FINAL

Coal Combustion Residue Impoundment
Round 9 - Dam Assessment Report

Plant McIntosh

Ash Dike
Georgia Power
Rincon, Georgia

Prepared for:

United States Environmental Protection Agency
Office of Resource Conservation and Recovery

Prepared by:

Dewberry & Davis, LLC
Fairfax, Virginia

Under Contract Number: EP-09W001727
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INTRODUCTION, SUMMARY CONCLUSIONS AND RECOMMENDATIONS

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

This assessment of the stability and functionality of the Plant McIntosh Coal Combustion Residue Impoundment is based on a review of available documents and on the site assessment conducted by Dewberry personnel on March 3, 2011. We found the supporting technical documentation adequate (Section 1.1.3). As detailed in Section 1.2.1, there is a recommendation based on field observations that may help to maintain a safe and trouble-free operation.

In summary, the Georgia Power Plant McIntosh CCR Impoundment is **SATISFACTORY** for continued safe and reliable operation, with no recognized existing or potential management unit safety deficiencies.

PURPOSE AND SCOPE

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

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

EPA requested that utility companies identify all management units including surface impoundments or similar diked or bermed management units or management units designated as landfills that receive liquid-borne material used for the storage or disposal of residuals or by-products from the combustion of coal, including, but not limited to, fly ash, bottom ash, boiler slag, or flue gas emission control residuals. Utility companies provided information on the size, design, age and the amount of material placed in the units (See Appendix C).

The purpose of this report is **to evaluate the condition and potential of residue release from management units that have or have not been rated for hazard potential classification**. This evaluation included a site visit. Prior to conducting the site visit, a two-person team reviewed the information submitted to EPA, reviewed any relevant publicly available information from state or federal agencies regarding the unit hazard potential classification (if any) and accepted information provided via telephone communication with the management unit owner.

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

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

Note: The terms "embankment", "berm", "dike" and "dam" are used interchangeably within this report, as are the terms "pond", "basin", and "impoundment".

LIMITATIONS

The assessment of dam safety reported herein is based on field observations and review of readily available information provided by the owner/operator of the subject coal combustion residue management unit(s). Qualified Dewberry engineering personnel performed the field observations and review and made the assessment in conformance with the required scope of work and in accordance with reasonable and acceptable engineering practices. No other warranty, either written or implied, is made with regard to our assessment of dam safety.

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APPENDIX A

APPENDIX B

1.0 CONCLUSIONS AND RECOMMENDATIONS

1.1 CONCLUSIONS

Conclusions are based on visual observations from a one-day site visit on March 3, 2011, and review of technical documentation provided by Georgia Power.

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

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

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

Hydrologic and hydraulic analyses provided to Dewberry indicate adequate impoundment capacity to contain the 1-percent probability/Probable Maximum Precipitation design storm without overtopping the dikes.

1.1.3 Conclusions Regarding the Adequacy of Supporting Technical Documentation

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

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

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

1.1.5 Conclusions Regarding the Field Observations

Dewberry staff was provided access to all areas in the vicinity of the management unit required to conduct a thorough field observation. The visible parts of the embankment dikes and outlet structure were observed to have no signs of overstress, significant settlement, or shear failure.

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

The current maintenance and methods of operation appear to be adequate for the CCR impoundment.

1.1.7 Conclusions Regarding the Adequacy of the Surveillance and Monitoring Program

The surveillance program appears to be adequate. The owner has a program of weekly ash dike inspections by plant staff and annual dam safety inspections by Southern Company engineering staff. Copies of these inspections are included in Appendix A – Docs 10, 11 and 12.

Based on the technical data provided by the owner's technical staff and Dewberry engineers' observations in the field, the current surveillance and monitoring program is satisfactory.

1.1.8 Classification Regarding Suitability for Continued Safe and Reliable Operation

The facility is SATISFACTORY for continued safe and reliable operation. No existing or potential management unit safety deficiencies are recognized. Acceptable performance is expected under all applicable loading conditions (static, hydrologic, seismic) in accordance with the applicable criteria.

1.2 RECOMMENDATIONS

1.2.1 Recommendations Regarding the Surveillance and Monitoring Program

The current surveillance program of weekly inspections of the dike system has been very effective in identifying and reporting areas of potential seepage of the CCR impoundment embankments. It is recommended that the regular surveillance program continue to ensure that particular attention be paid to indications of potential seepage during future inspections, and that the Southern Company Hydro Services staff be made immediately aware of new seepage or a recurrence in the old areas.

1.3 Participants and Acknowledgement

1.3.1 List of Participants

Scott Smith, Georgia Power Joe R. Griggs, Georgia Power
Brenda Fischer, Georgia Power
Lee Lively, Georgia Power
Cathie Hodges, Georgia Power
Brian Barton, Georgia Power
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Bradley J. Adams, Troutman Sanders LLP
Frank B. Lockridge, P.E., Dewberry
Joseph P. Klein III, P.E., Dewberry

1.3.2 Acknowledgement and Signature

We acknowledge that the management unit referenced herein has been assessed on March 3, 2011.

Frank B. Lockridge, P.E. (GA 033424)
Dewberry

Joseph P. Klein III, P.E.
Dewberry

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

2.1 LOCATION AND GENERAL DESCRIPTION

The plant is located at Mile Marker 43 on the Savannah River east of the city of Rincon, Georgia. The site is in Effingham County approximately 25 miles north of the city of Savannah. An aerial view and site topographic map of the site location are shown in Appendix A. Docs 01 and 02, respectively.

Plant McIntosh was constructed in the late 1960s and early 1970s and began producing power in 1978. In 1982 the steam unit, originally designed to burn No. 6 fuel oil, was converted to burn coal (See Appendix A Doc 03). The Plant McIntosh coal combustion residue (CCR) impoundment, also referred to as the ash pond, was constructed in conjunction with the 1982 conversion of the steam unit to burn coal.

The CCR impoundment is configured with four cells: cells A, B, and C are ash storage cells, and D cell is a polishing cell (See Appendix A Doc 02).

Table 2.1: Summary of Dam Dimensions and Size	
	Plant McIntosh Ash Pond
Dam Height (ft)	36
Crest Width (ft)	15 to 25 ft.
Length (ft)	4,600 ft
Side Slopes (interior) H:V	2(H): 1(V)
Side Slopes (exterior) H:V	3(H):1(V)

2.2 COAL COMBUSTION RESIDUE HANDLING

A Flow Chart of the ash residue is shown on Doc-04 in Appendix A.

2.2.1 Fly Ash

Fly ash generated by the combustion of coal is collected in electrostatic precipitators, removed from the plates by a rapping system, and caught in an ash hopper. It is transported by a pneumatic piping system to an ash silo or if necessary to the ash pond. From the ash silo, the ash is sold for beneficial re-use, transported to a Georgia Power owned and operated on-site permitted solid waste disposal facility or sluiced to the ash pond.

2.2.2 Bottom Ash

Bottom ash is collected in the bottom ash hopper located at the bottom of the boiler. It is sluiced from the hopper to the ash pond via a hydraulic piping system. After dewatering in the ash pond, it is excavated and transported to the Georgia Power owned and operated permitted on-site solid waste landfill via a covered truck.

2.2.3 Boiler Slag

Boiler slag formed on the inner walls of the boiler, is steam lanced from the walls and collected in the bottom ash hopper. It is pulverized by grinders in the hopper and sluiced to the ash ponds thru the hydraulic system. From the ash pond, it is handled in the same manner as the bottom ash.

2.2.4 Flue Gas Desulfurization Sludge

No flue gas desulfurization sludge is generated at Plant McIntosh.

2.3 SIZE AND HAZARD CLASSIFICATION

Based on the height and storage volume of the management unit, the facility is small as defined in Table 2.2a.

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

The Georgia Department of Natural Resources(DNR), Dam Safety Program reviewed the management unit in April 2010 and classified the ash pond containment dikes (dikes for Cells A, B, and C) as Category II, indicating loss of human life is not probable in the event of a catastrophic embankment failure. Cell D was classified as Exempt due to its low height and small storage volume (See Appendix A-Doc 05).

Dewberry conducted a qualitative hazard classification based on Federal Guidelines for Dam Safety, dated April 2004.

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

Based on the location of the impoundment, loss of human life is not probable and low economic/environmental losses are expected in the event of a catastrophic failure of the Plant McIntosh CCR impoundment embankments. Release of ash in the event of a catastrophic embankment failure is expected to be limited to property owned by the plant. Therefore Dewberry has evaluated the Plant McIntosh CCR impoundment as a low hazard.

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

Plant McIntosh ash ponds contain primarily bottom ash and boiler slag with smaller amounts of fly ash, pyrites, and other low volume waste as defined in 40 CFR 423.11.

Table 2.3: Maximum Capacity of Unit Plant McIntosh Ash Ponds	
Surface Area (acre)[1]	27
Current Storage Capacity (cubic yards)[1]	136,528
Current Storage Capacity (acre-feet)	84.6
Total Storage Capacity (cubic yards)[1]	552,156
Total Storage Capacity (acre-feet)	342
Crest Elevation (feet)	62.5
Normal Pond Level (feet)	59.0

[1] Estimates provided by Georgia Power based on available information (See Appendix A Doc 06)

PRINCIPAL PROJECT STRUCTURES

2.4.1 Earth Embankment

The CCR impoundment was designed as a perimeter clay core dike and three interior dikes forming three parallel ash storage cells and a polishing pond, and the length of the perimeter embankment is about 4,600 feet. The interior slopes are designed to be 2.0H: 1.0V and the exterior slopes are 3:1 or flatter depending on the transition to natural ground (See Appendix A Doc 07). The slopes are covered with vegetation, a few locations contain mixed stone that was used to repair erosion rills in the slopes.

2.4.2 Outlet Structures

The primary spillway is a concrete rectangular riser with bottom elevation of 29.5 and top elevation of 62.5. Inflow is controlled by a series of flap and ball valves and the water passes over stop logs set at the desired height. The discharge outlet is a 48-inch diameter concrete pipe that empties into a small, natural drainage feature to the east of the impoundment (See Appendix A Doc 08).

Water from the polishing pond (Cell 'D') is recycled for general plant use. A recycling pump station is located on the western side of the polishing pond

2.5 CRITICAL INFRASTRUCTURE WITHIN FIVE MILES DOWN GRADIENT

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

Based on available topographic maps, surface drainage is east and southeast toward the Savannah River. Based on available aerial photographs and a brief driving tour of the area, except for electrical power transmission lines, Dewberry did not identify critical infrastructure assets within 5 miles down-gradient of the CCR impoundment.

3.0 SUMMARY OF RELEVANT REPORTS, PERMITS, AND INCIDENTS

3.1 SUMMARY OF REPORTS ON THE SAFETY OF THE MANAGEMENT UNIT

Georgia Power provided reports of internal corporate dam safety inspections or related inspections conducted by Southern Company engineers or plant personnel.

- *Plant McIntosh Ash Pond Seep*, March 13, 2004 (See Appendix A Doc 09)
- *Plant McIntosh Dam Safety Inspection*, February 13, 2009 (See Appendix A Doc 10)
- *Plant McIntosh Dam Safety Inspection*, September 15, 2010 (See Appendix A Doc 11)
- "Plant McIntosh Weekly Ash Cell Dike Inspection Logs" for the weeks of December 10, 2009; December 17, 2009; August 14, 2010; December 16, 2010; and December 28, 2010 (See Appendix A Doc 12)
- *Plant McIntosh Ash Pond "C" Toe Drain Installation*, February 24, 2009 (See Appendix A, Doc 13)

The 2004 report presented observations and recommendations pertaining to notification by plant personnel of potential seepage at the north end of the west embankment of the CCR impoundment. The report confirmed the presence of soft, wet areas and evidence of flowing water on the outside slope of the west embankment. The recommendations in the report were:

- Inspect the seepage areas of each shift change in the plant and report significant changes to the Southern Company Generation engineering staff
- Construct a subsurface reverse filter if erosion is expected.

The 2009 Dam Safety Inspection report concluded that no conditions were noted that posed an immediate threat to the safety of the impoundment. The report included several recommendations, including some related to the interior partition dikes. Recommendations pertaining to the impounding embankment were:

- Install a subsurface drainage system to control potential seepage along portions of the east embankment
- Provide a 20-foot wide clear space along the eastern embankment toe for inspection and maintenance vehicles
- Review types of mowers used to cut grass in order to reduce ruts and tire depressions
- Fill in animal burrows.

The 2010 Dam Safety Inspection report concluded that no conditions were noted that posed an immediate threat to the safety of the impoundment. The report included two recommendations pertaining to the perimeter embankment. Recommendations were:

- Develop and implement a comprehensive turf management program to protect embankment slopes
- Extend the existing sump drain along the outside of the western embankment slope to collect seepage noted on the face of the slope.

The weekly inspection log for December 28, 2010 noted a small area of potential seepage near the overflow structure, and animal burrows at the north end of the eastern embankment.

The 2011 Slot Drain Installation review indicates that on February 18, 2011 a damp band was observed along a section of the north end of the eastern embankment and the seepage was determined to be coming through the embankment. A series of slot drains were designed and installed and reportedly were successful in drying the slope.

3.2 SUMMARY OF LOCAL, STATE, AND FEDERAL ENVIRONMENTAL PERMITS

The east and west side perimeter embankments and an interior embankment are regulated and classified by the Georgia Department of Natural Resources (GADNR). The GADNR permit numbers are (See Appendix A Doc 05).

- East embankment ID NO: 051-017-05840
- Interior embankment ID NO: 051-017-05841
- West embankment ID NO: 051-017-05842

The embankments were assessed in April 2010 and rated as Class II; i.e., loss of human life not probable in the event of an embankment failure. Class II embankments are reviewed every 5 years to determine the need for reclassification.

Discharge from the impoundment is regulated by the Georgia Department of Natural Resources, Environmental Protection Division, Water Protection Branch, and the impoundment was issued a National Pollutant Discharge Elimination System Permit (No. GA0003883) on June 30, 1999. A Permit Extension was issued on May 24, 2004.

3.3 SUMMARY OF SPILL/RELEASE INCIDENTS

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

4.0 SUMMARY OF HISTORY OF CONSTRUCTION AND OPERATION

4.1 SUMMARY OF CONSTRUCTION HISTORY

4.1.1 Original Construction

Construction of the plant site began in the late 1960s. Plant McIntosh first produced power in 1978 and became a commercial plant in February of 1979. The steam unit was originally designed to burn No. 6 fuel oil but was converted to coal in 1982. The ash pond was commissioned in 1982 in conjunction with the conversion of Unit 1 to coal burning.

4.1.2 Significant Changes/Modifications in Design since Original Construction

No significant changes or modifications have been made to the Plant McIntosh CCR impoundment since the original construction.

4.1.3 Significant Repairs/Rehabilitation since Original Construction

Significant repairs to the Plant McIntosh CCR impoundment include the installation of the new toe drains and sumps on the exterior slopes of the eastern and western perimeter embankments (See Appendix A Docs 11 and 13).

4.2 SUMMARY OF OPERATIONAL PROCEDURES

4.2.1 Original Operational Procedures

The Plant McIntosh CCR impoundment operated for coal combustion residue sedimentation and control. The impoundment receives slurried coal combustion residue, coal pile runoff, and storm water from the pond embankments. The impoundment receives primarily bottom ash and boiler slag; however, a small quantity of fly ash may occasionally be sluiced to the ash pond. (See Appendix A Doc 04)

4.2.2 Significant Changes in Operational Procedures and Original Startup

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

4.2.3 Current Operational Procedures

Coal combustion residue is deposited in cells on an alternating basis. As a cell is filled, material is slurried to one of the other cells (See Appendix A Docs 04 and 14). Material in the filled cell is allowed to dry and is subsequently removed for beneficial reuse or disposal. Removal of CCR from the impoundment is conducted by contractors in accordance with technical specifications developed by Southern Company Generation (See Appendix A Doc 15).

4.2.4 Other Notable Events since Original Startup

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

5.0 FIELD OBSERVATIONS

5.1 PROJECT OVERVIEW AND SIGNIFICANT FINDINGS

Dewberry personnel Frank B. Lockridge, P.E. and Joseph Klein, P.E. performed a site visit on March 3, 2011 in company with the participants.

The site visit began at approximately 1:30 P.M. The weather was warm and sunny. Photographs were taken of conditions observed. Please refer to the Dam Inspection Checklist in Appendix B. Selected photographs are included here for ease of visual reference. All pictures were taken by Dewberry personnel during the site visit.

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

5.2 WEST EMBANKMENT

5.2.1 Crest

The crest of the west dike had a crushed stone gravel surface and had no sign of depressions, tension cracks, or other indications of shear failures. Previous inspection reports reviewed by Dewberry did not indicate issues concerning the embankment crest. Figure 5.2.1-1 shows the crest of the dike near the north groin.

Figure 5.2.1-1 – West Embankment Crest

5.2.2 Upstream/Inside Slope

The upstream/inside slope of the west embankment is grassed. There were no observed scarps, sloughs, bulging, cracks, depressions, or other indications of slope stability or significant erosion. There are a few gravel spots where erosion rills have been repaired. Figure 5.2.2-1 shows the inside slope of the west embankment.

Figure 5.2.2-1 – Inside Slope of West Embankment at South Groin

5.2.3 Downstream/Outside Slope and Toe

The outside slope of the west embankment is vegetated with grass. There were no observed scarps, sloughs, bulging, cracks, depressions, or other indications of slope stability or significant erosion.

Observations of potential seepage near the toe of the west embankment in 2004 resulted in recommendations for installation of a new filter drain (See Appendix A Doc 10). The 2010 *Annual Dam Safety Inspection* report (See Appendix A Doc 11) indicated a sump and subsurface drains had been installed along a portion of the toe of the west embankment. The report recommended extending the drain systems southward to the end near the center of the embankment. Newly sowed grass along the toe of the embankment indicated the area of the extended drain system. Figure 5.2.3-1 shows the grassed outside slope of the west embankment.

Figure 5.2.3-1 – West Embankment Outside Slope

5.2.4 Abutments and Groin Areas

The west embankment was constructed as part of a continuous perimeter embankment without abutments. West embankment groins are vegetated with grass. No uncontrolled seepage was observed along the west embankment groins. Figure 5.2.4-1 shows the interior groin at the north end of the west embankment.

Figure 5.2.4-1 – West Embankment Inside Groin at North End

5.3 EAST EMBANKMENT

5.3.1 Crest

The east embankment crest had a crushed stone surface and no sign of depressions, tension cracks, or other indications of shear failures. Previous inspection reports reviewed by Dewberry did not indicate issues concerning the embankment crest. Figure 5.3.1-1 shows the crest of the dike.

Figure 5.3.1-1 – Crest and Inside Slope of East Embankment near South End

5.3.2 Upstream/Inside Slope

The upstream/inside slope of the east embankment is grassed. There were no observed scarps, sloughs, bulging, cracks, depressions, or other indications of slope stability or significant erosion. There are a few gravel spots where erosion rills have been repaired. Figure 5.3.1-1 above shows the inside slope of the east embankment.

5.3.3 Downstream/Outside Slope and Toe

The outside slope of the west embankment is vegetated with grass. There were no observed scarps, sloughs, bulging, cracks, depressions, or other indications of slope stability or significant erosion. Figure 5.3.3-1 shows the outside slope of the east embankment.

Figure 5.3.3-1 – East Embankment Outside Slope

The 2009 *Annual Dam Safety Inspection* report (See Appendix A Doc 10) noted a damp area and hydrophilic vegetation. The report recommended a subsurface drain to control potential localized seepage through the east embankment. The 2010 *Annual Dam Safety Inspection* report (see Appendix A Doc 11) indicated the subsurface drain was installed.

A March 2, 2011 report (See Appendix A Doc 12) indicated that plant personnel reported signs of additional seepage along the toe of the east embankment. A series of sand drains were installed and tied into the existing collection piping and sump that were part of the 2009/2010 drainage system. Figures 5.3.3-2 and 5.3.3-3 show the area of the new sand drains and north 2010 sump, respectively.

Figure 5.3.3-2 East Embankment Area of New Subsurface Drainage System

Figure 5.3.3-3 East Embankment North Drainage System Sump

Reportedly, drain flow is measured regularly and has stabilized at about 0.25 gallons per minute (gpm).

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5.3.4 Abutments and Groin Areas

The east embankment was constructed as part of a continuous perimeter embankment without abutments. East embankment groins are vegetated with grass. No uncontrolled seepage was observed along the west embankment groins. Figure 5.3.4-1 shows the interior groin at the south end of the east embankment.

Figure 5.3.4-1 East Embankment Inside Groin at South End (East Embankment on Right Side of Photograph) and South Embankment Crest

5.4 SOUTH EMBANKMENT

5.4.1 Crest

The south embankment crest had a crushed stone surface and no sign of depressions, tension cracks, or other indications of shear failures. Previous inspection reports reviewed by Dewberry did not indicate issues concerning the embankment crest. Figure 5.3.4-1 above shows the crest of the dike.

5.4.2 Upstream/Inside Slope

The upstream/inside slope of the south embankment is grassed. There were no observed scarps, sloughs, bulging, cracks, depressions, or other indications of slope stability or significant erosion. There are a few gravel spots where erosion rills have been repaired. Figure 5.4.2-1 shows the inside slope of the south embankment.

Figure 5.4.2-1: South Embankment Inside Slope

5.4.3 Downstream/Outside Slope and Toe

The downstream or outside slope of the south embankment is only a few feet high and very flat to transition to existing grade south of the impoundment. The outside slope of the south embankment is vegetated with grass. There were no observed scarps, sloughs, bulging, cracks, depressions, or other indications of slope stability or significant erosion. Figure 5.4.3-1 shows the outside slope.

Figure 5.4.3-1 – South Embankment Downstream Slope (Left Side of Gravel Surfaced Crest.

5.4.4 Groins and Abutments

Groins of the south embankment were formed at the transition to the west and east embankments. No erosion or controlled seepage was observed along the groins. Photographs of the south embankment groins are included in Sections 5.2.4 and 5.3.4 of this report.

5.5 NORTH EMBANKMENT

5.5.1 Crest

The crest of the North Embankment was surfaced with a gravel roadway used for servicing the ponds, embankments, and piping system. No sign of depressions, tension cracks, or other indications of shear failures were observed**.** Figure 5.5.1-1 shows the crest, the outside slope and the adjacent sluice piping system.

Figure 5.5.1-1 – North Embankment Crest and Outside Slope

5.5.2 Upstream/Inside Slope

The upstream slope of the north embankment is grassed. There were no observed scarps, sloughs, bulging, cracks, depressions, or other indications of slope stability or significant erosion.

5.5.3 Outside Slope and Toe

The downstream or outside slope of the north embankment is only a few feet high and very flat to transition to existing grade north of the impoundment. The outside slope of the north embankment is vegetated with grass. There were no observed scarps, sloughs, bulging, cracks, depressions, or other indications of slope stability or significant erosion**.** Figure 5.5.3-1 shows the outside slope of the north embankment.

Figure 5.5.3-1 – North Embankment Outside Slope.

5.5.4 Abutments and Groin Areas

Groins of the north embankment were formed at the transition to the west and east embankments. No erosion or controlled seepage was observed along the groins. Section 5.2.4 presented a photograph at the north embankment groin.

5.6 OUTLET STRUCTURES

5.6.1 Overflow Structure

Water elevation on Cell D is controlled by the installed pump system used to maintain the desired pool elevation.

Plant McIntosh has the capability to recycle water from the polishing pond for reuse in the plant. The pumping station for recycling/discharging is located on the west side of the polishing pond, Cell D. Photograph 5.6.1-3 shows the recycling pump station.

Figure 5.6.1-3 – Pumping Station to Recycle Water from CCR Impoundment Cell D to Plant.

5.6.2 Outlet Conduit

The emergency discharge spillway outlet conduit is 30-inch diameter concrete pipe with an invert elevation of 39.5 feet. The outlet conduit discharges to an unlined ditch that flows to a natural stream in a wooded area of the CCR impoundment. Water flowing from the outlet was clear. Figure 5.6.2-1 shows water discharge from the outlet conduit.

Figure 5.6.2-1 – Emergency Overflow Spillway Outlet Conduit Discharge

5.6.3 Emergency Spillway

The emergency overflow structure is a rectangular, reinforced concrete riser structure located in the southwest corner of Cell D, the polishing pond. The outlet structure has a top elevation of 62.5 feet and an invert elevation of 39.5 feet. (See Appendix A Doc 08).

Access to the overflow structure is provided by a steel framed walkway. Figure 5.6.3-1 shows the overflow structure. Figure 5.6.3-2 shows stop logs installed in the overflow structure.

Figure 5.6.3-1 Emergency Overflow Structure.

Figure 5.6.3-2: Emergency Overflow Structure with Stop Logs in Place.

5.6.4 Low Level Outlet

The Plant McIntosh CCR impoundment does not have a spillway low level outlet.

6.0 HYDROLOGIC/HYDRAULIC SAFETY

6.1 SUPPORTING TECHNICAL DOCUMENTATION

6.1.1 Flood of Record

No documentation has been provided about the flood of record.

6.1.2 Inflow Design Flood

Southern Company Generation conducted a hydraulic capacity analysis for the Plant McIntosh CCR impoundment for the design storm event (See Appendix A Doc 16). The design storm was a 100-year (1-percent probability of occurrence in any given year), 24-hour event with an intensity of 9.84 inches. The report estimates that the 1-percent probability storm can be retained by the impoundment at an elevation of 60.4 feet, leaving a freeboard of about 2 feet based on the design crest elevation of 62.5 feet.

Georgia Department of Natural Resources Safe Dams Program has classified the embankment as Category II and the Cell D dikes as Exempt; therefore, they are excluded from the regulatory design standards.

6.1.3 Spillway Rating

No spillway hydraulic data were provided for review.

6.1.4 Downstream Flood Analysis

No downstream flood analysis data were provided for review.

6.2 ADEQUACY OF SUPPORTING TECHNICAL DOCUMENTATION

Supporting documentation reviewed by Dewberry is adequate.

6.3 ASSESSMENT OF HYDROLOGIC/HYDRAULIC SAFETY

Based on the results of the hydraulic study (See Appendix A Doc 16) the CCR impoundment can retain the 1-percent probability design storm event with a freeboard safety of about 2 feet. Hence embankment failure by overtopping seems improbable.

7.0 STRUCTURAL STABILITY

7.1 SUPPORTING TECHNICAL DOCUMENTATION

7.1.1 Stability Analyses and Load Cases Analyzed

Southern Company Engineering and Construction Services conducted slope stability analyses for the CCR impoundment embankment. The results of the analyses were provided in a report dated February 11, 2011 (See Appendix A Doc 17). The analyses were conducted following the guidelines of the U. S. Army Corps of Engineers slope stability manuals. A geotechnical exploration including soil borings and laboratory testing was undertaken to provide data for the analyses.

The stability analyses included the results for four loading conditions:

- Long-term, steady state conditions
- Steady state with seismic loading
- Design storm event contained within the impoundment
- Design storm event water level and rapid drawdown

7.1.2 Design Parameters and Dam Materials

Documentation provided to Dewberry for review (See Appendix A Doc 17) indicated the stability analyses assumed eight general soil strata. The assumed soil strata and properties used for the stability analyses are shown in Table 7.1.2.

Table 7.1.2

Soil Description	Moist Unit Weight (pcf)	Effective Strength Parameters		Total Strength Parameters	
		Cohesion (psf)	Friction (Degrees)	Cohesion (psf)	Friction (Degrees)
West Embankment					
Clay Dike Fill	120	118	40	792	8.7
Silty Clay Foundation	118	85	32	158.4	22
Sandy Clay Foundation	120	400	20	400	20
Clay with Shells	120	400	20	400	20
Sand	112	0	25	0	25

Soil Description	Moist Unit Weight (pcf)	Effective Strength Parameters		Total Strength Parameters	
		Cohesion (psf)	Friction (Degrees)	Cohesion (psf)	Friction (Degrees)
East Embankment					
Clay Dike Fill 1	122	338	36.9	576	18.2
Clay Dike Fill 2	120	300	18	500	12
Clay Dike Fill 3	125	878	15.3	1066	8.8
Sand	112	0	38.7	159	25.1
Loose Sand	112	0	25	0	25

The soil properties are based on soil borings and laboratory testing conducted in September 2010 in conjunction with the analyses.

7.1.3 Uplift and/or Phreatic Surface Assumptions

No documentation of uplift considerations was provided for review. The phreatic surface was developed using the water levels measured in the wells installed in the area of the cross sections analyzed, and the normal pool elevation.

7.1.4 Factors of Safety and Base Stresses

The safety factors computed in the Slope Stability Analyses of Ash Pond Dikes report (Appendix A-Doc. 17) are listed in Table 7.1.4.

Table 7.1.4 Factors of Safety for Plant McIntosh

Failure Condition (Load Case)	Computed Factor of Safety	Required Minimum Factor of Safety*
North Section – West Dike Section A-A’		
Upstream Steady State	3.13	1.5
Upstream Seismic	1.55	1.1
Downstream Steady State	5.36	1.5
Downstream Seismic	1.91	1.1
Downstream – Max Surcharge	5.38	1.4
Upstream Rapid Drawdown – in dike	1.66	1.3
North Section – East Dike – Section B-B’		
Upstream Steady State	3.29	1.5
Upstream Seismic	1.51	1.1
Downstream Steady State	2.10	1.5
Downstream Seismic	1.14	1.1
Downstream – Max Surcharge	2.10	1.1
Upstream Rapid Drawdown – in dike	1.81	1.3

7.1.5 Liquefaction Potential

The Law Engineering Testing Company geotechnical study of the ash pond area conducted in January 1981 found a relatively high amount of potentially liquefiable soil located in the area of the eastern dike. A layer of loose to very loose slightly clayey silty fine sand was present at elevation +5 to +35 feet. It was recommended that this layer be removed and replaced with a more cohesive soil or densified using a soil improvement technique.

A subsequent Law Engineering report in June 1981 in which dynamic studies of the proposed dike structures were performed confirmed the liquefiable potential of the previously identified soil and later outlined specific areas where it should be removed.

Soil boring data included as part of the slope stability analyses confirms that the very loose, fine sand is not present under the embankments (See Appendix A Doc 17).

7.1.6 Critical Geological Conditions

The site is located in the Georgia Coastal Plain and therefore the near surface soils are recent marine deposits. These soils are underlain at depths in excess of 150 feet by limestone.

In accordance with the Georgia Rules for Dam Safety, and as shown on the USGS "Map for Peak Acceleration with a 2% Exceedance in 50 years" for the vicinity of Plant McIntosh, the ground motion having a 2% probability of exceedance in 50 years is 0.18 g.

7.2 ADEQUACY OF SUPPORTING TECHNICAL DOCUMENTATION

Structural stability documentation is adequate.

7.3 ASSESSMENT OF STRUCTURAL STABILITY

Overall, the structural stability of the dikes appears to be satisfactory based on the following observations:

- The dike crests are free of any signs of tension cracking, depressions, or horizontal alignment variations.
- There were no indications of major scarps, sloughs, or bulging along the dikes.
- The computed factors of safety are within recommended limits.
- The areas of previous seepage appear under control and the owner is aware of the need to maintain vigilance of future seepage in the area. No other areas of seepage were noted during the inspection.

8.0 ADEQUACY OF MAINTENANCE AND METHODS OF OPERATION

8.1 OPERATING PROCEDURES

Coal combustion residue, primarily bottom ash and boiler slag, are sluiced through a piping system from the boiler ash hopper to the ash ponds. The cell of the pond receiving the ash rotates depending on the level of dried ash in the cell. The cells are interconnected, permitting control of the water levels in the cells. Each ash-settling cell can discharge clear water though a pipe at its southern end to the polishing cell. Water is recycled from Cell D back to the plant for re-use or discharged through the primary spillway to the drainage feature located east of the impoundment area.

8.2 MAINTENANCE OF THE DAM AND PROJECT FACILITIES

The Southern Company has developed a manual, "Safety Procedure for Dams and Dikes," (Appendix A- Doc 18) that establishes inspection and maintenance requirements for the impoundment dikes. The required procedures include:

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

8.3 ASSESSMENT OF MAINTENANCE AND METHODS OF OPERATIONS

8.3.1 Adequacy of Operating Procedures

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

8.3.2 Adequacy of Maintenance

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

9.0 ADEQUACY OF SURVEILLANCE AND MONITORING PROGRAM

9.1 SURVEILLANCE PROCEDURES

Weekly inspections

Weekly inspections are conducted by plant personnel. Inspection observations are documented on the "Plant McIntosh Weekly Ash Pond Dike Inspection Log" visual inspection checklist and report (see Appendix A Doc 12). Inspection reports are submitted to Southern Company Services Hydro Services Engineer for review and copies maintained in plant files.

In 2006, routine maintenance observations reported potential seepage along the west embankment. A technical inspection was conducted and recommendations for subsurface drain developed and the drain installed.

In February 2011, plant staff reported a potential seepage area along the west embankment. An inspection of the site resulted in the design and installation of an addition to the west bank drainage system installed in 2009. The new work was completed in February 2011. Observations made by dewberry indicated the new drainage system was functioning properly.

Annual inspections

Annual inspections are conducted by Southern Company Generation Hydro Services dam safety engineers. The 2010 inspection report was submitted September 15, 2010 (see Appendix A – 11)

The 2009 annual inspection identified potential seepage along a section of the east embankment and recommended installation of a filter drain. The filter drain was installed.

The 2010 annual inspection report indicated that the prior year's recommendation had been completed. The 2010 report also recommended expansion of the east embankment slope and toe drain. Observation made by Dewberry indicated the recommendation has been implemented.

9.2 INSTRUMENTATION MONITORING

Piezometers were installed in four of the soil test borings performed in August 2010. Records indicate water levels are measured monthly during one of the Weekly Ash Pond Dike Inspections.

9.3 ASSESSMENT OF SURVEILLANCE AND MONITORING PROGRAM

9.3.1 Adequacy of Inspection Program

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

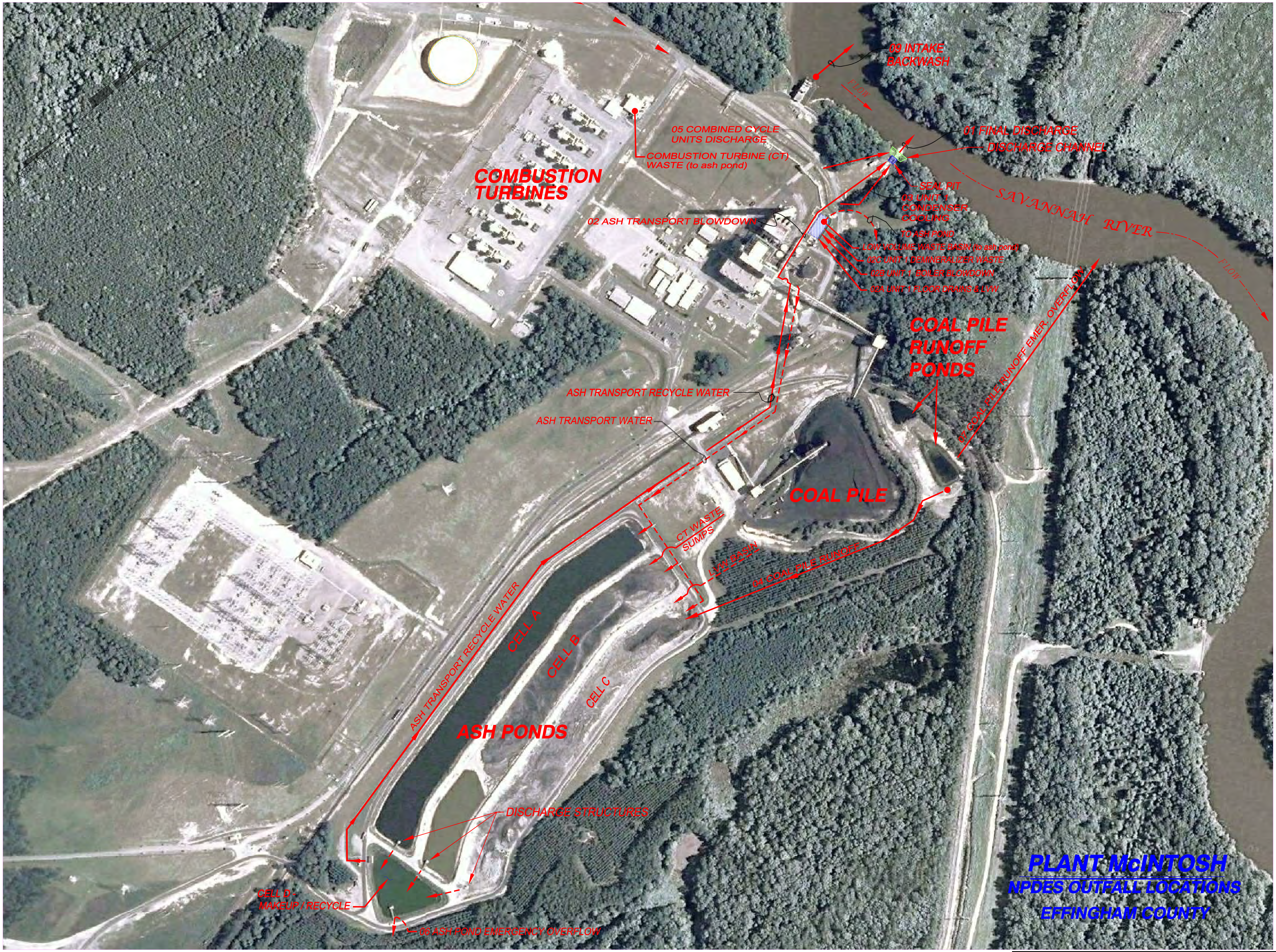
9.3.2 Adequacy of Instrumentation Monitoring Program

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

APPENDIX A

Document 1

Plant McIntosh Aerial Photograph



Confidential Business Information MCI API 038

Southern Company Generation Engineering and Construction Services FOR

Power Company

PLANT McINTOSH
NPDES PERMIT NO. GA0003883
NPDES SITE PLAN

REVISION 1	DATE 03-05-10	REVISION 0	DATE 11-19-03
A. INCORPORATED PROCESS FLOW UPDATES & NOMENCLATURE B. ISSUED FOR 2010 PERMIT APPLICATION EWO: 3490MH		A. APPROVED & ISSUED FOR 2003 PERMIT APPLICATION REA: SE03217 EWO: 0449-EY	

BY	CHK'D	CIVIL APPR	ELECT APPR	I/C APPR	MECH APPR	DISC MGR	BY	CHK'D	CIVIL APPR	ELECT APPR	I/C APPR	MECH APPR	DISC MGR
RVY	ABH	HP	X	X	X	ELM	RD	HP	HP	X	X	X	X

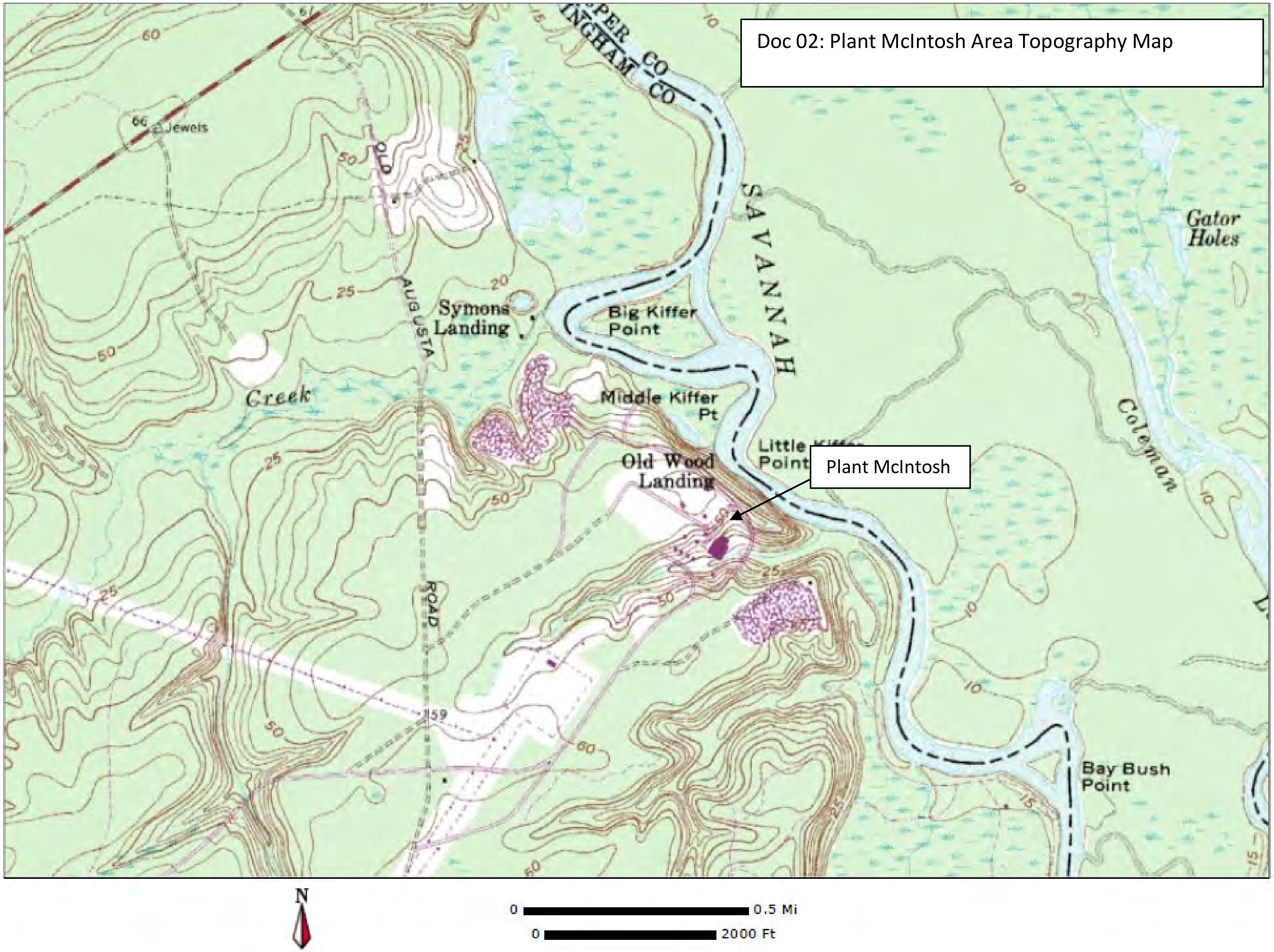
SCALE	DRAWING NUMBER	SHEET	CONT'D	REV
NONE	E1C5718	1	FINAL	1

ANSI E: 44x34

APPENDIX A

Document 2

Plant McIntosh Topographic Map


Doc 02: Plant McIntosh Area Topography Map
Plant McIntosh
SAVANNAH
Big Kiffer Point
Middle Kiffer Pt
Little Kiffer Point
Old Wood Landing
Symons Landing
Jewels
Creek
OLD AUGUSTA ROAD
Gator Holes
Coleman
Bay Bush Point
N
0
0.5 Mi
0
2000 Ft

APPENDIX A

Document 3

Plant McIntosh Plant History

Plant McIntosh – General Plant Info/History

- Construction of the plant site began in the late 1960's. Located at mile marker 43 on the Savannah River on approximately 2000 acres

- Plant McIntosh first produced power in December of 1978 and became a commercial plant in February of 1979

- Plant McIntosh was owned by Savannah Electric and Power Company from its construction up until the merger with Georgia Power, which took place in 2006.

- Plant McIntosh is comprised of nine generating units.
    - Eight units are combustion turbine generators that produce 80 MW each
    - One coal fired steam unit that produces 167 MW
    - Total generating capacity is 810 MW.

- The coal fired steam unit was originally designed to burn No. 6 fuel oil but was converted to coal in 1982.

- The eight ABB 11N combustion turbines began construction in 1992 and the units came online between 1994 and 1995. They are permitted to burn either No. 2 fuel oil, or natural gas.

- The ash pond was commissioned in 1982 along with the coal conversion on Unit 1. The ash pond is made up of 4 individual clay lined cells. Cells A, B, & C are ash storage cells, and D cell is the polishing cell. There is only one active cell in operation at a time. Ash pond discharges are permitted under a GA NPDES Permit

MCI-API 012

- Generally bottom ash is placed in the active ash storage cell, however there is capability to place fly ash in the active cell if other factors such as silo operation/maintenance issues arise.

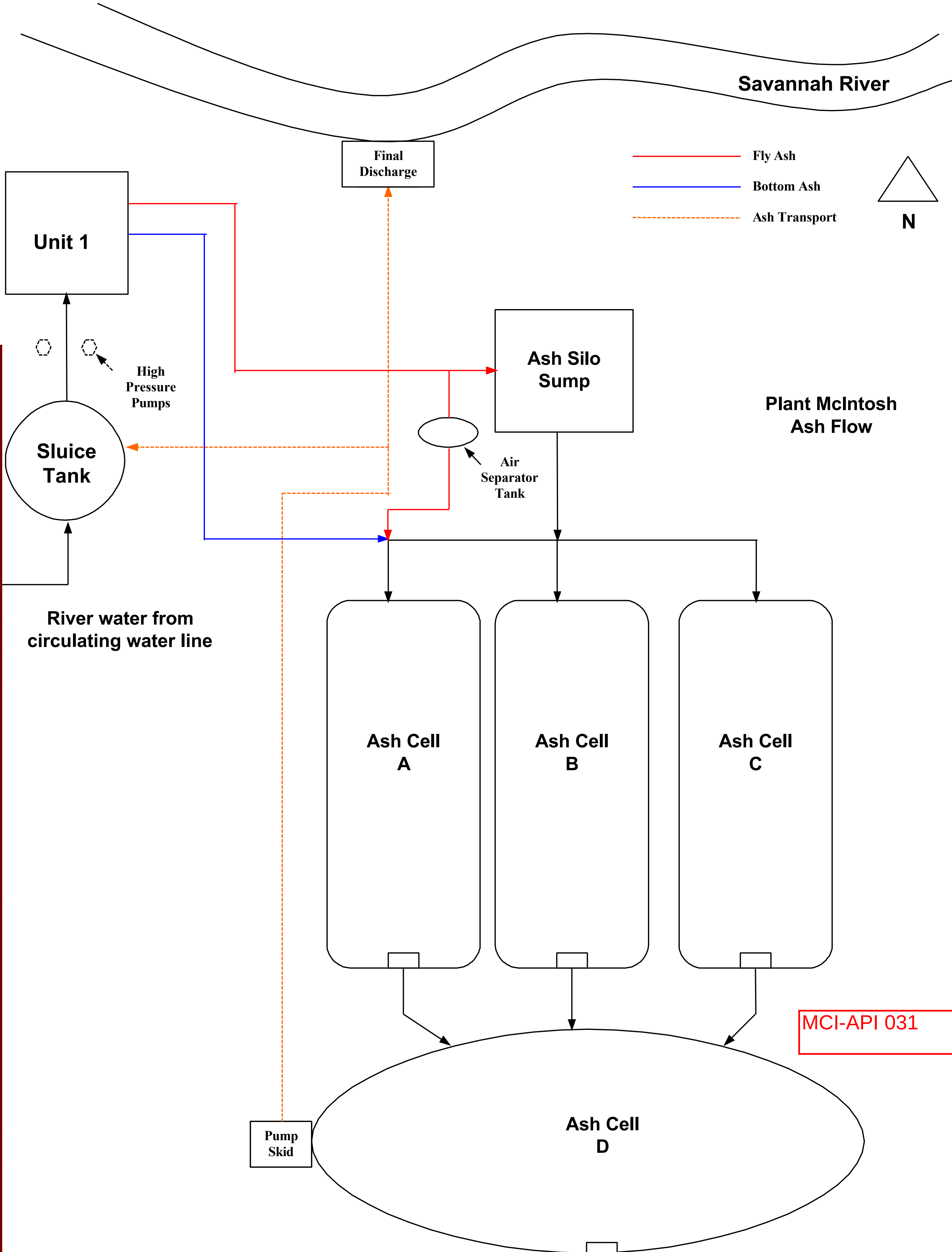
- Plant McIntosh has the capability to sell some of its fly ash, but has not sold any ash in quite sometime.

- As an active ash pond cell becomes full it is excavated. The ash is dewatered and hauled to the Plant McIntosh permitted solid waste disposal facility.

APPENDIX A

Document 4

Plant McIntosh Ash Residue Flow Chart



Savannah River
Final Discharge
Fly Ash
Bottom Ash
Ash Transport
N
Unit 1
High Pressure Pumps
Sluice Tank
Ash Silo Sump
Plant McIntosh Ash Flow
Air Separator Tank
River water from circulating water line
Ash Cell A
Ash Cell B
Ash Cell C
Ash Cell D
Pump Skid
Emergency Discharge

MCI-API 031

APPENDIX A

Document 5

GA DNR Safe Dams Program Classification Letters

Georgia Department of Natural Resources
Environmental Protection Division
Safe Dams Program
4244 International Parkway
Suite 110, Atlanta, GA 30354
Chris Clark, Commissioner
F. Allen Barnes, Director

April 22, 2010

Mr. Larry B. Wills
c/o Georgia Power
241 Ralph McGill Blvd., Bin 10193
Atlanta, Georgia 30308

SUBJECT: Plant McIntosh
Ash Cell A Dam
Effingham County

Dear Mr. Wills:

The Ash Cell A Dam (an existing dam) in Effingham County has been classified Category II by the Environmental Protection Division. A probable loss of life situation was judged not to exist in the event of a sudden failure of the dam.

You should be aware that the hazard category is subject to change without notice, due to changes in downstream land use. The dam will be re-inventoried at least once every 5 years. If significant development occurs in the dam failure flood zone downstream of the dam, it could be reclassified and a permit would be required by the State of Georgia for continued operation of the dam.

With a Category II classification, no action on your part is required under the Georgia Safe Dams Act.

INVENTORY INFORMATION

ID NO:	051-017-05840	**COE NO:**	-------
LAT:	32° 20' 56.8" N	**QUAD:**	Rincon
LONG:	81° 10' 23.8" W	**STREAM:**	unknown
HGT (TOD):	14 feet	**TRIB:**	Savannah River
STG (MAX):	127 acre-feet	**INV. BY:**	Robert Ringer
STG (NWL):	115 acre-feet		

DIRECTIONS: From Rincon, take 4th St. east for approx. 4.9 miles (name changes to Rincon Stillwell Rd.) to State Route 275. Turn right and follow for 4.7 miles to Old Augusta Road and turn right. Continue for approx. 1.6 miles to plant entrance on left (follow signage). Sign in at security gate and you will be escorted to plant.

If there are any questions, please contact the Safe Dams Program at 404/362-2678.

Sincerely,

Francis E. Fiegle II

Francis E. Fiegle II, P.E.
Program Manager
Safe Dams Program

MCI-API 013

RR:ks
cc: The Honorable Dusty Zeigler, Chairman, Effingham County Board of Commissioners
USACOE Regulatory Branch

S:\Damdocs\Classification Letters\Category II\Plant McIntosh Ash Cell A Dam (existing) April 2010.doc

Georgia Department of Natural Resources

Environmental Protection Division

Safe Dams Program
4244 International Parkway
Suite 110, Atlanta, GA 30354
Chris Clark, Commissioner
F. Allen Barnes, Director

April 22, 2010

Mr. Larry B. Wills
c/o Georgia Power
241 Ralph McGill Blvd., Bin 10193
Atlanta, Georgia 30308

SUBJECT: Plant McIntosh
Ash Cell B Dam
Effingham County

Dear Mr. Wills:

The Ash Cell B Dam (an existing dam) in Effingham County has been classified Category II by the Environmental Protection Division. A probable loss of life situation was judged not to exist in the event of a sudden failure of the dam.

You should be aware that the hazard category is subject to change without notice, due to changes in downstream land use. The dam will be re-inventoried at least once every 5 years. If significant development occurs in the dam failure flood zone downstream of the dam, it could be reclassified and a permit would be required by the State of Georgia for continued operation of the dam.

With a Category II classification, no action on your part is required under the Georgia Safe Dams Act.

INVENTORY INFORMATION

ID NO:	051-018-05841	**COE NO:**	-------
LAT:	32° 20' 56.0" N	**QUAD:**	Rincon
LONG:	81° 10' 22.4" W	**STREAM:**	unknown
HGT (TOD):	22 feet	**TRIB:**	Savannah River
STG (MAX):	119 acre-feet	**INV. BY:**	Robert Ringer
STG (NWL):	108 acre-feet		

DIRECTIONS: From Rincon, take 4th St. east for approx. 4.9 miles (name changes to Rincon Stillwell Rd.) to State Route 275. Turn right and follow for 4.7 miles to Old Augusta Road and turn right. Continue for approx. 1.6 miles to plant entrance on left (follow signage). Sign in at security gate and you will be escorted to plant.

If there are any questions, please contact the Safe Dams Program at 404/362-2678.

Sincerely,

Francis E Fiegle

Francis E. Fiegle II, P.E.
Program Manager
Safe Dams Program

RR:ks
cc: The Honorable Dusty Zeigler, Chairman, Effingham County Board of Commissioners
USACOE Regulatory Branch

S:\Damdocs\Classification Letters\Category II\Plant McIntosh Ash Cell B Dam (existing) April 2010.doc

Georgia Department of Natural Resources
Environmental Protection Division
Safe Dams Program
4244 International Parkway
Suite 110, Atlanta, GA 30354
Chris Clark, Commissioner
F. Allen Barnes, Director

April 22, 2010

Mr. Larry B. Wills
c/o Georgia Power
241 Ralph McGill Blvd., Bin 10193
Atlanta, Georgia 30308

SUBJECT: Plant McIntosh
Ash Cell C Dam
Effingham County

Dear Mr. Wills:

The Ash Cell C Dam (an existing dam) in Effingham County has been classified Category II by the Environmental Protection Division. A probable loss of life situation was judged not to exist in the event of a sudden failure of the dam.

You should be aware that the hazard category is subject to change without notice, due to changes in downstream land use. The dam will be re-inventoried at least once every 5 years. If significant development occurs in the dam failure flood zone downstream of the dam, it could be reclassified and a permit would be required by the State of Georgia for continued operation of the dam.

With a Category II classification, no action on your part is required under the Georgia Safe Dams Act.

INVENTORY INFORMATION

ID NO:	051-019-05842	**COE NO:**	-------
LAT:	32° 20' 55.3" N	**QUAD:**	Rincon
LONG:	81° 10' 20.6" W	**STREAM:**	unknown
HGT (TOD):	36 feet	**TRIB:**	Savannah River
STG (MAX):	108 acre-feet	**INV. BY:**	Robert Ringer
STG (NWL):	98 acre-feet		

DIRECTIONS: From Rincon, take 4th St. east for approx. 4.9 miles (name changes to Rincon Stillwell Rd.) to State Route 275. Turn right and follow for 4.7 miles to Old Augusta Road and turn right. Continue for approx. 1.6 miles to plant entrance on left (follow signage). Sign in at security gate and you will be escorted to plant.

If there are any questions, please contact the Safe Dams Program at 404/362-2678.

Sincerely,

Francis E. Fiegle II, P.E.
Program Manager
Safe Dams Program

RR:ks
cc: The Honorable Dusty Zeigler, Chairman, Effingham County Board of Commissioners
USACOE Regulatory Branch

S:\Damdocs\Classification Letters\Category II\Plant McIntosh Ash Cell C Dam (existing) April 2010.doc

Georgia Department of Natural Resources
Environmental Protection Division
Safe Dams Program
4244 International Parkway
Suite 110, Atlanta, GA 30354
Chris Clark, Commissioner
F. Allen Barnes, Director
(404) 362-2678

April 29, 2010

Mr. Larry B. Wills
c/o Georgia Power
241 Ralph McGill Blvd., Bin 10193
Atlanta, Georgia 30308

SUBJECT: Plant McIntosh
Cell D (polishing pond) Dam
Effingham County

Dear Mr. Wills:

The Safe Dams Program of the Georgia Environmental Protection Division visited an existing Cell D Dam on April 14, 2010. The dam was determined to be 20 feet in height and has 23 acre-feet of storage volume. This dam has been classified Exempt by the Environmental Protection Division.

This structure is exempt from regulation under the Georgia Safe Dams Act because it is less than 25 feet in height and has a maximum storage volume of less than 100 acre feet.

If there are further questions, please contact the Safe Dams Program at (404) 362-2678.

Sincerely,

Robert Ringer
Dam Classifier

RR:ks

cc: Honorable Dusty Ziegler, Chairman, Effingham County Board of Commissioners

S:\Damdocs\Classification Letters\Exempt\Plant McIntosh Cell D (existing) exempt ltr (April 2010).doc

APPENDIX A

Document 6

Plant McIntosh, Georgia Power Response to EPA Request for Information, April 9, 2009

April 6, 2009

PLANT MCINTOSH
P. O. Box 2507
Rincon, Georgia 31326

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

Please provide the information requested below for each surface impoundment or similar diked or bermed management unit(s) or management units designated as landfills which receive liquid-borne material for the storage or disposal of residuals or by-products from the combustion of coal, including, but not limited to, fly ash, bottom ash, boiler slag, or flue gas emission control residuals. This includes units that no longer receive coal combustion residues or by-products, but still contain free liquids.

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

   The National Inventory of Dams (NID) does not list the Plant McIntosh ash pond. The Georgia Environmental Protection Division Safe Dams Program does not list the Plant McIntosh ash pond in its inventory. Based on this, this unit does not have a rating.

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

   The Plant McIntosh ash pond was commissioned in 1982.

3. *What materials are temporarily or permanently contained in the unit? Use the following categories to respond to this question: (1) fly ash; (2) bottom ash; (3) boiler slag; (4) flue gas emission control residuals; (5) other. If the management unit contains more than one type of material, please identify all that apply. Also, if you identify "other", please specify the other types of materials that are temporarily or permanently contained in the unit(s).*

   Plant McIntosh ash pond contains fly ash, bottom ash, boiler slag, pyrites and other low volume waste as defined in 40 CFR 423.11.

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

   (a) Yes, the management unit was designed by a Professional Engineer.

(b) Yes, the Plant McIntosh ash pond was constructed under the supervision of a Professional Engineer.
(c) Yes, the inspection and monitoring of the safety of the Plant McIntosh ash pond is under the supervision of a Professional Engineer. See 5(b).

5. [Response provided in an appendix.]

6. [Response provided in an appendix.]

7. [Response provided in an appendix.]

8. [Response provided in an appendix.]

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

   There have been no spills or unpermitted releases from the Plant McIntosh ash pond within the last ten years.

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

    Georgia Power is the legal owner and operator of this facility.

CONFIDENTIAL APPENDIX

April 6, 2009

PLANT MCINTOSH
P. O. Box 2507
Rincon, Georgia 31326

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

Please provide the information requested below for each surface impoundment or similar diked or bermed management unit(s) or management units designated as landfills which receive liquid-borne material for the storage or disposal of residuals or by-products from the combustion of coal, including, but not limited to, fly ash, bottom ash, boiler slag, or flue gas emission control residuals. This includes units that no longer receive coal combustion residues or by-products, but still contain free liquids.

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

   (a) The Plant McIntosh ash pond was last inspected on January 16, 2009. This structure will be inspected annually as part of a comprehensive dam safety program run by the Southern Company Generation Hydro Services group. This dam safety program covers all of Southern Company's ash pond dams, storage pond dams, and hydroelectric dams. Additionally, plant personnel check these dams on a frequent basis.

   (b) The inspector for Plant McIntosh is Joel L. Galt, PE. Mr. Galt holds a Bachelor of Civil Engineering and a Master of Science in Civil Engineering (Geotechnical). He has over 30 years of experience in geotechnical engineering, the majority of this related to dams. The dam safety inspection results are reviewed by another geotechnical engineer (Larry B. Wills PE, who has over 20 years experience working with dams).

   (c) Plant staff is currently obtaining a contractor to perform needed erosion repairs, clear the lane at the toe of the ash pond, place gravel and sand stockpiles on the east and west sides of the ash pond, and implement recommended vegetation control measures. The work is expected to be complete by the end of June 2009. Joel Galt, PE of SCG Hydro Services, is working with the plant staff on a drainage issue.

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Not Subject to Disclosure under the Freedom of Information Act

(d) No special credentials are required for the majority of this work. Mr. Galt's credentials are covered above.

(e) The next inspection of the Plant McIntosh ash pond by the Southern Company Generation Hydro Services group is scheduled for the first quarter of 2010.

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

   There have been no State or Federal inspections or evaluations of the safety (structural integrity) of the Plant McIntosh ash pond.

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

   We are not aware of any state or federal assessment, evaluations, or inspections of the Plant McIntosh ash pond conducted within the last year that have uncovered a safety issue with these management units.

8. *What is the surface area (acres) and total storage capacity of each of the management units? What is the volume of material currently stored in each of the management units. Please provide the date that the volume measurement was taken.*

Management Unit	Surface area (acres)	Total storage capacity (yd^3)	Volume of material currently stored in unit (yd^3)	Date current volume measurement taken	Maximum height of management unit (feet)
McIntosh Ash Pond	27	552,156	136,528	March 2009	36

Engineering. He has over 20 years of experience in civil and geotechnical engineering with a considerable portion of this being related to slope stability studies and the design, construction, and inspection of dams and earth-fill embankments. He has been a full-time dam safety professional with Southern Company for the last year. The dam safety inspection results by Mr. Armitage are reviewed by two geotechnical engineers (Larry B. Wills, PE and Joel L. Galt, PE, each with over 20 years experience working with dams).

(c) As a result of the most recent inspection Plant Scherer personnel have made plans to or have begun treating fire ant mounds on the slopes with insecticide, filling rodent burrows in the slopes, and treating bare spots with grass seed, mulch and fertilizer. Construction materials have been removed from the toe of the slope and work has been scheduled to repair the ruts on the crest of the dike. These repairs are considered ongoing maintenance items.

(d) None of this work requires particular credentials. All of this work is being carried out in consultation with Mr. Hugh Armitage, PE.

(e) The next inspection by Southern Company Generation Hydro Services of the Plant Scherer ash pond dam is scheduled for the second quarter of 2009.

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

   Please provide a copy of the most recent official inspection report or evaluation.

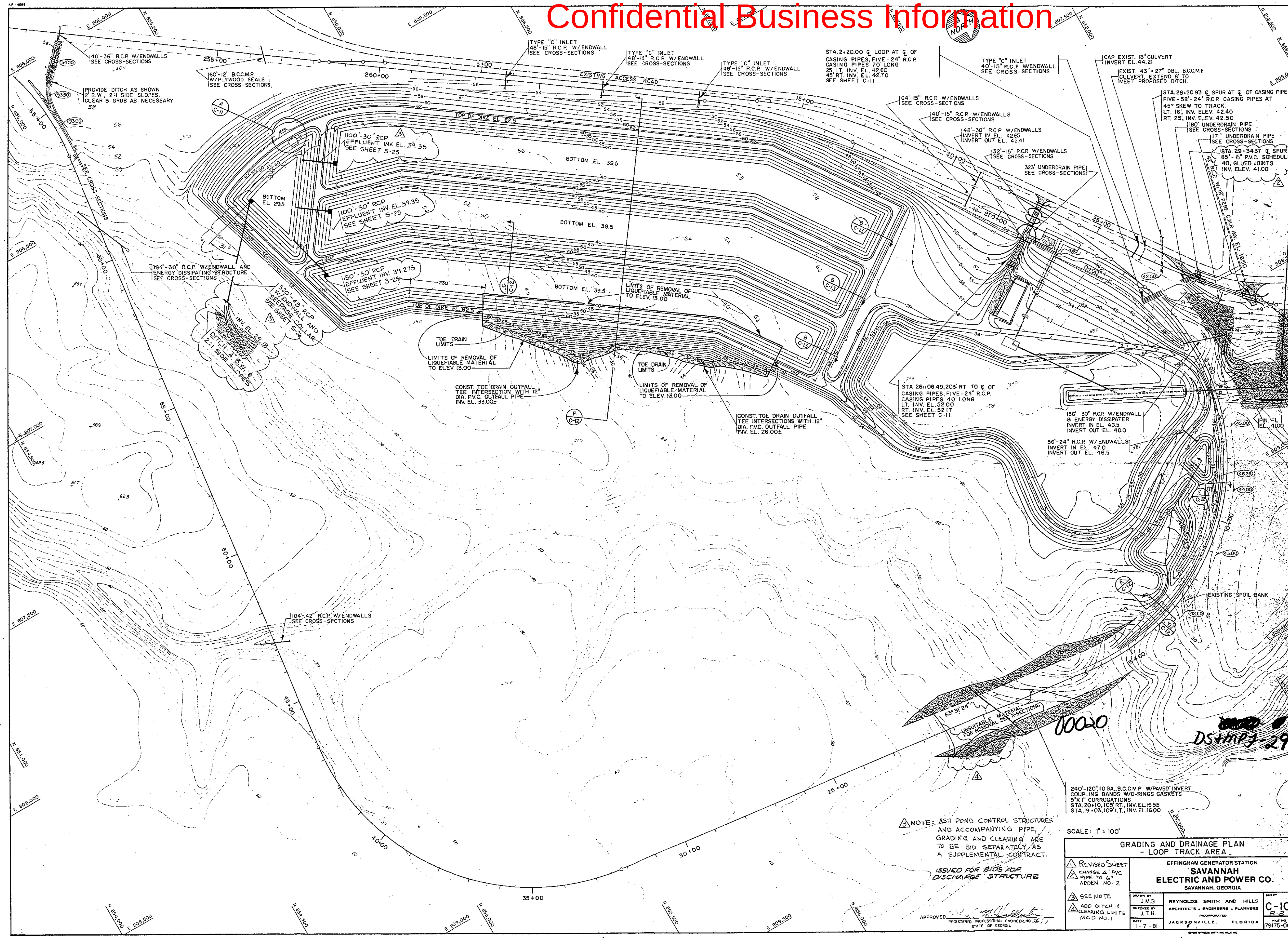
   There have been no State or Federal inspections of the Plant Scherer ash pond.

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

APPENDIX A

Document 7

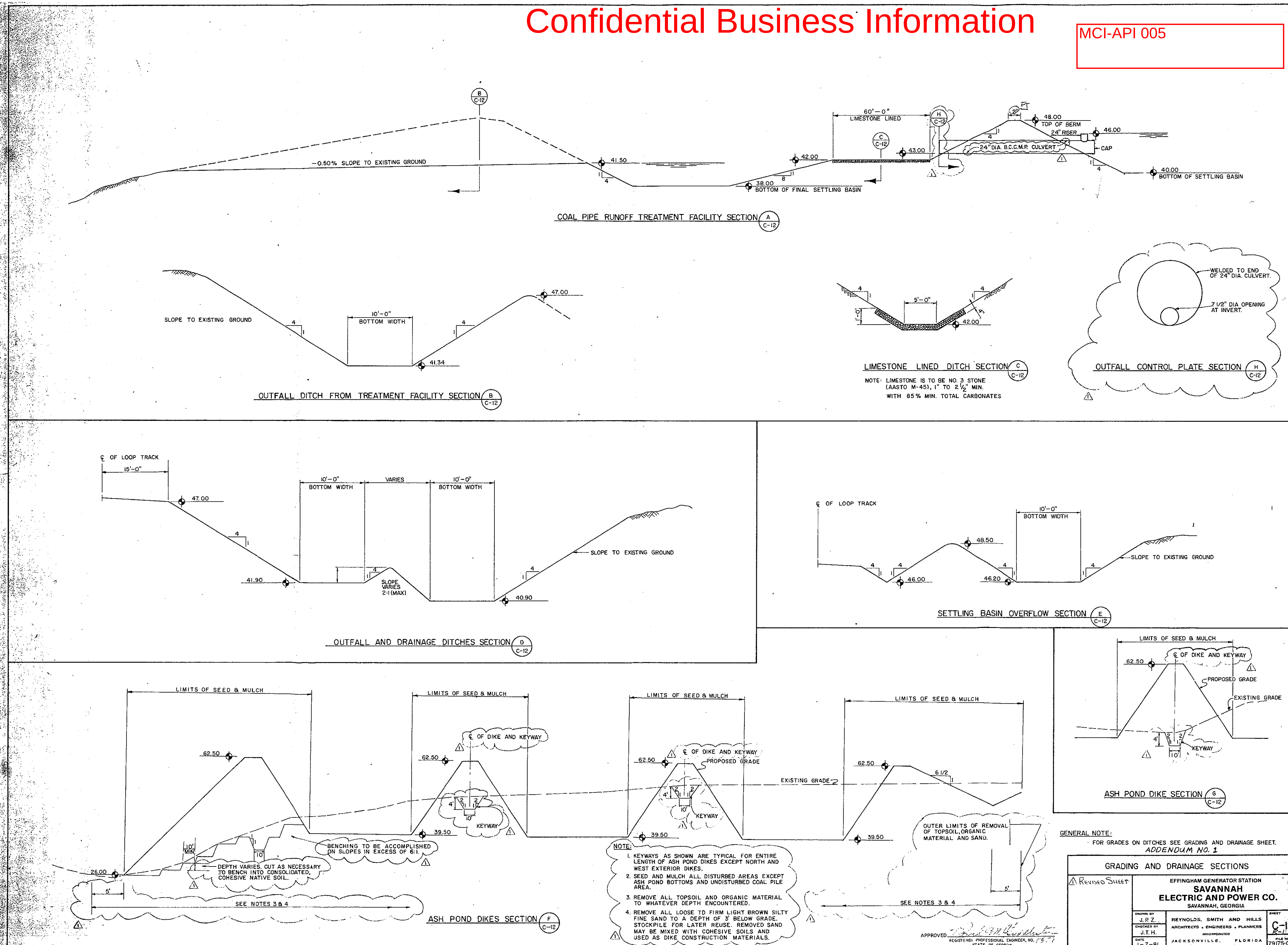
Effingham Generator Station Grading and Drainage Plan and Sections, Sheets C-10 and C-12, January 7, 1981


TYPE "C" INLET 48'-15" R.C.P. W/ENDWALL SEE CROSS-SECTIONS
140'-36" R.C.P. W/ENDWALLS SEE CROSS-SECTIONS
160'-12" B.C.C.M.P. W/PLYWOOD SEALS SEE CROSS-SECTIONS
PROVIDE DITCH AS SHOWN 2' B.W., 2:1 SIDE SLOPES CLEAR & GRUB AS NECESSARY
EXISTING ACCESS ROAD
TYPE "C" INLET 48'-15" R.C.P. W/ENDWALL SEE CROSS-SECTIONS
TYPE "C" INLET 48'-15" R.C.P. W/ENDWALL SEE CROSS-SECTIONS
STA.2+20.00 ℄ LOOP AT ℄ OF CASING PIPES, FIVE - 24" R.C.P. CASING PIPES 70' LONG 25' LT. INV. EL. 42.60 45' RT. INV. EL. 42.70 SEE SHEET C-11
TYPE "C" INLET 40'-15" R.C.P. W/ENDWALL SEE CROSS-SECTIONS
CAP EXIST. 18" CULVERT INVERT EL. 44.21
EXIST. 43"×27" DBL. B.C.C.M.P. CULVERT. EXTEND 8' TO MEET PROPOSED DITCH.
STA.28+20.93 ℄ SPUR AT ℄ OF CASING PIPES, FIVE - 58'- 24" R.C.P. CASING PIPES AT 45° SKEW TO TRACK. LT. 16', INV. ELEV. 42.40 RT. 25', INV. ELEV. 42.50
180' UNDERDRAIN PIPE SEE CROSS-SECTIONS
171' UNDERDRAIN PIPE SEE CROSS-SECTIONS
STA. 29+34.37 ℄ SPUR 85'- 6" P.V.C. SCHEDULE 40, GLUED JOINTS INV. ELEV. 41.00
64'-15" R.C.P. W/ENDWALLS SEE CROSS-SECTIONS
40'-15" R.C.P. W/ENDWALLS SEE CROSS-SECTIONS
48'-30" R.C.P. W/ENDWALLS INVERT IN EL. 42.65 INVERT OUT EL. 42.41
32'-15" R.C.P. W/ENDWALLS SEE CROSS-SECTIONS
323' UNDERDRAIN PIPE SEE CROSS-SECTIONS
TOP OF DIKE EL. 62.5
100'-30" RCP EFFLUENT INV. EL. 39.35 SEE SHEET S-25
BOTTOM EL. 39.5
BOTTOM EL. 29.5
100'-30" RCP EFFLUENT INV. EL. 39.35 SEE SHEET S-25
BOTTOM EL. 39.5
164'-30" R.C.P. W/ENDWALL AND ENERGY DISSIPATING STRUCTURE SEE CROSS-SECTIONS
150'-30" RCP EFFLUENT INV. 39.275 SEE SHEET S-25
BOTTOM EL. 39.5
330'-48" RCP W/ENDWALL AND SEEPAGE COLLAR SEE SHEET S-24
INV. EL. 29.18
DITCH 4' B.W. & 2:1 SIDE SLOPES
LIMITS OF REMOVAL OF LIQUEFIABLE MATERIAL TO ELEV. 13.00
TOP OF DIKE EL. 62.5
TOE DRAIN LIMITS
LIMITS OF REMOVAL OF LIQUEFIABLE MATERIAL TO ELEV 13.00
CONST. TOE DRAIN OUTFALL TEE INTERSECTION WITH 12" DIA. PVC. OUTFALL PIPE INV. EL. 33.00±
TOE DRAIN LIMITS
LIMITS OF REMOVAL OF LIQUEFIABLE MATERIAL TO ELEV. 13.00
CONST. TOE DRAIN OUTFALL TEE INTERSECTION WITH 12" DIA. PVC. OUTFALL PIPE INV. EL. 26.00±
STA 25+06.49, 203' RT. TO ℄ OF CASING PIPES, FIVE-24" R.C.P. CASING PIPES 40' LONG LT. INV. EL. 52.00 RT. INV. EL. 52.17 SEE SHEET C-11
136'-30" R.C.P. W/ENDWALL & ENERGY DISSIPATER INVERT IN EL. 40.5 INVERT OUT EL. 40.0
56'-24" R.C.P. W/ENDWALLS INVERT IN EL. 47.0 INVERT OUT EL. 46.5
EXISTING SPOIL BANK
104'-42" R.C.P. W/ENDWALLS SEE CROSS-SECTIONS
INSUITABLE MATERIAL FOR REMOVAL SEE X-SECTIONS
240'-120", 10 GA., B.C.C.M.P. W/PAVED INVERT COUPLING BANDS W/O-RINGS GASKETS 5"X1" CORRUGATIONS STA. 20+10, 105' RT., INV. EL. 16.55 STA. 19+03, 109' LT., INV. EL. 16.00
00020
DSHMPJ-29
NOTE: ASH POND CONTROL STRUCTURES AND ACCOMPANYING PIPE, GRADING AND CLEARING ARE TO BE BID SEPARATELY AS A SUPPLEMENTAL CONTRACT.
ISSUED FOR BIDS FOR DISCHARGE STRUCTURE
SCALE: 1" = 100'
GRADING AND DRAINAGE PLAN - LOOP TRACK AREA
1 REVISED SHEET
2 CHANGE 4" PVC PIPE TO 6" ADDEN NO. 2
3 SEE NOTE
4 ADD DITCH & CLEARING LIMITS MCD NO. 1
EFFINGHAM GENERATOR STATION
SAVANNAH ELECTRIC AND POWER CO.
SAVANNAH, GEORGIA
DRAWN BY J.M.B.
CHECKED BY J.T.H.
DATE 1-7-81
REYNOLDS SMITH AND HILLS ARCHITECTS • ENGINEERS • PLANNERS INCORPORATED JACKSONVILLE, FLORIDA
SHEET C-10 R-2
FILE NO. 79175-003
APPROVED
REGISTERED PROFESSIONAL ENGINEER, NO. STATE OF GEORGIA

Base Sheet

Confidential Business Information

MCI-API 005



APPENDIX A

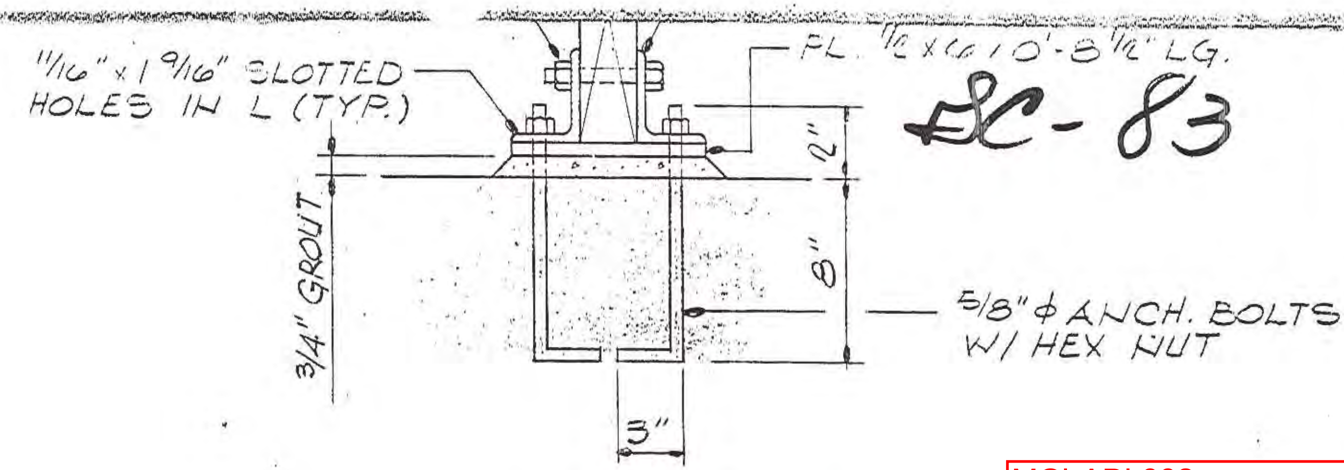
Document 8

Effingham Generator Station Discharge Structure Type I Plans, Sections and Details, Sheet S-25, February 9, 1981

00020

EC-83

MCI-API 008



ANCHOR DETAIL (G / S-25)
1 1/2" = 1'-0"

1 / S-25

DISCHARGE STRUCTURE TYPE I
PLANS, SECTIONS AND DETAILS

AB + C
WEIR
BOXES

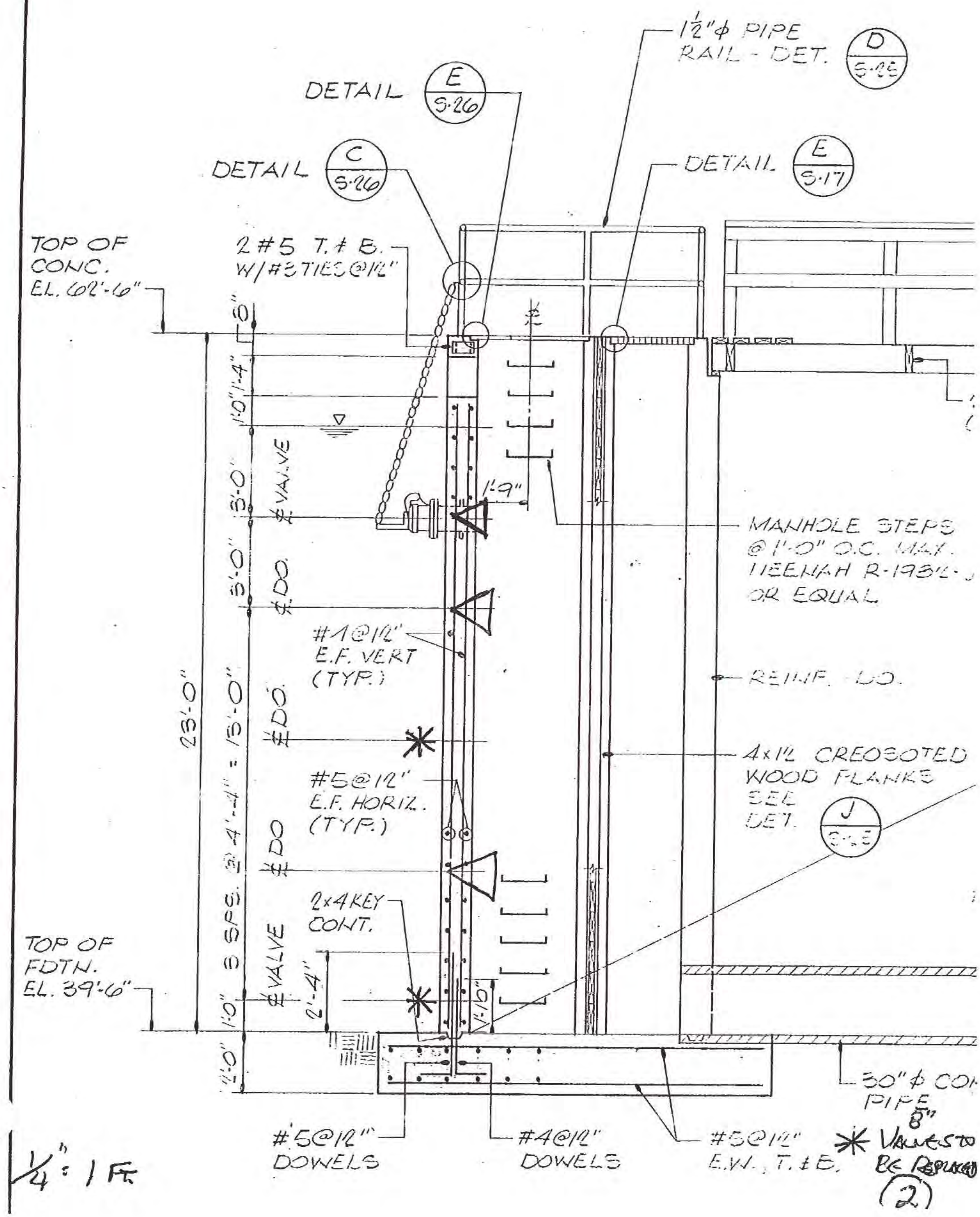
8" VALVES (5)

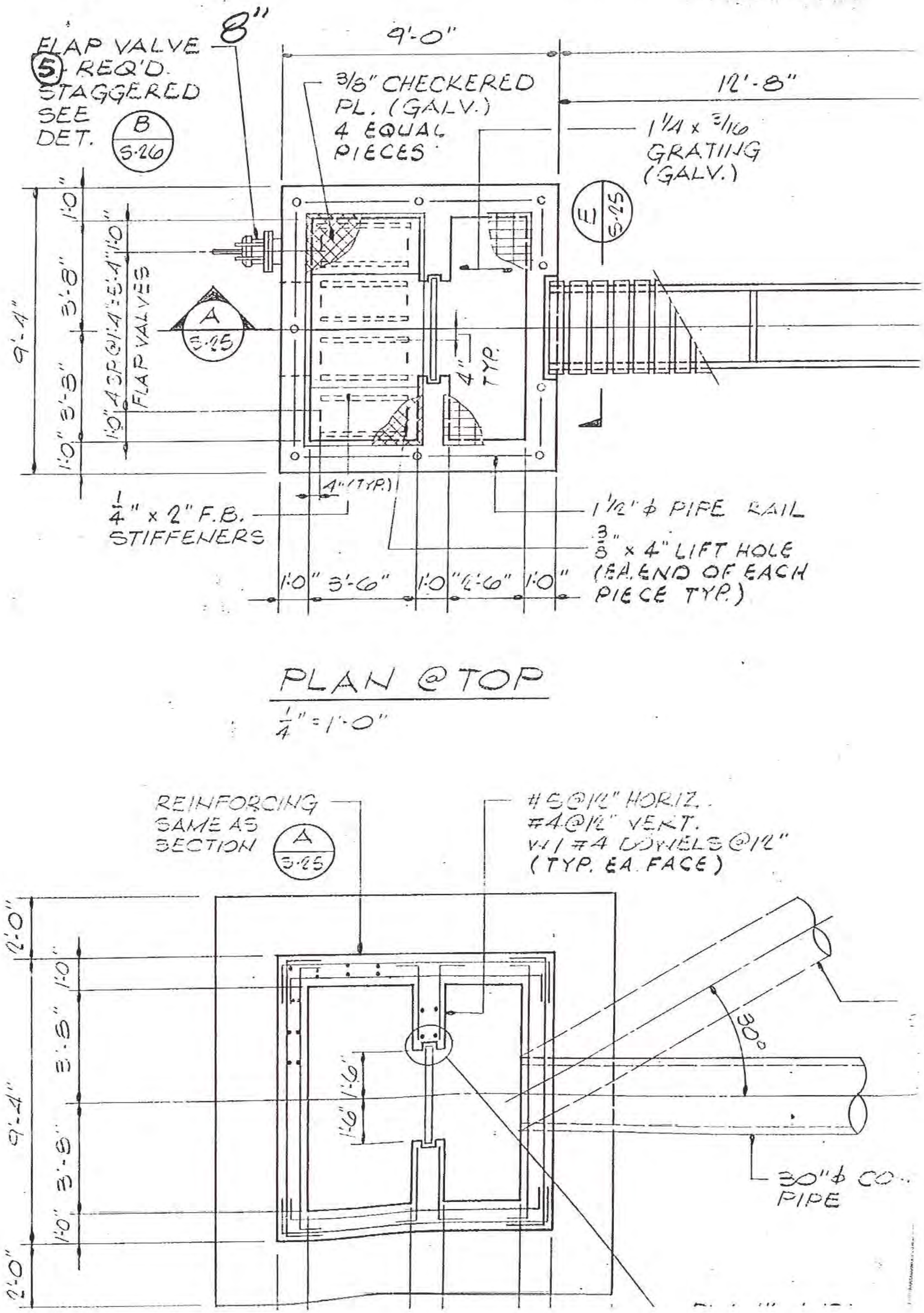
EFFINGHAM GENERATOR STATION
SAVANNAH
ELECTRIC AND POWER CO.
SAVANNAH, GEORGIA

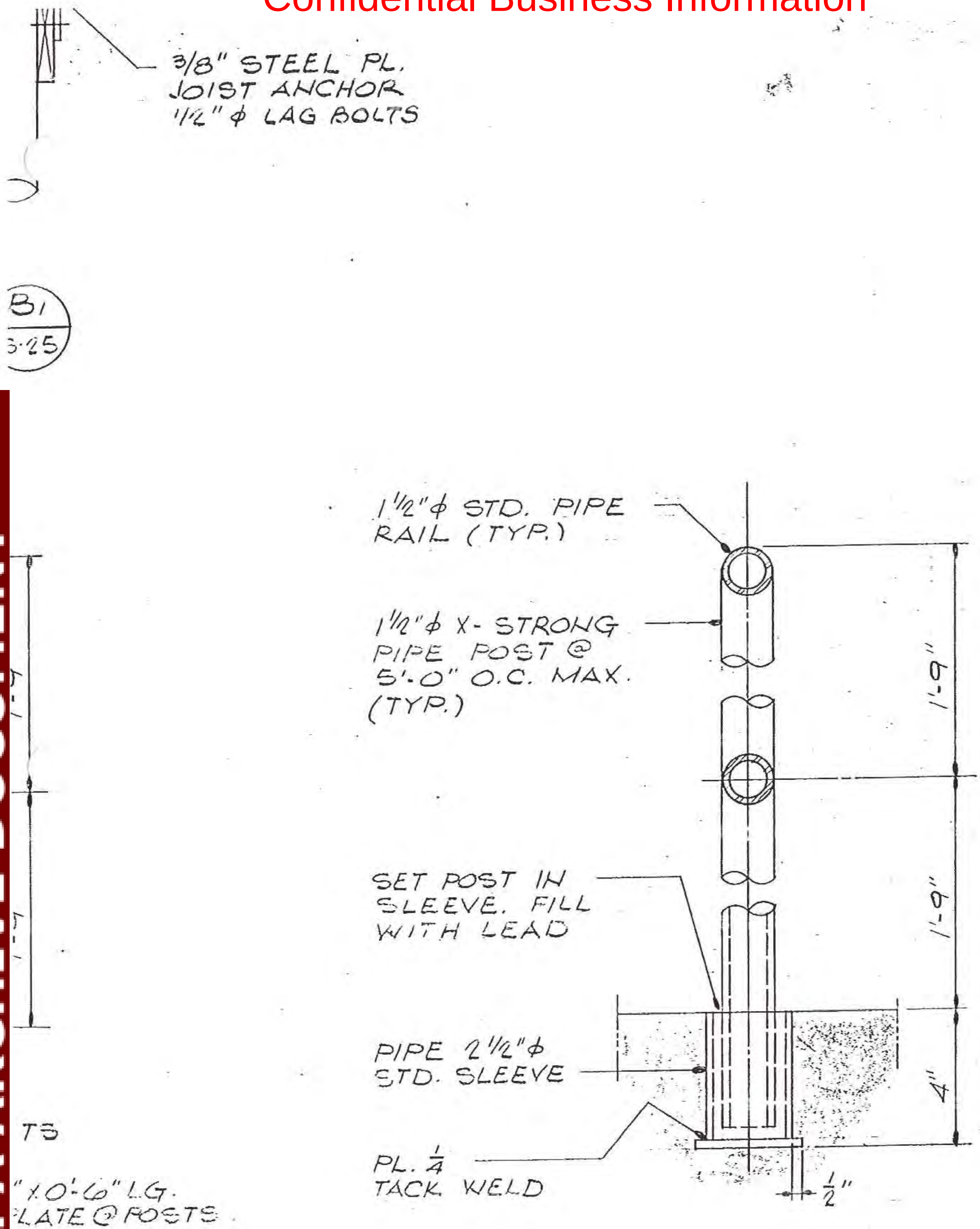
DRAWN BY	REYNOLDS, SMITH AND HILLS	SHEET
M.A.G.	ARCHITECTS • ENGINEERS • PLANNERS	S-25
CHECKED BY R.B.P.	INCORPORATED	
DATE 2-9-81	JACKSONVILLE, FLORIDA	FILE NO. 79175-003

(6 - 8" BALL VALVES)
PLUG REMAINING VALVES
(9 - 8" PLUGS/BLANK FLANGES)

25' CHAIN FOR BOTTOM VALVE ON A, B + C (35' FOR "D")




FLAP VALVE 8"
(5) REQ'D. STAGGERED SEE DET. B S-26
9'-0"
3/8" CHECKERED PL. (GALV.) 4 EQUAL PIECES
12'-8"
1 1/4 x 3/16 GRATING (GALV.)
E S-25
A S-25
1'-0" 4 SP @1'-4"=5'-4" 1'-0" FLAP VALVES
9'-4"
1'-0" 3'-8" 3'-8" 1'-0"
4" TYP.
4" (TYP.)
1/4" x 2" F.B. STIFFENERS
1 1/2" ϕ PIPE RAIL
3/8" x 4" LIFT HOLE (EA. END OF EACH PIECE TYP.)
1'-0" 3'-6" 1'-0" 2'-6" 1'-0"
PLAN @ TOP
1/4" = 1'-0"
REINFORCING SAME AS SECTION A S-25
#5@12" HORIZ.
#4@12" VERT.
W/ #4 DOWELS @12"
(TYP. EA. FACE)
2'-0"
1'-0" 3'-8" 3'-8" 1'-0"
9'-4"
1'-6" 1'-6"
30°
30" ϕ CO.. PIPE



STL. PIPERAIL - DET. D S-25

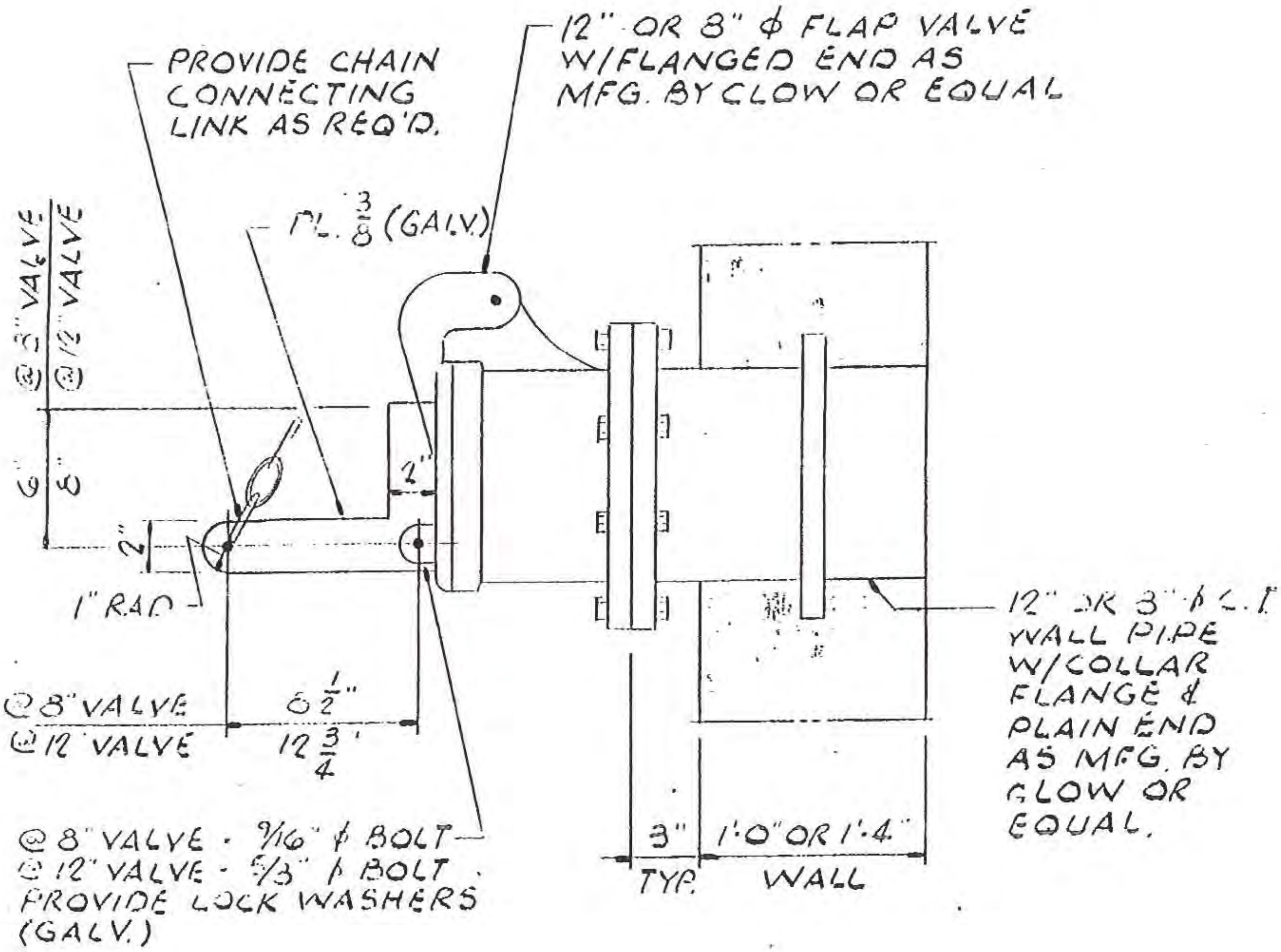
3" = 1'-0"

NOTES:

1. ALL RAIL JOINTS TO BE WELDED &

A; B & C 8" FLAP VALVES

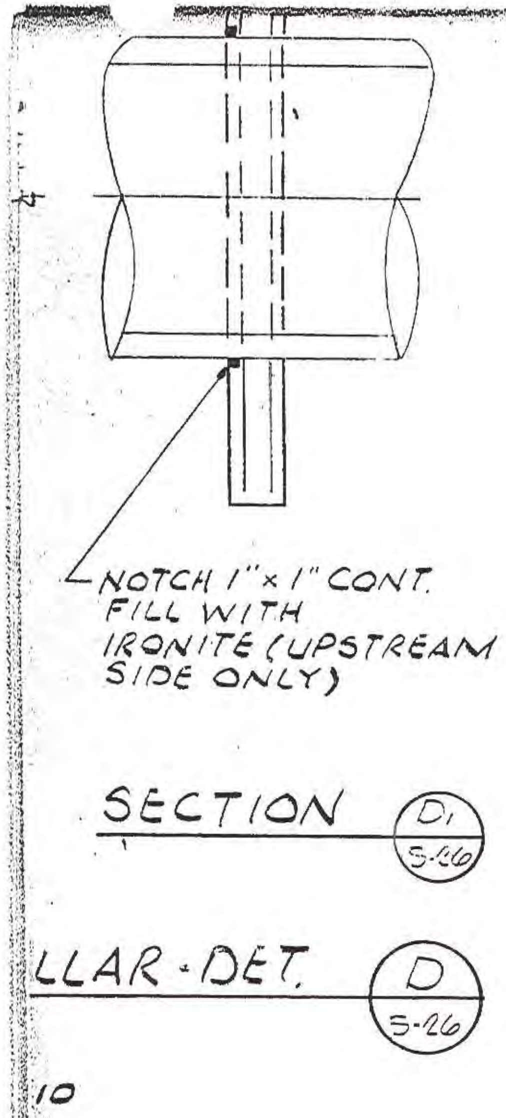
INC.

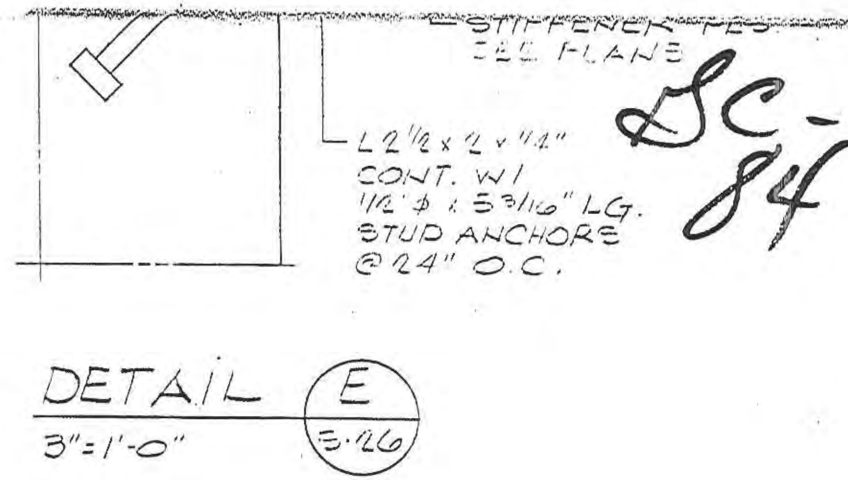


TYPICAL FLAP VALVE DETAIL (B / S-26)

1 1/2" = 1'-0"

NOTE:
FOR LOCATION OF DISCHARGE STRUCTURE SEE SHTS. C-9 & C-10





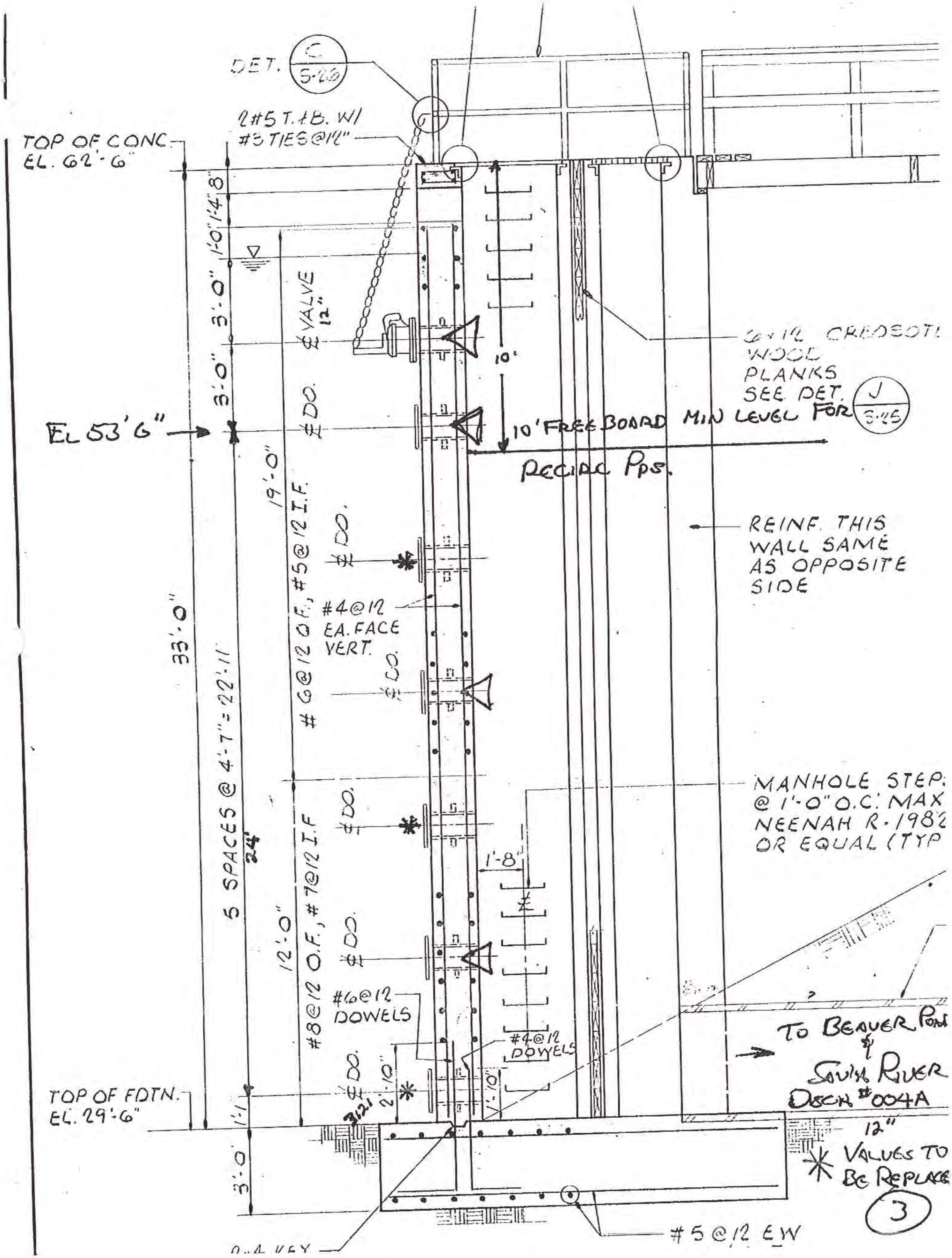
DISCHARGE STRUCTURE TYPE II
PLANS, SECTIONS AND DETAILS

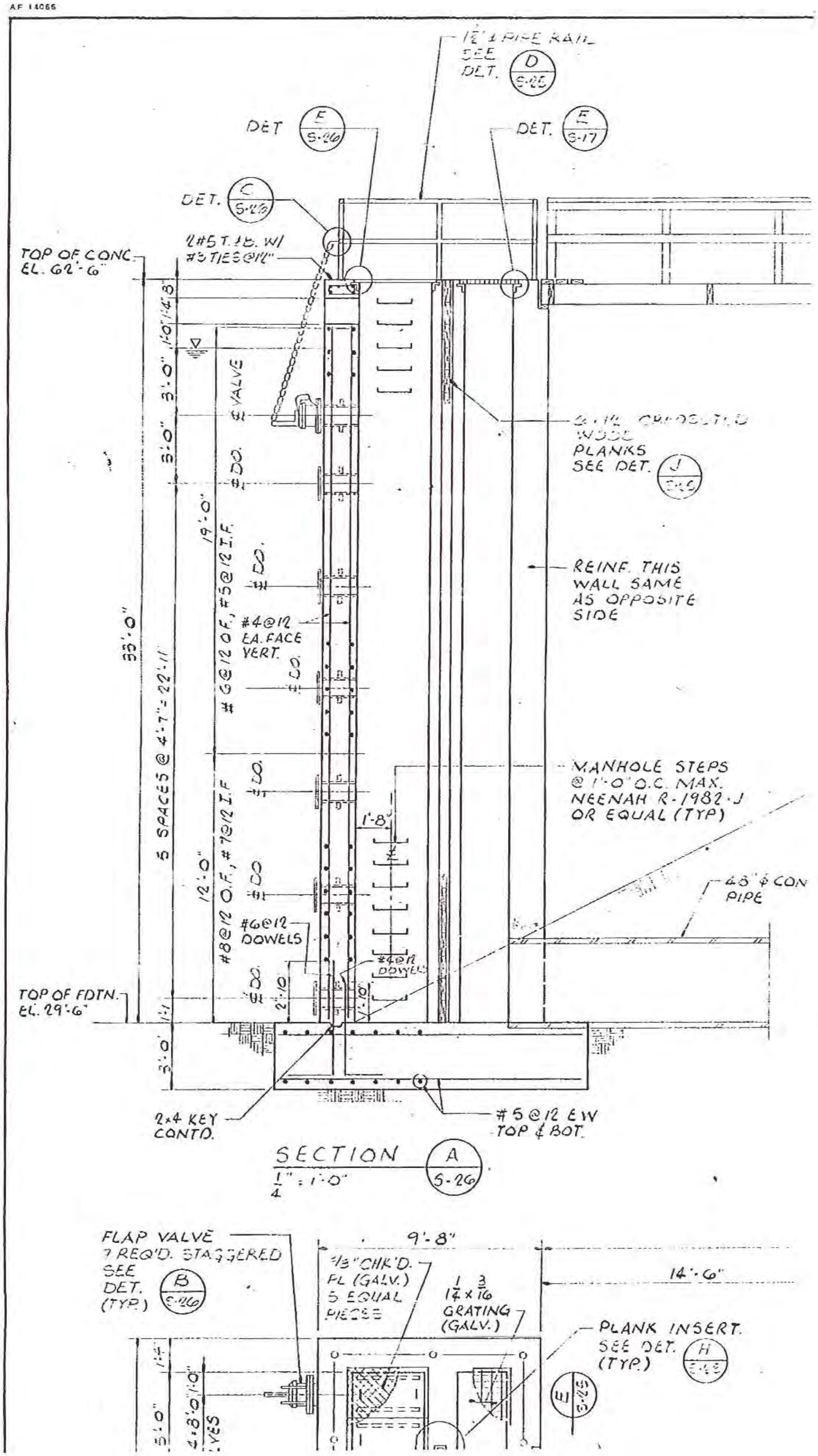
"D" CELL WEIR BOX
12" VALVES (7)

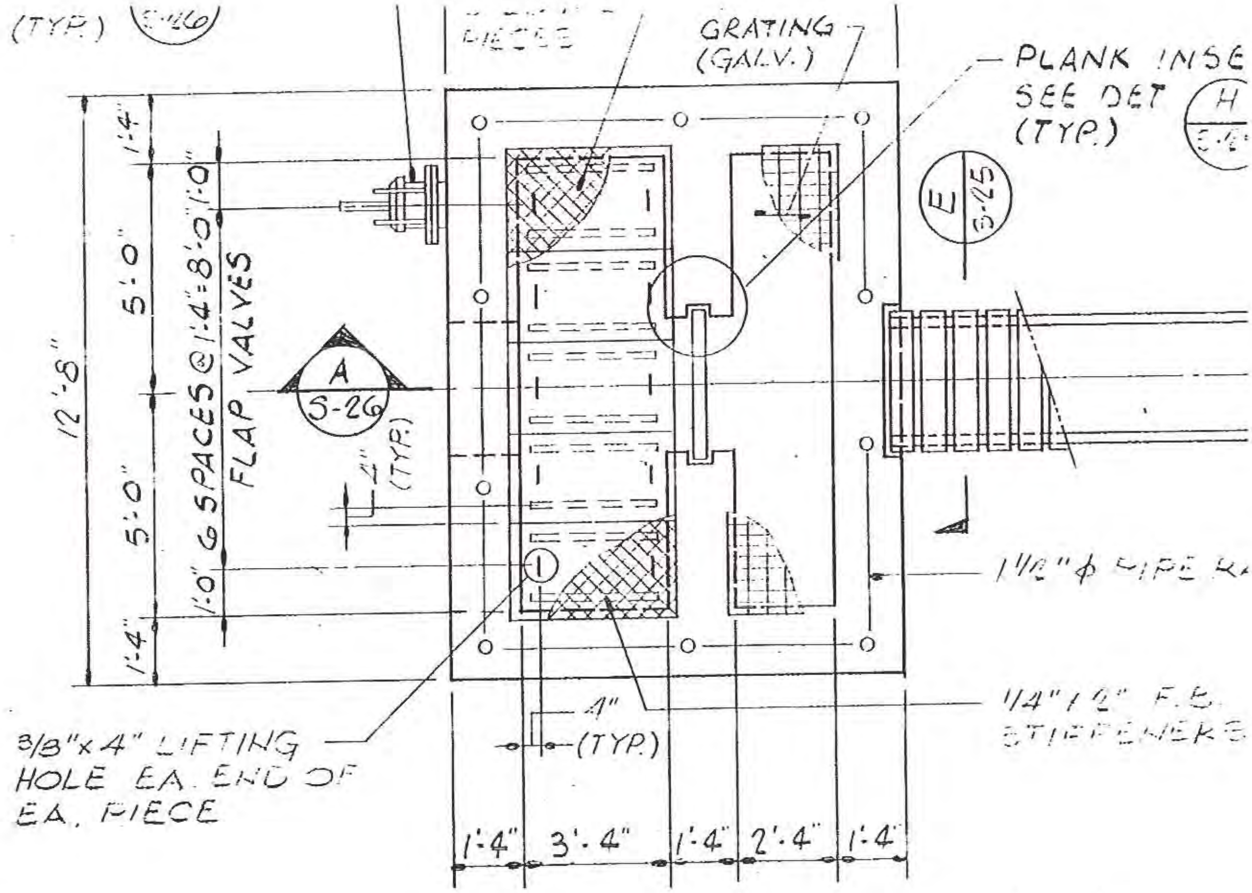
EFFINGHAM GENERATOR STATION
SAVANNAH ELECTRIC AND POWER CO.
SAVANNAH, GEORGIA

DRAWN BY M. A. G.	REYNOLDS, SMITH AND HILLS	SHEET S-26
CHECKED BY R. B. P.	ARCHITECTS . ENGINEERS . PLANNERS INCORPORATED	
DATE 2-9-81	JACKSONVILLE, FLORIDA	FILE NO. 79175-003

(3 - 12" BALL VALVES) → REPLACED @ 2-8" VALVES
(4 - 12" PLUGS / BLANK FLANGES)

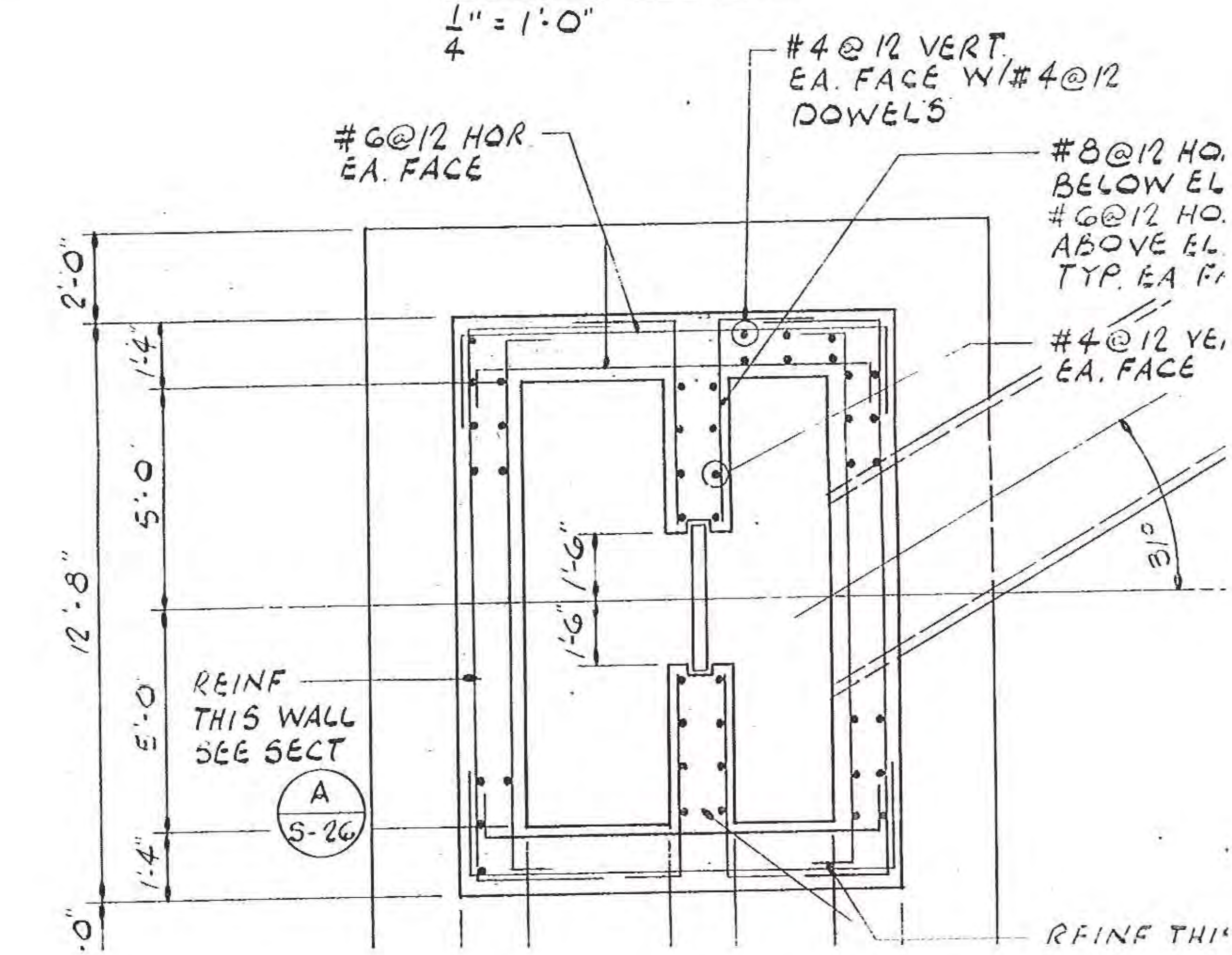

DET. C 5-26
2#5 T.&B. W/
#3 TIES@12"
TOP OF CONC.
EL. 62'-6"
1'-0"
1'-4"
3'-0"
3'-0"
℄ VALVE 12"
℄ DO.
EL 53'6"
10'
10' FREEBOARD MIN LEVEL FOR RECIRC PPS.
CREOSOTE WOOD PLANKS SEE DET. J 5-25
19'-0"
#6@12 O.F., #5@12 I.F.
℄ DO.
#4@12 EA. FACE VERT.
REINF. THIS WALL SAME AS OPPOSITE SIDE
33'-0"
5 SPACES @ 4'-7" = 22'-11"
24"
12'-0"
#8@12 O.F., #7@12 I.F.
MANHOLE STEPS @ 1'-0" O.C. MAX NEENAH R-1982 OR EQUAL (TYP)
1'-8"
#6@12 DOWELS
#4@12 DOWELS
To Beaver Pond & South River Disch #004A
TOP OF FDTN. EL. 29'-6"
2'-10"
1'-10"
3'-0"
12"
Valves To Be Replaced
3
#5@12 E.W.

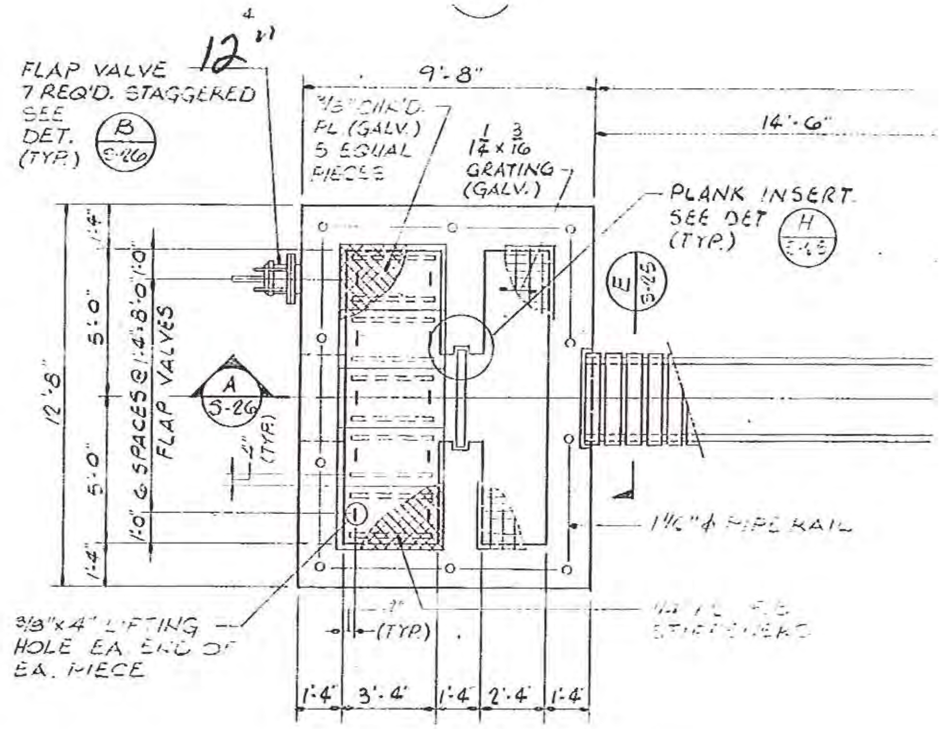

AF 14066
1½" ø PIPE RAIL
SEE DET. D S-26
DET. E S-26
DET. E S-17
DET. C S-26
2#5 T.&B. W/ #3 TIES@12"
TOP OF CONC. EL. 62'-6"
3'-0"
3'-0"
33'-0"
5 SPACES @ 4'-7" = 22'-11"
19'-0"
12'-0"
℄ VALVE
DO.
#6@12 O.F., #5@12 I.F.
#4@12 EA. FACE VERT.
#8@12 O.F., #7@12 I.F.
#6@12 DOWELS
#4@12 DOWELS
1'-8"
1'-10"
2'-10"
TOP OF FDTN. EL. 29'-6"
3'-0"
2x4 KEY CONT'D.
#5 @12 EW TOP & BOT.
PLANKS SEE DET. J
REINF. THIS WALL SAME AS OPPOSITE SIDE
MANHOLE STEPS @ 1'-0" O.C. MAX. NEENAH R-1982-J OR EQUAL (TYP)
48" ø CON PIPE
SECTION A S-26
1/4" = 1'-0"
FLAP VALVE 7 REQ'D. STAGGERED SEE DET. B S-26 (TYP.)
9'-8"
14'-6"
FL (GALV.) 5 EQUAL PIECES
1 1/4 x 3/16 GRATING (GALV.)
PLANK INSERT SEE DET. H (TYP.)
E S-25
5'-0"
4'-8"
YES



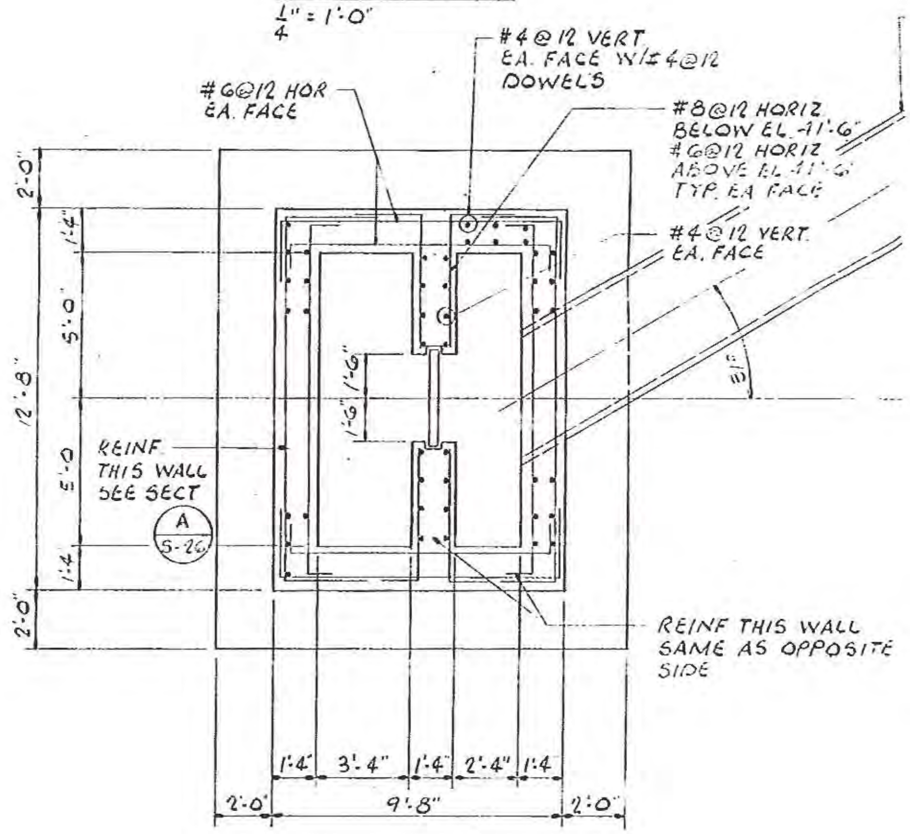
PLAN AT TOP

1/4" = 1'-0"





PLAN AT TOP
1/4" = 1'-0"

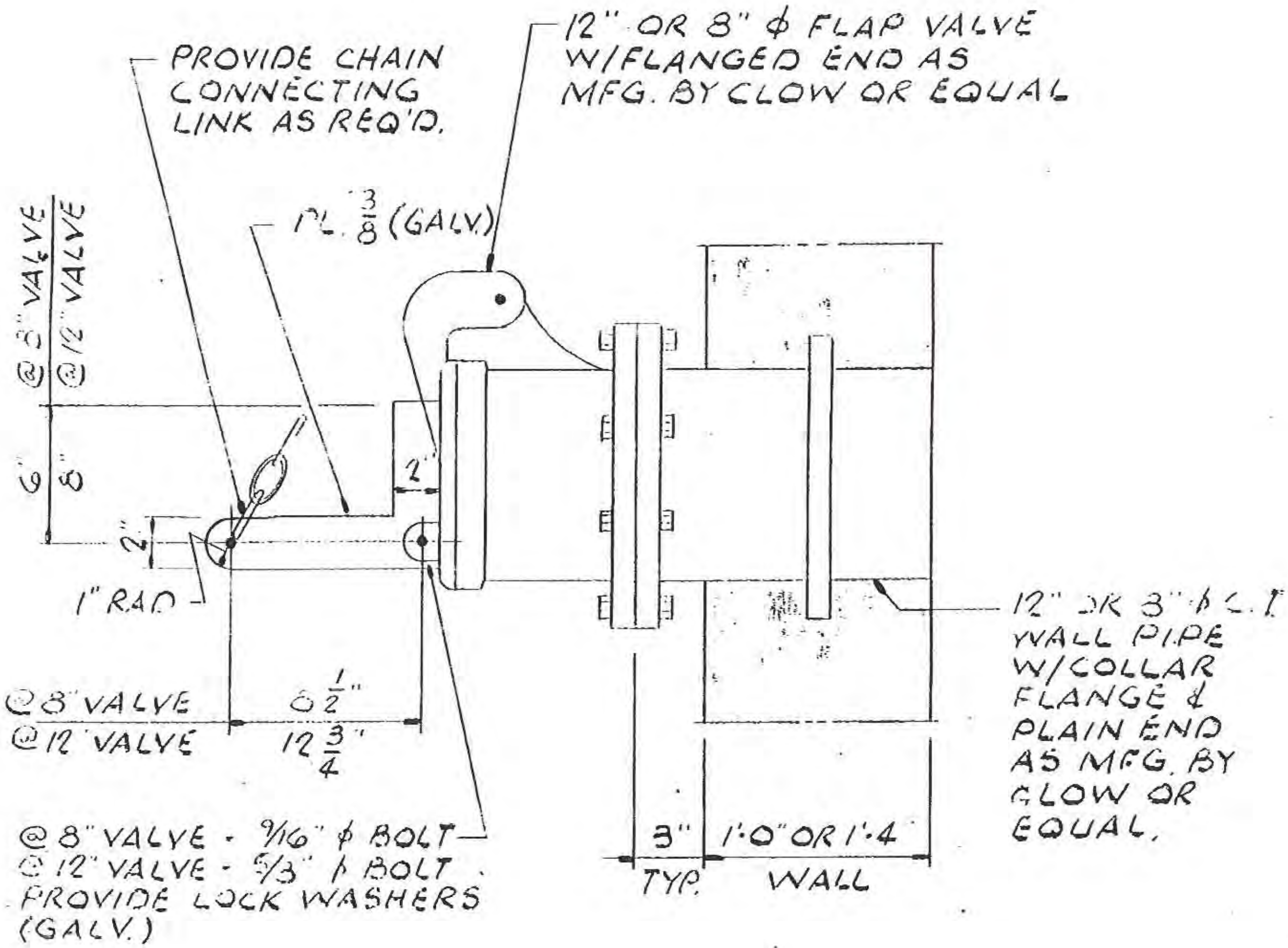


PLAN AT BOTTOM
1/4" = 1'-0"

NOTE: FOR REINF. @ CORNERS AND ADDED REINFORCING AT PIPE OPENINGS SEE SHEET S-20

D 12" Flap Valves

ONC.



TYPICAL FLAP VALVE DETAIL (B / S-26)

1 1/2" = 1'-0"

NOTE:
FOR LOCATION OF DISCHARGE STRUCTURE SEE SHTS. C-9 & C-10

APPENDIX A

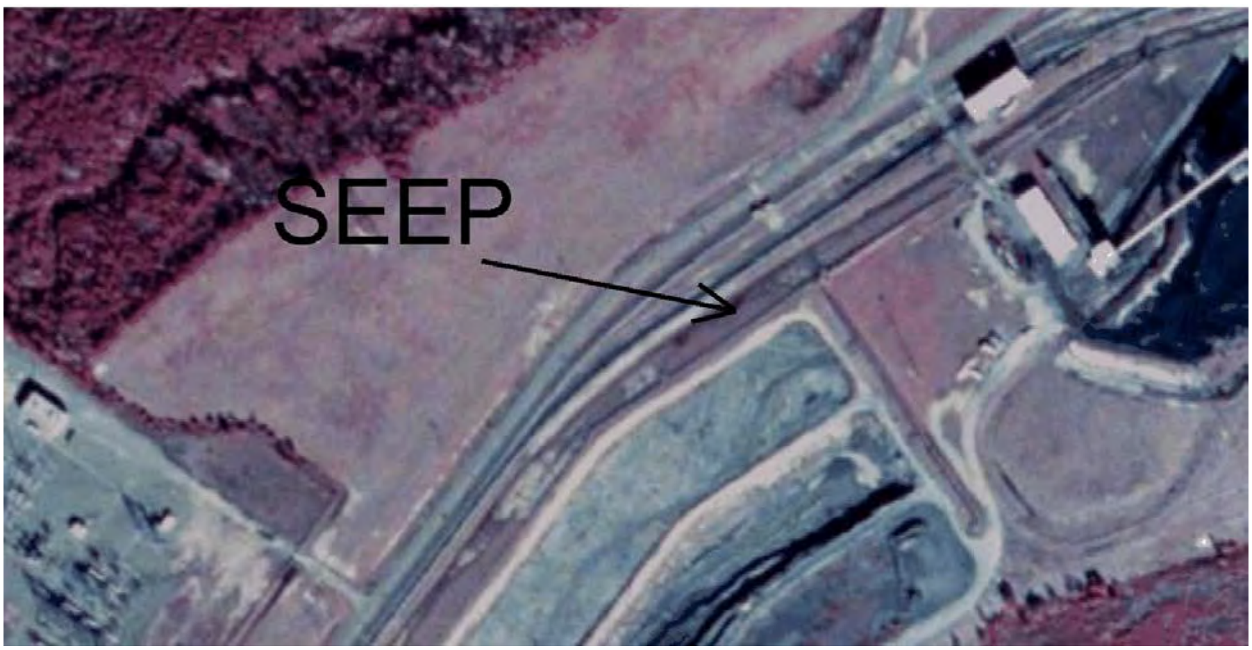
Document 9

Plant McIntosh Ash Pond Seep, March 13, 2004

Summary
On Friday, March 12, 2004, Billy Aiken asked me to come to Plant McIntosh to look at a seep at the ash pond that had been reported to him by Naclane Dixon on that day. On Saturday, March 13, Billy and I met at the site and looked over the situation. A number of observations were taken at the site. The seeps were marked with wire flags.

More information about the original construction of the ash pond, the location of buried pipelines, and about the recent construction in this area is needed before conclusions can be drawn as to the cause and source of the seepage. After this information is available conclusions can be drawn and a remediation plan designed. The investigation would have been able to move forward much faster if Plant McIntosh personnel had been available on the 13th to provide some of the history of the recent work in this area and to locate drawings of the facility.

There does not appear to be an immediate danger to the ash pond or to plant operations. The area of the seep and adjacent areas should be kept under observation for changes. Remediation in some form will be necessary.



Recommendations
In the short term I recommend the following actions be taken:

- Have the seeps observed once each shift and note the amount of flow, if any, and whether the flow appears to be carrying soil with it. If any flows are found to be carrying soil particles, call me at once.

- Be prepared to build a reverse filter over the seeps should they start flowing again to such a degree that they are carrying soil up from the subsurface. Such a filter is constructed by placing 6" to 12" layers of granular materials on top of the seep, starting with sand, then #89 stone, then #57 stone. Stockpile one truckload of each of the following materials near the seeps where the materials can be easily accessed by a front end loader:

- clean dredge sand or washed #10 sand
- #89 stone
- #57 stone

- Try to see if there is any correlation between any plant operations and flow from the seeps.

- Gather the information listed below under "Further Investigation" and forward it to me as soon as possible.

Observations

- The seeps are located on the slope of the ash pond near its northwest corner.

