sectional
 Hydraulic          Flow
                                                                              Area
   Radius       Capacity
                                     ft             ft                         ft²
       ft            cfs

-------------------------------------------------------------------------------------
----------------------
  Central Pipe      CIRCULAR          1.50           1.50            2        1.77
     0.38         24.46
  East Cell Pipe    CIRCULAR          2.00           2.00            1        3.14
     0.50         18.90
  East Pipe 1       CIRCULAR          0.83           0.83            1        0.55
```

Prep By JWM Date 10/17/13
Rev By FmG Date 10/2013
Calc No. DV-P2-PR-34172-01 Sheet 6 of 32

```
     0.21         2.23
 East Pipe 2      CIRCULAR          1.00          1.00            1         0.79
     0.25        11.87
 East Pipe 3      CIRCULAR          1.50          1.50            1         1.77
     0.38         8.78
 East Pipe 4      CIRCULAR          1.50          1.50            1         1.77
     0.38        42.19
 Middle Pipe      CIRCULAR          1.50          1.50            1         1.77
     0.38        40.50
 Middle Riser Pipe CIRCULAR          2.25          2.25            1         3.98
      0.56        67.10
 Outlet Pipe      CIRCULAR          3.00          3.00            1         7.07
     0.75       146.90


 **************************        Volume         Depth
 Runoff Quantity Continuity       acre-ft        inches
 **************************     ---------       -------
 Total Precipitation ......        81.634        23.864
 Surface Runoff ...........         5.865         1.714
 Continuity Error (%) .....        -0.000


 **************************        Volume        Volume
 Flow Routing Continuity          acre-ft      Mgallons
 **************************     ---------     ---------
 External Inflow ..........         0.000         0.000
 External Outflow .........        65.409        21.315
 Initial Stored Volume ....        68.023        22.166
 Final Stored Volume ......        61.438        20.020
 Continuity Error (%) .....         0.000


 ******************************************
 Composite Curve Number Computations Report
 ******************************************

 ------------------------------
 Subbasin Central Upper Cell
 ------------------------------
                                                         Area          Soil
 Soil/Surface Description                              (acres)        Group
  CN

--------------------------------------------------------------------------------------
----
  -                                                       3.00           -
48.00
  -                                                       1.37           -
98.00
 Composite Area & Weighted CN                             4.37
63.68

 ----------------------
 Subbasin East Upper
 ----------------------
                                                         Area          Soil
 Soil/Surface Description                              (acres)        Group
  CN

--------------------------------------------------------------------------------------
----
  -                                                       2.40           -
```

Prep By JWM	**Date** 10/7/13		
Rev By Pmb	**Date** 10/2013		
Calc No. DL-FP-FP34572-101	**Sheet** 7 **of** 32		

```
48.00
  -                                                         2.30            -
98.00
  Composite Area & Weighted CN                              4.70
72.47

  -----------------
  Subbasin Lower
  -----------------

                                                            Area            Soil
  Soil/Surface Description                                (acres)          Group
   CN

-----------------------------------------------------------------------------------
----
  -                                                        11.92            -
48.00
  Composite Area & Weighted CN                             11.92
48.00

  ------------------
  Subbasin Middle
  ------------------

                                                            Area            Soil
  Soil/Surface Description                                (acres)          Group
   CN

-----------------------------------------------------------------------------------
----
  -                                                         7.22            -
48.00
  -                                                         5.68            -
98.00
  Composite Area & Weighted CN                             12.90
70.02

  ---------------------------
  Subbasin West Upper Cell
  ---------------------------

                                                            Area            Soil
  Soil/Surface Description                                (acres)          Group
   CN

-----------------------------------------------------------------------------------
----
  -                                                         5.48            -
48.00
  -                                                         1.68            -
98.00
  Composite Area & Weighted CN                              7.16
59.73

  ***********************
  Subbasin Runoff Summary
  ***********************

  ---------------------------------------------------------------------------
  Subbasin                    Total      Total      Peak  Weighted      Time of
  ID                         Precip     Runoff    Runoff     Curve  Concentration
                                 in         in       cfs    Number  days  hh:mm:ss
  ---------------------------------------------------------------------------
  Central Upper Cell           23.50      17.82      76.37    63.680       0  00:06:00
  East Upper                 23.50      19.48      87.00    72.470     0  00:06:00
```

```
  Lower                    23.50      14.15     172.63     48.000          0   00:06:00
  Middle                   23.50      19.04     235.75     70.020          0   00:06:00
  West Upper Cell          23.50      16.98     120.77     59.730          0   00:06:00
  -------------------------------------------------------------------------------------


  ******************
  Node Depth Summary
  ******************


---------------------------------------------------------------------------------------
-----
  Node                   Average    Maximum    Maximum   Time of Max      Total      Total
Retention
  ID                       Depth      Depth        HGL    Occurrence    Flooded       Time
  Time
                        Attained   Attained   Attained                   Volume    Flooded

                              ft         ft         ft   days  hh:mm    acre-in    minutes
hh:mm:ss

---------------------------------------------------------------------------------------
-----
  Junction 1                0.82       0.91     102.94      0  12:20          0          0
0:00:00
  Junction 2                0.96       1.14      79.45      0  17:05          0          0
0:00:00
  Outlet                    0.96       1.13      72.29      0  17:05          0          0
0:00:00
  Central Cell             12.66      13.61     125.61      0  13:06          0          0
0:00:00
  East Cell                 9.76      11.97     127.97      0  00:00          0          0
0:00:00
  Lower Cell                7.60       8.98     100.98      0  17:05          0          0
0:00:00
  Middle Cell               5.31       6.00     112.00      0  12:21      84.70        104
0:00:00
  West Cell                18.57      20.10     122.10      0  00:00          0          0
0:00:00


  *****************
  Node Flow Summary
  *****************


---------------------------------------------------------------------------------------
  Node                 Element      Maximum      Peak      Time of    Maximum Time of
Peak
  ID                      Type      Lateral    Inflow   Peak Inflow   Flooding
Flooding
                                     Inflow             Occurrence    Overflow
Occurrence
                                        cfs       cfs   days  hh:mm        cfs   days
hh:mm

---------------------------------------------------------------------------------------
  Junction 1           JUNCTION        0.00     23.27      0  12:20       0.00
  Junction 2           JUNCTION        0.00     44.67      0  17:05       0.00
  Outlet               OUTFALL         0.00     44.67      0  17:05       0.00
  Central Cell         STORAGE        75.50     88.56      0  12:10       0.00
  East Cell            STORAGE        88.09     88.09      0  12:10       0.00
```

Prep By JWM Date 10/17/13
Rev By Date 10/2013
Calc No. DL-FPR-FPR-24572-01 Sheet 9 of 32

```
  Lower Cell            STORAGE     168.90    231.40      0  12:10       0.00
  Middle Cell           STORAGE     233.71    276.03      0  12:10     211.74      0
12:10
  West Cell             STORAGE     121.01    146.91      0  12:10       0.00


  ********************
  Storage Node Summary
  ********************


-------------------------------------------------------------------------------------
-------------------------------------------------
  Storage Node ID        Maximum     Maximum    Time of Max     Average    Average
  Maximum       Maximum  Time of Max.         Total
                          Ponded      Ponded         Ponded      Ponded     Ponded
Storage Node  Exfiltration  Exfiltration  Exfiltrated
                          Volume      Volume         Volume      Volume     Volume
  Outflow           Rate          Rate        Volume
                       1000 ft³        (%)      days hh:mm    1000 ft³        (%)
      cfs            cfm       hh:mm:ss       1000 ft³

-------------------------------------------------------------------------------------
-------------------------------------------------
  Central Cell           540.216          61         0  13:06     450.080         51
    26.47           0.00        0:00:00         0.000
  East Cell             1195.107          72         0  00:00     836.521         51
    18.90           0.00        0:00:00         0.000
  Lower Cell             952.003          41         0  17:04     478.569         21
    44.67           0.00        0:00:00         0.000
  Middle Cell            329.142         100         0  12:03     233.345         71
    62.50           0.00        0:00:00         0.000
  West Cell             1159.063          87         0  00:00     890.339         67
    57.72           0.00        0:00:00         0.000


  ***********************
  Outfall Loading Summary
  ***********************

  -----------------------------------------------
  Outfall Node ID         Flow      Average      Peak
                     Frequency         Flow    Inflow
                           (%)          cfs       cfs
  -----------------------------------------------
  Outlet                100.00        32.97     44.67
  -----------------------------------------------
  System                100.00        32.97     44.67


  *****************
  Link Flow Summary
  *****************


-------------------------------------------------------------------------------------
-------------------------------------------
  Link ID               Element       Time of   Maximum  Length   Peak Flow
Design  Ratio of  Ratio of        Total  Reported
                        Type       Peak Flow  Velocity  Factor      during
Flow    Maximum   Maximum        Time  Condition
                                   Occurrence  Attained               Analysis
Capacity   /Design      Flow  Surcharged
```

```
                                    Plant Scholz Half PMP
                                      days hh:mm    ft/sec               cfs
cfs      Flow     Depth     minutes

---------------------------------------------------------------------------------------
--------------------------------------------
  Central Pipe           CONDUIT      0  15:35     14.11    1.00        26.47
48.92     0.54     0.52             0  Calculated
  East Cell Pipe         CONDUIT      0  04:18      6.89    1.00        19.84
18.90     1.05     1.00             1  SURCHARGED
  East Pipe 1            CONDUIT      0  00:01      4.09    1.00         2.23
2.23     1.00     1.00           1440  SURCHARGED
  East Pipe 2            CONDUIT      0  00:01     14.71    1.00         4.75
11.87     0.40     0.43             0  Calculated
  East Pipe 3            CONDUIT      0  00:01      4.97    1.00         8.78
8.78     1.00     1.00           1440  SURCHARGED
  East Pipe 4            CONDUIT      0  00:55     27.25    1.00        44.28
42.19     1.05     1.00             0  > CAPACITY
  Middle Pipe            CONDUIT      0  12:05     26.11    1.00        39.23
40.50     0.97     0.79             0  Calculated
  Middle Riser Pipe      CONDUIT      0  12:05     15.33    1.00        23.27
67.10     0.35     0.41             0  Calculated
  Outlet Pipe            CONDUIT      0  17:05     18.23    1.00        44.67
146.90     0.30     0.38             0  Calculated
  Riser                  ORIFICE      0  17:05                          44.67

  Riser at Middle Cell ORIFICE        0  12:20                          23.27


  *********************************
  Highest Flow Instability Indexes
  *********************************
  Link Middle Pipe (7)
  Link East Pipe 4 (7)
  Link Central Pipe (3)
  Link East Cell Pipe (2)


  WARNING 107 : Initial water surface elevation defined for Junction Junction 1 is
below junction invert elevation.
              Assumed initial water surface elevation equal to invert elevation.
  WARNING 108 : Surcharge elevation defined for Junction Junction 1 is below
junction maximum elevation. Assumed surcharge elevation equal to maximum elevation.
  WARNING 107 : Initial water surface elevation defined for Junction Junction 2 is
below junction invert elevation.
              Assumed initial water surface elevation equal to invert elevation.
  WARNING 108 : Surcharge elevation defined for Junction Junction 2 is below
junction maximum elevation. Assumed surcharge elevation equal to maximum elevation.

  Analysis began on:  Thu Oct 17 11:00:23 2013
  Analysis ended on:  Thu Oct 17 11:00:24 2013
  Total elapsed time: 00:00:01
```

```
                Plant Scholz Half PMP Option 1

  Autodesk® Storm and Sanitary Analysis 2013 - Version 7.1.2186 (Build 1)

----------------------------------------------------------------------------------
-----

  *******************
  Project Description
  *******************
  File Name ................. Plant Scholz Ash Cell 10-08-13 Option 1.SPF


  ****************
  Analysis Options
  ****************
  Flow Units ................ cfs
  Subbasin Hydrograph Method. SCS TR-55
  Time of Concentration...... User-Defined
  Link Routing Method ....... Kinematic Wave
  Storage Node Exfiltration.. None
  Starting Date ............. JUN-14-2011 00:00:00
  Ending Date ............... JUN-15-2011 00:00:00
  Report Time Step .......... 00:05:00


  *************
  Element Count
  *************
  Number of rain gages ...... 1
  Number of subbasins ....... 5
  Number of nodes ........... 8
  Number of links ........... 11


  ****************
  Raingage Summary
  ****************
  Gage                    Data                    Data        Recording
  ID                      Source                  Type         Interval
                                                                         min
  ------------------------------------------------------------------------
  Design Storm            1/2 PMP                 CUMULATIVE       6.00


  ****************
  Subbasin Summary
  ****************
  Subbasin                     Total
                                Area
  ID                           acres
  ------------------------------
  Central Upper Cell              4.37
  East Upper                   4.70
  Lower                       11.92
  Middle                      12.90
  West Upper Cell              7.16


  ************
  Node Summary
  ************
  Node                    Element                 Invert   Maximum    Ponded    External
  ID                      Type                 Elevation     Elev.      Area      Inflow
```

Prep by	JWM	Date	10/17/13
Rev By		Date	10/21/13
Calc No.	~~[illegible]~~	Sheet	12 of 32

```
                              Plant Scholz Half PMP Option 1
                                              ft        ft        ft²
  -------------------------------------------------------------------------------
  Junction 1          JUNCTION                102.03    109.74      0.00
  Junction 2          JUNCTION                 78.31     97.57      0.00
  Outlet              OUTFALL                  71.16     74.16      0.00
  Central Cell        STORAGE                 112.00    128.00      0.00
  East Cell           STORAGE                 116.00    131.00      0.00     Yes
  Lower Cell          STORAGE                  92.00    104.00      0.00     Yes
  Middle Cell         STORAGE                 106.00    114.00      0.00
  West Cell           STORAGE                 102.00    123.00      0.00     Yes


  ************
  Link Summary
  ************
  Link                From Node       To Node         Element         Length     Slope
Manning's
  ID                                                  Type              ft          %
Roughness

------------------------------------------------------------------------------------
--------
  Central Pipe        Central Cell    West Cell       CONDUIT           58.0    4.6207
   0.0120
  East Cell Pipe      East Cell       Central Cell    CONDUIT           44.0    0.5000
   0.0110
  East Pipe 1         West Cell       Middle Cell     CONDUIT           66.0    0.7424
   0.0110
  East Pipe 2         West Cell       Middle Cell     CONDUIT           39.0    7.9487
   0.0110
  East Pipe 3         West Cell       Middle Cell     CONDUIT           66.0    0.5000
   0.0110
  East Pipe 4         West Cell       Middle Cell     CONDUIT           38.0   11.5526
   0.0110
  Middle Pipe         Middle Cell     Lower Cell      CONDUIT           49.0   19.7959
   0.0150
  Middle Riser PipeJunction 1          Lower Cell      CONDUIT           66.0    4.0000
    0.0120
  Outlet Pipe         Junction 2      Outlet          CONDUIT          173.0    4.1329
   0.0120
  Riser               Lower Cell      Junction 2      ORIFICE
  Riser at Middle CellMiddle Cell        Junction 1       ORIFICE


  *********************
  Cross Section Summary
  *********************
  Link                Shape           Depth/          Width         No. of       Cross
 Full Flow          Design
  ID                                  Diameter                      Barrels   Sectional
 Hydraulic            Flow
                                                                                  Area
    Radius        Capacity
                                         ft             ft                        ft²
       ft             cfs

------------------------------------------------------------------------------------
---------------------
  Central Pipe        CIRCULAR          1.50           1.50            2          1.77
     0.38           24.46
  East Cell Pipe      CIRCULAR          2.00           2.00            1          3.14
     0.50           18.90
  East Pipe 1         CIRCULAR          0.83           0.83            1          0.55
```

```
    0.21         2.23
  East Pipe 2     CIRCULAR           1.00          1.00              1          0.79
    0.25        11.87
  East Pipe 3     CIRCULAR           1.50          1.50              1          1.77
    0.38         8.78
  East Pipe 4     CIRCULAR           1.50          1.50              1          1.77
    0.38        42.19
  Middle Pipe     CIRCULAR           1.50          1.50              1          1.77
    0.38        40.50
  Middle Riser Pipe CIRCULAR          2.25          2.25              1          3.98
     0.56        67.10
  Outlet Pipe     CIRCULAR           3.00          3.00              1          7.07
    0.75       146.90


  **************************        Volume         Depth
  Runoff Quantity Continuity       acre-ft        inches
  **************************     ---------       -------
  Total Precipitation ......        81.634        23.864
  Surface Runoff ...........         5.865         1.714
  Continuity Error (%) .....        -0.000


  **************************        Volume        Volume
  Flow Routing Continuity          acre-ft      Mgallons
  **************************     ---------     ---------
  External Inflow ..........         0.000         0.000
  External Outflow .........        68.091        22.188
  Initial Stored Volume ....        68.023        22.166
  Final Stored Volume ......        65.822        21.449
  Continuity Error (%) .....         0.000


  ******************************************
  Composite Curve Number Computations Report
  ******************************************

  -----------------------------
  Subbasin Central Upper Cell
  -----------------------------

                                                                Area           Soil
  Soil/Surface Description                                     (acres)         Group
   CN

--------------------------------------------------------------------------------
----
   -                                                             3.00             -
48.00
   -                                                             1.37             -
98.00
  Composite Area & Weighted CN                                   4.37
63.68

  ---------------------
  Subbasin East Upper
  ---------------------

                                                                Area           Soil
  Soil/Surface Description                                     (acres)         Group
   CN

--------------------------------------------------------------------------------
----
   -                                                             2.40             -
```

Prep By	JWM	Date	10/17/13
Rev By	PMC	Date	10/2013
Calc No.	DL-FR-FR-3KB-101	Sheet	14 of 32

```
48.00
  -                                                         2.30          -
98.00
  Composite Area & Weighted CN                              4.70
72.47

  -----------------
  Subbasin Lower
  -----------------

                                                            Area          Soil
  Soil/Surface Description                                 (acres)        Group
   CN

-------------------------------------------------------------------------------
----
  -                                                        11.92          -
48.00
  Composite Area & Weighted CN                             11.92
48.00

  ------------------
  Subbasin Middle
  ------------------

                                                            Area          Soil
  Soil/Surface Description                                 (acres)        Group
   CN

-------------------------------------------------------------------------------
----
  -                                                         7.22          -
48.00
  -                                                         5.68          -
98.00
  Composite Area & Weighted CN                             12.90
70.02

  --------------------------
  Subbasin West Upper Cell
  --------------------------

                                                            Area          Soil
  Soil/Surface Description                                 (acres)        Group
   CN

-------------------------------------------------------------------------------
----
  -                                                         5.48          -
48.00
  -                                                         1.68          -
98.00
  Composite Area & Weighted CN                              7.16
59.73

  ***********************
  Subbasin Runoff Summary
  ***********************

  ---------------------------------------------------------------------------
  Subbasin                 Total     Total     Peak   Weighted        Time of
  ID                       Precip    Runoff    Runoff    Curve   Concentration
                             in        in       cfs     Number   days  hh:mm:ss
  ---------------------------------------------------------------------------
  Central Upper Cell         23.50     17.82     76.37    63.680       0  00:06:00
  East Upper               23.50     19.48     87.00    72.470       0  00:06:00
```

Prep By	JWM	Date	10/17/13
Rev By		Date	10/2013
Calc No.	PL-FP-FRS3/5/72-101	Sheet	15 of 32

```
  Lower                    23.50      14.15     172.63     48.000          0   00:06:00
  Middle                   23.50      19.04     235.75     70.020          0   00:06:00
  West Upper Cell          23.50      16.98     120.77     59.730          0   00:06:00
  -------------------------------------------------------------------------------------


  ******************
  Node Depth Summary
  ******************


---------------------------------------------------------------------------------------
-----
  Node                   Average    Maximum    Maximum    Time of Max       Total      Total
Retention
  ID                       Depth      Depth        HGL     Occurrence     Flooded       Time
  Time
                        Attained   Attained   Attained                     Volume    Flooded

                              ft         ft         ft   days  hh:mm    acre-in    minutes
hh:mm:ss

---------------------------------------------------------------------------------------
-----
  Junction 1                0.85       1.07     103.10      0  13:16          0          0
0:00:00
  Junction 2                0.98       1.18      79.49      0  17:47          0          0
0:00:00
  Outlet                    0.98       1.18      72.34      0  17:47          0          0
0:00:00
  Central Cell             12.66      13.61     125.61      0  13:06          0          0
0:00:00
  East Cell                 9.76      11.97     127.97      0  00:00          0          0
0:00:00
  Lower Cell                7.80       9.55     101.55      0  17:47          0          0
0:00:00
  Middle Cell               5.59       7.73     113.73      0  13:16          0          0
0:00:00
  West Cell                18.57      20.10     122.10      0  00:00          0          0
0:00:00


  *****************
  Node Flow Summary
  *****************


---------------------------------------------------------------------------------------
  Node                 Element      Maximum       Peak      Time of    Maximum Time of
Peak
  ID                      Type      Lateral     Inflow   Peak Inflow   Flooding
Flooding
                                     Inflow               Occurrence   Overflow
Occurrence
                                        cfs        cfs   days  hh:mm        cfs   days
hh:mm

---------------------------------------------------------------------------------------
  Junction 1           JUNCTION        0.00      30.91      0  13:16       0.00
  Junction 2           JUNCTION        0.00      48.23      0  17:47       0.00
  Outlet               OUTFALL         0.00      48.23      0  17:47       0.00
  Central Cell         STORAGE        75.50      88.56      0  12:10       0.00
  East Cell            STORAGE        88.09      88.09      0  12:10       0.00
```

Prep By JWM Date 10/17/13
Rev By Date 10/20/13
Calc No. DE-FP-FRS-3672-101 Sheet 16 of 32

```
  Lower Cell           STORAGE      168.90    235.07      0   12:10         0.00
  Middle Cell          STORAGE      233.71    276.03      0   12:10         0.00
  West Cell            STORAGE      121.01    146.91      0   12:10         0.00


  ********************
  Storage Node Summary
  ********************


---------------------------------------------------------------------------------------
-------------------------------------------------
  Storage Node ID         Maximum      Maximum      Time of Max      Average     Average
  Maximum       Maximum   Time of Max.          Total
                            Ponded       Ponded            Ponded       Ponded      Ponded
Storage Node   Exfiltration  Exfiltration  Exfiltrated
                            Volume       Volume            Volume       Volume      Volume
  Outflow           Rate          Rate          Volume
                          1000 ft³          (%)      days hh:mm     1000 ft³         (%)
      cfs            cfm        hh:mm:ss       1000 ft³

---------------------------------------------------------------------------------------
-------------------------------------------------
  Central Cell            540.216           61          0  13:06      450.080          51
    26.47           0.00          0:00:00          0.000
  East Cell              1195.107           72          0  00:00      836.521          51
    18.90           0.00          0:00:00          0.000
  Lower Cell             1192.810           52          0  17:46      562.521          24
    48.23           0.00          0:00:00          0.000
  Middle Cell             596.206           93          0  13:15      276.586          43
    71.41           0.00          0:00:00          0.000
  West Cell              1159.063           87          0  00:00      890.339          67
    57.72           0.00          0:00:00          0.000


  ***********************
  Outfall Loading Summary
  ***********************

  -----------------------------------------------------
  Outfall Node ID            Flow     Average      Peak
                        Frequency        Flow    Inflow
                              (%)         cfs       cfs
  -----------------------------------------------------
  Outlet                   100.00       34.33     48.23
  -----------------------------------------------------
  System                   100.00       34.33     48.23


  *****************
  Link Flow Summary
  *****************


---------------------------------------------------------------------------------------
-------------------------------------------
  Link ID                Element        Time of    Maximum   Length    Peak Flow
Design   Ratio of   Ratio of        Total   Reported
                         Type         Peak Flow  Velocity   Factor       during
Flow    Maximum    Maximum        Time  Condition
                                    Occurrence  Attained              Analysis
Capacity    /Design       Flow   Surcharged
                                    days hh:mm    ft/sec                   cfs
```

Prep By JWM Date 10/17/13
Rev By Date 10/20/13
Calc No. [illegible] Sheet 17 of 32

```
                                    Plant Scholz Half PMP Option 1
cfs       Flow     Depth      minutes

-----------------------------------------------------------------------------------------
--------------------------------------------
  Central Pipe           CONDUIT      0  15:35     14.11     1.00        26.47
48.92      0.54       0.52            0  Calculated
  East Cell Pipe         CDNDUIT      0  04:18      6.89     1.00        19.84
18.90      1.05       1.00            1  SURCHARGED
  East Pipe 1            CDNDUIT      0  00:01      4.09     1.00         2.23
2.23      1.00       1.00         1440  SURCHARGED
  East Pipe 2            CONDUIT      0  00:01     14.68     1.00         4.74
11.87      0.40       0.43            0  Calculated
  East Pipe 3            CDNDUIT      0  00:01      4.97     1.00         8.78
8.78      1.00       1.00         1440  SURCHARGED
  East Pipe 4            CONDUIT      0  00:55     27.25     1.00        44.28
42.19      1.05       1.00            0  > CAPACITY
  Middle Pipe            CONDUIT      0  12:06     26.21     1.00        42.67
40.50      1.05       1.00            0  SURCHARGED
  Middle Riser Pipe      CDNDUIT      0  13:16     16.53     1.00        30.91
67.10      0.46       0.48            0  Calculated
  Dutlet Pipe            CONDUIT      0  17:47     18.61     1.00        48.23
146.90      0.33       0.39            0  Calculated
  Riser                  DRIFICE      0  17:47                           48.23

  Riser at Middle Cell DRIFICE        0  13:16                           30.91


  *********************************
  Highest Flow Instability Indexes
  *********************************
  Link East Pipe 4 (7)
  Link Middle Pipe (5)
  Link Central Pipe (3)
  Link East Cell Pipe (2)


  WARNING 107 : Initial water surface elevation defined for Junction Junction 1 is
below junction invert elevation.
                Assumed initial water surface elevation equal to invert elevation.
  WARNING 108 : Surcharge elevation defined for Junction Junction 1 is below
junction maximum elevation. Assumed surcharge elevation equal to maximum elevation.
  WARNING 107 : Initial water surface elevation defined for Junction Junction 2 is
below junction invert elevation.
                Assumed initial water surface elevation equal to invert elevation.
  WARNING 108 : Surcharge elevation defined for Junction Junction 2 is below
junction maximum elevation. Assumed surcharge elevation equal to maximum elevation.

  Analysis began on:  Thu Dct 17 11:01:45 2013
  Analysis ended on:  Thu Dct 17 11:01:46 2013
  Total elapsed time: 00:00:01
```

Prep By JWM Date 10/17/13
Rev By Date 10/2013
Calc No. TE-PP-PPC345-12-01 Sheet 13 of 27

Minor, Jim

From: Markey, Richard M.
Sent: Tuesday, October 08, 2013 6:49 PM
To: Minor, Jim
Cc: Mendenhall, Kevin; Bryan, Ronald C.; Pegues, James C.
Subject: Re: Plant Scholz

In hearing from Jim Pegues, we need to run 1/2 the PMP.

Thanks

Mike Markey

Sent from my iPhone

On Oct 8, 2013, at 4:44 PM, "Minor, Jim" <JWMINOR@southernco.com> wrote:

> **Attorney-Client Communication Privileged and Confidential; Attorney Work Product**
>
> Mark,
> I wanted to make sure I understood exactly what is needed for the analysis on Scholz. Jim (Pegues) and I discussed the rainfall event and I read through the EPA Assessment. It mentions on page 1-3 to "Determine the PMP to complete the technical documentation". Jim recommended using the ½ PMP to develop the peak flow.
>
> We can use the PMP(probable maximum precipitation) value of 47.1" to do a calculation for the capacity in the ponds. Just for clarification…this is different than a "PMF" (probable maximum flood) analysis. A PMF analysis would be a lot more in depth.
>
> Can you please clarify exactly what is needed? Also, if we only need to provide you with the ½ PMP analysis, we would be able to complete this and have it checked by 10/18/13 or sooner.
>
> Thanks,
>
> **Jim Minor, PE**
> Southern Company Generation
> Engineering and Construction Services
> 42 Inverness Center Parkway Bin 453
> Birmingham, AL 35242
> 205-992-5368 (o)
> 205-288-9566 (c)
> 205-992-5884 (f)
> 15*1494 (Southern Linc)

Prep By JWM Date 10/17/13
Rev By Pm G Date 10/2013
Calc No TE-PP-PPL-315172-101 Sheet 19 of 22

Minor, Jim

From: Gallagher, Benjamin J.
Sent: Tuesday, October 15, 2013 10:30 AM
To: Minor, Jim
Subject: FW: Plant Scholz

I am working on updating our stability analysis. I could use the max storm water elevations in pond 1 (the upper cell) and pond 5 (the bottom cell). Please let me know when you will have elevations available. Thanks!

Ben Gallagher, P.E.
Southern Company - Earth Science and Environmental Engineering

---

From: Pegues, James C.
Sent: Tuesday, October 08, 2013 4:48 PM
To: Markey, Richard M.
Cc: Gallagher, Benjamin J.
Subject: FW: Plant Scholz

Mike:

Jim Minor and I talked about this all afternoon. It is my opinion that the PMP is all we need to run. A PMF analysis is what is generally run when routing runoff from a watershed through an impoundment. As we do not have any runoff that enters the pond (we basically only have what rainfall falls directly on the pond plus process flows), I think a calculation similar to what was done for the 25-yr and 100-yr storm events, using the ½ PMP rainfall event, is all we need.

Jim Pegues

From: Minor, Jim
Sent: Tuesday, October 08, 2013 4:44 PM
To: Markey, Richard M.
Cc: Mendenhall, Kevin; Bryan, Ronald C.; Pegues, James C.
Subject: Plant Scholz

Attorney-Client Communication Privileged and Confidential; Attorney Work Product

Mark,
I wanted to make sure I understood exactly what is needed for the analysis on Scholz. Jim (Pegues) and I discussed the rainfall event and I read through the EPA Assessment. It mentions on page 1-3 to "Determine the PMP to complete the technical documentation". Jim recommended using the ½ PMP to develop the peak flow.

We can use the PMP(probable maximum precipitation) value of 47.1" to do a calculation for the capacity in the ponds. Just for clarification…this is different than a "PMF" (probable maximum flood) analysis. A PMF analysis would be a lot more in depth.

Can you please clarify exactly what is needed? Also, if we only need to provide you with the ½ PMP analysis, we would be able to complete this and have it checked by 10/18/13 or sooner.

Thanks,

Jim Minor, PE

Southern Company Generation
Engineering and Construction Services
42 Inverness Center Parkway Bin 453
Birmingham, AL 35242
205-992-5368 (o)
205-288-9566 (c)
205-992-5884 (f)
15*1494 (Southern Linc)

Design Calculations

SOUTHERN COMPANY

Project PLANT SCHOLZ	Prepared By JWM	Date 10/17/13
Subject/Title ASH POND HYDROLOGIC & HYDRAULIC	Reviewed By	Date 10/2013
ANALYSIS	Calculation Number DC-FP-FPC34572-101	Sheet 21 of 32

CONFIRMATION OF SOFTWARE

AS A CHECK, HYDRAFLOW HYDROGRAPHS WAS USED ON THE EAST UPPER CELL. THE FOLLOWING ASSUMPTIONS WERE USED:

USE ONLY THE EAST POND W/ THE OUTLET PIPE DISCHARGING TO A FREE OUTFALL.

SET THE INVERT OF THE OUTLET PIPE TO EL = 131.00 TO VERIFY THAT POND WILL FILL UP.

USE SAME DATA FOR POND MODEL AS SHOWN IN CALCULATION DC-FP-FPC34572-100.

MAX. HGL IN POND IS 130.18 USING STORMNET.

MAX. HGL IN POND IS 130.06 USING HYDRAFLOW.

SO OK.

SEE SHEETS 22-30 FOR SOFTWARE OUTPUT.

Prep By	JWM	Date	10/17/13
Rev By		Date	10/2013
Calc No. DC-PP-FP-345P-101		Sheet	22 of 32

```
 Autodesk® Storm and Sanitary Analysis 2013 - Version 7.1.2186 (Build 1)

-----------------------------------------------------------------------------------
-----

 *******************
 Project Description
 *******************
 File Name ................. Test for East Cell.SPF
 Description ............... Plant Scholz
                             Check against Hydroflow Hydrographs for
                             East Upper Pond


 ****************
 Analysis Options
 ****************
 Flow Units ................ cfs
 Subbasin Hydrograph Method. SCS TR-55
 Time of Concentration...... User-Defined
 Link Routing Method ....... Kinematic Wave
 Storage Node Exfiltration.. None
 Starting Date ............. OCT-17-2013 00:00:00
 Ending Date ............... OCT-18-2013 00:00:00
 Report Time Step .......... 00:05:00


 *************
 Element Count
 *************
 Number of rain gages ...... 1
 Number of subbasins ....... 1
 Number of nodes ........... 2
 Number of links ........... 1


 ****************
 Raingage Summary
 ****************
 Gage                Data                Data       Recording
 ID                  Source              Type        Interval
                                                              min
 -----------------------------------------------------------
 Design-Storm        1/2 PMP             CUMULATIVE      6.00


 ****************
 Subbasin Summary
 ****************
 Subbasin                 Total
                           Area
 ID                       acres
 ------------------------------
 Sub-01                    4.70


 ************
 Node Summary
 ************
 Node                Element               Invert  Maximum   Ponded   External
 ID                  Type               Elevation    Elev.     Area     Inflow
                                               ft       ft      ft²
```

```
  --------------------------------------------------------------------------------
  Out-01              OUTFALL                   0.00     126.25       0.00
  EastPond            STORAGE                 127.00     131.00       0.00


  ************
  Link Summary
  ************
  Link                From Node          To Node             Element              Length      Slope
Manning's
  ID                                                         Type                     ft          %
Roughness

-------------------------------------------------------------------------------------------
--------
  Link-01             EastPond           Out-01              CONDUIT                44.0    15.3409
   0.0110


  *********************
  Cross Section Summary
  *********************
  Link               Shape            Depth/         Width          No. of          Cross
 Full Flow          Design
  ID                                  Diameter                      Barrels    Sectional
 Hydraulic            Flow
                                                                                    Area
    Radius        Capacity
                                          ft            ft                           ft²
        ft             cfs

-------------------------------------------------------------------------------------------
----------------------
  Link-01            CIRCULAR            2.00          2.00              1           3.14
      0.50          104.72

  **************************        Volume         Depth
  Runoff Quantity Continuity       acre-ft        inches
  **************************     ---------       -------
  Total Precipitation ......         9.347        23.864
  Surface Runoff ...........         0.761         1.943
  Continuity Error (%) .....        -0.000


  **************************        Volume        Volume
  Flow Routing Continuity          acre-ft      Mgallons
  **************************     ---------     ---------
  External Inflow ..........         0.000         0.000
  External Outflow .........         0.000         0.000
  Initial Stored Volume ....         1.700         0.554
  Final Stored Volume ......         9.308         3.033
  Continuity Error (%) .....         0.000


  ******************************************
  Composite Curve Number Computations Report
  ******************************************

  ------------------
  Subbasin Sub-01
  ------------------
                                                                  Area            Soil
```

Prep By	JWM	Date	10/17/13
Rev By		Date	10/2013
Calc No. DL-EP-EPC34KT2-101		Sheet 24	of 32

```
  Soil/Surface Description                               (acres)          Group
   CN

------------------------------------------------------------------------------------
----
  -                                                         2.40                 -
48.00
  -                                                         2.30                 -
98.00
  Composite Area & Weighted CN                              4.70
72.47

  ***********************
  Subbasin Runoff Summary
  ***********************

  --------------------------------------------------------------------------
  Subbasin             Total     Total      Peak  Weighted           Time of
  ID                  Precip    Runoff    Runoff     Curve     Concentration
                          in        in       cfs    Number    days  hh:mm:ss
  --------------------------------------------------------------------------
  Sub-01               23.50     19.48     87.00    72.470       0  00:06:00
  --------------------------------------------------------------------------


  ******************
  Node Depth Summary
  ******************


------------------------------------------------------------------------------------
-----
  Node            Average   Maximum   Maximum   Time of Max     Total     Total
Retention
  ID                Depth     Depth       HGL    Occurrence   Flooded      Time
  Time

                 Attained  Attained  Attained                  Volume   Flooded

                       ft        ft        ft   days  hh:mm   acre-in   minutes
hh:mm:ss

------------------------------------------------------------------------------------
-----
  Out-01           124.25    124.25    124.25      0  00:00         0         0
0:00:00
  EastPond           2.00      3.18    130.18      1  00:00         0         0
0:00:00

  *****************
  Node Flow Summary
  *****************


------------------------------------------------------------------------------------
  Node                Element     Maximum     Peak      Time of   Maximum Time of
Peak
  ID                     Type     Lateral   Inflow  Peak Inflow  Flooding
Flooding

                                   Inflow            Occurrence  Overflow

Occurrence

                                      cfs      cfs  days  hh:mm         cfs  days

hh:mm
```

```
-------------------------------------------------------------------------------------
  Out-01                OUTFALL         0.00      0.00      0  00:00       0.00
  EastPond              STORAGE        86.27     86.27      0  12:10       0.00


  ********************
  Storage Node Summary
  ********************


-------------------------------------------------------------------------------------
-------------------------------------------------
  Storage Node ID         Maximum     Maximum    Time of Max    Average   Average
  Maximum       Maximum  Time of Max.        Total
                            Ponded      Ponded         Ponded     Ponded    Ponded
Storage Node  Exfiltration  Exfiltration  Exfiltrated
                            Volume      Volume         Volume     Volume    Volume
  Outflow           Rate          Rate      Volume
                          1000 ft³         (%)     days hh:mm   1000 ft³       (%)
      cfs           cfm       hh:mm:ss     1000 ft³

-------------------------------------------------------------------------------------
-------------------------------------------------
  EastPond                405.461          76       1  00:00    225.249        42
     0.00          0.00       0:00:00       0.000


  ***********************
  Outfall Loading Summary
  ***********************

  -----------------------------------------------
  Outfall Node ID         Flow   Average     Peak
                     Frequency      Flow   Inflow
                           (%)       cfs      cfs
  -----------------------------------------------
  Out-01                  0.00      0.00     0.00
  -----------------------------------------------
  System                  0.00      0.00     0.00


  *****************
  Link Flow Summary
  *****************


-------------------------------------------------------------------------------------
-------------------------------------------
  Link ID              Element       Time of   Maximum  Length   Peak Flow
Design  Ratio of  Ratio of       Total  Reported
                       Type        Peak Flow  Velocity  Factor      during
Flow   Maximum   Maximum       Time  Condition
                                 Occurrence  Attained           Analysis
Capacity   /Design      Flow  Surcharged
                                 days hh:mm    ft/sec                  cfs
cfs       Flow     Depth     minutes

-------------------------------------------------------------------------------------
-------------------------------------------
  Link-01              CONDUIT       0  00:00      0.00    1.00        0.00
104.72      0.00     0.00          0  Calculated
```

Prep By JWM Date 10/17/13
Rev By Date 10/2013
Calc No. DI-FRC-FR2K13-101 Sheet 26 of 32

```
*********************************
Highest Flow Instability Indexes
*********************************
All links are stable.