- The seeps are all in a line parallel to the ditch and to the crest of the ash pond. The line of the seeps is about 27' long and is located 45' down the slope from the ash sluice line, 27' up the slope from the center of the ditch, and 53' south from the centerline of the railway. The end of the seep toward the plant is 135' from the bight in the ash sluice pipeline.

- The seeps were not flowing at the time of observation.

- The soil in the area of the seeps was saturated, as were the areas downhill from the seeps.

- There was a considerable puddle in the ditch at the toe of the slope directly downhill from the seeps.

- Aerial images taken in 1999 seem to indicate standing water at the toe of the ash pond slope in the area of the seeps.

- The patterns of silt deposits and scoured areas seem to indicate that the seeps were producing a considerable amount of water at one time.

- There was some silt concentrated at the site of the seeps, possibly indicating that previous flows had carried some soil up from the subsurface.

- All of the area on the northwest slope of the ash pond (paralleling the plant road and the railway) has been recently graded and grassed, from the railway all the way up to the ash sluice line.

- A few small excavations with a shovel indicate that soil is a highly remolded clay with some inclusions of organics.

- Probing with the tile probe to a depth of about 4' indicated that the soils in the area of the seep were soft.

- Probing across the adjacent areas indicated variable resistance, with most of the soils being soft to moderate.

- Michael Andrews from the lab helped out at our request by testing the water in a number of locations with a portable pH meter. The intent was to try to get a clue about the origin of the water in the seeps.

pH test results	
puddle at toe of slope directly downhill from the seep	3.92
hole dug into wet soil at heat of seep	4.09
ash pond	6.23
sump served by 12" PVC line east of seep	6.32
ash discharge	5.55
ash discharge	5.42

The low pH of the water in the seep area compared to the more moderate pH readings in the other sources seems to indicate that the seepage water did not originate in the nearby waste water line.

- Puddles and erosion in the ditch upstream from the seep area indicated that a substantial rain had fallen within the last week or so.

Further Investigation
At this point there are more questions to be answered before conclusions can be drawn and a remediation plan developed. The answers to the following questions are needed:

- Is there a history of wet spots in the area where the seeps were observed or nearby?
  Happened before when A cell was full. There is a history of standing water in this area. A cell was cleaned out and new clay liner put in a while back. There are some pyrites in the pond.

- How much flow was observed from the seeps when they were first discovered?

- When were the seeps first discovered?

- What is the location of the new CC water pipelines with relation to the seeps?

- What is the location of the edges of the ditch cut for the new CC water pipelines with relation to the seeps?
- Was the ditch in this area wet when the new CC water pipelines were being put in?
- Were there any slides or any other problems in this area during the pipeline construction?
- What was the CC water pipeline excavation backfilled with? Was this soil compacted? How?
- Was any granular bedding placed under the CC water pipelines?
- Have the CC water pipelines been pressurized at any time? If so, when?
- Are there any correlations between the flow in the seeps and any plant operations?
- Which ash pond cell was in use when the seeps were first noted?
- Have there been any spikes in ash pond levels lately?
- What other activity was going on in the ash pond cells recently?

Items that would be useful in determining the source of the seepage:

- Drawings of the ash pond.
- Construction history and construction photos of the ash pond.
- Drawings showing the location of the CC pipelines and any other buried piping in the area.
- Construction photos of the CC pipelines going in.
- Construction log of the CC pipeline project.

The answers to these questions and the listed information can be most efficiently gathered by Plant McIntosh personnel. As soon as I receive this information, I will resume work on this investigation. If there are any changes in the seepage area, or if there are any other relevant developments, please let me know right away.

Joel Galt Southern Company GEM Hydro Services

241 Ralph McGill Blvd.
BIN 10193
Atlanta, Georgia 30308
(O) 404-506-7033
(C) 770-235-6586
SoLinc 1800

APPENDIX A

Document 10

Plant McIntosh Dam Safety Inspection, February 13, 2009

Southern Company Generation
Hydro Services
Bin 10193
241 Ralph McGill Boulevard NE
Atlanta, Georgia 30308-3374
Tel 404.506.7033

SOUTHERN COMPANY
Energy to Serve Your World℠

February 13, 2009

Plant McIntosh
Dam Safety Inspection

Mr. J. R. Griggs
Plant Manager
Plant McIntosh
Georgia Power Company

Dear Mr. Griggs:

Attached is the Dam Safety Inspection Report for Plant McIntosh based on the inspection I conducted on January 16, 2009. I appreciate the support provided by Lee Lively in conducting this inspection. In addition to the ash cells, we also looked at the closed ash monofill and the active ash monofill. The report includes a discussion and photographs of site conditions noted during the inspections and a list of recommendations.

No conditions that posed an immediate threat to the safety of the ash cells were noted during this inspection. There are some areas that need attention and some things that can be done to reduce the chance of problems in the future. The interior slopes of the dikes have a number of erosion features that need to be addressed. Stockpiles of gravel and sand for emergency filters should be renewed on the west side of the pond and new stockpiles installed on the east side. At the toe of the east dike of ash cell C it would be prudent to clear a lane along the toe to provide access for vehicles in the event of a boil developing in that location. There is a swampy spot at the toe of the ash cell C east dike that is probably being fed by seepage from ash cell C. A subsurface drain should be installed in this location prior to refilling ash cell C.

The side slopes of the interior slopes of the dikes may have been altered by ash removal operations over the years. While cells B and C are low, it would be prudent to survey the slopes to determine the current geometry of the slopes. In order to calculate the stability of the dike slopes it will be necessary to obtain information about the soil in the dikes. If this information is not available from the plant files, it will be necessary to conduct a subsurface investigation to obtain it.

The closed ash monofill looked to be well cared for. Some gravel could be added to the driving lanes. Some mower damage to the grass cover was noted. The active ash monofill also appeared to be well maintained. The perimeter dikes were built with near-vertical side slopes, which does not match the design drawings. These ditches will cause ongoing maintenance problems in this configuration. It would be a good idea to have them regraded to the design lines and grades.

A detailed listing of the recommendations for the ash cells and the ash monofills is included in the attached report. I am available to talk over the recommendations and SCG Hydro Services will provide any assistance requested in obtaining the engineering resources needed to carry out the recommendations.

Details of this inspection were discussed with Mr. Lively at the conclusion of the inspection. Should you have any questions, please do not hesitate to contact me at 404-506-7033.

Sincerely,

Joel Galt
Hydro Services Supervisor

Attachment

XC: **Georgia Power Company**

D. E. Jones	(w/ attachment)
W. S. Smith	(w/attachment)
B. E. Fischer	(w/attachment)
C. B. Hodges	(w/attachment)
L. P. Lively	(w/attachment)

Southern Company Services

E. B. Allison	(w/ attachment)
L. B. Wills	(w/ attachment)

Plant McIntosh

Ash Cell and Ash Monofill Inspection Report

Date of Inspection:	January 16, 2009	**Inspection by:**	Joel Galt
Weather:	clear and windy		Lee Lively
Temperature:	30 to 40 F	**Report by:**	Joel Galt
Rainfall (past 24 hrs):	None	**Date of Report:**	February 13, 2009

SUMMARY

Ash Pond: No conditions that present an immediate threat to the ash cells were found during this inspection. The ash cells need some attention in the form of erosion repairs, drainage provisions, and vegetation control. In case of emergencies, it would be prudent to have a lane cleared at the toe of the east dike (ash cell C) and stockpiles of gravel and sand placed at both the east and west sides of the ash cells.

Closed ash monofill: This area looks well-maintained.

Active ash monofill: This area looks well-maintained. The perimeter ditches do not appear to have been built to match the design drawings. This can cause problems with erosion.

ADDITIONAL COMMENTS

RECOMMENDATIONS

No.	Description	Location No.-Photo No.
1	Ash cells: The rills on the inside slopes of the ash cells should be dressed with gravel.	314-2890 309-2879
2	Ash cells: The gullies on the inside of the ash cells should be shaped and lined with riprap or have plastic pipe down drains placed in them.	309-2877 313-2885
3	Ash cells: The two animal burrows found on the east slope of ash cell C dike should be filled in.	320-2898
4	Ash cells: The trees should be cleared from a 20 foot wide strip along the toe of ash cell C east dike in order to allow access for equipment in the event of an emergency. A pad should be cleared for the storage of emergency gravel stockpiles in this area.	321-2900
5	Ash cells: A subsurface drain should be installed at location 318-319 at the toe of ash cell C east dike to provide a controlled outlet for seepage from ash cell C. Hydro Services will provide a drain design and support for this effort.	318-2896
6	Ash cells: The gravel stockpiles at the toe of the west dike of ash cell A have been robbed for other purposes. These stockpiles should be replenished so that there are two truckloads each of washed #10 sand, #89 stone, #57 stone. A second set of stockpiles should be established at the toe of the east dike of ash cell C once the clearing is complete in this area.	308-2876
7	Ash cells: While cells B and C are low, it would be worthwhile to have the dikes surveyed to determine the current dike geometry. The cells have been filled and dug out a number of times since they were first built. Based on the experience with the ash removal contractor in 2005, there is a chance the geometry of the interior dike slopes may have been altered. This could have an impact on the stability of the dikes. An alternative method would be to wait until the cells are filled with water and then do a combined conventional survey and bathymetric survey.	
8	Ash cells: In order to calculate the stability of the dike slopes it will be necessary to obtain information about the soil in the dikes. If this information is not available from the plant files, it will be necessary to conduct a subsurface investigation to obtain it.	

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9	Ash cells: When ash cells A and C are filled it will be important to do regular inspections of the toe of the dikes, looking for seepage or boils. These should be done daily while the ponds are filling and for two weeks after reaching full pool, then weekly after that.	
10	Ash cells: The vegetation on the inside and outside slopes of the ash cells should be cut at least twice a year.	**312-2881** **312-2882**
11	Closed Monofill: There are some bare spots in the driving lanes that could use some gravel. The overall grass cover is pretty good. A general application of seed and fertilizer would be a good investment.	**324-2902**
12	Closed Monofill: There are some scalped spots from mowing. It might be useful to evaluate the mowing equipment and mowing techniques used in this area to see if this mowing damage can be avoided.	**324-2903**
13	Active monofill: The perimeter ditches have been cut with vertical sides. This makes it impossible to grass the ditches and ensures that the ditches will erode. The ditches should be reconfigured to their design dimensions and grades, then grassed.	**326-2904** **327-2910**
14	Active monofill: The armored channel where the west perimeter ditch drops down to the main channel has suffered some erosion along the edges of the gravel and geogrid mat. This erosion should be repaired.	**327-2909**
15	Active monofill: There are a few small pine trees growing in and near the perimeter ditch. These should be cut down.	**327-2910**

PREVIOUS RECOMMENDATIONS

No.	Description	Location	Status Open/Closed
1	none		
2			

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OBSERVATIONS

Ash Cells		
	Observations - Comments	**Location No. - Photograph No.**
General Comments	At the time of this inspection ash cell A was active with a pond elevation of 11. Ash cells B and C were almost empty. Ash cell D was full. All of the ash cells were recently cleaned of ash. A number of gravel bolsters of the design used on ash cell A in 2005 have been added in ash cells B and C to support the slopes and to control seepage between cells when there is a differential head between cells.	
1. Upstream Slope		
a. Condition	*The upstream slopes in some places are covered with tall grasses. In most places the slopes are gullied and have little grass cover. This is due to the ponds sitting empty for a long time.* ***The dike slopes should be cut at least twice a year.***	**312-2881** **312-2882**
b. Erosion/Sloughing	*Yes (X) No ( ) There are a number of erosion rills around the inside of cells A, B, and C. These have been formed by rainwater concentrating on the crest and running off into the interior of the ash pond. Some of these have formed into sizeable gullies.* ***The rills should be dressed with gravel. The gullies should be shaped and lined with riprap or have plastic pipe down drains placed in them.***	**309-2879** **313-2885** **314-2890** **315-2892**
2. Crest		
a. Condition	*The dike crests were generally in good shape. There were several locations where the crests are graded so that the runoff is concentrated when it runs down the interior dike slope.*	
3. Downstream Slope		
a. Condition	*The outer slopes of the ash cells are in pretty decent shape. There is a reasonable grass cover. There are some ruts from mower tires and two animal burrows on the east dike slope of cell C.* ***The burrows should be filled in.*** *The trees on the natural slope extends up to the toe of the dam.* ***A strip 20 feet wide should be cleared along the toe to allow equipment access to this area in the event of an emergency.***	**320-2898**
b. Seepage/Wet Spots	*Yes (X) No ( ) There is a damp spot with water-loving vegetation at the toe of the east dike of ash cell C. This area appears to be receiving seepage from ash cell C.* ***A subsurface drain is needed to provide a controlled outlet for the seepage.***	**318-2896**
c. Erosion/Sloughing	*Yes (x) No ( ) The main source of damage to the grass cover on the outer slopes seems to be ruts from mower tires.* ***It would be prudent to examine the type of mowers used and the techniques used to see if this damage to the grass cover can be prevented.***	**317-2895**
4. Emergency Aggregate Stockpiles		
a. Available	*Yes (X) No ( ) There are stockpiles on the west side of ash cell A but they have been robbed and should be replenished. Stockpiles are needed at the toe of the ash cell C east dike.*	**308-2876**

Closed Ash Monofill		
	Observations - Comments	**Location No. - Photograph No.**
a. Condition	*The closed landfill looks well-cared for.*	**324-2903**

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b. Bare spots/erosion	Yes (X) No ( ) **There are some bare spots in the driving lanes that could use some gravel.** The overall grass cover is pretty good. A general application of seed and fertilizer would be a good investment. There are some scalped spots from mowing. **It might be useful to evaluate the mowing equipment and mowing techniques used in this area to see if this mowing damage can be avoided.**	**324-2902**
c. Detention pond	*No problems noted.*	
d. Other Comments		

Active Ash Monofill

Observations - Comments		Location No. - Photograph No.
a. Condition	*The overall appearance and maintenance of the landfill looks good.*	
b. Bare spots/erosion	*Yes (X) No ( ) The most noticeable problem at the landfill is the configuration of the perimeter ditches. These have been cut with near vertical sides. This configuration makes it impossible to grass the ditches and ensures erosion of the ditch slopes. This erosion has the potential to eventually result in loss of ash from the monofill.* ***The perimeter ditches should be reconfigured to their design dimensions and grades***. *The armored channel where the west perimeter ditch drops down to the main channel has suffered some erosion along the edges of the gravel and geogrid mat.* ***These gullies should be dressed up, lined with filter fabric and a few inches of #57 stone, then filled with Type III riprap (choked with #57 stone) to form armor for the sides of the channel.***	**326-2904** **327-2910** **327-2909**
c. Detention pond	*The detention pond appeared to be in good shape.*	**327-2912**
d. Other Comments	***There are a few small pine trees growing in and near the perimeter ditch. These should be cut down.***	**327-2910**

XIV - Additional Observation/Comments - General

Observations - Comments	Photograph No.
	n/a

Joel Galt - Supervisor
SCG - Hydro Services

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2009 - Ash Pond Inspection Photographs - January 16, 2009

(See accompanying report attached)

Location No. Photo No.	Description	
308 2875	Ditch between railway and ash cell A, looking northeast. There was no seepage evident at the time of this inspection. Cell A has been low for some time and was at the mark of 11 on the staff gage. **When this pond level is raised this area should be monitored**.	
308 2876	Ditch between railway and ash cell A, looking southwest. This area was the site of seeps in 2003. pH testing of the seepage water at that time showed a very high reading, indicating that the water was coming from the ash cell. At that time stockpiles of sand, #89 stone, and #57 stone were stockpiled there to be used for an emergency filter in the event of a boil. **These stockpiles should be restored.**	
309 2877	Erosion gully at crest of ash cell A. The plastic netting indicates that some attempt to repair and regrass this area has been made. It appears that rainwater from the crest concentrates and runs down the slope at this point. Installing a plastic down drain in this location might be the best way to deal with this problem.	

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2009 - Ash Pond Inspection Photographs - January 16, 2009

(See accompanying report attached)

Location No. Photo No.	Description	
309 **2878**	View looking northeast toward ash discharge point in cell A.	
309 **2879**	East bank of ash cell A viewed from west bank. Erosion rills are prevalent along this area for the top 5 or 6 feet. These rills should be dressed and grassed. At locations where water concentrates and runs down the slope plastic pipe down drains could be installed, or the rills could be graveled.	
309 **2880**	Ash cell A looking south. Some ash bolsters were left in place during the 2005 cleanout to support the dike slopes and reduce seepage from cell B into cell A. These bolsters show up here covered with cattails.	
309 & 310	No photo taken in these locations, but there are gullies here resulting from rainwater concentrating on the dike crest and running down the slope. **Plastic pipe down drains would be an economical fix for these problems.**	No photo.

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2009 - Ash Pond Inspection Photographs - January 16, 2009

(See accompanying report attached)

Location No. Photo No.	Description	
312 **2881**	D pond looking from common dike with A pond toward cell D outlet.	
312 **2882**	D pond looking southeast along the common dike. The heavy cover of tall grass on the inside slope of the dike obscures the slope, making it impossible to detect erosion or other problems with the slope. **The dike slopes should be cut at least twice a year.**	
313 **2885**	South end of ash cell B viewed from outlet structure. The bank has been supported with a gravel bolster. The gravel is recycled concrete. There is a significant erosion gully in the southeast corner of this cell. **A plastic down drain could be installed in the gully to stop the erosion.**	
313 **2886**	View looking northeast up cell B from the outlet structure. Note the gravel bolsters on the left dike that were installed to support the dike and control seepage when cell B was drawn down and cell A was full.	

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2009 - Ash Pond Inspection Photographs - January 16, 2009

(See accompanying report attached)

Location No. Photo No.	Description	
314 2889	View looking northeast up cell C from outlet structure. Note gravel bolster on near left dike. There are numerous erosion gullies on the right (east) dike.	
314 2890	Ash cell C east dike near south end. **Note erosion gullies cut into slope. These should be addressed.** They could be filled with soil, graded and grassed, or filled with gravel.	
315 2892	Ash cell B west dike viewed from east dike. Note erosion rills in dike. These should be addressed.	
315 2893	Ash cell B west dike viewed from east dike. Note erosion gravel bolster installed to support dike and control seepage.	

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2009 - Ash Pond Inspection Photographs - January 16, 2009

(See accompanying report attached)

Location No. Photo No.	Description	
316 **2894**	Toe of cell C east dike. Note trees up to toe of slope. These trees would make it difficult to get emergency equipment in to the toe to work. **The trees should be cleared a distance of 20 feet from the toe of the east dike of ash cell C.** The east slope had 4" diameter trees on it until two years ago. The trees were cut off flush with the ground and the roots left in place.	
317 **2895**	Toe of cell C east dike. Note damage to the grass due to mower tires. **The mowing techniques and equipment should be evaluated to see if a more suitable technique or type of equipment is available.**	
318-319 **2896**	Boggy area at toe of ash cell C east dike with plants typical of a swampy area, except this location is on a slope. This location appears to be lower in elevation than the bottom of ash cell C. Since ash cell C is almost empty and this area is still wet, there is potential for increased seepage when ash cell C is refilled. **A subsurface drain should be installed in this area prior to refilling ash cell C.**	
320 **2898**	Ash cell C east dike toe: Armadillo burrow. This burrow should be filled in.	

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2009 - Ash Pond Inspection Photographs - January 16, 2009

(See accompanying report attached)

Location No. Photo No.	Description	
321 2900	Ash cell C east dike toe, maximum section. The ground in this area is dry There are no water-loving plants. This would indicate little or no seepage in this area. The trees here grow right up to the toe. **It would be desirable to have a 20 foot wide lane cleared along the toe for emergency equipment access. It would also be good to have a pocket cleared for an emergency gravel stockpile.**	
321	Ash cell C east dike toe: Animal burrow. **This burrow should be filled in.**	No photo.
322 2901	Ash cell C north end. Note erosion rills on interior slope of dike. **These rills should be addressed. Filling them with gravel would be one way to do it.**	

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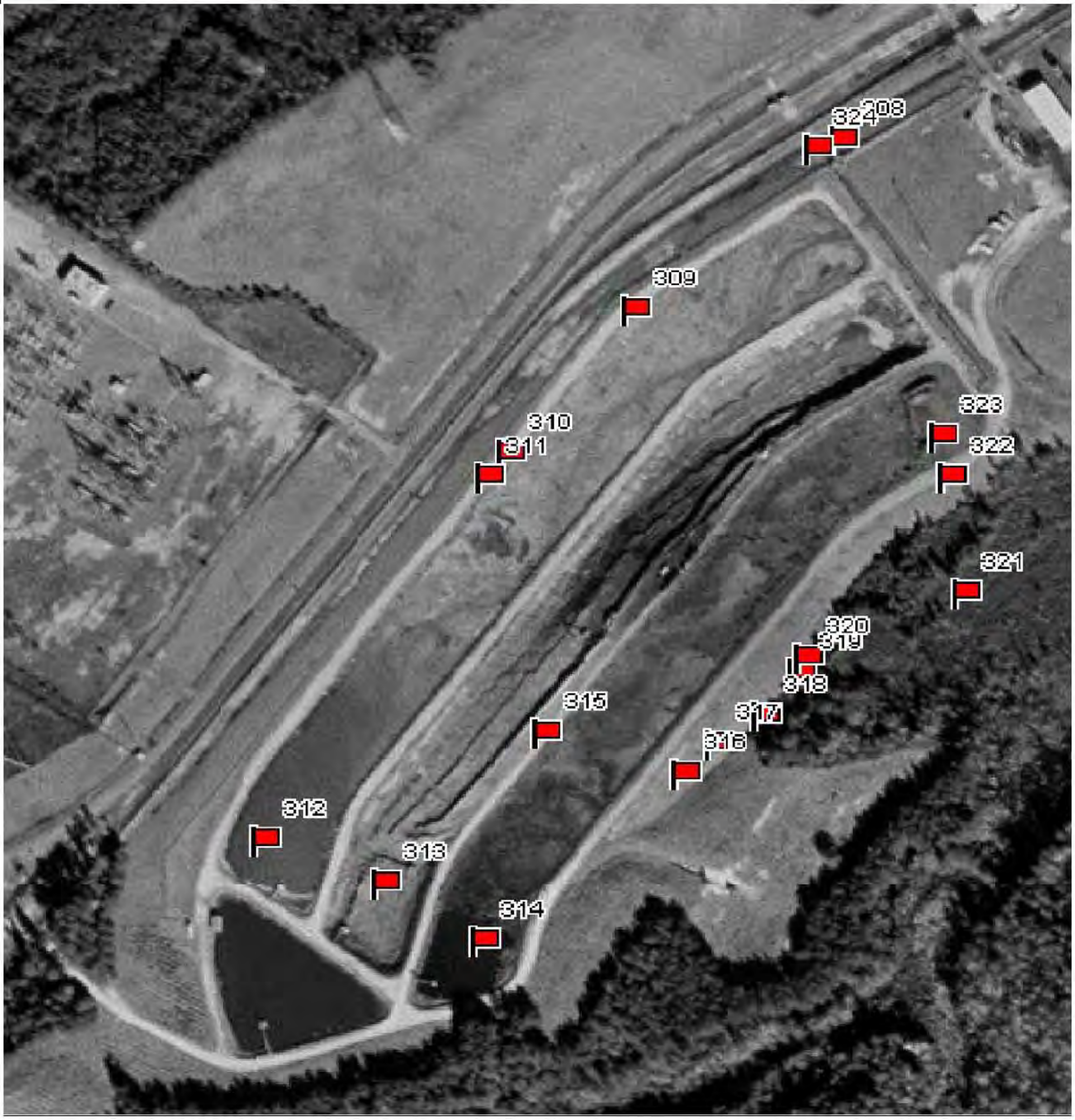
2009 - Ash Pond Inspection Photographs - January 16, 2009
(See accompanying report attached)

Location No. Photo No.	Description	



Plant McIntosh

2009 - Ash Monofill Inspection Photographs - January 16, 2009

(See accompanying report attached)

Location No. Photo No.	Description	
324 2902	Closed monofill: 'The surface of the closed landfill has a decent cover of grass for the most part, but **there is a need for some gravel on the driving lanes. A general application of seed and fertilizer would be a good investment.**	
324 2903	There was some minor scalping from the mowers noted. **It would be worthwhile to caution the mowing crew and to review the suitability of the mowing equipment and techniques to this task.**	
326 2904	The drainage ditches around the permiter of the ash stack have been cut with vertical sides. This has lead to erosion and makes maintaining the ditch impossible. These ditches were designed with 2:1 side slopes. The present configuration could eventually lead to erosion that will expose ash. **The ditches need to be regraded to the design configuration and grassed.**	
327 2909	Runoff has cut gullies on either side of the gravel/geogrid mattress where the perimeter ditches meet. **This gully should be built up with Type III riprap bedded on #57 stone and choked with #57 stone.**	

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2009 - Ash Monofill Inspection Photographs - January 16, 2009

(See accompanying report attached)

Location No. Photo No.	Description	
327 2910	Ditch near outlet. The ditch sides are near vertical. This configuration is not that shown on the design drawings. Side slopes this steep cannot be maintained and will erode. **The ditch needs to be regraded. The pine trees in the ditch need to be cut down.**	
327 2912	Detention pond. The dikes around this area appear to be in good shape.	

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2009 - Ash Monofill Inspection Photographs - January 16, 2009

(See accompanying report attached)

Location No. Photo No.	Description	

Plant McIntosh

2009 - Ash Monofill Inspection Photographs - January 16, 2009

(See accompanying report attached)

Location No. Photo No.	Description	

APPENDIX A

Document 11

Plant McIntosh Annual Dam Safety Inspection, September 15, 2010

Southern Company Generation
Hydro Services
Bin 10193
241 Ralph McGill Boulevard NE
Atlanta, Georgia 30308-3374
Tel 404.506.7033

SOUTHERN COMPANY
Energy to Serve Your World℠

September 15, 2010

Plant McIntosh
Annual Dam Safety Inspection

Mr. J. R. Griggs
Plant Manager
Plant McIntosh
Georgia Power Company

Dear Mr. Griggs:

Attached is the Dam Safety Inspection Report for Plant McIntosh based on the inspection I conducted on August 19, 2010 and a follow-up visit on August 31, 2010. I appreciate the support provided by Lee Lively in conducting this inspection.

No conditions that posed an immediate threat to the safety of the ash cells were noted during this inspection. At the time of the August 19 inspection a great deal of work was going on to improve the appearance of the dikes and reduce the potential for erosion damage. By the August 31 follow-up visit, all of this work had been completed. The dikes look good.
The sumps installed on the north side of cell A and the south side of cell C were done in a professional manner. They look and work as well as any in the system that I have seen.

The report contains my recommendations and comments. I am available to talk over the inspection and the recommendation at your convenience.

Details of this inspection were discussed with Mr. Lively at the conclusion of the inspection. Should you have any questions, please do not hesitate to contact me at 404-506-7033.

Sincerely,

Joel Galt

Joel Galt
Hydro Services Supervisor

Attachment

MCI-API 018

XC: **Georgia Power Company**

S. W. Connally	(w/ attachment)
W. S. Smith	(w/attachment)
B. E. Fischer	(w/attachment)
C. B. Hodges	(w/attachment)
L. P. Lively	(w/attachment)

Southern Company Services

E. B. Allison	(w/attachment)
J. F. Crew	(w/attachment)
L. B. Wills	(w/attachment)
T. Sadler	(w/attachment)

MC-10900

Plant McIntosh

Ash Cell Dam Safety Inspection Report

Date of Inspection:	August 19, 2010. Follow-up visit on August 31, 2010	**Inspection by:**	Joel Galt
Weather:	hot and clear		Lee Lively
Temperature:	85 F	**Report by:**	Joel Galt
Rainfall (past 24 hrs):	1" the previous night	**Date of Report:**	09/15/10
Pond Levels:	A = 3', B = 4', C = 4', D = 4'		

SUMMARY

Ash Pond: No conditions that present an immediate threat to the ash cells were found during this inspection. Work on dressing the interior slopes of the ash cells was underway, with grassing to follow. The installation of the three drainage pump-back systems was complete and the systems were functioning.

ADDITIONAL COMMENTS

A follow-up visit was made on August 31, 2010. Work done between the initial inspection on August 19 and August 31 is also recorded in this report. As of August 31, all of the work of dressing the interior slopes to deal with rills was complete. All of the interior slopes had been dressed, hydro-seeded and mulched. The C dike exterior slope had been tilled, hydro-seeded, and mulched. Rutted areas on the dike crest had been dressed and topped with gravel. The seep on the north end of A dike had been collected in a sand drain tied into the sump drain. The bare earth under the ash sluice return water pipeline had been dressed with gravel. The entire facility looked very good.

RECOMMENDATIONS

No.	Description	Photo No.
1	A comprehensive turf management program to include mowing, lime, fertilizer, over-seeding, etc. should be established in order to protect the dike slopes.	
2	Extend the A dike sump drain field southwest along the toe to a point near the center of the dike. Extend two lateral drains from this line up the slope to collect the seepage noted on face of A dike at this point.	
3	Perform a topographic survey of the interior slopes of the ash cells. This could be done by conventional surveying the next time the cells are nearly empty of water. This is a continuation of recommendation 8 from the 2009 inspection.	

PREVIOUS RECOMMENDATIONS

No.	Description	Status Open/Complete
1	The rills on the inside slopes of the ash cells should be dressed with gravel.	complete
2	The gullies on the inside of the ash cells should be shaped and lined with riprap or have plastic pipe down drains placed in them.	complete
3	The two animal burrows found on the east slope of ash cell C dike should be filled in.	complete
4	The trees should be cleared from a 20 foot wide strip along the toe of ash cell C east dike in order to allow access for equipment in the event of an emergency. A pad should be cleared for the storage of emergency gravel stockpiles in this area.	complete
5	A subsurface drain should be installed at location 318-319 at the toe of ash cell C east dike to provide a controlled outlet for seepage from ash cell C. Hydro Services will provide a drain design and support for this effort.	complete

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6	The gravel stockpiles at the toe of the west dike of ash cell A have been robbed for other purposes. These stockpiles should be replenished so that there are two truckloads each of washed #10 sand, #89 stone, #57 stone. A second set of stockpiles should be established at the toe of the east dike of ash cell C once the clearing is complete in this area.	**complete**
7	While cells B and C are low, it would be worthwhile to have the dikes surveyed to determine the current dike geometry. The cells have been filled and dug out a number of times since they were first built. Based on the experience with the ash removal contractor in 2005, there is a chance the geometry of the interior dike slopes may have been altered. This could have an impact on the stability of the dikes. An alternative method would be to wait until the cells are filled with water and then do a combined conventional survey and bathymetric survey.	**continued**
	It was not possible to conduct a detailed topographic survey of all of the slopes. However, while the water levels in the ponds were low, Mr. Lively did a careful visual inspection of the slopes with the intent to detect any areas that appeared to be overly steep. The result of this visual inspection was that all of the overly steep areas had been reinforced with gravel bolsters. The next time the level of the water in the ponds is pulled down, then the topographic survey should be done.	
8	In order to calculate the stability of the dike slopes it will be necessary to obtain information about the soil in the dikes. If this information is not available from the plant files, it will be necessary to conduct a subsurface investigation to obtain it.	**in progress**
	Civil Field Services has done the borings and installed piezoemeters. Earth Science and Environmental Engineeering is currently working on the stability analysis.	
9	When ash cells A and C are filled with water it will be important to do regular inspections of the toe of the dikes, looking for seepage or boils. These should be done daily while the ponds are filling and for two weeks after reaching full pool, then weekly after that.	**complete**
10	The vegetation on the inside and outside slopes of the ash cells should be cut at least twice a year.	**complete**

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OBSERVATIONS

Ash Cells		
	Observations - Comments	**Photograph No.**
General Comments	At the time of this inspection the water in ash cells A, B, C and D was at the normal operating level. Work was in progress in dressing the inside slopes preparatory to seeding and mulching.	**4095, 4106, 4120, 4121, 4122**
1. Upstream Slope		
a. Condition	*Work was in progress on dressing these slopes preparatory to seeding and mulching.*	**4095**
b. Erosion/Sloughing	*Yes (X) No ( ) There were a few rills and gullies at the time of the inspection, but these were being addressed at that time. By the time this report is published that work will be complete. Many gullies noted in the 2009 inspection had been replaced with plastic down-drains. These have been effective in reducing erosion.*	**4106, 4120, 4121, 4122**
2. Crest		
a. Condition	*The dike crests were generally in good shape. There were several locations where the crests are graded so that the runoff is concentrated when it runs down the interior dike slope. Many of these locations now have plastic down-drains installed. Down-drains are planned for several more locations and should be in place by the time this report is published.*	**4098, 4099, 4100, 4102, 4121, 4158**
3. Downstream Slope		
a. Condition	*A dike: The grass along the downstream slope of A dike seems to be in good condition.* *C dike: The trees along the toe of C dike noted in the 2009 inspection have been cleared. There is reasonable vehicle access to the toe now.*	**A: 4091, 4154, C:4107, 4162**
b. Seepage/Wet Spots	*Yes (X) No ( ) The subsurface drain recommended in the 2009 report has been installed. Sumps and subsurface drains have recently been installed at the toe of both A dike and C dike.. A seep was noted on the slope of A dike during the 8/19 inspection.* ***A sand drain has been installed at this location to convey this seep to the sump.*** *Another set of seeps was noted on the upstream face of A dike about midway down the dike.* ***The sump drain line should be extended along the toe of A dike to this point and the seeps should be collected with lateral drains.***	**A: 4086, 4090, 4156, 4091, 4154, 4092, 4093 C: 4107, 4108, 4111, 4113**
c. Erosion/Sloughing	*Yes ( ) No(X) The C dike slope has a number of bare spots, some due to the work on the subsurface drain/sump system and some due to poor grass cover.* ***These bare spots should be dressed, seeded and mulched to establish a good grass cover over the entire slope. A comprehensive turf management program to include mowing, lime, fertilizer, over-seeding, etc. should be established in order to protect the dike slopes.*** *By the date of the August 31, 2010 follow-up visit, the work on the C dike slope was complete.*	**A: 4088, 4093, 4153, 4092 C: 4107, 4110, 4113, 4114, 4115, 4117, 4162**
4. Emergency Aggregate Stockpiles		
a. Available	*Yes (X) No ( ) There are stockpiles on the west side of ash cell A and at the toe of the ash cell C east dike.*	**4088, 4093, 4110, 4116**

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XIV - Additional Observation/Comments - General

Observations - Comments	Photograph No.
	n/a

Joel Galt
Joel Galt - Supervisor
SCG - Hydro Services

Plant McIntosh

2010 - Ash Cell Dam Safety Inspection Photographs August 19 & 31, 2010

Photo No.	Description	Photo
4086	Control panel for A dike sump.	
4088	Stockpiles of granular materials along toe of A dike.	
4090	Sump at toe of A dike	
4156	Follow-up photo: Same location as above on 8/31/2010 showing excellent stand of grass cover.	

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2010 - Ash Cell Dam Safety Inspection Photographs August 19 & 31, 2010

Photo No.	Description	Photo
4091	Seep area at toe of A dike, near north end. This is in an area where there have been seeps in the past.	
4154	Follow-up photo 8/31/2010: Same area as above after installation of sand drain to tie seep into sand/pipe drain leading to sump. Note addition of gravel under pipe to combat erosion.	
4153	Follow-up photo 8/31/2010: Note addition of gravel under pipe to combat erosion.	
4092	View to southwest along alignment of sand/pipe drain leading to sump.	

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2010 - Ash Cell Dam Safety Inspection Photographs August 19 & 31, 2010

Photo No.	Description	Photo
4093	View looking northeast along toe of A dike showing granular stockpiles, sump, and alignment of sump sand/pipe drain.	
4168	Follow-up photo on 8/31/2010: Newly installed piezometers on crest and toe of A dike.	
4094	Looking northeast toward plant from west end of cell A.	
4095	Contractor dressing interior slopes of A cell.	

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2010 - Ash Cell Dam Safety Inspection Photographs August 19 & 31, 2010

Photo No.	Description	Photo
4096	View from west end of B cell looking northeast toward plant.	
4097	Interior slope of south corner of B cell. Note plastic pipe downdrain installed to address erosion problems.	
4098	BC dike looking from northeast from south end of dike. Gravel has been added to the crest to address past rutting issues. This repair has been successful.	
4099	Downdrain installed to deal with concentrated runoff from crest road gullying slope of BC dike. This repair has been successful.	

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2010 - Ash Cell Dam Safety Inspection Photographs August 19 & 31, 2010

Photo No.	Description	Photo
4100	West interior slope of D cell: gravel bolster installed to address past sluffing of the interior slope. This repair has been successful.	
4101	D cell interior slope at north end of pumping station: oversteepened slope.	
4165	Follow-up photo on 8/31/2010: Gravel has been added to the oversteepened slope noted above.	
4102	AB dike looking northeast from south end. Note recently dressed and hydro-seeded slope.	

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2010 - Ash Cell Dam Safety Inspection Photographs August 19 & 31, 2010

Photo No.	Description	Photo
4105	Newly installed sump discharge in headwall of A cell ash discharge.	
4106	AB dike looking southwest from east third of dike. Note freshly dressed and hydro-seeded slope. Note top of gravel bolsters installed in the past to deal with sluffing.	
4158	Follow-up photo on 8/31/2010: Same location as above showing mulch and emergence of some grass.	
4107	Area of northern sump at toe of C dike. The area is very nicely dressed up. This was a very neat job; the area was seeded and matted. The drain was seeping into the sump at a rapid drip.	

Plant McIntosh

2010 - Ash Cell Dam Safety Inspection Photographs August 19 & 31, 2010

Photo No.	Description	Photo
4108	Closer view of sump described above.	
4109	Interior of sump.	
4110	Granular material stockpiles at toe of C dike. The quantities are adequate and the material is in good shape.	
4111	Sump at south end of C dike. Trace of matting up slope indicates path of return line. This is a very neat job also.	

Photo No.	Description	Photo
4112	Interior of south sump at toe of C dike. Note small stream of water entering sump from drain. Also note iron oxide deposition in drain and in sump.	
4113	Sump at south end of C dike. Some additional work is needed to address poor grass cover on slopes.	
4114	There was not sign of the boils previously noted in the area of the new toe drain (which discharges to the sump) along the toe of C dike in its southern section.	
4115	Bare spots on slope of C dike. The grass is thin. The area should be tilled, seeded, fertilized and mulched.	

Plant McIntosh

2010 - Ash Cell Dam Safety Inspection Photographs August 19 & 31, 2010

Photo No.	Description	Photo
4116	View of saddle between two low areas at the toe of C dike showing granular material stockpiles. Also note matting from cleanup after installation of sumps.	
4117	Top of exterior slope of C dike near top showing bare earth and thin grass cover.	
4162	Follow-up photo on 8/31/2010: C dike downstream slope. Area has been tilled, hydroseeded and matted. Grass is emerging. Covers areas depicted by previous photos 4113 - 4117.	
4118	Control panel for sumps at toe of C dike. Note red light for alarm.	

Plant McIntosh

2010 - Ash Cell Dam Safety Inspection Photographs August 19 & 31, 2010

Photo No.	Description	Photo
4119	Sump outfall into C cell. Note that 2" HDPE pipe discharges into 4" corrugated pipe to avoid gullying of slope.	
4161	Follow-up photo on 8/31/2010: New piezometer installation at top of C dike.	
4120	View of BC dike from C dike. Note gravel bolster on left and recently dressed and seeded slope on right.	
4121	BC dike looking southwest. Note recently dressed and hydro-seeded slope in the forground and gravel bolster in the middle distance. Also, note gravel on crest.	

Plant McIntosh

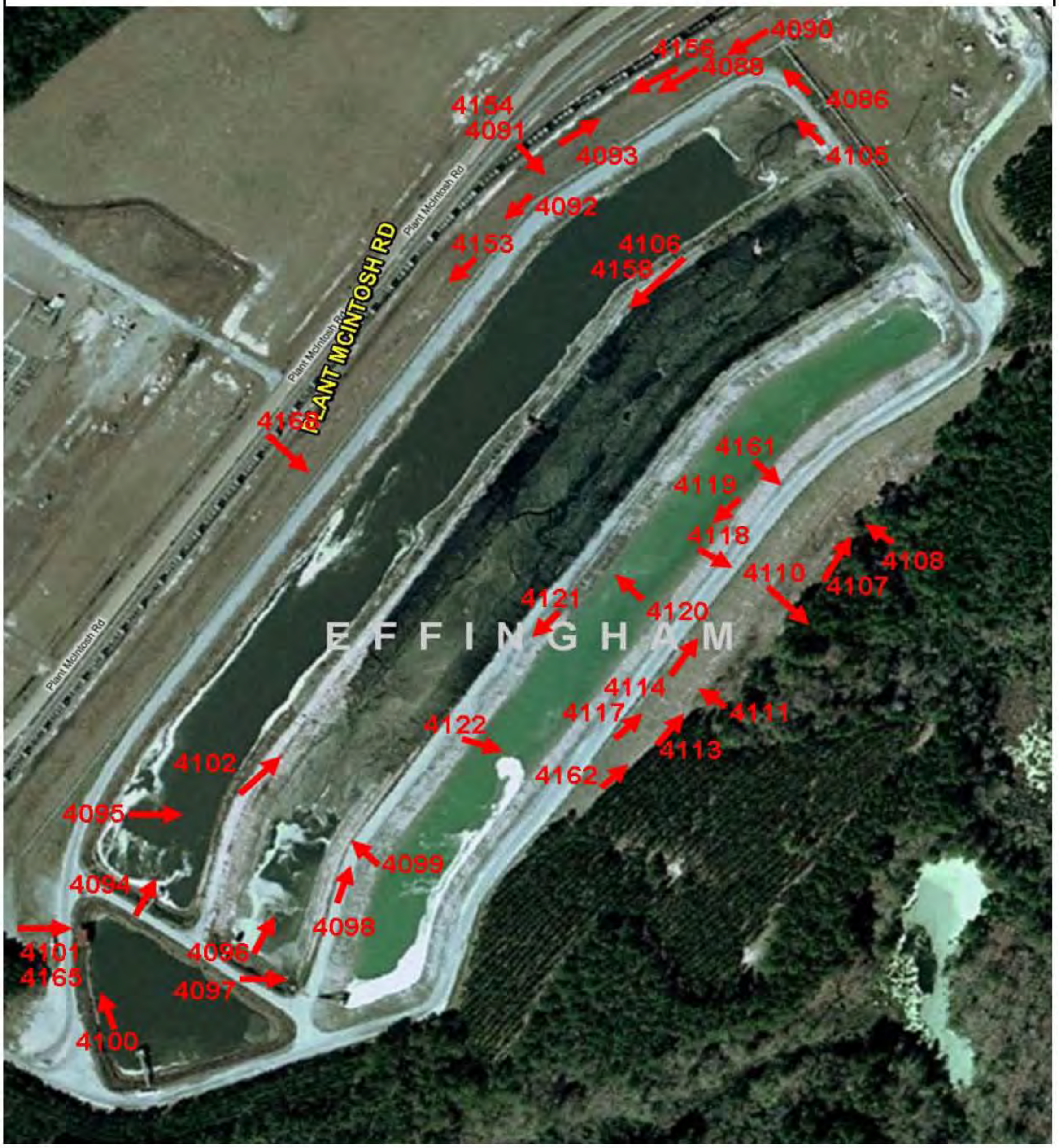
2010 - Ash Cell Dam Safety Inspection Photographs August 19 & 31, 2010

Photo No.	Description	Photo
4122	C dike viewed from BC dike. Note gravel bolsters and recently dressed and grassed slopes.	

Plant McIntosh

2010 - Ash Cell Dam Safety Inspection Photographs August 19 & 31, 2010

Photo No.	Description	Photo



APPENDIX A

Document 12

Plant McIntosh Weekly Ash Cell Dike Inspection Logs dated December 10, 2009; December 17, 2009; August 14, 2010; December 16, 2010; and December 28, 2010

Plant McIntosh Weekly Ash Cell Dike Inspection Log

Weather: Cloudy and cool	Date of Inspection: 12/10/2009
Temperature: 55 deg. F	Inspection by: Lee Lively
Rainfall (past 24 hrs): 0.8 inches	Pond Elev. : A -7ft. D -7ft. B - 10 C - 14 ft.
Rainfall (past week): 4 inches	

General Comments

Ash Pond Dike

		Observations - Comments
North (A) Dike		
Upstream Slope		
a. General Condition		
b. Erosion/Sloughing	Yes	*Minimal erosion - corner needs a down drain*
c. Excess Vegetation	No	
Crest		
a. General Condition		*Stone crest (road)*
b. Bare areas	Yes	*Some minimal rutting due to heavy rains and traffic*
c. Rutting	Yes	
Downstream Slope		
a. General Condition		
b. Seepage/Wet Spots	Yes	*Ditches full due to heavy rains*
c. Erosion/Sloughing	No	
East (C) Dike		
Upstream Slope		
a. General Condition		
b. Erosion/Sloughing	Yes	*Erosion in topsoil due to empty ponds and heavy rains (rills)*
c. Excess Vegetation	No	
Crest		
a. General Condition		
b. Bare areas	Yes	*Rutting due to heavy rains and traffic*
c. Rutting	Yes	
Downstream Slope		
a. General Condition		
b. Seepage/Wet Spots	Yes	*See Joel Galt Report/ In need of topsoil and grassing- fertilizer. Rutting due to tractors and heavy equipment holding water.*
c. Erosion/Sloughing	Yes	
South Dike		
Upstream Slope		
a. General Condition		*Need drain on A*
b. Erosion/Sloughing	Yes	
c. Excess Vegetation	No	
Crest		
a. General Condition		
b. Bare areas	Yes	*Rutting on A and D*
c. Rutting	Yes	
Downstream Slope		
a. General Condition		
b. Seepage/Wet Spots	No	
c. Erosion/Sloughing	No	
West Dike		
Upstream Slope		
a. General Condition		
b. Erosion/Sloughing	Yes	*Topsoil erosion - rills*
c. Excess Vegetation	No	
Crest		
a. General Condition		*Stone road*
b. Bare areas	Yes	*Road in good shape (rutting at south end of A pond crest)*
c. Rutting	No	
Downstream Slope		
a. General Condition		*Holding water in all ditches*
b. Seepage/Wet Spots	No	*Need top soil/fertilize in areas to help grass*
c. Erosion/Sloughing	Yes	

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Plant McIntosh Weekly Ash Cell Dike Inspection Log

West Interior (A-B) Dike		
West Slope		
a. General Condition		
b. Erosion/Sloughing	Yes	*topsoil rills due to heavy rain and low water level in ponds*
c. Excess Vegetation	No	
Crest		
a. General Condition		
b. Bare areas	Yes	*Rutting from heavy rain and traffic*
c. Rutting	Yes	
East Slope		
a. General Condition		
b. Seepage/Wet Spots	No	
c. Excess Vegetation	No	
East Interior (B-C)Dike		
West Slope		
a. General Condition		
b. Erosion/Sloughing	Yes	*Rills in topsoil*
c. Excess Vegetation	No	
Crest		
a. General Condition		
b. Bare areas	Yes	*Rutting in crest due to traffic*
c. Rutting	Yes	
East Slope		
a. General Condition		
b. Seepage/Wet Spots	No	
c. Excess Vegetation	No	
Emergency Aggregate Stockpiles		
a. Available/condition	Yes	*Good*

Ash Cell Outlet Structures		**Observations - Comments**
Cell A Outlet structure		
a. General Condition		*Valves open and discharging in to D cell*
b. Seepage	No	
c. Debris in weir	No	
d. Discharge this week	Yes	
Cell B Outlet structure		
a. General Condition		
b. Seepage	No	
c. Debris in weir	No	
d. Discharge this week	No	
Cell C Outlet structure		
a. General Condition		*Valves closed and plugged. Slight leakage thru valve*
b. Seepage	No	
c. Debris in weir	No	*2nd valve from top leaking*
d. Discharge this week	Yes	
Cell D Outlet structure		
a. General Condition		
b. Seepage	Yes	
c. Debris in weir	No	*Minimal discharge thru stop logs. Level controlled by pumps in "D" cell.*
d. Discharge this week	Yes / No	

Plant McIntosh Weekly Ash Cell Dike Inspection Log

Weather: Clear Skies	Date of Inspection: 12/13/09
Temperature: 60°	Inspection by: Lee Custy
Rainfall (past 24 hrs): None	Pond Elev.: A = 7 B = 8
Rainfall (past week): 6 1/2 inches	D = 7 C - Being Pumped Out

General Comments

New failures in C Pond.
Discussed with Hydro Group this date.

Ash Pond Dike

		Observations - Comments
North (A) Dike		
Upstream Slope		
a. General Condition		
b. Erosion/Sloughing	Yes / No (Yes)	Rills in Slopes
c. Excess Vegetation	Yes / No (No)	
Crest		
a. General Condition		
b. Bare areas	Yes / No (Yes)	Heavy rutting @ C & B - Stone ordered
c. Rutting	Yes / No (Yes)	
Downstream Slope		
a. General Condition		
b. Seepage/Wet Spots	Yes / No (Yes)	Water in Ditches from Rains
c. Erosion/Sloughing	Yes / No (No)	
East (C) Dike		
Upstream Slope		
a. General Condition		
b. Erosion/Sloughing	Yes / No (Yes)	New Slide - Approx 400 ft long - See Pics
c. Excess Vegetation	Yes / No (No)	
Crest		
a. General Condition		
b. Bare areas	Yes / No (Yes)	Rutting on Crest / Stone Ordered
c. Rutting	Yes / No (Yes)	
Downstream Slope		
a. General Condition		
b. Seepage/Wet Spots	Yes / No (Yes)	See Dact Report
c. Erosion/Sloughing	Yes / No (Yes)	Slopes Wet from Rains
South Dike		
Upstream Slope		
a. General Condition		
b. Erosion/Sloughing	Yes / No (Yes)	New Slide on North Side of "D" Cell
c. Excess Vegetation	Yes / No (No)	
Crest		
a. General Condition		
b. Bare areas	Yes / No (Yes)	Some rutting due to heavy rains & traffic
c. Rutting	Yes / No (Yes)	Rutting on A & D
Downstream Slope		
a. General Condition		
b. Seepage/Wet Spots	Yes / No (No)	
c. Erosion/Sloughing	Yes / No (No)	
West Dike		
Upstream Slope		
a. General Condition		
b. Erosion/Sloughing	Yes / No (Yes)	Rills in topsoil
c. Excess Vegetation	Yes / No (No)	
Crest		
a. General Condition		
b. Bare areas	Yes / No (Yes)	Rutting @ Corners
c. Rutting	Yes / No (Yes)	
Downstream Slope		
a. General Condition		Water in Ditches due to Rain / Soils saturated
b. Seepage/Wet Spots	Yes / No (No)	
c. Erosion/Sloughing	Yes / No (Yes)	Needs top soil / fertilizer

Plant McIntosh Weekly Ash Cell Dike Inspection Log

West Interior (A-B) Dike		
West Slope		
a. General Condition		Rills on Top Soil
b. Erosion/Sloughing	(Yes) / No	
c. Excess Vegetation	Yes / (No)	
Crest		
a. General Condition		Rutting due to heavy rains & vehicle traffic on dikes
b. Bare areas	(Yes) / No	
c. Rutting	(Yes) / No	
East Slope		
a. General Condition		Failure on Top Soil - Seepage @ North End
b. Seepage/Wet Spots	Yes / (No)	
c. Excess Vegetation	Yes / (No)	
East Interior (B-C) Dike		
West Slope		
a. General Condition		Failure - Slide - See Pics West Side Interior of C Pond
b. Erosion/Sloughing	(Yes) / No	
c. Excess Vegetation	Yes / (No)	
Crest		
a. General Condition		Rutting on Roadway
b. Bare areas	(Yes) / No	
c. Rutting	(Yes) / No	
East Slope		
a. General Condition		Failure on South End East Dike - See Pictures Sent to Joel Grant
b. Seepage/Wet Spots	Yes / (No)	
c. Excess Vegetation	Yes / (No)	
Emergency Aggregate Stockpiles		
a. Available/condition	Yes / No	*Good / not good*

Ash Cell Outlet Structures

		Observations - Comments
Cell A Outlet structure		
a. General Condition		
b. Seepage	Yes / (No)	Flowing in to D
c. Debris in weir	Yes / (No)	
d. Discharge this week	(Yes) / No	
Cell B Outlet structure		
a. General Condition		
b. Seepage	Yes / (No)	
c. Debris in weir	Yes / (No)	
d. Discharge this week	Yes / (No)	
Cell C Outlet structure		
a. General Condition		
b. Seepage	Yes / (No)	Valve leaking
c. Debris in weir	Yes / (No)	Rats from Top
d. Discharge this week	Yes / No	
Cell D Outlet structure		
a. General Condition		
b. Seepage	Yes / (No)	
c. Debris in weir	Yes / (No)	Minimal Flow thru logs / Pumping to Discharge
d. Discharge this week	(Yes) / No	

Stone ordered for Rutted areas in Crests /

Plant McIntosh Weekly Ash Cell Dike Inspection Log

Plant McIntosh Weekly Ash Cell Dike Inspection Log

Weather: Broken Clouds	Date of Inspection: 8/14/10
Temperature: 83° F	Inspection by: [illegible]
Rainfall (past 24 hrs): 0.40	Pond Elev. :
Rainfall (past week): 0.40	A=3 B=5 C=4 D=4

General Comments

Ash Pond Dike

		Observations - Comments
North (A) Dike		
Upstream Slope		
a. General Condition		
b. Erosion/Sloughing	(Yes) / No	
c. Excess Vegetation	Yes / (No)	
Crest		
a. General Condition		
b. Bare areas	Yes / (No)	
c. Rutting	Yes / (No)	
Downstream Slope		
a. General Condition		
b. Seepage/Wet Spots	(Yes) / No	
c. Erosion/Sloughing	(Yes) / No	
East (C) Dike		
Upstream Slope		
a. General Condition		
b. Erosion/Sloughing	(Yes) / No	
c. Excess Vegetation	Yes / (No)	Work in Progress on Dikes by Contractor
Crest		
a. General Condition		
b. Bare areas	Yes / (No)	
c. Rutting	(Yes) / No	
Downstream Slope		
a. General Condition		
b. Seepage/Wet Spots	(Yes) / No	
c. Erosion/Sloughing	(Yes) / No	
South Dike		
Upstream Slope		
a. General Condition		
b. Erosion/Sloughing	(Yes) / No	
c. Excess Vegetation	Yes / (No)	
Crest		
a. General Condition		
b. Bare areas	(Yes) / No	
c. Rutting	(Yes) / No	
Downstream Slope		
a. General Condition		
b. Seepage/Wet Spots	Yes / (No)	
c. Erosion/Sloughing	Yes / (No)	
West Dike		
Upstream Slope		
a. General Condition		
b. Erosion/Sloughing	(Yes) / No	
c. Excess Vegetation	Yes / (No)	
Crest		
a. General Condition		
b. Bare areas	Yes / (No)	
c. Rutting	(Yes) / No	SE Corner of A
Downstream Slope		
a. General Condition		
b. Seepage/Wet Spots	(Yes) / No	
c. Erosion/Sloughing	(Yes) / No	

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Plant McIntosh Weekly Ash Cell Dike Inspection Log

West Interior (A-B) Dike		
West Slope		
a. General Condition		
b. Erosion/Sloughing	Yes / No	
c. Excess Vegetation	Yes / No	
Crest		
a. General Condition		
b. Bare areas	Yes / No	
c. Rutting	Yes / No	
East Slope		
a. General Condition		
b. Seepage/Wet Spots	Yes / No	
c. Excess Vegetation	Yes / No	
East Interior (B-C)Dike		
West Slope		
a. General Condition		
b. Erosion/Sloughing	Yes / No	
c. Excess Vegetation	Yes / No	
Crest		
a. General Condition		
b. Bare areas	Yes / No	
c. Rutting	Yes / No	
East Slope		
a. General Condition		
b. Seepage/Wet Spots	Yes / No	
c. Excess Vegetation	Yes / No	
Emergency Aggregate Stockpiles		
a. Available/condition	Yes / No	*Good / not good*

Ash Cell Outlet Structures

		Observations - Comments
Cell A Outlet structure		
a. General Condition		
b. Seepage	Yes / No	
c. Debris in weir	Yes / No	A → D
d. Discharge this week	Yes / No	
Cell B Outlet structure		
a. General Condition		
b. Seepage	Yes / No	
c. Debris in weir	Yes / No	D → B
d. Discharge this week	Yes / No	
Cell C Outlet structure		
a. General Condition		
b. Seepage	Yes / No	
c. Debris in weir	Yes / No	D → C
d. Discharge this week	Yes / No	
Cell D Outlet structure		
a. General Condition		
b. Seepage	Yes / No	
c. Debris in weir	Yes / No	D → B, C
d. Discharge this week	Yes / No	

Plant McIntosh Weekly Ash Cell Dike Inspection Log

Weather:	Clear	Date of Inspection:	12/16/10
Temperature:	61°	Inspection by:	[illegible]
Rainfall (past 24 hrs):	0.0	Pond Elev. :	
Rainfall (past week):	0.46		A - 3.0 B - 3.25 C - 3.5 D - 3.25

General Comments

Filled Armadillo hole with sediment

Ash Pond Dike

	Observations - Comments
North (A) Dike	
Upstream Slope	
a. General Condition	
b. Erosion/Sloughing Yes / (No)	
c. Excess Vegetation Yes / (No)	
Crest	
a. General Condition	
b. Bare areas Yes / (No)	
c. Rutting Yes / (No)	
Downstream Slope	
a. General Condition	
b. Seepage/Wet Spots Yes / (No)	
c. Erosion/Sloughing Yes / (No)	
East (C) Dike	
Upstream Slope	
a. General Condition	Sealed Armadillo hole
b. Erosion/Sloughing Yes / (No)	
c. Excess Vegetation Yes / (No)	
Crest	
a. General Condition	
b. Bare areas Yes / (No)	
c. Rutting Yes / (No)	
Downstream Slope	
a. General Condition	Sealed armadillo hole
b. Seepage/Wet Spots (Yes) / No	
c. Erosion/Sloughing Yes / (No)	- Korsonic
South Dike	
Upstream Slope	
a. General Condition	
b. Erosion/Sloughing (Yes) / No	- Rills
c. Excess Vegetation Yes / (No)	
Crest	
a. General Condition	
b. Bare areas Yes / (No)	
c. Rutting Yes / (No)	
Downstream Slope	
a. General Condition	
b. Seepage/Wet Spots Yes / (No)	
c. Erosion/Sloughing Yes / (No)	
West Dike	
Upstream Slope	
a. General Condition	
b. Erosion/Sloughing (Yes) / No	- Rills
c. Excess Vegetation Yes / (No)	
Crest	
a. General Condition	
b. Bare areas Yes / (No)	
c. Rutting Yes / (No)	
Downstream Slope	
a. General Condition	
b. Seepage/Wet Spots Yes / (No)	
c. Erosion/Sloughing Yes / (No)	

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Plant McIntosh Weekly Ash Cell Dike Inspection Log

West Interior (A-B) Dike		
West Slope		
a. General Condition		
b. Erosion/Sloughing	Yes / No	
c. Excess Vegetation	Yes / No	
Crest		
a. General Condition		
b. Bare areas	Yes / No	
c. Rutting	Yes / No	
East Slope		
a. General Condition		
b. Seepage/Wet Spots	Yes / No	
c. Excess Vegetation	Yes / No	
East Interior (B-C)Dike		
West Slope		
a. General Condition		
b. Erosion/Sloughing	Yes / No	
c. Excess Vegetation	Yes / No	
Crest		
a. General Condition		
b. Bare areas	Yes / No	
c. Rutting	Yes / No	
East Slope		
a. General Condition		
b. Seepage/Wet Spots	Yes / No	
c. Excess Vegetation	Yes / No	
Emergency Aggregate Stockpiles		
a. Available/condition	Yes / No	Good / not good — Need to trim around piles

Ash Cell Outlet Structures

		Observations - Comments
Cell A Outlet structure		
a. General Condition		
b. Seepage	Yes / No	
c. Debris in weir	Yes / No	
d. Discharge this week	Yes / No	A -> D
Cell B Outlet structure		
a. General Condition		
b. Seepage	Yes / No	
c. Debris in weir	Yes / No	
d. Discharge this week	Yes / No	
Cell C Outlet structure		
a. General Condition		
b. Seepage	Yes / No	
c. Debris in weir	Yes / No	
d. Discharge this week	Yes / No	
Cell D Outlet structure		
a. General Condition		
b. Seepage	Yes / No	
c. Debris in weir	Yes / No	
d. Discharge this week	Yes / No	

Plant McIntosh Weekly Ash Cell Dike Inspection Log

12/10/10

— rills

Plant McIntosh Weekly Ash Cell Dike Inspection Log

Weather: Clear & Cool	Date of Inspection: 12-28-10
Temperature: 45°F	Inspection by: J. Grooms
Rainfall (past 24 hrs): None	Pond Elev.: A-3, B-3, C-3, D-3
Rainfall (past week): .52"	

General Comments

Some armadillo burrowing noticed on north east C dike. Areas have been covered.

Ash Pond Dike

Observations - Comments

North (A) Dike		Observations - Comments
Upstream Slope		
a. General Condition		Good
b. Erosion/Sloughing	Yes / **No**	
c. Excess Vegetation	Yes / **No**	
Crest		
a. General Condition		Good
b. Bare areas	Yes / **No**	
c. Rutting	Yes / **No**	
Downstream Slope		
a. General Condition		Good
b. Seepage/Wet Spots	Yes / **No**	
c. Erosion/Sloughing	Yes / **No**	
East (C) Dike		
Upstream Slope		
a. General Condition		Good
b. Erosion/Sloughing	Yes / **No**	
c. Excess Vegetation	Yes / **No**	
Crest		
a. General Condition		
b. Bare areas	Yes / **No**	
c. Rutting	Yes / **No**	
Downstream Slope		
a. General Condition		Good
b. Seepage/Wet Spots	Yes / **No**	
c. Erosion/Sloughing	Yes / **No**	
South Dike		
Upstream Slope		
a. General Condition		Fair
b. Erosion/Sloughing	**Yes** / No	Rills Present
c. Excess Vegetation	Yes / No	
Crest		
a. General Condition		Good
b. Bare areas	Yes / **No**	
c. Rutting	Yes / **No**	
Downstream Slope		
a. General Condition		Good
b. Seepage/Wet Spots	Yes / **No**	
c. Erosion/Sloughing	Yes / **No**	
West Dike		
Upstream Slope		
a. General Condition		Fair
b. Erosion/Sloughing	**Yes** / No	Rills Present
c. Excess Vegetation	Yes / **No**	
Crest		
a. General Condition		Good
b. Bare areas	Yes / **No**	
c. Rutting	Yes / **No**	
Downstream Slope		
a. General Condition		Good
b. Seepage/Wet Spots	Yes / **No**	
c. Erosion/Sloughing	Yes / **No**	

MCI-API 024

Plant McIntosh Weekly Ash Cell Dike Inspection Log

West Interior (A-B) Dike		
West Slope		
a. General Condition		Great
b. Erosion/Sloughing	Yes / **No**	
c. Excess Vegetation	Yes / **No**	
Crest		
a. General Condition		Good
b. Bare areas	Yes / **No**	
c. Rutting	Yes / **No**	
East Slope		
a. General Condition		Good
b. Seepage/Wet Spots	Yes / **No**	
c. Excess Vegetation	Yes / **No**	
East Interior (B-C)Dike		
West Slope		
a. General Condition		Good
b. Erosion/Sloughing	Yes / **No**	
c. Excess Vegetation	Yes / **No**	
Crest		
a. General Condition		Good
b. Bare areas	Yes / **No**	
c. Rutting	Yes / **No**	
East Slope		
a. General Condition		Good
b. Seepage/Wet Spots	Yes / **No**	
c. Excess Vegetation	Yes / **No**	
Emergency Aggregate Stockpiles		
a. Available/condition	**Yes** / No	**Good** / not good

Ash Cell Outlet Structures

		Observations - Comments
Cell A Outlet structure		
a. General Condition		Good
b. Seepage	Yes / **No**	
c. Debris in weir	Yes / **No**	
d. Discharge this week	**Yes** / No	A pond flowing to D pond
Cell B Outlet structure		
a. General Condition		Good
b. Seepage	Yes / **No**	
c. Debris in weir	Yes / **No**	
d. Discharge this week	Yes / **No**	
Cell C Outlet structure		
a. General Condition		Good
b. Seepage	Yes / **No**	
c. Debris in weir	Yes / **No**	
d. Discharge this week	Yes / **No**	
Cell D Outlet structure		
a. General Condition		Good
b. Seepage	Yes / **No**	
c. Debris in weir	Yes / **No**	
d. Discharge this week	**Yes** / No	Small seepage @ emergency overflow.

APPENDIX A

Document 13

Plant McIntosh Ash Pond C Toe Drain Installation, February 24, 2011

Plant McIntosh
Ash Cell C
Toe Drain Installation

Reason:

A swampy area exists at the toe of the east slope of ash cell C. The area is characterized by wet soils and the presence of water-loving plants. The water seeping into this area originates from ash cell C. The flow appears to occur along the interface of the dike and the natural ground. With ash cell C drawn down, but still holding some water, the area continues to be persistently wet. Raising ash cell C to higher water levels will probably result in an increase in seepage in this area.

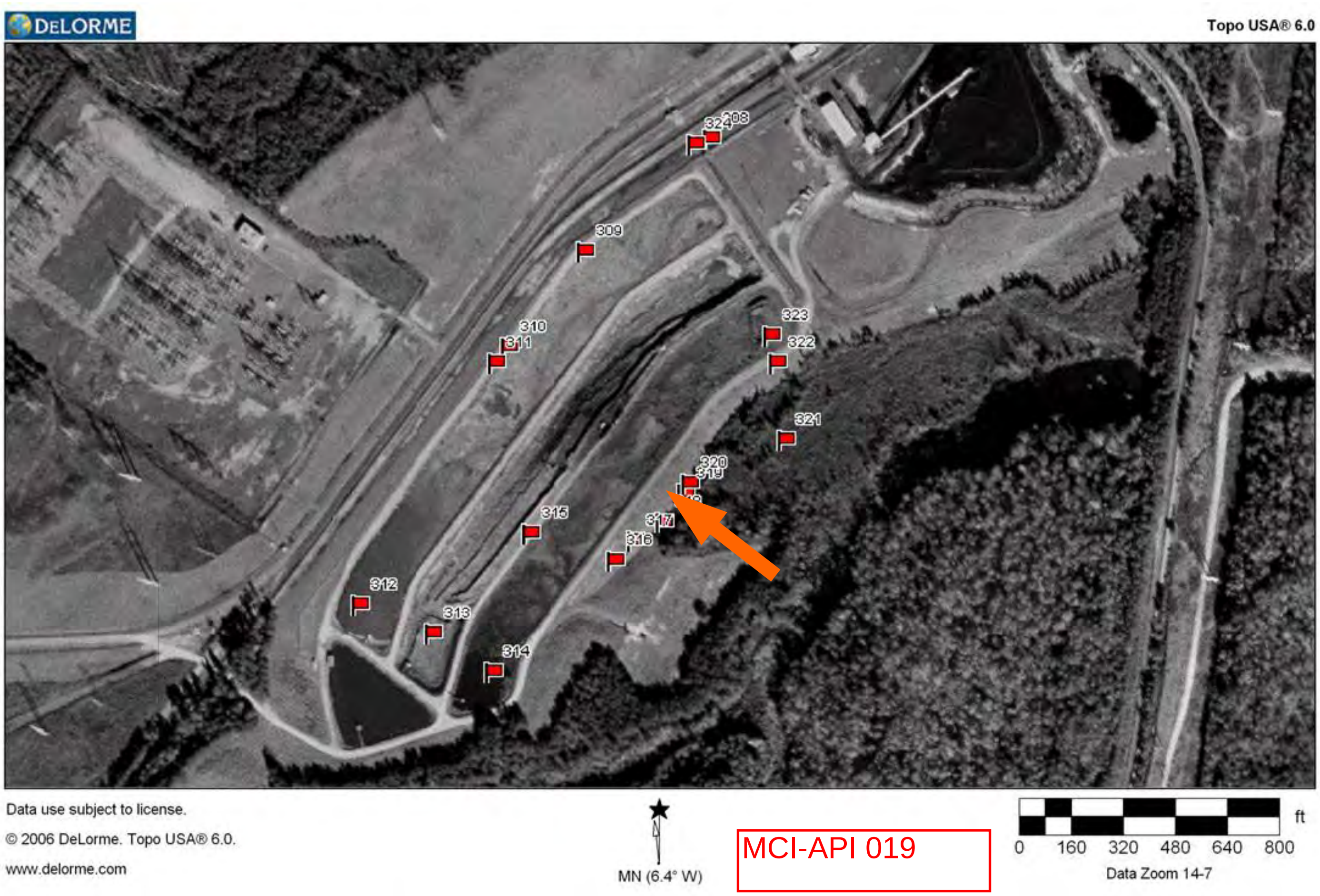
The seepage may increase over time and pose a threat to the dike. In some cases seepage water may transport soil particles. As soil particles are removed, the velocity of flow is increased, leading to transport of more soil particles. This phenomenon, known as "piping", can result in the development of a water passage under the dike and result in the failure of the structure. A fix for this situation is to provide a controlled outlet for the seepage water.

Action:

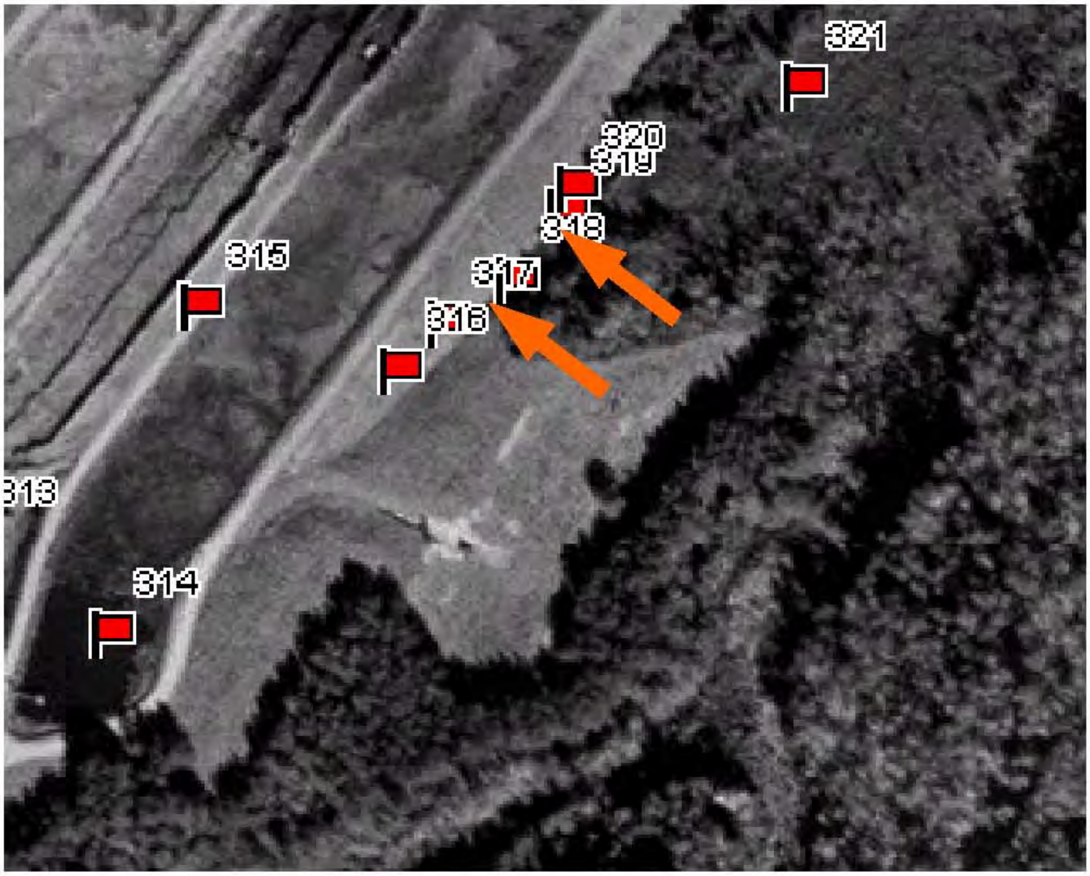
Install a toe drain at the contact of the ash cell dike with the natural slope.

Location:

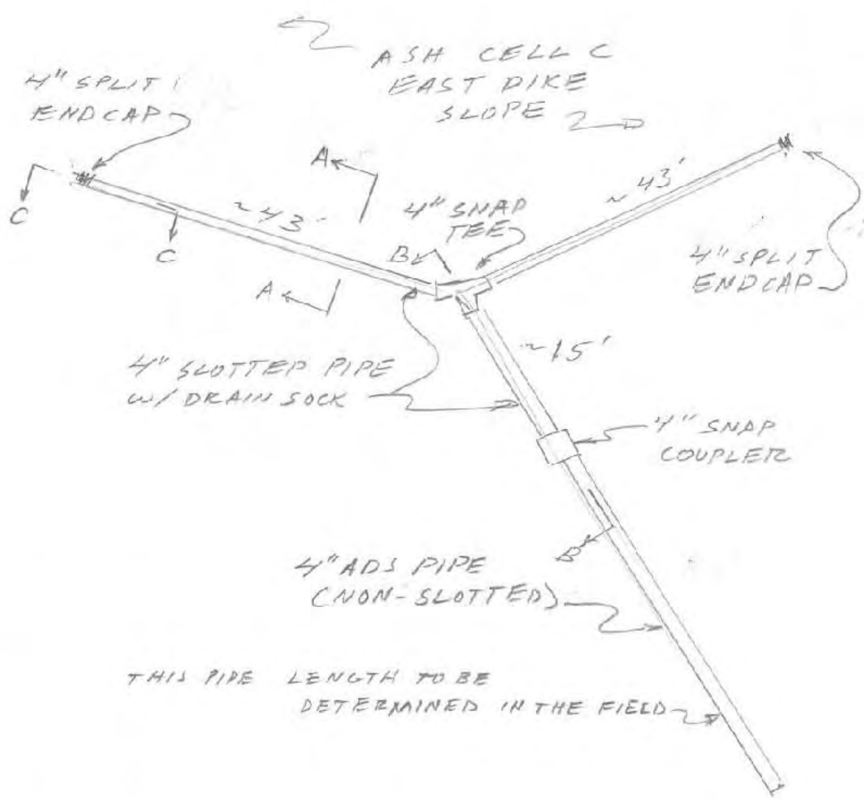
From location 318 to location 319 on the photo below.



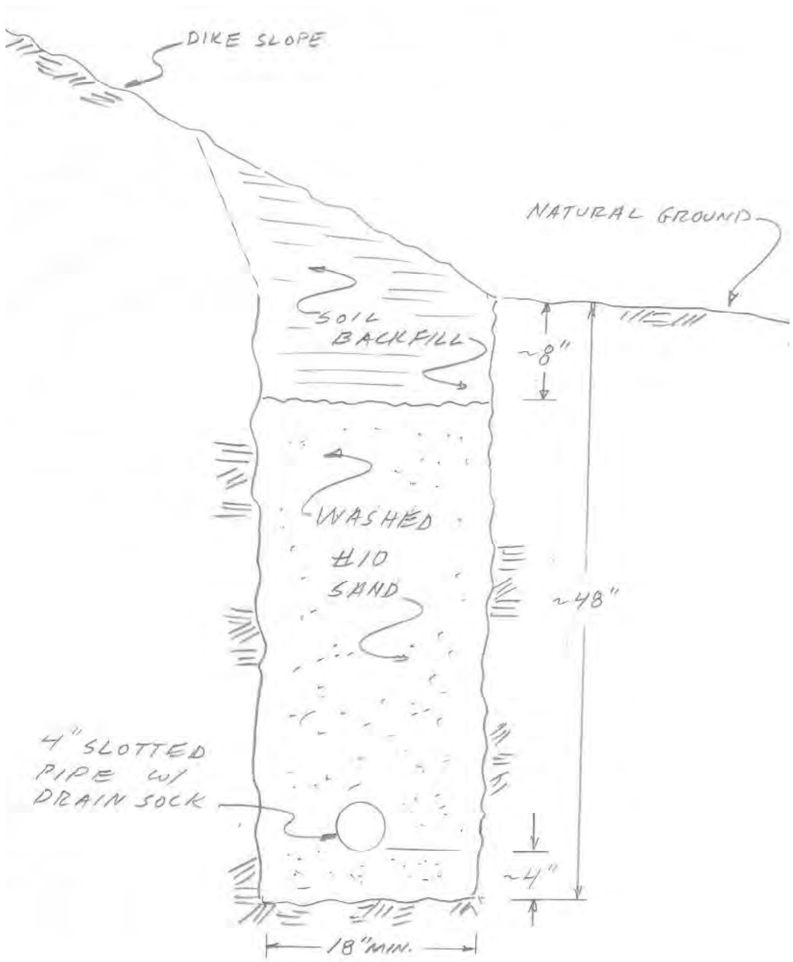
MCI-API 019



Toe Drain Extent

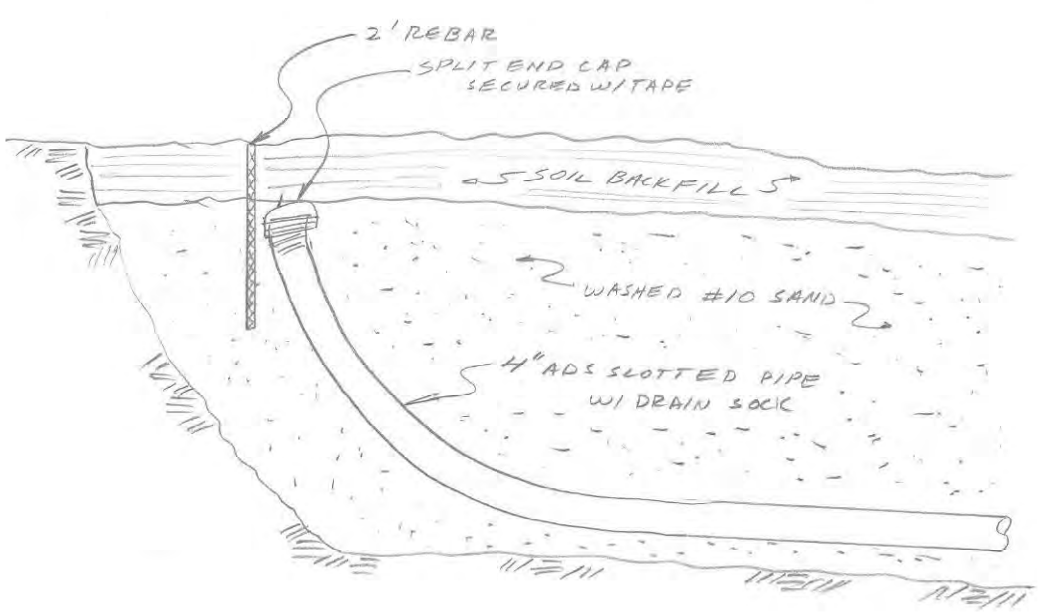


Toe Drain Pipe Layout (NTS)



Section A-A
Thru Toe Drain (NTS)

Section B-B
Thru Outlet Pipe (NTS)



Section C-C
Thru end of toe drain

Equipment:

Optical level & rod
Backhoe
Dump truck
Shovels
Utility knife
Hand sledge

Materials:

Stakes
Marking paint
Washed #10 sand or equivalent (approx. 37 yd^3)
Dredge sand may be substituted if its gradation is judged acceptable by a geotechnical engineer.
Grass seed
Fertilizer
Mulch
Advanced Drainage Systems pipe components as listed in the following table:

Part Description	Part Number	Size	Quantity
Snap T	0421AA	4"	1 each
Split end cap	0431AA	4"	2 each
Split coupler	0411AA	4"	3 each*
4" 100'coil w/ drain sock	0424HA	4"	1 (100")
4" 100' Coil Solid pipe	0401-100	4"	1 (100')
Vinyl tape	1147KA	2"x100'	1 roll

(Equivalent Hancor Pipe components may be used.)
* There are two extra split couplers in case of field modifications.

Safety:

- A job safety briefing shall be conducted on site prior to starting the excavation.
- No person shall enter the ditch at any time for any purpose.
- It will be important to keep the ditch (parallel to the toe of the slope) open for a minimum amount of time. The longer the ditch is open the greater the chance of a slide.
- Only 15 feet of ditch shall be open at any time.
- The ditch shall not be left open overnight or for lunch.
- If it is necessary to stop work overnight, the ditch shall be filled with sand. That excess sand shall be excavated and spoiled at the resumption of work.

Procedure:

1. Prepare access to the toe of ash cell C.
2. Prepare a stockpile location for storing emergency filter materials at or near the toe of the ash cell.
3. Stock the filter material storage area with the required granular materials: washed #10 sand, #89 stone, #57 stone, and surge stone.
4. Lay out the extent of the toe drain with stakes and paint.
5. Start the ditch by cutting from the outlet toward the dike.
6. As the ditch is being cut, the assembly of pipe shown in "Toe Drain Pipe Layout" shall be assembled. All connections shall be taped securely with vinyl tape. All of the slotted pipe shall be covered with the knit drain sock – no slots are to be left uncovered.
7. When the ditch has been cut from the outlet to the toe, place 4" of sand in the bottom of the ditch from the toe to a distance of about 15 feet toward the outlet.
8. Place the pipe in the ditch.
9. Backfill the solid pipe with compacted soil almost up to the joint with the slotted pipe. Wet the soil and tamp it carefully around the pipe to achieve a seal. Do not tamp so hard as to deform the pipe. Once the soil is 6 inches above the top of the pipe compact the soil with a tamping foot compactor in 3" layers.
10. Cut the first segment of the toe ditch across the end of the outlet ditch.
11. Extend the toe ditch to a length of 15'.
12. Place 4" of sand in the bottom of the toe ditch, followed by the pipe. Backfill the pipe with sand to within 8" of the surface as far as is practical.
13. Repeat steps 11 and 12 until the first leg of the toe drain is completed.
14. Construct the opposite leg of the toe drain as above.
15. Backfill the top 8" of the ditch with soil from the excavation.
16. Stake the locations of the end caps with 2 foot pieces of rebar set flush with the ground surface.
17. Remove spoil.
18. Dress disturbed areas and treat with seed, fertilizer and mulch.
19. Have a survey of the stakes done for an as-built drawing.
20. Monitor flow from outlet pipe daily for two weeks. Check flow (time to fill a quart container) and color of discharge. Report any color or particles in the flow or significant changes in flow volume immediately to SCG Hydro Services.

References:

Plant McIntosh Ash Cell and Ash Monofill Inspection Report, February 13, 2009, SCG Hydro Services.

Advanced Drainage Systems Product Catalog
http://www.ads-pipe.com/pdf/en/ADS_Product_Catalog_06-07.pdf

Hancor Product Catalog
http://www.hancor.com/pro_cat/contents.html

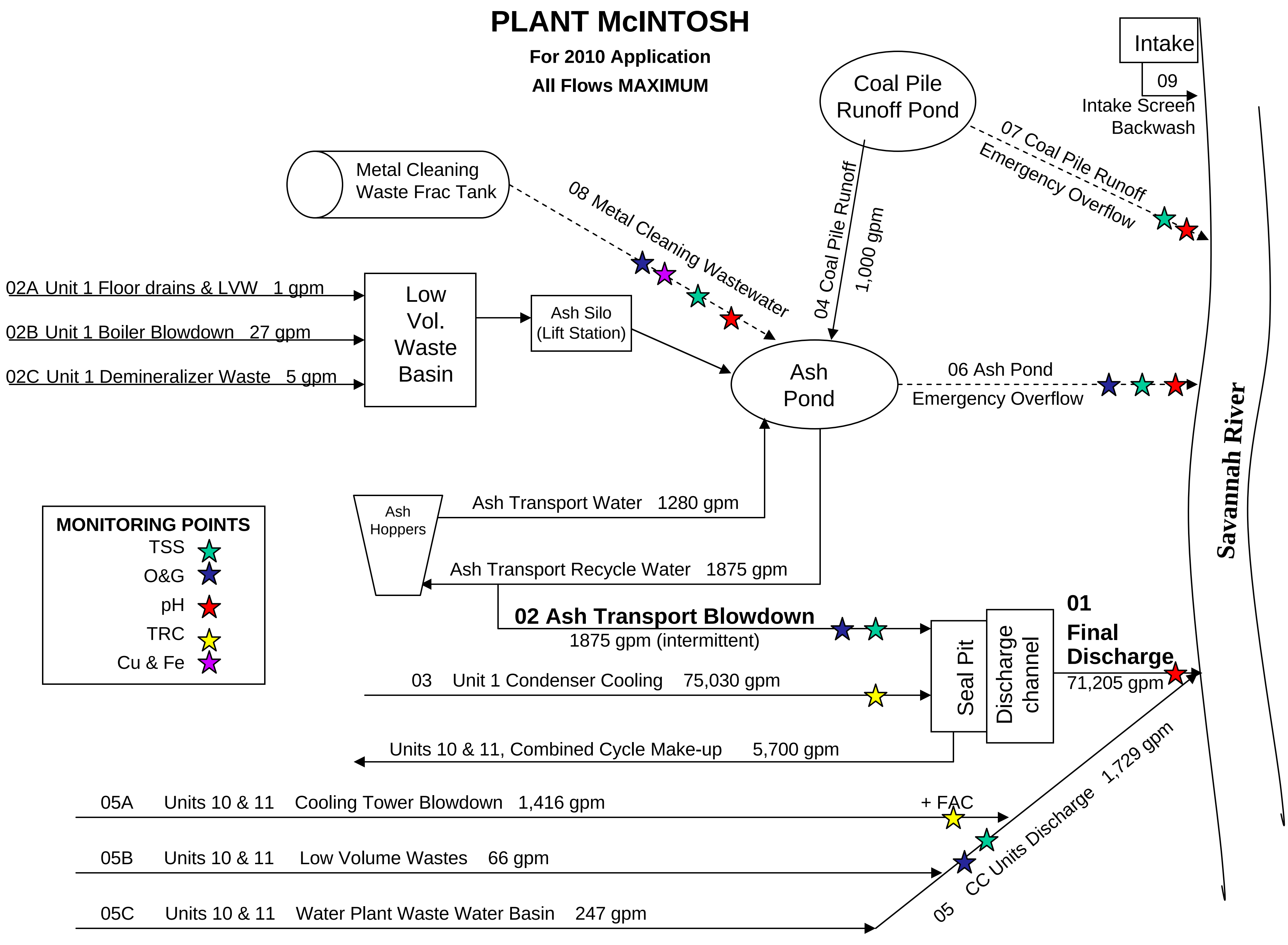
Document date: February 24, 2009

Written by: Joel Galt SCG Hydro Services

APPENDIX A

Document 14

Plant McIntosh All Flows Maximum


PLANT McINTOSH
For 2010 Application
All Flows MAXIMUM
Intake
09
Intake Screen Backwash
Coal Pile Runoff Pond
07 Coal Pile Runoff
Emergency Overflow
04 Coal Pile Runoff
1,000 gpm
Metal Cleaning Waste Frac Tank
08 Metal Cleaning Wastewater
02A Unit 1 Floor drains & LVW 1 gpm
02B Unit 1 Boiler Blowdown 27 gpm
02C Unit 1 Demineralizer Waste 5 gpm
Low Vol. Waste Basin
Ash Silo (Lift Station)
Ash Pond
06 Ash Pond
Emergency Overflow
Savannah River
MONITORING POINTS
TSS
O&G
pH
TRC
Cu & Fe
Ash Hoppers
Ash Transport Water 1280 gpm
Ash Transport Recycle Water 1875 gpm
02 Ash Transport Blowdown
1875 gpm (intermittent)
03 Unit 1 Condenser Cooling 75,030 gpm
Seal Pit
Discharge channel
01
Final Discharge
71,205 gpm
Units 10 & 11, Combined Cycle Make-up 5,700 gpm
05A Units 10 & 11 Cooling Tower Blowdown 1,416 gpm
+ FAC
05B Units 10 & 11 Low Volume Wastes 66 gpm
05C Units 10 & 11 Water Plant Waste Water Basin 247 gpm
05 CC Units Discharge 1,729 gpm

MCI-API 006

APPENDIX A

Document 15

Technical Specifications for Ash Pond Cleaning

TECHNICAL SPECIFICATIONS
FOR
ASH POND CLEANING

PLANT MCINTOSH ASH HOLDING POND NO. C

Prepared For

GEORGIA POWER COMPANY

PREPARED BY: ______________________ DATE: __________
William H. Aiken, P.E.

REVIEWED BY: ______________________ DATE: __________
Gary Laye,

APPROVED BY: ______________________ DATE: __________
Joe Griggs, Manager

REVISIONS:

NO.	DESCRIPTION	BY	REVIEWED	APPROVED	DATE
0	Issue for Inquiry	WHA	GL	JG	

SPECIFICATIONS
FOR
ASH POND CLEANING

PLANT MCINTOSH ASH HOLDING POND NO. C

1.0 GENERAL

1.1 This technical specification provides the guidelines and procedures for the removal of coal ash from Plant McIntosh Ash Holding Ponds.

1.2 The Contractor shall ensure that all work is performed in accordance with the Occupational Safety and Health Act of 1970 and other Standards and Codes listed herein (latest revision).

1.3 The Contractor shall be responsible for obtaining any necessary permits for conducting the work covered by these Specifications.

1.4 The Contractor shall receive, unload, haul to site, handle, store, place, and secure all materials and equipment. Any security measures taken for the protection of the Contractor's equipment shall be at his expense.

1.5 The Contractor shall furnish and keep in good working condition at all times sufficient equipment of the proper design and capacity to do all work described under this Plan and in accordance with the established schedule. The Purchaser's acceptance of the Contractor's list of equipment shall not be construed to mean that the listed equipment is adequate or sufficient to perform the work or that additional equipment will not be required to maintain the schedule or perform the work specified herein.

1.6 The Contractor shall furnish appropriate equipment for minimizing fugitive dust.

1.7 The Contractor shall comply with all applicable state and county regulations concerning hazardous material disposal and burning operations and shall obtain any necessary permits for these activities.

1.8 All earthwork, including ramps and access roads, done for the convenience of the Contractor shall be done at his expense. Such work will be restored to its original elevation at the Contractor's expense if the Purchaser so desires. All ramps shall be constructed of clay and rock.

1.9 All disturbed areas shall, at the Contractor's expense, be restored to the original conditions such as erosion control, vegetation, etc. as directed by the Purchaser.

1.10 The Contractor shall protect and maintain his earthwork and slopes by diverting surface runoff through the use of berms, ditches and drains above excavated areas and by not weakening slopes with excessive heavy vehicular traffic. He shall at his own expense, repair any damage that might be caused by his failure or negligence in protecting and maintaining his work.

1.11 The Contractor shall install, at his expense, any drainage piping required because of the Contractor's mode of operation including his ramps and roads.

1.12 The Contractor and the Purchaser's field representative shall agree on a designated path for the trucks hauling material to the site. The Contractor's vehicles outside the designated traffic path must not obstruct or hinder normal traffic flow on the site.

1.13 The provisions of these Specifications shall govern unless otherwise specified in the contract documents. In case of conflicting requirements, the contract documents shall govern. In the case of discrepancies between the Drawings and the Specifications, the Contractor shall notify the Purchaser. In case of discrepancies between the scale dimensions on the Drawings and the dimensions written on them, the written dimensions shall govern.

2.0 APPLICAALE DOCUMENTS

2.1 DRAWINGS

2.1.1 The following drawing(s) are made part of this Plan and will become part of the contract entered into for performance of work covered herein:

H-984-17	Plant McIntosh Ash Cells – May. 2006 Survey
C-10	Grading and Drainage Plan- Loop Track Area
C-11	Typical Sections and Pumping Structure Details
C-12	Grading and Drainage Sections

2.2 CODES AND STANDARDS

2.2.1 The following Codes, Standards, Specifications, Publications, and/or Regulations shall be made part of this Plan and will become part of the contract entered into for performance of the work covered herein. The latest edition in effect at the time of the contract shall apply.

OSHA Occupational Safety and Health Act of 1970

ASTM D2216 Standard Test Method for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass

ASTM D3017 Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)

ASTM D4643 Standard Test Method for Determination of Water (Moisture) Content of

Soil by the Microwave Oven Method

ASTM D4959 Standard Test Method for Determination of Water (Moisture) Content of Soil by Direct Heating Method

Manual for Erosion and Sediment Control in Georgia

This document can be found at the following web site:

http://gaswcc.georgia.gov/00/topic_index_channel/0,2092,28110777_29155149,00.html

Method 9095 Paint Filter Liquids Test – EPA Pub. No. SW-846

3.0 SITE CONDITIONS

3.1 The Contractor shall visit the site and acquaint himself with site conditions, utility locations, and the proposed scope of work.

4.0 LINES AND GRADES

4.1 The project shall be constructed to the elevations, lines, grades and cross sections shown on applicable drawings **except the bottom grade of the pond shall be constructed to elevation 42 not 39.5.** The Purchaser reserves the right to make changes in the Drawings and Specifications as conditions indicate are necessary for the construction of a safe and permanent structure. The Contractor shall be compensated for changes in plan and/or sections resulting in changes in quantities of material.

5.0 ASH REMOVAL AND RESTORATION

5.1 The Contractor shall furnish all labor, materials, and equipment required to remove ash from ash holding pond No. C and restore the work site to as good a condition as was existing before commencing work.

5.2 Prior to any excavation operations, existing utilities, facilities and/or permanent objects shall be properly located and adequately protected. Any cost resulting from damage to private property or the property of the owner due to negligence and/or lack of adequate protection shall be the responsibility of the contractor. The Contractor shall at all times take precaution as to accumulations upon roadway surfaces resulting from all hauling operations. It shall be the responsibility of the Contractor to clean up the roadway where haul material has been spilled or lost and deposited on roadways at his own expense.

5.3 All ash shall be adequately dewatered prior to transport. The ash shall be pulled up onto the slope of the ash pond to allow any excess water to drain back into the ash pond. The ash is to be given sufficient time to dewater. Before loading on trucks for hauling, the ash shall be free of liquid. *Note: Trucks will have to be covered due to dry condition of ash.*

5.4 Because of the unstable nature of the ash in a saturated condition, the use of this material for the constructing temporary dikes should not be considered.

5.5 The Contractor shall excavate as instructed by the Purchaser's field representative to the limits of excavation, slopes and all other features of the excavation. All excavations shall be carried to designated elevations in accordance with the intent of the design, and all excavations will be approved by the Purchaser's field representative before final acceptance. No extra payment will be allowed for excavation below designated elevations unless the Purchaser's field representative considers a change in elevation necessary.

5.6 If any portion of the dikes or earth slopes of the ash holding ponds are excavated or/and damaged, the Contractor shall, at his own expense, restore to original lines and grades and maintain the structural integrity of the dikes or slopes.

5.7 The Contractor will be responsible for coordinating the ash removal with plant operations to ensure that his work is not delayed. **The purchaser will not be responsible for any delays caused by scheduled coal train deliveries.**

6.0 DRAINAGE AND SEDIMENT CONTROL

6.1 The Contractor shall protect and maintain drainage system of berms, ditches and drains at all time. The Contractor shall maintain haul roads, and the Purchaser shall supply materials for maintenance. The Contractor shall, at his expense, repair any damage that might be caused by his failure or negligence in protecting and maintaining the work.

6.2 Contractor shall provide Type SF-C silt fencing around the outer edges of the perimeter access road of C Ash Pond (approximately 2000 Feet).

6.3 Erosion and sediment control measures, including preexisting ones, shall be maintained in accordance with the State of Georgia Soil and Water Conservation Commission's manual.

6.4 All construction practices shall conform to the Manual for Erosion and Sediment Control in Georgia, latest edition.

6.5 Project exits shall be maintained in a condition that will prevent tracking or the flow of mud or ash onto the public right-of-way.

7.0 SUMITTALS AND DOCUMENTATION

7.1 All laboratory and field test results in ash shall be complied and maintained by the Contractor, and forwarded to the Purchaser to be retained as a permanent record of the project.

APPENDIX A

Document 16

Evaluate Stormwater Capacity of Ash Ponds, February 4, 2011

Calculation Cover Sheet		Southern Company Generation
		Calculation Number SH-MT10911-01
Project Plant McIntosh		Discipline Hydro Services
Objective		___Number
Subject/Title Evaluate Stormwater Capacity of Ash Ponds		
Originator's Signature [signature]	Date 2/4/2011	Last Page Number 8

Contents

Topic	Page	Attachments (Computer Printouts, Technical Papers, Sketches, Correspondence, etc.)	Number of Pages
Purpose of Calculation/ Summary of Conclusions	1		
Criteria	1		
Major Equation Sources/ Derivation Methods	1		
Assumptions	1		
Listed References	1		
Body of Calculations	2-4		

Record of Revisions

Rev. No.	Description	Originator / Date	Reviewer / Date	Approver / Date
0	Initial Calcs	FLC 2/4/11	CRO 2/4/11	JJG 2-4-11

NOTES:

SOUTHERN COMPANY
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Design Calculations

Project McIntosh Ash Pond Flood Evaluation	Prepared By F. L. Cox, Jr., P.E.	Date 2/4/2011
Subject/Title	Reviewed By C. R. O'Mara, P.E.	Date 2/4/2011
	Calculation Number SH-MT-10911-01	Sheet 1 of 8

1.0 Purpose of Calculation:

To develop an estimate of the storm water handling capacity of the McIntosh ash pond.

2.0 Summary of Conclusions:

The required volume of 24.82 acre-feet for the 100-year storm can be stored at elevation 60.42, or 2.08 feet below the dike crest. This number is conservative because it does not include pond lowering benefits due to routing through the spillway structure. In addition, the pond can handle 19.01 inches of rainfall runoff, which is far greater than a 200-year rainfall event, with one foot of freeboard. Based on these calculations, it is concluded that the capacity of the McIntosh ash pond is adequate.

3.0 Criteria:

Plant McIntosh's ash pond is classified as a Category II structure according to the Georgia Environmental Protection Division Rules for Dam Safety, Chapter 391-3-8. According to the definition in the state rules, this means that improper operation or dam failure would not expect to result in probable loss of human life. Accordingly, the Georgia rules and regulations exclude Category II dams from the Standards for the Design and Evaluation of Dams, (Chapter 391-3-8-.04 for the exclusion and Chapter 391-3-8-.09 for the design standards). Thus, the appropriate design storm is left up to the owner/engineer. The 100-year storm is considered adequate for this site.

4.0 References:

1) Georgia Stormwater Manual, Table A-13, Savannah, Georgia
2) Savannah Electric and Power Co., Drawing C-10, Grading & Drainage Plan, Loop Track Area
3) McIntosh NPDES Permit Application Flow Chart, 2010
4) 2010 NPDES CoTreatment Calculations

5.0 Assumptions:

See Section 7.0 for complete calculation, but some assumptions include:

- CN of 100 was used to conservatively estimate runoff.
- Maximum flow of 1000 gpm from coal pile runoff pond (reference 3)
- Normal pond level of 59.0 (reference 4)

6.0 Major Equation Sources/Derivation of Methods:

The only equation used in this calculation is the one that follows which is used to calculate stormwater runoff.

$CN = 1000/\ 10+S$
$Q= (P-0.2S)^2 / (P+0.8S)$
$RO = Q/12 * \text{acres of entire site}$

With CN being the SCS curve number, P is the precipitation in inches, S is the storage capacity of the soil, and Q is the runoff flow in inches. RO is then the calculated runoff volume for the entire site in acre-ft.

7.0 Body of Calculations:

McIntosh has three ash ponds, A, B, and C. Ash is sluiced into one pond at a time. The ponds are dredged individually. Each of the three ponds drains into pond D, where the ash-sluice recycle structure and emergency discharge is located. Figure 1 is an aerial photo of the ash ponds and shows their interconnection. Ash ponds A,B, C, and D drain 24.88 acres. Note that the coal pile runoff pond also goes to ash pond C. From reference 3 the maximum flow from the coal pile runoff pond is 1000 gpm (4.42 ac-ft runoff during a 24-hour storm).

Runoff Calculation

Return Period, Yrs.	10YR	25YR	50YR	100YR
CN	100	100	100	100
S	0	0	0	0
24-hr intensity (inches/hr)	0.28	0.33	0.37	0.41
P, rain, inches	6.72	7.92	8.88	9.84
Q, runoff, inches	6.72	7.92	8.88	9.84
Ash Pond Area, acres	24.88	24.88	24.88	24.88
Runoff, ac-ft	13.93	16.42	18.41	20.40
Coal Pile Runoff, ac-ft	4.42	4.42	4.42	4.42
Total Runoff, ac-ft	18.35	20.84	22.83	24.82

Rainfall data is from Georgia Stormwater Manual, Table A-13, Savannah, Georgia (Reference 1), and uses the rainfall intensity of a 24-hour storm with return periods of 10-year, 25-year, 50-year, and 100-year (see Figure 3).

$CN = 1000/\ 10+S$
$Q= (P-0.2S)^2 / (P+0.8S)$
$RO = Q/12 *$ acres of entire site

With CN, being the SCS curve number, P is the precipitation in inches, S is the storage capacity of the soil, and Q is the runoff flow in inches. RO is then the calculated runoff volume for the entire site in acre-ft. Using a CN of 100 conservatively estimates runoff.

Design Calculations

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Project McIntosh Ash Pond Flood Evaluation	Prepared By F. L. Cox, Jr., P.E.	Date 2/4/2011
Subject/Title	Reviewed By C. R. O'Mara, P.E.	Date 2/4/2011
	Calculation Number SH-MT-10911-01	Sheet 3 of 8

Current Elevation-Volume Table Above Level of 59

Volume is reported above elevation 59, the normal pond operating level, and is based on reference 2. Figure 2 is a plot of reference 2.

Elevation	Volume Ac-ft	
59	333.17	Normal Pond Level
62.5	394.54	Top of Dike

Analysis

Determine if the 100 year stormwater runoff can be contained

Rain	9.84	inches
Coal Pile Runoff	1000	gpm
Total Runoff	24.82	ac-ft
Elevation	Volume	
59	333.17	ac-ft
60.42	357.99	ac-ft
Volume Difference	24.82	ac-ft
Freeboard	2.08	ft
% 100 Yr	100%	

Determine how many inches of runoff can be stored up to one foot of the top of dike:

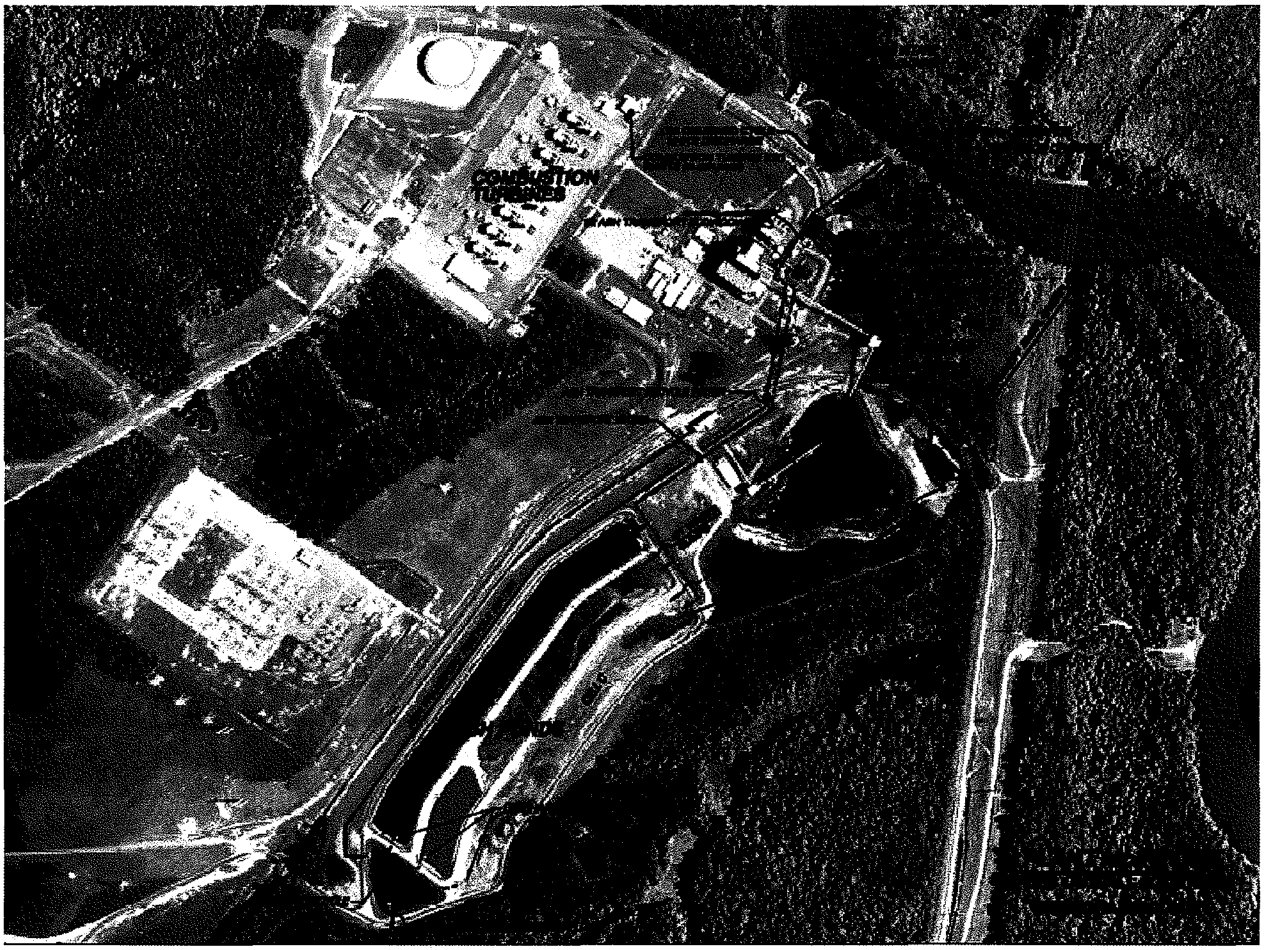
Rain	19.01	inches
Coal Pile Runoff	1000	gpm
Total Runoff	43.84	ac-ft
Elevation	Volume	
59	333.17	ac-ft
61.50	377.00	ac-ft
Volume Difference	43.84	ac-ft
Freeboard	1	ft
% 100 Yr	193%	

Figure 4 shows a semi log plot of the 2- to 100-year 24-hour rainfall with a line fit extended out to 300 years, showing an extrapolated 200 year rainfall of 10.7 inches. It is obvious from this plot that the 19.0 inch rainfall capacity of the pond is going to have a very low probability of occurrence (probability of occurrence in a given year = the inverse of the return period). Based on these calculations, it is concluded that the capacity of the McIntosh ash pond is adequate.

Design Calculations

Project McIntosh Ash Pond Flood Evaluation	Prepared By F. L. Cox, Jr., P.E.	Date 2/4/2011
Subject/Title	Reviewed By C. R. O'Mara, P.E.	Date 2/4/2011
	Calculation Number SH-MT-10911-01	Sheet 5 of 8

Figure 1:



Design Calculations

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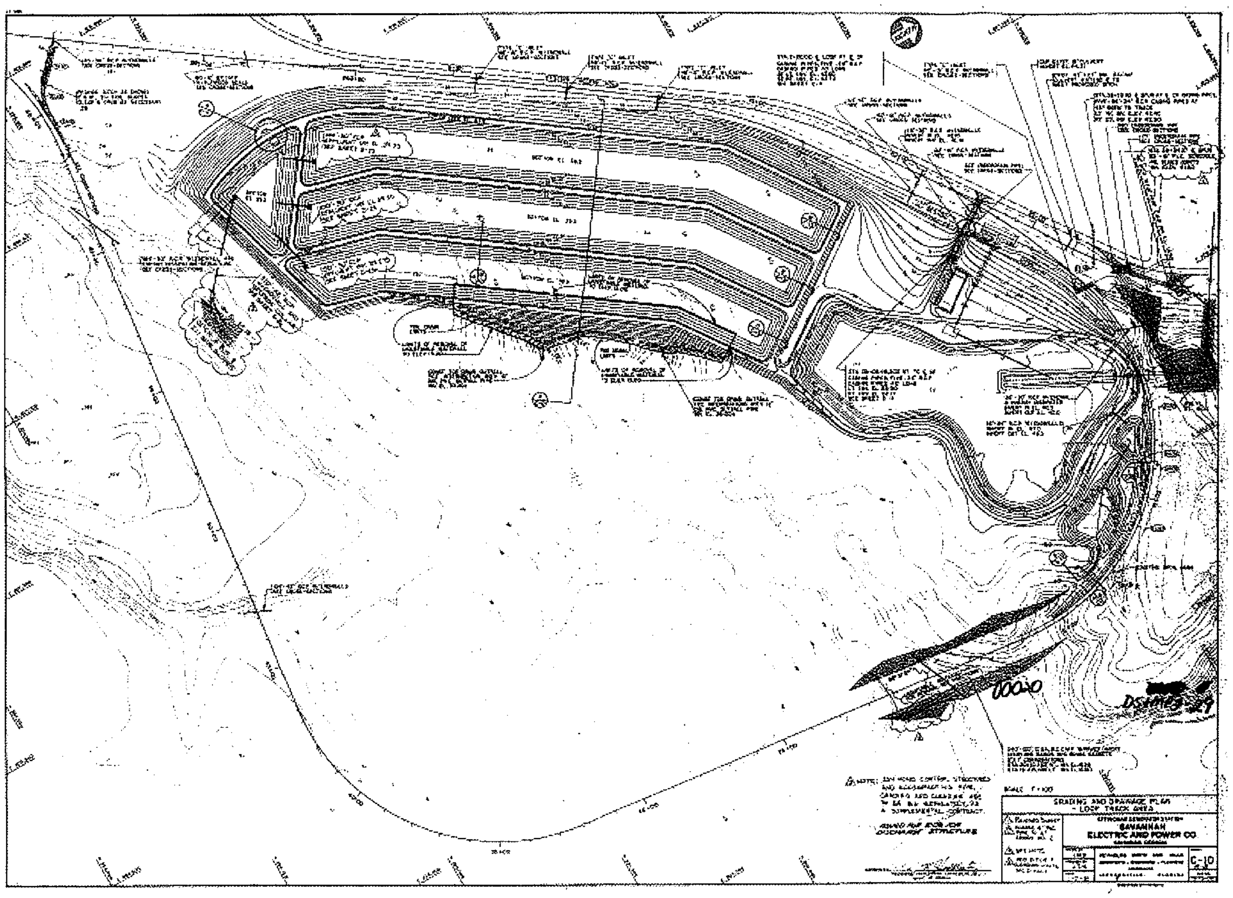
Subject/Title	Reviewed By C. R. O'Mara, P.E.	Date 2/4/2011
	Calculation Number SH-MT-10911-01	Sheet 6 of 8

Figure 2:



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Design Calculations

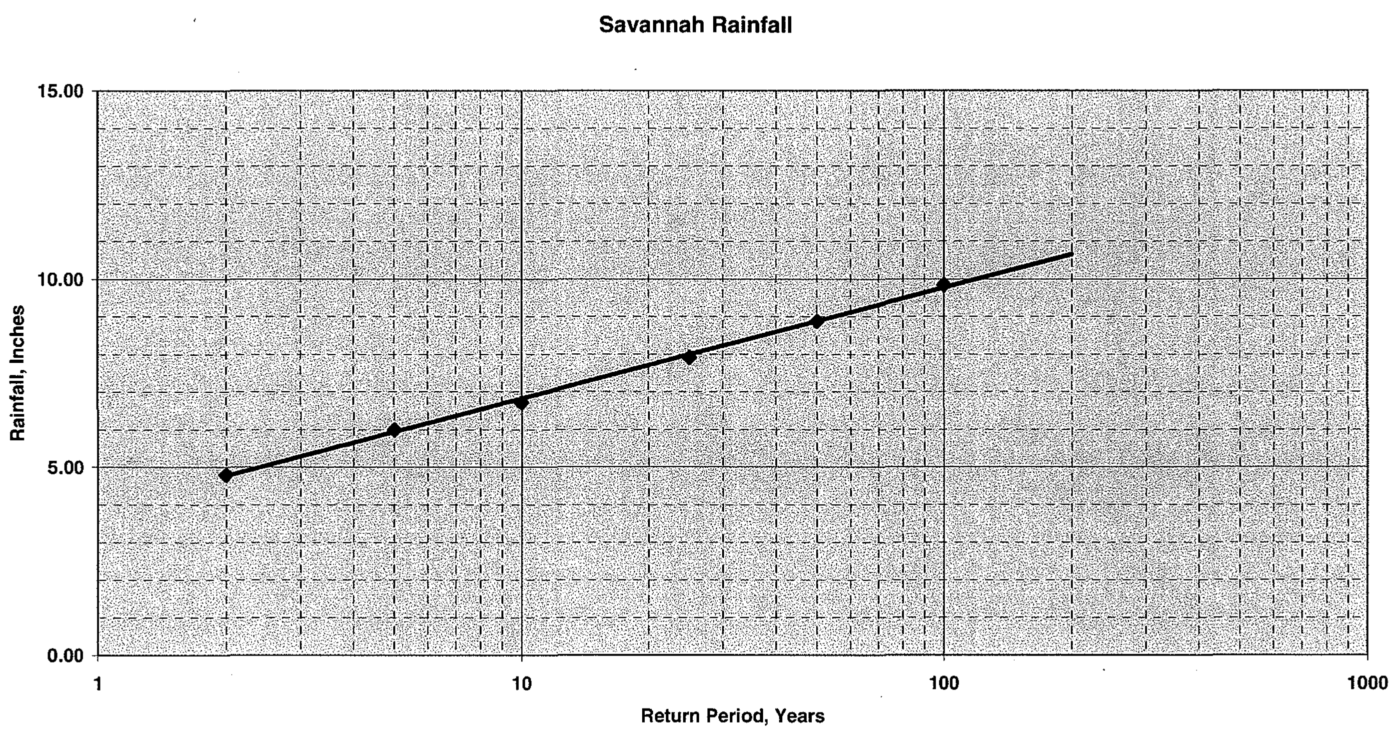
Project McIntosh Ash Pond Flood Evaluation	Prepared By F. L. Cox, Jr., P.E.	Date 2/4/2011
Subject/Title	Reviewed By C. R. O'Mara, P.E.	Date 2/4/2011
	Calculation Number SH-MT-10911-01	Sheet 1 of 8

Figure 3:

Table A-13
Savannah

Hours	Minutes	Return Period 1	2	5	10	25	50	100
	N	0.7585	0.9086	0.8696	0.8401	0.8597	0.8619	0.8671
	A	47.79	117.57	125.46	126.12	167.17	191.57	220.00
	B	12	20	23	24	28	30	32
Hours	Minutes	Rainfall Intensity						
0.08	5	5.57	6.31	6.92	7.45	8.27	8.94	9.61
	6	5.34	6.09	6.71	7.24	8.06	8.73	9.39
	7	5.12	5.88	6.52	7.04	7.86	8.52	9.18
	8	4.93	5.69	6.33	6.86	7.68	8.33	8.98
	9	4.75	5.51	6.16	6.68	7.50	8.15	8.79
	10	4.58	5.35	6.00	6.52	7.33	7.97	8.61
	11	4.43	5.19	5.85	6.36	7.17	7.80	8.43
	12	4.29	5.04	5.70	6.21	7.01	7.64	8.27
	13	4.16	4.90	5.56	6.07	6.86	7.49	8.11
	14	4.04	4.77	5.43	5.94	6.72	7.34	7.96
0.25	15	3.92	4.65	5.31	5.81	6.59	7.20	7.81
	16	3.82	4.53	5.19	5.69	6.46	7.07	7.67
	17	3.72	4.42	5.07	5.57	6.34	6.94	7.53
	18	3.62	4.31	4.97	5.46	6.22	6.81	7.40
	19	3.53	4.21	4.86	5.35	6.10	6.69	7.27
	20	3.45	4.12	4.77	5.25	5.99	6.58	7.15
	21	3.37	4.03	4.67	5.15	5.89	6.46	7.04
	22	3.29	3.94	4.58	5.06	5.79	6.36	6.92
	23	3.22	3.86	4.49	4.97	5.69	6.25	6.81
	24	3.15	3.78	4.41	4.88	5.60	6.15	6.71
	25	3.09	3.70	4.33	4.80	5.50	6.06	6.61
	26	3.03	3.63	4.25	4.71	5.42	5.96	6.51
	27	2.97	3.56	4.18	4.64	5.33	5.87	6.41
	28	2.91	3.49	4.11	4.56	5.25	5.79	6.32
	29	2.86	3.42	4.04	4.49	5.17	5.70	6.23
0.50	30	2.81	3.36	3.97	4.42	5.09	5.62	6.14
	31	2.76	3.30	3.91	4.35	5.02	5.54	6.06
	32	2.71	3.24	3.85	4.29	4.95	5.46	5.97
	33	2.66	3.19	3.79	4.22	4.88	5.39	5.89
	34	2.62	3.13	3.73	4.16	4.81	5.31	5.82
	35	2.58	3.08	3.67	4.10	4.74	5.24	5.74
	36	2.54	3.03	3.62	4.04	4.68	5.18	5.67
	37	2.50	2.98	3.57	3.99	4.62	5.11	5.60
	38	2.46	2.94	3.52	3.93	4.56	5.04	5.53
	39	2.42	2.89	3.47	3.88	4.50	4.98	5.46
	40	2.39	2.85	3.42	3.83	4.44	4.92	5.39
	41	2.35	2.81	3.37	3.78	4.39	4.86	5.33
	42	2.32	2.76	3.33	3.73	4.33	4.80	5.27
	43	2.29	2.72	3.28	3.69	4.28	4.75	5.21
	44	2.26	2.69	3.24	3.64	4.23	4.69	5.15
0.75	45	2.23	2.65	3.20	3.60	4.18	4.64	5.09
	46	2.20	2.61	3.16	3.55	4.13	4.58	5.03
	47	2.17	2.58	3.12	3.51	4.08	4.53	4.98
	48	2.14	2.54	3.08	3.47	4.04	4.48	4.92
	49	2.11	2.51	3.04	3.43	3.99	4.43	4.87
	50	2.09	2.48	3.01	3.39	3.95	4.39	4.82
	51	2.06	2.44	2.97	3.35	3.91	4.34	4.77
	52	2.04	2.41	2.94	3.32	3.86	4.29	4.72
	53	2.01	2.38	2.90	3.28	3.82	4.25	4.67
	54	1.99	2.35	2.87	3.24	3.78	4.20	4.62
	55	1.97	2.33	2.84	3.21	3.74	4.16	4.58
	56	1.95	2.30	2.81	3.18	3.70	4.12	4.53
	57	1.93	2.27	2.78	3.14	3.67	4.08	4.49
	58	1.90	2.24	2.75	3.11	3.63	4.04	4.45
	59	1.88	2.22	2.72	3.08	3.59	4.00	4.40
1	60	1.86	2.19	2.69	3.05	3.56	3.96	4.36
2	120	1.04	1.28	1.55	1.80	2.13	2.30	2.55
3	180	0.79	0.92	1.17	1.33	1.57	1.72	1.90
6	360	0.46	0.56	0.71	0.81	0.94	1.03	1.15
12	720	0.28	0.33	0.43	0.49	0.57	0.63	0.70
24	1440	0.15	0.20	0.25	0.28	0.33	0.37	0.41

Figure 4:



Savannah Rainfall
15.00
10.00
5.00
0.00
Rainfall, Inches
1
10
100
1000
Return Period, Years

APPENDIX A

Document 17

Slope Stability Analyses of Ash Pond Dikes, February 11, 2011

SOUTHERN COMPANY

Engineering and Construction Services Calculation

Calculation Number: TV-MC-3160BW-001

Project/Plant: Plant McIntosh Ash Pond Dikes	**Unit(s):** Unit 1	**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:** Terri H. Hartsfield	

Contents

Revision Record

Rev. No.	Description	Originator Initial / Date	Reviewer Initial / Date	Approver Initial / Date
0	Issued for Information	THH/2-11-11	GHM/2-11-11	JCP/2-11-11

Notes:

MCI-API 032

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Purpose of Calculation

Georgia Power Company's Plant McIntosh is comprised of nine generating units. Eight of the units are combustion turbine generators and one is a coal fired unit. The coal unit was originally designed to burn fuel oil but was converted to coal in 1982. The ash pond was commissioned in 1982.

The ash pond is comprised of three long, narrow cells, situated side by side, with a common outer dike and separated by two earthen interior divider dikes. The cells function as ash dewatering cells in turn. Ash is sluiced to a cell, allowed to drain and is then dry stacked in the permitted solid waste disposal facility located at the plant.

The purpose of this calculation is to check the stability of the ash pond dikes using current software.

Methodology

The calculation was performed using the following methods and software:

GeoStudio 2007 (Version 7.16, Build 4840), Copyright 1991-2010, GEO-SLOPE International, Ltd.

Bishop, Ordinary, Janbu and Morgenstern-Price analytical methods were run. Morgenstern-Price was reported.

Criteria and Assumptions

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

- The locations of the borings, piezometers and cross-sections analyzed are shown on Figure 1, Attachment A.
- The current required minimum criteria (factors of safety) were taken from the Georgia Department of Natural Resources, Environmental Protection, Rules for Dam Safety, Chapter 391-3-8, supplemented by the US Corps of Engineers Manual EM 1110-2-1902, October 2003.
- In August 2010, drilling was performed on the dikes, split spoon and undisturbed samples were taken and piezometers were installed in the dike fill and the foundation soils on the north and south dikes. These piezometers, in conjunction with survey data, were used to obtain current water elevations within the dikes and the foundation soils. Boring and piezometers logs are on Attachments B and C, respectively.
- The soil properties of unit weight, phi angle, and cohesion were obtained from triaxial shear testing performed on UD samples of the fill and foundation soils obtained during drilling in August 2010. The testing was performed according to ASTM D 4767. Laboratory analyses and water elevations are on Attachments D and E, respectively.
- The COE EM 1110-2-1902, October 2003, allows the use of the phreatic surface established for the maximum storage condition (normal pool) in the analysis for the

maximum surcharge loading condition. This is based on the short term duration of the surcharge loading relative to the permeability of the embankment and the foundation materials. This method is used in the analysis for the impoundments at this facility with surcharge loading.

- As a worst case, the ponds were assumed to have no ash.
- In accordance with the Georgia Rules for Dam Safety, and as shown on the USGS "Map for Peak Acceleration with a 2% Exceedance in 50 Years" for the vicinity of Plant McIntosh, the ground motion having a 2% probability of exceedance in 50 years is 0.18g (See Attachment F).
- Cross sections were based on cross sections surveyed in August 2010 and on a March 2009 survey of the interior of the cells. Original design drawings and the original geotechnical report indicate that several feet of loose foundation soils underlying the south dike were removed at the time of construction of the dike. This was seen during drilling and is reflected in Section B-B'.
- Normal pool – elevation 57.6 feet. Maximum Surcharge Pool is assumed to be 1 foot below the top of the dike or elevation 59.7 feet for Section A-A and 59.6 feet for Section B-B.

Input Data

The following soil properties were used in the analyses. This data was obtained from laboratory triaxial testing performed in September 2010 by Contour Engineering. The laboratory testing consisted of classification testing as well as consolidated undrained triaxial tests with pore pressure measurements in order to provide total as well as effective shear strength parameters of the embankment and foundation soils.

Soil Description	Moist Unit Weight, pcf	Effective Stress Parameters		Total Stress Parameters	
		Cohesion, psf	Phi Angle, degrees	Cohesion, psf	Phi Angle, degrees
Northwest Dike (Section A-A')					
Clay Dike Fill	120	118	40	792	8.7
Silty Clay Fdn Soil	118	85	32	158.4	22
Sandy Clay Fdn Soil	120	400	20	400	20
Clay with Shells	120	400	20	400	20
Sand	112	0	25	0	25
Southeast Dike (Section B-B')					
Clay Dike Fill 1	122	338	36.9	576	18.2
Clay Dike Fill 2	120	300	18	500	12
Clay Dike Fill 3	125	878	15.3	1066	8.8
Sand	112	0	38.7	159	25.1
Loose Sand	112	0	25	0	25

Summary of Conclusions

The impoundment dikes at Plant McIntosh were evaluated for the load cases indicated in the following table. The table lists the factors of safety for various slope stability failure conditions. All conditions are steady state except where noted. Construction cases were not considered. Based on the results of these analyses all structures are stable.

Failure Condition (Load Case)	Computed Factor of Safety	Required Minimum Factor of Safety[1]
Northwest Dike – Section A-A'		
Upstream Steady State	3.13	1.5
Upstream Seismic	1.55	1.1
Downstream Steady State	5.36	1.5
Downstream Seismic	1.91	1.1
Downstream – Max Surcharge	5.38	1.4 (COE EM1110-2-1902, 2003)
Upstream Rapid Drawdown – in dike	1.66	1.3
Southeast Dike – Section B-B'		
Upstream Steady State	3.29	1.5
Upstream Seismic	1.51	1.1
Downstream Steady State	2.10	1.5
Downstream Seismic	1.14	1.1
Downstream – Max Surcharge	2.10	1.1
Upstream Rapid Drawdown – in dike	1.81	1.3

The analyses indicate that in all cases the ash pond dikes are stable, both inboard and outboard.

Design Inputs/References

USGS Earthquake Hazards website, http://www.usgs.gov/hazards/earthquakes/.

Georgia Department of Natural Resources, Environmental Protection, Rules for Dam Safety.

Savannah Electric and Power Company Drawing C-10 (R-2), Effingham Generator Station Grading and Drainage Plan Loop Track Area

Savannah Electric and Power Company Drawing C-12 (R-1), Effingham Generator Station Grading and Drainage Sections

Georgia Power Company Drawing P-157-4, Plant McIntosh Ash Cells March 2009 Survey

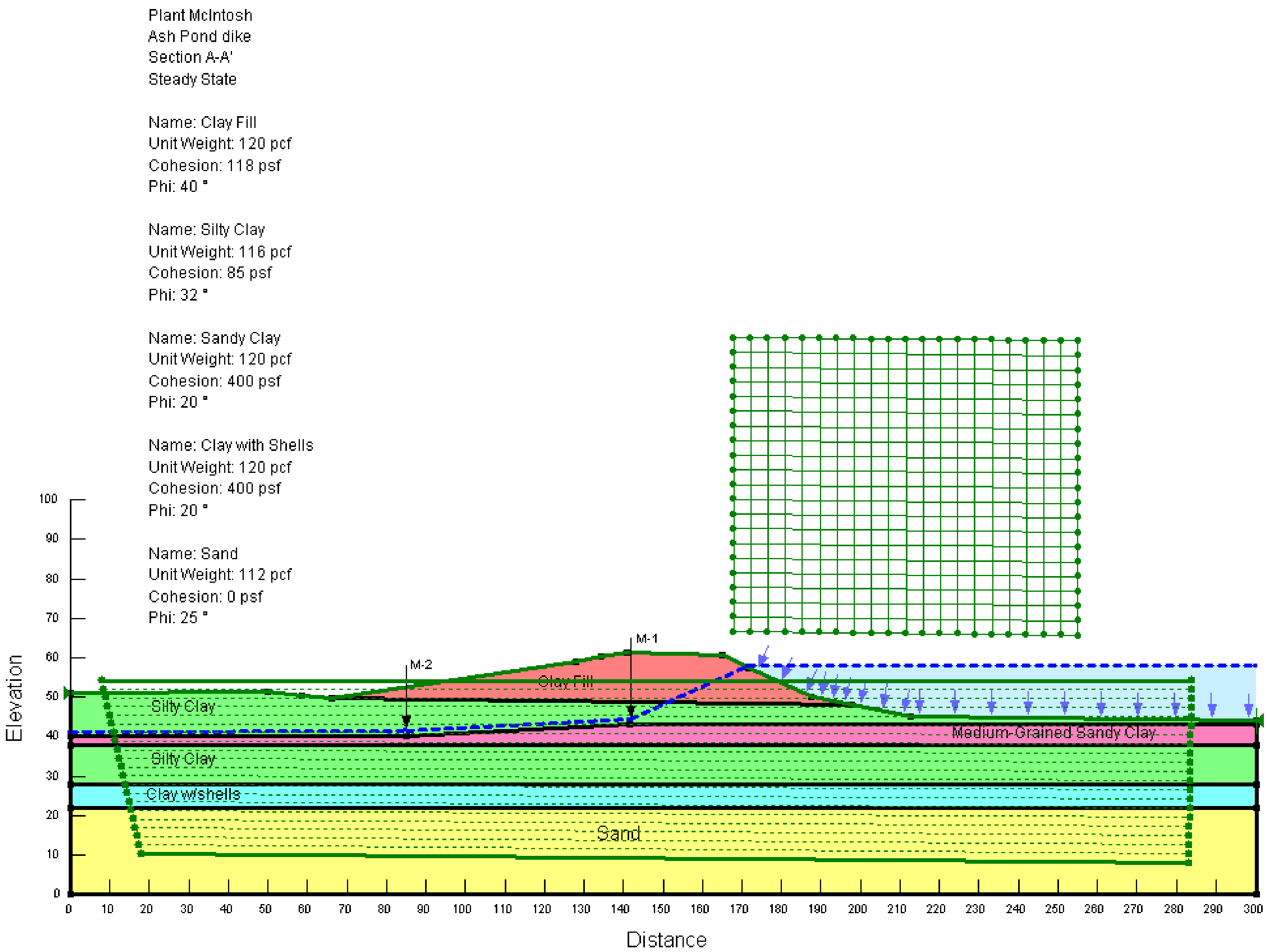
Body of Calculation

Calculation consists of Slope-W modeling attached.