Analysis began on:  Thu Oct 17 10:51:35 2013
Analysis ended on:  Thu Oct 17 10:51:36 2013
Total elapsed time: 00:00:01
```

Hydrograph Report

Prep By JWM Date 10/17/13 1
Rev By Date 10/2013
Calc No. DL-FP-FPR-3/592-101 Sheet 21 of 32
Thursday, 10 / 17 / 2013

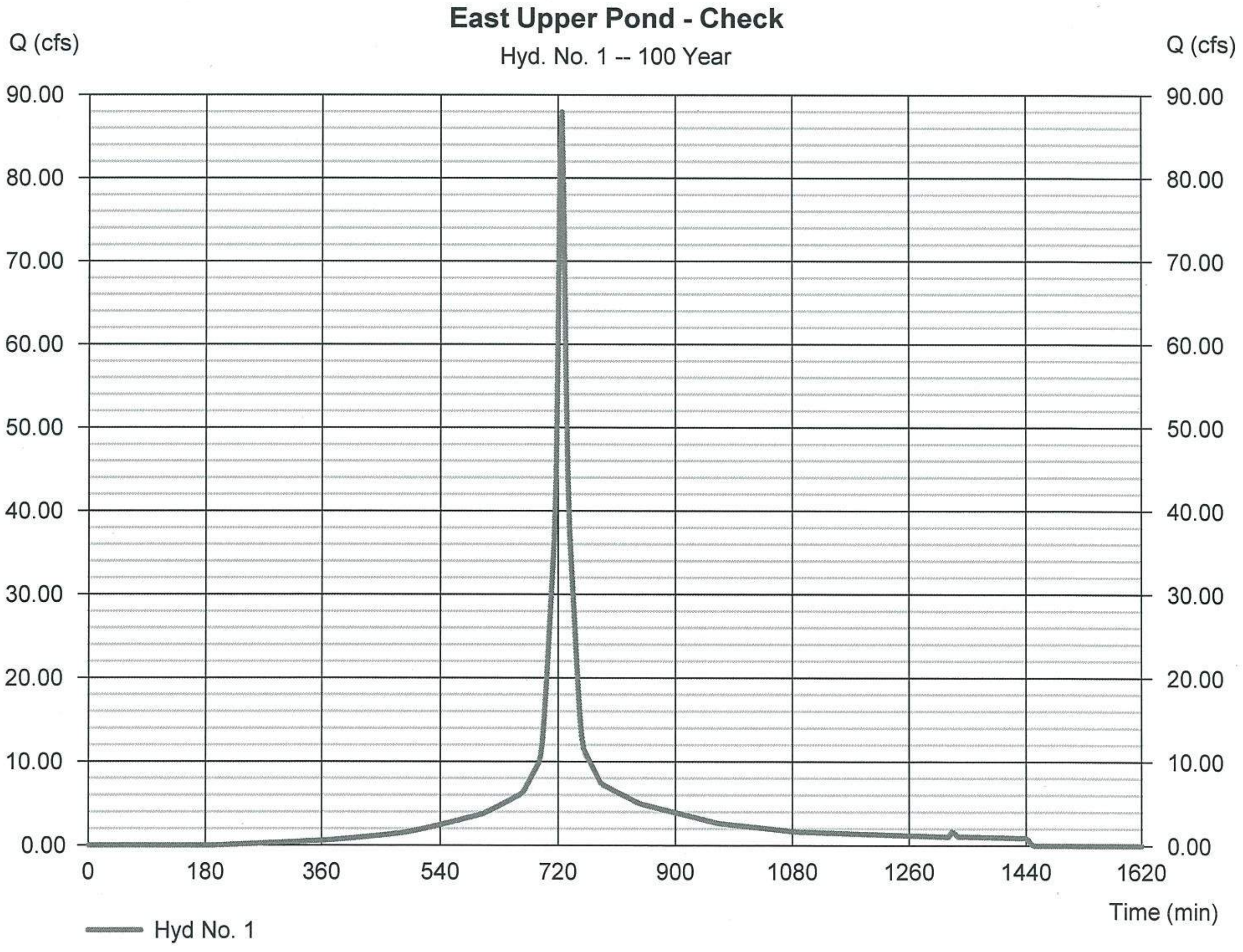
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2013 by Autodesk, Inc. v10

Hyd. No. 1

East Upper Pond - Check

Hydrograph type = SCS Runoff
Storm frequency = 100 yrs
Time interval = 3 min
Drainage area = 4.700 ac
Basin Slope = 0.0 %
Tc method = User
Total precip. = 23.50 in
Storm duration = 24 hrs

Peak discharge = 87.95 cfs
Time to peak = 726 min
Hyd. volume = 311,744 cuft
Curve number = 72.5
Hydraulic length = 0 ft
Time of conc. (Tc) = 6.00 min
Distribution = Type III
Shape factor = 484



Prep By	JWM	Date	10/17/13
Rev By	FMG	Date	10/2013
Calc No.	R-EP-FRZ345T2-101	Sheet	28 of 32

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2013 by Autodesk, Inc. v10

Thursday, 10 / 17 / 2013

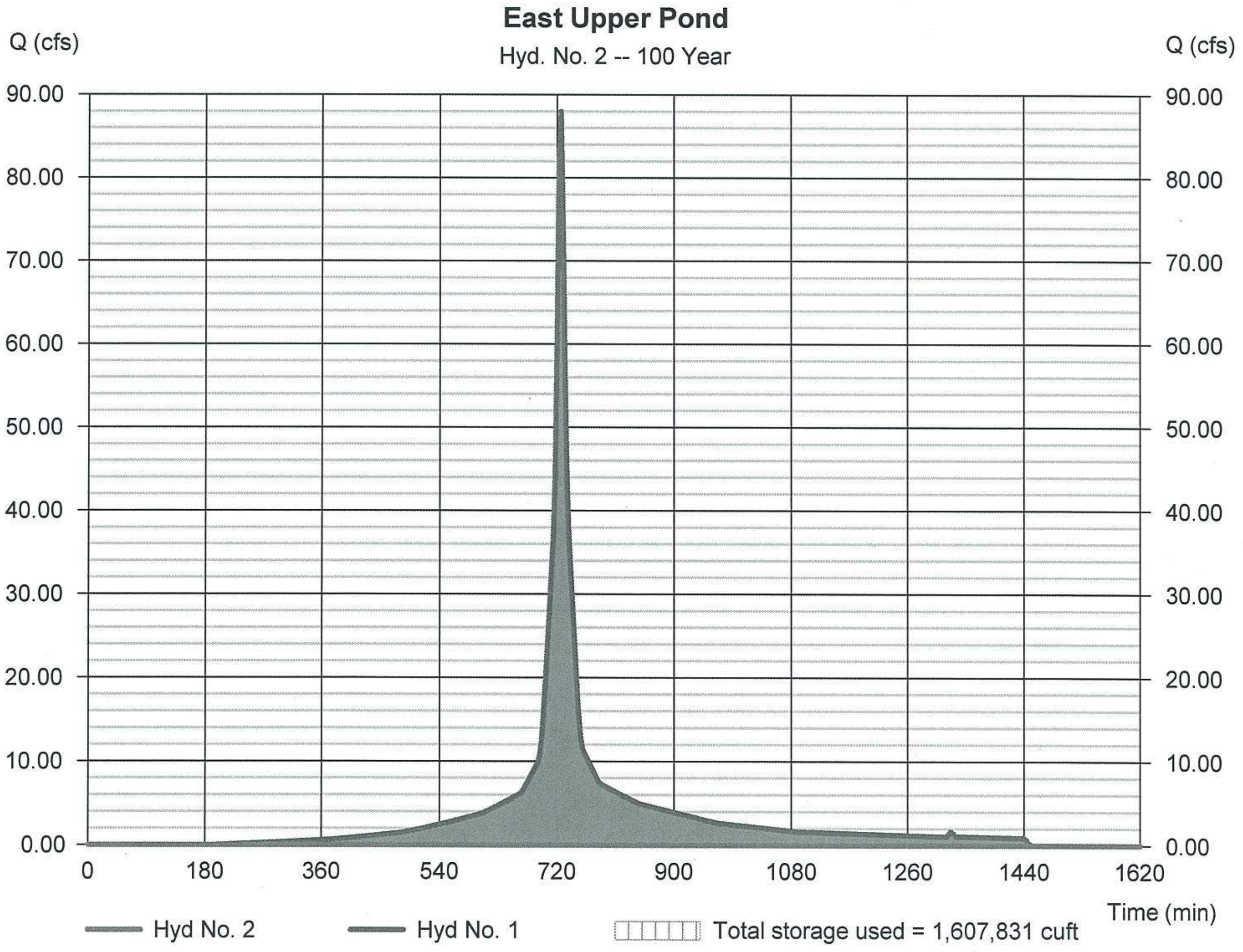
Hyd. No. 2

East Upper Pond

Hydrograph type = Reservoir
Storm frequency = 100 yrs
Time interval = 3 min
Inflow hyd. No. = 1 - East Upper Pond - Check
Reservoir name = East Upper Pond

Peak discharge = 0.000 cfs
Time to peak = n/a
Hyd. volume = 0 cuft
Max. Elevation = 130.06 ft
Max. Storage = 1,607,831 cuft

Storage Indication method used. Wet pond routing start elevation = 128.00 ft.



Prep By JWM **Date** 10/17/13
Rev By Pmb **Date** 10/2013
Calc No. R-PP-PR34572-101 **Sheet** 29 **of** 77

Pond Report

Pond No. 1 - East Upper Pond

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 116.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	116.00	682	0	0
1.00	117.00	4,137	2,166	2,166
2.00	118.00	141,330	56,543	58,709
3.00	119.00	29,201	78,250	136,959
4.00	120.00	46,383	37,458	174,418
5.00	121.00	106,673	74,458	248,876
6.00	122.00	124,230	115,329	364,204
7.00	123.00	130,766	127,471	491,676
8.00	124.00	167,177	148,584	640,260
9.00	125.00	169,686	168,413	808,673
10.00	126.00	171,697	170,673	979,347
11.00	127.00	156,947	164,250	1,143,597
12.00	128.00	148,105	152,489	1,296,086
13.00	129.00	151,431	149,750	1,445,836
14.00	130.00	154,762	153,078	1,598,914
15.00	131.00	158,183	156,454	1,755,368

Culvert / Orifice Structures

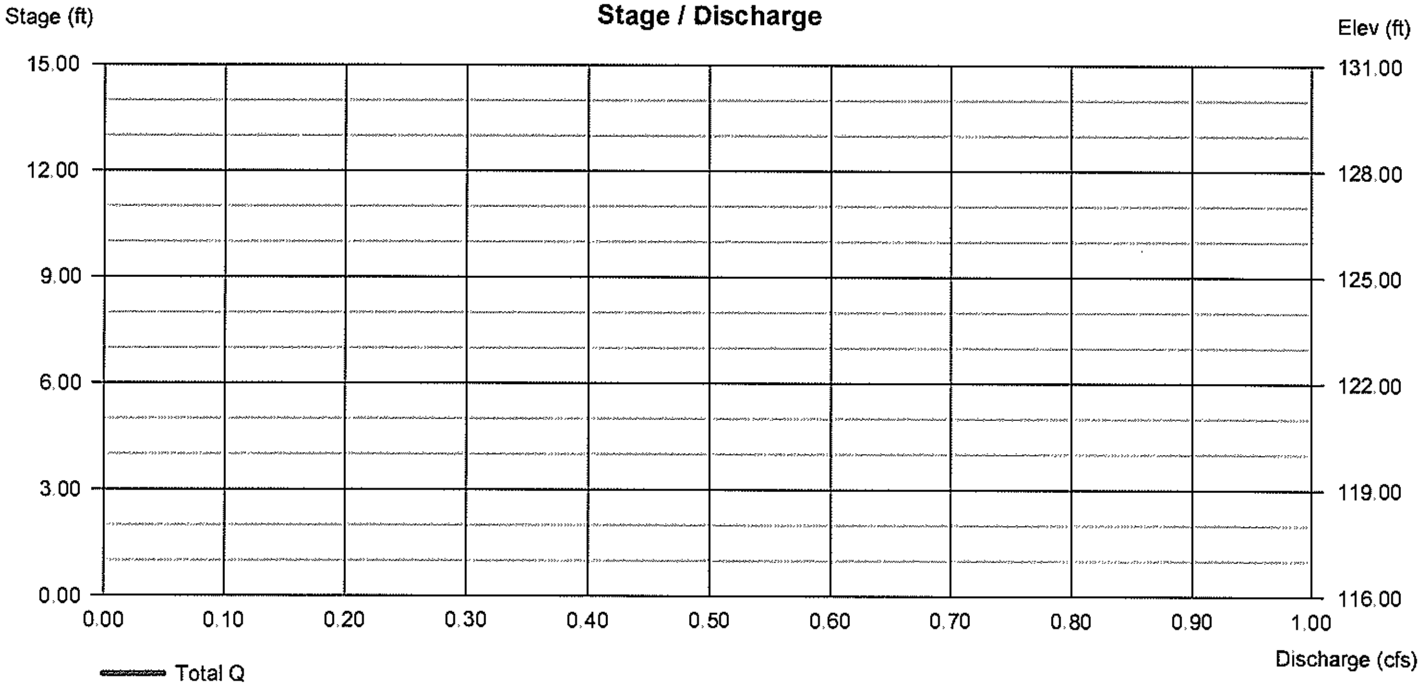
	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 0.00	0.00	0.00	0.00
Span (in)	= 0.00	0.00	0.00	0.00
No. Barrels	= 0	0	0	0
Invert El. (ft)	= 0.00	0.00	0.00	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .000	.000	.000	n/a
Orifice Coeff.	= 0.00	0.00	0.00	0.00
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.00	0.00	0.00	0.00
Crest El. (ft)	= 0.00	0.00	0.00	0.00
Weir Coeff.	= 0.00	0.00	0.00	0.00
Weir Type	= ---	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Wet area)
TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).



Prep By	JWM	Date	10/17/13
Rev By	FPG	Date	10/2013
Calc No.	DC-FP-FR3S72-10	Sheet	30 of 32

Hydraflow Rainfall Report

Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)			
	B	D	E	(N/A)
1	0.0000	0.0000	0.0000	--------
2	103.6151	17.9000	0.9437	--------
3	0.0000	0.0000	0.0000	--------
5	91.2107	16.7000	0.8635	--------
10	89.1615	16.0000	0.8290	--------
25	91.2380	15.4000	0.7970	--------
50	99.1734	15.5000	0.7905	--------
100	102.9225	15.3000	0.7759	--------

File name: Atlanta_GA FHA.IDF

Intensity = B / (Tc + D)^E

Return Period (Yrs)	Intensity Values (in/hr)											
	5 min	10	15	20	25	30	35	40	45	50	55	60
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	5.40	4.48	3.83	3.36	2.98	2.69	2.45	2.25	2.08	1.94	1.81	1.70
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	6.40	5.35	4.61	4.06	3.64	3.30	3.02	2.79	2.59	2.43	2.28	2.15
10	7.15	5.99	5.17	4.57	4.10	3.73	3.42	3.17	2.95	2.77	2.60	2.46
25	8.25	6.93	6.00	5.32	4.78	4.36	4.01	3.72	3.47	3.26	3.07	2.91
50	9.11	7.67	6.65	5.90	5.32	4.85	4.47	4.15	3.87	3.64	3.43	3.25
100	9.95	8.39	7.30	6.48	5.85	5.34	4.92	4.57	4.28	4.02	3.80	3.60

Tc = time in minutes. Values may exceed 60.

ngineering\Fossil and Hydro-West\Sitework__GROUP\Minor Jim\Plant Scholz\Storm Drainage\Scholz PMP.pcp

Storm Distribution	Rainfall Precipitation Table (in)							
	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
SCS 24-hour	0.00	5.00	0.00	6.50	7.75	9.00	10.25	23.50
SCS 6-Hr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-1st	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-2nd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-3rd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-4th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-Indy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Custom	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Prep By JWM	Date 10/17/13
Rev By	Date 10/2013
Calc No. DC-FP-FR245T2-101	Sheet 31 of 32

HYDROMETEOROLOGICAL REPORT NO. 51

Probable Maximum Precipitation Estimates, United States East of the 105th Meridian

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
U.S. DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS

Washington, D C
June 1978

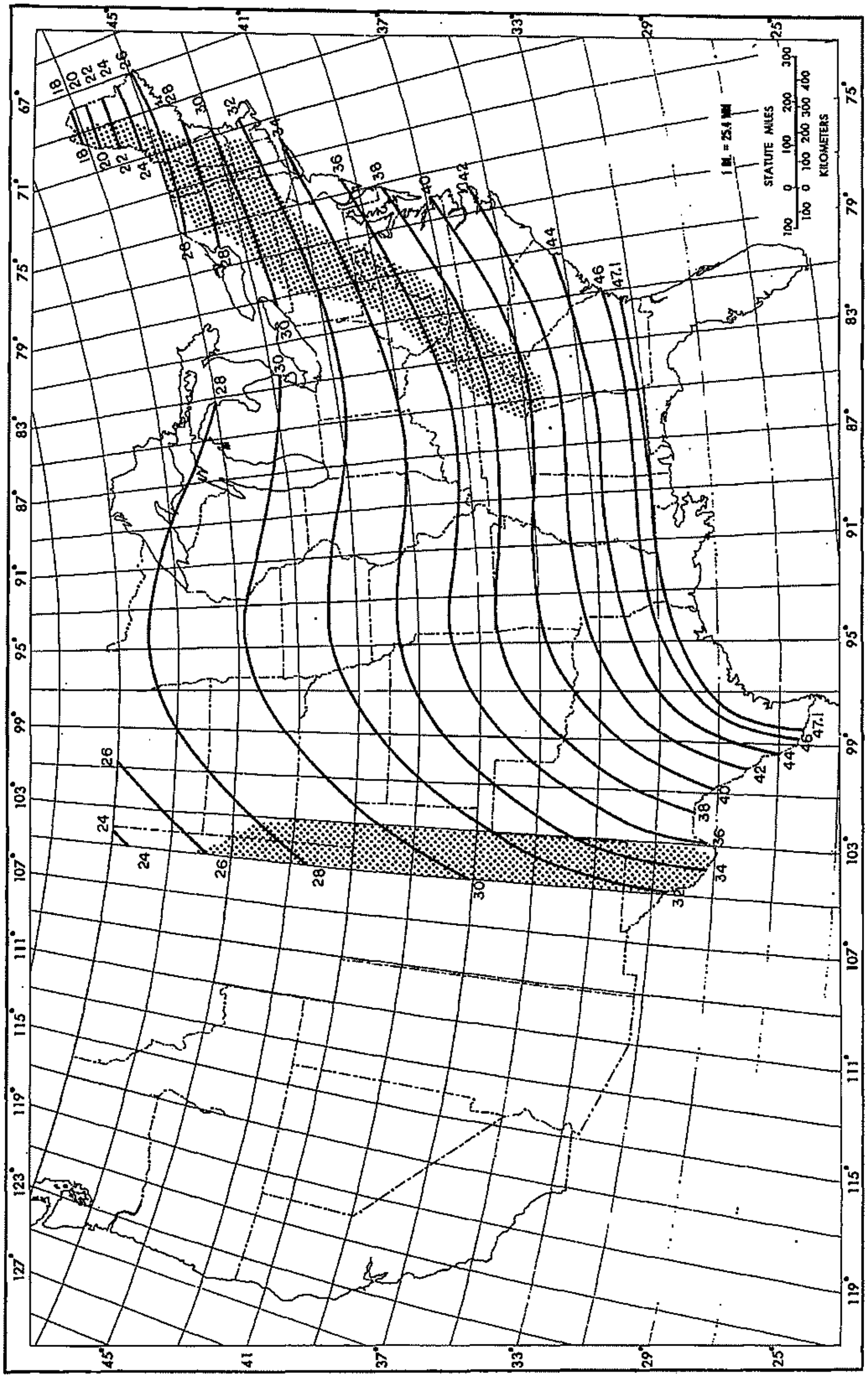


Figure 20.--All-season PMP (in.) for 24 hr 10 mi^2 (26 km^2).

Document 3

Sequential Plan for Tree Removal and Embankment Improvement

SEQUENTIAL PLAN FOR TREE REMOVAL AND EMBANKMENT IMPROVEMENTS
ASH POND SOUTH DIKE EMBANKMENT
PLANT SCHOLZ
SNEADS, FLORIDA

The Plant Scholz Ash Pond is formed on most sides by perimeter earthen dikes (a portion is incised). The South Dike is constructed atop a natural slope which flattens as it approaches the lowlands south of the pond. As noted in the 2011 and 2012 Ash Dike Inspections performed annually by Southern Company Hydro Services Dam Safety, numerous trees of various sizes and ages are present on the downstream slopes of the South Dike. This “Sequential Plan for Tree Removal and Embankment Improvements” has been developed as a guide for Plant Scholz to utilize in upcoming maintenance activities not only on the South Dike but elsewhere around the pond, as needed.

This guide was developed using recommendations made by Southern Company Hydro Services and FEMA Publication 534 “Technical Manual for Dam Owners”, September 2005.

The Hydro Services inspection reports recommend that trees be removed on the South Dike to a distance of about 25 feet down the slope, measured from the downstream crest edge. A distance of 25 feet was selected based on the configuration of the slope, as a distance of 25 feet is expected to extend beyond the toe of the downstream slope embankment fill. Thus, any trees present outside this zone will be located on natural slopes and do not present a concern with regard to embankment stability and integrity.

FEMA Pub. 534 outlines tree and brush removal needs and priorities based on position of trees and bushes along the downstream slope. The FEMA guidelines establish downstream embankment slope “inspection zones” based on the position from the crest and/or toe of the embankment relative to the height of the embankment. The FEMA guidelines also provide specific tree removal and maintenance measures applicable to each “zone”. However, the configuration of the South Dike is such that the FEMA guidelines, which have been prepared for higher and longer embankment slopes, are not directly applicable. Therefore, the SCS Hydro Services recommendation of removal of trees 25 feet down from the crest edge will be used.

Sequential Tree Removal and Embankment Improvement Measures

In accordance with the SCS Hydro Services recommendations and the FEMA Pub. 534 guidelines, tree removal and embankment improvement will be phased. Below is a sequential plan for the various tasks needed. As noted, some tasks have already been accomplished.

Year 1 (2012)

Cut and/or remove all brush and undergrowth from the downstream crest to approximately 25-ft down the slope. Cut all trees having a diameter of 6-in or less as near to the ground as possible within this same zone. Stumps and root balls may be left in place, but the stumps shall be sealed with a waterproof sealant to inhibit decay. Remove the one large tree on the upstream slope near the eyewash station at the west end of the South Dike. **COMPLETED IN 2012**

Year 2 (2013)

Remove all large debris that may be present (i.e. inorganic debris such as discarded pipe, concrete, etc.) and existing fallen trees from the downstream slope to approximately 25-ft from the downstream crest. Beginning at the east end of the South Dike and proceeding westward, begin removal of trees larger than 6-in diameter to approximately 10-ft down the slope from the downstream crest. Clearing this zone first will provide open space for removal of trees located further down the slope in future years. Removal of trees having a diameter greater than 6-in will also require removal of stumps and root balls. Soil loosened by the removal of the root ball shall be compacted in place, or shall be excavated to exposed relatively undisturbed embankment soil. The holes shall then be backfilled using clean and organic-free clayey sand (native to the site) and compacted in 6-in lifts using hand-guided mechanical compaction equipment. Backfilling shall continue until backfill grade matches surrounding grade. The backfilled areas shall then be grassed in accordance with the guidelines presented in the Plant Scholz Ash Pond Maintenance Plan. Growth of grasses and brush should continue to be controlled in accordance with the Maintenance Plan.

Year 3 (2014)

Complete all tasks initiated in Year 2 (2013), as needed. Then, beginning at the east end of the South Dike and proceeding westward, begin removal of the remaining trees larger than 6-in diameter between the downstream crest to 25-ft down the slope from the downstream crest. Removal of trees having a diameter greater than 6-in will also require removal of stumps and root balls. Soil loosened by the removal of the root ball shall be compacted in place, or shall be excavated to exposed relatively undisturbed embankment soil. The holes shall then be backfilled using clean and organic-free clayey sand (native to the site) and compacted in 6-in lifts using hand-guided mechanical compaction equipment. Backfilling shall continue until backfill grade matches surrounding grade. The backfilled areas shall then be grassed in accordance with the guidelines presented in the Plant Scholz Ash Pond Maintenance Plan.
Growth of grasses and brush should continue to be controlled in accordance with the Maintenance Plan.

Year 4 (2015)

Complete all tasks initiated in Year 3 (2014), as needed. A more uniform, moderate slope will better facilitate embankment maintenance and inspections. Therefore, after removal of the trees has been completed on the downstream slope to approximately 25-ft from the downstream crest, a topographic survey of the embankment should be performed. The survey will be used to develop an embankment improvement plan that may include regrading of the slope, flattening of the slope, etc. Details of the embankment improvement plan will be developed in Year 4 (2015), including the preparation of design and construction drawings, specifications, cost estimates and bid documents.

Year 5 (2016)

Implement the embankment improvement plan in accordance with its plans and specifications.

Document 4

Slope Stability Analyses

SOUTHERN COMPANY

Engineering and Construction Services Calculation

Calculation Number:
TV-SZ-FPC33667-002

Project/Plant: Plant Scholz Ash Pond Dikes	**Unit(s):** Units 1-2	**Discipline/Area:** ES&EE

Title/Subject:
Slope Stability Analyses of Ash Pond Dikes

Purpose/Objective:
Analyze Slope Stability of Ash Pond Dikes

System or Equipment Tag Numbers: NA

Originator: Benjamin J. Gallagher, P.E.

Contents

Revision Record

Rev. No.	**Description**	**Originator Initial / Date**	**Reviewer Initial / Date**	**Approver Initial / Date**
0	Issued for Information	BJG/2-9-11		JCP/2-9-11
1	Added South Dike, revised calculation number	JAL/9-10-12		JCP/9-10-12
2	Revised South Dike topo, Updated H&H data	BJG/10-19-11		JCP/10-19-13

Notes:

Rev. 0, issued as Calculation Number TV-SZ-4161AK-001, and Rev. 1 are superseded by this calculation.

Purpose of Calculation

Plant Background

Plant Scholz is coal-fired steam plant which began operations in 1953. A coal combustion residual, ash, is sluiced from the plant to the ash pond. The sluice water, and other water from the plant, passes through multiple water management cells in the ash pond, allowing the ash to settle out and the water to be treated. The ash is periodically removed from the pond and stockpiled dry. The treated water passes through a V-weir and is discharged to the Apalachicola River.

Portions of the pond were constructed at or below natural ground, with most of the pond formed by a dike of compacted fill. The dike was constructed over time by periodically placing lifts of fill to meet storage needs. The original design drawings for the ash pond were not available. However, the design slopes for the compacted dike are believed to be 2.5 horizontal to 1 vertical (2.5H:1V). Actual slopes generally range from 1.5H:1V to 2.9H:1V based on current survey data with some localized steeper sections.

Purpose

The purpose of this calculation is to evaluate the stability of the Ash Pond dikes using state of the art slope stability methods.

Criteria

The State of Florida 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 level, which varies between water management cells, was used for free water in the pond. Water levels within the dikes were estimated from drilling data and observed equalizer pipes.

Surcharge Water and Upstream Rapid Drawdown

Pond water levels used in the analysis are based on an October 2013 hydrologic and hydraulic analysis of the ponds for a ½ PMP storm event. For the purpose of the downstream slope stability analysis at the East, North, and South dikes, surcharge water was conservatively assumed to reach the interior top of the dike (0-foot freeboard), although the current hydraulic study indicates ½ PMP water levels will leave 3-foot freeboard in Cells 1 and 5.

The interior berm between Cell 1 and 2 crest is at Elev. 132. Drawdown below the normal operating level in Cell 1 (Elev. 129) is prevented by the elevation of the discharge pipe and operational restrictions that limit pumping rates for drawdown below the discharge pipe elevation. On this basis, rapid drawdown was assumed to be possible between the Elev. 132 and Elev. 129.

The normal pool elevation in Cell 5 is at Elev. 98. Rapid drawdown from normal pool to the level of the sluiced ash would only require a drawdown of two feet. However, for the purpose of this analysis we assumed a rapid drawdown condition from the south dike crest at Elev. 104 to the level of the sluiced ash at Elev. 96. This represents the most conservative drawdown case possible for Cell 5.

Submerged Toe with Rapid Drawdown

The dikes are located outside the mapped 100-year floodway, and the downstream rapid drawdown case is not applicable to these dikes.

Summary of Conclusions

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

Condition	Referenced Factor of Safety	Calculated Factor of Safety
Ash Pond Cell 1 – East Dike		
Downstream, Steady State	1.5	1.5
Downstream, Seismic	1.1	1.3
Downstream, Surcharge	1.4	1.4
Upstream, Steady State	1.5	1.7
Upstream, Seismic	1.1	1.3
Upstream, Rapid Drawdown	1.3	1.3

Ash Pond Cell 1 – North Dike		
Downstream, Steady State	1.5	1.6
Downstream, Seismic	1.1	1.4
Downstream, Surcharge	1.4	1.5
Upstream, Steady State	1.5	1.8
Upstream, Seismic	1.1	1.2
Upstream, Rapid Drawdown	1.3	1.3
Ash Pond Cell 5 – South Dike		
Downstream, Steady State	1.5	1.5
Downstream, Seismic	1.1	1.2
Downstream, Surcharge	1.4	1.4
Upstream, Steady State	1.5	3.2
Upstream, Seismic	1.1	2.3
Upstream, Rapid Drawdown	1.3	2.5

For the upstream and downstream slopes, computed factors of safety generally meet the criteria listed in the US Corps of Engineers Manual EM 1110-2-1902, October 2003. These stability analyses reflect the modification and cleanup of the interior of the North Dike and exterior of the South Dike completed as a result recommendations submitted to Gulf Power in 2012.

In addition, the stability analyses indicate the upstream (interior) slopes of the pond are subject to shallow sloughing with rapid changes in water level or seismic loads. The shallow depth of sloughing does not represent a hazard to the dike, but will require prompt maintenance attention. Plant personnel should include inspection of the interior slope following major storm or earthquake events and anytime water level in the cell has decreased more than 6 inches over a period of 24 hour or less.

Finally, the flow channel for Cell 1 is periodically located adjacent to the exterior dike. As pond maintenance and dredging allow, the flow channel should be reconfigured by allowing sluiced ash to buildup along the exterior dike, with dredging from the inside, separation dike. A buildup of sluiced ash along the exterior dike will further flatten the slope and further reduce the potential for drawdown-induced sloughing to impact the compacted exterior dike.

Methodology

Slope stability was evaluated using the following methods and software:

GeoStudio 2007 (Version 7.17, Build 4921), Copyright 1991-2010, GEO-SLOPE International, Ltd. (Rev. 0 calculation)

GeoStudio 2007 (Version 7.19, Build 5027), Copyright 1991-2012, GEO-SLOPE International, Ltd. (Rev.1 calculation)

GeoStudio 2012, June 2013 Release (Version 8.11.1.7283), Copyright 1991-2013, GEO-SLOPE International, Ltd. (Rev.2 calculation)

The software was utilized in general accordance with the procedures for analyzing slope stability using software described in *Soil Strength and Slope Stability* (2005) by Duncan and Wright. The Morgenstern-Price method was for all analyses.

Failure circles were searched using the grid and radius and entry and exit methods. The reported stability sections are the result of multiple iterations of searches at each section. The stability analyses generally begin with a search of a general set of criteria encompassing the entire slope and based on experience with stability analyses. These search incorporated software optimization, as described in the next paragraph. The search criteria (grid and radius or entry and exit locations) are then revised to reach a search condition where the critical slip surface indicated has the least, or minimum, factor of safety, and is bounded by slip surfaces with greater factors of safety. These revisions are often accomplished by focusing the search on the area or areas of critical slip surfaces identified during the initial searches. The final search criteria do not necessarily depict the full extend of searched surfaces, because the criteria used in the final search are focused on the area of critical slip surface.

Software optimization of the critical slip surfaces was utilized during the stability evaluation. After the critical slip surface has been identified by a particular search method, the optimization process in GeoStudio converts the identified critical slip surface into a fully-specified surface consisting of a number of connected points. The software makes adjustments to the points of trial surface using proprietary methods. The results of the adjustments guide further iterations, until an end criterion is reached. The final product is a new, fully-specified slip surface, and the factor of safety for this “optimized” surface is provided.

Optimization can assist the analyst in identifying needed modifications to the search criteria and potential non-circular failure conditions. Optimization can enhance the results of a search for non-circular surfaces using the block method due to the crude failure surface evaluated from block criteria. Where the critical surfaces are circular, or nearly circular, optimization does not make the reported factor of safety more reliable. In this study, the reported slip-surfaces include software optimization, unless noted otherwise.

The stability analysis under seismic load was performed using the pseudostatic method and GeoStudio 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 using the staged method described by Duncan. This type of analysis incorporates two piezometric surfaces and evaluates both the effective stress and total stress stability.

Design Inputs

The following general inputs were utilized in the stability analyses:

- The 2002 probabilistic earthquake acceleration mapped by the USGS for the vicinity of Plant Scholz is 0.161g 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-section of the Cell 1 dikes was obtained using a April and May 2010 survey for the pond interior, crest of dike, and downstream surface of the dike.
- The cross-section of the Cell 5 dike was obtained using a September 2012 survey for the pond interior, crest of the dike, and a December 2012 survey for the downstream surface of the dike.
- The rapid drawdown case is conservatively assumed saturation to a piezometric steady state level prior to drawdown.

The following soil properties were used in the analyses:

Soil Description	**Moist Unit Weight, pcf**	**Effective Stress Parameters**		**Total Stress Parameters**	
		Cohesion, psf	**Phi Angle, °**	**Cohesion, psf**	**Phi Angle, °**
North and East Dikes					
Sluiced Ash	80	0	27	100	24
Compacted Ash (Dike)	90	0	34	100	28
Sand (Foundation)	125	0	35	500	22
Clay (Foundation)	120	50	28	N/A	N/A
Marl (Foundation)	125	0	38	N/A	N/A
South Dike					
Sluiced Ash	80	0	27	100	24
Dike Fill	120	400	32	600	28
Residual Sandy Clay/Clayey Sand	120	300	22	N/A	N/A
Residual Silty Clay	120	600	20	N/A	N/A
Marl	125	0	38	N/A	N/A

Engineering properties of the ash materials were evaluated based on recent and historical SPT test data (ASTM D 1586), laboratory shear strength tests (ASTM D 4767) from other Gulf Power facilities, and previous experience with ash. The engineering properties of the foundation soils were determined on the basis of recent laboratory tests, recent field SPT data, a compilation of historical field and laboratory data, and previous experience with engineering properties of these soils.

A Mohr-Coulomb, effective stress soil strength model was used for the stability analyses. This model includes friction and cohesion components and is consistent with the approach described in *Soil Strength and Slope Stability*, an up-to-date textbook that addresses the analysis of the stability of dikes constructed from compacted soil.

References

SCS Drawing E-7058, Flue Gas Desulfurization Sludge Ponds (1974)
SCS Drawing E-PS-4038-15, Plant Scholz General Arrangement Site Plan (1975)
SCS Drawing D-PS-4038-16, Boring Locations (unknown)
SCS Drawing D-PS-4038-27, Geological Cross Sections A-A and B-B (unknown)

SCS Drawing D-PS-4038-28, Location of Existing Monitoring and Water Supply Wells (1984)
SCS Drawing D-PS-4038-29, Location of Ground-Water Monitoring Wells (1984)
SCS Drawing D-PS-4038-39, Topographic Map and Boring Locations (1984)
SCS Drawing D-PS-4038-50, Geologic Cross Sections A-A', B-B' and C-C' (1984)
SCS Drawing 2705SCH, Plant Scholz Ash Pond Plan (2002)
SCS Drawing 3813SHZ, Plant Scholz Profile Lines Rev. 2 (2010)

SCS Calculation DC-FP-FPC034572-101, Ash Pond Hydrologic and Hydraulic Study (2013)

Southern Company Services, Boring Logs EDB-1 through EDB-8, NDB-1 through NDB-4, and B-1 through B-5 (2009 and 2010)

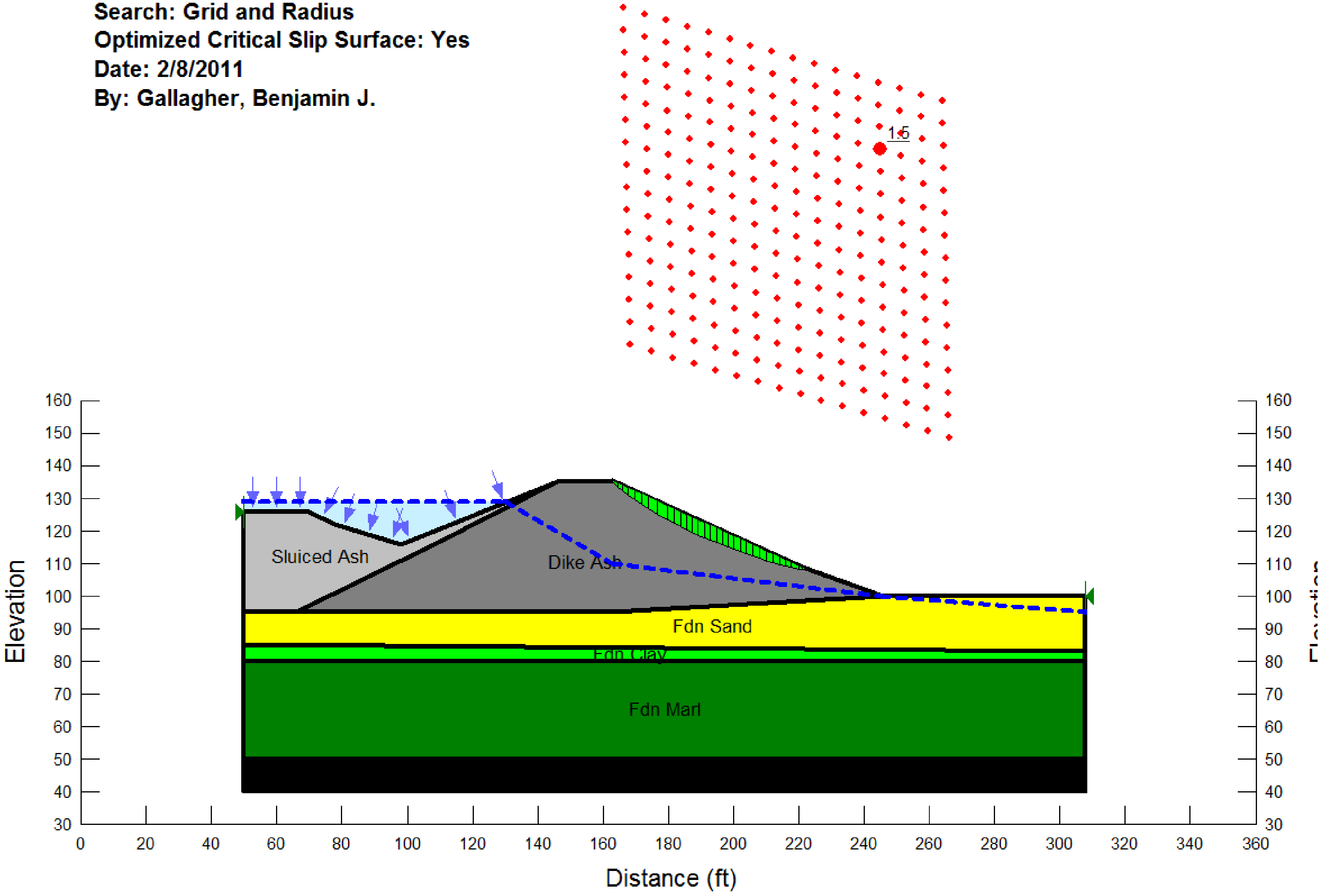
Pittman, Glaze, and Associates, Topographic Survey, Job No. 35298-12, (Dec. 2013)
Pensacola Testing Laboratories Report 55827, *Report of…Lab Test Data* (1981)

Body of Calculation

Calculation consists of GeoStudio slope stability runs. Each section and case modeled in GeoStudio is presented with the subsurface stratigraphy, critical slip surface and the minimum factor of safety axis. A supporting data file with slope geometry is also provided for each section.

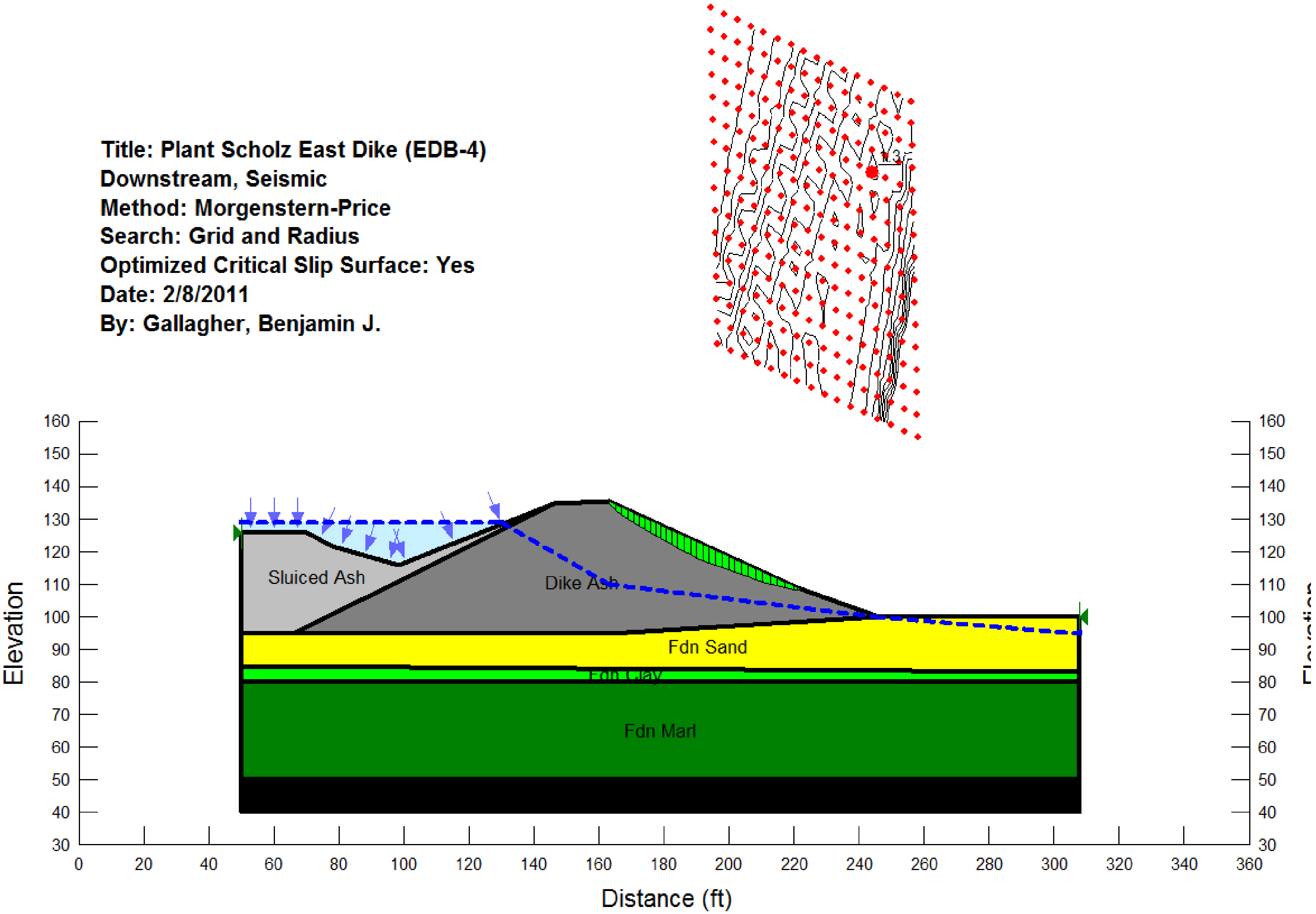
ATTACHMENT A

Title: Plant Scholz East Dike (EDB-4)
Downstream, Steady State
Method: Morgenstern-Price
Search: Grid and Radius
Optimized Critical Slip Surface: Yes
Date: 2/8/2011
By: Gallagher, Benjamin J.

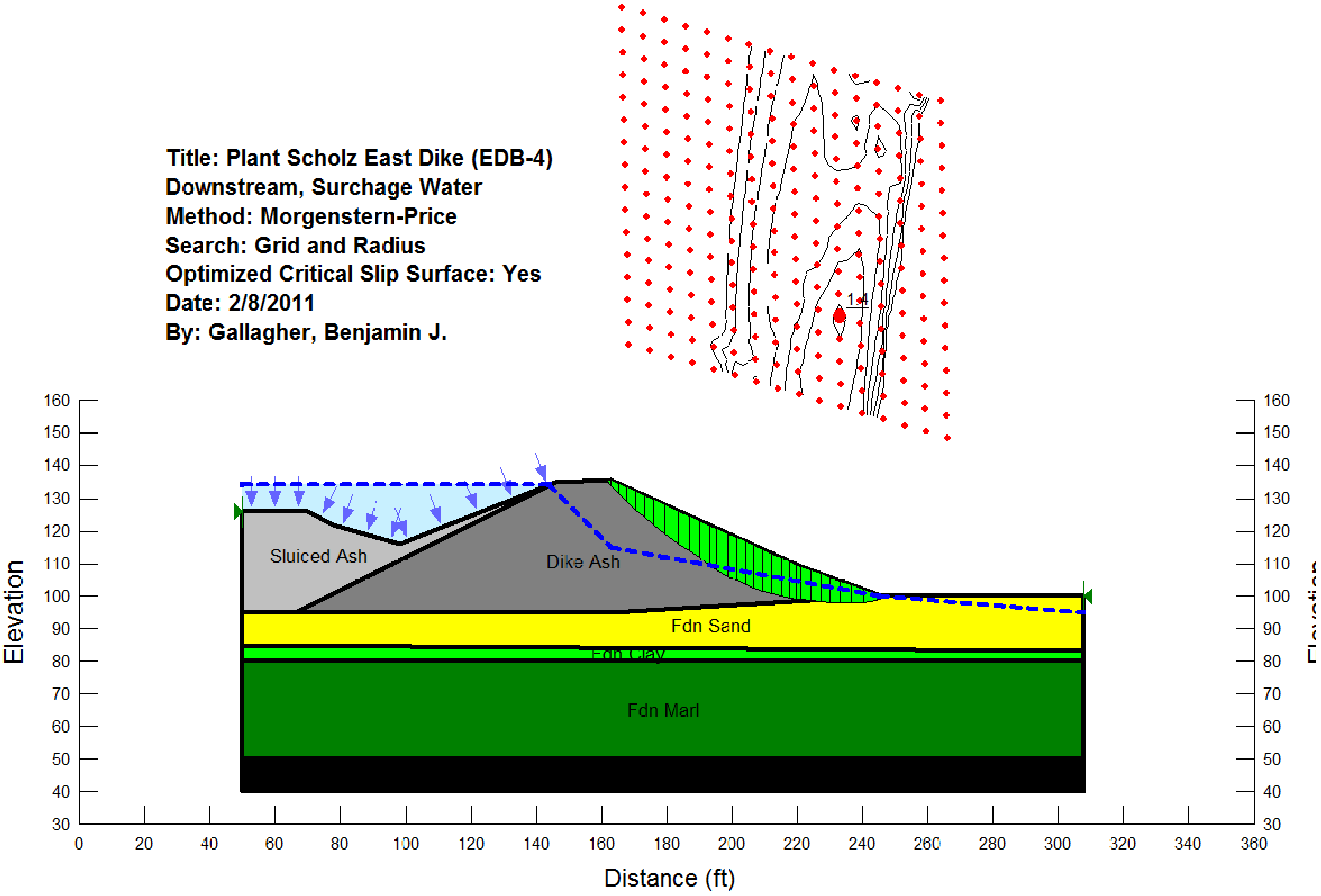


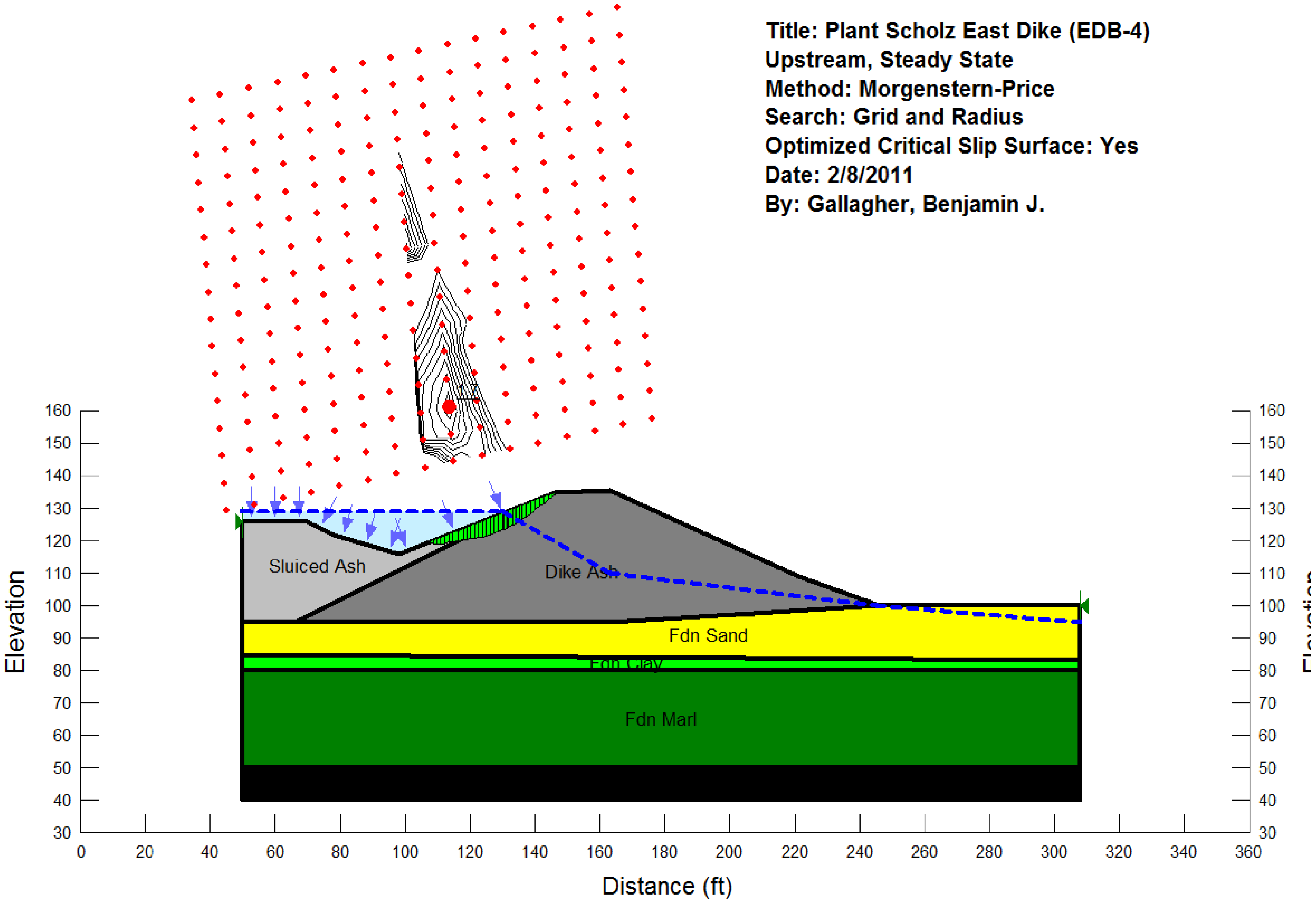
Confidential Business Information

Title: Plant Scholz East Dike (EDB-4)
Downstream, Seismic
Method: Morgenstern-Price
Search: Grid and Radius
Optimized Critical Slip Surface: Yes
Date: 2/8/2011
By: Gallagher, Benjamin J.



Title: Plant Scholz East Dike (EDB-4)
Downstream, Surcharge Water
Method: Morgenstern-Price
Search: Grid and Radius
Optimized Critical Slip Surface: Yes
Date: 2/8/2011
By: Gallagher, Benjamin J.

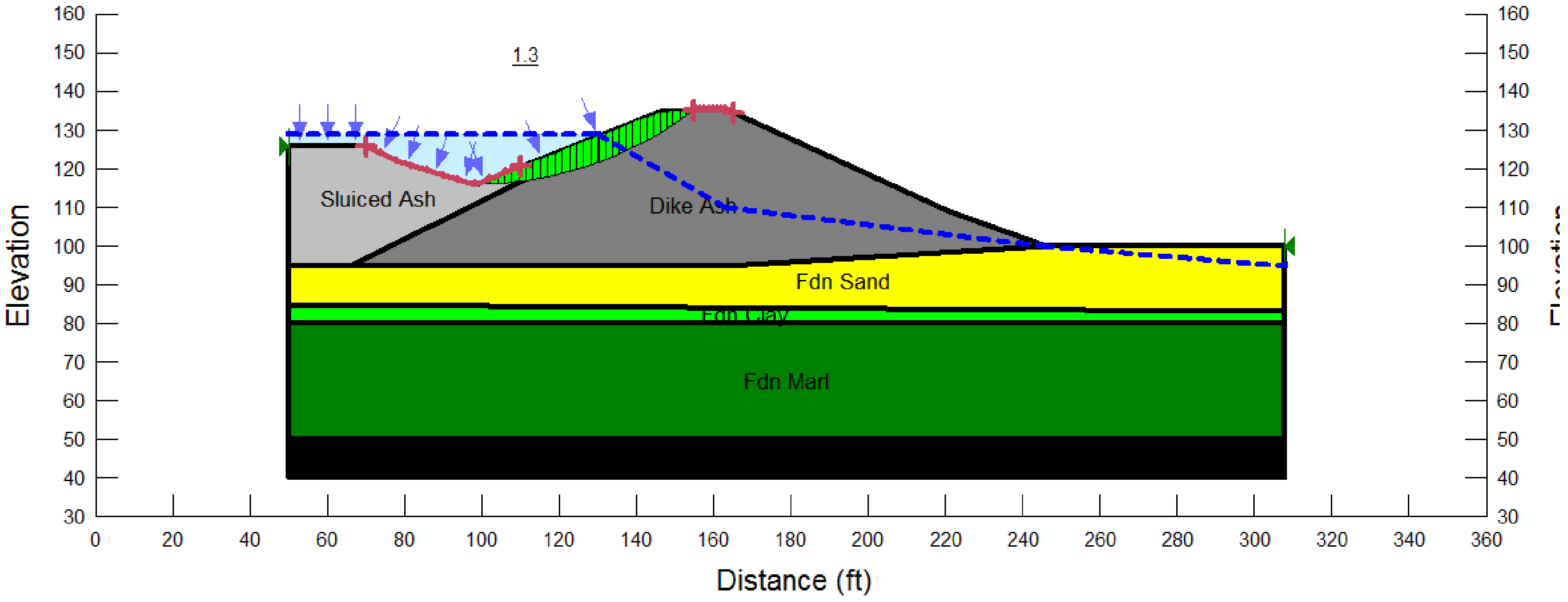




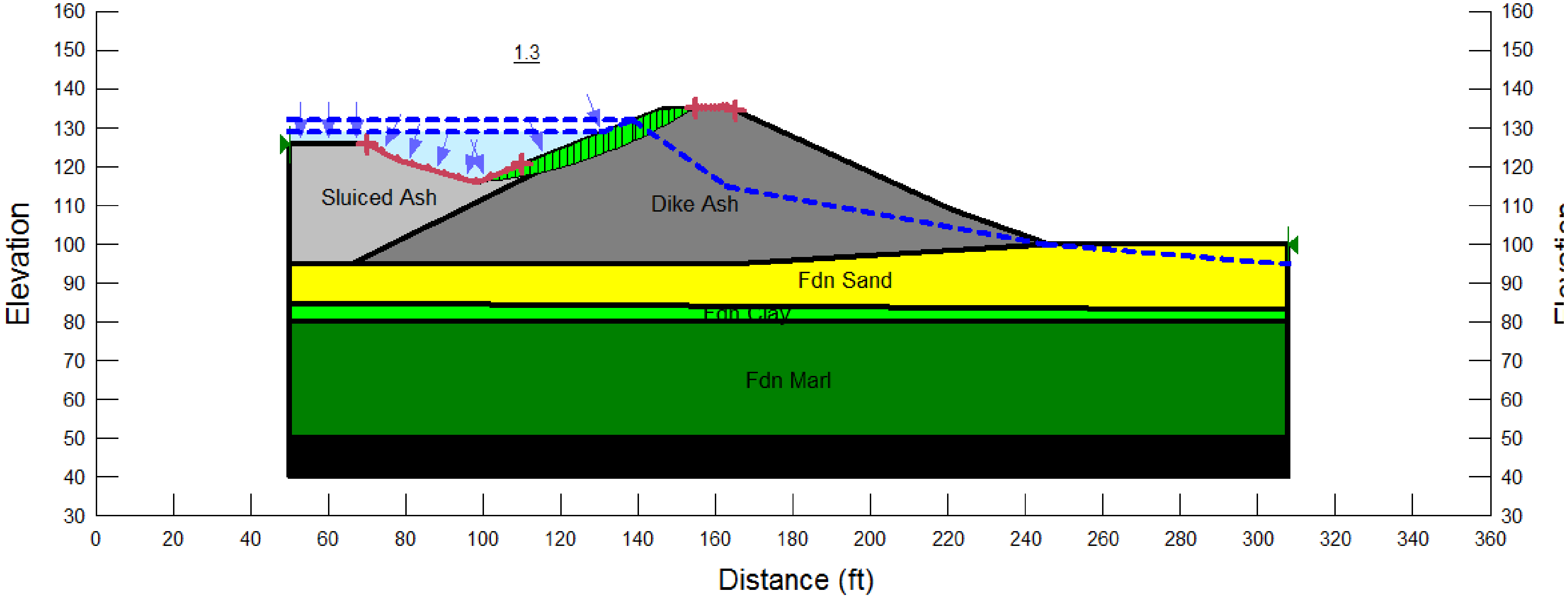
Title: Plant Scholz East Dike (EDB-4)
Upstream, Steady State
Method: Morgenstern-Price
Search: Grid and Radius
Optimized Critical Slip Surface: Yes
Date: 2/8/2011
By: Gallagher, Benjamin J.

Confidential Business Information

Title: Plant Scholz East Dike
Upstream, Seismic 0.072g (Deep Failure)
Method: Morgenstern-Price
Search: Entry and Exit
Optimized Critical Slip Surface: No
Date: 2/8/2011
By: Gallagher, Benjamin J.

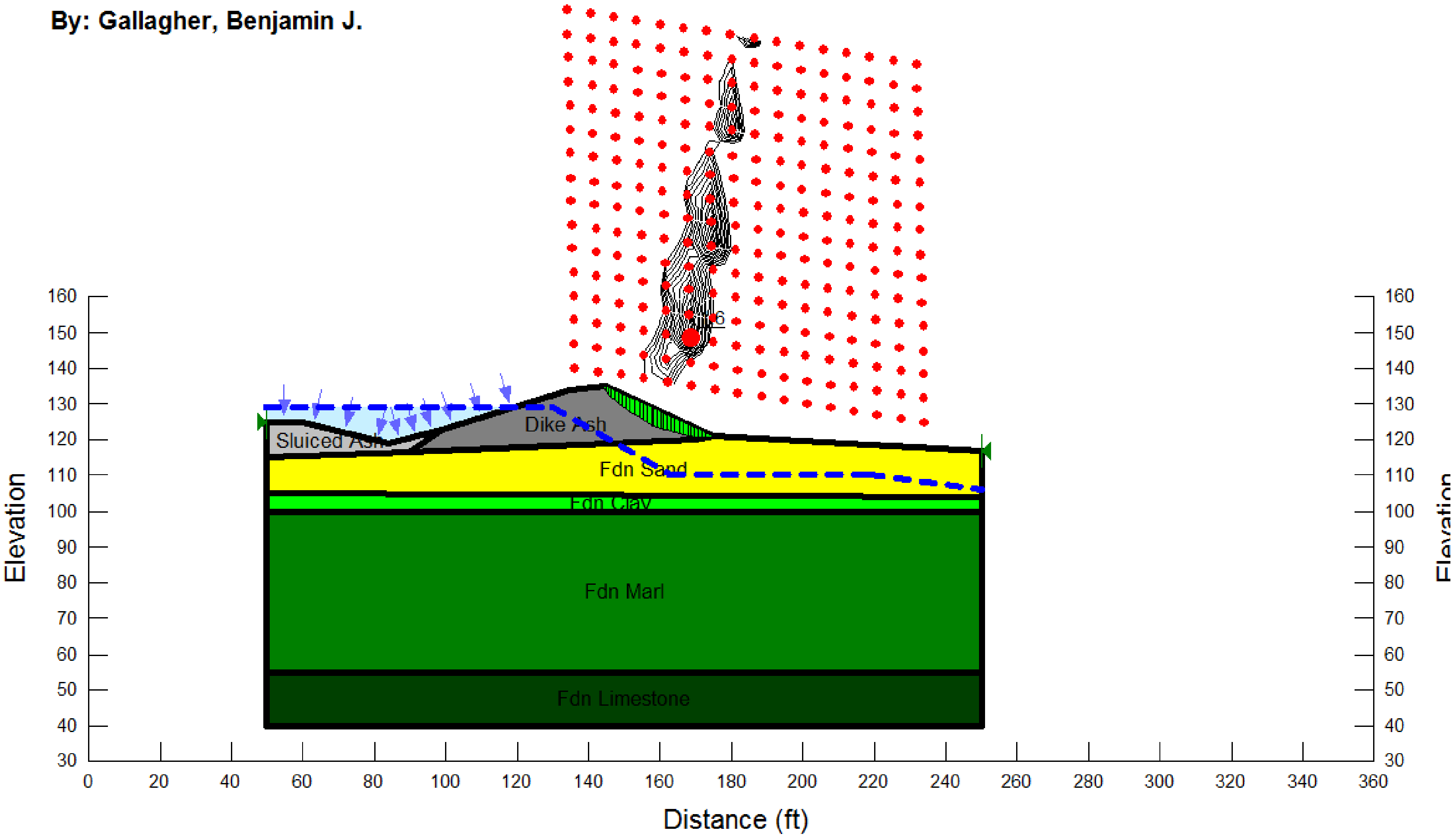


Title: Plant Scholz East Dike
Upstream, Rapid Drawdown (Deep Failure)
Method: Morgenstern-Price
Search: Entry and Exit
Optimized Critical Slip Surface: No
Date: 2/8/2011
By: Gallagher, Benjamin J.

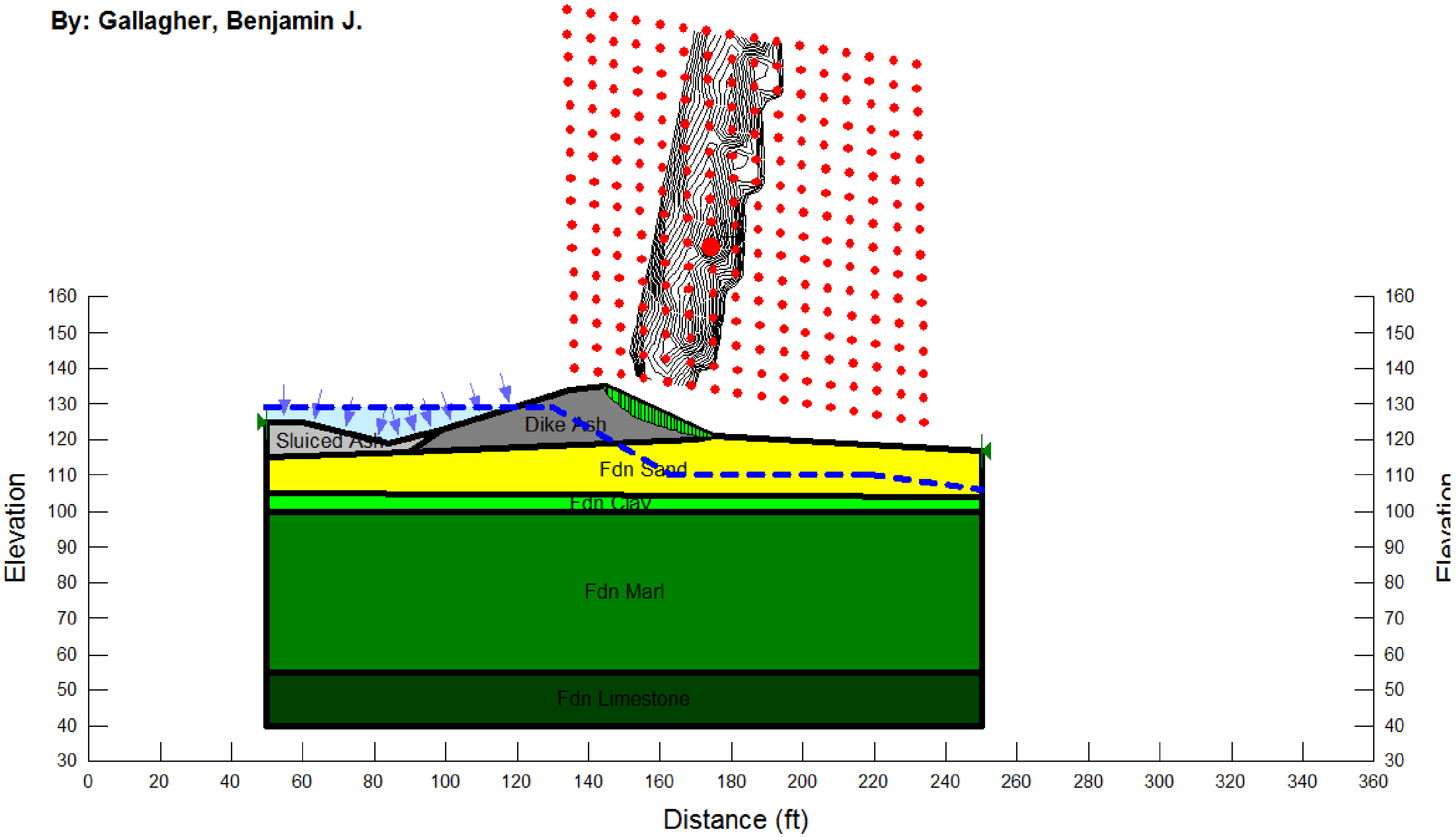


Confidential Business Information

Title: Plant Scholz North Dike Modified (NDB-1)
Downstream, Steady State
Method: Morgenstern-Price
Search: Grid and Radius
Optimized Critical Slip Surface: Yes
Date: 2/9/2011
By: Gallagher, Benjamin J.

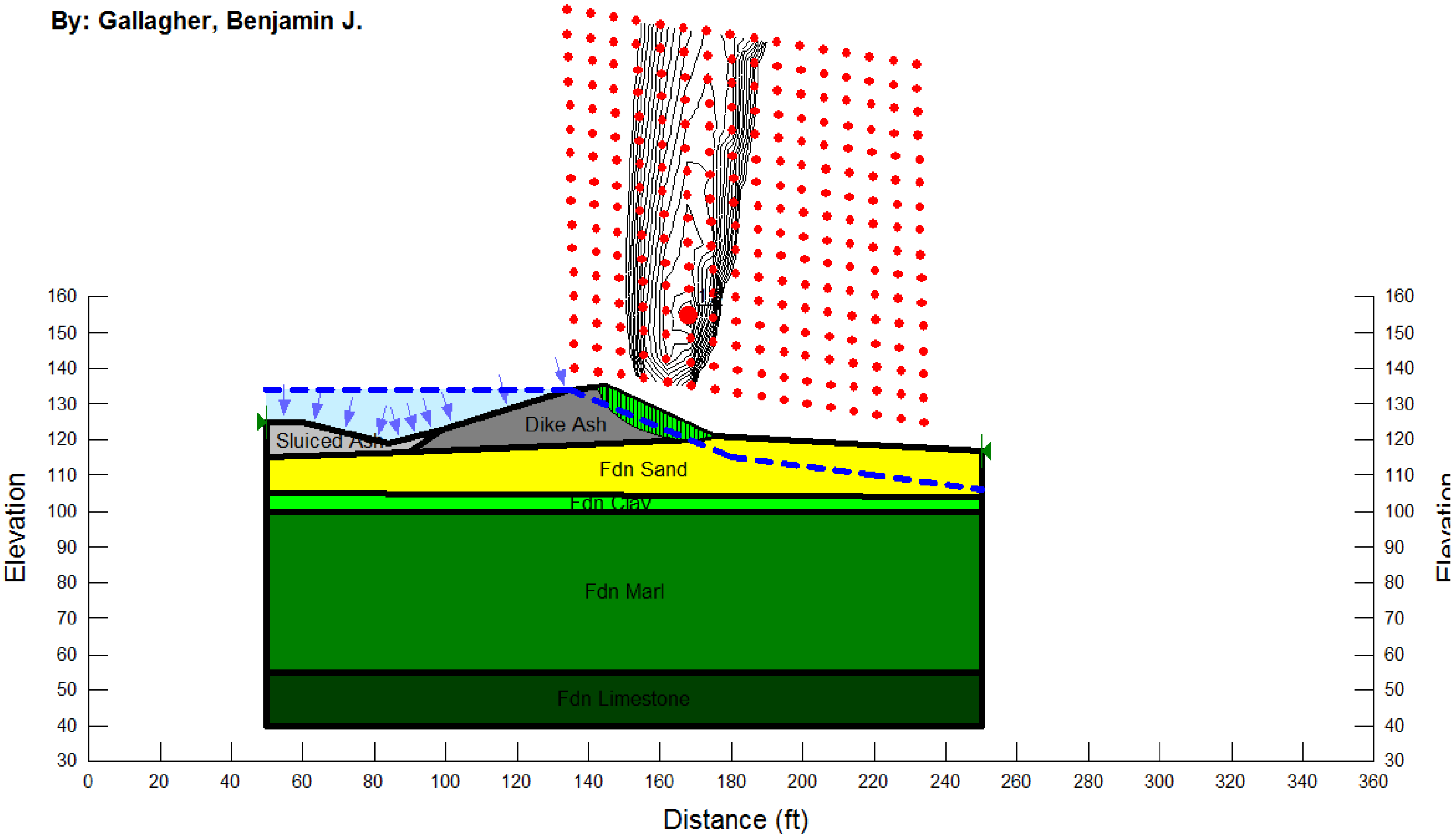


Title: Plant Scholz North Dike Modified (NDB-1)
Downstream, Seismic 0.072g
Method: Morgenstern-Price
Search: Grid and Radius
Optimized Critical Slip Surface: Yes
Date: 2/9/2011
By: Gallagher, Benjamin J.

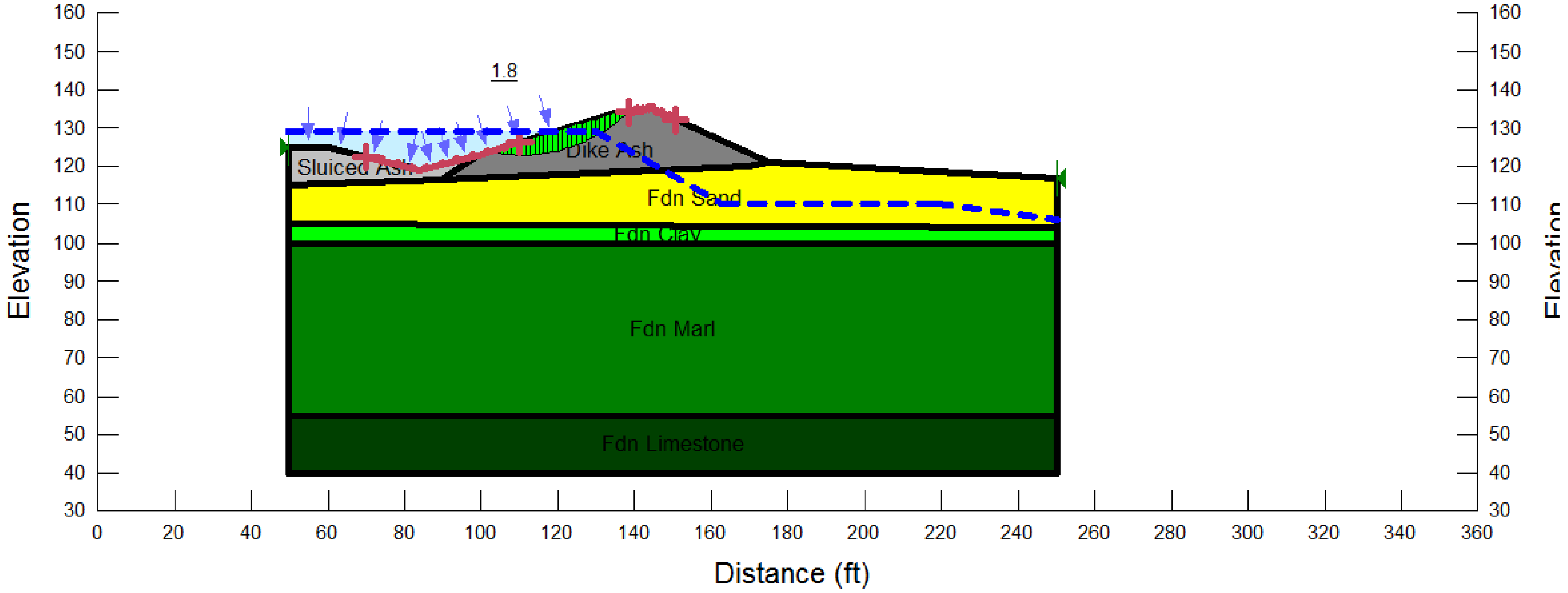


Confidential Business Information

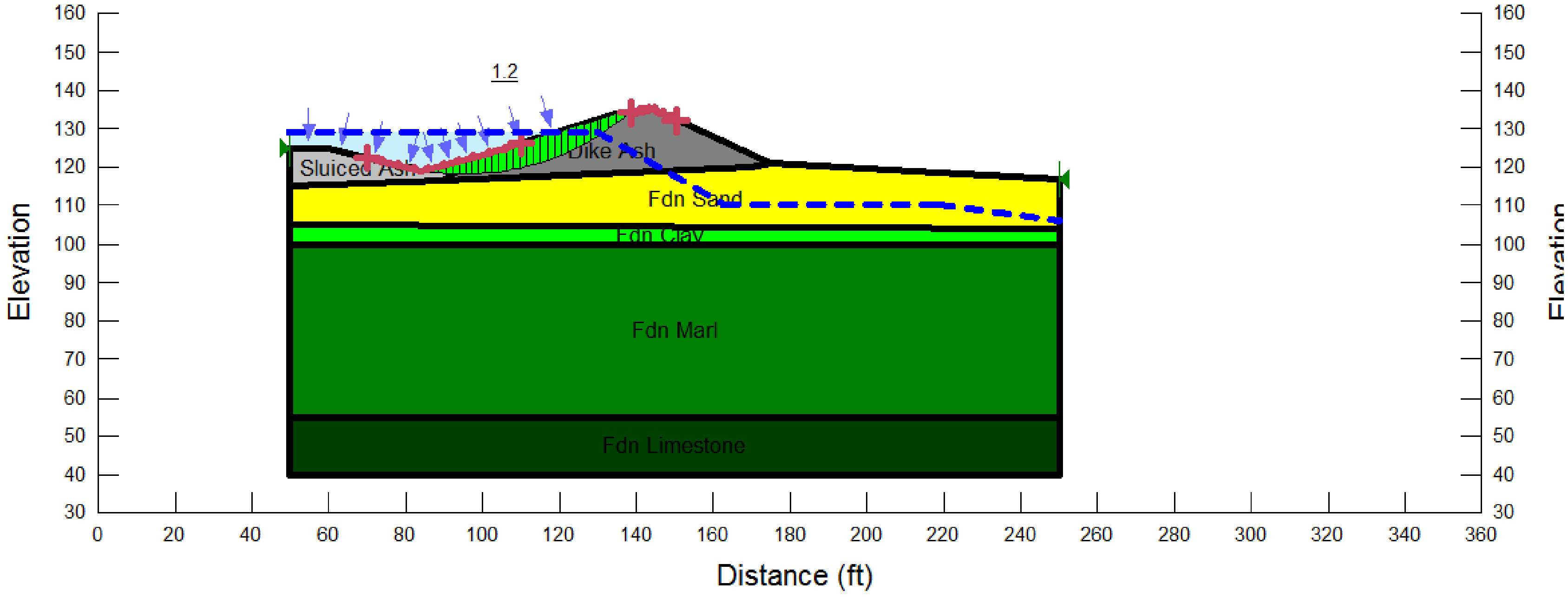
Title: Plant Scholz North Dike Modified (NDB-1)
Downstream, Surcharge
Method: Morgenstern-Price
Search: Grid and Radius
Optimized Critical Slip Surface: Yes
Date: 2/9/2011
By: Gallagher, Benjamin J.



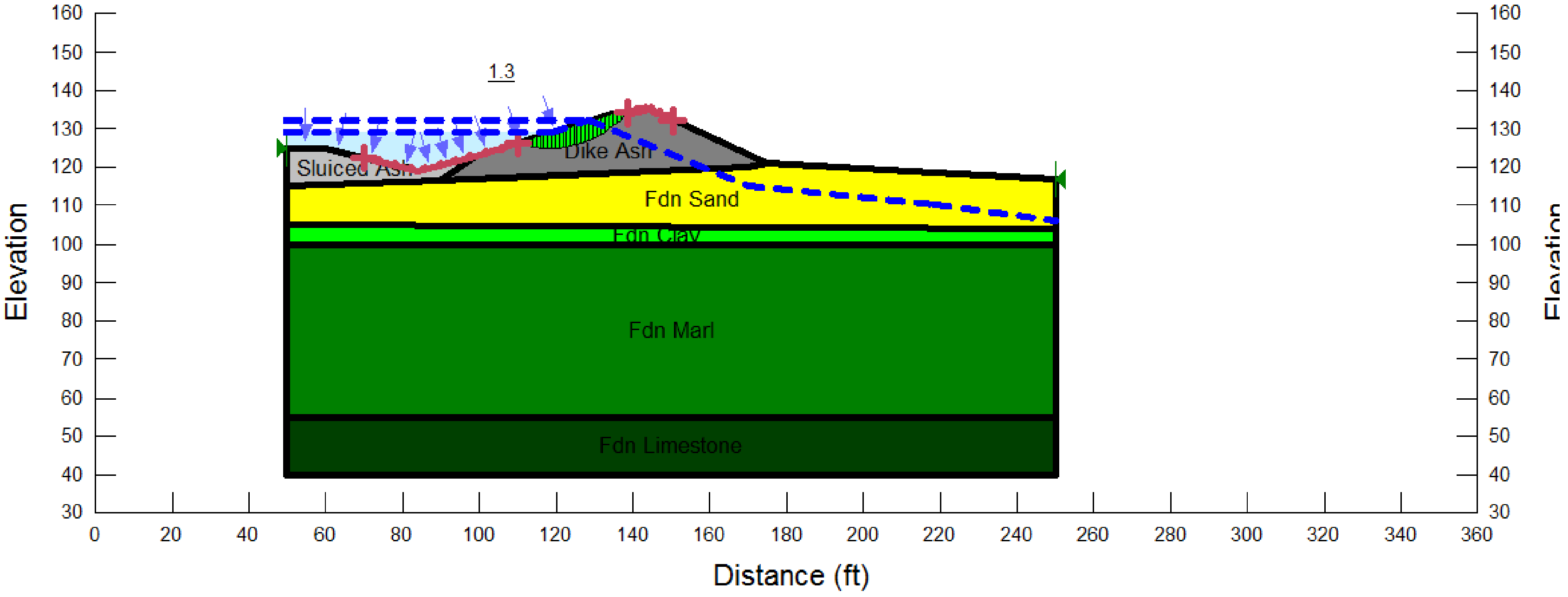
Title: Plant Scholz North Dike Modified (NDB-1)
Upstream, Steady State (Deep Failure)
Method: Morgenstern-Price
Search: Entry and Exit
Optimized Critical Slip Surface: No
Date: 2/9/2011
By: Gallagher, Benjamin J.



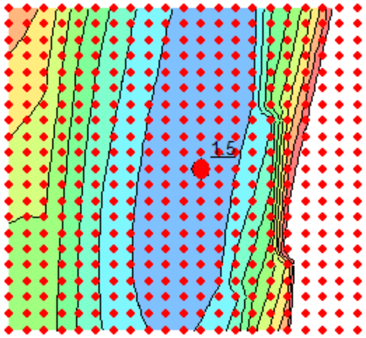
Title: Plant Scholz North Dike Modified (NDB-1)
Upstream, Seismic 0.072g (Deep Failure)
Method: Morgenstern-Price
Search: Entry and Exit
Optimized Critical Slip Surface: No
Date: 2/9/2011
By: Gallagher, Benjamin J.

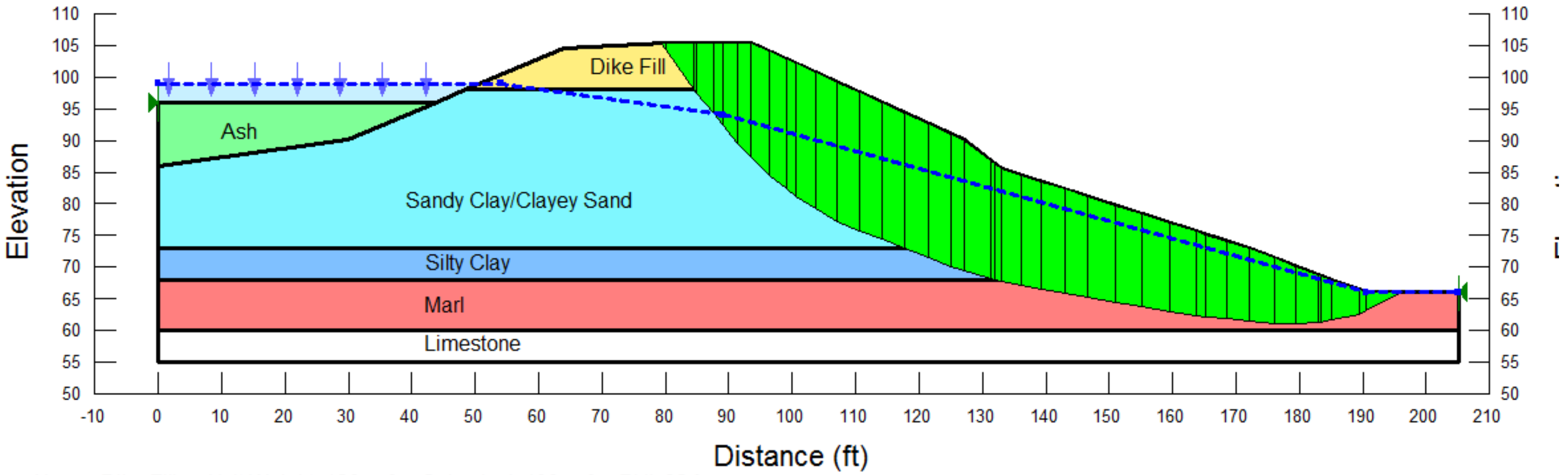


Title: Plant Scholz North Dike Modified (NDB-1)
Upstream, Rapid Drawdown (Deep Failure)
Method: Morgenstern-Price
Search: Entry and Exit
Optimized Critical Slip Surface: No
Date: 2/9/2011
By: Gallagher, Benjamin J.



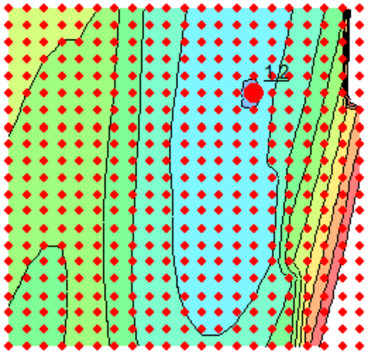
Title: Plant Scholz South Dike (SD-1)
Downstream, Steady State
Method: Morgenstern-Price
Search: Grid and Radius
Optimized Critical Slip Surface: Yes
Horz Seismic Load: 0
Created By: Lippert, Joshua A.
Last Edited By: Gallagher, Benjamin J.
Date: 10/16/2013

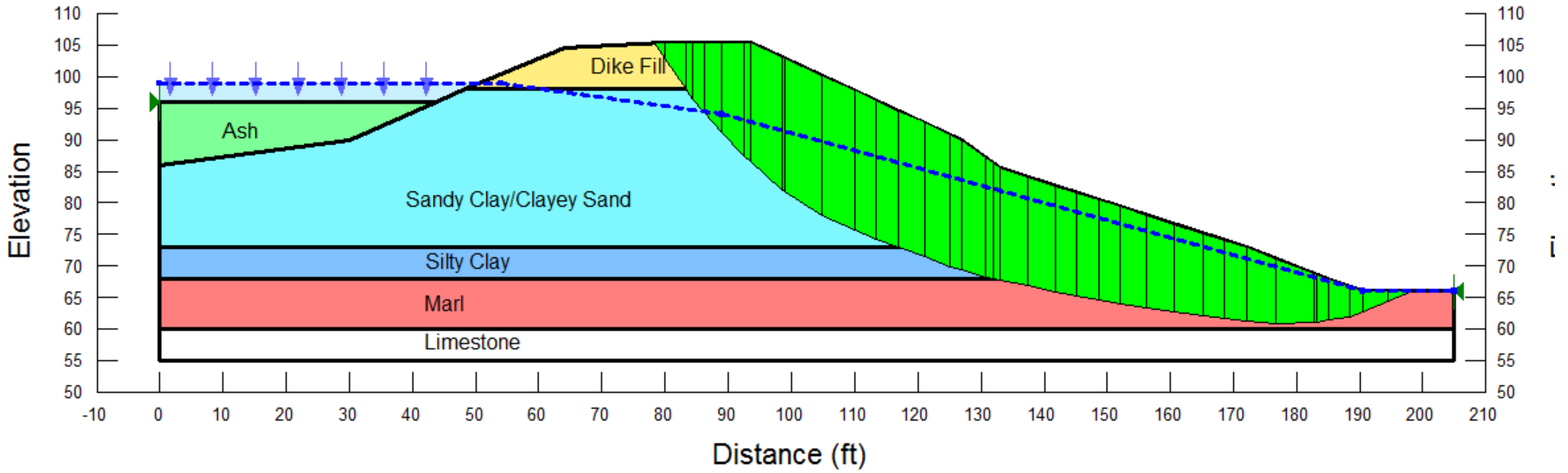




Name: Dike Fill Unit Weight: 120 pcf Cohesion': 400 psf Phi': 32 °
Name: Residual Sandy Clay/Clayey Sand Unit Weight: 120 pcf Cohesion': 300 psf Phi': 22 °
Name: Residual Silty Clay Unit Weight: 120 pcf Cohesion': 600 psf Phi': 20 °
Name: Marl Unit Weight: 125 pcf Cohesion': 0 psf Phi': 38 °
Name: Limestone
Name: Sluiced Ash Unit Weight: 80 pcf Cohesion': 0 psf Phi': 27 °

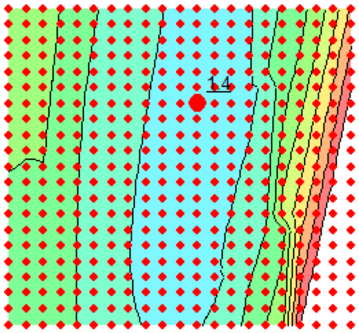
Title: Plant Scholz South Dike (SD-1)
Downstream, Seismic
Method: Morgenstern-Price
Search: Grid and Radius
Optimized Critical Slip Surface: Yes
Horz Seismic Load: 0.072
Created By: Lippert, Joshua A.
Last Edited By: Gallagher, Benjamin J.
Date: 10/16/2013

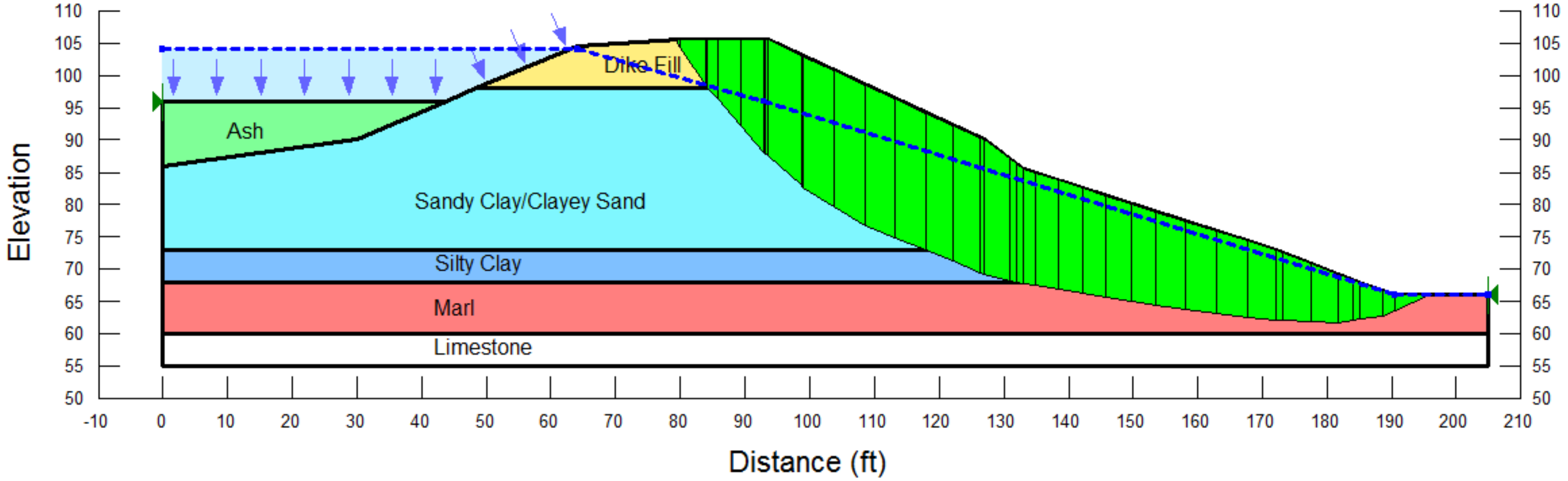




Name: Dike Fill Unit Weight: 120 pcf Cohesion': 400 psf Phi': 32 °
Name: Residual Sandy Clay/Clayey Sand Unit Weight: 120 pcf Cohesion': 300 psf Phi': 22 °
Name: Residual Silty Clay Unit Weight: 120 pcf Cohesion': 600 psf Phi': 20 °
Name: Marl Unit Weight: 125 pcf Cohesion': 0 psf Phi': 38 °
Name: Limestone
Name: Sluiced Ash Unit Weight: 80 pcf Cohesion': 0 psf Phi': 27 °

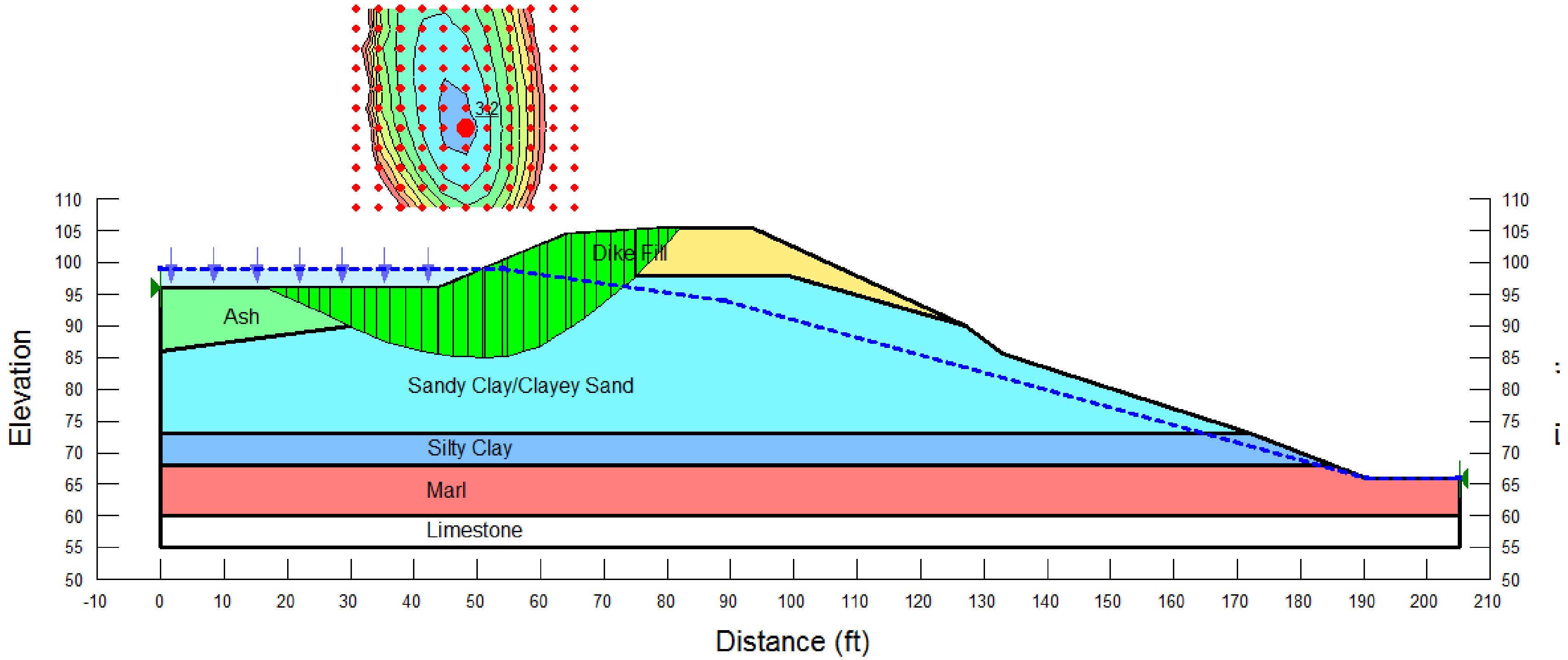
Title: Plant Scholz South Dike (SD-1)
Downstream, Surcharge
Method: Morgenstern-Price
Search: Grid and Radius
Optimized Critical Slip Surface: Yes
Horz Seismic Load: 0
Created By: Lippert, Joshua A.
Last Edited By: Gallagher, Benjamin J.
Date: 10/16/2013





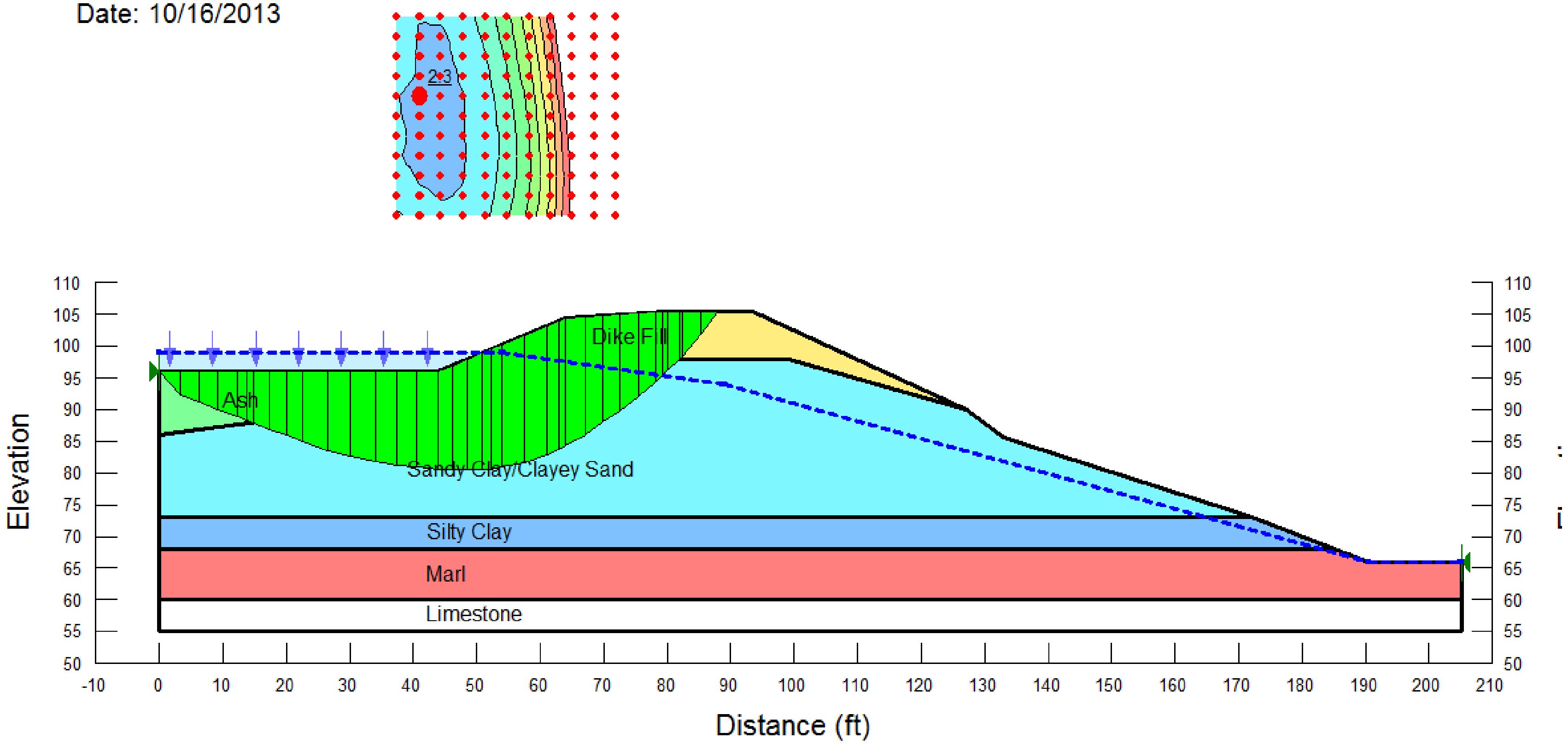
Name: Dike Fill Unit Weight: 120 pcf Cohesion': 400 psf Phi': 32 °
Name: Residual Sandy Clay/Clayey Sand Unit Weight: 120 pcf Cohesion': 300 psf Phi': 22 °
Name: Residual Silty Clay Unit Weight: 120 pcf Cohesion': 600 psf Phi': 20 °
Name: Marl Unit Weight: 125 pcf Cohesion': 0 psf Phi': 38 °
Name: Limestone
Name: Sluiced Ash Unit Weight: 80 pcf Cohesion': 0 psf Phi': 27 °

Title: Plant Scholz South Dike (SD-1)
Upstream, Steady State
Method: Morgenstern-Price
Search: Grid and Radius
Optimized Critical Slip Surface: Yes
Horz Seismic Load: 0
Created By: Lippert, Joshua A.
Last Edited By: Gallagher, Benjamin J.
Date: 10/16/2013



Name: Dike Fill Unit Weight: 120 pcf Cohesion': 400 psf Phi': 32 °
Name: Residual Sandy Clay/Clayey Sand Unit Weight: 120 pcf Cohesion': 300 psf Phi': 22 °
Name: Residual Silty Clay Unit Weight: 120 pcf Cohesion': 600 psf Phi': 20 °
Name: Marl Unit Weight: 125 pcf Cohesion': 0 psf Phi': 38 °
Name: Limestone
Name: Sluiced Ash Unit Weight: 80 pcf Cohesion': 0 psf Phi': 27 °

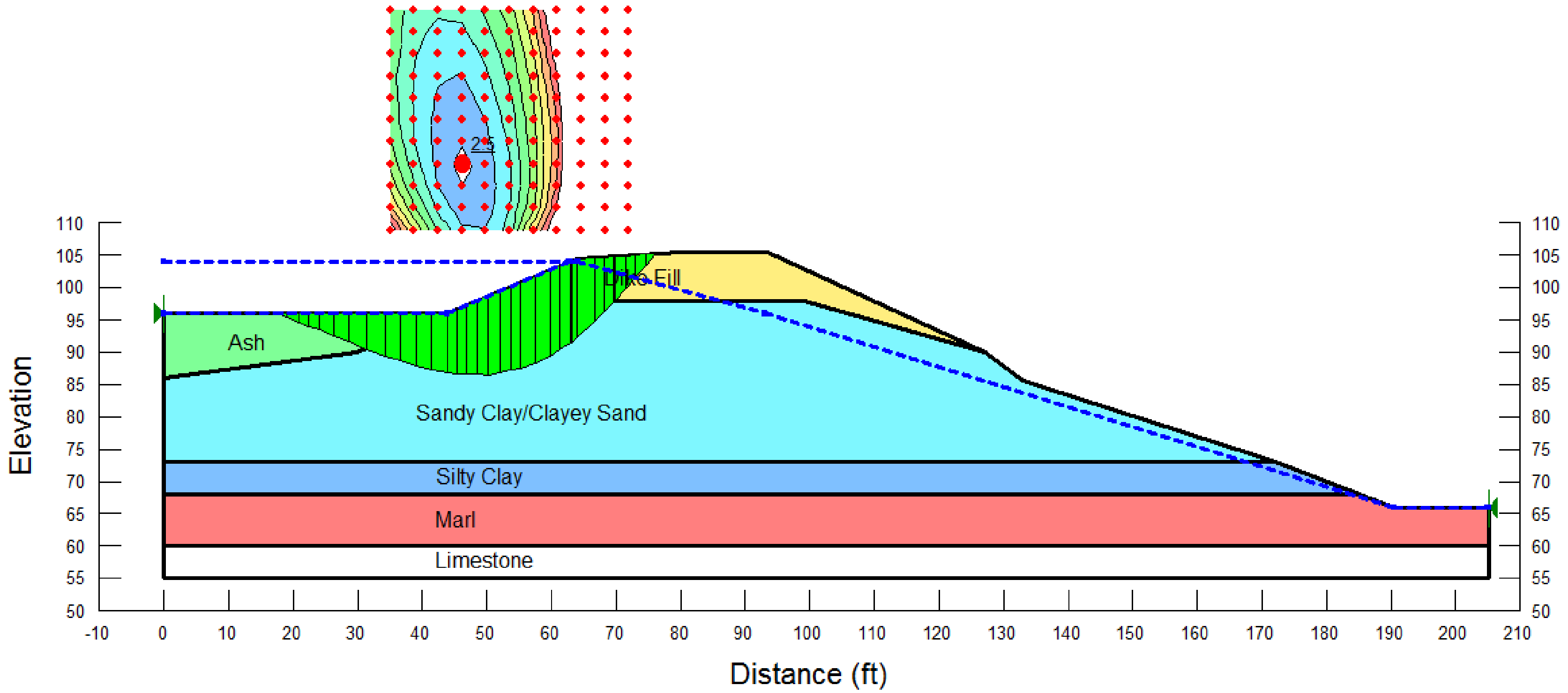
Title: Plant Scholz South Dike (SD-1)
Upstream, Seismic
Method: Morgenstern-Price
Search: Grid and Radius
Optimized Critical Slip Surface: Yes
Horz Seismic Load: 0.072
Created By: Lippert, Joshua A.
Last Edited By: Gallagher, Benjamin J.
Date: 10/16/2013



Name: Dike Fill Unit Weight: 120 pcf Cohesion': 400 psf Phi': 32 °
Name: Residual Sandy Clay/Clayey Sand Unit Weight: 120 pcf Cohesion': 300 psf Phi': 22 °
Name: Residual Silty Clay Unit Weight: 120 pcf Cohesion': 600 psf Phi': 20 °
Name: Marl Unit Weight: 125 pcf Cohesion': 0 psf Phi': 38 °
Name: Limestone
Name: Sluiced Ash Unit Weight: 80 pcf Cohesion': 0 psf Phi': 27 °

Confidential Business Information

Title: Plant Scholz South Dike (SD-1)
Upstream, Rapid Drawdown
Method: Morgenstern-Price
Search: Grid and Radius
Optimized Critical Slip Surface: Yes
Horz Seismic Load: 0
Created By: Lippert, Joshua A.
Last Edited By: Gallagher, Benjamin J.
Date: 10/16/2013



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Name: Residual Sandy Clay/Clayey Sand Unit Weight: 120 pcf Cohesion': 300 psf Phi': 22 ° Total Cohesion: 0 psf Total Phi: 0 °
Name: Residual Silty Clay Unit Weight: 120 pcf Cohesion': 600 psf Phi': 20 ° Total Cohesion: 0 psf Total Phi: 0 °
Name: Marl Unit Weight: 125 pcf Cohesion': 0 psf Phi': 38 ° Total Cohesion: 0 psf Total Phi: 0 °
Name: Limestone
Name: Sluiced Ash Unit Weight: 80 pcf Cohesion': 0 psf Phi': 27 ° Total Cohesion: 100 psf Total Phi: 24 °

East Dike, ED-4

Downstream, Seismic

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File Information

Title: Plant Scholz East Dike
Created By: Gallagher, Benjamin J.
Revision Number: 201
Last Edited By: Gallagher, Benjamin J.
Date: 1/12/2011
Time: 2:38:46 PM
File Name: East Dike Line 4.gsz
Directory: T:\ESEE MAJOR PROJECTS\PROJECTS\Scholz\2010\ES1874_Ash Pond Evaluation\SlopeStability\
Last Solved Date: 1/12/2011
Last Solved Time: 2:39:06 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

Downstream, Seismic

- Kind: SLOPE/W
- Method: Morgenstern-Price
- Settings
  - Apply Phreatic Correction: No
  - Side Function
    - Interslice force function option: Half-Sine
  - PWP Conditions Source: Piezometric Line
  - Use Staged Rapid Drawdown: No
- Slip Surface
  - Direction of movement: Left to Right
  - Use Passive Mode: No
  - Slip Surface Option: Grid and Radius
  - Critical slip surfaces saved: 1
  - Optimize Critical Slip Surface Location: Yes
  - Tension Crack
    - Tension Crack Option: (none)
- FOS Distribution
  - FOS Calculation Option: Constant
- Advanced
  - Number of Slices: 30
  - Optimization Tolerance: 0.01
  - Minimum Slip Surface Depth: 5 ft
  - Optimization Maximum Iterations: 10000
  - Optimization Convergence Tolerance: 1e-007
  - Starting Optimization Points: 8
  - Ending Optimization Points: 16
  - Complete Passes per Insertion: 1
  - Driving Side Maximum Convex Angle: 5 °
  - Resisting Side Maximum Convex Angle: 1 °

Materials

Dike Ash

Model: Mohr-Coulomb
Unit Weight: 90 pcf
Cohesion: 0 psf
Phi: 34 °

Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Sluiced Ash

Model: Mohr-Coulomb
Unit Weight: 80 pcf
Cohesion: 0 psf
Phi: 27 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Fdn Sand

Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion: 0 psf
Phi: 35 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Fdn Clay

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion: 50 psf
Phi: 28 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Fdn Marl

Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion: 0 psf
Phi: 38 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Fdn Limestone

Model: Bedrock (Impenetrable)
Pore Water Pressure
Piezometric Line: 1

Slip Surface Grid

Upper Left: (194.37502, 286.99107) ft
Lower Left: (196.50602, 183.66607) ft
Lower Right: (258.13802, 155.11807) ft
Grid Horizontal Increment: 15
Grid Vertical Increment: 15
Left Projection Angle: 0 °
Right Projection Angle: 0 °

Slip Surface Radius

Upper Left Coordinate: (50, 129) ft
Upper Right Coordinate: (290.866, 129.742) ft
Lower Left Coordinate: (43.7383, 51.9821) ft
Lower Right Coordinate: (290.227, 50.4909) ft
Number of Increments: 20
Left Projection: No
Left Projection Angle: 135 °
Right Projection: No
Right Projection Angle: 45 °

Slip Surface Limits

Left Coordinate: (50, 126) ft
Right Coordinate: (308, 100) ft

Piezometric Lines

Piezometric Line 1

Coordinates

	X (ft)	Y (ft)
	50	129
	130	129
	163	110
	245	100
	308	95

Seismic Loads

Horz Seismic Load: 0.074
Ignore seismic load in strength: No

Regions

	Material	Points	Area (ft²)
Region 1	Fdn Limestone	18,16,17,19	2580
Region 2	Fdn Marl	16,14,15,17	7740
Region 3	Fdn Clay	14,12,13,15	1032
Region 4	Fdn Sand	12,10,20,22,8,9,11,13	3355.5
Region 5	Dike Ash	20,21,5,6,7,8,22	3894.75
Region 6	Sluiced Ash	10,1,2,3,4,5,21,20	1196

Points

	X (ft)	Y (ft)
Point 1	50	126
Point 2	70	126
Point 3	78	122
Point 4	98	116
Point 5	146	135
Point 6	163	135.5
Point 7	221	109
Point 8	246	100
Point 9	308	100
Point 10	50	95
Point 11	308	95
Point 12	50	85
Point 13	308	83
Point 14	50	80
Point 15	308	80
Point 16	50	50
Point 17	308	50
Point 18	50	40
Point 19	308	40
Point 20	66	95

Point 21	108	116
Point 22	163	95

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.3	(244.249, 236.599)	35.89873	(162.393, 135.482)	(223.56, 108.079)
2	3955	1.3	(244.249, 236.599)	130.646	(161.552, 135.457)	(225.846, 107.256)

Slices of Slip Surface:* *Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	162.6964	135.17605	-1560.0546	18.352765	12.379096	0
2	Optimized	164.04285	133.81865	-1494.2105	68.242803	46.030352	0
3	Optimized	166.01425	132.1189	-1403.1375	125.79807	84.851873	0
4	Optimized	167.8714	130.82205	-1336.3866	151.23582	102.00985	0
5	Optimized	169.72855	129.5252	-1269.5915	175.94954	118.67947	0
6	Optimized	171.51995	128.3667	-1210.8935	206.68742	139.41243	0
7	Optimized	173.24565	127.34645	-1160.3627	219.76158	148.23106	0
8	Optimized	174.9714	126.3262	-1109.8319	232.86567	157.06988	0
9	Optimized	176.6189	125.3747	-1063.0162	249.21454	168.09733	0
10	Optimized	178.1881	124.4919	-1019.8624	259.04494	174.72802	0
11	Optimized	179.8085	123.59045	-975.92805	271.3689	183.04063	0
12	Optimized	181.48005	122.67035	-931.27467	281.23772	189.69723	0
13	Optimized	183.2724	121.7026	-884.52061	295.88826	199.57915	0
14	Optimized	185.18555	120.6872	-835.71916	305.88863	206.32449	0
15	Optimized	187.1063	119.67495	-787.14688	318.01524	214.50399	0
16	Optimized	189.0347	118.6658	-738.85764	328.18309	221.36229	0
17	Optimized	190.9687	117.78785	-698.80408	378.0634	255.00698	0
18	Optimized	192.90835	117.0412	-666.95278	370.17275	249.68467	0
19	Optimized	194.87885	116.2898	-635.08787	363.94503	245.48402	0
20	Optimized	196.88015	115.53365	-603.11612	353.75053	238.60775	0
21	Optimized	198.83475	114.80625	-	346.61759	233.79652	0

				572.60193			
22	Optimized	200.74265	114.1076	-543.5141	333.96365	225.26133	0
23	Optimized	202.65055	113.409	-514.4755	320.87167	216.43067	0
24	Optimized	204.71485	112.674	-484.28529	310.08296	209.1536	0
25	Optimized	206.93555	111.9026	-453.06304	289.76722	195.45046	0
26	Optimized	209.17745	111.1603	-423.80149	273.43962	184.43736	0
27	Optimized	211.44055	110.44715	-396.52159	244.61724	164.99641	0
28	Optimized	213.6912	109.7887	-372.56141	219.27405	147.90221	0
29	Optimized	215.9294	109.18495	-351.92035	180.58878	121.80867	0
30	Optimized	218.4591	108.60945	-335.26137	135.51387	91.405259	0
31	Optimized	220.43485	108.2964	-330.76363	88.564305	59.737378	0
32	Optimized	222.27985	108.16775	-336.77427	33.29666	22.458881	0

Slices of Slip Surface: 3955

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	3955	162.2759	134.8739	-1526.1388	37.784625	25.486052	0
2	3955	164.07405	133.4555	-1471.8146	96.155861	64.857947	0
3	3955	166.2222	131.8208	-1386.154	135.24018	91.220654	0
4	3955	168.37035	130.2546	-1304.7462	170.15018	114.76775	0
5	3955	170.5185	128.7539	-1227.467	201.54193	135.94175	0
6	3955	172.66665	127.31605	-1154.0705	229.96907	155.1161	0
7	3955	174.8148	125.9386	-1084.4671	255.86832	172.58536	0
8	3955	176.96295	124.6193	-1018.5083	279.58004	188.57912	0
9	3955	179.1111	123.3561	-956.03035	301.34406	203.25913	0
10	3955	181.25925	122.14715	-896.94493	321.29821	216.71838	0
11	3955	183.4074	120.99075	-841.12404	339.48158	228.98322	0
12	3955	185.55555	119.8854	-788.48715	355.83191	240.01165	0
13	3955	187.7037	118.8296	-738.96639	370.18401	249.69227	0
14	3955	189.85185	117.822	-692.42522	382.2729	257.84633	0
15	3955	192	116.8614	-648.83006	391.74283	264.23388	0

16	3955	194.14815	115.9467	-608.08516	398.16164	268.56342	0
17	3955	196.2963	115.07685	-570.16241	401.04497	270.50825	0
18	3955	198.44445	114.2509	-534.97454	399.87723	269.7206	0
19	3955	200.5926	113.468	-502.46362	394.15664	265.86201	0
20	3955	202.74075	112.7273	-472.60214	383.43143	258.62776	0
21	3955	204.8889	112.028	-445.30736	367.3475	247.77902	0
22	3955	207.03705	111.36945	-420.566	345.69251	233.17254	0
23	3955	209.1852	110.75105	-398.32392	318.42147	214.77799	0
24	3955	211.33335	110.17215	-378.5501	285.68867	192.69944	0
25	3955	213.4815	109.63225	-361.20562	247.82384	167.15929	0
26	3955	215.62965	109.13085	-346.26226	205.33914	138.503	0
27	3955	217.7778	108.66745	-333.69468	158.87205	107.16055	0
28	3955	219.92595	108.24165	-323.47135	109.15323	73.624783	0
29	3955	222.21145	107.8308	-315.22823	63.305198	42.699895	0
30	3955	224.6343	107.4395	-309.24907	21.446998	14.466183	0

North Dike, ND-6

Upstream, Rapid Drawdown

Report generated using GeoStudio 2007, version 7.16. Copyright © 1991-2010 GEO-SLOPE International Ltd.

File Information

Title: Plant Scholz North Dike
Created By: Gallagher, Benjamin J.
Revision Number: 222
Last Edited By: Gallagher, Benjamin J.
Date: 1/23/2011
Time: 6:50:49 PM
File Name: North Dike Line 6.gsz
Directory: T:\ESEE MAJOR PROJECTS\PROJECTS\Scholz\2010\ES1874_Ash Pond Evaluation\SlopeStability\

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

Upstream, Rapid Drawdown

- Kind: SLOPE/W
- Method: Morgenstern-Price
- Settings
  - Apply Phreatic Correction: No
  - Side Function
    - Interslice force function option: Half-Sine
  - PWP Conditions Source: Piezometric Line
  - Use Staged Rapid Drawdown: Yes
- Slip Surface
  - Direction of movement: Right to Left
  - Use Passive Mode: No
  - Slip Surface Option: Grid and Radius
  - Critical slip surfaces saved: 1
  - Optimize Critical Slip Surface Location: Yes
  - Tension Crack
    - Tension Crack Option: (none)
- FOS Distribution
  - FOS Calculation Option: Constant
- Advanced
  - Number of Slices: 30
  - Optimization Tolerance: 0.01
  - Minimum Slip Surface Depth: 5 ft
  - Optimization Maximum Iterations: 10000
  - Optimization Convergence Tolerance: 1e-007
  - Starting Optimization Points: 8
  - Ending Optimization Points: 16
  - Complete Passes per Insertion: 1
  - Driving Side Maximum Convex Angle: 5 °
  - Resisting Side Maximum Convex Angle: 1 °

Materials

Dike Ash

Model: Mohr-Coulomb
Unit Weight: 90 pcf
Cohesion: 0 psf
Phi: 34 °
Phi-B: 0 °

Drawdown Total Cohesion: 100 psf
Drawdown Total Phi: 28 °
Pore Water Pressure
    Piezometric Line: 1
    Piezometric Line After Drawdown: 2

Sluiced Ash

Model: Mohr-Coulomb
Unit Weight: 80 pcf
Cohesion: 0 psf
Phi: 27 °
Phi-B: 0 °
Drawdown Total Cohesion: 100 psf
Drawdown Total Phi: 24 °
Pore Water Pressure
    Piezometric Line: 1
    Piezometric Line After Drawdown: 2

Fdn Sand

Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion: 0 psf
Phi: 35 °
Phi-B: 0 °
Drawdown Total Cohesion: 500 psf
Drawdown Total Phi: 22 °
Pore Water Pressure
    Piezometric Line: 1
    Piezometric Line After Drawdown: 2

Fdn Clay

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion: 50 psf
Phi: 28 °
Phi-B: 0 °
Drawdown Total Cohesion: 0 psf
Drawdown Total Phi: 0 °
Pore Water Pressure
    Piezometric Line: 1
    Piezometric Line After Drawdown: 2

Fdn Marl

Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion: 0 psf
Phi: 38 °
Phi-B: 0 °
Drawdown Total Cohesion: 0 psf
Drawdown Total Phi: 0 °
Pore Water Pressure
    Piezometric Line: 1
    Piezometric Line After Drawdown: 2

Fdn Limestone

Model: Bedrock (Impenetrable)
Pore Water Pressure
    Piezometric Line: 1
    Piezometric Line After Drawdown: 2

Slip Surface Grid

Upper Left: (60.01054, 215.39798) ft
Lower Left: (55.01006, 137.0886) ft
Lower Right: (151.24569, 151.71264) ft
Grid Horizontal Increment: 15
Grid Vertical Increment: 15

Left Projection Angle: 0 °
Right Projection Angle: 0 °

Slip Surface Radius

Upper Left Coordinate: (50, 134) ft
Upper Right Coordinate: (265.47171, 147.27448) ft
Lower Left Coordinate: (50.40207, 55.56758) ft
Lower Right Coordinate: (266.83033, 52.17103) ft
Number of Increments: 25
Left Projection: No
Left Projection Angle: 135 °
Right Projection: No
Right Projection Angle: 45 °

Slip Surface Limits

Left Coordinate: (50, 125) ft
Right Coordinate: (250, 117) ft

Piezometric Lines

Piezometric Line 1

Coordinates

	X (ft)	Y (ft)
	50	132
	112.505	132