Attachments

Slope W computer runs

Northwest Dike
Section A-A'


Plant McIntosh
Ash Pond dike
Section A-A'
Steady State
Name: Clay Fill
Unit Weight: 120 pcf
Cohesion: 118 psf
Phi: 40 °
Name: Silty Clay
Unit Weight: 116 pcf
Cohesion: 85 psf
Phi: 32 °
Name: Sandy Clay
Unit Weight: 120 pcf
Cohesion: 400 psf
Phi: 20 °
Name: Clay with Shells
Unit Weight: 120 pcf
Cohesion: 400 psf
Phi: 20 °
Name: Sand
Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 25 °
M-1
M-2
Clay Fill
Silty Clay
Medium-Grained Sandy Clay
Silty Clay
Clay w/shells
Sand
Elevation
Distance
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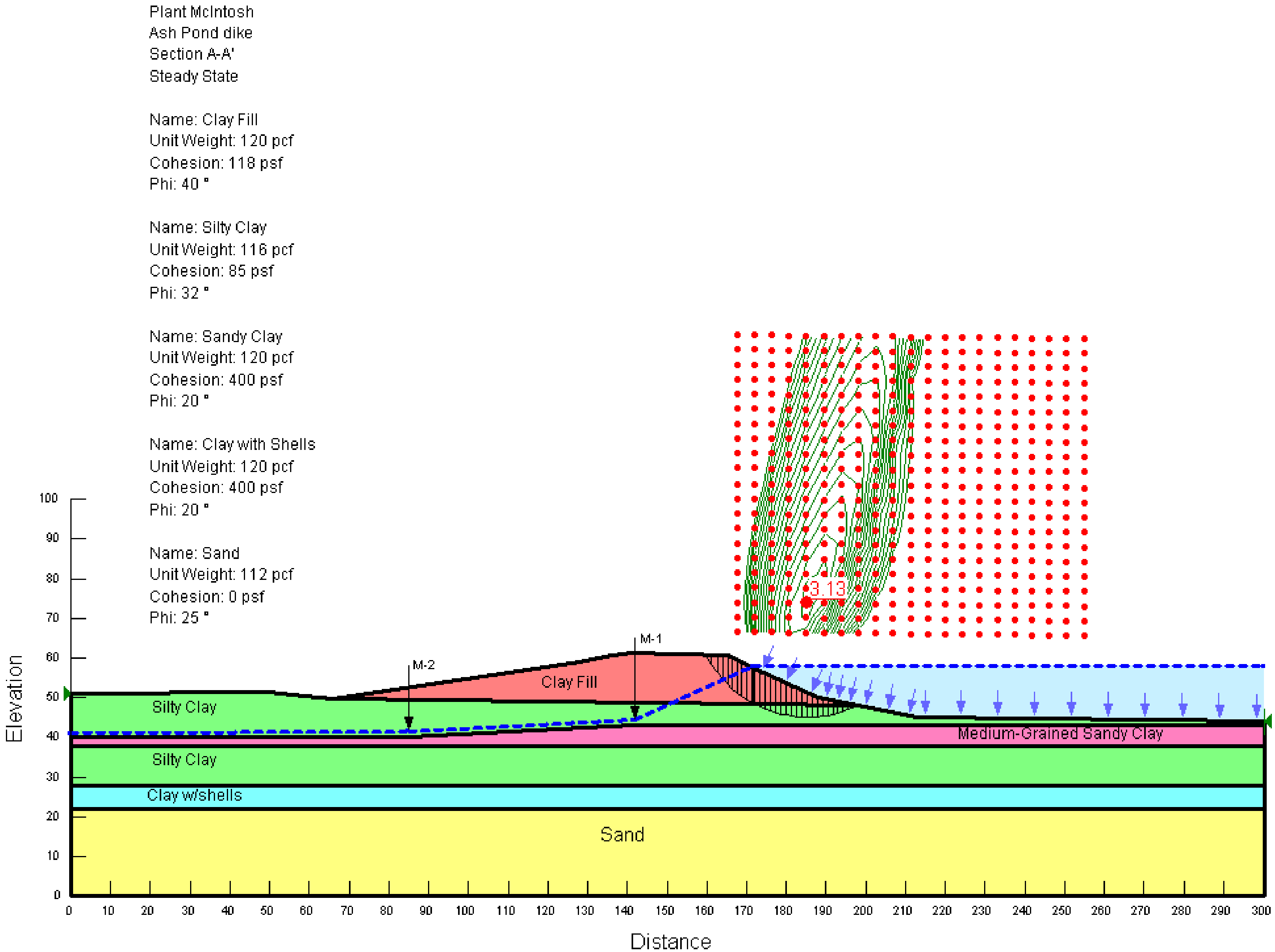
0 10 20 30 40 50 60 70 80 90 100



Plant McIntosh
Ash Pond dike
Section A-A'
Steady State
Name: Clay Fill
Unit Weight: 120 pcf
Cohesion: 118 psf
Phi: 40 °
Name: Silty Clay
Unit Weight: 116 pcf
Cohesion: 85 psf
Phi: 32 °
Name: Sandy Clay
Unit Weight: 120 pcf
Cohesion: 400 psf
Phi: 20 °
Name: Clay with Shells
Unit Weight: 120 pcf
Cohesion: 400 psf
Phi: 20 °
Name: Sand
Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 25 °
3.13
M-1
M-2
Clay Fill
Silty Clay
Medium-Grained Sandy Clay
Silty Clay
Clay w/shells
Sand
Elevation
Distance
0
10
20
30
40
50
60
70
80
90
100
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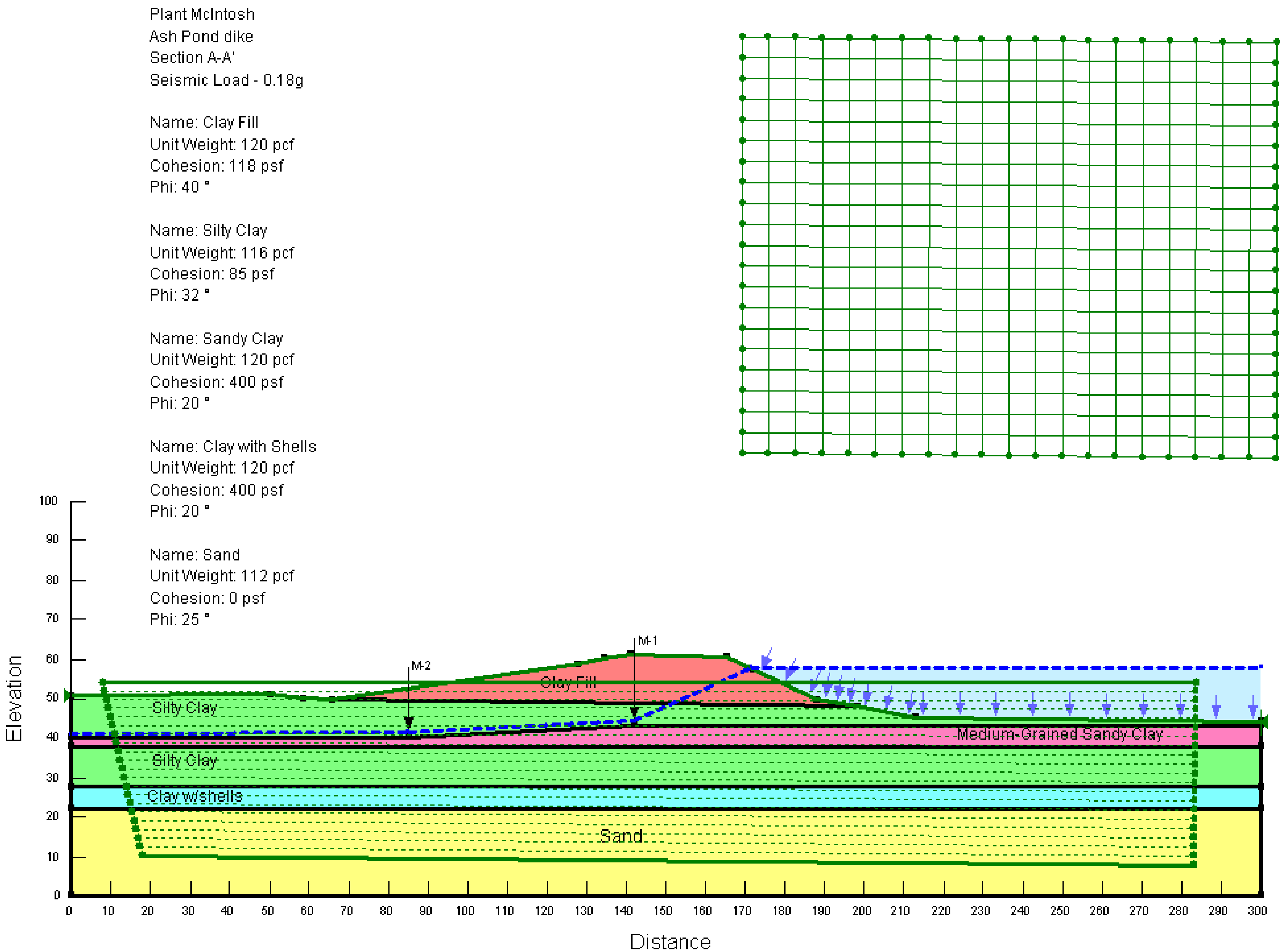
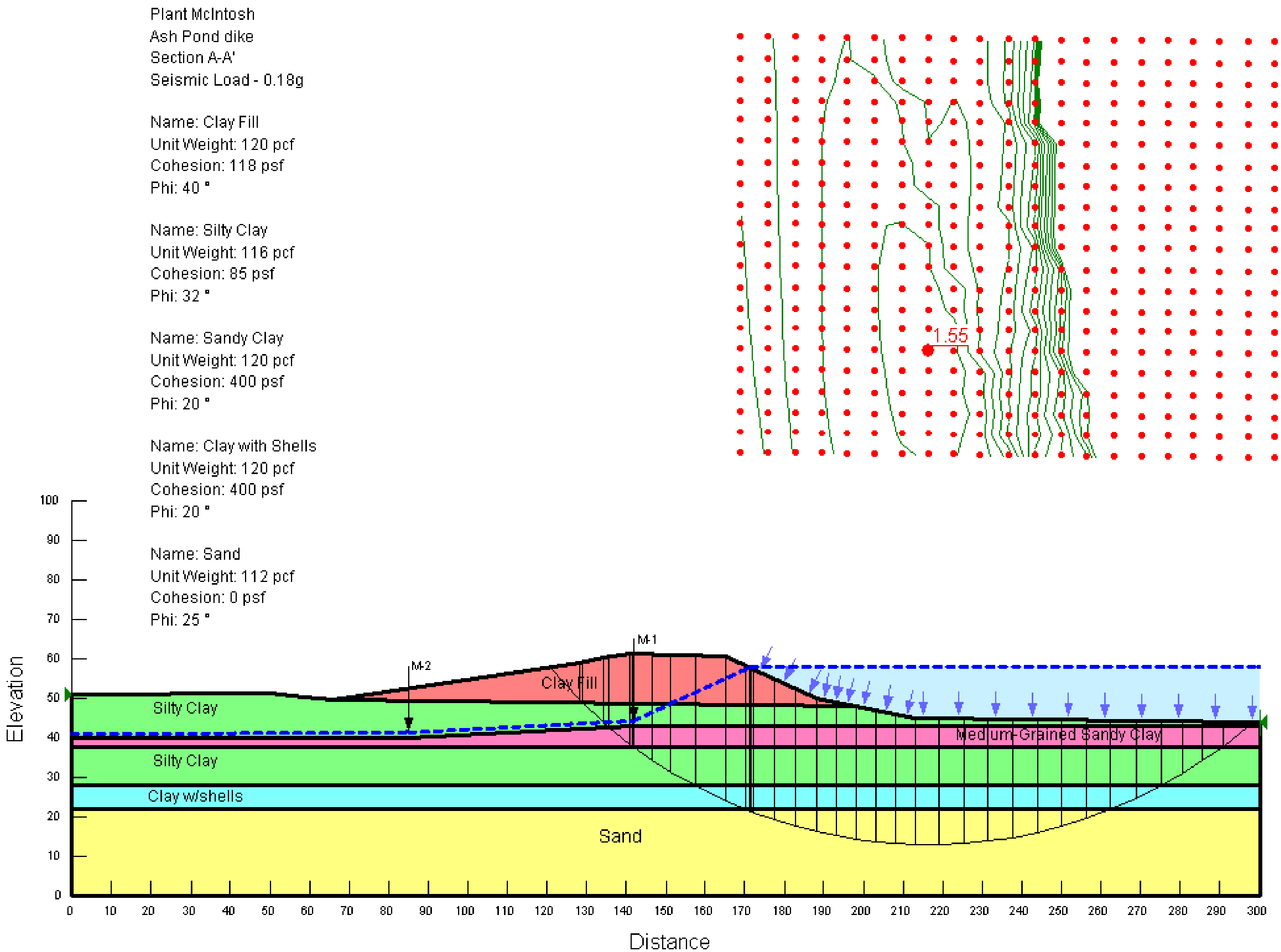
260
270
280
290
300


Plant McIntosh
Ash Pond dike
Section A-A'
Seismic Load - 0.18g
Name: Clay Fill
Unit Weight: 120 pcf
Cohesion: 118 psf
Phi: 40 °
Name: Silty Clay
Unit Weight: 116 pcf
Cohesion: 85 psf
Phi: 32 °
Name: Sandy Clay
Unit Weight: 120 pcf
Cohesion: 400 psf
Phi: 20 °
Name: Clay with Shells
Unit Weight: 120 pcf
Cohesion: 400 psf
Phi: 20 °
Name: Sand
Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 25 °
M-1
M-2
Clay Fill
Silty Clay
Medium-Grained Sandy Clay
Silty Clay
Clay w/shells
Sand
Elevation
Distance
0 10 20 30 40 50 60 70 80 90 100
0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250 260 270 280 290 300



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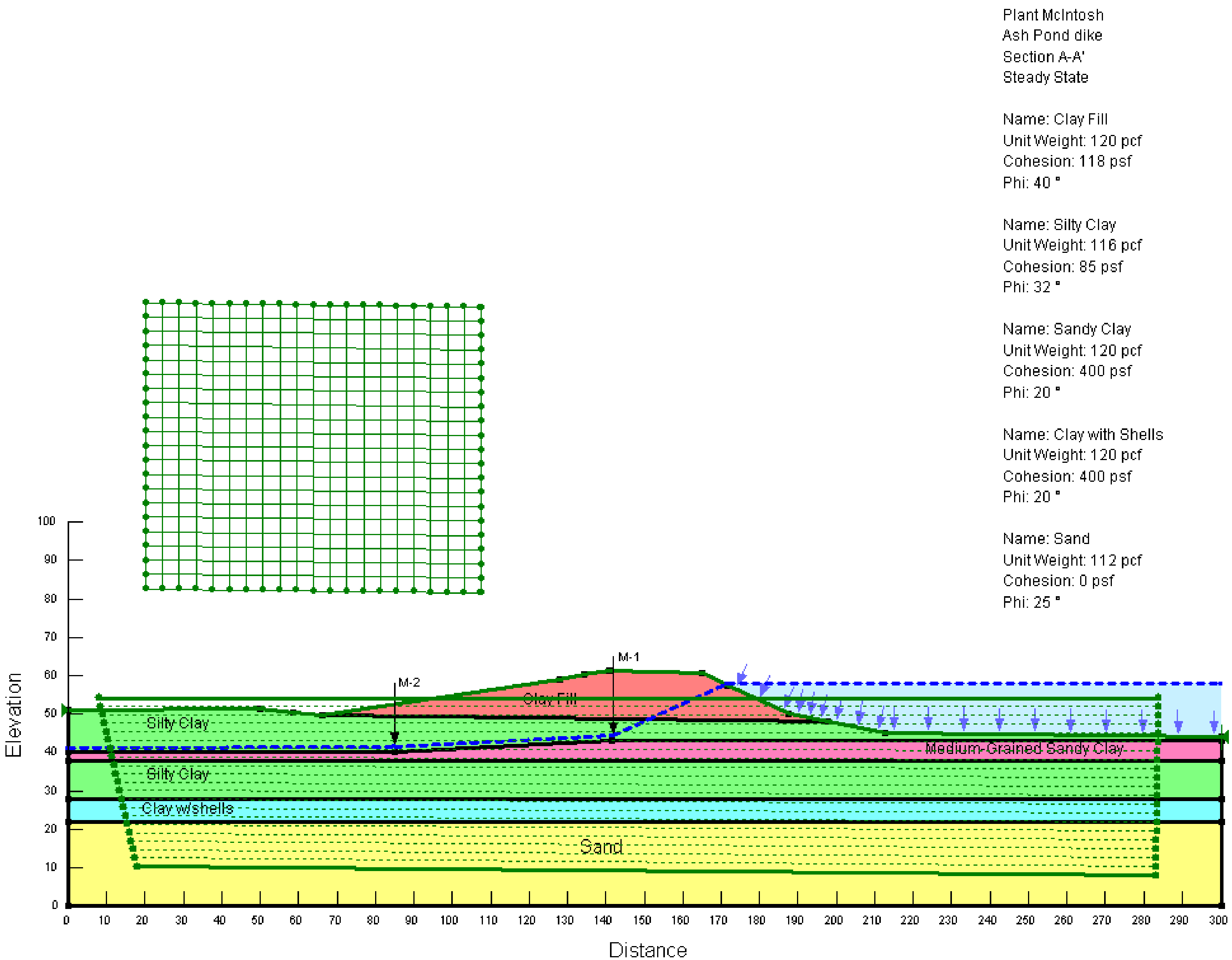
Plant McIntosh
Ash Pond dike
Section A-A'
Steady State
Name: Clay Fill
Unit Weight: 120 pcf
Cohesion: 118 psf
Phi: 40 °
Name: Silty Clay
Unit Weight: 116 pcf
Cohesion: 85 psf
Phi: 32 °
Name: Sandy Clay
Unit Weight: 120 pcf
Cohesion: 400 psf
Phi: 20 °
Name: Clay with Shells
Unit Weight: 120 pcf
Cohesion: 400 psf
Phi: 20 °
Name: Sand
Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 25 °
M-1
M-2
Clay Fill
Silty Clay
Medium-Grained Sandy Clay
Silty Clay
Clay w/shells
Sand
Elevation
Distance
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
170
180
190
200
210
220
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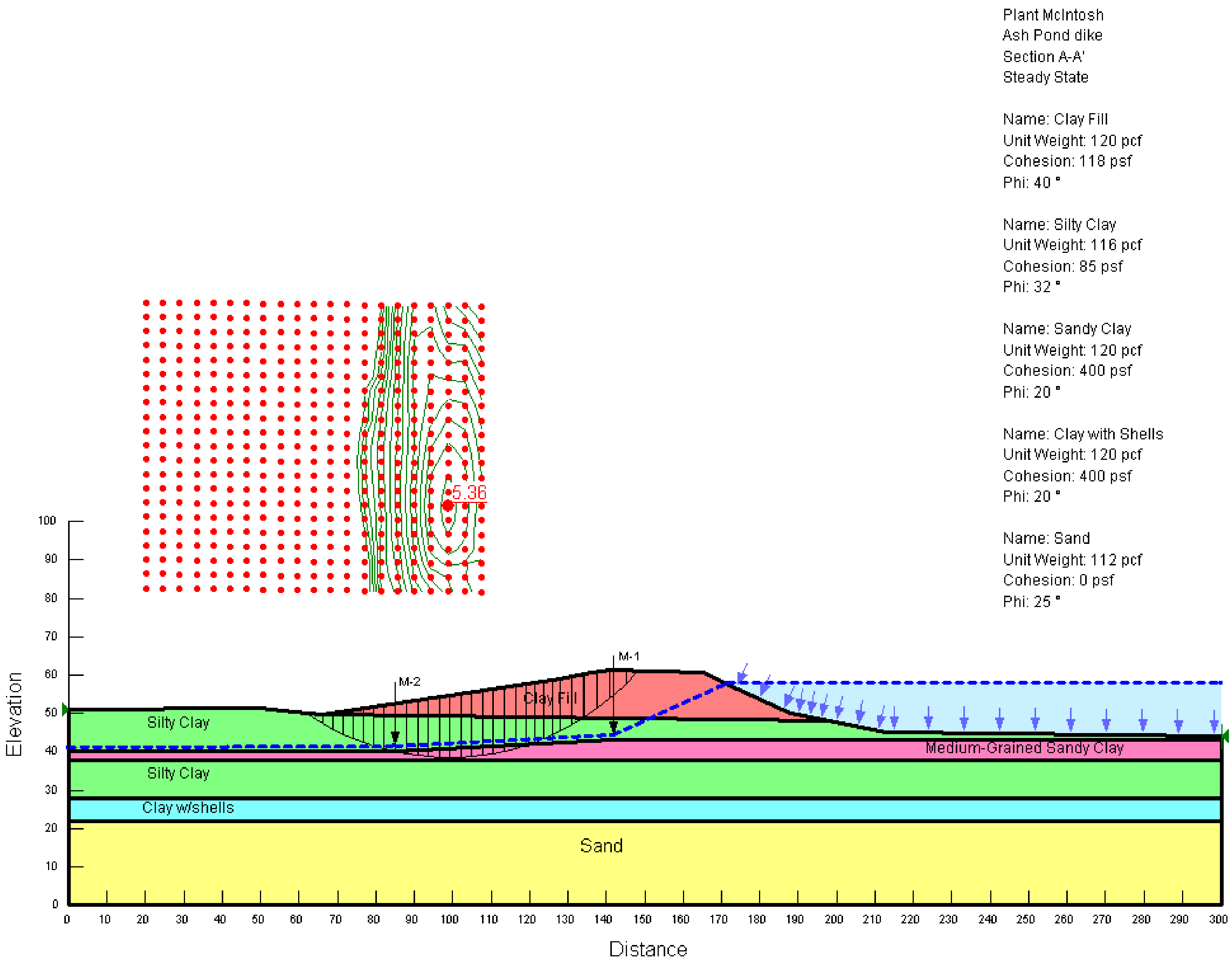
240
250
260
270
280
290
300


Plant McIntosh
Ash Pond dike
Section A-A'
Steady State
Name: Clay Fill
Unit Weight: 120 pcf
Cohesion: 118 psf
Phi: 40 °
Name: Silty Clay
Unit Weight: 116 pcf
Cohesion: 85 psf
Phi: 32 °
Name: Sandy Clay
Unit Weight: 120 pcf
Cohesion: 400 psf
Phi: 20 °
Name: Clay with Shells
Unit Weight: 120 pcf
Cohesion: 400 psf
Phi: 20 °
Name: Sand
Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 25 °
5.36
M-1
M-2
Clay Fill
Silty Clay
Medium-Grained Sandy Clay
Silty Clay
Clay w/shells
Sand
Elevation
Distance

Plant McIntosh
Ash Pond dike
Section A-A'
Seismic Load - 0.18g

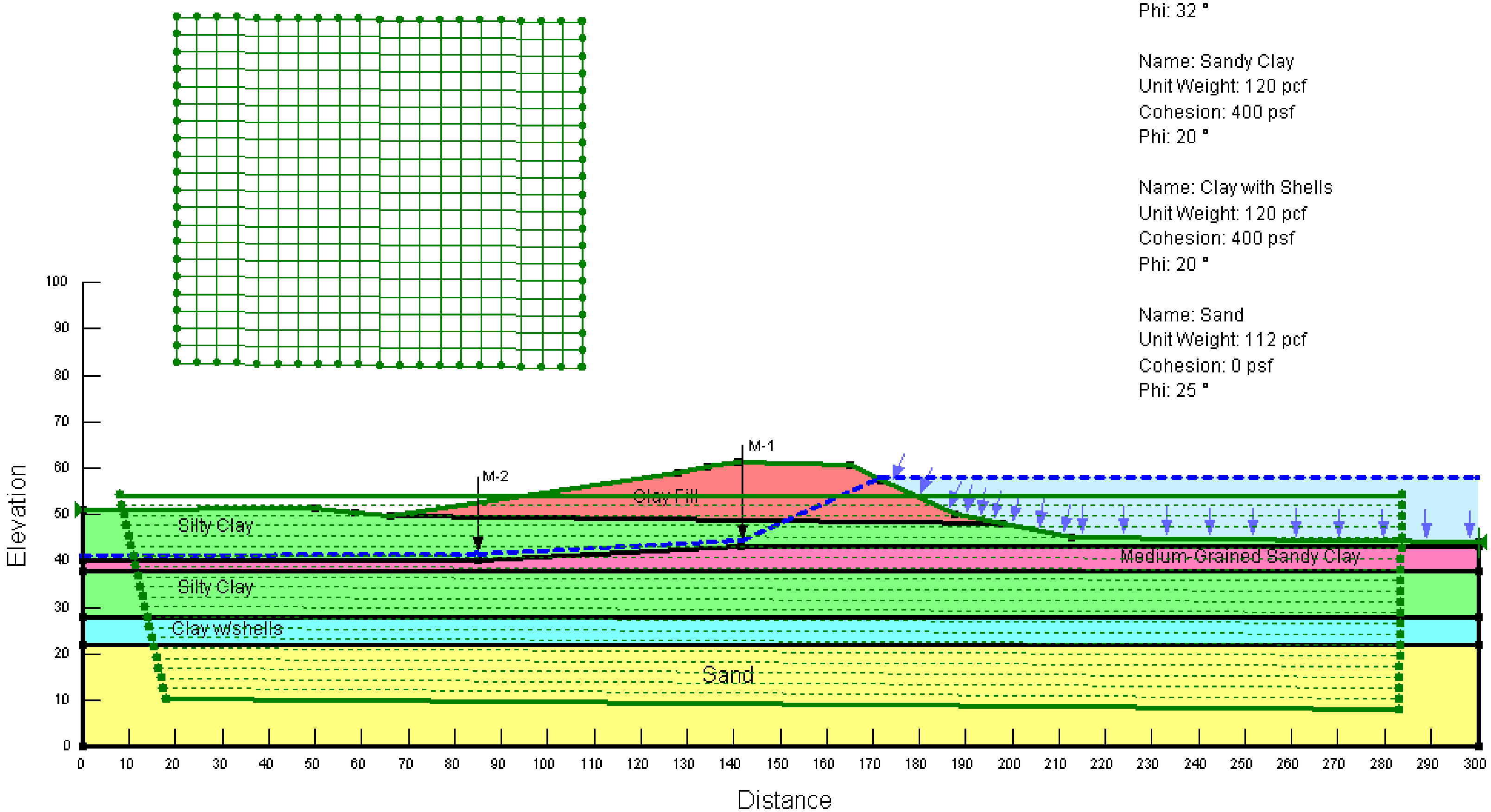
Name: Clay Fill
Unit Weight: 120 pcf
Cohesion: 118 psf
Phi: 40 °

Name: Silty Clay
Unit Weight: 116 pcf
Cohesion: 85 psf
Phi: 32 °

Name: Sandy Clay
Unit Weight: 120 pcf
Cohesion: 400 psf
Phi: 20 °

Name: Clay with Shells
Unit Weight: 120 pcf
Cohesion: 400 psf
Phi: 20 °

Name: Sand
Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 25 °



Plant McIntosh
Ash Pond dike
Section A-A'
Seismic Load - 0.18g

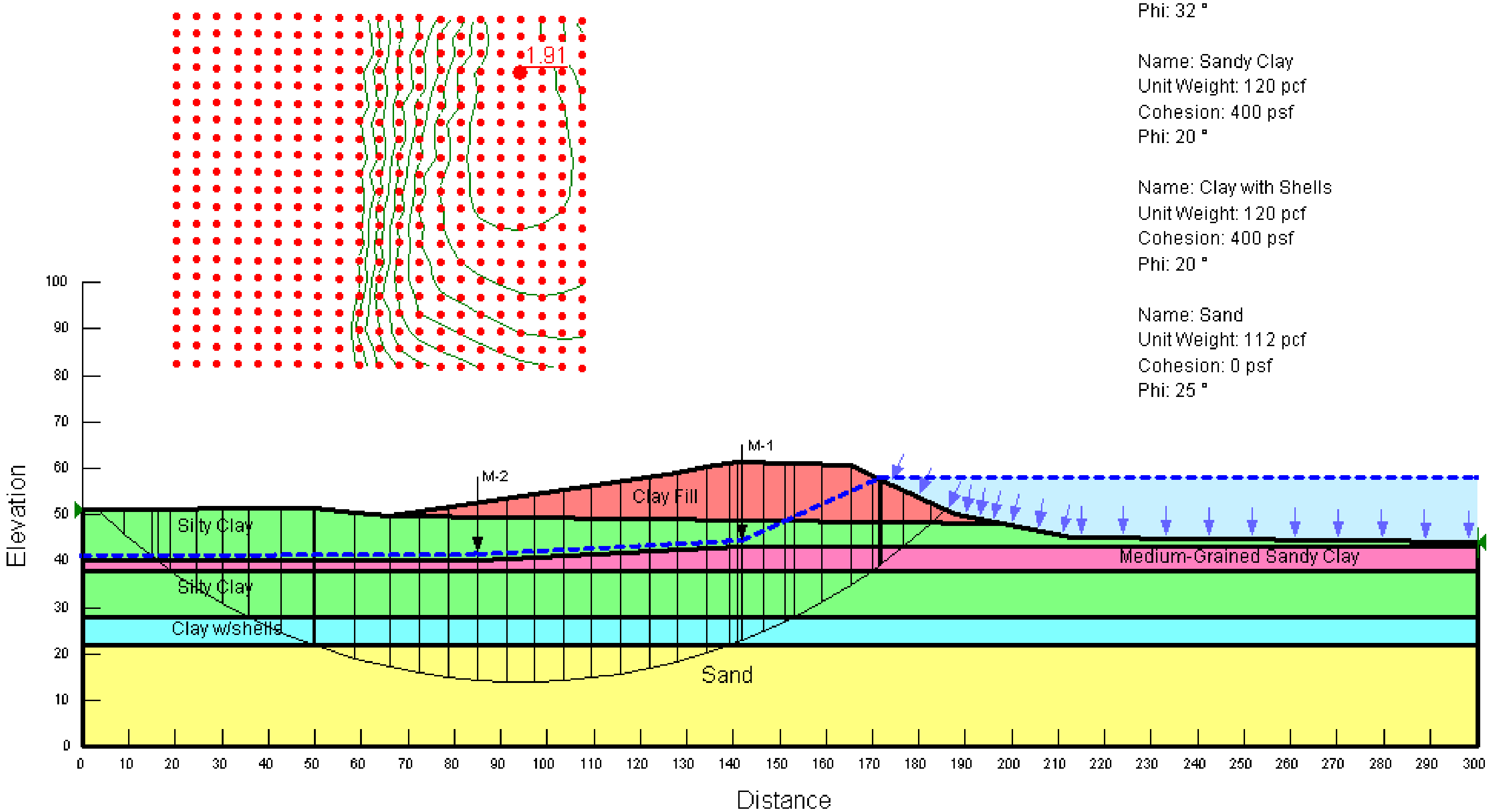
Name: Clay Fill
Unit Weight: 120 pcf
Cohesion: 118 psf
Phi: 40 °

Name: Silty Clay
Unit Weight: 116 pcf
Cohesion: 85 psf
Phi: 32 °

Name: Sandy Clay
Unit Weight: 120 pcf
Cohesion: 400 psf
Phi: 20 °

Name: Clay with Shells
Unit Weight: 120 pcf
Cohesion: 400 psf
Phi: 20 °

Name: Sand
Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 25 °



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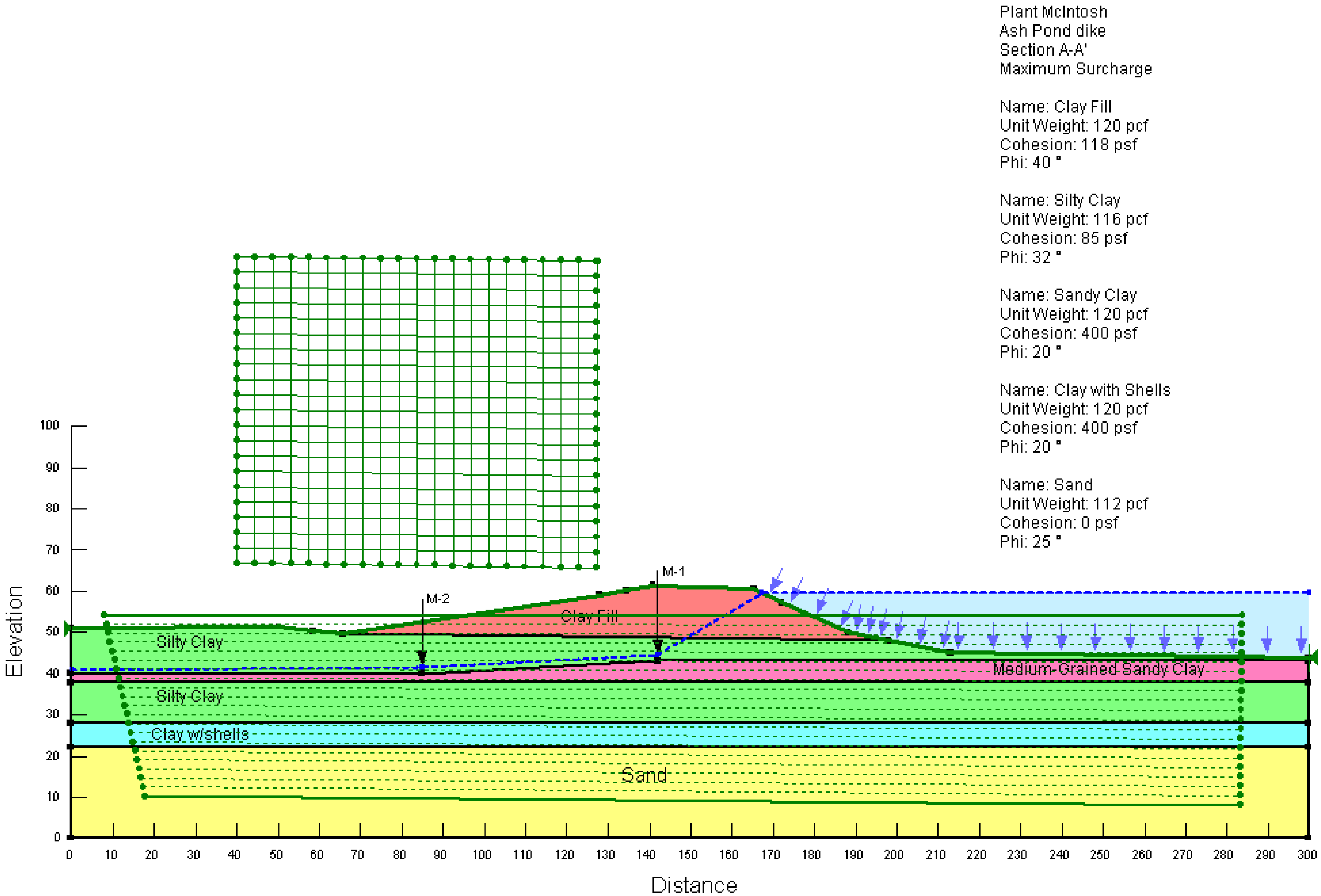
Plant McIntosh
Ash Pond dike
Section A-A'
Maximum Surcharge
Name: Clay Fill
Unit Weight: 120 pcf
Cohesion: 118 psf
Phi: 40 °
Name: Silty Clay
Unit Weight: 116 pcf
Cohesion: 85 psf
Phi: 32 °
Name: Sandy Clay
Unit Weight: 120 pcf
Cohesion: 400 psf
Phi: 20 °
Name: Clay with Shells
Unit Weight: 120 pcf
Cohesion: 400 psf
Phi: 20 °
Name: Sand
Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 25 °
M-1
M-2
Clay Fill
Silty Clay
Medium-Grained Sandy Clay
Silty Clay
Clay w/shells
Sand
Elevation
Distance
0
10
20
30
40
50
60
70
80
90
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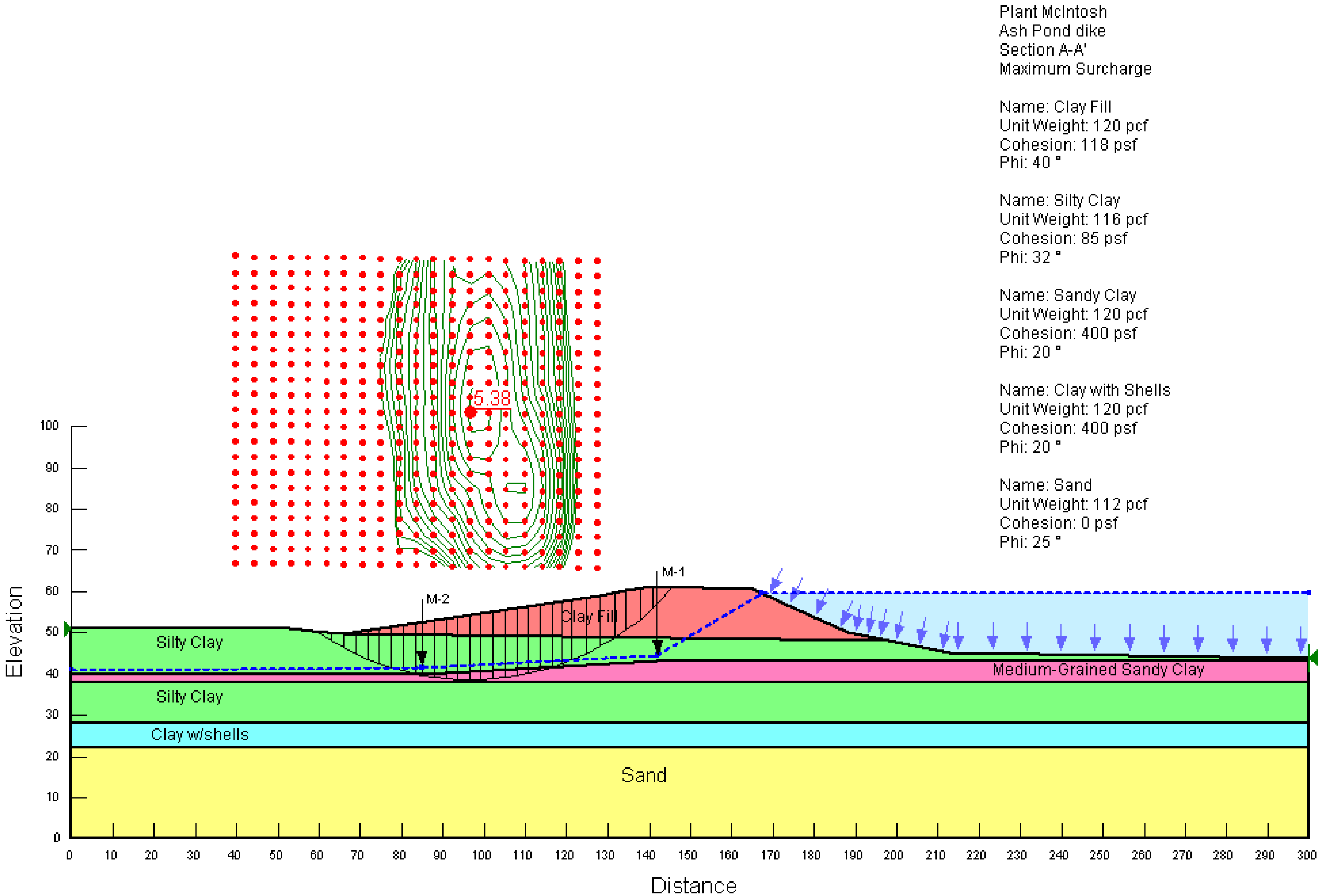

Plant McIntosh
Ash Pond dike
Section A-A'
Maximum Surcharge

Name: Clay Fill
Unit Weight: 120 pcf
Cohesion: 118 psf
Phi: 40 °

Name: Silty Clay
Unit Weight: 116 pcf
Cohesion: 85 psf
Phi: 32 °

Name: Sandy Clay
Unit Weight: 120 pcf
Cohesion: 400 psf
Phi: 20 °

Name: Clay with Shells
Unit Weight: 120 pcf
Cohesion: 400 psf
Phi: 20 °

Name: Sand
Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 25 °

5.38
M-1
M-2
Clay Fill
Silty Clay
Medium-Grained Sandy Clay
Silty Clay
Clay w/shells
Sand
Elevation
Distance
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
170
180
190
200
210
220
230
240
250
260
270
280
290
300

Plant McIntosh
Ash Pond dike
Section A-A'
Rapid Drawdown

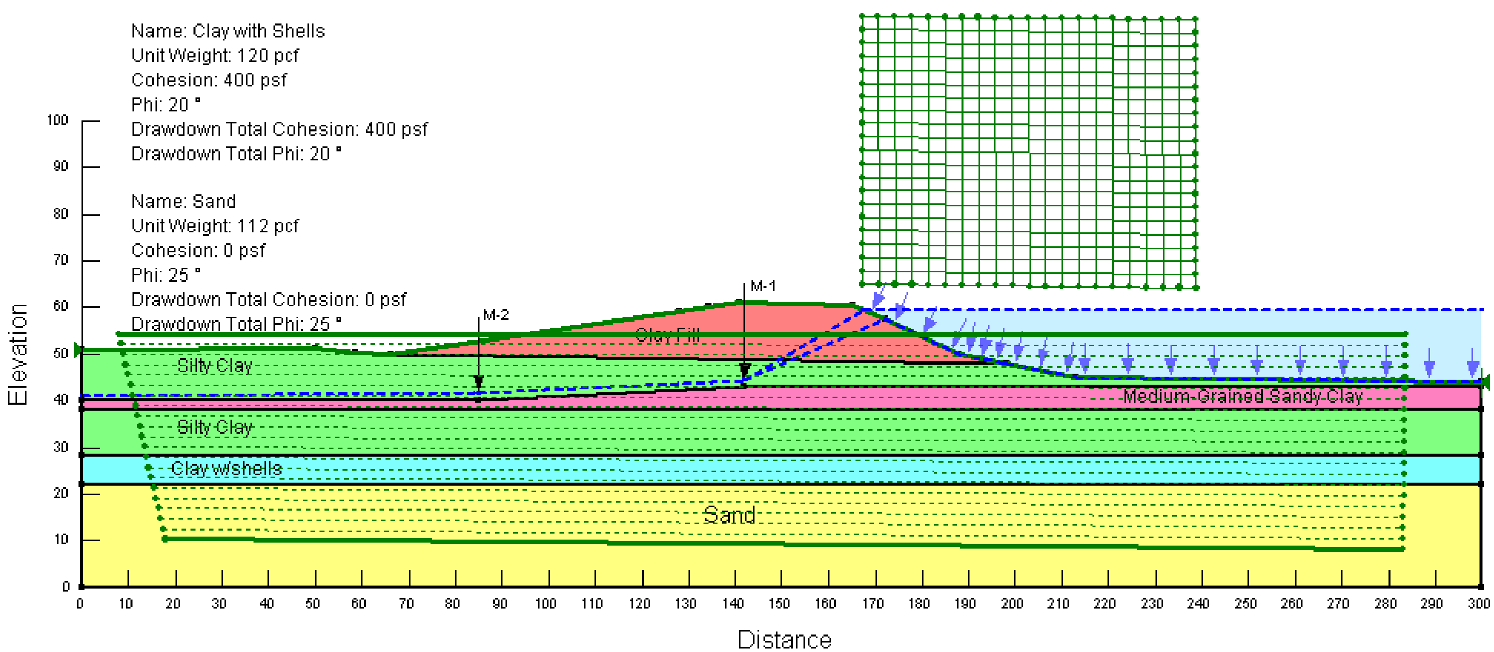
Name: Clay Fill
Unit Weight: 120 pcf
Cohesion: 118 psf
Phi: 40 °
Drawdown Total Cohesion: 792 psf
Drawdown Total Phi: 8.7 °

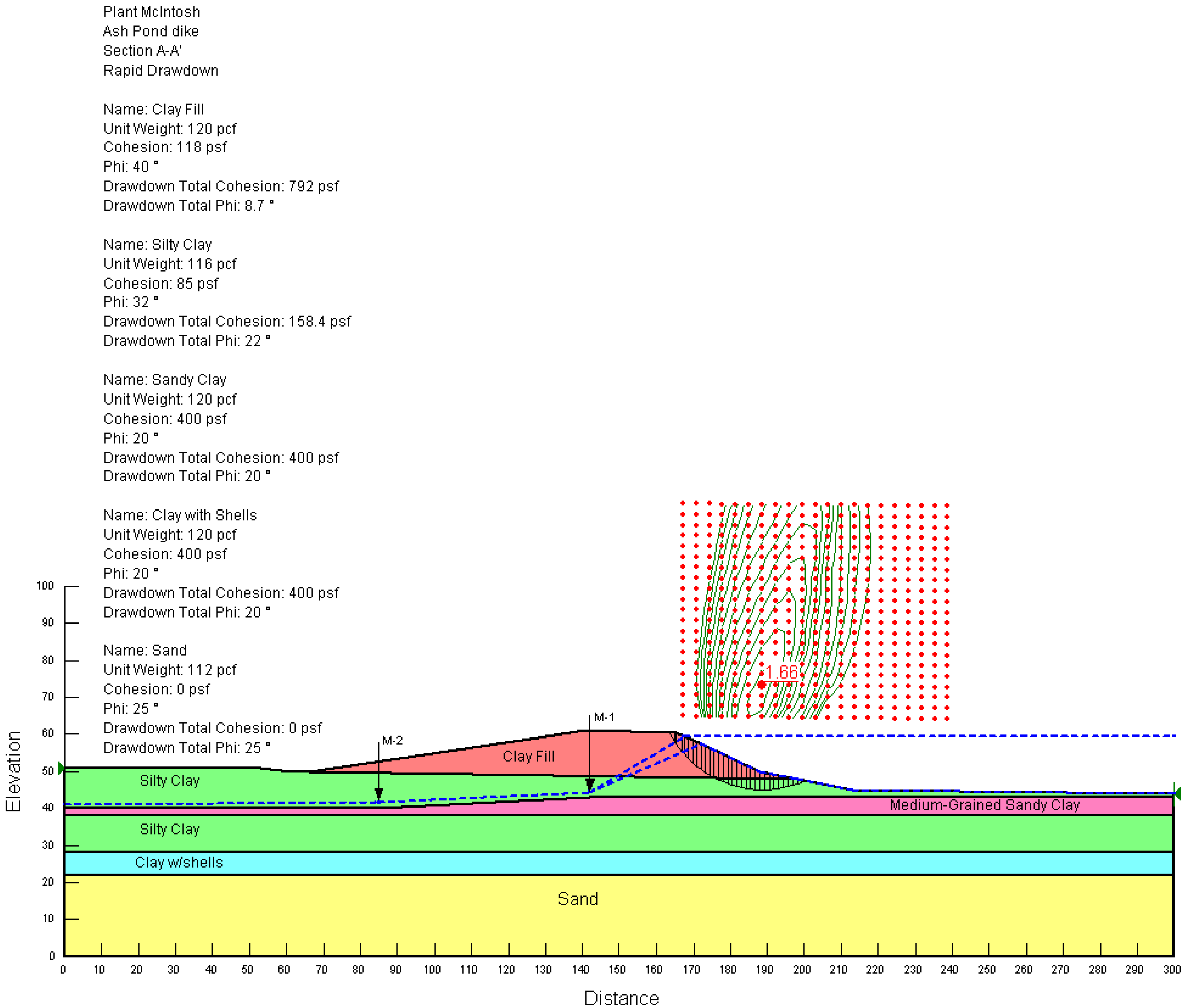
Name: Silty Clay
Unit Weight: 116 pcf
Cohesion: 85 psf
Phi: 32 °
Drawdown Total Cohesion: 158.4 psf
Drawdown Total Phi: 22 °

Name: Sandy Clay
Unit Weight: 120 pcf
Cohesion: 400 psf
Phi: 20 °
Drawdown Total Cohesion: 400 psf
Drawdown Total Phi: 20 °

Name: Clay with Shells
Unit Weight: 120 pcf
Cohesion: 400 psf
Phi: 20 °
Drawdown Total Cohesion: 400 psf
Drawdown Total Phi: 20 °

Name: Sand
Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 25 °
Drawdown Total Cohesion: 0 psf
Drawdown Total Phi: 25 °




Plant McIntosh
Ash Pond dike
Section A-A'
Rapid Drawdown

Name: Clay Fill
Unit Weight: 120 pcf
Cohesion: 118 psf
Phi: 40 °
Drawdown Total Cohesion: 792 psf
Drawdown Total Phi: 8.7 °

Name: Silty Clay
Unit Weight: 116 pcf
Cohesion: 85 psf
Phi: 32 °
Drawdown Total Cohesion: 158.4 psf
Drawdown Total Phi: 22 °

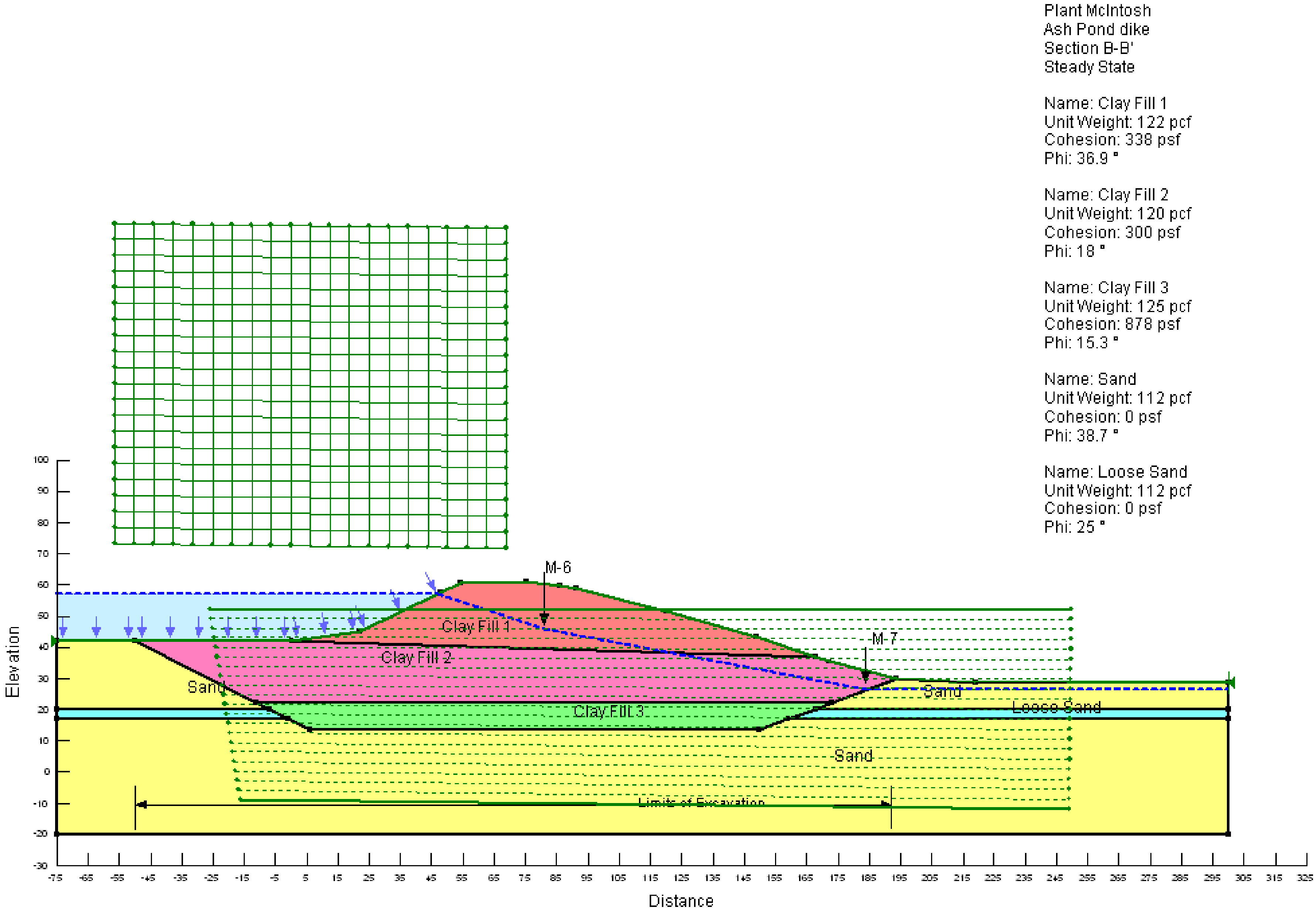
Name: Sandy Clay
Unit Weight: 120 pcf
Cohesion: 400 psf
Phi: 20 °
Drawdown Total Cohesion: 400 psf
Drawdown Total Phi: 20 °

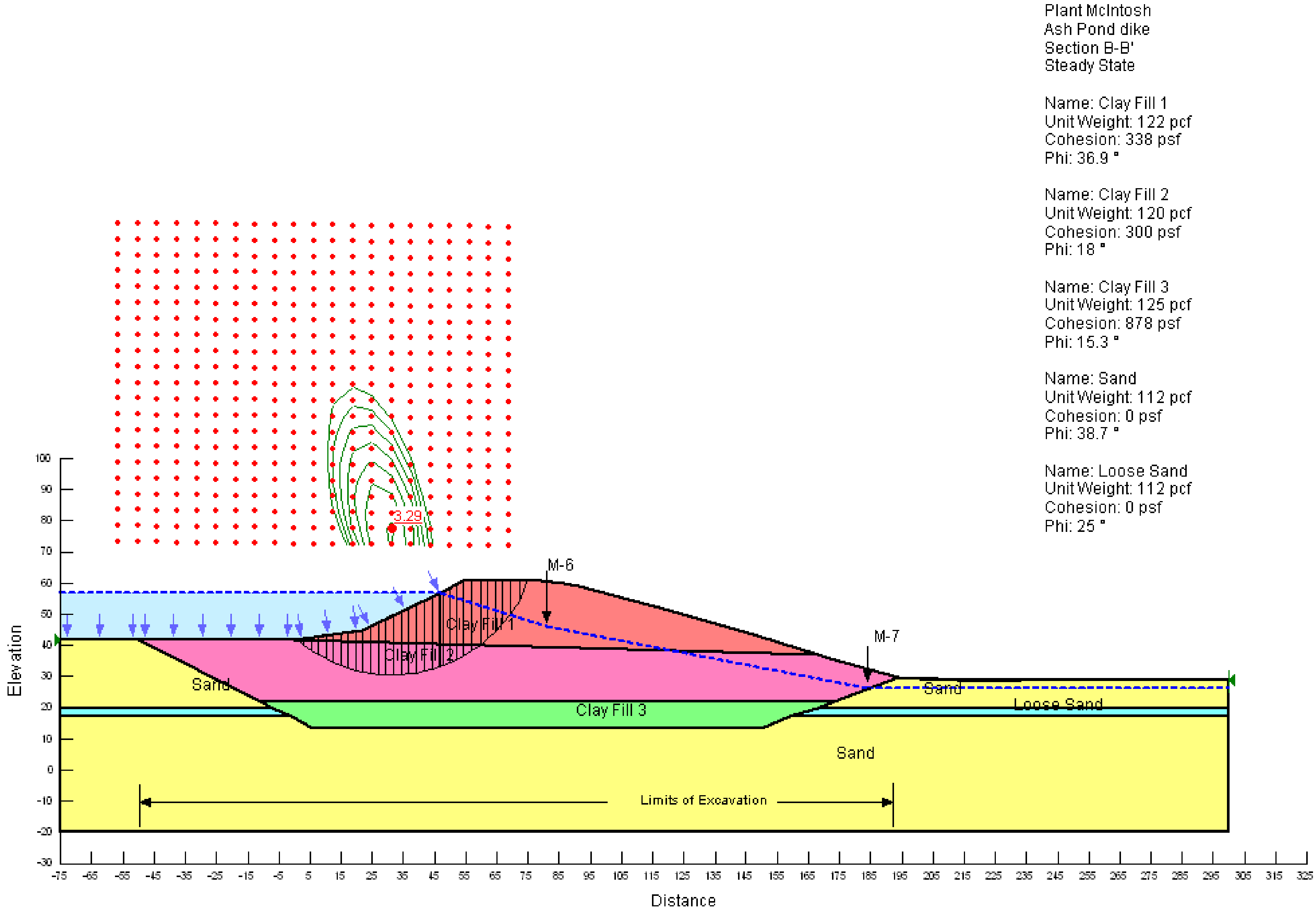
Name: Clay with Shells
Unit Weight: 120 pcf
Cohesion: 400 psf
Phi: 20 °
Drawdown Total Cohesion: 400 psf
Drawdown Total Phi: 20 °

Name: Sand
Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 25 °
Drawdown Total Cohesion: 0 psf
Drawdown Total Phi: 25 °

1.66
M-1
M-2
Clay Fill
Silty Clay
Medium-Grained Sandy Clay
Silty Clay
Clay w/shells
Sand
Elevation
Distance

Southeast Dike
Section B-B'


Plant McIntosh
Ash Pond dike
Section B-B'
Steady State
Name: Clay Fill 1
Unit Weight: 122 pcf
Cohesion: 338 psf
Phi: 36.9 °
Name: Clay Fill 2
Unit Weight: 120 pcf
Cohesion: 300 psf
Phi: 18 °
Name: Clay Fill 3
Unit Weight: 125 pcf
Cohesion: 878 psf
Phi: 15.3 °
Name: Sand
Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 38.7 °
Name: Loose Sand
Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 25 °
M-6
M-7
Clay Fill 1
Clay Fill 2
Clay Fill 3
Sand
Loose Sand
Limits of Excavation
Elevation
Distance


Plant McIntosh
Ash Pond dike
Section B-B'
Steady State
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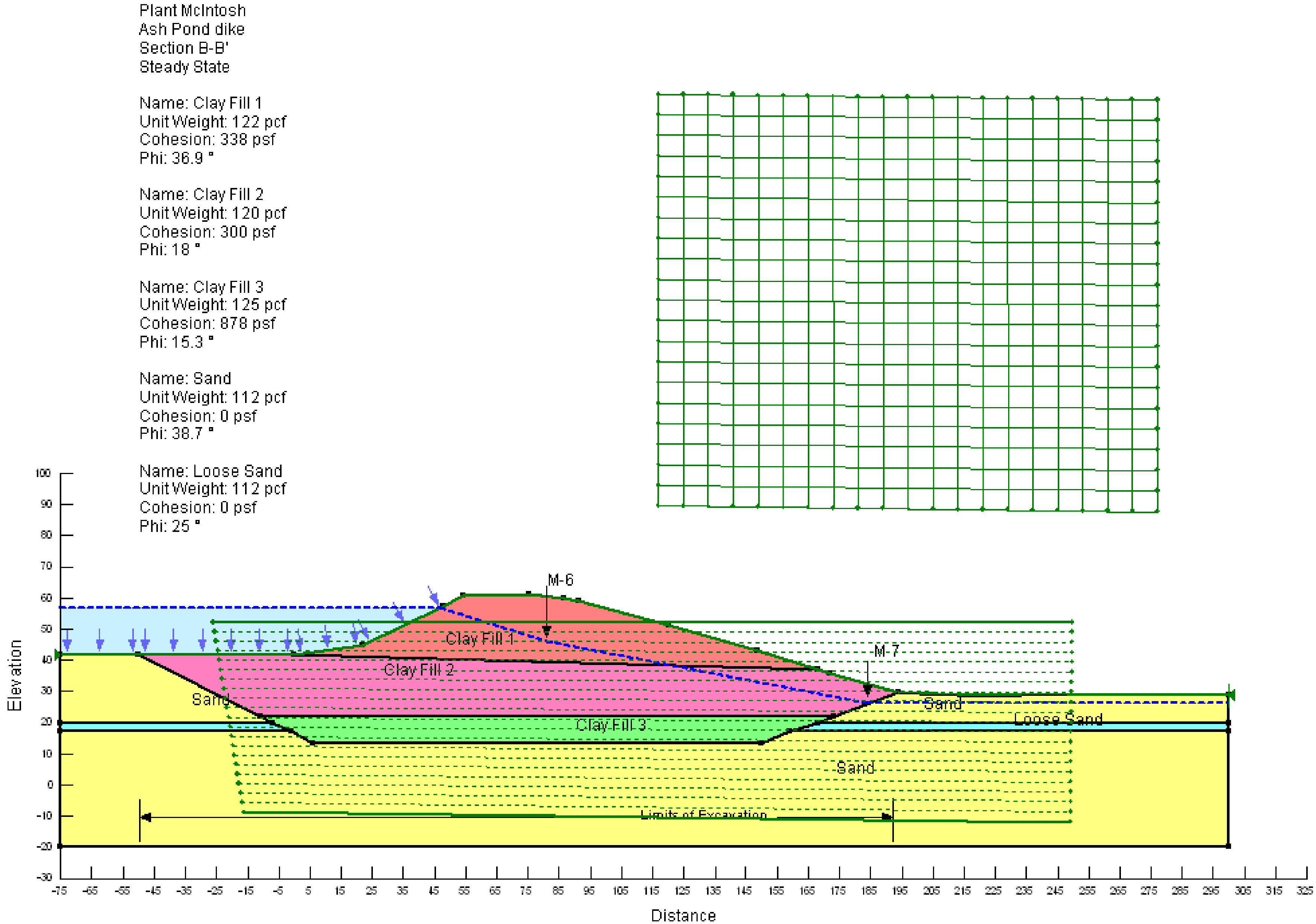
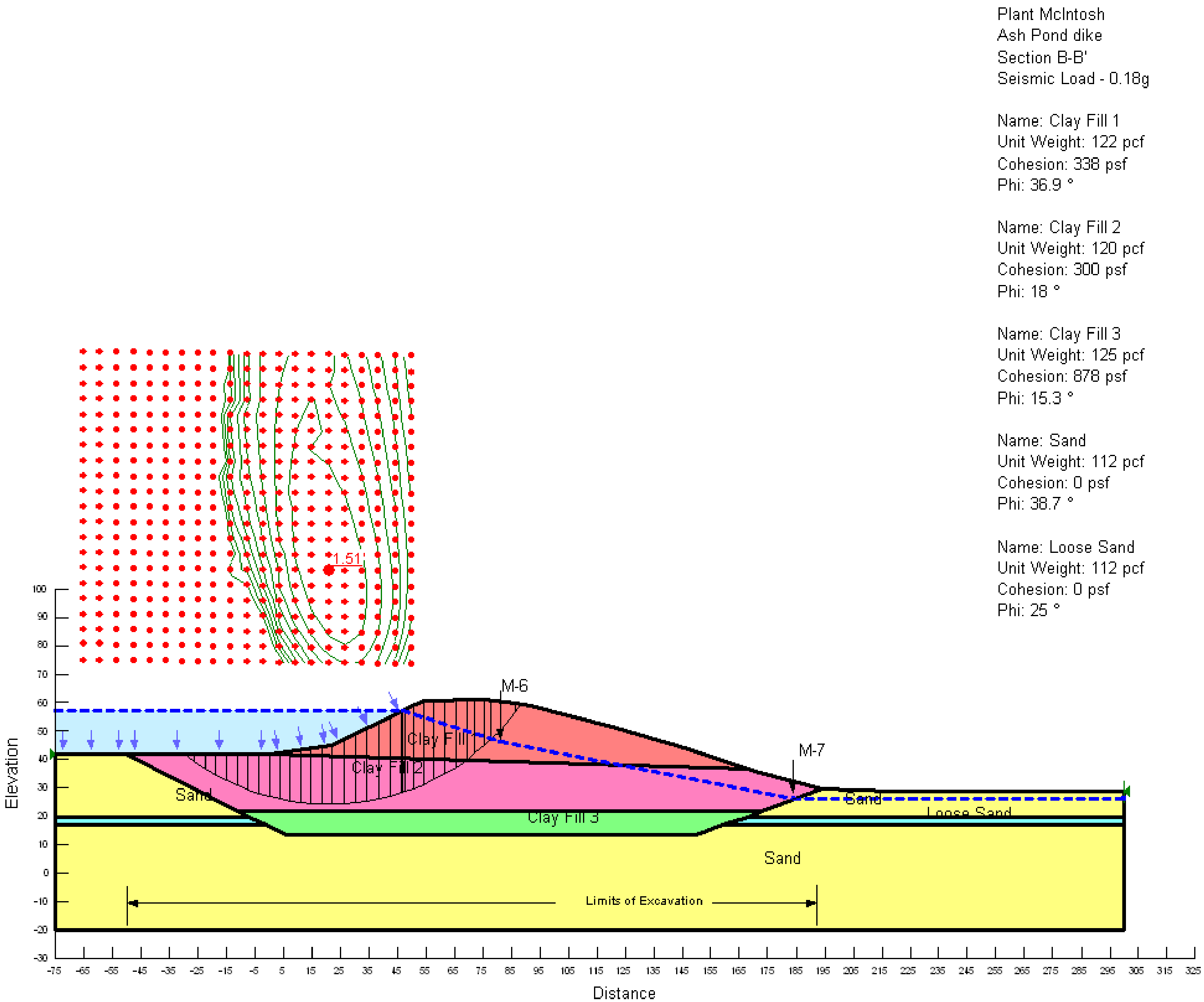
Unit Weight: 122 pcf
Cohesion: 338 psf
Phi: 36.9 °
Name: Clay Fill 2
Unit Weight: 120 pcf
Cohesion: 300 psf
Phi: 18 °
Name: Clay Fill 3
Unit Weight: 125 pcf
Cohesion: 878 psf
Phi: 15.3 °
Name: Sand
Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 38.7 °
Name: Loose Sand
Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 25 °
3.29
M-6
M-7
Clay Fill 1
Clay Fill 2
Clay Fill 3
Sand
Loose Sand
Limits of Excavation
Elevation
Distance


Plant McIntosh
Ash Pond dike
Section B-B'
Steady State
Name: Clay Fill 1
Unit Weight: 122 pcf
Cohesion: 338 psf
Phi: 36.9 °
Name: Clay Fill 2
Unit Weight: 120 pcf
Cohesion: 300 psf
Phi: 18 °
Name: Clay Fill 3
Unit Weight: 125 pcf
Cohesion: 878 psf
Phi: 15.3 °
Name: Sand
Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 38.7 °
Name: Loose Sand
Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 25 °
M-6
M-7
Clay Fill 1
Clay Fill 2
Clay Fill 3
Sand
Loose Sand
Limits of Excavation
Elevation
Distance



CONFIDENTIAL BUSINESS INFORMATION

Plant McIntosh
Ash Pond dike
Section B-B'
Seismic Load - 0.18g

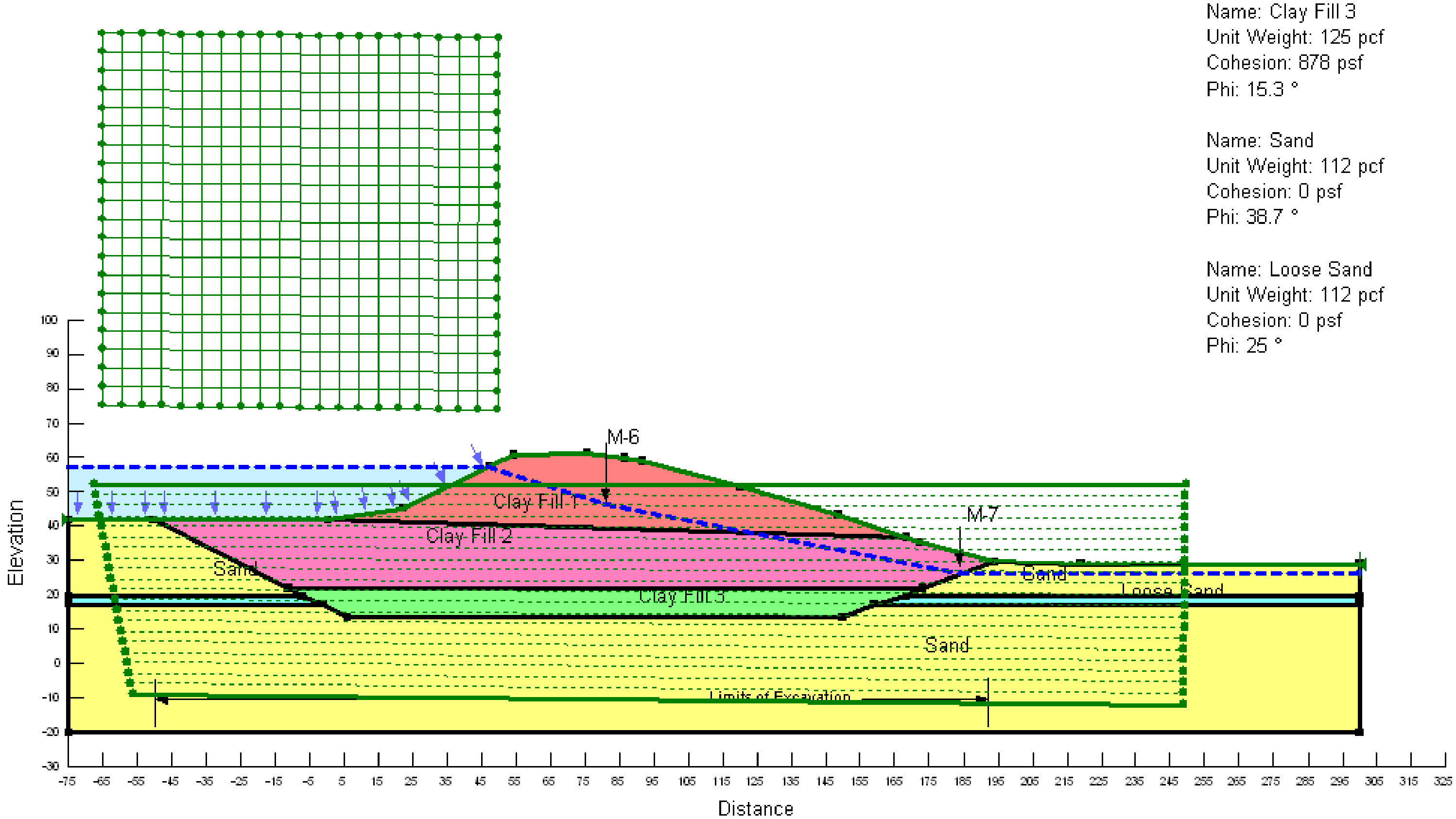
Name: Clay Fill 1
Unit Weight: 122 pcf
Cohesion: 338 psf
Phi: 36.9 °

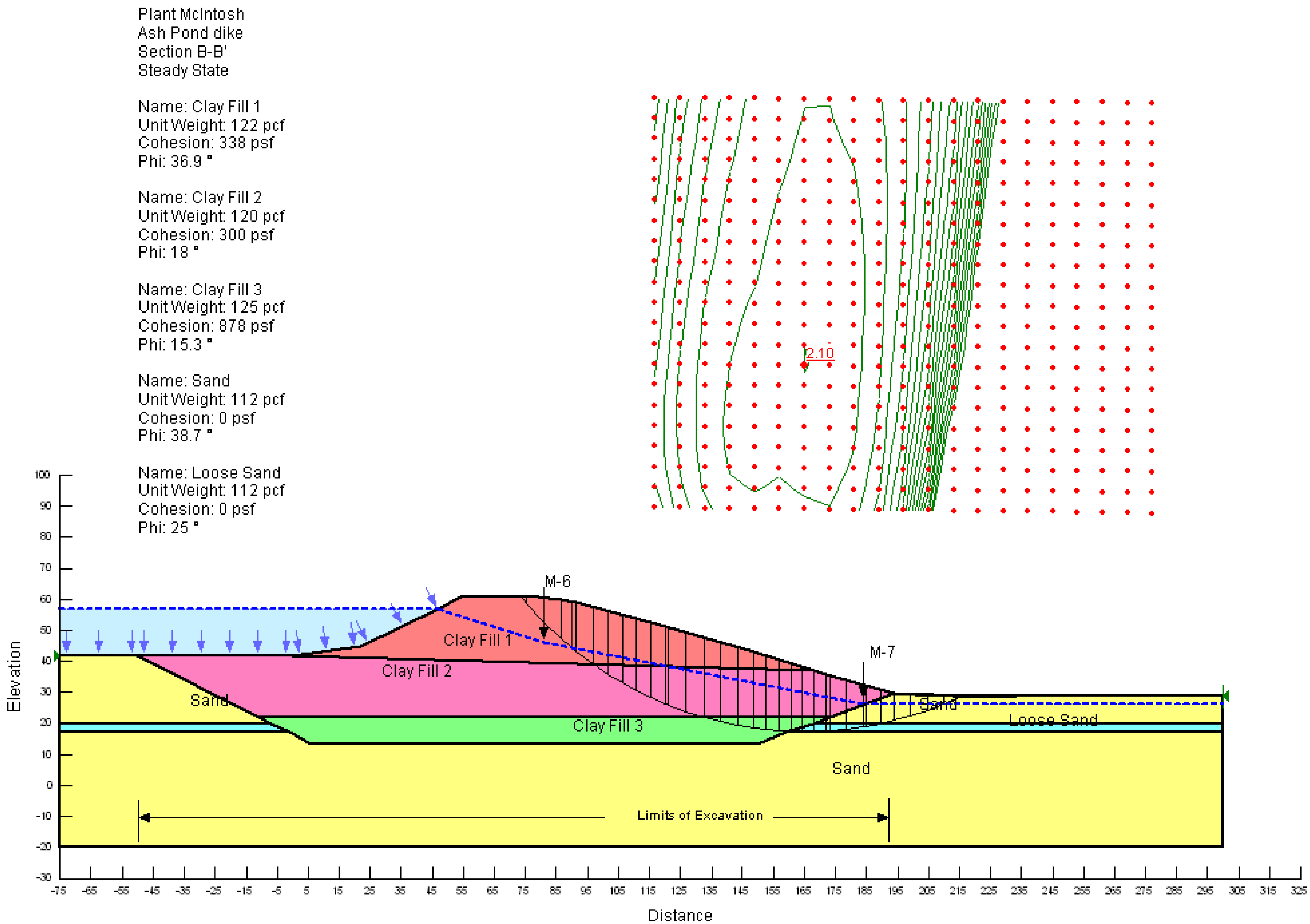
Name: Clay Fill 2
Unit Weight: 120 pcf
Cohesion: 300 psf
Phi: 18 °

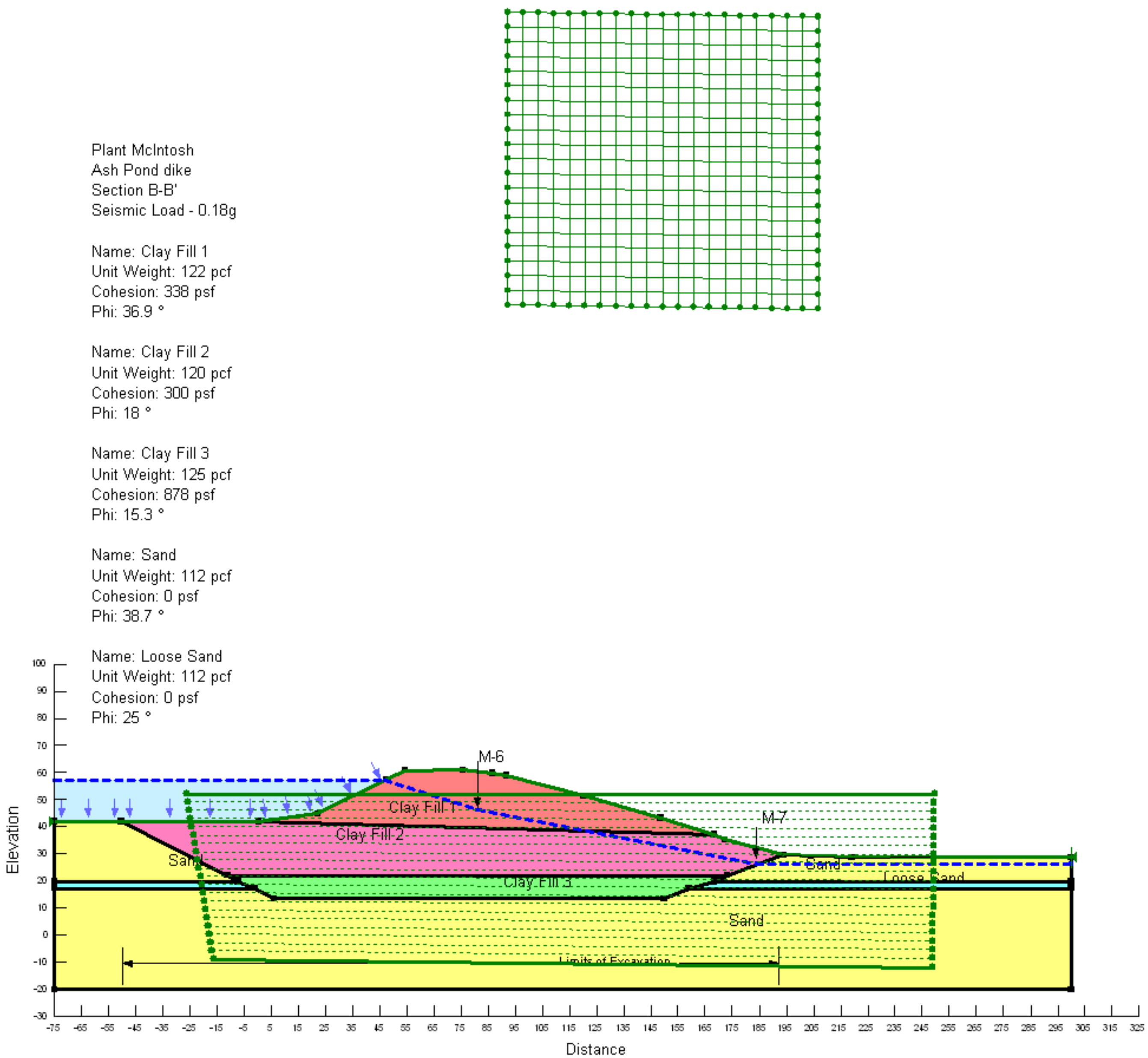
Name: Clay Fill 3
Unit Weight: 125 pcf
Cohesion: 878 psf
Phi: 15.3 °

Name: Sand
Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 38.7 °

Name: Loose Sand
Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 25 °




Plant McIntosh
Ash Pond dike
Section B-B'
Steady State
Name: Clay Fill 1
Unit Weight: 122 pcf
Cohesion: 338 psf
Phi: 36.9 °
Name: Clay Fill 2
Unit Weight: 120 pcf
Cohesion: 300 psf
Phi: 18 °
Name: Clay Fill 3
Unit Weight: 125 pcf
Cohesion: 878 psf
Phi: 15.3 °
Name: Sand
Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 38.7 °
Name: Loose Sand
Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 25 °
2.10
M-6
M-7
Clay Fill 1
Clay Fill 2
Clay Fill 3
Sand
Loose Sand
Limits of Excavation
Elevation
Distance



Plant McIntosh
Ash Pond dike
Section B-B'
Seismic Load - 0.18g

Name: Clay Fill 1
Unit Weight: 122 pcf
Cohesion: 338 psf
Phi: 36.9 °

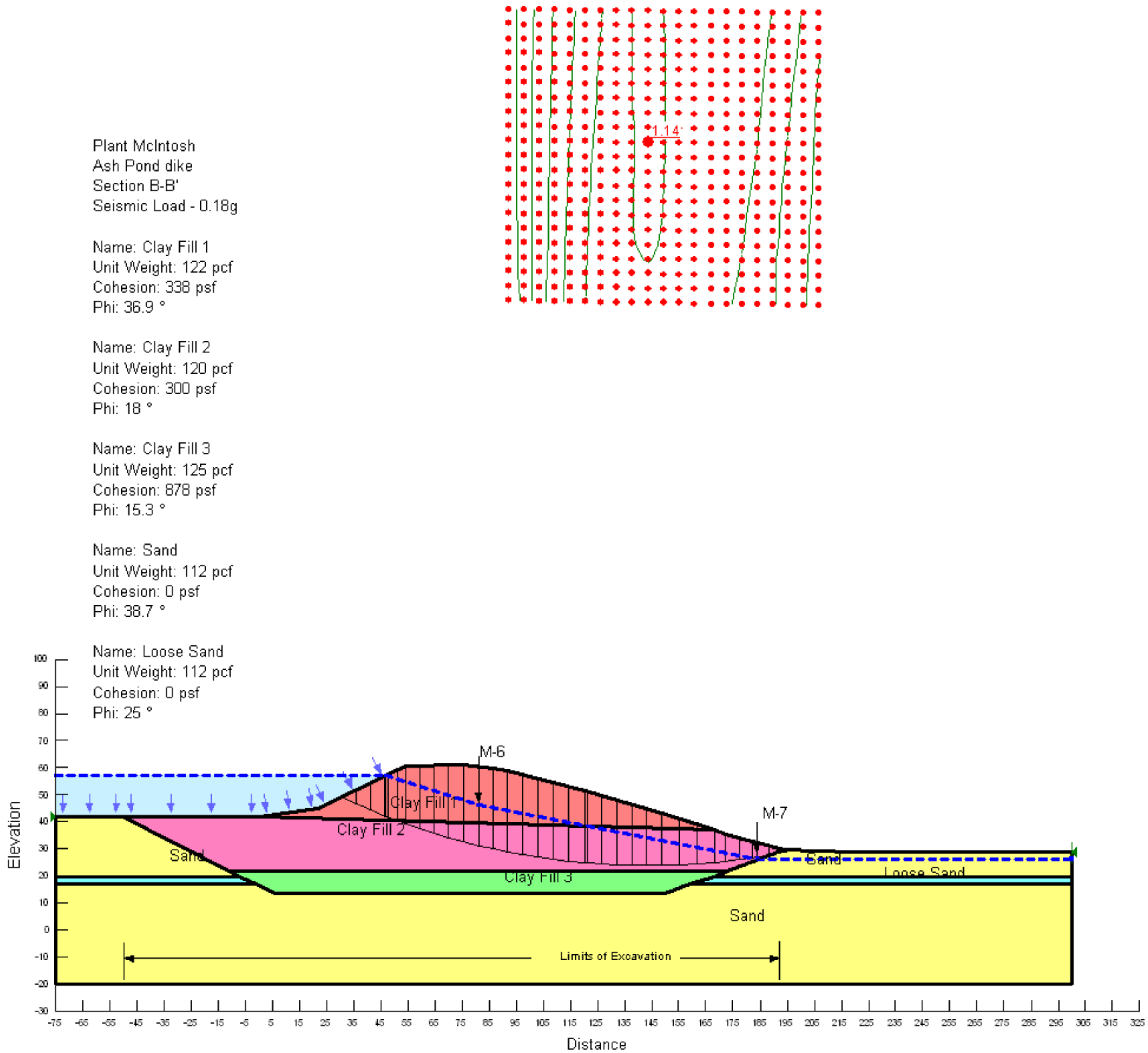
Name: Clay Fill 2
Unit Weight: 120 pcf
Cohesion: 300 psf
Phi: 18 °

Name: Clay Fill 3
Unit Weight: 125 pcf
Cohesion: 878 psf
Phi: 15.3 °

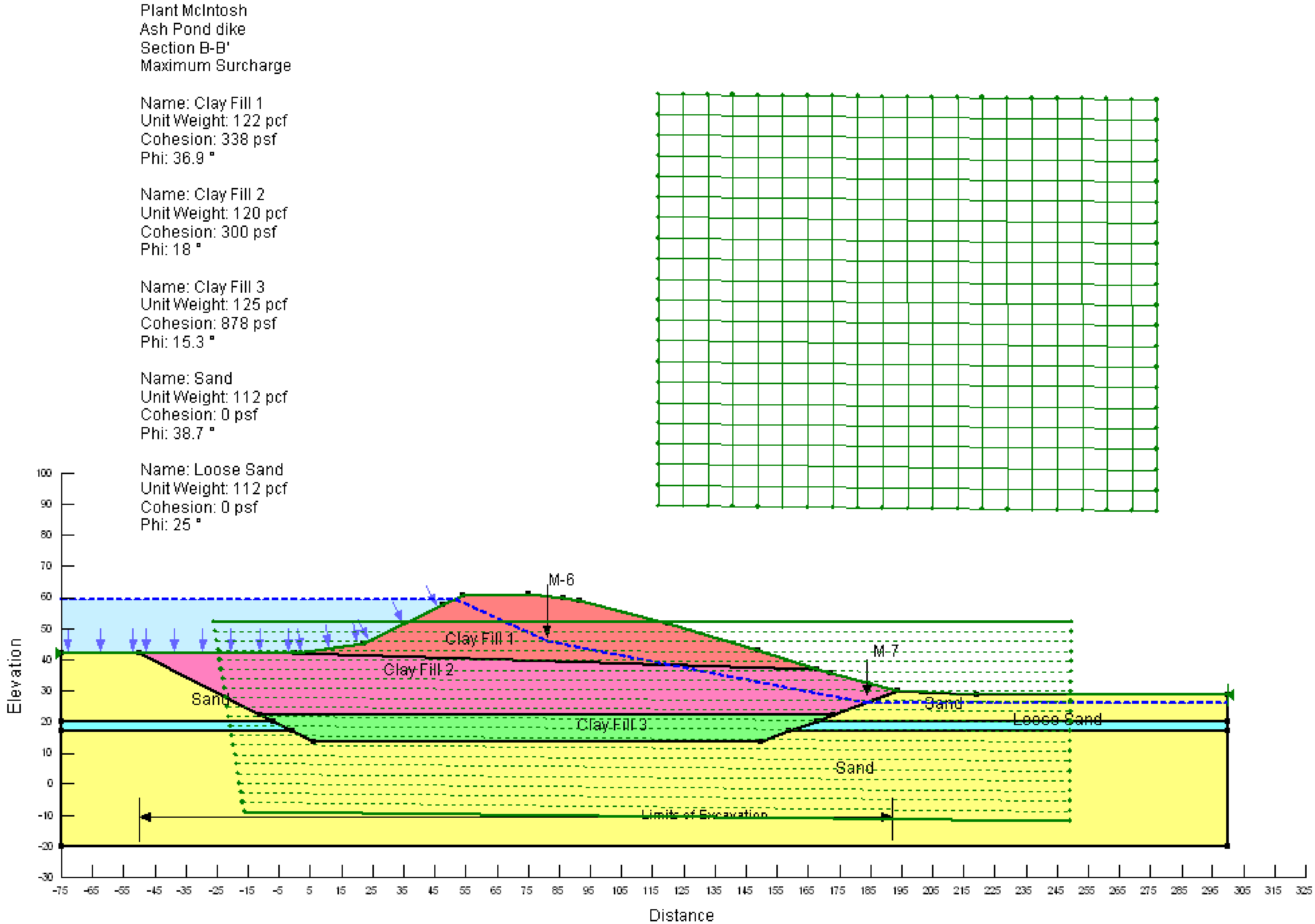
Name: Sand
Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 38.7 °

Name: Loose Sand
Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 25 °

M-6
M-7
Clay Fill 1
Clay Fill 2
Clay Fill 3
Sand
Loose Sand
Limits of Excavation
Elevation
Distance



CONFIDENTIAL BUSINESS INFORMATION


Plant McIntosh
Ash Pond dike
Section B-B'
Maximum Surcharge
Name: Clay Fill 1
Unit Weight: 122 pcf
Cohesion: 338 psf
Phi: 36.9 °
Name: Clay Fill 2
Unit Weight: 120 pcf
Cohesion: 300 psf
Phi: 18 °
Name: Clay Fill 3
Unit Weight: 125 pcf
Cohesion: 878 psf
Phi: 15.3 °
Name: Sand
Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 38.7 °
Name: Loose Sand
Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 25 °
M-6
M-7
Clay Fill 1
Clay Fill 2
Clay Fill 3
Sand
Sand
Sand
Loose Sand
Limits of Excavation
Elevation
Distance
100
90
80
70
60
50
40
30
20
10
0
-10
-20
-30
-75
-65
-55
-45
-35
-25
-15
-5
5
15
25
35
45
55
65
75
85
95
105
115
125
135
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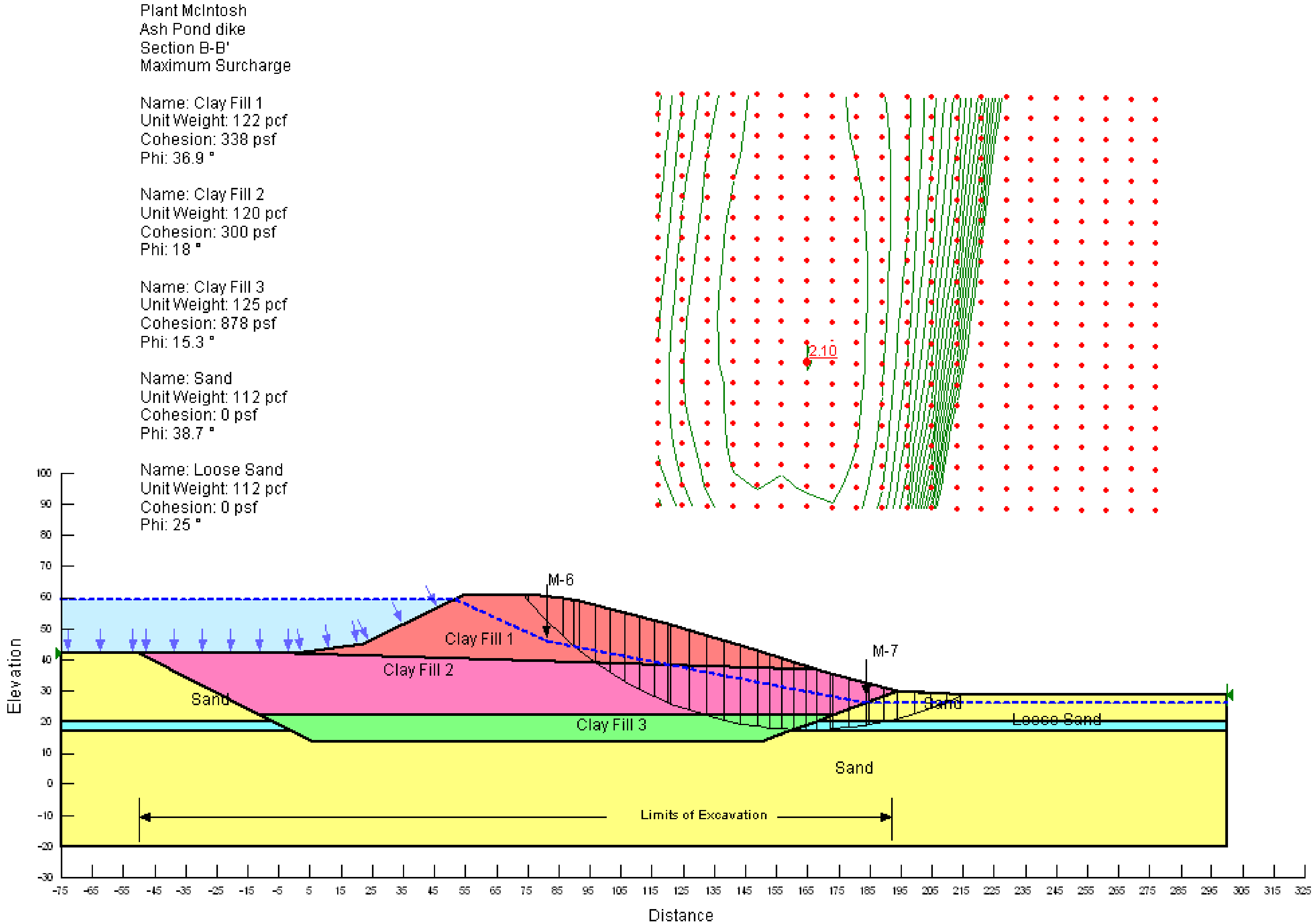
285
295
305
315
325



Plant McIntosh
Ash Pond dike
Section B-B'
Maximum Surcharge
Name: Clay Fill 1
Unit Weight: 122 pcf
Cohesion: 338 psf
Phi: 36.9 °
Name: Clay Fill 2
Unit Weight: 120 pcf
Cohesion: 300 psf
Phi: 18 °
Name: Clay Fill 3
Unit Weight: 125 pcf
Cohesion: 878 psf
Phi: 15.3 °
Name: Sand
Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 38.7 °
Name: Loose Sand
Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 25 °
2.10
M-6
M-7
Clay Fill 1
Clay Fill 2
Clay Fill 3
Sand
Loose Sand
Limits of Excavation
Elevation
Distance

Plant McIntosh
Ash Pond dike
Section B-B'
Rapid Drawdown

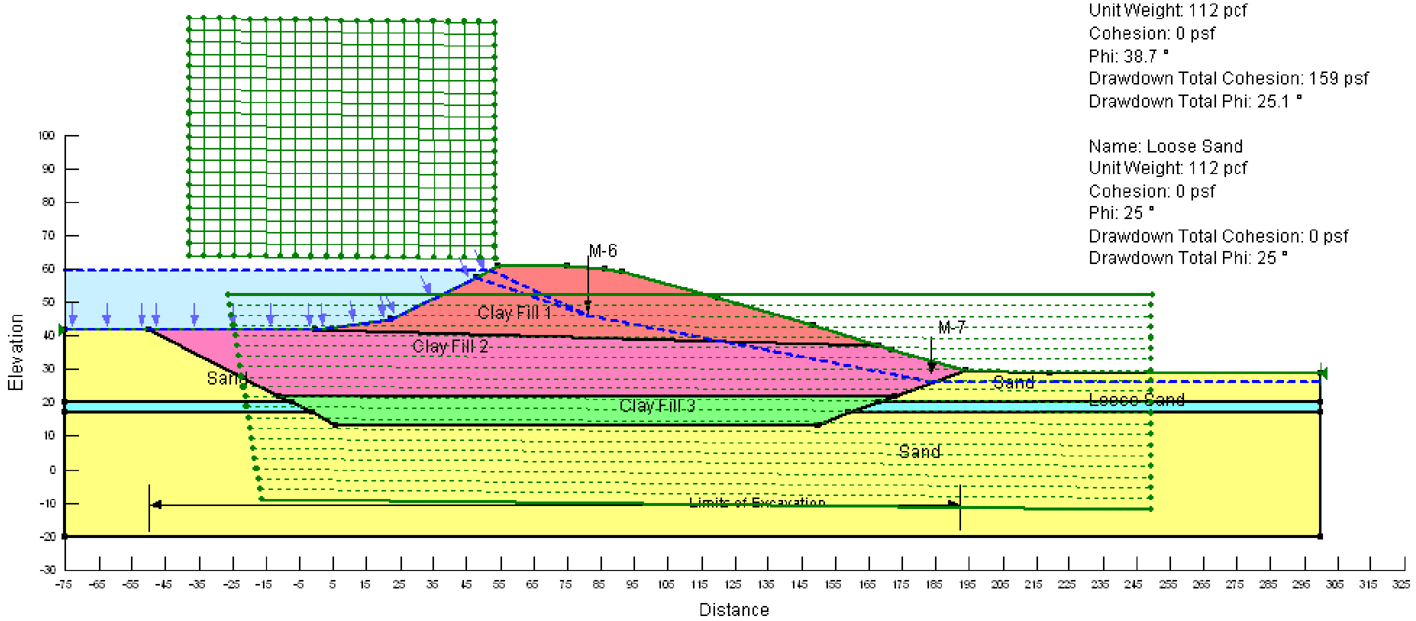
Name: Clay Fill 1
Unit Weight: 122 pcf
Cohesion: 338 psf
Phi: 36.9 °
Drawdown Total Cohesion: 576 psf
Drawdown Total Phi: 18.2 °

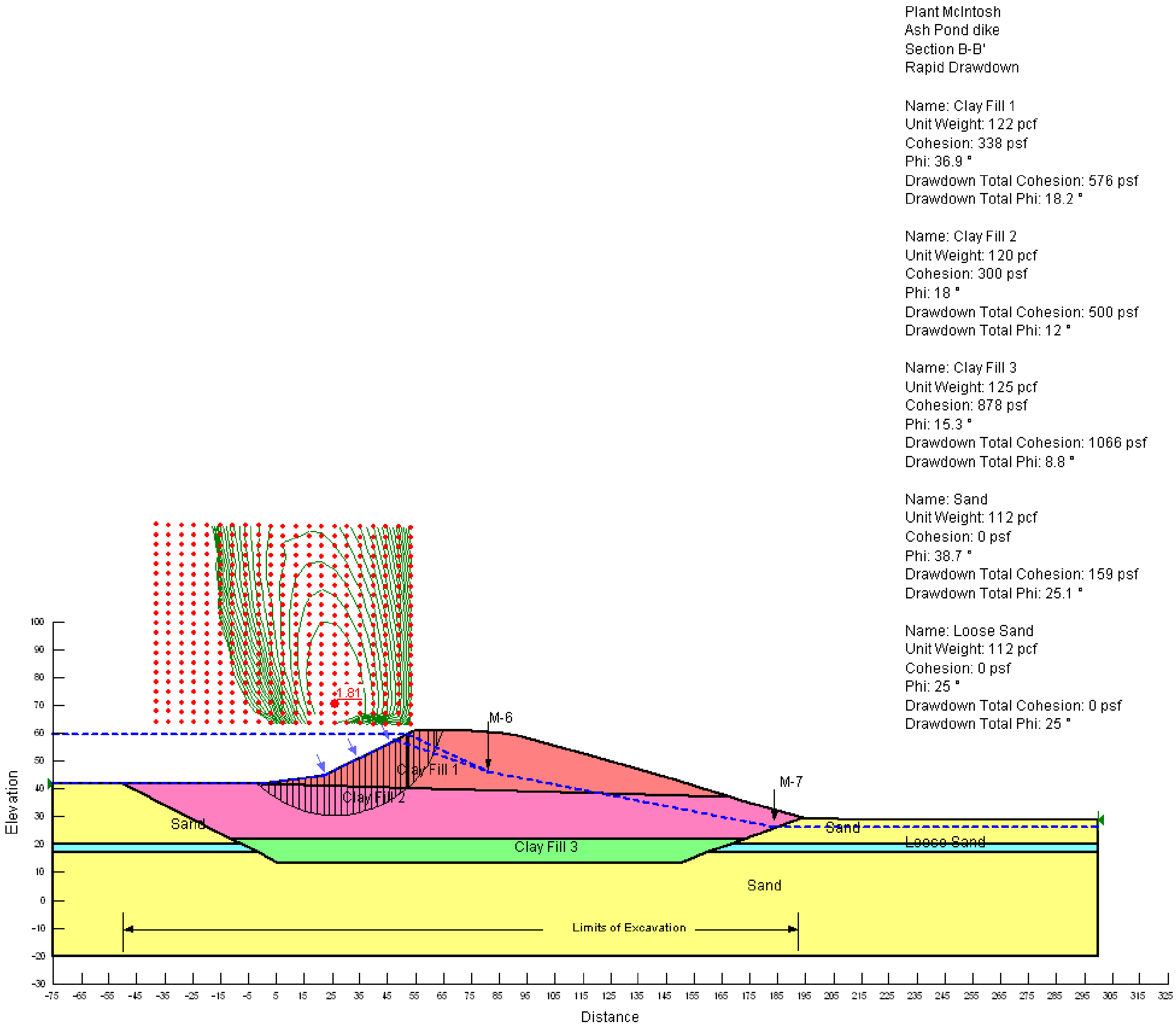
Name: Clay Fill 2
Unit Weight: 120 pcf
Cohesion: 300 psf
Phi: 18 °
Drawdown Total Cohesion: 500 psf
Drawdown Total Phi: 12 °

Name: Clay Fill 3
Unit Weight: 125 pcf
Cohesion: 878 psf
Phi: 15.3 °
Drawdown Total Cohesion: 1066 psf
Drawdown Total Phi: 8.8 °

Name: Sand
Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 38.7 °
Drawdown Total Cohesion: 159 psf
Drawdown Total Phi: 25.1 °

Name: Loose Sand
Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 25 °
Drawdown Total Cohesion: 0 psf
Drawdown Total Phi: 25 °




Plant McIntosh
Ash Pond dike
Section B-B'
Rapid Drawdown

Name: Clay Fill 1
Unit Weight: 122 pcf
Cohesion: 338 psf
Phi: 36.9 °
Drawdown Total Cohesion: 576 psf
Drawdown Total Phi: 18.2 °

Name: Clay Fill 2
Unit Weight: 120 pcf
Cohesion: 300 psf
Phi: 18 °
Drawdown Total Cohesion: 500 psf
Drawdown Total Phi: 12 °

Name: Clay Fill 3
Unit Weight: 125 pcf
Cohesion: 878 psf
Phi: 15.3 °
Drawdown Total Cohesion: 1066 psf
Drawdown Total Phi: 8.8 °

Name: Sand
Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 38.7 °
Drawdown Total Cohesion: 159 psf
Drawdown Total Phi: 25.1 °

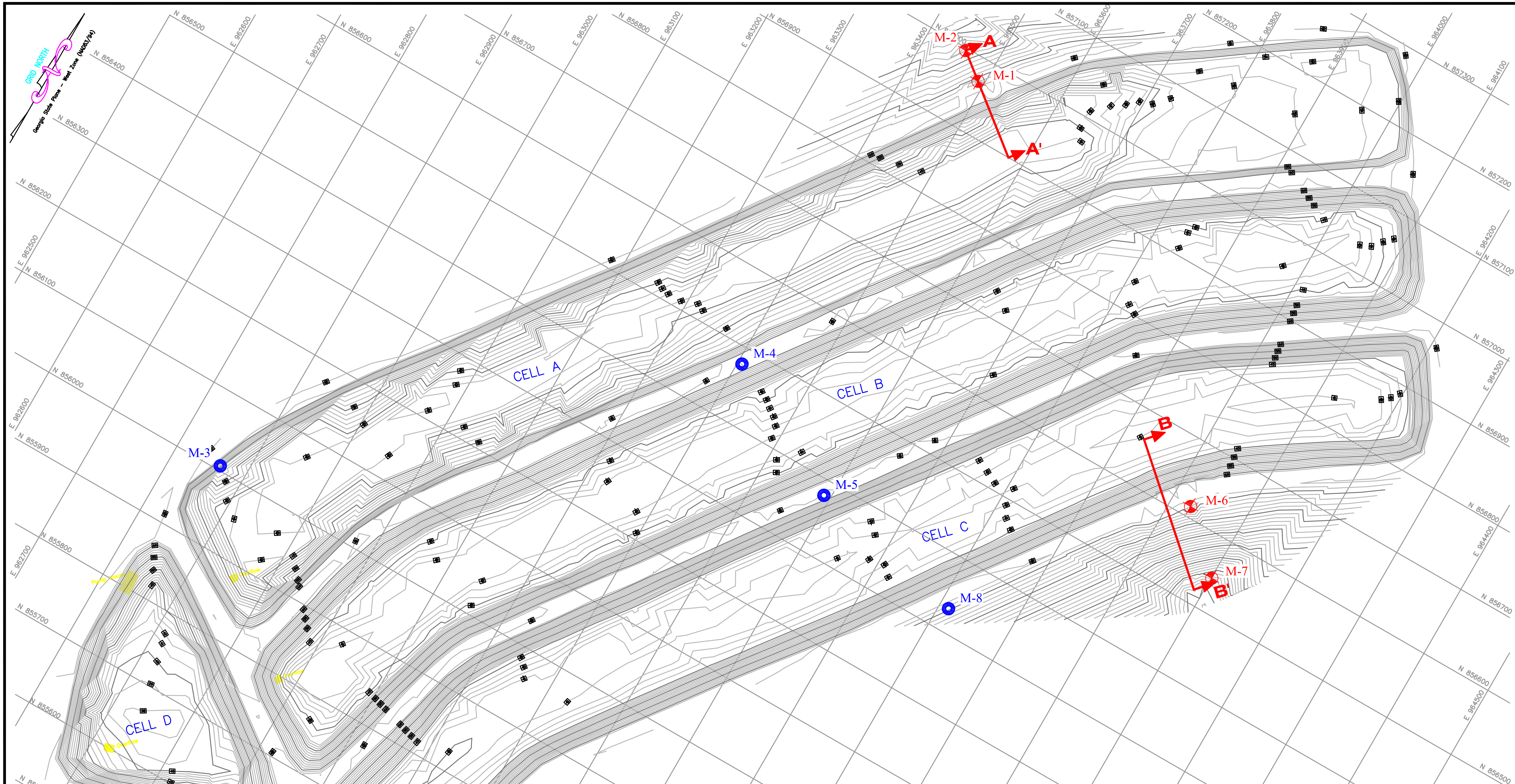
Name: Loose Sand
Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 25 °
Drawdown Total Cohesion: 0 psf
Drawdown Total Phi: 25 °

1.81
M-6
M-7
Clay Fill 1
Clay Fill 2
Clay Fill 3
Sand
Sand
Loose Sand
Sand
Limits of Excavation
Elevation
Distance

ATTACHMENT A

Figure 1

Boring Locations
Cross-Sections A-A' and B-B'



Legend:

M-7 Well

M-3 Soil Boring

GRAPHIC SCALE

125 0 125 250

(IN FEET)
1 inch =125 ft.

CONFIDENTIAL BUSINESS INFORMATION

ATTACHMENT A - FIGURE 1
PLANT MCINTOSH CALC. # TV-MC-3160BW-001
BORING & WELL LOCATIONS
CROSS SECTIONS A-A' & B-B'

BY	CHK'D	DATE

Southern Company Generation
Engineering and Construction Services
FOR

Georgia Power Company

SCALE	DRAWING NUMBER	SHEET	CONT'D	REV
AS SHOWN	ES1896S2	1	FINAL	0

ATTACHMENT B

Boring Logs

SOUTHERN COMPANY

LOG OF TEST BORING

BORING M1
PAGE 1 OF 2
ECS10258

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT McIntosh Ash Pond Dike
LOCATION Ash Pond Dike

DATE STARTED 8/26/2010 **COMPLETED** 8/26/2010 **SURF. ELEV.** 61.6 **COORDINATES:** N 856,968.80 E 963,491.20
CONTRACTOR Universal **EQUIPMENT** CME-55 **METHOD** Mud Rotary
DRILLED BY Bucky **LOGGED BY** G. Wilson **CHECKED BY** T. Hartsfield **ANGLE** **BEARING**
BORING DEPTH 50 ft. **GROUND WATER DEPTH: DURING** **COMP.** **DELAYED** 19 ft.
NOTES Well set @ 30' with 10' screen in off-set boring

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		- Reddish brown with gray and tan mottling, slightly micaceous, fine sandy CLAY (CL)						
				SS -1	2.0-3.5	3-4-5 (9)	100	
5				SS -2	4.0-5.5	3-4-4 (8)	100	
				SS -3	6.0-7.5	1-2-2 (4)	100	UD taken in off-set boring. (UD-1 (6-8))
10				SS -4	9.0-10.5	1-2-3 (5)	100	Color changes to mottled Red/brown.
			48.1					
15		- Gray, tan, and red, slightly micaceous, silty CLAY		SS -5	13.5-15.0	1-2-2 (4)	100	UD taken in off-set boring. (UD-2 (14-16))
							100	(MC = 26.8%; LL=45; PI=26; FC = 73.5%; Gravel = 0.2%; UW(d) = 94.3pcf) (Triaxial Test Performed)
			43.1					
20		▽ - Brownish-gray, CLAY with medium-grained sand, moist		SS -6	18.5-20.0	1-2-3 (5)	100	
			38.1					
25		- Gray silty CLAY		SS -7	23.5-25.0	1-1-2 (3)	100	

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SOUTHERN COMPANY

LOG OF TEST BORING

BORING M1
PAGE 2 OF 2
ECS10258

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT McIntosh Ash Pond Dike
LOCATION Ash Pond Dike

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		(con't)						
30				SS -8	28.5-30.0	WH-1-WH (1)	100	Large % of fine sand in sample. Color changes to Brown.
								Lost drilling fluid @ 32'.
35		- Brownish-gray CLAY with abundant shell fragments	28.1	SS -9	33.5-35.0	2-3-5 (8)	100	Sample had a large % of marine shell in sample. > 50%.
40		- Dark bown silty SAND, very loose	23.1	SS -10	38.5-40.0	2-1-2 (3)	100	Shell in material.
				UD -3	40.0-42.0	WR-WR-WR (0)	100	UD from 40'-42'.
45				SS -11	43.5-45.0	1-1-1 (2)	100	
50			11.6	SS -12	48.5-50.0	2-4-8 (12)	100	

Bottom of borehole at 50.0 feet.

BORING M2
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SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT McIntosh Ash Pond Dike
LOCATION Ash Pond Dike

DATE STARTED 8/26/2010 **COMPLETED** 8/26/2010 **SURF. ELEV.** 52.9 **COORDINATES:** N 856,996.60 E 963,455.90
CONTRACTOR Universal **EQUIPMENT** CME-55 **METHOD** Mud Rotary
DRILLED BY Bucky **LOGGED BY** G. Wilson **CHECKED BY** T. Hartsfield **ANGLE** **BEARING**
BORING DEPTH 30 ft. **GROUND WATER DEPTH: DURING** **COMP.** **DELAYED** 13.3 ft.
NOTES Well set @ 30' with 10' screen

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		- Slightly micaceous CLAY, mottled light gray/brown, damp, medium stiff. (CL)						
				SS-1	2.0-3.5	2-3-2 (5)		
			48.9					
5		- Silty, fine sandy CLAY, mottled light gray/brown, damp. (CL)		SS-2	4.0-5.5	2-2-2 (4)		
			46.9					
		- Reddish tan sandy CLAY (CL)		SS-3	6.0-7.5	WH-WH-2 (2)		
10				UD-1	9.0-11.0	WR-WR-WR (0)	100	(MC = 31.1%; LL=40; PI=22; FC = 72.4%; Gravel = 0%; UW(d) = 88.5pcf) (Triaxial Test Performed)
			39.4					
15		- Gray fine to medium SAND with clay and silt (SC-SM)		SS-4	13.5-15.0	1-2-3 (5)		
20				SS-5	18.5-20.0	1-1-2 (3)		
			29.4					
25		- Gray silty CLAY (CL)		SS-6	23.5-25.0	1-1-1 (2)		

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SOUTHERN COMPANY

LOG OF TEST BORING

BORING M2
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ECS10258

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT McIntosh Ash Pond Dike
LOCATION Ash Pond Dike

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		(con't)	24.4					
30		- Clayey SAND, gray, damp, Very loose. (SC)	22.9	SS -7	28.5-30.0	WH-1-2 (3)		
		Bottom of borehole at 30.0 feet.						
35								
40								
45								
50								

SOUTHERN COMPANY

LOG OF TEST BORING

BORING M3
PAGE 1 OF 1
ECS10258

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT McIntosh Ash Pond Dike
LOCATION Ash Pond Dike

DATE STARTED 8/24/2010 **COMPLETED** 8/24/2010 **SURF. ELEV.** Not Surveyed **COORDINATES:** Lat. N32.349578 Long. W-81.173508
CONTRACTOR Universal **EQUIPMENT** CME-55 **METHOD** Mud Rotary
DRILLED BY Bucky **LOGGED BY** G. Wilson **CHECKED BY** T. Hartsfield **ANGLE** **BEARING**
BORING DEPTH 25 ft. **GROUND WATER DEPTH: DURING** **COMP.** **DELAYED**
NOTES Handheld GPS was used to take coordinates

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
0		- Sandy micaceous CLAY, red/brown, moist, Stiff. (CL)					
			SS -1	2.0-3.5	2-6-8 (14)	100	
5		- Medium Stiff	SS -2	4.0-5.5	2-4-6 (10)	100	
		- Stiff	SS -3	6.0-7.5	3-6-7 (13)	100	
10			UD -1	8.0-10.0	WR-WR-WR (0)	100	
15		- Gray SILT with fine sand; soft	SS -4	13.5-15.0	2-1-3 (4)	100	Color changes to Gray.
20			SS -5	18.5-20.0	1-2-3 (5)		
			UD -2	20.0-22.0	WR-WR-WR (0)	100	
25			SS -6	23.5-25.0	1-2-2 (4)	100	

Bottom of borehole at 25.0 feet.

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SOUTHERN COMPANY

LOG OF TEST BORING

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SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT McIntosh Ash Pond Dike
LOCATION Ash Pond Dike

DATE STARTED 8/25/2010 **COMPLETED** 8/25/2010 **SURF. ELEV.** Not Surveyed **COORDINATES:** Lat. N32.350861 Long. W-81.171739
CONTRACTOR Universal **EQUIPMENT** CME-55 **METHOD** Mud Rotary
DRILLED BY Bucky **LOGGED BY** G. Wilson **CHECKED BY** T. Hartsfield **ANGLE** **BEARING**
BORING DEPTH 50 ft. **GROUND WATER DEPTH: DURING** **COMP.** **DELAYED**
NOTES Interior dike. Handheld GPS was used to take coordinates

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		- Slightly micaceous mottled gray CLAY and red sandy, silty CLAY, soft, moist. (CL)					
			SS -1	2.0-3.5	2-2-3 (5)	100	
5		- Becomes less sandy with depth	SS -2	4.0-5.5	1-2-2 (4)	100	
			SS -3	6.0-7.5	1-2-3 (5)	100	Fine sand in sample.
10			SS -4	9.0-10.5	2-3-4 (7)	100	
15		- Silty fine SAND to fine sandy SILT, brown, very loose, moist	SS -5	13.5-15.0	2-3-4 (7)	100	
20			SS -6	18.5-20.0	1-2-2 (4)	100	Sample changes to gray.
25		- CLAY, light brown, moist, medium stiff. (CL)	SS -7	23.5-25.0	2-3-5 (8)	100	

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SOUTHERN COMPANY

LOG OF TEST BORING

BORING M4
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SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT McIntosh Ash Pond Dike

LOCATION Ash Pond Dike

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		(con't)					
		- Silty, very fine SAND, light brown, moist, very loose. (SM)	SS -8	28.5-30.0	WH-WH-1 (1)	100	
30							
			SS -9	33.5-35.0	WH-WH-WH (0)	100	
35							
			SS -10	38.5-40.0	1-1-1 (2)	100	
40							
			SS -11	43.5-45.0	WH-1-1 (2)	100	
45							
			SS -12	48.5-50.0	17-12-20 (32)	100	
50		Bottom of borehole at 50.0 feet.					

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SOUTHERN COMPANY

LOG OF TEST BORING

BORING M5
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SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT McIntosh Ash Pond Dike
LOCATION Ash Pond Dike

DATE STARTED 8/25/2010 **COMPLETED** 8/25/2010 **SURF. ELEV.** Not Surveyed **COORDINATES:** Lat. N32.350586 Long. W-81.171144
CONTRACTOR Universal **EQUIPMENT** CME-55 **METHOD** Mud Rotary
DRILLED BY Bucky **LOGGED BY** G. Wilson **CHECKED BY** T. Hartsfield **ANGLE** **BEARING**
BORING DEPTH 50 ft. **GROUND WATER DEPTH: DURING** 28.5 ft. **COMP.** 28.5 ft. **DELAYED**
NOTES Interior dike. Handheld GPS was used to take coordinates

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		- Slightly micaceous, silty CLAY, brown/red, damp, soft. (CL)					
			SS -1	2.0-3.5	2-2-2 (4)	100	
5			SS -2	4.0-5.5	1-2-2 (4)	100	
			SS -3	6.0-7.5	1-2-3 (5)	100	
10			SS -4	9.0-10.5	2-2-2 (4)	100	
15		- Medium Stiff	SS -5	13.5-15.0	2-3-5 (8)	100	
20		- CLAY, gray, damp, stiff. (CL)	SS -6	18.5-20.0	2-4-5 (9)	100	
25			SS -7	23.5-25.0	2-5-7 (12)	100	

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SOUTHERN COMPANY

LOG OF TEST BORING

BORING M5
PAGE 2 OF 2
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SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT McIntosh Ash Pond Dike
LOCATION Ash Pond Dike

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		(con't)					
		- Silty, very fine SAND	SS -8	28.5-30.0	1-1-2 (3)	100	
30							
		- SAND, brown, wet, very loose (SP)	SS -9	33.5-35.0	WH-WH-WH (0)	100	
35							
			SS -10	38.5-40.0	WH-WH-1 (1)	100	
40							
			SS -11	43.5-45.0	WH-WH-2 (2)	100	
45							
		- Dense; contains gravel	SS -12	48.5-50.0	10-28-20 (48)	100	
50							

Bottom of borehole at 50.0 feet.

GEOTECH ENGINEERING LOGS - ESEE DATABASE.GDT - 1/5/11 10:47 - T:\ESEE MAJOR PROJECTS\PROJECTS\MCINTOSH\2010\ES1896 DATA FOR EPA INSPECTION\LOGS\LOGS\LOGS.GPJ

SOUTHERN COMPANY

LOG OF TEST BORING

BORING M6
PAGE 1 OF 3
ECS10258

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT McIntosh Ash Pond Dike
LOCATION Ash Pond Dike

DATE STARTED 8/24/2010 **COMPLETED** 8/24/2010 **SURF. ELEV.** 60.5 **COORDINATES:** N 856,614.40 E 964,027.50
CONTRACTOR Universal **EQUIPMENT** CME-55 **METHOD** Mud Rotary
DRILLED BY Bucky **LOGGED BY** G. Wilson **CHECKED BY** T. Hartsfield **ANGLE** **BEARING**
BORING DEPTH 60 ft. **GROUND WATER DEPTH: DURING** **COMP.** **DELAYED** 16.3 ft.
NOTES Set piezometer @ 20' in off-set well. UD's taken @ 6' & 13' in off-set well.

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
0		- Sandy, silty CLAY, red, moist, soft. (CL)						
				SS -1	2.0-3.5	1-2-2 (4)	100	
5				SS -2	4.0-5.5	1-2-3 (5)	100	
				SS -3	6.0-7.5	1-2-3 (5)	100	UD-1 (6-8)
10		- Medium Stiff; becomes brown		SS -4	9.0-10.5	2-3-4 (7)	100	
15		- Soft		SS -5	13.5-15.0	1-2-2 (4)	100 100	(MC = 24%; LL=45; PI=25; FC = 65.9%; Gravel = 0%; UW(d) = 98.7pcf) (Triaxial Test Performed) UD-2 (13-15)
		▼ (groundwater, delayed)						
20				SS -6	18.5-20.0	2-2-3 (5)	100	
25		- Medium Stiff		SS -7	23.5-25.0	2-3-4 (7)	100	

(Continued Next Page)

SOUTHERN COMPANY

LOG OF TEST BORING

BORING M6
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SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT McIntosh Ash Pond Dike
LOCATION Ash Pond Dike

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		(con't)						
		- Very Soft; becomes gray in color						
30				SS -8	28.5-30.0	1-1-2 (3)	100	
35				SS -9	33.5-35.0	1-1-2 (3)	100	
40				UD -3	38.5-40.5	WR-WR-WR (0)	100	(MC = 24.6%; LL=42; PI=24; FC = 59%; Gravel = 0%; UW(d) = 100.1pcf) (Triaxial Test Performed)
45		- Medium Stiff		SS -10	43.5-45.0	2-3-4 (7)	100	
			12.0					
50		- Clayey SAND with gravel, brown, moist, very dense. (SC)		SS -11	48.5-50.0	7-13-13 (26)	100	
			7.0					
		- Silty SAND, dark brown, moist, very dense. (SM)		SS	53.5-	35-26-57	100	

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SOUTHERN COMPANY

LOG OF TEST BORING

BORING M6
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SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT McIntosh Ash Pond Dike
LOCATION Ash Pond Dike

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
55		*(con't)*		-12	55.0	(83)	100	
60			0.5	SS -13	58.5-60.0	20-50-WR (50)	67	
65		Bottom of borehole at 60.0 feet.						
70								
75								
80								

SOUTHERN COMPANY

LOG OF TEST BORING

BORING M7
PAGE 1 OF 1
ECS10258

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT McIntosh Ash Pond Dike
LOCATION Ash Pond Dike

DATE STARTED 8/30/2010 **COMPLETED** 8/30/2010 **SURF. ELEV.** 32.6 **COORDINATES:** N 856,544.70 E 964,100.90
CONTRACTOR Universal **EQUIPMENT** CME-55 **METHOD** Mud Rotary
DRILLED BY Bucky **LOGGED BY** G. Wilson **CHECKED BY** T. Hartsfield **ANGLE** **BEARING**
BORING DEPTH 25 ft. **GROUND WATER DEPTH: DURING** **COMP.** **DELAYED** 8 ft.
NOTES Well set @ 25' with 10' screen

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
0		- Silty fine SAND, gray, damp, dense. (SP)						
				UD -1	2.0-4.0	WR-WR-WR (0)	100	
5				SS -1	4.0-5.5	8-14-20 (34)	100	Changes to brown.
		- Medium dense; wet		SS -2	6.0-7.5	8-8-9 (17)	100	
		▼ (groundwater ~8 ft)						
10				SS -3	9.0-10.5	8-8-9 (17)	100	
15		- Very loose		SS -4	13.5-15.0	1-2-1 (3)	100	
				UD -2	16.0-18.0	WR-WR-WR (0)	100	(MC = 38.1%; PL=NP; FC = 13.3%; Gravel = 0.2%; UW(d) = 81.2pcf) (Triaxial Test Performed)
20		- Medium dense; becomes silty fine SAND with depth		SS -5	18.5-20.0	5-5-20 (25)	100	
25		- Dense	7.6	SS -6	23.5-25.0	25-18-50 (68)	93	

Bottom of borehole at 25.0 feet.