	170	115
	219	110
	250	106

Piezometric Line 2

Coordinates

	X (ft)	Y (ft)
	50	129
	108.006	129
	112.505	132
	170	115
	219	110
	250	106

Regions

	Material	Points	Area (ft²)
Region 1	Fdn Limestone	18,16,17,19	3000
Region 2	Fdn Marl	16,14,15,17	9000
Region 3	Fdn Clay	14,12,13,15	900
Region 4	Fdn Sand	12,10,20,11,7,8,9,13	2715
Region 5	Dike Ash	20,4,5,6,7,11	903.25
Region 6	Sluiced Ash	1,2,3,4,20,10	285.25

Points

	X (ft)	Y (ft)
Point 1	50	125
Point 2	60	125
Point 3	84	119

Point 4	99	123
Point 5	114	133
Point 6	142	135.5
Point 7	172	121
Point 8	212	119
Point 9	250	117
Point 10	50	115
Point 11	170	120
Point 12	50	105
Point 13	250	104
Point 14	50	100
Point 15	250	100
Point 16	50	55
Point 17	250	55
Point 18	50	40
Point 19	250	40
Point 20	90	116.5

South Dike, SD-1

Downstream, Seismic

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File Information

Created By: Lippert, Joshua A.
Last Edited By: Gallagher, Benjamin J.
Revision Number: 87
File Version: 8.1
Tool Version: 8.11.1.7283
Date: 10/18/2013
Time: 10:49:36 AM
File Name: South Dike SD-1.gsz
Directory: T:\ESEE MAJOR PROJECTS\PROJECTS\Scholz\2013\ES2290\SlopeFiles\

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D
Element Thickness: 1

Analysis Settings

Downstream, Seismic

- Kind: SLOPE/W
- Method: Morgenstern-Price
- Settings
  - Side Function
    - Interslice force function option: Half-Sine
  - Lambda
    - Lambda 1: -1
    - Lambda 2: -0.8
    - Lambda 3: -0.6
    - Lambda 4: -0.4
    - Lambda 5: -0.2
    - Lambda 6: 0
    - Lambda 7: 0.2
    - Lambda 8: 0.4
    - Lambda 9: 0.6
    - Lambda 10: 0.8
    - Lambda 11: 1
  - PWP Conditions Source: Piezometric Line
  - Apply Phreatic Correction: No
  - Use Staged Rapid Drawdown: No
- Slip Surface
  - Direction of movement: Left to Right
  - Use Passive Mode: No
  - Slip Surface Option: Grid and Radius
  - Critical slip surfaces saved: 1
  - Optimize Critical Slip Surface Location: Yes
  - Tension Crack
    - Tension Crack Option: (none)
- F of S Distribution
  - F of S Calculation Option: Constant
- Advanced
  - Number of Slices: 30
  - F of S Tolerance: 0.01
  - Minimum Slip Surface Depth: 0.1 ft
  - Optimization Maximum Iterations: 2,000
  - Optimization Convergence Tolerance: 1e-007
  - Starting Optimization Points: 8
  - Ending Optimization Points: 16
  - Complete Passes per Insertion: 1

Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

Dike Fill

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 400 psf
Phi': 32 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Residual Sandy Clay/Clayey Sand

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 300 psf
Phi': 22 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Residual Silty Clay

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 600 psf
Phi': 20 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Marl

Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion': 0 psf
Phi': 38 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Limestone

Model: Bedrock (Impenetrable)
Pore Water Pressure
Piezometric Line: 1

Sluiced Ash

Model: Mohr-Coulomb
Unit Weight: 80 pcf
Cohesion': 0 psf
Phi': 27 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Slip Surface Grid

Upper Left: (133.50955, 198.0175) ft
Lower Left: (133.50955, 147.99485) ft
Lower Right: (185.52425, 147.99485) ft
Grid Horizontal Increment: 20
Grid Vertical Increment: 20
Left Projection Angle: 0 °
Right Projection Angle: 0 °

Slip Surface Radius

Upper Left Coordinate: (11, 102.08545) ft
Upper Right Coordinate: (173, 102.08545) ft
Lower Left Coordinate: (11, 55.0066) ft
Lower Right Coordinate: (173, 55.0066) ft
Number of Increments: 15
Left Projection: No
Left Projection Angle: 135 °
Right Projection: No
Right Projection Angle: 45 °

Slip Surface Limits

Left Coordinate: (0, 96) ft
Right Coordinate: (205, 66) ft

Piezometric Lines

Piezometric Line 1

Coordinates

	X (ft)	Y (ft)
Coordinate 1	0	99
Coordinate 2	54	99
Coordinate 3	89	94
Coordinate 4	190.5	66
Coordinate 5	205	66

Seismic Coefficients

Horz Seismic Coef.: 0.072
Ignore seismic load in strength: No

Points

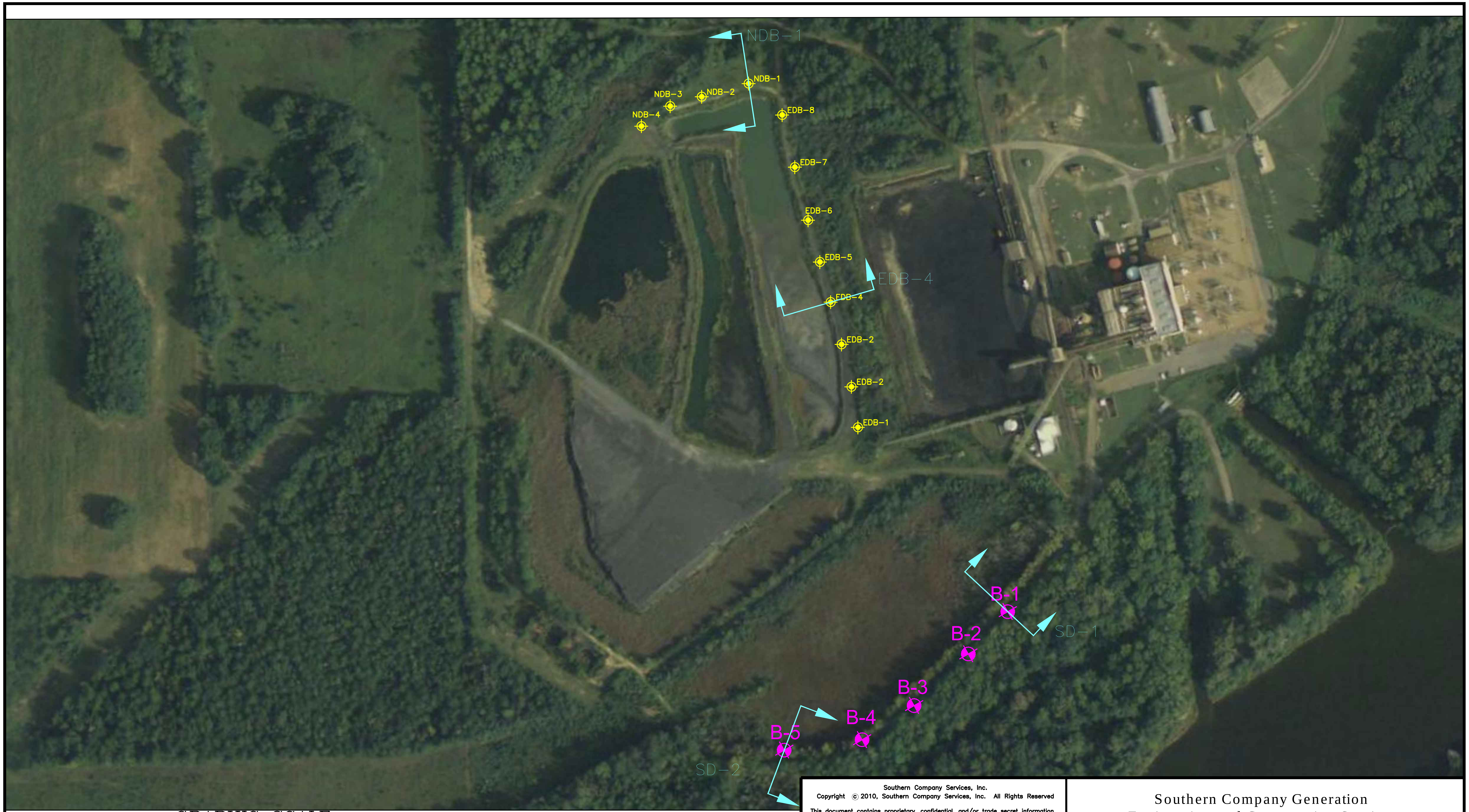
	X (ft)	Y (ft)
Point 1	30	90
Point 2	64	104.5
Point 3	80	105.5
Point 4	93.5	105.5
Point 5	127	90
Point 6	133	85.5
Point 7	190.5	66
Point 8	99	98
Point 9	48.5	98
Point 10	0	73
Point 11	0	68
Point 12	0	60
Point 13	205	60
Point 14	205	66
Point 15	172	73
Point 16	185	68
Point 17	0	55
Point 18	205	55
Point 19	0	96
Point 20	43.875	96
Point 21	0	86

Point 22	182.5	71

Regions

	Material	Points	Area (ft²)
Region 1	Dike Fill	9,2,3,4,5,8	367.25
Region 2	Residual Sandy Clay/Clayey Sand	1,20,9,8,5,6,15,10,21	3,021.3
Region 3	Residual Silty Clay	10,11,16,15	892.5
Region 4	Marl	11,12,13,14,7,16	1,605.5
Region 5	Limestone	12,13,18,17	1,025
Region 6	Sluiced Ash	1,21,19,20	281.63

ATTACHMENT B



GRAPHIC SCALE

250 0 125 250 500 1000

(IN FEET)
1 inch = 250 ft.

Drawing name: T:\ESEE MAJOR PROJECTS\PROJECTS\Scholz\2009\South Embankment Borings\Figure 1_recover.dwg Sep 10, 2012 - 10:34am

Southern Company Services, Inc.

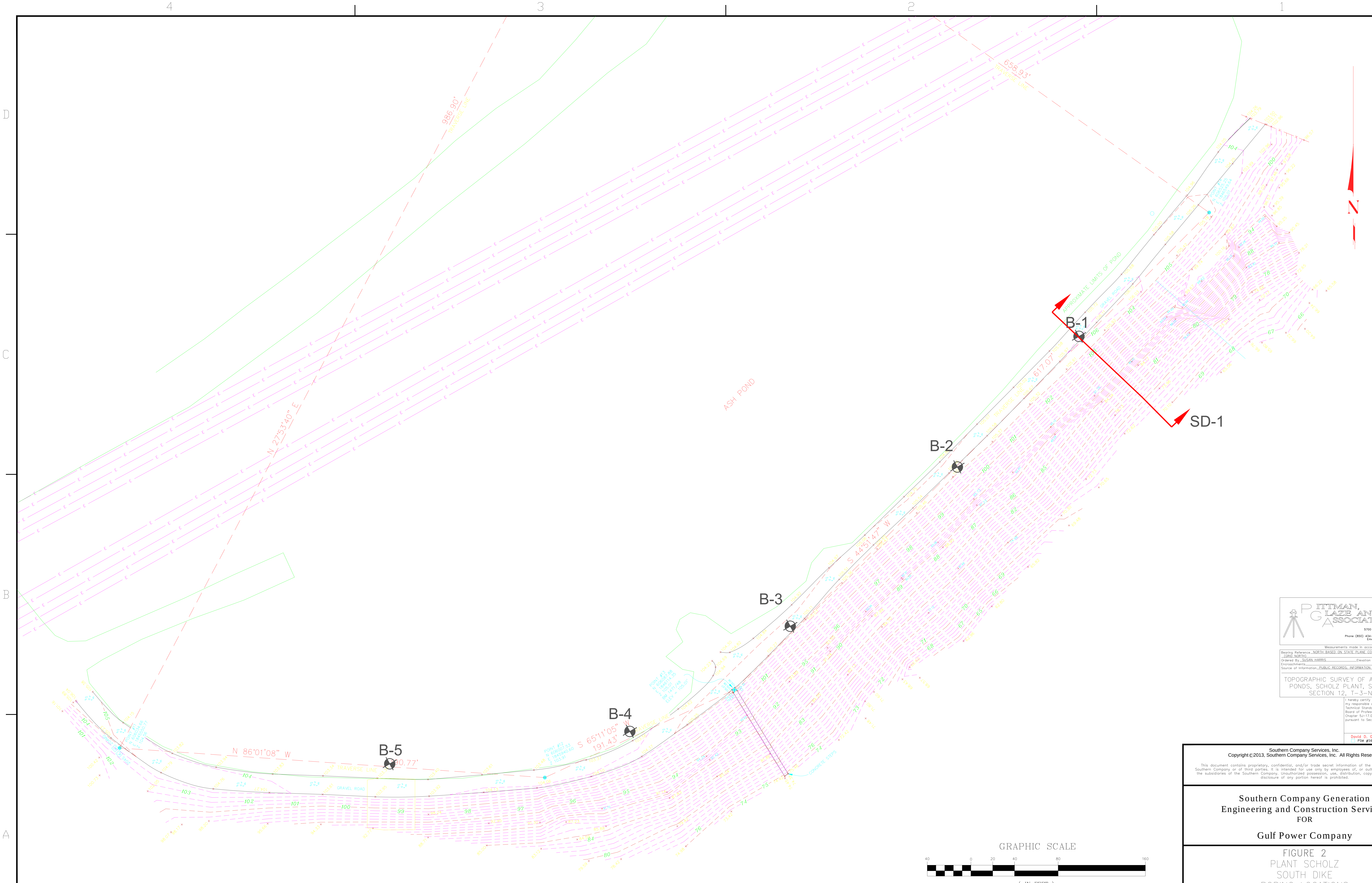
Southern Company Generation
Engineering and Construction Services
FOR

PLANT SCHOLZ
North and East Dike
Boring Locations

Gulf Power Company

SCALE	PROJ I.D.	DRAWING NUMBER	SHEET	CONT'D	REV
AS SHOWN		**FIGURE 1**	1	FINAL	0

ANSI B: 17x11 Acad2009



PITTMAN, GLAZE AND ASSOCIATES, INC.
LAND SURVEYORS
5700 N. DAVIS HIGHWAY, SUITE 3
PENSACOLA, FL 32503
Phone (850) 434-6666 Fax (850) 434-6661
Email: pgasurvey@bellsouth.net

Measurements made in accordance with United States Standards.

Bearing Reference NORTH BASED ON STATE PLANE COORDINATE SYSTEM (GRID NORTH)
Ordered By SUSAN HARRIS Elevation Reference NAVD 88
Encroachments
Source of Information PUBLIC RECORDS; INFORMATION FURNISHED BY CLIENT

TOPOGRAPHIC SURVEY OF A PORTION OF ASH PONDS, SCHOLZ PLANT, SNEADS, FLORIDA, SECTION 12, T-3-N, R-07-W

I hereby certify that this survey was made under my responsible charge and meets the Minimum Technical Standards as set forth by the Florida Board of Professional Surveyors & Mappers in Chapter 5J-17.050, 5J-17.051 and 5J-17.052, pursuant to Section 472.027 Florida Statutes.

David D. Glaze
☐ PSM #5605

Walter J. Glaze
■ PSM #6190

Southern Company Generation
Engineering and Construction Services
FOR
Gulf Power Company

FIGURE 2
PLANT SCHOLZ
SOUTH DIKE
BORING LOCATIONS

SCALE	PROJ I.D.	DRAWING NUMBER	SHEET	CONT'D	REV
1"= 40'		**ES2290 TOPO**	1	FINAL	0

ANSI D: 34X22 CIVIL 3D 2013

ATTACHMENT C

BORING EDB-1
PAGE 1 OF 2

SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Dike Evaluation
LOCATION Plant Scholz - Sneads, FL

DATE STARTED 3/3/2010 **COMPLETED** 3/3/2010 **SURF. ELEV.** 134.7 **COORDINATES:** N 606,932.81 E 1,846,006.49
CONTRACTOR SCS Field Services **EQUIPMENT** **METHOD** Hollow Stem Auger
DRILLED BY S. Denty **LOGGED BY** G. Wilson **CHECKED BY** **ANGLE** **BEARING**
BORING DEPTH 61 ft. **GROUND WATER DEPTH: DURING** **COMP.** **DELAYED**
NOTES

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		Coal Combustion Byproduct (ASH) - black, damp, no plasticity						
				SS-1	2.5-4.0	2-3-2 (5)	100	
5				SS-2	4.5-6.0	2-2-2 (4)	100	
				SS-3	7.5-9.0	3-4-3 (7)	100	
10				SS-4	9.5-11.0	1-3-5 (8)	100	
15				SS-5	14.5-16.0	6-7-9 (16)	100	
20				SS-6	19.5-21.0	6-7-6 (13)	100	
25				SS-7	24.5-26.0	2-3-3 (6)	100	
30				SS-8	29.5-31.0	3-2-3 (5)	100	
35				SS-9	34.5-36.0	3-2-2 (4)	100	

(Continued Next Page)

GEOTECH ENGINEERING LOGS - ESEE DATABASE.GDT - 01/24/11 07:39 - T:\ESEE MAJOR PROJECTS\PROJECTS\SCHOLZ\2010\ES1874_ASH POND EVALUATION\LOGS\ASHPONDDIKEBORINGS.GPJ

SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Dike Evaluation
LOCATION Plant Scholz - Sneads, FL

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
40		**Silty Sand (SM)** - brown, moist, loose, low plasticity	95.2	SS -10	39.5- 41.0	2-1-2 (3)	100	
45		**Coal Combustion Byproduct (ASH)** - black, wet, very loose, no plasticity, with fine sand	90.2	SS -11	44.5- 46.0	WH-WH-1 (1)	100	(MC = 23.5%; PL=NP; FC = 92.3%)
50		**Poorly-graded Sand (SP)** - brown, wet, loose to medium dense, fine grain	85.2	SS -12	49.5- 51.0	2-1-4 (5)	100	(MC = 16.4%; PL=NP; FC = 28.2%)
55				SS -13	54.5- 56.0	3-4-7 (11)	100	
60			73.7	SS -14	59.5- 61.0	24-26-35 (61)	100	(MC = 33%; LL=53; PI=32; FC = 48.8%)
		Bottom of borehole at 61.0 feet.						
65								
70								
75								
80								

SOUTHERN COMPANY

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

LOG OF TEST BORING

BORING EDB-2

PAGE 1 OF 2

PROJECT Ash Pond Dike Evaluation

LOCATION Plant Scholz - Sneads, FL

DATE STARTED 3/3/2010 **COMPLETED** 3/3/2010 **SURF. ELEV.** 134.1 **COORDINATES:** N 607,047.50 E 1,845,988.23

CONTRACTOR SCS Field Services **EQUIPMENT** **METHOD** Hollow Stem Auger

DRILLED BY S. Denty **LOGGED BY** G. Wilson **CHECKED BY** **ANGLE** **BEARING**

BORING DEPTH 56 ft. **GROUND WATER DEPTH: DURING** **COMP.** **DELAYED**

NOTES

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
	▓	**Coal Combustion Byproduct (ASH)** - black, damp, no plasticity						
	▓			SS -1	2.5-4.0	4-7-8 (15)	100	
5	▓			SS -2	4.5-6.0	4-5-5 (10)	100	
	▓			SS -3	7.5-9.0	3-4-4 (8)	100	
10	▓			SS -4	9.5-11.0	2-2-5 (7)	100	
15	░	**Poorly-graded Sand (SP)** - dark br, very moist, loose, no plasticity	119.6	SS -5	14.5-16.0	2-2-2 (4)	100	
20	▓	**Coal Combustion Byproduct (ASH)** - blackish gray, wet, loose, no plasticity	114.6	SS -6	19.5-21.0	1-1-1 (2)	100	
25	▓			SS -7	24.5-26.0	WH-WH-WH (0)	100	(MC = 36.6%; PL=NP; FC = 74.7%)
30	▓			SS -8	29.5-31.0	1-1-2 (3)	100	
35	▓			SS -9	34.5-36.0	2-2-3 (5)	100	

(Continued Next Page)

SOUTHERN COMPANY

LOG OF TEST BORING

BORING EDB-2
PAGE 2 OF 2

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Dike Evaluation
LOCATION Plant Scholz - Sneads, FL

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
40	■	**Coal Combustion Byproduct (ASH)***(con't)*	89.6	SS -10	39.5- 41.0	WH-WH-2 (2)	100	
45	▨	**Silty Sand (SM)** - tan, wet, loose, no plasticity, fine to medium grain	84.6	SS -11	44.5- 46.0	WH-WH-2 (2)	100	(MC = 15.8%; FC = 12.2%)
50	░	**Poorly-graded Sand (SP)** - tan, wet, dense, fine to medium grain		SS -12	49.5- 51.0	5-5-15 (20)	100	
55	░		78.1	SS -13	54.5- 56.0	13-50 (50)	56	
		Bottom of borehole at 56.0 feet.						
60								
65								
70								
75								
80								

SOUTHERN COMPANY

LOG OF TEST BORING

BORING EDB-3
PAGE 1 OF 2

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Dike Evaluation
LOCATION Plant Scholz - Sneads, FL

DATE STARTED 3/2/2010 **COMPLETED** 3/2/2010 **SURF. ELEV.** 134.3 **COORDINATES:** N 607,167.33 E 1,845,960.46
CONTRACTOR SCS Field Services **EQUIPMENT** **METHOD** Hollow Stem Auger
DRILLED BY S. Denty **LOGGED BY** G. Wilson **CHECKED BY** **ANGLE** **BEARING**
BORING DEPTH 55 ft. **GROUND WATER DEPTH: DURING** **COMP.** **DELAYED** 22 ft. after 24 hrs.
NOTES

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
	▨	**Coal Combustion Byproduct (ASH)** - black, damp, no plasticity						
				SS -1	2.5-4.0	3-3-3 (6)	100	
5				SS -2	4.5-6.0	2-3-3 (6)	100	
				SS -3	7.5-9.0	2-2-2 (4)	100	
10				SS -4	9.5-11.0	3-2-3 (5)	100	
15				SS -5	14.5-16.0	4-5-7 (12)	100	
20				SS -6	19.5-21.0	4-6-8 (14)	100	
	▽							
25				SS -7	24.5-26.0	1-1-3 (4)	100	
30				SS -8	29.5-31.0	1-1-2 (3)	100	
35				SS -9	34.5-36.0	2-3-2 (5)	100	

(Continued Next Page)

SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Dike Evaluation
LOCATION Plant Scholz - Sneads, FL

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
40		**Well-graded Sand with Silt (SW-SM)** - black, tan and brown, moist, v. loose to dense, no plasticity, fine to medium grain	94.8	SS-10	39.5-41.0	WH-WH-2 (2)	100	(MC = 39.2%; FC = 11.3%)
45				SS-11	44.5-46.0	10-23-24 (47)	100	
50		**Poorly-graded Sand with Silt (SP-SM)** - black, tan and brown, moist, very loose, no plasticity, with gravel	84.8	SS-12	49.5-51.0	WH-10-2 (12)	100	(MC = 13.8%; FC = 9.9%)
55		**Poorly-graded Sand (SP)** - gray, moist, very dense	79.8 79.3	SS-13	54.5-56.0	5-10-50 (60)	89	
		Bottom of borehole at 55.0 feet.						
60								
65								
70								
75								
80								

GEOTECH ENGINEERING LOGS - ESEE DATABASE.GDT - 01/24/11 07:39 - T:\ESEE MAJOR PROJECTS\PROJECTS\SCHOLZ\2010\ES1874_ASH POND EVALUATION\LOGS\ASHPONDDIKEBORINGS.GPJ

BORING EDB-4
PAGE 1 OF 2

SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Dike Evaluation
LOCATION Plant Scholz - Sneads, FL

DATE STARTED 3/2/2010 **COMPLETED** 3/2/2010 **SURF. ELEV.** 135.1 **COORDINATES:** N 607,287.08 E 1,845,929.45
CONTRACTOR SCS Field Services **EQUIPMENT** **METHOD** Hollow Stem Auger
DRILLED BY S. Denty **LOGGED BY** G. Wilson **CHECKED BY** **ANGLE** **BEARING**
BORING DEPTH 51 ft. **GROUND WATER DEPTH: DURING** **COMP.** **DELAYED**
NOTES

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
	▩	**Coal Combustion Byproduct (ASH)** - black, damp, no plasticity						
				SS-1	2.5-4.0	3-5-6 (11)	100	
5				SS-2	4.5-6.0	3-3-2 (5)	100	
				SS-3	7.5-9.0	2-2-2 (4)	100	
10				SS-4	9.5-11.0	3-6-7 (13)	100	
15				SS-5	14.5-16.0	2-2-2 (4)	100	
20				SS-6	19.5-21.0	3-4-4 (8)	100	
25				SS-7	24.5-26.0	3-4-4 (8)	100	
30				SS-8	29.5-31.0	1-1-2 (3)	100	
35				SS-9	34.5-36.0	WH-1-2 (3)	100	

(Continued Next Page)

SOUTHERN COMPANY

LOG OF TEST BORING

BORING EDB-4
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SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Dike Evaluation
LOCATION Plant Scholz - Sneads, FL

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
40		**Silty Sand (SM)** - black, wet, loose to medium dense, no plasticity	95.6	SS -10	39.5-41.0	WH-WH-4 (4)	100	(MC = 37.2%; PL=NP; FC = 29.2%)
45				SS -11	44.5-46.0	4-6-8 (14)	100	
50		**Poorly-graded Sand (SP)** - tan/br, very damp, dense	85.6 84.1	SS -12	49.5-51.0	3-16-24 (40)	100	
55								
60								
65								
70								
75								
80								

Bottom of borehole at 51.0 feet.

BORING EDB-5
PAGE 1 OF 2

SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Dike Evaluation
LOCATION Plant Scholz - Sneads, FL

DATE STARTED 3/2/2010 **COMPLETED** 3/2/2010 **SURF. ELEV.** 135.2 **COORDINATES:** N 607,400.29 E 1,845,898.98
CONTRACTOR SCS Field Services **EQUIPMENT** **METHOD** Hollow Stem Auger
DRILLED BY S. Denty **LOGGED BY** G. Wilson **CHECKED BY** **ANGLE** **BEARING**
BORING DEPTH 46 ft. **GROUND WATER DEPTH: DURING** **COMP.** **DELAYED**
NOTES

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		Coal Combustion Byproduct (ASH) - black, damp to wet, no plasticity						
				⧗ SS -1	2.5-4.0	3-5-4 (9)	100	
5				⧗ SS -2	4.5-6.0	2-1-2 (3)	100	
				⧗ SS -3	7.5-9.0	1-2-2 (4)	100	
10				⧗ SS -4	9.5-11.0	2-2-3 (5)	100	
15				⧗ SS -5	14.5-16.0	2-1-1 (2)	100	
20				⧗ SS -6	19.5-21.0	2-3-3 (6)	100	
25				⧗ SS -7	24.5-26.0	2-3-5 (8)	100	
30				⧗ SS -8	29.5-31.0	1-1-1 (2)	100	(MC = 48.8%; FC = 85.6%)
35				⧗ SS -9	34.5-36.0	1-2-3 (5)	100	

(Continued Next Page)

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Dike Evaluation
LOCATION Plant Scholz - Sneads, FL

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
40		**Poorly-graded Sand with Silt (SP-SM)** - brown, very damp, medium dense, low plasticity	95.7	SS -10	39.5-41.0	6-9-12 (21)	100	(MC = 14.8%; LL=28; PI=5; FC = 8.9%)
			90.7					
45		**Coal Combustion Byproduct (ASH)** - tannish black, moist, medium dense, no plasticity	89.2	SS -11	44.5-46.0	1-3-13 (16)	100	(MC = 22.2%; FC = 90.9%)
		Bottom of borehole at 46.0 feet.						
50								
55								
60								
65								
70								
75								
80								

GEOTECH ENGINEERING LOGS - ESEE DATABASE.GDT - 01/24/11 07:39 - T:\ESEE MAJOR PROJECTS\PROJECTS\SCHOLZ\2010\ES1874_ASH POND EVALUATION\LOGS\ASHPONDDIKEBORINGS.GPJ

SOUTHERN COMPANY

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

LOG OF TEST BORING

BORING EDB-6
PAGE 1 OF 2

PROJECT Ash Pond Dike Evaluation
LOCATION Plant Scholz - Sneads, FL

DATE STARTED 3/1/2010 **COMPLETED** 3/1/2010 **SURF. ELEV.** 134.1 **COORDINATES:** N 607,518.54 E 1,845,865.70
CONTRACTOR SCS Field Services **EQUIPMENT** **METHOD** Hollow Stem Auger
DRILLED BY S. Denty **LOGGED BY** G. Wilson **CHECKED BY** **ANGLE** **BEARING**
BORING DEPTH 46 ft. **GROUND WATER DEPTH: DURING** **COMP.** **DELAYED**
NOTES

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		Coal Combustion Byproduct (ASH) - black, damp, no plasticity						
				SS-1	2.5-4.0	1-1-2 (3)	100	
5								
				SS-2	4.5-6.0	1-2-2 (4)	100	
				SS-3	7.5-9.0	WH-WH-WH (0)	100	(MC = 66.5%; FC = 90%)
10		- wet below 9.5 ft.		SS-4	9.5-11.0	1-2-1 (3)	100	
15				SS-5	14.5-16.0	1-1-1 (2)	100	(MC = 38.4%; FC = 79.4%)
20				SS-6	19.5-21.0	2-4-3 (7)	100	
25				SS-7	24.5-26.0	WH-WH-WH (0)	100	(MC = 63.8%; FC = 87.1%)
30				SS-8	29.5-31.0	WH-WH-1 (1)	100	
35				SS-9	34.5-36.0	WH-WH-2 (2)	100	

(Continued Next Page)

SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Dike Evaluation
LOCATION Plant Scholz - Sneads, FL

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
40		**Poorly-graded Sand (SP)** - brown, very damp, med dense to very dense	94.6	SS -10	39.5- 41.0	3-6-8 (14)	100	
45			88.1	SS -11	44.5- 46.0	35-38-50 (88)	87	
		Bottom of borehole at 46.0 feet.						
50								
55								
60								
65								
70								
75								
80								

BORING EDB-7
PAGE 1 OF 2

SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Dike Evaluation
LOCATION Plant Scholz - Sneads, FL

DATE STARTED 3/3/2010 **COMPLETED** 3/3/2010 **SURF. ELEV.** 132.9 **COORDINATES:** N 607,668.59 E 1,845,828.53
CONTRACTOR SCS Field Services **EQUIPMENT** **METHOD** Hollow Stem Auger
DRILLED BY S. Denty **LOGGED BY** G. Wilson **CHECKED BY** **ANGLE** **BEARING**
BORING DEPTH 41 ft. **GROUND WATER DEPTH: DURING** **COMP.** **DELAYED** 23.5 ft. after 24 hrs.
NOTES

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		Coal Combustion Byproduct (ASH) - black, damp, loose, no plasticity						
				SS-1	2.5-4.0	2-2-2 (4)	100	
5				SS-2	4.5-6.0	1-1-2 (3)	100	
				SS-3	7.5-9.0	1-1-1 (2)	100	
10				SS-4	9.5-11.0	2-2-2 (4)	100	
15				SS-5	14.5-16.0	2-2-2 (4)	100	
20				SS-6	19.5-21.0	1-1-3 (4)	100	
		▽						
25				SS-7	24.5-26.0	WH-1-1 (2)	100	
30				SS-8	29.5-31.0	WH-1-1 (2)	100	(MC = 53.2%; FC = 83.5%)
35		**Poorly-graded Sand (SP)** - red/white, very damp, medium dense	98.4	SS-9	34.5-36.0	4-7-8 (15)	100	

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SOUTHERN COMPANY

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

LOG OF TEST BORING

PROJECT Ash Pond Dike Evaluation
LOCATION Plant Scholz - Sneads, FL

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
40	▨	**Poorly-graded Sand (SP)***(con't)*	91.9	SS -10	39.5-41.0	4-5-10 (15)	100	
		Bottom of borehole at 41.0 feet.						
45								
50								
55								
60								
65								
70								
75								
80								

SOUTHERN COMPANY

LOG OF TEST BORING

BORING EDB-8
PAGE 1 OF 1

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Dike Evaluation
LOCATION Plant Scholz - Sneads, FL

DATE STARTED 2/17/2010 **COMPLETED** 2/17/2010 **SURF. ELEV.** 133.5 **COORDINATES:** N 607,816.08 E 1,845,792.45
CONTRACTOR SCS Field Services **EQUIPMENT** ______ **METHOD** Hollow Stem Auger
DRILLED BY S. Denty **LOGGED BY** G. Wilson **CHECKED BY** ______ **ANGLE** ______ **BEARING** ______
BORING DEPTH 36 ft. **GROUND WATER DEPTH: DURING** ______ **COMP.** ______ **DELAYED** ______
NOTES ______

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		Coal Combustion Byproduct (ASH) - black, damp, loose, no plasticity		SS -1	2.5-4.0	4-4-5 (9)	100	
5			126.0	SS -2	4.5-6.0	1-1-4 (5)	100	
		Poorly-graded Sand (SP) - brown, damp, medium dense, no plasticity, fine to coarse grain, trace gravel	124.0	SS -3	7.5-9.0	5-7-9 (16)	100	
10		**Coal Combustion Byproduct (ASH)** - black, damp, loose, no plasticity		SS -4	9.5-11.0	2-2-3 (5)	100	
15			114.0	SS -5	14.5-16.0	8-5-6 (11)	100	
20		**Silty Sand (SM)** - tan and brown, wet, medium dense, no plasticity	109.0	SS -6	19.5-21.0	7-6-8 (14)	100	(MC = 11.6%; PL=NP; FC = 32.8%)
25		**Clayey Sand (SC)** - brown, wet, loose, low plasticity	104.0	SS -7	24.5-26.0	3-2-2 (4)	100	(MC = 18.4%; LL=24; PI=13; FC = 31.9%)
30		**Silty Sand (SM)** - tannish red, moist, medium dense, no plasticity	99.0	SS -8	29.5-31.0	6-6-8 (14)	100	(MC = 18.4%; PL=NP; FC = 43.4%)
35		**Poorly-graded Sand (SP)** - tan and brown, very damp, loose	97.5	SS -9	34.5-36.0	6-5-4 (9)	100	

Bottom of borehole at 36.0 feet.

SOUTHERN COMPANY

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

LOG OF TEST BORING

BORING NDB-1

PAGE 1 OF 1

PROJECT Ash Pond Dike Evaluation

LOCATION Plant Scholz - Sneads, FL

DATE STARTED 2/17/2010 **COMPLETED** 2/17/2010 **SURF. ELEV.** 135.1 **COORDINATES:** N 607,905.14 E 1,845,697.72

CONTRACTOR SCS Field Services **EQUIPMENT** **METHOD** Hollow Stem Auger

DRILLED BY S. Denty **LOGGED BY** G. Wilson **CHECKED BY** **ANGLE** **BEARING**

BORING DEPTH 36 ft. **GROUND WATER DEPTH: DURING** **COMP.** **DELAYED**

NOTES

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
	▨	**Clayey Sand (SC)** - red, moist, loose, low plasticity		SS -1	2.5-4.0	4-2-2 (4)	100	
5	■	**Coal Combustion Byproduct (ASH)** - black, wet, very loose	130.6	SS -2	4.5-6.0	WH-1-1 (2)	100	(MC = 51.1%; PL=NP; FC = 62.5%)
	░	**Poorly-graded Sand (SP)** - white and tan, wet, medium dense	127.6	SS -3	7.5-9.0	3-5-6 (11)	100	
10	■	**Coal Combustion Byproduct (ASH)** - black, wet, loose	125.6	SS -4	9.5-11.0	4-4-4 (8)	100	
15	░	**Poorly-graded Sand (SP)** - tan and red, wet, medium dense	120.6	SS -5	14.5-16.0	7-9-9 (18)	100	