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SOUTHERN COMPANY

LOG OF TEST BORING

BORING M8
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SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT McIntosh Ash Pond Dike
LOCATION Ash Pond Dike

DATE STARTED 8/25/2010 **COMPLETED** 8/25/2010 **SURF. ELEV.** Not Surveyed **COORDINATES:** Lat. N32.350447 Long. W-81.170425
CONTRACTOR Universal **EQUIPMENT** CME-55 **METHOD** Mud Rotary
DRILLED BY Bucky **LOGGED BY** G. Wilson **CHECKED BY** T. Hartsfield **ANGLE** **BEARING**
BORING DEPTH 60 ft. **GROUND WATER DEPTH: DURING** 48 ft. **COMP.** 48 ft. **DELAYED**
NOTES Handheld GPS was used to take coordinates

DEPTH (ft)	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
	- Fine sandy, slightly micaceous, silty CLAY, mottled light gray/red, moist, medium stiff. (CL)					
		SS -1	2.0-3.5	1-4-3 (7)	100	
5	- Soft	SS -2	4.0-5.5	1-2-2 (4)	100	Sample changes to brown.
	- Medium Stiff	SS -3	6.0-7.5	1-3-3 (6)	100	Color changes to a layered light gray/brown/red.
	- Soft	SS -4	8.5-10.0	1-2-3 (5)	100	Coarse sand in sample.
10		UD -1	10.0-12.0	WR-WR-WR (0)	100	
	- Medium Stiff	SS -5	13.5-15.0	2-3-4 (7)	100	Sample changes to brown.
15						
	- Soft	SS -6	18.5-20.0	1-2-2 (4)	100	Sample changes to a mottled light red/brown/gray.
20						
	- Medium Stiff	SS -7	23.5-25.0	2-4-5 (9)	100	
25						

(Continued Next Page)

SOUTHERN COMPANY

LOG OF TEST BORING

BORING M8
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SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT McIntosh Ash Pond Dike
LOCATION Ash Pond Dike

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		(con't)					
30			SS -8	28.5-30.0	1-2-5 (7)	100	Sample changes to gray.
35		- Silty SAND, brown, dry, medium dense. (SM)	SS -9	33.5-35.0	13-16-11 (27)	100	
			UD -2	35.0-37.0	WR-WR-WR (0)	100	
40		- Silty SAND, brown/light gray, moist, very loose. (SM)	SS -10	38.5-40.0	1-1-2 (3)	100	
45			SS -11	43.5-45.0	1-2-1 (3)	100	
50		- Very Dense	SS -12	48.5-50.0	5-50-WR (50)	60	
		- Dense	SS	53.5-	16-19-28	100	

TV-MC-3160BW-001 Attachment B

(Continued Next Page)

SOUTHERN COMPANY

LOG OF TEST BORING

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SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT McIntosh Ash Pond Dike
LOCATION Ash Pond Dike

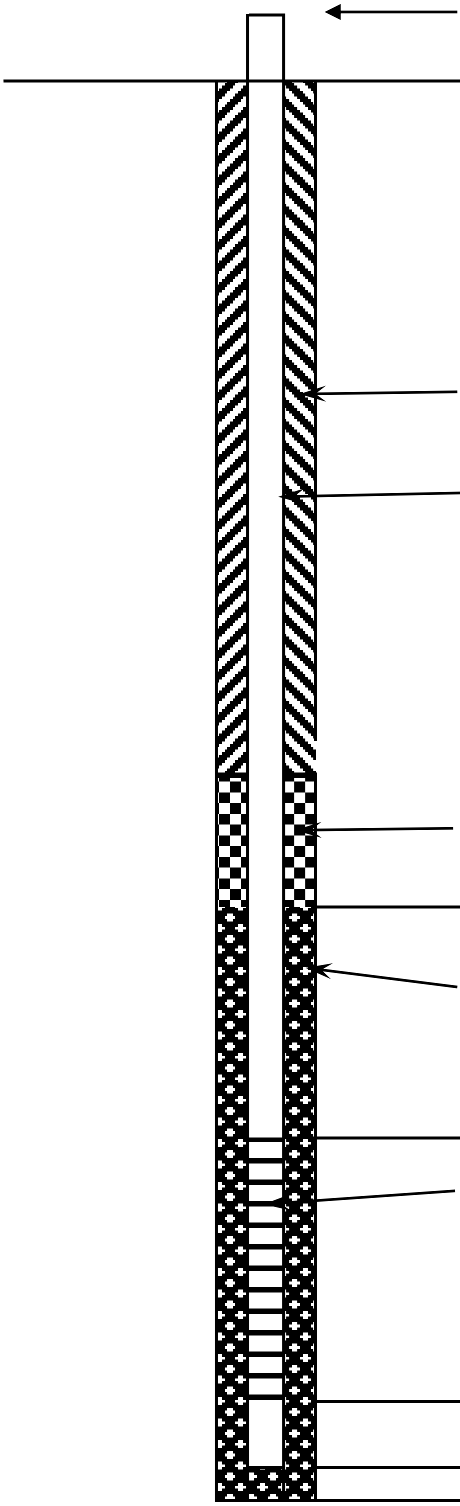
DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
55		*(con't)*	-13	55.0	(47)	100	
60			SS -14	58.5-60.0	17-21-31 (52)	33	
		Bottom of borehole at 60.0 feet.					
65							
70							
75							
80							

ATTACHMENT C

Piezometer Logs

SOUTHERN COMPANY SERVICES

WELL CONSTRUCTION LOG		PROJECT	Ash Pond Dike Investigation	WELL NO.
SITE	Plant McIntosh	LOCATION	Rincon, GA	
DATE STARTED 8/26/2010	ENDED 8/26/2010	PREPARED		M-1



	DEPTH	ELEVATION
TOP OF CASING	-1.85	63.44
GROUND SURFACE	0	61.59
TOP OF FILTER PACK	18.0	43.59
BOTTOM OF RISER/ TOP OF SCREEN	20.0	41.59
BOTTOM OF SCREEN	30.0	31.59
BOTTOM OF CASING	30.0	31.59
BOTTOM OF HOLE	30.0	31.59

BACKFILL
Bentonite Grout

RISER CASING
DIAMETER: 2-inch PVC

SEAL
Bentonite Grout

FILTER PACK
TYPE: Sand filter pack

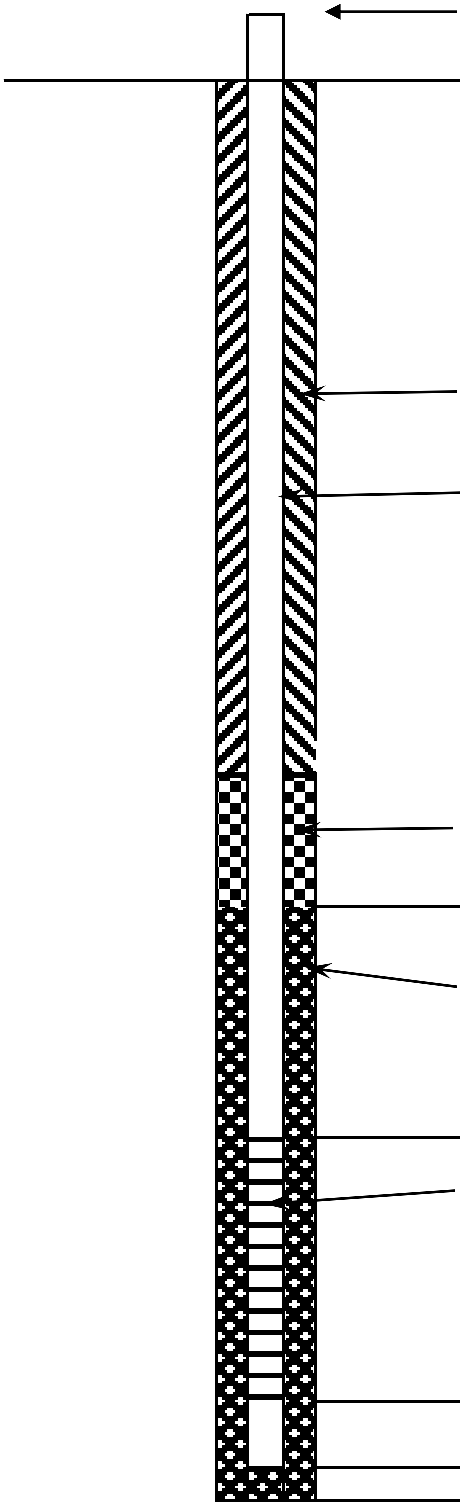
SCREEN
DIAMETER: 2-inch
OPENING WIDTH: 0.01"
OPENING TYPE: Slotted

HOLE DIA:

SOUTHERN COMPANY SERVICES

WELL CONSTRUCTION LOG

PROJECT	Ash Pond Dike Investigation			WELL NO.
SITE	Plant McIntosh	LOCATION	Rincon, GA	M-2
DATE STARTED	8/26/2010	ENDED	8/26/2010	PREPARED



BACKFILL
Bentonite Grout

RISER CASING
DIAMETER: 2-inch PVC

SEAL
Bentonite Grout

FILTER PACK
TYPE: Sand filter pack

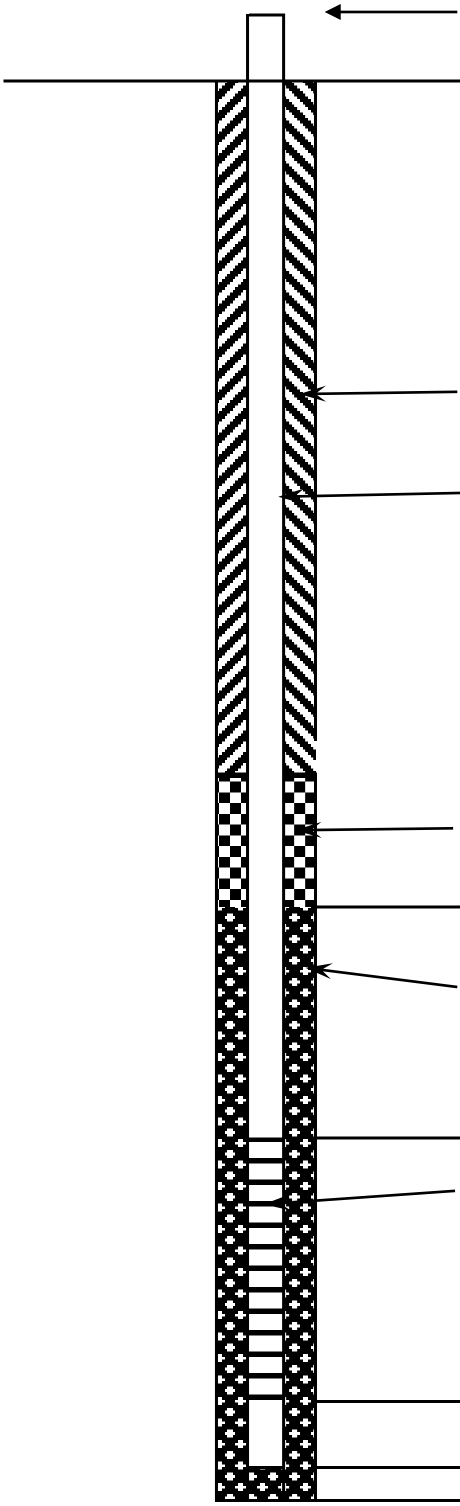
SCREEN
DIAMETER: 2-inch
OPENING WIDTH: 0.01"
OPENING TYPE: Slotted

	DEPTH	ELEVATION
TOP OF CASING	-2.00	54.92
GROUND SURFACE	0	52.92
TOP OF FILTER PACK	18.0	34.92
BOTTOM OF RISER/ TOP OF SCREEN	20.0	32.92
BOTTOM OF SCREEN	30.0	22.92
BOTTOM OF CASING	30.0	22.92
BOTTOM OF HOLE	30.0	22.92

HOLE DIA:

SOUTHERN COMPANY SERVICES

WELL CONSTRUCTION LOG		PROJECT	Ash Pond Dike Investigation	WELL NO.
SITE	Plant McIntosh	LOCATION	Rincon, GA	
DATE STARTED 8/24/2010	ENDED 8/24/2010	PREPARED		M-6



	DEPTH	ELEVATION
TOP OF CASING	-1.93	62.47
GROUND SURFACE	0	60.54
TOP OF FILTER PACK	8.0	52.54
BOTTOM OF RISER/ TOP OF SCREEN	10.0	50.54
BOTTOM OF SCREEN	20.0	40.54
BOTTOM OF CASING	20.0	40.54
BOTTOM OF HOLE	20.0	40.54

BACKFILL
Bentonite Grout

RISER CASING
DIAMETER: 2-inch PVC

SEAL
Bentonite Grout

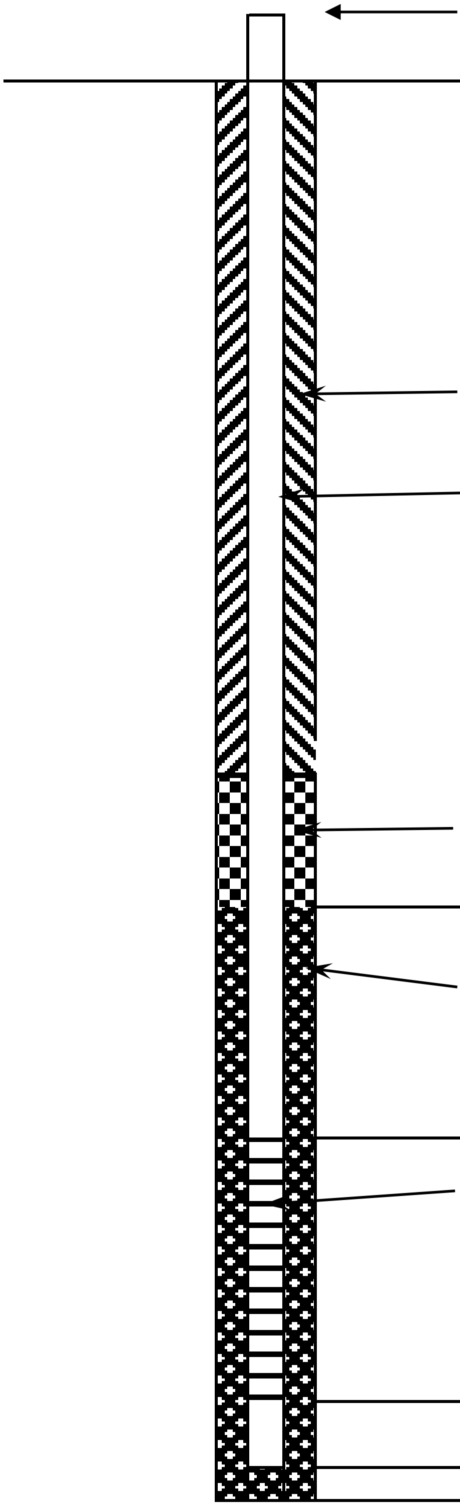
FILTER PACK
TYPE: Sand filter pack

SCREEN
DIAMETER: 2-inch
OPENING WIDTH: 0.01"
OPENING TYPE: Slotted

HOLE DIA:

SOUTHERN COMPANY SERVICES

WELL CONSTRUCTION LOG		PROJECT	Ash Pond Dike Investigation	WELL NO.
SITE	Plant McIntosh	LOCATION	Rincon, GA	
DATE STARTED 8/30/2010	ENDED 8/30/2010	PREPARED		M-7



	DEPTH	ELEVATION
TOP OF CASING	-1.75	34.35
GROUND SURFACE	0	32.60
TOP OF FILTER PACK	13.0	19.60
BOTTOM OF RISER/ TOP OF SCREEN	15.0	17.60
BOTTOM OF SCREEN	25.0	7.60
BOTTOM OF CASING	25.0	7.60
BOTTOM OF HOLE	25.0	7.60

BACKFILL
Bentonite Grout

RISER CASING
DIAMETER: 2-inch PVC

SEAL
Bentonite Grout

FILTER PACK
TYPE: Sand filter pack

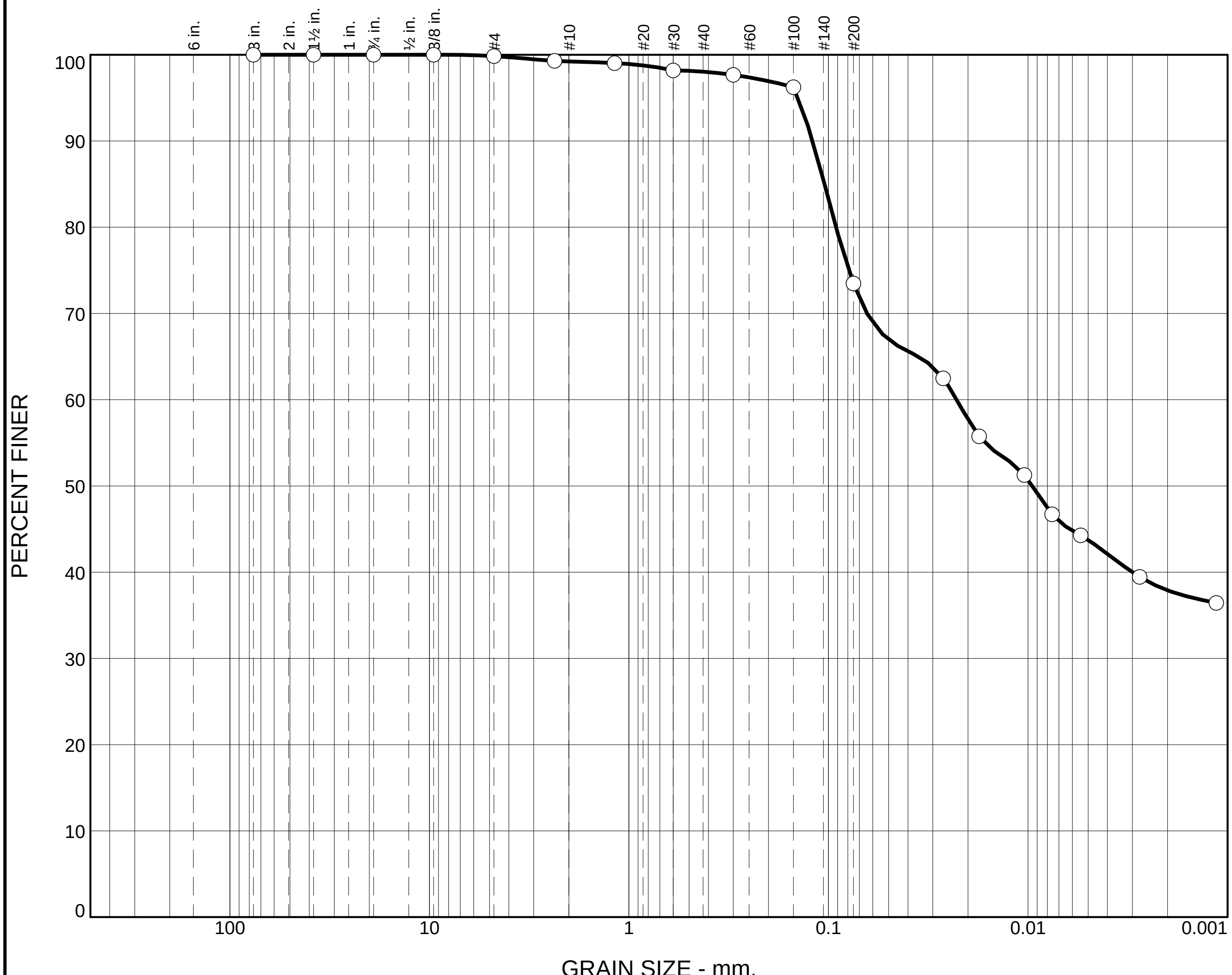
SCREEN
DIAMETER: 2-inch
OPENING WIDTH: 0.01"
OPENING TYPE: Slotted

HOLE DIA:

ATTACHMENT D

Soil Laboratory Analyses

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.2	0.6	1.2	24.5	29.8	43.7

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	45	19	0.1048	0.0228	0.0095					

Material Description	USCS	AASHTO
○ Gray tan red silty CLAY (CL)	CL	A-7-6(18)

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

○ **Location:** M-1 **Depth:** 14-16' **Sample Number:** UD-2

Contour Engineering, LLC

Kennesaw, GA

Remarks:

Figure

CONTOUR ENGINEERING, LLC

Geotechnical Services • Materials Testing Services • Environmental Services

SIEVE ANALYSIS

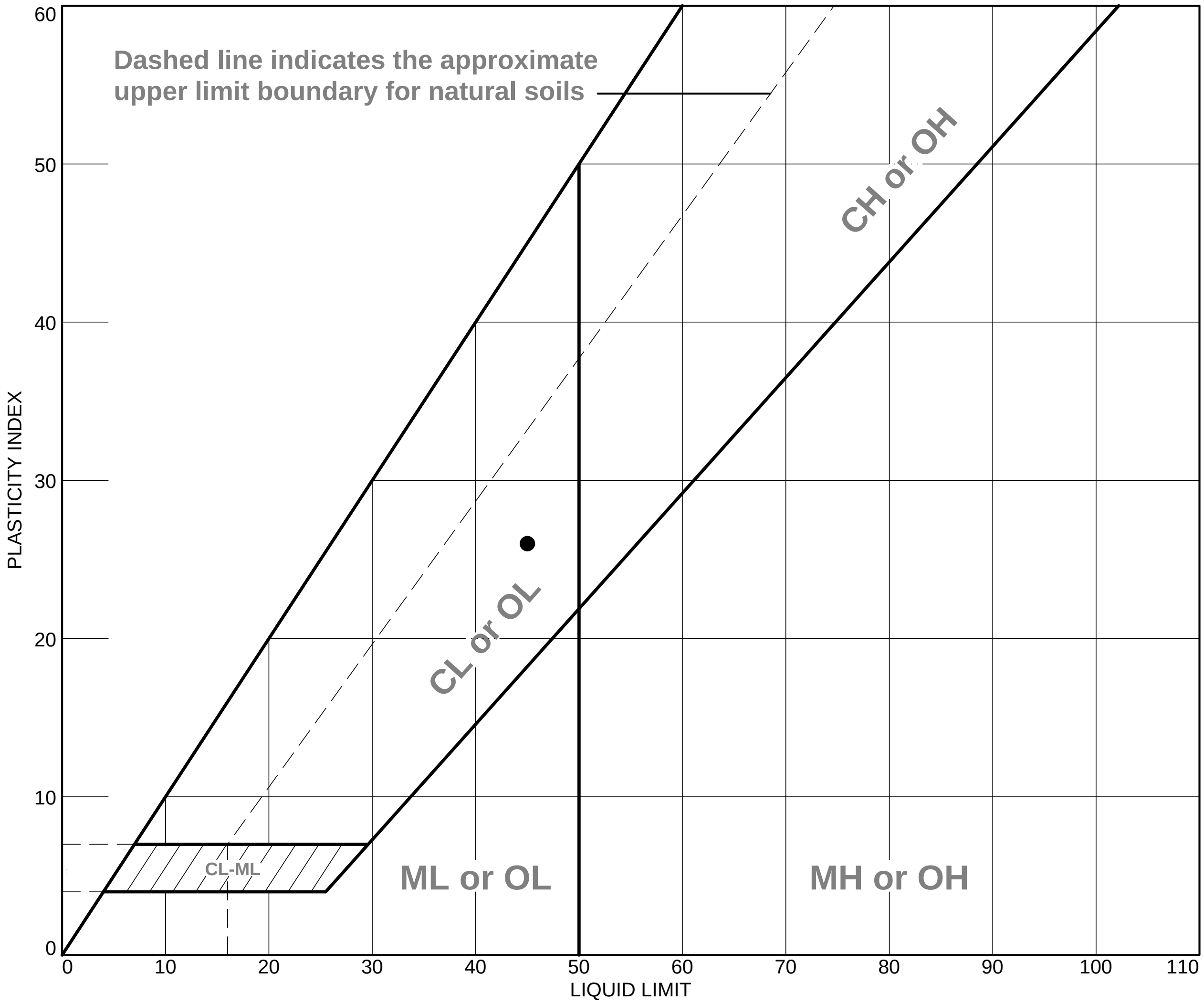
ASTM D 422 - Uniform Spacing Set

Project Name: Plant McIntosh
Project No.: At10SOC03-M
Sample No.: M-1 UD-2 14-16'
Tare No.: BB

Wt of Soil+Tare Before Wash	471.27
Wt of Soil+Tare After Wash	274.87
Wt of Tare	204.83
Wt Soil Passing No. 200	196.40
Wt of Soil After Wash	70.04

Sieve No.	Opening Size (mm)	Cumulative Wt	% Retained	% Passing
3"	75	0.00	0.0	100.00
1.5"	37.5	0.00	0.0	100.00
3/4"	19.0	0.00	0.0	100.00
3/8"	9.5	0.00	0.0	100.00
#4	4.75	0.43	0.2	99.84
#8	2.36	1.89	0.7	99.29
#16	1.18	2.59	1.0	99.03
#30	0.600	4.84	1.8	98.18
#50	0.300	6.23	2.3	97.66
#100	0.150	10.03	3.8	96.24
#200	0.075	70.67	26.5	73.48
	Pan			

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Gray tan red silty CLAY (CL)	45	19	26	98.0	73.5	CL

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

Project: Plant McIntosh

● **Location:** M-1 **Depth:** 14-16' **Sample Number:** UD-2

Remarks:

Contour Engineering, LLC

Kennesaw, GA

Figure

Contour Engineering

Consolidated Undrained Triaxial Test (ASTM D4767)

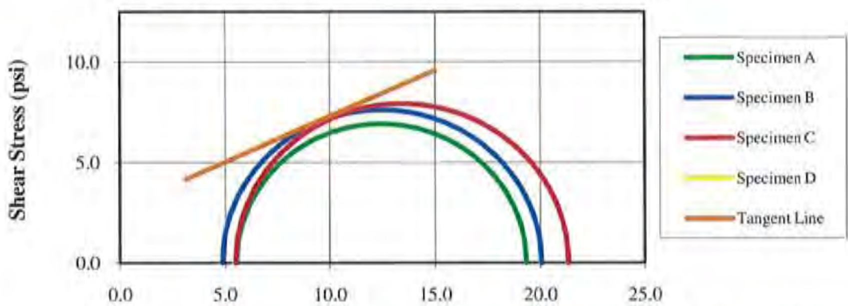
Date:

Checked By:

Date

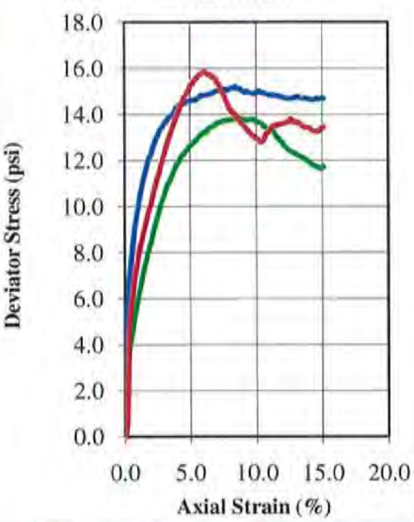
Tested By:

Effective Stress at Maximum Deviator Stress Criterion



121.7 118.5 118.4 AVG=120

Deviator Stress Vs. Axial Strain



Initial	A	B	C	D
Water Content (%)	29.1	29.1	22.2	
Dry Density (pcf)	94.3	91.8	96.9	
Saturation (%)	99.77	94.06	80.97	
Void Ratio	0.784	0.832	0.737	
Diameter (in)	2.873	2.868	2.851	
Height (in)	6.055	5.786	5.996	
Specific Gravity	2.70	2.70	2.70	
Liquid Limit	45	45	45	
Plastic Limit	19	19	19	
After Consolidation	**A**	**B**	**C**	**D**
B-Value	0.95	0.95	0.95	
Water Content (%)	31.0	31.0	30.9	
Dry Density (pcf)	95.51	92.46	93.08	
Saturation (%)	100.00	100.00	100.00	
Void Ratio	0.765	0.823	0.811	
Effective Stress (psi)	3.4	7.0	10.3	
Back Press. (psi)	65.1	64.9	65.2	
Rate of Strain	0.015	0.015	0.015	

Maximium Deviator Stress Criterion	
790psf **C (psi)**	5.5
118 **C' (psi)**	2.8
Ø (deg)	8.7
40.5 **Ø' (deg)**	24.5

After Shear	A	B	C	D
σ'1 at Failure (psi)	19.30	20.01	21.29	
σ'3 at Failure (psi)	5.49	4.80	5.44	

Project:	Plant McIntosh
Location:	M-1, UD-2
Project Number:	AT10SOC03-M
Boring Number:	M-1
Sample Number:	M-1, UD-2
Depth:	14-16'
Sample Type:	Undisturbed
Description:	Upper 7 inches of tube void. Top - Red tan SILT (ML), Middle - Red tan and gray CLAY (Cl
Test Type	Consolidated Undrained
Remarks	

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

M-1
14-16'

Contour Engineering

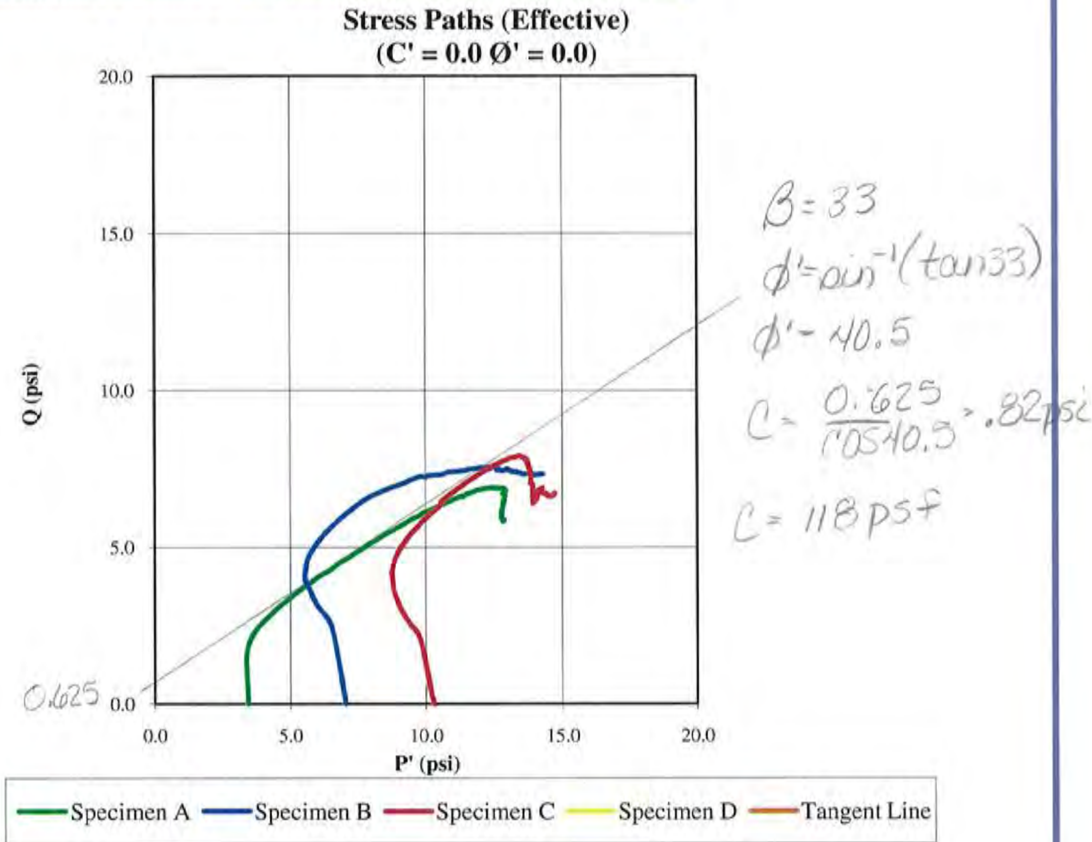
Consolidated Undrained Triaxial Test (ASTM D4767)

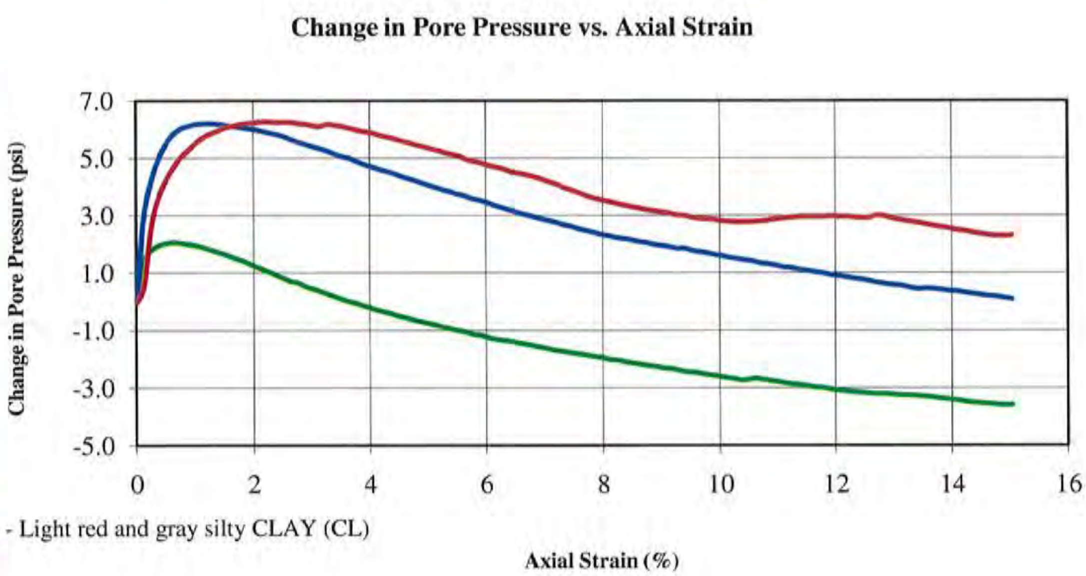
Date:

Checked By:

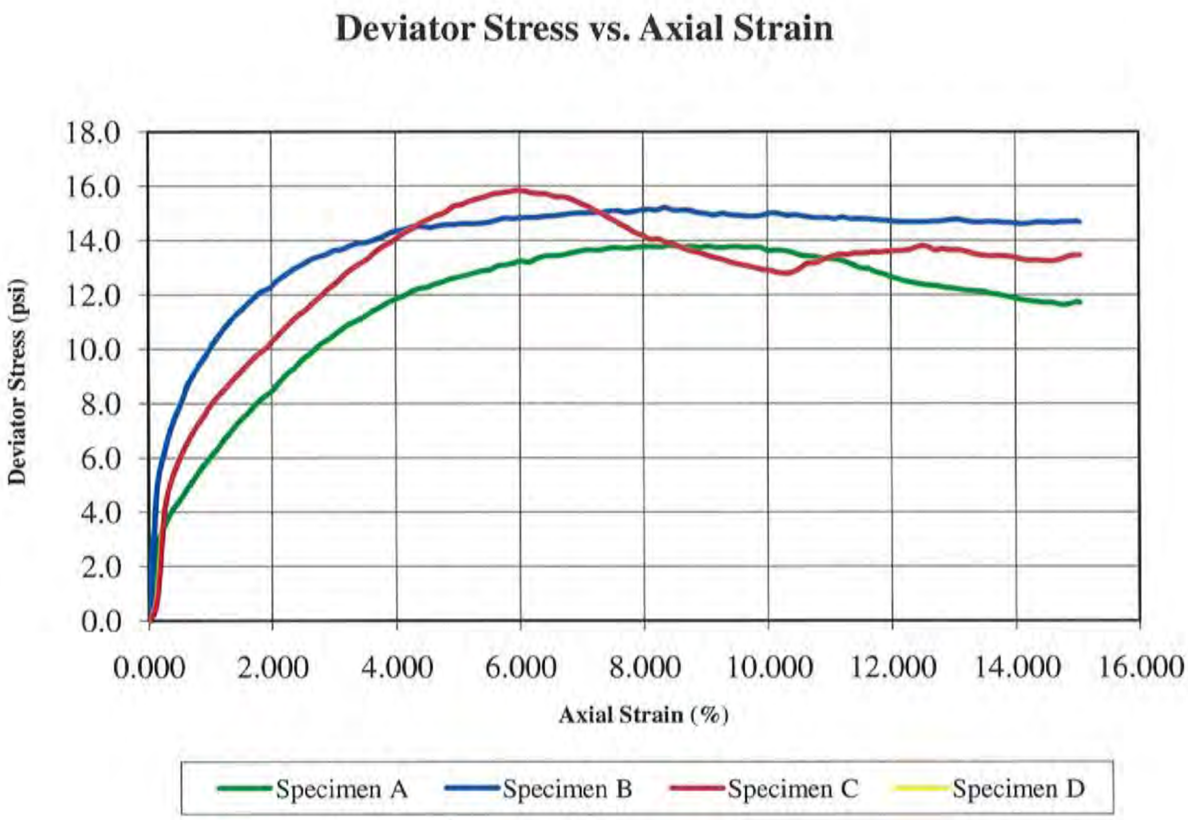
Date:

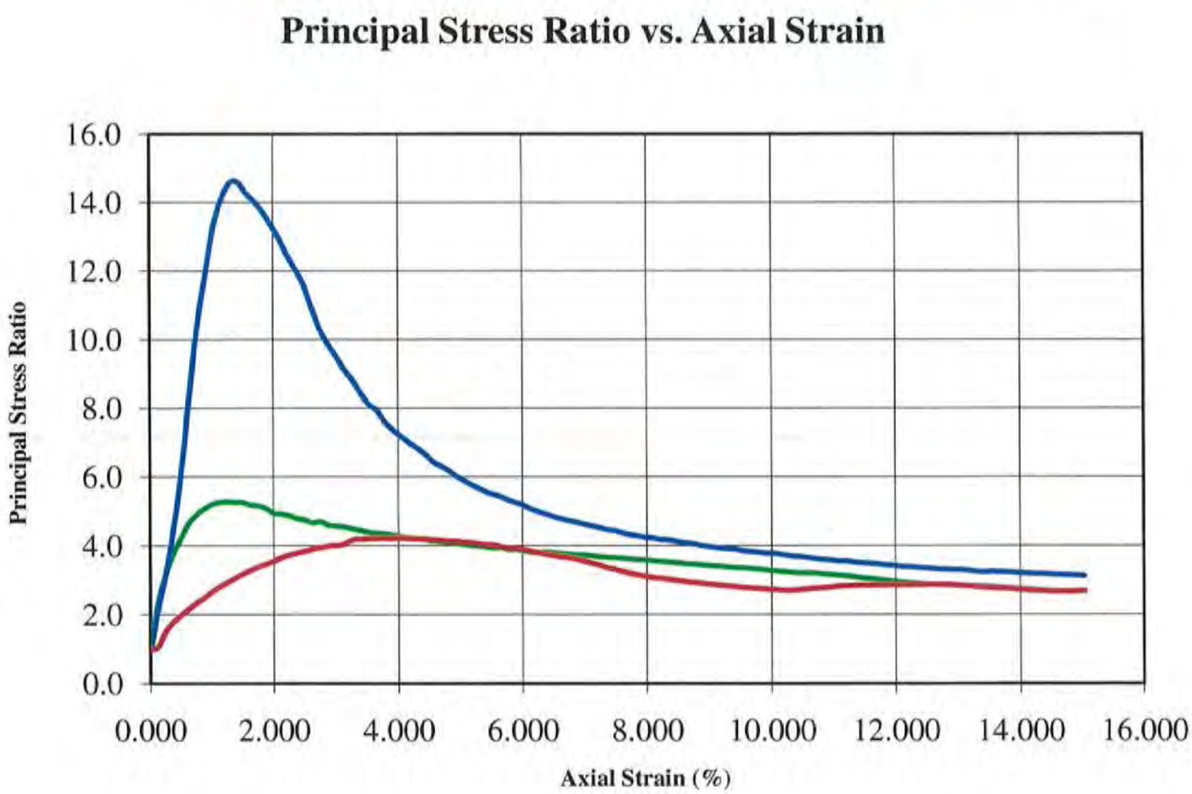
Tested By:





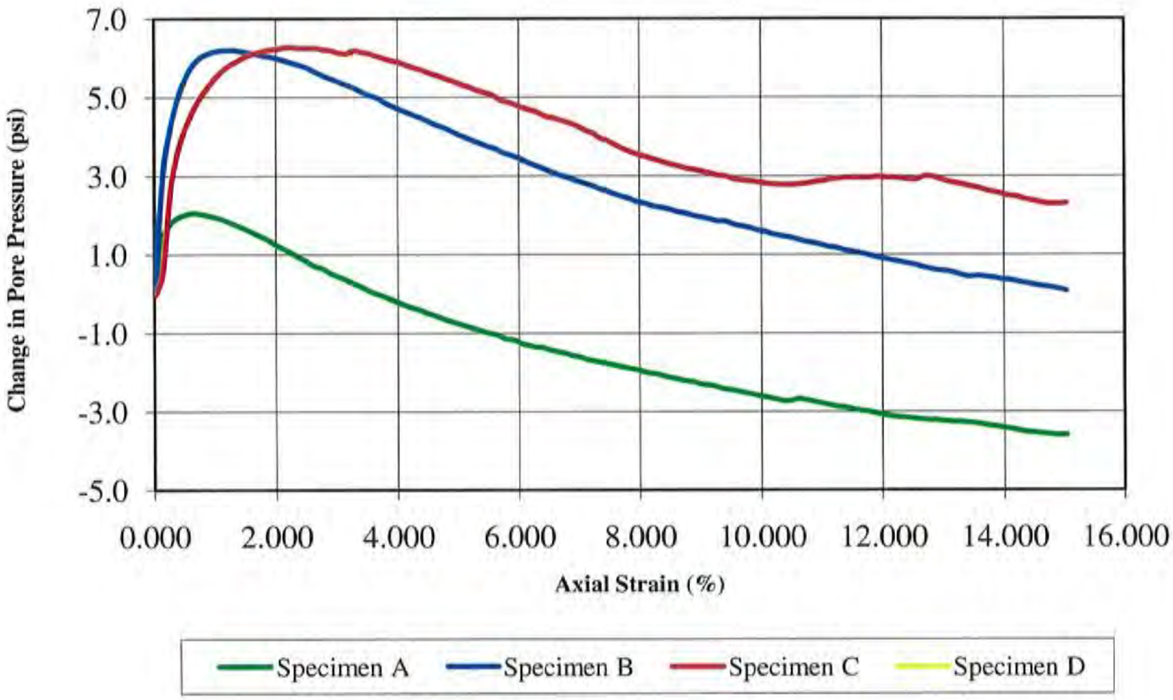
.), Bottom - Light red and gray silty CLAY (CL)





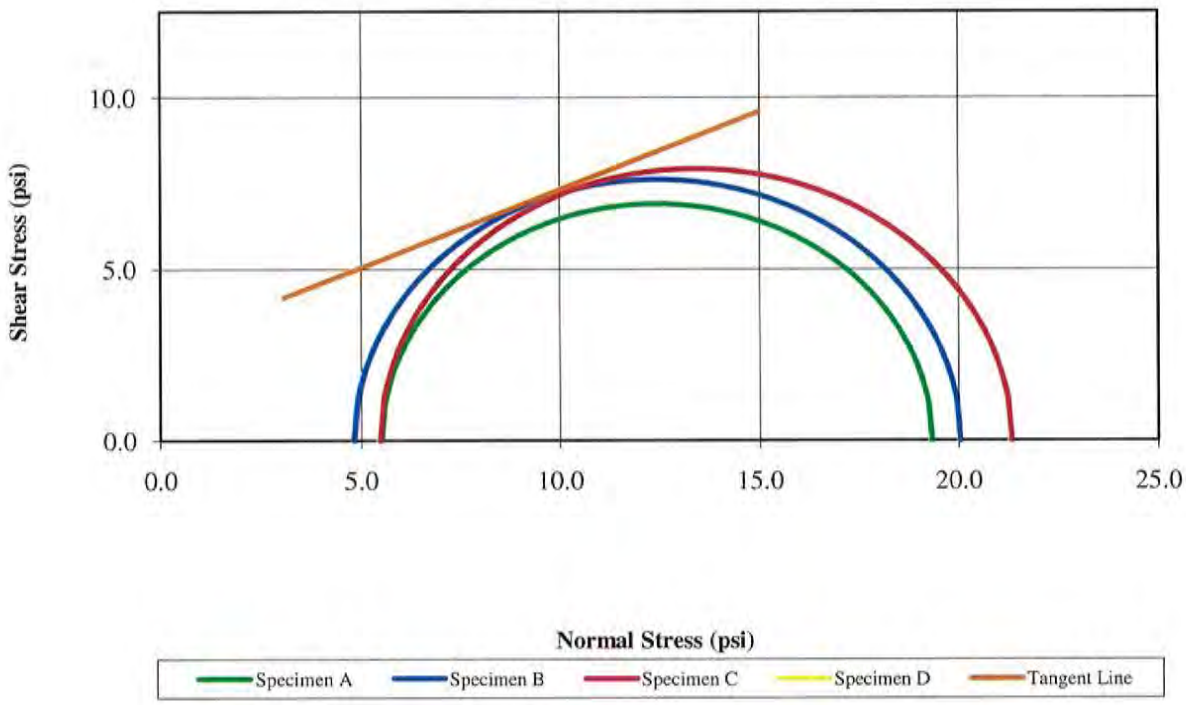
CONFIDENTIAL BUSINESS INFORMATION

Change in Pore Pressure vs. Axial Strain

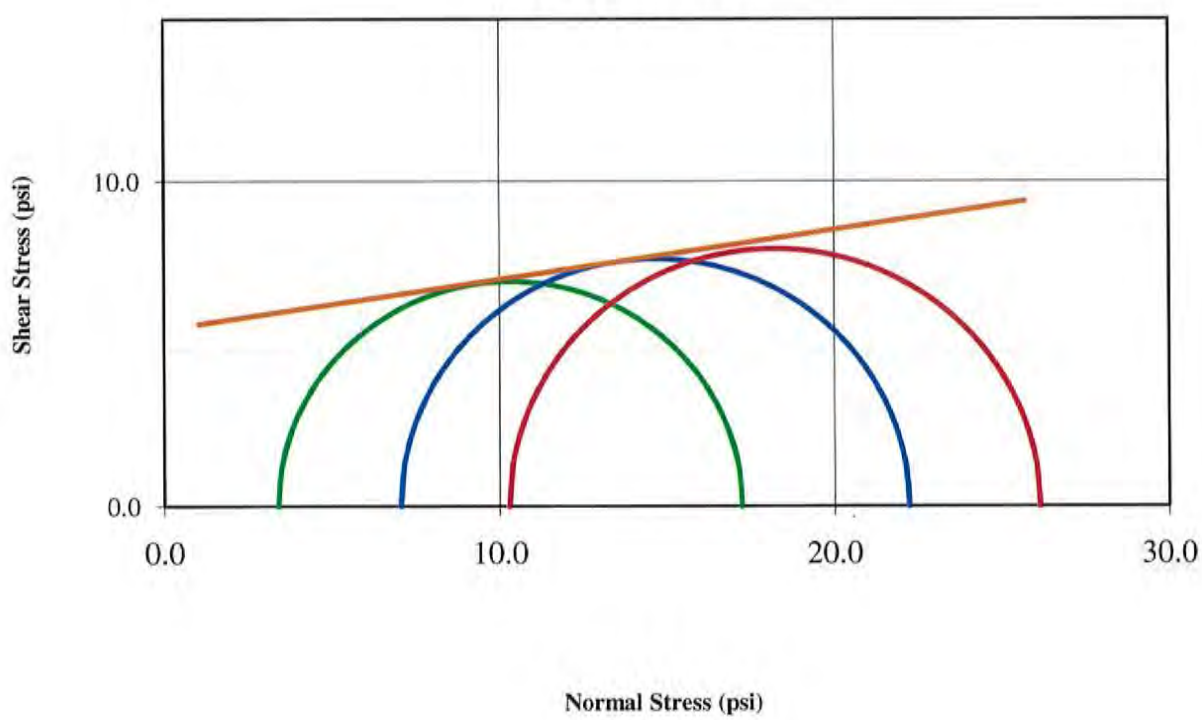


Mohr Stress Circles at Maximum Deviator Stress Criterion

Effective Stress
(C' = 2.8 Ø' = 24.5)

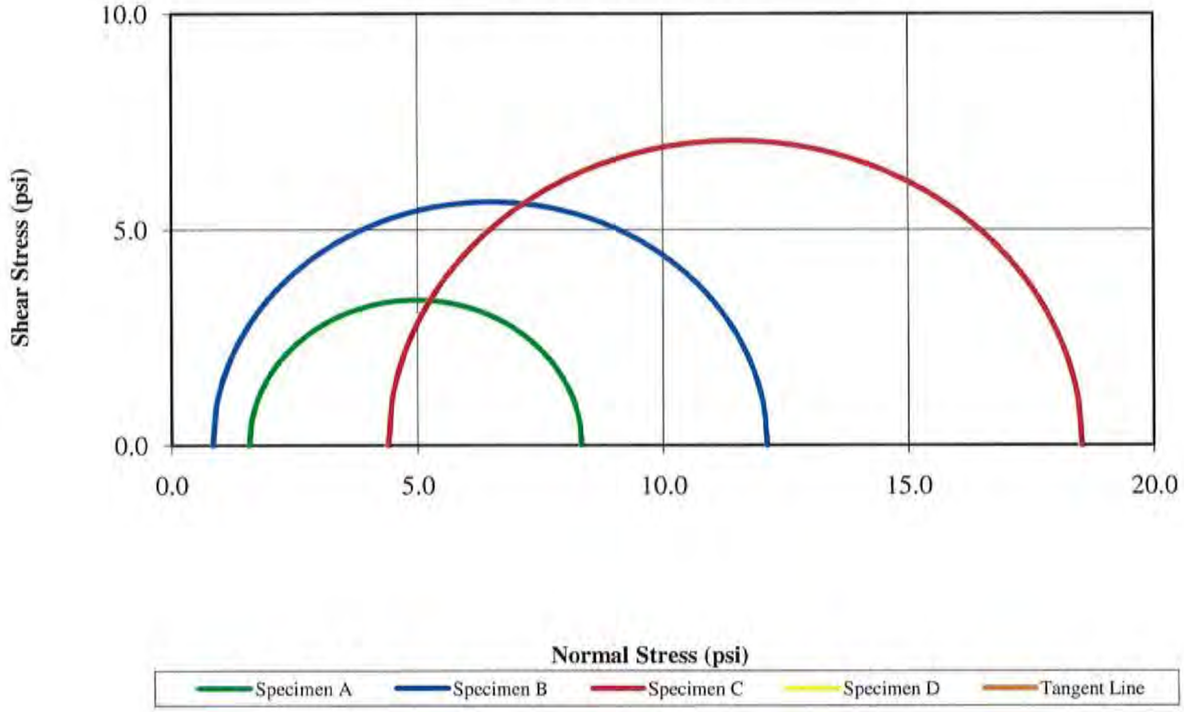


Total Stress
(C = 5.5 Ø = 8.7)

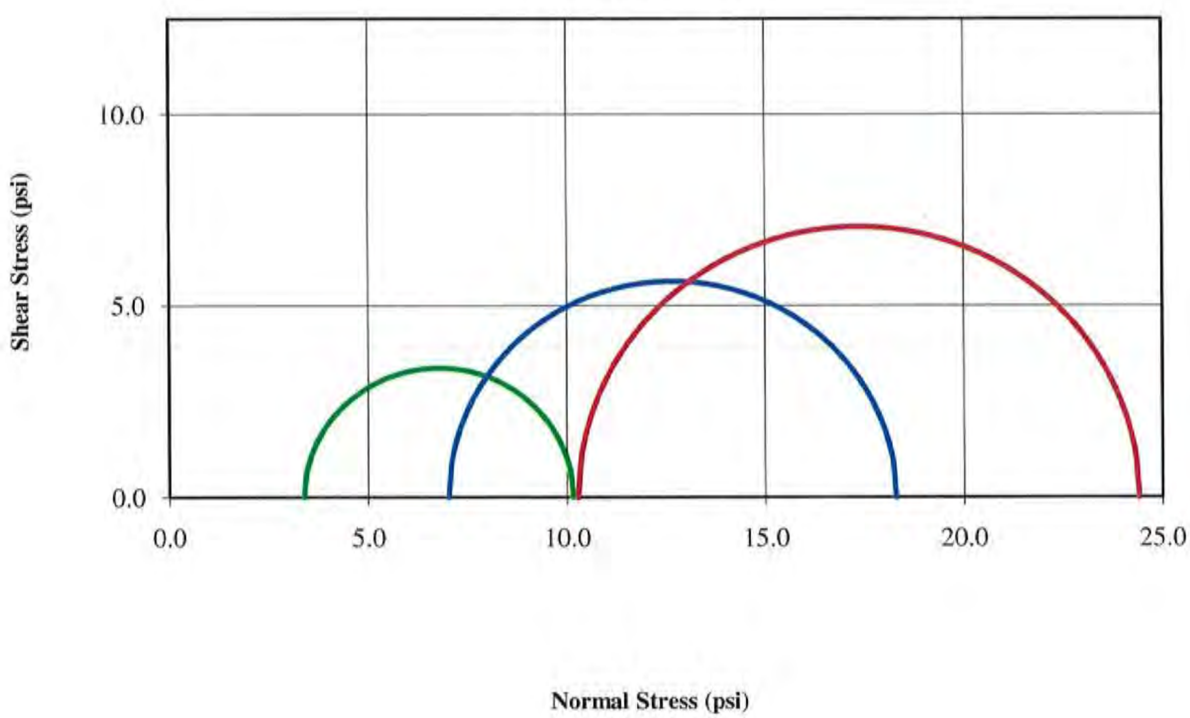


Mohr Stress Circles at Maximum Principal Stress Ratio Criterion

Effective Stress
(C' = 0.0 Ø' = 0.0)

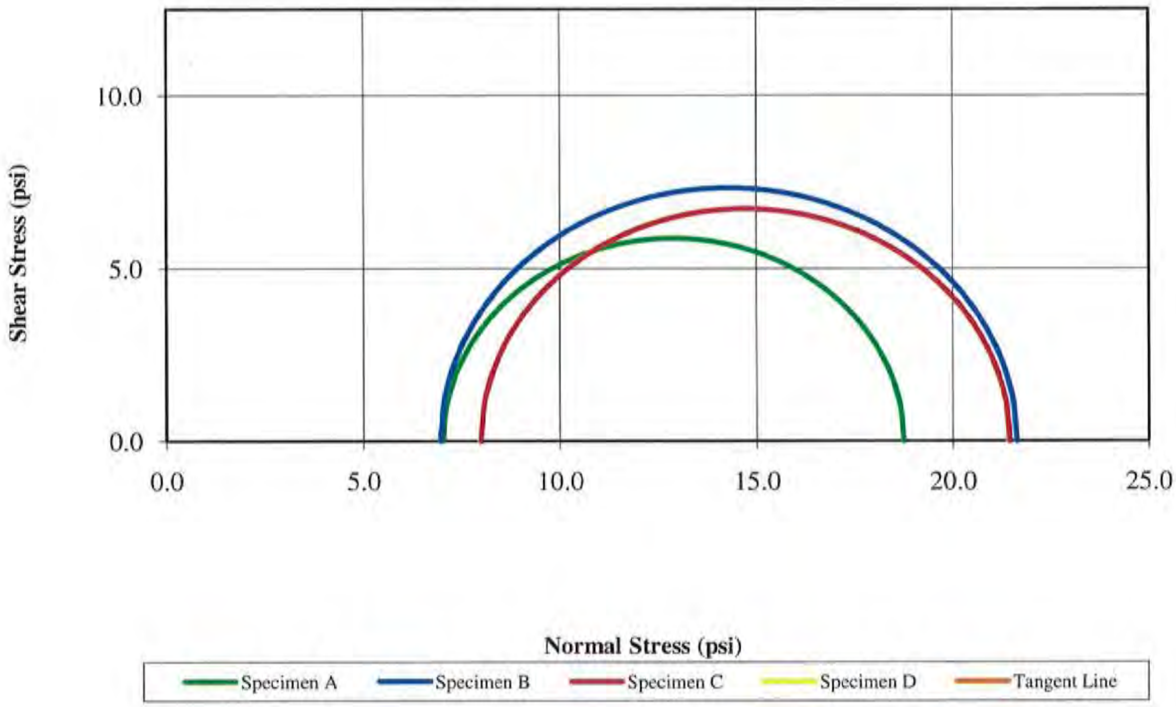


Total Stress
(C = 0.0 Ø = 0.0)

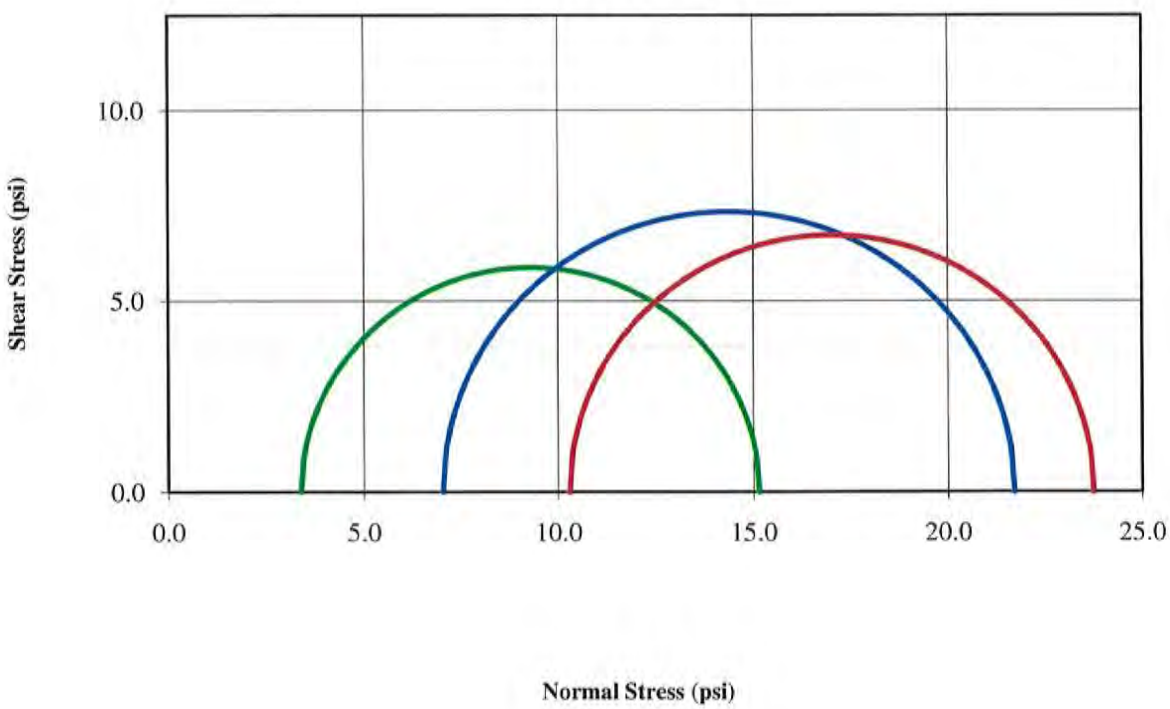


Mohr Stress Circles at 15% Axial Strain Criterion

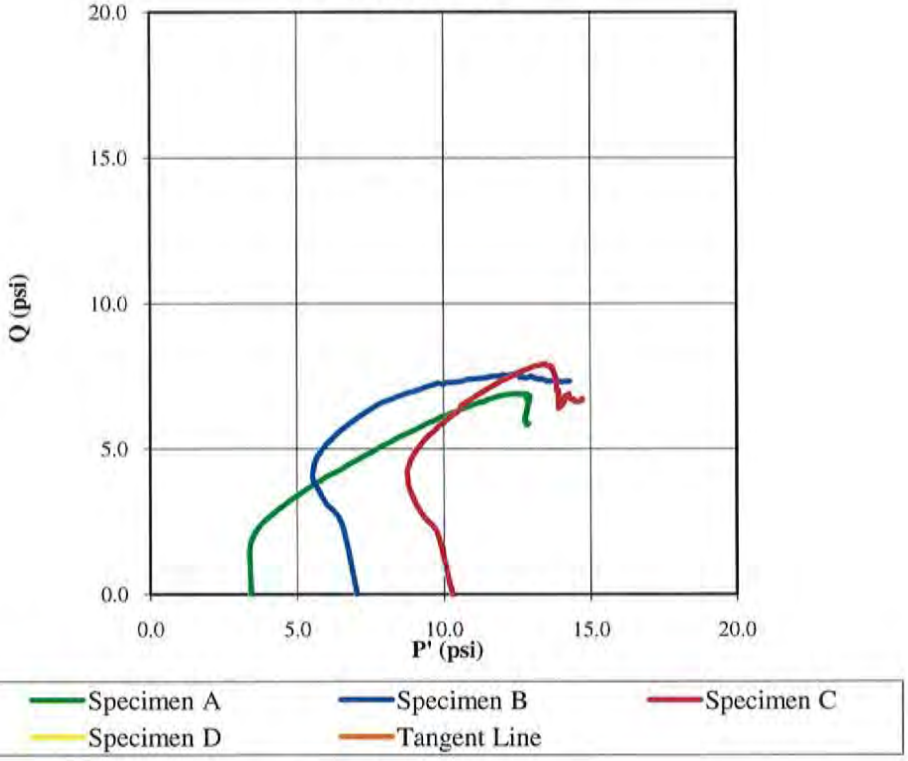
Effective Stress
(C' = 0.0 Ø' = 0.0)



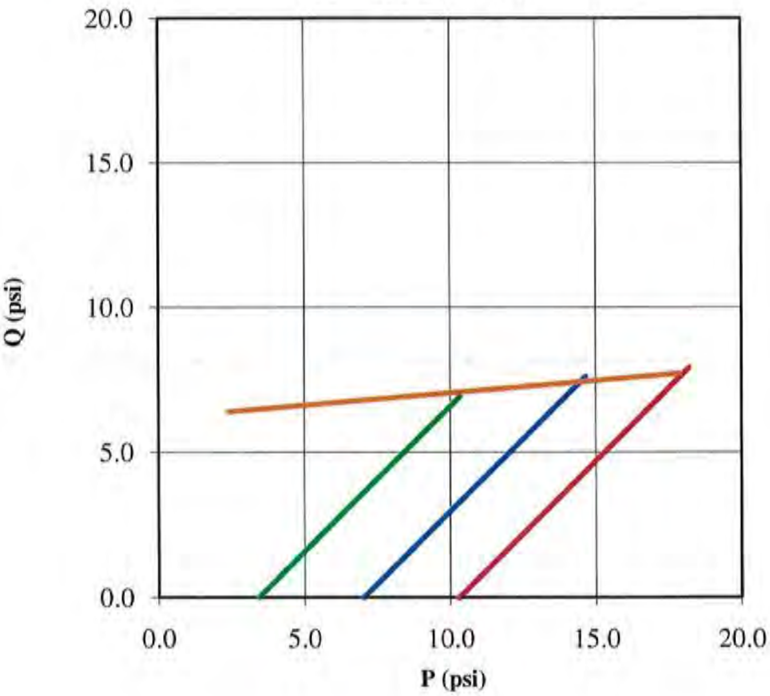
Total Stress
(C = 0.0 Ø = 0.0)



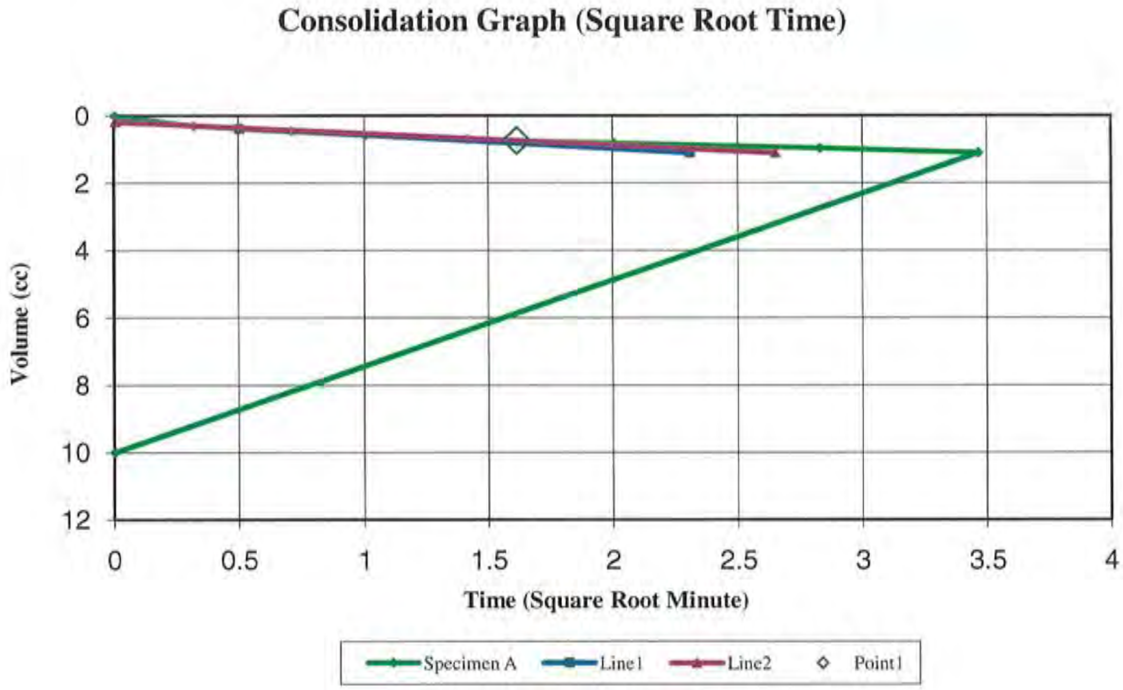
Stress Paths (Effective)
(C' = 0.0 Ø' = 0.0)

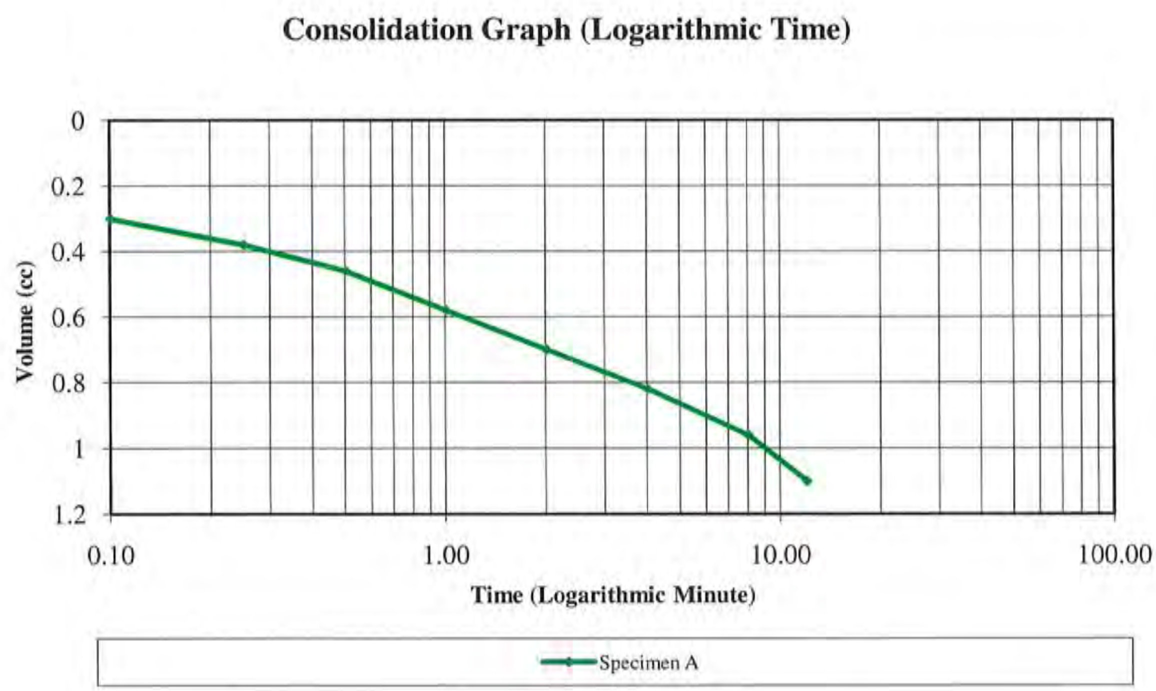


Stress Paths (Total)
(C' = 6.2 Ø' = 4.9)



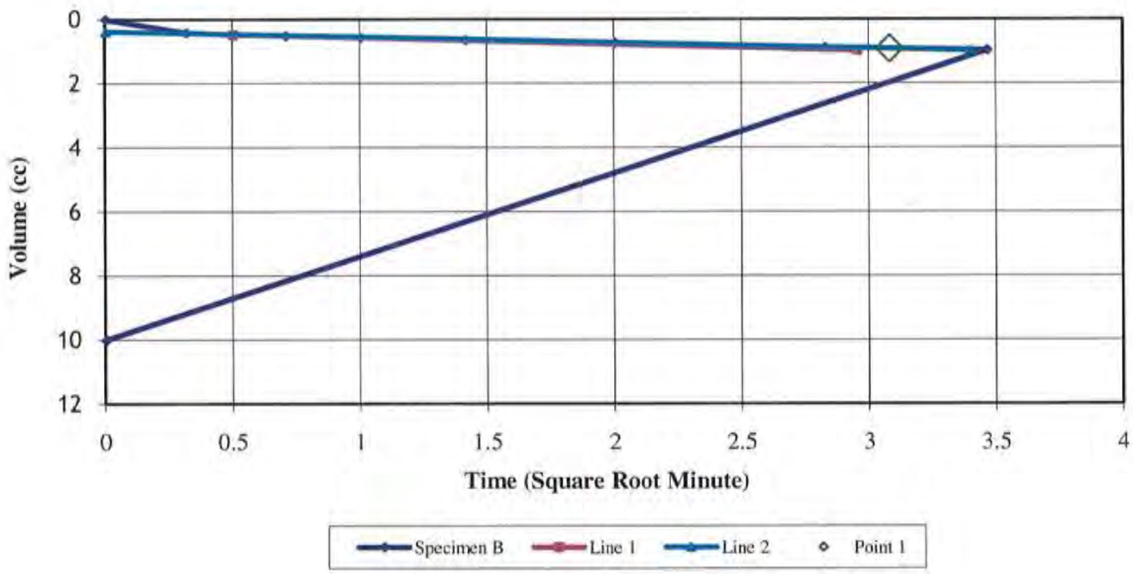
Specimen A Consolidation Graphs



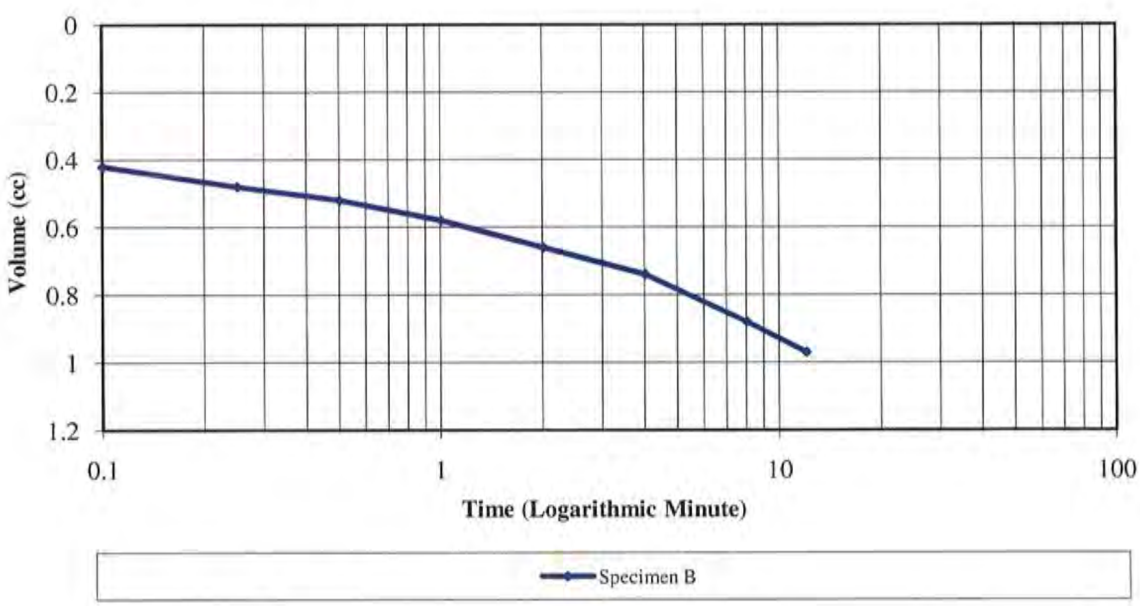


Specimen B Consolidation Graphs

Consolidation Graph (Square Root Time)

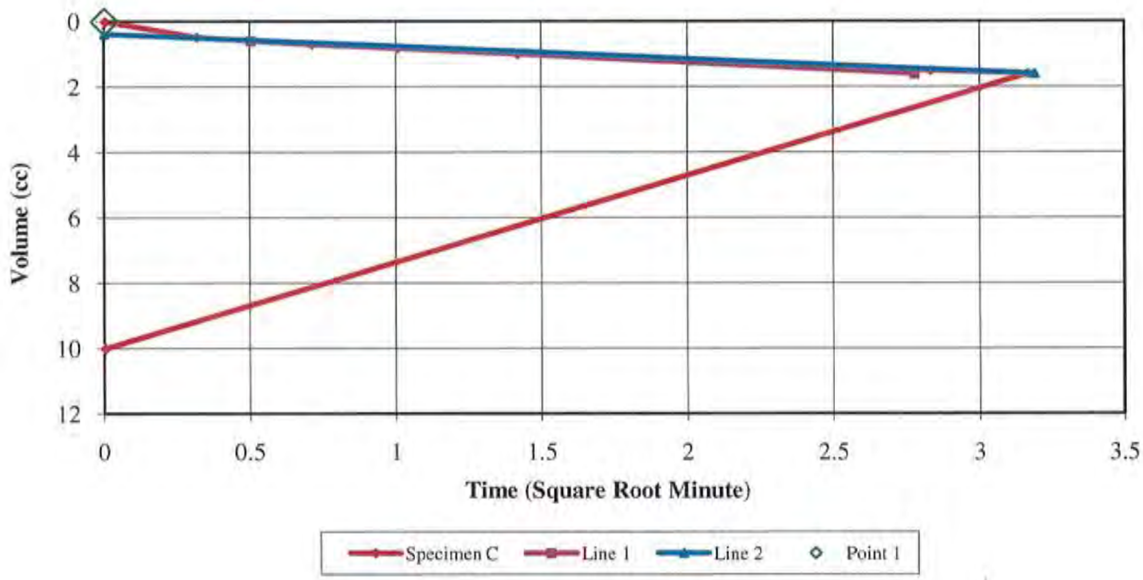


Consolidation Graph (Logarithmic Time)

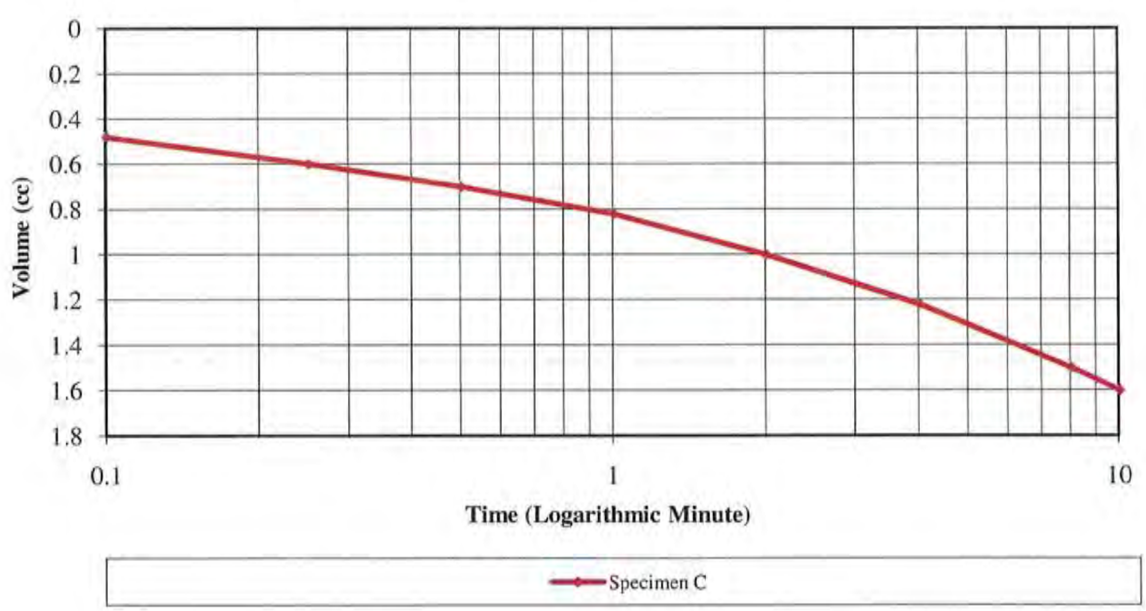


Specimen C Consolidation Graphs

Consolidation Graph (Square Root Time)



Consolidation Graph (Logarithmic Time)



Consolidation Calculations Specimen A

CU Triaxial Test

Contour Engineering

Client: Southern Company | Project No. AT10SOC03-M

Project Name: Plant McIntosh

Project Location: M-1, UD-2

Hole No. M-1 | Depth: 14-16'

Cell Pressure (psi) = 68.47

Back Pressure (psi) = 65

Effective Pressure (psi)= 3.47

Test Type = CU

Initial Sample Diameter (in) = 2.873

Initial Sample Height (in) = 6.055

Initial Sample Area (in2) = 6.483

Initial Volume (in3) = 39.26

Burrette Reading at Start of Test (cc)= 0

Time	Burrette Reading (cc)	Volume Change (cc)
00:00:00	0.00	N/A
00:00:06	-0.30	0.300
00:00:15	-0.38	0.380
00:00:30	-0.46	0.460
00:01:00	-0.58	0.580
00:02:00	-0.70	0.700
00:04:00	-0.82	0.820
00:08:00	-0.96	0.960
00:12:00	-1.10	1.100
	-10.00	10

Laboratory Supervisor

Consolidation Calculations Specimen B
CU Triaxial Test

Contour Engineering

Client: Southern Company | Project No. AT10SOC03-M

Project Name: Plant McIntosh

Project Location: M-1, UD-2

Hole No. M-1 | Depth: 14-16'

Cell Pressure (psi) = 71.94

Back Pressure (psi) = 65

Effective Pressure (psi)= 6.94

Test Type = CU

Initial Sample Diameter (in) = 2.868

Initial Sample Height (in) = 5.786

Initial Sample Area (in2) = 6.462

Initial Volume (in3) = 37.39

Burrette Reading at Start of Test (cc)= 0

Time	Burrette Reading (cc)	Volume Change (cc)
00:00:00	0.00	N/A
00:00:06	-0.42	0.420
00:00:15	-0.48	0.480
00:00:30	-0.52	0.520
00:01:00	-0.58	0.580
00:02:00	-0.66	0.660
00:04:00	-0.74	0.740
00:08:00	-0.88	0.880
00:12:00	-0.97	0.970
	-10.00	10

Laboratory Supervisor

Consolidation Calculations Specimen C
CU Triaxial Test

Contour Engineering

Client: Southern Company Project No. AT10SOC03-M
Project Name: Plant McIntosh

Project Location: M-1, UD-2

Hole No. M-1 Depth: 14-16'

Cell Pressure (psi) = 75.42
Back Pressure (psi) = 65
Effective Pressure (psi)= 10.42

Test Type = CU

Initial Sample Diameter (in) = 2.851
Initial Sample Height (in) = 5.996
Initial Sample Area (in2) = 6.385
Initial Volume (in3) = 38.29

Burrette Reading at Start of Test (cc)= 0

Time	Burrette Reading (cc)	Volume Change (cc)
00:00:00	0.00	N/A
00:00:06	-0.48	0.480
00:00:15	-0.60	0.600
00:00:30	-0.70	0.700
00:01:00	-0.82	0.820
00:02:00	-1.00	1.000
00:04:00	-1.22	1.220
00:08:00	-1.50	1.500
00:10:00	-1.60	1.600
	-10.00	10

Laboratory Supervisor

Specimen A Shear Data
CU Triaxial Test

Contour Engineering

File Location
Plant McIntosh M-1 (9-20-10).HSD

Project Information

Project No. AT10SOC03-M
Project Name: Plant McIntosh
Client: Southern Company
Sample Location: M-1, UD-2
Sample Description: Red tan SILT (ML)
Remarks:

Sample Data

Sample Type: Undisturbed
Specific Gravity: 2.7
LL: 45.000
PL: 19.000

Sample Parameters	Initial	After Consolidation	Final
Diameter (in)	2.873	2.858	
Height (in)	6.055	6.016	
Weight (grams)	1254.52		1267.25
Moisture (%)	29.09		30.97
Dry Density (pcf)	94.31	95.51	
Saturation (%)	99.77	100.00	
Void Ratio	0.784	0.765	

Test Data

Rate of Strain: 0.015
Cell Pressure (psi): 68.470
Effective Confining Stress (psi): 3.4
Corrected Peak Deviator Stress (psi): 13.810 at reading number: 67

Specimen A

Reading No.	Deviator Load (lbs)	Axial Deformation (in)	Pore Pressure (psi)	Change in Pore Pressure (psi)	Corrected Area (in2)	Axial Strain (%)	Deviator Stress (psi)	Corrected Deviator Stress (psi)	σ_1 (psi)	σ_3 (psi)	σ'_1 (psi)	σ'_3 (psi)	σ'_1/σ'_3	Abar	P (psi)	Q (psi)	P' (psi)
0	2.6	0.001	65.1	0.0	6.41	0.000	0.000	0.000	3.4	3.4	3.4	3.4	1.00	0.00	3.4	0.0	3.4
1	20.6	0.008	66.5	1.4	6.42	0.123	2.805	2.754	6.1	3.4	4.7	2.0	2.41	0.52	4.8	1.4	3.3
2	25.9	0.015	66.9	1.8	6.43	0.246	3.623	3.520	6.9	3.4	5.1	1.6	3.18	0.50	5.2	1.8	3.4
3	29.7	0.023	67.0	1.9	6.44	0.369	4.213	4.055	7.4	3.4	5.5	1.5	3.79	0.48	5.4	2.0	3.5
4	32.4	0.030	67.1	2.0	6.45	0.492	4.646	4.434	7.8	3.4	5.8	1.4	4.23	0.46	5.6	2.2	3.6
5	35.8	0.038	67.1	2.1	6.46	0.625	5.176	4.903	8.3	3.4	6.2	1.3	4.68	0.42	5.8	2.5	3.8
6	38.7	0.046	67.1	2.0	6.46	0.748	5.621	5.291	8.7	3.4	6.6	1.4	4.91	0.39	6.0	2.6	4.0
7	41.6	0.053	67.1	2.0	6.47	0.871	6.079	5.691	9.1	3.4	7.1	1.4	5.08	0.35	6.2	2.8	4.2
8	44.2	0.060	67.0	2.0	6.48	0.994	6.476	6.029	9.4	3.4	7.5	1.4	5.20	0.32	6.4	3.0	4.4
9	46.8	0.068	67.0	1.9	6.49	1.117	6.885	6.378	9.8	3.4	7.9	1.5	5.27	0.30	6.6	3.2	4.7
10	49.5	0.075	66.9	1.8	6.50	1.240	7.307	6.739	10.1	3.4	8.3	1.6	5.28	0.27	6.8	3.4	4.9
11	52.0	0.083	66.8	1.7	6.50	1.363	7.704	7.074	10.5	3.4	8.7	1.7	5.27	0.25	6.9	3.5	5.2
12	54.6	0.090	66.7	1.7	6.51	1.487	8.101	7.408	10.8	3.4	9.1	1.7	5.27	0.22	7.1	3.7	5.4
13	56.8	0.098	66.6	1.6	6.52	1.619	8.450	7.690	11.1	3.4	9.5	1.8	5.18	0.20	7.2	3.8	5.7
14	59.1	0.105	66.6	1.5	6.53	1.733	8.811	7.992	11.4	3.4	9.9	1.9	5.17	0.18	7.4	4.0	5.9
15	61.3	0.113	66.5	1.4	6.54	1.865	9.148	8.260	11.7	3.4	10.3	2.0	5.09	0.17	7.5	4.1	6.1
16	63.0	0.120	66.3	1.3	6.55	1.988	9.413	8.461	11.9	3.4	10.6	2.1	4.95	0.15	7.6	4.2	6.4
17	65.3	0.128	66.2	1.2	6.55	2.111	9.774	8.798	12.2	3.4	11.0	2.2	4.93	0.13	7.8	4.4	6.6
18	67.3	0.135	66.1	1.0	6.56	2.235	10.087	9.092	12.5	3.4	11.4	2.3	4.88	0.12	7.9	4.5	6.9

Specimen A

Reading No.	Deviator Load (lbs)	Axial Deformation (in)	Pore Pressure (psi)	Change in Pore Pressure (psi)	Corrected Area (in2)	Axial Strain (%)	Deviator Stress (psi)	Corrected Deviator Stress (psi)	σ_1 (psi)	σ_3 (psi)	σ'_1 (psi)	σ'_3 (psi)	σ'_1/σ'_3	Abar	P (psi)	Q (psi)	P' (psi)
19	69.0	0.143	66.0	0.9	6.57	2.367	10.352	9.337	12.7	3.4	11.8	2.5	4.79	0.10	8.1	4.7	7.1
20	71.0	0.150	65.9	0.8	6.58	2.490	10.665	9.630	13.0	3.4	12.2	2.6	4.76	0.09	8.2	4.8	7.4
21	72.6	0.158	65.8	0.7	6.59	2.613	10.906	9.851	13.2	3.4	12.5	2.7	4.67	0.07	8.3	4.9	7.6
22	74.7	0.166	65.7	0.6	6.60	2.755	11.231	10.151	13.5	3.4	12.9	2.7	4.70	0.06	8.5	5.1	7.8
23	75.8	0.173	65.6	0.5	6.60	2.869	11.411	10.314	13.7	3.4	13.2	2.9	4.60	0.05	8.5	5.2	8.0
24	77.4	0.181	65.5	0.4	6.61	3.001	11.652	10.532	13.9	3.4	13.5	2.9	4.57	0.04	8.7	5.3	8.2
25	78.9	0.189	65.4	0.4	6.62	3.125	11.893	10.751	14.1	3.4	13.8	3.0	4.55	0.03	8.8	5.4	8.4
26	80.2	0.196	65.3	0.3	6.63	3.248	12.097	10.935	14.3	3.4	14.1	3.1	4.49	0.02	8.9	5.5	8.6
27	81.2	0.203	65.3	0.2	6.64	3.371	12.254	11.071	14.5	3.4	14.3	3.2	4.45	0.02	8.9	5.5	8.7
28	82.4	0.211	65.2	0.1	6.65	3.494	12.434	11.230	14.6	3.4	14.5	3.3	4.39	0.01	9.0	5.6	8.9
29	83.7	0.218	65.1	0.0	6.66	3.617	12.639	11.412	14.8	3.4	14.8	3.4	4.36	0.00	9.1	5.7	9.1
30	84.8	0.226	65.0	-0.1	6.66	3.740	12.807	11.559	15.0	3.4	15.0	3.5	4.35	-0.01	9.2	5.8	9.2
31	86.0	0.233	64.9	-0.1	6.67	3.863	13.000	11.728	15.1	3.4	15.3	3.5	4.32	-0.01	9.3	5.9	9.4
32	86.9	0.240	64.9	-0.2	6.68	3.986	13.145	11.851	15.2	3.4	15.5	3.6	4.28	-0.02	9.3	5.9	9.5
33	87.8	0.248	64.8	-0.3	6.69	4.109	13.277	11.962	15.4	3.4	15.7	3.7	4.24	-0.03	9.4	6.0	9.7
34	89.0	0.255	64.7	-0.4	6.70	4.232	13.457	12.118	15.5	3.4	15.9	3.8	4.23	-0.03	9.5	6.1	9.8
35	89.8	0.263	64.7	-0.4	6.71	4.355	13.590	12.228	15.6	3.4	16.0	3.8	4.21	-0.03	9.5	6.1	9.9
36	90.2	0.270	64.6	-0.5	6.72	4.478	13.650	12.269	15.7	3.4	16.2	3.9	4.15	-0.04	9.5	6.1	10.0
37	91.1	0.278	64.5	-0.6	6.73	4.611	13.795	12.389	15.8	3.4	16.3	4.0	4.13	-0.05	9.6	6.2	10.2
38	91.8	0.285	64.4	-0.6	6.73	4.734	13.903	12.475	15.9	3.4	16.5	4.0	4.09	-0.05	9.6	6.2	10.3
39	92.7	0.293	64.4	-0.7	6.74	4.867	14.035	12.582	16.0	3.4	16.7	4.1	4.07	-0.06	9.7	6.3	10.4
40	93.2	0.301	64.3	-0.8	6.75	4.990	14.120	12.645	16.0	3.4	16.8	4.2	4.04	-0.06	9.7	6.3	10.5
41	93.7	0.308	64.3	-0.8	6.76	5.113	14.204	12.708	16.1	3.4	16.9	4.2	4.01	-0.07	9.7	6.4	10.6
42	94.4	0.316	64.2	-0.9	6.77	5.245	14.312	12.792	16.2	3.4	17.1	4.3	3.99	-0.07	9.8	6.4	10.7
43	95.1	0.324	64.1	-0.9	6.78	5.368	14.420	12.877	16.3	3.4	17.2	4.3	3.97	-0.07	9.8	6.4	10.8
44	95.5	0.332	64.1	-1.0	6.79	5.501	14.481	12.914	16.3	3.4	17.3	4.4	3.93	-0.08	9.8	6.5	10.9
45	96.6	0.339	64.0	-1.0	6.80	5.624	14.649	13.055	16.4	3.4	17.5	4.4	3.94	-0.08	9.9	6.5	11.0
46	97.0	0.347	63.9	-1.2	6.81	5.757	14.709	13.093	16.5	3.4	17.6	4.5	3.88	-0.09	9.9	6.5	11.1
47	97.5	0.354	63.9	-1.2	6.82	5.880	14.794	13.154	16.5	3.4	17.7	4.6	3.88	-0.09	10.0	6.6	11.1
48	98.2	0.362	63.8	-1.3	6.82	6.003	14.902	13.238	16.6	3.4	17.9	4.6	3.85	-0.09	10.0	6.6	11.3
49	98.0	0.369	63.8	-1.3	6.83	6.126	14.866	13.185	16.6	3.4	17.9	4.7	3.80	-0.10	10.0	6.6	11.3
50	99.0	0.377	63.7	-1.4	6.84	6.249	15.022	13.314	16.7	3.4	18.1	4.7	3.81	-0.10	10.0	6.7	11.4
51	99.8	0.384	63.7	-1.4	6.85	6.372	15.143	13.408	16.8	3.4	18.2	4.8	3.81	-0.10	10.1	6.7	11.5
52	100.1	0.391	63.6	-1.4	6.86	6.495	15.191	13.434	16.8	3.4	18.3	4.8	3.78	-0.11	10.1	6.7	11.5
53	100.2	0.399	63.6	-1.5	6.87	6.618	15.215	13.438	16.8	3.4	18.3	4.9	3.76	-0.11	10.1	6.7	11.6
54	100.8	0.406	63.6	-1.5	6.88	6.741	15.299	13.498	16.9	3.4	18.4	4.9	3.75	-0.11	10.1	6.7	11.7
55	101.3	0.414	63.5	-1.6	6.89	6.864	15.383	13.558	16.9	3.4	18.5	5.0	3.73	-0.12	10.2	6.8	11.7
56	101.8	0.421	63.5	-1.6	6.90	6.988	15.468	13.617	17.0	3.4	18.6	5.0	3.72	-0.12	10.2	6.8	11.8
57	102.2	0.428	63.4	-1.7	6.91	7.111	15.528	13.654	17.0	3.4	18.7	5.1	3.69	-0.12	10.2	6.8	11.9
58	102.2	0.436	63.4	-1.7	6.92	7.234	15.528	13.635	17.0	3.4	18.7	5.1	3.67	-0.13	10.2	6.8	11.9
59	102.7	0.444	63.3	-1.8	6.93	7.366	15.600	13.681	17.1	3.4	18.8	5.1	3.66	-0.13	10.2	6.8	12.0

Specimen A

Reading No.	Deviator Load (lbs)	Axial Deformation (in)	Pore Pressure (psi)	Change in Pore Pressure (psi)	Corrected Area (in2)	Axial Strain (%)	Deviator Stress (psi)	Corrected Deviator Stress (psi)	σ_1 (psi)	σ_3 (psi)	σ'_1 (psi)	σ'_3 (psi)	σ'_1/σ'_3	Abar	P (psi)	Q (psi)	P' (psi)
60	103.2	0.451	63.3	-1.8	6.93	7.489	15.672	13.729	17.1	3.4	18.9	5.2	3.65	-0.13	10.3	6.9	12.1
61	103.2	0.459	63.2	-1.8	6.94	7.612	15.684	13.721	17.1	3.4	18.9	5.2	3.62	-0.13	10.3	6.9	12.1
62	103.3	0.466	63.2	-1.9	6.95	7.736	15.696	13.712	17.1	3.4	19.0	5.3	3.60	-0.14	10.2	6.9	12.1
63	103.8	0.474	63.2	-1.9	6.96	7.868	15.769	13.758	17.1	3.4	19.1	5.3	3.59	-0.14	10.3	6.9	12.2
64	104.0	0.481	63.1	-2.0	6.97	7.991	15.805	13.772	17.2	3.4	19.1	5.3	3.57	-0.14	10.3	6.9	12.2
65	104.2	0.489	63.1	-2.0	6.98	8.124	15.829	13.773	17.2	3.4	19.2	5.4	3.55	-0.15	10.3	6.9	12.3
66	104.2	0.497	63.0	-2.0	6.99	8.256	15.841	13.763	17.2	3.4	19.2	5.4	3.53	-0.15	10.3	6.9	12.3
67	104.7	0.505	63.0	-2.1	7.00	8.379	15.913	13.810	17.2	3.4	19.3	5.5	3.52	-0.15	10.3	6.9	12.4
68	104.7	0.512	62.9	-2.1	7.01	8.502	15.913	13.790	17.2	3.4	19.3	5.5	3.49	-0.16	10.3	6.9	12.4
69	104.6	0.520	62.9	-2.2	7.02	8.626	15.901	13.760	17.2	3.4	19.3	5.6	3.47	-0.16	10.3	6.9	12.5
70	105.0	0.527	62.9	-2.2	7.03	8.749	15.961	13.795	17.2	3.4	19.4	5.6	3.46	-0.16	10.3	6.9	12.5
71	104.8	0.534	62.8	-2.2	7.04	8.872	15.925	13.742	17.1	3.4	19.4	5.6	3.44	-0.16	10.3	6.9	12.5
72	105.2	0.542	62.8	-2.3	7.05	8.995	15.997	13.789	17.2	3.4	19.5	5.7	3.42	-0.17	10.3	6.9	12.6
73	105.2	0.549	62.8	-2.3	7.06	9.118	15.985	13.758	17.1	3.4	19.5	5.7	3.41	-0.17	10.3	6.9	12.6
74	105.2	0.557	62.7	-2.4	7.07	9.241	15.985	13.738	17.1	3.4	19.5	5.8	3.39	-0.17	10.3	6.9	12.6
75	105.6	0.564	62.7	-2.4	7.08	9.364	16.045	13.773	17.2	3.4	19.6	5.8	3.37	-0.18	10.3	6.9	12.7
76	105.7	0.571	62.6	-2.4	7.09	9.487	16.070	13.775	17.2	3.4	19.6	5.8	3.36	-0.18	10.3	6.9	12.7
77	105.7	0.579	62.6	-2.5	7.10	9.620	16.070	13.754	17.1	3.4	19.6	5.9	3.34	-0.18	10.3	6.9	12.8
78	105.9	0.587	62.6	-2.5	7.11	9.743	16.106	13.767	17.2	3.4	19.7	5.9	3.33	-0.18	10.3	6.9	12.8
79	105.9	0.594	62.5	-2.6	7.12	9.866	16.106	13.747	17.1	3.4	19.7	6.0	3.31	-0.19	10.3	6.9	12.8
80	105.3	0.602	62.5	-2.6	7.13	9.989	16.009	13.640	17.0	3.4	19.6	6.0	3.28	-0.19	10.2	6.8	12.8
81	105.6	0.610	62.4	-2.6	7.14	10.122	16.045	13.652	17.0	3.4	19.7	6.0	3.26	-0.19	10.2	6.8	12.9
82	105.6	0.617	62.4	-2.7	7.15	10.245	16.045	13.632	17.0	3.4	19.7	6.1	3.24	-0.20	10.2	6.8	12.9
83	105.3	0.624	62.4	-2.7	7.16	10.368	16.009	13.580	17.0	3.4	19.7	6.1	3.22	-0.20	10.2	6.8	12.9
84	104.7	0.632	62.4	-2.7	7.17	10.500	15.913	13.472	16.9	3.4	19.6	6.1	3.21	-0.20	10.1	6.7	12.8
85	104.6	0.639	62.4	-2.7	7.18	10.614	15.889	13.433	16.8	3.4	19.5	6.1	3.22	-0.20	10.1	6.7	12.8
86	104.6	0.647	62.4	-2.7	7.19	10.737	15.889	13.413	16.8	3.4	19.5	6.1	3.20	-0.20	10.1	6.7	12.8
87	104.4	0.655	62.3	-2.7	7.20	10.870	15.865	13.371	16.8	3.4	19.5	6.1	3.18	-0.21	10.1	6.7	12.8
88	104.2	0.662	62.3	-2.8	7.21	10.993	15.841	13.330	16.7	3.4	19.5	6.2	3.16	-0.21	10.1	6.7	12.8
89	104.2	0.669	62.3	-2.8	7.22	11.116	15.841	13.310	16.7	3.4	19.5	6.2	3.14	-0.21	10.0	6.7	12.9
90	103.8	0.677	62.2	-2.9	7.23	11.239	15.769	13.227	16.6	3.4	19.5	6.3	3.11	-0.22	10.0	6.6	12.9
91	103.2	0.684	62.2	-2.9	7.24	11.362	15.672	13.122	16.5	3.4	19.4	6.3	3.09	-0.22	10.0	6.6	12.8
92	102.4	0.692	62.2	-2.9	7.25	11.485	15.552	12.996	16.4	3.4	19.3	6.3	3.06	-0.23	9.9	6.5	12.8
93	102.3	0.700	62.1	-3.0	7.26	11.618	15.540	12.965	16.4	3.4	19.3	6.4	3.04	-0.23	9.9	6.5	12.8
94	101.5	0.707	62.1	-3.0	7.27	11.741	15.420	12.839	16.2	3.4	19.2	6.4	3.01	-0.23	9.8	6.4	12.8
95	101.2	0.714	62.1	-3.0	7.28	11.864	15.371	12.778	16.2	3.4	19.2	6.4	2.99	-0.24	9.8	6.4	12.8
96	100.5	0.722	62.0	-3.1	7.29	11.987	15.263	12.664	16.1	3.4	19.1	6.5	2.96	-0.24	9.7	6.3	12.8
97	100.1	0.730	62.0	-3.1	7.30	12.119	15.191	12.580	16.0	3.4	19.1	6.5	2.94	-0.25	9.7	6.3	12.8
98	99.6	0.737	62.0	-3.1	7.31	12.242	15.119	12.498	15.9	3.4	19.0	6.5	2.92	-0.25	9.6	6.2	12.8
99	99.4	0.745	61.9	-3.1	7.32	12.366	15.083	12.448	15.8	3.4	19.0	6.5	2.90	-0.25	9.6	6.2	12.8
100	99.1	0.752	61.9	-3.2	7.33	12.498	15.034	12.386	15.8	3.4	18.9	6.6	2.89	-0.26	9.6	6.2	12.8

Specimen A

Reading No.	Deviator Load (lbs)	Axial Deformation (in)	Pore Pressure (psi)	Change in Pore Pressure (psi)	Corrected Area (in2)	Axial Strain (%)	Deviator Stress (psi)	Corrected Deviator Stress (psi)	σ_1 (psi)	σ_3 (psi)	σ'_1 (psi)	σ'_3 (psi)	σ'_1/σ'_3	Abar	P (psi)	Q (psi)	P' (psi)
101	99.0	0.760	61.9	-3.2	7.34	12.621	15.022	12.357	15.7	3.4	18.9	6.6	2.88	-0.26	9.6	6.2	12.8
102	98.9	0.767	61.9	-3.2	7.35	12.744	15.010	12.328	15.7	3.4	18.9	6.6	2.87	-0.26	9.6	6.2	12.8
103	98.6	0.775	61.9	-3.2	7.36	12.867	14.962	12.267	15.7	3.4	18.9	6.6	2.86	-0.26	9.5	6.1	12.7
104	98.6	0.782	61.8	-3.2	7.37	12.990	14.962	12.249	15.6	3.4	18.9	6.6	2.85	-0.26	9.5	6.1	12.7
105	98.4	0.790	61.8	-3.2	7.38	13.123	14.926	12.197	15.6	3.4	18.8	6.6	2.84	-0.27	9.5	6.1	12.7
106	98.2	0.797	61.8	-3.2	7.39	13.237	14.902	12.160	15.6	3.4	18.8	6.6	2.83	-0.27	9.5	6.1	12.7
107	98.2	0.804	61.8	-3.3	7.40	13.360	14.902	12.141	15.5	3.4	18.8	6.7	2.82	-0.27	9.5	6.1	12.7
108	98.2	0.812	61.8	-3.3	7.42	13.492	14.902	12.122	15.5	3.4	18.8	6.7	2.81	-0.27	9.5	6.1	12.7
109	97.8	0.819	61.8	-3.3	7.43	13.606	14.830	12.042	15.4	3.4	18.7	6.7	2.80	-0.27	9.4	6.0	12.7
110	97.7	0.827	61.7	-3.3	7.44	13.729	14.818	12.014	15.4	3.4	18.8	6.7	2.78	-0.28	9.4	6.0	12.7
111	97.3	0.834	61.7	-3.4	7.45	13.852	14.758	11.944	15.3	3.4	18.7	6.8	2.77	-0.28	9.4	6.0	12.7
112	97.0	0.841	61.7	-3.4	7.46	13.975	14.709	11.884	15.3	3.4	18.7	6.8	2.75	-0.29	9.3	5.9	12.7
113	96.7	0.848	61.6	-3.4	7.47	14.089	14.661	11.826	15.2	3.4	18.6	6.8	2.73	-0.29	9.3	5.9	12.7
114	96.5	0.856	61.6	-3.5	7.48	14.212	14.637	11.787	15.2	3.4	18.6	6.9	2.72	-0.29	9.3	5.9	12.8
115	96.4	0.864	61.6	-3.5	7.49	14.344	14.613	11.747	15.1	3.4	18.6	6.9	2.70	-0.30	9.3	5.9	12.8
116	96.3	0.871	61.5	-3.5	7.50	14.467	14.601	11.719	15.1	3.4	18.6	6.9	2.69	-0.30	9.3	5.9	12.8
117	96.4	0.879	61.5	-3.6	7.51	14.600	14.613	11.710	15.1	3.4	18.7	6.9	2.69	-0.30	9.2	5.9	12.8
118	96.0	0.886	61.5	-3.6	7.52	14.723	14.553	11.640	15.0	3.4	18.6	7.0	2.67	-0.31	9.2	5.8	12.8
119	96.2	0.894	61.5	-3.6	7.53	14.846	14.589	11.653	15.0	3.4	18.6	7.0	2.67	-0.31	9.2	5.8	12.8
120	97.0	0.902	61.5	-3.6	7.55	14.979	14.709	11.736	15.1	3.4	18.7	7.0	2.68	-0.31	9.3	5.9	12.9
121	96.8	0.905	61.5	-3.6	7.55	15.026	14.685	11.709	15.1	3.4	18.7	7.0	2.68	-0.31	9.2	5.9	12.8

Specimen B Shear Data

CU Triaxial Test

Contour Engineering

File Location
Plant McIntosh M-1 (9-20-10).HSD

Project Information

Project No. AT10SOC03-M
Project Name: Plant McIntosh
Client: Southern Company
Sample Location: M-1, UD-2
Sample Description: Red tan and gray CLAY (CL)
Remarks:

Sample Data

Sample Type: Undisturbed
Specific Gravity: 2.7
LL: 45.000
PL: 19.000

Sample Parameters	Initial	After Consolidation	Final
Diameter (in)	2.868	2.872	
Height (in)	5.786	5.766	
Weight (grams)	1163.46		1187.14
Moisture (%)	29.11		30.97
Dry Density (pcf)	91.82	92.46	
Saturation (%)	94.06	100.00	
Void Ratio	0.832	0.823	

Test Data

Rate of Strain: 0.015
Cell Pressure (psi): 71.940
Effective Confining Stress (psi): 7.0
Corrected Peak Deviator Stress (psi): 15.211 at reading number: 64

Specimen B

Reading No.	Deviator Load (lbs)	Axial Deformation (in)	Pore Pressure (psi)	Change in Pore Pressure (psi)	Corrected Area (in2)	Axial Strain (%)	Deviator Stress (psi)	Corrected Deviator Stress (psi)	σ_1 (psi)	σ_3 (psi)	σ'_1 (psi)	σ'_3 (psi)	σ'_1/σ'_3	Abar	P (psi)	Q (psi)	P' (psi)
0	2.2	0.001	64.9	0.0	6.48	0.000	0.000	0.000	7.0	7.0	7.0	7.0	1.00	0.00	7.0	0.0	7.0
1	33.7	0.007	67.8	2.9	6.48	0.119	4.852	4.801	11.8	7.0	8.9	4.1	2.17	0.61	9.4	2.4	6.5
2	43.5	0.015	69.1	4.2	6.49	0.247	6.366	6.256	13.3	7.0	9.1	2.8	3.21	0.67	10.1	3.1	6.0
3	50.4	0.022	69.9	5.0	6.50	0.375	7.439	7.267	14.3	7.0	9.3	2.0	4.56	0.68	10.6	3.6	5.7
4	55.4	0.030	70.4	5.5	6.51	0.504	8.202	7.967	15.0	7.0	9.5	1.5	6.26	0.69	11.0	4.0	5.5
5	60.4	0.036	70.7	5.8	6.52	0.622	8.977	8.682	15.7	7.0	9.9	1.2	8.29	0.67	11.3	4.3	5.5
6	64.2	0.044	71.0	6.0	6.53	0.751	9.573	9.213	16.2	7.0	10.2	1.0	10.31	0.65	11.6	4.6	5.6
7	67.7	0.052	71.1	6.1	6.54	0.889	10.109	9.679	16.7	7.0	10.6	0.9	11.89	0.63	11.8	4.8	5.7
8	71.2	0.059	71.1	6.2	6.54	1.018	10.646	10.148	17.2	7.0	11.0	0.8	13.26	0.61	12.1	5.1	5.9
9	74.3	0.067	71.1	6.2	6.55	1.146	11.122	10.556	17.6	7.0	11.4	0.8	14.07	0.59	12.3	5.3	6.1
10	77.4	0.075	71.1	6.2	6.56	1.284	11.599	10.958	18.0	7.0	11.8	0.8	14.57	0.57	12.5	5.5	6.3
11	79.8	0.082	71.1	6.2	6.57	1.413	11.981	11.270	18.3	7.0	12.1	0.8	14.61	0.55	12.6	5.6	6.5
12	82.1	0.089	71.1	6.1	6.58	1.541	12.327	11.546	18.5	7.0	12.4	0.9	14.30	0.53	12.8	5.8	6.6
13	84.6	0.097	71.0	6.1	6.59	1.679	12.708	11.851	18.9	7.0	12.8	0.9	14.04	0.51	12.9	5.9	6.8
14	86.6	0.105	71.0	6.1	6.60	1.808	13.030	12.102	19.1	7.0	13.1	0.9	13.75	0.50	13.1	6.1	7.0
15	88.0	0.113	71.0	6.0	6.61	1.946	13.244	12.241	19.2	7.0	13.2	1.0	13.37	0.49	13.1	6.1	7.1
16	90.3	0.121	70.9	6.0	6.62	2.085	13.590	12.541	19.5	7.0	13.6	1.0	12.95	0.47	13.3	6.3	7.3
17	91.7	0.128	70.8	5.9	6.62	2.213	13.805	12.733	19.7	7.0	13.8	1.1	12.47	0.46	13.4	6.4	7.5
18	93.2	0.136	70.8	5.8	6.63	2.341	14.043	12.948	20.0	7.0	14.1	1.2	12.06	0.45	13.5	6.5	7.6

Specimen B

Reading No.	Deviator Load (lbs)	Axial Deformation (in)	Pore Pressure (psi)	Change in Pore Pressure (psi)	Corrected Area (in2)	Axial Strain (%)	Deviator Stress (psi)	Corrected Deviator Stress (psi)	σ_1 (psi)	σ_3 (psi)	σ'_1 (psi)	σ'_3 (psi)	σ'_1/σ'_3	Abar	P (psi)	Q (psi)	P' (psi)
19	94.3	0.143	70.7	5.8	6.64	2.470	14.210	13.093	20.1	7.0	14.3	1.2	11.63	0.44	13.5	6.5	7.8
20	95.6	0.150	70.6	5.7	6.65	2.598	14.413	13.272	20.3	7.0	14.6	1.3	10.96	0.43	13.6	6.6	8.0
21	96.5	0.158	70.5	5.6	6.66	2.727	14.556	13.393	20.4	7.0	14.8	1.4	10.34	0.42	13.7	6.7	8.1
22	97.1	0.165	70.4	5.5	6.67	2.855	14.651	13.467	20.5	7.0	15.0	1.5	9.89	0.41	13.7	6.7	8.2
23	98.3	0.173	70.3	5.4	6.68	2.984	14.830	13.621	20.6	7.0	15.2	1.6	9.54	0.40	13.8	6.8	8.4
24	98.7	0.180	70.3	5.3	6.69	3.112	14.890	13.660	20.7	7.0	15.3	1.7	9.15	0.39	13.8	6.8	8.5
25	99.7	0.187	70.2	5.2	6.69	3.240	15.045	13.791	20.8	7.0	15.5	1.8	8.85	0.38	13.9	6.9	8.7
26	100.5	0.195	70.1	5.1	6.70	3.369	15.164	13.887	20.9	7.0	15.7	1.9	8.48	0.37	13.9	6.9	8.8
27	100.8	0.203	70.0	5.0	6.71	3.507	15.223	13.923	20.9	7.0	15.9	2.0	8.11	0.36	14.0	7.0	8.9
28	101.6	0.210	69.9	5.0	6.72	3.636	15.343	14.019	21.0	7.0	16.0	2.0	7.95	0.36	14.0	7.0	9.0
29	102.5	0.218	69.8	4.9	6.73	3.764	15.474	14.125	21.1	7.0	16.3	2.1	7.60	0.34	14.1	7.1	9.2
30	103.6	0.225	69.7	4.8	6.74	3.892	15.653	14.277	21.3	7.0	16.5	2.2	7.37	0.33	14.1	7.1	9.4
31	104.2	0.232	69.6	4.7	6.75	4.021	15.748	14.349	21.4	7.0	16.7	2.3	7.18	0.33	14.2	7.2	9.5
32	104.9	0.240	69.5	4.6	6.76	4.149	15.843	14.420	21.4	7.0	16.8	2.4	7.00	0.32	14.2	7.2	9.6
33	105.6	0.247	69.5	4.5	6.77	4.278	15.963	14.514	21.5	7.0	17.0	2.5	6.85	0.31	14.3	7.3	9.7
34	105.7	0.255	69.4	4.4	6.78	4.416	15.974	14.503	21.5	7.0	17.1	2.6	6.66	0.31	14.3	7.3	9.8
35	105.6	0.263	69.3	4.3	6.79	4.544	15.963	14.471	21.5	7.0	17.1	2.7	6.43	0.30	14.2	7.2	9.9
36	106.3	0.271	69.2	4.3	6.80	4.683	16.058	14.540	21.5	7.0	17.3	2.7	6.30	0.29	14.3	7.3	10.0
37	106.6	0.278	69.1	4.2	6.80	4.811	16.117	14.576	21.6	7.0	17.4	2.8	6.16	0.29	14.3	7.3	10.1
38	106.8	0.285	69.0	4.1	6.81	4.940	16.141	14.578	21.6	7.0	17.5	2.9	5.98	0.28	14.3	7.3	10.2
39	107.2	0.293	68.9	4.0	6.82	5.068	16.201	14.614	21.6	7.0	17.6	3.0	5.86	0.27	14.3	7.3	10.3
40	107.3	0.300	68.9	3.9	6.83	5.196	16.213	14.604	21.6	7.0	17.7	3.1	5.73	0.27	14.3	7.3	10.4
41	107.6	0.308	68.8	3.8	6.84	5.335	16.261	14.627	21.6	7.0	17.8	3.2	5.62	0.26	14.3	7.3	10.5
42	107.9	0.316	68.7	3.8	6.85	5.463	16.308	14.651	21.7	7.0	17.9	3.2	5.51	0.26	14.3	7.3	10.6
43	108.5	0.323	68.6	3.7	6.86	5.592	16.404	14.720	21.7	7.0	18.0	3.3	5.45	0.25	14.4	7.4	10.7
44	109.3	0.330	68.5	3.6	6.87	5.720	16.523	14.812	21.8	7.0	18.2	3.4	5.34	0.24	14.4	7.4	10.8
45	109.3	0.338	68.5	3.5	6.88	5.849	16.535	14.802	21.8	7.0	18.3	3.5	5.26	0.24	14.4	7.4	10.9
46	109.6	0.346	68.4	3.5	6.89	5.987	16.582	14.824	21.8	7.0	18.4	3.6	5.17	0.23	14.4	7.4	11.0
47	109.9	0.353	68.3	3.3	6.90	6.115	16.618	14.836	21.8	7.0	18.5	3.7	5.06	0.23	14.4	7.4	11.1
48	110.0	0.361	68.2	3.3	6.91	6.254	16.642	14.835	21.8	7.0	18.6	3.7	4.97	0.22	14.4	7.4	11.2
49	110.5	0.369	68.1	3.2	6.92	6.382	16.714	14.881	21.9	7.0	18.7	3.8	4.90	0.21	14.4	7.4	11.3
50	110.7	0.376	68.0	3.1	6.93	6.510	16.749	14.893	21.9	7.0	18.8	3.9	4.82	0.21	14.4	7.4	11.3
51	111.1	0.384	68.0	3.0	6.94	6.649	16.809	14.925	21.9	7.0	18.9	4.0	4.75	0.20	14.5	7.5	11.4
52	111.6	0.391	67.9	3.0	6.95	6.777	16.880	14.970	22.0	7.0	19.0	4.0	4.71	0.20	14.5	7.5	11.5
53	112.0	0.399	67.8	2.9	6.96	6.915	16.940	15.002	22.0	7.0	19.1	4.1	4.64	0.19	14.5	7.5	11.6
54	112.1	0.407	67.8	2.8	6.97	7.044	16.964	15.003	22.0	7.0	19.2	4.2	4.59	0.19	14.5	7.5	11.7
55	112.4	0.414	67.7	2.8	6.98	7.172	17.000	15.014	22.0	7.0	19.3	4.2	4.54	0.18	14.5	7.5	11.7
56	112.6	0.422	67.6	2.7	6.99	7.301	17.035	15.026	22.0	7.0	19.3	4.3	4.48	0.18	14.5	7.5	11.8
57	113.0	0.429	67.6	2.6	7.00	7.429	17.107	15.070	22.1	7.0	19.4	4.4	4.44	0.17	14.5	7.5	11.9
58	113.4	0.436	67.5	2.5	7.01	7.558	17.155	15.092	22.1	7.0	19.6	4.5	4.38	0.17	14.5	7.5	12.0
59	113.0	0.444	67.4	2.5	7.02	7.686	17.107	15.026	22.0	7.0	19.5	4.5	4.32	0.17	14.5	7.5	12.0

Specimen B

Reading No.	Deviator Load (lbs)	Axial Deformation (in)	Pore Pressure (psi)	Change in Pore Pressure (psi)	Corrected Area (in2)	Axial Strain (%)	Deviator Stress (psi)	Corrected Deviator Stress (psi)	σ_1 (psi)	σ_3 (psi)	σ'_1 (psi)	σ'_3 (psi)	σ'_1/σ'_3	Abar	P (psi)	Q (psi)	P' (psi)
60	113.4	0.451	67.4	2.4	7.03	7.814	17.167	15.059	22.1	7.0	19.6	4.6	4.29	0.16	14.5	7.5	12.1
61	114.0	0.459	67.3	2.3	7.04	7.943	17.250	15.114	22.1	7.0	19.8	4.7	4.24	0.15	14.6	7.6	12.2
62	114.3	0.466	67.2	2.3	7.05	8.071	17.298	15.135	22.1	7.0	19.8	4.7	4.22	0.15	14.6	7.6	12.3
63	114.3	0.473	67.2	2.2	7.06	8.190	17.298	15.115	22.1	7.0	19.9	4.8	4.17	0.15	14.6	7.6	12.3
64	115.1	0.481	67.1	2.2	7.07	8.328	17.429	15.211	22.2	7.0	20.0	4.8	4.17	0.14	14.6	7.6	12.4
65	114.6	0.488	67.1	2.2	7.08	8.457	17.345	15.112	22.1	7.0	20.0	4.8	4.12	0.14	14.6	7.6	12.4
66	114.7	0.496	67.0	2.1	7.09	8.585	17.369	15.112	22.1	7.0	20.0	4.9	4.08	0.14	14.6	7.6	12.5
67	114.9	0.504	67.0	2.1	7.10	8.723	17.393	15.110	22.1	7.0	20.1	4.9	4.06	0.14	14.6	7.6	12.5
68	114.4	0.511	66.9	2.0	7.11	8.852	17.322	15.022	22.0	7.0	20.0	5.0	4.00	0.13	14.5	7.5	12.5
69	114.4	0.519	66.9	2.0	7.12	8.990	17.310	14.987	22.0	7.0	20.0	5.0	3.97	0.13	14.5	7.5	12.5
70	114.1	0.526	66.9	1.9	7.13	9.119	17.274	14.933	21.9	7.0	20.0	5.1	3.94	0.13	14.5	7.5	12.6
71	114.7	0.534	66.8	1.9	7.14	9.257	17.369	14.995	22.0	7.0	20.1	5.1	3.91	0.12	14.5	7.5	12.6
72	114.5	0.542	66.8	1.9	7.15	9.385	17.333	14.941	21.9	7.0	20.1	5.1	3.90	0.12	14.5	7.5	12.6
73	114.5	0.550	66.7	1.8	7.16	9.524	17.333	14.917	21.9	7.0	20.1	5.2	3.85	0.12	14.5	7.5	12.7
74	114.5	0.557	66.7	1.7	7.17	9.652	17.333	14.894	21.9	7.0	20.2	5.3	3.83	0.12	14.4	7.4	12.7
75	114.7	0.565	66.6	1.7	7.18	9.780	17.357	14.894	21.9	7.0	20.2	5.3	3.81	0.11	14.4	7.4	12.8
76	115.1	0.572	66.6	1.6	7.19	9.909	17.429	14.936	21.9	7.0	20.3	5.4	3.78	0.11	14.5	7.5	12.8
77	115.8	0.579	66.5	1.6	7.20	10.037	17.536	15.010	22.0	7.0	20.4	5.4	3.78	0.11	14.5	7.5	12.9
78	115.8	0.587	66.5	1.5	7.21	10.166	17.536	14.987	22.0	7.0	20.5	5.5	3.74	0.10	14.5	7.5	13.0
79	115.5	0.594	66.4	1.5	7.22	10.294	17.488	14.922	21.9	7.0	20.4	5.5	3.71	0.10	14.5	7.5	13.0
80	115.8	0.602	66.4	1.5	7.23	10.423	17.536	14.942	21.9	7.0	20.5	5.5	3.69	0.10	14.5	7.5	13.0
81	115.7	0.609	66.3	1.4	7.24	10.551	17.512	14.898	21.9	7.0	20.5	5.6	3.67	0.09	14.5	7.4	13.0
82	115.5	0.616	66.3	1.4	7.25	10.679	17.488	14.855	21.9	7.0	20.5	5.7	3.63	0.09	14.4	7.4	13.1
83	115.5	0.624	66.2	1.3	7.26	10.818	17.488	14.830	21.8	7.0	20.5	5.7	3.61	0.09	14.4	7.4	13.1
84	115.7	0.632	66.2	1.3	7.27	10.946	17.524	14.840	21.8	7.0	20.6	5.7	3.59	0.09	14.4	7.4	13.2
85	115.6	0.639	66.1	1.2	7.28	11.065	17.500	14.798	21.8	7.0	20.6	5.8	3.55	0.08	14.4	7.4	13.2
86	116.2	0.646	66.1	1.2	7.29	11.193	17.596	14.860	21.9	7.0	20.7	5.8	3.56	0.08	14.4	7.4	13.2
87	115.9	0.654	66.1	1.1	7.31	11.332	17.548	14.793	21.8	7.0	20.7	5.9	3.52	0.08	14.4	7.4	13.3
88	116.1	0.661	66.0	1.1	7.32	11.460	17.584	14.803	21.8	7.0	20.7	5.9	3.50	0.07	14.4	7.4	13.3
89	116.2	0.669	66.0	1.0	7.33	11.588	17.596	14.791	21.8	7.0	20.7	6.0	3.48	0.07	14.4	7.4	13.3
90	116.2	0.677	65.9	1.0	7.34	11.727	17.596	14.766	21.8	7.0	20.8	6.0	3.46	0.07	14.4	7.4	13.4
91	116.2	0.685	65.9	0.9	7.35	11.865	17.596	14.742	21.7	7.0	20.8	6.1	3.43	0.06	14.4	7.4	13.4
92	116.1	0.692	65.8	0.9	7.36	11.993	17.584	14.709	21.7	7.0	20.8	6.1	3.41	0.06	14.4	7.4	13.4
93	116.1	0.700	65.8	0.9	7.37	12.132	17.584	14.684	21.7	7.0	20.8	6.1	3.39	0.06	14.3	7.3	13.5
94	116.3	0.707	65.8	0.8	7.38	12.260	17.608	14.683	21.7	7.0	20.9	6.2	3.38	0.06	14.3	7.3	13.5
95	116.4	0.715	65.7	0.8	7.39	12.389	17.631	14.681	21.7	7.0	20.9	6.2	3.36	0.05	14.3	7.3	13.6
96	116.6	0.723	65.7	0.7	7.40	12.527	17.655	14.678	21.7	7.0	20.9	6.3	3.35	0.05	14.3	7.3	13.6
97	116.9	0.730	65.6	0.7	7.41	12.645	17.703	14.698	21.7	7.0	21.0	6.3	3.33	0.05	14.4	7.3	13.7
98	117.1	0.737	65.6	0.6	7.43	12.774	17.739	14.707	21.7	7.0	21.1	6.4	3.31	0.04	14.4	7.4	13.7
99	117.6	0.745	65.5	0.6	7.44	12.902	17.810	14.746	21.7	7.0	21.1	6.4	3.31	0.04	14.4	7.4	13.8
100	118.0	0.752	65.5	0.6	7.45	13.031	17.870	14.775	21.8	7.0	21.2	6.4	3.30	0.04	14.4	7.4	13.8

Specimen B

Reading No.	Deviator Load (lbs)	Axial Deformation (in)	Pore Pressure (psi)	Change in Pore Pressure (psi)	Corrected Area (in2)	Axial Strain (%)	Deviator Stress (psi)	Corrected Deviator Stress (psi)	σ_1 (psi)	σ_3 (psi)	σ'_1 (psi)	σ'_3 (psi)	σ'_1/σ'_3	Abar	P (psi)	Q (psi)	P' (psi)
101	117.8	0.759	65.5	0.5	7.46	13.159	17.846	14.732	21.7	7.0	21.2	6.5	3.28	0.04	14.4	7.4	13.8
102	117.6	0.767	65.4	0.5	7.47	13.288	17.810	14.678	21.7	7.0	21.2	6.5	3.25	0.03	14.3	7.3	13.9
103	117.7	0.774	65.4	0.4	7.48	13.416	17.822	14.665	21.7	7.0	21.2	6.6	3.24	0.03	14.3	7.3	13.9
104	118.1	0.782	65.4	0.5	7.49	13.544	17.882	14.694	21.7	7.0	21.2	6.5	3.25	0.03	14.3	7.3	13.9
105	118.1	0.789	65.4	0.4	7.50	13.673	17.894	14.681	21.7	7.0	21.2	6.6	3.24	0.03	14.3	7.3	13.9
106	118.1	0.796	65.4	0.4	7.51	13.801	17.894	14.658	21.7	7.0	21.2	6.6	3.23	0.03	14.3	7.3	13.9
107	118.2	0.804	65.3	0.4	7.53	13.930	17.906	14.645	21.6	7.0	21.3	6.6	3.21	0.03	14.3	7.3	13.9
108	118.1	0.811	65.3	0.4	7.54	14.058	17.894	14.612	21.6	7.0	21.3	6.6	3.20	0.02	14.3	7.3	13.9
109	118.4	0.819	65.3	0.3	7.55	14.196	17.930	14.618	21.6	7.0	21.3	6.7	3.19	0.02	14.3	7.3	14.0
110	118.9	0.827	65.2	0.3	7.56	14.325	18.013	14.667	21.7	7.0	21.4	6.7	3.18	0.02	14.3	7.3	14.1
111	119.1	0.835	65.2	0.2	7.57	14.463	18.049	14.672	21.7	7.0	21.4	6.8	3.17	0.02	14.3	7.3	14.1
112	119.1	0.841	65.1	0.2	7.58	14.582	18.049	14.651	21.7	7.0	21.5	6.8	3.15	0.01	14.3	7.3	14.1
113	119.5	0.849	65.1	0.2	7.60	14.720	18.096	14.667	21.7	7.0	21.5	6.8	3.15	0.01	14.3	7.3	14.2
114	119.8	0.857	65.1	0.1	7.61	14.849	18.144	14.684	21.7	7.0	21.5	6.9	3.14	0.01	14.3	7.3	14.2
115	120.0	0.864	65.0	0.1	7.62	14.977	18.180	14.691	21.7	7.0	21.6	6.9	3.13	0.01	14.3	7.3	14.2
116	119.9	0.866	65.0	0.1	7.62	15.016	18.168	14.674	21.7	7.0	21.6	6.9	3.12	0.01	14.3	7.3	14.3

Specimen C Shear Data
CU Triaxial Test

Contour Engineering

File Location
Plant McIntosh M-1 (9-20-10).HSD

Project Information

Project No. AT10SOC03-M
Project Name: Plant McIntosh
Client: Southern Company
Sample Location: M-1, UD-2
Sample Description: Light gray and red silty CLAY (CL)
Remarks:

Sample Data

Sample Type: Undisturbed
Specific Gravity: 2.7
LL: 45.000
PL: 19.000

Sample Parameters	Initial	After Consolidation	Final
Diameter (in)	2.851	2.849	
Height (in)	5.996	5.914	
Weight (grams)	1189.79		1206.27
Moisture (%)	22.18		30.91
Dry Density (pcf)	96.89	93.08	
Saturation (%)	80.97	100.00	
Void Ratio	0.737	0.811	

Test Data

Rate of Strain: 0.015
Cell Pressure (psi): 75.420
Effective Confining Stress (psi): 10.3
Corrected Peak Deviator Stress (psi): 15.849 at reading number: 47

Specimen C

Reading No.	Deviator Load (lbs)	Axial Deformation (in)	Pore Pressure (psi)	Change in Pore Pressure (psi)	Corrected Area (in2)	Axial Strain (%)	Deviator Stress (psi)	Corrected Deviator Stress (psi)	σ_1 (psi)	σ_3 (psi)	σ'_1 (psi)	σ'_3 (psi)	σ'_1/σ'_3	Abar	P (psi)	Q (psi)	P' (psi)
0	2.3	0.001	65.2	0.0	6.38	0.000	0.000	0.000	10.3	10.3	10.3	10.3	1.00	0.00	10.3	0.0	10.3
1	7.6	0.007	65.7	0.5	6.38	0.116	0.823	0.778	11.0	10.3	10.5	9.8	1.08	0.65	10.6	0.4	10.1
2	29.2	0.015	67.7	2.6	6.39	0.241	4.214	4.111	14.4	10.3	11.8	7.7	1.53	0.62	12.3	2.1	9.8
3	36.7	0.022	68.7	3.6	6.40	0.356	5.389	5.232	15.5	10.3	11.9	6.7	1.78	0.68	12.9	2.6	9.3
4	41.8	0.029	69.3	4.2	6.41	0.482	6.188	5.972	16.2	10.3	12.1	6.1	1.98	0.70	13.2	3.0	9.1
5	46.0	0.036	69.8	4.6	6.42	0.607	6.854	6.578	16.8	10.3	12.2	5.6	2.17	0.70	13.5	3.3	8.9
6	49.7	0.044	70.1	5.0	6.42	0.732	7.423	7.086	17.3	10.3	12.4	5.3	2.34	0.70	13.8	3.5	8.8
7	52.6	0.051	70.4	5.2	6.43	0.857	7.883	7.485	17.7	10.3	12.5	5.0	2.49	0.70	14.0	3.7	8.8
8	55.9	0.059	70.6	5.5	6.44	0.982	8.404	7.942	18.2	10.3	12.7	4.8	2.66	0.69	14.2	4.0	8.7
9	58.5	0.066	70.8	5.7	6.45	1.108	8.804	8.278	18.5	10.3	12.8	4.6	2.81	0.69	14.4	4.1	8.7
10	60.8	0.073	71.0	5.8	6.46	1.233	9.179	8.590	18.9	10.3	13.0	4.4	2.94	0.68	14.6	4.3	8.7
11	63.3	0.081	71.1	5.9	6.46	1.358	9.566	8.912	19.2	10.3	13.2	4.3	3.06	0.67	14.7	4.5	8.8
12	65.8	0.089	71.2	6.1	6.47	1.493	9.954	9.229	19.5	10.3	13.4	4.2	3.19	0.66	14.9	4.6	8.8
13	68.1	0.096	71.3	6.1	6.48	1.618	10.317	9.526	19.8	10.3	13.7	4.1	3.30	0.64	15.0	4.8	8.9
14	70.3	0.104	71.3	6.2	6.49	1.743	10.668	9.809	20.1	10.3	13.9	4.1	3.40	0.63	15.2	4.9	9.0
15	72.3	0.112	71.4	6.2	6.50	1.878	10.971	10.040	20.3	10.3	14.1	4.0	3.48	0.62	15.3	5.0	9.1
16	74.5	0.118	71.4	6.2	6.51	1.994	11.322	10.327	20.6	10.3	14.4	4.0	3.57	0.60	15.4	5.2	9.2
17	76.6	0.126	71.4	6.3	6.51	2.119	11.649	10.630	20.9	10.3	14.6	4.0	3.67	0.59	15.6	5.3	9.3
18	78.5	0.133	71.4	6.3	6.52	2.244	11.952	10.912	21.2	10.3	14.9	4.0	3.74	0.58	15.7	5.5	9.4

Specimen C

Reading No.	Deviator Load (lbs)	Axial Deformation (in)	Pore Pressure (psi)	Change in Pore Pressure (psi)	Corrected Area (in2)	Axial Strain (%)	Deviator Stress (psi)	Corrected Deviator Stress (psi)	σ_1 (psi)	σ_3 (psi)	σ'_1 (psi)	σ'_3 (psi)	σ'_1/σ'_3	Abar	P (psi)	Q (psi)	P' (psi)
19	80.6	0.141	71.4	6.3	6.53	2.379	12.279	11.215	21.5	10.3	15.2	4.0	3.80	0.56	15.9	5.6	9.6
20	82.0	0.149	71.4	6.3	6.54	2.504	12.497	11.412	21.7	10.3	15.4	4.0	3.85	0.55	16.0	5.7	9.7
21	83.9	0.156	71.4	6.3	6.55	2.629	12.800	11.691	22.0	10.3	15.7	4.0	3.92	0.54	16.1	5.8	9.9
22	85.6	0.163	71.4	6.2	6.56	2.755	13.066	11.934	22.2	10.3	16.0	4.0	3.95	0.52	16.2	6.0	10.0
23	87.6	0.171	71.4	6.2	6.57	2.880	13.369	12.212	22.5	10.3	16.3	4.1	4.00	0.51	16.4	6.1	10.2
24	89.1	0.178	71.3	6.1	6.57	3.005	13.611	12.430	22.7	10.3	16.6	4.1	4.01	0.49	16.5	6.2	10.3
25	91.0	0.186	71.3	6.1	6.58	3.130	13.914	12.706	23.0	10.3	16.9	4.1	4.06	0.48	16.6	6.4	10.5
26	92.7	0.193	71.4	6.2	6.59	3.255	14.180	12.946	23.2	10.3	17.0	4.1	4.18	0.48	16.7	6.5	10.5
27	94.1	0.200	71.3	6.2	6.60	3.371	14.386	13.129	23.4	10.3	17.2	4.1	4.20	0.47	16.8	6.6	10.7
28	95.4	0.208	71.3	6.1	6.61	3.506	14.604	13.320	23.6	10.3	17.5	4.1	4.21	0.46	16.9	6.7	10.8
29	97.1	0.215	71.2	6.1	6.62	3.621	14.858	13.548	23.8	10.3	17.8	4.2	4.22	0.45	17.0	6.8	11.0
30	98.6	0.222	71.2	6.0	6.62	3.747	15.100	13.763	24.0	10.3	18.0	4.3	4.22	0.44	17.1	6.9	11.1
31	99.8	0.230	71.1	5.9	6.63	3.882	15.294	13.928	24.2	10.3	18.3	4.3	4.22	0.43	17.2	7.0	11.3
32	101.3	0.238	71.1	5.9	6.64	4.007	15.524	14.130	24.4	10.3	18.5	4.4	4.23	0.42	17.3	7.1	11.4
33	102.7	0.245	71.0	5.8	6.65	4.132	15.742	14.320	24.6	10.3	18.8	4.4	4.22	0.41	17.4	7.2	11.6
34	103.8	0.252	70.9	5.8	6.66	4.257	15.912	14.462	24.7	10.3	19.0	4.5	4.21	0.40	17.5	7.2	11.7
35	105.2	0.260	70.8	5.7	6.67	4.382	16.142	14.662	24.9	10.3	19.2	4.6	4.21	0.39	17.6	7.3	11.9
36	106.3	0.268	70.8	5.6	6.68	4.517	16.311	14.803	25.1	10.3	19.5	4.7	4.18	0.38	17.7	7.4	12.1
37	107.4	0.276	70.7	5.5	6.69	4.652	16.481	14.942	25.2	10.3	19.7	4.7	4.17	0.37	17.7	7.5	12.2
38	108.3	0.283	70.6	5.5	6.70	4.777	16.614	15.048	25.3	10.3	19.8	4.8	4.14	0.36	17.8	7.5	12.3
39	109.8	0.291	70.6	5.4	6.71	4.902	16.856	15.258	25.5	10.3	20.1	4.9	4.14	0.35	17.9	7.6	12.5
40	110.4	0.298	70.5	5.3	6.71	5.037	16.953	15.327	25.6	10.3	20.3	4.9	4.11	0.35	17.9	7.7	12.6
41	111.3	0.306	70.4	5.3	6.72	5.163	17.099	15.444	25.7	10.3	20.4	5.0	4.09	0.34	18.0	7.7	12.7
42	112.1	0.313	70.3	5.2	6.73	5.288	17.220	15.537	25.8	10.3	20.6	5.1	4.06	0.33	18.0	7.8	12.8
43	112.7	0.321	70.3	5.1	6.74	5.413	17.317	15.607	25.9	10.3	20.7	5.1	4.04	0.33	18.1	7.8	12.9
44	113.6	0.328	70.2	5.1	6.75	5.538	17.450	15.711	26.0	10.3	20.9	5.2	4.02	0.32	18.1	7.9	13.1
45	114.0	0.336	70.1	4.9	6.76	5.663	17.510	15.746	26.0	10.3	21.1	5.3	3.96	0.31	18.1	7.9	13.2
46	114.4	0.343	70.0	4.9	6.77	5.798	17.583	15.791	26.1	10.3	21.2	5.4	3.94	0.31	18.2	7.9	13.3
47	115.0	0.351	70.0	4.8	6.78	5.923	17.668	15.849	26.1	10.3	21.3	5.4	3.91	0.30	18.2	7.9	13.4
48	115.0	0.358	69.9	4.7	6.79	6.049	17.668	15.827	26.1	10.3	21.3	5.5	3.87	0.30	18.2	7.9	13.4
49	114.7	0.366	69.8	4.7	6.80	6.174	17.619	15.759	26.0	10.3	21.3	5.6	3.82	0.30	18.1	7.9	13.5
50	114.6	0.373	69.8	4.6	6.81	6.299	17.607	15.726	26.0	10.3	21.4	5.6	3.79	0.29	18.1	7.9	13.5
51	114.7	0.381	69.7	4.5	6.81	6.424	17.619	15.715	26.0	10.3	21.5	5.7	3.74	0.29	18.1	7.9	13.6
52	114.1	0.388	69.6	4.5	6.82	6.559	17.534	15.612	25.9	10.3	21.4	5.8	3.70	0.29	18.1	7.8	13.6
53	114.3	0.396	69.6	4.4	6.83	6.684	17.559	15.613	25.9	10.3	21.5	5.8	3.67	0.28	18.1	7.8	13.6
54	113.9	0.403	69.5	4.4	6.84	6.809	17.498	15.535	25.8	10.3	21.4	5.9	3.63	0.28	18.0	7.8	13.7
55	113.0	0.411	69.4	4.3	6.85	6.944	17.365	15.387	25.6	10.3	21.4	6.0	3.57	0.28	18.0	7.7	13.7
56	112.4	0.419	69.3	4.2	6.86	7.070	17.268	15.275	25.5	10.3	21.4	6.1	3.51	0.27	17.9	7.6	13.7
57	111.4	0.427	69.3	4.1	6.87	7.204	17.111	15.106	25.4	10.3	21.3	6.2	3.45	0.27	17.8	7.6	13.7
58	110.7	0.433	69.1	4.0	6.88	7.320	16.990	14.974	25.2	10.3	21.3	6.3	3.38	0.27	17.7	7.5	13.8
59	109.6	0.441	69.1	3.9	6.89	7.455	16.832	14.805	25.1	10.3	21.2	6.4	3.33	0.26	17.7	7.4	13.8