20				SS -6	19.5-21.0	10-13-14 (27)	100	
25	▨	**Clayey Sand (SC)** - tan and red, wet, very loose, medium plasticity	110.6	SS -7	24.5-26.0	1-2-2 (4)	100	
30	▧	**Sandy Fat Clay (CH)** - reddish gray, moist, stiff, low plasticity	106.1	SS -8	29.5-31.0	6-5-7 (12)	100	(MC = 19.4%; LL=51; PI=29; FC = 67.4%)
35	▨	**Clayey Sand (SC)** - red and brown, moist, medium dense, no plasticity	100.6 99.1	SS -9	34.5-36.0	6-9-8 (17)	100	

Bottom of borehole at 36.0 feet.

SOUTHERN COMPANY

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

LOG OF TEST BORING

BORING NDB-2
PAGE 1 OF 1

PROJECT Ash Pond Dike Evaluation
LOCATION Plant Scholz - Sneads, FL

DATE STARTED 2/17/2010 **COMPLETED** 2/17/2010 **SURF. ELEV.** 134.5 **COORDINATES:** N 607,867.70 E 1,845,565.08
CONTRACTOR SCS Field Services **EQUIPMENT** **METHOD** Hollow Stem Auger
DRILLED BY S. Denty **LOGGED BY** G. Wilson **CHECKED BY** **ANGLE** **BEARING**
BORING DEPTH 36 ft. **GROUND WATER DEPTH: DURING** **COMP.** **DELAYED** 10.9 ft. after 24 hrs.
NOTES

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		Coal Combustion Byproduct (ASH) - red and black, moist						
				SS-1	2.5-4.0	1-1-1 (2)	100	
5		- black		SS-2	4.5-6.0	1-2-2 (4)	100	
		- tan and black		SS-3	7.5-9.0	2-3-4 (7)	100	
			125.0					
10		**Silty Sand (SM)** ⊻ - red, moist, medium dense, fine to medium grain		SS-4	9.5-11.0	3-5-5 (10)	100	
15		- tan and brown		SS-5	14.5-16.0	11-12-13 (25)	100	(MC = 12.2%; FC = 19.3%)
20				SS-6	19.5-21.0	10-11-14 (25)	100	
			110.0					
25		**Clayey Sand (CL)** - red, brown and gray, wet, medium dense, low plasticity, fine to medium grain		SS-7	24.5-26.0	5-6-6 (12)	100	(MC = 16.1%; LL=46; PI=27; FC = 47.2%)
30				SS-8	29.5-31.0	4-3-5 (8)	100	
			100.0					
35		**Poorly-graded Sand (SP)** - white and tan, moist, dense	98.5	SS-9	34.5-36.0	15-40-49 (89)	100	

Bottom of borehole at 36.0 feet.

SOUTHERN COMPANY

LOG OF TEST BORING

BORING NDB-3
PAGE 1 OF 1

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Dike Evaluation
LOCATION Plant Scholz - Sneads, FL

DATE STARTED 2/16/2010 **COMPLETED** 2/16/2010 **SURF. ELEV.** 133.8 **COORDINATES:** N 607,841.00 E 1,845,475.95
CONTRACTOR SCS Field Services **EQUIPMENT** ______ **METHOD** Hollow Stem Auger
DRILLED BY S. Denty **LOGGED BY** G. Wilson **CHECKED BY** ______ **ANGLE** ______ **BEARING** ______
BORING DEPTH 36 ft. **GROUND WATER DEPTH: DURING** ______ **COMP.** ______ **DELAYED** ______
NOTES ______

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		Coal Combustion Byproduct (ASH) - dark gray, damp, loose						
				SS -1	2.5-4.0	2-2-3 (5)	100	
5				SS -2	4.5-6.0	2-3-4 (7)	100	
			126.3					
		Clayey Sand (SC) - red, wet, medium dense, low plasticity, fine to medium grain		SS -3	7.5-9.0	4-7-8 (15)	100	(MC = 30.8%; LL=28; PI=10; FC = 29.5%)
10			124.3					
		Poorly-graded Sand (SP) - red/tan/br, moist, medium dense		SS -4	9.5-11.0	5-7-8 (15)	100	
15				SS -5	14.5-16.0	9-13-15 (28)	100	
			114.3					
20		**Silty Sand (SM)** - gray, moist, medium dense, fine to medium grain		SS -6	19.5-21.0	8-9-10 (19)	100	(MC = 11.3%; PL=NP; FC = 16.5%)
			109.3					
25		**Poorly-graded Sand (SP)** - white/tan/br/gray, moist, loose		SS -7	24.5-26.0	5-3-3 (6)	100	
			104.3					
30		**Sandy Silt (ML)** - brown, moist, very dense		SS -8	29.5-31.0	17-30-50 (80)	83	(MC = 13.9%; FC = 54.5%)
35			97.8	SS -9	34.5-36.0	15-33-50 (83)	87	

Bottom of borehole at 36.0 feet.

BORING NDB-4
PAGE 1 OF 1

SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Dike Evaluation
LOCATION Plant Scholz - Sneads, FL

DATE STARTED 2/16/2010 **COMPLETED** 2/16/2010 **SURF. ELEV.** 132.2 **COORDINATES:** N 607,784.60 E 1,845,394.55
CONTRACTOR SCS Field Services **EQUIPMENT** ______ **METHOD** Hollow Stem Auger
DRILLED BY S. Denty **LOGGED BY** G. Wilson **CHECKED BY** ______ **ANGLE** ______ **BEARING** ______
BORING DEPTH 36 ft. **GROUND WATER DEPTH: DURING** ______ **COMP.** ______ **DELAYED** ______
NOTES ______

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		Coal Combustion Byproduct (ASH) - black, wet						
				SS -1	2.5-4.0	3-4-5 (9)	100	
5				SS -2	4.5-6.0	2-2-3 (5)	100	
				SS -3	7.5-9.0	WH-WH-WH (0)	100	
10				SS -4	9.5-11.0	WH-WH-WH (0)	100	(MC = 69.7%; PL=NP; FC = 92.9%)
15				SS -5	14.5-16.0	WH-WH-WH (0)	100	(MC = 61.1%; PL=NP; FC = 95.6%)
			112.7					
20		**Clayey Sand (SC)** - tan and brown, very damp, loose, low plasticity		SS -6	19.5-21.0	3-3-5 (8)	100	
			107.7					
25		**Poorly-graded Sand (SP)** - tan, moist, very dense		SS -7	24.5-26.0	15-47-50 (97)	87	
30				SS -8	29.5-31.0	10-27-50 (77)	87	
35			96.2	SS -9	34.5-36.0	29-50 (50)	60	
		Bottom of borehole at 36.0 feet.						

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DRILLING LOG
GEOLOGICAL SERVICES

Hole No. B-1
Sheet 1 of 2

SITE Plant Scholz Ash Pond HOLE DEPTH 50' SURF.ELEV. NA
LOCATION Sneads, Florida GPS coordinates N 30 40.008 W 084 53.296
DRILLING METHOD H.S.A. NO. SAMPLES NA NO. U.D. SAMPLES NA
CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA
WATER TABLE DEPTH NA ELEV. NA TIME AFTER COMP. NA DATE TAKEN NA
TYPE GROUT NA QUANTITY NA MIX NA DRILLING START DATE 10/29/2009
DRILLER Universal RECORDER M. Boatright APPROVED B. Coates DRILLING COMP. DATE 10/29/2009

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test From To	Blows	N	Comments	% Rec	RQD
0									
1									
2									
3									
4									
5		tan to olive brown clayey silty fine to medium SAND (SM-SC)		3.5-5.0	25-12-16	28			
6									
7									
8									
9									
10		white gravelly CLAY (CL)		8.5-10	2-4-6	10	med plastic		
11									
12									
13									
14									
15		white to tan gravelly CLAY w/ coarse sand (CL)		13.5-15	4-4-8	12			
16									
17									
18									
19									
20		white to tan gravelly CLAY w/ coarse sand (CL)		18.5-20	4-5-6	11			
21									
22									
23									
24									
25		white lean CLAY few gravel		23.5-25	2-4-3	7			

SOUTHERN COMPANY
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DRILLING LOG
GEOLOGICAL SERVICES

Hole No. B-1
Sheet 2 of 2

SITE Plant Scholz Ash Pond
TOTAL DEPTH 50'
SURF.ELEV. NA

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From To	Blows	N			
26									
27									
28									
29									
30		olive grey fine sandy CLAY (CH)		28.5-30	1-2-2	4	high plastic		
31									
32									
33									
34									
35		bluish grey silty CLAY (CL)		33.5-35	2-4-8	12	begin native?		
36									
37									
38									
39									
40		dirty white weathered limestone w/ bluish silty CLAY (CL)		38.5-40	35-33-50/3	ref			
41									
42									
43									
44									
45		white weathered limestone and CLAY (CL)		43.5-45	50/5	ref			
46									
47									
48									
49									
50		coarse-sand sized limestone fragments w/ white silty CLAY (CL)		48.5-50	2-3-5	8			
51		Boring terminated @ 50'							
52									
53									
54									
55									
56									
57									

Form GS9901 7-26-2004

SOUTHERN COMPANY
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DRILLING LOG
GEOLOGICAL SERVICES

Hole No. B-2
Sheet 1 of 2

SITE **Plant Scholz Ash Pond** HOLE DEPTH 50' SURF.ELEV. NA
LOCATION Sneads, Florida GPS coordinates N 30 39.992 W 084 53.316
DRILLING METHOD H.S.A. NO. SAMPLES NA NO. U.D. SAMPLES NA
CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA
WATER TABLE DEPTH NA ELEV. NA TIME AFTER COMP. NA DATE TAKEN NA
TYPE GROUT NA QUANTITY NA MIX NA DRILLING START DATE 10/29/2009
DRILLER Universal RECORDER M. Boatright APPROVED B. Coates DRILLING COMP. DATE 10/29/2009

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test From To	Blows	N	Comments	% Rec	RQD
0									
1									
2									
3									
4									
5		orange clayey fine to medium SAND (SP-SC)		3.5-5.0	5-8-10	18			
6									
7									
8									
9									
10		light brown clayey fine SAND (SP-SC)		8.5-10	1-1-2	3	wet		
11									
12									
13									
14									
15		light brown clayey fine SAND (SP-SC)		13.5-15	2-1-3	4			
16									
17									
18									
19									
20		tan sandy CLAY-clay SAND mix (SC)		18.5-20	0-0-1	1			
21									
22									
23									
24									
25		olive grey fine sandy CLAY w/ gravel (CH)		23.5-25	3-4-4	8	limestone frags		

SOUTHERN COMPANY
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DRILLING LOG

GEOLOGICAL SERVICES

Hole No. B-2

Sheet 2 of 2

SITE **Plant Scholz Ash Pond**

TOTAL DEPTH 50'

SURF.ELEV. NA

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From To	Blows	N			
26									
27									
28									
29									
30		white to tan gravelly CLAY (GC-CH)		28.5-30	2-3-1	4			
31									
32									
33									
34									
35		white to tan gravelly CLAY (GC-CH)		33.5-35	2-3-3	6			
36									
37									
38									
39									
40		dirty white weathered limestone w/ bluish silty CLAY (CL)		38.5-40	2-3-3	6			
41									
42									
43									
44									
45		coarse-sand sized limestone fragments w/ white silty CLAY (CL)		43.5-45	25-50/3	ref			
46									
47									
48									
49									
50		white silty CLAY w/ limestone fragments (CL)		48.5-50	11-15-24	39			
51		Boring terminated @ 50'							
52									
53									
54									
55									
56									
57									

SOUTHERN COMPANY
Energy to Serve Your World™

DRILLING LOG

GEOLOGICAL SERVICES

Hole No. B-3

Sheet 1 of 2

SITE Plant Scholz Ash Pond HOLE DEPTH 50' SURF.ELEV. NA

LOCATION Sneads, Florida GPS coordinates N 30 39.964 W 084 53.350

DRILLING METHOD H.S.A. NO. SAMPLES NA NO. U.D. SAMPLES NA

CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA

WATER TABLE DEPTH NA ELEV. NA TIME AFTER COMP. NA DATE TAKEN NA

TYPE GROUT NA QUANTITY NA MIX NA DRILLING START DATE 10/29/2009

DRILLER Universal RECORDER M. Boatright APPROVED B. Coates DRILLING COMP. DATE 10/29/2009

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From To	Blows	N			
0									
1									
2									
3									
4									
5		orange clayey SAND (SC)		3.5-5.0	5-7-14	21			
6									
7									
8									
9									
10		light to dark brown silty clayey SAND (SM-SC)		8.5-10	6-4-3	7			
11									
12									
13									
14									
15		olive grey fine sandy CLAY (CH)		13.5-15	1-1-1	2			
16									
17									
18									
19									
20		olive grey fine sandy CLAY (CH)		18.5-20	WOH	0			
21									
22									
23									
24									
25		olive grey clayey SAND- SAND CLAY mix (SC)		23.5-25	WOH	0			

SOUTHERN COMPANY
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DRILLING LOG
GEOLOGICAL SERVICES

Hole No. B-3

Sheet 2 of 2

SITE **Plant Scholz Ash Pond** TOTAL DEPTH 50' SURF.ELEV. NA

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From To	Blows	N			
26									
27									
28									
29									
30		olive grey silty CLAY (CL)		28.5-30	3-3-4	7			
31									
32									
33									
34									
35		white silty CLAY w/ limestone fragments (CL)		33.5-35	2-3-9	12			
36									
37									
38									
39									
40		bluish silty CLAY w/ limestone fragments (CL)		38.5-40	7-8-4	12			
41									
42									
43									
44									
45		white limestone fragments w/ white clay (GC-CL)		43.5-45	50/2	ref			
46									
47									
48									
49									
50		white limestone fragments w/ white clay (GC-CL)		48.5-50	9-42-50/4	ref			
51		Boring terminated @ 50'							
52									
53									
54									
55									
56									
57									

SOUTHERN COMPANY
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DRILLING LOG

GEOLOGICAL SERVICES

Hole No. B-4
Sheet 1 of 2

SITE **Plant Scholz Ash Pond** HOLE DEPTH 47' SURF.ELEV. NA
LOCATION Sneads, Florida GPS coordinates N 30 39.948 W 084 53.378
DRILLING METHOD Mud rotary NO. SAMPLES NA NO. U.D. SAMPLES NA
CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA
WATER TABLE DEPTH NA ELEV. NA TIME AFTER COMP. NA DATE TAKEN NA
TYPE GROUT NA QUANTITY NA MIX NA DRILLING START DATE 10/30/2009
DRILLER Universal RECORDER M. Boatright APPROVED B. Coates DRILLING COMP. DATE 10/30/2009

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test From To	Blows	N	Comments	% Rec	RQD
0									
1									
2									
3									
4									
5		light brown clayey fine to med SAND (SP-SC)		3.5-5.0	8-6-7	13			
6									
7									
8									
9									
10		light brown clayey fine SAND (SP-SC)		8.5-10	2-1-2	3			
11									
12									
13									
14									
15		olive grey silty CLAY (CH)		13.5-15	1-1-2	3			
16									
17									
18									
19									
20		olive grey silty CLAY (CH)		18.5-20	0-0-3	3			
21									
22									
23									
24									
25		olive grey silty clay (CH)		23.5-25	0-0-1	1			

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DRILLING LOG
GEOLOGICAL SERVICES

Hole No. B-4
Sheet 2 of 2

SITE **Plant Scholz Ash Pond** TOTAL DEPTH 47' SURF.ELEV. NA

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From To	Blows	N			
26									
27									
28									
29									
30		No Recovery		28.5-30	1-1-1	2			
31									
32									
33									
34									
35		light grey clayey SILT (ML) w/ rock fragments		33.5-35	7-18-21	39			
36									
37									
38									
39									
40		white to bluish CLAY to silty CLAY (CL)		38.5-40	13-14-50/3	ref			
41									
42									
43									
44									
45		rock fragments		43.5-45	50/1	ref			
46									
47		Refusal @ 47'							
48									
49									
50									
51									
52									
53									
54									
55									
56									
57									

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DRILLING LOG

GEOLOGICAL SERVICES

Hole No. B-5
Sheet 1 of 2

SITE **Plant Scholz Ash Pond** HOLE DEPTH 50' SURF.ELEV. NA
LOCATION Sneads, Florida GPS coordinates N 30 39.943 W 084 53.420
DRILLING METHOD Mud rotary NO. SAMPLES NA NO. U.D. SAMPLES NA
CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA
WATER TABLE DEPTH NA ELEV. NA TIME AFTER COMP. NA DATE TAKEN NA
TYPE GROUT NA QUANTITY NA MIX NA DRILLING START DATE 10/30/2009
DRILLER Universal RECORDER M. Boatright APPROVED B. Coates DRILLING COMP. DATE 10/30/2009

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From To	Blows	N			
0									
1									
2									
3									
4									
5		grey brown siilty fine SAND (SP) trace clay		3.5-5.0	8-11-11	22			
6									
7									
8									
9									
10		olive grey clayey silty fine SAND (SP)		8.5-10	1-1-1	2			
11									
12									
13									
14									
15		grey to dark brown clayey fine to med SAND (SP-SC)		13.5-15	3-1-2	3			
16									
17									
18									
19									
20		orange brown clayey fine to med SAND (SP-SC)		18.5-20	9-9-10	19			
21									
22									
23									
24									
25		white to yellowish brown silty CLAY (CH)		23.5-25	0-0-1	1			

SOUTHERN COMPANY
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DRILLING LOG
GEOLOGICAL SERVICES

Hole No. B-5
Sheet 2 of 2

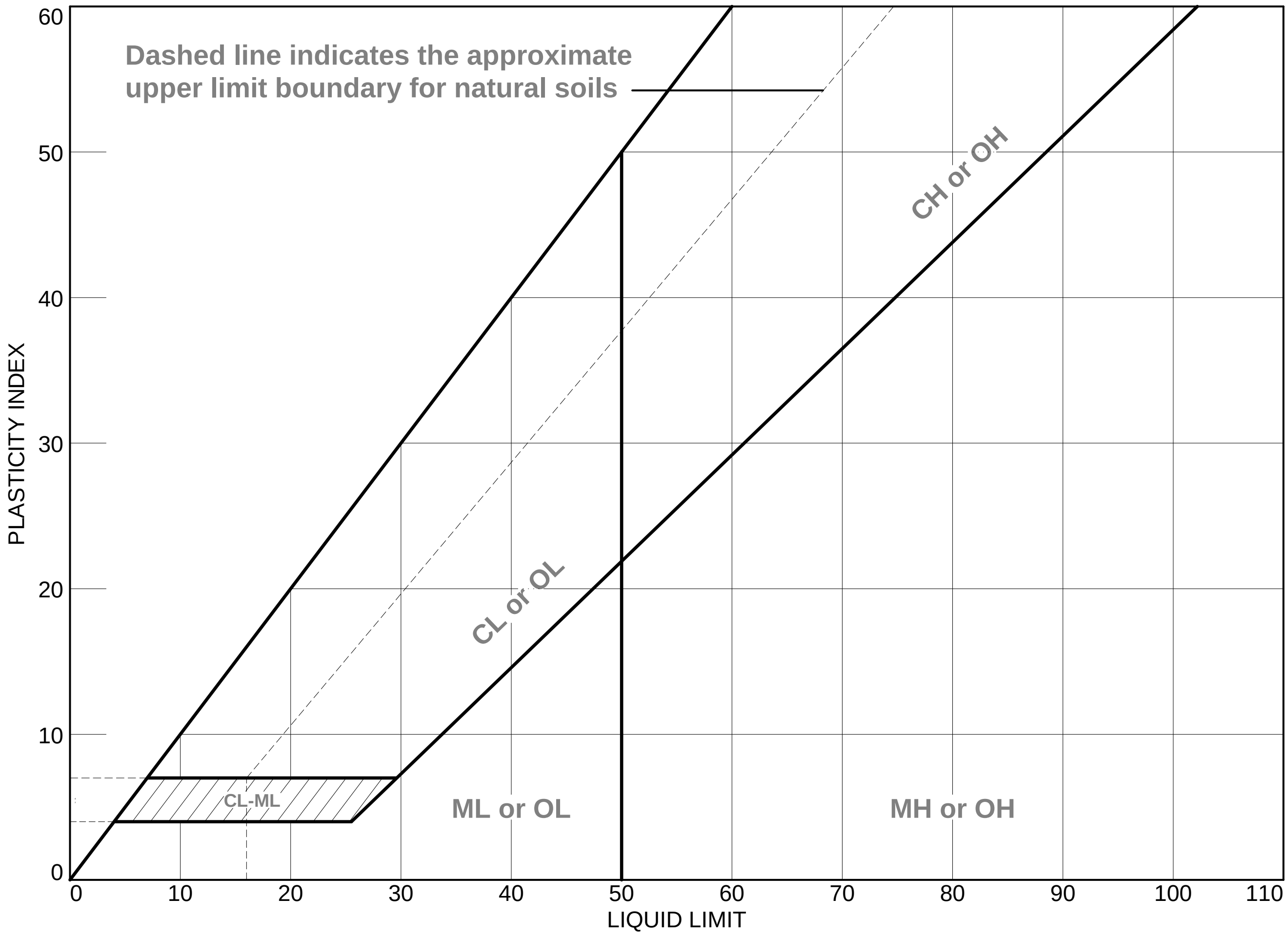
SITE **Plant Scholz Ash Pond** TOTAL DEPTH 50' SURF.ELEV. NA

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test From To	Blows	N	Comments	% Rec	RQD
26									
27									
28									
29									
30		light grey to tan slightly clayey SILT (ML)		28.5-30	10-23-20	43			
31									
32									
33									
34									
35		white to bluish Clay to silty CLAY (CL)		33.5-35	9-50/2	ref			
36									
37									
38									
39									
40		white CLAY w/ rock fragments (CL)		38.5-40	50/1	ref			
41									
42									
43									
44									
45		white clayey SILT few fine sand (ML)		43.5-45	10-11-20	31			
46									
47									
48									
49									
50		white clayey SILT few fine sand (ML)		48.5-50	50/2	ref			
51									
52		Boring terminated @ 50'							
53									
54									
55									
56									
57									

Form GS9901 7-26-2004

ATTACHMENT D

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	EDB-1	11	44.5ft. - 46ft.	23.5	NP	NV	NP	ML

Alabama Power Co.

Birmingham, Alabama

Client: Southern Company

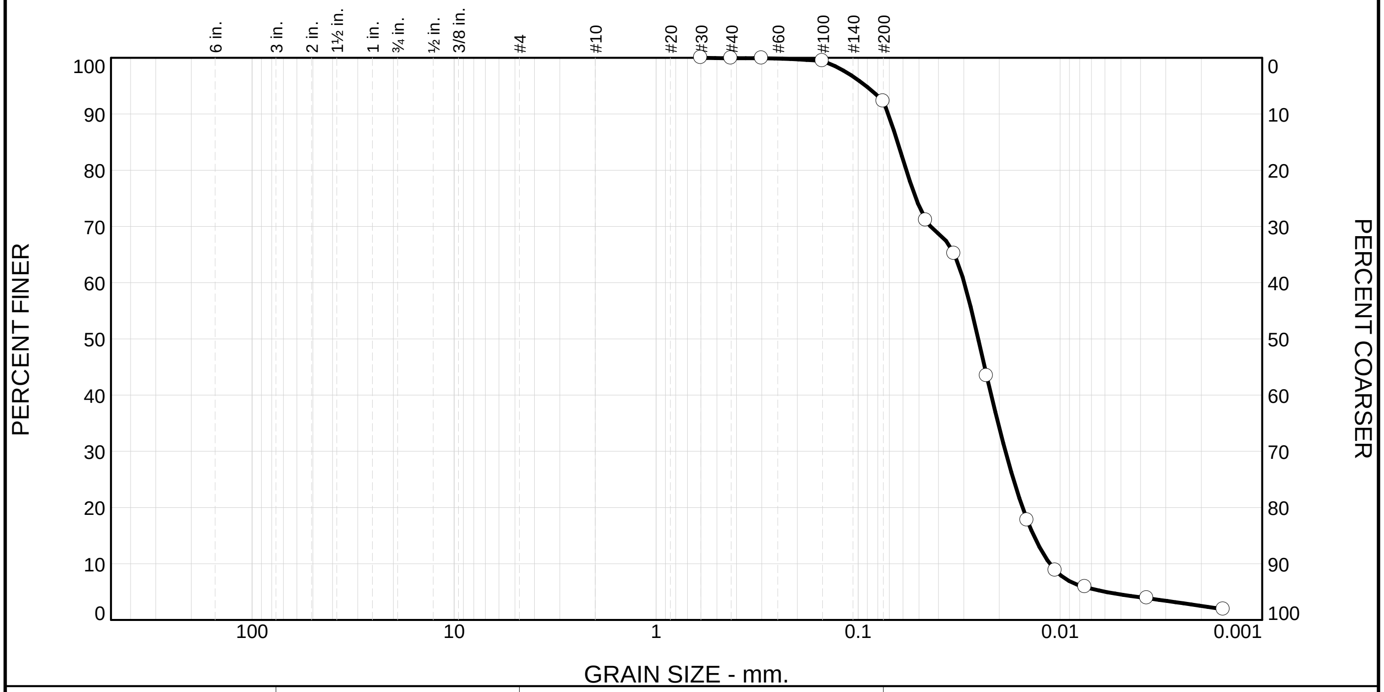
Project: Plant Scholz Ash Pond

Project No.:

Lab # AP09890

Tested By: J.Strother (5-6-2010) **Checked By:** D.Wilson (5-25-2010)

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	**Fine**	**Coarse**	**Medium**	**Fine**	**Silt**	**Clay**
0.0	0.0	0.0	0.0	0.1	7.6	87.8	4.5

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#30	100.0		
#40	99.9		
#50	99.9		
#100	99.4		
#200	92.3		
0.0461 mm.	71.1		
0.0335 mm.	65.2		
0.0231 mm.	43.4		
0.0145 mm.	17.7		
0.0106 mm.	8.8		
0.0075 mm.	5.9		
0.0037 mm.	3.9		
0.0016 mm.	1.9		

* (no specification provided)

Material Description

Black SILT

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= ML **AASHTO (M 145)=** A-4(0)

Coefficients

D_{90}= 0.0710	D_{85}= 0.0638	D_{60}= 0.0298
D_{50}= 0.0254	D_{30}= 0.0187	D_{15}= 0.0135
D_{10}= 0.0112	C_u= 2.65	C_c= 1.04

Remarks

F.M.=0.01

Date Received: 03-30-10 **Date Tested:** 05-7-2010

Tested By: Joseph Strother

Checked By: Donna Wilson

Title: Supervisor/Mat.Eng.

Source of Sample: EDB-1 **Depth:** 44.5ft. - 46ft. **Date Sampled:** NA

Sample Number: 11

Alabama Power Co.

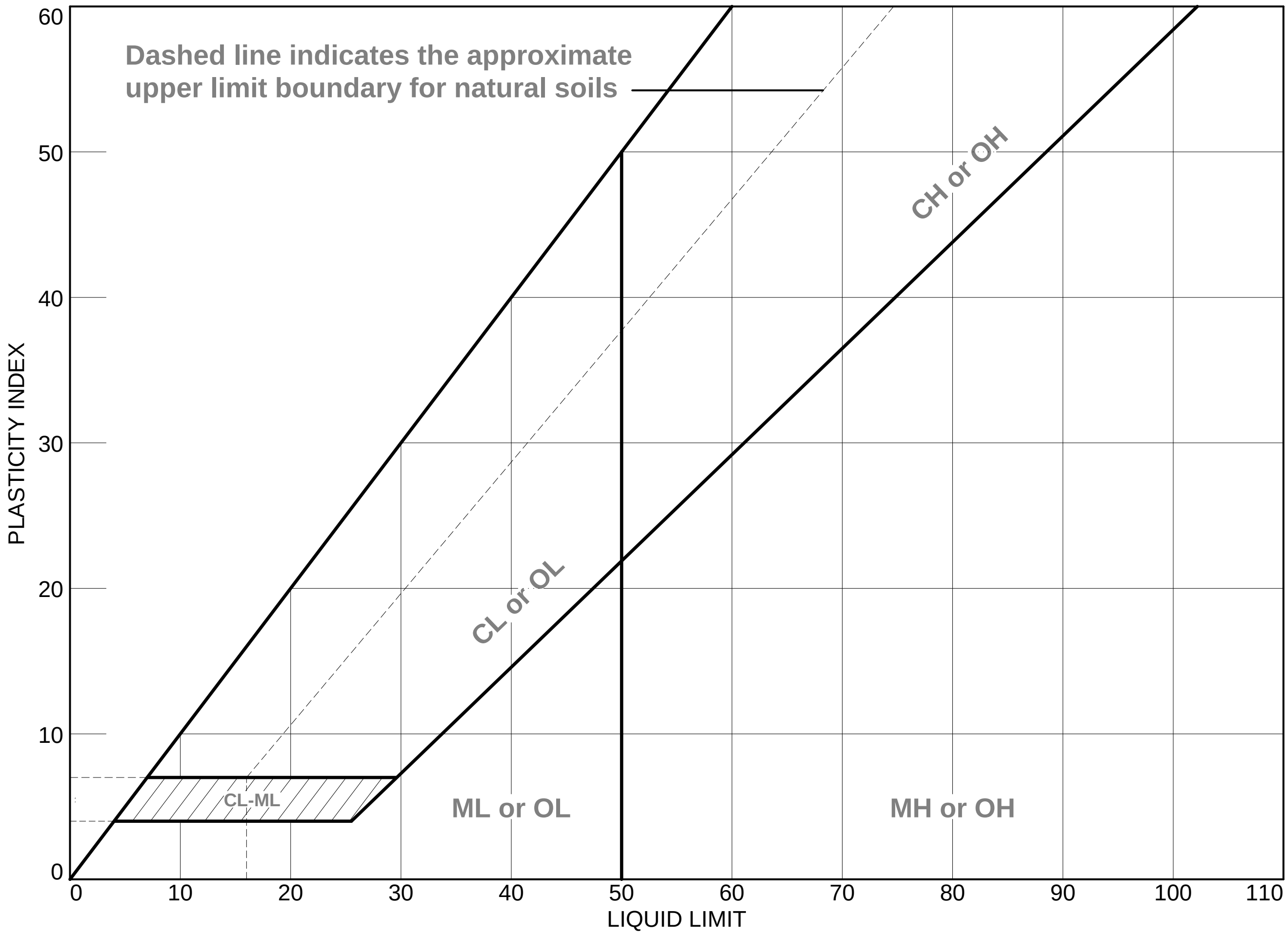
Birmingham, Alabama

Client: Southern Company

Project: Plant Scholz Ash Pond

Project No: **Lab #** AP09890

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	EDB-1	12	49.5ft. - 51.0ft.	16.4	NP	NV	NP	SM

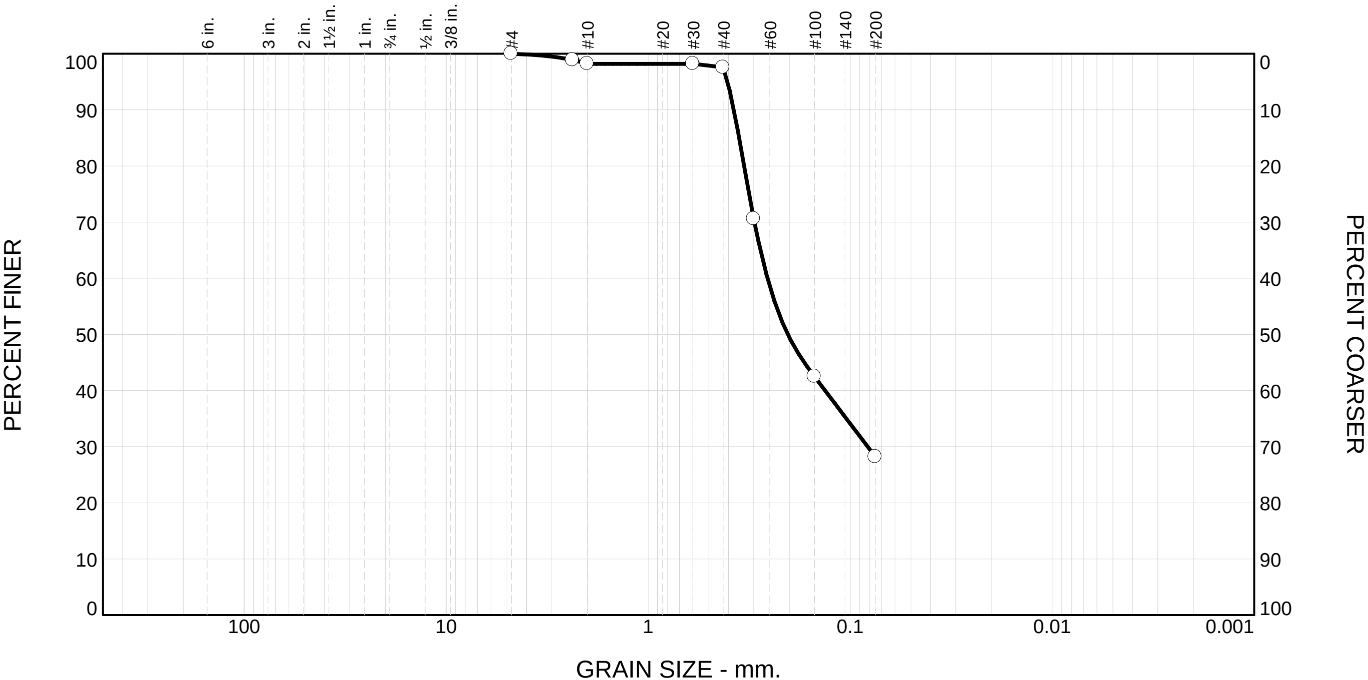
Alabama Power Co.

Birmingham, Alabama

Client: Southern Company
Project: Plant Scholz Ash Pond
Project No.:
Lab # AP09891

Tested By: J.Strother (5-6-2010) **Checked By:** D.Wilson (5-25-2010)

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	1.8	0.7	69.3	28.2	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100.0		
#8	98.9		
#10	98.2		
#30	98.2		
#40	97.5		
#50	70.6		
#100	42.5		
#200	28.2		

* (no specification provided)

Material Description

Grayish tan SILTY SAND

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= SM **AASHTO (M 145)=** A-2-4(0)

Coefficients

D_{90}= 0.3766	D_{85}= 0.3544	D_{60}= 0.2565
D_{50}= 0.2035	D_{30}= 0.0819	D_{15}=
D_{10}=	C_u=	C_c=

Remarks

F.M.=0.92

Date Received: 03-31-2010 **Date Tested:** 05-7-2010

Tested By: Joseph Strother

Checked By: Donna Wilson

Title: Supervisor/Mat.Eng.

Source of Sample: EDB-1 **Depth:** 49.5ft. - 51.0ft. **Date Sampled:** NA
Sample Number: 12

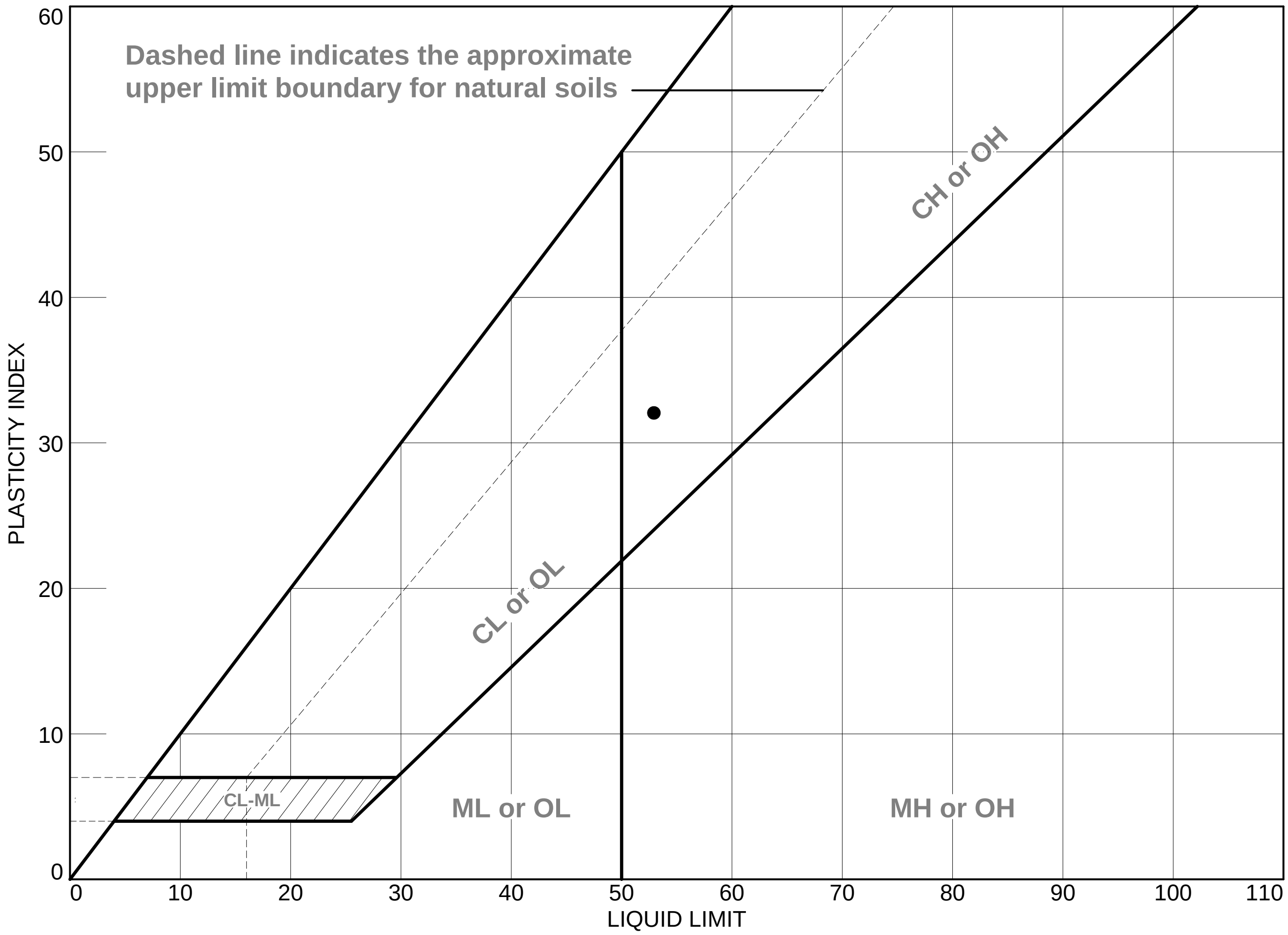
Alabama Power Co.

Birmingham, Alabama

Client: Southern Company
Project: Plant Scholz Ash Pond

Project No: **Lab #** AP09891

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	EDB-1	14	59.5ft. - 61ft.	33.0	21	53	32	SC

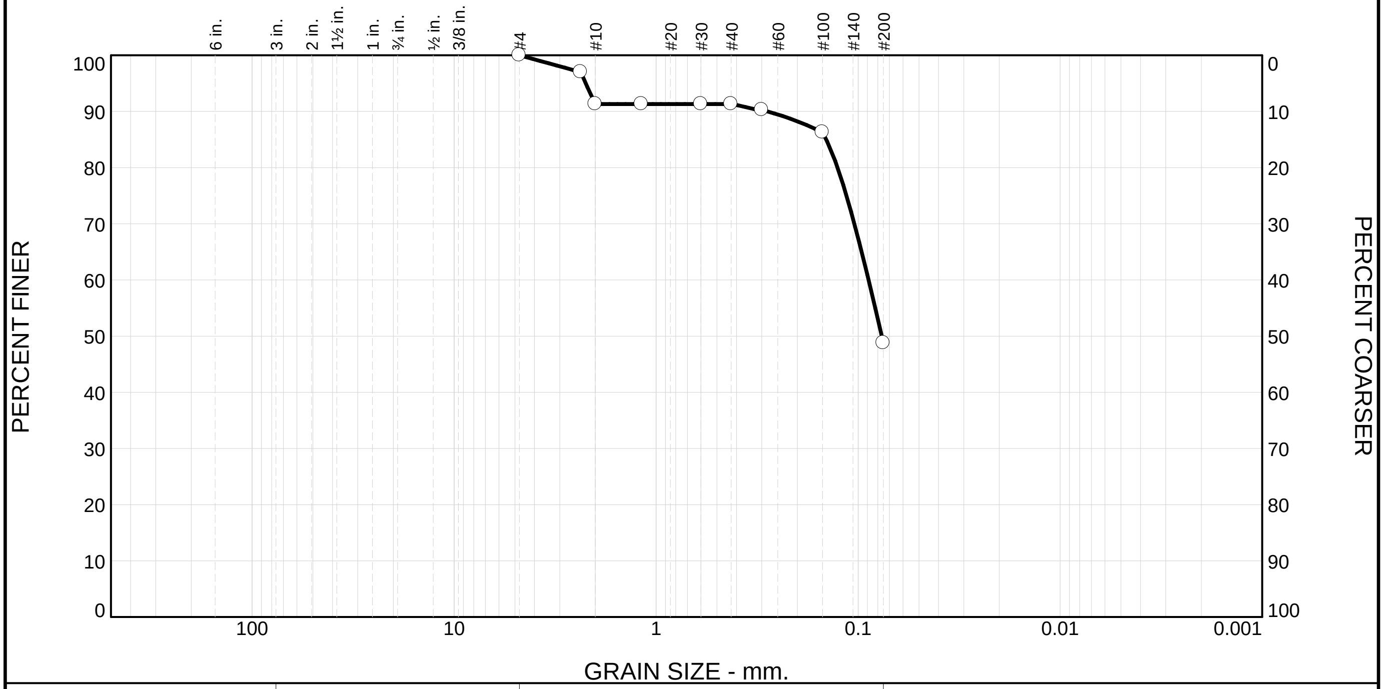
Alabama Power Co.

Birmingham, Alabama

Client: Southern Company
Project: Plant Scholz Ash Pond
Project No.:
Lab # AP09892

Tested By: J.Strother (5-6-2010) **Checked By:** D.Wilson (5-25-2010)

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	8.7	0.0	42.5	48.8	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100.0		
#8	97.0		
#10	91.3		
#16	91.3		
#30	91.3		
#40	91.3		
#50	90.3		
#100	86.3		
#200	48.8		

* (no specification provided)

Material Description

Grayish tan CLAYEY SAND

Atterberg Limits (ASTM D 4318)

PL= 21 **LL=** 53 **PI=** 32

Classification

USCS (D 2487)= SC **AASHTO (M 145)=** A-7-6(11)

Coefficients

D_{90}= 0.2816	D_{85}= 0.1437	D_{60}= 0.0888
D_{50}= 0.0764	D_{30}=	D_{15}=
D_{10}=	C_u=	C_c=

Remarks

F.M.=0.44

Date Received: 3/30/2010 **Date Tested:** 05/07/2010

Tested By: Joseph Strother

Checked By: Donna Wilson

Title: Supervisor/Mat.Eng.

Source of Sample: EDB-1 **Depth:** 59.5ft. - 61ft. **Date Sampled:** NA

Sample Number: 14

Alabama Power Co.

Birmingham, Alabama

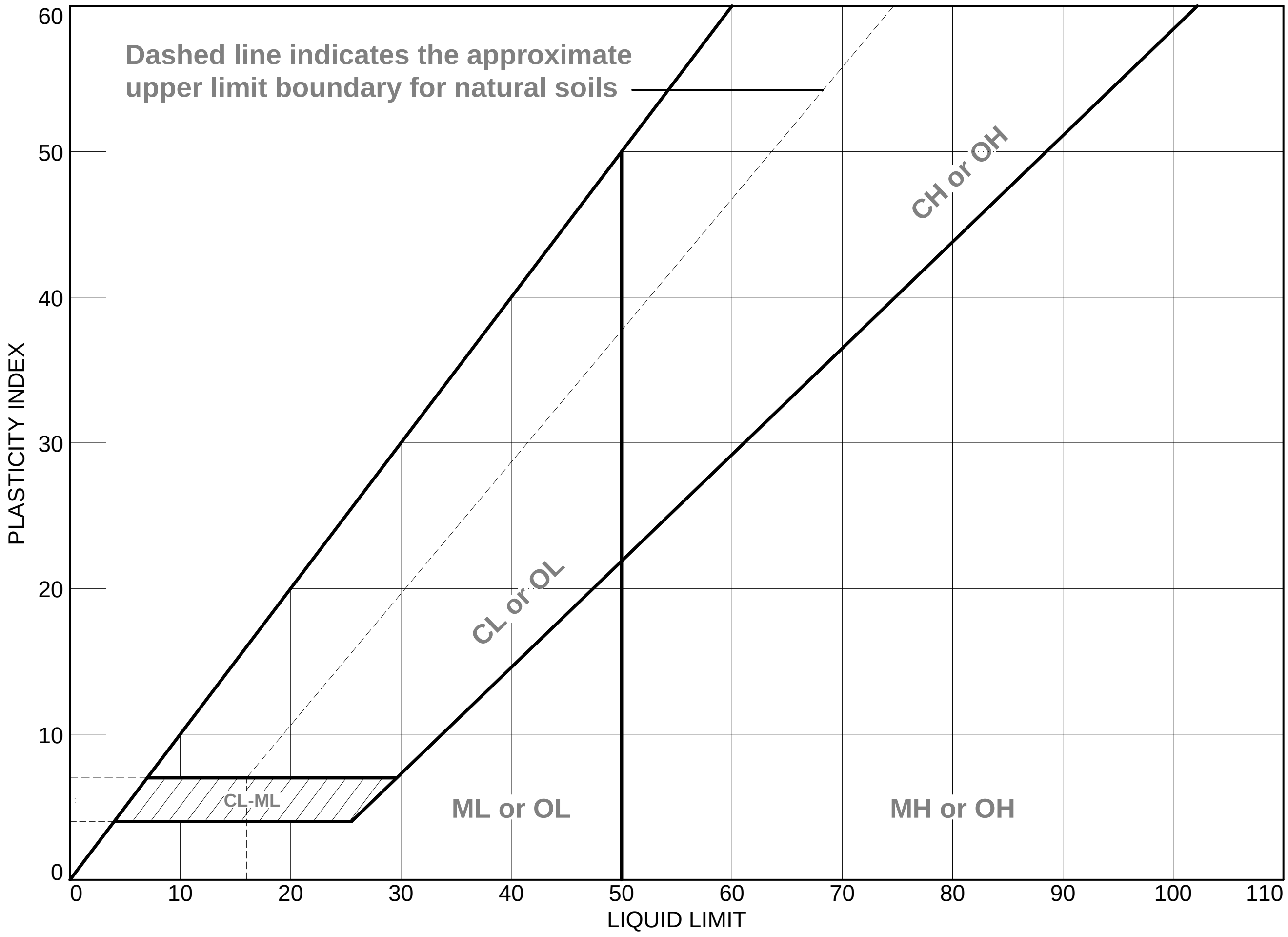
Client: Southern Company

Project: Plant Scholz Ash Pond

Project No:

Lab # AP09892

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	EDB-2	7	24.5ft. - 26.0ft.	36.6	NP	NV	NP	ML

Alabama Power Co.

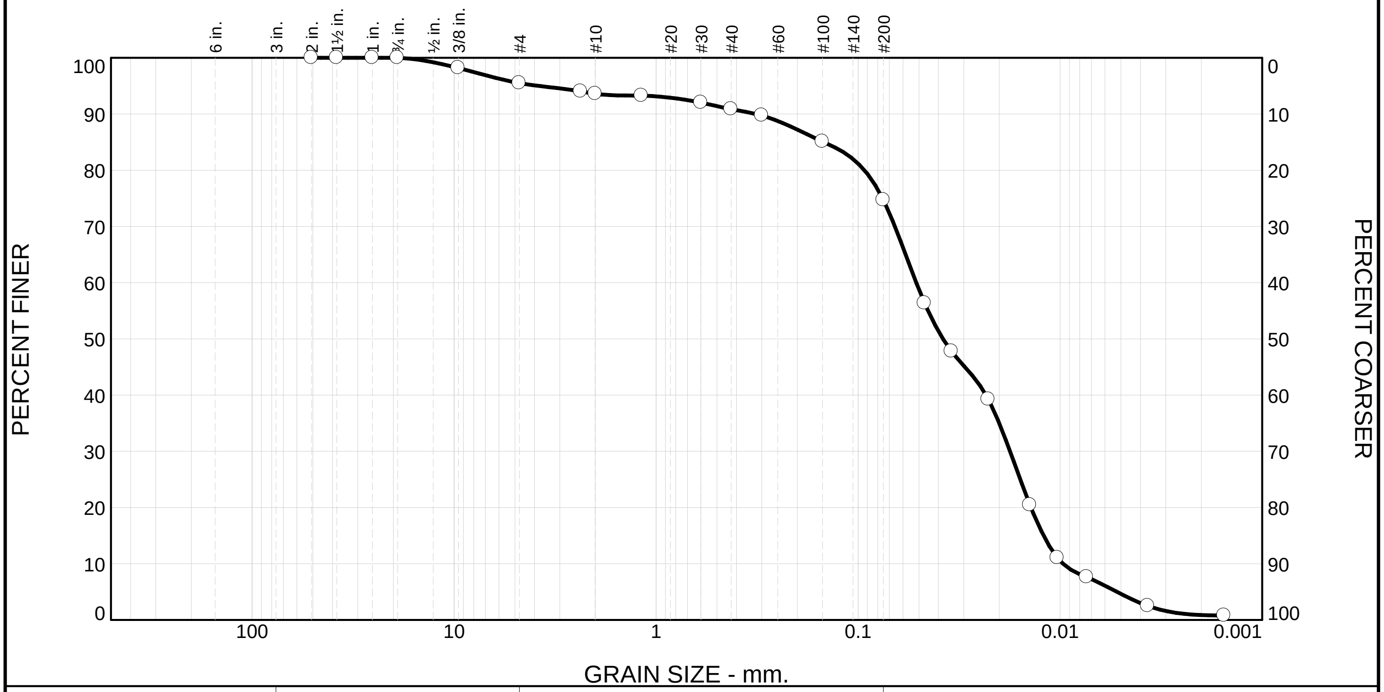
Birmingham, Alabama

Client: Southern Company
Project: Plant Scholz Ash Pond

Project No.:
Lab # AP09893

Tested By: J.Strother (5-6-2010)

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	4.5	1.9	2.7	16.2	70.1	4.6

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
2	100.0		
1.5	100.0		
1	100.0		
.75	100.0		
.375	98.2		
#4	95.5		
#8	94.0		
#10	93.6		
#16	93.3		
#30	92.0		
#40	90.9		
#50	89.7		
#100	85.1		
#200	74.7		
0.0468 mm.	56.4		
0.0345 mm.	47.8		
0.0227 mm.	39.3		
0.0141 mm.	20.4		
0.0103 mm.	11.0		
0.0074 mm.	7.6		
0.0037 mm.	2.5		
0.0015 mm.	0.8		

* (no specification provided)

Material Description

Blackish gray SILT with SAND

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= ML **AASHTO (M 145)=** A-4(0)

Coefficients

D_{90}= 0.3210	D_{85}= 0.1481	D_{60}= 0.0515
D_{50}= 0.0380	D_{30}= 0.0177	D_{15}= 0.0121
D_{10}= 0.0097	C_u= 5.32	C_c= 0.63

Remarks

F.M.=0.52

Date Received: 03/30/2010 **Date Tested:** 05/07/2010

Tested By: Joseph Strother

Checked By: Donna Wilson

Title: Supervisor/Mat.Eng.

Source of Sample: EDB-2 **Depth:** 24.5ft. - 26.0ft. **Date Sampled:** NA

Sample Number: 7

Alabama Power Co.

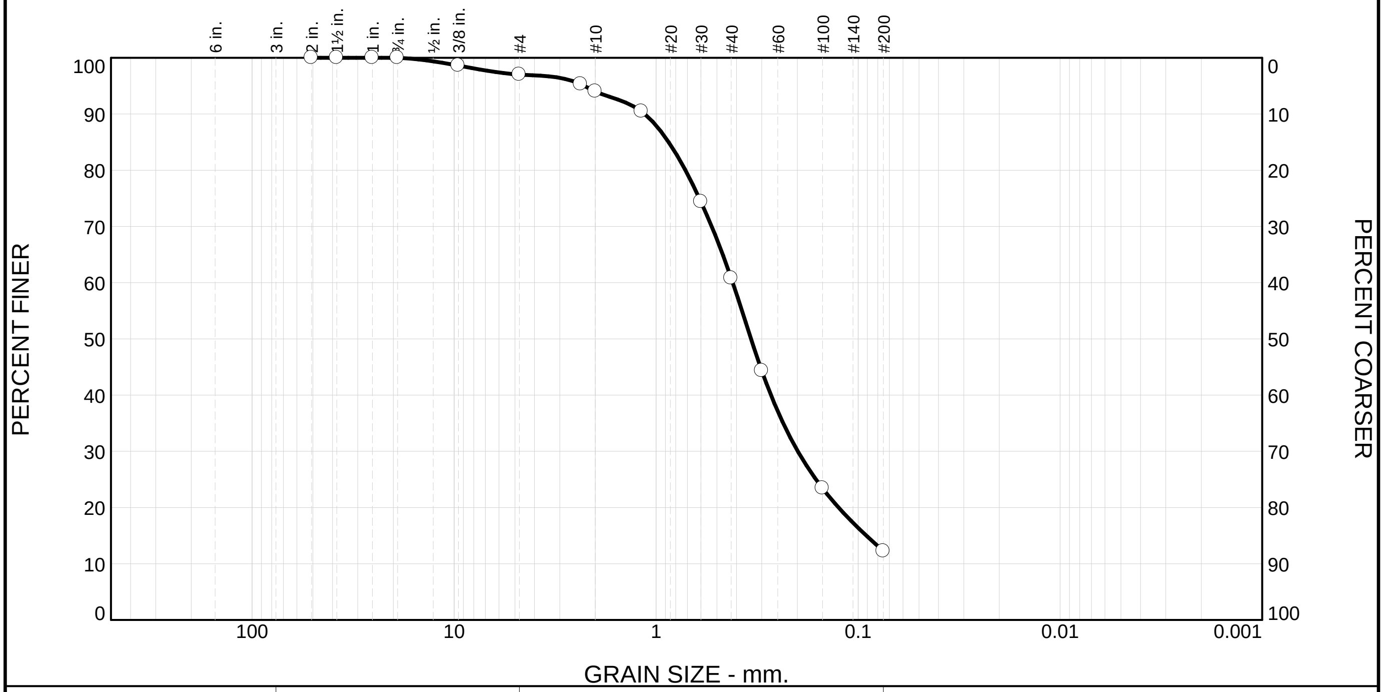
Birmingham, Alabama

Client: Southern Company

Project: Plant Scholz Ash Pond

Project No: **Lab #** AP09893

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	3.0	3.0	33.2	48.6	12.2	

TEST RESULTS			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
2	100.0		
1.5	100.0		
1	100.0		
.75	100.0		
.375	98.6		
#4	97.0		
#8	95.3		
#10	94.0		
#16	90.4		
#30	74.4		
#40	60.8		
#50	44.3		
#100	23.4		
#200	12.2		

* (no specification provided)

Material Description

Brownish black SILTY SAND

Atterberg Limits (ASTM D 4318)