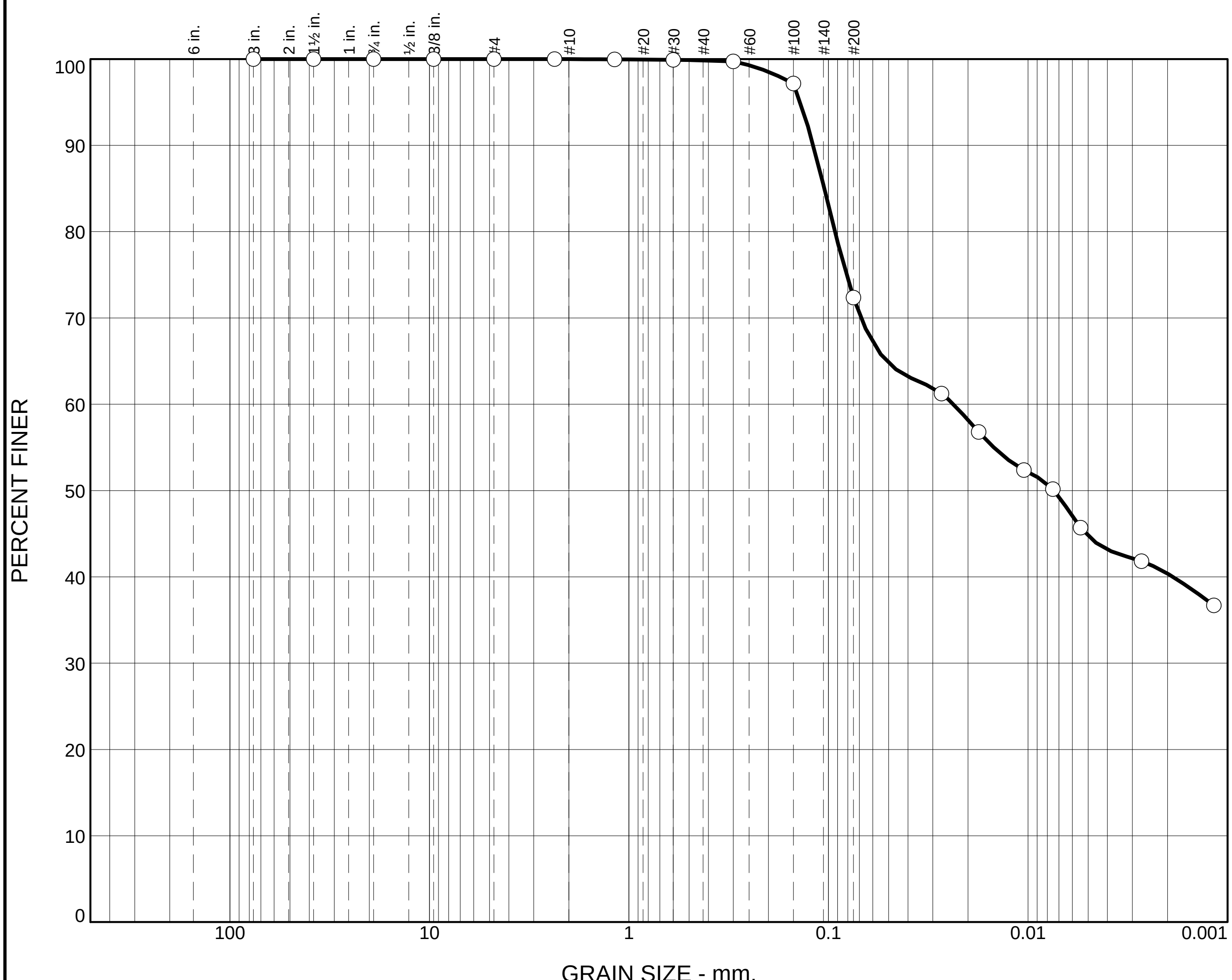
Specimen C

Reading No.	Deviator Load (lbs)	Axial Deformation (in)	Pore Pressure (psi)	Change in Pore Pressure (psi)	Corrected Area (in2)	Axial Strain (%)	Deviator Stress (psi)	Corrected Deviator Stress (psi)	σ_1 (psi)	σ_3 (psi)	σ'_1 (psi)	σ'_3 (psi)	σ'_1/σ'_3	Abar	P (psi)	Q (psi)	P' (psi)
60	108.6	0.449	69.0	3.8	6.90	7.580	16.675	14.639	24.9	10.3	21.1	6.5	3.26	0.26	17.6	7.3	13.8
61	107.7	0.457	68.9	3.7	6.91	7.715	16.529	14.482	24.7	10.3	21.1	6.6	3.20	0.25	17.5	7.2	13.8
62	106.6	0.464	68.8	3.6	6.92	7.840	16.360	14.305	24.6	10.3	21.0	6.6	3.15	0.25	17.4	7.2	13.8
63	106.0	0.472	68.7	3.6	6.93	7.965	16.263	14.195	24.5	10.3	20.9	6.7	3.12	0.25	17.4	7.1	13.8
64	105.2	0.479	68.7	3.5	6.94	8.090	16.130	14.053	24.3	10.3	20.8	6.8	3.08	0.25	17.3	7.0	13.8
65	105.4	0.486	68.6	3.4	6.95	8.216	16.166	14.066	24.3	10.3	20.9	6.8	3.06	0.24	17.3	7.0	13.9
66	104.6	0.494	68.5	3.4	6.96	8.351	16.045	13.933	24.2	10.3	20.8	6.9	3.02	0.24	17.2	7.0	13.9
67	104.3	0.502	68.5	3.3	6.97	8.476	15.997	13.869	24.1	10.3	20.8	7.0	3.00	0.24	17.2	6.9	13.9
68	103.6	0.509	68.4	3.3	6.98	8.601	15.888	13.749	24.0	10.3	20.7	7.0	2.97	0.24	17.1	6.9	13.9
69	102.9	0.517	68.4	3.2	6.99	8.726	15.779	13.630	23.9	10.3	20.7	7.1	2.93	0.24	17.1	6.8	13.9
70	102.7	0.525	68.3	3.2	7.00	8.861	15.742	13.575	23.8	10.3	20.7	7.1	2.91	0.23	17.0	6.8	13.9
71	102.2	0.532	68.3	3.1	7.01	8.986	15.658	13.478	23.7	10.3	20.6	7.1	2.89	0.23	17.0	6.7	13.9
72	101.6	0.539	68.2	3.1	7.02	9.111	15.573	13.382	23.6	10.3	20.6	7.2	2.87	0.23	17.0	6.7	13.9
73	101.3	0.547	68.2	3.0	7.03	9.246	15.524	13.317	23.6	10.3	20.6	7.2	2.84	0.23	16.9	6.7	13.9
74	100.7	0.555	68.2	3.0	7.04	9.381	15.427	13.208	23.5	10.3	20.5	7.3	2.82	0.23	16.9	6.6	13.9
75	100.4	0.562	68.1	2.9	7.05	9.497	15.379	13.146	23.4	10.3	20.5	7.3	2.80	0.22	16.8	6.6	13.9
76	100.1	0.570	68.1	2.9	7.06	9.632	15.331	13.082	23.3	10.3	20.4	7.4	2.78	0.22	16.8	6.5	13.9
77	99.8	0.578	68.0	2.9	7.07	9.757	15.282	13.019	23.3	10.3	20.4	7.4	2.77	0.22	16.8	6.5	13.9
78	99.4	0.585	68.0	2.9	7.08	9.882	15.222	12.945	23.2	10.3	20.3	7.4	2.75	0.22	16.7	6.5	13.9
79	99.3	0.593	68.0	2.8	7.09	10.017	15.209	12.914	23.2	10.3	20.3	7.4	2.74	0.22	16.7	6.5	13.9
80	98.8	0.600	68.0	2.8	7.10	10.142	15.137	12.830	23.1	10.3	20.3	7.5	2.72	0.22	16.7	6.4	13.9
81	98.8	0.608	67.9	2.8	7.11	10.267	15.125	12.800	23.1	10.3	20.3	7.5	2.71	0.22	16.7	6.4	13.9
82	99.2	0.615	67.9	2.8	7.12	10.392	15.197	12.846	23.1	10.3	20.3	7.5	2.72	0.22	16.7	6.4	13.9
83	100.5	0.623	67.9	2.8	7.13	10.518	15.391	13.000	23.3	10.3	20.5	7.5	2.74	0.21	16.8	6.5	14.0
84	101.8	0.629	68.0	2.8	7.14	10.633	15.597	13.166	23.4	10.3	20.6	7.5	2.77	0.21	16.8	6.6	14.0
85	102.1	0.637	68.0	2.8	7.15	10.758	15.645	13.190	23.5	10.3	20.6	7.4	2.77	0.21	16.9	6.6	14.0
86	103.1	0.644	68.0	2.9	7.16	10.884	15.803	13.311	23.6	10.3	20.7	7.4	2.80	0.22	16.9	6.7	14.1
87	103.9	0.652	68.0	2.9	7.17	11.009	15.936	13.410	23.7	10.3	20.8	7.4	2.82	0.22	17.0	6.7	14.1
88	104.7	0.659	68.1	2.9	7.18	11.134	16.057	13.497	23.8	10.3	20.8	7.3	2.84	0.22	17.0	6.7	14.1
89	104.8	0.666	68.1	2.9	7.19	11.259	16.069	13.488	23.7	10.3	20.8	7.3	2.84	0.22	17.0	6.7	14.1
90	105.3	0.674	68.1	3.0	7.20	11.394	16.154	13.541	23.8	10.3	20.8	7.3	2.86	0.22	17.0	6.8	14.1
91	105.5	0.682	68.1	3.0	7.21	11.519	16.178	13.542	23.8	10.3	20.8	7.3	2.86	0.22	17.0	6.8	14.1
92	105.9	0.689	68.1	3.0	7.22	11.645	16.239	13.576	23.8	10.3	20.9	7.3	2.86	0.22	17.0	6.8	14.1
93	106.0	0.697	68.1	3.0	7.23	11.779	16.263	13.575	23.8	10.3	20.9	7.3	2.86	0.22	17.0	6.8	14.1
94	106.4	0.705	68.1	3.0	7.24	11.905	16.324	13.608	23.9	10.3	20.9	7.3	2.87	0.22	17.1	6.8	14.1
95	106.7	0.713	68.1	3.0	7.25	12.039	16.372	13.629	23.9	10.3	20.9	7.3	2.87	0.22	17.1	6.8	14.1
96	106.9	0.721	68.1	3.0	7.26	12.174	16.408	13.639	23.9	10.3	20.9	7.3	2.87	0.22	17.1	6.8	14.1
97	107.4	0.728	68.1	2.9	7.27	12.299	16.481	13.682	23.9	10.3	21.0	7.3	2.87	0.22	17.1	6.8	14.2
98	108.3	0.735	68.1	2.9	7.28	12.425	16.626	13.788	24.0	10.3	21.1	7.3	2.88	0.21	17.2	6.9	14.2
99	108.5	0.743	68.1	2.9	7.29	12.550	16.650	13.789	24.0	10.3	21.1	7.3	2.88	0.21	17.2	6.9	14.2
100	107.6	0.751	68.2	3.0	7.30	12.685	16.517	13.650	23.9	10.3	20.9	7.3	2.88	0.22	17.1	6.8	14.1

Specimen C

Reading No.	Deviator Load (lbs)	Axial Deformation (in)	Pore Pressure (psi)	Change in Pore Pressure (psi)	Corrected Area (in2)	Axial Strain (%)	Deviator Stress (psi)	Corrected Deviator Stress (psi)	σ_1 (psi)	σ_3 (psi)	σ'_1 (psi)	σ'_3 (psi)	σ'_1/σ'_3	Abar	P (psi)	Q (psi)	P' (psi)
101	108.1	0.758	68.1	3.0	7.31	12.810	16.590	13.693	24.0	10.3	21.0	7.3	2.88	0.22	17.1	6.8	14.1
102	107.9	0.766	68.1	2.9	7.32	12.935	16.566	13.651	23.9	10.3	21.0	7.3	2.86	0.21	17.1	6.8	14.2
103	108.2	0.773	68.0	2.9	7.33	13.060	16.602	13.662	23.9	10.3	21.1	7.4	2.85	0.21	17.1	6.8	14.2
104	107.9	0.780	68.0	2.8	7.35	13.186	16.554	13.599	23.9	10.3	21.0	7.4	2.83	0.21	17.1	6.8	14.2
105	107.4	0.788	67.9	2.8	7.36	13.311	16.481	13.515	23.8	10.3	21.0	7.5	2.81	0.21	17.0	6.8	14.2
106	107.2	0.795	67.9	2.7	7.37	13.426	16.445	13.465	23.7	10.3	21.0	7.5	2.79	0.20	17.0	6.7	14.2
107	107.1	0.802	67.9	2.7	7.38	13.552	16.433	13.434	23.7	10.3	21.0	7.6	2.78	0.20	17.0	6.7	14.3
108	107.3	0.809	67.8	2.6	7.39	13.677	16.469	13.444	23.7	10.3	21.1	7.6	2.76	0.20	17.0	6.7	14.3
109	107.4	0.817	67.8	2.6	7.40	13.802	16.481	13.434	23.7	10.3	21.1	7.7	2.75	0.19	17.0	6.7	14.4
110	107.3	0.824	67.7	2.6	7.41	13.927	16.469	13.403	23.7	10.3	21.1	7.7	2.74	0.19	17.0	6.7	14.4
111	106.9	0.832	67.7	2.5	7.42	14.062	16.408	13.329	23.6	10.3	21.1	7.8	2.72	0.19	16.9	6.7	14.4
112	106.7	0.840	67.6	2.5	7.43	14.187	16.372	13.277	23.5	10.3	21.1	7.8	2.71	0.19	16.9	6.6	14.4
113	106.9	0.847	67.6	2.4	7.44	14.312	16.408	13.288	23.5	10.3	21.1	7.8	2.70	0.18	16.9	6.6	14.5
114	106.9	0.854	67.5	2.4	7.45	14.438	16.408	13.267	23.5	10.3	21.1	7.9	2.68	0.18	16.9	6.6	14.5
115	107.0	0.862	67.5	2.3	7.46	14.573	16.420	13.255	23.5	10.3	21.2	7.9	2.67	0.18	16.9	6.6	14.5
116	107.6	0.870	67.5	2.3	7.48	14.698	16.505	13.307	23.6	10.3	21.3	8.0	2.67	0.17	16.9	6.7	14.6
117	108.6	0.878	67.5	2.3	7.49	14.833	16.663	13.419	23.7	10.3	21.4	8.0	2.69	0.17	17.0	6.7	14.7
118	109.0	0.885	67.5	2.3	7.50	14.958	16.735	13.460	23.7	10.3	21.4	8.0	2.69	0.17	17.0	6.7	14.7
119	109.1	0.889	67.5	2.3	7.50	15.016	16.747	13.461	23.7	10.3	21.4	7.9	2.70	0.17	17.0	6.7	14.7

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.0	0.2	27.4	27.7	44.7

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	40	18	0.1050	0.0236	0.0074					

Material Description	USCS	AASHTO
○ Red tan sandy CLAY (CL)	CL	A-6(14)

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

○ **Location:** M-2 **Depth:** 9-11' **Sample Number:** UD-1

Remarks:

Contour Engineering, LLC

Kennesaw, GA

Figure

CONTOUR ENGINEERING, LLC

Geotechnical Services • Materials Testing Services • Environmental Services

SIEVE ANALYSIS

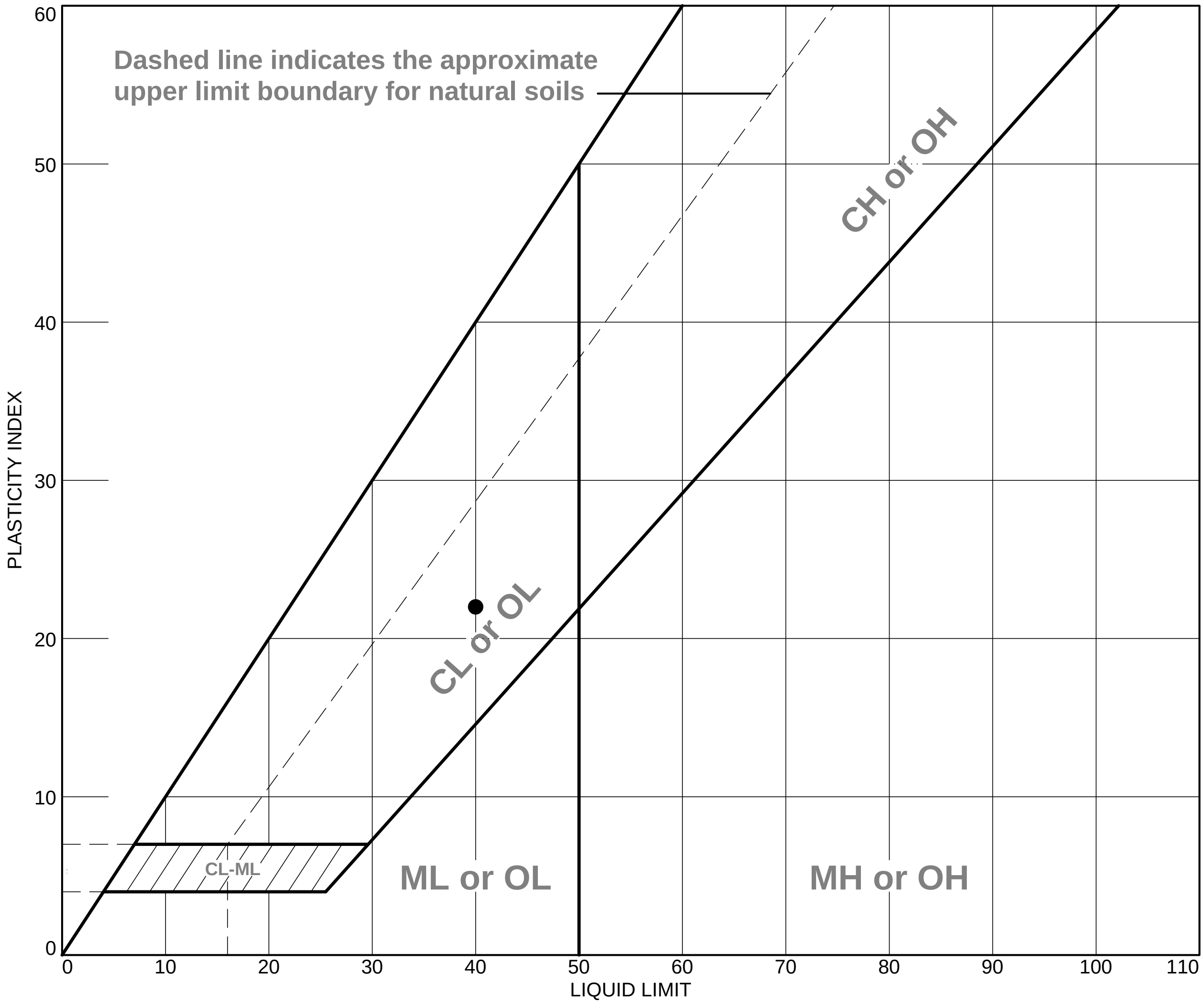
ASTM D 422 - Uniform Spacing Set

Project Name: Plant McIntosh
Project No.: AT10SOC03-M
Sample No.: M-2, UD-1 (9-11')
Tare No.: 44A

Wt of Soil+Tare Before Wash	592.26
Wt of Soil+Tare After Wash	312.29
Wt of Tare	206.63
Wt Soil Passing No. 200	279.97
Wt of Soil After Wash	105.66

Sieve No.	Opening Size (mm)	Cumulative Wt	% Retained	% Passing
3"	75	0.00	0.0	100.00
1.5"	37.5	0.00	0.0	100.00
3/4"	19.0	0.00	0.0	100.00
3/8"	9.5	0.00	0.0	100.00
#4	4.75	0.00	0.0	100.00
#8	2.36	0.03	0.0	99.99
#16	1.18	0.15	0.0	99.96
#30	0.600	0.34	0.1	99.91
#50	0.300	1.05	0.3	99.73
#100	0.150	10.95	2.8	97.16
#200	0.075	106.55	27.6	72.37
	Pan			

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Red tan sandy CLAY (CL)	40	18	22	99.8	72.4	CL

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

Project: Plant McIntosh

● **Location:** M-2 **Depth:** 9-11' **Sample Number:** UD-1

Remarks:

Contour Engineering, LLC

Kennesaw, GA

Figure

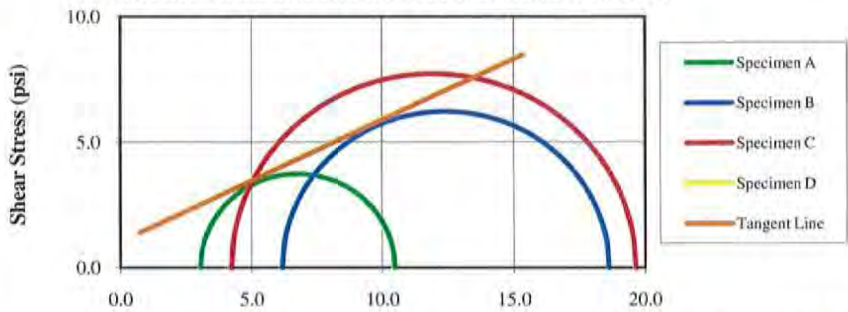
Contour Engineering

Consolidated Undrained Triaxial Test (ASTM D4767)

Date:

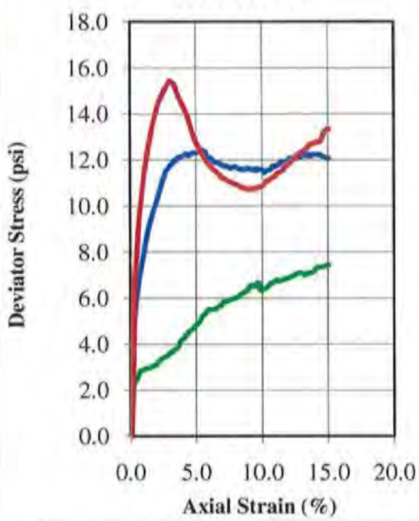
Checked By:

Effective Stress at Maximum Deviator Stress Criterion



Normal Stress (psi) 116.4 116.5 114.9 AVG=116 pcf

Deviator Stress Vs. Axial Strain



Initial	Specimen A	Specimen B	Specimen C	Specimen D
Water Content (%)	39.4	29.9	24.1	
Dry Density (pcf)	83.5	89.7	92.4	
Saturation (%)	104.25	91.84	78.83	
Void Ratio	1.016	0.875	0.821	
Diameter (in)	2.853	2.865	2.874	
Height (in)	4.911	6.012	5.898	
Specific Gravity	2.70	2.70	2.70	
Liquid Limit	40	40	40	
Plastic Limit	18	18	18	
After Consolidation	**A**	**B**	**C**	**D**
B-Value	0.97	0.97	0.95	
Water Content (%)	32.0	31.5	36.1	
Dry Density (pcf)	93.72	93.32	87.95	
Saturation (%)	100.00	100.00	100.00	
Void Ratio	0.798	0.806	0.917	
Effective Stress (psi)	3.4	6.9	10.3	
Back Press. (psi)	75.0	75.0	75.1	
Rate of Strain	0.015	0.015	0.015	
After Shear	**A**	**B**	**C**	**D**
σ'1 at Failure (psi)	10.43	18.57	19.59	
σ'3 at Failure (psi)	2.98	6.13	4.16	

Date

Maximium Deviator Stress Criterion	
psf 154.8 C (psi)	1.1
psf 85.3 C' (psi)	1.1
22 Ø (deg)	22.0
32 Ø' (deg)	25.9

Project:	Plant McIntosh	N/A	N/A	N/A	N/A
Location:	M-2, UD-1 (9-11')				
Project Number:	AT10SOC03-M				
Boring Number:	M-2				
Sample Number:	M-2, UD-1				
Depth:	9-11'				
Sample Type:	Undisturbed	Failure Photographs			
Description:	Red tan sandy CLAY (CL) through entire shelby tube				
Test Type	Consolidated Undrained				
Remarks	2" void on top of tube. Top of sample very soft.				

Tested By:

M-2
9-11'

Contour Engineering

Consolidated Undrained Triaxial Test (ASTM D4767)

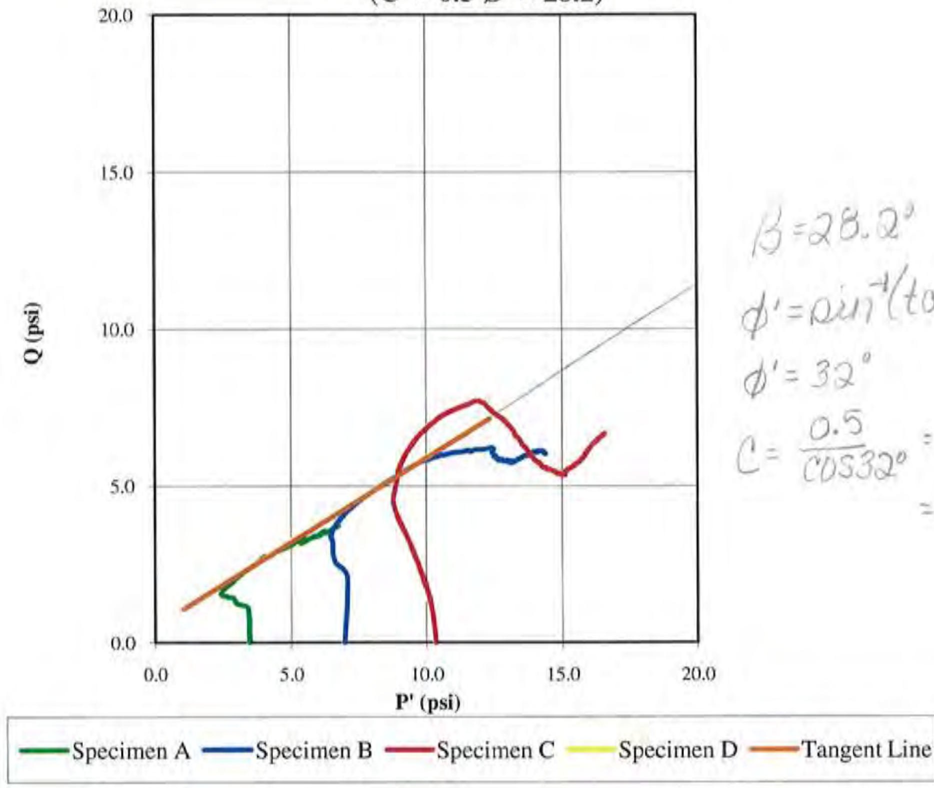
Date:

Checked By:

Date:

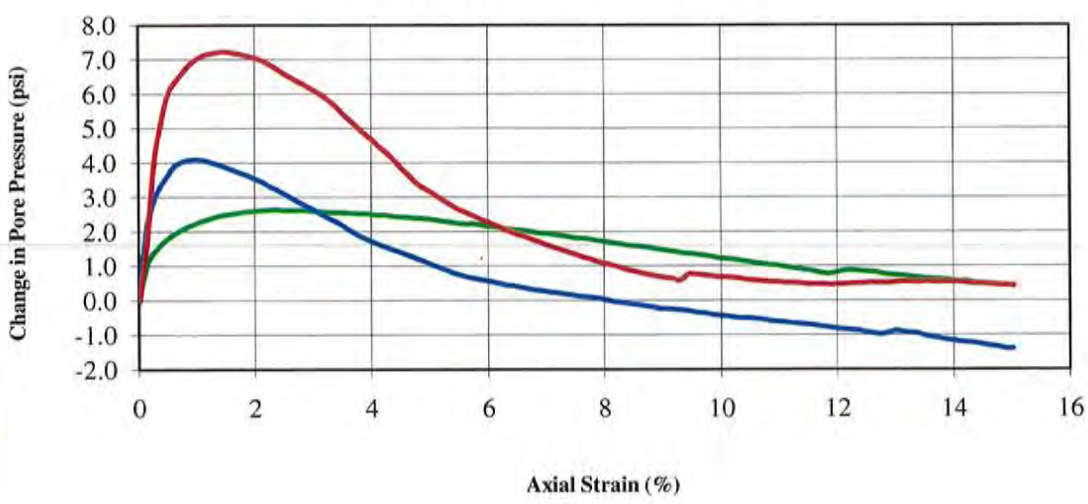
Tested By:

Stress Paths (Effective)
(C' = 0.5 Ø' = 28.2)

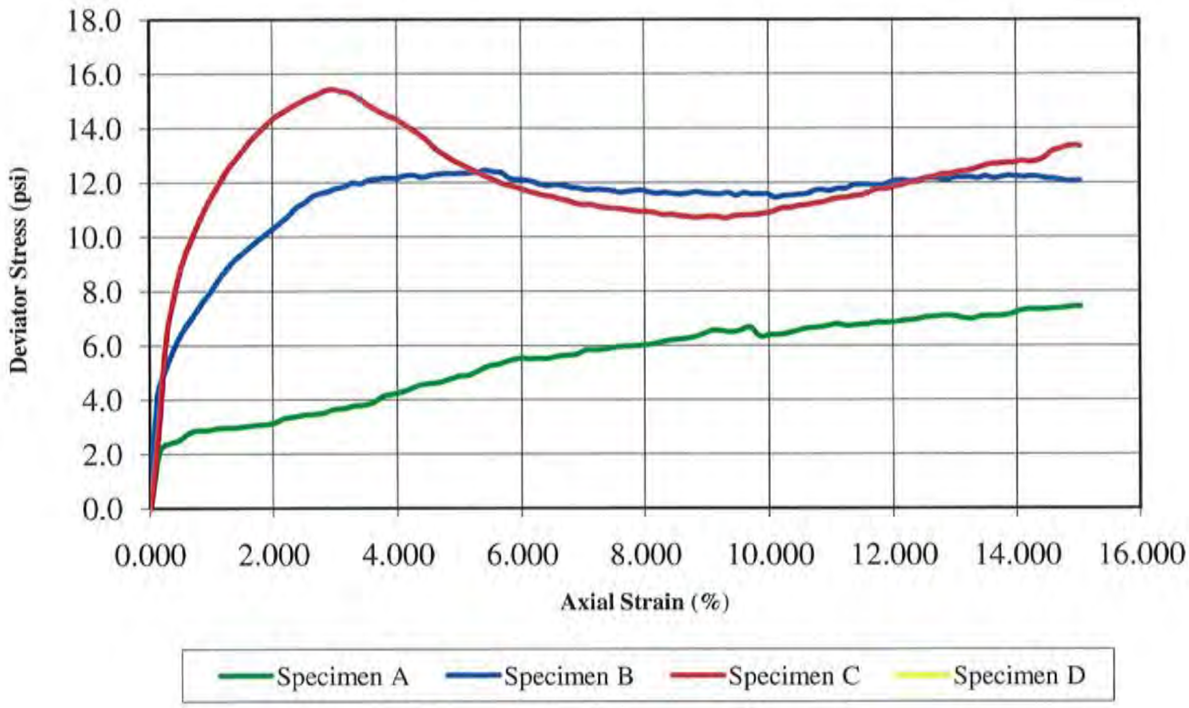


$\beta = 28.2°$
$\phi' = \sin^{-1}(\tan 28.2°)$
$\phi' = 32°$
$C = \frac{0.5}{\cos 32°} = .59\text{psi}$
$= 85.3\text{psf}$

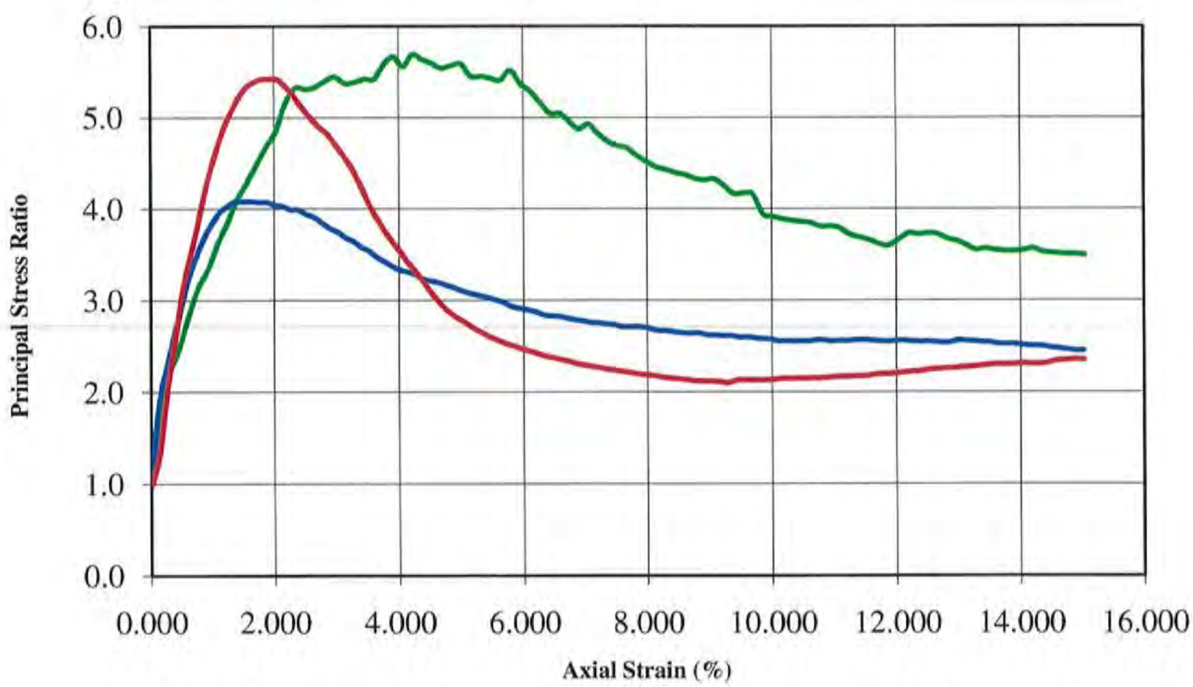
Change in Pore Pressure vs. Axial Strain



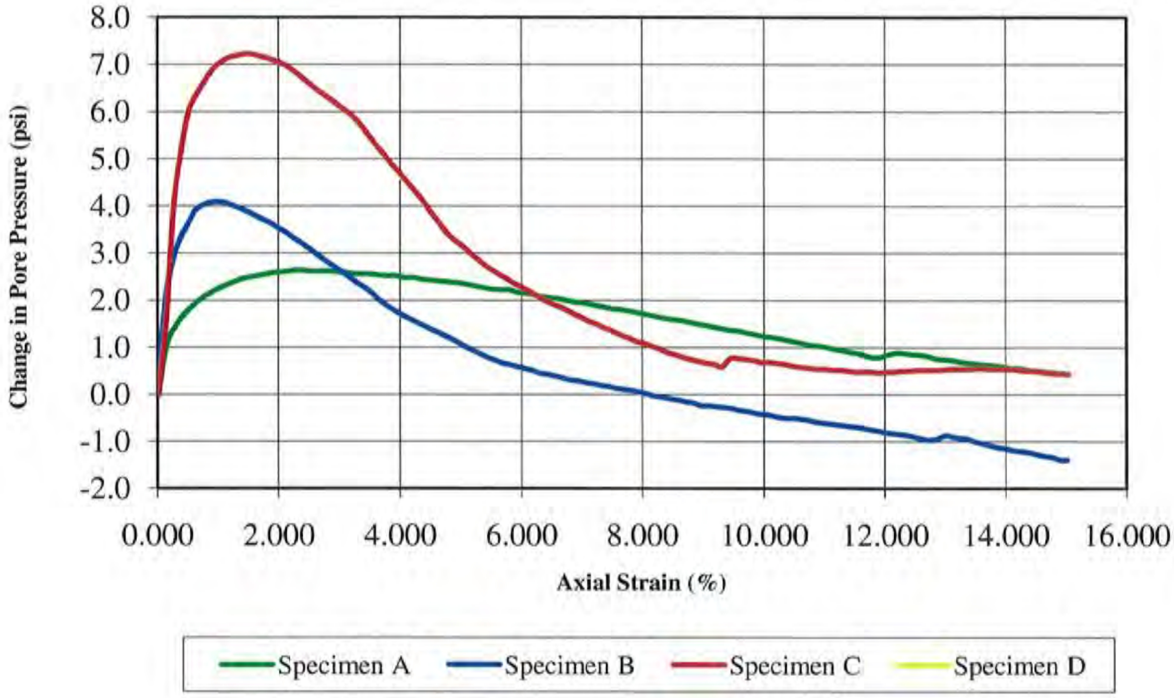
Deviator Stress vs. Axial Strain



Principal Stress Ratio vs. Axial Strain

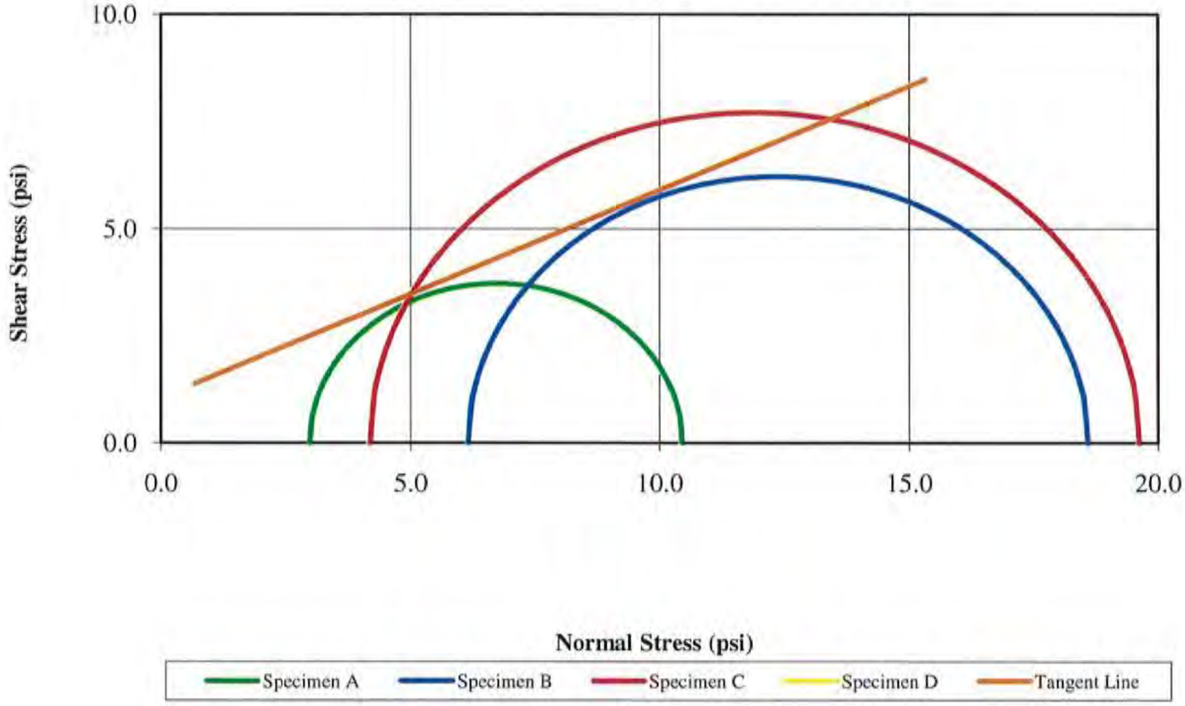


Change in Pore Pressure vs. Axial Strain

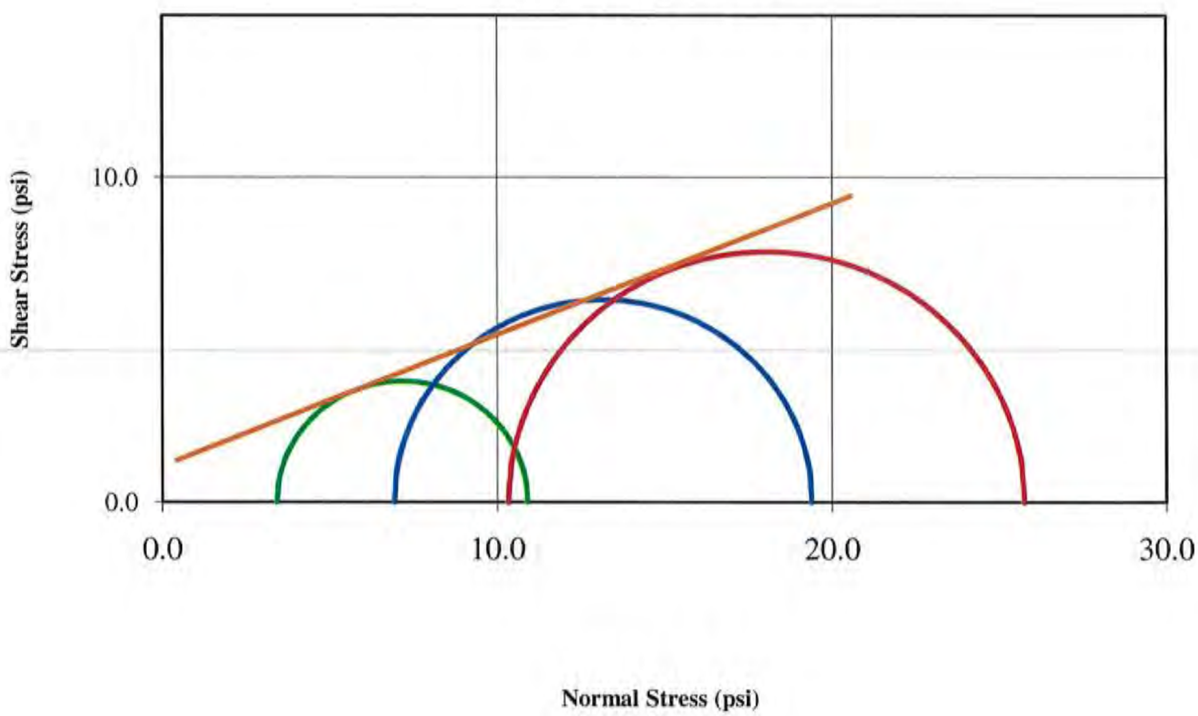


Mohr Stress Circles at Maximum Deviator Stress Criterion

Effective Stress
(C' = 1.1 Ø' = 25.9)

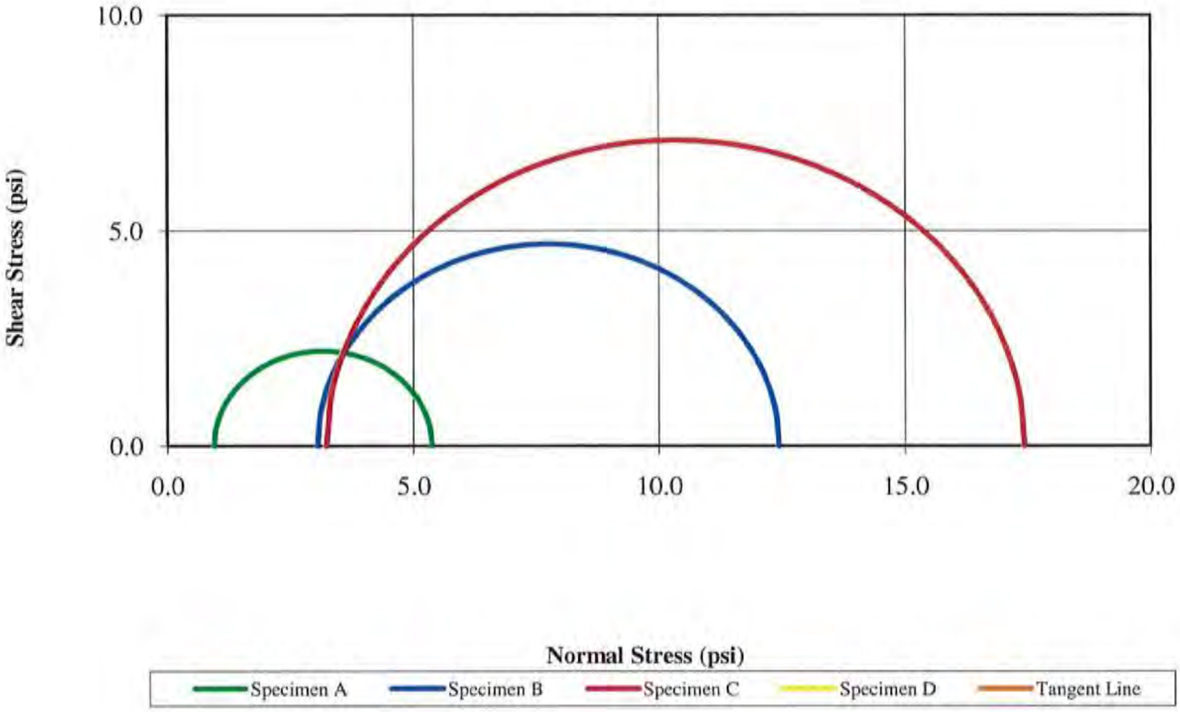


Total Stress
(C = 1.1 Ø = 22.0)

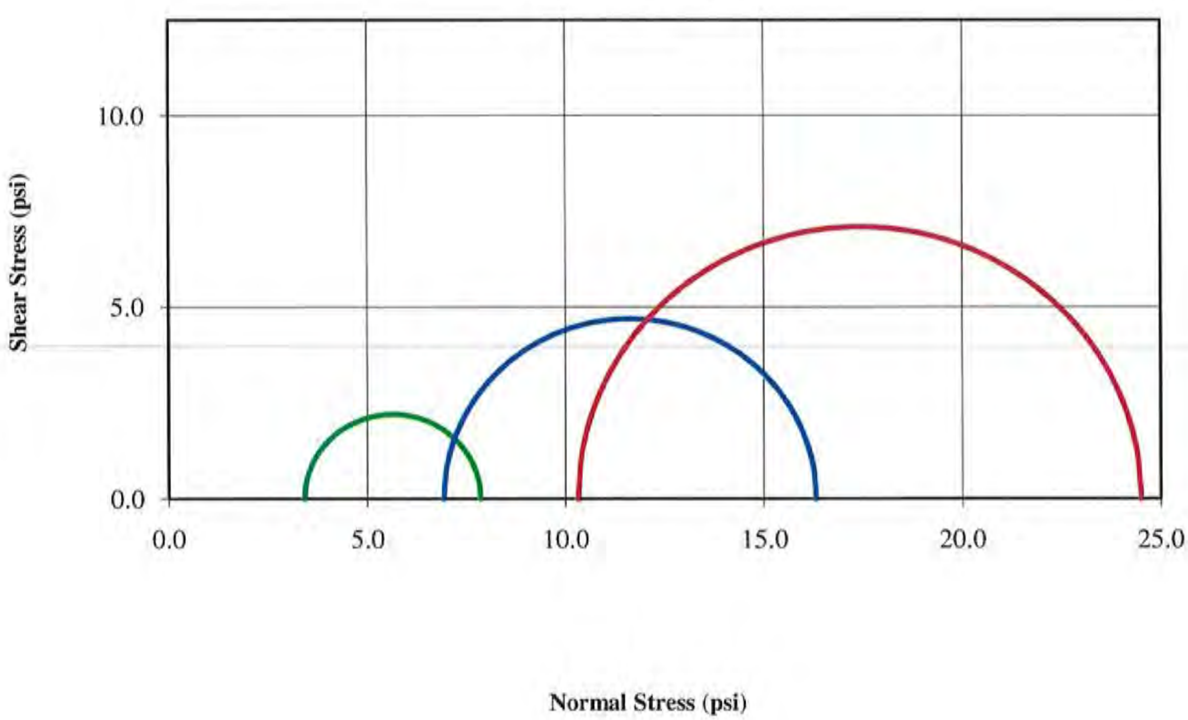


Mohr Stress Circles at Maximum Principal Stress Ratio Criterion

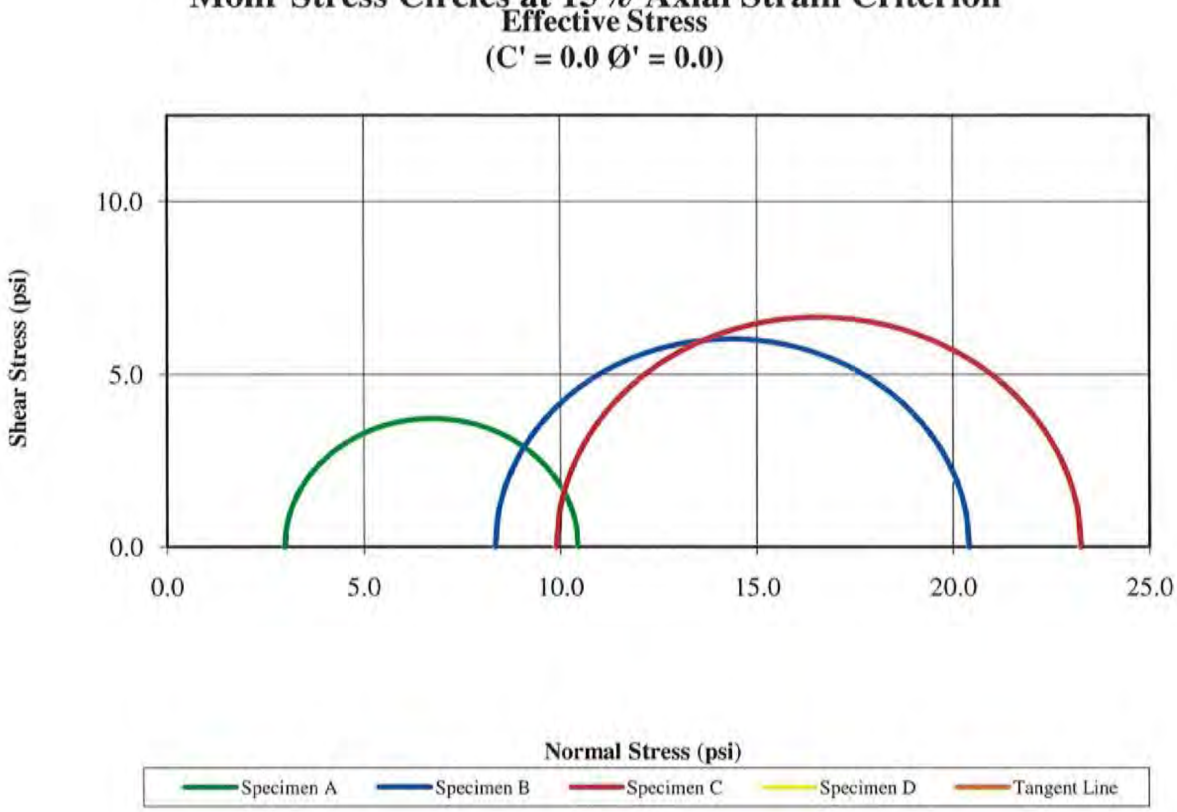
Effective Stress
(C' = 0.0 Ø' = 0.0)

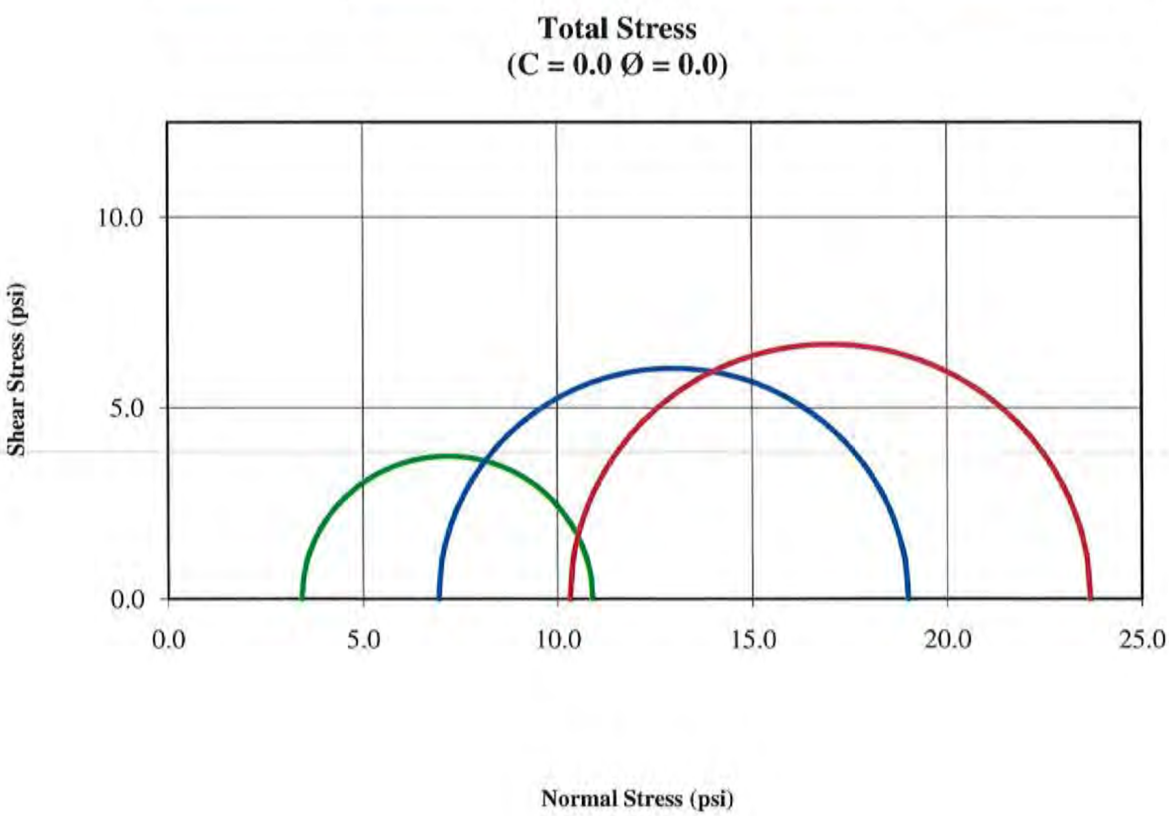


Total Stress
(C = 0.0 Ø = 0.0)

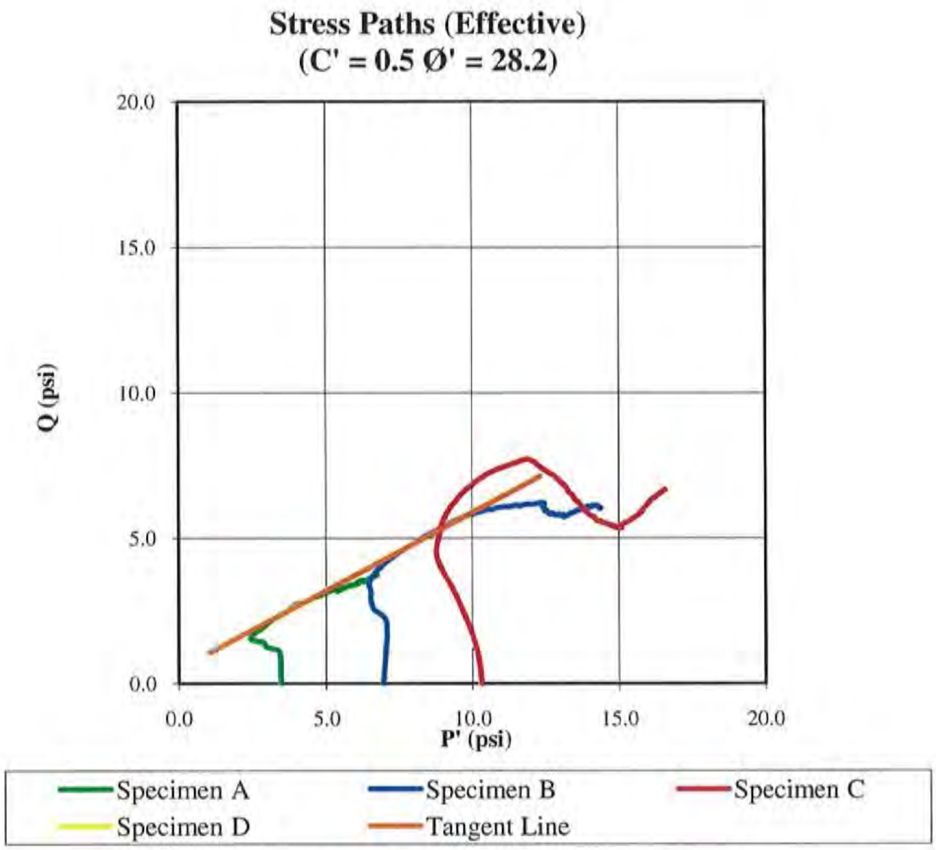


Mohr Stress Circles at 15% Axial Strain Criterion

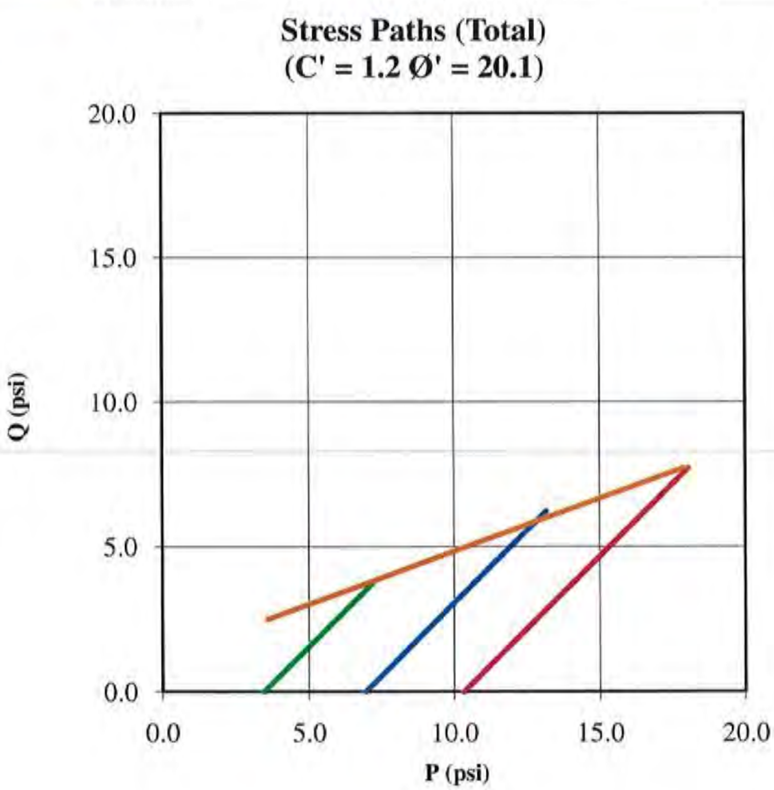




 CONFIDENTIAL BUSINESS INFORMATION

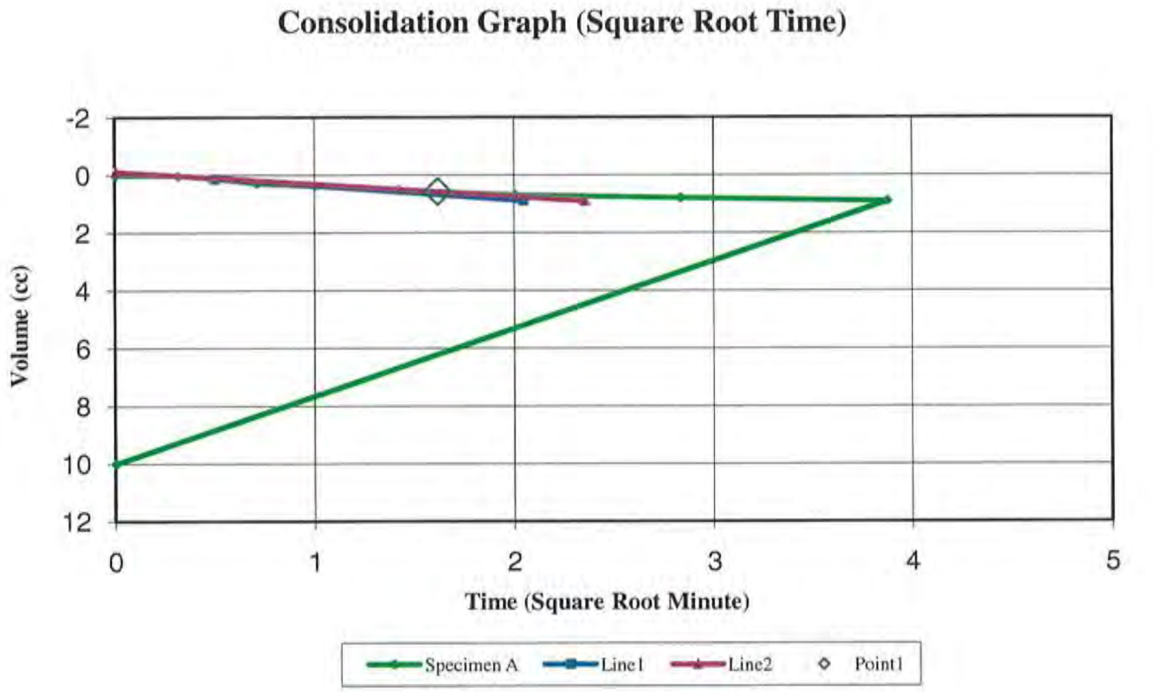


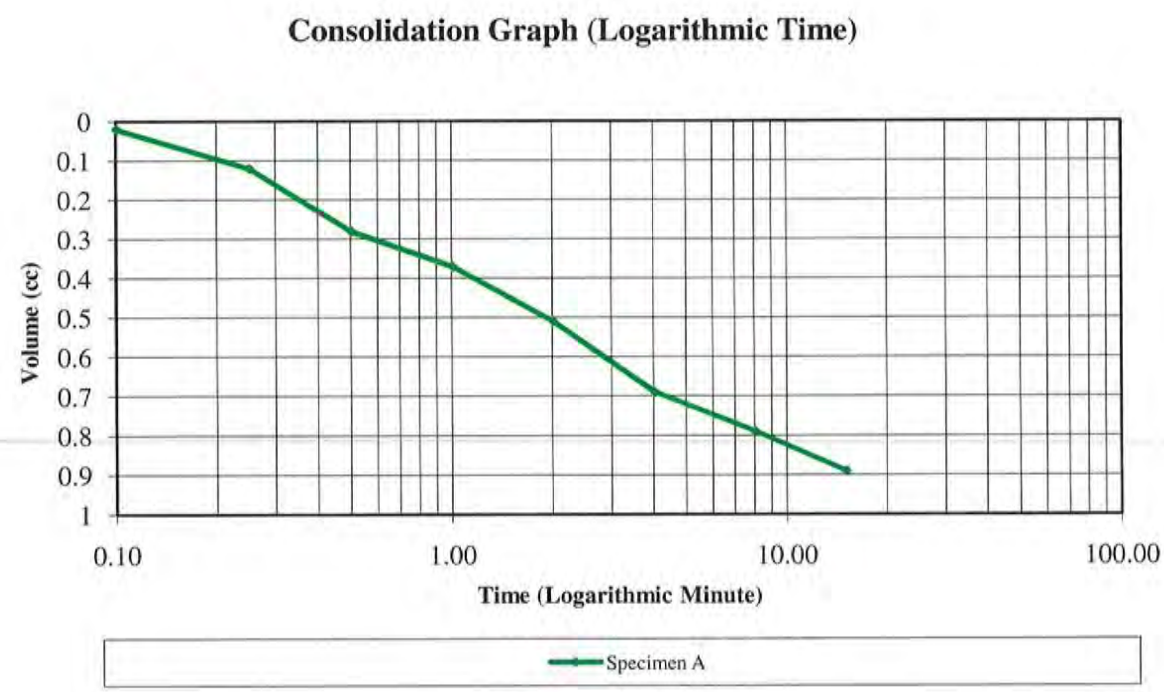
Stress Paths (Effective)
(C' = 0.5 Ø' = 28.2)
Q (psi)
P' (psi)
0.0
5.0
10.0
15.0
20.0
Specimen A
Specimen B
Specimen C
Specimen D
Tangent Line



Stress Paths (Total)
(C' = 1.2 Ø' = 20.1)
Q (psi)
P (psi)
0.0
5.0
10.0
15.0
20.0

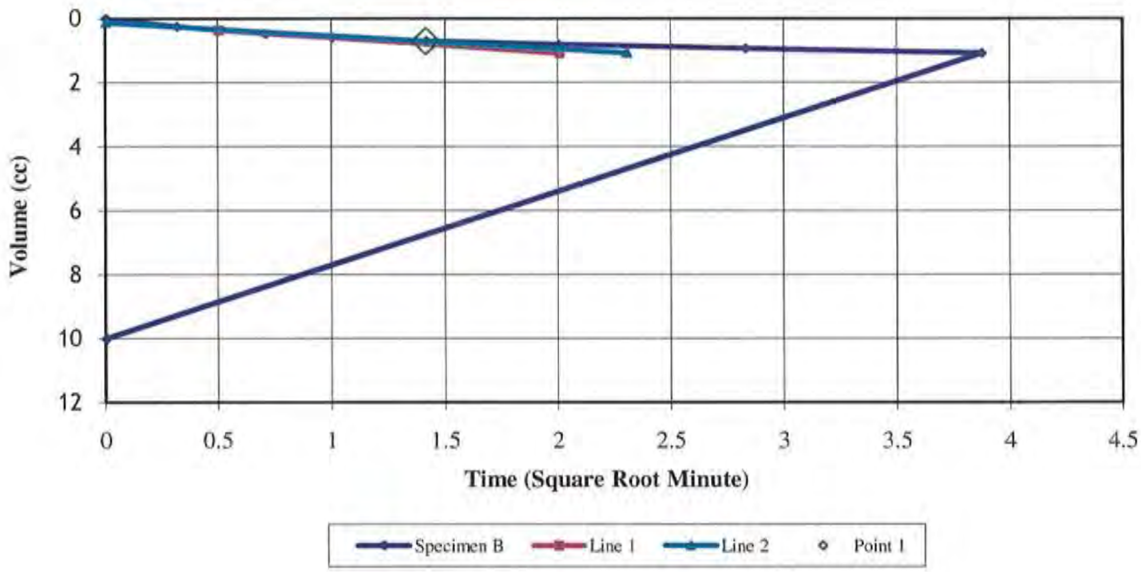
Specimen A Consolidation Graphs



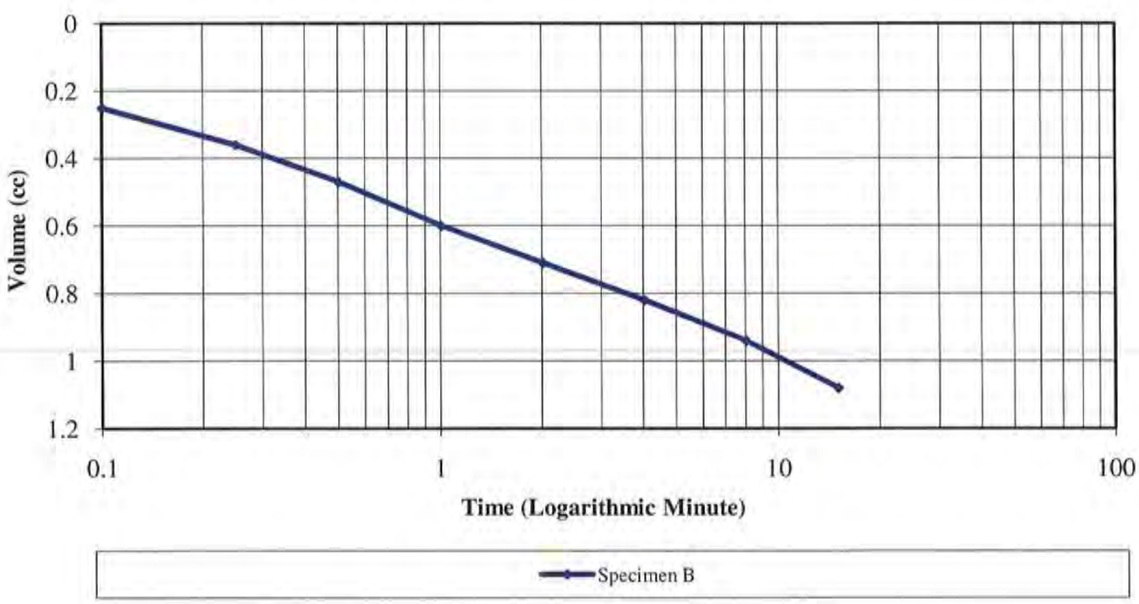


Specimen B Consolidation Graphs

Consolidation Graph (Square Root Time)

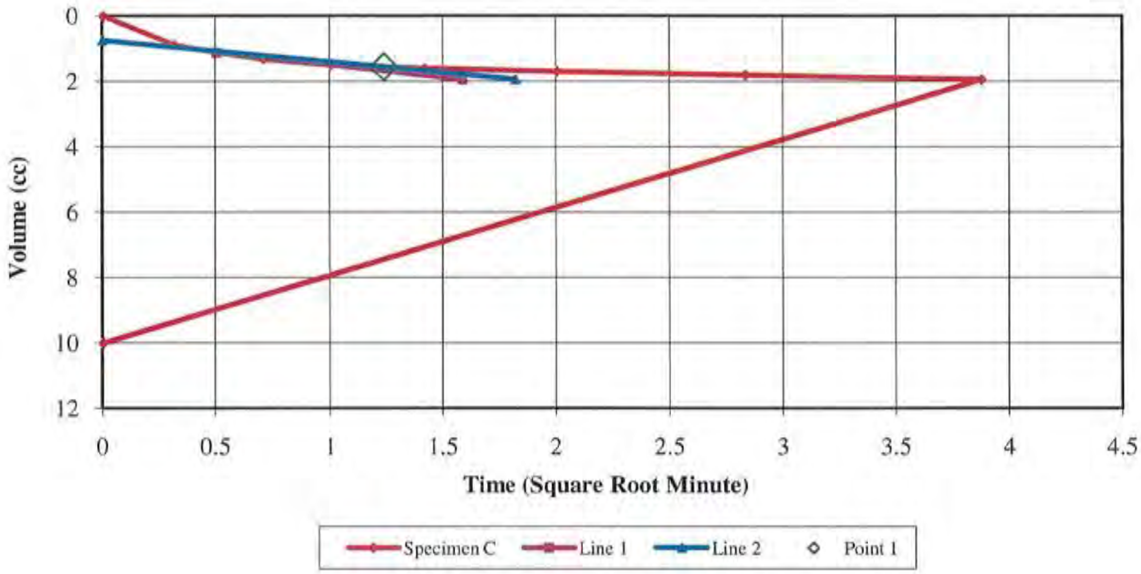


Consolidation Graph (Logarithmic Time)

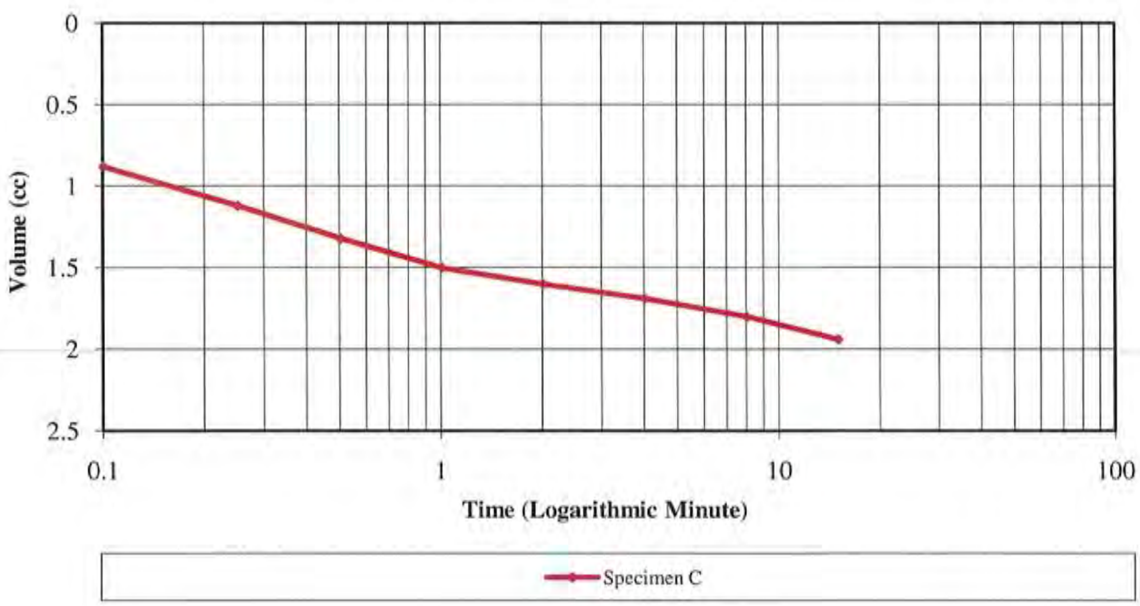


Specimen C Consolidation Graphs

Consolidation Graph (Square Root Time)



Consolidation Graph (Logarithmic Time)



Consolidation Calculations Specimen A

CU Triaxial Test

Contour Engineering

Client: Southern Company

Project No. AT10SOC03-M

Project Name: Plant McIntosh

Project Location: M-2, UD-1 (9-11')

Hole No. M-2

Depth: 9-11'

Cell Pressure (psi) = 78.47

Back Pressure (psi) = 75

Effective Pressure (psi)= 3.47

Test Type = CU

Initial Sample Diameter (in) = 2.853

Initial Sample Height (in) = 4.911

Initial Sample Area (in2) = 6.393

Initial Volume (in3) = 31.39

Burrette Reading at Start of Test (cc)= 0

Time	Burrette Reading (cc)	Volume Change (cc)
00:00:00	0.00	N/A
00:00:06	-0.02	0.020
00:00:15	-0.12	0.120
00:00:30	-0.28	0.280
00:01:00	-0.37	0.370
00:02:00	-0.51	0.510
00:04:00	-0.69	0.690
00:08:00	-0.79	0.790
00:15:00	-0.89	0.890
	-10.00	10

Laboratory Supervisor

Consolidation Calculations Specimen B
CU Triaxial Test

Contour Engineering

Client: Southern Company

Project No. AT10SOC03-M

Project Name: Plant McIntosh

Project Location: M-2, UD-1 (9-11')

Hole No. M-2

Depth: 9-11'

Cell Pressure (psi) = 81.94
Back Pressure (psi) = 75
Effective Pressure (psi)= 6.94

Test Type = CU

Initial Sample Diameter (in) = 2.865
Initial Sample Height (in) = 6.012
Initial Sample Area (in2) = 6.447
Initial Volume (in3) = 38.76

Burrette Reading at Start of Test (cc)= 0

Time	Burrette Reading (cc)	Volume Change (cc)
00:00:00	0.00	N/A
00:00:06	-0.25	0.250
00:00:15	-0.36	0.360
00:00:30	-0.47	0.470
00:01:00	-0.60	0.600
00:02:00	-0.71	0.710
00:04:00	-0.82	0.820
00:08:00	-0.94	0.940
00:15:00	-1.08	1.080
	-10.00	10

Laboratory Supervisor

Consolidation Calculations Specimen C

CU Triaxial Test

Contour Engineering

Client: Southern Company

Project No. AT10SOC03-M

Project Name: Plant McIntosh

Project Location: M-2, UD-1 (9-11')

Hole No. M-2

Depth: 9-11'

Cell Pressure (psi) = 85.42

Back Pressure (psi) = 75

Effective Pressure (psi)= 10.42

Test Type = CU

Initial Sample Diameter (in) = 2.874

Initial Sample Height (in) = 5.898

Initial Sample Area (in2) = 6.486

Initial Volume (in3) = 38.26

Burrette Reading at Start of Test (cc)= 0

Time	Burrette Reading (cc)	Volume Change (cc)
00:00:00	0.00	N/A
00:00:06	-0.88	0.880
00:00:15	-1.12	1.120
00:00:30	-1.32	1.320
00:01:00	-1.50	1.500
00:02:00	-1.60	1.600
00:04:00	-1.69	1.690
00:08:00	-1.80	1.800
00:15:00	-1.94	1.940
	-10.00	10

Laboratory Supervisor

Specimen A Shear Data

CU Triaxial Test

Contour Engineering

File Location
Plant McIntosh M-2 UD-1 (10-1-10).HSD

Project Information

Project No.: AT10SOC03-M
Project Name: Plant McIntosh
Client: Southern Company
Sample Location: M-2, UD-1 (9-11')
Sample Description: Red tan CLAY (CL)
Remarks: Top of sample very soft

Sample Data

Sample Type: Undisturbed
Specific Gravity: 2.7
LL: 40.000
PL: 18.000

Sample Parameters	Initial	After Consolidation	Final
Diameter (in)	2.853	2.808	
Height (in)	4.911	4.815	
Weight (grams)	958.51		968.54
Moisture (%)	39.37		32.02
Dry Density (pcf)	83.46	93.72	
Saturation (%)	104.25	100.00	
Void Ratio	1.016	0.798	

Test Data

Rate of Strain: 0.015
Cell Pressure (psi): 78.470
Effective Confining Stress (psi): 3.4
Corrected Peak Deviator Stress (psi): 7.448 at reading number: 96

Specimen A

Reading No.	Deviator Load (lbs)	Axial Deformation (in)	Pore Pressure (psi)	Change in Pore Pressure (psi)	Corrected Area (in2)	Axial Strain (%)	Deviator Stress (psi)	Corrected Deviator Stress (psi)	σ_1 (psi)	σ_3 (psi)	σ'_1 (psi)	σ'_3 (psi)	σ'_1/σ'_3	Abar	P (psi)	Q (psi)	P' (psi)
0	2.5	0.000	75.0	0.0	6.19	0.000	0.000	0.000	3.4	3.4	3.4	3.4	1.00	0.00	3.4	0.0	3.4
1	16.1	0.007	76.2	1.1	6.20	0.154	2.194	2.131	5.6	3.4	4.4	2.3	1.92	0.52	4.5	1.1	3.4
2	18.1	0.015	76.5	1.5	6.21	0.308	2.518	2.390	5.8	3.4	4.3	1.9	2.24	0.62	4.6	1.2	3.1
3	19.1	0.022	76.8	1.7	6.22	0.450	2.680	2.492	5.9	3.4	4.2	1.7	2.48	0.70	4.7	1.2	2.9
4	21.2	0.030	77.0	1.9	6.23	0.615	3.017	2.757	6.2	3.4	4.2	1.5	2.86	0.70	4.8	1.4	2.9
5	22.2	0.036	77.1	2.1	6.24	0.757	3.192	2.871	6.3	3.4	4.2	1.3	3.14	0.72	4.9	1.4	2.8
6	22.7	0.044	77.2	2.2	6.25	0.923	3.266	2.875	6.3	3.4	4.1	1.2	3.35	0.77	4.9	1.4	2.7
7	23.6	0.052	77.3	2.3	6.26	1.077	3.404	2.945	6.4	3.4	4.1	1.1	3.62	0.78	4.9	1.5	2.6
8	24.1	0.059	77.4	2.4	6.27	1.230	3.491	2.966	6.4	3.4	4.0	1.0	3.85	0.80	4.9	1.5	2.5
9	24.6	0.067	77.5	2.5	6.28	1.384	3.566	2.974	6.4	3.4	3.9	1.0	4.09	0.83	4.9	1.5	2.4
10	25.2	0.074	77.5	2.5	6.29	1.538	3.678	3.019	6.4	3.4	3.9	0.9	4.28	0.83	4.9	1.5	2.4
11	26.0	0.082	77.6	2.5	6.30	1.704	3.802	3.070	6.5	3.4	4.0	0.9	4.49	0.83	5.0	1.5	2.4
12	26.6	0.089	77.6	2.6	6.31	1.858	3.890	3.090	6.5	3.4	3.9	0.8	4.68	0.84	5.0	1.5	2.4
13	27.3	0.097	77.7	2.6	6.32	2.011	4.014	3.150	6.6	3.4	4.0	0.8	4.84	0.83	5.0	1.6	2.4
14	28.4	0.104	77.7	2.6	6.33	2.165	4.189	3.315	6.7	3.4	4.1	0.8	5.15	0.79	5.1	1.7	2.5
15	28.8	0.112	77.7	2.6	6.34	2.331	4.251	3.369	6.8	3.4	4.1	0.8	5.32	0.78	5.1	1.7	2.5
16	29.3	0.120	77.7	2.6	6.35	2.496	4.339	3.447	6.9	3.4	4.2	0.8	5.31	0.76	5.1	1.7	2.5
17	29.5	0.128	77.7	2.6	6.36	2.650	4.363	3.464	6.9	3.4	4.3	0.8	5.33	0.76	5.2	1.7	2.5
18	29.9	0.136	77.7	2.6	6.37	2.816	4.426	3.518	6.9	3.4	4.3	0.8	5.40	0.75	5.2	1.8	2.6

Specimen A

Reading No.	Deviator Load (lbs)	Axial Deformation (in)	Pore Pressure (psi)	Change in Pore Pressure (psi)	Corrected Area (in2)	Axial Strain (%)	Deviator Stress (psi)	Corrected Deviator Stress (psi)	σ_1 (psi)	σ_3 (psi)	σ'_1 (psi)	σ'_3 (psi)	σ'_1/σ'_3	Abar	P (psi)	Q (psi)	P' (psi)
19	30.7	0.143	77.7	2.6	6.38	2.970	4.563	3.644	7.1	3.4	4.5	0.8	5.45	0.71	5.2	1.8	2.6
20	31.0	0.151	77.6	2.6	6.39	3.135	4.600	3.673	7.1	3.4	4.5	0.8	5.37	0.70	5.3	1.8	2.7
21	31.7	0.158	77.6	2.6	6.40	3.289	4.713	3.774	7.2	3.4	4.6	0.9	5.39	0.68	5.3	1.9	2.7
22	31.9	0.166	77.6	2.6	6.41	3.443	4.750	3.803	7.2	3.4	4.7	0.9	5.42	0.67	5.3	1.9	2.8
23	32.5	0.173	77.6	2.5	6.42	3.597	4.850	3.892	7.3	3.4	4.8	0.9	5.42	0.65	5.4	1.9	2.8
24	34.1	0.181	77.6	2.5	6.44	3.751	5.099	4.124	7.5	3.4	5.0	0.9	5.58	0.61	5.5	2.1	3.0
25	34.6	0.188	77.6	2.5	6.45	3.904	5.186	4.200	7.6	3.4	5.1	0.9	5.66	0.60	5.5	2.1	3.0
26	35.2	0.195	77.5	2.5	6.46	4.058	5.286	4.288	7.7	3.4	5.2	0.9	5.56	0.58	5.6	2.1	3.1
27	36.1	0.203	77.5	2.5	6.47	4.212	5.423	4.411	7.8	3.4	5.4	0.9	5.69	0.56	5.6	2.2	3.1
28	37.0	0.210	77.5	2.4	6.48	4.366	5.573	4.546	8.0	3.4	5.5	1.0	5.63	0.54	5.7	2.3	3.3
29	37.4	0.218	77.5	2.4	6.49	4.520	5.635	4.597	8.0	3.4	5.6	1.0	5.59	0.53	5.7	2.3	3.3
30	37.7	0.224	77.4	2.4	6.50	4.662	5.685	4.637	8.1	3.4	5.7	1.0	5.54	0.52	5.7	2.3	3.3
31	38.5	0.232	77.4	2.4	6.51	4.827	5.822	4.758	8.2	3.4	5.8	1.0	5.57	0.50	5.8	2.4	3.4
32	39.3	0.240	77.4	2.4	6.52	4.981	5.947	4.867	8.3	3.4	5.9	1.1	5.58	0.49	5.9	2.4	3.5
33	39.6	0.247	77.4	2.3	6.53	5.135	5.997	4.905	8.3	3.4	6.0	1.1	5.45	0.47	5.9	2.5	3.6
34	40.8	0.255	77.3	2.3	6.54	5.300	6.196	5.084	8.5	3.4	6.2	1.1	5.45	0.45	6.0	2.5	3.7
35	41.9	0.263	77.3	2.2	6.55	5.454	6.371	5.240	8.7	3.4	6.4	1.2	5.43	0.43	6.0	2.6	3.8
36	42.4	0.270	77.3	2.2	6.56	5.608	6.445	5.301	8.7	3.4	6.5	1.2	5.41	0.42	6.1	2.7	3.9
37	43.3	0.278	77.3	2.2	6.57	5.774	6.595	5.431	8.9	3.4	6.6	1.2	5.51	0.41	6.1	2.7	3.9
38	43.9	0.286	77.2	2.2	6.58	5.939	6.695	5.514	8.9	3.4	6.8	1.3	5.36	0.39	6.2	2.8	4.0
39	43.9	0.293	77.2	2.1	6.60	6.093	6.695	5.503	8.9	3.4	6.8	1.3	5.29	0.39	6.2	2.8	4.0
40	44.1	0.301	77.1	2.1	6.61	6.247	6.720	5.517	8.9	3.4	6.8	1.3	5.17	0.38	6.2	2.8	4.1
41	44.2	0.309	77.1	2.1	6.62	6.413	6.732	5.517	8.9	3.4	6.9	1.4	5.04	0.37	6.2	2.8	4.1
42	44.8	0.316	77.1	2.0	6.63	6.566	6.832	5.600	9.0	3.4	7.0	1.4	5.04	0.36	6.2	2.8	4.2
43	45.1	0.324	77.0	2.0	6.64	6.720	6.882	5.636	9.1	3.4	7.1	1.4	4.95	0.35	6.2	2.8	4.2
44	45.4	0.331	77.0	2.0	6.65	6.874	6.932	5.672	9.1	3.4	7.1	1.5	4.87	0.35	6.3	2.8	4.3
45	46.6	0.338	77.0	1.9	6.66	7.028	7.119	5.835	9.3	3.4	7.3	1.5	4.93	0.33	6.3	2.9	4.4
46	46.6	0.346	76.9	1.9	6.67	7.182	7.131	5.836	9.3	3.4	7.4	1.5	4.82	0.33	6.3	2.9	4.4
47	46.9	0.353	76.9	1.9	6.68	7.335	7.169	5.859	9.3	3.4	7.4	1.6	4.74	0.32	6.4	2.9	4.5
48	47.4	0.361	76.9	1.8	6.70	7.489	7.256	5.929	9.4	3.4	7.5	1.6	4.69	0.31	6.4	3.0	4.6
49	47.7	0.369	76.8	1.8	6.71	7.655	7.306	5.963	9.4	3.4	7.6	1.6	4.67	0.30	6.4	3.0	4.6
50	47.9	0.376	76.8	1.8	6.72	7.809	7.331	5.975	9.4	3.4	7.6	1.7	4.58	0.29	6.4	3.0	4.7
51	48.2	0.383	76.8	1.7	6.73	7.962	7.380	6.009	9.4	3.4	7.7	1.7	4.52	0.29	6.4	3.0	4.7
52	48.5	0.391	76.7	1.7	6.74	8.116	7.430	6.044	9.5	3.4	7.8	1.7	4.46	0.28	6.4	3.0	4.8
53	49.2	0.398	76.7	1.6	6.75	8.270	7.543	6.135	9.6	3.4	7.9	1.8	4.43	0.27	6.5	3.1	4.9
54	49.7	0.406	76.6	1.6	6.76	8.436	7.630	6.203	9.6	3.4	8.0	1.8	4.39	0.26	6.5	3.1	4.9
55	50.0	0.414	76.6	1.6	6.78	8.589	7.680	6.237	9.7	3.4	8.1	1.8	4.37	0.25	6.5	3.1	5.0
56	50.5	0.421	76.6	1.5	6.79	8.743	7.755	6.293	9.7	3.4	8.2	1.9	4.33	0.24	6.6	3.1	5.0
57	51.3	0.428	76.5	1.5	6.80	8.897	7.879	6.395	9.8	3.4	8.3	1.9	4.31	0.23	6.6	3.2	5.1
58	52.4	0.436	76.5	1.5	6.81	9.063	8.066	6.552	10.0	3.4	8.5	2.0	4.33	0.22	6.7	3.3	5.2
59	52.4	0.444	76.5	1.4	6.82	9.217	8.066	6.539	10.0	3.4	8.5	2.0	4.25	0.22	6.7	3.3	5.3

Specimen A

Reading No.	Deviator Load (lbs)	Axial Deformation (in)	Pore Pressure (psi)	Change in Pore Pressure (psi)	Corrected Area (in2)	Axial Strain (%)	Deviator Stress (psi)	Corrected Deviator Stress (psi)	σ_1 (psi)	σ_3 (psi)	σ'_1 (psi)	σ'_3 (psi)	σ'_1/σ'_3	Abar	P (psi)	Q (psi)	P' (psi)
60	52.2	0.451	76.4	1.4	6.83	9.370	8.029	6.493	9.9	3.4	8.5	2.1	4.17	0.21	6.7	3.2	5.3
61	52.8	0.459	76.4	1.4	6.85	9.536	8.129	6.570	10.0	3.4	8.6	2.1	4.17	0.21	6.7	3.3	5.4
62	53.6	0.466	76.4	1.3	6.86	9.678	8.253	6.671	10.1	3.4	8.8	2.1	4.16	0.20	6.8	3.3	5.4
63	53.7	0.474	76.3	1.3	6.87	9.844	8.266	6.332	9.8	3.4	8.5	2.2	3.94	0.20	6.6	3.2	5.3
64	54.2	0.481	76.3	1.2	6.88	9.986	8.353	6.394	9.8	3.4	8.6	2.2	3.92	0.19	6.6	3.2	5.4
65	54.4	0.488	76.3	1.2	6.89	10.139	8.378	6.398	9.8	3.4	8.6	2.2	3.89	0.19	6.6	3.2	5.4
66	55.0	0.496	76.2	1.2	6.91	10.305	8.478	6.468	9.9	3.4	8.7	2.3	3.87	0.18	6.7	3.2	5.5
67	55.8	0.504	76.2	1.1	6.92	10.459	8.602	6.562	10.0	3.4	8.9	2.3	3.86	0.17	6.7	3.3	5.6
68	56.4	0.511	76.1	1.1	6.93	10.613	8.714	6.643	10.1	3.4	9.0	2.3	3.85	0.16	6.7	3.3	5.7
69	56.8	0.518	76.1	1.0	6.94	10.766	8.764	6.669	10.1	3.4	9.0	2.4	3.81	0.16	6.8	3.3	5.7
70	57.3	0.526	76.1	1.0	6.95	10.920	8.852	6.728	10.2	3.4	9.1	2.4	3.81	0.15	6.8	3.4	5.8
71	57.9	0.533	76.0	1.0	6.96	11.074	8.951	6.798	10.2	3.4	9.2	2.4	3.79	0.15	6.8	3.4	5.8
72	57.6	0.541	76.0	0.9	6.98	11.240	8.901	6.733	10.2	3.4	9.2	2.5	3.72	0.14	6.8	3.4	5.8
73	58.0	0.549	76.0	0.9	6.99	11.393	8.964	6.770	10.2	3.4	9.3	2.5	3.69	0.13	6.8	3.4	5.9
74	58.3	0.557	75.9	0.9	7.00	11.559	9.014	6.793	10.2	3.4	9.3	2.6	3.66	0.13	6.8	3.4	6.0
75	58.8	0.564	75.9	0.8	7.02	11.713	9.101	6.851	10.3	3.4	9.5	2.6	3.62	0.12	6.8	3.4	6.0
76	59.0	0.571	75.8	0.8	7.03	11.867	9.126	6.854	10.3	3.4	9.5	2.6	3.60	0.11	6.8	3.4	6.1
77	59.3	0.579	75.9	0.8	7.04	12.032	9.176	6.877	10.3	3.4	9.5	2.6	3.67	0.12	6.9	3.4	6.0
78	59.8	0.587	75.9	0.9	7.05	12.186	9.263	6.934	10.4	3.4	9.5	2.5	3.74	0.13	6.9	3.5	6.0
79	60.2	0.594	75.9	0.9	7.07	12.340	9.313	6.958	10.4	3.4	9.5	2.6	3.72	0.12	6.9	3.5	6.0
80	60.9	0.602	75.9	0.8	7.08	12.506	9.438	7.046	10.5	3.4	9.6	2.6	3.74	0.12	6.9	3.5	6.1
81	61.2	0.610	75.9	0.8	7.09	12.659	9.487	7.070	10.5	3.4	9.7	2.6	3.72	0.12	7.0	3.5	6.1
82	61.6	0.617	75.8	0.8	7.10	12.813	9.550	7.105	10.5	3.4	9.8	2.7	3.67	0.11	7.0	3.6	6.2
83	61.7	0.624	75.8	0.7	7.12	12.967	9.562	7.096	10.5	3.4	9.8	2.7	3.65	0.11	7.0	3.5	6.2
84	61.3	0.632	75.8	0.7	7.13	13.121	9.500	7.021	10.4	3.4	9.7	2.7	3.60	0.10	6.9	3.5	6.2
85	61.2	0.639	75.7	0.7	7.14	13.263	9.487	6.992	10.4	3.4	9.7	2.7	3.55	0.10	6.9	3.5	6.2
86	62.0	0.646	75.7	0.7	7.15	13.417	9.612	7.080	10.5	3.4	9.8	2.8	3.57	0.09	7.0	3.5	6.3
87	62.2	0.653	75.7	0.6	7.17	13.570	9.650	7.093	10.5	3.4	9.9	2.8	3.55	0.09	7.0	3.5	6.3
88	62.5	0.661	75.7	0.6	7.18	13.736	9.687	7.103	10.5	3.4	9.9	2.8	3.54	0.09	7.0	3.6	6.3
89	63.0	0.669	75.7	0.6	7.19	13.890	9.774	7.158	10.6	3.4	10.0	2.8	3.54	0.08	7.0	3.6	6.4
90	64.1	0.676	75.6	0.6	7.21	14.044	9.949	7.288	10.7	3.4	10.1	2.9	3.55	0.08	7.1	3.6	6.5
91	64.6	0.684	75.6	0.6	7.22	14.197	10.036	7.342	10.8	3.4	10.2	2.9	3.57	0.08	7.1	3.7	6.5
92	64.7	0.691	75.6	0.5	7.23	14.351	10.048	7.332	10.8	3.4	10.2	2.9	3.53	0.07	7.1	3.7	6.6
93	65.0	0.699	75.6	0.5	7.25	14.517	10.098	7.353	10.8	3.4	10.3	2.9	3.52	0.07	7.1	3.7	6.6
94	65.3	0.706	75.5	0.5	7.26	14.671	10.148	7.374	10.8	3.4	10.3	2.9	3.51	0.07	7.1	3.7	6.6
95	65.8	0.714	75.5	0.5	7.27	14.836	10.223	7.416	10.8	3.4	10.4	3.0	3.51	0.06	7.1	3.7	6.7
96	66.2	0.722	75.5	0.4	7.29	14.990	10.285	7.448	10.9	3.4	10.4	3.0	3.50	0.06	7.1	3.7	6.7
97	66.1	0.723	75.5	0.4	7.29	15.026	10.273	7.432	10.9	3.4	10.4	3.0	3.49	0.06	7.1	3.7	6.7

Specimen A

Reading No.	Deviator Load (lbs)	Axial Deformation (in)	Pore Pressure (psi)	Change in Pore Pressure (psi)	Corrected Area (in2)	Axial Strain (%)	Deviator Stress (psi)	Corrected Deviator Stress (psi)	σ_1 (psi)	σ_3 (psi)	σ'_1 (psi)	σ'_3 (psi)	σ'_1/σ'_3	Abar	P (psi)	Q (psi)	P' (psi)

Specimen B Shear Data

CU Triaxial Test

Contour Engineering

File Location
Plant McIntosh M-2 UD-1 (10-1-10).HSD

Project Information

Project No. AT10SOC03-M
Project Name: Plant McIntosh
Client: Southern Company
Sample Location: M-2, UD-1 (9-11')
Sample Description: Red tan sandy CLAY (CL)
Remarks:

Sample Data

Sample Type: Undisturbed
Specific Gravity: 2.7
LL: 40.000
PL: 18.000

Sample Parameters	Initial	After Consolidation	Final
Diameter (in)	2.865	2.843	
Height (in)	6.012	5.952	
Weight (grams)	1185.71		1217.14
Moisture (%)	29.87		31.49
Dry Density (pcf)	89.75	93.32	
Saturation (%)	91.84	100.00	
Void Ratio	0.875	0.806	

Test Data

Rate of Strain: 0.015
Cell Pressure (psi): 81.940
Effective Confining Stress (psi): 6.9
Corrected Peak Deviator Stress (psi): 12.444 at reading number: 43

Specimen B

Reading No.	Deviator Load (lbs)	Axial Deformation (in)	Pore Pressure (psi)	Change in Pore Pressure (psi)	Corrected Area (in2)	Axial Strain (%)	Deviator Stress (psi)	Corrected Deviator Stress (psi)	σ_1 (psi)	σ_3 (psi)	σ'_1 (psi)	σ'_3 (psi)	σ'_1/σ'_3	Abar	P (psi)	Q (psi)	P' (psi)
0	3.8	0.000	75.0	0.0	6.35	0.000	0.000	0.000	6.9	6.9	6.9	6.9	1.00	0.00	6.9	0.0	6.9
1	30.5	0.007	77.0	2.0	6.36	0.115	4.208	4.159	11.1	6.9	9.1	4.9	1.84	0.48	9.0	2.1	7.0
2	36.6	0.014	77.9	2.8	6.36	0.239	5.169	5.064	12.0	6.9	9.1	4.1	2.24	0.56	9.4	2.5	6.6
3	41.2	0.021	78.3	3.3	6.37	0.354	5.886	5.728	12.6	6.9	9.4	3.6	2.58	0.57	9.8	2.9	6.5
4	45.4	0.028	78.6	3.6	6.38	0.479	6.555	6.339	13.3	6.9	9.7	3.3	2.91	0.57	10.1	3.2	6.5
5	48.6	0.036	78.9	3.9	6.39	0.603	7.066	6.790	13.7	6.9	9.8	3.0	3.25	0.57	10.3	3.4	6.4
6	51.6	0.043	79.0	4.0	6.40	0.727	7.528	7.192	14.1	6.9	10.1	2.9	3.48	0.56	10.5	3.6	6.5
7	54.7	0.051	79.1	4.1	6.40	0.852	8.014	7.617	14.5	6.9	10.5	2.8	3.68	0.54	10.7	3.8	6.6
8	57.4	0.058	79.1	4.1	6.41	0.976	8.440	7.980	14.9	6.9	10.8	2.8	3.83	0.51	10.9	4.0	6.8
9	60.5	0.066	79.1	4.1	6.42	1.101	8.927	8.403	15.3	6.9	11.2	2.8	3.96	0.49	11.1	4.2	7.0
10	63.2	0.073	79.0	4.0	6.43	1.225	9.364	8.776	15.7	6.9	11.7	2.9	4.03	0.46	11.3	4.4	7.3
11	65.8	0.080	79.0	4.0	6.44	1.350	9.766	9.112	16.0	6.9	12.1	3.0	4.08	0.43	11.5	4.6	7.5
12	67.9	0.088	78.9	3.9	6.44	1.484	10.094	9.370	16.3	6.9	12.4	3.0	4.08	0.41	11.6	4.7	7.7
13	69.9	0.096	78.8	3.8	6.45	1.608	10.410	9.621	16.5	6.9	12.7	3.1	4.08	0.39	11.7	4.8	7.9
14	71.7	0.103	78.7	3.7	6.46	1.732	10.702	9.847	16.8	6.9	13.0	3.2	4.08	0.38	11.8	4.9	8.1
15	73.7	0.111	78.7	3.6	6.47	1.866	11.018	10.091	17.0	6.9	13.4	3.3	4.08	0.36	12.0	5.0	8.3
16	75.5	0.118	78.6	3.5	6.48	1.991	11.298	10.303	17.2	6.9	13.7	3.4	4.05	0.34	12.1	5.2	8.5
17	77.3	0.126	78.5	3.4	6.49	2.125	11.578	10.558	17.5	6.9	14.0	3.5	4.03	0.32	12.2	5.3	8.8
18	78.9	0.134	78.3	3.3	6.50	2.249	11.833	10.793	17.7	6.9	14.4	3.6	4.00	0.31	12.3	5.4	9.0

Specimen B

Reading No.	Deviator Load (lbs)	Axial Deformation (in)	Pore Pressure (psi)	Change in Pore Pressure (psi)	Corrected Area (in2)	Axial Strain (%)	Deviator Stress (psi)	Corrected Deviator Stress (psi)	σ_1 (psi)	σ_3 (psi)	σ'_1 (psi)	σ'_3 (psi)	σ'_1/σ'_3	Abar	P (psi)	Q (psi)	P' (psi)
19	80.9	0.141	78.2	3.2	6.50	2.374	12.149	11.087	18.0	6.9	14.8	3.7	3.99	0.29	12.5	5.5	9.2
20	82.2	0.149	78.1	3.1	6.51	2.508	12.344	11.261	18.2	6.9	15.1	3.8	3.94	0.27	12.5	5.6	9.5
21	83.8	0.157	78.0	3.0	6.52	2.632	12.599	11.494	18.4	6.9	15.4	3.9	3.91	0.26	12.7	5.7	9.7
22	84.6	0.164	77.9	2.8	6.53	2.756	12.721	11.597	18.5	6.9	15.7	4.1	3.85	0.25	12.7	5.8	9.9
23	85.2	0.172	77.8	2.7	6.54	2.890	12.818	11.674	18.6	6.9	15.9	4.2	3.79	0.23	12.8	5.8	10.0
24	86.0	0.179	77.7	2.6	6.55	3.015	12.952	11.788	18.7	6.9	16.1	4.3	3.75	0.22	12.8	5.9	10.2
25	86.5	0.187	77.5	2.5	6.56	3.139	13.025	11.842	18.8	6.9	16.3	4.4	3.68	0.21	12.8	5.9	10.3
26	87.6	0.194	77.4	2.4	6.56	3.264	13.195	11.991	18.9	6.9	16.5	4.5	3.65	0.20	12.9	6.0	10.5
27	87.4	0.202	77.3	2.3	6.57	3.388	13.171	11.951	18.9	6.9	16.6	4.6	3.58	0.19	12.9	6.0	10.6
28	88.3	0.209	77.2	2.2	6.58	3.513	13.317	12.075	19.0	6.9	16.8	4.8	3.54	0.18	13.0	6.0	10.8
29	88.7	0.216	77.0	2.0	6.59	3.627	13.378	12.119	19.0	6.9	17.0	4.9	3.48	0.17	13.0	6.1	11.0
30	89.1	0.223	76.9	1.9	6.60	3.752	13.439	12.161	19.1	6.9	17.2	5.0	3.42	0.16	13.0	6.1	11.1
31	89.2	0.231	76.8	1.8	6.61	3.876	13.451	12.156	19.1	6.9	17.3	5.1	3.38	0.15	13.0	6.1	11.2
32	89.4	0.238	76.7	1.7	6.61	4.001	13.487	12.174	19.1	6.9	17.4	5.2	3.33	0.14	13.0	6.1	11.3
33	90.0	0.246	76.6	1.6	6.62	4.125	13.584	12.250	19.2	6.9	17.5	5.3	3.31	0.13	13.0	6.1	11.4
34	90.3	0.253	76.6	1.5	6.63	4.250	13.621	12.268	19.2	6.9	17.6	5.4	3.28	0.13	13.0	6.1	11.5
35	89.8	0.261	76.5	1.5	6.64	4.384	13.548	12.180	19.1	6.9	17.6	5.5	3.23	0.12	13.0	6.1	11.6
36	90.4	0.268	76.4	1.4	6.65	4.508	13.645	12.256	19.2	6.9	17.8	5.5	3.21	0.11	13.0	6.1	11.7
37	90.9	0.276	76.3	1.3	6.66	4.642	13.718	12.308	19.2	6.9	17.9	5.6	3.19	0.10	13.1	6.2	11.8
38	91.1	0.284	76.2	1.2	6.67	4.766	13.755	12.325	19.2	6.9	18.0	5.7	3.16	0.10	13.1	6.2	11.9
39	91.2	0.291	76.2	1.1	6.68	4.891	13.767	12.320	19.2	6.9	18.1	5.8	3.13	0.09	13.1	6.2	11.9
40	91.4	0.299	76.1	1.0	6.69	5.025	13.803	12.336	19.2	6.9	18.2	5.9	3.10	0.08	13.1	6.2	12.1
41	91.7	0.306	76.0	0.9	6.69	5.149	13.840	12.353	19.3	6.9	18.3	6.0	3.07	0.08	13.1	6.2	12.1
42	92.0	0.314	75.9	0.9	6.70	5.283	13.901	12.393	19.3	6.9	18.4	6.0	3.05	0.07	13.1	6.2	12.2
43	92.5	0.322	75.8	0.8	6.71	5.408	13.974	12.444	19.4	6.9	18.6	6.1	3.03	0.06	13.1	6.2	12.3
44	92.3	0.329	75.8	0.7	6.72	5.532	13.937	12.392	19.3	6.9	18.6	6.2	3.00	0.06	13.1	6.2	12.4
45	92.2	0.337	75.7	0.7	6.73	5.656	13.925	12.364	19.3	6.9	18.6	6.2	2.98	0.05	13.1	6.2	12.4
46	90.9	0.345	75.7	0.6	6.74	5.790	13.718	12.150	19.1	6.9	18.4	6.3	2.93	0.05	13.0	6.1	12.4
47	90.7	0.351	75.6	0.6	6.75	5.905	13.694	12.112	19.0	6.9	18.4	6.3	2.91	0.05	13.0	6.1	12.4
48	90.7	0.359	75.6	0.5	6.76	6.039	13.682	12.082	19.0	6.9	18.5	6.4	2.90	0.05	13.0	6.0	12.4
49	90.4	0.367	75.5	0.5	6.77	6.164	13.645	12.030	18.9	6.9	18.4	6.4	2.88	0.04	12.9	6.0	12.4
50	89.8	0.374	75.5	0.4	6.78	6.288	13.548	11.922	18.8	6.9	18.4	6.5	2.84	0.04	12.9	6.0	12.4
51	89.6	0.382	75.5	0.4	6.78	6.413	13.524	11.883	18.8	6.9	18.4	6.5	2.83	0.04	12.9	5.9	12.4
52	90.0	0.390	75.4	0.4	6.79	6.547	13.584	11.921	18.8	6.9	18.5	6.5	2.83	0.03	12.9	6.0	12.5
53	89.9	0.397	75.4	0.3	6.80	6.671	13.560	11.882	18.8	6.9	18.5	6.6	2.81	0.03	12.9	5.9	12.5
54	89.6	0.404	75.3	0.3	6.81	6.795	13.512	11.820	18.7	6.9	18.4	6.6	2.79	0.03	12.8	5.9	12.5
55	89.5	0.412	75.3	0.3	6.82	6.920	13.499	11.791	18.7	6.9	18.4	6.6	2.78	0.02	12.8	5.9	12.5
56	89.2	0.420	75.3	0.2	6.83	7.054	13.451	11.728	18.6	6.9	18.4	6.7	2.76	0.02	12.8	5.9	12.5
57	89.4	0.427	75.2	0.2	6.84	7.178	13.487	11.745	18.7	6.9	18.4	6.7	2.76	0.02	12.8	5.9	12.6
58	89.5	0.435	75.2	0.2	6.85	7.303	13.499	11.740	18.7	6.9	18.5	6.7	2.74	0.02	12.8	5.9	12.6
59	89.3	0.443	75.2	0.2	6.86	7.437	13.475	11.699	18.6	6.9	18.5	6.8	2.73	0.01	12.8	5.8	12.6

Specimen B

Reading No.	Deviator Load (lbs)	Axial Deformation (in)	Pore Pressure (psi)	Change in Pore Pressure (psi)	Corrected Area (in2)	Axial Strain (%)	Deviator Stress (psi)	Corrected Deviator Stress (psi)	σ_1 (psi)	σ_3 (psi)	σ'_1 (psi)	σ'_3 (psi)	σ'_1/σ'_3	Abar	P (psi)	Q (psi)	P' (psi)
60	89.0	0.450	75.1	0.1	6.87	7.561	13.426	11.637	18.6	6.9	18.4	6.8	2.71	0.01	12.7	5.8	12.6
61	89.3	0.457	75.1	0.1	6.88	7.686	13.463	11.654	18.6	6.9	18.5	6.8	2.71	0.01	12.7	5.8	12.6
62	89.7	0.465	75.1	0.1	6.89	7.810	13.536	11.705	18.6	6.9	18.5	6.8	2.71	0.01	12.8	5.9	12.7
63	89.9	0.473	75.1	0.0	6.90	7.944	13.560	11.709	18.6	6.9	18.6	6.9	2.70	0.00	12.8	5.9	12.7
64	89.5	0.480	75.0	0.0	6.91	8.068	13.499	11.636	18.5	6.9	18.5	6.9	2.68	0.00	12.7	5.8	12.7
65	89.3	0.487	75.0	0.0	6.92	8.183	13.475	11.599	18.5	6.9	18.6	7.0	2.67	0.00	12.7	5.8	12.8
66	89.6	0.494	75.0	-0.1	6.92	8.308	13.524	11.626	18.5	6.9	18.6	7.0	2.67	-0.01	12.7	5.8	12.8
67	89.5	0.502	74.9	-0.1	6.93	8.442	13.499	11.586	18.5	6.9	18.6	7.0	2.65	-0.01	12.7	5.8	12.8
68	89.5	0.510	74.9	-0.1	6.94	8.566	13.499	11.569	18.5	6.9	18.6	7.0	2.64	-0.01	12.7	5.8	12.8
69	89.9	0.517	74.9	-0.2	6.95	8.690	13.560	11.608	18.5	6.9	18.7	7.1	2.64	-0.01	12.7	5.8	12.9
70	90.3	0.525	74.8	-0.2	6.96	8.815	13.633	11.658	18.6	6.9	18.8	7.1	2.64	-0.02	12.7	5.8	12.9
71	90.1	0.532	74.8	-0.2	6.97	8.939	13.597	11.607	18.5	6.9	18.8	7.2	2.62	-0.02	12.7	5.8	13.0
72	90.1	0.540	74.8	-0.2	6.98	9.073	13.597	11.589	18.5	6.9	18.7	7.2	2.62	-0.02	12.7	5.8	12.9
73	90.1	0.547	74.8	-0.3	6.99	9.198	13.597	11.572	18.5	6.9	18.7	7.2	2.61	-0.02	12.7	5.8	13.0
74	90.6	0.555	74.7	-0.3	7.00	9.332	13.670	11.620	18.5	6.9	18.8	7.2	2.61	-0.02	12.7	5.8	13.0
75	90.0	0.563	74.7	-0.3	7.01	9.456	13.584	11.526	18.4	6.9	18.7	7.2	2.60	-0.03	12.7	5.8	13.0
76	90.8	0.570	74.7	-0.3	7.02	9.581	13.706	11.619	18.5	6.9	18.9	7.3	2.60	-0.03	12.7	5.8	13.1
77	90.6	0.578	74.7	-0.4	7.03	9.715	13.670	11.568	18.5	6.9	18.8	7.3	2.59	-0.03	12.7	5.8	13.1
78	90.8	0.586	74.6	-0.4	7.04	9.839	13.706	11.584	18.5	6.9	18.9	7.3	2.58	-0.03	12.7	5.8	13.1
79	90.8	0.593	74.6	-0.4	7.05	9.963	13.706	11.567	18.5	6.9	18.9	7.3	2.58	-0.04	12.7	5.8	13.1
80	90.1	0.600	74.6	-0.4	7.06	10.088	13.597	11.451	18.4	6.9	18.8	7.4	2.56	-0.04	12.6	5.7	13.1
81	90.7	0.608	74.5	-0.5	7.07	10.222	13.694	11.520	18.4	6.9	18.9	7.4	2.56	-0.04	12.7	5.8	13.2
82	91.0	0.616	74.5	-0.5	7.08	10.346	13.730	11.536	18.4	6.9	19.0	7.4	2.56	-0.04	12.7	5.8	13.2
83	91.3	0.623	74.5	-0.5	7.09	10.471	13.779	11.563	18.5	6.9	19.0	7.4	2.56	-0.04	12.7	5.8	13.2
84	91.6	0.631	74.5	-0.5	7.10	10.595	13.828	11.589	18.5	6.9	19.0	7.4	2.56	-0.05	12.7	5.8	13.2
85	92.6	0.638	74.5	-0.5	7.11	10.720	13.986	11.713	18.6	6.9	19.2	7.5	2.57	-0.05	12.8	5.9	13.3
86	92.9	0.645	74.4	-0.6	7.12	10.834	14.034	11.740	18.7	6.9	19.2	7.5	2.57	-0.05	12.8	5.9	13.4
87	92.7	0.652	74.4	-0.6	7.13	10.959	14.010	11.701	18.6	6.9	19.2	7.5	2.56	-0.05	12.8	5.9	13.4
88	93.4	0.660	74.4	-0.6	7.14	11.093	14.120	11.780	18.7	6.9	19.3	7.5	2.56	-0.05	12.8	5.9	13.4
89	93.6	0.668	74.4	-0.6	7.15	11.217	14.144	11.784	18.7	6.9	19.3	7.6	2.56	-0.05	12.8	5.9	13.5
90	94.6	0.675	74.4	-0.7	7.16	11.342	14.302	11.906	18.8	6.9	19.5	7.6	2.57	-0.06	12.9	6.0	13.5
91	95.0	0.682	74.3	-0.7	7.17	11.466	14.363	11.942	18.9	6.9	19.5	7.6	2.57	-0.06	12.9	6.0	13.6
92	95.0	0.690	74.3	-0.7	7.18	11.591	14.363	11.924	18.8	6.9	19.5	7.6	2.57	-0.06	12.9	6.0	13.6
93	95.1	0.698	74.3	-0.7	7.19	11.724	14.375	11.916	18.8	6.9	19.6	7.7	2.56	-0.06	12.9	6.0	13.6
94	95.3	0.705	74.3	-0.8	7.20	11.849	14.411	11.930	18.8	6.9	19.6	7.7	2.55	-0.06	12.9	6.0	13.6
95	96.3	0.713	74.2	-0.8	7.21	11.983	14.570	12.050	19.0	6.9	19.8	7.7	2.56	-0.07	12.9	6.0	13.7
96	96.8	0.721	74.2	-0.8	7.22	12.107	14.643	12.096	19.0	6.9	19.8	7.7	2.56	-0.07	13.0	6.0	13.8
97	96.7	0.729	74.2	-0.8	7.23	12.241	14.630	12.066	19.0	6.9	19.8	7.8	2.55	-0.07	12.9	6.0	13.8
98	96.8	0.736	74.2	-0.9	7.25	12.366	14.655	12.069	19.0	6.9	19.8	7.8	2.55	-0.07	12.9	6.0	13.8
99	97.6	0.743	74.1	-0.9	7.26	12.490	14.776	12.157	19.1	6.9	20.0	7.8	2.55	-0.07	13.0	6.1	13.9
100	97.8	0.751	74.1	-0.9	7.27	12.624	14.813	12.169	19.1	6.9	20.0	7.9	2.55	-0.08	13.0	6.1	13.9

Specimen B

Reading No.	Deviator Load (lbs)	Axial Deformation (in)	Pore Pressure (psi)	Change in Pore Pressure (psi)	Corrected Area (in2)	Axial Strain (%)	Deviator Stress (psi)	Corrected Deviator Stress (psi)	σ_1 (psi)	σ_3 (psi)	σ'_1 (psi)	σ'_3 (psi)	σ'_1/σ'_3	Abar	P (psi)	Q (psi)	P' (psi)
101	97.8	0.759	74.1	-1.0	7.28	12.749	14.801	12.140	19.1	6.9	20.0	7.9	2.54	-0.08	13.0	6.1	14.0
102	97.7	0.766	74.1	-0.9	7.29	12.873	14.788	12.111	19.0	6.9	20.0	7.8	2.54	-0.08	13.0	6.1	13.9
103	98.5	0.774	74.2	-0.9	7.30	12.997	14.910	12.198	19.1	6.9	20.0	7.8	2.57	-0.07	13.0	6.1	13.9
104	98.6	0.781	74.1	-0.9	7.31	13.122	14.934	12.201	19.1	6.9	20.0	7.8	2.56	-0.07	13.0	6.1	13.9
105	98.8	0.788	74.1	-0.9	7.32	13.237	14.959	12.205	19.1	6.9	20.0	7.8	2.56	-0.08	13.0	6.1	13.9
106	98.6	0.796	74.1	-0.9	7.33	13.371	14.934	12.164	19.1	6.9	20.0	7.9	2.55	-0.08	13.0	6.1	13.9
107	99.3	0.803	74.0	-1.0	7.34	13.486	15.044	12.241	19.2	6.9	20.2	7.9	2.55	-0.08	13.0	6.1	14.0
108	98.8	0.811	74.0	-1.0	7.35	13.620	14.971	12.158	19.1	6.9	20.1	8.0	2.53	-0.09	13.0	6.1	14.0
109	99.3	0.817	73.9	-1.1	7.36	13.734	15.044	12.204	19.1	6.9	20.2	8.0	2.52	-0.09	13.0	6.1	14.1
110	99.8	0.825	73.9	-1.1	7.37	13.859	15.129	12.259	19.2	6.9	20.3	8.0	2.52	-0.09	13.0	6.1	14.2
111	99.8	0.832	73.9	-1.2	7.38	13.983	15.117	12.229	19.1	6.9	20.3	8.1	2.52	-0.09	13.0	6.1	14.2
112	99.8	0.840	73.8	-1.2	7.39	14.108	15.117	12.210	19.1	6.9	20.3	8.1	2.51	-0.10	13.0	6.1	14.2
113	100.1	0.847	73.8	-1.2	7.40	14.232	15.166	12.233	19.1	6.9	20.4	8.1	2.51	-0.10	13.0	6.1	14.2
114	100.1	0.854	73.8	-1.2	7.41	14.357	15.166	12.215	19.1	6.9	20.4	8.1	2.50	-0.10	13.0	6.1	14.3
115	99.8	0.862	73.8	-1.3	7.43	14.491	15.117	12.153	19.1	6.9	20.3	8.2	2.48	-0.10	13.0	6.1	14.3
116	99.8	0.870	73.7	-1.3	7.44	14.615	15.129	12.144	19.1	6.9	20.4	8.2	2.48	-0.11	13.0	6.1	14.3
117	99.5	0.878	73.7	-1.3	7.45	14.749	15.068	12.072	19.0	6.9	20.3	8.2	2.46	-0.11	12.9	6.0	14.3
118	99.5	0.885	73.6	-1.4	7.46	14.873	15.068	12.053	19.0	6.9	20.4	8.3	2.45	-0.12	12.9	6.0	14.3
119	99.7	0.893	73.6	-1.4	7.47	15.007	15.105	12.064	19.0	6.9	20.4	8.3	2.45	-0.12	12.9	6.0	14.3
120	99.8	0.893	73.6	-1.4	7.47	15.007	15.117	12.074	19.0	6.9	20.4	8.3	2.45	-0.12	13.0	6.0	14.3

Specimen C Shear Data

CU Triaxial Test

Contour Engineering

File Location
Plant McIntosh M-2 UD-1 (10-1-10).HSD

Project Information

Project No. AT10SOC03-M
Project Name: Plant McIntosh
Client: Southern Company
Sample Location: M-2, UD-1 (9-11')
Sample Description: Tan and red sandy CLAY (CL)
Remarks:

Sample Data

Sample Type: Undisturbed
Specific Gravity: 2.7
LL: 40.000
PL: 18.000

Sample Parameters	Initial	After Consolidation	Final
Diameter (in)	2.874	2.859	
Height (in)	5.898	5.827	
Weight (grams)	1151.07		1175.03
Moisture (%)	24.07		36.09
Dry Density (pcf)	92.39	87.95	
Saturation (%)	78.83	100.00	
Void Ratio	0.821	0.917	

Test Data

Rate of Strain: 0.015
Cell Pressure (psi): 85.420
Effective Confining Stress (psi): 10.3
Corrected Peak Deviator Stress (psi): 15.435 at reading number: 23

Specimen C

Reading No.	Deviator Load (lbs)	Axial Deformation (in)	Pore Pressure (psi)	Change in Pore Pressure (psi)	Corrected Area (in2)	Axial Strain (%)	Deviator Stress (psi)	Corrected Deviator Stress (psi)	σ_1 (psi)	σ_3 (psi)	σ'_1 (psi)	σ'_3 (psi)	σ'_1/σ'_3	Abar	P (psi)	Q (psi)	P' (psi)
0	2.5	0.000	75.1	0.0	6.42	0.000	0.000	0.000	10.3	10.3	10.3	10.3	1.00	0.00	10.3	0.0	10.3
1	20.6	0.007	76.7	1.6	6.43	0.127	2.827	2.775	13.1	10.3	11.5	8.7	1.32	0.58	11.7	1.4	10.1
2	42.4	0.014	79.1	4.0	6.43	0.244	6.220	6.111	16.4	10.3	12.4	6.3	1.96	0.65	13.3	3.1	9.4
3	53.7	0.022	80.4	5.3	6.44	0.381	7.989	7.812	18.1	10.3	12.8	5.0	2.55	0.67	14.2	3.9	8.9
4	61.3	0.029	81.2	6.0	6.45	0.499	9.168	8.930	19.2	10.3	13.2	4.3	3.10	0.68	14.8	4.5	8.7
5	67.2	0.037	81.5	6.4	6.46	0.635	10.082	9.774	20.1	10.3	13.7	3.9	3.51	0.65	15.2	4.9	8.8
6	72.0	0.044	81.8	6.7	6.47	0.762	10.828	10.452	20.7	10.3	14.1	3.6	3.88	0.64	15.5	5.2	8.9
7	76.4	0.052	82.0	6.9	6.48	0.890	11.526	11.081	21.4	10.3	14.5	3.4	4.27	0.62	15.8	5.5	8.9
8	80.3	0.059	82.2	7.0	6.48	1.017	12.127	11.613	21.9	10.3	14.9	3.2	4.57	0.61	16.1	5.8	9.1
9	83.9	0.067	82.3	7.1	6.49	1.144	12.681	12.096	22.4	10.3	15.2	3.1	4.84	0.59	16.3	6.0	9.2
10	87.3	0.074	82.3	7.2	6.50	1.271	13.222	12.565	22.9	10.3	15.7	3.1	5.04	0.57	16.6	6.3	9.4
11	90.0	0.081	82.4	7.2	6.51	1.398	13.643	12.915	23.2	10.3	16.0	3.1	5.21	0.56	16.7	6.5	9.5
12	92.9	0.089	82.4	7.2	6.52	1.525	14.089	13.287	23.6	10.3	16.4	3.1	5.33	0.54	16.9	6.6	9.7
13	95.6	0.096	82.3	7.2	6.53	1.652	14.510	13.634	23.9	10.3	16.7	3.1	5.39	0.53	17.1	6.8	9.9
14	97.9	0.104	82.3	7.1	6.53	1.779	14.871	13.921	24.2	10.3	17.1	3.1	5.42	0.51	17.3	7.0	10.1
15	100.2	0.111	82.2	7.1	6.54	1.906	15.219	14.196	24.5	10.3	17.4	3.2	5.42	0.50	17.4	7.1	10.3
16	102.2	0.118	82.2	7.0	6.55	2.033	15.532	14.447	24.7	10.3	17.7	3.3	5.42	0.49	17.5	7.2	10.5
17	103.5	0.126	82.0	6.9	6.56	2.170	15.737	14.626	24.9	10.3	18.0	3.4	5.34	0.47	17.6	7.3	10.7
18	104.8	0.134	81.9	6.8	6.57	2.297	15.941	14.806	25.1	10.3	18.3	3.5	5.24	0.46	17.7	7.4	10.9

Specimen C

Reading No.	Deviator Load (lbs)	Axial Deformation (in)	Pore Pressure (psi)	Change in Pore Pressure (psi)	Corrected Area (in2)	Axial Strain (%)	Deviator Stress (psi)	Corrected Deviator Stress (psi)	σ_1 (psi)	σ_3 (psi)	σ'_1 (psi)	σ'_3 (psi)	σ'_1/σ'_3	Abar	P (psi)	Q (psi)	P' (psi)
19	105.9	0.141	81.8	6.7	6.58	2.424	16.122	14.961	25.3	10.3	18.6	3.6	5.12	0.45	17.8	7.5	11.1
20	107.1	0.149	81.6	6.5	6.59	2.561	16.302	15.115	25.4	10.3	18.9	3.8	5.00	0.43	17.8	7.6	11.3
21	108.0	0.157	81.5	6.4	6.60	2.688	16.447	15.235	25.5	10.3	19.1	3.9	4.91	0.42	17.9	7.6	11.5
22	109.2	0.165	81.4	6.3	6.60	2.825	16.627	15.388	25.7	10.3	19.4	4.0	4.83	0.41	18.0	7.7	11.7
23	109.6	0.173	81.3	6.1	6.61	2.962	16.699	15.435	25.7	10.3	19.6	4.2	4.71	0.40	18.0	7.7	11.9
24	109.3	0.180	81.1	6.0	6.62	3.089	16.639	15.356	25.6	10.3	19.6	4.3	4.59	0.39	18.0	7.7	12.0
25	109.0	0.187	81.0	5.9	6.63	3.216	16.603	15.300	25.6	10.3	19.7	4.4	4.46	0.38	17.9	7.6	12.1
26	108.0	0.195	80.8	5.7	6.64	3.343	16.447	15.127	25.4	10.3	19.7	4.6	4.29	0.38	17.9	7.6	12.2
27	106.8	0.202	80.6	5.5	6.65	3.470	16.254	14.921	25.2	10.3	19.7	4.8	4.09	0.37	17.8	7.5	12.3
28	105.7	0.210	80.4	5.3	6.66	3.597	16.086	14.737	25.0	10.3	19.8	5.0	3.93	0.36	17.7	7.4	12.4
29	104.8	0.217	80.2	5.1	6.67	3.724	15.941	14.578	24.9	10.3	19.8	5.2	3.79	0.35	17.6	7.3	12.5
30	104.0	0.224	80.0	4.9	6.67	3.842	15.821	14.444	24.7	10.3	19.9	5.4	3.67	0.34	17.5	7.2	12.6
31	103.3	0.231	79.8	4.7	6.68	3.969	15.713	14.320	24.6	10.3	19.9	5.6	3.56	0.33	17.5	7.2	12.8
32	102.2	0.239	79.6	4.5	6.69	4.096	15.532	14.127	24.4	10.3	19.9	5.8	3.44	0.32	17.4	7.1	12.9
33	101.1	0.246	79.4	4.3	6.70	4.223	15.364	13.945	24.2	10.3	19.9	6.0	3.33	0.31	17.3	7.0	12.9
34	99.8	0.254	79.2	4.1	6.71	4.360	15.159	13.729	24.0	10.3	19.9	6.2	3.22	0.30	17.2	6.9	13.1
35	98.4	0.261	79.0	3.9	6.72	4.477	14.943	13.504	23.8	10.3	19.9	6.4	3.10	0.29	17.0	6.8	13.2
36	96.4	0.269	78.8	3.7	6.73	4.614	14.642	13.197	23.5	10.3	19.8	6.6	2.99	0.28	16.9	6.6	13.2
37	95.4	0.276	78.6	3.4	6.74	4.741	14.474	13.018	23.3	10.3	19.9	6.9	2.90	0.26	16.8	6.5	13.4
38	94.1	0.284	78.4	3.3	6.75	4.878	14.281	12.815	23.1	10.3	19.8	7.0	2.82	0.26	16.7	6.4	13.4
39	93.3	0.292	78.3	3.1	6.76	5.005	14.149	12.671	23.0	10.3	19.8	7.1	2.77	0.25	16.6	6.3	13.5
40	92.4	0.300	78.1	3.0	6.77	5.142	14.004	12.515	22.8	10.3	19.8	7.3	2.71	0.24	16.5	6.3	13.6
41	91.5	0.308	78.0	2.8	6.78	5.279	13.872	12.370	22.7	10.3	19.8	7.4	2.66	0.23	16.5	6.2	13.6
42	90.6	0.316	77.8	2.7	6.79	5.416	13.728	12.215	22.5	10.3	19.8	7.6	2.61	0.22	16.4	6.1	13.7
43	89.9	0.323	77.7	2.6	6.79	5.543	13.619	12.095	22.4	10.3	19.8	7.7	2.57	0.22	16.3	6.0	13.7
44	89.0	0.331	77.6	2.5	6.80	5.679	13.487	11.951	22.2	10.3	19.7	7.8	2.53	0.21	16.3	6.0	13.8
45	88.7	0.338	77.5	2.4	6.81	5.807	13.439	11.889	22.2	10.3	19.8	7.9	2.51	0.20	16.2	5.9	13.8
46	88.2	0.346	77.4	2.3	6.82	5.943	13.355	11.791	22.1	10.3	19.8	8.0	2.48	0.20	16.2	5.9	13.9
47	87.6	0.354	77.3	2.2	6.83	6.070	13.270	11.695	22.0	10.3	19.8	8.1	2.45	0.19	16.1	5.8	13.9
48	87.2	0.362	77.2	2.1	6.84	6.207	13.198	11.609	21.9	10.3	19.8	8.2	2.42	0.18	16.1	5.8	14.0
49	86.8	0.369	77.1	2.0	6.85	6.334	13.138	11.536	21.8	10.3	19.8	8.3	2.39	0.17	16.1	5.8	14.0
50	86.6	0.377	77.1	1.9	6.86	6.461	13.114	11.497	21.8	10.3	19.9	8.4	2.38	0.17	16.0	5.7	14.1
51	86.2	0.384	77.0	1.9	6.87	6.589	13.042	11.413	21.7	10.3	19.8	8.4	2.36	0.16	16.0	5.7	14.1
52	85.9	0.391	76.9	1.8	6.88	6.716	12.994	11.352	21.6	10.3	19.8	8.5	2.34	0.16	16.0	5.7	14.2
53	85.2	0.399	76.8	1.7	6.89	6.843	12.897	11.245	21.5	10.3	19.8	8.6	2.31	0.15	15.9	5.6	14.2
54	85.0	0.406	76.8	1.6	6.90	6.970	12.861	11.195	21.5	10.3	19.9	8.7	2.29	0.15	15.9	5.6	14.3
55	85.2	0.414	76.7	1.6	6.91	7.097	12.885	11.201	21.5	10.3	19.9	8.7	2.28	0.14	15.9	5.6	14.3
56	84.8	0.421	76.6	1.5	6.92	7.224	12.825	11.129	21.4	10.3	19.9	8.8	2.26	0.13	15.9	5.6	14.4
57	84.6	0.428	76.5	1.4	6.93	7.351	12.789	11.079	21.4	10.3	20.0	8.9	2.25	0.13	15.8	5.5	14.4
58	84.5	0.436	76.5	1.4	6.94	7.478	12.777	11.052	21.3	10.3	20.0	8.9	2.24	0.12	15.8	5.5	14.5
59	84.5	0.443	76.4	1.3	6.95	7.605	12.777	11.036	21.3	10.3	20.1	9.0	2.22	0.12	15.8	5.5	14.5