PL= 0 **LL=** 0 **PI=** 0

Classification

USCS (D 2487)= SM **AASHTO (M 145)=** A-2-4(0)

Coefficients

D_{90}= 1.1392 D_{85}= 0.8669 D_{60}= 0.4176
D_{50}= 0.3392 D_{30}= 0.1988 D_{15}= 0.0910
D_{10}= C_u= C_c=

Remarks

%Moist = 15.8
F.M.=1.77

Date Received: 03/30/2010 **Date Tested:** 04/27/2010
Tested By: Joseph Strother
Checked By: Donna Wilson
Title: Supervisor/Mat.Eng.

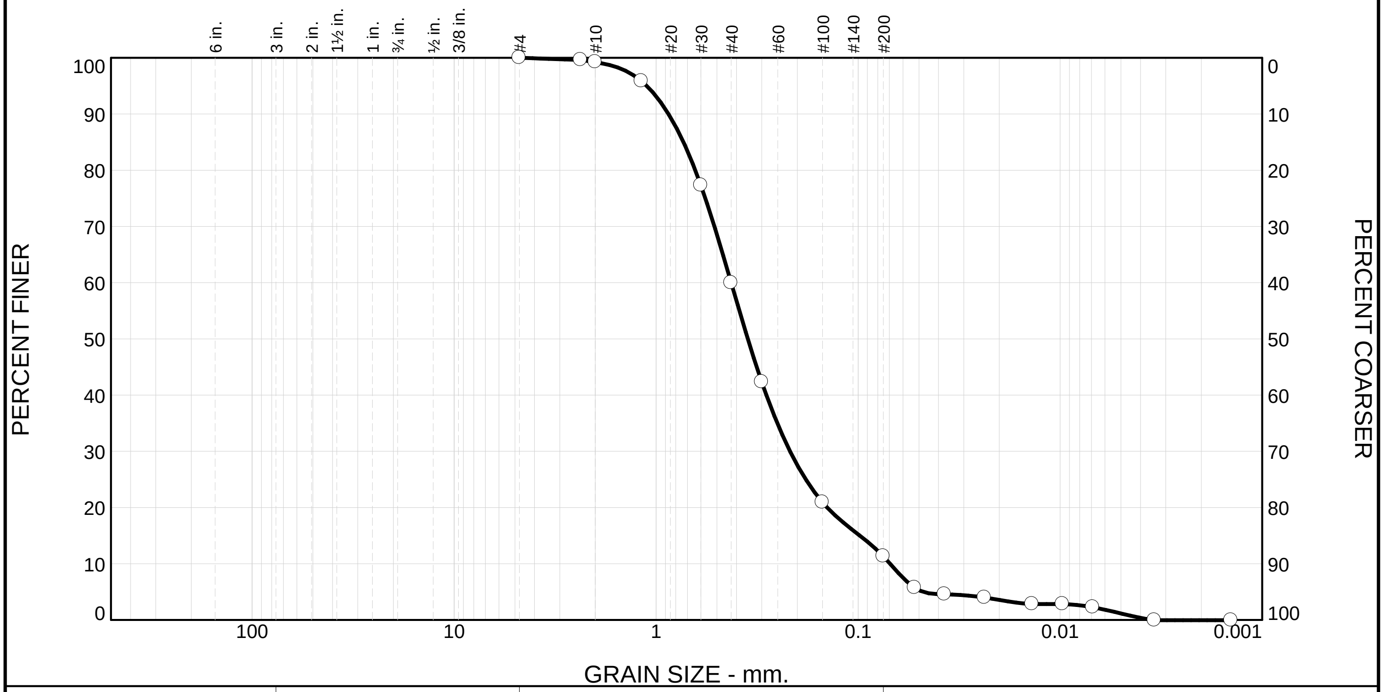
Source of Sample: EDB-2 **Depth:** 44.5ft. - 46ft. **Date Sampled:** NA
Sample Number: 11

Alabama Power Co.

Birmingham, Alabama

Client: Southern Company
Project: Plant Scholz Ash Pond
Project No: **Lab #** AP09894

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.8	39.2	48.7	10.1	1.2

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100.0		
#8	99.6		
#10	99.2		
#16	95.8		
#30	77.3		
#40	60.0		
#50	42.3		
#100	20.9		
#200	11.3		
0.0525 mm.	5.7		
0.0373 mm.	4.6		
0.0237 mm.	4.0		
0.0137 mm.	2.8		
0.0097 mm.	2.8		
0.0069 mm.	2.3		
0.0034 mm.			
0.0014 mm.			

* (no specification provided)

Material Description

Black tan well-graded SAND with SILT

Atterberg Limits (ASTM D 4318)

PL= 0 **LL=** 0 **PI=** 0

Classification

USCS (D 2487)= SW-SM **AASHTO (M 145)=** A-2-4(0)

Coefficients

D_{90}= 0.8682 D_{85}= 0.7325 D_{60}= 0.4253
D_{50}= 0.3517 D_{30}= 0.2172 D_{15}= 0.0981
D_{10}= 0.0694 C_u= 6.13 C_c= 1.60

Remarks

%Moist = 39.2
F.M.=1.64

Date Received: 03/30/2010 **Date Tested:** 05/07/2010
Tested By: Joseph Strother
Checked By: Donna Wilson
Title: Supervisor/Mat.Eng.

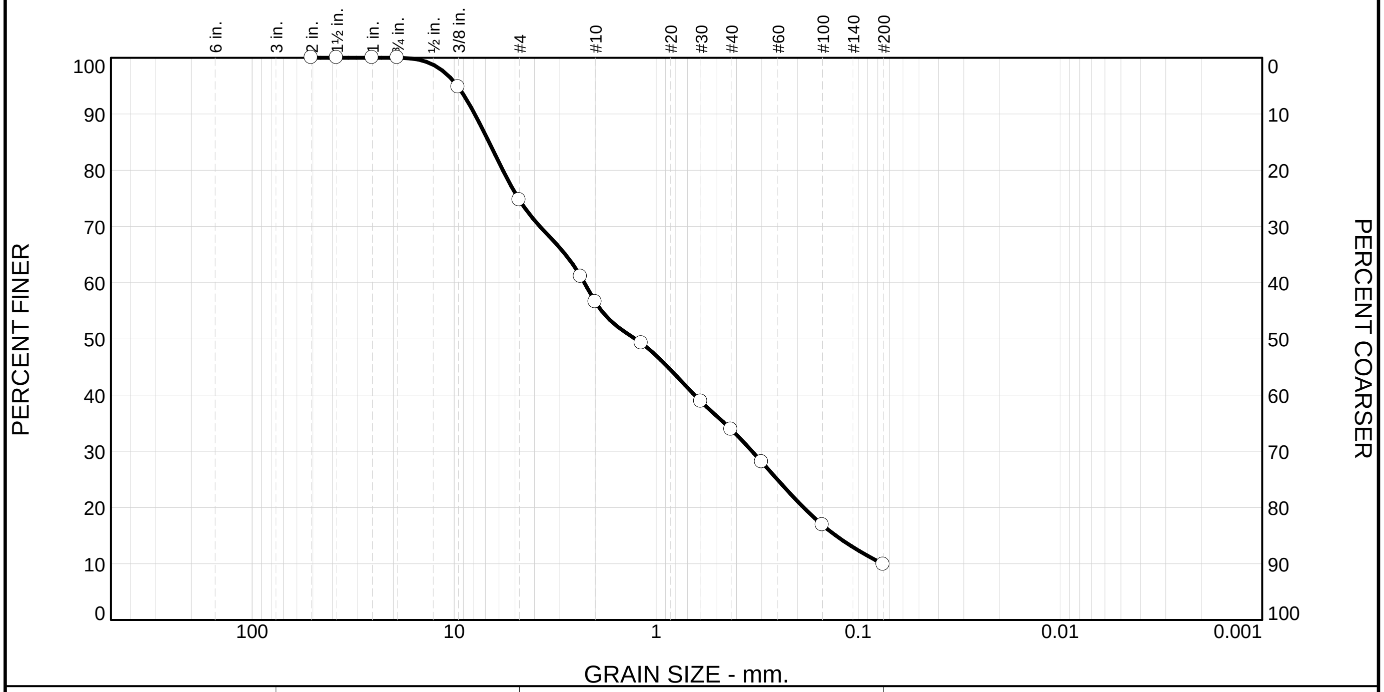
Source of Sample: EDB-3 **Depth:** 39.5ft. - 41.0ft. **Date Sampled:** NA
Sample Number: 10

Alabama Power Co.

Birmingham, Alabama

Client: Southern Company
Project: Plant Scholz Ash Pond
Project No: **Lab #** AP09895

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	25.3	18.1	22.7	24.0	9.9	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
2	100.0		
1.5	100.0		
1	100.0		
.75	100.0		
.375	94.8		
#4	74.7		
#8	61.1		
#10	56.6		
#16	49.2		
#30	38.9		
#40	33.9		
#50	28.1		
#100	16.9		
#200	9.9		

* (no specification provided)

Material Description

Gray poorly graded SAND with SILT and GRAVEL

Atterberg Limits (ASTM D 4318)

PL= 0 **LL=** 0 **PI=** 0

Classification

USCS (D 2487)= SP-SM **AASHTO (M 145)=** A-1-b

Coefficients

D_{90}= 7.9049	D_{85}= 6.7215	D_{60}= 2.2670
D_{50}= 1.2664	D_{30}= 0.3350	D_{15}= 0.1288
D_{10}= 0.0762	C_u= 29.76	C_c= 0.65

Remarks

%Moist = 13.8
F.M.=3.36

Date Received: 03/30/2010 **Date Tested:** 04/27/2010
Tested By: Joseph Strother
Checked By: Donna Wilson
Title: Supervisor/Mat.Eng.

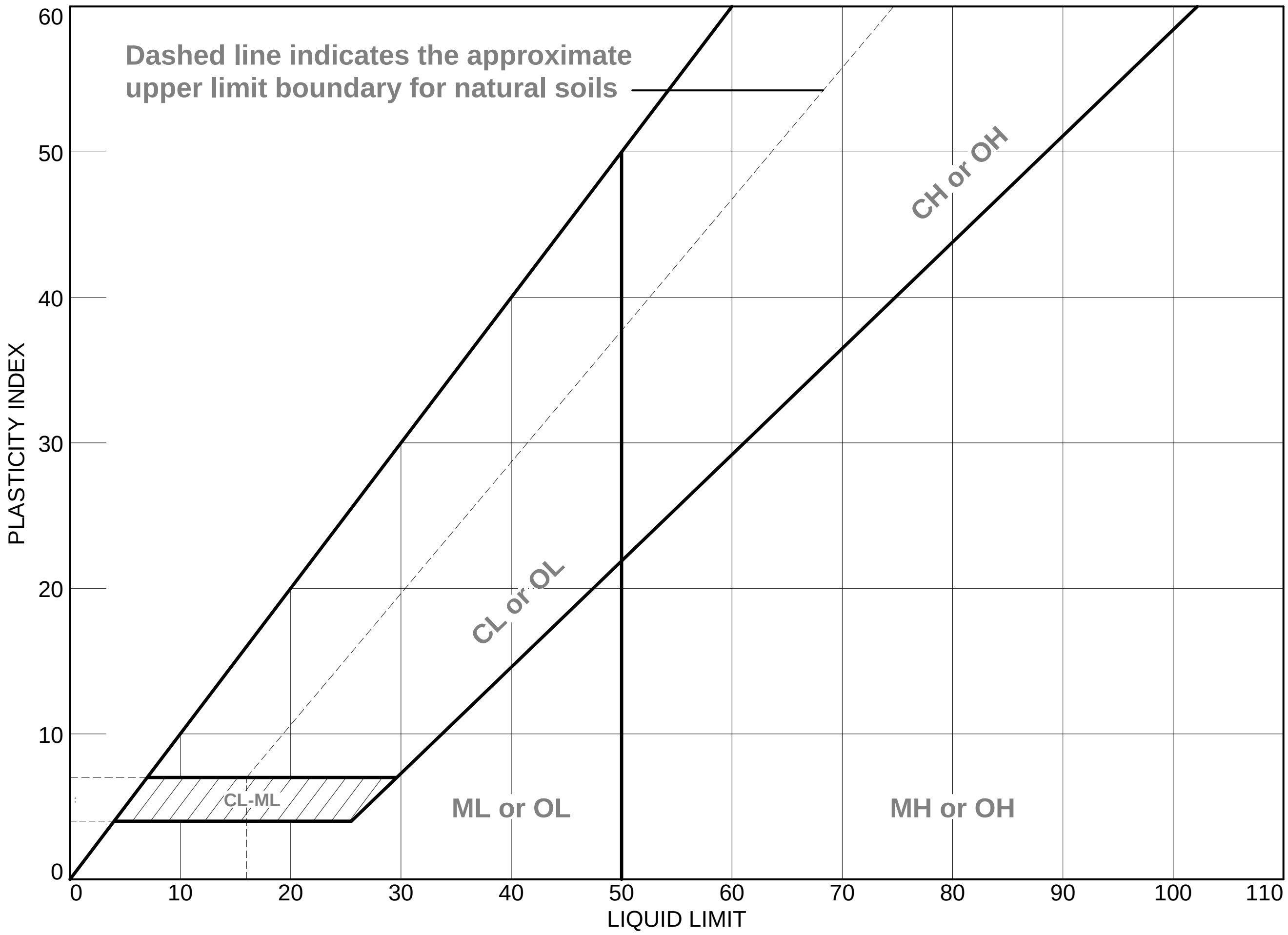
Source of Sample: EDB-3 **Depth:** 49.5ft. - 51.0ft. **Date Sampled:** NA
Sample Number: 12

Alabama Power Co.

Birmingham, Alabama

Client: Southern Company
Project: Plant Scholz Ash Pond
Project No: **Lab #** AP09896

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	EDB-4	10	39.5ft. - 41.0ft.	37.2	NP	NV	NP	SM

Alabama Power Co.

Birmingham, Alabama

Client: Southern Company

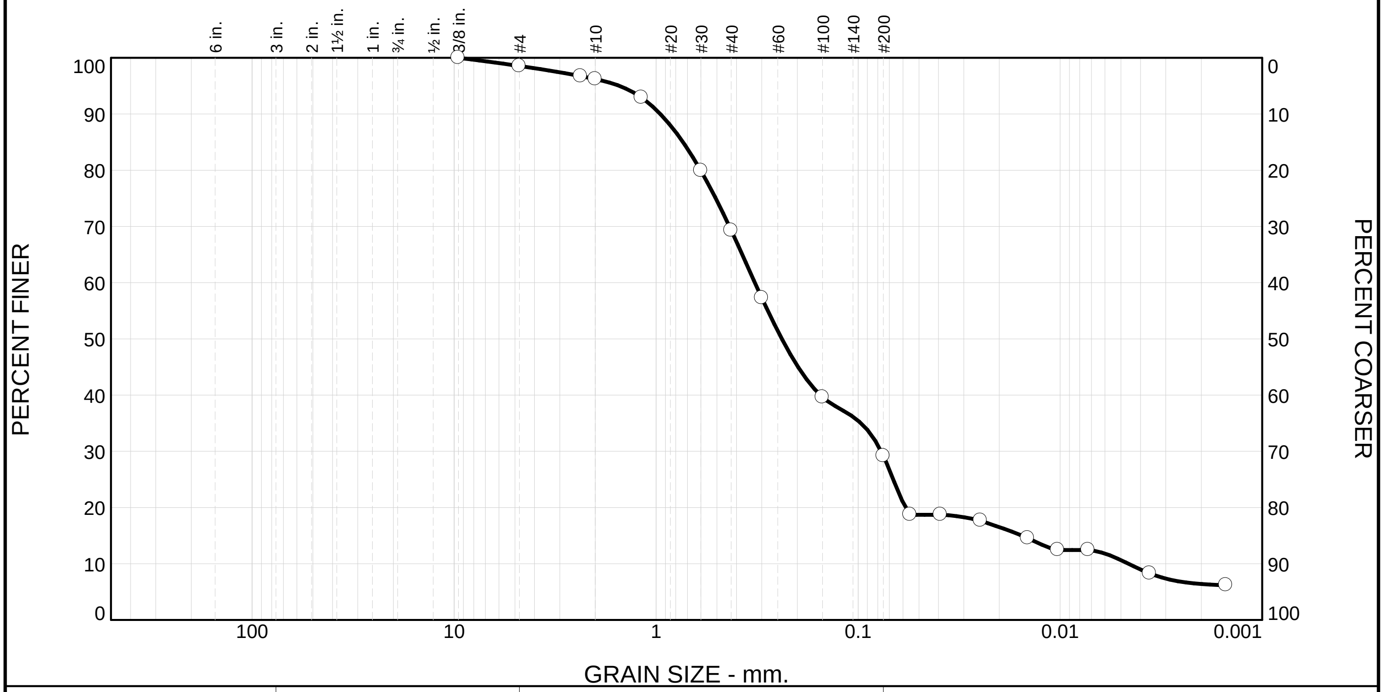
Project: Plant Scholz Ash Pond

Project No.:

Lab # AP09897

Tested By: J.Strother (5-6-2010)

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	1.5	2.3	26.9	40.1	18.6	10.6

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
.375	100.0		
#4	98.5		
#8	96.7		
#10	96.2		
#16	92.9		
#30	79.9		
#40	69.3		
#50	57.3		
#100	39.6		
#200	29.2		
0.0552 mm.	18.7		
0.0391 mm.	18.7		
0.0248 mm.	17.7		
0.0144 mm.	14.5		
0.0103 mm.	12.5		
0.0073 mm.	12.5		
0.0036 mm.	8.3		
0.0015 mm.	6.2		

* (no specification provided)

Material Description

Grayish tan SILTY SAND

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= SM **AASHTO (M 145)=** A-2-4(0)

Coefficients

D_{90}= 0.9531	D_{85}= 0.7365	D_{60}= 0.3247
D_{50}= 0.2385	D_{30}= 0.0769	D_{15}= 0.0154
D_{10}= 0.0046	C_u= 70.84	C_c= 3.98

Remarks

F.M.=1.35

Date Received: 03-30-2010 **Date Tested:** 05-7-2010

Tested By: Joseph Strother

Checked By: Donna Wilson

Title: Supervisor/Mat.Eng.

Source of Sample: EDB-4 **Depth:** 39.5ft. - 41.0ft. **Date Sampled:** NA

Sample Number: 10

Alabama Power Co.

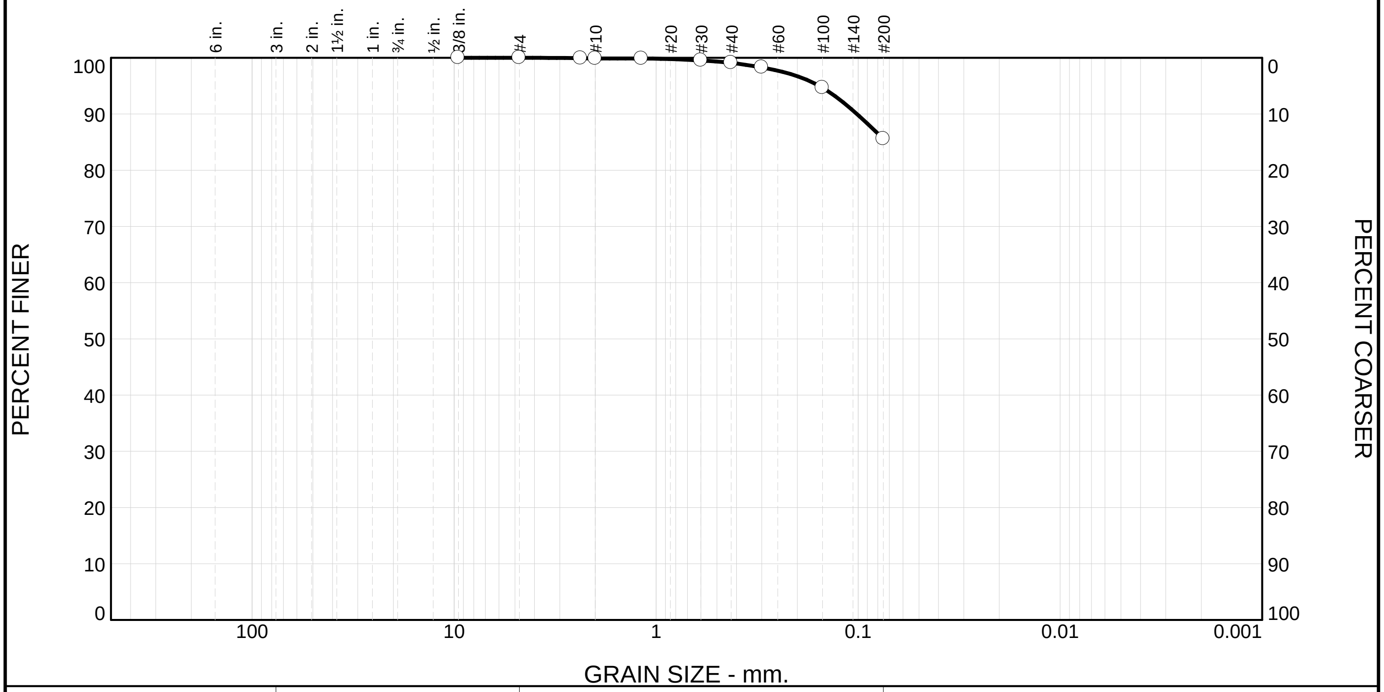
Birmingham, Alabama

Client: Southern Company

Project: Plant Scholz Ash Pond

Project No: **Lab #** AP09897

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	0.8	13.5	85.6	

TEST RESULTS			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
.375	100.0		
#4	100.0		
#8	99.9		
#10	99.9		
#16	99.9		
#30	99.5		
#40	99.1		
#50	98.3		
#100	94.7		
#200	85.6		

* (no specification provided)

Material Description

Gray SILT

Atterberg Limits (ASTM D 4318)

PL= 0 **LL=** 0 **PI=** 0

Classification

USCS (D 2487)= ML **AASHTO (M 145)=** A-4(0)

Coefficients

D_{90}=	0.1014	D_{85}=		D_{60}=	
D_{50}=		D_{30}=		D_{15}=	
D_{10}=		C_u=		C_c=	

Remarks

%Moisture = 48.8
F.M.=0.08

Date Received: 03/30/2010 **Date Tested:** 04/27/2010
Tested By: Joseph Strother
Checked By: Donna Wilson
Title: Supervisor/Mat.Eng.

Source of Sample: EDB-5 **Depth:** 29.5ft. - 31.0ft. **Date Sampled:** NA
Sample Number: 8

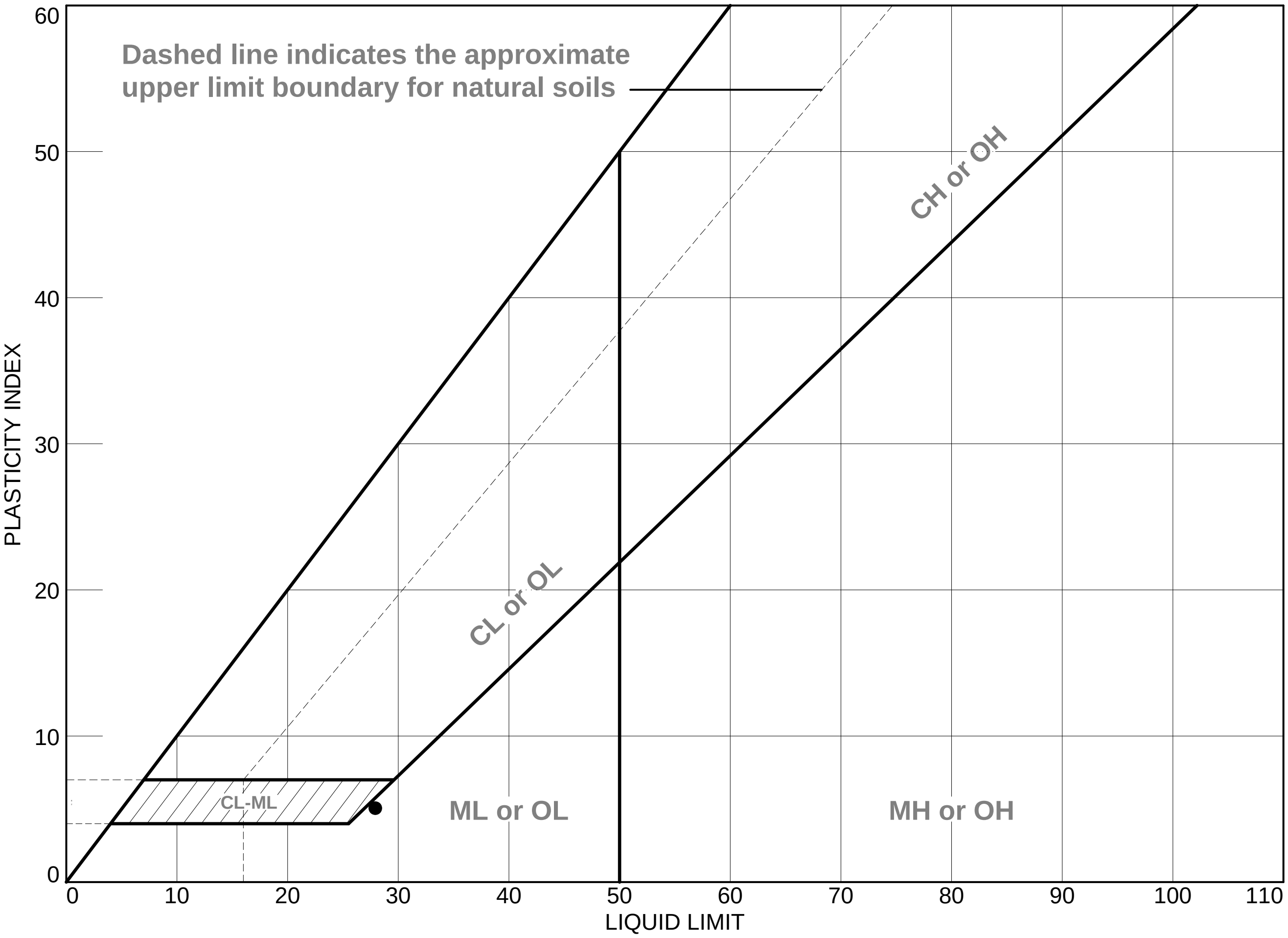
Alabama Power Co.

Birmingham, Alabama

Client: Southern Company
Project: Plant Scholz Ash Pond

Project No: **Lab #** AP09898

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	EDB-5	10	39.5ft. - 41.0	14.8	23	28	5	SP-SM

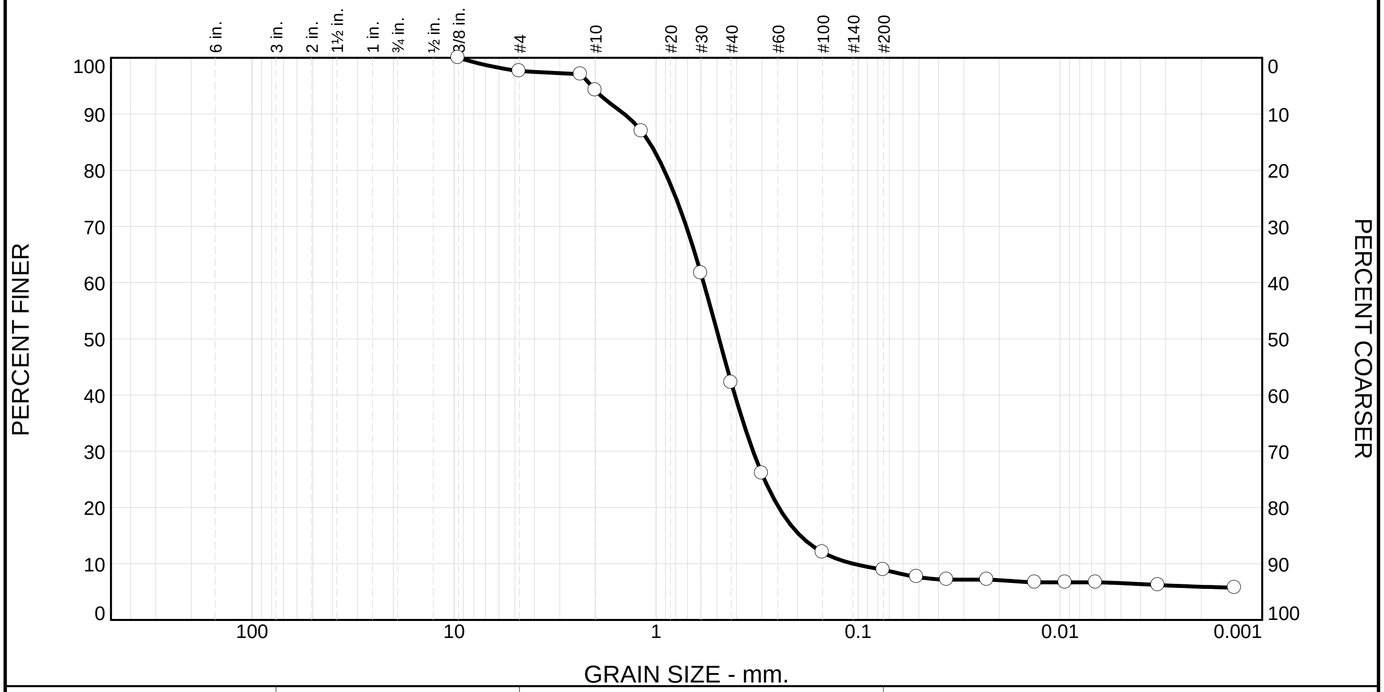
Alabama Power Co.

Birmingham, Alabama

Client: Southern Company
Project: Plant Scholz Ash Pond
Project No.:
Lab # AP09899

Tested By: J.Strother (5-6-2010) **Checked By:** D.Wilson (5-25-2010)

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	2.4	3.4	52.0	33.3	2.4	6.5

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
.375	100.0		
#4	97.6		
#8	97.1		
#10	94.2		
#16	86.9		
#30	61.7		
#40	42.2		
#50	26.1		
#100	12.0		
#200	8.9		
0.0512 mm.	7.7		
0.0363 mm.	7.2		
0.0230 mm.	7.2		
0.0133 mm.	6.7		
0.0094 mm.	6.7		
0.0067 mm.	6.7		
0.0033 mm.	6.2		
0.0014 mm.	5.7		

* (no specification provided)

Material Description

Brown poorly graded SAND with SILT

Atterberg Limits (ASTM D 4318)

PL= 23 **LL=** 28 **PI=** 5

Classification

USCS (D 2487)= SP-SM **AASHTO (M 145)=** A-1-b

Coefficients

D_{90}= 1.4388 D_{85}= 1.0818 D_{60}= 0.5817
D_{50}= 0.4878 D_{30}= 0.3311 D_{15}= 0.1932
D_{10}= 0.1057 C_u= 5.50 C_c= 1.78

Remarks

F.M.=2.19

Date Received: 03-30-2010 **Date Tested:** 05-7-2010
Tested By: Joseph Strother
Checked By: Donna Wilson
Title: Supervisor/Mat.Eng.

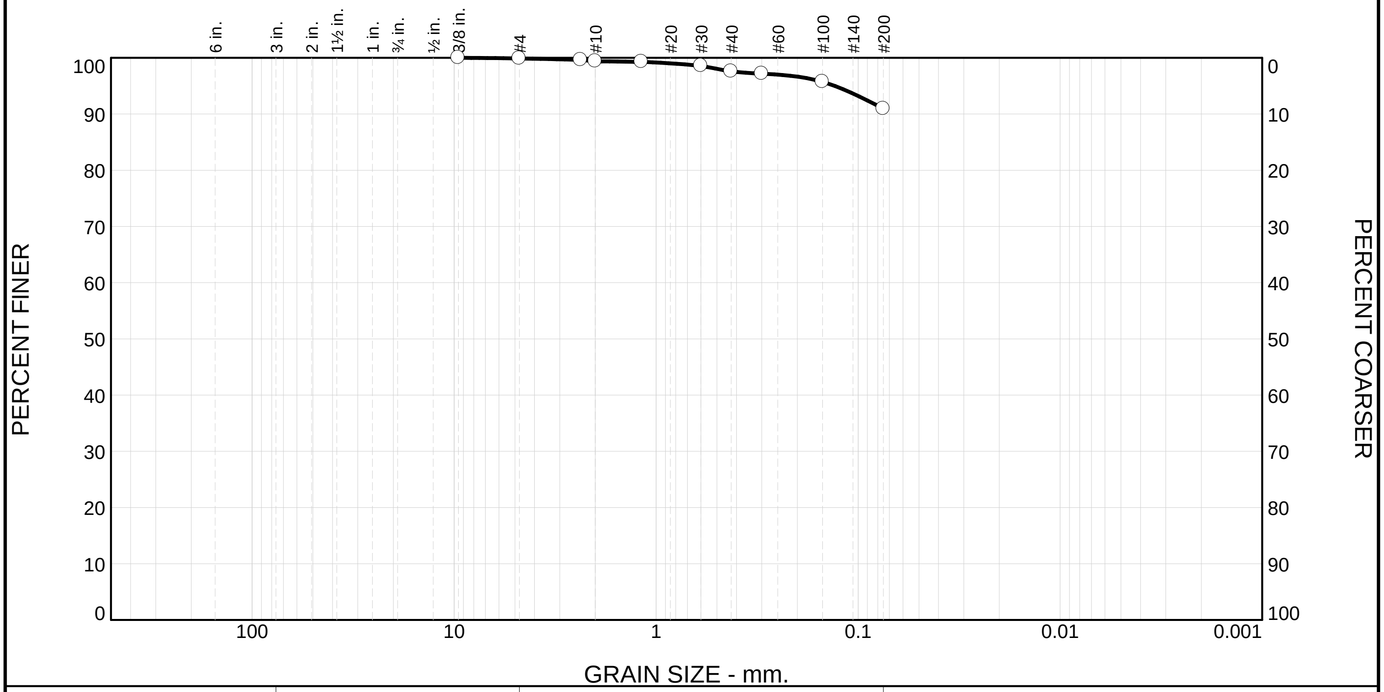
Source of Sample: EDB-5 **Depth:** 39.5ft. - 41.0 **Date Sampled:** NA
Sample Number: 10

Alabama Power Co.

Birmingham, Alabama

Client: Southern Company
Project: Plant Scholz Ash Pond
Project No: **Lab #** AP09899

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.1	0.5	1.8	6.7	90.9	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
.375	100.0		
#4	99.9		
#8	99.6		
#10	99.4		
#16	99.3		
#30	98.6		
#40	97.6		
#50	97.2		
#100	95.7		
#200	90.9		

* (no specification provided)

Material Description

Tannish black SILT

Atterberg Limits (ASTM D 4318)

PL= 0 **LL=** 0 **PI=** 0

Classification

USCS (D 2487)= ML **AASHTO (M 145)=** A-4(0)

Coefficients

D_{90}=	D_{85}=	D_{60}=
D_{50}=	D_{30}=	D_{15}=
D_{10}=	C_u=	C_c=

Remarks

%MOIST = 22.2
F.M.=0.10

Date Received: 03-31-2010 **Date Tested:** 05-7-2010
Tested By: Joseph Strother
Checked By: Donna Wilson
Title: 05-25-2010

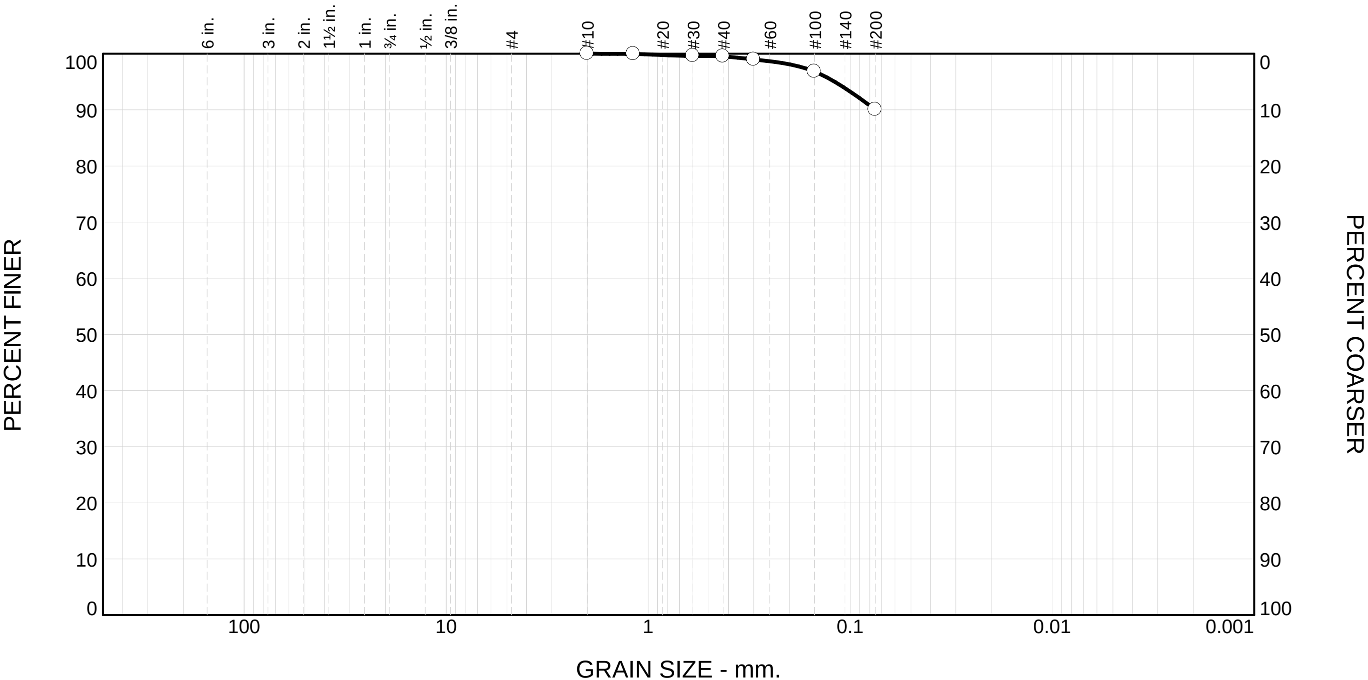
Source of Sample: EDB-5 **Depth:** 44.5ft. - 46.0ft. **Date Sampled:** NA
Sample Number: 11

Alabama Power Co.

Birmingham, Alabama

Client: Southern Company
Project: Plant Scholz Ash Pond
Project No: **Lab #** AP09900

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.5	9.5	90.0	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#10	100.0		
#16	100.0		
#30	99.6		
#40	99.5		
#50	99.0		
#100	96.8		
#200	90.0		

* (no specification provided)

Material Description

Gray SILT

Atterberg Limits (ASTM D 4318)

PL= 0 **LL=** 0 **PI=** 0

Classification

USCS (D 2487)= ML **AASHTO (M 145)=** A-4(0)

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

% MOIST = 66.5
F.M.=0.05

Date Received: 03-30-2010 **Date Tested:** 05-7-2010
Tested By: Joseph Strother
Checked By: Donna Wilson
Title: 05-25-2010

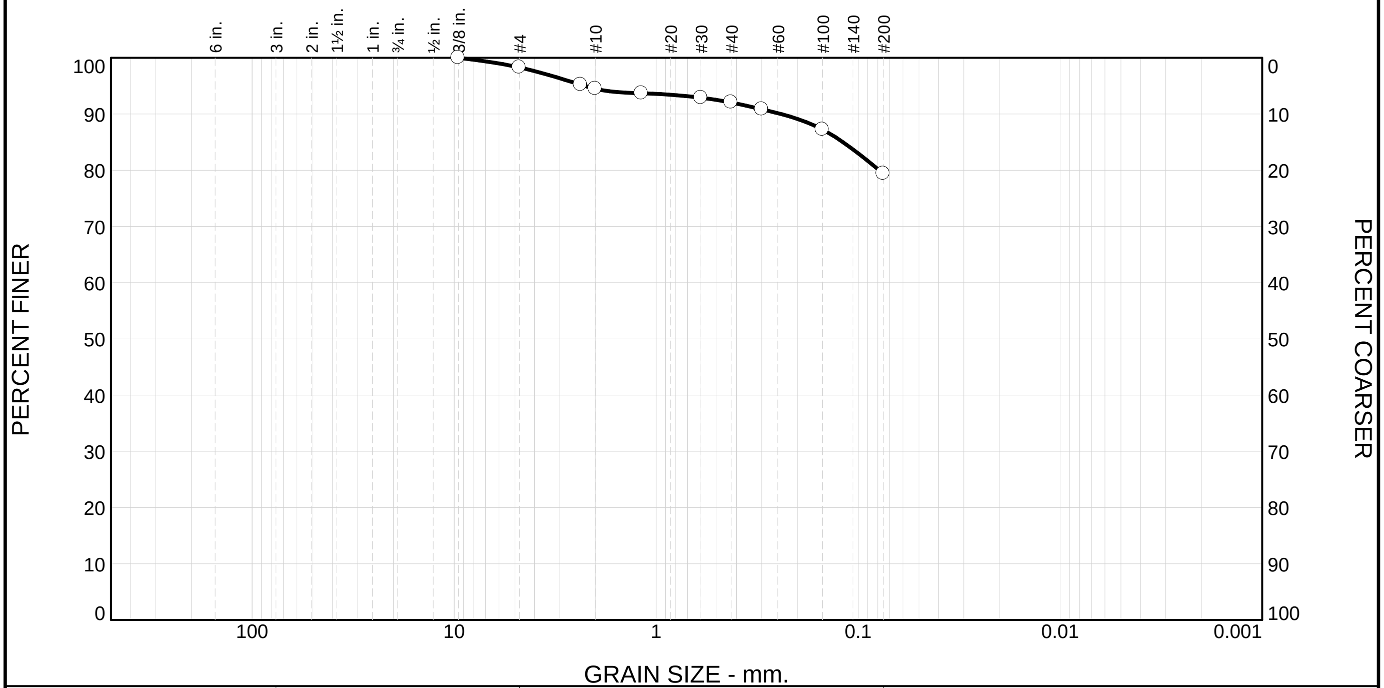
Source of Sample: EDB-6 **Depth:** 7.5 - 9.0 **Date Sampled:** NA
Sample Number: 3

Alabama Power Co.

Birmingham, Alabama

Client: Southern Company
Project: Plant Scholz Ash Pond
Project No: **Lab #** AP09901

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	1.7	3.8	2.4	12.7	79.4	

TEST RESULTS			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
.375	100.0		
#4	98.3		
#8	95.2		
#10	94.5		
#16	93.7		
#30	92.9		
#40	92.1		
#50	90.8		
#100	87.2		
#200	79.4		

* (no specification provided)

Material Description

Black SILT with SAND

Atterberg Limits (ASTM D 4318)

PL= 0 **LL=** 0 **PI=** 0

Classification

USCS (D 2487)= ML **AASHTO (M 145)=** A-4(0)

Coefficients

D_{90}= 0.2410	D_{85}= 0.1189	D_{60}=
D_{50}=	D_{30}=	D_{15}=
D_{10}=	C_u=	C_c=

Remarks

% Moist = 38.4
F.M.=0.42

Date Received: 03/30/2010 **Date Tested:** 05/12/2010
Tested By: Joseph Stother
Checked By: Donna Wilson
Title: Supervisor/Mat.Eng.

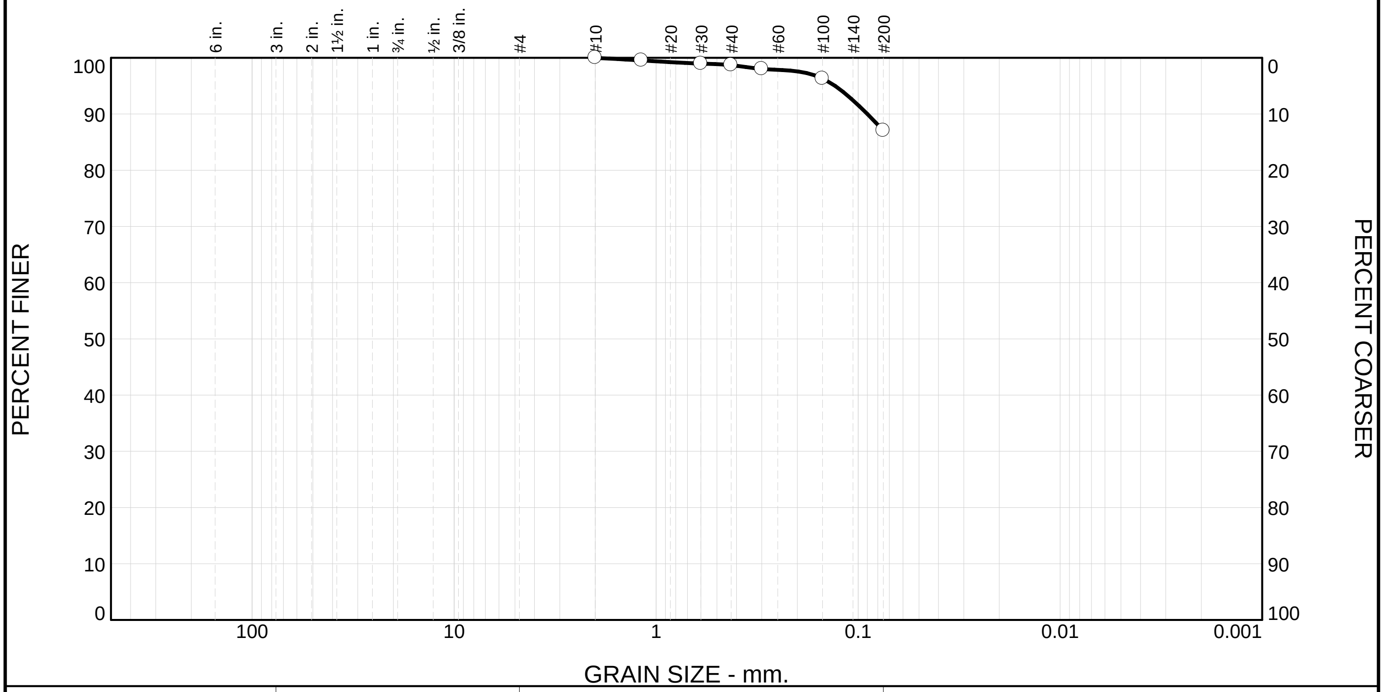
Source of Sample: EDB-6 **Depth:** 14.5ft. - 16.0ft. **Date Sampled:** NA
Sample Number: 5

Alabama Power Co.

Birmingham, Alabama

Client: Southern Company
Project: Plant Scholz Ash Pond
Project No: **Lab #** AP09902

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	1.3	11.6	87.1	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#10	100.0		
#16	99.5		
#30	99.0		
#40	98.7		
#50	98.0		
#100	96.3		
#200	87.1		

* (no specification provided)

Material Description

Black SILT

Atterberg Limits (ASTM D 4318)

PL= 0 **LL=** 0 **PI=** 0

Classification

USCS (D 2487)= ML **AASHTO (M 145)=** A-4(0)

Coefficients

D_{90}= 0.0901	D_{85}=	D_{60}=
D_{50}=	D_{30}=	D_{15}=
D_{10}=	C_u=	C_c=

Remarks

%Moist = 63.8
F.M.=0.07

Date Received: 03-30-2010 **Date Tested:** 05/12/2010
Tested By: Joseph Stother
Checked By: Donna Wilson
Title: Supervisor/Mat.Eng.

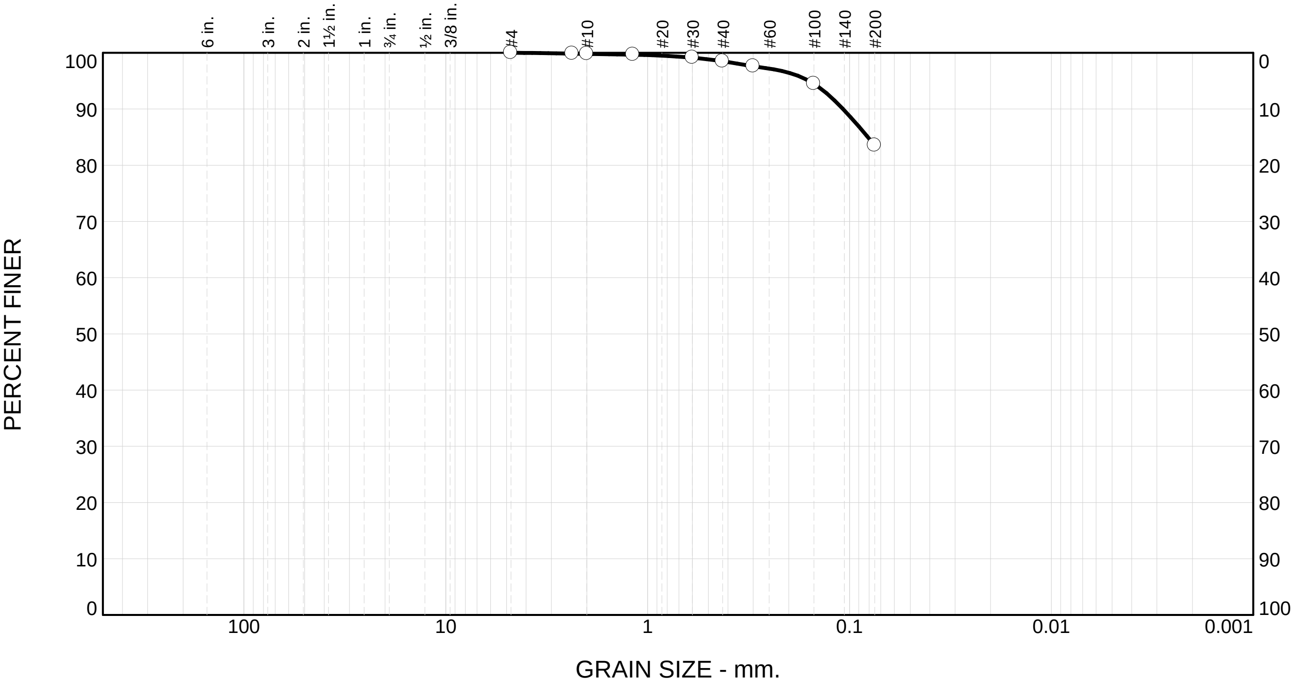
Source of Sample: EDB7 **Depth:** 24.5ft. - 26.0ft. **Date Sampled:** NA
Sample Number: 7

Alabama Power Co.

Birmingham, Alabama

Client: Southern Company
Project: Plant Scholz Ash Pond
Project No: **Lab #** AP09903

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.2	1.3	15.0	83.5	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100.0		
#8	99.9		
#10	99.8		
#16	99.7		
#30	99.1		
#40	98.5		
#50	97.6		
#100	94.5		
#200	83.5		

* (no specification provided)

Material Description

Black SILT with SAND

Atterberg Limits (ASTM D 4318)

PL= 0 **LL=** 0 **PI=** 0

Classification

USCS (D 2487)= ML **AASHTO (M 145)=** A-4(0)

Coefficients

$D_{90}=$ 0.1076 $D_{85}=$ 0.0812 $D_{60}=$
$D_{50}=$ $D_{30}=$ $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

%Moist = 53.2
F.M.=0.09

Date Received: 03/30/2010 **Date Tested:** 05/12/2010
Tested By: Joseph Strother
Checked By: Donna Wilson
Title: Supervisor/Mat.Eng.

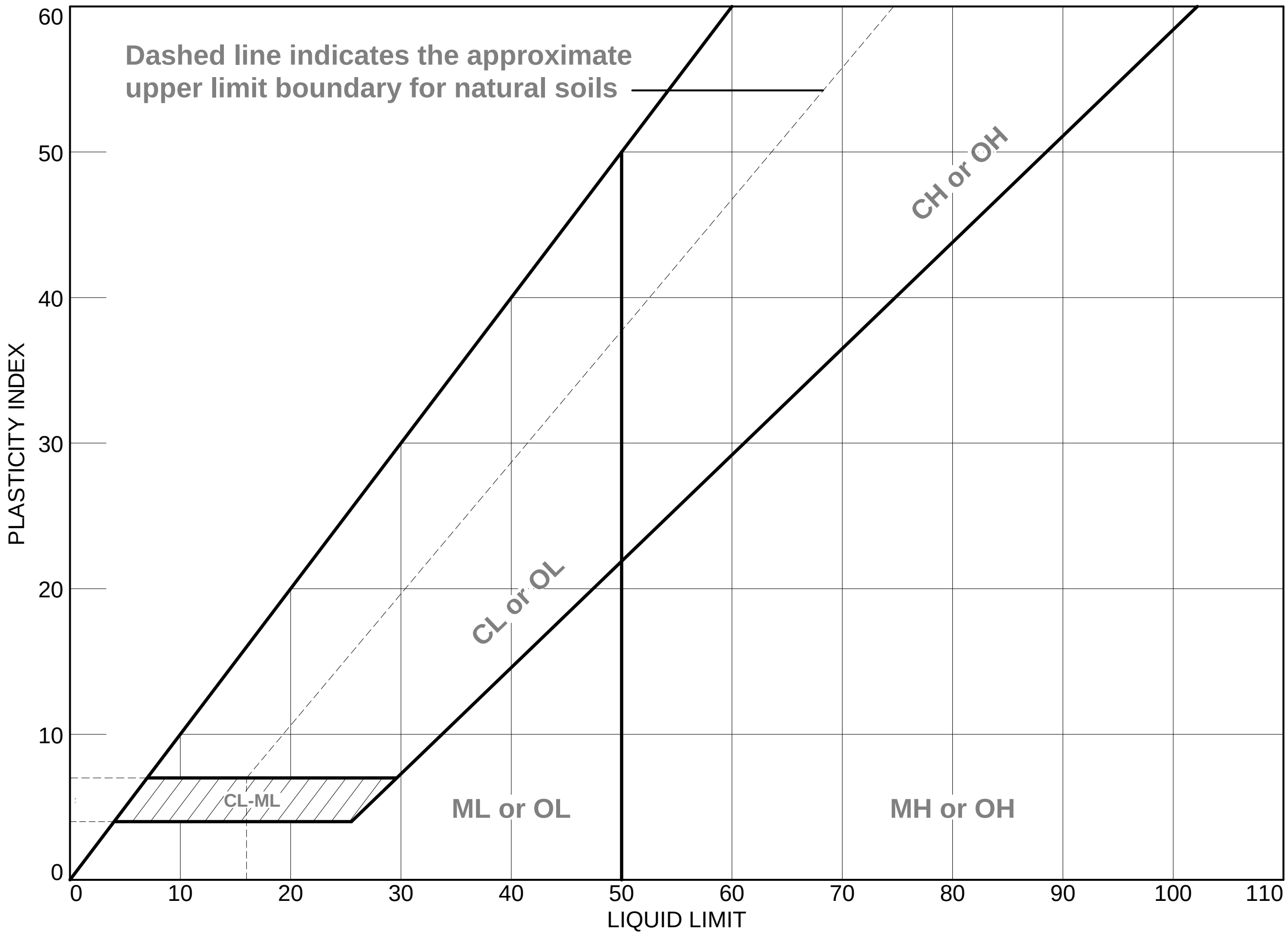
Source of Sample: EDB-7 **Depth:** 29.5ft. - 31.0 ft. **Date Sampled:** NA
Sample Number: 8

Alabama Power Co.

Birmingham, Alabama

Client: Southern Company
Project: Plant Scholz Ash Pond
Project No: **Lab #** AP09904

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	EDB-8	6	19.5ft. - 21.0ft.	11.6	NP	NV	NP	SM

Alabama Power Co.

Birmingham, Alabama

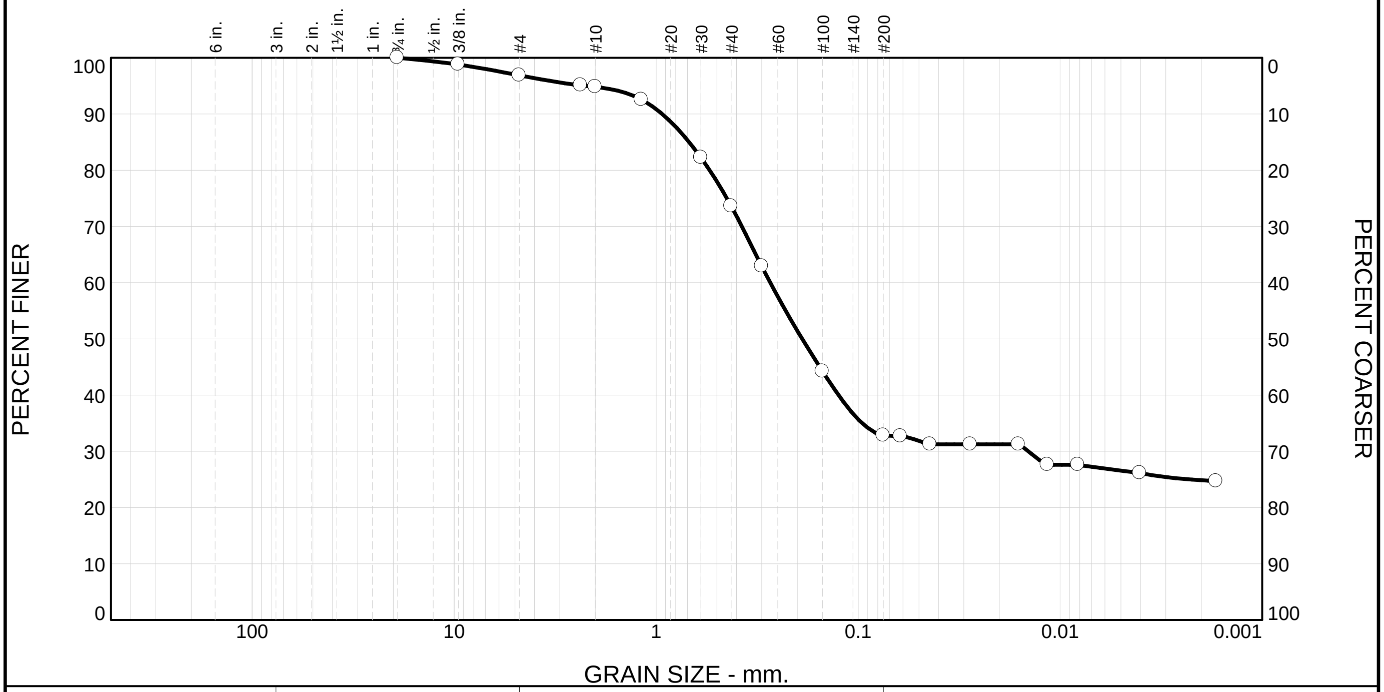
Client: Southern Company
Project: Plant Scholz Ash Pond

Project No.:

Lab # AP09906

Tested By: J.Strother (5-6-2010) **Checked By:** D. Wilson (5-6-2010)

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	3.1	2.1	21.2	40.8	6.2	26.6

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
.75	100.0		
.375	98.8		
#4	96.9		
#8	95.1		
#10	94.8		
#16	92.5		
#30	82.2		
#40	73.6		
#50	62.9		
#100	44.2		
#200	32.8		
0.0617 mm.	32.7		
0.0440 mm.	31.2		
0.0278 mm.	31.2		
0.0161 mm.	31.2		
0.0116 mm.	27.6		
0.0082 mm.	27.6		
0.0040 mm.	26.1		
0.0017 mm.	24.7		

* (no specification provided)

Material Description

Brown SILTY SAND

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= SM **AASHTO (M 145)=** A-2-4(0)

Coefficients

D_{90}= 0.9330	D_{85}= 0.6865	D_{60}= 0.2723
D_{50}= 0.1891	D_{30}= 0.0144	D_{15}=
D_{10}=	C_u=	C_c=

Remarks

F.M.=1.27

Date Received: 03/30/2010 **Date Tested:** 05/12/2010

Tested By: Joseph Strother

Checked By: Donna Wilson

Title: Supervisor/Mat.Eng.

Source of Sample: EDB-8 **Depth:** 19.5ft. - 21.0ft. **Date Sampled:** NA

Sample Number: 6

Alabama Power Co.

Birmingham, Alabama

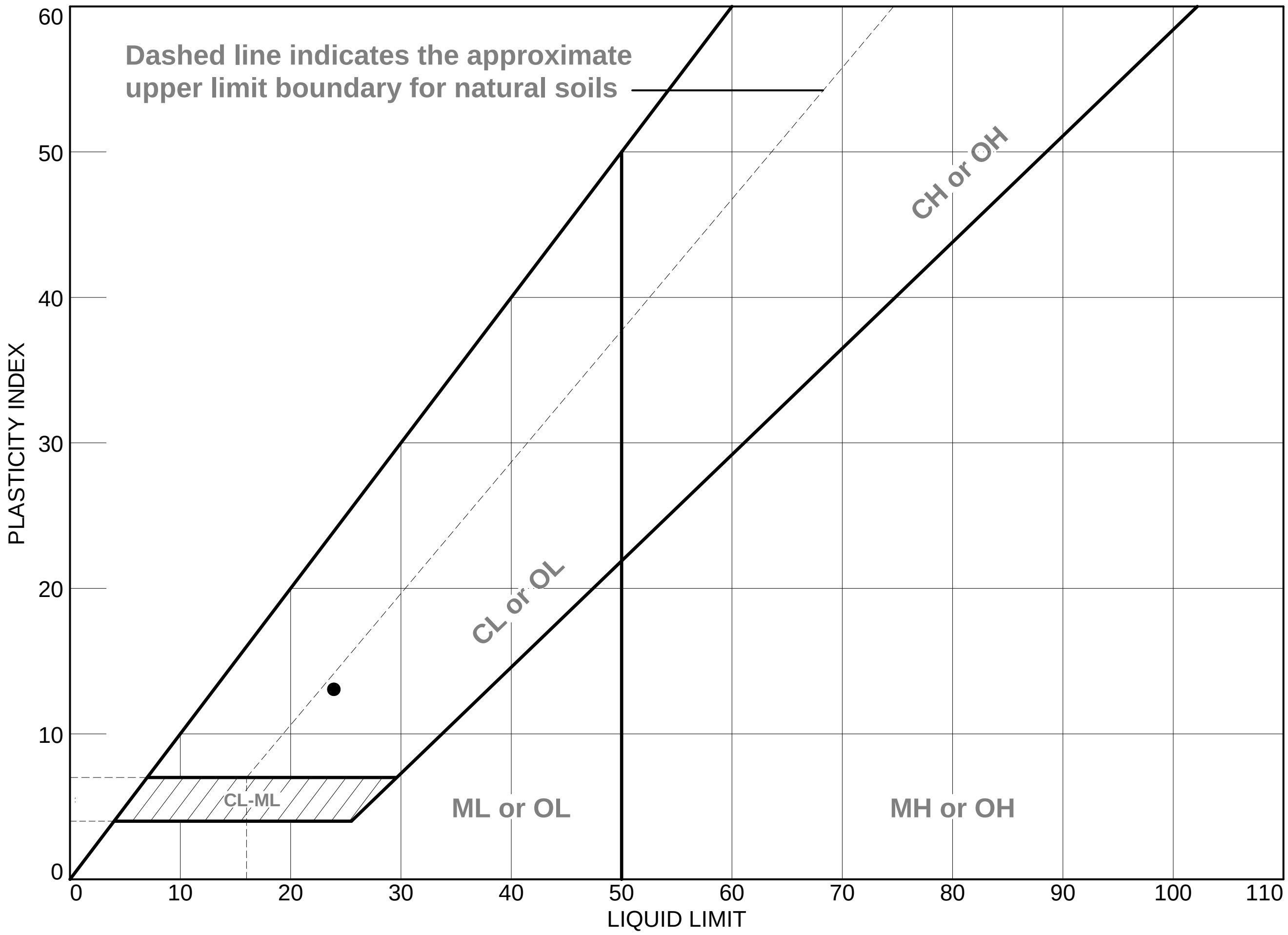
Client: Southern Company

Project: Plant Scholz Ash Pond

Project No:

Lab # AP09906

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	EDB-8	7	24.5ft. - 26.0ft.	18.4	11	24	13	SC

Alabama Power Co.

Birmingham, Alabama

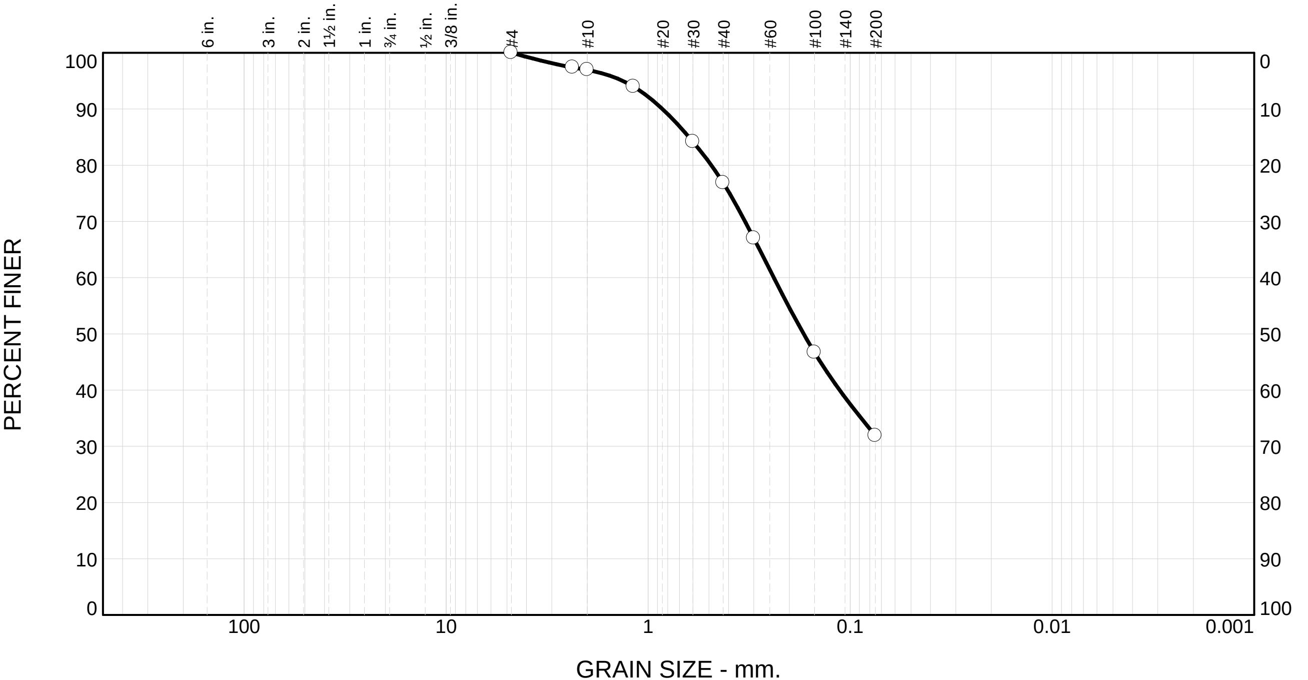
Client: Southern Company
Project: Plant Scholz Ash Pond

Project No.:

Lab # AP09909

Tested By: J.Strother (5-14-2010) **Checked By:** D.Wilson (5-26-2010)

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	3.1	20.0	45.0	31.9	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100.0		
#8	97.4		
#10	96.9		
#16	94.0		
#30	84.2		
#40	76.9		
#50	67.0		
#100	46.7		
#200	31.9		

* (no specification provided)

Material Description

Brown CLAYEY SAND

Atterberg Limits (ASTM D 4318)

PL= 11 **LL=** 24 **PI=** 13

Classification

USCS (D 2487)= SC **AASHTO (M 145)=** A-2-6(1)

Coefficients

D_{90}= 0.8498 D_{85}= 0.6276 D_{60}= 0.2386

D_{50}= 0.1699 D_{30}= D_{15}=

D_{10}= C_u= C_c=

Remarks

F.M.=1.11

Date Received: 03-30-2010 **Date Tested:** 05-14-2010

Tested By: Joseph Strother

Checked By: Donna Wilson

Title: Supervisor/Mat.Eng.

Source of Sample: EDB-8 **Depth:** 24.5ft. - 26.0ft. **Date Sampled:** NA

Sample Number: 7

Alabama Power Co.

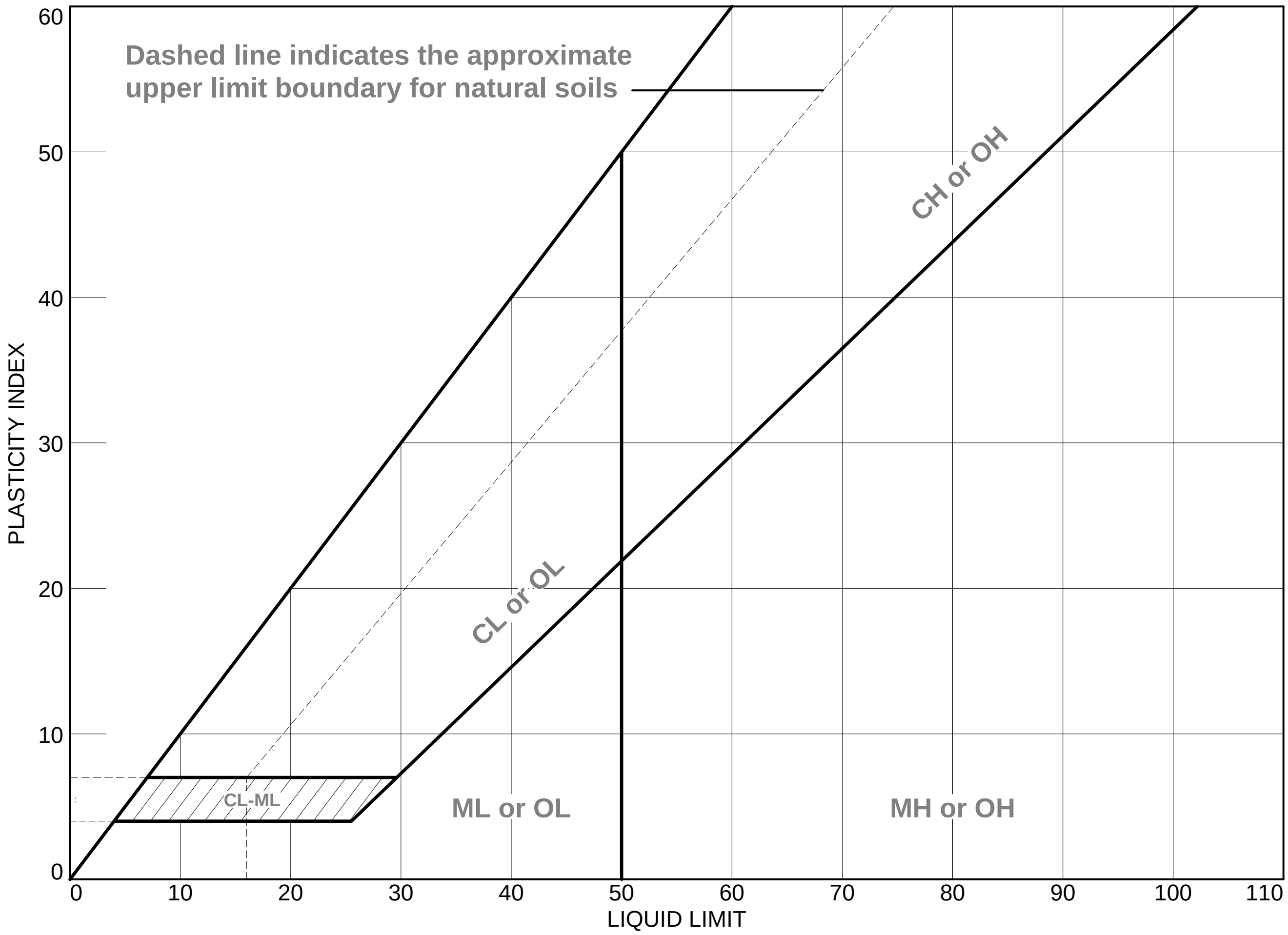
Birmingham, Alabama

Client: Southern Company

Project: Plant Scholz Ash Pond

Project No: **Lab #** AP09909

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	EDB-8	8	29.5ft. - 31.0ft	18.4	NP	NV	NP	SM

Alabama Power Co.

Birmingham, Alabama

Client: Southern Company

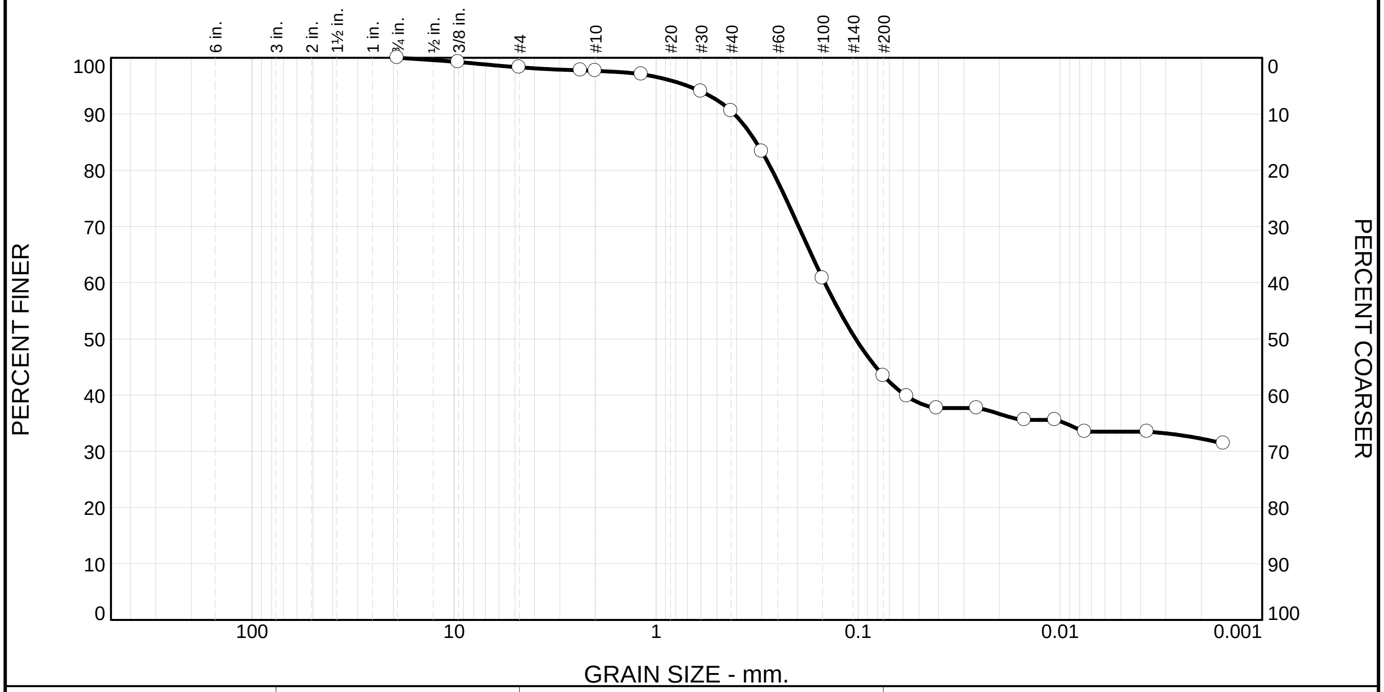
Project: Plant Scholz Ash Pond

Project No.:

Lab # AP09907

Tested By: J. Strother (5-6-10 **Checked By:** D. Wilson (5-26-10)

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	1.7	0.6	7.2	47.1	9.9	33.5

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
.75	100.0		
.375	99.2		
#4	98.3		
#8	97.8		
#10	97.7		
#16	97.1		
#30	94.0		
#40	90.5		
#50	83.3		
#100	60.8		
#200	43.4		
0.0573 mm.	39.8		
0.0408 mm.	37.7		
0.0258 mm.	37.7		
0.0150 mm.	35.6		
0.0106 mm.	35.6		
0.0075 mm.	33.5		
0.0037 mm.	33.5		
0.0016 mm.	31.4		

* (no specification provided)

Material Description

Tannish Red SILTY SAND

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= SM **AASHTO (M 145)=** A-4(0)

Coefficients

D_{90}= 0.4103 D_{85}= 0.3202 D_{60}= 0.1464
D_{50}= 0.1028 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

F.M.=0.70

Date Received: 03/30/2010 **Date Tested:** 05/12/2010
Tested By: Joseph Strother
Checked By: Donna Wilson
Title: Supervisor/Mat.Eng.

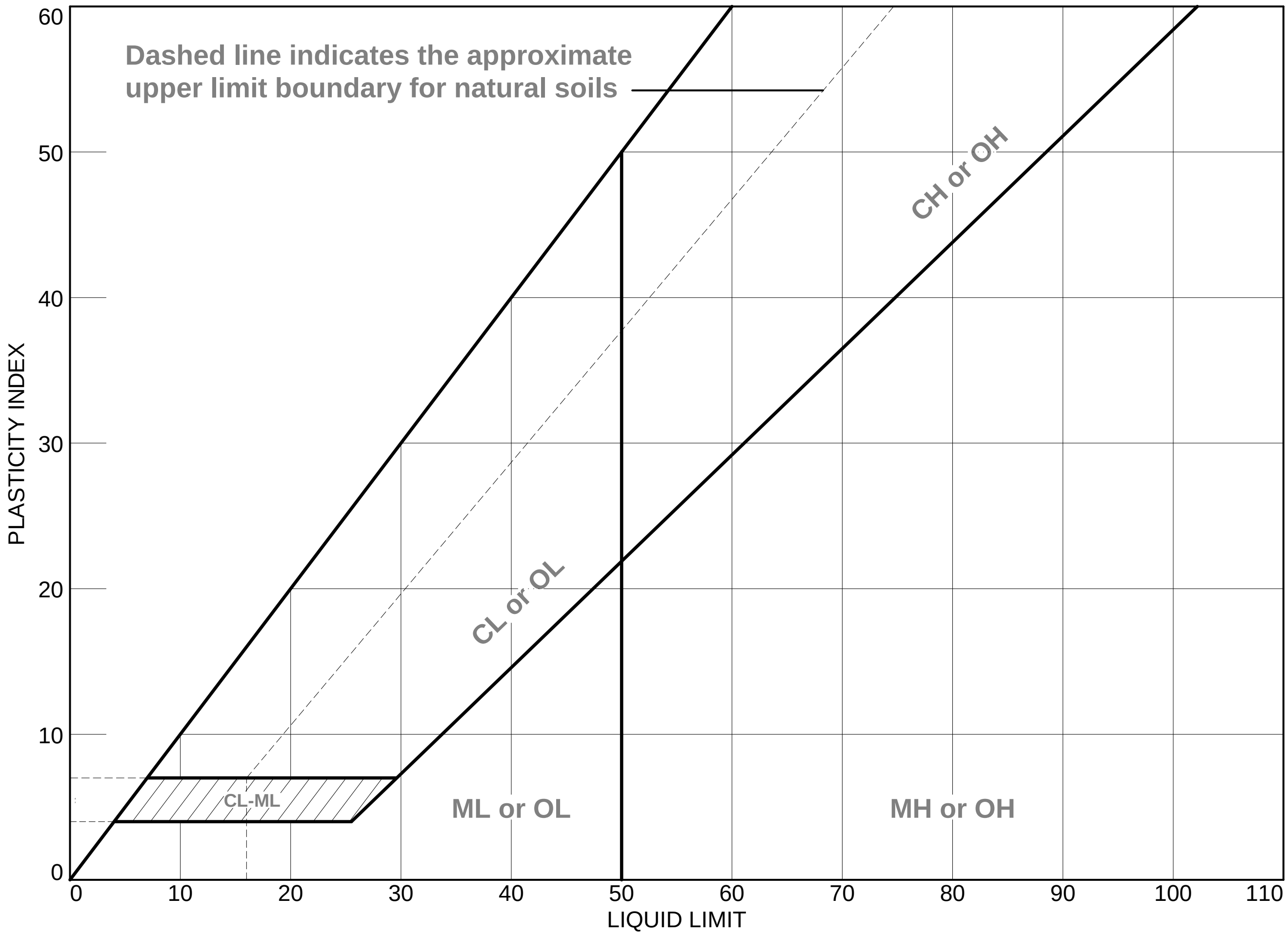
Source of Sample: EDB-8 **Depth:** 29.5ft. - 31.0ft **Date Sampled:** NA
Sample Number: 8

Alabama Power Co.

Birmingham, Alabama

Client: Southern Company
Project: Plant Scholz Ash Pond
Project No: **Lab #** AP09907

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	NDB-1	2	4.5ft. - 6.0ft.	51.1	NP	NV	NP	ML

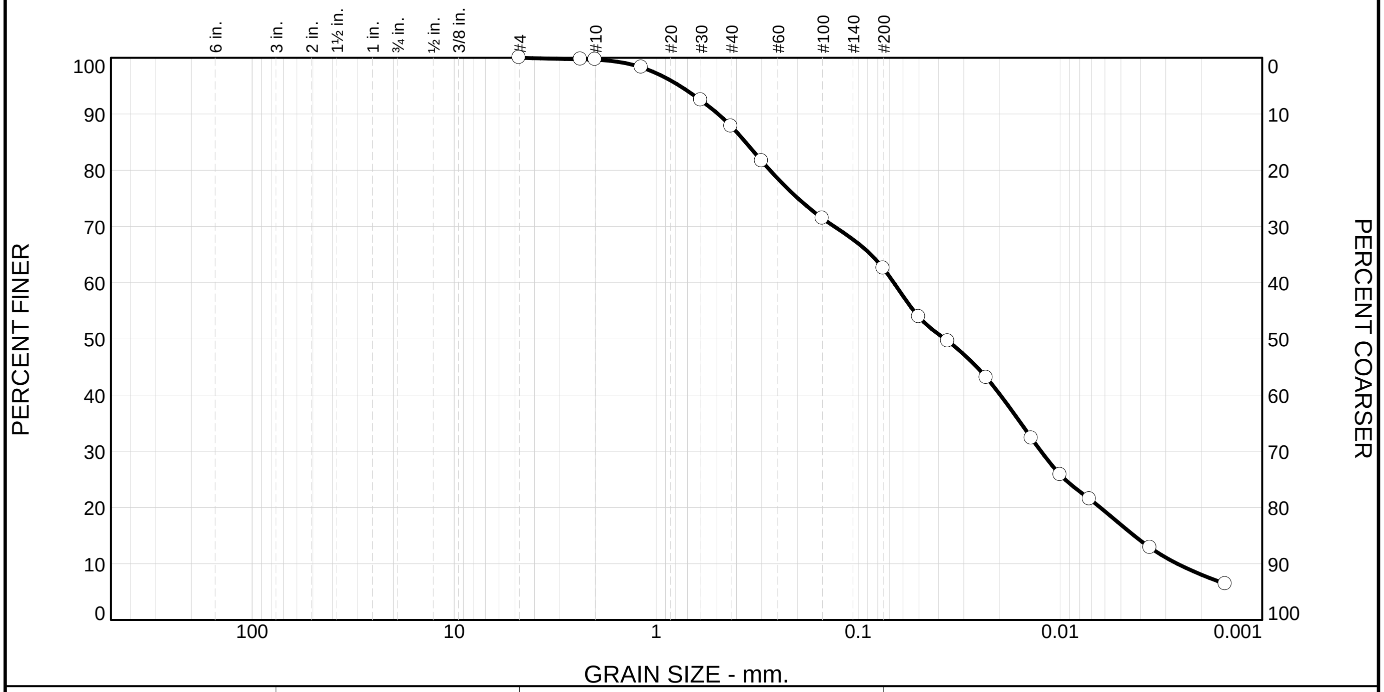
Alabama Power Co.

Birmingham, Alabama

Client: Southern Company
Project: Plant Scholz Ash Pond
Project No.:
Lab # AP09908

Tested By: J.Strother (5-14-2010) **Checked By:** D.Wilson (5-26-2010)

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.3	11.9	25.3	45.6	16.9

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100.0		
#8	99.7		
#10	99.7		
#16	98.3		
#30	92.4		
#40	87.8		
#50	81.6		
#100	71.4		
#200	62.5		
0.0499 mm.	53.9		
0.0358 mm.	49.6		
0.0232 mm.	43.1		
0.0138 mm.	32.3		
0.0100 mm.	25.8		
0.0071 mm.	21.5		
0.0036 mm.	12.9		
0.0015 mm.	6.4		

* (no specification provided)

Material Description

Gray SANDY SILT

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= ML **AASHTO (M 145)=** A-4(0)

Coefficients

D_{90}= 0.4934	D_{85}= 0.3611	D_{60}= 0.0666
D_{50}= 0.0372	D_{30}= 0.0124	D_{15}= 0.0043
D_{10}= 0.0026	C_u= 25.33	C_c= 0.88

Remarks

F.M.=0.56

Date Received: 03-30-2010 **Date Tested:** 05-14-2010
Tested By: Joseph Strother
Checked By: Donna Wilson
Title: Supervisor/Mat.Eng.

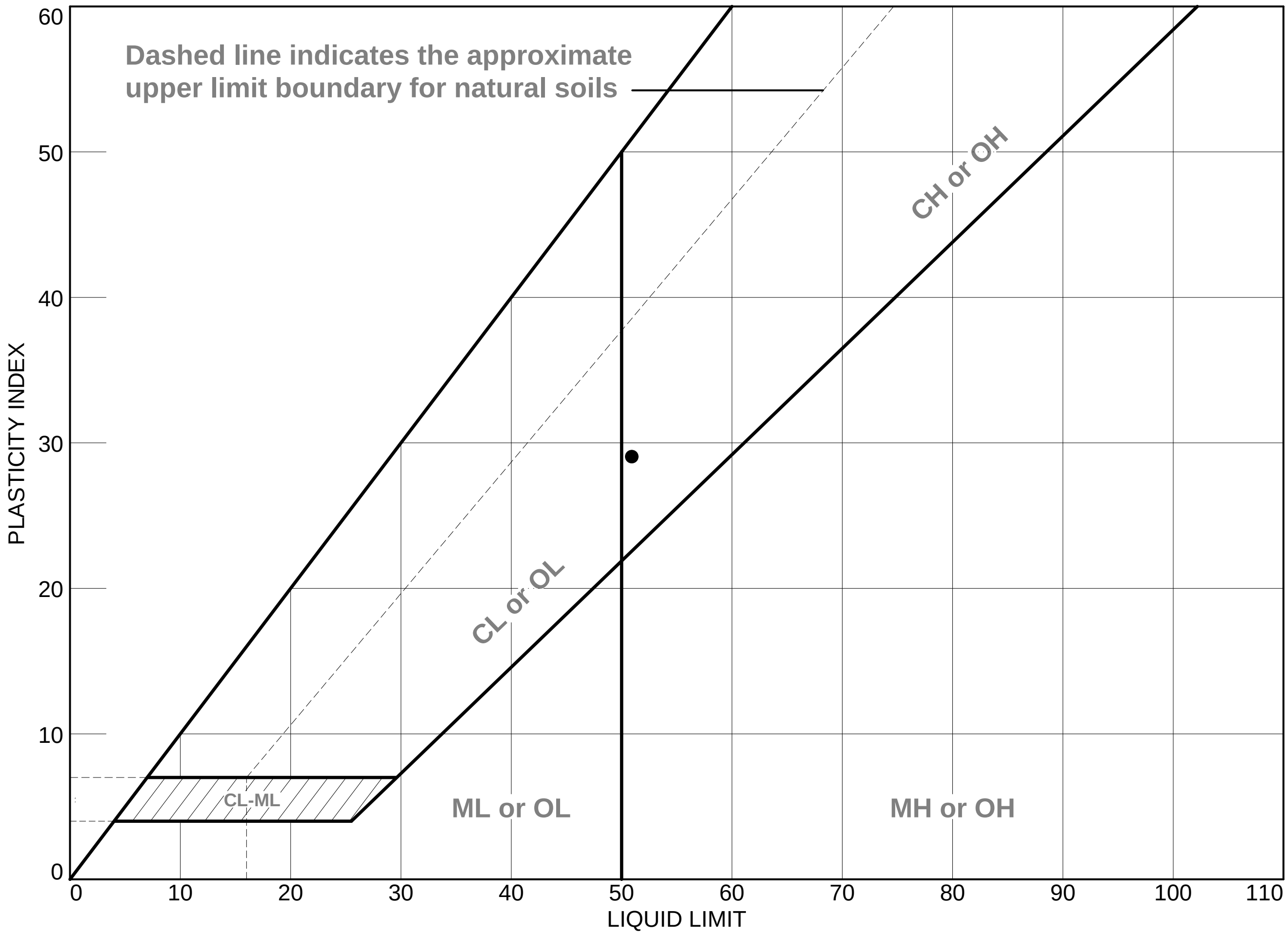
Source of Sample: NDB-1 **Depth:** 4.5ft. - 6.0ft. **Date Sampled:** NA
Sample Number: 2

Alabama Power Co.

Birmingham, Alabama

Client: Southern Company
Project: Plant Scholz Ash Pond
Project No: **Lab #** AP09908

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	NDB-1	8	29.5ft. - 31.0ft.	19.4	22	51	29	CH

Alabama Power Co.

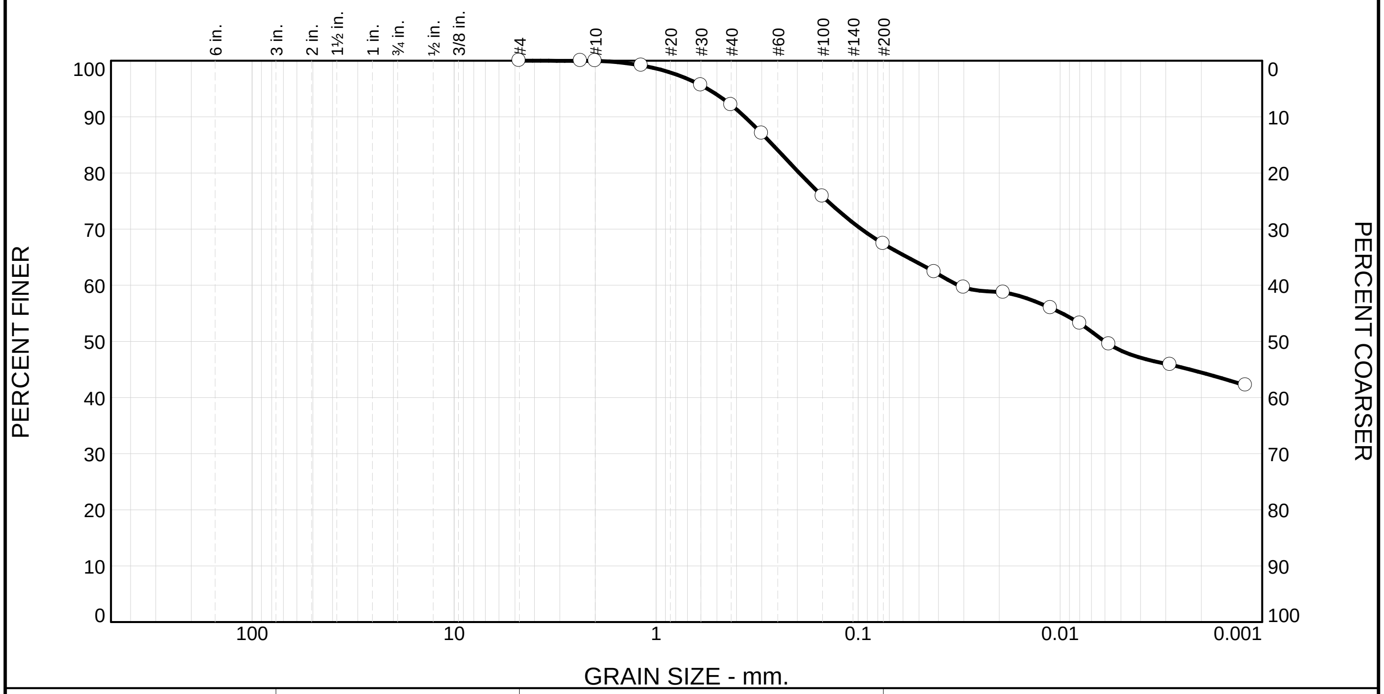
Birmingham, Alabama

Client: Southern Company
Project: Plant Scholz Ash Pond

Project No.:
Lab # AP09910

Tested By: J.Strother (5-14-2010) **Checked By:** D.Wilson (5-26-2010)

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	7.9	24.7	19.0	48.4

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100.0		
#8	100.0		
#10	100.0		
#16	99.2		
#30	95.6		
#40	92.1		
#50	87.0		
#100	75.8		
#200	67.4		
0.0419 mm.	62.4		
0.0300 mm.	59.6		
0.0190 mm.	58.7		
0.0111 mm.	55.9		
0.0080 mm.	53.2		
0.0057 mm.	49.5		
0.0028 mm.	45.8		
0.0012 mm.	42.2		

* (no specification provided)

Material Description

Reddish gray SANDY FAT CLAY

Atterberg Limits (ASTM D 4318)

PL= 22 **LL=** 51 **PI=** 29

Classification

USCS (D 2487)= CH **AASHTO (M 145)=** A-7-6(18)

Coefficients

D_{90}= 0.3642	D_{85}= 0.2646	D_{60}= 0.0319
D_{50}= 0.0060	D_{30}=	D_{15}=
D_{10}=	C_u=	C_c=

Remarks

F.M.=0.42

Date Received: 03-30-2010 **Date Tested:** 05-14-2010

Tested By: Joseph Strother

Checked By: Donna Wilson

Title: Supervisor/Mat.Eng.

Source of Sample: NDB-1 **Depth:** 29.5ft. - 31.0ft. **Date Sampled:** NA

Sample Number: 8

Alabama Power Co.

Birmingham, Alabama

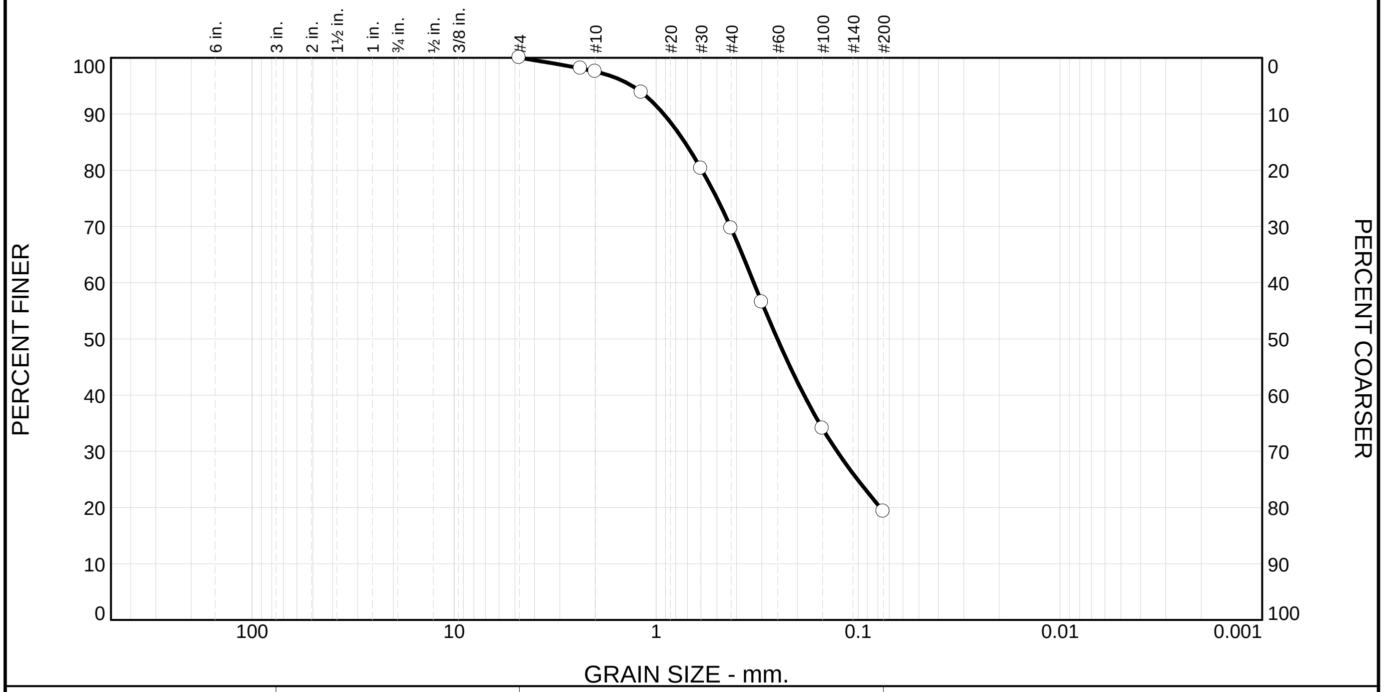
Client: Southern Company

Project: Plant Scholz Ash Pond

Project No:

Lab # AP09910

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	2.5	27.9	50.3	19.3	

TEST RESULTS			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100.0		
#8	98.1		
#10	97.5		
#16	93.8		
#30	80.3		
#40	69.6		
#50	56.5		
#100	34.0		
#200	19.3		

* (no specification provided)

Material Description

Brown SILTY SAND

Atterberg Limits (ASTM D 4318)

PL= 0 **LL=** 0 **PI=** 0

Classification

USCS (D 2487)= SM **AASHTO (M 145)=** A-2-4(0)

Coefficients

$D_{90}=$ 0.9168 $D_{85}=$ 0.7220 $D_{60}=$ 0.3286
$D_{50}=$ 0.2511 $D_{30}=$ 0.1272 $D_{15}=$
$D_{10}=$ $C_u=$ $C_c=$

Remarks

%Moist = 12.2
F.M.=1.37

Date Received: 03-30-2010 **Date Tested:** 05-14-2010
Tested By: Joseph Strother
Checked By: Donna Wilson
Title: Supervisor/Mat.Eng.

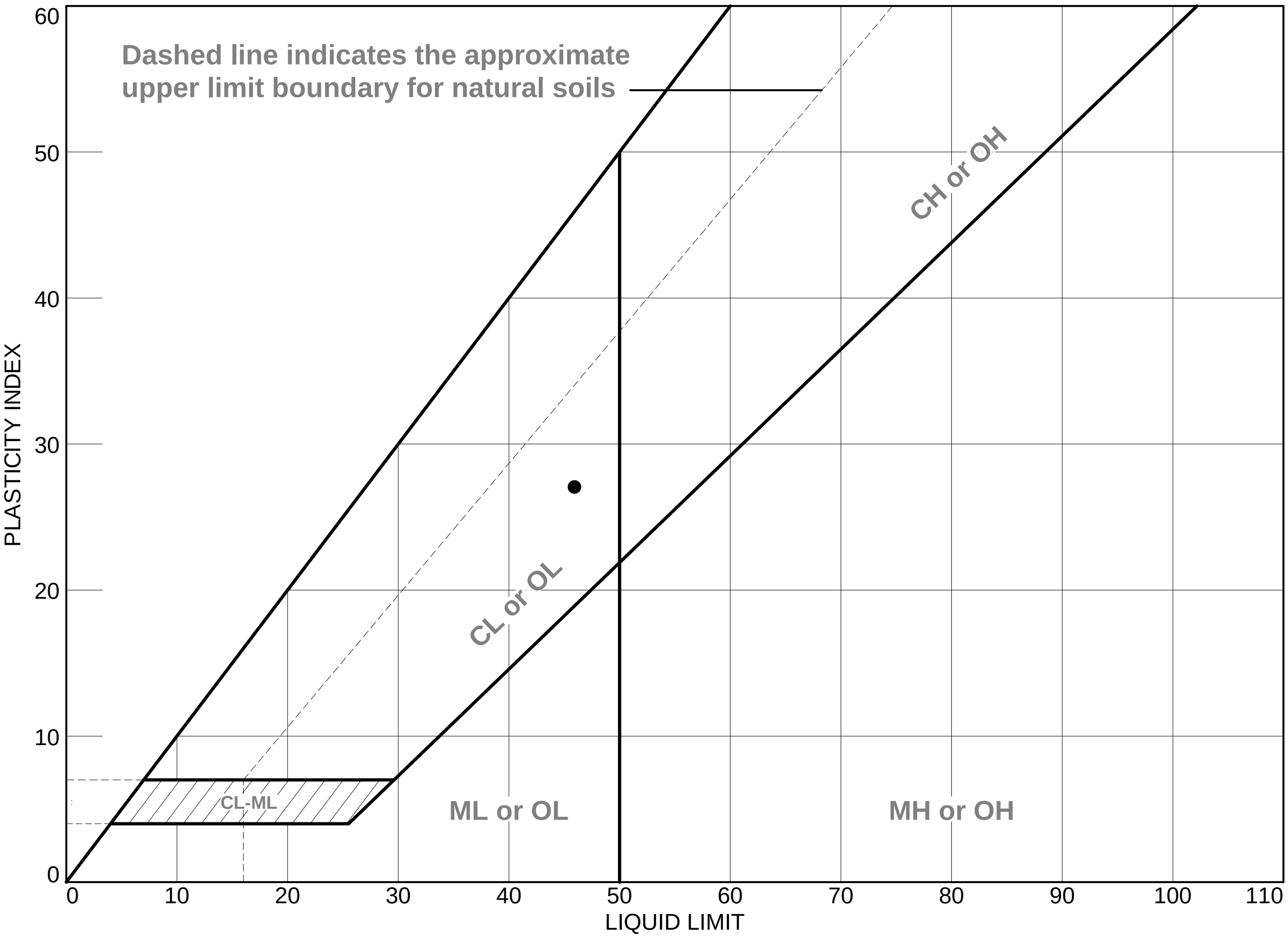
Source of Sample: NDB-2 **Depth:** 14.5ft. - 16.0ft. **Date Sampled:** NA
Sample Number: 5

Alabama Power Co.

Birmingham, Alabama

Client: Southern Company
Project: Plant Scholz Ash Pond
Project No: **Lab #** AP09912

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	NDB-2	7	24.5ft. - 26.0ft.	16.1	19	46	27	SC

Alabama Power Co.

Birmingham, Alabama

Client: Southern Company

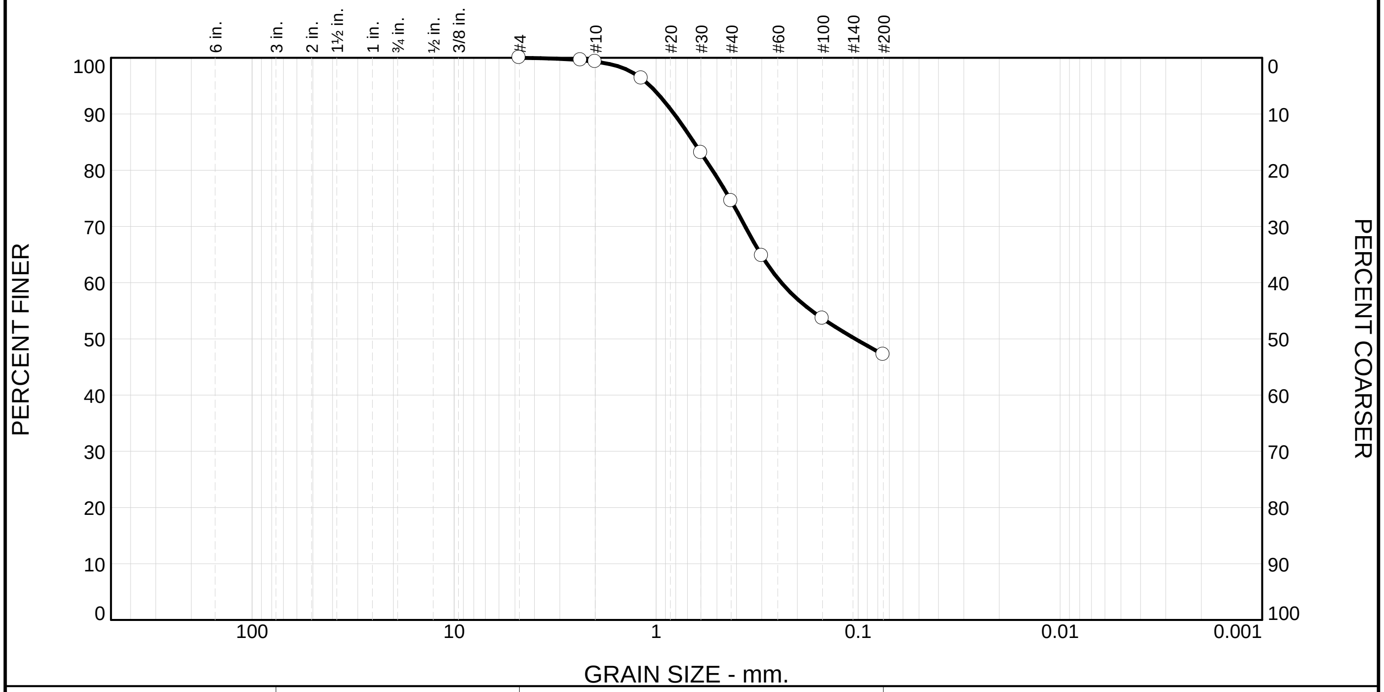
Project: Plant Scholz Ash Pond

Project No.:

Lab # AP09913

Tested By: J.Strother (5-14-2010) **Checked By:** D.Wilson (5-26-2010)

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.7	24.8	27.3	47.2	

TEST RESULTS			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100.0		
#8	99.6		
#10	99.3		
#16	96.3		
#30	83.1		
#40	74.5		
#50	64.8		
#100	53.6		
#200	47.2		

* (no specification provided)

Material Description

Brownish red CLAYEY SAND

Atterberg Limits (ASTM D 4318)

PL= 19 **LL=** 46 **PI=** 27

Classification

USCS (D 2487)= SC **AASHTO (M 145)=** A-7-6(8)

Coefficients

D_{90}= 0.8138	D_{85}= 0.6507	D_{60}= 0.2399
D_{50}= 0.1034	D_{30}=	D_{15}=
D_{10}=	C_u=	C_c=

Remarks

F.M.=1.03

Date Received: 03-30-2010 **Date Tested:** 05-14-2010

Tested By: Joseph Strother

Checked By: Donna Wilson

Title: 05-26-2010

Source of Sample: NDB-2 **Depth:** 24.5ft. - 26.0ft. **Date Sampled:** NA

Sample Number: 7

Alabama Power Co.

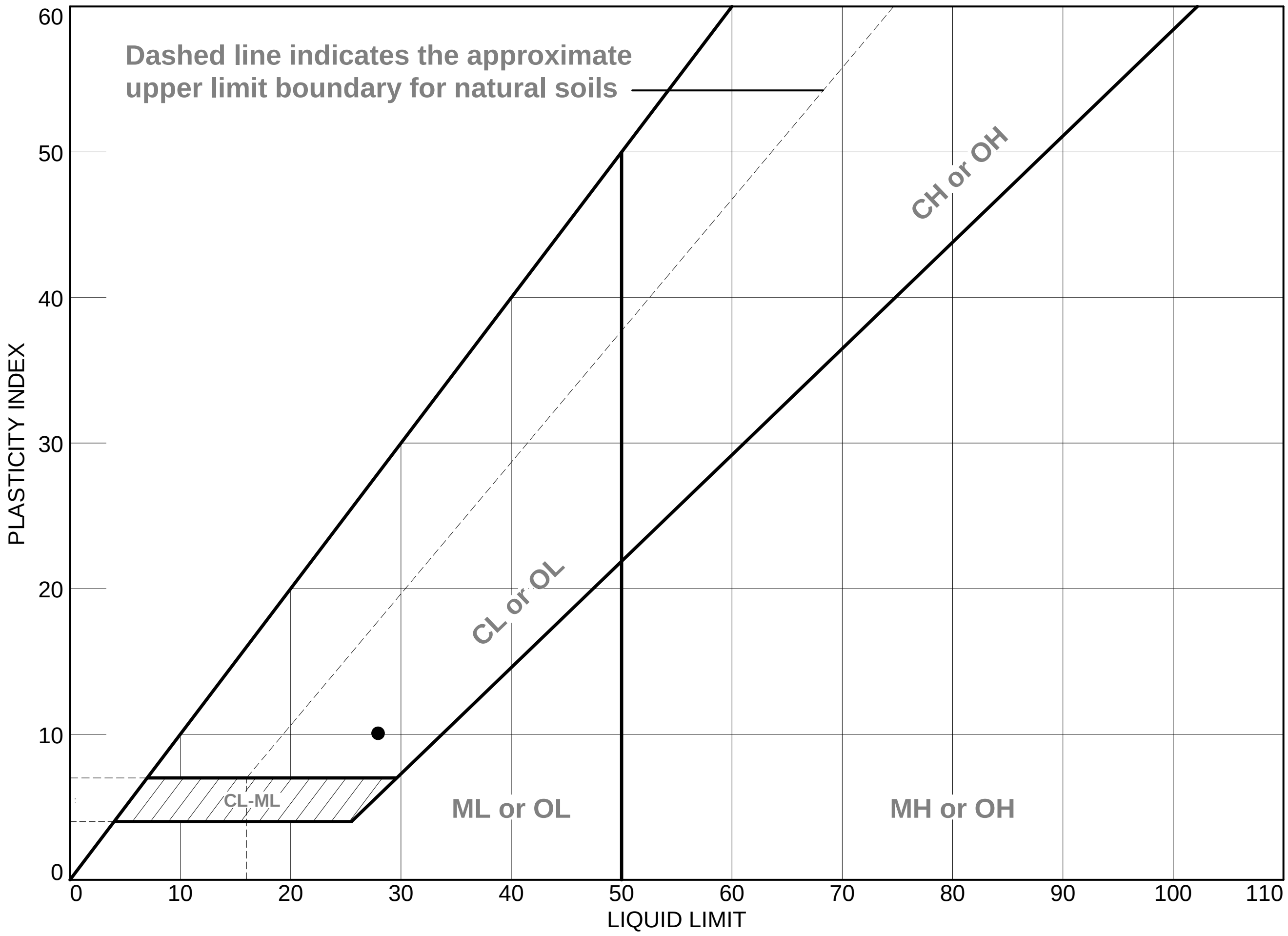
Birmingham, Alabama

Client: Southern Company

Project: Plant Scholz Ash Pond

Project No: **Lab #** AP09913

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	NDB-3	3	7.5ft. -9.0ft.	30.8	18	28	10	SC

Alabama Power Co.

Birmingham, Alabama

Client: Southern Company

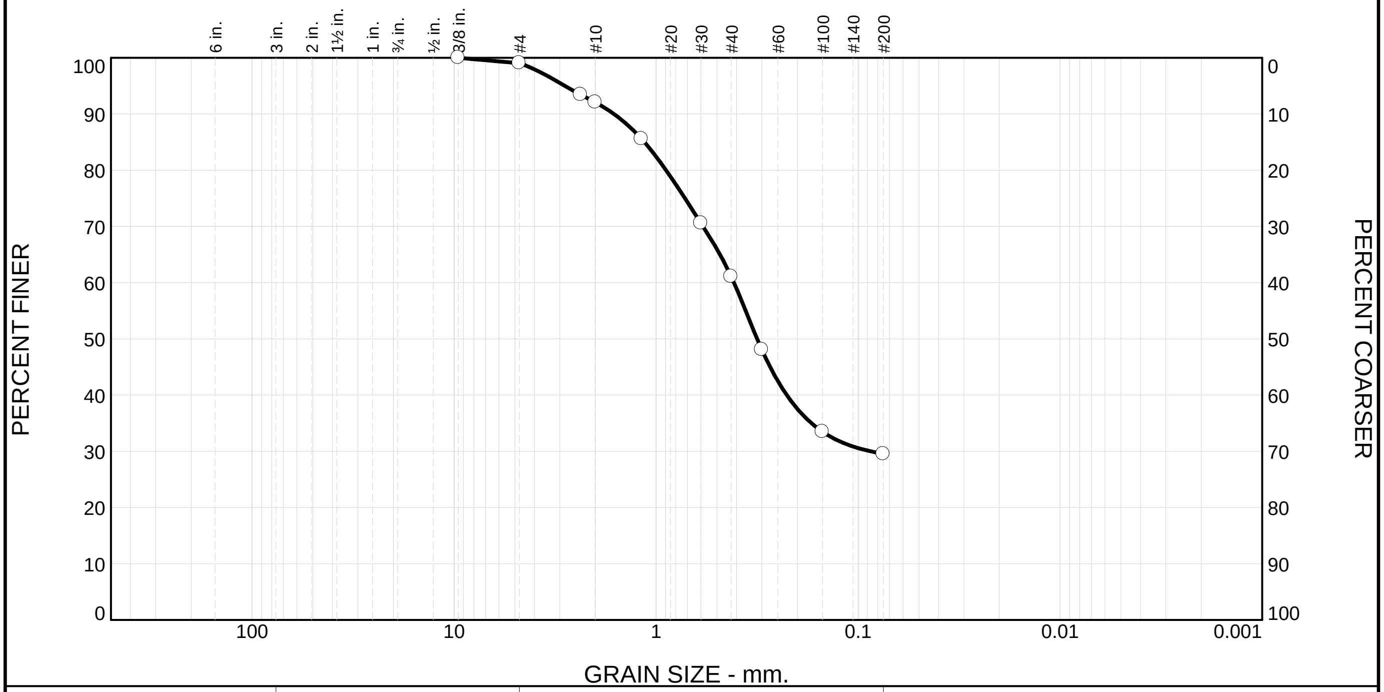
Project: Plant Scholz Ash Pond

Project No.:

Lab # AP09911

Tested By: J.Strother (5-14-2010 **Checked By:** D.Wilson (5-26-2010)

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	1.0	6.9	31.0	31.6	29.5	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
.375	100.0		
#4	99.0		
#8	93.4		
#10	92.1		
#16	85.6		
#30	70.6		
#40	61.1		
#50	48.1		
#100	33.5		
#200	29.5		

* (no specification provided)

Material Description

Tan CLAYEY SAND

Atterberg Limits (ASTM D 4318)

PL= 18 **LL=** 28 **PI=** 10

Classification

USCS (D 2487)= SC **AASHTO (M 145)=** A-2-4(0)

Coefficients

D_{90}= 1.6164	D_{85}= 1.1425	D_{60}= 0.4119
D_{50}= 0.3164	D_{30}= 0.0867	D_{15}=
D_{10}=	C_u=	C_c=

Remarks

F.M.=1.70

Date Received: 03-30-2010 **Date Tested:** 05-14-2010

Tested By: Joseph Strother

Checked By: Donna Wilson

Title: Supervisor/Mat.Eng.

Source of Sample: NDB-3 **Depth:** 7.5ft. -9.0ft. **Date Sampled:** NA

Sample Number: 3

Alabama Power Co.

Birmingham, Alabama

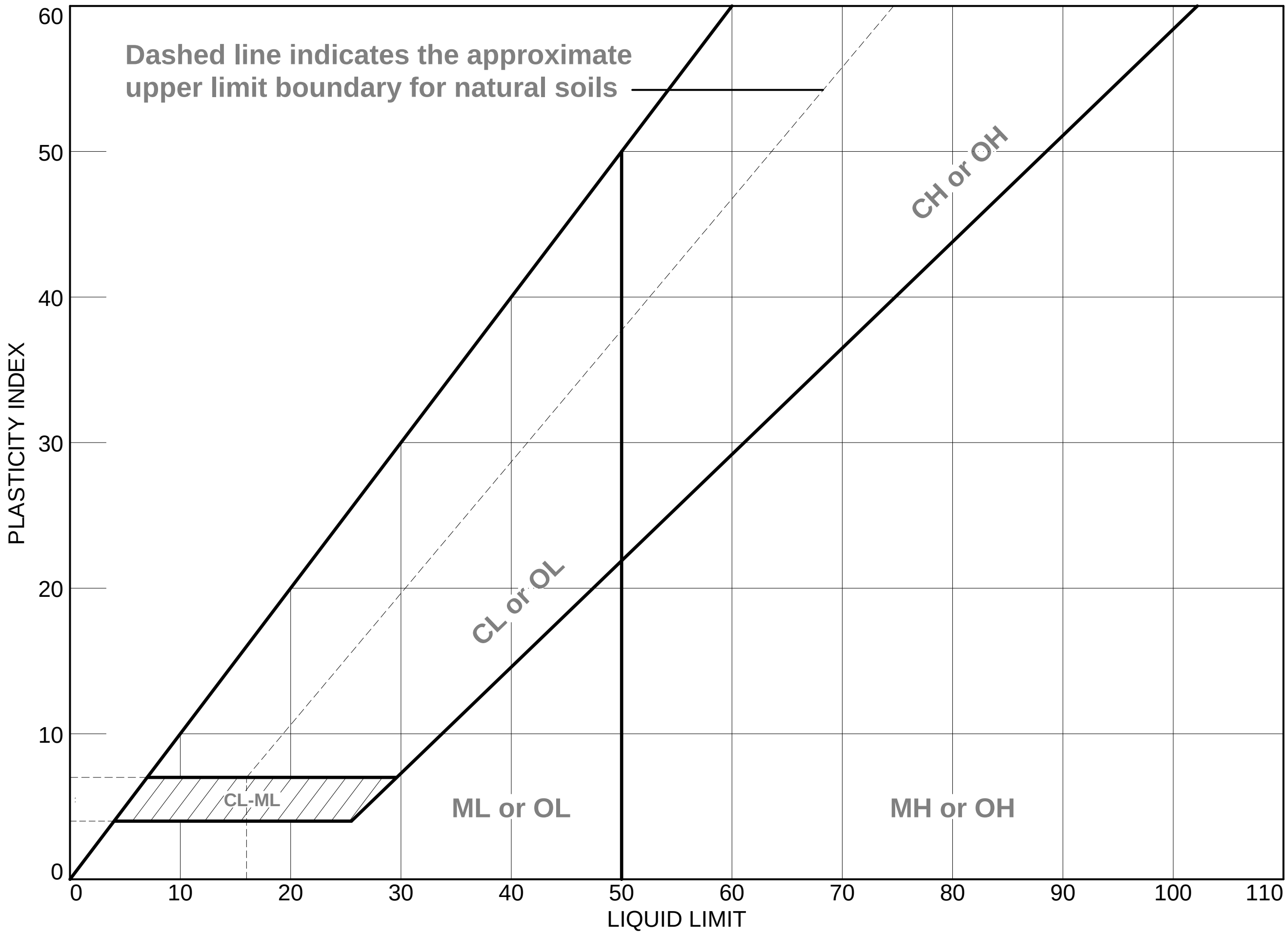
Client: Southern Company

Project: Plant Scholz Ash Pond

Project No:

Lab # AP09911

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	NDB-3	6	19.5ft. - 21.0ft.	11.3	NP	NV	NP	SM

Alabama Power Co.

Birmingham, Alabama

Client: Southern Company

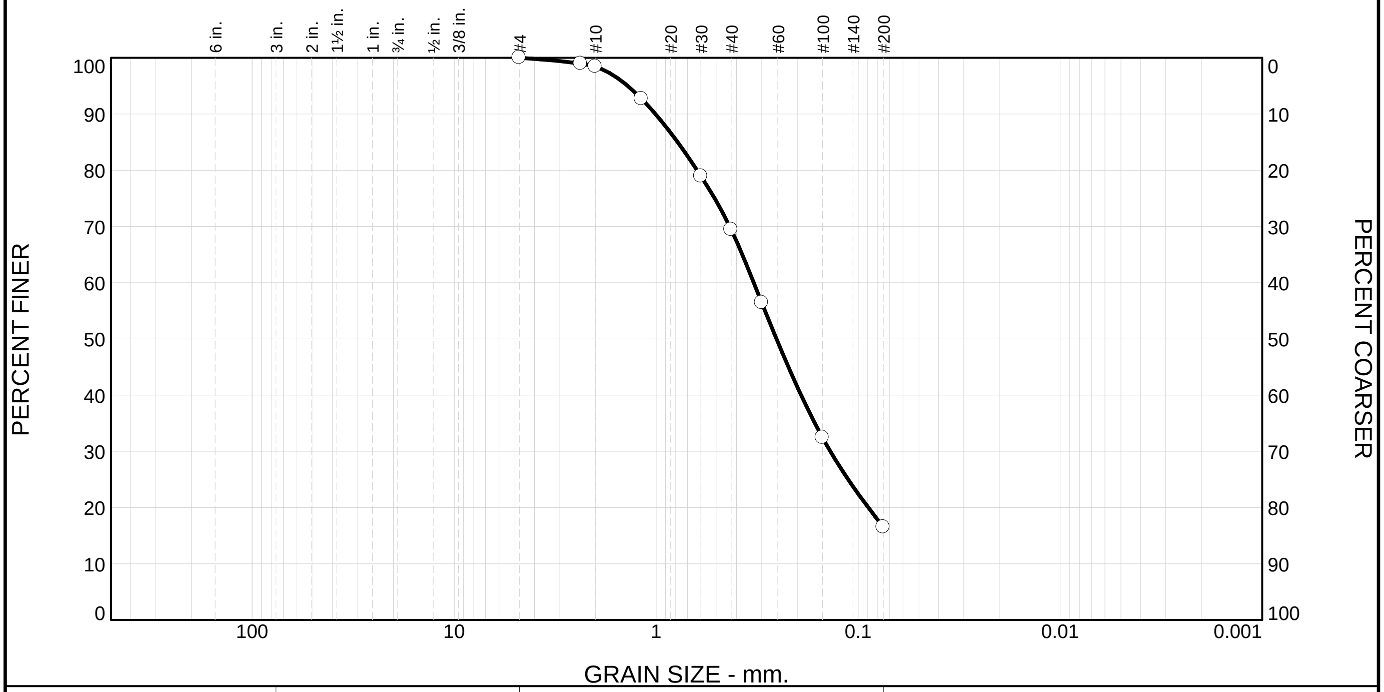
Project: Plant Scholz Ash Pond

Project No.:

Lab # AP09914

Tested By: J.Strother (5-14-2010) **Checked By:** D.Wilson (5-26-2010)

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	1.6	29.0	52.9	16.5	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100.0		
#8	98.9		
#10	98.4		
#16	92.7		
#30	78.9		
#40	69.4		
#50	56.4		
#100	32.4		
#200	16.5		

* (no specification provided)

Material Description

Gray SILTY SAND

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= SM **AASHTO (M 145)=** A-2-4(0)

Coefficients

D_{90}= 1.0078 D_{85}= 0.7829 D_{60}= 0.3288
D_{50}= 0.2537 D_{30}= 0.1373 D_{15}=
D_{10}= C_u= C_c=

Remarks

F.M.=1.41

Date Received: 03-30-2010 **Date Tested:** 05-14-2010
Tested By: Joseph Strother
Checked By: Donna Wilson
Title: Supervisor/Mat.Eng.

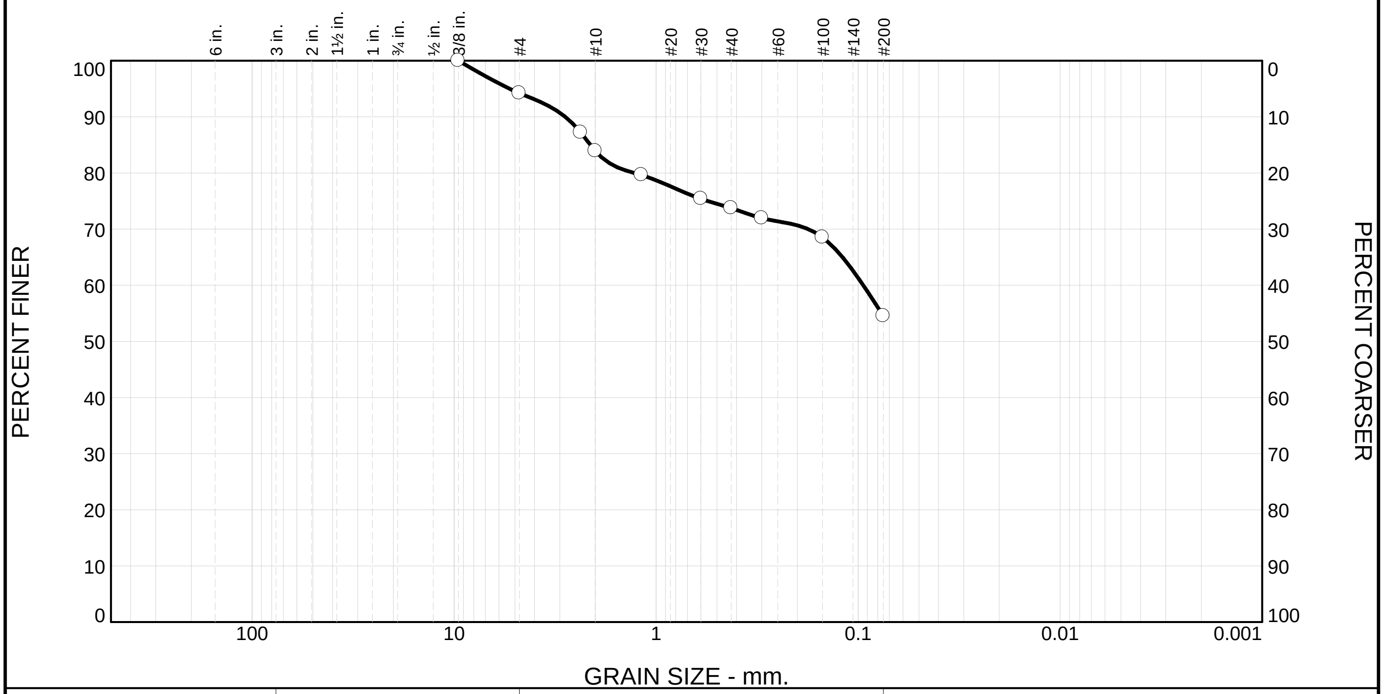
Source of Sample: NDB-3 **Depth:** 19.5ft. - 21.0ft. **Date Sampled:** NA
Sample Number: 6

Alabama Power Co.

Birmingham, Alabama

Client: Southern Company
Project: Plant Scholz Ash Pond
Project No: **Lab #** AP09914

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	5.8	10.3	10.2	19.2	54.5	

TEST RESULTS			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
.375	100.0		
#4	94.2		
#8	87.2		
#10	83.9		
#16	79.6		
#30	75.4		
#40	73.7		
#50	72.0		
#100	68.5		
#200	54.5		

* (no specification provided)

Material Description

Brown SANDY SILT

Atterberg Limits (ASTM D 4318)

PL= 0 **LL=** 0 **PI=** 0

Classification

USCS (D 2487)= ML **AASHTO (M 145)=** A-4(0)

Coefficients

D_{90}=	2.8187	D_{85}=	2.1160	D_{60}=	0.0943
D_{50}=		D_{30}=		D_{15}=	
D_{10}=		C_u=		C_c=	

Remarks

%Moist = 13.9
F.M.=1.23

Date Received: 03/30/2010 **Date Tested:** 05/12/2010
Tested By: Joseph Strother
Checked By: Donna Wilson
Title: Supervisor/Mat.Eng.

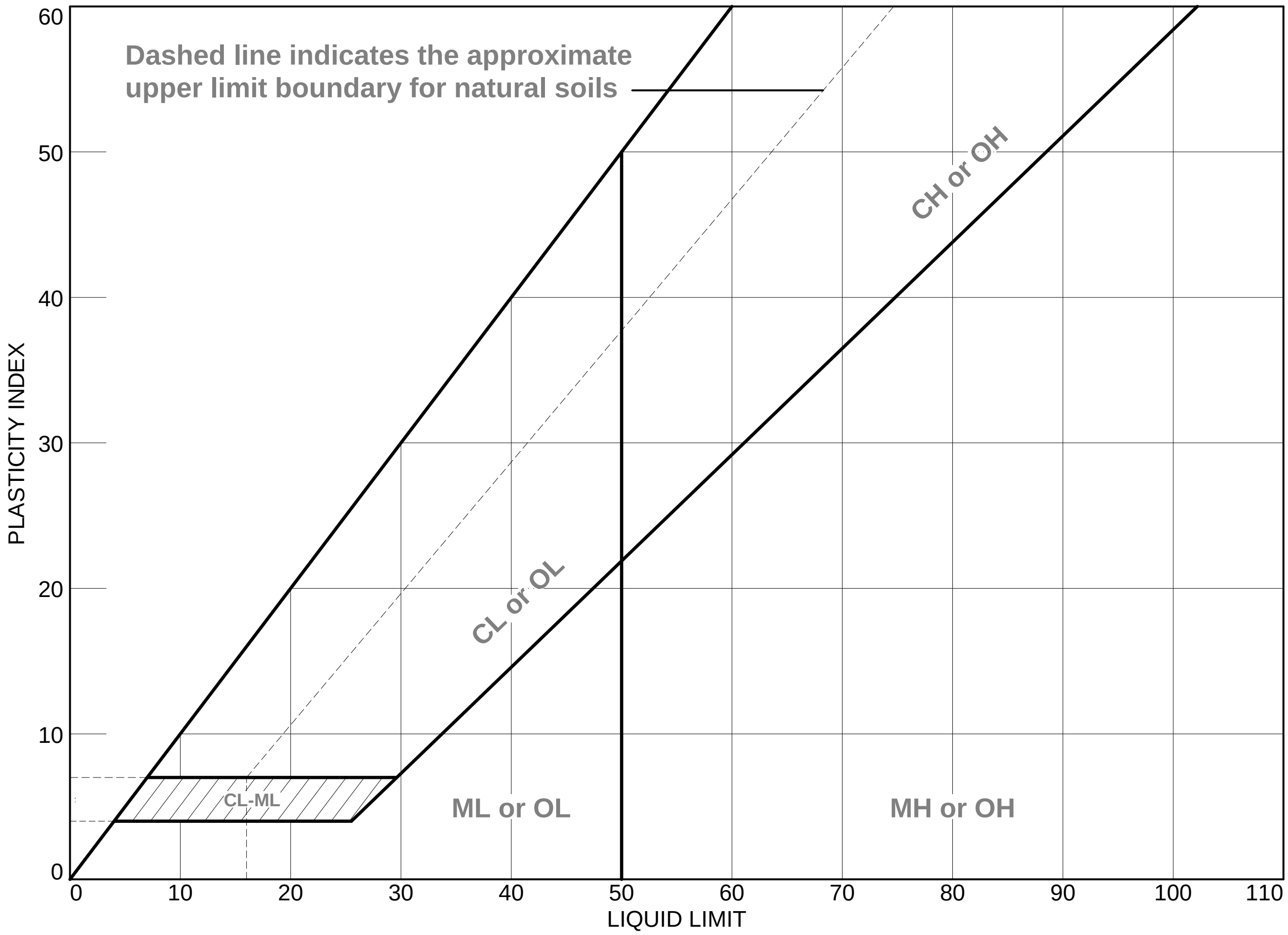
Source of Sample: NDB-3 **Depth:** 29.5ft. - 31.0ft. **Date Sampled:** NA
Sample Number: 8

Alabama Power Co.

Birmingham, Alabama

Client: Southern Company
Project: Plant Scholz Ash Pond
Project No: **Lab #** AP09905

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	NDB-4	4	9.5ft. - 11.0ft	69.7	NP	NV	NP	ML

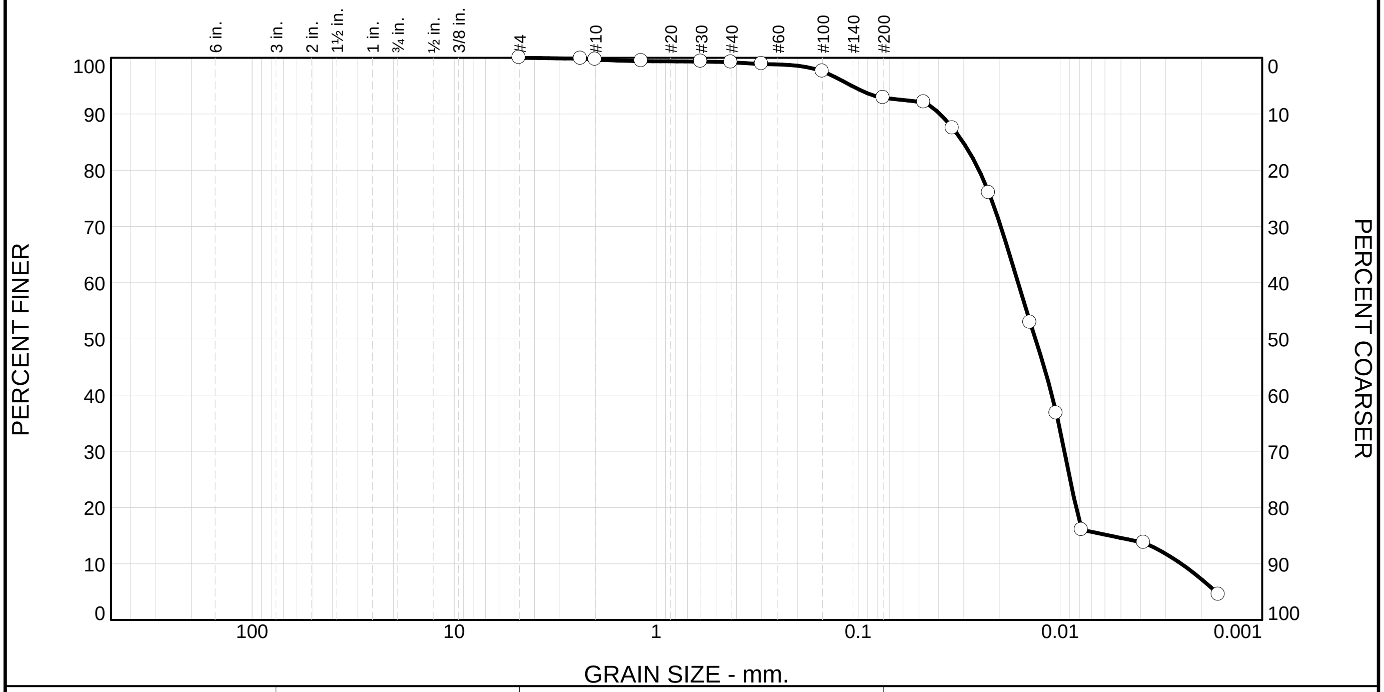
Alabama Power Co.

Birmingham, Alabama

Client: Southern Company
Project: Plant Scholz Ash Pond
Project No.:
Lab # AP09915

Tested By: J.Strother (5-14-2010) **Checked By:** D.Wilson (5-26-2010)

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.3	0.5	6.3	78.3	14.6

TEST RESULTS			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100.0		
#8	99.9		
#10	99.7		
#16	99.4		
#30	99.3		
#40	99.2		
#50	98.9		
#100	97.6		
#200	92.9		
0.0472 mm.	92.1		
0.0340 mm.	87.5		
0.0225 mm.	76.0		
0.0141 mm.	52.9		
0.0104 mm.	36.8		
0.0078 mm.	16.0		
0.0039 mm.	13.7		
0.0016 mm.	4.5		

* (no specification provided)

Material Description

Black SILT

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= ML **AASHTO (M 145)=** A-4(0)

Coefficients

D_{90}= 0.0393	D_{85}= 0.0303	D_{60}= 0.0162
D_{50}= 0.0133	D_{30}= 0.0095	D_{15}= 0.0057
D_{10}= 0.0025	C_u= 6.43	C_c= 2.24

Remarks

F.M.=0.05

Date Received: 03-30-2010 **Date Tested:** 05-14-2010

Tested By: Joseph Strother

Checked By: Donna Wilson

Title: Supervisor/Mat.Eng.

Source of Sample: NDB-4 **Depth:** 9.5ft. - 11.0ft **Date Sampled:** NA

Sample Number: 4

Alabama Power Co.

Birmingham, Alabama

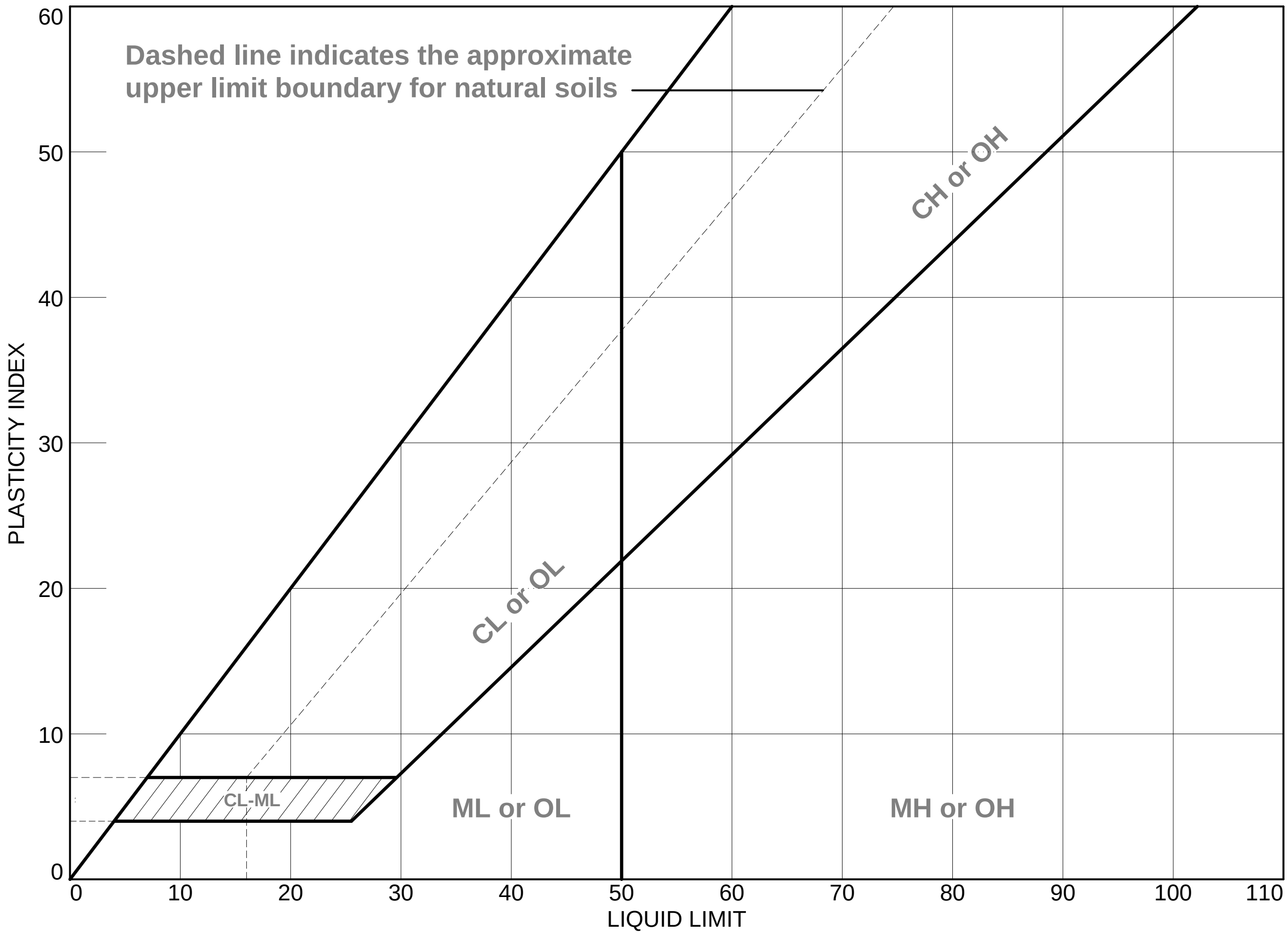
Client: Southern Company

Project: Plant Scholz Ash Pond

Project No:

Lab # AP09915

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	NDB-4	5	14.5ft. - 16.0ft.	61.1	NP	NV	NP	ML

Alabama Power Co.

Birmingham, Alabama

Client: Southern Company

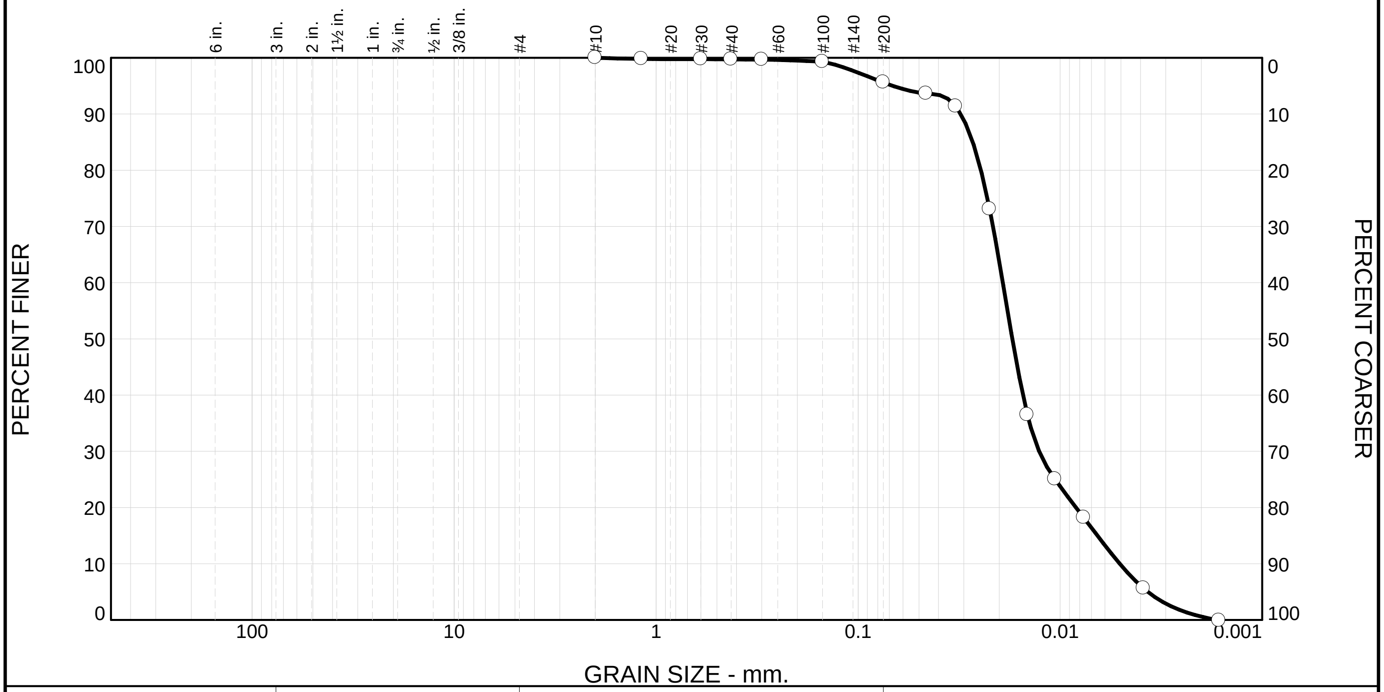
Project: Plant Scholz Ash Pond

Project No.:

Lab # AP09916

Tested By: J.Strother (5-14-2010) **Checked By:** D.Wilson (5-26-2010)

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.3	4.1	85.8	9.8

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#10	100.0		
#16	99.8		
#30	99.8		
#40	99.7		
#50	99.7		
#100	99.3		
#200	95.6		
0.0460 mm.	93.6		
0.0328 mm.	91.4		
0.0223 mm.	73.1		
0.0145 mm.	36.5		
0.0106 mm.	25.1		
0.0076 mm.	18.2		
0.0039 mm.	5.6		
0.0016 mm.			

* (no specification provided)

Material Description

Black SILT

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= ML **AASHTO (M 145)=** A-4(0)

Coefficients

D_{90}= 0.0310	D_{85}= 0.0271	D_{60}= 0.0192
D_{50}= 0.0172	D_{30}= 0.0127	D_{15}= 0.0065
D_{10}= 0.0051	C_u= 3.79	C_c= 1.66

Remarks

F.M.=0.01

Date Received: 03-31-2010 **Date Tested:** 05-14-2010

Tested By: Joseph Strother

Checked By: Donna Wilson

Title: Donna WilsonSuperviso

Source of Sample: NDB-4 **Depth:** 14.5ft. - 16.0ft. **Date Sampled:** NA

Sample Number: 5

Alabama Power Co.

Birmingham, Alabama

Client: Southern Company

Project: Plant Scholz Ash Pond

Project No:

Lab # AP09916

217 E. Brent Ln.
PENSACOLA, FLA.
Phone: 477-5100

PENSACOLA TESTING LABORATORIES, INC.

AMERICAN COUNCIL OF INDEPENDENT LABORATORIES, INC.

REPORT OF SUMMARY OF LAB TEST DATA

For GULF POWER COMPANY
P.O. BOX 1151
PENSACOLA, FLORIDA 32520

Report No. 55827 se
Date March 2, 1981
Purchase Order No.

Sample Identification

BOTTOM ASH, FLY ASH & SAND FROM SMITH PLANT

Sample SUBMITTED BY CLIENT, TESTED By J. SIMS & R. STRICKLIN Date 2-23-81

SAMPLE ID	MAX. DRY DENSITY PCF (ASTM D-698)	OPTIMUM MOISTURE %	ANGLE OF INTERNAL FRICTION	COHESION	REMOLDED DRY DENSITY
50% FLY ASH 50% SAND	100.8	19.6	34°	0	90.7
50% BOTTOM ASH 50% SAND	104.8	14.2	38°	0	94.4
50% BOTTOM ASH 50% FLY ASH	87.0	18.0	35°	0	78.3

NOTE: SAMPLES REMOLDED TO 90% OF MAX. DRY DENSITY (ASTM D-698) AND TESTED IN THE DIRECT SHEAR APPARATUS CONSOLIDATED DRAINED.

Reports to:

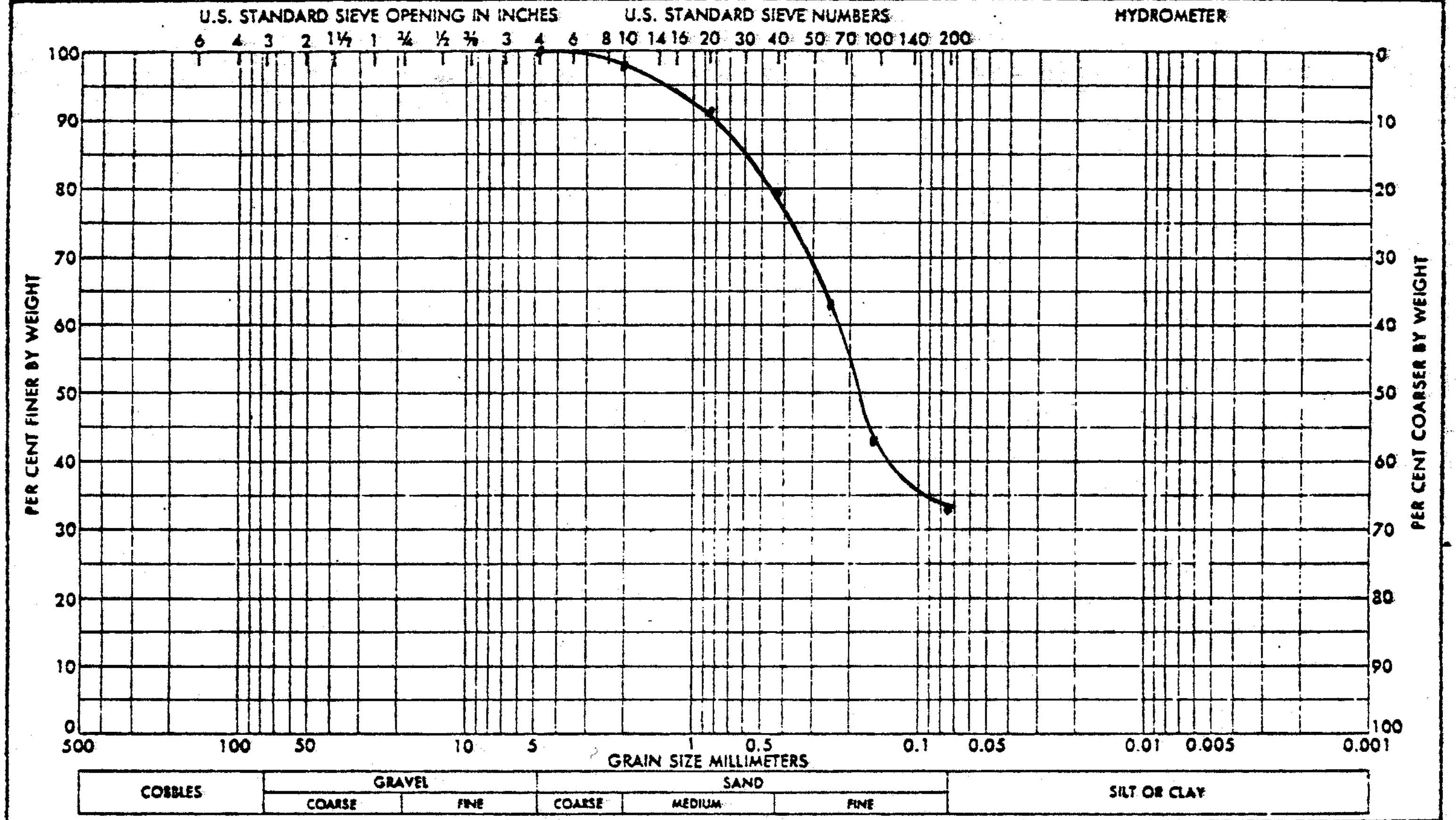
3- GULF POWER
ATTENTION: MR. RALPH CZEPLUCH

PENSACOLA TESTING LABORATORIES

By John D Sims

PENSACOLA TESTING LABORATORIES, INC.

REPORT NO. 55827



SAMPLE NO.	ELEV OR DEPTH	CLASSIFICATION	NAT W%	LL	PL	PI
		SMITH PLANT		-		
		50% FLY ASH				
		50% SAND				

PROJECT GULF POWER COMPANY
SMITH PLANT

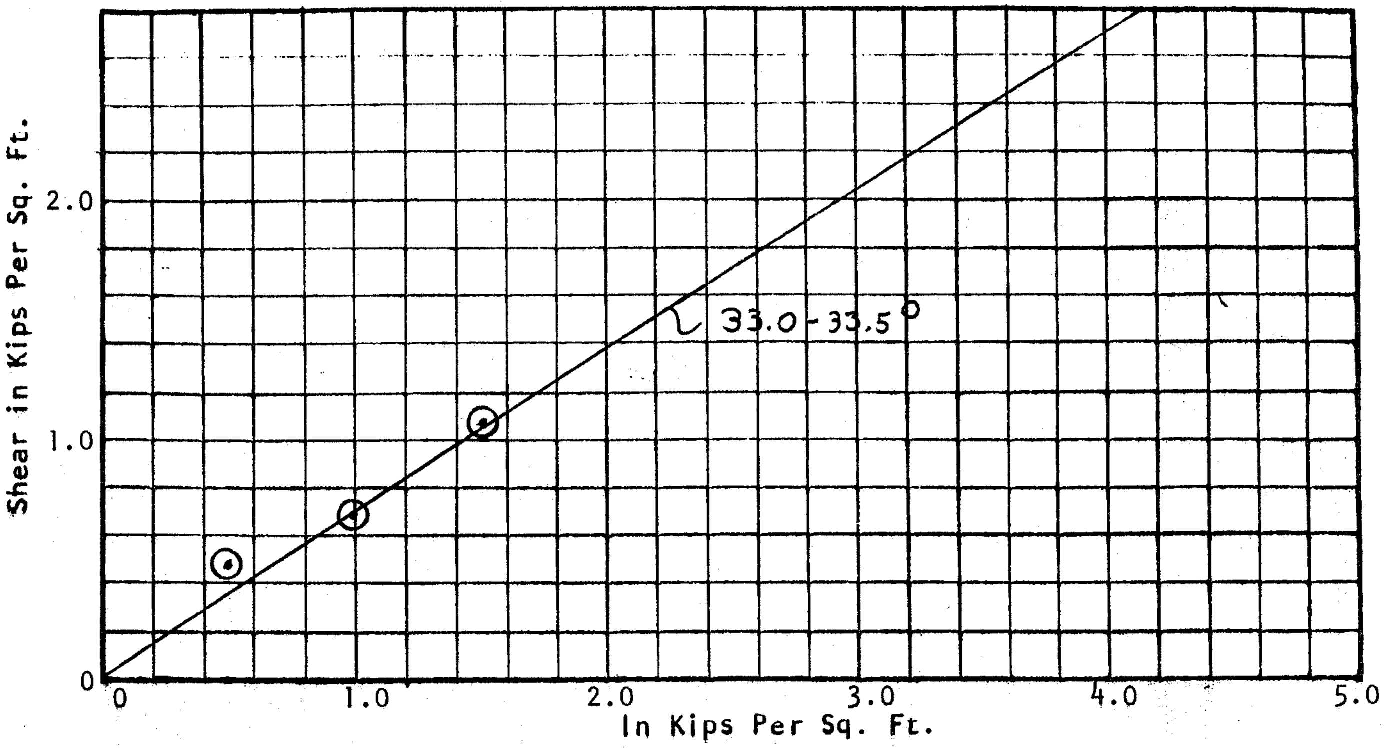
AREA

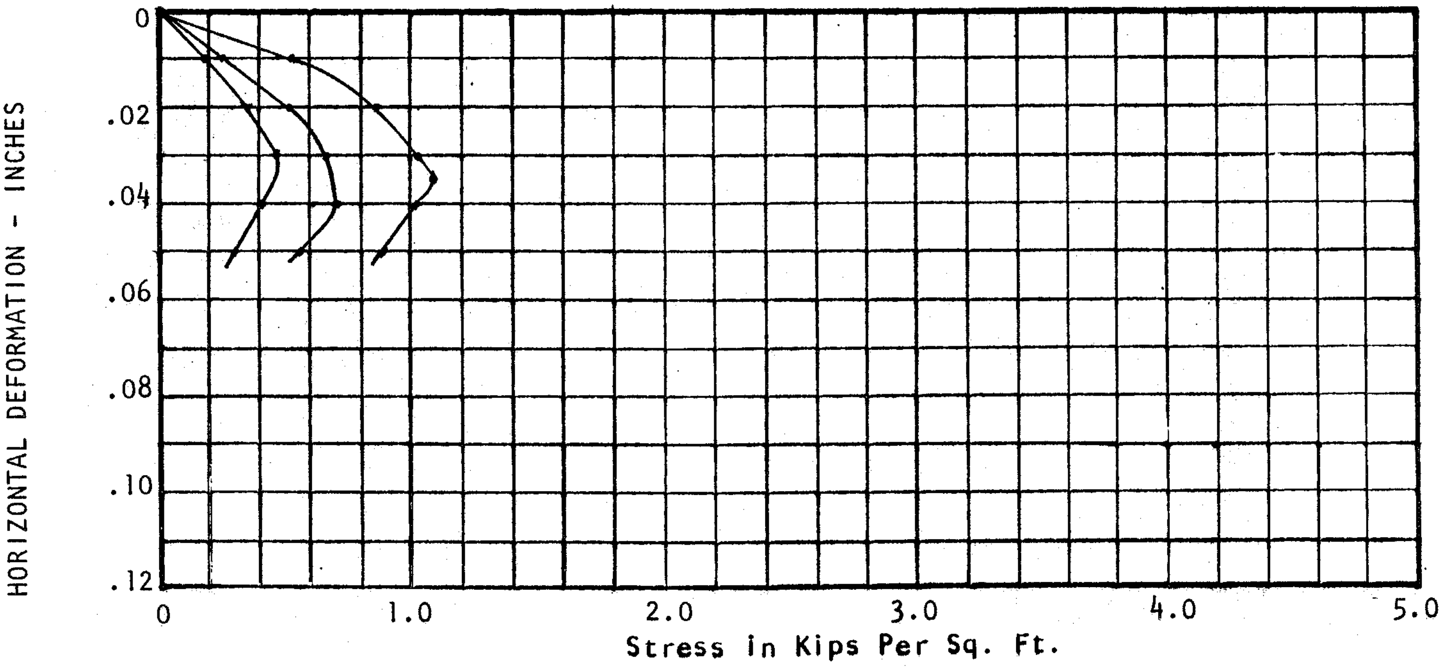
BORING NO.

DATE 3/2/81

GRADATION CURVES

SIEVE SIZES:	#4	#10	#20	#40	#60	#100	#200
% PASSING:	100	97.9	90.6	79.8	62.8	43.2	33.0





STRESS-STRAIN CURVES

"Cohesion", C 0

Angle of Shear Resistance, Ø 34°

Dry Unit Weight, γ 90.7 = 90% ASTM D-698

Water Content, W 19.6

Void Ratio, e

DIRECT SHEAR TEST
GULF POWER CO. - SMITH PLANT - 50% FLY ASH, 50% SAND
(BY LOOSE VOLUME)

PENSACOLA TESTING LABORATORIES, INC
CHEMICAL ANALYSES – INSPECTIONS – TESTS

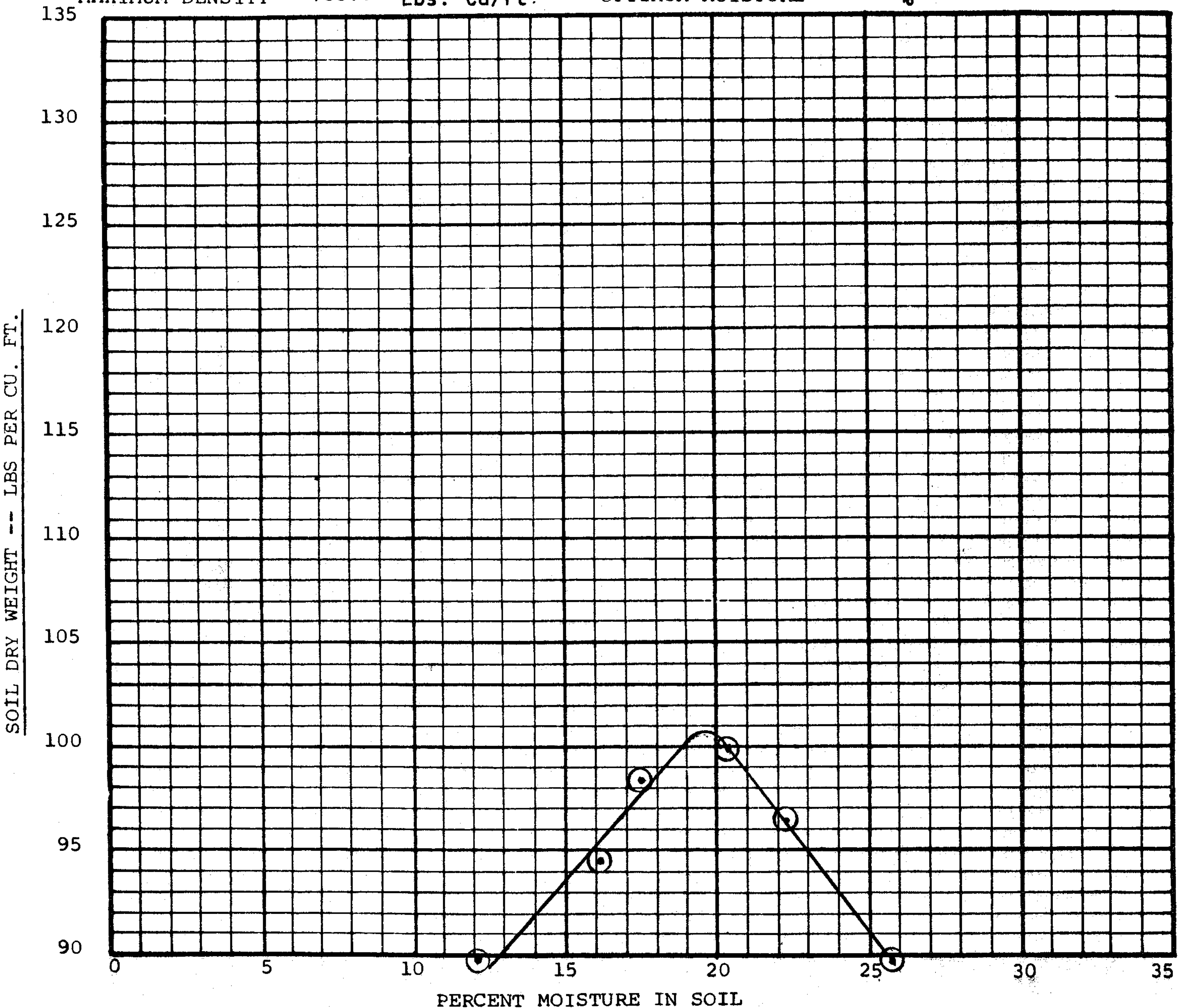
OFFICE AND LABORATORIES
217 East Brent Lane
Pensacola, Florida 32503
Phone: 477-5100

PROCTOR

PROJECT SMITH PLANT
FOR GULF POWER COMPANY, P.O. BOX 1151, PENSACOLA, FL
SAMPLE IDENTIFICATION 50% FLY ASH, 50% SAND (BY LOOSE VOLUME)
APPLICABLE SPECIFICATION ASTM D-698
SAMPLED AND TESTED BY CLIENT & J. SIMS

REPORT NO. 55827 bh
DATE 3/2/81
ORDER NO.
DATE 2/23/81

MAXIMUM DENSITY 100.8 Lbs. Cu/Ft. OPTIMUM MOISTURE 19.6 %



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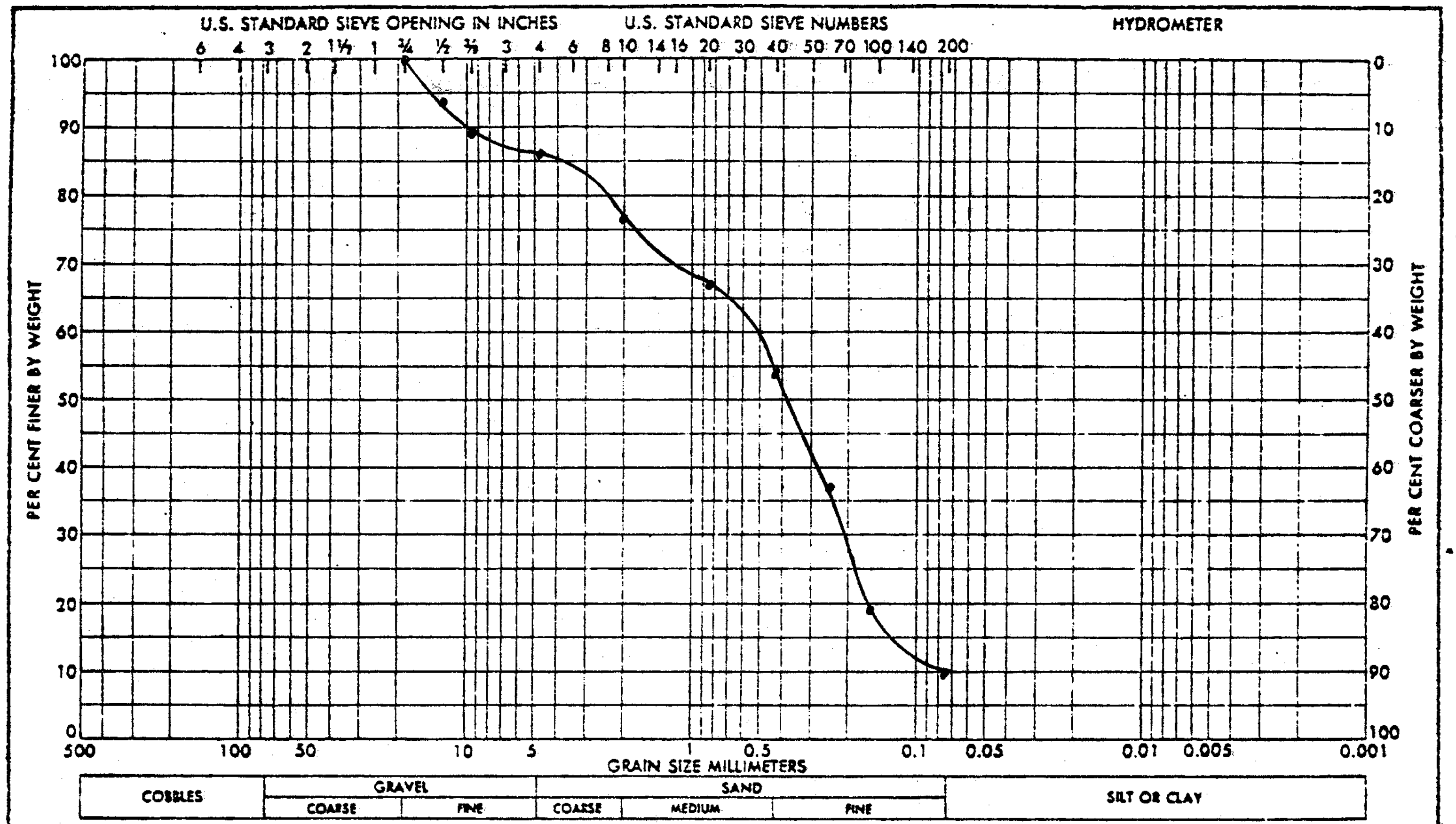
Reports to: 3-Gulf Power Co.

PENSACOLA TESTING LABORATORIES, INC.

By se John D Sims

PENSACOLA TESTING LABORATORIES, INC.

REPORT NO: 55827



SAMPLE NO.	ELEV OF DEPTH	CLASSIFICATION	NAT W%	LL	PL	PI
		SMITH PLANT				
		50% BOTTOM ASH				
		50% SAND				

PROJECT GULF POWER COMPANY
SMITH PLANT, PANAMA CITY

AREA

BORING NO.

DATE March 2, 1981

GRADATION CURVES

SIEVE SIZES:	3/4",	½"	3/8"	#4,	#10,	#20,	#40,	#60,	#100,	#200
% PASSING:	100	94.3	89.8	85.5	76.9	66.9	54.2	37.0	19.7	10.0

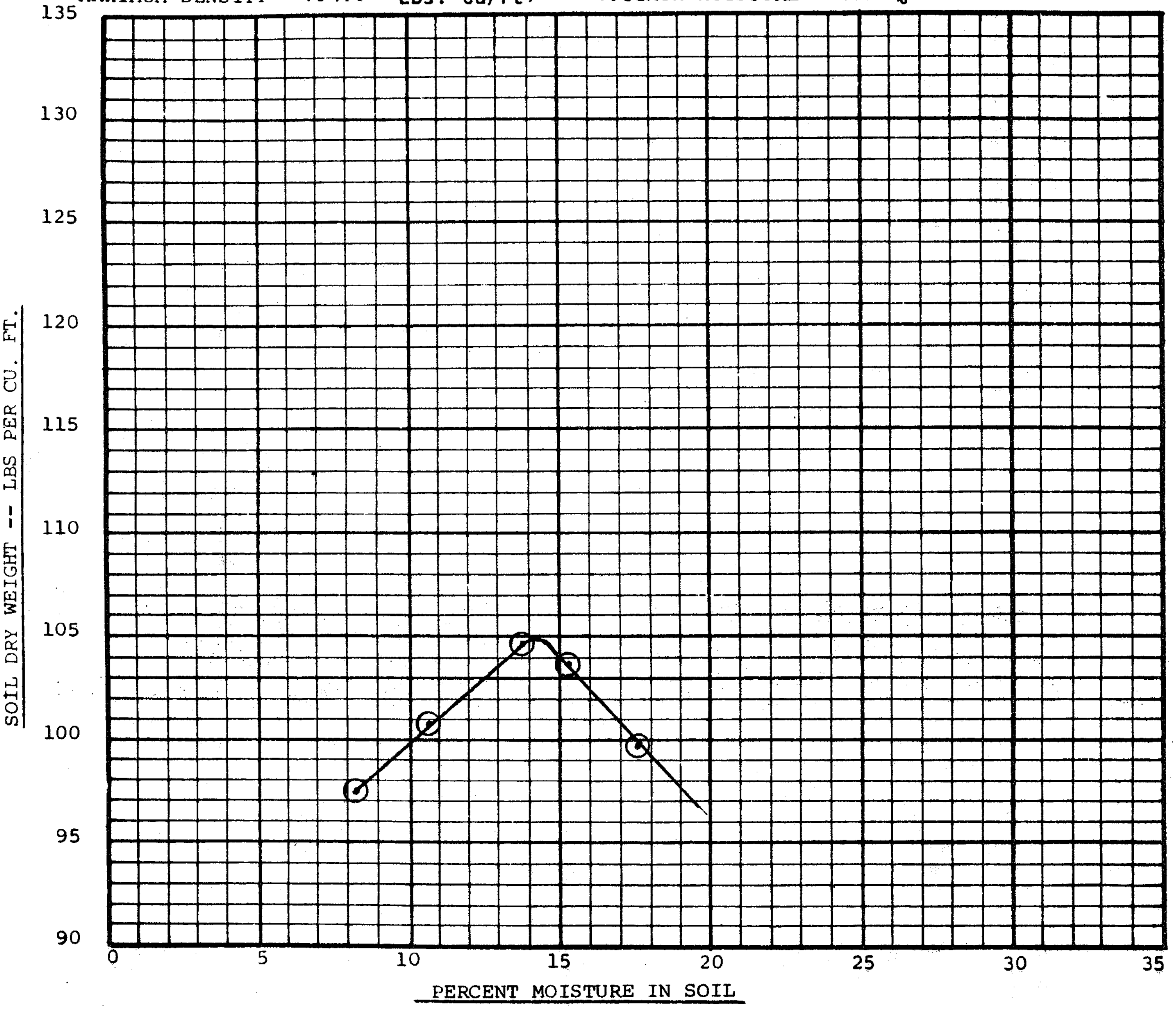
PENSACOLA TESTING LABORATORIES, INC
CHEMICAL ANALYSES – INSPECTIONS – TESTS

OFFICE AND LABORATORIES
217 East Brent Lane
Pensacola, Florida 32503
Phone: 477-5100

PROCTOR

PROJECT SMITH PLANT
REPORT NO. 55827 se
FOR GULF POWER COMPANY, P.O. BOX 1151, PENSACOLA FLA.
DATE March 2, 1981
SAMPLE IDENTIFICATION 50% BOTTOM ASH, 50% SAND (BY LOOSE VOC.)
APPLICABLE SPECIFICATION ASTM D-698
ORDER NO.
SAMPLED AND TESTED BY J. SIMS
DATE 2-23-81

MAXIMUM DENSITY 104.8 Lbs. Cu/Ft. OPTIMUM MOISTURE 14.2 %

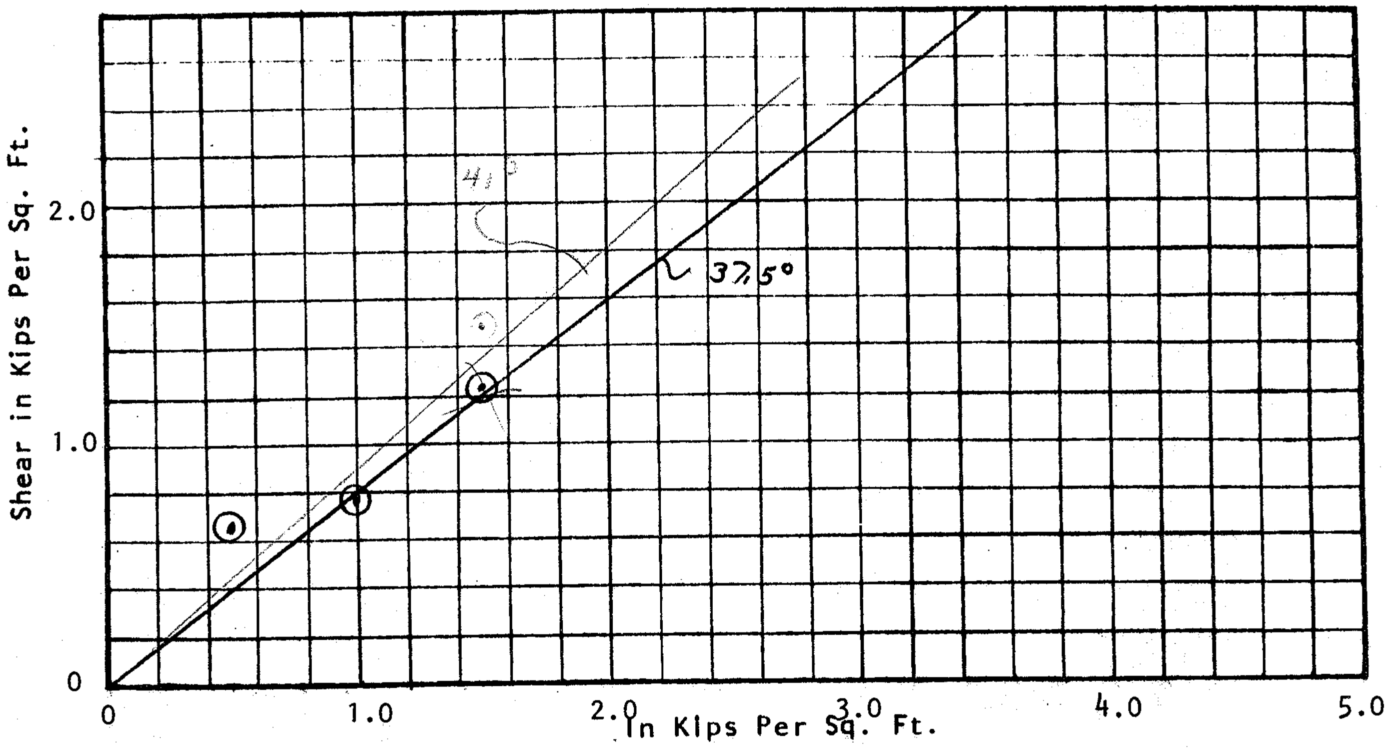


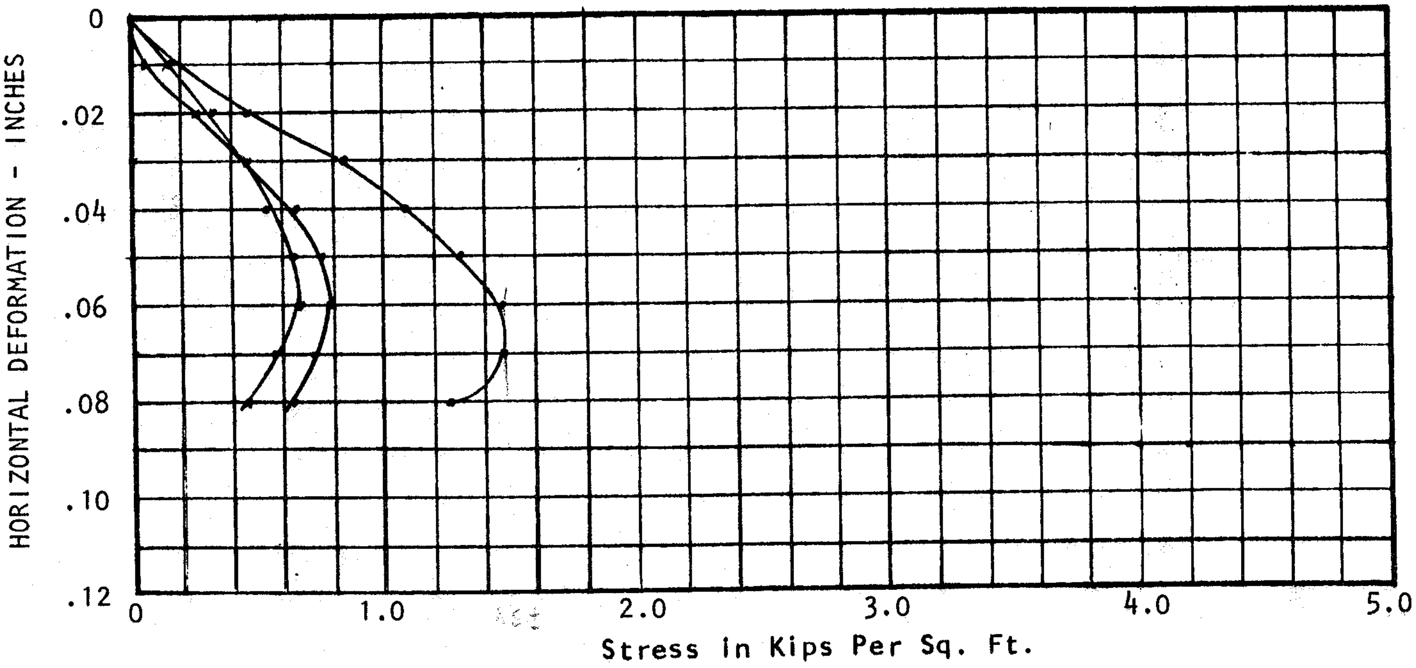
Reports to:

3 GULF POWER COMPANY
ATTN: MR. RALPH CZEPLUCH

PENSACOLA TESTING LABORATORIES, INC.

By John D Sims





STRESS-STRAIN CURVES

"Cohesion", C 0

Angle of Shear Resistance, Ø 38°

Unit Weight, γ 94.4 =90% ASTM D-698

Water Content, W 14.2

Void Ratio, e

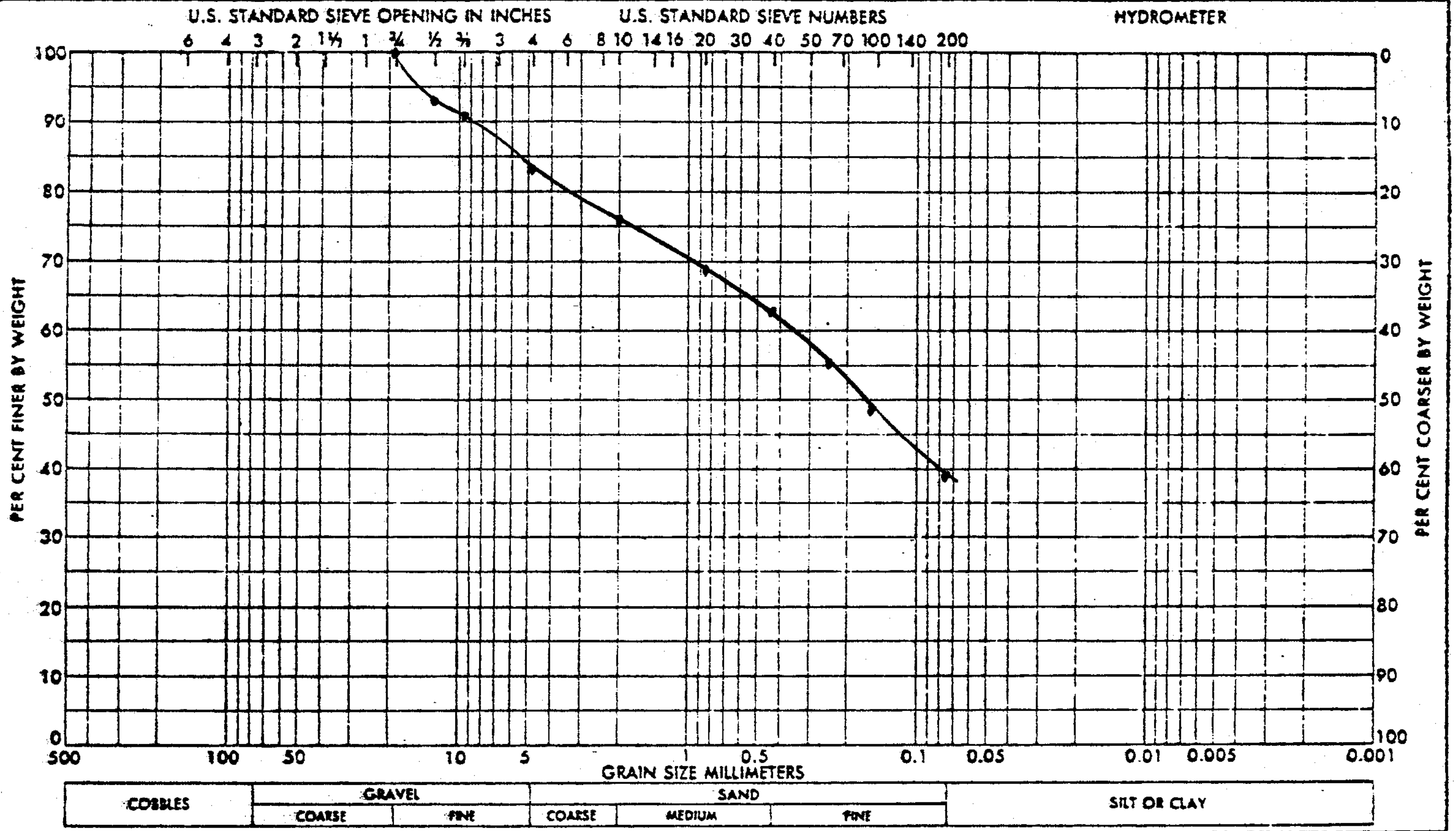
NOTE: SAMPLE SIEVED OVER #4 BEFORE TEST

DIRECT SHEAR TEST

GULF POWER COMPANY
SMITH PLANT - 50% BOTTOM ASH
50% SAND (BY LOOSE VOL

PENSACOLA TESTING LABORATORIES, INC.

REPORT NO. 55827



SAMPLE NO.	ELEV OR DEPTH	CLASSIFICATION	NAT W%	LL	PL	PI
		SMITH PLANT				
		50% FLY ASH 50% BOTTOM ASH				

GRADATION CURVES

PROJECT GULF POWER CO.
SMITH PLANT

AREA

BORING NO.

DATE 3/2/81

SIEVE SIZES:	3/4"	1/2"	3/8"	#4	#10	#20	#40	#60	#100	#200
% PASSING:	100	93.5	90.8	83.5	75.1	68.5	62.9	55.2	48.5	38.8

PENSACOLA TESTING LABORATORIES, INC
CHEMICAL ANALYSES – INSPECTIONS – TESTS

OFFICE AND LABORATORIES
217 East Brent Lane
Pensacola, Florida 32503
Phone: 477-5100

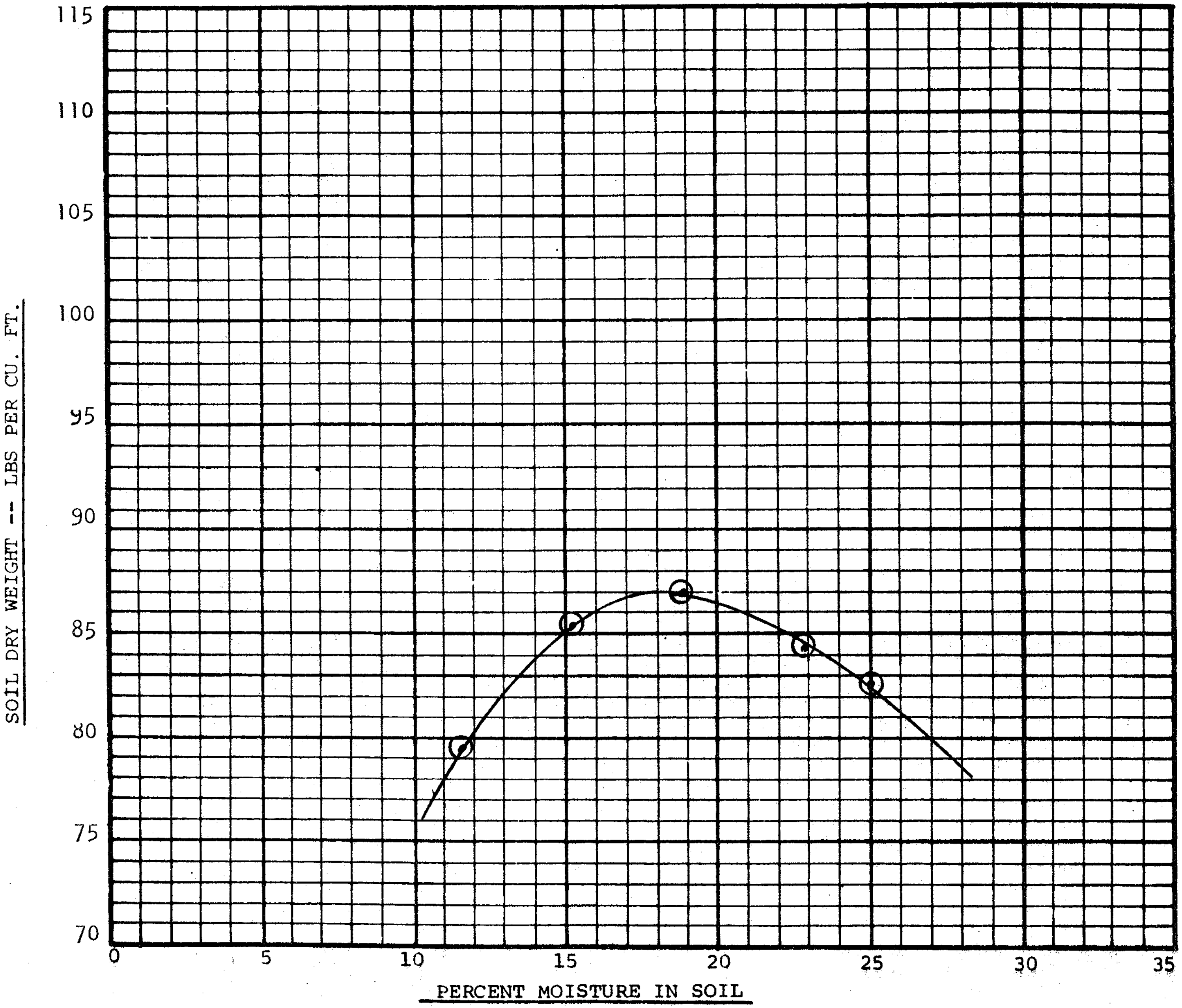
PROCTOR

PROJECT SMITH PLANT
FOR GULF POWER CO., P.O.BOX 1151,PENSACOLA, FL
SAMPLE IDENTIFICATION 50% FLY ASH, 50% BOTTOM ASH
APPLICABLE SPECIFICATION ASTM D-698
SAMPLED AND TESTED BY CLIENT AND J. SIMS

REPORT NO. 55827 bh
DATE 3/2/81

ORDER NO.
DATE 2/23/81

MAXIMUM DENSITY 87.0 Lbs. Cu/Ft. OPTIMUM MOISTURE 18.0 %



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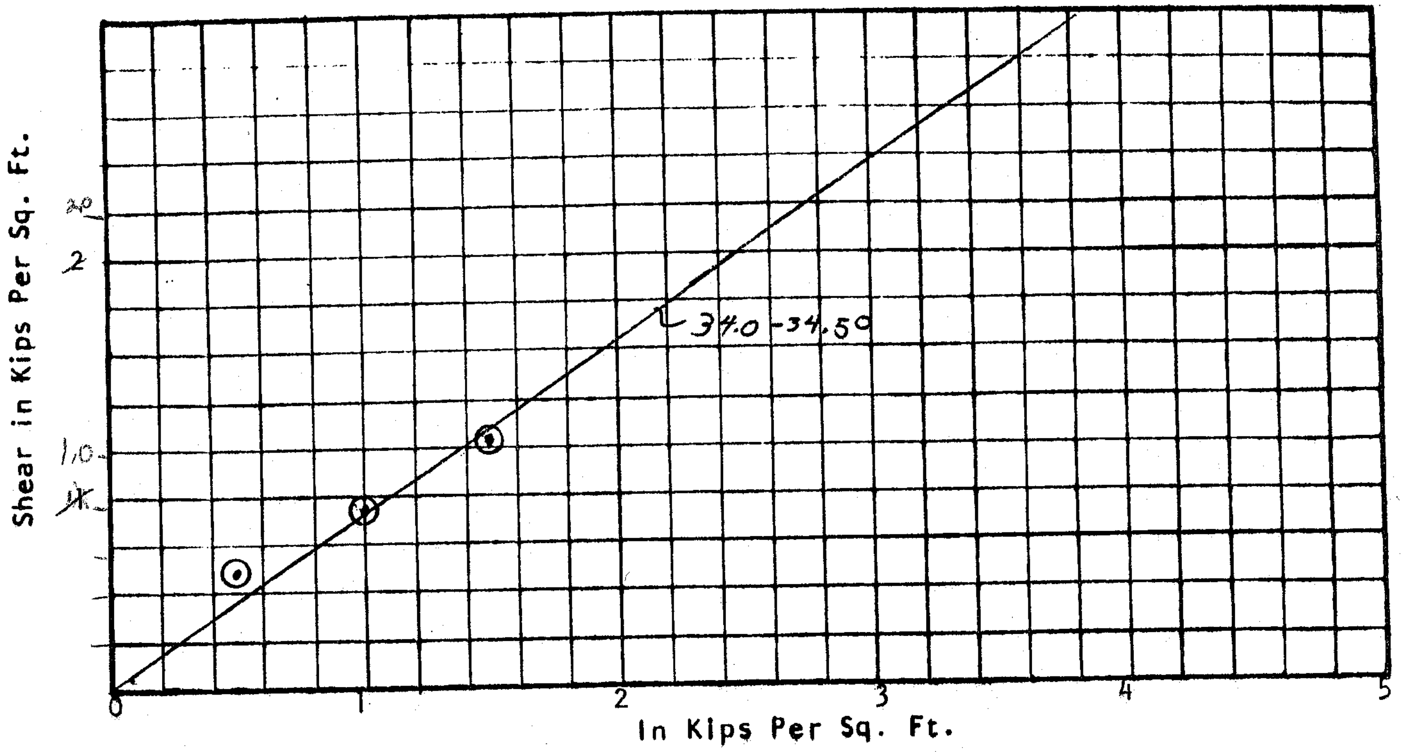
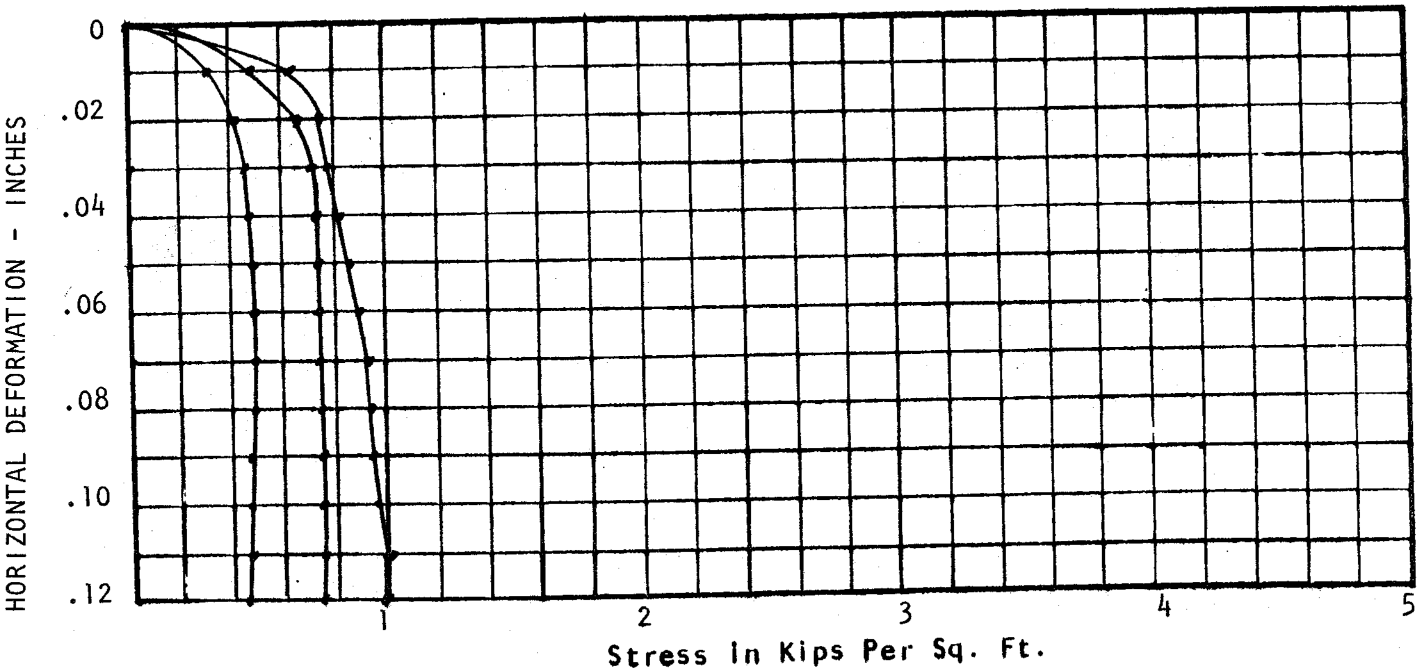
Reports to: Gulf Power Co.

PENSACOLA TESTING LABORATORIES, INC.

By John D Sims





STRESS-STRAIN CURVES

"Cohesion", C 0

Angle of Shear Resistance, Ø 35°

DRY Unit Weight, γ 78.3 (90% ASTM D-698)

Water Content, W 18.0

Void Ratio, e

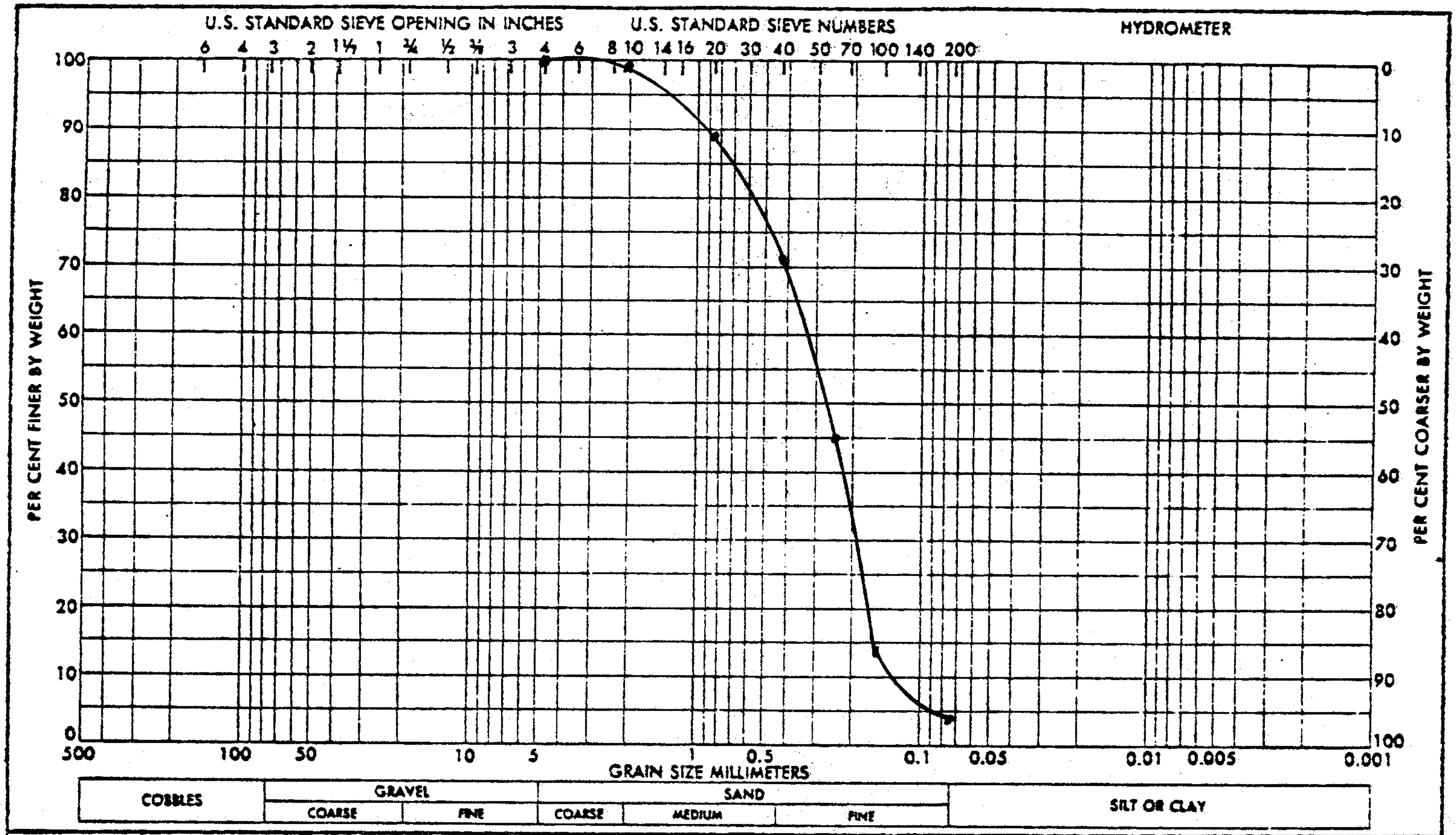
NOTE: SAMPLE SIEVED OVER #4 BEFORE TESTING

DIRECT SHEAR TEST

GULF POWER CO. - SMITH PLANT
50% FLY ASH, 50% BOTTOM ASH
(BY LOOSE VOLUME)

PENSACOLA TESTING LABORATORIES, INC.

REPORT NO: 55827



SAMPLE NO.	ELEV OR DEPTH	CLASSIFICATION	NAT W%	LL	PL	PI
		SMITH PLANT SAND				

GRADATION CURVES

PROJECT GULF POWER COMPANY
SMITH PLANT, PANAMA CITY,
AREA
BORING NO.
DATE March 2, 1981

SIEVE SIZES:	# 4,	#10,	#20,	#40,	#60,	#100,	#200
% PASSING:	100	99.2	88.9	70.9	44.6	14.3	4.2

ATTACHMENT E

Plant Scholz Ash Pond Dikes

by: Ben Gallagher

Pseudostatic Coefficent from USGS PSHA

Based on Bray and Travasarou (2007)

Height of Slope	35	ft	a=	3.858236	
Shear Wave Velocity of Slide Ma	1000	ft/sec	b=	4.504542	
Period of Slide Mass (Ts)	0.14	sec	**Pseudostatic Analysis**		
1.5 Ts	0.21	sec	**Kh**	**0.074**	**g**
Earthquake Magnitude	6.05	M			
Spectral Acc	0.161	g			
Allowable Crest Dispacement	2	in			
episilon	1.3398	(2% exceedance)			

Document 5

Analysis of Liquefaction Potential

SOUTHERN COMPANY

Engineering and Construction Services Calculation

Calculation Number:
TV-SZ-FPC33667-001

Project/Plant: Plant Scholz CCB Facility	**Unit(s):** Common	**Discipline/Area:** Geotechnical
Title/Subject: Analysis of Liquefaction Potential for Ash Pond		
Purpose/Objective: Evaluate the potential for dike and foundation soils to liquefy under earthquake shaking		
System or Equipment Tag Numbers: NA	**Originator:** Benjamin J. Gallagher, P.E.	

Contents

Topic	**Page**	**Attachments** (Computer Printouts, Tech. Papers, Sketches, Correspondence)	**# of Pages**
Purpose of Calculation	2	Attachment A: Liquefaction Potential Summary	1
Summary of Conclusions	2	Attachment B: USGS Probabilistic Hazard Data	4
Methodology	3		
Criteria and Assumptions	3		
Design Inputs/References	4		
Body of Calculation	4		
Total # of pages including cover sheet & attachments:	9		

Revision Record

Rev. No.	**Description**	**Originator Initial / Date**	**Reviewer Initial / Date**	**Approver Initial / Date**
0	Issued for Information	BJG/09-07-12	JCP/09-07-12	JCP/09-07-12

Notes:

Purpose of Calculation

Plant Scholz is a coal-fired steam plant and produces ash as a byproduct of combustion. The ash sluiced to the ash pond where it is allowed to settle. Ash is periodically dredged from the pond and stacked in a landfill located within the perimeter of the ash pond. The pond is subdivided into a series of five water management cells by non-structural interior berms.

The ash pond is enclosed by dikes on the north, east and south sides. On the west side, natural topography forms the boundary of facility. The dikes are made of compacted earth bearing on native soils. The purpose of this calculation is to evaluate the potential for liquefaction of the dikes and foundation soils to occur during earthquake shaking.

Summary of Conclusions

The USGS online map of Quaternary Fault and Fold Database indicates the nearest mapped faults are the Gulf-margin normal faults, located nearly 200km west of Plant Scholz. The USGS report indicates there is little evident of Quaternary slip on these faults, and states that is it not clear that slip on these faults would occur seismically. They have a “strikingly low historical seismicity.”

Based on factors of safety of at least 1.8, liquefaction does not appear to be a significant threat during the CEUS scenario earthquake. This earthquake source comprises 75 percent of the overall mapped hazard at the ash pond.

During the Charleston scenario earthquake, some of softer soils within and immediately below the dikes exhibited factors of safety between 0.9 and 1.4. This suggests some pockets may liquefy and others portions of the dike may lose strength due to earthquake-induced pore pressure buildup. It should be recognized that the Charleston earthquake source is currently modeled in the USGS probabilistic hazard analysis as a time-independent event, where the probability of occurring tomorrow is the same as the probability of occurring on a day 300 years from now. Paleoseismic evidence suggests that major earthquakes in the Charleston Source zone may recur on the order of every 500 years. The last major event happened in 1886, or about 126 years ago. Although a time-dependant model for the Charleston hazard is not available at present, we believe there is very low likelyhood of a Charleston scenario earthquake occurring during the remaining life of the plant.

To evaluate the impact of earthquake-induced liquefaction and strength loss in the soft soils, it would be necessary to perform seismic deformation analysis on the dike and foundation. This would be an extensive undertaking including significant additional field and laboratory testing, and engineering analysis. Given the low risk, such an extensive study is unwarranted at this time.

Methodology

Liquefaction potential was assessed using procedures outlined in the 2004 paper by Idriss and Boulanger titled, "Semi-Empirical Procedures for Evaluating *Liquefaction Potential During Earthquakes*".

The SPT test data collected in 2009 and 2010 was used to evaluate liquefaction potential. Supplemental information regarding SPT correction factors was obtained from the 2001 paper by Youd and Idriss " Liquefaction Resistance of Soils: Summary Report From The 1996 NCEER and 1998 NCEER/NSF Workshops on Evaluation of Liquefaction Resistance of Soils" and ASTM D 6066-04. The reported factor of safety is the ratio of the cyclic resistance ratio (CRR) to the cyclic stress ratio (CSR).

The deaggregation of the published 2008 PSHA data for the site indicates the 75% of the seismic hazard for Plant Scholz is derived from the Central and Eastern US random faulting source (CEUS), and about 18% percent of the hazard is attributed to the distant Charleston Source Zone. Two scenarios were evaluated for potential liquefaction, the average magnitude and acceleration from the CEUS random source and the distant M7.4 Charleston event.

Criteria and Assumptions

Based on the SPT data, the subsurface conditions at the ash pond are considered consistent with Site Class E, Soft Soils.

The deaggregation of the USGS PSHA data (2% chance of exceedance over 50 years) for the Plant Crist indicated an average earthquake of M5.8 at 100km for the CUES source and a M7.4 at 435km for Charleston. The corresponding site-modified zero period accelerations (PGA) are 0.060g (CEUS) and 0.048g (Charleston). A topographic amplification factor of 1.42 was applied to the site-modified PGA values to determine the accelerations at the crest of the dikes.

SPT testing was generally performed at 5-foot increments throughout the borings. The liquefaction potential was analyzed at each SPT test and the results are summarized on the attached table. Liquefaction potential is evaluated as the CRR divided by CSR. Values of less than 1.1 are considered at risk of liquefaction during a design earthquake event, values between 1.1 and 1.4 are considered to have the potential for some pore-pressure induced strength loss, and values greater than 1.4 are considered not likely to liquefy.

Design Inputs/References

1. Southern Company SPT Test Borings SDB-3, SDB-4 and SDB-5 (2009)
2. Southern Company SPT Test Borings EDB-2, EDB-6 and NDB-4 (2010)
3. USGS Probabilistic Earthquake Hazard Data Interactive Deaggregation (2008 data; 2% exceedance over 50 years)

Body of Calculation

Attached

Plant Scholz Ash Pond

Simplified Evaluation of Liquefaction Potential in SPT Test Borings

prepared by Ben Gallagher, 9/7/2012

North and East Dike									
	EDB-2			EDB-6			NDB-4		
Depth	SPT N-value	Factor of Safety, CEUS	Factor of Safety, Charleston	SPT N-value	Factor of Safety, CEUS	Factor of Safety, Charleston	SPT N-value	Factor of Safety, CEUS	Factor of Safety, Charleston
5	10	>5	>5	3	4.6	3.0	5	>5	3.8
10	7	>5	3.3	**0**	2.2	1.4	**0**	2.2	1.4
15	4	2.6	1.6	2	2.8	1.7	**0**	2.0	**1.2**
20	2	2.6	1.5	7	4.6	2.7	8	4.6	2.7
25	0	1.9	**1.0**	**0**	1.9	**1.0**	97	>5	>5
30	3	2.8	1.4	**1**	2.2	**1.1**	77	>5	>5
35	5	3.4	1.7	2	2.5	**1.2**	50	>5	>5
40	2	2.6	**1.2**	14	>5	2.8			
45	2	2.2	**0.9**	88	>5	>5			
50	20	>5	>5						
55	50	>5	>5						

Water at 5 feet below top of dike

South Dike									
	SDB-3			SDB-4			SDB-5		
Depth	SPT N-value	Factor of Safety, CEUS	Factor of Safety, Charleston	SPT N-value	Factor of Safety, CEUS	Factor of Safety, Charleston	SPT N-value	Factor of Safety, CEUS	Factor of Safety, Charleston
5	21	>5	>5	13	>5	>5	22	>5	>5
10	7	3.7	2.4	3	2.3	1.5	2	2.0	**1.3**
15	2	2.8	1.7	3	3.2	1.9	3	2.2	**1.3**
20	0	1.9	**1.1**	3	2.9	1.7	19	>5	>5
25	0	1.8	**1.0**	1	2.2	**1.2**	1	2.2	**1.2**
30	7	4.1	2.1	2	2.3	**1.2**	43	>5	>5
35	12	>5	3.5	39	>5	>5	100	>5	>5
40	12	>5	3.2	100	>5	>5	100	>5	>5
45	100	>5	>5	100	>5	>5	31	>5	>5
50	100	>5	>5				100	>5	>5

Water at 5 feet below top of dike

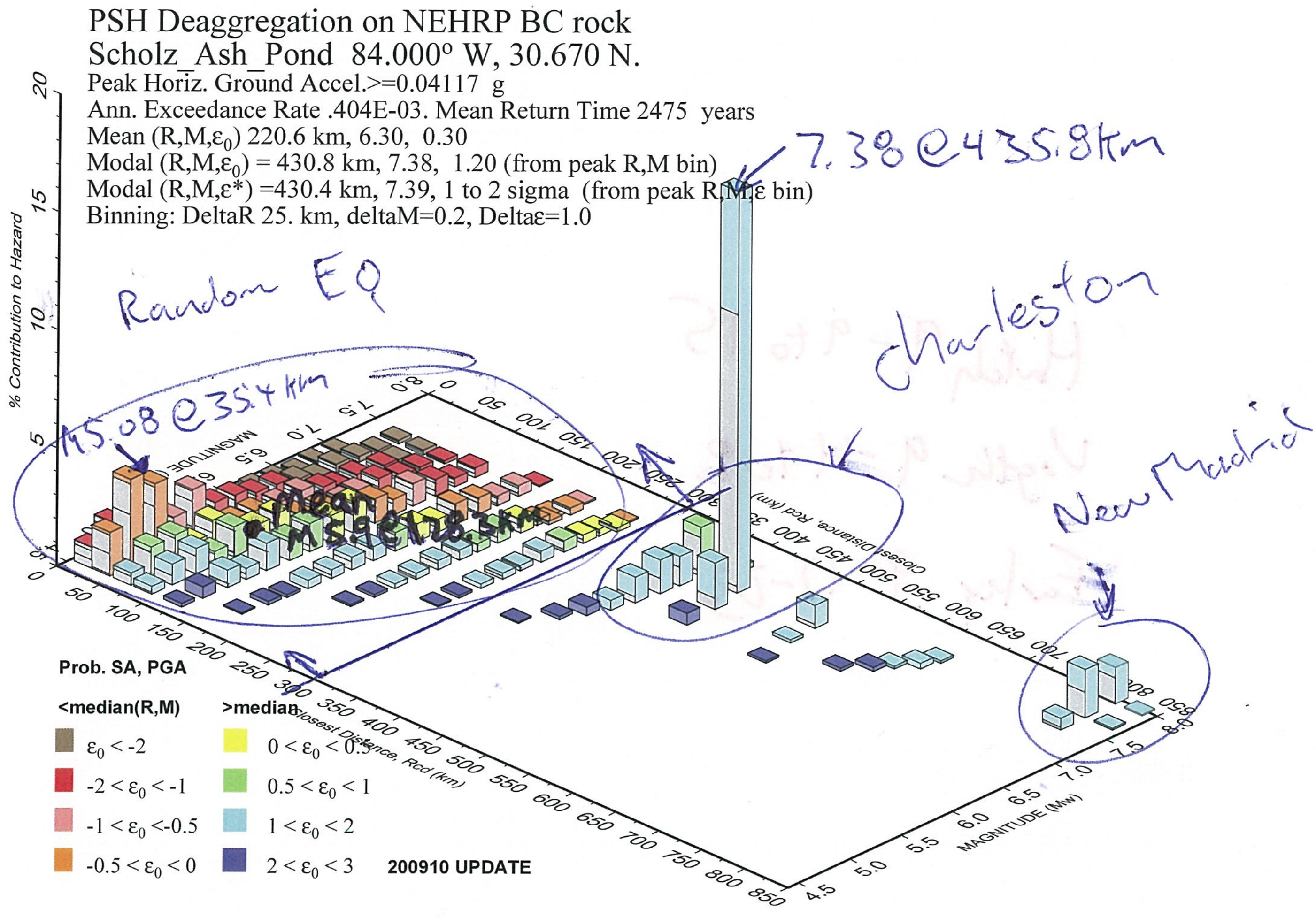
Reported N-values are uncorrected field values

Factor of Safety = Cyclic Resistance Ratio (CRR) divided by the Cyclic Shear Stress Ratio (CSR)

This evaluation was performed following the using the "Simplified" procedures described by Idriss and Boulanger in the paper titled "Semi-emprical procedures for evaluating liquefaction potential during earthquakes " dated January 2004 and the journal article titled "Liquefaction Resistance of Soils: Summary report fromthe 1996 NCEER and 1998 NCEER/NSF Workshops on evaluation of liquefaction resistance of soils" by Youd and Idriss dated April 2001.

The ground motions were selected based on sources identified using the interactive deaggregation of the USGS-published 2008 PSHA data. For comparison, two earthquake sources were considered, the CEUS gridded random source with an average magnitude of 5.93 and distance of 128.3 km and the Charleston source zone with a magnitude of 7.38 and distance of 435.8 km. The respective accelerations (PGA) are 0.024g and 0.019g. Assuming Site Class E, the site-modified zero period accelerations are 0.060g and 0.048g, respectively. A topographic amplification factor of 1.42 was applied to the site-modified PGA values to determine the accelerations at the crest of the dikes.

TV-S2-FPC33667-001



PSH Deaggregation on NEHRP BC rock
Scholz_Ash_Pond 84.000° W, 30.670 N.
Peak Horiz. Ground Accel.>=0.04117 g
Ann. Exceedance Rate .404E-03. Mean Return Time 2475 years
Mean (R,M,ε_0) 220.6 km, 6.30, 0.30
Modal (R,M,ε_0) = 430.8 km, 7.38, 1.20 (from peak R,M bin)
Modal (R,M,ε*) =430.4 km, 7.39, 1 to 2 sigma (from peak R,M,ε bin)
Binning: DeltaR 25. km, deltaM=0.2, Deltaε=1.0

GMT 2012 Aug 22 14:23:38 Distance (R), magnitude (M), epsilon (E0,E) deaggregation for a site on rock with average vs= 760. m/s top 30 m. USGS CGHT PSHA2008 UPDATE Bins with lt 0.05% contrib. omitted

TV-SZ-FPC33667-001