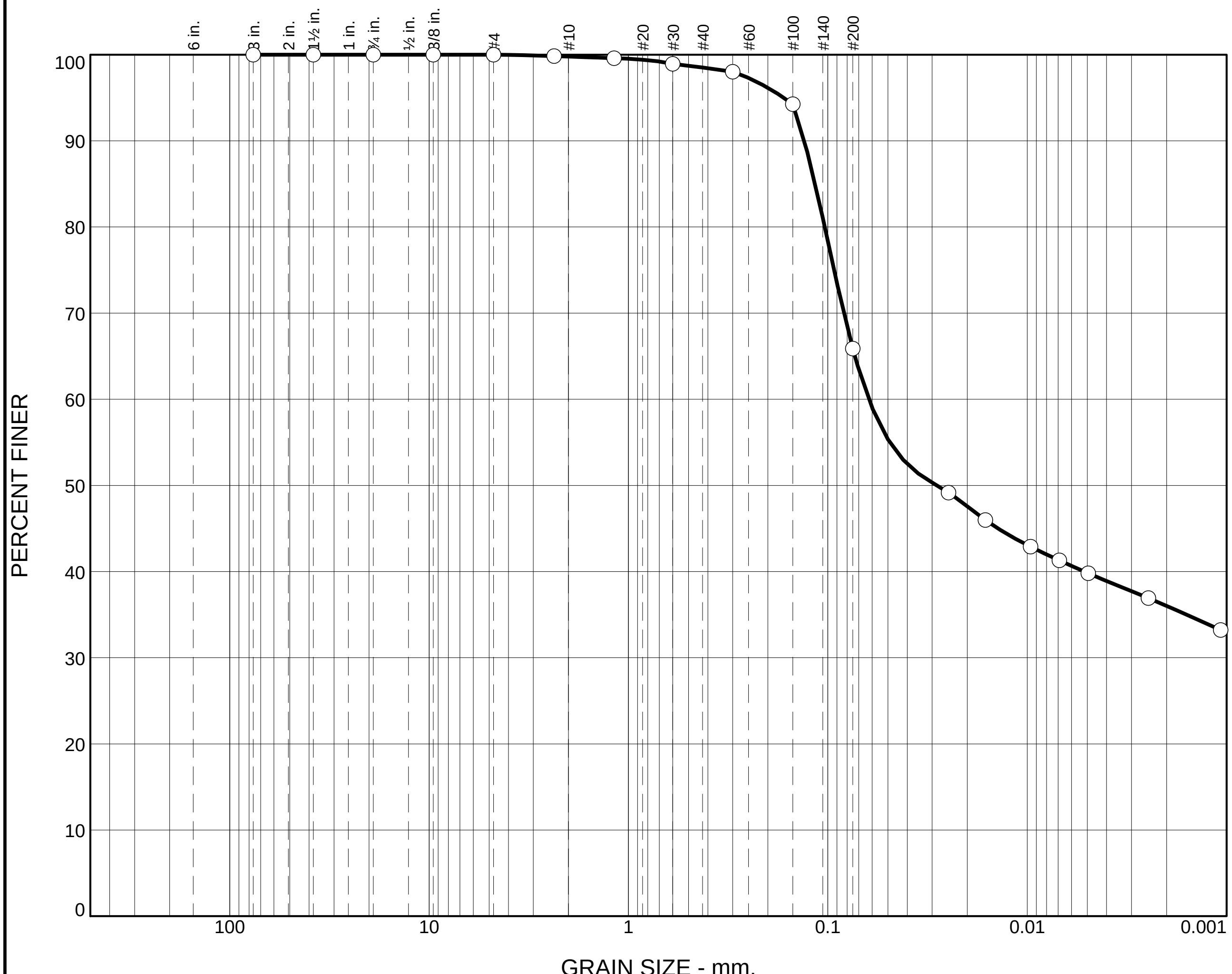
Specimen C

Reading No.	Deviator Load (lbs)	Axial Deformation (in)	Pore Pressure (psi)	Change in Pore Pressure (psi)	Corrected Area (in2)	Axial Strain (%)	Deviator Stress (psi)	Corrected Deviator Stress (psi)	σ_1 (psi)	σ_3 (psi)	σ'_1 (psi)	σ'_3 (psi)	σ'_1/σ'_3	Abar	P (psi)	Q (psi)	P' (psi)
60	84.2	0.451	76.3	1.2	6.96	7.742	12.741	10.985	21.3	10.3	20.1	9.1	2.21	0.11	15.8	5.5	14.6
61	84.1	0.459	76.3	1.1	6.97	7.869	12.717	10.947	21.2	10.3	20.1	9.2	2.19	0.10	15.8	5.5	14.6
62	84.2	0.466	76.2	1.1	6.98	7.996	12.729	10.942	21.2	10.3	20.1	9.2	2.19	0.10	15.8	5.5	14.7
63	84.0	0.473	76.2	1.0	6.99	8.123	12.705	10.903	21.2	10.3	20.2	9.3	2.18	0.09	15.7	5.5	14.7
64	83.5	0.481	76.1	1.0	7.00	8.260	12.633	10.820	21.1	10.3	20.1	9.3	2.16	0.09	15.7	5.4	14.7
65	83.8	0.489	76.0	0.9	7.01	8.397	12.669	10.835	21.1	10.3	20.2	9.4	2.15	0.08	15.7	5.4	14.8
66	83.5	0.497	76.0	0.8	7.02	8.524	12.633	10.786	21.1	10.3	20.2	9.4	2.14	0.08	15.7	5.4	14.8
67	83.5	0.504	75.9	0.8	7.03	8.651	12.621	10.759	21.1	10.3	20.3	9.5	2.13	0.07	15.7	5.4	14.9
68	83.3	0.512	75.9	0.7	7.04	8.778	12.597	10.721	21.0	10.3	20.3	9.5	2.12	0.07	15.7	5.4	14.9
69	83.5	0.519	75.8	0.7	7.05	8.905	12.633	10.738	21.0	10.3	20.3	9.6	2.12	0.07	15.7	5.4	15.0
70	83.9	0.526	75.8	0.7	7.06	9.032	12.681	10.766	21.1	10.3	20.4	9.6	2.12	0.06	15.7	5.4	15.0
71	83.9	0.534	75.8	0.6	7.07	9.159	12.681	10.750	21.0	10.3	20.4	9.6	2.11	0.06	15.7	5.4	15.0
72	83.6	0.541	75.7	0.6	7.08	9.287	12.645	10.701	21.0	10.3	20.4	9.7	2.10	0.05	15.6	5.4	15.1
73	84.3	0.549	75.9	0.8	7.09	9.423	12.753	10.782	21.1	10.3	20.3	9.5	2.13	0.07	15.7	5.4	14.9
74	84.6	0.557	75.9	0.8	7.10	9.551	12.801	10.809	21.1	10.3	20.3	9.5	2.13	0.07	15.7	5.4	14.9
75	84.8	0.564	75.9	0.7	7.11	9.678	12.825	10.815	21.1	10.3	20.4	9.5	2.13	0.07	15.7	5.4	15.0
76	85.0	0.571	75.9	0.7	7.12	9.805	12.861	10.831	21.1	10.3	20.4	9.6	2.13	0.07	15.7	5.4	15.0
77	85.5	0.579	75.8	0.7	7.13	9.932	12.934	10.879	21.2	10.3	20.5	9.6	2.13	0.06	15.7	5.4	15.0
78	86.2	0.587	75.8	0.7	7.14	10.069	13.042	10.959	21.3	10.3	20.6	9.6	2.14	0.06	15.8	5.5	15.1
79	87.1	0.594	75.8	0.7	7.15	10.196	13.186	11.072	21.4	10.3	20.7	9.6	2.15	0.06	15.8	5.5	15.2
80	87.3	0.602	75.8	0.6	7.16	10.323	13.210	11.077	21.4	10.3	20.7	9.6	2.15	0.06	15.8	5.5	15.2
81	88.0	0.610	75.7	0.6	7.17	10.460	13.319	11.156	21.4	10.3	20.8	9.7	2.15	0.05	15.9	5.6	15.3
82	88.3	0.617	75.7	0.6	7.18	10.587	13.367	11.182	21.5	10.3	20.9	9.7	2.15	0.05	15.9	5.6	15.3
83	88.8	0.624	75.7	0.6	7.19	10.714	13.451	11.240	21.5	10.3	21.0	9.7	2.16	0.05	15.9	5.6	15.3
84	89.3	0.632	75.7	0.5	7.20	10.851	13.523	11.286	21.6	10.3	21.0	9.7	2.16	0.05	15.9	5.6	15.4
85	90.0	0.639	75.7	0.5	7.21	10.968	13.631	11.367	21.7	10.3	21.1	9.7	2.17	0.05	16.0	5.7	15.4
86	90.6	0.647	75.7	0.5	7.22	11.105	13.728	11.434	21.7	10.3	21.2	9.8	2.17	0.05	16.0	5.7	15.5
87	90.9	0.655	75.7	0.5	7.23	11.232	13.776	11.459	21.8	10.3	21.2	9.8	2.17	0.05	16.0	5.7	15.5
88	91.4	0.662	75.6	0.5	7.24	11.359	13.860	11.516	21.8	10.3	21.3	9.8	2.18	0.04	16.1	5.8	15.5
89	91.8	0.669	75.6	0.5	7.25	11.486	13.920	11.552	21.8	10.3	21.4	9.8	2.18	0.04	16.1	5.8	15.6
90	92.8	0.677	75.6	0.5	7.26	11.613	14.077	11.672	22.0	10.3	21.5	9.8	2.19	0.04	16.1	5.8	15.6
91	93.7	0.684	75.6	0.5	7.27	11.740	14.209	11.771	22.1	10.3	21.6	9.8	2.20	0.04	16.2	5.9	15.7
92	93.9	0.692	75.6	0.5	7.28	11.877	14.245	11.783	22.1	10.3	21.6	9.8	2.20	0.04	16.2	5.9	15.7
93	94.5	0.699	75.6	0.5	7.29	11.994	14.341	11.851	22.1	10.3	21.7	9.8	2.21	0.04	16.2	5.9	15.7
94	95.2	0.707	75.6	0.5	7.30	12.131	14.450	11.927	22.2	10.3	21.7	9.8	2.22	0.04	16.3	6.0	15.8
95	96.0	0.714	75.6	0.5	7.31	12.258	14.570	12.014	22.3	10.3	21.8	9.8	2.23	0.04	16.3	6.0	15.8
96	96.3	0.722	75.6	0.5	7.33	12.385	14.618	12.038	22.3	10.3	21.8	9.8	2.23	0.04	16.3	6.0	15.8
97	97.4	0.730	75.7	0.5	7.34	12.522	14.798	12.176	22.5	10.3	21.9	9.8	2.25	0.04	16.4	6.1	15.9
98	97.9	0.737	75.7	0.5	7.35	12.649	14.871	12.220	22.5	10.3	22.0	9.8	2.25	0.04	16.4	6.1	15.9
99	98.8	0.745	75.7	0.5	7.36	12.776	15.003	12.317	22.6	10.3	22.1	9.8	2.26	0.04	16.5	6.2	15.9
100	99.0	0.752	75.7	0.5	7.37	12.913	15.039	12.327	22.6	10.3	22.1	9.8	2.26	0.04	16.5	6.2	15.9

Specimen C

Reading No.	Deviator Load (lbs)	Axial Deformation (in)	Pore Pressure (psi)	Change in Pore Pressure (psi)	Corrected Area (in2)	Axial Strain (%)	Deviator Stress (psi)	Corrected Deviator Stress (psi)	σ_1 (psi)	σ_3 (psi)	σ'_1 (psi)	σ'_3 (psi)	σ'_1/σ'_3	Abar	P (psi)	Q (psi)	P' (psi)
101	99.7	0.760	75.7	0.5	7.38	13.040	15.147	12.402	22.7	10.3	22.1	9.7	2.27	0.04	16.5	6.2	15.9
102	100.1	0.768	75.7	0.5	7.39	13.177	15.207	12.434	22.7	10.3	22.2	9.7	2.28	0.04	16.5	6.2	16.0
103	100.8	0.775	75.7	0.5	7.40	13.304	15.316	12.509	22.8	10.3	22.3	9.7	2.28	0.04	16.5	6.3	16.0
104	101.6	0.783	75.7	0.5	7.41	13.431	15.448	12.604	22.9	10.3	22.4	9.7	2.29	0.04	16.6	6.3	16.0
105	102.4	0.790	75.7	0.6	7.42	13.558	15.568	12.688	23.0	10.3	22.4	9.7	2.30	0.04	16.6	6.3	16.1
106	102.6	0.797	75.7	0.5	7.43	13.676	15.604	12.701	23.0	10.3	22.4	9.7	2.30	0.04	16.6	6.4	16.1
107	103.0	0.804	75.7	0.5	7.45	13.803	15.665	12.733	23.0	10.3	22.5	9.7	2.31	0.04	16.7	6.4	16.1
108	103.2	0.812	75.7	0.5	7.46	13.930	15.701	12.744	23.0	10.3	22.5	9.7	2.31	0.04	16.7	6.4	16.1
109	103.9	0.819	75.7	0.5	7.47	14.057	15.797	12.807	23.1	10.3	22.6	9.7	2.31	0.04	16.7	6.4	16.2
110	103.8	0.827	75.7	0.5	7.48	14.184	15.785	12.776	23.1	10.3	22.5	9.8	2.31	0.04	16.7	6.4	16.2
111	104.1	0.833	75.6	0.5	7.49	14.301	15.833	12.799	23.1	10.3	22.6	9.8	2.31	0.04	16.7	6.4	16.2
112	105.1	0.841	75.6	0.5	7.50	14.428	15.989	12.913	23.2	10.3	22.7	9.8	2.32	0.04	16.7	6.5	16.2
113	107.1	0.848	75.6	0.5	7.51	14.555	16.302	13.160	23.5	10.3	23.0	9.8	2.34	0.04	16.9	6.6	16.4
114	107.9	0.856	75.6	0.5	7.52	14.683	16.423	13.242	23.5	10.3	23.1	9.8	2.35	0.04	16.9	6.6	16.4
115	108.8	0.863	75.6	0.4	7.53	14.810	16.567	13.344	23.6	10.3	23.2	9.8	2.35	0.03	17.0	6.7	16.5
116	109.1	0.870	75.6	0.4	7.55	14.937	16.615	13.364	23.7	10.3	23.2	9.8	2.36	0.03	17.0	6.7	16.5
117	109.0	0.875	75.6	0.4	7.55	15.015	16.603	13.341	23.6	10.3	23.2	9.9	2.35	0.03	17.0	6.7	16.5

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	32.6	26.1	39.8

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	45	20	0.1159	0.0623	0.0284					

Material Description	USCS	AASHTO
○ Red tan gray CLAY (CL)	CL	A-7-6(15)

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

○ **Location:** M-6 **Depth:** 13-15' **Sample Number:** UD-2

Contour Engineering, LLC

Kennesaw, GA

Remarks:

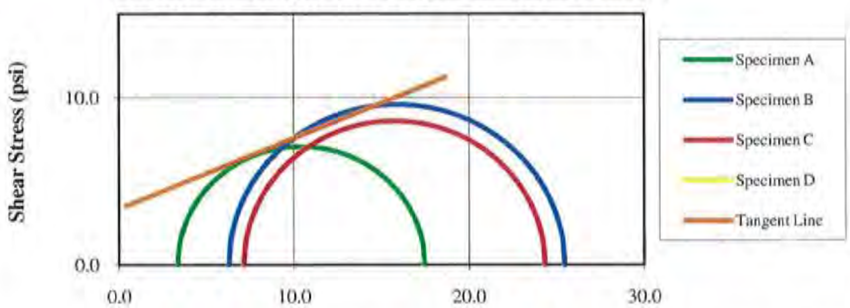
Figure

Contour Engineering

Consolidated Undrained Triaxial Test (ASTM D4767)

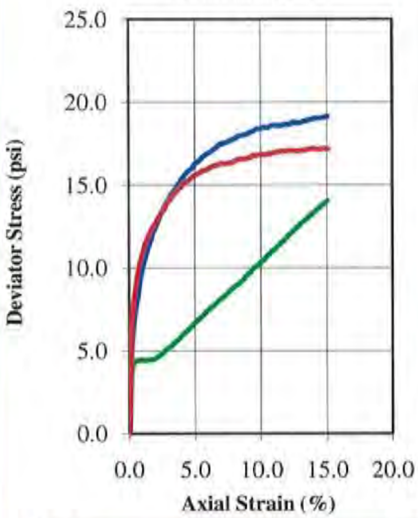
Date:

Effective Stress at Maximum Deviator Stress Criterion



Normal Stress (psi) 120.5 124.6 121.7 AVG=122pcf

Deviator Stress Vs. Axial Strain



Checked By:

Initial	A	B	C	D
Water Content (%)	20.7	23.0	28.2	
Dry Density (pcf)	99.8	101.3	94.9	
Saturation (%)	81.20	93.56	98.09	
Void Ratio	0.687	0.664	0.773	
Diameter (in)	2.864	2.862	2.857	
Height (in)	5.159	6.069	4.899	
Specific Gravity	2.70	2.70	2.70	
Liquid Limit	45	45	45	
Plastic Limit	20	20	20	
After Consolidation	**A**	**B**	**C**	**D**
B-Value	0.95	0.95	0.95	
Water Content (%)	22.2	26.3	29.5	
Dry Density (pcf)	105.10	100.15	95.46	
Saturation (%)	100.00	100.00	100.00	
Void Ratio	0.604	0.683	0.766	
Effective Stress (psi)	3.4	6.9	9.2	
Back Press. (psi)	80.1	80.1	81.2	
Rate of Strain	0	0	0	

Date

Maximum Deviator Stress Criterion	
576 psf C (psi)	4.0
335 psf C' (psi)	3.4
18.2 Ø (deg)	18.2
36.9 Ø' (deg)	22.8

After Shear	A	B	C	D
σ'1 at Failure (psi)	17.40	25.39	24.27	
σ'3 at Failure (psi)	3.32	6.24	7.06	

Project:	Plant McIntosh
Location:	M-6, UD-2 13-15'
Project Number:	AT10SOC03-M
Boring Number:	M-6
Sample Number:	M-6, UD-2
Depth:	13-15'
Sample Type:	Undisturbed
Description:	Red tan to red tan gray CLAY (CL)
Test Type	Consolidated Undrained
Remarks	

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

Tested By:

m-4
13-15'

Contour Engineering

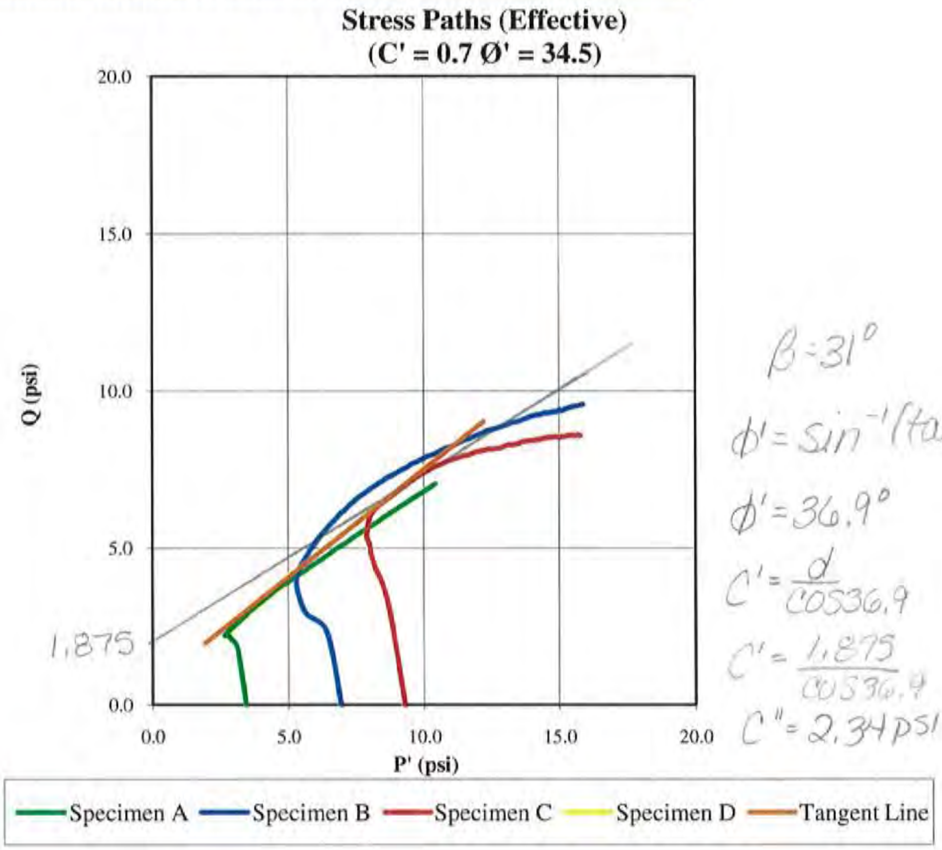
Consolidated Undrained Triaxial Test (ASTM D4767)

Date:

Checked By:

Date:

Tested By:



β = 31°

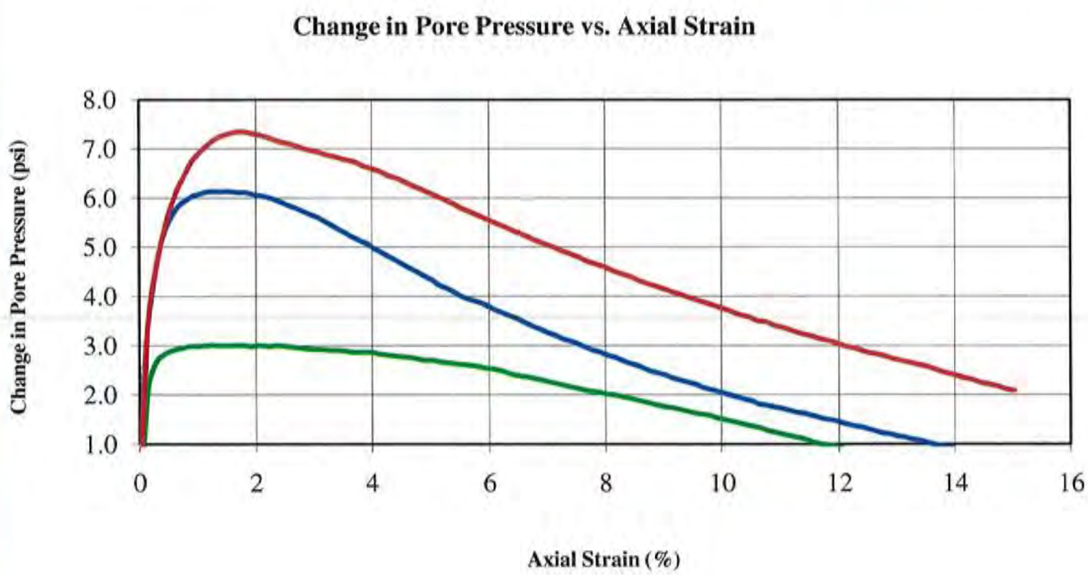
$\phi' = \sin^{-1}(\tan 31°)$

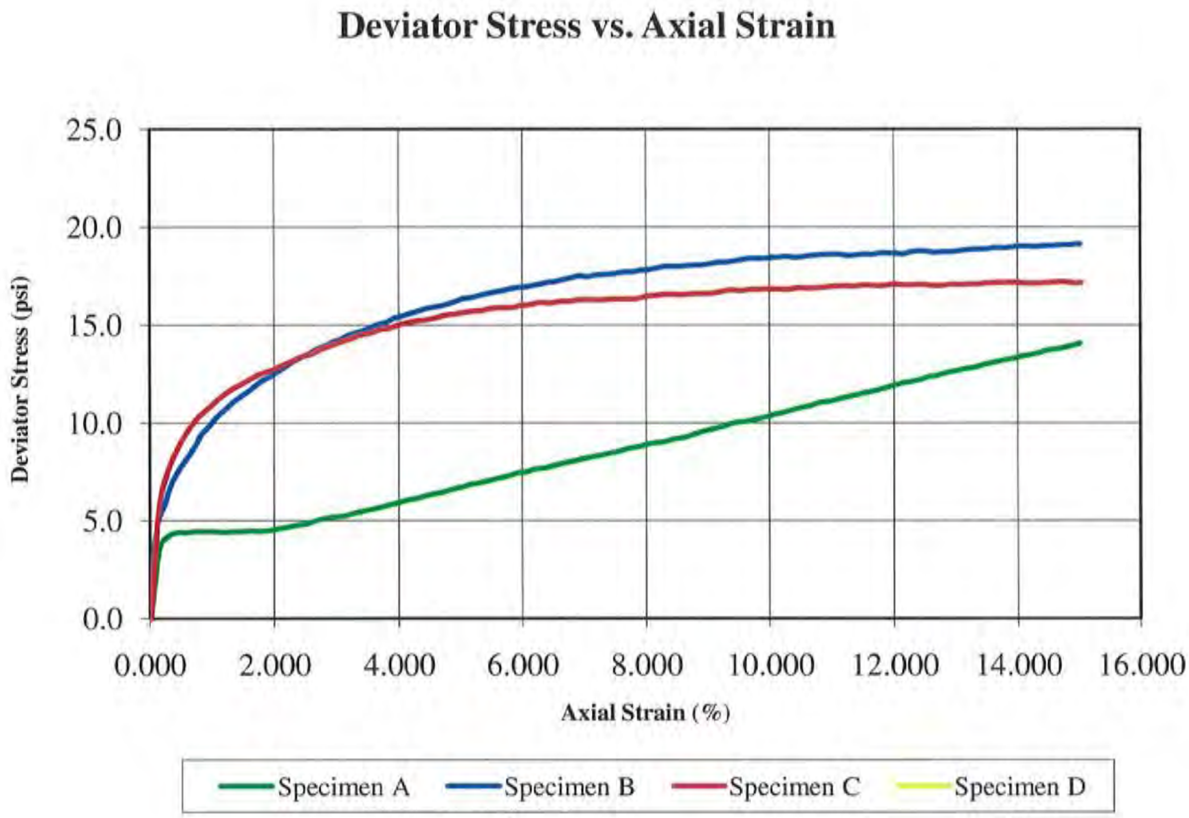
$\phi' = 36.9°$

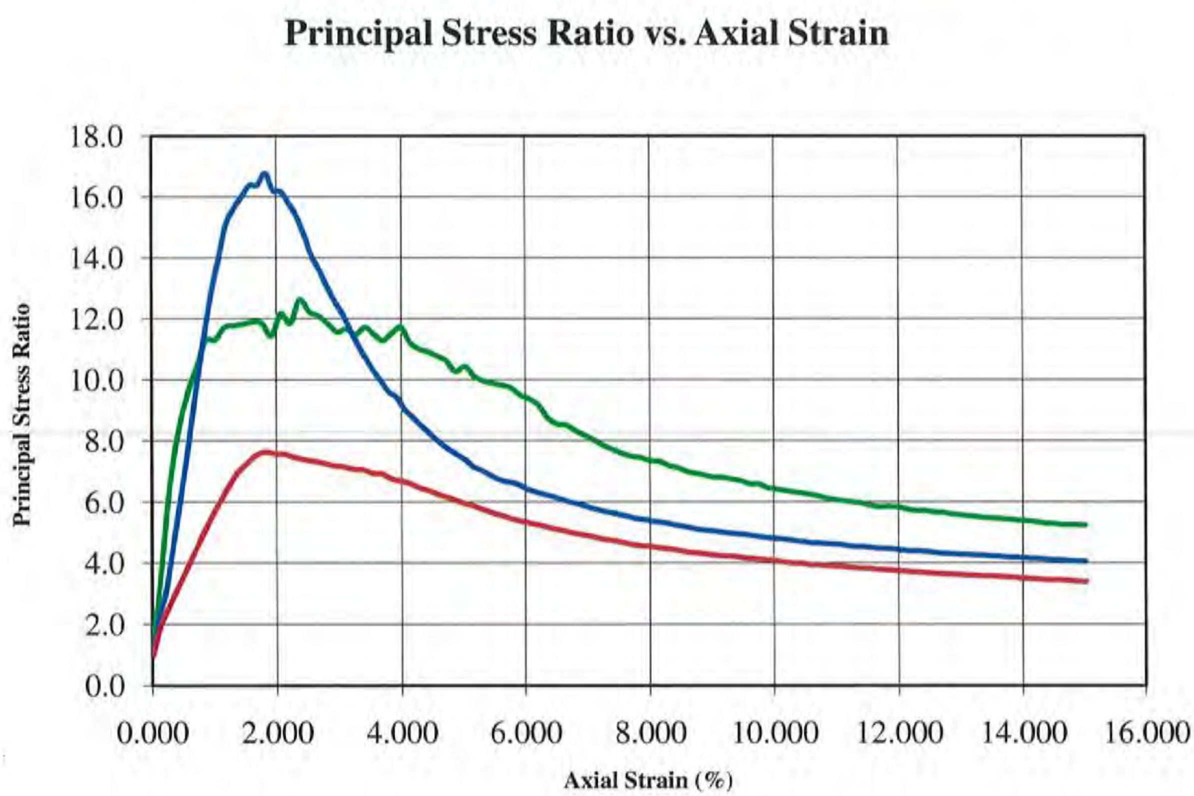
$C' = \frac{d}{\cos 36.9}$

$C' = \frac{1.875}{\cos 36.9}$

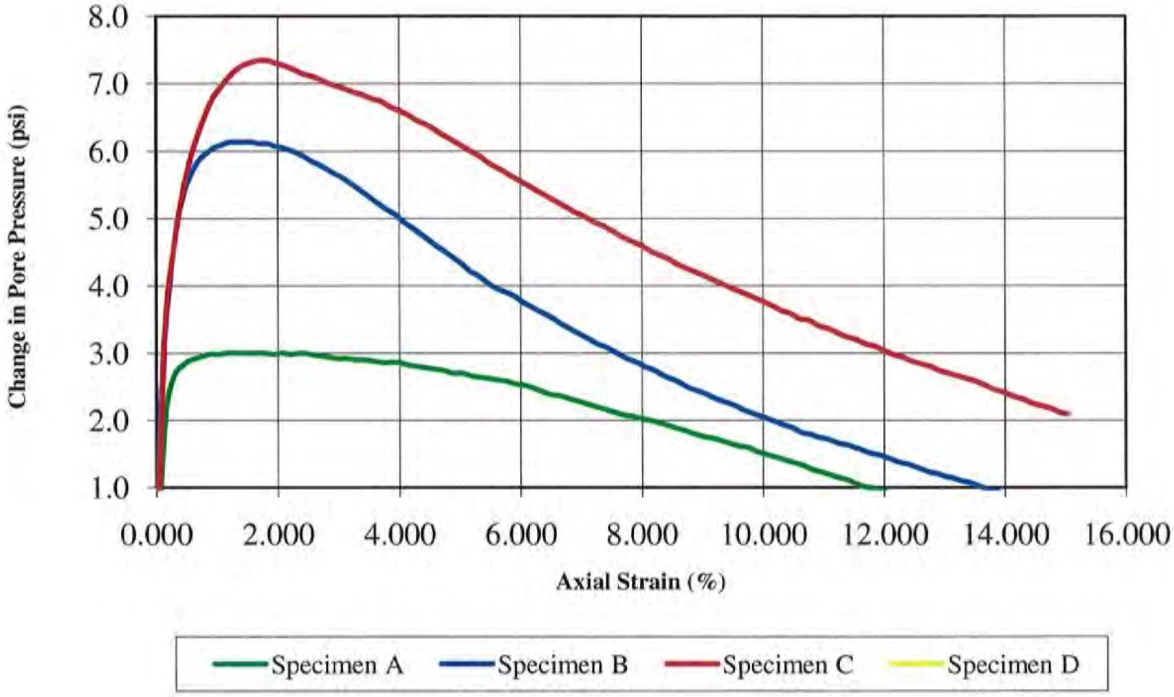
C'' = 2.34 psi = 338 psf




Deviator Stress vs. Axial Strain
25.0
20.0
15.0
10.0
5.0
0.0
Deviator Stress (psi)
0.000
2.000
4.000
6.000
8.000
10.000
12.000
14.000
16.000
Axial Strain (%)
Specimen A
Specimen B
Specimen C
Specimen D


Principal Stress Ratio vs. Axial Strain
18.0
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
Principal Stress Ratio
0.000
2.000
4.000
6.000
8.000
10.000
12.000
14.000
16.000
Axial Strain (%)

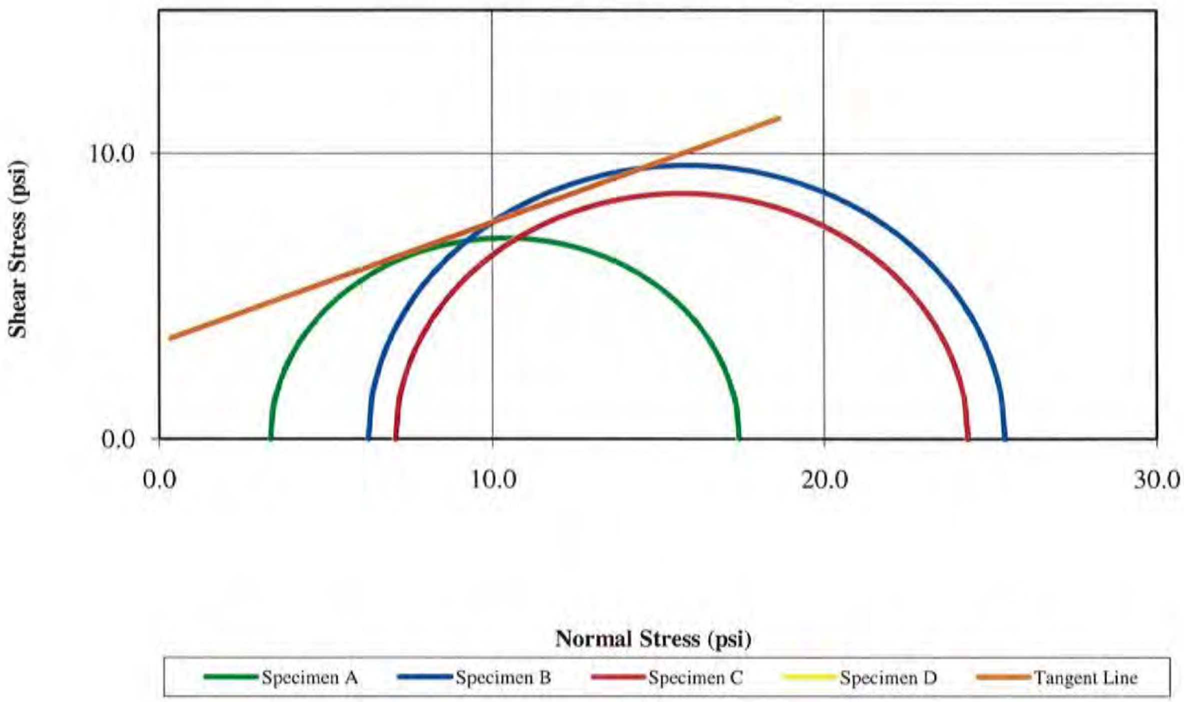
Change in Pore Pressure vs. Axial Strain



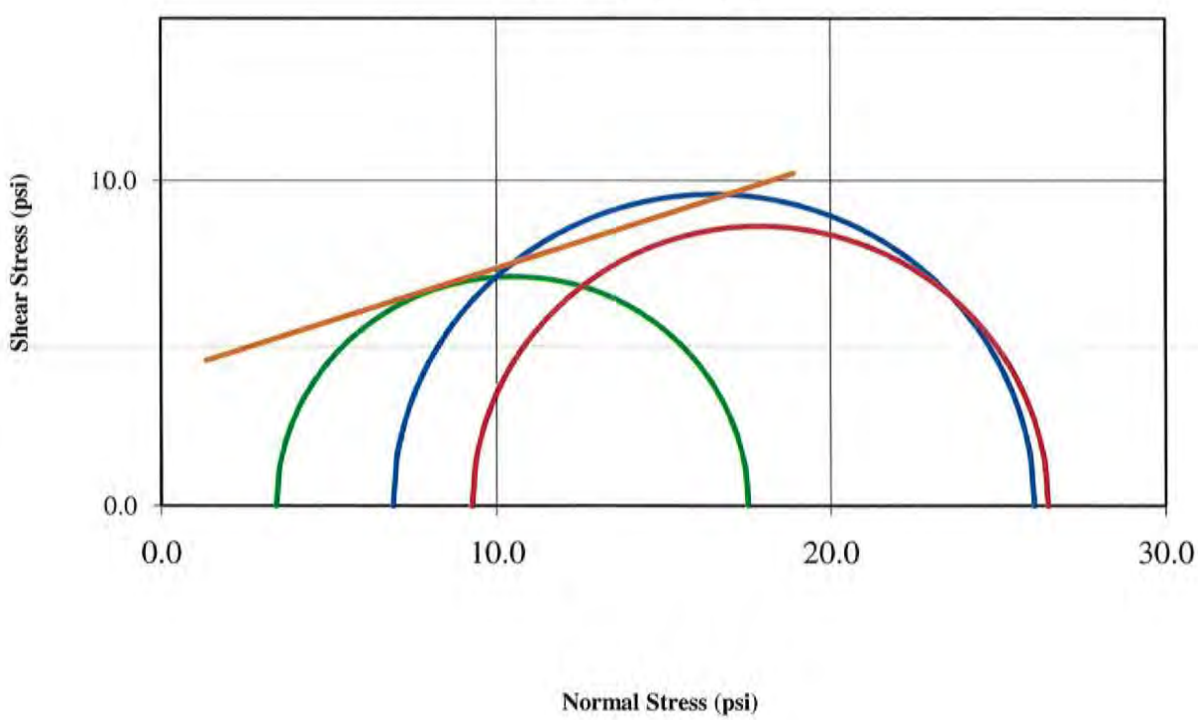
CONFIDENTIAL BUSINESS INFORMATION

Mohr Stress Circles at Maximum Deviator Stress Criterion

Effective Stress
(C' = 3.4 Ø' = 22.8)

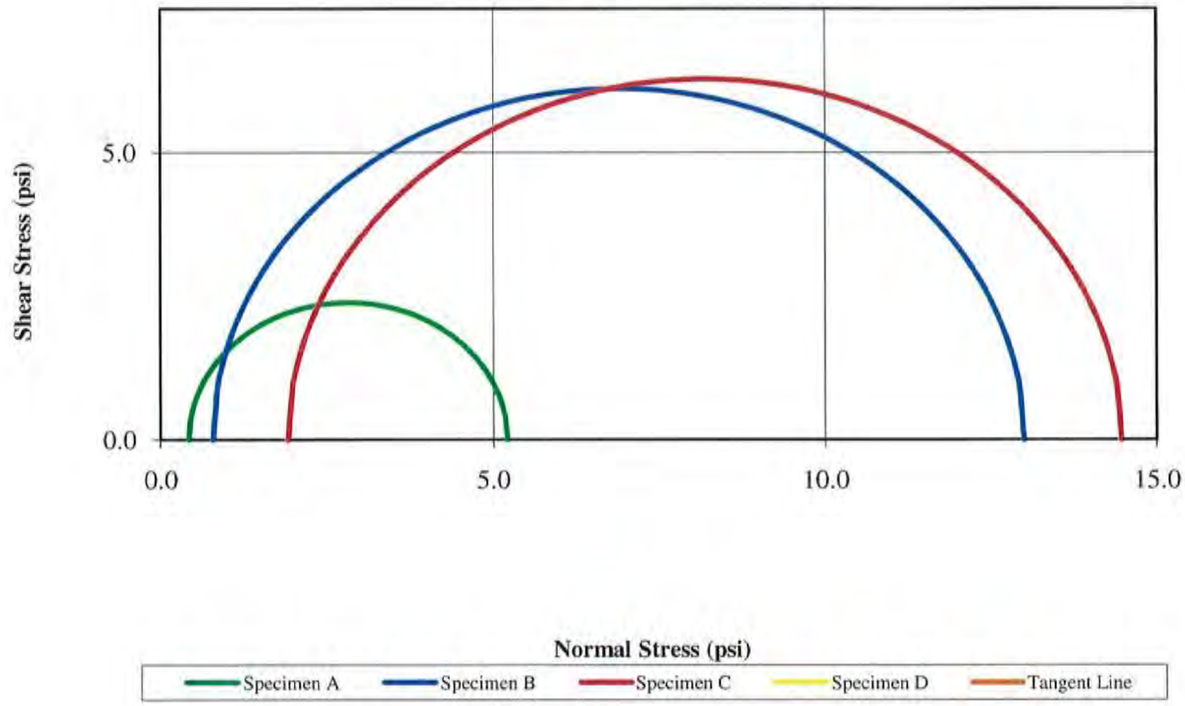


Total Stress
(C = 4.0 Ø = 18.2)

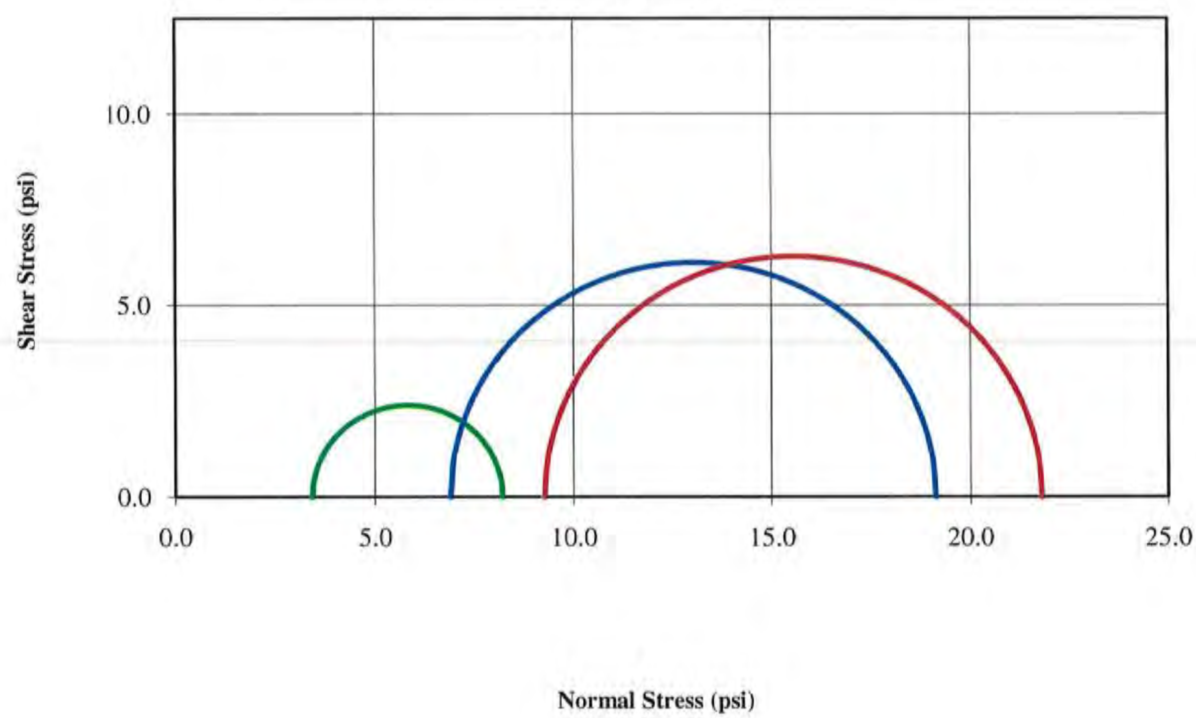


Mohr Stress Circles at Maximum Principal Stress Ratio Criterion

Effective Stress
(C' = 0.0 Ø' = 0.0)

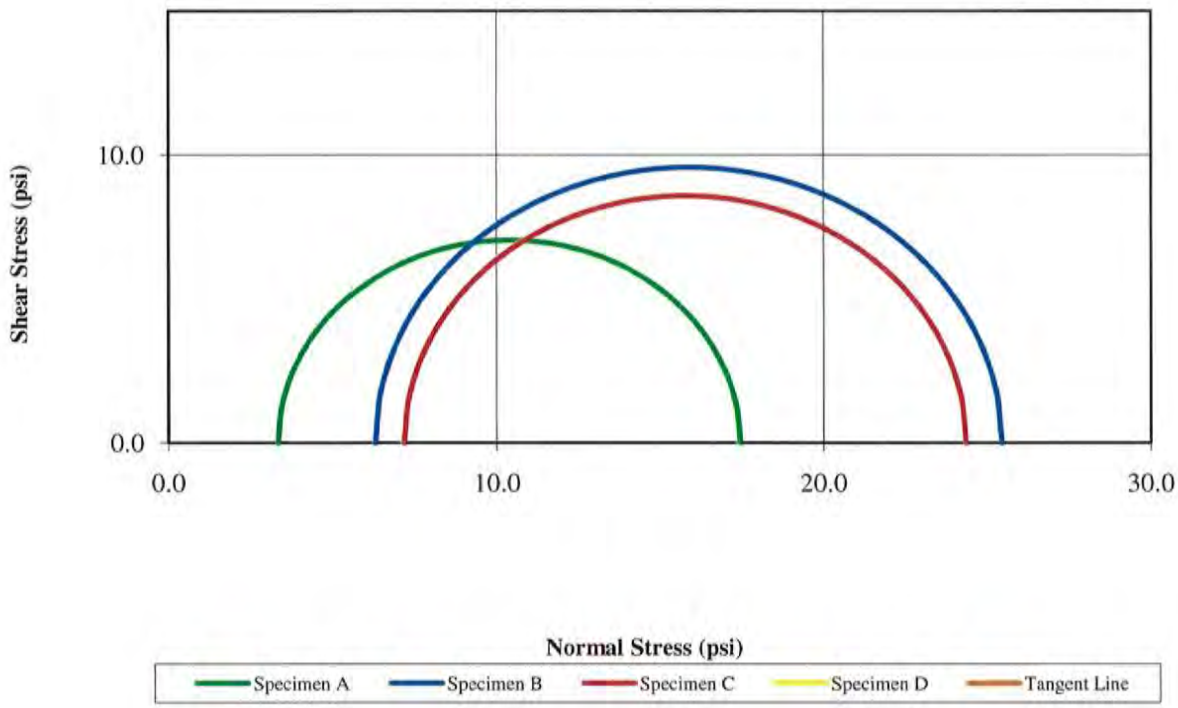


Total Stress
(C = 0.0 Ø = 0.0)

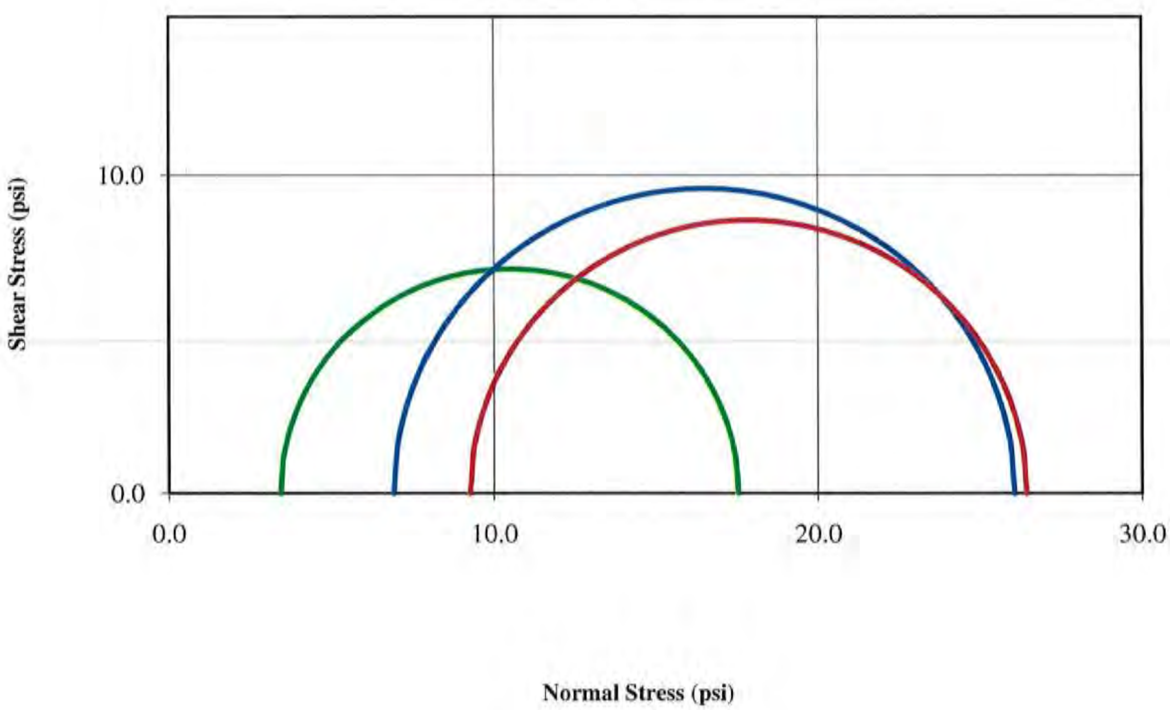


Mohr Stress Circles at 15% Axial Strain Criterion

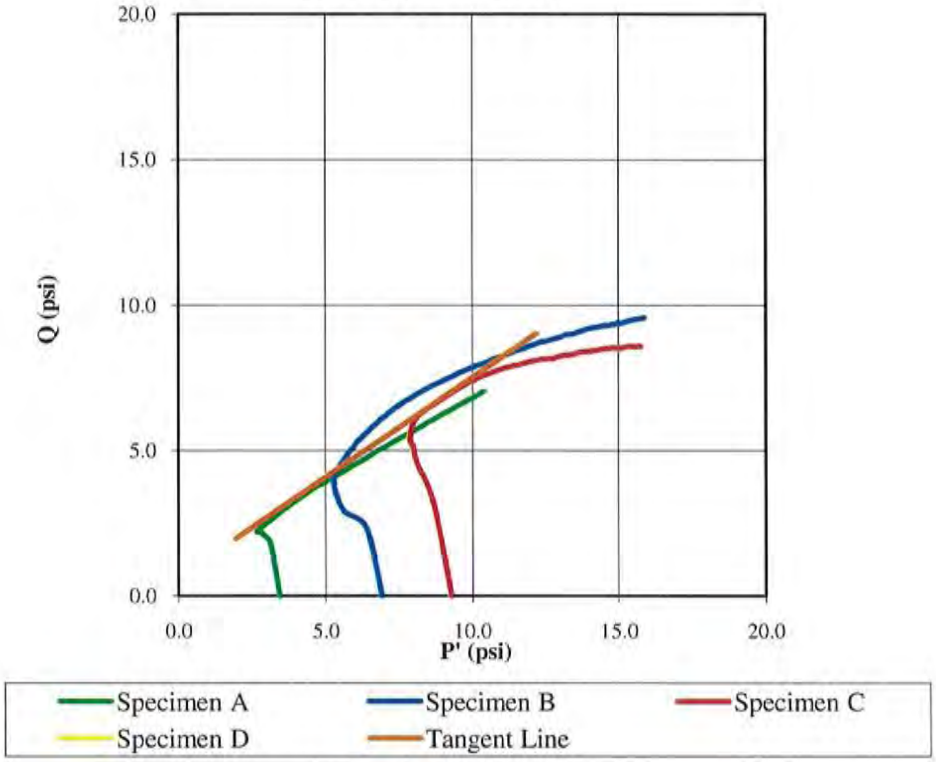
Effective Stress
(C' = 0.0 Ø' = 0.0)



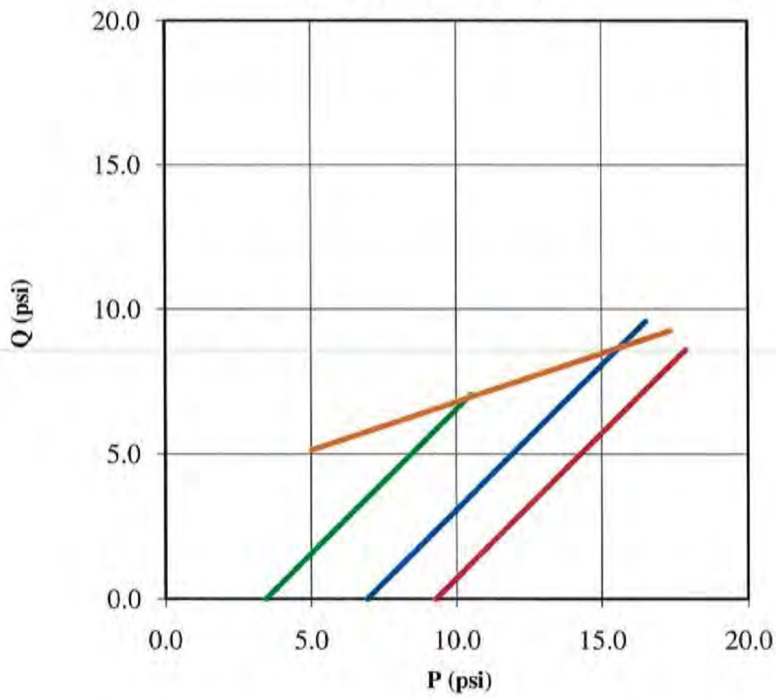
Total Stress
(C = 0.0 Ø = 0.0)



Stress Paths (Effective)
(C' = 0.7 Ø' = 34.5)

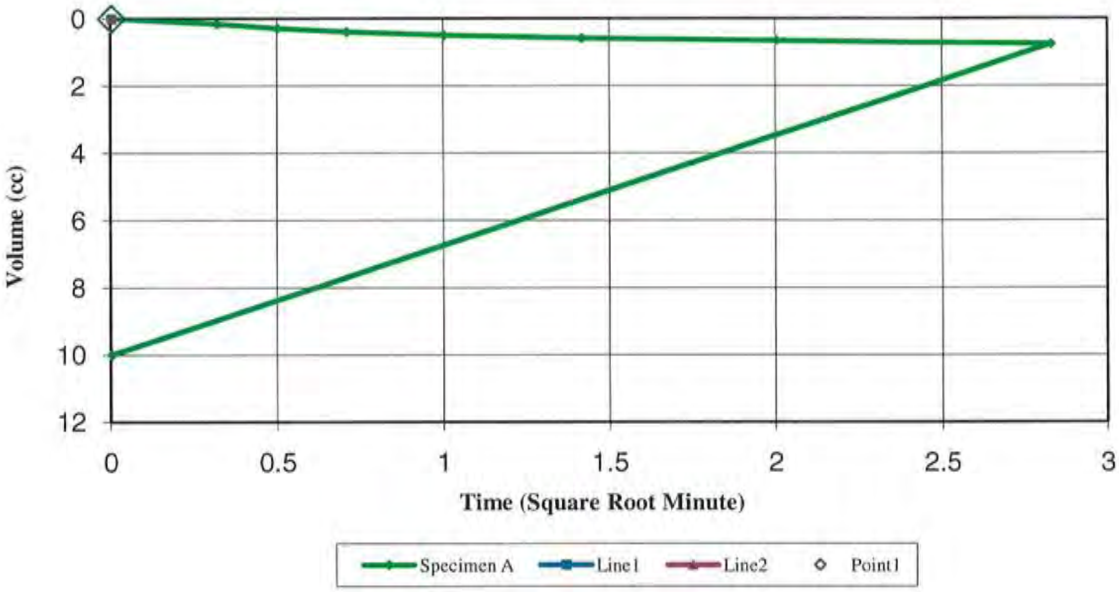


Stress Paths (Total)
(C' = 3.5 Ø' = 18.4)

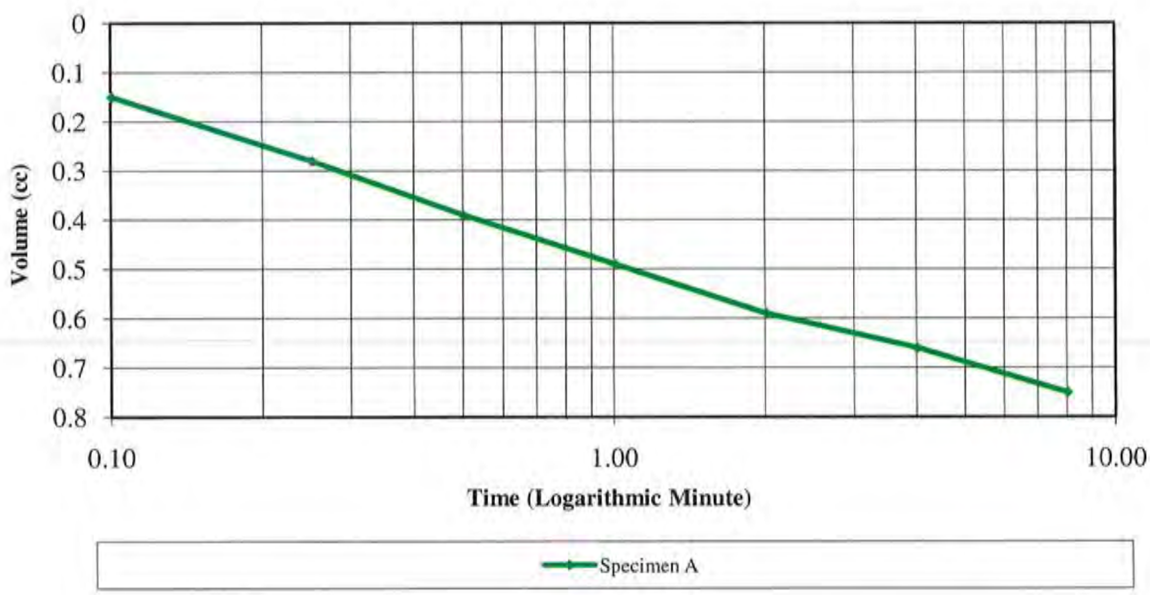


Specimen A Consolidation Graphs

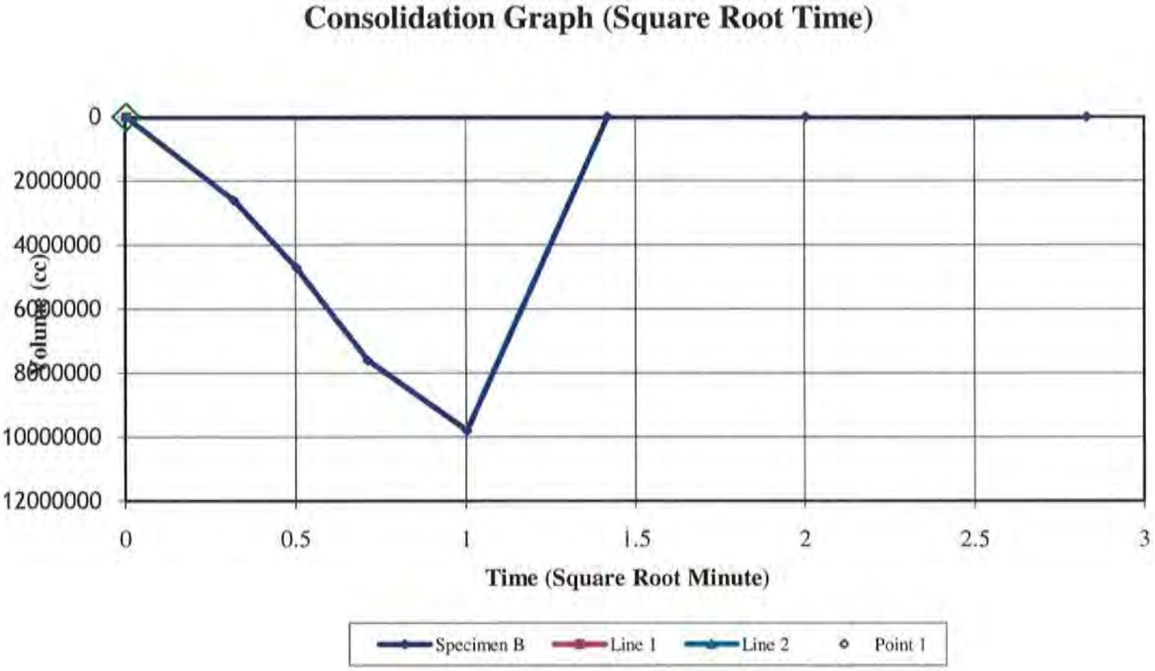
Consolidation Graph (Square Root Time)

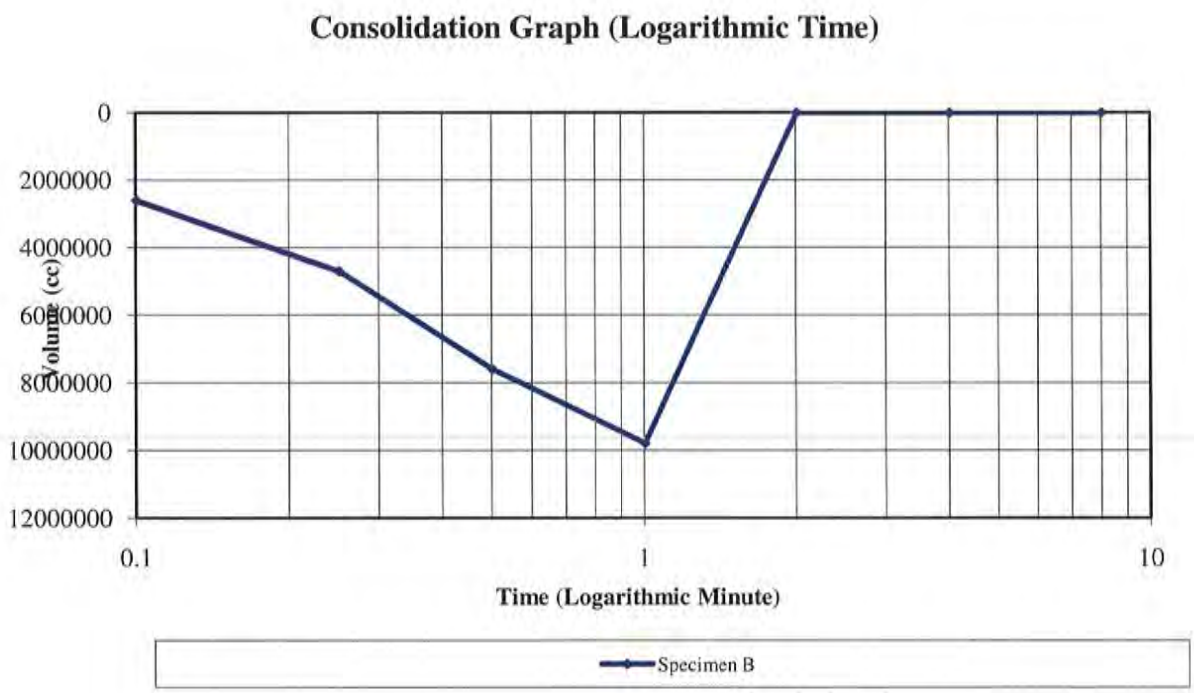


Consolidation Graph (Logarithmic Time)

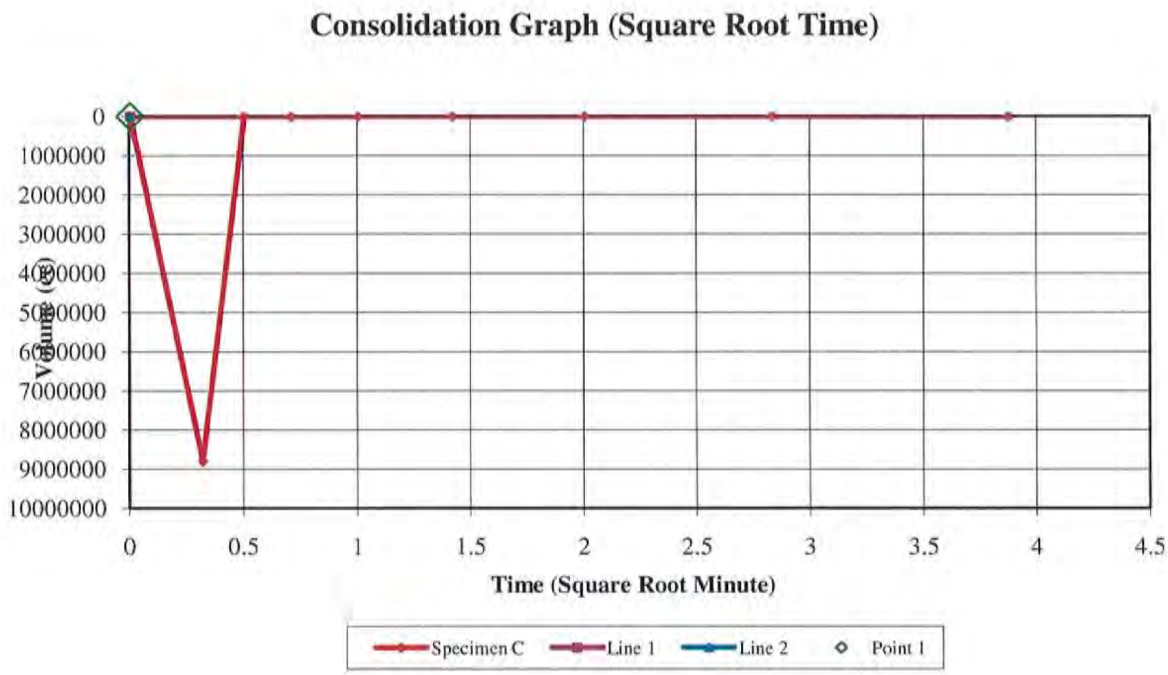


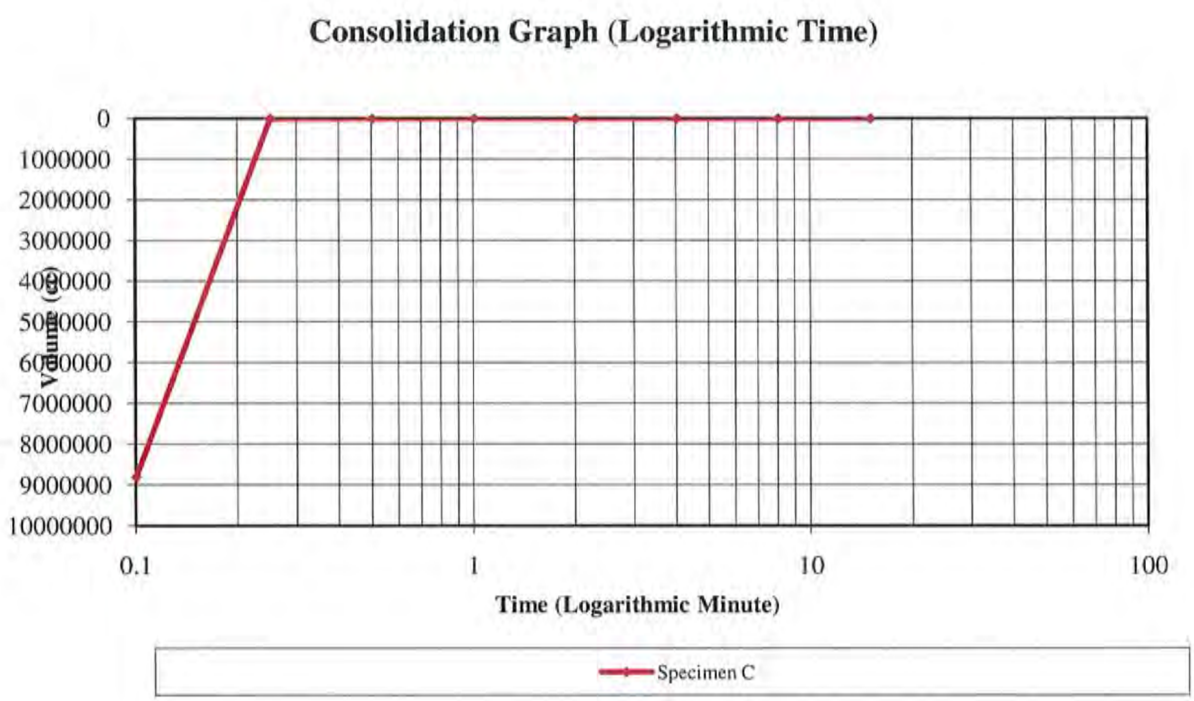
Specimen B Consolidation Graphs





Specimen C Consolidation Graphs





Consolidation Calculations Specimen A
CU Triaxial Test

Contour Engineering

Client: Southern Company
Project No. AT10SOC03-M
Project Name: Plant McIntosh

Project Location: M-6, UD-2 13-15'

Hole No. M-6
Depth: 13-15'

Cell Pressure (psi) = 83.47
Back Pressure (psi) = 80
Effective Pressure (psi)= 3.47

Test Type = CU

Initial Sample Diameter (in) = 2.864
Initial Sample Height (in) = 5.159
Initial Sample Area (in2) = 6.444
Initial Volume (in3) = 33.24

Burrette Reading at Start of Test (cc)= 0

Time	Burrette Reading (cc)	Volume Change (cc)
00:00:00	0.00	N/A
00:00:06	-0.15	0.150
00:00:15	-0.28	0.280
00:00:30	-0.39	0.390
00:01:00	-0.49	0.490
00:02:00	-0.59	0.590
00:04:00	-0.66	0.660
00:08:00	-0.75	0.750
	-10.00	10

Laboratory Supervisor

Consolidation Calculations Specimen B
CU Triaxial Test

Contour Engineering

Client: Southern Company | Project No. AT10SOC03-M
Project Name: Plant McIntosh

Project Location: M-6, UD-2 13-15'

Hole No. M-6 | Depth: 13-15'

Cell Pressure (psi) = 86.94
Back Pressure (psi) = 80
Effective Pressure (psi)= 6.94

Test Type = CU

Initial Sample Diameter (in) = 2.862
Initial Sample Height (in) = 6.069
Initial Sample Area (in2) = 6.432
Initial Volume (in3) = 39.04

Burrette Reading at Start of Test (cc)= 0

Time	Burrette Reading (cc)	Volume Change (cc)
00:00:00	0.00	N/A
00:00:06	-0.26	2600002.000
00:00:15	-0.47	4700003.000
00:00:30	-0.76	7600002.000
00:01:00	-0.98	9799995.000
00:02:00	-1.11	111.000
00:04:00	-1.25	125.000
00:08:00	-1.49	149.000
	-10.00	10

Laboratory Supervisor

Consolidation Calculations Specimen C
CU Triaxial Test

Contour Engineering

Client: Southern Company
Project No. AT10SOC03-M
Project Name: Plant McIntosh

Project Location: M-6, UD-2 13-15'

Hole No. M-6
Depth: 13-15'

Cell Pressure (psi) = 90.42
Back Pressure (psi) = 80
Effective Pressure (psi)= 10.42

Test Type = CU

Initial Sample Diameter (in) = 2.857
Initial Sample Height (in) = 4.899
Initial Sample Area (in2) = 6.409
Initial Volume (in3) = 31.4

Burrette Reading at Start of Test (cc)= 0

Time	Burrette Reading (cc)	Volume Change (cc)
00:00:00	0.00	N/A
00:00:06	-0.88	8800001.000
00:00:15	-1.38	138.000
00:00:30	-1.88	188.000
00:01:00	-2.15	215.000
00:02:00	-2.48	248.000
00:04:00	-2.86	286.000
00:08:00	-3.11	311.000
00:15:00	-3.36	336.000
	-10.00	10

Laboratory Supervisor

Specimen A Shear Data

CU Triaxial Test

Contour Engineering

File Location
Plant McIntosh M-6 UD-2 (10-1-10).HSD

Project Information

Project No. AT10SOC03-M
Project Name: Plant McIntosh
Client: Southern Company
Sample Location: M-6, UD-2 13-15'
Sample Description: Red tan CLAY (CL)
Remarks:

Sample Data

Sample Type: Undisturbed
Specific Gravity: 2.7
LL: 45.000
PL: 20.000

Sample Parameters	Initial	After Consolidation	Final
Diameter (in)	2.864	2.833	
Height (in)	5.159	5.093	
Weight (grams)	1051.01		1082.57
Moisture (%)	20.74		22.23
Dry Density (pcf)	99.76	105.10	
Saturation (%)	81.20	100.00	
Void Ratio	0.687	0.604	

Test Data

Rate of Strain: 0
Cell Pressure (psi): 83.470
Effective Confining Stress (psi): 3.4
Corrected Peak Deviator Stress (psi): 14.081 at reading number: 102

Specimen A

Reading No.	Deviator Load (lbs)	Axial Deformation (in)	Pore Pressure (psi)	Change in Pore Pressure (psi)	Corrected Area (in2)	Axial Strain (%)	Deviator Stress (psi)	Corrected Deviator Stress (psi)	σ_1 (psi)	σ_3 (psi)	σ'_1 (psi)	σ'_3 (psi)	σ'_1/σ'_3	Abar	P (psi)	Q (psi)	P' (psi)
0	2.6	0.000	80.1	0.0	6.30	0.000	0.000	0.000	3.4	3.4	3.4	3.4	1.00	0.00	3.4	0.0	3.4
1	26.1	0.007	82.2	2.2	6.31	0.145	3.724	3.662	7.1	3.4	4.9	1.3	3.91	0.59	5.2	1.8	3.1
2	29.9	0.014	82.7	2.7	6.32	0.280	4.324	4.204	7.6	3.4	5.0	0.8	6.57	0.63	5.5	2.1	2.9
3	31.4	0.022	82.9	2.8	6.33	0.425	4.569	4.385	7.8	3.4	5.0	0.6	8.39	0.64	5.6	2.2	2.8
4	31.9	0.029	83.0	2.9	6.34	0.570	4.643	4.395	7.8	3.4	4.9	0.5	9.57	0.66	5.6	2.2	2.7
5	32.7	0.036	83.0	2.9	6.35	0.716	4.765	4.453	7.9	3.4	4.9	0.5	10.43	0.66	5.6	2.2	2.7
6	33.0	0.044	83.0	3.0	6.36	0.861	4.827	4.451	7.9	3.4	4.9	0.4	11.31	0.67	5.6	2.2	2.7
7	33.4	0.051	83.0	3.0	6.37	1.007	4.888	4.448	7.9	3.4	4.9	0.4	11.30	0.67	5.6	2.2	2.7
8	33.7	0.059	83.1	3.0	6.38	1.163	4.925	4.416	7.8	3.4	4.8	0.4	11.73	0.68	5.6	2.2	2.6
9	34.2	0.067	83.1	3.0	6.39	1.309	5.010	4.437	7.9	3.4	4.8	0.4	11.78	0.68	5.6	2.2	2.6
10	34.7	0.074	83.1	3.0	6.40	1.454	5.096	4.458	7.9	3.4	4.9	0.4	11.83	0.67	5.6	2.2	2.6
11	35.4	0.082	83.1	3.0	6.41	1.611	5.194	4.485	7.9	3.4	4.9	0.4	11.89	0.67	5.7	2.2	2.7
12	35.7	0.089	83.1	3.0	6.42	1.756	5.243	4.469	7.9	3.4	4.9	0.4	11.86	0.67	5.7	2.2	2.6
13	36.4	0.097	83.0	3.0	6.43	1.913	5.353	4.508	7.9	3.4	4.9	0.4	11.44	0.66	5.7	2.3	2.7
14	37.2	0.105	83.1	3.0	6.44	2.058	5.488	4.599	8.0	3.4	5.0	0.4	12.17	0.65	5.7	2.3	2.7
15	37.8	0.113	83.0	3.0	6.45	2.215	5.586	4.686	8.1	3.4	5.1	0.4	11.85	0.64	5.8	2.3	2.8
16	38.5	0.120	83.1	3.0	6.46	2.360	5.697	4.785	8.2	3.4	5.2	0.4	12.62	0.63	5.8	2.4	2.8
17	39.0	0.128	83.0	3.0	6.47	2.517	5.770	4.848	8.3	3.4	5.3	0.4	12.23	0.62	5.8	2.4	2.9
18	40.2	0.136	83.0	3.0	6.48	2.662	5.954	5.019	8.4	3.4	5.5	0.5	12.10	0.59	5.9	2.5	3.0

Specimen A

Reading No.	Deviator Load (lbs)	Axial Deformation (in)	Pore Pressure (psi)	Change in Pore Pressure (psi)	Corrected Area (in2)	Axial Strain (%)	Deviator Stress (psi)	Corrected Deviator Stress (psi)	σ_1 (psi)	σ_3 (psi)	σ'_1 (psi)	σ'_3 (psi)	σ'_1/σ'_3	Abar	P (psi)	Q (psi)	P' (psi)
19	40.9	0.143	83.0	2.9	6.49	2.807	6.076	5.129	8.5	3.4	5.6	0.5	11.86	0.57	6.0	2.6	3.0
20	41.5	0.151	83.0	2.9	6.50	2.964	6.162	5.203	8.6	3.4	5.7	0.5	11.57	0.56	6.0	2.6	3.1
21	41.9	0.158	83.0	2.9	6.51	3.109	6.223	5.253	8.7	3.4	5.7	0.5	11.67	0.56	6.0	2.6	3.1
22	42.7	0.166	83.0	2.9	6.52	3.255	6.358	5.375	8.8	3.4	5.9	0.5	11.48	0.54	6.1	2.7	3.2
23	43.6	0.173	83.0	2.9	6.53	3.400	6.493	5.495	8.9	3.4	6.0	0.5	11.72	0.53	6.2	2.7	3.3
24	44.2	0.181	82.9	2.9	6.53	3.546	6.603	5.592	9.0	3.4	6.1	0.5	11.50	0.52	6.2	2.8	3.3
25	44.9	0.188	82.9	2.9	6.54	3.691	6.713	5.689	9.1	3.4	6.2	0.6	11.29	0.50	6.3	2.8	3.4
26	45.9	0.195	82.9	2.9	6.55	3.836	6.860	5.821	9.2	3.4	6.4	0.6	11.53	0.49	6.3	2.9	3.5
27	46.6	0.203	82.9	2.9	6.56	3.982	6.983	5.928	9.3	3.4	6.5	0.6	11.72	0.48	6.4	3.0	3.5
28	47.6	0.210	82.9	2.8	6.57	4.127	7.142	6.071	9.5	3.4	6.7	0.6	11.23	0.47	6.5	3.0	3.6
29	48.2	0.218	82.9	2.8	6.58	4.273	7.228	6.142	9.6	3.4	6.8	0.6	11.01	0.46	6.5	3.1	3.7
30	49.2	0.225	82.8	2.8	6.59	4.418	7.387	6.284	9.7	3.4	6.9	0.6	10.92	0.44	6.6	3.1	3.8
31	50.0	0.233	82.8	2.8	6.61	4.575	7.510	6.389	9.8	3.4	7.0	0.7	10.77	0.43	6.6	3.2	3.8
32	50.7	0.240	82.8	2.7	6.62	4.720	7.620	6.484	9.9	3.4	7.2	0.7	10.62	0.42	6.7	3.2	3.9
33	51.7	0.248	82.8	2.7	6.63	4.865	7.779	6.624	10.0	3.4	7.3	0.7	10.27	0.41	6.7	3.3	4.0
34	52.5	0.256	82.8	2.7	6.64	5.022	7.914	6.740	10.2	3.4	7.5	0.7	10.43	0.40	6.8	3.4	4.1
35	53.5	0.263	82.7	2.7	6.65	5.167	8.073	6.879	10.3	3.4	7.6	0.8	10.11	0.39	6.9	3.4	4.2
36	54.1	0.271	82.7	2.6	6.66	5.313	8.159	6.949	10.4	3.4	7.7	0.8	9.97	0.38	6.9	3.5	4.2
37	54.9	0.278	82.7	2.6	6.67	5.458	8.294	7.064	10.5	3.4	7.9	0.8	9.88	0.37	7.0	3.5	4.3
38	55.8	0.286	82.7	2.6	6.68	5.615	8.441	7.190	10.6	3.4	8.0	0.8	9.82	0.36	7.0	3.6	4.4
39	56.6	0.293	82.6	2.6	6.69	5.760	8.563	7.293	10.7	3.4	8.1	0.8	9.73	0.35	7.1	3.6	4.5
40	57.7	0.301	82.6	2.5	6.70	5.906	8.735	7.442	10.9	3.4	8.3	0.9	9.50	0.34	7.1	3.7	4.6
41	58.1	0.308	82.6	2.5	6.71	6.051	8.808	7.499	10.9	3.4	8.4	0.9	9.37	0.34	7.2	3.7	4.6
42	59.2	0.316	82.5	2.5	6.72	6.196	8.980	7.647	11.1	3.4	8.6	0.9	9.17	0.32	7.2	3.8	4.8
43	59.7	0.324	82.5	2.4	6.73	6.353	9.053	7.701	11.1	3.4	8.7	1.0	8.73	0.31	7.3	3.9	4.8
44	60.6	0.331	82.4	2.4	6.74	6.498	9.200	7.826	11.2	3.4	8.9	1.0	8.54	0.30	7.3	3.9	5.0
45	61.5	0.338	82.4	2.4	6.75	6.644	9.335	7.938	11.4	3.4	9.0	1.1	8.51	0.30	7.4	4.0	5.0
46	62.2	0.346	82.4	2.3	6.76	6.789	9.457	8.039	11.5	3.4	9.1	1.1	8.32	0.29	7.4	4.0	5.1
47	63.1	0.354	82.3	2.3	6.77	6.946	9.592	8.149	11.6	3.4	9.3	1.1	8.16	0.28	7.5	4.1	5.2
48	63.9	0.361	82.3	2.2	6.78	7.091	9.727	8.261	11.7	3.4	9.4	1.2	8.01	0.27	7.5	4.1	5.3
49	64.6	0.369	82.3	2.2	6.79	7.237	9.825	8.337	11.8	3.4	9.6	1.2	7.84	0.26	7.6	4.2	5.4
50	65.4	0.376	82.2	2.2	6.81	7.382	9.960	8.448	11.9	3.4	9.7	1.3	7.71	0.26	7.6	4.2	5.5
51	66.2	0.384	82.2	2.1	6.82	7.539	10.082	8.546	12.0	3.4	9.8	1.3	7.58	0.25	7.7	4.3	5.6
52	67.3	0.391	82.1	2.1	6.83	7.684	10.254	8.689	12.1	3.4	10.0	1.3	7.48	0.24	7.8	4.3	5.7
53	67.9	0.399	82.1	2.1	6.84	7.829	10.352	8.765	12.2	3.4	10.1	1.4	7.44	0.23	7.8	4.4	5.7
54	68.8	0.407	82.1	2.0	6.85	7.986	10.499	8.884	12.3	3.4	10.3	1.4	7.34	0.23	7.9	4.4	5.8
55	69.6	0.414	82.0	2.0	6.86	8.131	10.621	8.981	12.4	3.4	10.4	1.4	7.32	0.22	7.9	4.5	5.9
56	70.0	0.422	82.0	2.0	6.87	8.288	10.695	9.032	12.5	3.4	10.5	1.5	7.18	0.22	7.9	4.5	6.0
57	71.1	0.430	82.0	1.9	6.88	8.433	10.866	9.173	12.6	3.4	10.7	1.5	7.11	0.21	8.0	4.6	6.1
58	71.7	0.437	81.9	1.9	6.89	8.579	10.952	9.236	12.7	3.4	10.8	1.5	6.99	0.20	8.0	4.6	6.2
59	72.7	0.444	81.9	1.8	6.91	8.724	11.123	9.376	12.8	3.4	11.0	1.6	6.93	0.20	8.1	4.7	6.3

Specimen A

Reading No.	Deviator Load (lbs)	Axial Deformation (in)	Pore Pressure (psi)	Change in Pore Pressure (psi)	Corrected Area (in2)	Axial Strain (%)	Deviator Stress (psi)	Corrected Deviator Stress (psi)	σ_1 (psi)	σ_3 (psi)	σ'_1 (psi)	σ'_3 (psi)	σ'_1/σ'_3	Abar	P (psi)	Q (psi)	P' (psi)
60	73.9	0.451	81.8	1.8	6.92	8.858	11.307	9.529	12.9	3.4	11.2	1.6	6.87	0.19	8.2	4.8	6.4
61	74.8	0.459	81.8	1.8	6.93	9.004	11.454	9.646	13.1	3.4	11.3	1.7	6.80	0.18	8.2	4.8	6.5
62	75.7	0.466	81.8	1.7	6.94	9.149	11.589	9.752	13.2	3.4	11.4	1.7	6.79	0.18	8.3	4.9	6.6
63	76.8	0.473	81.7	1.7	6.95	9.295	11.761	9.891	13.3	3.4	11.6	1.7	6.74	0.17	8.4	4.9	6.7
64	77.8	0.481	81.7	1.7	6.96	9.440	11.932	10.029	13.4	3.4	11.8	1.8	6.69	0.16	8.4	5.0	6.8
65	78.2	0.489	81.7	1.6	6.97	9.596	11.993	10.066	13.5	3.4	11.9	1.8	6.58	0.16	8.5	5.0	6.8
66	79.1	0.496	81.6	1.6	6.98	9.742	12.128	10.170	13.6	3.4	12.0	1.8	6.57	0.16	8.5	5.1	6.9
67	79.9	0.504	81.6	1.5	6.99	9.887	12.263	10.274	13.7	3.4	12.2	1.9	6.45	0.15	8.6	5.1	7.0
68	81.0	0.511	81.5	1.5	7.01	10.033	12.434	10.410	13.8	3.4	12.3	1.9	6.41	0.14	8.6	5.2	7.1
69	81.9	0.519	81.5	1.5	7.02	10.189	12.581	10.523	13.9	3.4	12.5	2.0	6.35	0.14	8.7	5.3	7.2
70	82.9	0.526	81.5	1.4	7.03	10.335	12.741	10.647	14.1	3.4	12.7	2.0	6.31	0.13	8.7	5.3	7.3
71	84.0	0.534	81.4	1.4	7.04	10.480	12.912	10.782	14.2	3.4	12.8	2.0	6.27	0.13	8.8	5.4	7.4
72	84.9	0.542	81.4	1.3	7.05	10.637	13.047	10.882	14.3	3.4	13.0	2.1	6.22	0.12	8.9	5.4	7.5
73	86.1	0.549	81.3	1.3	7.06	10.782	13.243	11.038	14.5	3.4	13.2	2.1	6.14	0.12	8.9	5.5	7.7
74	86.7	0.557	81.3	1.2	7.08	10.939	13.341	11.105	14.5	3.4	13.3	2.2	6.08	0.11	9.0	5.6	7.7
75	87.6	0.565	81.2	1.2	7.09	11.084	13.488	11.216	14.6	3.4	13.4	2.2	6.03	0.11	9.0	5.6	7.8
76	88.6	0.572	81.2	1.2	7.10	11.229	13.647	11.338	14.8	3.4	13.6	2.3	6.00	0.10	9.1	5.7	7.9
77	89.6	0.580	81.2	1.1	7.11	11.386	13.794	11.447	14.9	3.4	13.8	2.3	5.96	0.10	9.1	5.7	8.0
78	90.6	0.587	81.1	1.0	7.12	11.531	13.953	11.568	15.0	3.4	13.9	2.4	5.88	0.09	9.2	5.8	8.2
79	91.3	0.595	81.1	1.0	7.14	11.677	14.076	11.656	15.1	3.4	14.1	2.4	5.84	0.09	9.2	5.8	8.2
80	92.4	0.602	81.0	1.0	7.15	11.822	14.247	11.786	15.2	3.4	14.2	2.4	5.85	0.08	9.3	5.9	8.3
81	93.6	0.610	81.0	0.9	7.16	11.979	14.431	11.926	15.3	3.4	14.4	2.5	5.83	0.08	9.4	6.0	8.4
82	94.7	0.617	80.9	0.9	7.17	12.124	14.603	12.056	15.5	3.4	14.6	2.5	5.76	0.07	9.4	6.0	8.6
83	95.3	0.624	80.9	0.8	7.18	12.258	14.701	12.122	15.5	3.4	14.7	2.6	5.72	0.07	9.5	6.1	8.6
84	96.2	0.632	80.9	0.8	7.20	12.404	14.848	12.229	15.6	3.4	14.8	2.6	5.72	0.07	9.5	6.1	8.7
85	97.4	0.639	80.8	0.8	7.21	12.549	15.044	12.379	15.8	3.4	15.0	2.7	5.67	0.06	9.6	6.2	8.8
86	98.1	0.647	80.8	0.7	7.22	12.695	15.154	12.454	15.9	3.4	15.1	2.7	5.66	0.06	9.6	6.2	8.9
87	99.3	0.654	80.7	0.7	7.23	12.840	15.338	12.592	16.0	3.4	15.3	2.7	5.61	0.05	9.7	6.3	9.0
88	100.2	0.662	80.7	0.6	7.24	12.997	15.472	12.685	16.1	3.4	15.5	2.8	5.57	0.05	9.8	6.3	9.1
89	101.1	0.669	80.7	0.6	7.26	13.142	15.619	12.790	16.2	3.4	15.6	2.8	5.55	0.05	9.8	6.4	9.2
90	101.7	0.677	80.6	0.6	7.27	13.287	15.717	12.852	16.3	3.4	15.7	2.9	5.50	0.04	9.8	6.4	9.3
91	102.9	0.684	80.6	0.5	7.28	13.433	15.901	12.989	16.4	3.4	15.9	2.9	5.49	0.04	9.9	6.5	9.4
92	103.9	0.692	80.5	0.5	7.29	13.589	16.060	13.101	16.5	3.4	16.0	2.9	5.47	0.04	10.0	6.6	9.5
93	104.8	0.700	80.5	0.4	7.31	13.735	16.207	13.205	16.6	3.4	16.2	3.0	5.44	0.03	10.0	6.6	9.6
94	105.6	0.707	80.5	0.4	7.32	13.891	16.342	13.295	16.7	3.4	16.3	3.0	5.41	0.03	10.1	6.6	9.7
95	106.6	0.715	80.4	0.4	7.33	14.037	16.501	13.409	16.8	3.4	16.5	3.1	5.39	0.03	10.1	6.7	9.8
96	107.5	0.723	80.4	0.3	7.35	14.193	16.636	13.498	16.9	3.4	16.6	3.1	5.36	0.02	10.2	6.7	9.8
97	108.4	0.730	80.3	0.3	7.36	14.339	16.783	13.600	17.0	3.4	16.8	3.2	5.31	0.02	10.2	6.8	10.0
98	109.6	0.738	80.3	0.2	7.37	14.484	16.979	13.743	17.2	3.4	16.9	3.2	5.30	0.02	10.3	6.9	10.1
99	110.2	0.745	80.2	0.2	7.38	14.630	17.065	13.792	17.2	3.4	17.0	3.2	5.26	0.01	10.3	6.9	10.1
100	111.2	0.753	80.2	0.2	7.40	14.786	17.224	13.901	17.3	3.4	17.2	3.3	5.27	0.01	10.4	7.0	10.2

Specimen A

Reading No.	Deviator Load (lbs)	Axial Deformation (in)	Pore Pressure (psi)	Change in Pore Pressure (psi)	Corrected Area (in2)	Axial Strain (%)	Deviator Stress (psi)	Corrected Deviator Stress (psi)	σ_1 (psi)	σ_3 (psi)	σ'_1 (psi)	σ'_3 (psi)	σ'_1/σ'_3	Abar	P (psi)	Q (psi)	P' (psi)
101	112.2	0.760	80.2	0.1	7.41	14.932	17.384	14.011	17.4	3.4	17.3	3.3	5.25	0.01	10.4	7.0	10.3
102	112.8	0.764	80.2	0.1	7.42	15.010	17.482	14.081	17.5	3.4	17.4	3.3	5.24	0.01	10.5	7.0	10.4

Specimen B Shear Data

CU Triaxial Test

Contour Engineering

File Location
Plant McIntosh M-6 UD-2 (10-1-10).HSD

Project Information

Project No. AT10SOC03-M
Project Name: Plant McIntosh
Client: Southern Company
Sample Location: M-6, UD-2 13-15'
Sample Description: Red tan and gray CLAY (CL)
Remarks:

Sample Data

Sample Type: Undisturbed
Specific Gravity: 2.7
LL: 45.000
PL: 20.000

Sample Parameters	Initial	After Consolidation	Final
Diameter (in)	2.862	2.863	
Height (in)	6.069	6.058	
Weight (grams)	1276.79		1294.47
Moisture (%)	23.01		26.26
Dry Density (pcf)	101.29	100.15	
Saturation (%)	93.56	100.00	
Void Ratio	0.664	0.683	

Test Data

Rate of Strain: 0
Cell Pressure (psi): 86.940
Effective Confining Stress (psi): 6.9
Corrected Peak Deviator Stress (psi): 19.152 at reading number: 121

Specimen B

Reading No.	Deviator Load (lbs)	Axial Deformation (in)	Pore Pressure (psi)	Change in Pore Pressure (psi)	Corrected Area (in2)	Axial Strain (%)	Deviator Stress (psi)	Corrected Deviator Stress (psi)	σ_1 (psi)	σ_3 (psi)	σ'_1 (psi)	σ'_3 (psi)	σ'_1/σ'_3	Abar	P (psi)	Q (psi)	P' (psi)
0	3.0	0.000	80.1	0.0	6.44	0.000	0.000	0.000	6.9	6.9	6.9	6.9	1.00	0.00	6.9	0.0	6.9
1	33.2	0.006	82.9	2.8	6.44	0.094	4.690	4.650	11.5	6.9	8.7	4.0	2.15	0.61	9.2	2.3	6.4
2	40.8	0.013	84.2	4.1	6.45	0.216	5.866	5.770	12.7	6.9	8.5	2.8	3.10	0.72	9.8	2.9	5.6
3	48.0	0.020	85.0	4.9	6.46	0.329	6.993	6.844	13.7	6.9	8.8	1.9	4.52	0.72	10.3	3.4	5.4
4	53.1	0.027	85.5	5.4	6.47	0.451	7.785	7.576	14.5	6.9	9.1	1.5	6.12	0.71	10.7	3.8	5.3
5	57.2	0.035	85.7	5.7	6.47	0.574	8.421	8.152	15.0	6.9	9.3	1.2	7.81	0.70	11.0	4.1	5.3
6	61.2	0.042	85.9	5.9	6.48	0.696	9.045	8.714	15.6	6.9	9.7	1.0	9.58	0.67	11.2	4.4	5.4
7	66.1	0.050	86.0	6.0	6.49	0.818	9.800	9.406	16.3	6.9	10.3	0.9	11.28	0.64	11.6	4.7	5.6
8	69.3	0.057	86.1	6.1	6.50	0.940	10.292	9.834	16.7	6.9	10.7	0.8	12.78	0.62	11.8	4.9	5.8
9	72.7	0.064	86.1	6.1	6.51	1.062	10.820	10.297	17.2	6.9	11.1	0.8	13.96	0.59	12.0	5.1	5.9
10	75.3	0.072	86.2	6.1	6.51	1.185	11.228	10.640	17.5	6.9	11.4	0.8	15.11	0.58	12.2	5.3	6.1
11	78.1	0.079	86.2	6.1	6.52	1.307	11.672	11.017	17.9	6.9	11.8	0.8	15.61	0.56	12.4	5.5	6.3
12	80.6	0.087	86.2	6.1	6.53	1.439	12.055	11.329	18.2	6.9	12.1	0.8	16.03	0.54	12.6	5.7	6.4
13	82.8	0.095	86.2	6.1	6.54	1.561	12.391	11.598	18.5	6.9	12.4	0.8	16.38	0.53	12.7	5.8	6.6
14	85.2	0.102	86.2	6.1	6.55	1.683	12.775	11.913	18.8	6.9	12.7	0.8	16.39	0.51	12.8	6.0	6.7
15	87.6	0.110	86.2	6.1	6.56	1.815	13.147	12.211	19.1	6.9	13.0	0.8	16.77	0.50	13.0	6.1	6.9
16	89.3	0.117	86.1	6.1	6.56	1.937	13.399	12.395	19.3	6.9	13.2	0.8	16.22	0.49	13.1	6.2	7.0
17	91.3	0.125	86.1	6.1	6.57	2.059	13.723	12.672	19.6	6.9	13.5	0.8	16.18	0.48	13.2	6.3	7.2
18	93.2	0.133	86.1	6.0	6.58	2.191	14.011	12.935	19.8	6.9	13.8	0.9	15.78	0.46	13.4	6.5	7.3

Specimen B

Reading No.	Deviator Load (lbs)	Axial Deformation (in)	Pore Pressure (psi)	Change in Pore Pressure (psi)	Corrected Area (in2)	Axial Strain (%)	Deviator Stress (psi)	Corrected Deviator Stress (psi)	σ_1 (psi)	σ_3 (psi)	σ'_1 (psi)	σ'_3 (psi)	σ'_1/σ'_3	Abar	P (psi)	Q (psi)	P' (psi)
19	94.9	0.140	86.0	6.0	6.59	2.304	14.275	13.177	20.1	6.9	14.1	0.9	15.40	0.45	13.5	6.6	7.5
20	96.5	0.148	86.0	5.9	6.60	2.435	14.526	13.404	20.3	6.9	14.4	1.0	14.74	0.44	13.6	6.7	7.7
21	97.6	0.154	85.9	5.9	6.61	2.548	14.694	13.552	20.4	6.9	14.6	1.0	14.08	0.43	13.7	6.8	7.8
22	99.4	0.162	85.8	5.8	6.61	2.680	14.970	13.801	20.7	6.9	14.9	1.1	13.58	0.42	13.8	6.9	8.0
23	100.5	0.170	85.8	5.7	6.62	2.802	15.138	13.946	20.8	6.9	15.1	1.2	13.05	0.41	13.9	7.0	8.1
24	101.8	0.177	85.7	5.7	6.63	2.915	15.342	14.127	21.0	6.9	15.3	1.2	12.60	0.40	14.0	7.1	8.3
25	102.9	0.185	85.7	5.6	6.64	3.046	15.510	14.269	21.2	6.9	15.5	1.3	12.16	0.39	14.0	7.1	8.4
26	104.3	0.192	85.6	5.5	6.65	3.169	15.738	14.471	21.4	6.9	15.8	1.4	11.65	0.38	14.1	7.2	8.6
27	105.3	0.199	85.5	5.4	6.66	3.291	15.894	14.602	21.5	6.9	16.0	1.4	11.14	0.37	14.2	7.3	8.7
28	106.3	0.207	85.4	5.4	6.66	3.413	16.050	14.734	21.6	6.9	16.3	1.5	10.69	0.36	14.3	7.4	8.9
29	107.6	0.214	85.3	5.3	6.67	3.535	16.242	14.899	21.8	6.9	16.5	1.6	10.30	0.35	14.3	7.4	9.1
30	108.7	0.222	85.3	5.2	6.68	3.658	16.422	15.053	21.9	6.9	16.7	1.7	9.95	0.35	14.4	7.5	9.2
31	109.5	0.230	85.2	5.1	6.69	3.789	16.542	15.146	22.0	6.9	16.9	1.8	9.59	0.34	14.5	7.6	9.3
32	111.0	0.237	85.1	5.1	6.70	3.911	16.782	15.357	22.2	6.9	17.2	1.8	9.42	0.33	14.6	7.7	9.5
33	111.9	0.244	85.0	5.0	6.71	4.034	16.914	15.463	22.4	6.9	17.4	1.9	9.04	0.32	14.6	7.7	9.7
34	113.0	0.252	84.9	4.9	6.72	4.165	17.082	15.602	22.5	6.9	17.6	2.0	8.78	0.31	14.7	7.8	9.8
35	113.8	0.260	84.9	4.8	6.73	4.288	17.213	15.707	22.6	6.9	17.8	2.1	8.53	0.31	14.7	7.9	9.9
36	114.8	0.267	84.8	4.7	6.73	4.410	17.369	15.835	22.7	6.9	18.0	2.2	8.31	0.30	14.8	7.9	10.1
37	115.4	0.275	84.7	4.6	6.74	4.532	17.465	15.905	22.8	6.9	18.2	2.2	8.08	0.29	14.8	8.0	10.2
38	116.1	0.282	84.6	4.6	6.75	4.654	17.561	15.976	22.9	6.9	18.3	2.3	7.86	0.29	14.9	8.0	10.3
39	116.9	0.290	84.5	4.5	6.76	4.786	17.693	16.078	23.0	6.9	18.5	2.4	7.68	0.28	14.9	8.0	10.4
40	118.0	0.297	84.5	4.4	6.77	4.908	17.861	16.216	23.1	6.9	18.7	2.5	7.51	0.27	15.0	8.1	10.6
41	119.1	0.305	84.4	4.3	6.78	5.030	18.029	16.354	23.2	6.9	18.9	2.6	7.36	0.26	15.1	8.2	10.7
42	119.5	0.312	84.3	4.2	6.79	5.153	18.101	16.400	23.3	6.9	19.1	2.7	7.14	0.26	15.1	8.2	10.9
43	120.3	0.320	84.2	4.2	6.80	5.275	18.221	16.491	23.4	6.9	19.2	2.7	7.04	0.25	15.1	8.2	11.0
44	121.2	0.327	84.1	4.1	6.80	5.397	18.353	16.594	23.5	6.9	19.4	2.8	6.90	0.25	15.2	8.3	11.1
45	121.8	0.334	84.0	4.0	6.81	5.519	18.461	16.674	23.6	6.9	19.6	2.9	6.76	0.24	15.2	8.3	11.2
46	122.5	0.342	84.0	3.9	6.82	5.651	18.569	16.751	23.6	6.9	19.7	3.0	6.67	0.23	15.3	8.4	11.3
47	123.3	0.350	83.9	3.9	6.83	5.773	18.689	16.841	23.7	6.9	19.8	3.0	6.63	0.23	15.3	8.4	11.4
48	124.0	0.358	83.9	3.8	6.84	5.905	18.797	16.918	23.8	6.9	20.0	3.1	6.54	0.23	15.3	8.5	11.5
49	124.3	0.365	83.8	3.8	6.85	6.027	18.845	16.941	23.8	6.9	20.1	3.1	6.40	0.22	15.4	8.5	11.6
50	125.0	0.373	83.7	3.7	6.86	6.149	18.953	17.019	23.9	6.9	20.2	3.2	6.33	0.22	15.4	8.5	11.7
51	125.7	0.380	83.7	3.6	6.87	6.272	19.061	17.097	24.0	6.9	20.4	3.3	6.25	0.21	15.4	8.5	11.8
52	126.5	0.388	83.6	3.6	6.88	6.403	19.181	17.184	24.1	6.9	20.5	3.3	6.18	0.21	15.5	8.6	11.9
53	126.9	0.395	83.6	3.5	6.89	6.525	19.253	17.228	24.1	6.9	20.6	3.4	6.10	0.20	15.5	8.6	12.0
54	127.9	0.403	83.5	3.4	6.90	6.657	19.397	17.337	24.2	6.9	20.8	3.5	6.01	0.20	15.6	8.7	12.1
55	128.6	0.411	83.4	3.4	6.91	6.779	19.517	17.425	24.3	6.9	20.9	3.5	5.95	0.19	15.6	8.7	12.2
56	129.4	0.418	83.4	3.3	6.91	6.902	19.637	17.513	24.4	6.9	21.1	3.6	5.89	0.19	15.6	8.8	12.3
57	129.3	0.426	83.3	3.2	6.92	7.024	19.613	17.467	24.4	6.9	21.1	3.6	5.80	0.19	15.6	8.7	12.4
58	130.0	0.433	83.2	3.2	6.93	7.146	19.721	17.543	24.4	6.9	21.2	3.7	5.74	0.18	15.7	8.8	12.5
59	130.3	0.440	83.2	3.1	6.94	7.268	19.780	17.574	24.5	6.9	21.3	3.8	5.67	0.18	15.7	8.8	12.5

Specimen B

Reading No.	Deviator Load (lbs)	Axial Deformation (in)	Pore Pressure (psi)	Change in Pore Pressure (psi)	Corrected Area (in2)	Axial Strain (%)	Deviator Stress (psi)	Corrected Deviator Stress (psi)	σ_1 (psi)	σ_3 (psi)	σ'_1 (psi)	σ'_3 (psi)	σ'_1/σ'_3	Abar	P (psi)	Q (psi)	P' (psi)
60	130.7	0.448	83.1	3.1	6.95	7.390	19.828	17.595	24.5	6.9	21.4	3.8	5.63	0.18	15.7	8.8	12.6
61	131.2	0.455	83.1	3.0	6.96	7.513	19.912	17.648	24.5	6.9	21.5	3.9	5.57	0.17	15.7	8.8	12.7
62	131.8	0.463	83.0	3.0	6.97	7.635	20.008	17.712	24.6	6.9	21.6	3.9	5.52	0.17	15.7	8.9	12.8
63	132.0	0.470	83.0	2.9	6.98	7.757	20.044	17.721	24.6	6.9	21.7	4.0	5.45	0.16	15.7	8.9	12.8
64	132.7	0.478	82.9	2.9	6.99	7.889	20.152	17.794	24.7	6.9	21.8	4.0	5.42	0.16	15.8	8.9	12.9
65	133.0	0.485	82.9	2.8	7.00	8.011	20.200	17.814	24.7	6.9	21.9	4.1	5.36	0.16	15.8	8.9	13.0
66	133.8	0.493	82.8	2.8	7.01	8.133	20.320	17.899	24.8	6.9	22.0	4.1	5.34	0.15	15.8	8.9	13.1
67	134.6	0.501	82.8	2.7	7.02	8.265	20.440	17.982	24.9	6.9	22.2	4.2	5.30	0.15	15.9	9.0	13.2
68	134.8	0.508	82.7	2.6	7.03	8.387	20.476	17.990	24.9	6.9	22.2	4.2	5.24	0.15	15.9	9.0	13.2
69	135.1	0.516	82.7	2.6	7.04	8.509	20.512	17.998	24.9	6.9	22.3	4.3	5.20	0.14	15.9	9.0	13.3
70	135.4	0.523	82.6	2.5	7.05	8.641	20.572	18.026	24.9	6.9	22.4	4.3	5.15	0.14	15.9	9.0	13.4
71	135.8	0.531	82.5	2.5	7.06	8.763	20.632	18.056	24.9	6.9	22.5	4.4	5.10	0.14	15.9	9.0	13.4
72	136.1	0.539	82.5	2.4	7.07	8.895	20.680	18.072	25.0	6.9	22.5	4.4	5.06	0.14	15.9	9.0	13.5
73	136.8	0.546	82.5	2.4	7.08	9.017	20.776	18.134	25.0	6.9	22.6	4.5	5.04	0.13	16.0	9.1	13.6
74	137.4	0.554	82.4	2.3	7.09	9.149	20.884	18.205	25.1	6.9	22.8	4.5	5.00	0.13	16.0	9.1	13.7
75	137.7	0.562	82.4	2.3	7.09	9.271	20.920	18.212	25.1	6.9	22.8	4.6	4.97	0.13	16.0	9.1	13.7
76	138.2	0.569	82.3	2.3	7.10	9.393	21.004	18.263	25.2	6.9	22.9	4.6	4.95	0.12	16.0	9.1	13.8
77	138.9	0.577	82.3	2.2	7.11	9.525	21.112	18.333	25.2	6.9	23.0	4.7	4.93	0.12	16.1	9.2	13.8
78	139.5	0.584	82.2	2.2	7.12	9.647	21.208	18.394	25.3	6.9	23.1	4.7	4.89	0.12	16.1	9.2	13.9
79	139.8	0.592	82.2	2.1	7.13	9.769	21.244	18.400	25.3	6.9	23.2	4.8	4.86	0.12	16.1	9.2	14.0
80	140.0	0.599	82.1	2.1	7.14	9.892	21.280	18.407	25.3	6.9	23.2	4.8	4.83	0.11	16.1	9.2	14.0
81	140.5	0.607	82.1	2.0	7.15	10.014	21.352	18.445	25.3	6.9	23.3	4.9	4.80	0.11	16.1	9.2	14.1
82	140.8	0.614	82.0	2.0	7.16	10.136	21.412	18.473	25.4	6.9	23.4	4.9	4.78	0.11	16.1	9.2	14.1
83	141.2	0.621	82.0	2.0	7.17	10.249	21.472	18.503	25.4	6.9	23.4	4.9	4.75	0.11	16.1	9.3	14.2
84	141.1	0.628	82.0	1.9	7.18	10.371	21.448	18.455	25.3	6.9	23.4	5.0	4.71	0.10	16.1	9.2	14.2
85	141.5	0.636	81.9	1.9	7.19	10.503	21.508	18.480	25.4	6.9	23.5	5.0	4.69	0.10	16.1	9.2	14.3
86	142.1	0.643	81.9	1.8	7.20	10.616	21.604	18.542	25.4	6.9	23.6	5.1	4.66	0.10	16.2	9.3	14.3
87	142.5	0.651	81.8	1.8	7.21	10.747	21.676	18.578	25.5	6.9	23.7	5.1	4.65	0.10	16.2	9.3	14.4
88	142.9	0.659	81.8	1.8	7.22	10.869	21.736	18.605	25.5	6.9	23.7	5.1	4.62	0.09	16.2	9.3	14.4
89	143.2	0.666	81.8	1.7	7.23	10.992	21.784	18.621	25.5	6.9	23.8	5.2	4.61	0.09	16.2	9.3	14.5
90	143.4	0.674	81.7	1.7	7.24	11.123	21.808	18.614	25.5	6.9	23.8	5.2	4.58	0.09	16.2	9.3	14.5
91	143.2	0.681	81.7	1.7	7.25	11.246	21.772	18.555	25.4	6.9	23.8	5.2	4.55	0.09	16.2	9.3	14.5
92	143.6	0.689	81.7	1.6	7.26	11.377	21.844	18.590	25.5	6.9	23.8	5.3	4.54	0.09	16.2	9.3	14.5
93	144.1	0.697	81.6	1.6	7.27	11.499	21.916	18.627	25.5	6.9	23.9	5.3	4.52	0.09	16.2	9.3	14.6
94	144.2	0.705	81.6	1.6	7.28	11.631	21.928	18.609	25.5	6.9	23.9	5.3	4.49	0.08	16.2	9.3	14.6
95	144.9	0.712	81.6	1.5	7.29	11.753	22.048	18.688	25.6	6.9	24.1	5.4	4.48	0.08	16.2	9.3	14.7
96	145.2	0.719	81.5	1.5	7.30	11.875	22.084	18.693	25.6	6.9	24.1	5.4	4.46	0.08	16.2	9.3	14.7
97	145.2	0.727	81.5	1.5	7.32	12.007	22.096	18.674	25.6	6.9	24.1	5.4	4.44	0.08	16.2	9.3	14.8
98	145.2	0.735	81.5	1.4	7.33	12.129	22.096	18.647	25.5	6.9	24.1	5.5	4.41	0.08	16.2	9.3	14.8
99	146.2	0.742	81.4	1.4	7.34	12.252	22.240	18.746	25.6	6.9	24.3	5.5	4.40	0.07	16.3	9.4	14.9
100	146.7	0.750	81.4	1.4	7.35	12.374	22.324	18.793	25.7	6.9	24.3	5.5	4.39	0.07	16.3	9.4	14.9

Specimen B

Reading No.	Deviator Load (lbs)	Axial Deformation (in)	Pore Pressure (psi)	Change in Pore Pressure (psi)	Corrected Area (in2)	Axial Strain (%)	Deviator Stress (psi)	Corrected Deviator Stress (psi)	σ_1 (psi)	σ_3 (psi)	σ'_1 (psi)	σ'_3 (psi)	σ'_1/σ'_3	Abar	P (psi)	Q (psi)	P' (psi)
101	146.9	0.757	81.4	1.3	7.36	12.496	22.360	18.797	25.7	6.9	24.4	5.6	4.37	0.07	16.3	9.4	15.0
102	146.6	0.764	81.3	1.3	7.37	12.618	22.312	18.728	25.6	6.9	24.3	5.6	4.33	0.07	16.3	9.4	15.0
103	147.0	0.772	81.3	1.2	7.38	12.741	22.372	18.753	25.6	6.9	24.4	5.7	4.31	0.07	16.3	9.4	15.0
104	147.3	0.779	81.3	1.2	7.39	12.863	22.407	18.757	25.6	6.9	24.4	5.7	4.30	0.06	16.3	9.4	15.1
105	147.6	0.787	81.2	1.2	7.40	12.985	22.467	18.782	25.7	6.9	24.5	5.7	4.28	0.06	16.3	9.4	15.1
106	148.3	0.794	81.2	1.2	7.41	13.107	22.563	18.838	25.7	6.9	24.6	5.7	4.28	0.06	16.3	9.4	15.2
107	148.7	0.801	81.2	1.1	7.42	13.229	22.635	18.872	25.8	6.9	24.7	5.8	4.27	0.06	16.3	9.4	15.2
108	149.0	0.809	81.1	1.1	7.43	13.352	22.683	18.886	25.8	6.9	24.7	5.8	4.26	0.06	16.3	9.4	15.2
109	149.3	0.817	81.1	1.0	7.44	13.483	22.731	18.898	25.8	6.9	24.7	5.8	4.24	0.06	16.3	9.4	15.3
110	150.0	0.824	81.1	1.0	7.45	13.606	22.839	18.963	25.9	6.9	24.8	5.9	4.23	0.05	16.4	9.5	15.4
111	150.2	0.832	81.0	1.0	7.46	13.728	22.863	18.956	25.8	6.9	24.9	5.9	4.20	0.05	16.4	9.5	15.4
112	150.5	0.839	81.0	0.9	7.47	13.850	22.911	18.970	25.9	6.9	24.9	5.9	4.19	0.05	16.4	9.5	15.4
113	151.2	0.847	81.0	0.9	7.48	13.982	23.019	19.032	25.9	6.9	25.0	6.0	4.18	0.05	16.4	9.5	15.5
114	151.5	0.854	80.9	0.9	7.49	14.104	23.067	19.045	25.9	6.9	25.1	6.0	4.16	0.05	16.4	9.5	15.5
115	151.6	0.862	80.9	0.8	7.51	14.236	23.079	19.025	25.9	6.9	25.1	6.0	4.15	0.04	16.4	9.5	15.6
116	151.9	0.870	80.9	0.8	7.52	14.358	23.127	19.038	25.9	6.9	25.1	6.1	4.13	0.04	16.4	9.5	15.6
117	152.2	0.877	80.8	0.8	7.53	14.480	23.175	19.051	25.9	6.9	25.2	6.1	4.11	0.04	16.4	9.5	15.6
118	152.6	0.885	80.8	0.7	7.54	14.602	23.235	19.074	26.0	6.9	25.2	6.1	4.11	0.04	16.4	9.5	15.7
119	153.0	0.892	80.8	0.7	7.55	14.724	23.307	19.107	26.0	6.9	25.3	6.2	4.09	0.04	16.4	9.6	15.7
120	153.3	0.899	80.7	0.7	7.56	14.847	23.343	19.109	26.0	6.9	25.3	6.2	4.07	0.03	16.4	9.6	15.8
121	153.8	0.907	80.7	0.6	7.57	14.969	23.427	19.152	26.0	6.9	25.4	6.2	4.07	0.03	16.5	9.6	15.8
122	153.8	0.909	80.7	0.6	7.57	15.007	23.427	19.143	26.0	6.9	25.4	6.3	4.06	0.03	16.5	9.6	15.8

Specimen C Shear Data

CU Triaxial Test

Contour Engineering

File Location
Plant McIntosh M-6 UD-2 (10-1-10).HSD

Project Information

Project No. AT10SOC03-M
Project Name: Plant McIntosh
Client: Southern Company
Sample Location: M-6, UD-2 13-15'
Sample Description: Red tan and gray CLAY (CL)
Remarks:

Sample Data

Sample Type: Undisturbed
Specific Gravity: 2.7
LL: 45.000
PL: 20.000

Sample Parameters	Initial	After Consolidation	Final
Diameter (in)	2.857	2.859	
Height (in)	4.899	4.889	
Weight (grams)	1002.71		1018.68
Moisture (%)	28.21		29.54
Dry Density (pcf)	94.88	95.46	
Saturation (%)	98.09	100.00	
Void Ratio	0.773	0.766	

Test Data

Rate of Strain: 0
Cell Pressure (psi): 90.420
Effective Confining Stress (psi): 9.2
Corrected Peak Deviator Stress (psi): 17.211 at reading number: 96

Specimen C

Reading No.	Deviator Load (lbs)	Axial Deformation (in)	Pore Pressure (psi)	Change in Pore Pressure (psi)	Corrected Area (in2)	Axial Strain (%)	Deviator Stress (psi)	Corrected Deviator Stress (psi)	σ_1 (psi)	σ_3 (psi)	σ'_1 (psi)	σ'_3 (psi)	σ'_1/σ'_3	Abar	P (psi)	Q (psi)	P' (psi)
0	3.5	0.001	81.2	0.0	6.42	0.000	0.000	0.000	9.2	9.2	9.2	9.2	1.00	0.00	9.2	0.0	9.2
1	40.2	0.007	84.6	3.4	6.43	0.128	5.726	5.670	14.9	9.2	11.5	5.9	1.97	0.59	12.1	2.8	8.7
2	53.1	0.015	85.8	4.6	6.44	0.280	7.735	7.606	16.8	9.2	12.2	4.6	2.65	0.61	13.0	3.8	8.4
3	60.7	0.022	86.6	5.4	6.45	0.431	8.914	8.710	17.9	9.2	12.5	3.8	3.30	0.63	13.6	4.4	8.1
4	66.5	0.030	87.2	6.0	6.46	0.583	9.817	9.535	18.8	9.2	12.8	3.2	3.96	0.63	14.0	4.8	8.0
5	71.6	0.038	87.6	6.4	6.47	0.746	10.611	10.245	19.5	9.2	13.0	2.8	4.66	0.63	14.4	5.1	7.9
6	74.9	0.045	87.9	6.8	6.48	0.897	11.128	10.683	19.9	9.2	13.2	2.5	5.31	0.63	14.6	5.3	7.8
7	78.2	0.052	88.1	7.0	6.49	1.049	11.645	11.120	20.4	9.2	13.4	2.3	5.88	0.63	14.8	5.6	7.8
8	81.2	0.060	88.3	7.1	6.50	1.200	12.114	11.507	20.7	9.2	13.6	2.1	6.44	0.62	15.0	5.8	7.9
9	83.8	0.067	88.4	7.2	6.51	1.351	12.511	11.822	21.1	9.2	13.8	2.0	6.93	0.61	15.1	5.9	7.9
10	85.9	0.075	88.5	7.3	6.52	1.503	12.848	12.077	21.3	9.2	14.0	1.9	7.25	0.60	15.3	6.0	8.0
11	88.3	0.082	88.5	7.3	6.53	1.654	13.209	12.354	21.6	9.2	14.2	1.9	7.53	0.59	15.4	6.2	8.1
12	90.1	0.089	88.5	7.3	6.54	1.806	13.498	12.559	21.8	9.2	14.5	1.9	7.63	0.58	15.5	6.3	8.2
13	91.7	0.097	88.5	7.3	6.55	1.957	13.738	12.716	22.0	9.2	14.6	1.9	7.58	0.57	15.6	6.4	8.3
14	93.4	0.104	88.4	7.3	6.56	2.109	14.015	12.950	22.2	9.2	14.9	2.0	7.56	0.56	15.7	6.5	8.4
15	94.9	0.112	88.4	7.2	6.57	2.260	14.244	13.152	22.4	9.2	15.2	2.0	7.47	0.55	15.8	6.6	8.6
16	96.6	0.119	88.3	7.1	6.58	2.412	14.508	13.389	22.6	9.2	15.5	2.1	7.39	0.53	15.9	6.7	8.8
17	97.6	0.127	88.3	7.1	6.59	2.575	14.665	13.518	22.8	9.2	15.7	2.1	7.33	0.53	16.0	6.8	8.9
18	99.5	0.134	88.2	7.0	6.60	2.726	14.953	13.776	23.0	9.2	16.0	2.2	7.27	0.51	16.1	6.9	9.1

Specimen C

Reading No.	Deviator Load (lbs)	Axial Deformation (in)	Pore Pressure (psi)	Change in Pore Pressure (psi)	Corrected Area (in2)	Axial Strain (%)	Deviator Stress (psi)	Corrected Deviator Stress (psi)	σ_1 (psi)	σ_3 (psi)	σ'_1 (psi)	σ'_3 (psi)	σ'_1/σ'_3	Abar	P (psi)	Q (psi)	P' (psi)
19	100.8	0.142	88.2	7.0	6.61	2.889	15.170	13.962	23.2	9.2	16.2	2.3	7.19	0.50	16.2	7.0	9.2
20	102.2	0.150	88.1	6.9	6.62	3.041	15.387	14.149	23.4	9.2	16.4	2.3	7.16	0.49	16.3	7.1	9.4
21	103.5	0.158	88.1	6.9	6.63	3.204	15.579	14.310	23.5	9.2	16.7	2.4	7.07	0.48	16.4	7.2	9.5
22	104.9	0.165	88.0	6.8	6.64	3.355	15.808	14.508	23.7	9.2	16.9	2.4	7.05	0.47	16.5	7.3	9.7
23	105.7	0.173	88.0	6.8	6.65	3.519	15.928	14.598	23.8	9.2	17.1	2.5	6.94	0.46	16.5	7.3	9.8
24	107.1	0.181	87.9	6.7	6.66	3.670	16.144	14.782	24.0	9.2	17.3	2.5	6.92	0.46	16.6	7.4	9.9
25	107.6	0.188	87.8	6.7	6.67	3.821	16.229	14.839	24.1	9.2	17.4	2.6	6.75	0.45	16.7	7.4	10.0
26	109.0	0.195	87.8	6.6	6.68	3.973	16.433	15.011	24.2	9.2	17.7	2.6	6.69	0.44	16.7	7.5	10.1
27	109.9	0.203	87.7	6.5	6.69	4.124	16.578	15.124	24.4	9.2	17.8	2.7	6.60	0.43	16.8	7.6	10.3
28	110.7	0.210	87.6	6.5	6.70	4.264	16.698	15.216	24.5	9.2	18.0	2.8	6.47	0.42	16.8	7.6	10.4
29	111.2	0.217	87.6	6.4	6.72	4.416	16.782	15.271	24.5	9.2	18.1	2.8	6.37	0.42	16.9	7.6	10.5
30	112.0	0.224	87.5	6.3	6.73	4.567	16.902	15.361	24.6	9.2	18.3	2.9	6.26	0.41	16.9	7.7	10.6
31	113.0	0.231	87.4	6.2	6.74	4.707	17.071	15.498	24.7	9.2	18.5	3.0	6.16	0.40	17.0	7.7	10.8
32	113.7	0.239	87.3	6.2	6.75	4.870	17.167	15.561	24.8	9.2	18.6	3.1	6.05	0.40	17.0	7.8	10.9
33	114.4	0.247	87.3	6.1	6.76	5.021	17.275	15.638	24.9	9.2	18.8	3.2	5.94	0.39	17.1	7.8	11.0
34	115.1	0.254	87.2	6.0	6.77	5.173	17.384	15.715	25.0	9.2	19.0	3.2	5.84	0.38	17.1	7.9	11.1
35	115.4	0.261	87.1	5.9	6.78	5.324	17.444	15.745	25.0	9.2	19.1	3.3	5.73	0.38	17.1	7.9	11.2
36	116.4	0.269	87.0	5.8	6.79	5.476	17.588	15.855	25.1	9.2	19.3	3.4	5.63	0.37	17.2	7.9	11.4
37	116.8	0.277	86.9	5.7	6.80	5.639	17.660	15.895	25.1	9.2	19.4	3.5	5.53	0.36	17.2	7.9	11.5
38	117.0	0.284	86.8	5.7	6.81	5.790	17.684	15.891	25.1	9.2	19.5	3.6	5.43	0.36	17.2	7.9	11.5
39	117.8	0.292	86.8	5.6	6.82	5.942	17.817	15.988	25.2	9.2	19.7	3.7	5.36	0.35	17.2	8.0	11.7
40	118.5	0.300	86.7	5.5	6.84	6.105	17.913	16.050	25.3	9.2	19.8	3.7	5.28	0.34	17.3	8.0	11.8
41	119.3	0.307	86.6	5.4	6.85	6.256	18.045	16.147	25.4	9.2	20.0	3.8	5.22	0.33	17.3	8.1	11.9
42	119.4	0.315	86.5	5.3	6.86	6.420	18.057	16.129	25.4	9.2	20.0	3.9	5.12	0.33	17.3	8.1	12.0
43	120.1	0.323	86.4	5.2	6.87	6.583	18.178	16.211	25.4	9.2	20.2	4.0	5.06	0.32	17.3	8.1	12.1
44	120.4	0.330	86.3	5.2	6.88	6.734	18.214	16.218	25.5	9.2	20.3	4.1	4.98	0.32	17.3	8.1	12.2
45	121.2	0.338	86.3	5.1	6.89	6.897	18.334	16.300	25.5	9.2	20.5	4.2	4.92	0.31	17.4	8.1	12.3
46	121.4	0.346	86.2	5.0	6.91	7.049	18.370	16.306	25.5	9.2	20.5	4.2	4.87	0.31	17.4	8.2	12.4
47	121.5	0.353	86.1	4.9	6.92	7.200	18.382	16.289	25.5	9.2	20.6	4.3	4.79	0.30	17.4	8.1	12.4
48	121.8	0.361	86.1	4.9	6.93	7.352	18.442	16.317	25.6	9.2	20.7	4.4	4.75	0.30	17.4	8.2	12.5
49	122.2	0.369	86.0	4.8	6.94	7.515	18.502	16.342	25.6	9.2	20.8	4.4	4.68	0.29	17.4	8.2	12.6
50	122.4	0.376	85.9	4.7	6.95	7.666	18.526	16.337	25.6	9.2	20.9	4.5	4.62	0.29	17.4	8.2	12.7
51	122.7	0.383	85.8	4.7	6.96	7.818	18.575	16.353	25.6	9.2	20.9	4.6	4.57	0.29	17.4	8.2	12.8
52	123.7	0.391	85.8	4.6	6.97	7.969	18.731	16.469	25.7	9.2	21.1	4.6	4.55	0.28	17.5	8.2	12.9
53	124.2	0.398	85.7	4.5	6.99	8.121	18.815	16.518	25.8	9.2	21.2	4.7	4.50	0.27	17.5	8.3	13.0
54	124.9	0.406	85.6	4.5	7.00	8.272	18.911	16.577	25.8	9.2	21.4	4.8	4.47	0.27	17.5	8.3	13.1
55	125.1	0.413	85.6	4.4	7.01	8.423	18.948	16.582	25.8	9.2	21.4	4.8	4.43	0.27	17.5	8.3	13.1
56	125.1	0.420	85.5	4.3	7.02	8.575	18.948	16.553	25.8	9.2	21.5	4.9	4.36	0.26	17.5	8.3	13.2
57	125.6	0.428	85.4	4.3	7.03	8.726	19.032	16.601	25.8	9.2	21.6	5.0	4.33	0.26	17.5	8.3	13.3
58	125.9	0.436	85.4	4.2	7.04	8.889	19.080	16.614	25.9	9.2	21.7	5.0	4.30	0.25	17.5	8.3	13.3
59	126.2	0.443	85.3	4.1	7.06	9.041	19.128	16.629	25.9	9.2	21.7	5.1	4.26	0.25	17.6	8.3	13.4

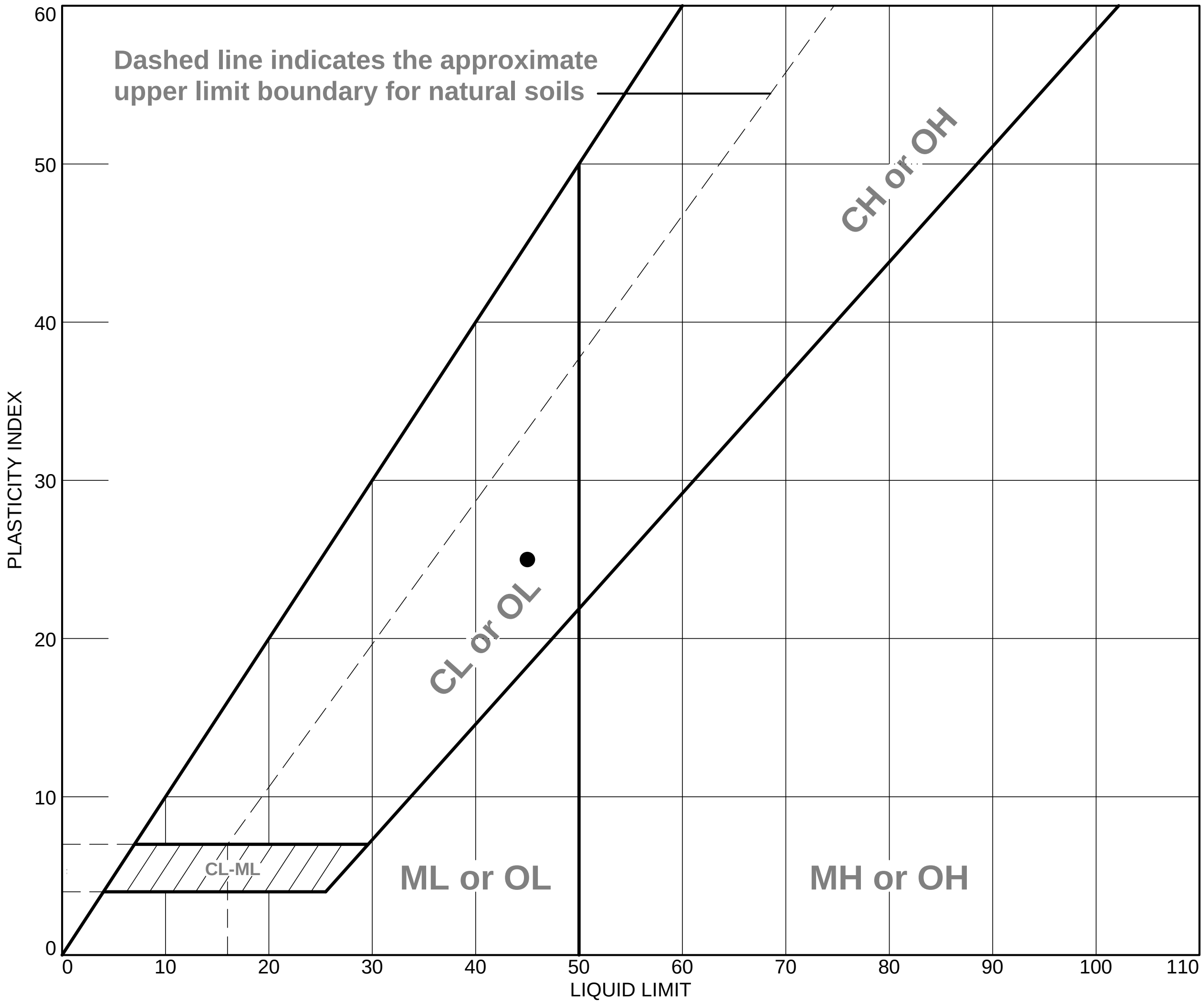
Specimen C

Reading No.	Deviator Load (lbs)	Axial Deformation (in)	Pore Pressure (psi)	Change in Pore Pressure (psi)	Corrected Area (in2)	Axial Strain (%)	Deviator Stress (psi)	Corrected Deviator Stress (psi)	σ_1 (psi)	σ_3 (psi)	σ'_1 (psi)	σ'_3 (psi)	σ'_1/σ'_3	Abar	P (psi)	Q (psi)	P' (psi)
60	127.0	0.451	85.3	4.1	7.07	9.192	19.248	16.709	25.9	9.2	21.9	5.2	4.24	0.24	17.6	8.4	13.5
61	127.9	0.458	85.2	4.0	7.08	9.344	19.381	16.800	26.0	9.2	22.0	5.2	4.22	0.24	17.6	8.4	13.6
62	127.8	0.465	85.1	4.0	7.09	9.495	19.369	16.760	26.0	9.2	22.0	5.3	4.17	0.24	17.6	8.4	13.7
63	128.4	0.473	85.1	3.9	7.10	9.658	19.465	16.815	26.1	9.2	22.2	5.3	4.15	0.23	17.6	8.4	13.8
64	128.7	0.481	85.0	3.8	7.12	9.822	19.513	16.827	26.1	9.2	22.2	5.4	4.11	0.23	17.7	8.4	13.8
65	129.0	0.489	85.0	3.8	7.13	9.973	19.561	16.841	26.1	9.2	22.3	5.5	4.08	0.22	17.7	8.4	13.9
66	129.3	0.496	84.9	3.7	7.14	10.124	19.597	16.843	26.1	9.2	22.4	5.5	4.05	0.22	17.7	8.4	13.9
67	129.4	0.504	84.8	3.6	7.15	10.288	19.621	16.833	26.1	9.2	22.4	5.6	4.00	0.22	17.7	8.4	14.0
68	130.2	0.512	84.8	3.6	7.17	10.439	19.742	16.911	26.1	9.2	22.6	5.6	3.99	0.21	17.7	8.5	14.1
69	130.3	0.519	84.7	3.5	7.18	10.590	19.754	16.892	26.1	9.2	22.6	5.7	3.95	0.21	17.7	8.4	14.2
70	130.6	0.526	84.7	3.5	7.19	10.742	19.802	16.905	26.1	9.2	22.7	5.7	3.94	0.21	17.7	8.5	14.2
71	131.0	0.534	84.6	3.4	7.20	10.893	19.874	16.939	26.2	9.2	22.8	5.8	3.91	0.20	17.7	8.5	14.3
72	131.7	0.541	84.6	3.4	7.22	11.045	19.970	16.995	26.2	9.2	22.9	5.9	3.90	0.20	17.7	8.5	14.4
73	132.0	0.549	84.5	3.3	7.23	11.196	20.018	17.007	26.2	9.2	22.9	5.9	3.87	0.19	17.7	8.5	14.4
74	132.1	0.556	84.4	3.2	7.24	11.348	20.042	16.998	26.2	9.2	23.0	6.0	3.84	0.19	17.7	8.5	14.5
75	132.8	0.563	84.4	3.2	7.25	11.499	20.151	17.064	26.3	9.2	23.1	6.0	3.83	0.19	17.8	8.5	14.6
76	132.8	0.571	84.3	3.1	7.27	11.651	20.151	17.033	26.3	9.2	23.1	6.1	3.80	0.18	17.8	8.5	14.6
77	133.0	0.579	84.3	3.1	7.28	11.814	20.187	17.032	26.3	9.2	23.2	6.1	3.78	0.18	17.8	8.5	14.6
78	133.7	0.586	84.2	3.0	7.29	11.965	20.295	17.097	26.3	9.2	23.3	6.2	3.76	0.18	17.8	8.5	14.7
79	133.8	0.594	84.2	3.0	7.30	12.117	20.307	17.077	26.3	9.2	23.3	6.3	3.73	0.17	17.8	8.5	14.8
80	134.0	0.602	84.1	2.9	7.32	12.280	20.343	17.075	26.3	9.2	23.4	6.3	3.71	0.17	17.8	8.5	14.8
81	134.4	0.609	84.1	2.9	7.33	12.431	20.391	17.087	26.3	9.2	23.4	6.4	3.69	0.17	17.8	8.5	14.9
82	134.3	0.616	84.0	2.8	7.34	12.583	20.379	17.045	26.3	9.2	23.4	6.4	3.67	0.17	17.8	8.5	14.9
83	134.4	0.624	84.0	2.8	7.36	12.746	20.403	17.033	26.3	9.2	23.5	6.4	3.65	0.16	17.8	8.5	14.9
84	135.1	0.632	83.9	2.7	7.37	12.897	20.511	17.096	26.3	9.2	23.6	6.5	3.63	0.16	17.8	8.5	15.0
85	135.3	0.639	83.9	2.7	7.38	13.049	20.535	17.086	26.3	9.2	23.6	6.5	3.61	0.16	17.8	8.5	15.1
86	135.6	0.647	83.8	2.7	7.39	13.200	20.584	17.097	26.3	9.2	23.7	6.6	3.60	0.16	17.8	8.5	15.1
87	135.9	0.654	83.8	2.6	7.41	13.352	20.632	17.107	26.3	9.2	23.7	6.6	3.59	0.15	17.8	8.6	15.2
88	136.5	0.661	83.8	2.6	7.42	13.503	20.728	17.159	26.4	9.2	23.8	6.7	3.58	0.15	17.8	8.6	15.2
89	136.9	0.669	83.7	2.5	7.43	13.655	20.788	17.180	26.4	9.2	23.9	6.7	3.56	0.15	17.8	8.6	15.3
90	137.2	0.676	83.6	2.5	7.45	13.806	20.836	17.190	26.4	9.2	24.0	6.8	3.54	0.14	17.8	8.6	15.4
91	137.4	0.684	83.6	2.4	7.46	13.958	20.872	17.190	26.4	9.2	24.0	6.8	3.52	0.14	17.8	8.6	15.4
92	137.4	0.692	83.5	2.4	7.47	14.121	20.860	17.145	26.4	9.2	24.0	6.9	3.49	0.14	17.8	8.6	15.4
93	137.6	0.699	83.5	2.3	7.49	14.272	20.896	17.144	26.4	9.2	24.1	6.9	3.48	0.14	17.8	8.6	15.5
94	138.0	0.706	83.4	2.3	7.50	14.424	20.957	17.164	26.4	9.2	24.1	7.0	3.46	0.13	17.8	8.6	15.6
95	138.5	0.714	83.4	2.2	7.51	14.587	21.041	17.202	26.4	9.2	24.2	7.0	3.45	0.13	17.8	8.6	15.6
96	138.8	0.722	83.4	2.2	7.53	14.738	21.089	17.211	26.4	9.2	24.3	7.1	3.44	0.13	17.8	8.6	15.7
97	138.7	0.729	83.3	2.1	7.54	14.890	21.065	17.159	26.4	9.2	24.3	7.1	3.41	0.12	17.8	8.6	15.7
98	139.0	0.735	83.3	2.1	7.55	15.018	21.113	17.173	26.4	9.2	24.3	7.1	3.41	0.12	17.8	8.6	15.7

Specimen C

Reading No.	Deviator Load (lbs)	Axial Deformation (in)	Pore Pressure (psi)	Change in Pore Pressure (psi)	Corrected Area (in2)	Axial Strain (%)	Deviator Stress (psi)	Corrected Deviator Stress (psi)	σ_1 (psi)	σ_3 (psi)	σ'_1 (psi)	σ'_3 (psi)	σ'_1/σ'_3	Abar	P (psi)	Q (psi)	P' (psi)

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Red tan gray CLAY (CL)	45	20	25	98.5	65.9	CL

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

Project: Plant McIntosh

● **Location:** M-6 **Depth:** 13-15' **Sample Number:** UD-2

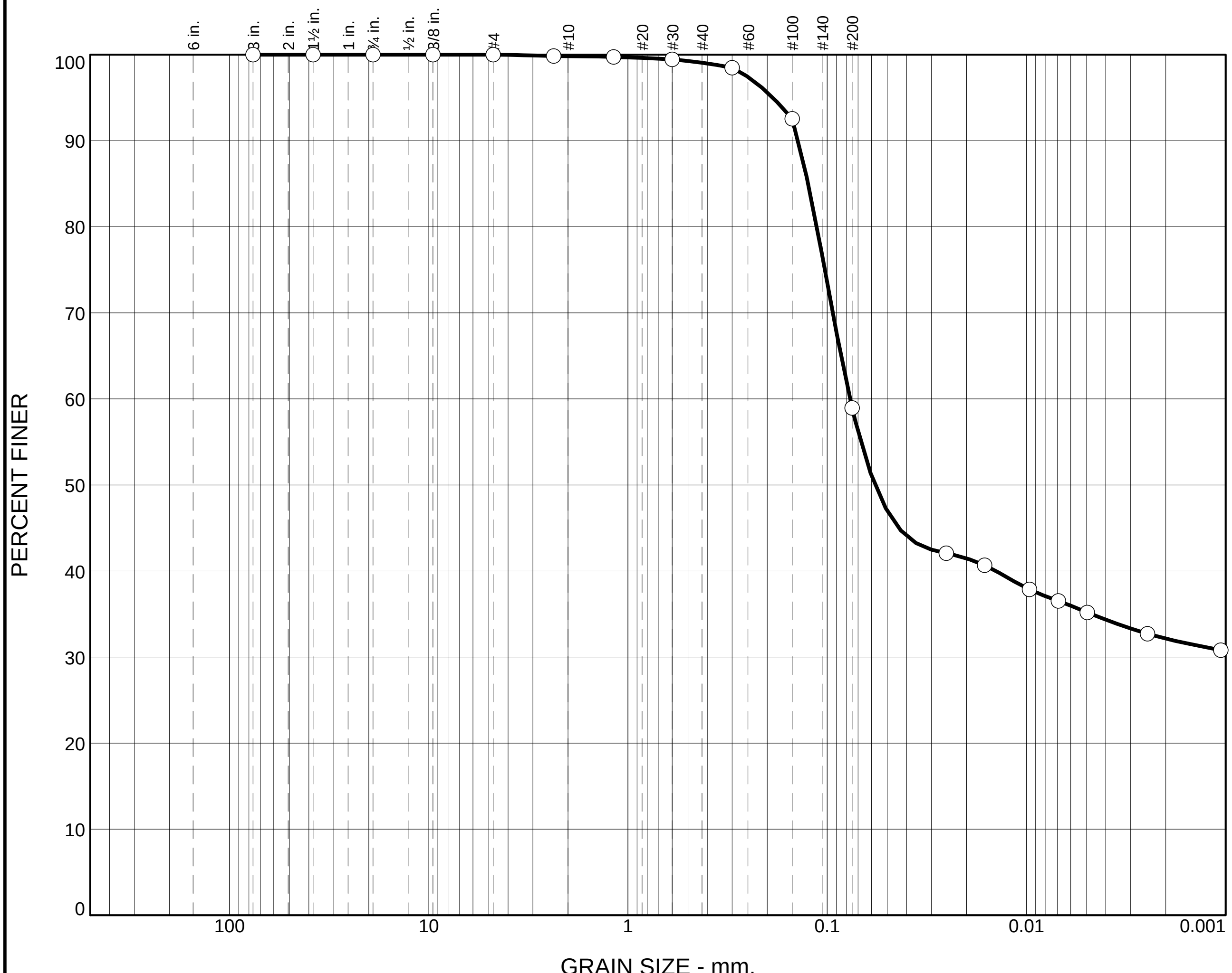
Contour Engineering, LLC

Kennesaw, GA

Remarks:

Figure

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.2	0.8	40.0	23.8	35.2

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	42	18	0.1247	0.0768	0.0576					

Material Description	USCS	AASHTO
○ Gray red and tan sandy CLAY (CL)	CL	A-7-6(11)

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

Project: Plant McIntosh

○ **Location:** M-6 **Depth:** 38.5-40.5' **Sample Number:** UD-3

Remarks:

Contour Engineering, LLC

Kennesaw, GA

Figure

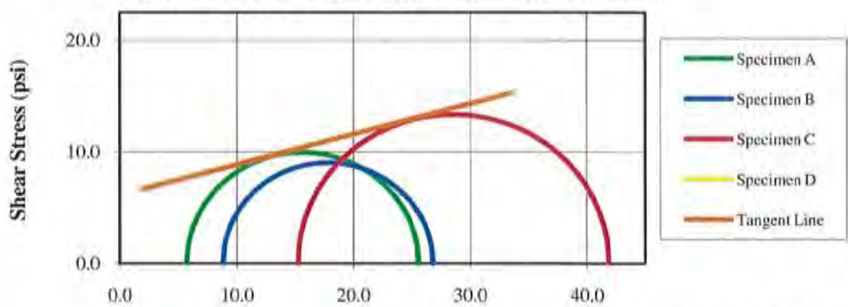
Contour Engineering

Consolidated Undrained Triaxial Test (ASTM D4767)

Date:

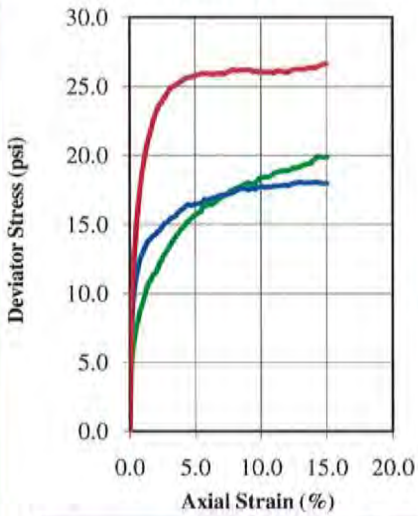
Checked By:

Effective Stress at Maximum Deviator Stress Criterion



127.2 122.7 123.9 124.6 pcf

Deviator Stress Vs. Axial Strain



Initial	Specimen A	Specimen B	Specimen C	Specimen D
Water Content (%)	21.0	27.0	25.8	
Dry Density (pcf)	105.1	96.6	98.5	
Saturation (%)	93.76	97.71	98.13	
Void Ratio	0.600	0.742	0.708	
Diameter (in)	2.866	2.866	2.889	
Height (in)	5.885	5.928	5.397	
Specific Gravity	2.70	2.70	2.70	
Liquid Limit	42	42	42	
Plastic Limit	18	18	18	
After Consolidation	**A**	**B**	**C**	**D**
B-Value	0.95	0.95	0.95	
Water Content (%)	23.5	27.2	28.5	
Dry Density (pcf)	104.32	98.55	99.84	
Saturation (%)	100.00	100.00	100.00	
Void Ratio	0.616	0.710	0.688	
Effective Stress (psi)	6.8	13.8	27.2	
Back Press. (psi)	60.2	60.1	60.1	
Rate of Strain	0.015	0.015	0.015	

Date

Maximum Deviator Stress Criterion	
psf 1066 C (psi)	7.4
psf 878 C' (psi)	6.1
Ø (deg)	8.8
Ø' (deg)	15.3

After Shear	A	B	C	D
σ'1 at Failure (psi)	25.56	26.78	41.84	
σ'3 at Failure (psi)	5.66	8.75	15.20	

Project:	Plant McIntosh
Location:	M-6, UD-3 38.5-40.5'
Project Number:	AT10SOC03-M
Boring Number:	M-6
Sample Number:	M-6, UD-3
Depth:	38.5-40.5'
Sample Type:	Undisturbed
Description:	Gray tan to tan gray CLAY (CL)
Test Type	Consolidated Undrained
Remarks	Top 9" of shelby tube VOID!!