```
*** Deaggregation of Seismic Hazard at One Period of Spectral Accel. ***
*** Data from U.S.G.S. National Seismic Hazards Mapping Project, 2008 version ***
PSHA Deaggregation. %contributions. site: Scholz_Ash_Pond long:  84.000 W., lat: 30.670 N.
 Vs30(m/s)= 760.0 CEUS atten. model site cl BC(firm) or A(hard).
NSHMP 2007-08  See USGS OFR 2008-1128. dM=0.2 below
Return period: 2475  yrs. Exceedance PGA =0.04117  g. Weight * Computed_Rate_Ex 0.404E-03
#Pr[at least one eq with median motion>=PGA in 50 yrs]=0.00726
#This deaggregation corresponds to Mean Hazard w/all GMPEs
DIST(KM) MAG(MW) ALL_EPS EPSILON>2  1<EPS<2 0<EPS<1 -1<EPS<0 -2<EPS<-1 EPS<-2
   14.0    4.60    0.898    0.025    0.147    0.369    0.322    0.034    0.001
   34.2    4.60    1.841    0.131    0.777    0.868    0.066    0.000    0.000
   59.1    4.61    0.516    0.142    0.374    0.000    0.000    0.000    0.000
   83.0    4.61    0.326    0.261    0.065    0.000    0.000    0.000    0.000
  117.8    4.61    0.143    0.143    0.000    0.000    0.000    0.000    0.000
   14.1    4.79    1.562    0.041    0.242    0.608    0.578    0.091    0.003
→  34.7    4.80    3.713    0.215    1.285    1.946    0.267    0.000    0.000
   59.3    4.80    1.225    0.234    0.942    0.049    0.000    0.000    0.000
   83.4    4.81    0.880    0.493    0.386    0.000    0.000    0.000    0.000
  119.1    4.81    0.485    0.477    0.007    0.000    0.000    0.000    0.000
  163.1    4.82    0.053    0.053    0.000    0.000    0.000    0.000    0.000
   14.2    5.03    1.063    0.026    0.156    0.392    0.392    0.093    0.003
→  35.4    5.03    3.049    0.139    0.830    1.685    0.396    0.000    0.000
   59.5    5.03    1.268    0.151    0.848    0.269    0.000    0.000    0.000
   83.9    5.04    1.079    0.325    0.754    0.000    0.000    0.000    0.000
  120.2    5.04    0.736    0.566    0.170    0.000    0.000    0.000    0.000
  166.8    5.04    0.139    0.139    0.000    0.000    0.000    0.000    0.000
   14.3    5.21    0.392    0.009    0.056    0.140    0.140    0.044    0.001
   35.9    5.21    1.276    0.050    0.297    0.696    0.233    0.000    0.000
   59.7    5.21    0.623    0.054    0.323    0.246    0.000    0.000    0.000
   84.2    5.21    0.600    0.116    0.478    0.005    0.000    0.000    0.000
  120.9    5.21    0.471    0.246    0.225    0.000    0.000    0.000    0.000
  168.4    5.21    0.116    0.116    0.000    0.000    0.000    0.000    0.000
   14.3    5.39    0.578    0.014    0.081    0.204    0.204    0.073    0.003
   36.3    5.39    2.089    0.072    0.430    1.072    0.501    0.013    0.000
   59.8    5.40    1.173    0.078    0.468    0.627    0.000    0.000    0.000
   84.5    5.40    1.277    0.169    0.931    0.177    0.000    0.000    0.000
  121.7    5.40    1.162    0.361    0.801    0.000    0.000    0.000    0.000
  169.4    5.41    0.353    0.315    0.039    0.000    0.000    0.000    0.000
  217.7    5.41    0.077    0.077    0.000    0.000    0.000    0.000    0.000
   14.4    5.61    0.276    0.006    0.038    0.096    0.096    0.037    0.003
   36.7    5.61    1.111    0.034    0.203    0.509    0.346    0.019    0.000
   60.0    5.61    0.729    0.037    0.220    0.453    0.019    0.000    0.000
   84.8    5.62    0.915    0.079    0.474    0.362    0.000    0.000    0.000
  122.4    5.62    0.971    0.170    0.751    0.049    0.000    0.000    0.000
  170.3    5.62    0.367    0.215    0.151    0.000    0.000    0.000    0.000
  219.8    5.62    0.112    0.112    0.000    0.000    0.000    0.000    0.000
   14.4    5.80    0.240    0.006    0.033    0.083    0.083    0.033    0.003
   36.9    5.80    1.026    0.029    0.175    0.439    0.354    0.029    0.000
   60.2    5.80    0.739    0.032    0.190    0.452    0.065    0.000    0.000
   85.1    5.81    1.015    0.068    0.409    0.538    0.000    0.000    0.000
  123.0    5.81    1.204    0.147    0.816    0.242    0.000    0.000    0.000
  170.9    5.81    0.530    0.195    0.335    0.000    0.000    0.000    0.000
  220.6    5.81    0.192    0.178    0.014    0.000    0.000    0.000    0.000
  270.3    5.82    0.060    0.060    0.000    0.000    0.000    0.000    0.000
   13.7    6.01    0.179    0.004    0.025    0.062    0.062    0.025    0.003
   36.5    6.01    0.717    0.019    0.113    0.284    0.266    0.035    0.000
   64.1    6.01    0.756    0.029    0.173    0.431    0.124    0.000    0.000
   88.1    6.00    0.628    0.033    0.196    0.398    0.002    0.000    0.000
  123.4    6.01    1.126    0.091    0.541    0.494    0.000    0.000    0.000
  171.8    6.01    0.588    0.120    0.452    0.016    0.000    0.000    0.000
  221.6    6.01    0.254    0.159    0.095    0.000    0.000    0.000    0.000
  271.3    6.02    0.105    0.104    0.000    0.000    0.000    0.000    0.000
  339.2    6.02    0.060    0.060    0.000    0.000    0.000    0.000    0.000
   13.7    6.21    0.189    0.004    0.026    0.065    0.065    0.026    0.004
```

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   36.5    6.21    0.655    0.017    0.099    0.249    0.246    0.045    0.001
   65.0    6.21    0.837    0.029    0.172    0.431    0.205    0.000    0.000
   89.8    6.21    0.582    0.025    0.152    0.371    0.034    0.000    0.000
  123.9    6.21    1.297    0.079    0.475    0.743    0.000    0.000    0.000
  172.8    6.22    0.786    0.105    0.555    0.126    0.000    0.000    0.000
  222.3    6.22    0.389    0.142    0.247    0.000    0.000    0.000    0.000
  271.9    6.22    0.188    0.164    0.025    0.000    0.000    0.000    0.000
  358.8    6.26    0.134    0.134    0.000    0.000    0.000    0.000    0.000
   13.0    6.42    0.114    0.003    0.015    0.039    0.039    0.015    0.002
   36.4    6.42    0.430    0.010    0.063    0.157    0.157    0.042    0.001
   65.0    6.42    0.577    0.018    0.105    0.263    0.191    0.001    0.000
   89.8    6.42    0.436    0.016    0.094    0.236    0.090    0.000    0.000
  124.5    6.42    1.024    0.048    0.284    0.645    0.046    0.000    0.000
  173.4    6.42    0.748    0.065    0.386    0.298    0.000    0.000    0.000
  222.9    6.42    0.431    0.086    0.337    0.008    0.000    0.000    0.000
  272.7    6.43    0.244    0.124    0.120    0.000    0.000    0.000    0.000
  369.8    6.43    0.353    0.347    0.007    0.000    0.000    0.000    0.000
   17.5    6.58    0.117    0.003    0.016    0.040    0.040    0.016    0.002
   38.7    6.60    0.218    0.005    0.031    0.079    0.079    0.023    0.000
   60.6    6.59    0.237    0.007    0.039    0.099    0.090    0.003    0.000
   85.8    6.59    0.390    0.013    0.075    0.189    0.114    0.000    0.000
  125.3    6.59    0.672    0.027    0.162    0.400    0.083    0.000    0.000
  173.6    6.59    0.548    0.036    0.218    0.293    0.000    0.000    0.000
  223.1    6.60    0.357    0.049    0.262    0.047    0.000    0.000    0.000
  272.8    6.60    0.230    0.072    0.158    0.000    0.000    0.000    0.000
  377.2    6.60    0.419    0.379    0.041    0.000    0.000    0.000    0.000
   13.4    6.78    0.103    0.002    0.014    0.035    0.035    0.014    0.002
   37.0    6.78    0.360    0.008    0.051    0.127    0.127    0.044    0.002
   60.7    6.78    0.314    0.008    0.050    0.124    0.122    0.010    0.000
   85.8    6.78    0.534    0.016    0.095    0.238    0.186    0.000    0.000
  125.2    6.78    0.951    0.034    0.201    0.504    0.212    0.000    0.000
  174.0    6.79    0.865    0.045    0.271    0.534    0.015    0.000    0.000
  223.6    6.79    0.659    0.062    0.372    0.225    0.000    0.000    0.000
  273.6    6.79    0.459    0.089    0.362    0.008    0.000    0.000    0.000
  382.3    6.79    1.091    0.838    0.254    0.000    0.000    0.000    0.000
  442.0    6.80    0.502    0.502    0.000    0.000    0.000    0.000    0.000
  537.5    6.77    0.076    0.076    0.000    0.000    0.000    0.000    0.000
   13.8    7.00    0.073    0.002    0.010    0.025    0.025    0.010    0.002
   36.5    7.00    0.236    0.005    0.033    0.082    0.082    0.031    0.002
   64.6    7.01    0.292    0.007    0.045    0.112    0.112    0.017    0.000
   88.3    6.99    0.283    0.008    0.046    0.116    0.111    0.001    0.000
  125.3    7.00    0.685    0.021    0.126    0.317    0.221    0.000    0.000
  174.7    7.00    0.692    0.028    0.170    0.416    0.077    0.000    0.000
  224.3    7.00    0.596    0.038    0.230    0.328    0.000    0.000    0.000
  274.2    7.01    0.484    0.056    0.325    0.103    0.000    0.000    0.000
  385.4    7.01    1.432    0.782    0.649    0.001    0.000    0.000    0.000
  438.7    7.10    1.981    1.498    0.483    0.000    0.000    0.000    0.000
  526.7    7.10    0.131    0.131    0.000    0.000    0.000    0.000    0.000
  592.8    7.04    0.121    0.121    0.000    0.000    0.000    0.000    0.000
   36.5    7.19    0.130    0.003    0.018    0.045    0.045    0.018    0.001
   60.1    7.18    0.118    0.003    0.017    0.043    0.043    0.011    0.000
   85.6    7.18    0.203    0.005    0.032    0.080    0.079    0.007    0.000
  125.6    7.19    0.378    0.011    0.065    0.164    0.138    0.001    0.000
  175.3    7.19    0.408    0.015    0.088    0.222    0.083    0.000    0.000
  224.4    7.16    0.244    0.013    0.079    0.151    0.000    0.000    0.000
  225.3    7.23    0.151    0.007    0.042    0.097    0.005    0.000    0.000
  274.5    7.19    0.353    0.029    0.175    0.149    0.000    0.000    0.000
  386.9    7.19    1.241    0.458    0.758    0.025    0.000    0.000    0.000
  612.8    7.19    0.175    0.175    0.000    0.000    0.000    0.000    0.000
   36.2    7.39    0.148    0.003    0.020    0.051    0.051    0.020    0.002
   65.3    7.38    0.189    0.005    0.027    0.069    0.069    0.019    0.000
   89.8    7.39    0.143    0.004    0.022    0.054    0.054    0.009    0.000
  125.5    7.38    0.409    0.011    0.066    0.167    0.158    0.005    0.000
  175.8    7.39    0.452    0.015    0.088    0.222    0.128    0.000    0.000
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   224.9    7.32    0.185    0.009    0.051    0.119    0.007    0.000    0.000
   225.3    7.44    0.284    0.012    0.069    0.172    0.032    0.000    0.000
   274.7    7.34    0.291    0.019    0.113    0.159    0.000    0.000    0.000
   275.3    7.47    0.185    0.010    0.062    0.112    0.000    0.000    0.000
   387.2    7.39    2.066    0.440    1.422    0.204    0.000    0.000    0.000
 ->430.8    7.38   17.008    5.221   11.511    0.277    0.000    0.000    0.000
   522.5    7.37    0.980    0.803    0.177    0.000    0.000    0.000    0.000
   622.0    7.32    0.122    0.119    0.004    0.000    0.000    0.000    0.000
   637.6    7.44    0.236    0.204    0.032    0.000    0.000    0.000    0.000
   799.5    7.45    0.498    0.387    0.111    0.000    0.000    0.000    0.000
   175.4    7.59    0.056    0.002    0.010    0.025    0.020    0.000    0.000
   225.5    7.59    0.062    0.002    0.013    0.034    0.013    0.000    0.000
   275.5    7.59    0.066    0.003    0.019    0.043    0.001    0.000    0.000
   398.8    7.54    0.130    0.020    0.087    0.023    0.000    0.000    0.000
   400.8    7.63    0.224    0.031    0.148    0.045    0.000    0.000    0.000
   642.3    7.60    0.099    0.070    0.029    0.000    0.000    0.000    0.000
   798.6    7.70    2.043    0.963    1.080    0.000    0.000    0.000    0.000
   830.3    7.70    0.074    0.027    0.047    0.000    0.000    0.000    0.000
   798.7    8.00    1.545    0.446    1.042    0.057    0.000    0.000    0.000
   830.3    8.00    0.054    0.008    0.046    0.000    0.000    0.000    0.000

 Summary statistics for above PSHA PGA  deaggregation, R=distance, e=epsilon:
 Contribution from this GMPE(%):  100.0
  Mean src-site R=  220.6 km; M= 6.30; eps0=   0.30. Mean calculated for all sources.
 Modal src-site R=  430.8 km; M= 7.38; eps0=   1.20 from peak (R,M) bin
  MODE R*= 430.4km; M*= 7.39; EPS.INTERVAL: 1 to 2 sigma  % CONTRIB.= 11.511

 Principal sources (faults, subduction, random seismicity having > 3% contribution)
 Source Category:                    % contr.  R(km)    M   epsilon0 (mean values).
 New Madrid SZ no clustering           4.26   799.7   7.79    1.52
 CEUS gridded                         75.10   128.3   5.93   -0.04
 Charleston SC M>7.2; 2 zones         17.99   435.8   7.38    1.23
 Individual fault hazard details if its contribution to mean hazard > 2%:
 Fault ID                            % contr.   Rcd(km)  M   epsilon0 Site-to-src azimuth(d)
 New Madrid FZ, central                2.99   799.9   7.79    1.52     -41.3
 #*********End of deaggregation corresponding to Mean Hazard w/all GMPEs   *********#

 PSHA Deaggregation. %contributions. site: Scholz_Ash_Pond long:  84.000 W., lat: 30.670 N.
  Vs30(m/s)= 760.0 CEUS atten. model site cl BC(firm) or A(hard).
 NSHMP 2007-08  See USGS OFR 2008-1128. dM=0.2 below
 Return period: 2475  yrs. Exceedance PGA =0.04117  g. Weight * Computed_Rate_Ex 0.791E-04
 #Pr[at least one eq with median motion>=PGA in 50 yrs]=0.00879
 #This deaggregation corresponds to Toro et al. 1997
 DIST(KM) MAG(MW) ALL_EPS EPSILON>2  1<EPS<2  0<EPS<1 -1<EPS<0 -2<EPS<-1 EPS<-2
    14.2    4.60    0.245    0.025    0.147    0.074    0.000    0.000    0.000
    35.0    4.60    0.635    0.131    0.487    0.017    0.000    0.000    0.000
    59.5    4.61    0.239    0.142    0.097    0.000    0.000    0.000    0.000
    82.7    4.61    0.163    0.161    0.001    0.000    0.000    0.000    0.000
   116.9    4.61    0.058    0.058    0.000    0.000    0.000    0.000    0.000
    14.2    4.79    0.411    0.041    0.242    0.128    0.000    0.000    0.000
    35.3    4.80    1.153    0.215    0.886    0.051    0.000    0.000    0.000
    59.6    4.80    0.481    0.234    0.247    0.000    0.000    0.000    0.000
    83.0    4.81    0.357    0.326    0.031    0.000    0.000    0.000    0.000
   117.9    4.81    0.149    0.149    0.000    0.000    0.000    0.000    0.000
   163.3    4.83    0.015    0.015    0.000    0.000    0.000    0.000    0.000
    14.3    5.03    0.275    0.026    0.156    0.092    0.000    0.000    0.000
    35.9    5.03    0.918    0.139    0.700    0.079    0.000    0.000    0.000
    59.8    5.03    0.467    0.151    0.316    0.000    0.000    0.000    0.000
    83.4    5.03    0.407    0.291    0.116    0.000    0.000    0.000    0.000
   119.2    5.04    0.213    0.212    0.000    0.000    0.000    0.000    0.000
   167.2    5.04    0.040    0.040    0.000    0.000    0.000    0.000    0.000
    14.3    5.21    0.100    0.009    0.056    0.035    0.000    0.000    0.000
    36.3    5.21    0.374    0.050    0.278    0.047    0.000    0.000    0.000
    59.9    5.21    0.218    0.054    0.164    0.000    0.000    0.000    0.000
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Document 6

Photographic Documentation

Exhibit 37

South Dike Where Trees Removed 25 Feet Down From the Crest (View to Southwest)

South Dike Where Trees Removed 25 Feet Down From the Crest (View to Northeast)

Document 7

Topographic Survey

SURVEYOR'S NOTES:

1. The underground utilities shown have been located from field survey information and existing drawings. The surveyor has not physically located the underground utilities. The surveyor does not certify that the underground utilities shown comprise all such utilities or that they are the exact size, material, or location as indicated.
2. This survey does not reflect or determine ownership.
3. This survey is subject to any facts that may be disclosed by a full and accurate title search.
4. This survey is subject to setbacks, easements, and restrictions of record.
5. To assure the contractor is on the same vertical and horizontal datum as this survey, it is strongly recommended that vertical checks be made between two benchmarks and that horizontal checks be made between three control points or property corners.
6. Footings and foundations below natural ground not located.

7. Coordinates shown are State Plane Coordinates referenced to N.A.D. 83 datum, 2011 adjustment, Florida North Zone and expressed in U.S. survey feet.

BENCHMARKS:

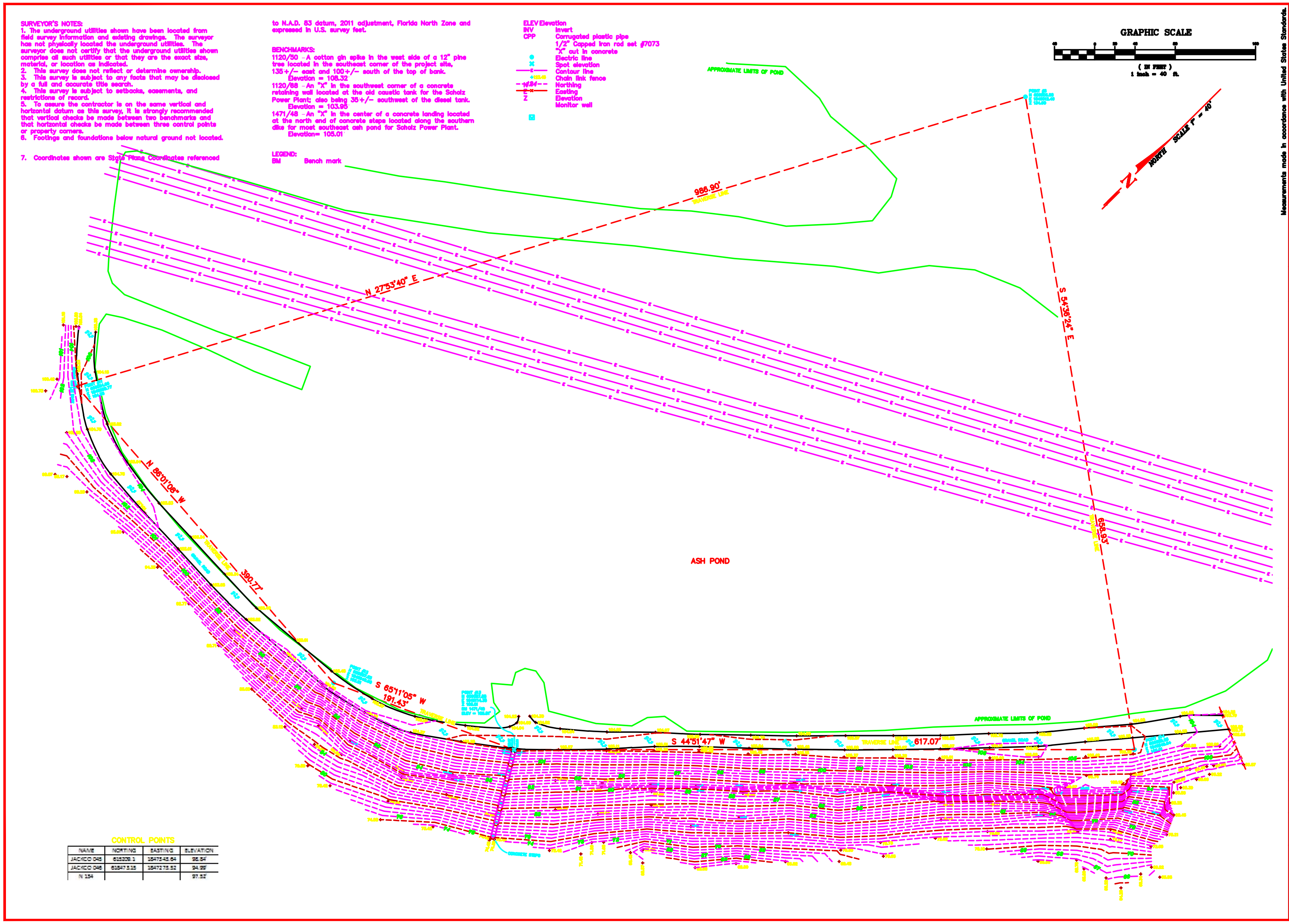
1120/50 -A cotton gin spike in the west side of a 12" pine tree located in the southeast corner of the project site, 135'+/- east and 100'+/- south of the top of bank.
Elevation = 108.32'

1120/68 -An "X" in the southwest corner of a concrete retaining wall located at the old caustic tank for the Scholz Power Plant; also being 35'+/- southwest of the diesel tank.
Elevation = 103.95'

1471/48 -An "X" in the center of a concrete landing located at the north end of concrete steps located along the southern dike for most southeast ash pond for Scholz Power Plant.
Elevation= 105.01'

LEGEND:

BM	Bench mark
ELEV	Elevation
INV	Invert
CPP	Corrugated plastic pipe
	1/2" Capped iron rod set #7073
	"X" cut in concrete
●	Electric line
×	Spot elevation
—E—	Contour line
	Chain link fence
N	Northing
E	Easting
Z	Elevation
▣	Monitor well



CONTROL POINTS

NAME	NORTHING	EASTING	ELEVATION
JACKCO 045	535329.1	1547543.64	95.54
JACKCO 046	535475.35	1547275.52	94.99
N 154			97.52

Measurements made in accordance with United States Standards.

Bearing Reference NORTH BASED ON STATE PLANE COORDINATE SYSTEM (GRID NORTH)
Ordered By SUSAN HARRIS
Elevation Reference NAVD 88
Encroachments
Source of Information PUBLIC RECORDS; INFORMATION FURNISHED BY CLIENT

TOPOGRAPHIC SURVEY OF A PORTION OF ASH PONDS, SCHOLZ PLANT, SNEADS, FLORIDA, SECTION 12, T-3-N, R-07-W

PITTMAN, GLAZE AND ASSOCIATES, INC.
LAND SURVEYORS
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Phone (850) 434-6686 Fax (850) 434-6661
Email: pgasurvey@bellsouth.net

I hereby certify that this survey was made under my responsible charge and meets the Minimum Technical Standards as set forth by the Florida Board of Professional Surveyors & Mappers in Chapter 5J-17.050, 5J-17.051 and 5J-17.052, pursuant to Section 472.027 Florida Statutes.

David D. Glaze
☐ PSM #5605

Walter J. Glaze
■ PSM #6190

SHEET 1 OF 1

LB No. 7073

NOT VALID UNLESS IMPRINTED WITH EMBOSSED SEAL AND SIGN BY SURVEYOR

Scale 1" = 40'
File No. C-6849
Job No. 35298-12
Date of Plat 12-31-12
Date of Survey 12-20-12
FB 1471 PG 47-53
FB ___ PG ___
FB ___ PG ___
Drawn by PMJ

Appendix B

USEPA Checklists

Coal Combustion Dam Inspection Checklist Form

US Environmental
Protection Agency

Site Name: Gulf Power- Plant Scholz **Date:** August 22, 2012

Unit Name: Upper East Pond **Operator's Name:** Gulf Power

Unit I.D.: **Hazard Potential Classification:** High [✓ Significant] Low

Inspector's Name: William Fox/ Eduardo Gutierrez

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

	Yes	No		Yes	No
1. Frequency of Company's Dam Inspections?	Weekly		18. Sloughing or bulging on slopes?		X
2. Pool elevation (operator records)?	126.0		19. Major erosion or slope deterioration?		X
3. Decant inlet elevation (operator records)?	123.7		20. Decant Pipes:		
4. Open channel spillway elevation (operator records)?	DNA		Is water entering inlet, but not exiting outlet?		X
5. Lowest dam crest elevation (operator records)?	131.0		Is water exiting outlet, but not entering inlet?		X
6. If instrumentation is present, are readings recorded (operator records)?	DNA		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)?	DNA		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?	DNA		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?	DNA		Around the outside of the decant pipe?		X
15. Are spillway or ditch linings deteriorated?	DNA		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.

Inspection Issue # Comments

1. Weekly by plant personnel, annually by Southern Company Services.

2,3,5. Referenced to Mean Sea Level (MSL).

6. Instrumentation is not present.

12. Trashracks are not present.

17. Shallow scarps appear to have been repaired recently.

EPA FORM -XXXX

N/A = Not Available
DNA = Does Not Apply

U. S. Environmental Protection Agency

Coal Combustion Waste (CCW)
Impoundment Inspection

Impoundment NPDES Permit # 0002283 INSPECTOR William Fox and Eduardo Gutierrez

Date August 22, 2012

Impoundment Name Upper East Pond
Impoundment Company Gulf Power
EPA Region 4
State Agency (Field Office) Addresss 61 Forsyth Street, SW
Atlanta, Ga 30303-8960
Name of Impoundment Upper East Pond
(Report each impoundment on a separate form under the same Impoundment NPDES Permit number)

New X Update ______

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

IMPOUNDMENT FUNCTION: Receives process and plant water; storage and primary settling of coal combustion waste (ash)

Nearest Downstream Town : Name Bristol, Florida
Distance from the impoundment 17 miles
Impoundment
Location: Longitude 84 Degrees 53 Minutes 25.09W Seconds
Latitude 30 Degrees 40 Minutes 10.73N Seconds
State Florida County Jackson

Does a state agency regulate this impoundment? YES X NO ______

If So Which State Agency? Florida Department of Environmental Protection

HAZARD POTENTIAL (In the event the impoundment should fail, the following would occur):

______ **LESS THAN LOW HAZARD POTENTIAL:** Failure or misoperation of the dam results in no probable loss of human life or economic or environmental losses.

______ **LOW HAZARD POTENTIAL:** Dams assigned the low hazard potential classification are those where failure or misoperation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property.

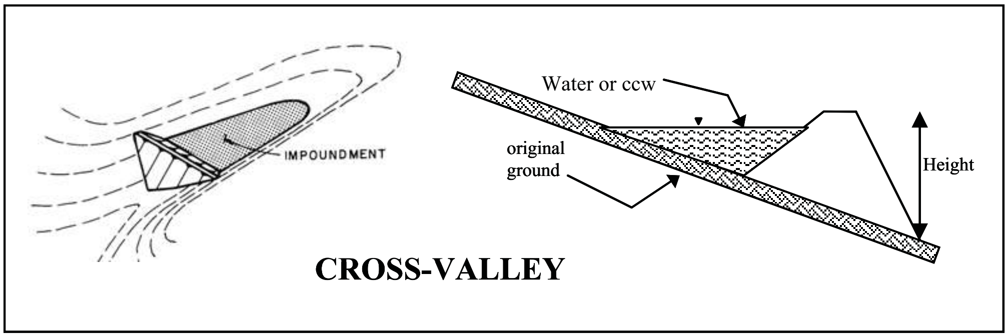
__X___ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure.

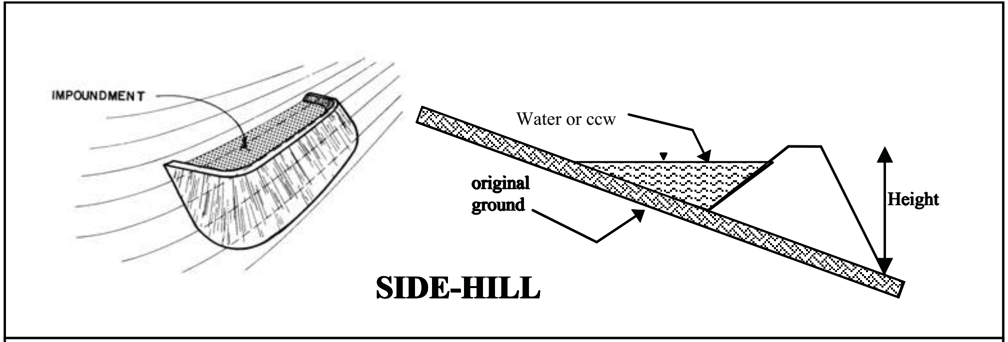
______ **HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

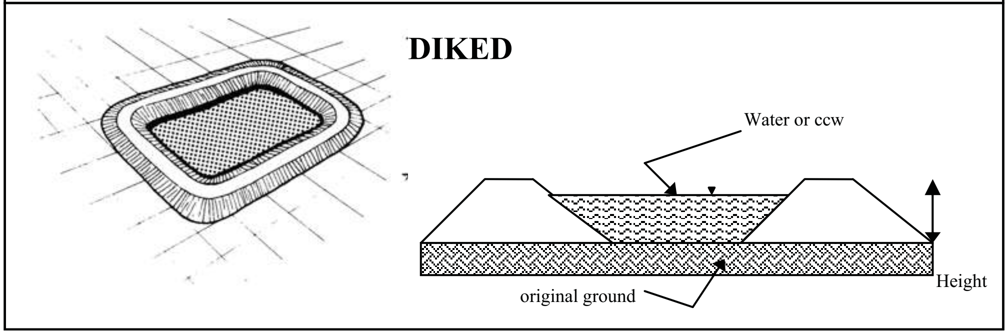
DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

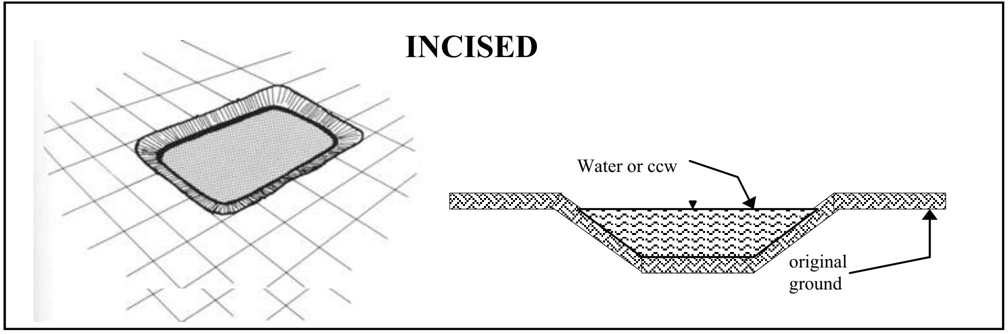
Failure or mis-operation could result in economic loss and damage to plant infrastructure, operations and utilities, and environmental damage to adjacent waterways and downstream areas. Loss of human life as a result of failure or mis-operation is not anticipated.

CONFIGURATION:









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

No

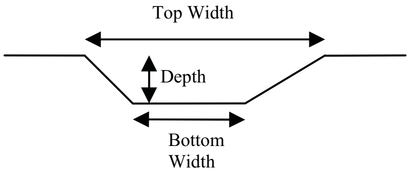
Embankment Height 35 feet
Embankment Material Ash/soil mix
Pool Area 2.5 acres
Liner No
Current Freeboard 5 feet
Liner Permeability Not Applicable

TYPE OF OUTLET (Mark all that apply)

______ **Open Channel Spillway**
______ Trapezoidal
______ Triangular
______ Rectangular
______ Irregular

______ depth
______ bottom (or average) width
______ top width

TRAPEZOIDAL



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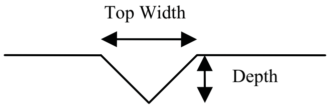
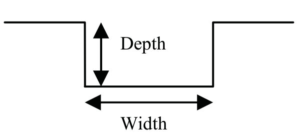
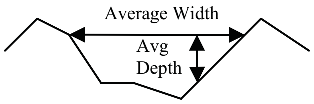


RECTANGULAR

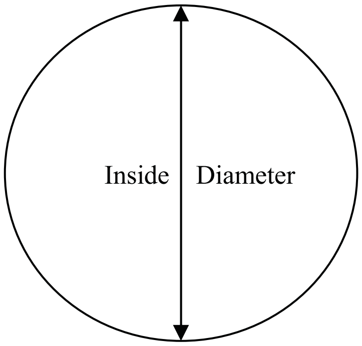


IRREGULAR



X **Outlet**

18" inside diameter



Material
______ corrugated metal
______ welded steel
______ concrete
X plastic ([✓ hdpe], pvc, etc.)
______ other (specify) ______________________

Is water flowing through the outlet? YES X NO ______

______ **No Outlet**

______ **Other Type of Outlet** (specify) ______________________

The Impoundment was designed by Southern Company Services

Has there ever been a failure at this site? YES ___________ NO ____x_____

If So When? ______________________________

If So Please Describe : ______________________________

Has there ever been significant seepages at this site? YES x NO

If So When? October 2, 2010

IF So Please Describe:

Piping was discovered by plant personnel during routine observations near the outboard toe of slope of the north dike. Effluent did not leave the plant property. Maintenance and repairs were made on the same day. Initial repairs consisted of placing and compacting available backfill soils. Final repairs consisted placing an inverted filter system consisting of sand overlain by #89 and #57 gradation stone.

Has there ever been any measures undertaken to monitor/lower Phreatic water table levels based on past seepages or breaches at this site? YES ________ NO __X__

If so, which method (e.g., piezometers, gw pumping,...)? ____________________

If so Please Describe : ____

ADDITIONAL INSPECTION QUESTIONS

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

It is unknown if the embankment construction was over wet ash, slag, or other unsuitable materials.

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

The assessor did not meet with, or have documentation from the design Engineer of Record concerning foundation preparation.

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

On October 2, 2010, during routine observations, an area of seepage was found near the toe of the Upper East Pond's north embankment. A disturbance in the surface water of the pond indicated the location of the seepage area. The plant personnel immediately utilized on-site equipment to place ash on the interior slope, which reportedly stopped the seepage. After visual inspection by Southern Company Services (SCS), the recommended final repair was to install a reverse filter consisting of sand overlain by #89 and #57 Stone in the area where the seepage emerged on the toe of the exterior slope. SCS performed subsequent seepage modeling to evaluate the benefits of adding a toe berm at the toe of slope of the north embankment. Based on the results of the analysis, SCS concluded that a toe berm would provide little or no benefit and that the cost of such remedial work was unnecessary.

Coal Combustion Dam Inspection Checklist Form

US Environmental
Protection Agency

Site Name: Gulf Power- Plant Scholz **Date:** August 22, 2012

Unit Name: Upper Middle Pond **Operator's Name:** Gulf Power

Unit I.D.: **Hazard Potential Classification:** High [✓ Significant] Low

Inspector's Name: William Fox/ Eduardo Gutierrez

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

	Yes	No		Yes	No
1. Frequency of Company's Dam Inspections?	Weekly		18. Sloughing or bulging on slopes?		X
2. Pool elevation (operator records)?	123.0		19. Major erosion or slope deterioration?		X
3. Decant inlet elevation (operator records)?	122.7		20. Decant Pipes:		
4. Open channel spillway elevation (operator records)?	DNA		Is water entering inlet, but not exiting outlet?		X
5. Lowest dam crest elevation (operator records)?	128.0		Is water exiting outlet, but not entering inlet?		X
6. If instrumentation is present, are readings recorded (operator records)?	DNA		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)?	DNA		From underdrain?		DNA
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?	DNA		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?	DNA		Around the outside of the decant pipe?		X
15. Are spillway or ditch linings deteriorated?	DNA		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.

Inspection Issue # Comments

1. Weekly by plant personnel, annually by Southern Company Services.

2,3,5. Referenced to Mean Sea Level (MSL).

6. Instrumentation is not present.

12. Trashracks are not present.

17. Several shallow scarps on interior slopes; Frequency of one every @50 feet.

23. Upper East Pond at east embankment downstream side and Upper West Pond at west embankment downstream side.

N/A = Not Available
DNA = Does Not Apply

U. S. Environmental Protection Agency

Coal Combustion Waste (CCW)
Impoundment Inspection

Impoundment NPDES Permit # 0002283 INSPECTOR William Fox and Eduardo Gutierrez

Date August 22, 2012

Impoundment Name Upper Middle Pond
Impoundment Company Gulf Power
EPA Region 4
State Agency (Field Office) Addresss 61 Forsyth Street, SW
Atlanta, Ga 30303-8960
Name of Impoundment Upper Middle Pond
(Report each impoundment on a separate form under the same Impoundment NPDES Permit number)

New X Update ______

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

IMPOUNDMENT FUNCTION: Receives process water from Upper East Pond; storage and secondary settling of coal combustion waste (ash)

Nearest Downstream Town : Name Bristol, Florida
Distance from the impoundment 17 miles
Impoundment
Location: Longitude 84 Degrees 53 Minutes 26.94W Seconds
Latitude 30 Degrees 40 Minutes 8.99N Seconds
State Florida County Jackson

Does a state agency regulate this impoundment? YES X NO ______

If So Which State Agency? Florida Department of Environmental Protection

HAZARD POTENTIAL (In the event the impoundment should fail, the following would occur):

______ **LESS THAN LOW HAZARD POTENTIAL:** Failure or misoperation of the dam results in no probable loss of human life or economic or environmental losses.

______ **LOW HAZARD POTENTIAL:** Dams assigned the low hazard potential classification are those where failure or misoperation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property.

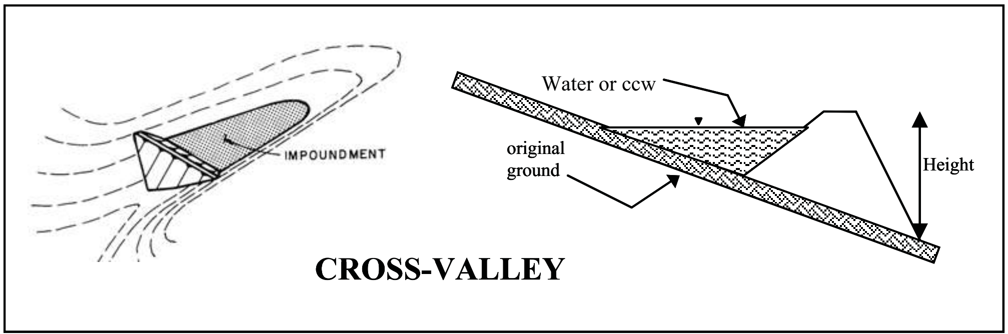
__X__ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure.

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

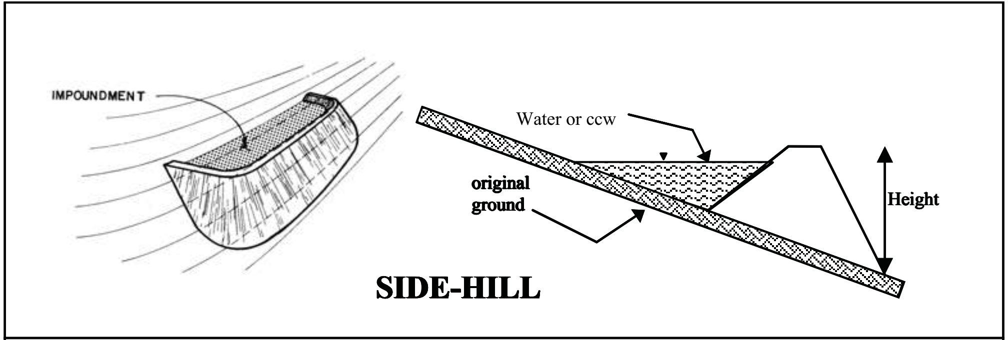
DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

Failure or mis-operation could result in economic loss and damage to plant infrastructure, operations and utilities. Loss of human life as a result of failure or mis-operation is not anticipated.

CONFIGURATION:

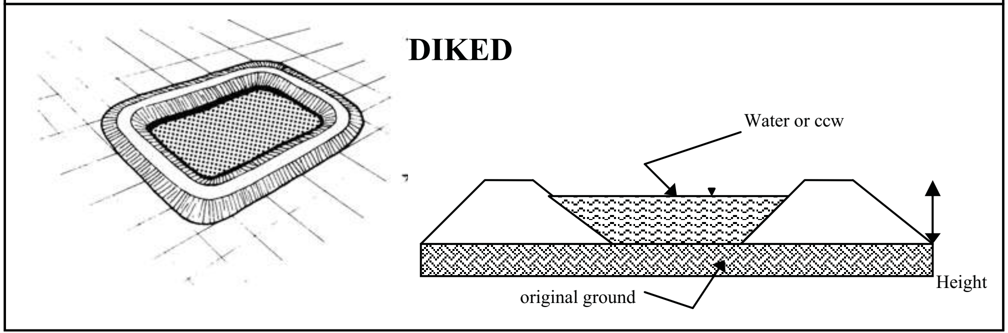


CROSS-VALLEY

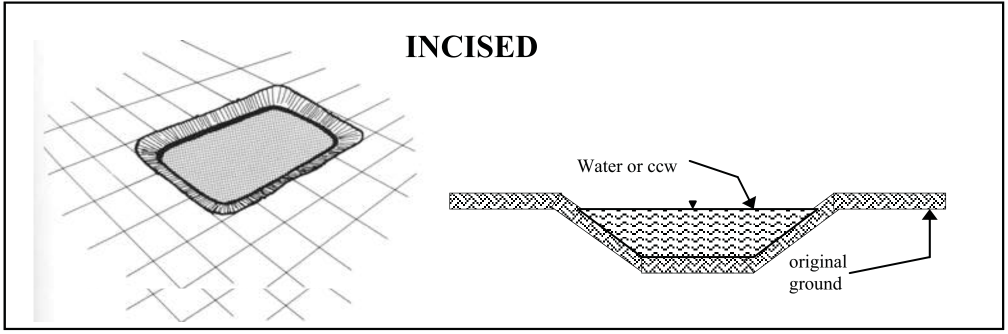


SIDE-HILL

DIKED



INCISED



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

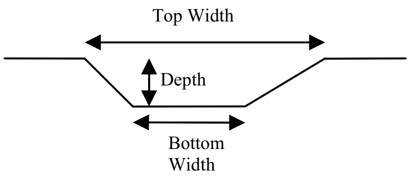
Embankment Height 8 feet Embankment Material Ash/soil mix
Pool Area 3.5 acres Liner No
Current Freeboard 5 feet Liner Permeability Not Applicable

TYPE OF OUTLET (Mark all that apply)

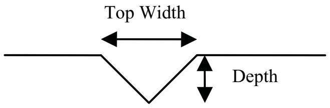
______ **Open Channel Spillway**
______ Trapezoidal
______ Triangular
______ Rectangular
______ Irregular

______ depth
______ bottom (or average) width
______ top width

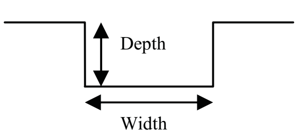
TRAPEZOIDAL



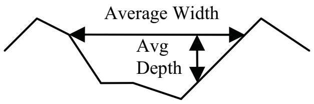
TRIANGULAR



RECTANGULAR

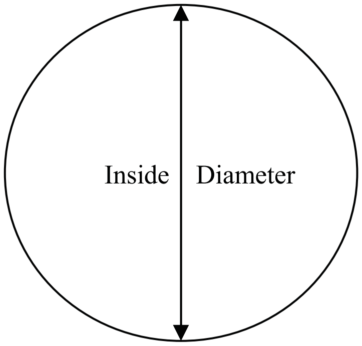


IRREGULAR



__X__ **Outlet**

__18"__ inside diameter



Material
______ corrugated metal
______ welded steel
______ concrete
__X__ plastic ([✓ hdpe], pvc, etc.)
______ other (specify) ______________________

Is water flowing through the outlet? YES __X__ NO _______

______ **No Outlet**

______ **Other Type of Outlet** (specify) ________________________________

The Impoundment was Designed By __Southern Company Services__
____

Has there ever been a failure at this site? YES ___________ NO ___x___

If So When? ______________________________

If So Please Describe : ______________________________

Has there ever been significant seepages at this site? YES _______ NO ___X___

If So When? ______________________________

IF So Please Describe: ______________________________

Has there ever been any measures undertaken to monitor/lower Phreatic water table levels based on past seepages or breaches at this site? YES ________ NO __X__

If so, which method (e.g., piezometers, gw pumping,...)? ____________________

If so Please Describe : ____________________

ADDITIONAL INSPECTION QUESTIONS

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

It is unknown if the embankment construction was over wet ash, slag, or other unsuitable materials.

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

The assessor did not meet with, or have documentation from the design Engineer of Record concerning foundation preparation.

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

There was no indication of prior releases, failures or patchwork on the embankments.

Coal Combustion Dam Inspection Checklist Form

US Environmental
Protection Agency

Site Name: Gulf Power- Plant Scholz **Date:** August 22, 2012

Unit Name: Upper West Pond **Operator's Name:** Gulf Power

Unit I.D.: **Hazard Potential Classification:** High [✓ Significant] Low

Inspector's Name: William Fox/ Eduardo Gutierrez

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

	Yes	No		Yes	No
1. Frequency of Company's Dam Inspections?	Weekly		18. Sloughing or bulging on slopes?		X
2. Pool elevation (operator records)?	120.5		19. Major erosion or slope deterioration?		X
3. Decant inlet elevation (operator records)?	120.5		20. Decant Pipes:		
4. Open channel spillway elevation (operator records)?	DNA		Is water entering inlet, but not exiting outlet?		X
5. Lowest dam crest elevation (operator records)?	123.0		Is water exiting outlet, but not entering inlet?		X
6. If instrumentation is present, are readings recorded (operator records)?	DNA		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)?	DNA		From underdrain?		DNA
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?	DNA		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?	DNA		Around the outside of the decant pipe?		X
15. Are spillway or ditch linings deteriorated?	DNA		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.

Inspection Issue #	Comments

1. Weekly by plant personnel, annually by Southern Company Services.

2,3,5. Referenced to Mean Sea Level (MSL).

6. Instrumentation is not present.

12. Trashracks are not present.

17. Several shallow scarps on interior slopes; Frequency of one every @50 feet.

21. Ponded water on certain areas at toe of slope due to rain on previous days.

23. Upper Middle Pond at east embankment downstream side and Middle Pond at south embankment downstream toe.

N/A = Not Available
DNA = Does Not Apply

U. S. Environmental Protection Agency

Coal Combustion Waste (CCW)
Impoundment Inspection

Impoundment NPDES Permit # 0002283

INSPECTOR William Fox and Eduardo Gutierrez

Date August 22, 2012

Impoundment Name Upper West Pond
Impoundment Company Gulf Power
EPA Region 4
State Agency (Field Office) Addresss 61 Forsyth Street, SW
Atlanta, Ga 30303-8960
Name of Impoundment Upper West Pond
(Report each impoundment on a separate form under the same Impoundment NPDES Permit number)

New X Update ______

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

IMPOUNDMENT FUNCTION: Receives process water from Upper Middle Pond; storage and tertiary settling of coal combustion waste (ash)

Nearest Downstream Town : Name Bristol, Florida
Distance from the impoundment 17 miles
Impoundment
Location: Longitude 84 Degrees 53 Minutes 30.16W Seconds
Latitude 30 Degrees 40 Minutes 10.35N Seconds
State Florida County Jackson

Does a state agency regulate this impoundment? YES X NO ______

If So Which State Agency? Florida Department of Environmental Protection

<u>HAZARD POTENTIAL</u> (In the event the impoundment should fail, the following would occur):

______ **LESS THAN LOW HAZARD POTENTIAL:** Failure or misoperation of the dam results in no probable loss of human life or economic or environmental losses.

______ **LOW HAZARD POTENTIAL:** Dams assigned the low hazard potential classification are those where failure or misoperation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property.

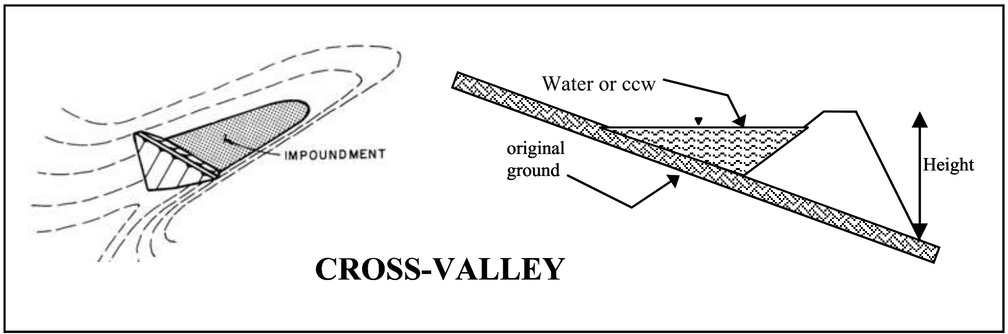
__X___ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure.

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

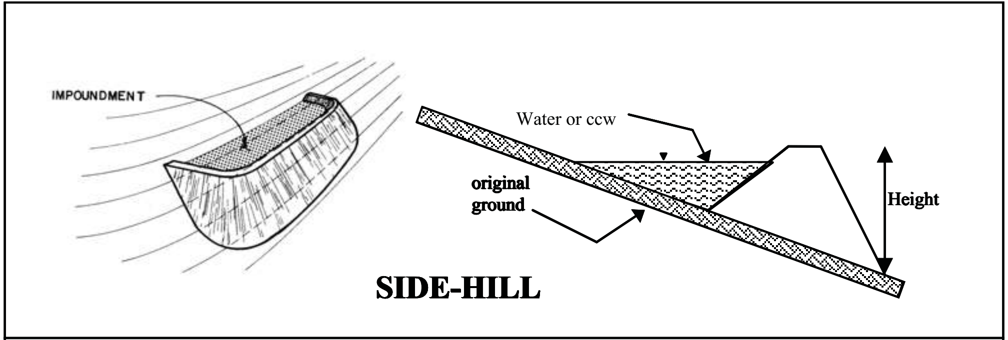
DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

Failure or mis-operation could result in economic loss and damage to plant infrastructure, operations and utilities, and environmental damage to downstream areas. Loss of human life as a result of failure or mis-operation is not anticipated.

CONFIGURATION:

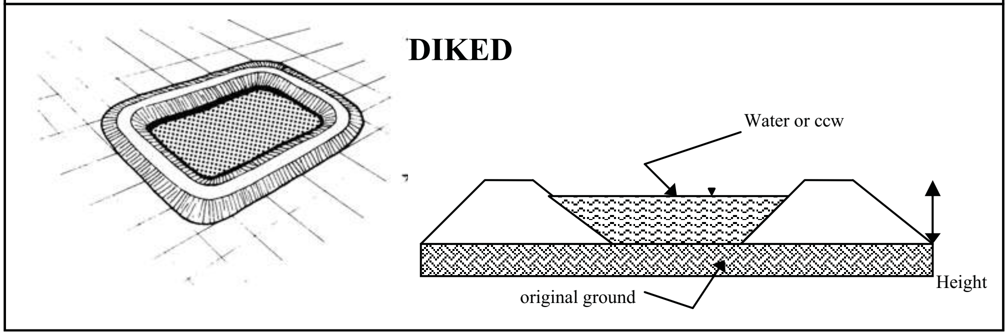


CROSS-VALLEY

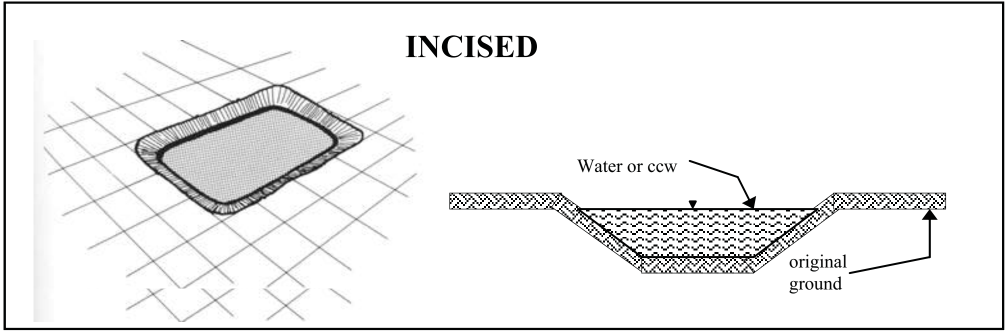


SIDE-HILL

DIKED



INCISED



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

Embankment Height 8 feet

Embankment Material Ash/soil mix

Pool Area 4.5 acres

Liner No

Current Freeboard 2-1/2 feet

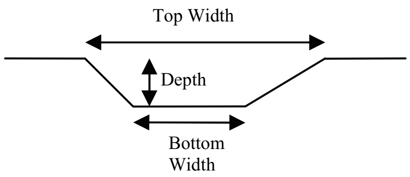
Liner Permeability Not Applicable

TYPE OF OUTLET (Mark all that apply)

_____ **Open Channel Spillway**
_____ Trapezoidal
_____ Triangular
_____ Rectangular
_____ Irregular

_____ depth
_____ bottom (or average) width
_____ top width

TRAPEZOIDAL



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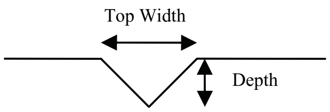

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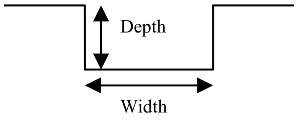
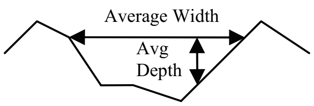
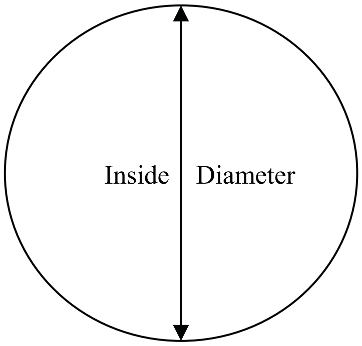


IRREGULAR



X **Outlet**

18" inside diameter



Material
_____ corrugated metal
_____ welded steel
_____ concrete
X plastic ([✓ hdpe], pvc, etc.)
_____ other (specify) ______________________

Is water flowing through the outlet? YES X NO _______

_____ **No Outlet**

_____ **Other Type of Outlet** (specify) ________________________________

The Impoundment was designed By Southern Company Services
____

Has there ever been a failure at this site? YES __________ NO ____x____

If So When? ____________________________

If So Please Describe : ____

Has there ever been significant seepages at this site? YES ________ NO __X__

If So When? ______________________________

IF So Please Describe: ______________________________

Has there ever been any measures undertaken to monitor/lower Phreatic water table levels based on past seepages or breaches at this site? YES ________ NO __X__

If so, which method (e.g., piezometers, gw pumping,...)? ____________________

If so Please Describe : ____

ADDITIONAL INSPECTION QUESTIONS

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

It is unknown if the embankment construction was over wet ash, slag, or other unsuitable materials.

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

The assessor did not meet with, or have documentation from the design Engineer of Record concerning foundation preparation.

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

There was no indication of prior releases, failures or patchwork on the embankments.

Coal Combustion Dam Inspection Checklist Form

US Environmental
Protection Agency

Site Name: Gulf Power- Plant Scholz
Date: August 22, 2012
Unit Name: Middle Pond
Operator's Name: Gulf Power
Unit I.D.:
Hazard Potential Classification: High [✓ Significant] Low
Inspector's Name: William Fox/ Eduardo Gutierrez

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

	Yes	No		Yes	No
1. Frequency of Company's Dam Inspections?	Weekly		18. Sloughing or bulging on slopes?		X
2. Pool elevation (operator records)?	110.0		19. Major erosion or slope deterioration?		X
3. Decant inlet elevation (operator records)?	109.7		20. Decant Pipes:		
4. Open channel spillway elevation (operator records)?	DNA		Is water entering inlet, but not exiting outlet?		X
5. Lowest dam crest elevation (operator records)?	112.0		Is water exiting outlet, but not entering inlet?		X
6. If instrumentation is present, are readings recorded (operator records)?	DNA		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)?	DNA		From underdrain?		DNA
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?	DNA		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?	DNA		Around the outside of the decant pipe?		X
15. Are spillway or ditch linings deteriorated?	DNA		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.

Inspection Issue # Comments

1. Weekly by plant personnel, annually by Southern Company Services.

2,3,5. Referenced to Mean Sea Level (MSL).

6. Instrumentation is not present.

12. Trashracks are not present.

23. Lower Pond at south embankment downstream toe.

EPA FORM -XXXX

N/A = Not Available
DNA = Does Not Apply

U. S. Environmental Protection Agency

Coal Combustion Waste (CCW)
Impoundment Inspection

Impoundment NPDES Permit # 0002283

INSPECTOR William Fox and Eduardo Gutierrez

Date August 22, 2012

Impoundment Name Middle Pond
Impoundment Company Gulf Power
EPA Region 4
State Agency (Field Office) Addresss 61 Forsyth Street, SW
Atlanta, Ga 30303-8960
Name of Impoundment Middle Pond
(Report each impoundment on a separate form under the same Impoundment NPDES Permit number)

New X Update ______

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

IMPOUNDMENT FUNCTION: Receives process water from Upper West Pond; storage and additional settling of coal combustion waste (ash)

Nearest Downstream Town : Name Bristol, Florida
Distance from the impoundment 17 miles
Impoundment
Location: Longitude 84 Degrees 53 Minutes 32.43W Seconds
Latitude 30 Degrees 40 Minutes 2.79N Seconds
State Florida County Jackson

Does a state agency regulate this impoundment? YES X NO ______

If So Which State Agency? Florida Department of Environmental Protection

HAZARD POTENTIAL (In the event the impoundment should fail, the following would occur):

______ **LESS THAN LOW HAZARD POTENTIAL:** Failure or misoperation of the dam results in no probable loss of human life or economic or environmental losses.

______ **LOW HAZARD POTENTIAL:** Dams assigned the low hazard potential classification are those where failure or misoperation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property.

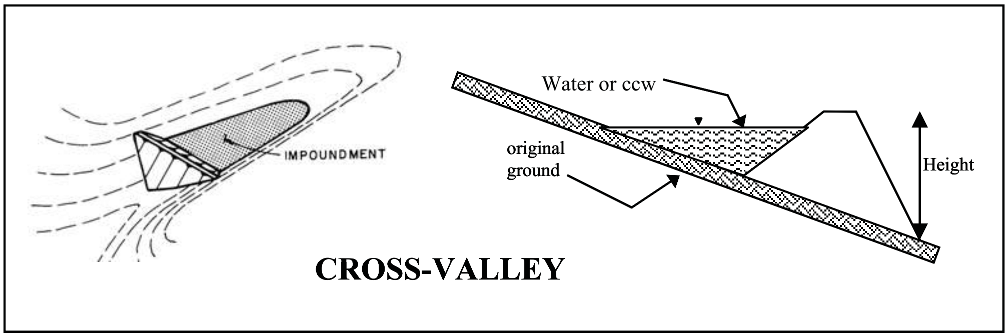
__X___ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure.

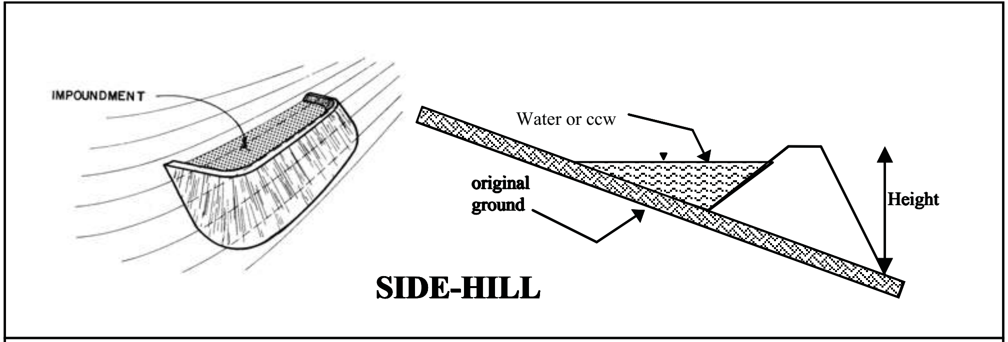
______ **HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

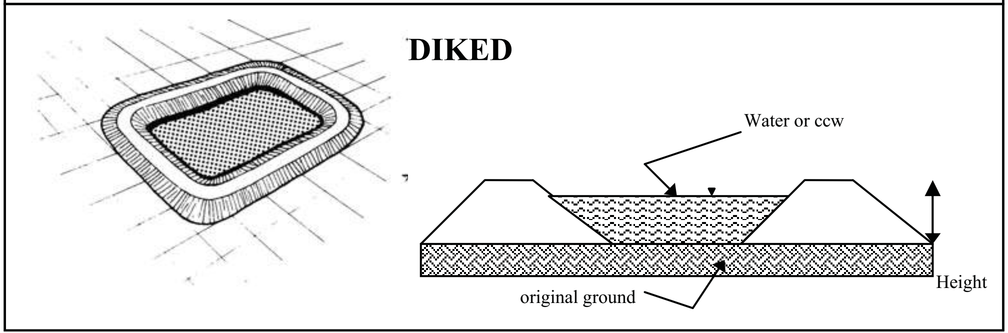
DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

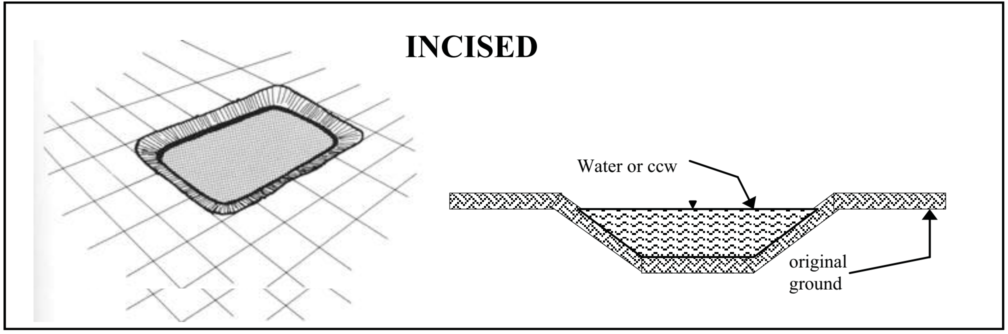
Failure or mis-operation could result in economic loss and damage to plant infrastructure, operations and utilities, and environmental damage to downstream areas. Loss of human life as a result of failure or mis-operation is not anticipated.

CONFIGURATION:









______ Cross-Valley
______ Side-Hill
______ Diked
______ Incised (form completion optional)
__X__ Combination Incised/Diked

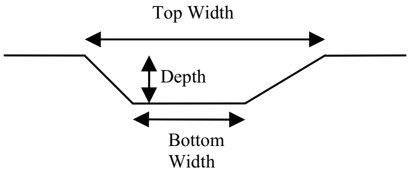
Embankment Height 13 feet
Embankment Material Ash/soil mix
Pool Area 6.3 acres
Liner Not Applicable
Current Freeboard 2 feet
Liner Permeability No

TYPE OF OUTLET (Mark all that apply)

______ **Open Channel Spillway**
______ Trapezoidal
______ Triangular
______ Rectangular
______ Irregular

______ depth
______ bottom (or average) width
______ top width

TRAPEZOIDAL



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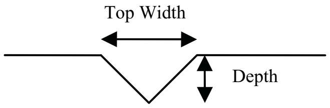
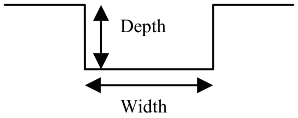
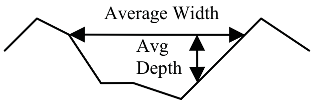


RECTANGULAR

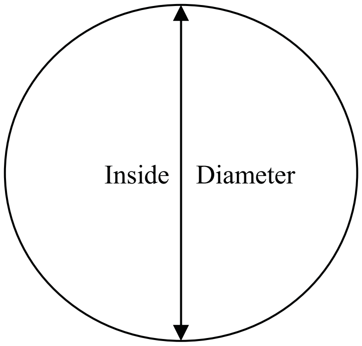


IRREGULAR



X **Outlet**

18" inside diameter



Material
______ corrugated metal
______ welded steel
______ concrete
X plastic ([✓ hdpe], pvc, etc.)
______ other (specify) ______________________

Is water flowing through the outlet? YES x NO ______

______ **No Outlet**

______ **Other Type of Outlet** (specify) ________________________________

The Impoundment was designed By Southern Company Services

Has there ever been a failure at this site? YES ___________ NO ______x______

If So When? ______________________________

If So Please Describe : ____

Has there ever been significant seepages at this site? YES ________ NO ___x___

If So When? ______________________________

IF So Please Describe: ____

Has there ever been any measures undertaken to monitor/lower Phreatic water table levels based on past seepages or breaches at this site? YES ________ NO __X__

If so, which method (e.g., piezometers, gw pumping,...)? ____________________

If so Please Describe : ____________________

ADDITIONAL INSPECTION QUESTIONS

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

It is unknown if the embankment construction was over wet ash, slag, or other unsuitable materials.

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

The assessor did not meet with, or have documentation from the design Engineer of Record concerning foundation preparation.

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

There was no indication of prior releases, failures or patchwork on the embankments.

Coal Combustion Dam Inspection Checklist Form

US Environmental
Protection Agency

Site Name: Gulf Power- Plant Scholz **Date:** August 22, 2012

Unit Name: Lower Pond **Operator's Name:** Gulf Power

Unit I.D.: **Hazard Potential Classification:** High [✓ Significant] Low

Inspector's Name: William Fox/ Eduardo Gutierrez

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

	Yes	No		Yes	No
1. Frequency of Company's Dam Inspections?	Weekly		18. Sloughing or bulging on slopes?	X	
2. Pool elevation (operator records)?	97.6		19. Major erosion or slope deterioration?	X	
3. Decant inlet elevation (operator records)?	97.6		20. Decant Pipes:		
4. Open channel spillway elevation (operator records)?	DNA		Is water entering inlet, but not exiting outlet?		X
5. Lowest dam crest elevation (operator records)?	104.0		Is water exiting outlet, but not entering inlet?		X
6. If instrumentation is present, are readings recorded (operator records)?	DNA		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)?	DNA		From underdrain?		DNA
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?	DNA		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?	DNA		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.

Inspection Issue # Comments

1. Weekly by plant personnel, annually by Southern Company Services.

2,3,5. Referenced to Mean Sea Level (MSL).

6. Instrumentation is not present.

9. Trees up to 24 inches in diameter.

12. Trashracks are not present.

17,18,19. Several scarps, areas of sloughing, and eroded areas were observed along the south outboard slopes.

EPA FORM -XXXX

N/A = Not Available
DNA = Does Not Apply

U. S. Environmental Protection Agency

Coal Combustion Waste (CCW)
Impoundment Inspection

Impoundment NPDES Permit # 0002283

INSPECTOR William Fox and Eduardo Gutierrez

Date August 22, 2012

Impoundment Name Lower Pond
Impoundment Company Gulf Power
EPA Region 4
State Agency (Field Office) Addresss 61 Forsyth Street, SW
Atlanta, Ga 30303-8960
Name of Impoundment Lower Pond
(Report each impoundment on a separate form under the same Impoundment NPDES Permit number)

New X Update ______

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

IMPOUNDMENT FUNCTION: Receives process water from Middle Pond; storage and additional settling of coal combustion waste (ash)

Nearest Downstream Town : Name Bristol, Florida
Distance from the impoundment 17 miles
Impoundment
Location: Longitude 84 Degrees 53 Minutes 22.59W Seconds
Latitude 30 Degrees 40 Minutes 0.45N Seconds
State Florida County Jackson

Does a state agency regulate this impoundment? YES X NO ______

If So Which State Agency? Florida Department of Environmental Protection

HAZARD POTENTIAL (In the event the impoundment should fail, the following would occur):

______ **LESS THAN LOW HAZARD POTENTIAL:** Failure or misoperation of the dam results in no probable loss of human life or economic or environmental losses.

______ **LOW HAZARD POTENTIAL:** Dams assigned the low hazard potential classification are those where failure or misoperation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property.

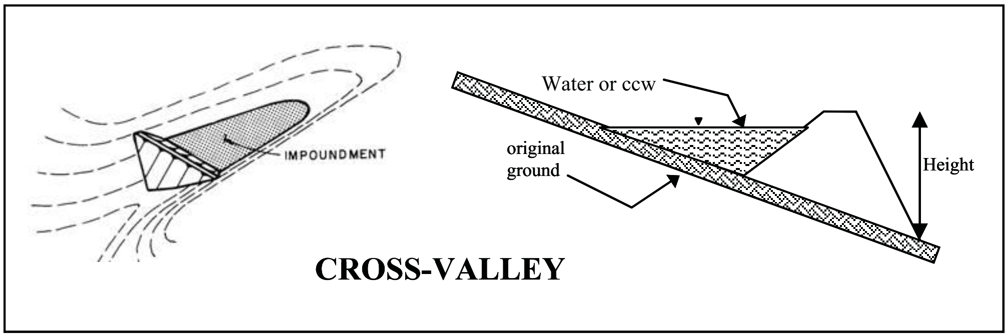
__X___ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure.

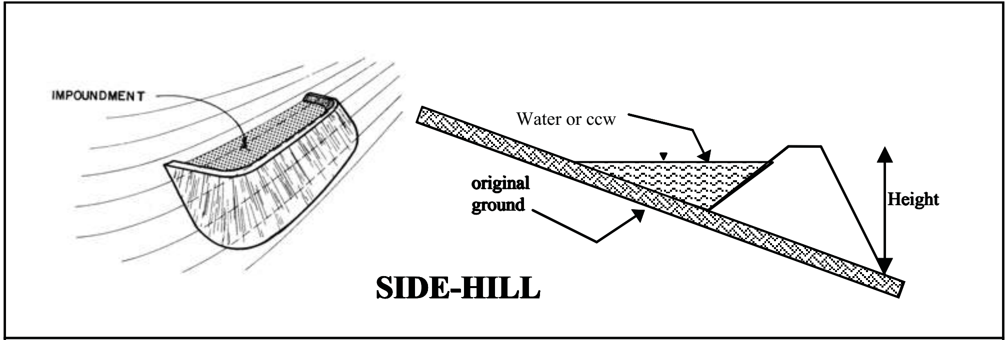
______ **HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

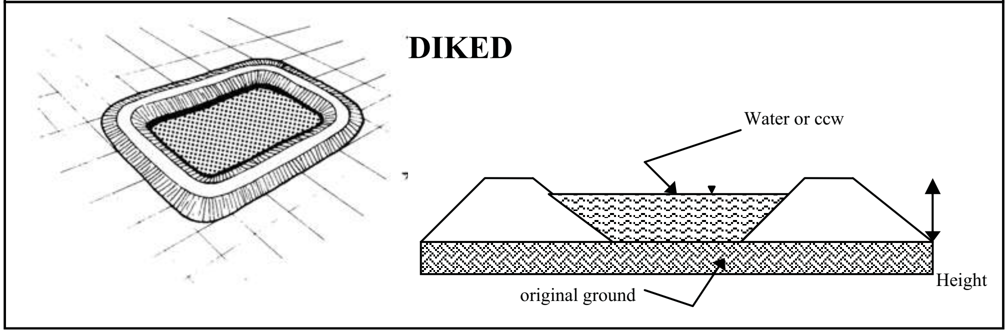
DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

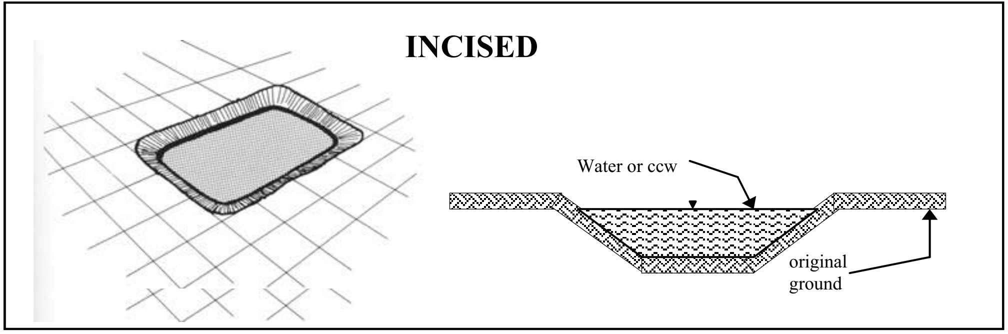
Failure or mis-operation could result in economic loss and damage to plant infrastructure, operations and utilities, and environmental damage to adjacent waterways and downstream areas. Loss of human life as a result of failure or mis-operation is not anticipated.

CONFIGURATION:









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

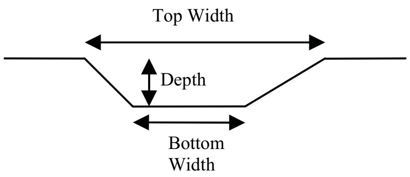
Embankment Height 30 feet
Embankment Material Ash/soil mix
Pool Area 11.4 acres
Liner Not
Current Freeboard 6-1/2 feet
Liner Permeability Not Applicable

TYPE OF OUTLET (Mark all that apply)

______ **Open Channel Spillway**
______ Trapezoidal
______ Triangular
______ Rectangular
______ Irregular

______ depth
______ bottom (or average) width
______ top width

TRAPEZOIDAL



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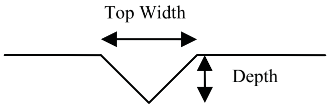

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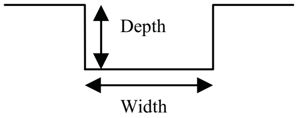
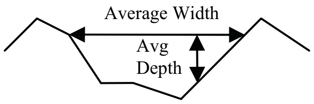
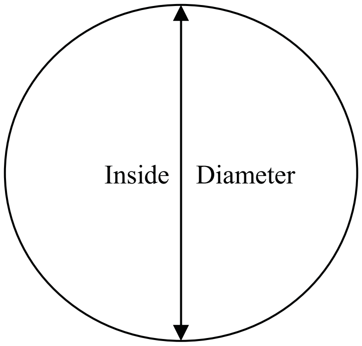


IRREGULAR



X **Outlet** (vertical riser pipe)

24" inside diameter



Material
______ corrugated metal
______ welded steel
______ concrete
______ plastic (hdpe, pvc, etc.)
X other (specify) steel

Is water flowing through the outlet? YES X NO ______

______ **No Outlet**

______ **Other Type of Outlet** (specify) ______

The Impoundment was Designed By Southern Company Services

Has there ever been a failure at this site? YES __________ NO ____x____

If So When? ____________________________

If So Please Describe : ____

Has there ever been significant seepages at this site? YES _______ NO ___X___

If So When? ______________________________

IF So Please Describe: ____

Has there ever been any measures undertaken to monitor/lower Phreatic water table levels based on past seepages or breaches at this site? YES ________ NO __X__

If so, which method (e.g., piezometers, gw pumping,...)? ____________________

If so Please Describe : ____________________

ADDITIONAL INSPECTION QUESTIONS

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

It is unknown if the embankment construction was over wet ash, slag, or other unsuitable materials.

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

The assessor did not meet with, or have documentation from the design Engineer of Record concerning foundation preparation.

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

There was no indication of prior releases, failures or patchwork on the embankments.

Appendix C
Photographs GPS Locations

Site: Gulf Power - Plant Scholz
Datum: NAD83
Coordinate Units: Decimal Degrees

Photograph No.	Latitude	Longitude
1	30.667294	-84.887785
2	30.667193	-84.887926
3	30.666788	-84.888340
4	30.666476	-84.888677
5	30.666368	-84.888763
6	30.666202	-84.889134
7	30.666466	-84.888796
8	30.666143	-84.889201
9	30.666063	-84.889299
10	30.665990	-84.889382
11 - 15	30.665702	-84.889070
16	30.665812	-84.888826
17	30.666059	-84.888459
18	30.666157	-84.888335
19	30.665718	-84.889669
20	30.665811	-84.889612
21	30.665657	-84.889903
22	30.665777	-84.889912
23	30.665711	-84.890328
24	30.665838	-84.891014
25	30.665901	-84.891100
26	30.666287	-84.891445
27	30.666347	-84.891559
28	30.666413	-84.891485
29	30.666719	-84.890789
30	30.667423	-84.889823
31	30.667505	-84.889893
32	30.667503	-84.889699
33	30.667664	-84.889686
34	30.667710	-84.889537
35	30.667583	-84.889592
36	30.667829	-84.889654
37	30.667933	-84.889731
38	30.667864	-84.889872
39	30.667878	-84.890099
40	30.667927	-84.889988
41	30.667755	-84.890410
42	30.667821	-84.890299
43	30.668194	-84.889930
44	30.668133	-84.890012
45	30.668517	-84.889419
46	30.668996	-84.889666
47	30.669125	-84.889734
48	30.669095	-84.889588
49	30.669390	-84.889673
50	30.669479	-84.889687
51	30.669670	-84.889856
52	30.670779	-84.890123
53	30.670950	-84.890432

Appendix C
Photographs GPS Locations

Site: Gulf Power - Plant Scholz
Datum: NAD83
Coordinate Units: Decimal Degrees

Photograph No.	Latitude	Longitude
54	30.670790	-84.890322
55	30.670907	-84.890336
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57	30.670181	-84.890239
58	30.670274	-84.890283
59	30.669474	-84.889957
60	30.669394	-84.889922
61	30.671167	-84.890494
62	30.671167	-84.890494
63	30.671119	-84.890797
64	30.671141	-84.890700
65	30.670985	-84.890951
66	30.670959	-84.891067
67	30.670917	-84.891155
68	30.670762	-84.891569
69	30.669328	-84.892616
70	30.669723	-84.892283
71	30.669893	-84.892277
72	30.669838	-84.892188
73	30.669621	-84.892222
74	30.669063	-84.892461
75	30.668946	-84.892609
76	30.669044	-84.892585
77	30.668949	-84.892495
78	30.668720	-84.892239
79	30.668643	-84.892207
80	30.668435	-84.891501
81	30.668372	-84.891407
82	30.668242	-84.891195
83	30.668413	-84.891320
84	30.668367	-84.891255
85	30.668566	-84.891318
86	30.668492	-84.891191
87	30.668614	-84.891155
88	30.669283	-84.891102
89	30.670326	-84.891330
90	30.670503	-84.891364
91	30.670524	-84.891507
92	30.670647	-84.891425
93	30.670534	-84.890820
94	30.670549	-84.890902
95	30.670267	-84.890721
96	30.670255	-84.890850
97	30.669388	-84.890581
98	30.669544	-84.890624
99	30.669461	-84.890491
100	30.669547	-84.890512
101	30.669458	-84.890676
102	30.668766	-84.890435

Appendix C
Photographs GPS Locations

Site: Gulf Power - Plant Scholz
Datum: NAD83
Coordinate Units: Decimal Degrees

Photograph No.	Latitude	Longitude
103	30.668686	-84.890332
104	30.668244	-84.890329
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106	30.668244	-84.890211
107	30.667953	-84.890557
108	30.667925	-84.890443
109	30.666825	-84.890850
110	30.667058	-84.890421
111	30.667128	-84.890320
112	30.666877	-84.890718
113	30.666616	-84.891956
114	30.666480	-84.891709
115	30.667009	-84.892466
116	30.666959	-84.892520
117	30.667116	-84.892616
118	30.667393	-84.892646
119	30.668148	-84.892650
120	30.668224	-84.892669
121	30.668205	-84.893001
122	30.667897	-84.888167
123	30.667856	-84.888056
124	30.667892	-84.888543
125	30.667917	-84.888904
126	30.667919	-84.889102
127	30.667927	-84.889222

EPA Assessment Gulf Power - Scholz Plant Photos August 22, 2012

Photo 1: Lower Pond – Southeast embankment exterior slope, looking southwest. Note trees and dense vegetation.

Photo 2: Lower Pond – Southeast embankment interior slope, looking southwest.

Photo 3: Lower Pond – Southeast embankment exterior slope, looking south-west. Note erosion of crest and trees/dense vegetation on exterior slope.

Photo 4: Lower Pond – Southeast embankment exterior slope, looking east. Note steepness, eroded areas along crest, trees, and dense vegetation.

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Photo 5: Lower Pond – Southeast embankment exterior slope, looking southwest. Note steepness, eroded areas along crest, trees, and dense vegetation.

Photo 6: Lower Pond – Southeast embankment interior slope, looking northeast.

Photo 7: Lower Pond – Southeast embankment interior slope, 5-foot long by 1-foot wide by 16-inches deep scarp, looking southeast.

Photo 8: Lower Pond – Southeast embankment exterior slope, chemical storage system looking west.

Photo 9: Lower Pond – Southeast embankment interior slope, Morning glory-type drop inlet structure. Pipe is metal, 24-inches in diameter with a trash rack.

Photo 10: Lower Pond – Southeast embankment interior slope, Morning glory-type drop inlet structure. Pipe is metal, 24-inches in diameter with a trash rack.

Photo 11: Lower Pond – Outside southeast embankment exterior slope, outlet structure looking northeast. Outflow to lined ditch is through V-notch weir.

Photo 12: Lower Pond – Outside southeast embankment exterior slope, outlet structure looking northwest. Outlet from pond is via 27-inch diameter Reinforced Concrete Pipe (RCP).

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Photo 13: Lower Pond – Outside south embankment exterior slope, outlet structure located at toe of exterior slope, looking southwest.

Photo 14: Lower Pond – Outside south embankment exterior slope, outlet structure with discharge from pond area flowing through lined ditch.

Photo 15: Lower Pond – Outside Southeast embankment exterior slope, general view of outlet structure and flow-meter, looking southeast.

Photo 16: Lower Pond – Southeast embankment exterior slope, looking north From toe. Note steepness, trees, and dense vegetation.

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Photo 17: Lower Pond – Southeast embankment exterior slope, looking north from toe. Note scarps, steepness, trees, and dense vegetation.

Photo 18: Lower Pond – Outside southeast embankment exterior slope Fabri-Form installation discharge channel located in wooded area beyond toe of exterior slope looking east.

Photo 19: Lower Pond – Southeast embankment exterior slope, looking southwest. Note trees, dense vegetation, and erosion along crest.

Photo 20: Lower Pond – Southeast embankment interior slope, looking north.

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Photo 21: Lower Pond – South embankment exterior slope, Miscellaneous trash and debris.

Photo 22: Lower Pond – South embankment interior slope, looking west.

Photo 23: Lower Pond – South embankment exterior slope, Miscellaneous trash and debris looking west.

Photo 24: Lower Pond – Southwest embankment exterior slope, groundwater monitoring wells looking west.

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Photo 25: Lower Pond – Southwest embankment toe of exterior slope, Area of standing/ponded water looking west.

Photo 26: Lower Pond – Southwest embankment interior slope, looking southeast.

Photo 27: Lower Pond – Southwest embankment exterior slope looking southeast.

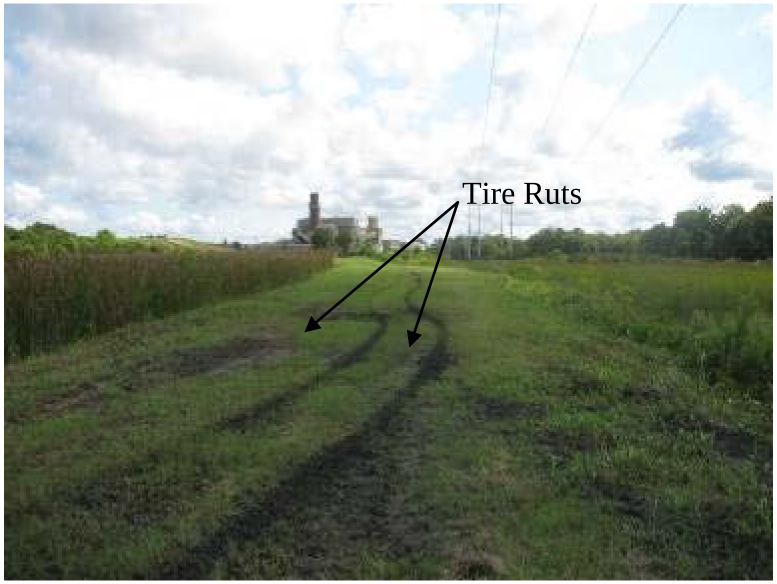

Photo 28: Lower and Middle pond – General view of crest of divider embankment looking northeast. Note tire ruts.

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Photo 29: Lower pond – Divider embankment interior slope looking northeast.

Photo 30: Lower pond – Divider embankment interior slope looking south.

Photo 31: Middle pond – Divider embankment interior slope looking southwest. Note erosion rills on slope.

Photo 32: Lower pond – Divider embankment interior slope, general view of pond surface looking south. Note the vegetation (cattails).

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Photo 33: Middle Pond – Divider embankment interior slope, Morning glory-type drop inlet structure looking northwest. Pipe is 18-inch diameter metal.

Photo 34: Lower Pond – Divider embankment interior slope looking south. Note scarp.

Photo 35: Lower Pond – Divider embankment interior slope looking south.

Photo 36: Middle Pond – General view of pond surface looking south.

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Photo 37: Middle Pond – North embankment interior slope, erosion rill looking west.

Photo 38: Middle Pond – North embankment interior slope, erosion rill looking south.

Photo 39: Middle Pond – North embankment interior slope, general view of pond surface looking southwest. Note vegetation (cattails).

Photo 40: Middle Pond – North embankment interior slope, scarp looking west.

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Photo 41: Middle Pond – North embankment interior slope, scarp looking east.

Photo 42: Middle Pond – North embankment interior slope, erosion looking east.

Photo 43: Upper East Pond –East embankment interior slope, general view of inflow pipes looking northeast.

Photo 44: Upper East Pond – Divider embankment, general view looking north.

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Photo 45: Upper East Pond – East embankment exterior toe of slope looking north. Note recently repaired/backfilled areas where prior erosion had occurred.

Photo 46: Upper East Pond – East embankment exterior slope, looking south.

Photo 47: Upper East Pond – East embankment exterior slope, looking north.

Photo 48: Upper East Pond – East embankment exterior slope looking north. Note recent repair of erosion rills.

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Photo 49: Upper East Pond – East embankment exterior slope looking west. Note saturated area at toe of slope.

Photo 50: Upper East Pond – East embankment exterior toe of slope looking west. Note saturated area at toe of slope.

Photo 51: Upper East Pond – East embankment exterior toe of slope, looking west. Note area of possible seepage and depression 3-foot wide by 10-foot long by 6-inches deep.

Photo 52: Upper East Pond – East embankment exterior slope, looking south.

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Photo 53: Upper East Pond – North embankment interior slope looking west. Note buttressed slope from previous repairs.

Photo 54: Upper East Pond – Crest of divider embankment, looking south.

Photo 55: Upper East Pond – Crest of divider embankment interior slope, looking south.

Photo 56: Upper East Pond – Divider embankment interior slope, general view of pond surface, looking southwest.

Photo 57: Upper East Pond, Divider embankment interior slope looking south at embankment erosion.

Photo 58: Upper East Pond – Divider embankment interior slope, Inflow pipe looking west. Note eroded areas at discharge of pipe.

Photo 59: Upper East Pond – Crest of east embankment looking north.

Photo 60: Upper East Pond – Crest of East embankment looking south.

Photo 61: Upper East Pond – North embankment exterior slope, repair of seepage area.

Photo 62: Upper East Pond – North embankment exterior slope, Repaired area where seepage from pond had previously occurred at toe of slope.

Photo 63: Upper East Pond –North embankment toe of exterior slope looking south. Note saturation at toe of slope.

Photo 64: Upper East Pond – North embankment toe of exterior slope looking south. Note saturation at toe of slope.

Photo 65: Upper East Pond – North embankment exterior slope, looking east.

Photo 66: Upper East Pond –North embankment mid-slope, Animal burrow. Note burrow is about 1-foot deep.

Photo 67: Upper East Pond – North embankment exterior slope, looking west.

Photo 68: Upper East Pond – North embankment exterior slope, looking east.

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Photo 69: Upper West Pond – West embankment exterior slope, general view looking north.

Photo 70: Upper West Pond – West embankment exterior slope, general view looking southwest.

Photo 71: Upper West Pond – West embankment interior slope, general view looking south. Note shallow scarps over approximate 50-foot length.

Photo 72: Upper West Pond – West embankment interior slope, scarp looking east.

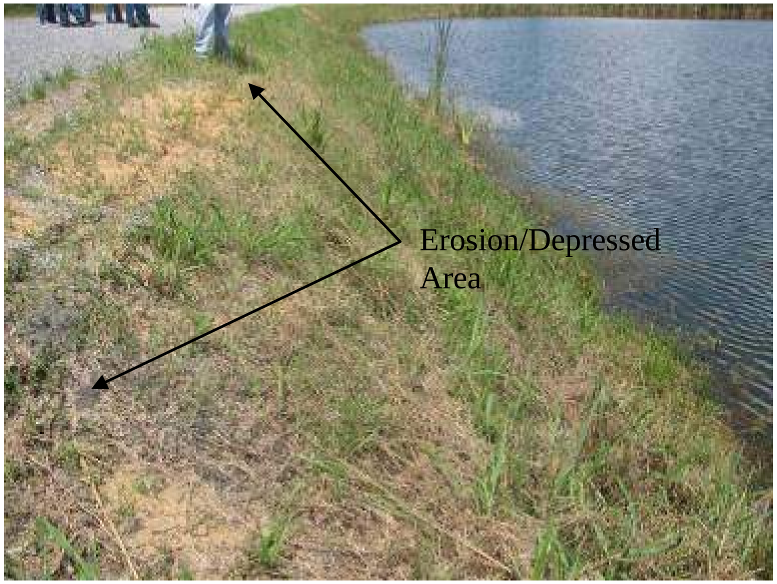

Photo 73: Upper West Pond – West embankment interior slope, showing erosion/depressed area approximately 30-foot long, looking north.

Photo 74: Upper West Pond – Southwest embankment interior slope, morning glory-type drop inlet structure looking southeast.

Photo 75: Middle Pond – Divider embankment interior slope at discharge of structure shown in Photo 74, looking southeast. Note water flowing from Upper West Pond to Middle Pond.

Photo 76: Middle Pond – Divider embankment interior slope at discharge of structure shown in Photo 74, looking southeast. Note water flowing from Upper West Pond to Middle Pond.

Photo 77: Middle Pond – Divider embankment interior slope discharge Structure, looking southeast. Note water flowing from Upper West Pond to Middle Pond.

Photo 78: Middle Pond – Divider embankment interior slope looking northwest.

Photo 79: Crest of divider embankment between Middle Pond and Upper West Pond, looking southeast at excavator tracks.

Photo 80: Crest and interior slope of divider embankment between Middle Pond and Upper West Pond, looking northwest.

Photo 81: Upper West Pond – Divider embankment interior slope, 18-inch diameter corrugated HDPE inlet pipe, looking north.

Photo 82: Upper Middle Pond – Divider embankment interior slope, 18-inch diameter corrugated HDPE outlet pipe looking northwest.

Photo 83: Crest of divider embankment between Upper West Pond and Upper Middle Pond, looking north.

Photo 84: Upper West Pond – Divider embankment interior slope, looking north.

Photo 85: Upper Middle Pond – Divider embankment interior slope and crest, looking north.

Photo 86: Upper Middle Pond – Divider embankment interior slope looking north. Typical of four scarps along approximate 50-foot length of slope.

Photo 87: Upper Middle Pond – Divider embankment Interior slope scarp looking northwest.

Photo 88: Upper West Pond – Divider embankment interior slope and crest, looking north.

Photo 89: Upper Middle Pond – Divider embankment interior slope, 18-inch diameter corrugated HDPE inlet pipe, looking north. Note scarp adjacent to pipe.

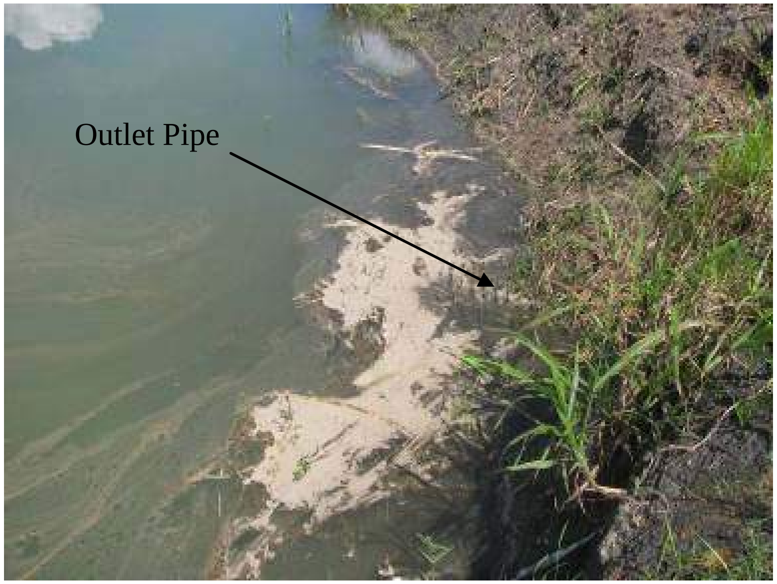

Photo 90: Upper East Pond – Divider embankment interior slope, 18-inch diameter corrugated HDPE outlet pipe, looking east. Pipe is submerged.

Photo 91: Upper East Pond – Divider embankment interior slope, general view of pond surface, looking east.

Photo 92: Upper East Pond – North embankment interior slope, general view of pond surface, looking northeast.

Photo 93: Crest of divider embankment between Upper East Pond and Upper Middle Pond, looking south.

Photo 94: Crest of divider embankment between Upper East Pond and Upper Middle Pond, looking west.

Photo 95: Upper East Pond – Divider embankment interior slope, general view of pond surface, looking south.

Photo 96: Upper Middle Pond – Divider embankment interior slope, general view of pond surface, looking south.

Photo 97: Upper Middle Pond – Divider embankment interior slope, general view of pond surface, looking south.

Photo 98: Upper Middle Pond – Divider embankment interior slope, general view of pond surface, looking north.

Photo 99: Upper East Pond – Divider embankment interior slope, general view of pond surface, looking south.

Photo 100: Upper East Pond – Divider embankment interior slope, general view of pond surface, looking north.

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Photo 101: Upper Middle Pond – Divider embankment interior slope, 2-foot x 2-foot x 6-foot long erosion rill, looking west.

Photo 102: Upper Middle Pond – Divider embankment interior slope, close up of erosion rill, looking west.

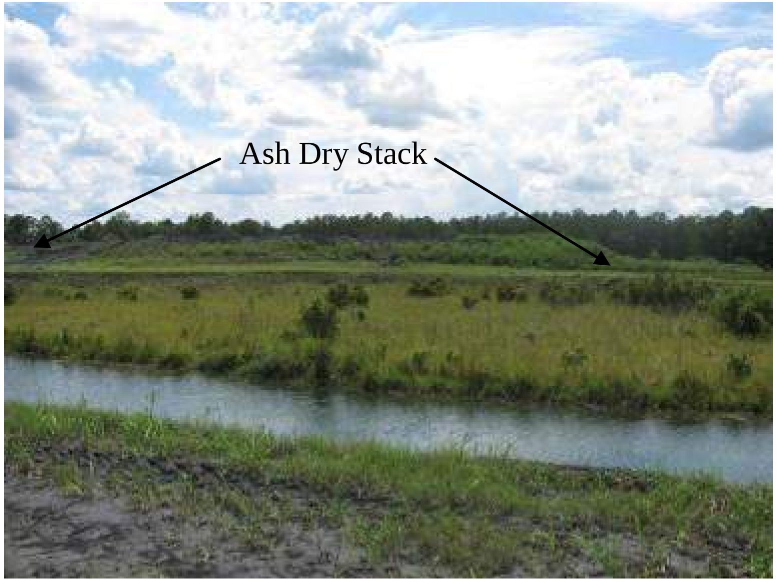

Photo 103: General view of Ash Dry Stack area, looking southwest.

Photo 104: Crest of divider embankment between Upper East Pond and Upper Middle Pond, looking north.

EPA Assessment Gulf Power - Scholz Plant Photos August 22, 2012

Photo 105: Upper Middle Pond – Divider embankment interior slope, general looking north.

Photo 106: Upper East Pond – Divider embankment interior slope, looking north.

Photo 107: Ash Dry stack – General view looking southwest.

Photo 108: Ash Dry Stack looking southwest.

Photo 109: Crest of divider embankment between Middle Pond and Lower Pond, looking southwest.

Photo 110: Crest of divider embankment between Middle Pond and Lower Pond, looking northeast.

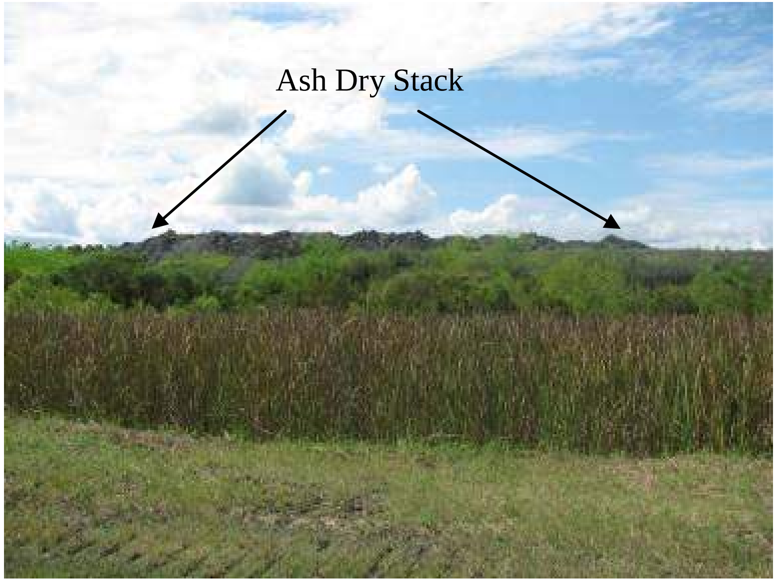

Photo 111: Middle Pond - Southside of Ash Dry stack area, looking northwest. Slope along South side of Ash Dry Stack area is nearly vertical and inaccessible.

Photo 112: Southside of Ash Dry Stack area, looking northeast. Slope along South side of Ash Dry Stack area is nearly vertical and inaccessible.

EPA Assessment Gulf Power - Scholz Plant Photos August 22, 2012

Photo 113: Middle Pond – West embankment exterior slope, crest looking northwest.

Photo 114: Middle Pond – West embankment exterior slope, trash and miscellaneous debris looking northwest.

Photo 115: Middle Pond – West embankment interior slope, crest looking southeast.

Photo 116: Middle Pond – West embankment exterior slope, crest looking southeast.

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Photo 117: Middle Pond – West embankment interior slope, crest looking north.

Photo 118: Middle Pond – West embankment interior slope scarp, looking south.

Photo 119: Middle Pond – West embankment interior slope, looking south.

Photo 120: Middle Pond – West embankment interior slope, looking west.

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Photo 121: Middle Pond – West embankment interior slope, looking north.

Photo 122: Lower Pond – North embankment interior slope, looking south.

Photo 123: Lower Pond – North embankment interior slope, general view of crest looking north.

Photo 124: Lower Pond – North embankment interior slope, looking northwest.

EPA Assessment Gulf Power - Scholz Plant Photos August 22, 2012

Photo 125: Lower Pond – North embankment interior slope, PVC inlet pipe from plant, looking southeast.

Photo 126: Lower Pond – North embankment interior slope, looking east.

Photo 127: Lower Pond – North embankment interior slope, looking west.

Appendix D

CDM Smith Memorandum of Explanation Draft Report Comments

Appendix D

CDM Smith Memorandum of Explanation Draft Report Comments

CDM Smith
11 British American Boulevard, Suite 200
Latham, New York 12110
tel: 518-782-4500
fax: 518-783-3810

Memorandum

To: Jana Englander

From: William J. Friers

Date: June 9, 2014

Subject: Round 12, Final Report – Plant Scholz

Please find attached a copy of the CCW Impoundment Final Report for Plant Scholz (Round 12, CLIN 011). This Final Report has been revised to address the comments received from the EPA and the Plant Owner, Gulf Power, as noted below.

Gulf Power Comment No. 1 - Section 2.1 identifies the presence of three separate CCW impoundments, the Upper, Middle and Lower Pond at Plant Scholz. Gulf Power requests the wording in the Draft Report, Section 2.1 and elsewhere, be revised to reflect a single CCW impoundment.

CDM Smith Action - CDM Smith reviewed available information and documentation of the three units (Upper Pond, Middle Pond and Lower Pond). In their letter dated December 13, 2013, Gulf Power states there is nominal head difference between the various cells and there is minimal risk of a progressive failure resulting in the unexpected breach of one of the interior divider dikes. However, Gulf Power's Hydrologic and Hydraulic Analyses (Calculation Number DC-FP-FPC34572-101), dated October 18, 2013 lists normal pool elevations of cells as follows:

Pond Name		Normal Pool Elevation (feet)
Upper Pond	Upper East Pond	128.0
	Upper Middle Pond	124.31
	Upper West Pond	122.1
Middle Pond		110.0
Lower Pond		98.16

The average head difference between individual cells is about 7.5 feet. The head difference between the Upper West Pond and the Middle Pond (normal pool) is 12.1 feet and the head difference between the Middle Pond and the Lower Pond (normal pool) is 11.8 feet. The total head difference between the Upper East Pond and the Lower Pond is 29.8 feet. Given the layout of the individual ponds, a failure of the south embankment of either the Upper East Pond or the Upper Middle Pond could result in discharge of CCW to the Lower Pond. As such, CDM Smith's opinion is that the Upper Pond, Middle Pond, and Lower Pond are physically separate impoundments with measurable head differences that warrant individual assessments.

Gulf Power Comment No. 2 – Section 2.1.2 states boring records were not provided to CDM Smith.

CDM Smith Action - CDM Smith revised the report to indicate boring logs were provided.

Gulf Power Comment No. 3 –Section 2.3, Table 3 assigns a "Significant" hazard rating to each of the areas of the ash pond. Gulf Power disagrees with the assigned hazard rating and the appropriate hazard rating is "Low".

CDM Smith Action - CDM Smith reevaluated the Hazard Ratings assigned to the CCW impoundments and found the assigned Significant Hazard potential classifications to be appropriate. Failure of the Lower Pond's south embankment would likely discharge CCW to the River causing environmental damage; failure of the Upper East or Upper Middle Ponds' west embankments would likely impact the overhead power line (support structures) approximately 90 feet west of the impoundments; failure of the Middle Pond's southwest embankment would likely impact the overhead power line (support structures) approximately 60 feet southwest of the impoundment.

Gulf Power Comment No. 4 –Section 7.3 references lack of documentation relative to design and construction of the west, south, and interior embankments. Gulf Power indicates, for various reasons, that separate stability analyses are not required for the identified embankments. Gulf Power further states they have made efforts since CDM Smith's site visit on August 22, 2012, including removal of trees from the Lower Pond's south embankment, repair of erosion features and flattening existing embankment slopes and, as a result, a "Satisfactory" condition rating for the plant CCW impoundment(s) is warranted.

CDM Smith Action - CDM Smith has acknowledged receipt of analyses provided by Gulf Power in Section 7 and has revised Section 7 to reflect the calculations presented in the analyses . CDM Smith documents in Section 7 of the report that analyses of the Upper Middle Pond, Upper West Pond, and Middle Pond embankments have not been provided. Based, however, on our review of the analyses provided by Gulf Power for the Upper East Pond and Lower Pond, and our observations of the CCW impoundment embankments during the site visit, it is our opinion that the calculated factors of safety for the Upper East Pond and Lower Pond embankments are representative of the Upper West, Upper Middle, and Middle Pond embankments. As such, the supporting technical documentation for Plant Scholz is considered adequate. CDM Smith has assessed the Structural Stability rating of Plant Scholz CCW impoundment embankments to be Satisfactory.

Please call or email with any questions.

Sincerely,

William J. Friers, P.E.
Senior Civil Engineer
CDM Smith