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

Tested By:

Contour Engineering

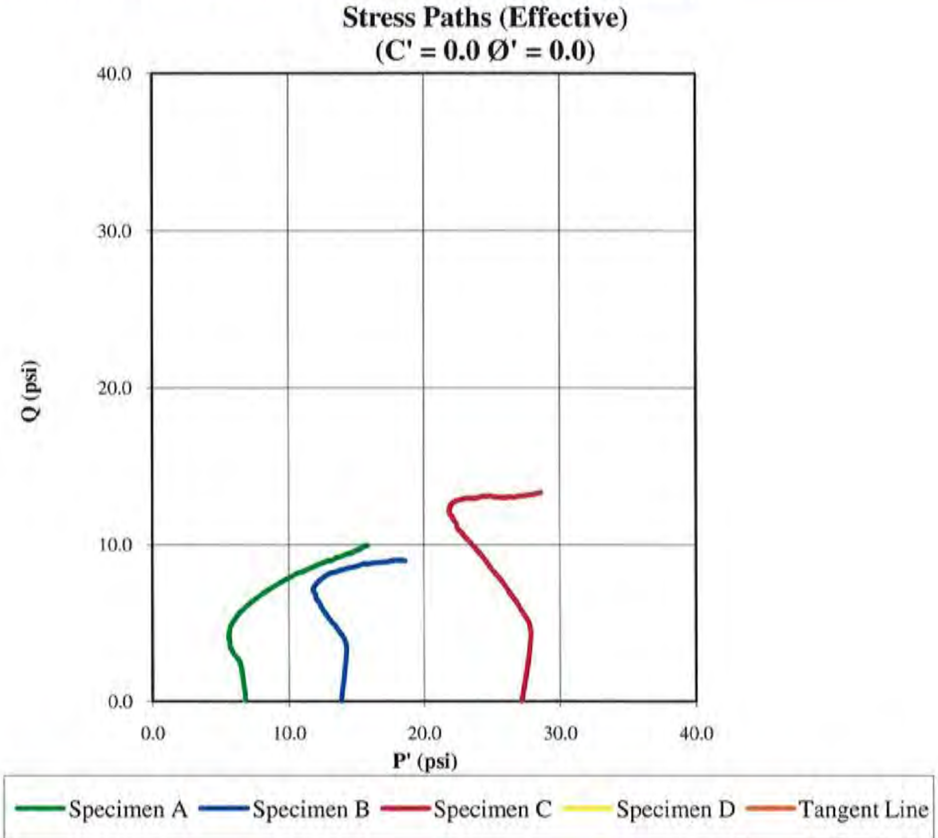
Consolidated Undrained Triaxial Test (ASTM D4767)

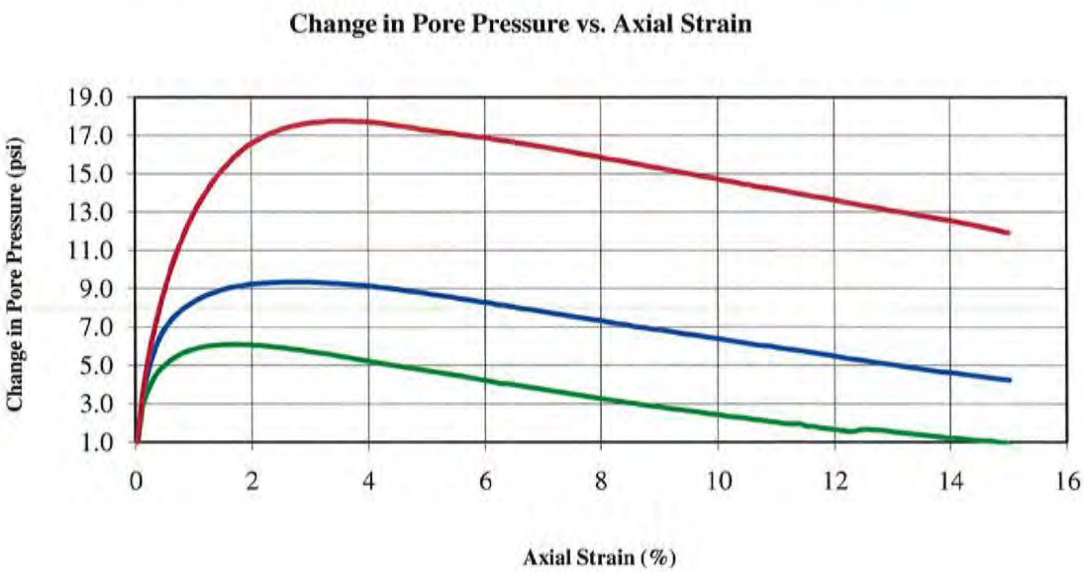
Date:

Checked By:

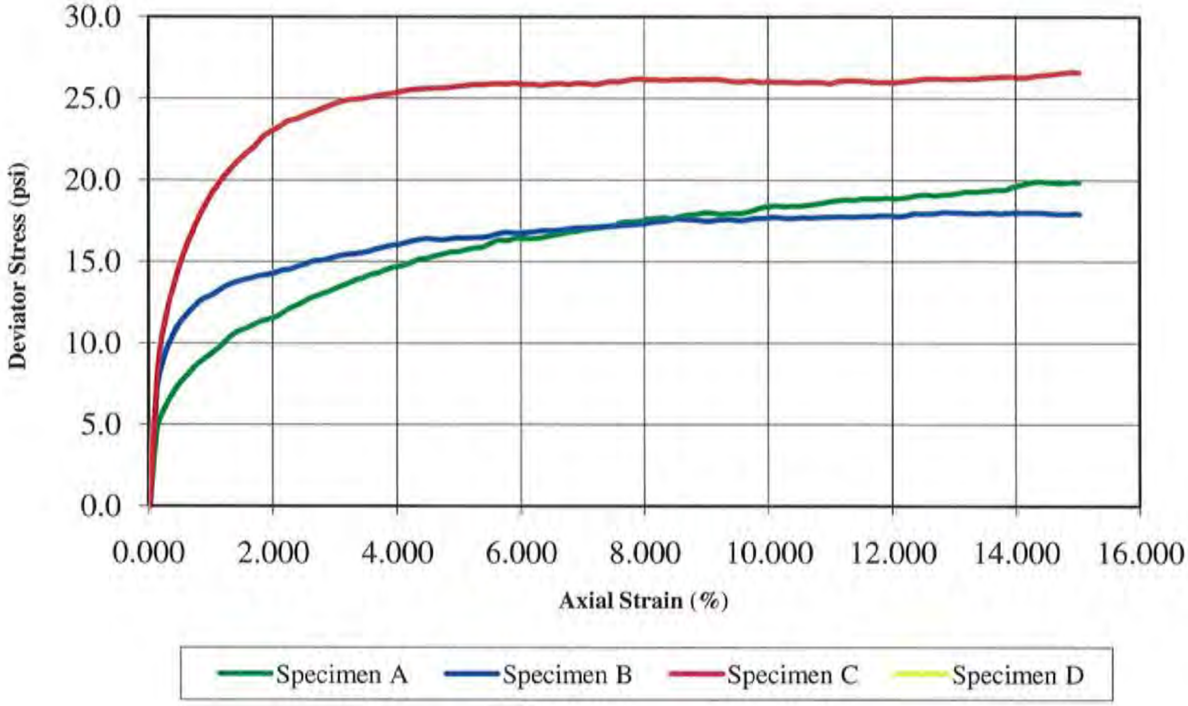
Date:

Tested By:

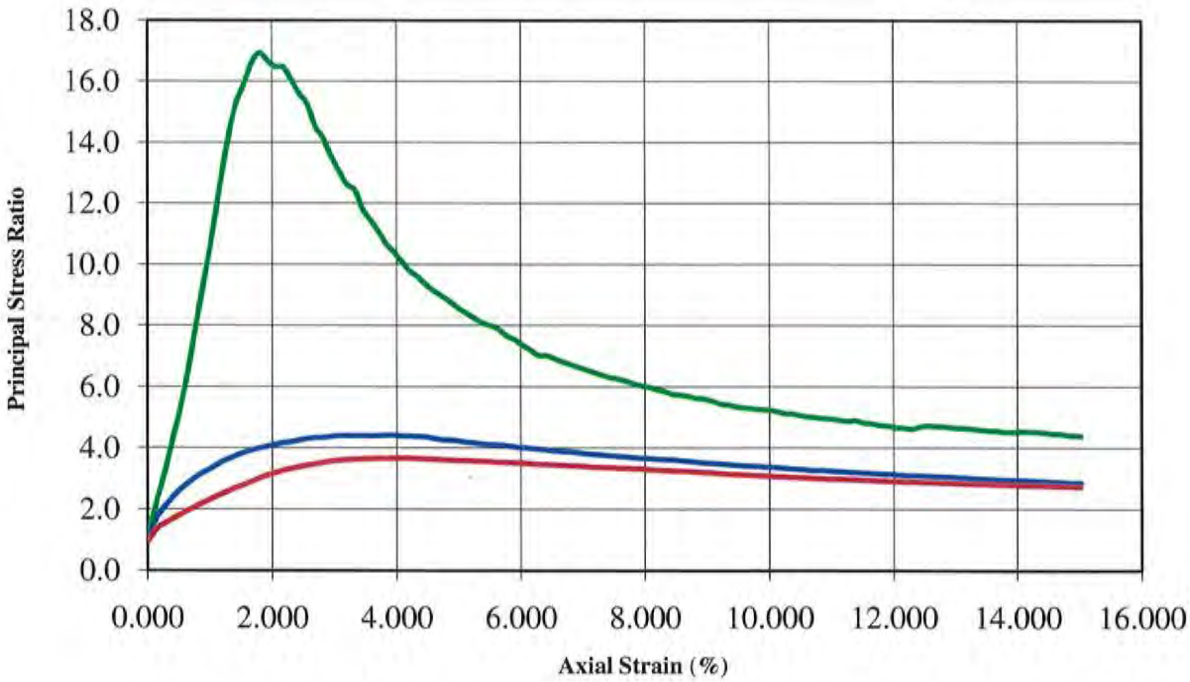


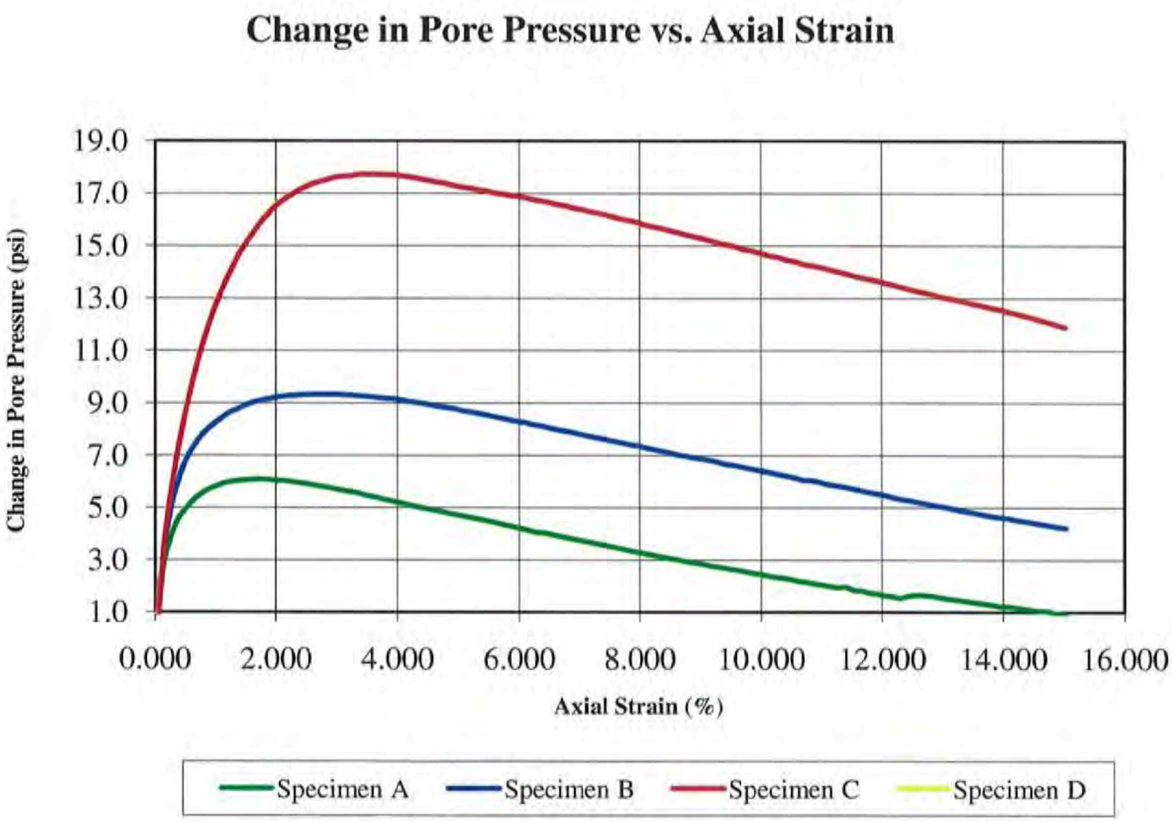


Deviator Stress vs. Axial Strain



Principal Stress Ratio vs. Axial Strain

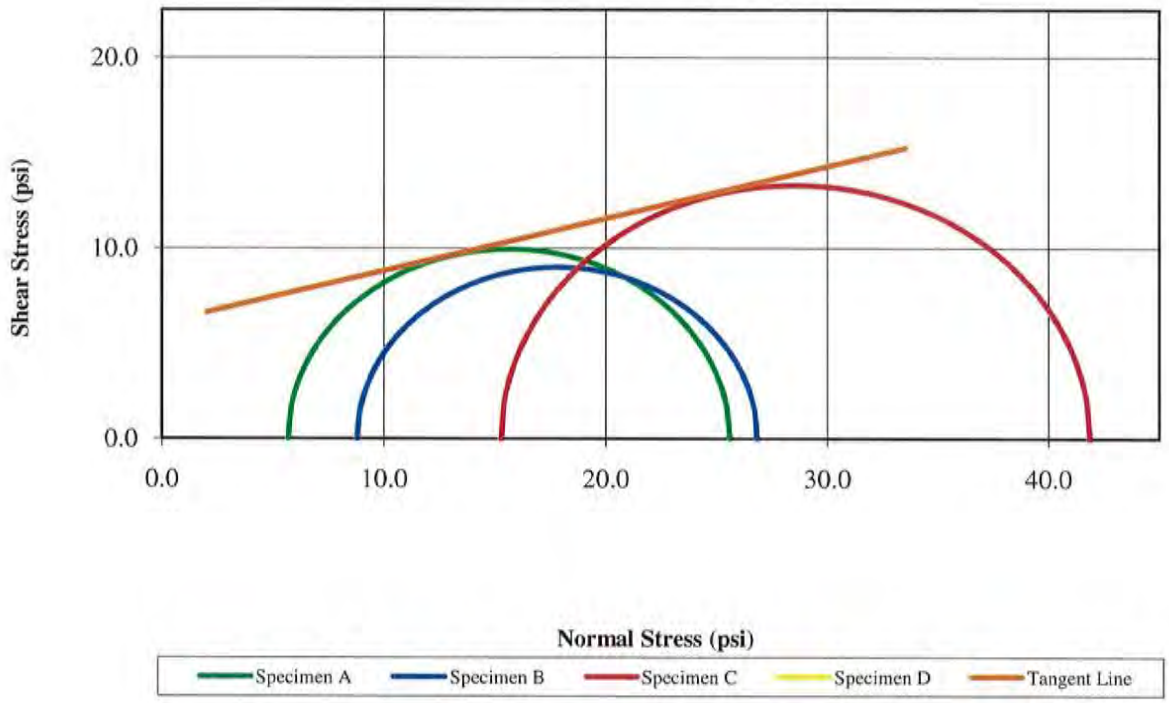



Change in Pore Pressure vs. Axial Strain
Change in Pore Pressure (psi)
19.0
17.0
15.0
13.0
11.0
9.0
7.0
5.0
3.0
1.0
0.000
2.000
4.000
6.000
8.000
10.000
12.000
14.000
16.000
Axial Strain (%)
Specimen A
Specimen B
Specimen C
Specimen D

Mohr Stress Circles at Maximum Deviator Stress Criterion

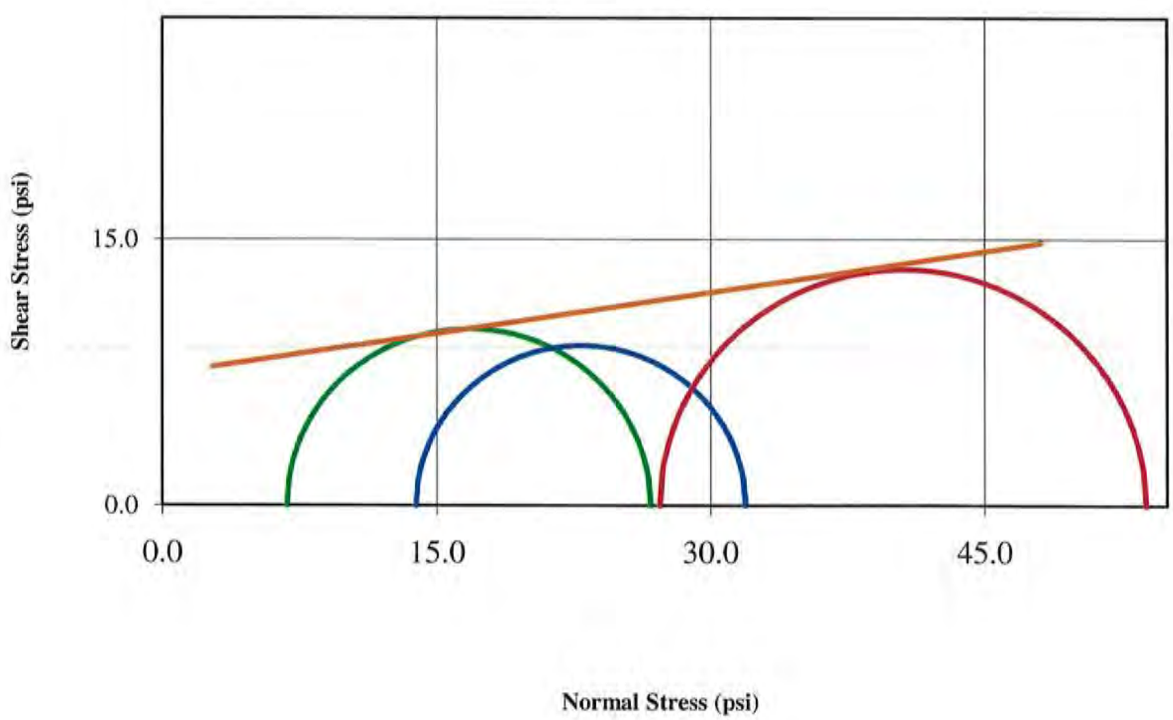
Effective Stress

(C' = 6.1 Ø' = 15.3)

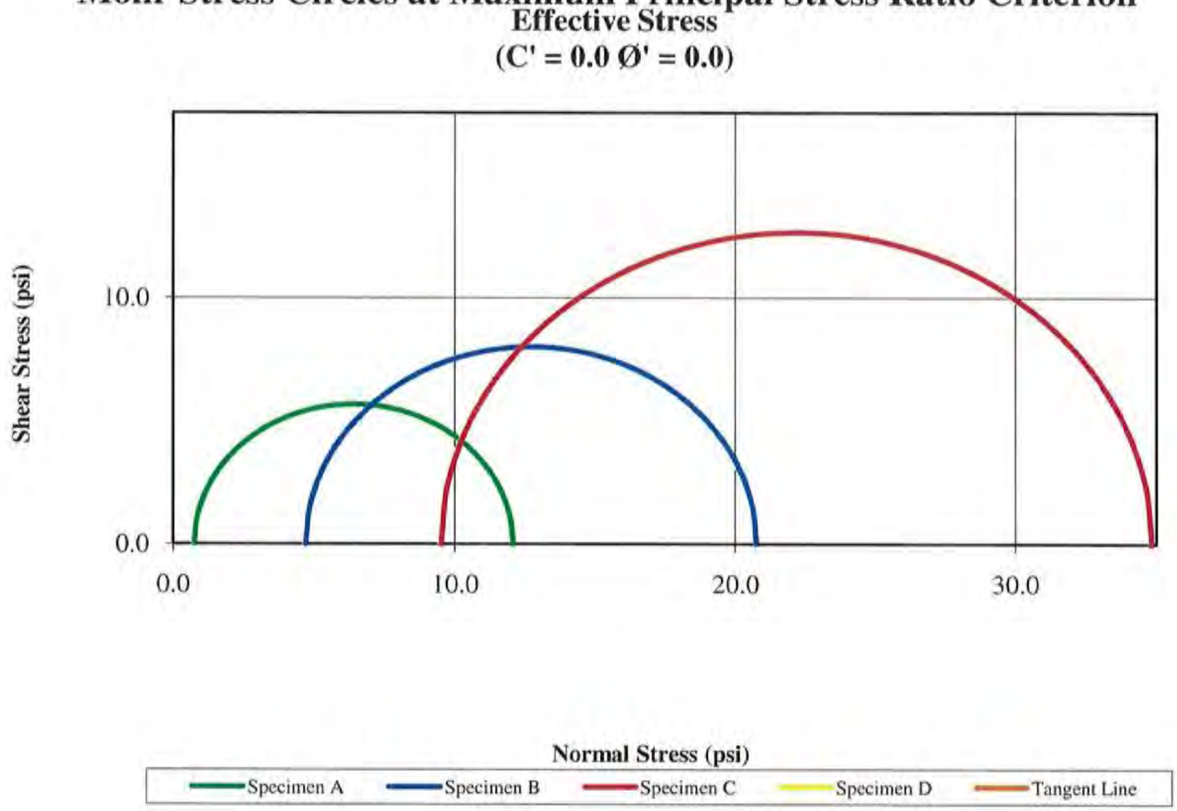


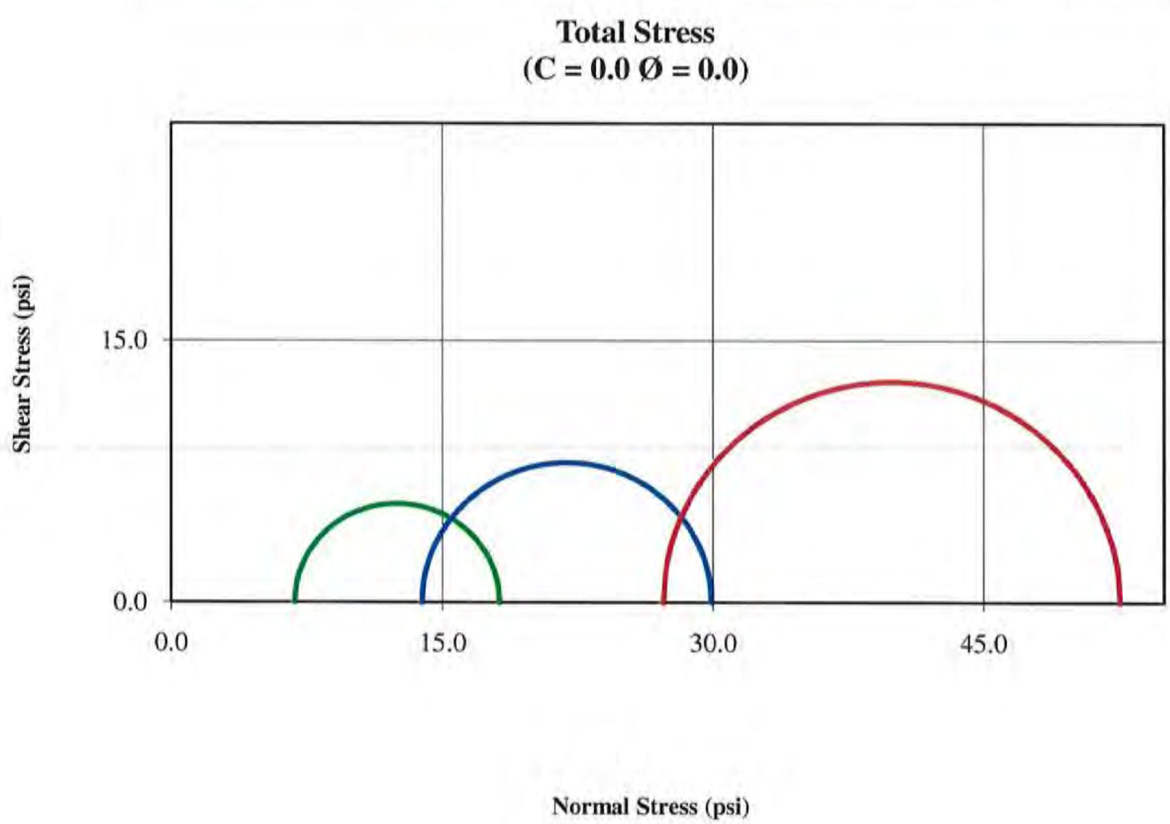
Total Stress

(C = 7.4 Ø = 8.8)

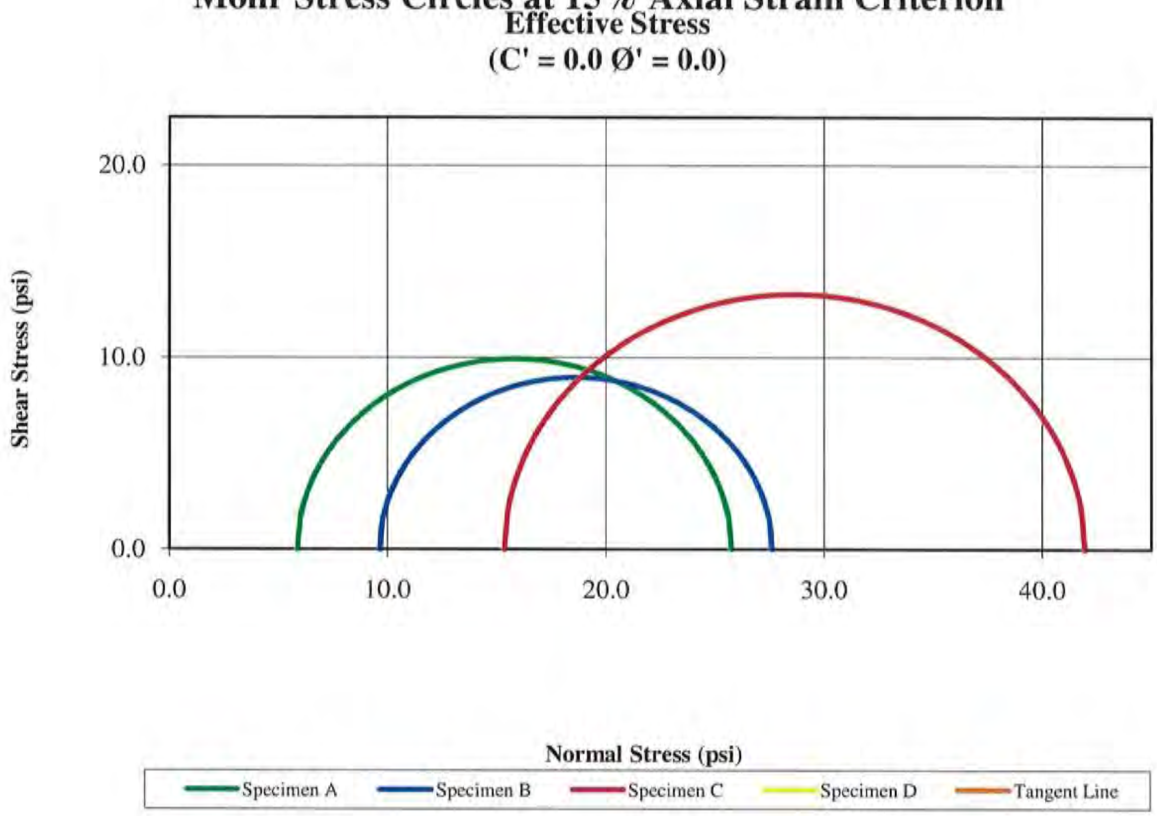


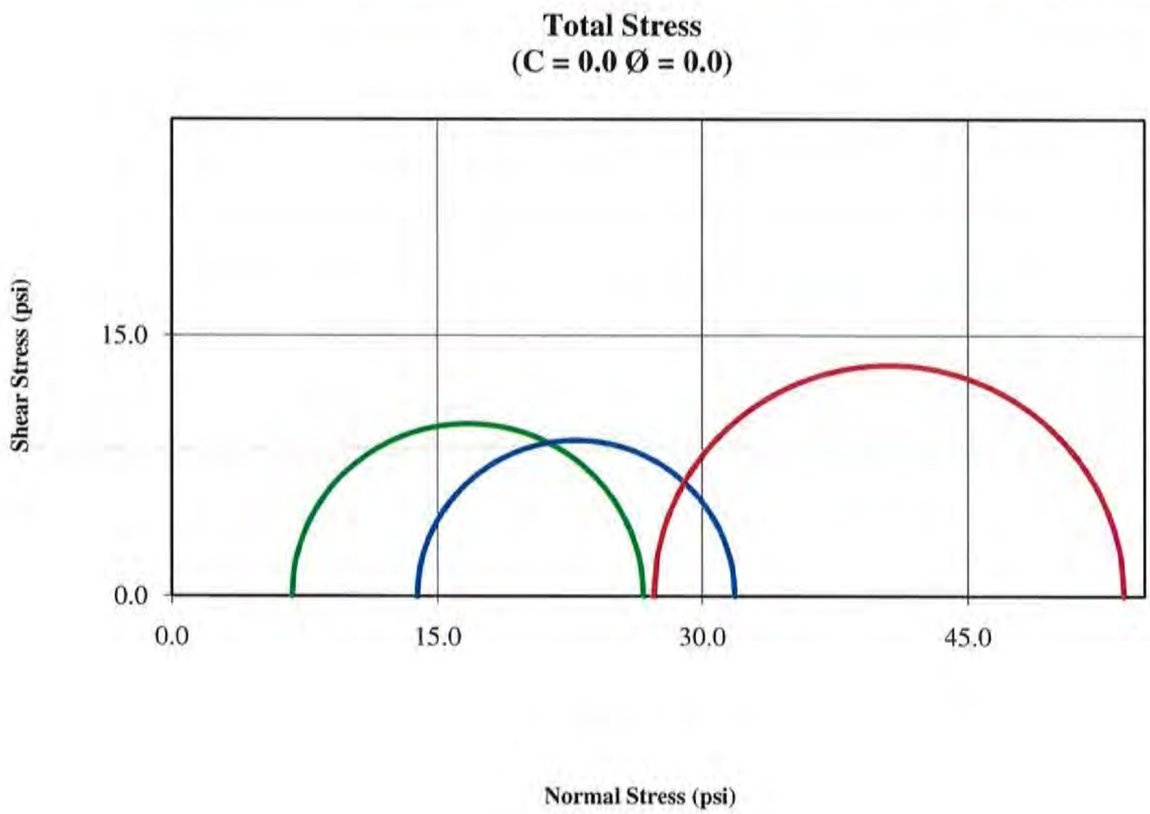
Mohr Stress Circles at Maximum Principal Stress Ratio Criterion

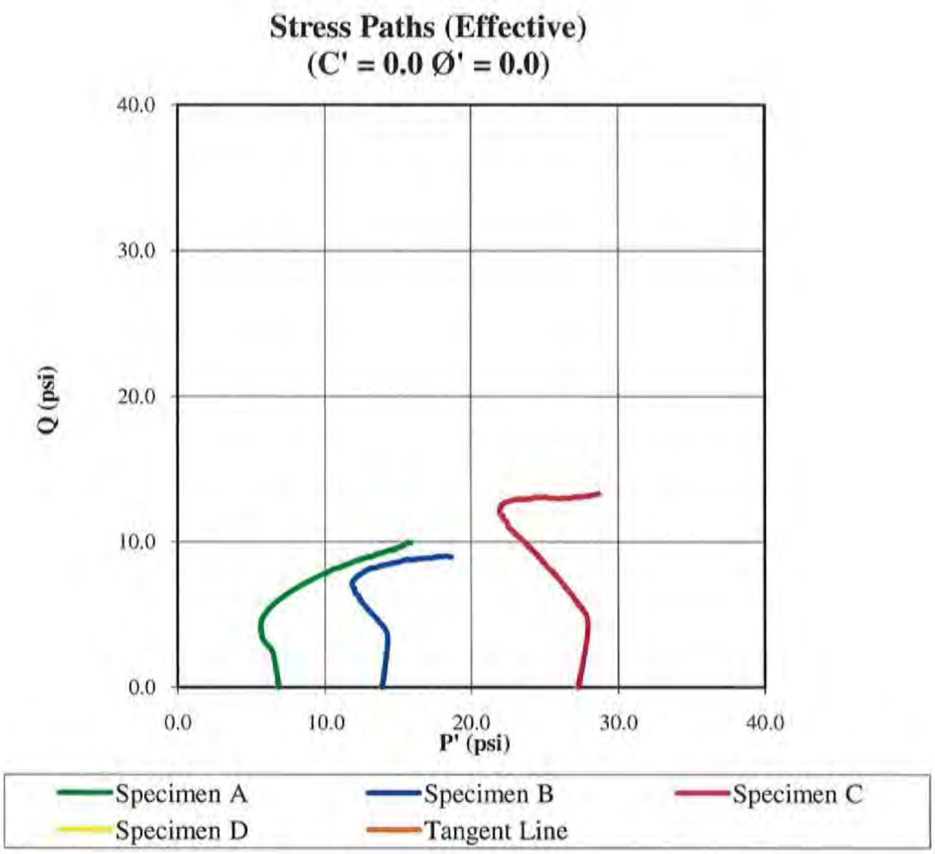




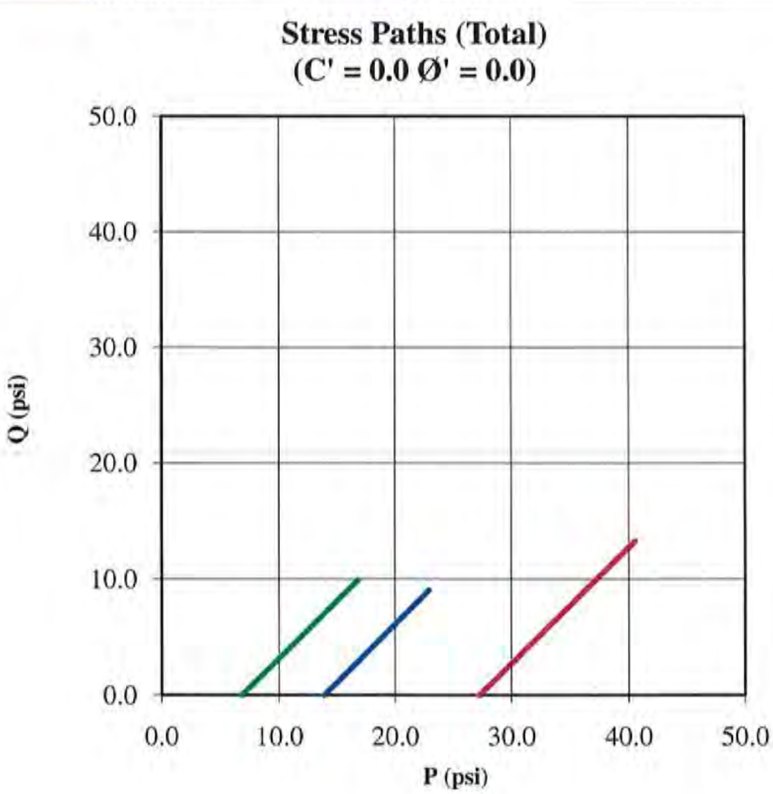
Mohr Stress Circles at 15% Axial Strain Criterion







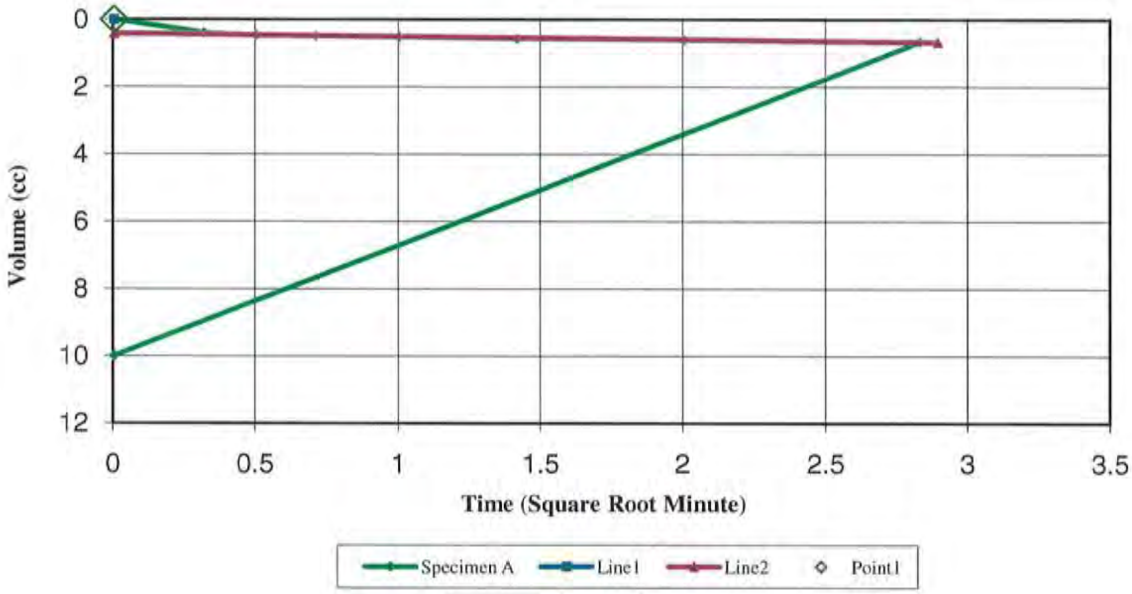
Stress Paths (Effective)
(C' = 0.0 Ø' = 0.0)
40.0
30.0
20.0
10.0
0.0
Q (psi)
0.0
10.0
20.0
30.0
40.0
P' (psi)
Specimen A
Specimen B
Specimen C
Specimen D
Tangent Line



Stress Paths (Total)
(C' = 0.0 Ø' = 0.0)
50.0
40.0
30.0
20.0
10.0
0.0
Q (psi)
0.0
10.0
20.0
30.0
40.0
50.0
P (psi)

Specimen A Consolidation Graphs

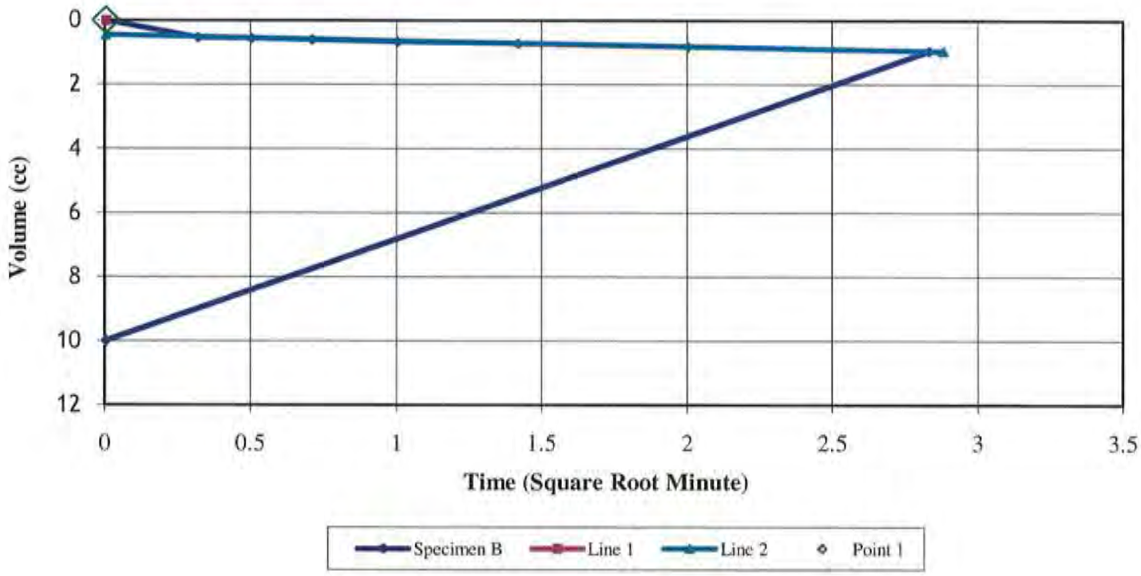
Consolidation Graph (Square Root Time)



Consolidation Graph (Logarithmic Time)

Specimen B Consolidation Graphs

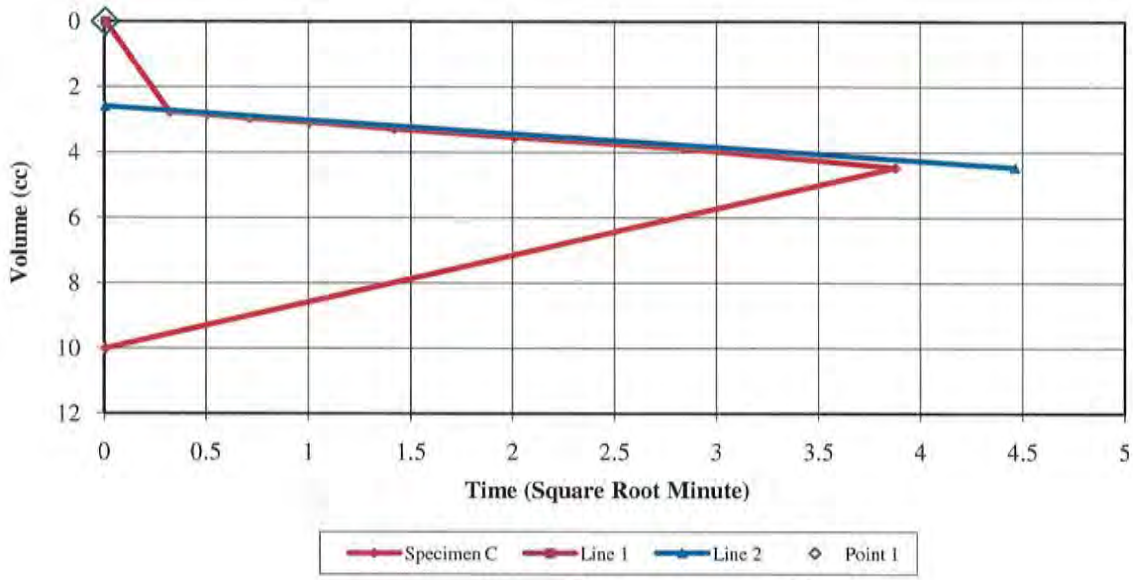
Consolidation Graph (Square Root Time)



Consolidation Graph (Logarithmic Time)

Specimen C Consolidation Graphs

Consolidation Graph (Square Root Time)



Consolidation Graph (Logarithmic Time)

Consolidation Calculations Specimen A

CU Triaxial Test

Contour Engineering

Client: Southern Company
Project No. AT10SOC03-M
Project Name: Plant McIntosh

Project Location: M-6, UD-3 38.5-40.5'

Hole No. M-6
Depth: 38.5-40.5'

Cell Pressure (psi) = 66.94
Back Pressure (psi) = 60
Effective Pressure (psi)= 6.94

Test Type = CU

Initial Sample Diameter (in) = 2.866
Initial Sample Height (in) = 5.885
Initial Sample Area (in2) = 6.451
Initial Volume (in3) = 37.97

Burrette Reading at Start of Test (cc)= 0

Time	Burrette Reading (cc)	Volume Change (cc)
00:00:00	0.00	N/A
00:00:06	-0.40	0.400
00:00:15	-0.46	0.460
00:00:30	-0.48	0.480
00:01:00	-0.51	0.510
00:02:00	-0.56	0.560
00:04:00	-0.60	0.600
00:08:00	-0.66	0.660
	-10.00	10

Laboratory Supervisor

Consolidation Calculations Specimen B

CU Triaxial Test

Contour Engineering

Client: Southern Company

Project No. AT10SOC03-M

Project Name: Plant McIntosh

Project Location: M-6, UD-3 38.5-40.5'

Hole No. M-6

Depth: 38.5-40.5'

Cell Pressure (psi) = 73.89
Back Pressure (psi) = 60
Effective Pressure (psi)= 13.89

Test Type = CU

Initial Sample Diameter (in) = 2.866
Initial Sample Height (in) = 5.928
Initial Sample Area (in2) = 6.45
Initial Volume (in3) = 38.23

Burrette Reading at Start of Test (cc)= 0

Time	Burrette Reading (cc)	Volume Change (cc)
00:00:00	0.00	N/A
00:00:06	-0.54	0.540
00:00:15	-0.56	0.560
00:00:30	-0.60	0.600
00:01:00	-0.66	0.660
00:02:00	-0.72	0.720
00:04:00	-0.82	0.820
00:08:00	-0.96	0.960
	-10.00	10

Laboratory Supervisor

Consolidation Calculations Specimen C
CU Triaxial Test

Contour Engineering

Client: Southern Company
Project No. AT10SOC03-M
Project Name: Plant McIntosh

Project Location: M-6, UD-3 38.5-40.5'

Hole No. M-6
Depth: 38.5-40.5'

Cell Pressure (psi) = 87.28
Back Pressure (psi) = 60
Effective Pressure (psi)= 27.28

Test Type = CU

Initial Sample Diameter (in) = 2.889
Initial Sample Height (in) = 5.397
Initial Sample Area (in2) = 6.557
Initial Volume (in3) = 35.38

Burrette Reading at Start of Test (cc)= 0

Time	Burrette Reading (cc)	Volume Change (cc)
00:00:00	0.00	N/A
00:00:06	-2.76	2.760
00:00:15	-2.84	2.840
00:00:30	-2.96	2.960
00:01:00	-3.08	3.080
00:02:00	-3.28	3.280
00:04:00	-3.54	3.540
00:08:00	-3.88	3.880
00:15:00	-4.46	4.460
	-10.00	10

Laboratory Supervisor

Specimen A Shear Data

CU Triaxial Test

Contour Engineering

File Location
Plant McIntosh M-6 UD-3 (10-15-10).HSD

Project Information

Project No. AT10SOC03-M
Project Name: Plant McIntosh
Client: Southern Company
Sample Location: M-6, UD-3 38.5-40.5'
Sample Description: Tan gray CLAY (CL)
Remarks:

Sample Data

Sample Type: Undisturbed
Specific Gravity: 2.7
LL: 42.000
PL: 18.000

Sample Parameters	Initial	After Consolidation	Final
Diameter (in)	2.866	2.868	
Height (in)	5.885	5.872	
Weight (grams)	1267.19		1282.91
Moisture (%)	20.95		23.53
Dry Density (pcf)	105.13	104.32	
Saturation (%)	93.76	100.00	
Void Ratio	0.600	0.616	

Test Data

Rate of Strain: 0.015
Cell Pressure (psi): 66.940
Effective Confining Stress (psi): 6.8
Corrected Peak Deviator Stress (psi): 19.906 at reading number: 112

Specimen A

Reading No.	Deviator Load (lbs)	Axial Deformation (in)	Pore Pressure (psi)	Change in Pore Pressure (psi)	Corrected Area (in2)	Axial Strain (%)	Deviator Stress (psi)	Corrected Deviator Stress (psi)	σ_1 (psi)	σ_3 (psi)	σ'_1 (psi)	σ'_3 (psi)	σ'_1/σ'_3	Abar	P (psi)	Q (psi)	P' (psi)
0	2.6	0.000	60.2	0.0	6.46	0.000	0.000	0.000	6.8	6.8	6.8	6.8	1.00	0.00	6.8	0.0	6.8
1	33.2	0.007	62.9	2.7	6.47	0.116	4.734	4.684	11.5	6.8	8.7	4.1	2.15	0.58	9.1	2.3	6.4
2	42.2	0.014	64.0	3.9	6.47	0.243	6.121	6.013	12.8	6.8	8.9	2.9	3.07	0.64	9.8	3.0	5.9
3	48.3	0.022	64.7	4.6	6.48	0.369	7.065	6.898	13.7	6.8	9.1	2.2	4.13	0.66	10.2	3.4	5.7
4	53.1	0.029	65.1	5.0	6.49	0.495	7.819	7.590	14.4	6.8	9.4	1.8	5.17	0.65	10.6	3.8	5.6
5	56.8	0.036	65.4	5.3	6.50	0.621	8.392	8.102	14.9	6.8	9.6	1.5	6.41	0.65	10.8	4.1	5.5
6	60.7	0.044	65.7	5.5	6.51	0.747	8.990	8.637	15.4	6.8	9.9	1.3	7.88	0.64	11.1	4.3	5.6
7	63.9	0.052	65.9	5.7	6.52	0.883	9.480	9.058	15.8	6.8	10.1	1.1	9.43	0.63	11.3	4.5	5.6
8	66.5	0.059	66.0	5.8	6.52	1.009	9.887	9.400	16.2	6.8	10.4	1.0	10.86	0.62	11.5	4.7	5.7
9	69.5	0.067	66.1	5.9	6.53	1.135	10.353	9.800	16.6	6.8	10.7	0.9	12.50	0.61	11.7	4.9	5.8
10	73.0	0.074	66.1	6.0	6.54	1.261	10.903	10.282	17.1	6.8	11.1	0.8	13.98	0.58	11.9	5.1	5.9
11	76.0	0.081	66.2	6.0	6.55	1.387	11.357	10.668	17.5	6.8	11.4	0.8	15.19	0.57	12.1	5.3	6.1
12	77.6	0.089	66.2	6.1	6.56	1.513	11.608	10.852	17.6	6.8	11.6	0.7	15.84	0.56	12.2	5.4	6.2
13	79.6	0.097	66.2	6.1	6.57	1.649	11.919	11.090	17.9	6.8	11.8	0.7	16.59	0.55	12.3	5.5	6.3
14	81.6	0.104	66.2	6.1	6.58	1.775	12.230	11.332	18.1	6.8	12.0	0.7	16.93	0.54	12.5	5.7	6.4
15	82.9	0.112	66.2	6.1	6.58	1.911	12.433	11.463	18.2	6.8	12.2	0.7	16.67	0.53	12.5	5.7	6.5
16	84.4	0.120	66.2	6.0	6.59	2.037	12.660	11.635	18.4	6.8	12.4	0.8	16.48	0.52	12.6	5.8	6.6
17	86.5	0.127	66.2	6.0	6.60	2.163	12.983	11.935	18.7	6.8	12.7	0.8	16.46	0.50	12.8	6.0	6.7
18	88.5	0.134	66.1	6.0	6.61	2.289	13.294	12.223	19.0	6.8	13.0	0.8	16.05	0.49	12.9	6.1	6.9

Specimen A

Reading No.	Deviator Load (lbs)	Axial Deformation (in)	Pore Pressure (psi)	Change in Pore Pressure (psi)	Corrected Area (in2)	Axial Strain (%)	Deviator Stress (psi)	Corrected Deviator Stress (psi)	σ_1 (psi)	σ_3 (psi)	σ'_1 (psi)	σ'_3 (psi)	σ'_1/σ'_3	Abar	P (psi)	Q (psi)	P' (psi)
19	90.0	0.142	66.1	5.9	6.62	2.425	13.521	12.426	19.2	6.8	13.3	0.9	15.58	0.48	13.0	6.2	7.1
20	92.0	0.150	66.0	5.9	6.63	2.551	13.832	12.712	19.5	6.8	13.6	0.9	15.24	0.46	13.1	6.4	7.2
21	93.3	0.157	66.0	5.8	6.64	2.677	14.035	12.892	19.7	6.8	13.8	1.0	14.52	0.45	13.2	6.4	7.4
22	94.6	0.165	65.9	5.8	6.65	2.804	14.238	13.072	19.9	6.8	14.1	1.0	14.15	0.44	13.3	6.5	7.5
23	95.9	0.172	65.9	5.7	6.65	2.930	14.442	13.251	20.0	6.8	14.3	1.1	13.57	0.43	13.4	6.6	7.7
24	97.4	0.179	65.8	5.7	6.66	3.056	14.681	13.465	20.3	6.8	14.6	1.1	13.08	0.42	13.5	6.7	7.8
25	98.8	0.187	65.8	5.6	6.67	3.192	14.896	13.653	20.4	6.8	14.8	1.2	12.62	0.41	13.6	6.8	8.0
26	100.5	0.195	65.7	5.6	6.68	3.318	15.159	13.889	20.7	6.8	15.1	1.2	12.42	0.40	13.7	6.9	8.2
27	101.5	0.202	65.6	5.5	6.69	3.434	15.314	14.021	20.8	6.8	15.3	1.3	11.81	0.39	13.8	7.0	8.3
28	102.9	0.209	65.6	5.4	6.70	3.560	15.530	14.210	21.0	6.8	15.6	1.4	11.47	0.38	13.9	7.1	8.5
29	103.9	0.216	65.5	5.4	6.71	3.686	15.673	14.328	21.1	6.8	15.7	1.4	11.11	0.37	13.9	7.2	8.6
30	105.3	0.224	65.4	5.3	6.71	3.812	15.900	14.527	21.3	6.8	16.0	1.5	10.70	0.36	14.0	7.3	8.8
31	106.5	0.231	65.4	5.2	6.72	3.939	16.080	14.679	21.5	6.8	16.2	1.6	10.42	0.36	14.1	7.3	8.9
32	107.1	0.239	65.3	5.2	6.73	4.065	16.175	14.751	21.5	6.8	16.4	1.6	10.11	0.35	14.2	7.4	9.0
33	108.4	0.247	65.2	5.1	6.74	4.201	16.378	14.923	21.7	6.8	16.6	1.7	9.78	0.34	14.2	7.5	9.2
34	110.0	0.254	65.2	5.0	6.75	4.327	16.630	15.143	21.9	6.8	16.9	1.8	9.60	0.33	14.4	7.6	9.3
35	110.6	0.261	65.1	5.0	6.76	4.453	16.713	15.202	22.0	6.8	17.0	1.8	9.35	0.33	14.4	7.6	9.4
36	111.7	0.269	65.1	4.9	6.77	4.579	16.881	15.340	22.1	6.8	17.2	1.9	9.15	0.32	14.5	7.7	9.6
37	112.7	0.277	65.0	4.8	6.78	4.715	17.036	15.466	22.3	6.8	17.4	1.9	8.96	0.31	14.5	7.7	9.7
38	113.7	0.284	64.9	4.8	6.79	4.841	17.191	15.592	22.4	6.8	17.6	2.0	8.79	0.31	14.6	7.8	9.8
39	114.0	0.292	64.9	4.7	6.80	4.977	17.251	15.625	22.4	6.8	17.7	2.1	8.57	0.30	14.6	7.8	9.9
40	115.0	0.300	64.8	4.7	6.81	5.103	17.395	15.740	22.5	6.8	17.9	2.1	8.41	0.30	14.7	7.9	10.0
41	115.8	0.307	64.8	4.6	6.82	5.229	17.526	15.843	22.6	6.8	18.0	2.2	8.25	0.29	14.7	7.9	10.1
42	116.4	0.315	64.7	4.5	6.83	5.365	17.610	15.898	22.7	6.8	18.1	2.2	8.08	0.29	14.7	7.9	10.2
43	118.1	0.322	64.6	4.5	6.83	5.491	17.885	16.136	22.9	6.8	18.4	2.3	8.00	0.28	14.9	8.1	10.4
44	119.5	0.330	64.6	4.4	6.84	5.617	18.100	16.316	23.1	6.8	18.7	2.4	7.90	0.27	14.9	8.2	10.5
45	119.6	0.338	64.5	4.3	6.85	5.753	18.112	16.303	23.1	6.8	18.7	2.4	7.66	0.27	14.9	8.2	10.6
46	120.5	0.345	64.4	4.3	6.86	5.879	18.255	16.415	23.2	6.8	18.9	2.5	7.55	0.26	15.0	8.2	10.7
47	120.8	0.353	64.4	4.2	6.87	6.015	18.303	16.435	23.2	6.8	19.0	2.6	7.35	0.26	15.0	8.2	10.8
48	120.9	0.361	64.3	4.1	6.88	6.141	18.315	16.423	23.2	6.8	19.1	2.6	7.20	0.25	15.0	8.2	10.9
49	121.2	0.368	64.2	4.1	6.89	6.267	18.363	16.445	23.2	6.8	19.2	2.7	7.03	0.25	15.0	8.2	11.0
50	122.1	0.375	64.2	4.0	6.90	6.393	18.494	16.545	23.3	6.8	19.3	2.7	7.02	0.24	15.1	8.3	11.0
51	122.9	0.383	64.1	4.0	6.91	6.519	18.614	16.633	23.4	6.8	19.4	2.8	6.92	0.24	15.1	8.3	11.1
52	123.5	0.390	64.1	3.9	6.92	6.645	18.722	16.710	23.5	6.8	19.6	2.9	6.82	0.23	15.1	8.4	11.2
53	124.5	0.398	64.0	3.9	6.93	6.771	18.865	16.821	23.6	6.8	19.8	2.9	6.74	0.23	15.2	8.4	11.3
54	125.0	0.405	63.9	3.8	6.94	6.897	18.949	16.875	23.7	6.8	19.9	3.0	6.64	0.22	15.2	8.4	11.4
55	125.9	0.412	63.9	3.7	6.95	7.023	19.080	16.973	23.8	6.8	20.0	3.1	6.56	0.22	15.3	8.5	11.5
56	126.5	0.420	63.8	3.7	6.96	7.159	19.176	17.036	23.8	6.8	20.1	3.1	6.47	0.22	15.3	8.5	11.6
57	127.1	0.427	63.8	3.6	6.97	7.276	19.272	17.102	23.9	6.8	20.3	3.2	6.39	0.21	15.3	8.6	11.7
58	127.6	0.435	63.7	3.6	6.98	7.412	19.355	17.154	23.9	6.8	20.4	3.2	6.30	0.21	15.4	8.6	11.8
59	129.0	0.443	63.6	3.5	6.99	7.538	19.558	17.317	24.1	6.8	20.6	3.3	6.26	0.20	15.4	8.7	12.0

Specimen A

Reading No.	Deviator Load (lbs)	Axial Deformation (in)	Pore Pressure (psi)	Change in Pore Pressure (psi)	Corrected Area (in2)	Axial Strain (%)	Deviator Stress (psi)	Corrected Deviator Stress (psi)	σ_1 (psi)	σ_3 (psi)	σ'_1 (psi)	σ'_3 (psi)	σ'_1/σ'_3	Abar	P (psi)	Q (psi)	P' (psi)
60	129.9	0.450	63.6	3.4	7.00	7.664	19.702	17.425	24.2	6.8	20.8	3.4	6.19	0.20	15.5	8.7	12.1
61	130.2	0.457	63.5	3.4	7.00	7.790	19.750	17.444	24.2	6.8	20.9	3.4	6.11	0.19	15.5	8.7	12.1
62	130.7	0.465	63.5	3.3	7.01	7.916	19.822	17.485	24.3	6.8	21.0	3.5	6.03	0.19	15.5	8.7	12.2
63	131.7	0.473	63.4	3.2	7.02	8.052	19.989	17.612	24.4	6.8	21.1	3.5	5.98	0.18	15.6	8.8	12.3
64	132.1	0.480	63.3	3.2	7.03	8.178	20.049	17.642	24.4	6.8	21.2	3.6	5.90	0.18	15.6	8.8	12.4
65	132.7	0.488	63.3	3.1	7.04	8.314	20.132	17.691	24.5	6.8	21.3	3.7	5.84	0.18	15.6	8.8	12.5
66	132.5	0.496	63.2	3.1	7.05	8.440	20.108	17.644	24.4	6.8	21.4	3.7	5.75	0.17	15.6	8.8	12.5
67	133.6	0.503	63.2	3.0	7.06	8.566	20.276	17.772	24.6	6.8	21.5	3.8	5.73	0.17	15.7	8.9	12.6
68	134.4	0.510	63.1	3.0	7.07	8.692	20.407	17.866	24.7	6.8	21.7	3.8	5.68	0.17	15.7	8.9	12.8
69	134.9	0.518	63.1	2.9	7.08	8.828	20.479	17.904	24.7	6.8	21.8	3.9	5.62	0.16	15.7	9.0	12.8
70	135.7	0.526	63.0	2.9	7.09	8.954	20.611	17.998	24.8	6.8	21.9	3.9	5.59	0.16	15.8	9.0	12.9
71	135.8	0.533	63.0	2.8	7.10	9.080	20.623	17.983	24.8	6.8	22.0	4.0	5.52	0.16	15.8	9.0	13.0
72	135.4	0.541	62.9	2.7	7.11	9.206	20.563	17.903	24.7	6.8	21.9	4.0	5.43	0.15	15.7	9.0	13.0
73	136.0	0.549	62.9	2.7	7.12	9.342	20.646	17.950	24.7	6.8	22.0	4.1	5.40	0.15	15.8	9.0	13.1
74	136.1	0.556	62.8	2.6	7.13	9.468	20.670	17.946	24.7	6.8	22.1	4.1	5.33	0.15	15.8	9.0	13.1
75	136.7	0.563	62.8	2.6	7.14	9.594	20.754	17.996	24.8	6.8	22.2	4.2	5.30	0.14	15.8	9.0	13.2
76	137.8	0.571	62.7	2.5	7.16	9.730	20.933	18.129	24.9	6.8	22.4	4.2	5.27	0.14	15.8	9.1	13.3
77	139.2	0.579	62.6	2.5	7.17	9.856	21.149	18.297	25.1	6.8	22.6	4.3	5.25	0.14	15.9	9.1	13.5
78	139.9	0.586	62.6	2.4	7.18	9.982	21.256	18.367	25.2	6.8	22.7	4.3	5.23	0.13	16.0	9.2	13.5
79	140.5	0.594	62.5	2.4	7.19	10.108	21.340	18.416	25.2	6.8	22.8	4.4	5.18	0.13	16.0	9.2	13.6
80	140.4	0.601	62.5	2.3	7.20	10.234	21.328	18.378	25.2	6.8	22.8	4.5	5.12	0.13	16.0	9.2	13.7
81	140.8	0.608	62.5	2.3	7.21	10.361	21.400	18.415	25.2	6.8	22.9	4.5	5.11	0.12	16.0	9.2	13.7
82	140.9	0.616	62.4	2.2	7.22	10.487	21.412	18.399	25.2	6.8	22.9	4.5	5.05	0.12	16.0	9.2	13.7
83	141.5	0.623	62.3	2.2	7.23	10.613	21.507	18.457	25.2	6.8	23.1	4.6	5.01	0.12	16.0	9.2	13.8
84	142.2	0.631	62.3	2.1	7.24	10.739	21.603	18.516	25.3	6.8	23.2	4.6	4.99	0.12	16.0	9.3	13.9
85	143.0	0.638	62.2	2.1	7.25	10.865	21.734	18.606	25.4	6.8	23.3	4.7	4.95	0.11	16.1	9.3	14.0
86	143.9	0.645	62.2	2.0	7.26	10.991	21.866	18.695	25.5	6.8	23.4	4.7	4.94	0.11	16.1	9.3	14.1
87	144.5	0.653	62.1	2.0	7.27	11.117	21.961	18.753	25.5	6.8	23.6	4.8	4.90	0.11	16.2	9.4	14.2
88	144.9	0.660	62.1	1.9	7.28	11.243	22.033	18.789	25.6	6.8	23.6	4.8	4.88	0.10	16.2	9.4	14.2
89	145.1	0.668	62.1	2.0	7.29	11.379	22.057	18.780	25.6	6.8	23.6	4.8	4.89	0.10	16.2	9.4	14.2
90	145.9	0.676	62.0	1.8	7.30	11.505	22.177	18.858	25.6	6.8	23.8	4.9	4.81	0.10	16.2	9.4	14.4
91	146.0	0.683	62.0	1.8	7.31	11.631	22.201	18.851	25.6	6.8	23.8	5.0	4.79	0.10	16.2	9.4	14.4
92	146.2	0.690	61.9	1.7	7.32	11.758	22.236	18.855	25.6	6.8	23.9	5.0	4.73	0.09	16.2	9.4	14.5
93	146.8	0.698	61.8	1.7	7.33	11.893	22.320	18.898	25.7	6.8	24.0	5.1	4.71	0.09	16.2	9.4	14.5
94	146.7	0.706	61.8	1.6	7.34	12.019	22.308	18.860	25.6	6.8	24.0	5.2	4.66	0.09	16.2	9.4	14.6
95	147.3	0.714	61.7	1.6	7.35	12.155	22.404	18.913	25.7	6.8	24.1	5.2	4.64	0.08	16.2	9.5	14.6
96	147.9	0.721	61.7	1.5	7.36	12.281	22.499	18.969	25.8	6.8	24.2	5.3	4.61	0.08	16.3	9.5	14.7
97	149.0	0.729	61.8	1.6	7.37	12.407	22.655	19.077	25.9	6.8	24.2	5.2	4.69	0.08	16.3	9.5	14.7
98	149.3	0.737	61.8	1.7	7.39	12.543	22.715	19.098	25.9	6.8	24.2	5.1	4.72	0.09	16.3	9.5	14.7
99	149.2	0.744	61.8	1.6	7.40	12.669	22.691	19.049	25.8	6.8	24.2	5.2	4.70	0.09	16.3	9.5	14.7
100	149.8	0.751	61.8	1.6	7.41	12.796	22.786	19.104	25.9	6.8	24.3	5.2	4.69	0.08	16.3	9.6	14.7

Specimen A

Reading No.	Deviator Load (lbs)	Axial Deformation (in)	Pore Pressure (psi)	Change in Pore Pressure (psi)	Corrected Area (in2)	Axial Strain (%)	Deviator Stress (psi)	Corrected Deviator Stress (psi)	σ_1 (psi)	σ_3 (psi)	σ'_1 (psi)	σ'_3 (psi)	σ'_1/σ'_3	Abar	P (psi)	Q (psi)	P' (psi)
101	150.3	0.759	61.7	1.6	7.42	12.931	22.858	19.135	25.9	6.8	24.4	5.2	4.66	0.08	16.4	9.6	14.8
102	151.0	0.766	61.7	1.5	7.43	13.048	22.966	19.202	26.0	6.8	24.5	5.3	4.64	0.08	16.4	9.6	14.9
103	151.8	0.774	61.6	1.5	7.44	13.174	23.097	19.287	26.1	6.8	24.6	5.3	4.63	0.08	16.4	9.6	15.0
104	152.0	0.782	61.6	1.4	7.45	13.310	23.133	19.287	26.1	6.8	24.6	5.4	4.60	0.07	16.4	9.6	15.0
105	152.4	0.788	61.5	1.4	7.46	13.426	23.193	19.312	26.1	6.8	24.7	5.4	4.58	0.07	16.4	9.7	15.0
106	152.9	0.796	61.5	1.4	7.47	13.552	23.265	19.345	26.1	6.8	24.8	5.4	4.56	0.07	16.5	9.7	15.1
107	153.6	0.803	61.5	1.3	7.48	13.678	23.372	19.408	26.2	6.8	24.9	5.5	4.55	0.07	16.5	9.7	15.2
108	153.7	0.811	61.4	1.3	7.49	13.804	23.396	19.399	26.2	6.8	24.9	5.5	4.52	0.07	16.5	9.7	15.2
109	155.4	0.818	61.4	1.2	7.50	13.931	23.647	19.586	26.4	6.8	25.2	5.6	4.51	0.06	16.6	9.8	15.4
110	156.4	0.825	61.4	1.2	7.52	14.057	23.815	19.700	26.5	6.8	25.3	5.6	4.53	0.06	16.6	9.8	15.4
111	157.6	0.833	61.3	1.2	7.53	14.183	23.994	19.824	26.6	6.8	25.4	5.6	4.53	0.06	16.7	9.9	15.5
112	158.4	0.840	61.3	1.1	7.54	14.309	24.125	19.906	26.7	6.8	25.6	5.7	4.52	0.06	16.7	10.0	15.6
113	158.6	0.848	61.2	1.1	7.55	14.435	24.149	19.896	26.7	6.8	25.6	5.7	4.49	0.05	16.7	9.9	15.6
114	158.6	0.856	61.2	1.0	7.56	14.571	24.149	19.863	26.6	6.8	25.6	5.7	4.46	0.05	16.7	9.9	15.7
115	158.5	0.863	61.2	1.0	7.57	14.697	24.137	19.823	26.6	6.8	25.6	5.7	4.46	0.05	16.7	9.9	15.6
116	159.1	0.870	61.1	1.0	7.58	14.823	24.221	19.864	26.6	6.8	25.7	5.8	4.41	0.05	16.7	9.9	15.7
117	159.5	0.878	61.1	0.9	7.59	14.949	24.293	19.894	26.7	6.8	25.7	5.8	4.41	0.05	16.7	9.9	15.8
118	159.3	0.881	61.1	0.9	7.60	15.007	24.257	19.849	26.6	6.8	25.7	5.9	4.39	0.05	16.7	9.9	15.8

Specimen B Shear Data

CU Triaxial Test

Contour Engineering

File Location
Plant McIntosh M-6 UD-3 (10-15-10).HSD

Project Information

Project No. AT10SOC03-M
Project Name: Plant McIntosh
Client: Southern Company
Sample Location: M-6, UD-3 38.5-40.5'
Sample Description: Gray tan CLAY (CL)
Remarks:

Sample Data

Sample Type: Undisturbed
Specific Gravity: 2.7
LL: 42.000
PL: 18.000

Sample Parameters	Initial	After Consolidation	Final
Diameter (in)	2.866	2.869	
Height (in)	5.928	5.912	
Weight (grams)	1230.89		1257.05
Moisture (%)	26.95		27.16
Dry Density (pcf)	96.61	98.55	
Saturation (%)	97.71	100.00	
Void Ratio	0.742	0.710	

Test Data

Rate of Strain: 0.015
Cell Pressure (psi): 73.890
Effective Confining Stress (psi): 13.8
Corrected Peak Deviator Stress (psi): 18.030 at reading number: 101

Specimen B

Reading No.	Deviator Load (lbs)	Axial Deformation (in)	Pore Pressure (psi)	Change in Pore Pressure (psi)	Corrected Area (in2)	Axial Strain (%)	Deviator Stress (psi)	Corrected Deviator Stress (psi)	σ_1 (psi)	σ_3 (psi)	σ'_1 (psi)	σ'_3 (psi)	σ'_1/σ'_3	Abar	P (psi)	Q (psi)	P' (psi)
0	2.5	0.001	60.1	0.0	6.46	0.000	0.000	0.000	13.8	13.8	13.8	13.8	1.00	0.00	13.8	0.0	13.8
1	47.2	0.007	63.1	3.0	6.47	0.106	6.905	6.857	20.7	13.8	17.6	10.8	1.64	0.44	17.3	3.4	14.2
2	62.5	0.015	64.9	4.8	6.48	0.231	9.282	9.172	23.0	13.8	18.2	9.0	2.02	0.53	18.4	4.6	13.6
3	70.6	0.022	66.0	6.0	6.49	0.357	10.524	10.350	24.2	13.8	18.2	7.8	2.32	0.58	19.0	5.2	13.0
4	76.4	0.029	66.8	6.7	6.49	0.472	11.420	11.185	25.0	13.8	18.3	7.1	2.58	0.60	19.4	5.6	12.7
5	80.5	0.036	67.3	7.3	6.50	0.597	12.065	11.764	25.6	13.8	18.3	6.6	2.79	0.62	19.7	5.9	12.5
6	84.3	0.044	67.7	7.7	6.51	0.723	12.650	12.282	26.1	13.8	18.4	6.1	3.00	0.63	20.0	6.1	12.3
7	87.4	0.051	68.0	8.0	6.52	0.848	13.128	12.692	26.5	13.8	18.5	5.8	3.17	0.63	20.2	6.3	12.2
8	89.3	0.059	68.3	8.3	6.53	0.983	13.427	12.918	26.8	13.8	18.5	5.6	3.31	0.64	20.3	6.5	12.0
9	91.8	0.067	68.5	8.5	6.54	1.108	13.809	13.231	27.1	13.8	18.6	5.4	3.47	0.64	20.5	6.6	12.0
10	94.1	0.074	68.7	8.7	6.54	1.233	14.167	13.520	27.4	13.8	18.7	5.2	3.61	0.64	20.6	6.8	11.9
11	95.8	0.081	68.8	8.8	6.55	1.359	14.430	13.713	27.5	13.8	18.8	5.1	3.71	0.64	20.7	6.9	11.9
12	97.3	0.089	69.0	8.9	6.56	1.484	14.657	13.871	27.7	13.8	18.8	4.9	3.82	0.64	20.8	6.9	11.9
13	98.5	0.096	69.1	9.0	6.57	1.609	14.836	13.981	27.8	13.8	18.8	4.8	3.90	0.65	20.8	7.0	11.8
14	99.9	0.104	69.2	9.1	6.58	1.744	15.063	14.132	28.0	13.8	18.9	4.7	3.98	0.64	20.9	7.1	11.8
15	100.8	0.112	69.2	9.2	6.59	1.869	15.207	14.206	28.0	13.8	18.9	4.7	4.04	0.64	20.9	7.1	11.8
16	101.9	0.119	69.3	9.2	6.60	1.995	15.374	14.303	28.1	13.8	18.9	4.6	4.10	0.64	21.0	7.2	11.8
17	103.2	0.127	69.3	9.3	6.60	2.130	15.577	14.478	28.3	13.8	19.1	4.6	4.17	0.64	21.1	7.2	11.8
18	103.8	0.134	69.3	9.3	6.61	2.255	15.661	14.541	28.4	13.8	19.1	4.6	4.19	0.64	21.1	7.3	11.8

Specimen B

Reading No.	Deviator Load (lbs)	Axial Deformation (in)	Pore Pressure (psi)	Change in Pore Pressure (psi)	Corrected Area (in2)	Axial Strain (%)	Deviator Stress (psi)	Corrected Deviator Stress (psi)	σ_1 (psi)	σ_3 (psi)	σ'_1 (psi)	σ'_3 (psi)	σ'_1/σ'_3	Abar	P (psi)	Q (psi)	P' (psi)
19	105.2	0.142	69.4	9.3	6.62	2.380	15.876	14.731	28.6	13.8	19.3	4.5	4.25	0.63	21.2	7.4	11.9
20	106.3	0.150	69.4	9.3	6.63	2.515	16.043	14.873	28.7	13.8	19.4	4.5	4.30	0.63	21.3	7.4	11.9
21	107.6	0.157	69.4	9.3	6.64	2.640	16.246	15.050	28.9	13.8	19.6	4.5	4.33	0.62	21.4	7.5	12.0
22	108.0	0.165	69.4	9.3	6.65	2.775	16.318	15.098	28.9	13.8	19.6	4.5	4.35	0.62	21.4	7.5	12.1
23	108.9	0.173	69.4	9.3	6.66	2.900	16.449	15.205	29.0	13.8	19.7	4.5	4.37	0.61	21.4	7.6	12.1
24	110.0	0.180	69.4	9.3	6.67	3.026	16.616	15.347	29.2	13.8	19.9	4.5	4.40	0.61	21.5	7.7	12.2
25	110.7	0.187	69.4	9.3	6.67	3.151	16.736	15.442	29.3	13.8	20.0	4.5	4.41	0.60	21.6	7.7	12.3
26	111.2	0.195	69.3	9.3	6.68	3.286	16.807	15.488	29.3	13.8	20.0	4.6	4.40	0.60	21.6	7.7	12.3
27	111.8	0.202	69.3	9.3	6.69	3.401	16.903	15.561	29.4	13.8	20.1	4.6	4.40	0.60	21.6	7.8	12.4
28	112.5	0.210	69.3	9.2	6.70	3.527	17.011	15.644	29.5	13.8	20.2	4.6	4.41	0.59	21.7	7.8	12.4
29	113.7	0.217	69.3	9.2	6.71	3.652	17.190	15.795	29.6	13.8	20.4	4.6	4.41	0.58	21.7	7.9	12.5
30	114.5	0.224	69.2	9.2	6.72	3.777	17.321	15.900	29.7	13.8	20.6	4.7	4.42	0.58	21.8	7.9	12.6
31	115.4	0.232	69.2	9.2	6.73	3.902	17.464	16.016	29.9	13.8	20.7	4.7	4.43	0.57	21.8	8.0	12.7
32	116.0	0.239	69.2	9.1	6.74	4.028	17.548	16.074	29.9	13.8	20.8	4.7	4.41	0.57	21.9	8.0	12.8
33	117.0	0.247	69.1	9.1	6.74	4.153	17.703	16.201	30.0	13.8	21.0	4.8	4.39	0.56	21.9	8.1	12.9
34	118.0	0.255	69.1	9.0	6.75	4.288	17.859	16.326	30.2	13.8	21.1	4.8	4.39	0.55	22.0	8.2	13.0
35	118.7	0.262	69.0	9.0	6.76	4.413	17.966	16.406	30.2	13.8	21.3	4.9	4.38	0.55	22.0	8.2	13.1
36	118.8	0.270	69.0	8.9	6.77	4.548	17.990	16.405	30.2	13.8	21.3	4.9	4.34	0.54	22.0	8.2	13.1
37	118.6	0.277	68.9	8.9	6.78	4.673	17.954	16.348	30.2	13.8	21.3	5.0	4.28	0.54	22.0	8.2	13.2
38	119.0	0.285	68.9	8.8	6.79	4.799	18.014	16.383	30.2	13.8	21.4	5.0	4.26	0.54	22.0	8.2	13.2
39	119.7	0.293	68.8	8.8	6.80	4.934	18.121	16.461	30.3	13.8	21.5	5.1	4.25	0.53	22.1	8.2	13.3
40	119.8	0.300	68.8	8.7	6.81	5.059	18.145	16.461	30.3	13.8	21.6	5.1	4.20	0.53	22.1	8.2	13.4
41	120.1	0.308	68.7	8.7	6.82	5.184	18.181	16.472	30.3	13.8	21.7	5.2	4.18	0.53	22.1	8.2	13.4
42	120.3	0.316	68.7	8.6	6.83	5.319	18.217	16.481	30.3	13.8	21.7	5.2	4.15	0.52	22.1	8.2	13.5
43	120.8	0.323	68.6	8.5	6.84	5.444	18.301	16.537	30.4	13.8	21.8	5.3	4.12	0.52	22.1	8.3	13.6
44	121.9	0.330	68.5	8.5	6.85	5.569	18.468	16.672	30.5	13.8	22.0	5.4	4.11	0.51	22.2	8.3	13.7
45	122.9	0.338	68.5	8.4	6.85	5.695	18.611	16.784	30.6	13.8	22.2	5.4	4.10	0.50	22.2	8.4	13.8
46	123.0	0.346	68.4	8.4	6.86	5.830	18.635	16.782	30.6	13.8	22.3	5.5	4.06	0.50	22.2	8.4	13.9
47	122.9	0.353	68.3	8.3	6.87	5.945	18.623	16.749	30.6	13.8	22.3	5.5	4.02	0.50	22.2	8.4	13.9
48	123.4	0.361	68.3	8.3	6.88	6.080	18.695	16.791	30.6	13.8	22.4	5.6	4.01	0.49	22.2	8.4	14.0
49	123.9	0.368	68.2	8.2	6.89	6.205	18.778	16.846	30.7	13.8	22.5	5.7	3.97	0.49	22.3	8.4	14.1
50	124.6	0.375	68.2	8.1	6.90	6.331	18.874	16.912	30.7	13.8	22.6	5.7	3.97	0.48	22.3	8.5	14.2
51	124.7	0.383	68.1	8.1	6.91	6.466	18.898	16.909	30.7	13.8	22.7	5.8	3.92	0.48	22.3	8.5	14.2
52	125.1	0.391	68.0	8.0	6.92	6.591	18.958	16.941	30.8	13.8	22.8	5.8	3.90	0.47	22.3	8.5	14.3
53	125.6	0.398	68.0	7.9	6.93	6.716	19.041	16.996	30.8	13.8	22.9	5.9	3.88	0.47	22.3	8.5	14.4
54	126.3	0.406	67.9	7.9	6.94	6.841	19.149	17.072	30.9	13.8	23.0	5.9	3.87	0.46	22.4	8.5	14.5
55	126.5	0.414	67.9	7.8	6.95	6.976	19.173	17.068	30.9	13.8	23.1	6.0	3.83	0.46	22.4	8.5	14.6
56	126.9	0.421	67.8	7.7	6.96	7.102	19.232	17.100	30.9	13.8	23.2	6.1	3.81	0.45	22.4	8.5	14.6
57	127.2	0.428	67.7	7.7	6.97	7.227	19.280	17.120	31.0	13.8	23.3	6.1	3.78	0.45	22.4	8.6	14.7
58	127.6	0.436	67.7	7.6	6.98	7.352	19.352	17.162	31.0	13.8	23.4	6.2	3.76	0.44	22.4	8.6	14.8
59	127.9	0.443	67.6	7.6	6.99	7.477	19.388	17.171	31.0	13.8	23.4	6.3	3.74	0.44	22.4	8.6	14.9

Specimen B

Reading No.	Deviator Load (lbs)	Axial Deformation (in)	Pore Pressure (psi)	Change in Pore Pressure (psi)	Corrected Area (in2)	Axial Strain (%)	Deviator Stress (psi)	Corrected Deviator Stress (psi)	σ_1 (psi)	σ_3 (psi)	σ'_1 (psi)	σ'_3 (psi)	σ'_1/σ'_3	Abar	P (psi)	Q (psi)	P' (psi)
60	128.5	0.451	67.6	7.5	7.00	7.612	19.483	17.233	31.1	13.8	23.6	6.3	3.72	0.44	22.5	8.6	14.9
61	128.8	0.459	67.5	7.4	7.01	7.738	19.531	17.253	31.1	13.8	23.6	6.4	3.70	0.43	22.5	8.6	15.0
62	129.2	0.466	67.4	7.4	7.02	7.863	19.591	17.284	31.1	13.8	23.7	6.5	3.68	0.43	22.5	8.6	15.1
63	129.6	0.473	67.4	7.3	7.03	7.988	19.662	17.325	31.2	13.8	23.8	6.5	3.67	0.42	22.5	8.7	15.2
64	130.6	0.481	67.3	7.3	7.03	8.113	19.806	17.432	31.3	13.8	24.0	6.6	3.65	0.42	22.6	8.7	15.3
65	131.0	0.488	67.3	7.2	7.04	8.239	19.865	17.462	31.3	13.8	24.1	6.6	3.63	0.41	22.6	8.7	15.4
66	131.6	0.496	67.2	7.1	7.05	8.373	19.961	17.523	31.4	13.8	24.2	6.7	3.62	0.41	22.6	8.8	15.5
67	132.4	0.503	67.1	7.1	7.06	8.489	20.092	17.620	31.5	13.8	24.4	6.8	3.61	0.40	22.6	8.8	15.6
68	132.4	0.511	67.1	7.0	7.07	8.624	20.081	17.582	31.4	13.8	24.4	6.8	3.57	0.40	22.6	8.8	15.6
69	132.4	0.518	67.0	7.0	7.08	8.749	20.092	17.568	31.4	13.8	24.4	6.9	3.56	0.40	22.6	8.8	15.7
70	132.4	0.525	67.0	6.9	7.09	8.865	20.081	17.534	31.4	13.8	24.5	6.9	3.53	0.39	22.6	8.8	15.7
71	132.1	0.533	66.9	6.9	7.10	9.000	20.045	17.474	31.3	13.8	24.4	7.0	3.51	0.39	22.6	8.7	15.7
72	132.8	0.541	66.9	6.8	7.11	9.135	20.152	17.544	31.4	13.8	24.6	7.0	3.49	0.39	22.6	8.8	15.8
73	133.1	0.549	66.8	6.7	7.12	9.260	20.200	17.563	31.4	13.8	24.7	7.1	3.47	0.38	22.6	8.8	15.9
74	133.4	0.556	66.7	6.7	7.13	9.385	20.248	17.581	31.4	13.8	24.8	7.2	3.45	0.38	22.6	8.8	16.0
75	133.1	0.564	66.7	6.6	7.14	9.520	20.200	17.510	31.3	13.8	24.7	7.2	3.43	0.38	22.6	8.8	16.0
76	133.8	0.571	66.6	6.6	7.15	9.645	20.307	17.582	31.4	13.8	24.9	7.3	3.42	0.37	22.6	8.8	16.1
77	134.5	0.579	66.6	6.5	7.16	9.771	20.415	17.653	31.5	13.8	25.0	7.3	3.41	0.37	22.7	8.8	16.2
78	134.7	0.587	66.5	6.4	7.17	9.906	20.451	17.658	31.5	13.8	25.1	7.4	3.39	0.36	22.7	8.8	16.2
79	135.4	0.594	66.4	6.4	7.18	10.031	20.546	17.719	31.6	13.8	25.2	7.5	3.38	0.36	22.7	8.9	16.3
80	135.4	0.602	66.4	6.3	7.19	10.156	20.558	17.704	31.5	13.8	25.2	7.5	3.35	0.36	22.7	8.9	16.4
81	135.3	0.609	66.3	6.3	7.20	10.281	20.534	17.656	31.5	13.8	25.2	7.6	3.33	0.35	22.7	8.8	16.4
82	135.5	0.616	66.2	6.2	7.21	10.407	20.570	17.663	31.5	13.8	25.3	7.6	3.31	0.35	22.7	8.8	16.5
83	136.1	0.624	66.2	6.1	7.23	10.532	20.654	17.712	31.5	13.8	25.4	7.7	3.30	0.35	22.7	8.9	16.6
84	136.1	0.631	66.1	6.1	7.24	10.657	20.654	17.686	31.5	13.8	25.5	7.8	3.27	0.34	22.7	8.8	16.6
85	136.4	0.639	66.1	6.0	7.25	10.782	20.714	17.713	31.5	13.8	25.5	7.8	3.27	0.34	22.7	8.9	16.7
86	136.8	0.646	66.0	6.0	7.26	10.908	20.773	17.741	31.6	13.8	25.6	7.8	3.26	0.34	22.7	8.9	16.7
87	137.0	0.653	66.0	5.9	7.27	11.033	20.797	17.736	31.6	13.8	25.7	7.9	3.24	0.33	22.7	8.9	16.8
88	137.4	0.661	65.9	5.9	7.28	11.158	20.857	17.763	31.6	13.8	25.7	8.0	3.22	0.33	22.7	8.9	16.9
89	137.4	0.668	65.9	5.8	7.29	11.283	20.869	17.747	31.6	13.8	25.8	8.0	3.21	0.33	22.7	8.9	16.9
90	137.7	0.676	65.8	5.8	7.30	11.418	20.905	17.751	31.6	13.8	25.8	8.1	3.20	0.32	22.7	8.9	17.0
91	138.1	0.684	65.7	5.7	7.31	11.544	20.976	17.788	31.6	13.8	25.9	8.1	3.18	0.32	22.7	8.9	17.0
92	138.2	0.691	65.7	5.6	7.32	11.669	20.988	17.772	31.6	13.8	26.0	8.2	3.17	0.32	22.7	8.9	17.1
93	138.8	0.698	65.6	5.6	7.33	11.794	21.072	17.820	31.7	13.8	26.1	8.3	3.16	0.31	22.7	8.9	17.2
94	139.0	0.706	65.6	5.5	7.34	11.929	21.108	17.823	31.7	13.8	26.2	8.3	3.14	0.31	22.7	8.9	17.2
95	138.8	0.714	65.5	5.4	7.35	12.054	21.084	17.776	31.6	13.8	26.2	8.4	3.12	0.31	22.7	8.9	17.3
96	139.3	0.722	65.4	5.4	7.36	12.189	21.156	17.810	31.6	13.8	26.3	8.5	3.10	0.30	22.7	8.9	17.4
97	140.5	0.729	65.4	5.3	7.37	12.315	21.335	17.941	31.8	13.8	26.5	8.5	3.10	0.30	22.8	9.0	17.5
98	140.6	0.737	65.3	5.3	7.38	12.440	21.359	17.935	31.8	13.8	26.5	8.6	3.09	0.29	22.8	9.0	17.5
99	140.8	0.744	65.3	5.2	7.39	12.565	21.383	17.929	31.8	13.8	26.6	8.6	3.08	0.29	22.8	9.0	17.6
100	141.4	0.752	65.2	5.1	7.40	12.700	21.478	17.984	31.8	13.8	26.7	8.7	3.07	0.29	22.8	9.0	17.7

Specimen B

Reading No.	Deviator Load (lbs)	Axial Deformation (in)	Pore Pressure (psi)	Change in Pore Pressure (psi)	Corrected Area (in2)	Axial Strain (%)	Deviator Stress (psi)	Corrected Deviator Stress (psi)	σ_1 (psi)	σ_3 (psi)	σ'_1 (psi)	σ'_3 (psi)	σ'_1/σ'_3	Abar	P (psi)	Q (psi)	P' (psi)
101	141.9	0.759	65.1	5.1	7.42	12.825	21.562	18.030	31.9	13.8	26.8	8.8	3.06	0.28	22.9	9.0	17.8
102	142.0	0.767	65.1	5.0	7.43	12.950	21.574	18.013	31.8	13.8	26.8	8.8	3.05	0.28	22.8	9.0	17.8
103	142.2	0.774	65.0	5.0	7.44	13.076	21.598	18.007	31.8	13.8	26.9	8.9	3.03	0.28	22.8	9.0	17.9
104	142.2	0.782	65.0	4.9	7.45	13.211	21.598	17.978	31.8	13.8	26.9	8.9	3.02	0.27	22.8	9.0	17.9
105	142.3	0.790	64.9	4.9	7.46	13.336	21.622	17.971	31.8	13.8	26.9	9.0	3.00	0.27	22.8	9.0	18.0
106	142.6	0.796	64.9	4.8	7.47	13.452	21.669	17.988	31.8	13.8	27.0	9.0	3.00	0.27	22.8	9.0	18.0
107	143.0	0.804	64.8	4.8	7.48	13.577	21.729	18.012	31.8	13.8	27.1	9.1	2.99	0.26	22.8	9.0	18.1
108	142.9	0.811	64.8	4.7	7.49	13.702	21.705	17.964	31.8	13.8	27.1	9.1	2.97	0.26	22.8	9.0	18.1
109	143.2	0.819	64.7	4.7	7.50	13.827	21.765	17.988	31.8	13.8	27.2	9.2	2.96	0.26	22.8	9.0	18.2
110	143.6	0.826	64.7	4.6	7.51	13.953	21.825	18.013	31.8	13.8	27.2	9.2	2.95	0.26	22.8	9.0	18.2
111	143.9	0.833	64.6	4.6	7.52	14.078	21.860	18.016	31.9	13.8	27.3	9.3	2.95	0.25	22.8	9.0	18.3
112	144.1	0.841	64.6	4.5	7.53	14.203	21.896	18.019	31.9	13.8	27.3	9.3	2.93	0.25	22.8	9.0	18.3
113	144.2	0.848	64.5	4.5	7.54	14.319	21.920	18.015	31.9	13.8	27.4	9.4	2.93	0.25	22.8	9.0	18.4
114	144.3	0.855	64.5	4.4	7.56	14.444	21.932	17.997	31.8	13.8	27.4	9.4	2.92	0.25	22.8	9.0	18.4
115	144.2	0.862	64.4	4.4	7.57	14.569	21.920	17.960	31.8	13.8	27.4	9.5	2.90	0.24	22.8	9.0	18.4
116	144.2	0.870	64.4	4.3	7.58	14.695	21.920	17.932	31.8	13.8	27.4	9.5	2.89	0.24	22.8	9.0	18.5
117	144.5	0.878	64.3	4.3	7.59	14.829	21.956	17.933	31.8	13.8	27.5	9.6	2.88	0.24	22.8	9.0	18.5
118	144.9	0.885	64.3	4.2	7.60	14.955	22.016	17.956	31.8	13.8	27.6	9.6	2.87	0.24	22.8	9.0	18.6
119	144.8	0.889	64.3	4.2	7.61	15.013	22.004	17.934	31.8	13.8	27.6	9.6	2.86	0.24	22.8	9.0	18.6

Specimen C Shear Data

CU Triaxial Test

Contour Engineering

File Location
Plant McIntosh M-6 UD-3 (10-15-10).HSD

Project Information

Project No. AT10SOC03-M
Project Name: Plant McIntosh
Client: Southern Company
Sample Location: M-6, UD-3 38.5-40.5'
Sample Description: Tan gray CLAY (CL)
Remarks:

Sample Data

Sample Type: Undisturbed
Specific Gravity: 2.7
LL: 42.000
PL: 18.000

Sample Parameters	Initial	After Consolidation	Final
Diameter (in)	2.889	2.886	
Height (in)	5.397	5.346	
Weight (grams)	1151.46		1177.28
Moisture (%)	25.84		28.45
Dry Density (pcf)	98.52	99.84	
Saturation (%)	98.13	100.00	
Void Ratio	0.708	0.688	

Test Data

Rate of Strain: 0.015
Cell Pressure (psi): 87.280
Effective Confining Stress (psi): 27.2
Corrected Peak Deviator Stress (psi): 26.638 at reading number: 106

Specimen C

Reading No.	Deviator Load (lbs)	Axial Deformation (in)	Pore Pressure (psi)	Change in Pore Pressure (psi)	Corrected Area (in2)	Axial Strain (%)	Deviator Stress (psi)	Corrected Deviator Stress (psi)	σ_1 (psi)	σ_3 (psi)	σ'_1 (psi)	σ'_3 (psi)	σ'_1/σ'_3	Abar	P (psi)	Q (psi)	P' (psi)
0	2.3	0.000	60.1	0.0	6.54	0.000	0.000	0.000	27.2	27.2	27.2	27.2	1.00	0.00	27.2	0.0	27.2
1	59.0	0.007	63.7	3.6	6.55	0.128	8.664	8.604	35.8	27.2	32.2	23.6	1.37	0.42	31.5	4.3	27.9
2	80.6	0.014	66.1	6.0	6.56	0.266	11.969	11.835	39.0	27.2	33.0	21.2	1.56	0.51	33.1	5.9	27.1
3	94.5	0.022	67.9	7.8	6.57	0.405	14.093	13.882	41.1	27.2	33.2	19.4	1.72	0.56	34.1	6.9	26.3
4	105.9	0.029	69.4	9.3	6.58	0.543	15.840	15.547	42.7	27.2	33.4	17.9	1.87	0.60	35.0	7.8	25.6
5	115.0	0.036	70.7	10.6	6.59	0.682	17.221	16.844	44.0	27.2	33.4	16.6	2.02	0.63	35.6	8.4	25.0
6	123.2	0.044	71.8	11.7	6.60	0.821	18.484	18.020	45.2	27.2	33.5	15.5	2.16	0.65	36.2	9.0	24.5
7	130.1	0.051	72.7	12.6	6.61	0.959	19.535	18.982	46.2	27.2	33.5	14.6	2.30	0.67	36.7	9.5	24.0
8	136.0	0.059	73.5	13.4	6.61	1.098	20.432	19.789	47.0	27.2	33.6	13.8	2.44	0.68	37.1	9.9	23.7
9	141.2	0.067	74.2	14.1	6.62	1.247	21.235	20.495	47.7	27.2	33.5	13.0	2.57	0.69	37.4	10.2	23.3
10	145.7	0.074	74.9	14.8	6.63	1.385	21.919	21.088	48.3	27.2	33.5	12.4	2.70	0.70	37.7	10.5	23.0
11	149.9	0.082	75.4	15.3	6.64	1.534	22.557	21.626	48.8	27.2	33.5	11.9	2.82	0.71	38.0	10.8	22.7
12	153.3	0.089	75.8	15.7	6.65	1.673	23.076	22.052	49.2	27.2	33.5	11.4	2.93	0.71	38.2	11.0	22.5
13	157.6	0.096	76.2	16.1	6.66	1.801	23.737	22.623	49.8	27.2	33.7	11.1	3.04	0.71	38.5	11.3	22.4
14	160.8	0.104	76.6	16.5	6.67	1.950	24.233	23.017	50.2	27.2	33.7	10.7	3.15	0.72	38.7	11.5	22.2
15	163.2	0.112	76.8	16.7	6.68	2.089	24.599	23.323	50.5	27.2	33.8	10.5	3.23	0.72	38.8	11.7	22.1
16	165.6	0.119	77.0	17.0	6.69	2.227	24.965	23.646	50.8	27.2	33.9	10.2	3.31	0.72	39.0	11.8	22.1
17	166.7	0.126	77.2	17.1	6.70	2.366	25.130	23.773	51.0	27.2	33.8	10.1	3.36	0.72	39.1	11.9	21.9
18	168.5	0.134	77.4	17.3	6.71	2.504	25.401	24.003	51.2	27.2	33.9	9.9	3.43	0.72	39.2	12.0	21.9

Specimen C

Reading No.	Deviator Load (lbs)	Axial Deformation (in)	Pore Pressure (psi)	Change in Pore Pressure (psi)	Corrected Area (in2)	Axial Strain (%)	Deviator Stress (psi)	Corrected Deviator Stress (psi)	σ_1 (psi)	σ_3 (psi)	σ'_1 (psi)	σ'_3 (psi)	σ'_1/σ'_3	Abar	P (psi)	Q (psi)	P' (psi)
19	170.2	0.142	77.5	17.4	6.72	2.653	25.661	24.218	51.4	27.2	34.0	9.8	3.48	0.72	39.3	12.1	21.9
20	171.7	0.149	77.6	17.5	6.73	2.792	25.897	24.412	51.6	27.2	34.1	9.7	3.52	0.72	39.4	12.2	21.9
21	173.5	0.157	77.7	17.6	6.74	2.930	26.169	24.639	51.8	27.2	34.2	9.6	3.57	0.71	39.5	12.3	21.9
22	175.1	0.164	77.8	17.7	6.75	3.069	26.405	24.832	52.0	27.2	34.4	9.5	3.61	0.71	39.6	12.4	21.9
23	176.1	0.172	77.8	17.7	6.76	3.218	26.570	24.952	52.1	27.2	34.4	9.5	3.63	0.71	39.7	12.5	22.0
24	176.6	0.179	77.8	17.7	6.77	3.357	26.641	24.984	52.2	27.2	34.4	9.4	3.64	0.71	39.7	12.5	21.9
25	177.4	0.187	77.8	17.7	6.78	3.495	26.770	25.073	52.3	27.2	34.5	9.4	3.65	0.71	39.7	12.5	22.0
26	178.4	0.194	77.8	17.7	6.79	3.634	26.912	25.172	52.4	27.2	34.6	9.4	3.66	0.70	39.8	12.6	22.0
27	179.1	0.202	77.8	17.7	6.80	3.772	27.030	25.248	52.4	27.2	34.7	9.5	3.67	0.70	39.8	12.6	22.1
28	180.0	0.209	77.8	17.7	6.81	3.911	27.160	25.336	52.5	27.2	34.8	9.5	3.68	0.70	39.9	12.7	22.1
29	181.0	0.216	77.8	17.7	6.82	4.049	27.313	25.445	52.6	27.2	35.0	9.5	3.68	0.69	39.9	12.7	22.2
30	182.0	0.224	77.7	17.6	6.83	4.188	27.467	25.554	52.7	27.2	35.1	9.5	3.68	0.69	40.0	12.8	22.3
31	182.5	0.231	77.7	17.6	6.84	4.326	27.538	25.584	52.8	27.2	35.2	9.6	3.66	0.69	40.0	12.8	22.4
32	182.9	0.239	77.6	17.5	6.85	4.465	27.609	25.614	52.8	27.2	35.3	9.7	3.65	0.68	40.0	12.8	22.5
33	183.5	0.246	77.5	17.5	6.86	4.603	27.691	25.654	52.8	27.2	35.4	9.7	3.64	0.68	40.0	12.8	22.6
34	183.8	0.254	77.5	17.4	6.87	4.753	27.738	25.658	52.8	27.2	35.4	9.8	3.62	0.68	40.0	12.8	22.6
35	184.5	0.261	77.4	17.3	6.88	4.891	27.856	25.732	52.9	27.2	35.6	9.9	3.61	0.67	40.1	12.9	22.7
36	185.2	0.269	77.3	17.3	6.89	5.030	27.951	25.783	53.0	27.2	35.7	9.9	3.60	0.67	40.1	12.9	22.8
37	185.9	0.276	77.3	17.2	6.90	5.168	28.069	25.856	53.0	27.2	35.8	10.0	3.59	0.67	40.1	12.9	22.9
38	186.2	0.284	77.2	17.1	6.91	5.317	28.116	25.859	53.0	27.2	35.9	10.1	3.57	0.66	40.1	12.9	23.0
39	186.8	0.292	77.2	17.1	6.92	5.456	28.199	25.898	53.1	27.2	36.0	10.1	3.57	0.66	40.1	12.9	23.0
40	187.2	0.299	77.1	17.0	6.93	5.594	28.258	25.915	53.1	27.2	36.1	10.2	3.55	0.66	40.1	13.0	23.1
41	187.4	0.307	77.1	17.0	6.94	5.744	28.293	25.906	53.1	27.2	36.1	10.2	3.54	0.66	40.1	13.0	23.2
42	188.0	0.314	77.0	16.9	6.95	5.882	28.388	25.956	53.1	27.2	36.2	10.3	3.53	0.65	40.2	13.0	23.3
43	187.8	0.322	77.0	16.9	6.96	6.031	28.352	25.880	53.1	27.2	36.2	10.3	3.51	0.65	40.1	12.9	23.3
44	188.0	0.330	76.9	16.8	6.97	6.170	28.388	25.874	53.1	27.2	36.3	10.4	3.49	0.65	40.1	12.9	23.3
45	187.9	0.337	76.8	16.7	6.98	6.308	28.376	25.823	53.0	27.2	36.3	10.5	3.47	0.65	40.1	12.9	23.4
46	188.8	0.345	76.8	16.7	6.99	6.458	28.506	25.903	53.1	27.2	36.4	10.5	3.46	0.64	40.1	13.0	23.5
47	189.3	0.353	76.7	16.6	7.00	6.596	28.576	25.929	53.1	27.2	36.5	10.6	3.45	0.64	40.2	13.0	23.6
48	189.2	0.361	76.6	16.5	7.02	6.745	28.565	25.876	53.1	27.2	36.5	10.7	3.43	0.64	40.1	12.9	23.6
49	190.0	0.368	76.5	16.4	7.03	6.884	28.683	25.946	53.1	27.2	36.7	10.7	3.42	0.63	40.2	13.0	23.7
50	190.1	0.375	76.5	16.4	7.04	7.022	28.706	25.928	53.1	27.2	36.7	10.8	3.40	0.63	40.1	13.0	23.8
51	190.0	0.383	76.4	16.3	7.05	7.161	28.683	25.866	53.1	27.2	36.7	10.9	3.38	0.63	40.1	12.9	23.8
52	190.9	0.390	76.3	16.2	7.06	7.299	28.824	25.958	53.1	27.2	36.9	10.9	3.37	0.63	40.2	13.0	23.9
53	191.8	0.398	76.3	16.2	7.07	7.438	28.966	26.049	53.2	27.2	37.1	11.0	3.36	0.62	40.2	13.0	24.0
54	192.0	0.405	76.2	16.1	7.08	7.576	29.001	26.042	53.2	27.2	37.1	11.1	3.35	0.62	40.2	13.0	24.1
55	193.0	0.412	76.1	16.0	7.09	7.715	29.155	26.143	53.3	27.2	37.3	11.2	3.34	0.61	40.3	13.1	24.3
56	193.8	0.420	76.0	15.9	7.10	7.864	29.273	26.209	53.4	27.2	37.5	11.2	3.33	0.61	40.3	13.1	24.3
57	193.8	0.428	75.9	15.8	7.11	8.003	29.273	26.168	53.4	27.2	37.5	11.3	3.31	0.61	40.3	13.1	24.4
58	194.0	0.435	75.9	15.8	7.12	8.131	29.296	26.152	53.3	27.2	37.6	11.4	3.29	0.60	40.3	13.1	24.5
59	194.0	0.443	75.8	15.7	7.13	8.280	29.308	26.119	53.3	27.2	37.6	11.5	3.27	0.60	40.2	13.1	24.5

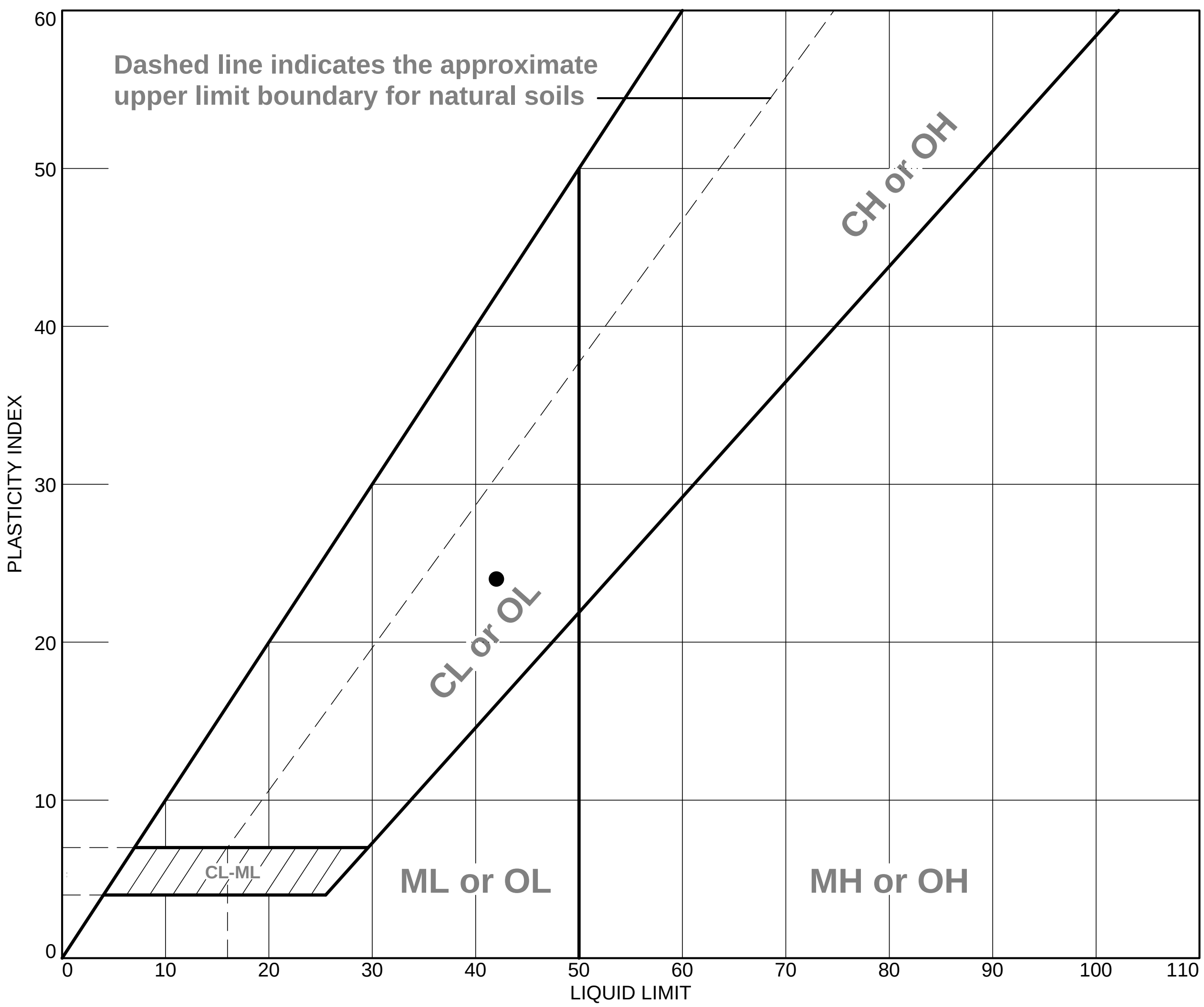
Specimen C

Reading No.	Deviator Load (lbs)	Axial Deformation (in)	Pore Pressure (psi)	Change in Pore Pressure (psi)	Corrected Area (in2)	Axial Strain (%)	Deviator Stress (psi)	Corrected Deviator Stress (psi)	σ_1 (psi)	σ_3 (psi)	σ'_1 (psi)	σ'_3 (psi)	σ'_1/σ'_3	Abar	P (psi)	Q (psi)	P' (psi)
60	194.5	0.450	75.7	15.6	7.14	8.418	29.379	26.144	53.3	27.2	37.7	11.6	3.26	0.60	40.3	13.1	24.6
61	195.1	0.457	75.6	15.5	7.15	8.557	29.462	26.178	53.4	27.2	37.8	11.6	3.25	0.59	40.3	13.1	24.7
62	195.4	0.465	75.6	15.5	7.16	8.695	29.509	26.181	53.4	27.2	37.9	11.7	3.23	0.59	40.3	13.1	24.8
63	195.7	0.472	75.5	15.4	7.18	8.834	29.556	26.183	53.4	27.2	38.0	11.8	3.22	0.59	40.3	13.1	24.9
64	196.0	0.480	75.4	15.3	7.19	8.983	29.603	26.182	53.4	27.2	38.1	11.9	3.20	0.58	40.3	13.1	25.0
65	196.3	0.488	75.3	15.2	7.20	9.122	29.651	26.184	53.4	27.2	38.2	12.0	3.19	0.58	40.3	13.1	25.1
66	196.2	0.495	75.2	15.1	7.21	9.260	29.639	26.132	53.3	27.2	38.2	12.1	3.16	0.58	40.3	13.1	25.1
67	196.0	0.502	75.1	15.1	7.22	9.399	29.603	26.059	53.2	27.2	38.2	12.1	3.15	0.58	40.2	13.0	25.2
68	196.1	0.510	75.1	15.0	7.23	9.548	29.627	26.036	53.2	27.2	38.2	12.2	3.13	0.58	40.2	13.0	25.2
69	196.8	0.518	75.0	14.9	7.24	9.686	29.733	26.091	53.3	27.2	38.4	12.3	3.12	0.57	40.2	13.0	25.4
70	196.6	0.526	74.9	14.8	7.26	9.835	29.698	26.015	53.2	27.2	38.4	12.4	3.10	0.57	40.2	13.0	25.4
71	197.1	0.533	74.8	14.7	7.27	9.974	29.780	26.048	53.2	27.2	38.5	12.5	3.09	0.57	40.2	13.0	25.5
72	197.3	0.541	74.7	14.6	7.28	10.113	29.804	26.028	53.2	27.2	38.6	12.6	3.07	0.56	40.2	13.0	25.6
73	197.6	0.549	74.7	14.6	7.29	10.262	29.851	26.026	53.2	27.2	38.6	12.6	3.06	0.56	40.2	13.0	25.6
74	197.7	0.556	74.6	14.5	7.30	10.400	29.863	25.995	53.2	27.2	38.7	12.7	3.04	0.56	40.2	13.0	25.7
75	198.1	0.563	74.5	14.4	7.31	10.539	29.922	26.006	53.2	27.2	38.8	12.8	3.04	0.55	40.2	13.0	25.8
76	198.4	0.571	74.4	14.3	7.32	10.677	29.981	26.018	53.2	27.2	38.9	12.9	3.02	0.55	40.2	13.0	25.9
77	198.7	0.578	74.3	14.2	7.34	10.816	30.016	26.008	53.2	27.2	38.9	12.9	3.01	0.55	40.2	13.0	25.9
78	198.5	0.586	74.3	14.2	7.35	10.965	29.993	25.942	53.1	27.2	38.9	13.0	3.00	0.55	40.2	13.0	26.0
79	199.7	0.593	74.2	14.1	7.36	11.093	30.170	26.061	53.2	27.2	39.1	13.1	2.99	0.54	40.2	13.0	26.1
80	200.4	0.601	74.1	14.0	7.37	11.242	30.276	26.110	53.3	27.2	39.3	13.2	2.98	0.54	40.2	13.1	26.2
81	200.7	0.608	74.0	13.9	7.38	11.381	30.323	26.110	53.3	27.2	39.4	13.2	2.97	0.53	40.2	13.1	26.3
82	200.8	0.616	74.0	13.9	7.39	11.519	30.335	26.079	53.3	27.2	39.4	13.3	2.96	0.53	40.2	13.0	26.4
83	200.7	0.623	73.9	13.8	7.41	11.658	30.323	26.026	53.2	27.2	39.4	13.4	2.94	0.53	40.2	13.0	26.4
84	201.0	0.631	73.8	13.7	7.42	11.807	30.371	26.022	53.2	27.2	39.5	13.5	2.93	0.53	40.2	13.0	26.5
85	201.2	0.639	73.7	13.6	7.43	11.945	30.406	26.012	53.2	27.2	39.6	13.5	2.92	0.52	40.2	13.0	26.6
86	201.8	0.646	73.7	13.6	7.44	12.084	30.489	26.042	53.2	27.2	39.7	13.6	2.91	0.52	40.2	13.0	26.6
87	202.3	0.653	73.6	13.5	7.45	12.222	30.571	26.072	53.3	27.2	39.8	13.7	2.90	0.52	40.2	13.0	26.7
88	203.2	0.661	73.5	13.4	7.46	12.361	30.713	26.154	53.3	27.2	39.9	13.8	2.90	0.51	40.3	13.1	26.9
89	204.1	0.668	73.4	13.3	7.48	12.499	30.843	26.225	53.4	27.2	40.1	13.9	2.89	0.51	40.3	13.1	27.0
90	204.5	0.677	73.3	13.2	7.49	12.659	30.914	26.238	53.4	27.2	40.2	13.9	2.88	0.50	40.3	13.1	27.1
91	204.7	0.684	73.3	13.2	7.50	12.787	30.937	26.219	53.4	27.2	40.2	14.0	2.87	0.50	40.3	13.1	27.1
92	204.9	0.691	73.2	13.1	7.51	12.926	30.973	26.207	53.4	27.2	40.3	14.1	2.86	0.50	40.3	13.1	27.2
93	205.4	0.698	73.1	13.0	7.52	13.064	31.043	26.226	53.4	27.2	40.4	14.2	2.85	0.50	40.3	13.1	27.3
94	205.7	0.706	73.0	13.0	7.54	13.213	31.091	26.220	53.4	27.2	40.5	14.2	2.84	0.49	40.3	13.1	27.3
95	206.2	0.714	73.0	12.9	7.55	13.352	31.161	26.238	53.4	27.2	40.5	14.3	2.83	0.49	40.3	13.1	27.4
96	206.9	0.721	72.9	12.8	7.56	13.491	31.279	26.297	53.5	27.2	40.7	14.4	2.83	0.49	40.3	13.1	27.5
97	207.4	0.729	72.8	12.7	7.57	13.629	31.350	26.315	53.5	27.2	40.8	14.5	2.82	0.48	40.3	13.2	27.6
98	207.9	0.736	72.7	12.7	7.59	13.768	31.433	26.343	53.5	27.2	40.9	14.5	2.81	0.48	40.4	13.2	27.7
99	208.3	0.743	72.7	12.6	7.60	13.906	31.492	26.350	53.5	27.2	40.9	14.6	2.81	0.48	40.4	13.2	27.8
100	208.3	0.751	72.6	12.5	7.61	14.045	31.492	26.307	53.5	27.2	41.0	14.7	2.79	0.48	40.3	13.2	27.8

Specimen C

Reading No.	Deviator Load (lbs)	Axial Deformation (in)	Pore Pressure (psi)	Change in Pore Pressure (psi)	Corrected Area (in2)	Axial Strain (%)	Deviator Stress (psi)	Corrected Deviator Stress (psi)	σ_1 (psi)	σ_3 (psi)	σ'_1 (psi)	σ'_3 (psi)	σ'_1/σ'_3	Abar	P (psi)	Q (psi)	P' (psi)
101	208.9	0.758	72.5	12.4	7.62	14.183	31.575	26.334	53.5	27.2	41.1	14.8	2.78	0.47	40.4	13.2	27.9
102	210.0	0.766	72.4	12.3	7.64	14.322	31.740	26.432	53.6	27.2	41.3	14.8	2.78	0.47	40.4	13.2	28.1
103	210.6	0.773	72.4	12.3	7.65	14.460	31.834	26.469	53.7	27.2	41.4	14.9	2.77	0.46	40.4	13.2	28.2
104	211.3	0.780	72.3	12.2	7.66	14.599	31.940	26.515	53.7	27.2	41.5	15.0	2.77	0.46	40.4	13.3	28.3
105	212.1	0.788	72.2	12.1	7.67	14.737	32.070	26.582	53.8	27.2	41.7	15.1	2.76	0.45	40.5	13.3	28.4
106	212.9	0.795	72.1	12.0	7.69	14.876	32.188	26.638	53.8	27.2	41.8	15.2	2.75	0.45	40.5	13.3	28.5
107	213.0	0.802	72.0	11.9	7.70	15.004	32.212	26.617	53.8	27.2	41.9	15.3	2.74	0.45	40.5	13.3	28.6

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Gray red and tan sandy CLAY (CL)	42	18	24	99.0	59.0	CL

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

Project: Plant McIntosh

● **Location:** M-6 **Depth:** 38.5-40.5' **Sample Number:** UD-3

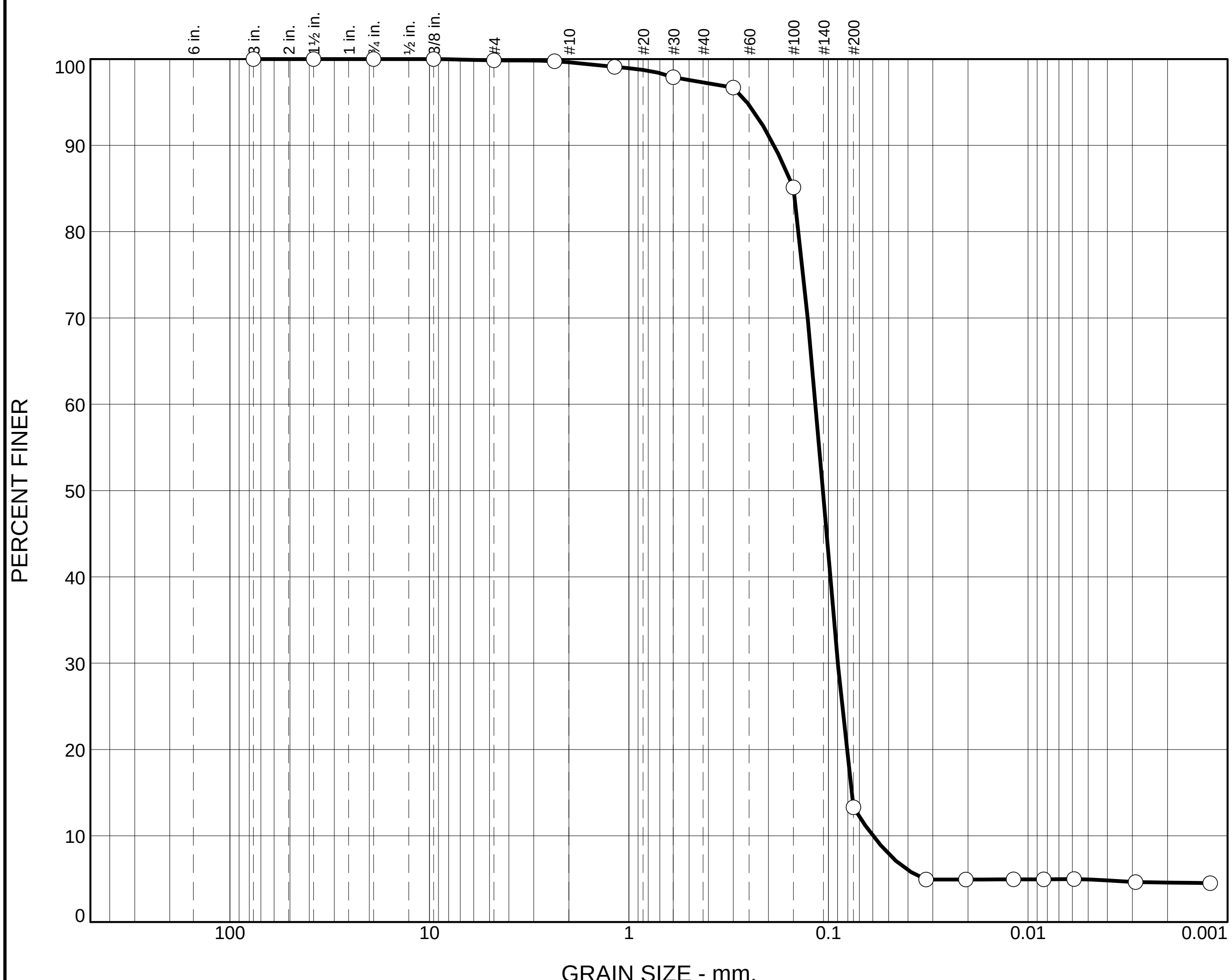
Remarks:

Contour Engineering, LLC

Kennesaw, GA

Figure

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.2	0.2	2.3	84.0	8.4	4.9

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	NV	NP	0.1498	0.1162	0.1067	0.0897	0.0767	0.0599	1.16	1.94

Material Description	USCS	AASHTO
○ Tan SAND (SM)	SM	A-2-4(0)

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

Project: Plant McIntosh

○ **Location:** M-7 **Depth:** 16-18' **Sample Number:** UD-2

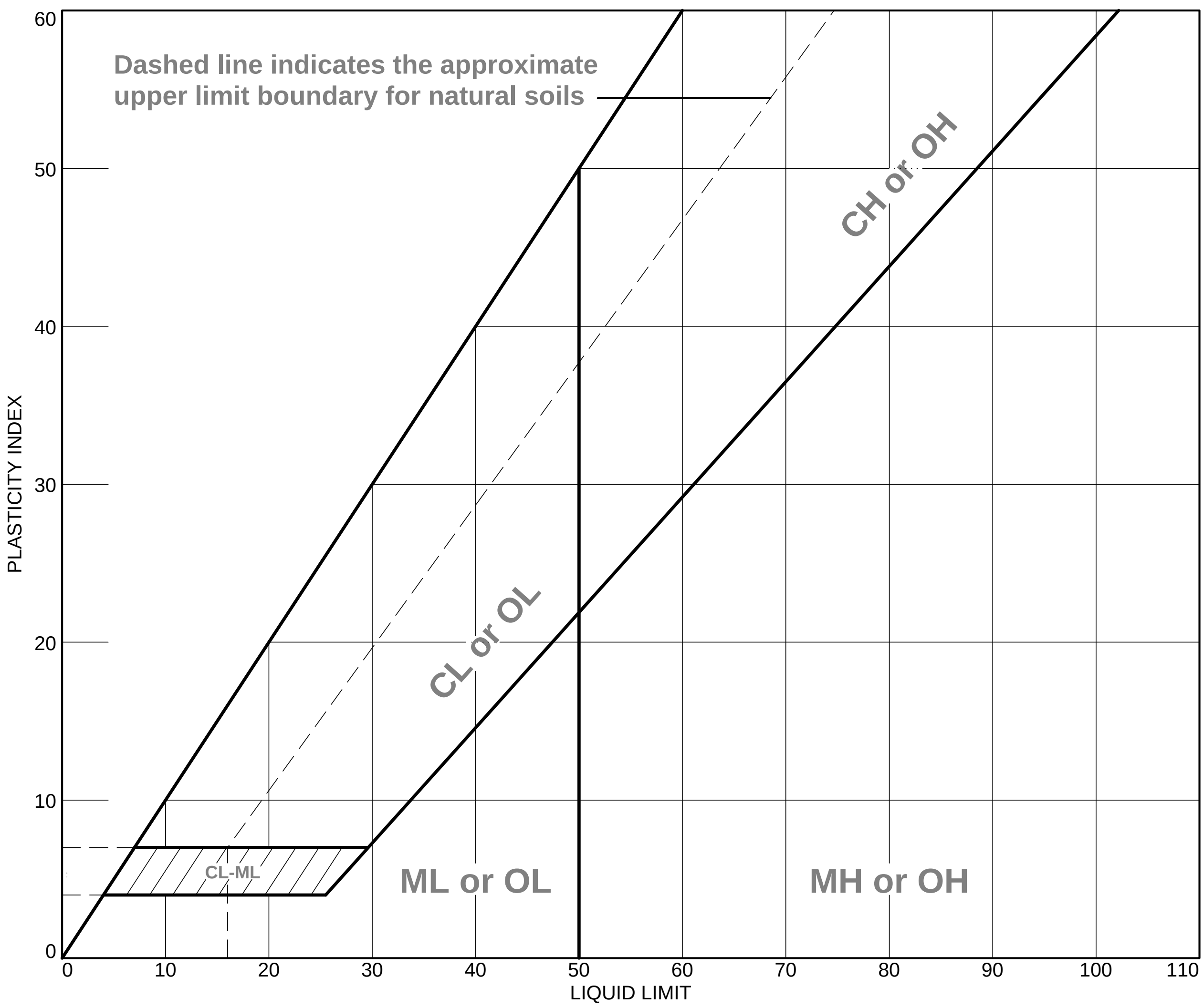
Remarks:

Contour Engineering, LLC

Kennesaw, GA

Figure

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Tan SAND (SM)	NV	NP	NP	97.3	13.3	SM

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

Project: Plant McIntosh

● **Location:** M-7 **Depth:** 16-18' **Sample Number:** UD-2

Remarks:

Contour Engineering, LLC

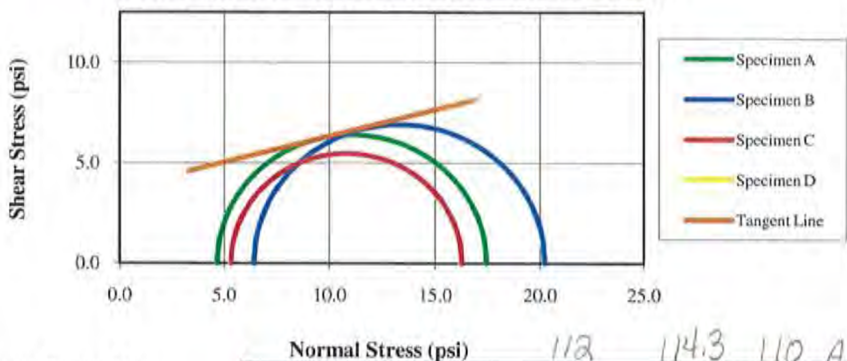
Kennesaw, GA

Figure

Contour Engineering

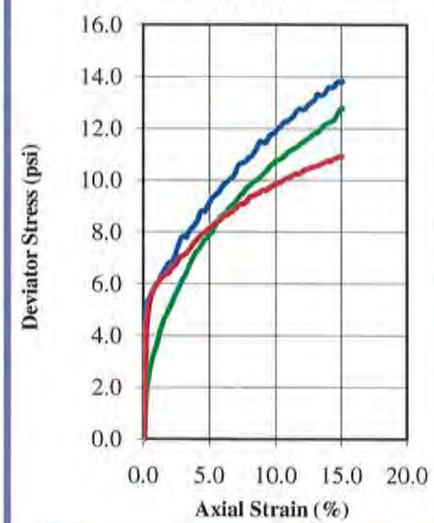
Consolidated Undrained Triaxial Test (ASTM D4767)

Effective Stress at Maximum Deviator Stress Criterion



112 114.3 110 AVG= 112pcf

Deviator Stress Vs. Axial Strain



Initial	Specimen A	B	C	D
Water Content (%)	33.8	38.1	42.5	
Dry Density (pcf)	83.7	82.8	77.2	
Saturation (%)	91.75	101.20	98.73	
Void Ratio	0.973	0.995	1.138	
Diameter (in)	2.839	2.830	2.863	
Height (in)	6.202	5.707	5.942	
Specific Gravity	2.65	2.65	2.65	
Liquid Limit	0	0	0	
Plastic Limit	0	0	0	
After Consolidation	**A**	**B**	**C**	**D**
B-Value	0.99	0.99	0.99	
Water Content (%)	38.8	38.8	40.7	
Dry Density (pcf)	83.92	83.59	79.37	
Saturation (%)	100.00	100.00	100.00	
Void Ratio	0.971	0.979	1.084	
Effective Stress (psi)	3.3	7.0	10.3	
Back Press. (psi)	55.2	55.0	55.1	
Rate of Strain	0.02	0.02	0.02	

Maximum Deviator Stress Criterion	
psf 159 C (psi)	5.1
psf 0 C' (psi)	3.7
25.1 Ø (deg)	7.9
38.7 Ø' (deg)	14.7

After Shear	A	B	C	D
σ'1 at Failure (psi)	17.40	20.18	16.20	
σ'3 at Failure (psi)	4.61	6.37	5.27	

Project:	Plant McIntosh
Location:	M-7, UD-2 16-18'
Project Number:	AT10SOC03-M
Boring Number:	M-7
Sample Number:	M-7, UD-2
Depth:	16-18'
Sample Type:	Undisturbed
Description:	Tan SAND (SM)
Test Type	Consolidated Undrained
Remarks	Top 5.5" of shelby tube void!!

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

M-7
16-18'

Contour Engineering

Consolidated Undrained Triaxial Test (ASTM D4767)

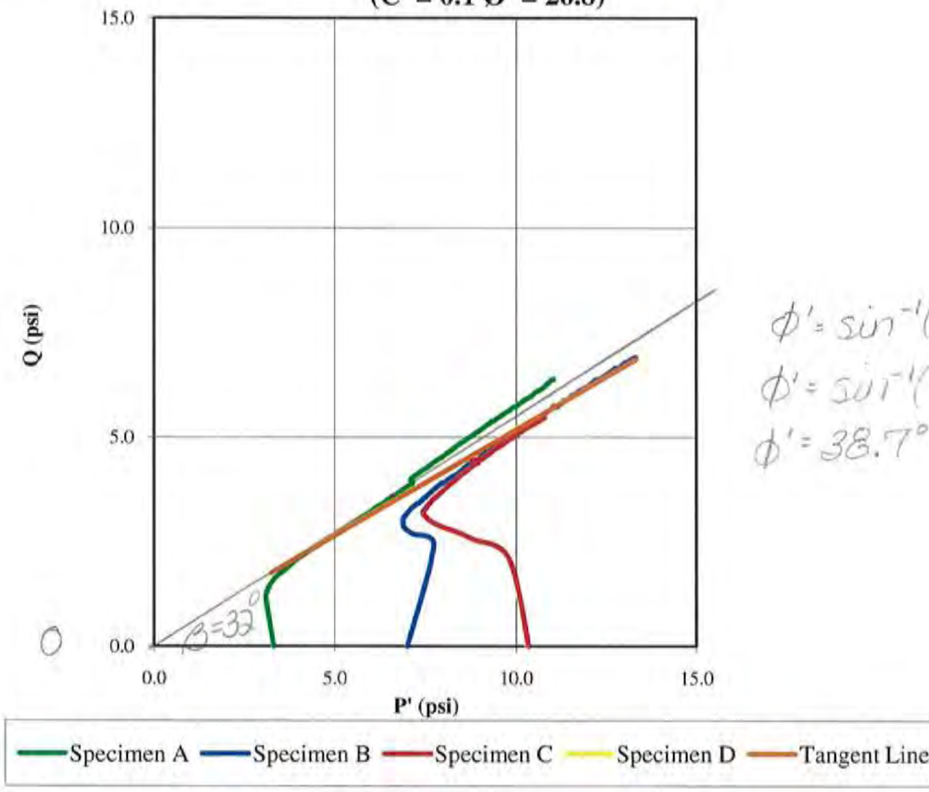
Date:

Checked By:

Date:

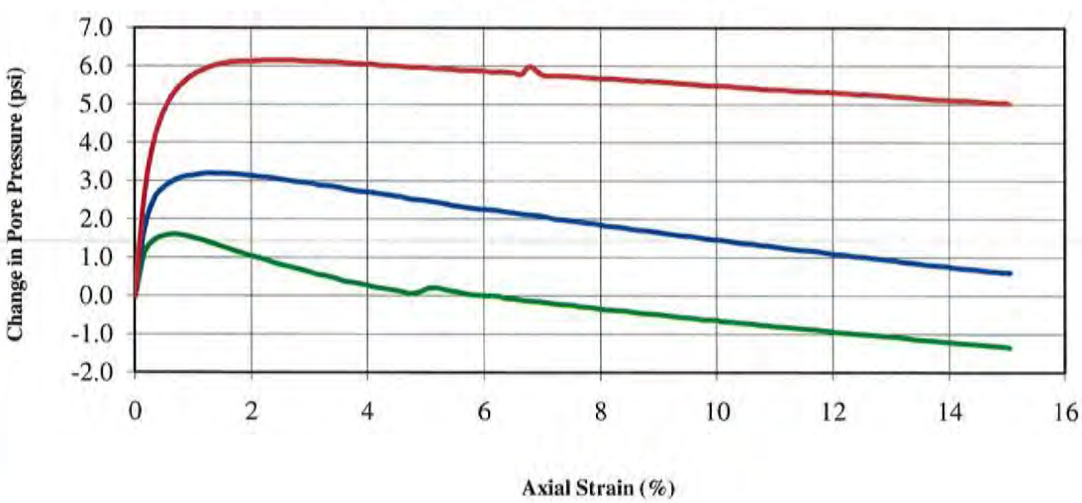
Tested By:

Stress Paths (Effective)
(C' = 0.1 Ø' = 26.8)

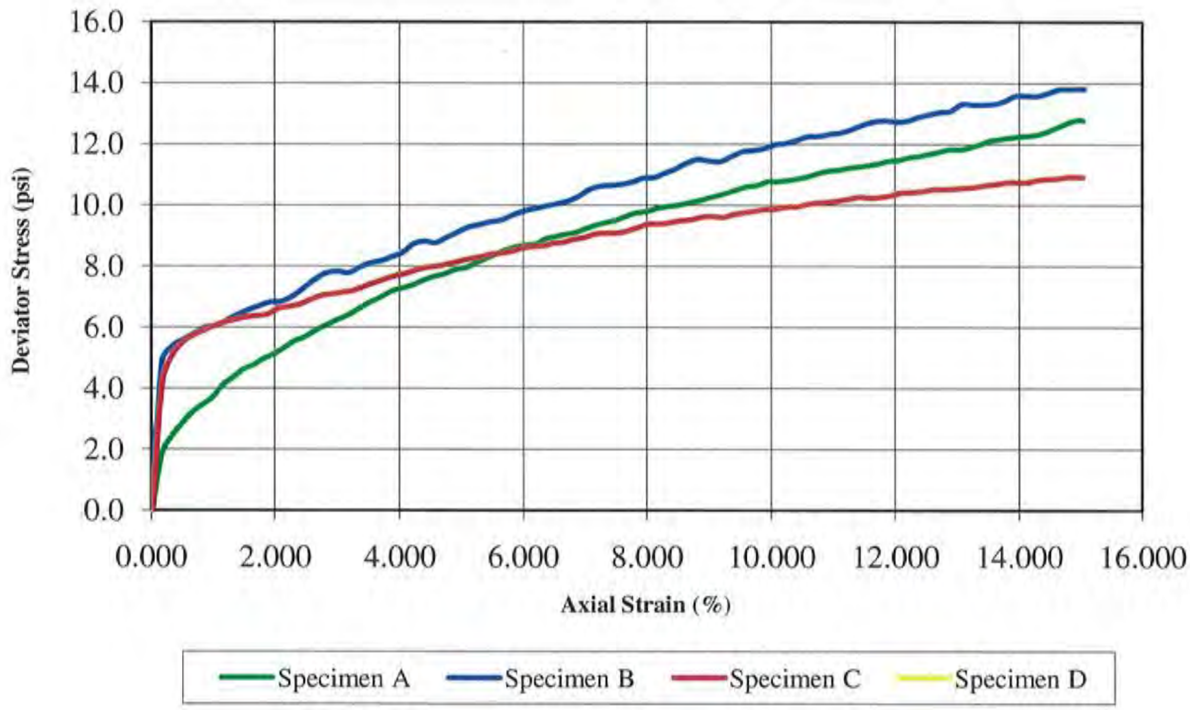


ϕ' = sin⁻¹(tanβ)
ϕ' = sin⁻¹(tan32°)
ϕ' = 38.7°

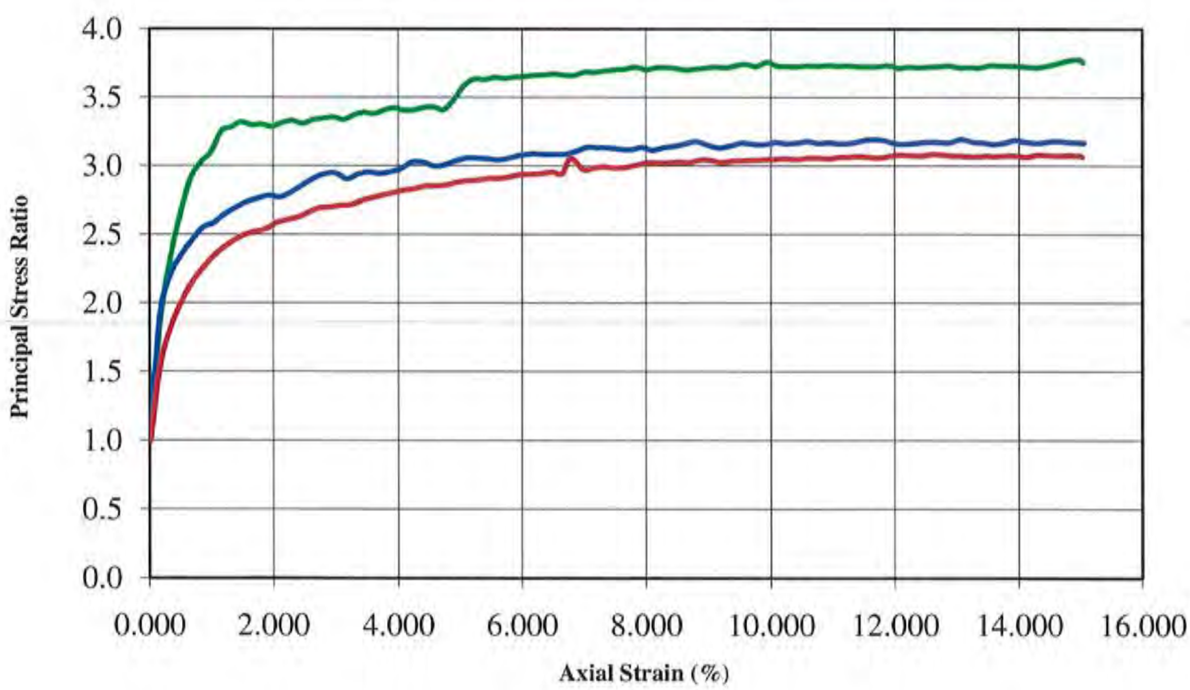
Change in Pore Pressure vs. Axial Strain



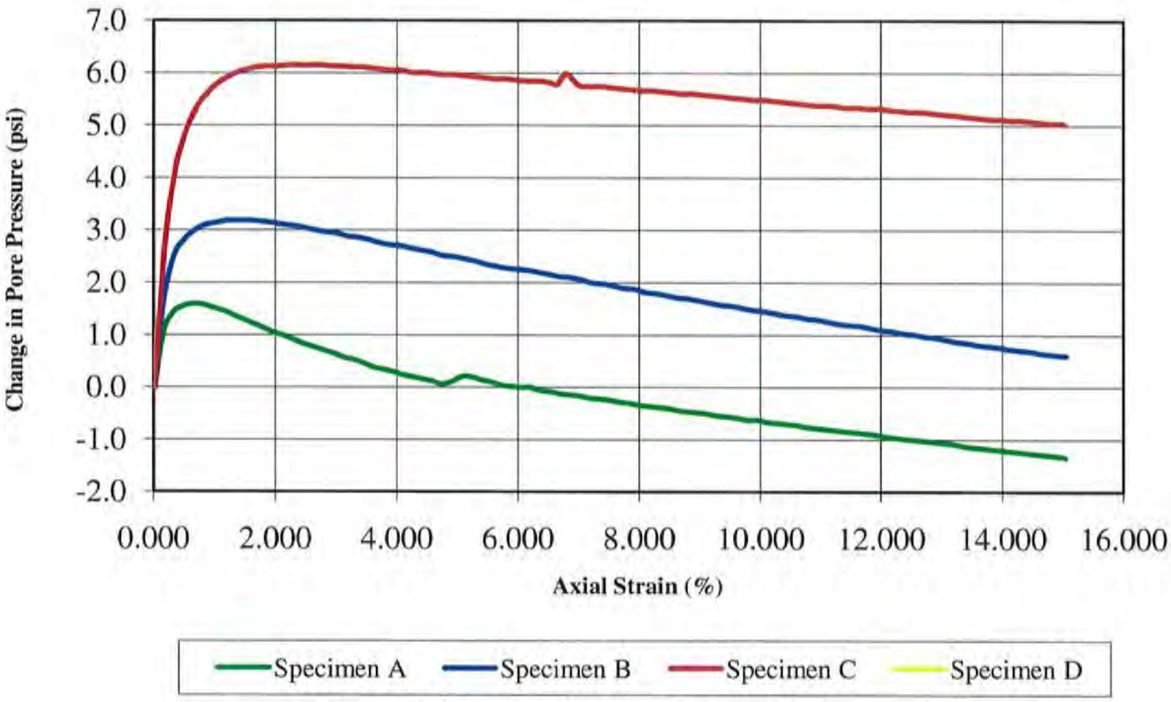
Deviator Stress vs. Axial Strain



Principal Stress Ratio vs. Axial Strain



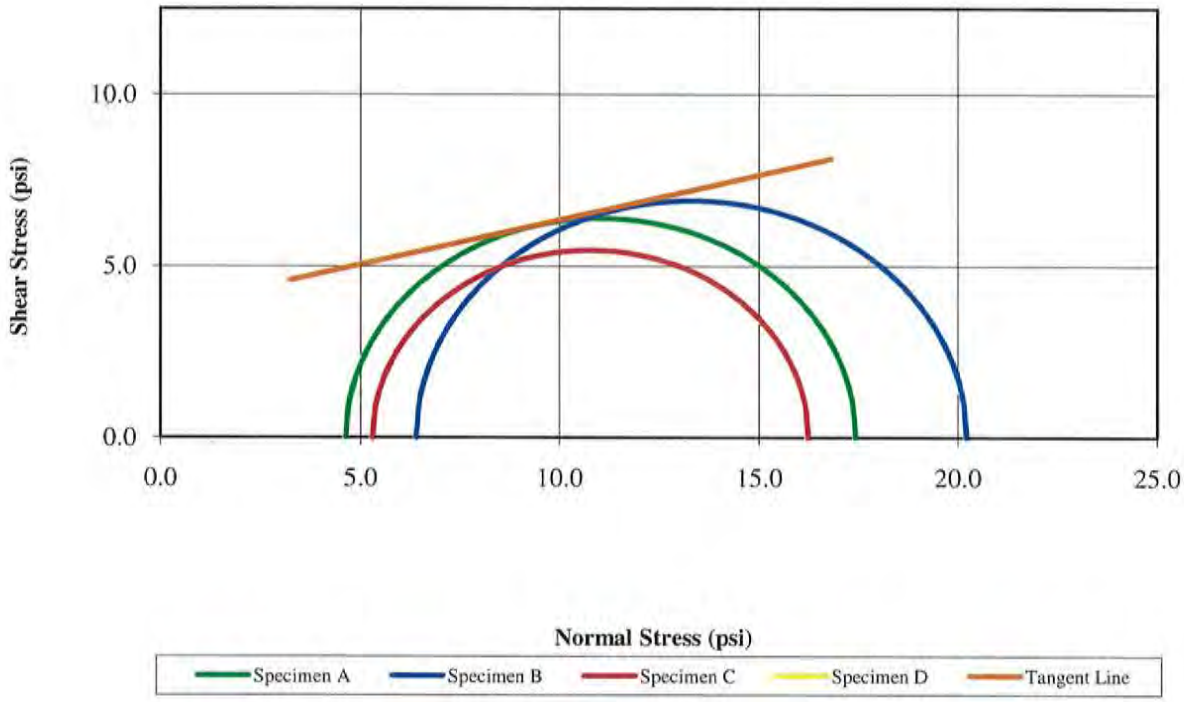
Change in Pore Pressure vs. Axial Strain



Mohr Stress Circles at Maximum Deviator Stress Criterion

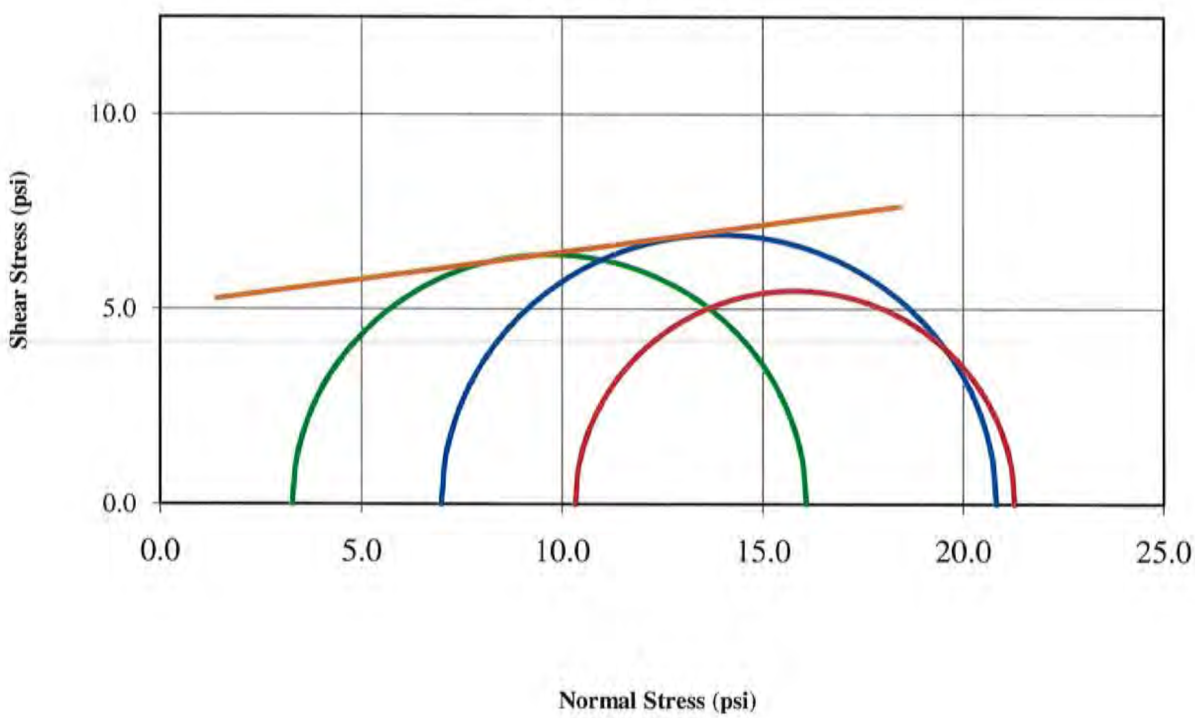
Effective Stress

(C' = 3.7 Ø' = 14.7)



Total Stress

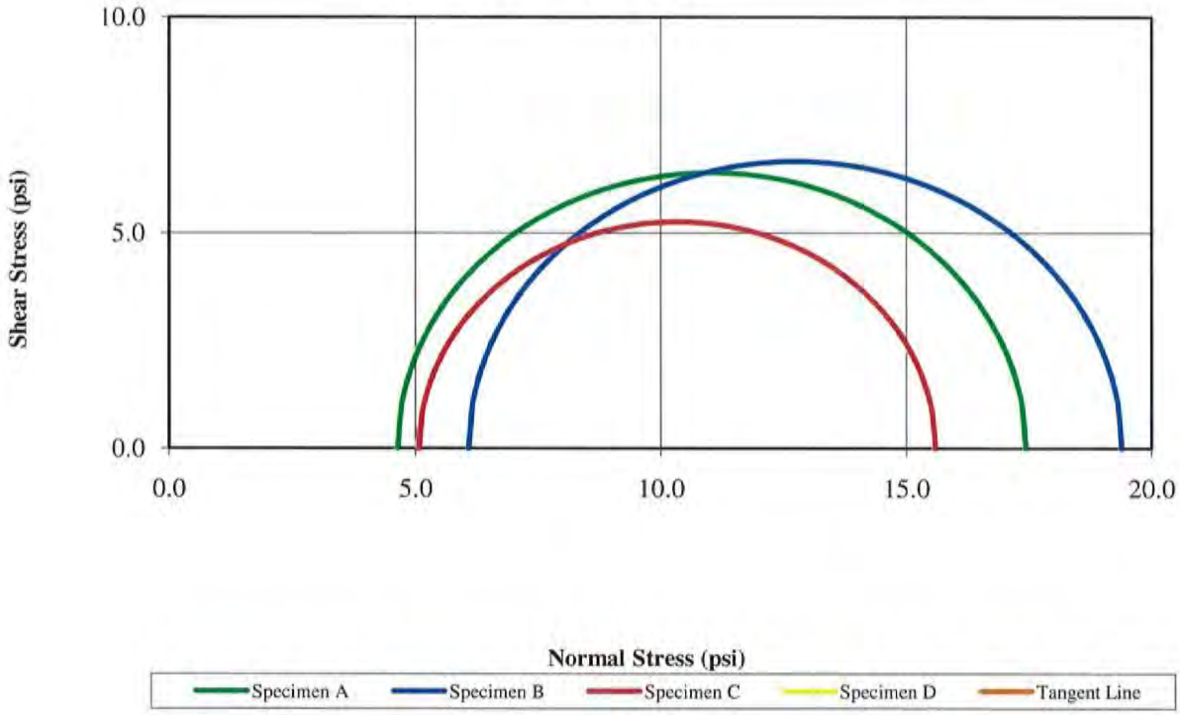
(C = 5.1 Ø = 7.9)



Mohr Stress Circles at Maximum Principal Stress Ratio Criterion

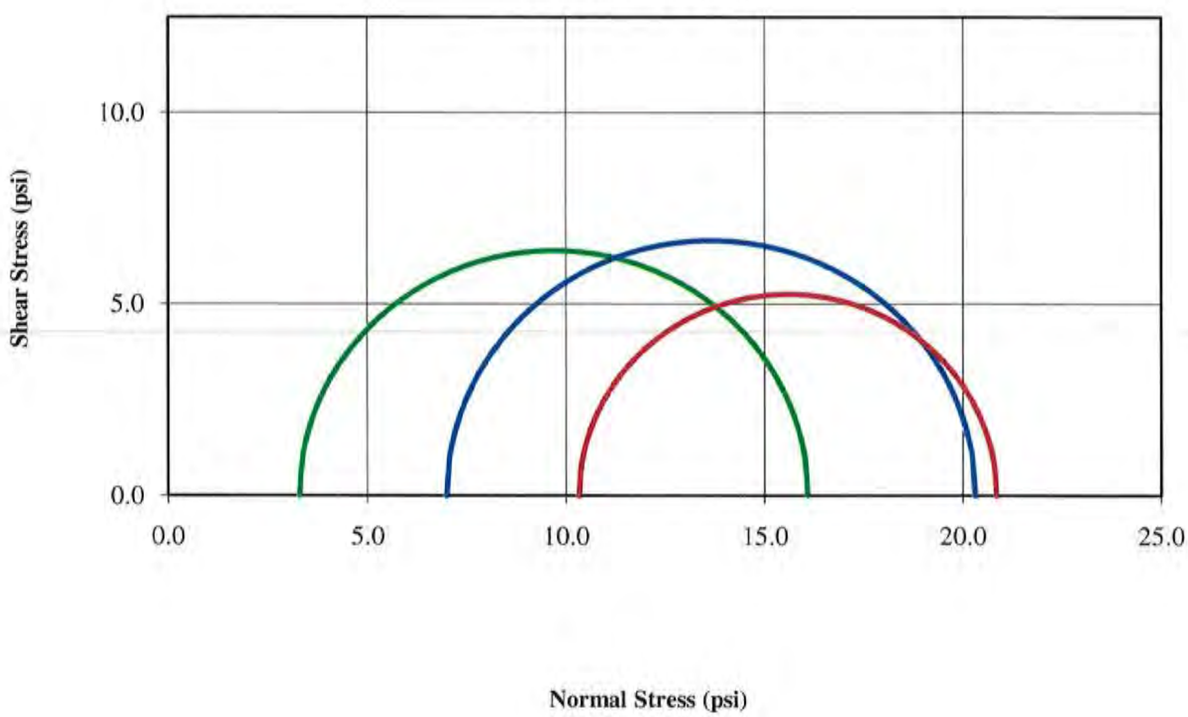
Effective Stress

(C' = 0.0 Ø' = 0.0)



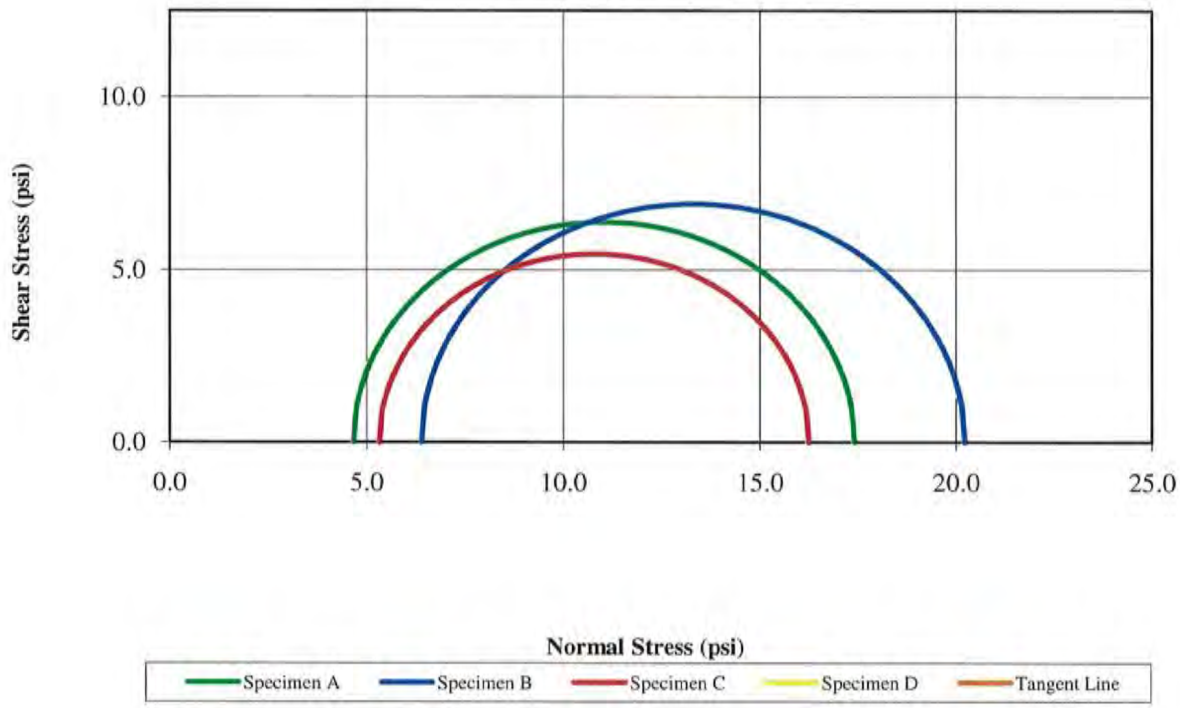
Total Stress

(C = 0.0 Ø = 0.0)

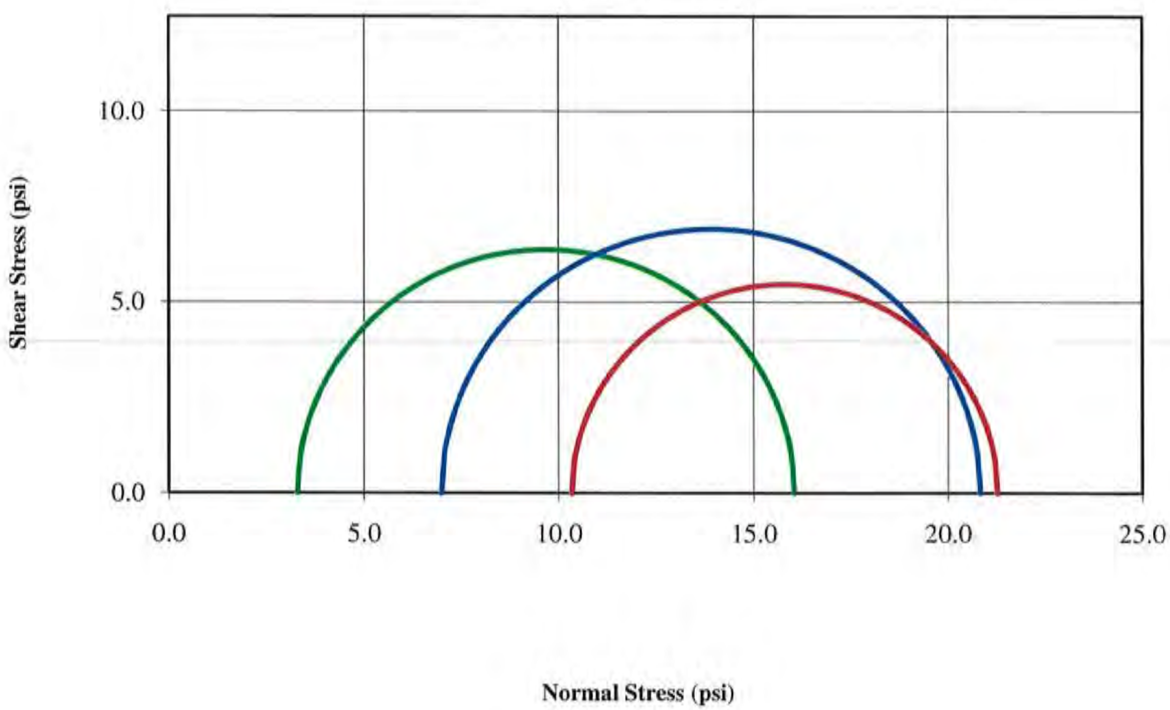


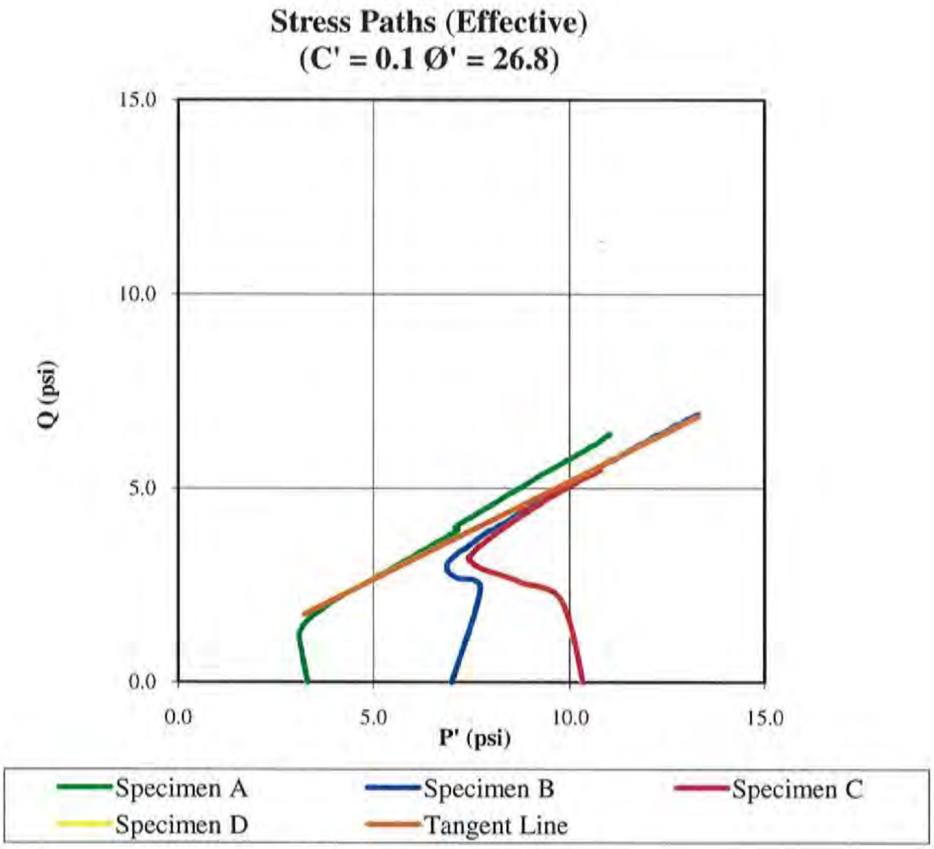
Mohr Stress Circles at 15% Axial Strain Criterion

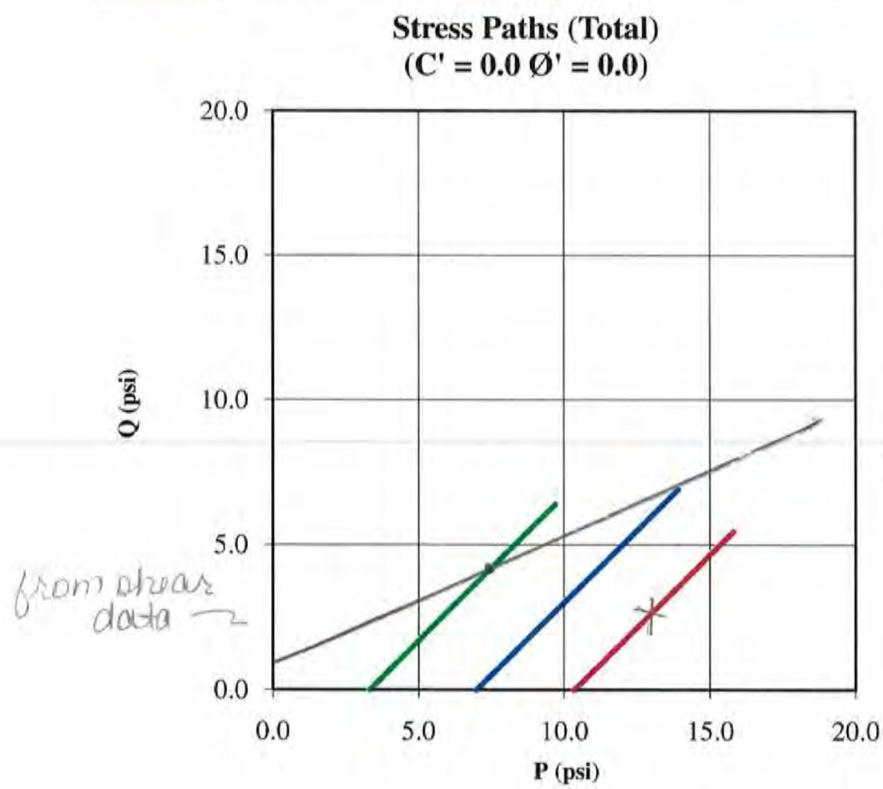
Effective Stress
(C' = 0.0 Ø' = 0.0)



Total Stress
(C = 0.0 Ø = 0.0)







$\beta = 23^{o}$

$\phi = \sin^{-1}(\tan 23^{o})$

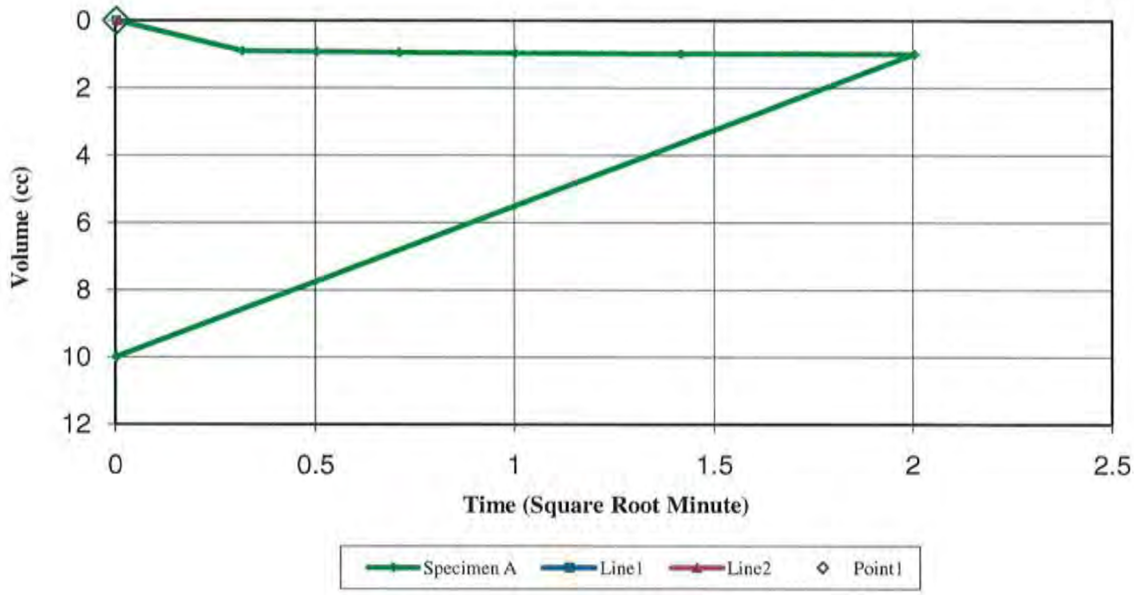
$\phi = 25.1^{o}$

$C = \frac{1.0}{\cos 25.1} = 1.1\ psi = 159\ psf$

 CONFIDENTIAL BUSINESS INFORMATION

Specimen A Consolidation Graphs

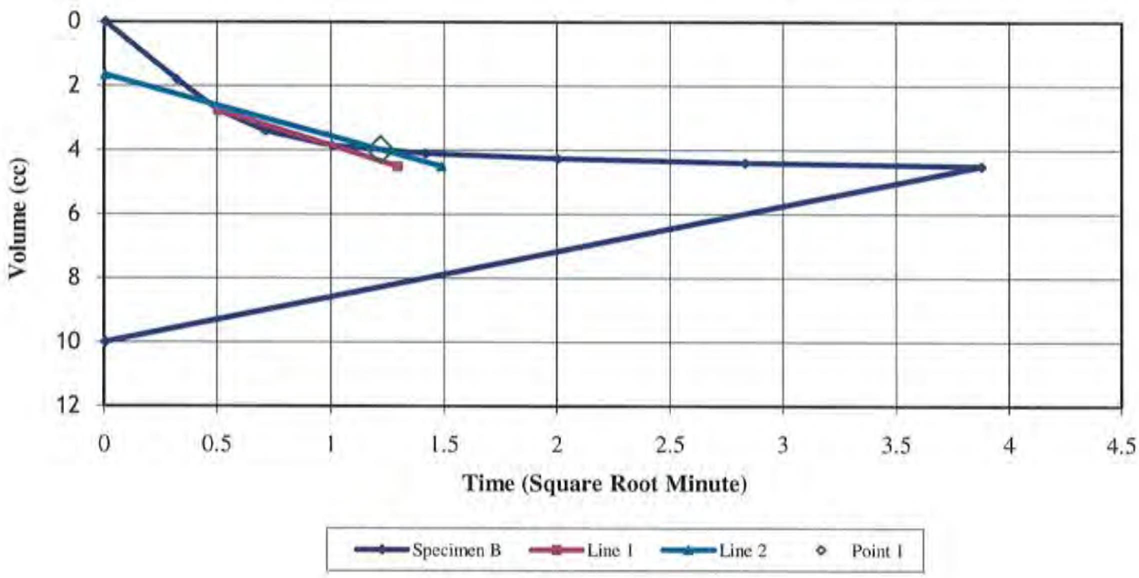
Consolidation Graph (Square Root Time)



Consolidation Graph (Logarithmic Time)

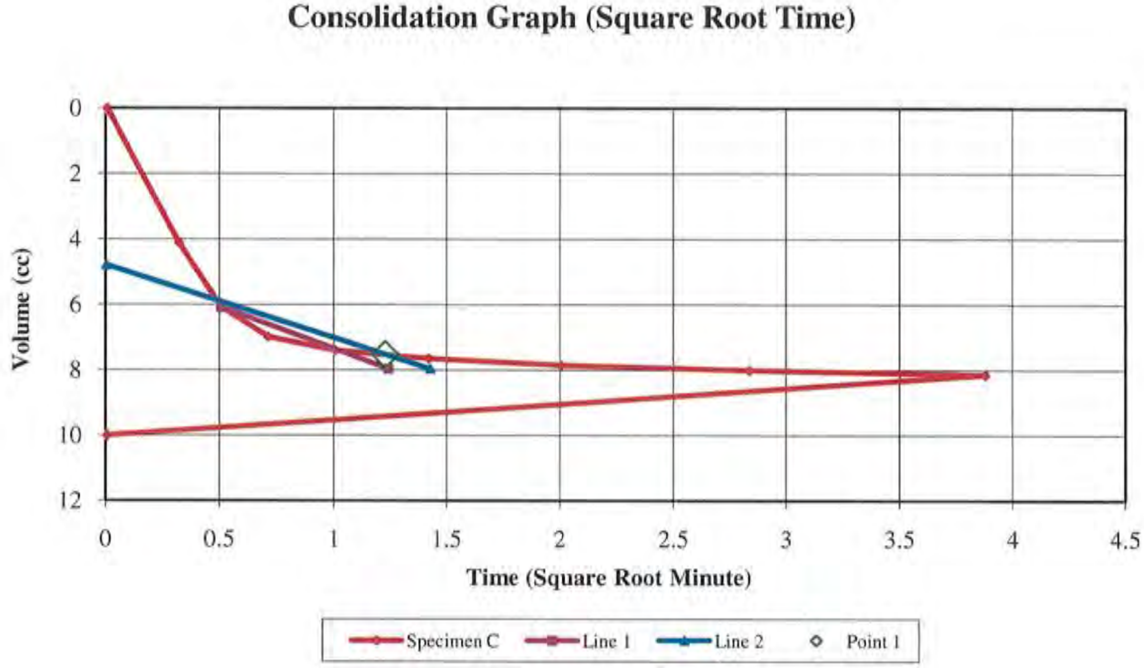
Specimen B Consolidation Graphs

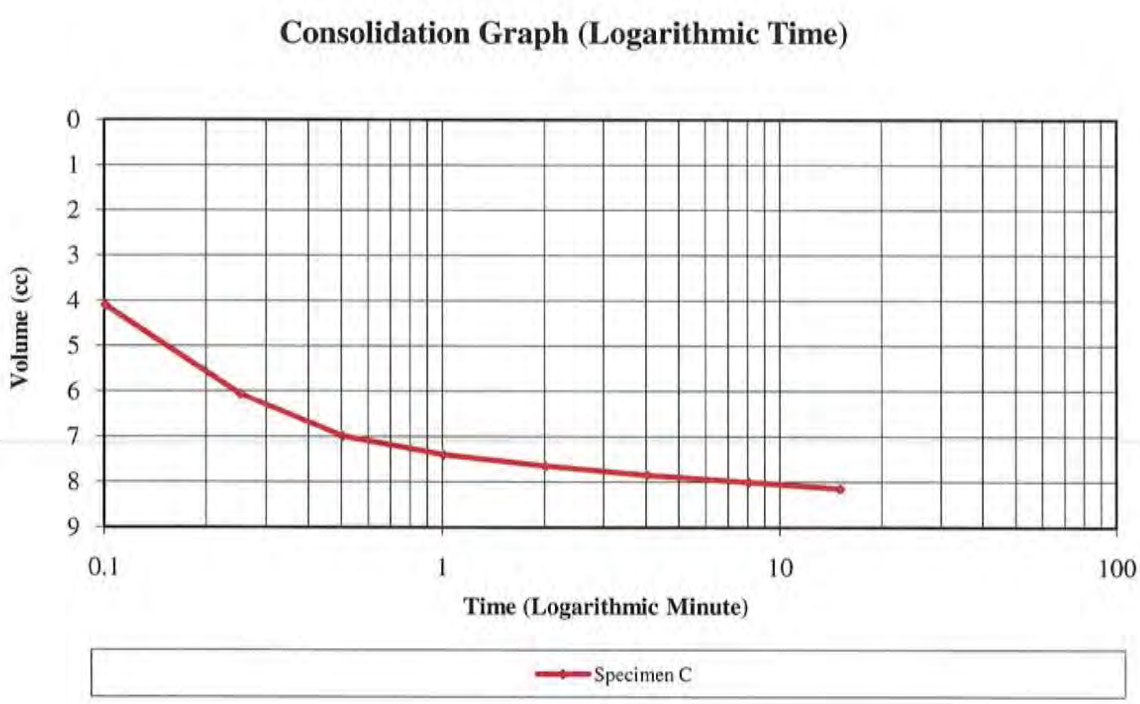
Consolidation Graph (Square Root Time)



Consolidation Graph (Logarithmic Time)

Specimen C Consolidation Graphs





Consolidation Calculations Specimen A CU Triaxial Test	Contour Engineering

Client: Southern Company | Project No. AT10SOC03-M

Project Name: Plant McIntosh

Project Location: M-7, UD-2 16-18'

Hole No. M-7 | Depth: 16-18'

Cell Pressure (psi) = 58.47

Back Pressure (psi) = 55

Effective Pressure (psi)= 3.47

Test Type = CU

Initial Sample Diameter (in) = 2.839

Initial Sample Height (in) = 6.202

Initial Sample Area (in2) = 6.332

Initial Volume (in3) = 39.27

Burrette Reading at Start of Test (cc)= 0

Time	Burrette Reading (cc)	Volume Change (cc)
00:00:00	0.00	N/A
00:00:06	-0.90	0.900
00:00:15	-0.92	0.920
00:00:30	-0.94	0.940
00:01:00	-0.96	0.960
00:02:00	-0.98	0.980
00:04:00	-1.00	1.000
	-10.00	10

Laboratory Supervisor

Consolidation Calculations Specimen B

CU Triaxial Test

Contour Engineering

Client: Southern Company

Project No. AT10SOC03-M

Project Name: Plant McIntosh

Project Location: M-7, UD-2 16-18'

Hole No. M-7

Depth: 16-18'

Cell Pressure (psi) = 61.94

Back Pressure (psi) = 55

Effective Pressure (psi)= 6.94

Test Type = CU

Initial Sample Diameter (in) = 2.83

Initial Sample Height (in) = 5.707

Initial Sample Area (in2) = 6.292

Initial Volume (in3) = 35.91

Burrette Reading at Start of Test (cc)= 0

Time	Burrette Reading (cc)	Volume Change (cc)
00:00:00	0.00	N/A
00:00:06	-1.80	1.800
00:00:15	-2.76	2.760
00:00:30	-3.40	3.400
00:01:00	-3.86	3.860
00:02:00	-4.10	4.100
00:04:00	-4.26	4.260
00:08:00	-4.40	4.400
00:15:00	-4.50	4.500
	-10.00	10

Laboratory Supervisor

Consolidation Calculations Specimen C

CU Triaxial Test

Contour Engineering

Client: Southern Company

Project No. AT10SOC03-M

Project Name: Plant McIntosh

Project Location: M-7, UD-2 16-18'

Hole No. M-7

Depth: 16-18'

Cell Pressure (psi) = 65.42

Back Pressure (psi) = 55

Effective Pressure (psi)= 10.42

Test Type = CU

Initial Sample Diameter (in) = 2.863

Initial Sample Height (in) = 5.942

Initial Sample Area (in2) = 6.438

Initial Volume (in3) = 38.25

Burrette Reading at Start of Test (cc)= 0

Time	Burrette Reading (cc)	Volume Change (cc)
00:00:00	0.00	N/A
00:00:06	-4.10	4.100
00:00:15	-6.06	6.060
00:00:30	-6.98	6.980
00:01:00	-7.39	7.390
00:02:00	-7.64	7.640
00:04:00	-7.84	7.840
00:08:00	-8.00	8.000
00:15:00	-8.14	8.140
	-10.00	10

Laboratory Supervisor

Specimen A Shear Data

CU Triaxial Test

Contour Engineering

File Location
Plant McIntosh M-7 UD-2 (10-15-10).HSD

Project Information

Project No. AT10SOC03-M
Project Name: Plant McIntosh
Client: Southern Company
Sample Location: M-7, UD-2 16-18'
Sample Description: Tan SAND (SM)
Remarks:

Sample Data

Sample Type: Undisturbed
Specific Gravity: 2.6500001
LL: 0.000
PL: 0.000

Sample Parameters	Initial	After Consolidation	Final
Diameter (in)	2.839	2.823	
Height (in)	6.202	6.152	
Weight (grams)	1154.57		1177.07
Moisture (%)	33.80		38.75
Dry Density (pcf)	83.71	83.92	
Saturation (%)	91.75	100.00	
Void Ratio	0.973	0.971	

Test Data

Rate of Strain: 0.02
Cell Pressure (psi): 58.470
Effective Confining Stress (psi): 3.3
Corrected Peak Deviator Stress (psi): 12.793 at reading number: 92

Specimen A

Reading No.	Deviator Load (lbs)	Axial Deformation (in)	Pore Pressure (psi)	Change in Pore Pressure (psi)	Corrected Area (in2)	Axial Strain (%)	Deviator Stress (psi)	Corrected Deviator Stress (psi)	σ_1 (psi)	σ_3 (psi)	σ'_1 (psi)	σ'_3 (psi)	σ'_1/σ'_3	Abar	P (psi)	Q (psi)	P' (psi)
0	2.5	0.001	55.2	0.0	6.26	0.000	0.000	0.000	3.3	3.3	3.3	3.3	1.00	0.00	3.3	0.0	3.3
1	14.6	0.010	56.3	1.1	6.27	0.157	1.924	1.860	5.1	3.3	4.0	2.2	1.86	0.60	4.2	0.9	3.1
2	18.5	0.020	56.6	1.4	6.28	0.315	2.554	2.423	5.7	3.3	4.3	1.8	2.31	0.59	4.5	1.2	3.1
3	21.6	0.030	56.7	1.6	6.29	0.481	3.047	2.845	6.1	3.3	4.6	1.7	2.65	0.55	4.7	1.4	3.1
4	24.4	0.040	56.8	1.6	6.30	0.648	3.491	3.216	6.5	3.3	4.9	1.7	2.91	0.50	4.9	1.6	3.3
5	26.3	0.051	56.8	1.6	6.31	0.815	3.799	3.451	6.7	3.3	5.2	1.7	3.02	0.46	5.0	1.7	3.4
6	28.4	0.061	56.7	1.5	6.32	0.981	4.133	3.710	7.0	3.3	5.5	1.8	3.10	0.41	5.1	1.9	3.6
7	31.4	0.071	56.6	1.5	6.33	1.148	4.614	4.113	7.4	3.3	5.9	1.8	3.25	0.35	5.3	2.1	3.9
8	33.4	0.081	56.6	1.4	6.34	1.306	4.922	4.349	7.6	3.3	6.3	1.9	3.28	0.32	5.5	2.2	4.1
9	35.4	0.091	56.5	1.3	6.35	1.463	5.255	4.608	7.9	3.3	6.6	2.0	3.32	0.28	5.6	2.3	4.3
10	36.8	0.101	56.4	1.2	6.36	1.630	5.477	4.753	8.0	3.3	6.8	2.1	3.30	0.25	5.7	2.4	4.4
11	38.5	0.111	56.3	1.1	6.37	1.787	5.749	4.950	8.2	3.3	7.1	2.1	3.30	0.23	5.8	2.5	4.6
12	39.9	0.120	56.2	1.0	6.38	1.944	5.971	5.097	8.4	3.3	7.3	2.2	3.29	0.21	5.8	2.5	4.8
13	41.4	0.130	56.2	1.0	6.39	2.111	6.205	5.295	8.6	3.3	7.6	2.3	3.31	0.19	5.9	2.6	4.9
14	42.9	0.141	56.1	0.9	6.41	2.278	6.452	5.525	8.8	3.3	7.9	2.4	3.33	0.16	6.0	2.8	5.1
15	43.9	0.151	56.0	0.8	6.42	2.444	6.600	5.659	8.9	3.3	8.1	2.5	3.31	0.15	6.1	2.8	5.3
16	45.2	0.161	56.0	0.8	6.43	2.611	6.822	5.864	9.1	3.3	8.4	2.5	3.33	0.13	6.2	2.9	5.4
17	46.4	0.171	55.9	0.7	6.44	2.768	7.007	6.034	9.3	3.3	8.6	2.6	3.34	0.12	6.3	3.0	5.6
18	47.6	0.181	55.8	0.6	6.45	2.935	7.192	6.201	9.5	3.3	8.8	2.6	3.35	0.10	6.4	3.1	5.7

Specimen A

Reading No.	Deviator Load (lbs)	Axial Deformation (in)	Pore Pressure (psi)	Change in Pore Pressure (psi)	Corrected Area (in2)	Axial Strain (%)	Deviator Stress (psi)	Corrected Deviator Stress (psi)	σ_1 (psi)	σ_3 (psi)	σ'_1 (psi)	σ'_3 (psi)	σ'_1/σ'_3	Abar	P (psi)	Q (psi)	P' (psi)
19	48.6	0.191	55.8	0.6	6.46	3.102	7.352	6.345	9.6	3.3	9.1	2.7	3.34	0.09	6.5	3.2	5.9
20	49.8	0.201	55.7	0.5	6.47	3.259	7.550	6.524	9.8	3.3	9.3	2.8	3.37	0.08	6.5	3.3	6.0
21	51.2	0.211	55.7	0.5	6.48	3.417	7.772	6.727	10.0	3.3	9.5	2.8	3.39	0.07	6.6	3.4	6.2
22	52.4	0.221	55.6	0.4	6.49	3.583	7.957	6.892	10.2	3.3	9.8	2.9	3.38	0.06	6.7	3.4	6.3
23	53.5	0.231	55.5	0.3	6.50	3.741	8.142	7.058	10.3	3.3	10.0	2.9	3.40	0.05	6.8	3.5	6.5
24	54.6	0.240	55.5	0.3	6.51	3.898	8.314	7.211	10.5	3.3	10.2	3.0	3.42	0.04	6.9	3.6	6.6
25	55.3	0.251	55.4	0.2	6.52	4.065	8.425	7.304	10.6	3.3	10.3	3.0	3.40	0.03	6.9	3.7	6.7
26	56.1	0.260	55.4	0.2	6.54	4.222	8.549	7.409	10.7	3.3	10.5	3.1	3.41	0.03	7.0	3.7	6.8
27	57.1	0.271	55.4	0.2	6.55	4.389	8.721	7.559	10.8	3.3	10.7	3.1	3.42	0.02	7.1	3.8	6.9
28	58.0	0.281	55.3	0.1	6.56	4.555	8.857	7.674	11.0	3.3	10.8	3.2	3.43	0.02	7.1	3.8	7.0
29	58.6	0.291	55.3	0.1	6.57	4.713	8.956	7.754	11.0	3.3	11.0	3.2	3.41	0.01	7.2	3.9	7.1
30	59.6	0.301	55.3	0.1	6.58	4.879	9.116	7.892	11.2	3.3	11.1	3.2	3.48	0.01	7.2	3.9	7.1
31	60.2	0.311	55.4	0.2	6.59	5.046	9.203	7.959	11.2	3.3	11.0	3.1	3.59	0.03	7.3	4.0	7.1
32	61.2	0.321	55.4	0.2	6.60	5.213	9.375	8.107	11.4	3.3	11.2	3.1	3.63	0.02	7.3	4.1	7.1
33	62.3	0.332	55.3	0.1	6.62	5.379	9.548	8.255	11.5	3.3	11.4	3.1	3.63	0.02	7.4	4.1	7.3
34	63.5	0.342	55.3	0.1	6.63	5.546	9.733	8.414	11.7	3.3	11.6	3.2	3.65	0.01	7.5	4.2	7.4
35	64.5	0.352	55.2	0.0	6.64	5.713	9.893	8.549	11.8	3.3	11.8	3.2	3.64	0.00	7.6	4.3	7.5
36	65.2	0.362	55.2	0.0	6.65	5.870	10.004	8.638	11.9	3.3	11.9	3.3	3.65	0.00	7.6	4.3	7.6
37	65.7	0.372	55.2	0.0	6.66	6.037	10.091	8.702	12.0	3.3	12.0	3.3	3.65	0.00	7.6	4.4	7.6
38	66.0	0.382	55.2	0.0	6.67	6.194	10.140	8.733	12.0	3.3	12.0	3.3	3.66	0.00	7.6	4.4	7.6
39	67.3	0.391	55.1	-0.1	6.68	6.352	10.337	8.902	12.2	3.3	12.2	3.3	3.67	-0.01	7.7	4.5	7.8
40	67.9	0.402	55.1	-0.1	6.70	6.518	10.436	8.977	12.3	3.3	12.3	3.4	3.67	-0.01	7.8	4.5	7.8
41	68.5	0.411	55.1	-0.1	6.71	6.676	10.535	9.052	12.3	3.3	12.5	3.4	3.66	-0.01	7.8	4.5	7.9
42	69.0	0.421	55.0	-0.1	6.72	6.833	10.609	9.105	12.4	3.3	12.5	3.4	3.66	-0.02	7.8	4.6	8.0
43	70.0	0.431	55.0	-0.2	6.73	7.000	10.769	9.236	12.5	3.3	12.7	3.4	3.68	-0.02	7.9	4.6	8.1
44	70.8	0.441	55.0	-0.2	6.74	7.157	10.905	9.345	12.6	3.3	12.8	3.5	3.68	-0.02	8.0	4.7	8.2
45	71.5	0.451	55.0	-0.2	6.75	7.324	11.016	9.430	12.7	3.3	12.9	3.5	3.69	-0.02	8.0	4.7	8.2
46	72.2	0.461	54.9	-0.2	6.77	7.490	11.127	9.514	12.8	3.3	13.0	3.5	3.70	-0.03	8.0	4.8	8.3
47	73.2	0.472	54.9	-0.3	6.78	7.657	11.287	9.644	12.9	3.3	13.2	3.6	3.71	-0.03	8.1	4.8	8.4
48	74.1	0.481	54.9	-0.3	6.79	7.815	11.423	9.751	13.0	3.3	13.3	3.6	3.72	-0.03	8.2	4.9	8.5
49	74.4	0.492	54.8	-0.3	6.80	7.981	11.485	9.789	13.1	3.3	13.4	3.6	3.70	-0.04	8.2	4.9	8.5
50	75.3	0.501	54.8	-0.4	6.81	8.139	11.620	9.895	13.2	3.3	13.5	3.6	3.72	-0.04	8.2	4.9	8.6
51	75.8	0.512	54.8	-0.4	6.83	8.305	11.707	9.955	13.2	3.3	13.6	3.7	3.72	-0.04	8.3	5.0	8.6
52	76.2	0.521	54.8	-0.4	6.84	8.463	11.768	9.993	13.3	3.3	13.7	3.7	3.71	-0.04	8.3	5.0	8.7
53	76.8	0.531	54.7	-0.4	6.85	8.620	11.855	10.054	13.3	3.3	13.8	3.7	3.70	-0.04	8.3	5.0	8.8
54	77.4	0.541	54.7	-0.5	6.86	8.787	11.966	10.135	13.4	3.3	13.9	3.7	3.71	-0.05	8.3	5.1	8.8
55	78.1	0.551	54.7	-0.5	6.87	8.944	12.077	10.217	13.5	3.3	14.0	3.8	3.71	-0.05	8.4	5.1	8.9
56	78.8	0.561	54.7	-0.5	6.89	9.102	12.188	10.299	13.6	3.3	14.1	3.8	3.72	-0.05	8.4	5.1	8.9
57	79.6	0.571	54.6	-0.5	6.90	9.268	12.311	10.391	13.7	3.3	14.2	3.8	3.72	-0.05	8.5	5.2	9.0
58	80.5	0.581	54.6	-0.6	6.91	9.435	12.459	10.504	13.8	3.3	14.3	3.8	3.73	-0.05	8.5	5.3	9.1
59	81.3	0.591	54.6	-0.6	6.92	9.592	12.583	10.596	13.9	3.3	14.5	3.9	3.74	-0.06	8.6	5.3	9.2

Specimen A

Reading No.	Deviator Load (lbs)	Axial Deformation (in)	Pore Pressure (psi)	Change in Pore Pressure (psi)	Corrected Area (in2)	Axial Strain (%)	Deviator Stress (psi)	Corrected Deviator Stress (psi)	σ_1 (psi)	σ_3 (psi)	σ'_1 (psi)	σ'_3 (psi)	σ'_1/σ'_3	Abar	P (psi)	Q (psi)	P' (psi)
60	81.8	0.601	54.6	-0.6	6.94	9.759	12.657	10.642	13.9	3.3	14.5	3.9	3.73	-0.06	8.6	5.3	9.2
61	82.8	0.611	54.6	-0.6	6.95	9.926	12.817	10.766	14.0	3.3	14.7	3.9	3.76	-0.06	8.7	5.4	9.3
62	82.9	0.621	54.5	-0.7	6.96	10.092	12.842	10.766	14.0	3.3	14.7	3.9	3.73	-0.06	8.7	5.4	9.3
63	83.4	0.632	54.5	-0.7	6.98	10.259	12.916	10.811	14.1	3.3	14.8	4.0	3.73	-0.06	8.7	5.4	9.4
64	83.9	0.641	54.5	-0.7	6.99	10.416	12.990	10.857	14.1	3.3	14.8	4.0	3.72	-0.07	8.7	5.4	9.4
65	84.6	0.652	54.5	-0.7	7.00	10.583	13.101	10.935	14.2	3.3	14.9	4.0	3.73	-0.07	8.7	5.5	9.5
66	85.4	0.662	54.4	-0.8	7.01	10.750	13.236	11.034	14.3	3.3	15.1	4.0	3.73	-0.07	8.8	5.5	9.6
67	86.1	0.672	54.4	-0.8	7.03	10.907	13.347	11.112	14.4	3.3	15.2	4.1	3.73	-0.07	8.8	5.6	9.6
68	86.5	0.682	54.4	-0.8	7.04	11.074	13.409	11.145	14.4	3.3	15.2	4.1	3.73	-0.07	8.9	5.6	9.7
69	87.1	0.692	54.4	-0.8	7.05	11.231	13.508	11.211	14.5	3.3	15.3	4.1	3.73	-0.07	8.9	5.6	9.7
70	87.5	0.701	54.3	-0.8	7.06	11.389	13.569	11.245	14.5	3.3	15.4	4.1	3.72	-0.08	8.9	5.6	9.7
71	88.0	0.711	54.3	-0.9	7.08	11.555	13.656	11.299	14.6	3.3	15.4	4.1	3.72	-0.08	8.9	5.6	9.8
72	88.6	0.721	54.3	-0.9	7.09	11.713	13.742	11.353	14.6	3.3	15.5	4.2	3.72	-0.08	9.0	5.7	9.8
73	89.3	0.731	54.3	-0.9	7.10	11.879	13.866	11.439	14.7	3.3	15.6	4.2	3.73	-0.08	9.0	5.7	9.9
74	89.7	0.742	54.2	-0.9	7.12	12.046	13.927	11.470	14.7	3.3	15.7	4.2	3.71	-0.08	9.0	5.7	10.0
75	90.5	0.751	54.2	-1.0	7.13	12.203	14.051	11.557	14.8	3.3	15.8	4.2	3.72	-0.08	9.1	5.8	10.0
76	91.0	0.762	54.2	-1.0	7.14	12.370	14.125	11.598	14.9	3.3	15.9	4.3	3.72	-0.09	9.1	5.8	10.1
77	91.7	0.772	54.2	-1.0	7.16	12.537	14.236	11.672	15.0	3.3	16.0	4.3	3.72	-0.09	9.1	5.8	10.1
78	92.4	0.782	54.2	-1.0	7.17	12.703	14.347	11.745	15.0	3.3	16.1	4.3	3.73	-0.09	9.2	5.9	10.2
79	93.0	0.792	54.1	-1.0	7.18	12.861	14.458	11.819	15.1	3.3	16.1	4.3	3.73	-0.09	9.2	5.9	10.2
80	93.2	0.802	54.1	-1.1	7.20	13.027	14.482	11.816	15.1	3.3	16.2	4.3	3.72	-0.09	9.2	5.9	10.3
81	93.8	0.812	54.1	-1.1	7.21	13.185	14.581	11.879	15.2	3.3	16.2	4.4	3.72	-0.09	9.2	5.9	10.3
82	94.7	0.821	54.1	-1.1	7.22	13.342	14.717	11.974	15.3	3.3	16.4	4.4	3.72	-0.09	9.3	6.0	10.4
83	95.7	0.831	54.0	-1.2	7.24	13.500	14.889	12.100	15.4	3.3	16.5	4.4	3.73	-0.10	9.3	6.1	10.5
84	96.3	0.841	54.0	-1.2	7.25	13.666	14.976	12.150	15.4	3.3	16.6	4.4	3.73	-0.10	9.4	6.1	10.5
85	96.8	0.851	54.0	-1.2	7.26	13.824	15.062	12.201	15.5	3.3	16.7	4.5	3.73	-0.10	9.4	6.1	10.6
86	97.3	0.861	54.0	-1.2	7.28	13.981	15.136	12.241	15.5	3.3	16.7	4.5	3.73	-0.10	9.4	6.1	10.6
87	97.7	0.871	54.0	-1.2	7.29	14.148	15.198	12.268	15.5	3.3	16.8	4.5	3.72	-0.10	9.4	6.1	10.6
88	98.2	0.881	53.9	-1.3	7.31	14.314	15.284	12.317	15.6	3.3	16.8	4.5	3.72	-0.10	9.4	6.2	10.7
89	99.3	0.891	53.9	-1.3	7.32	14.481	15.457	12.439	15.7	3.3	17.0	4.6	3.73	-0.10	9.5	6.2	10.8
90	100.5	0.902	53.9	-1.3	7.33	14.648	15.654	12.582	15.9	3.3	17.2	4.6	3.75	-0.10	9.6	6.3	10.9
91	101.8	0.912	53.9	-1.3	7.35	14.814	15.852	12.724	16.0	3.3	17.3	4.6	3.77	-0.10	9.6	6.4	11.0
92	102.5	0.922	53.9	-1.3	7.36	14.972	15.963	12.793	16.1	3.3	17.4	4.6	3.77	-0.10	9.7	6.4	11.0
93	102.2	0.925	53.8	-1.4	7.37	15.018	15.926	12.755	16.0	3.3	17.4	4.6	3.75	-0.11	9.7	6.4	11.0

Specimen A

Reading No.	Deviator Load (lbs)	Axial Deformation (in)	Pore Pressure (psi)	Change in Pore Pressure (psi)	Corrected Area (in2)	Axial Strain (%)	Deviator Stress (psi)	Corrected Deviator Stress (psi)	σ_1 (psi)	σ_3 (psi)	σ'_1 (psi)	σ'_3 (psi)	σ'_1/σ'_3	Abar	P (psi)	Q (psi)	P' (psi)

Specimen B Shear Data

CU Triaxial Test

Contour Engineering

File Location
Plant McIntosh M-7 UD-2 (10-15-10).HSD

Project Information

Project No. AT10SOC03-M
Project Name: Plant McIntosh
Client: Southern Company
Sample Location: M-7, UD-2 16-18'
Sample Description: Tan SAND (SM)
Remarks:

Sample Data

Sample Type: Undisturbed
Specific Gravity: 2.6500001
LL: 0.000
PL: 0.000

Sample Parameters	Initial	After Consolidation	Final
Diameter (in)	2.830	2.815	
Height (in)	5.707	5.664	
Weight (grams)	1077.69		1073.65
Moisture (%)	38.13		38.83
Dry Density (pcf)	82.78	83.59	
Saturation (%)	101.20	100.00	
Void Ratio	0.995	0.979	

Test Data

Rate of Strain: 0.02
Cell Pressure (psi): 61.940
Effective Confining Stress (psi): 7.0
Corrected Peak Deviator Stress (psi): 13.817 at reading number: 85

Specimen B

Reading No.	Deviator Load (lbs)	Axial Deformation (in)	Pore Pressure (psi)	Change in Pore Pressure (psi)	Corrected Area (in2)	Axial Strain (%)	Deviator Stress (psi)	Corrected Deviator Stress (psi)	σ_1 (psi)	σ_3 (psi)	σ'_1 (psi)	σ'_3 (psi)	σ'_1/σ'_3	Abar	P (psi)	Q (psi)	P' (psi)
0	2.4	0.001	55.0	0.0	6.22	0.000	0.000	0.000	7.0	7.0	7.0	7.0	1.00	0.00	7.0	0.0	7.0
1	33.0	0.009	56.7	1.7	6.23	0.151	4.914	4.848	11.8	7.0	10.1	5.3	1.92	0.35	9.4	2.4	7.7
2	36.7	0.019	57.5	2.5	6.24	0.322	5.510	5.366	12.3	7.0	9.8	4.4	2.21	0.47	9.7	2.7	7.1
3	38.5	0.028	57.8	2.8	6.25	0.493	5.807	5.586	12.6	7.0	9.7	4.1	2.35	0.51	9.8	2.8	6.9
4	40.3	0.039	58.0	3.0	6.26	0.674	6.093	5.788	12.8	7.0	9.8	4.0	2.46	0.52	9.9	2.9	6.9
5	42.0	0.048	58.1	3.1	6.28	0.845	6.366	5.982	13.0	7.0	9.8	3.9	2.55	0.52	10.0	3.0	6.9
6	43.0	0.059	58.1	3.1	6.29	1.026	6.527	6.059	13.0	7.0	9.9	3.8	2.58	0.52	10.0	3.0	6.9
7	44.6	0.068	58.2	3.2	6.30	1.197	6.775	6.227	13.2	7.0	10.0	3.8	2.65	0.51	10.1	3.1	6.9
8	46.3	0.079	58.2	3.2	6.31	1.378	7.048	6.413	13.4	7.0	10.2	3.8	2.70	0.50	10.2	3.2	7.0
9	47.8	0.089	58.2	3.2	6.32	1.559	7.297	6.574	13.5	7.0	10.4	3.8	2.74	0.49	10.3	3.3	7.1
10	49.2	0.099	58.1	3.2	6.33	1.740	7.520	6.709	13.7	7.0	10.5	3.8	2.76	0.47	10.3	3.4	7.2
11	50.4	0.109	58.1	3.1	6.34	1.911	7.718	6.824	13.8	7.0	10.6	3.8	2.78	0.46	10.4	3.4	7.2
12	50.9	0.119	58.1	3.1	6.36	2.092	7.793	6.848	13.8	7.0	10.7	3.9	2.77	0.45	10.4	3.4	7.3
13	52.1	0.129	58.1	3.1	6.37	2.273	7.991	7.028	14.0	7.0	10.9	3.9	2.81	0.44	10.5	3.5	7.4
14	53.9	0.139	58.0	3.0	6.38	2.444	8.277	7.293	14.3	7.0	11.2	3.9	2.86	0.42	10.6	3.6	7.6
15	55.8	0.149	58.0	3.0	6.39	2.625	8.575	7.568	14.5	7.0	11.5	4.0	2.91	0.40	10.8	3.8	7.7
16	57.1	0.159	57.9	3.0	6.40	2.796	8.798	7.770	14.7	7.0	11.8	4.0	2.94	0.38	10.9	3.9	7.9
17	57.7	0.169	57.9	2.9	6.41	2.977	8.885	7.839	14.8	7.0	11.9	4.0	2.95	0.38	10.9	3.9	7.9
18	57.4	0.179	57.9	2.9	6.43	3.158	8.848	7.787	14.8	7.0	11.9	4.1	2.91	0.37	10.9	3.9	8.0

Specimen B

Reading No.	Deviator Load (lbs)	Axial Deformation (in)	Pore Pressure (psi)	Change in Pore Pressure (psi)	Corrected Area (in2)	Axial Strain (%)	Deviator Stress (psi)	Corrected Deviator Stress (psi)	σ_1 (psi)	σ_3 (psi)	σ'_1 (psi)	σ'_3 (psi)	σ'_1/σ'_3	Abar	P (psi)	Q (psi)	P' (psi)
19	58.7	0.189	57.8	2.9	6.44	3.329	9.046	7.963	14.9	7.0	12.1	4.1	2.94	0.36	11.0	4.0	8.1
20	59.7	0.199	57.8	2.8	6.45	3.500	9.208	8.104	15.1	7.0	12.2	4.1	2.95	0.35	11.0	4.1	8.2
21	60.3	0.209	57.7	2.8	6.46	3.681	9.307	8.183	15.2	7.0	12.4	4.2	2.95	0.34	11.1	4.1	8.3
22	61.2	0.219	57.7	2.7	6.47	3.852	9.456	8.310	15.3	7.0	12.6	4.2	2.96	0.33	11.1	4.2	8.4
23	62.3	0.229	57.7	2.7	6.48	4.033	9.629	8.459	15.4	7.0	12.7	4.3	2.98	0.32	11.2	4.2	8.5
24	64.2	0.239	57.6	2.7	6.50	4.204	9.940	8.740	15.7	7.0	13.0	4.3	3.03	0.30	11.3	4.4	8.7
25	64.9	0.249	57.6	2.6	6.51	4.385	10.039	8.817	15.8	7.0	13.2	4.3	3.03	0.30	11.4	4.4	8.8
26	64.7	0.259	57.6	2.6	6.52	4.566	10.014	8.775	15.7	7.0	13.2	4.4	3.00	0.29	11.4	4.4	8.8
27	65.9	0.268	57.5	2.5	6.53	4.727	10.200	8.936	15.9	7.0	13.4	4.4	3.01	0.28	11.4	4.5	8.9
28	67.1	0.279	57.5	2.5	6.54	4.908	10.399	9.107	16.1	7.0	13.6	4.5	3.04	0.27	11.5	4.6	9.0
29	68.4	0.289	57.4	2.5	6.56	5.089	10.610	9.288	16.3	7.0	13.8	4.5	3.06	0.27	11.6	4.6	9.2
30	69.0	0.298	57.4	2.4	6.57	5.260	10.709	9.364	16.3	7.0	13.9	4.5	3.06	0.26	11.7	4.7	9.2
31	69.8	0.309	57.3	2.4	6.58	5.441	10.833	9.462	16.4	7.0	14.1	4.6	3.05	0.25	11.7	4.7	9.3
32	70.3	0.318	57.3	2.3	6.59	5.612	10.908	9.514	16.5	7.0	14.2	4.7	3.05	0.24	11.7	4.8	9.4
33	71.4	0.329	57.2	2.3	6.61	5.793	11.094	9.669	16.6	7.0	14.4	4.7	3.06	0.24	11.8	4.8	9.5
34	72.4	0.338	57.2	2.3	6.62	5.964	11.255	9.802	16.8	7.0	14.5	4.7	3.08	0.23	11.9	4.9	9.6
35	73.1	0.349	57.2	2.2	6.63	6.145	11.367	9.887	16.9	7.0	14.6	4.7	3.09	0.23	11.9	4.9	9.7
36	73.7	0.359	57.2	2.2	6.64	6.326	11.466	9.959	16.9	7.0	14.7	4.8	3.09	0.22	12.0	5.0	9.8
37	74.4	0.369	57.1	2.2	6.66	6.507	11.578	10.043	17.0	7.0	14.9	4.8	3.09	0.22	12.0	5.0	9.8
38	75.1	0.379	57.1	2.1	6.67	6.688	11.689	10.126	17.1	7.0	15.0	4.9	3.09	0.21	12.0	5.1	9.9
39	76.3	0.390	57.1	2.1	6.68	6.869	11.875	10.278	17.2	7.0	15.2	4.9	3.11	0.20	12.1	5.1	10.0
40	77.9	0.399	57.0	2.1	6.69	7.040	12.136	10.500	17.5	7.0	15.4	4.9	3.14	0.20	12.2	5.3	10.2
41	78.8	0.409	57.0	2.0	6.71	7.211	12.285	10.617	17.6	7.0	15.6	5.0	3.13	0.19	12.3	5.3	10.3
42	79.2	0.419	56.9	2.0	6.72	7.392	12.347	10.653	17.6	7.0	15.6	5.0	3.13	0.19	12.3	5.3	10.3
43	79.6	0.430	56.9	1.9	6.73	7.573	12.409	10.688	17.7	7.0	15.7	5.0	3.12	0.18	12.3	5.3	10.4
44	80.2	0.439	56.9	1.9	6.74	7.744	12.508	10.758	17.7	7.0	15.8	5.1	3.12	0.18	12.4	5.4	10.5
45	81.2	0.449	56.8	1.9	6.76	7.915	12.670	10.885	17.9	7.0	16.0	5.1	3.14	0.17	12.4	5.4	10.5
46	81.5	0.459	56.8	1.8	6.77	8.096	12.719	10.908	17.9	7.0	16.1	5.2	3.12	0.17	12.4	5.5	10.6
47	82.6	0.469	56.8	1.8	6.78	8.267	12.893	11.046	18.0	7.0	16.2	5.2	3.13	0.16	12.5	5.5	10.7
48	83.8	0.479	56.7	1.8	6.80	8.448	13.079	11.193	18.2	7.0	16.4	5.2	3.15	0.16	12.6	5.6	10.8
49	85.1	0.488	56.7	1.7	6.81	8.609	13.290	11.364	18.3	7.0	16.6	5.3	3.16	0.15	12.7	5.7	10.9
50	86.2	0.498	56.7	1.7	6.82	8.790	13.464	11.499	18.5	7.0	16.8	5.3	3.18	0.15	12.7	5.7	11.0
51	86.0	0.509	56.6	1.7	6.84	8.971	13.439	11.452	18.4	7.0	16.8	5.3	3.15	0.14	12.7	5.7	11.0
52	86.0	0.519	56.6	1.6	6.85	9.152	13.439	11.427	18.4	7.0	16.8	5.4	3.13	0.14	12.7	5.7	11.1
53	87.3	0.529	56.5	1.6	6.86	9.333	13.638	11.583	18.6	7.0	17.0	5.4	3.15	0.14	12.8	5.8	11.2
54	88.6	0.539	56.5	1.6	6.88	9.514	13.848	11.749	18.7	7.0	17.2	5.4	3.17	0.13	12.8	5.9	11.3
55	89.0	0.550	56.5	1.5	6.89	9.695	13.923	11.792	18.8	7.0	17.2	5.5	3.16	0.13	12.9	5.9	11.4
56	89.6	0.560	56.4	1.5	6.90	9.876	14.022	11.856	18.8	7.0	17.4	5.5	3.16	0.12	12.9	5.9	11.4
57	90.7	0.570	56.4	1.5	6.92	10.057	14.196	11.987	19.0	7.0	17.5	5.5	3.17	0.12	13.0	6.0	11.5
58	91.2	0.580	56.4	1.4	6.93	10.228	14.270	12.029	19.0	7.0	17.6	5.6	3.16	0.12	13.0	6.0	11.6
59	92.1	0.590	56.3	1.4	6.95	10.409	14.419	12.137	19.1	7.0	17.7	5.6	3.17	0.11	13.0	6.1	11.7

Specimen B

Reading No.	Deviator Load (lbs)	Axial Deformation (in)	Pore Pressure (psi)	Change in Pore Pressure (psi)	Corrected Area (in2)	Axial Strain (%)	Deviator Stress (psi)	Corrected Deviator Stress (psi)	σ_1 (psi)	σ_3 (psi)	σ'_1 (psi)	σ'_3 (psi)	σ'_1/σ'_3	Abar	P (psi)	Q (psi)	P' (psi)
60	93.0	0.600	56.3	1.4	6.96	10.580	14.568	12.245	19.2	7.0	17.9	5.6	3.18	0.11	13.1	6.1	11.7
61	93.3	0.610	56.3	1.3	6.97	10.761	14.605	12.252	19.2	7.0	17.9	5.7	3.16	0.11	13.1	6.1	11.8
62	94.0	0.620	56.3	1.3	6.99	10.932	14.717	12.327	19.3	7.0	18.0	5.7	3.17	0.10	13.1	6.2	11.8
63	94.4	0.629	56.2	1.3	7.00	11.103	14.792	12.368	19.3	7.0	18.1	5.7	3.16	0.10	13.2	6.2	11.9
64	95.4	0.640	56.2	1.2	7.01	11.284	14.953	12.484	19.5	7.0	18.2	5.8	3.17	0.10	13.2	6.2	12.0
65	96.6	0.649	56.2	1.2	7.03	11.455	15.139	12.623	19.6	7.0	18.4	5.8	3.18	0.09	13.3	6.3	12.1
66	97.5	0.660	56.1	1.2	7.04	11.636	15.288	12.727	19.7	7.0	18.5	5.8	3.19	0.09	13.3	6.4	12.2
67	98.0	0.670	56.1	1.1	7.06	11.817	15.362	12.765	19.7	7.0	18.6	5.8	3.19	0.09	13.4	6.4	12.2
68	97.9	0.680	56.1	1.1	7.07	11.998	15.350	12.727	19.7	7.0	18.6	5.9	3.16	0.09	13.3	6.4	12.2
69	98.3	0.690	56.0	1.1	7.08	12.169	15.412	12.755	19.7	7.0	18.7	5.9	3.16	0.08	13.3	6.4	12.3
70	99.4	0.700	56.0	1.0	7.10	12.350	15.586	12.879	19.9	7.0	18.8	5.9	3.17	0.08	13.4	6.4	12.4
71	100.2	0.710	56.0	1.0	7.11	12.531	15.722	12.970	19.9	7.0	18.9	6.0	3.18	0.08	13.5	6.5	12.4
72	100.9	0.720	55.9	1.0	7.13	12.702	15.834	13.041	20.0	7.0	19.0	6.0	3.17	0.07	13.5	6.5	12.5
73	101.4	0.730	55.9	0.9	7.14	12.873	15.908	13.079	20.1	7.0	19.1	6.0	3.17	0.07	13.5	6.5	12.6
74	103.2	0.740	55.9	0.9	7.16	13.054	16.206	13.309	20.3	7.0	19.4	6.1	3.20	0.07	13.6	6.7	12.7
75	103.2	0.750	55.8	0.9	7.17	13.235	16.206	13.280	20.3	7.0	19.4	6.1	3.18	0.07	13.6	6.6	12.7
76	103.5	0.760	55.8	0.8	7.19	13.406	16.243	13.284	20.3	7.0	19.4	6.1	3.17	0.06	13.6	6.6	12.8
77	103.9	0.770	55.8	0.8	7.20	13.577	16.305	13.310	20.3	7.0	19.5	6.2	3.16	0.06	13.6	6.7	12.8
78	104.8	0.779	55.8	0.8	7.21	13.748	16.454	13.411	20.4	7.0	19.6	6.2	3.17	0.06	13.7	6.7	12.9
79	106.2	0.789	55.7	0.8	7.23	13.919	16.678	13.575	20.5	7.0	19.8	6.2	3.19	0.06	13.8	6.8	13.0
80	106.4	0.799	55.7	0.7	7.24	14.100	16.715	13.577	20.5	7.0	19.8	6.2	3.17	0.05	13.8	6.8	13.0
81	106.6	0.809	55.7	0.7	7.26	14.281	16.752	13.578	20.5	7.0	19.8	6.3	3.17	0.05	13.8	6.8	13.1
82	107.6	0.819	55.7	0.7	7.27	14.452	16.901	13.677	20.6	7.0	20.0	6.3	3.18	0.05	13.8	6.8	13.1
83	108.6	0.829	55.6	0.6	7.29	14.633	17.075	13.795	20.8	7.0	20.1	6.3	3.18	0.05	13.9	6.9	13.2
84	108.9	0.840	55.6	0.6	7.30	14.814	17.112	13.795	20.8	7.0	20.1	6.3	3.17	0.05	13.9	6.9	13.2
85	109.3	0.850	55.6	0.6	7.32	14.995	17.174	13.817	20.8	7.0	20.2	6.4	3.17	0.04	13.9	6.9	13.3
86	109.2	0.852	55.6	0.6	7.32	15.035	17.162	13.800	20.8	7.0	20.2	6.4	3.17	0.04	13.9	6.9	13.3

Specimen B

Reading No.	Deviator Load (lbs)	Axial Deformation (in)	Pore Pressure (psi)	Change in Pore Pressure (psi)	Corrected Area (in2)	Axial Strain (%)	Deviator Stress (psi)	Corrected Deviator Stress (psi)	σ_1 (psi)	σ_3 (psi)	σ'_1 (psi)	σ'_3 (psi)	σ'_1/σ'_3	Abar	P (psi)	Q (psi)	P' (psi)

Specimen C Shear Data

CU Triaxial Test

Contour Engineering

File Location
Plant McIntosh M-7 UD-2 (10-15-10).HSD

Project Information

Project No. AT10SOC03-M
Project Name: Plant McIntosh
Client: Southern Company
Sample Location: M-7, UD-2 16-18'
Sample Description: Tan SAND (SM)
Remarks:

Sample Data

Sample Type: Undisturbed
Specific Gravity: 2.6500001
LL: 0.000
PL: 0.000

Sample Parameters	Initial	After Consolidation	Final
Diameter (in)	2.863	2.854	
Height (in)	5.942	5.890	
Weight (grams)	1105.51		1104.53
Moisture (%)	42.53		40.72
Dry Density (pcf)	77.25	79.37	
Saturation (%)	98.73	100.00	
Void Ratio	1.138	1.084	

Test Data

Rate of Strain: 0.02
Cell Pressure (psi): 65.420
Effective Confining Stress (psi): 10.3
Corrected Peak Deviator Stress (psi): 10.936 at reading number: 87

Specimen C

Reading No.	Deviator Load (lbs)	Axial Deformation (in)	Pore Pressure (psi)	Change in Pore Pressure (psi)	Corrected Area (in2)	Axial Strain (%)	Deviator Stress (psi)	Corrected Deviator Stress (psi)	σ_1 (psi)	σ_3 (psi)	σ'_1 (psi)	σ'_3 (psi)	σ'_1/σ'_3	Abar	P (psi)	Q (psi)	P' (psi)
0	2.9	0.000	55.1	0.0	6.40	0.000	0.000	0.000	10.3	10.3	10.3	10.3	1.00	0.00	10.3	0.0	10.3
1	30.2	0.009	57.8	2.6	6.41	0.155	4.262	4.195	14.5	10.3	11.9	7.7	1.55	0.63	12.4	2.1	9.8
2	36.7	0.019	59.2	4.1	6.42	0.329	5.276	5.132	15.4	10.3	11.3	6.2	1.83	0.80	12.9	2.6	8.8
3	39.8	0.030	60.0	4.9	6.43	0.503	5.759	5.536	15.8	10.3	11.0	5.4	2.02	0.88	13.1	2.8	8.2
4	41.7	0.040	60.4	5.3	6.44	0.677	6.060	5.758	16.1	10.3	10.7	5.0	2.16	0.93	13.2	2.9	7.9
5	43.2	0.050	60.7	5.6	6.45	0.841	6.290	5.912	16.2	10.3	10.6	4.7	2.25	0.95	13.3	3.0	7.7
6	44.6	0.060	60.9	5.8	6.46	1.016	6.519	6.061	16.4	10.3	10.6	4.5	2.34	0.96	13.3	3.0	7.5
7	45.9	0.069	61.0	5.9	6.47	1.180	6.712	6.178	16.5	10.3	10.6	4.4	2.40	0.96	13.4	3.1	7.5
8	46.9	0.080	61.1	6.0	6.48	1.354	6.881	6.266	16.6	10.3	10.6	4.3	2.46	0.96	13.4	3.1	7.4
9	48.0	0.089	61.2	6.1	6.49	1.518	7.038	6.346	16.7	10.3	10.6	4.2	2.50	0.96	13.5	3.2	7.4
10	48.6	0.099	61.2	6.1	6.51	1.683	7.147	6.378	16.7	10.3	10.6	4.2	2.52	0.96	13.5	3.2	7.4
11	49.5	0.109	61.2	6.1	6.52	1.857	7.280	6.429	16.7	10.3	10.6	4.2	2.54	0.95	13.5	3.2	7.4
12	51.2	0.120	61.2	6.1	6.53	2.031	7.545	6.621	16.9	10.3	10.8	4.2	2.59	0.93	13.6	3.3	7.5
13	51.7	0.130	61.3	6.2	6.54	2.205	7.618	6.679	17.0	10.3	10.8	4.2	2.61	0.92	13.6	3.3	7.5
14	52.3	0.140	61.3	6.2	6.55	2.379	7.714	6.760	17.1	10.3	10.9	4.2	2.63	0.91	13.7	3.4	7.5
15	53.4	0.150	61.3	6.2	6.56	2.553	7.883	6.911	17.2	10.3	11.1	4.2	2.66	0.89	13.8	3.5	7.6
16	54.3	0.160	61.3	6.2	6.57	2.718	8.028	7.039	17.3	10.3	11.2	4.2	2.69	0.87	13.8	3.5	7.7
17	54.7	0.170	61.2	6.1	6.59	2.892	8.101	7.095	17.4	10.3	11.3	4.2	2.70	0.86	13.9	3.5	7.7
18	55.2	0.181	61.2	6.1	6.60	3.066	8.173	7.151	17.5	10.3	11.3	4.2	2.71	0.86	13.9	3.6	7.8

Specimen C

Reading No.	Deviator Load (lbs)	Axial Deformation (in)	Pore Pressure (psi)	Change in Pore Pressure (psi)	Corrected Area (in2)	Axial Strain (%)	Deviator Stress (psi)	Corrected Deviator Stress (psi)	σ_1 (psi)	σ_3 (psi)	σ'_1 (psi)	σ'_3 (psi)	σ'_1/σ'_3	Abar	P (psi)	Q (psi)	P' (psi)
19	55.7	0.190	61.2	6.1	6.61	3.230	8.245	7.208	17.5	10.3	11.4	4.2	2.72	0.85	13.9	3.6	7.8
20	56.7	0.201	61.2	6.1	6.62	3.404	8.402	7.345	17.7	10.3	11.5	4.2	2.75	0.83	14.0	3.7	7.9
21	57.5	0.210	61.2	6.1	6.63	3.569	8.535	7.460	17.8	10.3	11.7	4.2	2.77	0.82	14.0	3.7	7.9
22	58.5	0.220	61.2	6.1	6.64	3.743	8.680	7.584	17.9	10.3	11.8	4.2	2.79	0.80	14.1	3.8	8.0
23	59.2	0.230	61.2	6.1	6.66	3.907	8.801	7.686	18.0	10.3	11.9	4.3	2.81	0.79	14.2	3.8	8.1
24	59.8	0.240	61.2	6.1	6.67	4.072	8.897	7.764	18.1	10.3	12.0	4.3	2.82	0.78	14.2	3.9	8.1
25	60.7	0.250	61.1	6.0	6.68	4.236	9.030	7.877	18.2	10.3	12.2	4.3	2.83	0.76	14.2	3.9	8.2
26	61.4	0.260	61.1	6.0	6.69	4.410	9.139	7.965	18.3	10.3	12.3	4.3	2.85	0.76	14.3	4.0	8.3
27	61.8	0.269	61.1	6.0	6.70	4.575	9.199	8.007	18.3	10.3	12.3	4.3	2.85	0.75	14.3	4.0	8.3
28	62.3	0.280	61.1	6.0	6.72	4.749	9.284	8.072	18.4	10.3	12.4	4.3	2.86	0.74	14.3	4.0	8.4
29	63.0	0.290	61.1	6.0	6.73	4.923	9.392	8.159	18.5	10.3	12.5	4.3	2.88	0.73	14.4	4.1	8.4
30	63.7	0.300	61.1	6.0	6.74	5.097	9.501	8.246	18.6	10.3	12.6	4.4	2.89	0.72	14.4	4.1	8.5
31	64.2	0.310	61.0	5.9	6.75	5.271	9.585	8.309	18.6	10.3	12.7	4.4	2.90	0.71	14.5	4.2	8.5
32	64.9	0.321	61.0	5.9	6.76	5.445	9.694	8.395	18.7	10.3	12.8	4.4	2.91	0.70	14.5	4.2	8.6
33	65.3	0.331	61.0	5.9	6.78	5.619	9.754	8.435	18.7	10.3	12.9	4.4	2.91	0.70	14.5	4.2	8.6
34	65.8	0.341	61.0	5.9	6.79	5.784	9.827	8.488	18.8	10.3	12.9	4.4	2.92	0.69	14.6	4.2	8.7
35	66.7	0.351	61.0	5.9	6.80	5.967	9.972	8.606	18.9	10.3	13.0	4.4	2.94	0.68	14.6	4.3	8.7
36	67.1	0.361	61.0	5.9	6.81	6.132	10.032	8.646	19.0	10.3	13.1	4.5	2.94	0.68	14.6	4.3	8.8
37	67.4	0.371	61.0	5.9	6.83	6.306	10.080	8.674	19.0	10.3	13.1	4.5	2.95	0.67	14.6	4.3	8.8
38	68.1	0.381	60.9	5.8	6.84	6.470	10.189	8.759	19.1	10.3	13.2	4.5	2.96	0.67	14.7	4.4	8.9
39	68.4	0.391	60.9	5.8	6.85	6.635	10.237	8.787	19.1	10.3	13.3	4.5	2.94	0.66	14.7	4.4	8.9
40	69.1	0.399	61.1	6.0	6.86	6.770	10.346	8.875	19.2	10.3	13.2	4.3	3.06	0.68	14.7	4.4	8.8
41	69.8	0.411	60.9	5.8	6.88	6.983	10.455	8.954	19.3	10.3	13.5	4.5	2.97	0.64	14.8	4.5	9.0
42	70.7	0.421	60.9	5.8	6.89	7.147	10.587	9.060	19.4	10.3	13.6	4.6	2.99	0.63	14.8	4.5	9.1
43	71.0	0.431	60.9	5.8	6.90	7.322	10.636	9.086	19.4	10.3	13.6	4.6	2.99	0.63	14.9	4.5	9.1
44	71.1	0.441	60.8	5.7	6.91	7.486	10.660	9.091	19.4	10.3	13.7	4.6	2.99	0.63	14.9	4.5	9.1
45	71.7	0.451	60.8	5.7	6.93	7.660	10.744	9.150	19.5	10.3	13.7	4.6	2.99	0.62	14.9	4.6	9.2
46	72.6	0.461	60.8	5.7	6.94	7.824	10.889	9.266	19.6	10.3	13.9	4.6	3.01	0.61	14.9	4.6	9.3
47	73.5	0.471	60.8	5.7	6.95	7.999	11.034	9.381	19.7	10.3	14.0	4.6	3.02	0.60	15.0	4.7	9.3
48	73.7	0.481	60.8	5.7	6.97	8.173	11.058	9.384	19.7	10.3	14.0	4.6	3.02	0.60	15.0	4.7	9.3
49	74.1	0.491	60.8	5.7	6.98	8.337	11.119	9.421	19.7	10.3	14.1	4.7	3.02	0.60	15.0	4.7	9.4
50	74.7	0.501	60.7	5.6	6.99	8.511	11.215	9.490	19.8	10.3	14.2	4.7	3.03	0.59	15.1	4.7	9.4
51	75.0	0.511	60.7	5.6	7.00	8.676	11.263	9.515	19.8	10.3	14.2	4.7	3.02	0.59	15.1	4.8	9.5
52	75.7	0.521	60.7	5.6	7.02	8.850	11.384	9.606	19.9	10.3	14.3	4.7	3.04	0.58	15.1	4.8	9.5
53	76.1	0.531	60.7	5.6	7.03	9.014	11.433	9.631	19.9	10.3	14.4	4.7	3.04	0.58	15.1	4.8	9.5
54	76.0	0.541	60.7	5.6	7.04	9.188	11.420	9.600	19.9	10.3	14.3	4.7	3.03	0.58	15.1	4.8	9.5
55	76.8	0.551	60.7	5.5	7.06	9.362	11.541	9.690	20.0	10.3	14.5	4.8	3.04	0.57	15.2	4.8	9.6
56	77.3	0.561	60.6	5.5	7.07	9.527	11.626	9.747	20.1	10.3	14.5	4.8	3.04	0.57	15.2	4.9	9.7
57	77.8	0.571	60.6	5.5	7.08	9.701	11.710	9.803	20.1	10.3	14.6	4.8	3.04	0.56	15.2	4.9	9.7
58	78.4	0.582	60.6	5.5	7.10	9.875	11.795	9.859	20.2	10.3	14.7	4.8	3.04	0.56	15.2	4.9	9.8
59	78.6	0.591	60.6	5.5	7.11	10.039	11.831	9.872	20.2	10.3	14.7	4.8	3.05	0.56	15.2	4.9	9.8

Specimen C

Reading No.	Deviator Load (lbs)	Axial Deformation (in)	Pore Pressure (psi)	Change in Pore Pressure (psi)	Corrected Area (in2)	Axial Strain (%)	Deviator Stress (psi)	Corrected Deviator Stress (psi)	σ_1 (psi)	σ_3 (psi)	σ'_1 (psi)	σ'_3 (psi)	σ'_1/σ'_3	Abar	P (psi)	Q (psi)	P' (psi)
60	79.2	0.602	60.6	5.5	7.12	10.213	11.927	9.938	20.2	10.3	14.8	4.8	3.05	0.55	15.3	5.0	9.8
61	79.5	0.612	60.6	5.4	7.14	10.387	11.964	9.950	20.3	10.3	14.8	4.9	3.05	0.55	15.3	5.0	9.8
62	80.2	0.621	60.5	5.4	7.15	10.552	12.072	10.028	20.3	10.3	14.9	4.9	3.05	0.54	15.3	5.0	9.9
63	80.7	0.632	60.5	5.4	7.16	10.726	12.157	10.082	20.4	10.3	15.0	4.9	3.06	0.54	15.4	5.0	9.9
64	80.9	0.641	60.5	5.4	7.18	10.890	12.193	10.094	20.4	10.3	15.0	4.9	3.05	0.53	15.4	5.0	10.0
65	81.5	0.652	60.5	5.4	7.19	11.065	12.278	10.148	20.5	10.3	15.1	4.9	3.06	0.53	15.4	5.1	10.0
66	82.0	0.661	60.5	5.4	7.21	11.229	12.362	10.203	20.5	10.3	15.1	4.9	3.06	0.53	15.4	5.1	10.0
67	82.6	0.671	60.5	5.3	7.22	11.393	12.459	10.268	20.6	10.3	15.2	5.0	3.07	0.52	15.4	5.1	10.1
68	82.5	0.681	60.5	5.3	7.23	11.567	12.447	10.236	20.5	10.3	15.2	5.0	3.06	0.52	15.4	5.1	10.1
69	82.9	0.691	60.4	5.3	7.25	11.732	12.495	10.258	20.6	10.3	15.2	5.0	3.06	0.52	15.4	5.1	10.1
70	83.5	0.701	60.4	5.3	7.26	11.906	12.591	10.321	20.6	10.3	15.3	5.0	3.07	0.52	15.5	5.2	10.1
71	84.2	0.711	60.4	5.3	7.27	12.070	12.712	10.407	20.7	10.3	15.4	5.0	3.08	0.51	15.5	5.2	10.2
72	84.6	0.722	60.4	5.3	7.29	12.254	12.760	10.426	20.7	10.3	15.4	5.0	3.08	0.51	15.5	5.2	10.2
73	84.9	0.731	60.4	5.3	7.30	12.419	12.821	10.458	20.8	10.3	15.5	5.0	3.07	0.50	15.5	5.2	10.3
74	85.6	0.742	60.4	5.3	7.32	12.593	12.917	10.520	20.8	10.3	15.6	5.0	3.09	0.50	15.6	5.3	10.3
75	85.8	0.752	60.4	5.2	7.33	12.767	12.954	10.529	20.8	10.3	15.6	5.1	3.08	0.50	15.6	5.3	10.3
76	86.0	0.762	60.3	5.2	7.35	12.931	12.990	10.539	20.8	10.3	15.6	5.1	3.07	0.50	15.6	5.3	10.4
77	86.4	0.772	60.3	5.2	7.36	13.105	13.050	10.569	20.9	10.3	15.7	5.1	3.07	0.49	15.6	5.3	10.4
78	86.8	0.782	60.3	5.2	7.38	13.279	13.111	10.599	20.9	10.3	15.7	5.1	3.07	0.49	15.6	5.3	10.4
79	87.4	0.792	60.3	5.2	7.39	13.444	13.207	10.661	21.0	10.3	15.8	5.1	3.07	0.48	15.6	5.3	10.5
80	87.8	0.801	60.3	5.1	7.40	13.608	13.267	10.691	21.0	10.3	15.9	5.2	3.07	0.48	15.7	5.3	10.5
81	88.4	0.812	60.2	5.1	7.42	13.782	13.364	10.751	21.1	10.3	15.9	5.2	3.07	0.48	15.7	5.4	10.6
82	88.6	0.821	60.2	5.1	7.43	13.947	13.388	10.750	21.1	10.3	15.9	5.2	3.07	0.48	15.7	5.4	10.6
83	88.7	0.831	60.2	5.1	7.45	14.111	13.412	10.749	21.1	10.3	16.0	5.2	3.07	0.47	15.7	5.4	10.6
84	89.5	0.841	60.2	5.1	7.46	14.276	13.533	10.830	21.1	10.3	16.0	5.2	3.08	0.47	15.7	5.4	10.6
85	89.9	0.851	60.2	5.1	7.48	14.450	13.593	10.858	21.2	10.3	16.1	5.2	3.08	0.47	15.7	5.4	10.7
86	90.2	0.861	60.2	5.1	7.49	14.614	13.642	10.877	21.2	10.3	16.1	5.2	3.07	0.47	15.7	5.4	10.7
87	90.8	0.871	60.2	5.0	7.51	14.788	13.738	10.936	21.2	10.3	16.2	5.3	3.08	0.46	15.8	5.5	10.7
88	90.9	0.881	60.2	5.0	7.52	14.962	13.750	10.922	21.2	10.3	16.2	5.3	3.07	0.46	15.8	5.5	10.7
89	91.0	0.884	60.1	5.0	7.53	15.011	13.762	10.926	21.2	10.3	16.2	5.3	3.07	0.46	15.8	5.5	10.7

Specimen C

Reading No.	Deviator Load (lbs)	Axial Deformation (in)	Pore Pressure (psi)	Change in Pore Pressure (psi)	Corrected Area (in2)	Axial Strain (%)	Deviator Stress (psi)	Corrected Deviator Stress (psi)	σ_1 (psi)	σ_3 (psi)	σ'_1 (psi)	σ'_3 (psi)	σ'_1/σ'_3	Abar	P (psi)	Q (psi)	P' (psi)

ATTACHMENT E

Water Elevations

Plant McIntosh Ash Pond Dike
Calculation Number TV-MC-3160BW-001
Attachment E
Survey Information and Groundwater Elevations

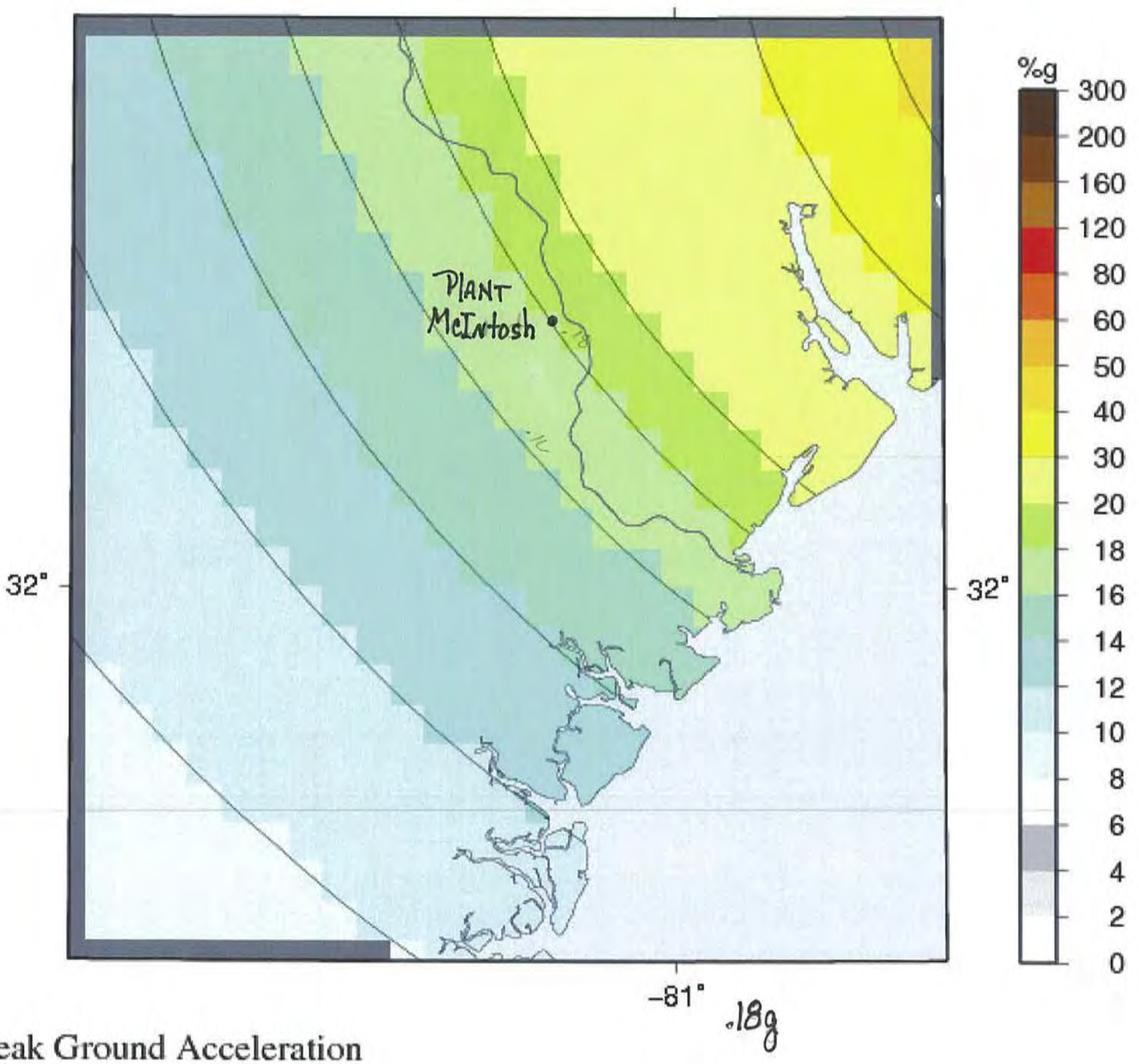
Well ID	Top of Ground Elev.	Top of Casing Elev.	Depth to Water 11/24/10, ft	Water Elev.	northing	easting
M1	61.59	63.44	19.04	44.40	856968.80	963491.20
M2	52.92	54.92	13.33	41.59	856996.6	963455.9
M6	60.54	62.47	16.33	46.14	856544.7	964100.9
M7	32.60	34.35	8.04	26.31	856614.4	964027.5

ATTACHMENT F

Hazard Map

Plant McIntosh Ash Pond Dike
Calculation #TV-MC-3160BW-001
Peak acceleration (%g) with a 2% probability of exceedance in 50 years
from: http://earthquake.usgs.gov/hazards/apps/cmaps
Attachment F

Custom Hazard Map



Peak Ground Acceleration

APPENDIX A

Document 18

Safety Procedure for Dams and Dikes, Southern Company Generations, June 29, 2009

GEN-10003, Rev. 0
APPROVAL:

TITLE,
Southern Company
Generation

SIGNATURE 6-29-09

Safety Procedure
for
Dams and Dikes

MCI-API 010

Table of Contents

10003.000 Purpose

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

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

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

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

10003.100 General Information

10003.110 Definitions

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

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

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

Crest – top of the dam

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

10003.120 Dam Safety Criteria

10003.120.1 FERC-Licensed Structures

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

10003.120.2 Other Structures

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

10003.130 Regulatory Interface

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

10003.140 Compliance

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

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

10003.200 Inspections

10003.210 Inspection Applicability

This procedure is applicable to the following water retaining structures:

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

10003.220 Inspection Scheduling

10003.220.1 Inspections by Plant Personnel

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

10003.220.2 Inspections by Dam Safety Engineers

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

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

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

10003.220.3 Unusual Circumstances

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

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

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

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

10003.230 Inspection Methodology

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

10003.230.1 Checklist for Inspection by Plant Personnel

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

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

10003.230.2 Checklist for Inspection by Dam Safety Engineers

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

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

10003.240 Inspection Documentation

10003.240.1 Documentation of Inspections by Plant Personnel

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

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

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

10003.240.2 Documentation of Inspections by Dam Safety Engineers

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

This report shall contain (at a minimum):

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

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

10003.240.2.1 Dam Safety Engineer Inspection Recommendation Tracking

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

10003.240.2.2 Dam Safety Engineer Inspection Report Distribution

Inspection reports will be distributed to the following:

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

6. Any other personnel designated by the Plant Manager

10003.300 Instrumentation

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

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

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

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

10003.400 Emergency Response

10003.410 Emergency Notification

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

10003.420 Dam Safety Problem Reporting

Suspected dam safety problems should be brought to the attention of the assigned SCG Hydro Services Dam Safety Engineer immediately by phone. If unable to contact the assigned Dam Safety Engineer, call the Dam Safety Referral Line number for contact information for the Engineer on duty.

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

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

10003.430 Emergency Equipment

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

10003.440 Emergency Supplies

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

10003.500 Training

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

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

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

10003.600 Vegetation Control

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

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

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

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

10003.700 Modification of Retaining Structures and Water Levels

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

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

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

10003.900 References

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

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

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

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

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

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

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

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

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

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

The Southern Company Records and Information Management Retention Schedule, Revision 12, June 16, 2009.
http://compliance.southernco.com/records-mgmt/SOCORIMRetentionSchedule_06_16_2009.pdf

APPENDIX B

Document 19

Dam Inspection Checklist Form

Site Name:	**Plant McIntosh**	**Date:**	**3 March 2011**
Unit Name:		**Operator's Name:**	**Georgia Power**
Unit I.D.:		**Hazard Potential Classification:**	**High** ☐ **Significant** ☐ **Low** ☒
	Inspector's Name:	Frank Lockridge, P.E. and Joe Klein, P.E.	

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

	Yes	No		Yes	No
1. Frequency of Company's Dam Inspections?	X		18. Sloughing or bulging on slopes?		X
2. Pool elevation (operator records)?	59.0		19. Major erosion or slope deterioration?		X
3. Decant inlet elevation (operator records)?	29.5		20. Decant Pipes:		
4. Open channel spillway elevation (operator records)?	N/A		Is water entering inlet, but not exiting outlet?		X
5. Lowest dam crest elevation (operator records)?	62.5		Is water exiting outlet, but not entering inlet?		X
6. If instrumentation is present, are readings recorded (operator records)?	X		Is water exiting outlet flowing clear?	X	
7. Is the embankment currently under construction?		X	21. Seepage (specify location, if seepage carries fines, and approximate seepage rate below):		
8. Foundation preparation (remove vegetation, stumps, topsoil in area where embankment fill will be placed)?	N/A Note Below		From underdrain?	**X** See Note Below	
9. Trees growing on embankment? (If so, indicate largest diameter below)		X	At isolated points on embankment slopes?		X
10. Cracks or scarps on crest?		X	At natural hillside in the embankment area?		X
11. Is there significant settlement along the crest?		X	Over widespread areas?		X
12. Are decant trashracks clear and in place?		X	From downstream foundation area?		X
13. Depressions or sinkholes in tailings surface or whirlpool in the pool area?		X	"Boils" beneath stream or ponded water?		X
14. Clogged spillways, groin or diversion ditches?		X	Around the outside of the decant pipe?		X
15. Are spillway or ditch linings deteriorated?		X	22. Surface movements in valley bottom or on hillside?		X
16. Are outlets of decant or underdrains blocked?		X	23. Water against downstream toe?		X
17. Cracks or scarps on slopes?		X	24. Were Photos taken during the dam inspection?	X	

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

Issue #	Comments
1	Daily observations are made by plant personnel. The Southern Company Generation (SCG) ***Safety Procedures for Dames and Dikes*** requires weekly documented inspections by plant personnel and annual inspections by SCG Hydro Services Dam Safety Engineers
8	Soil borings conducted for new stability analyses did not indicate topsoil under the dam. Construction photographs show area being stripped.
21	Seepage into under drain system reported to range from 0.2 gallons/minute (gpm) to 0.5 gpm in two sumps.

Coal Combustion Waste (CCW)

Impoundment Inspection

Impoundment NPDES Permit GA 0003883 **INSPECTOR** Frank Lockridge & Joe Klein

Date June 30, 1999
Impoundment Name Plant McIntosh

Impoundment Company Georgia Power
EPA Region IV

State Agency (Field Office) Address GA Department of Natural Resources
4220 International Parkway
Atlanta, GA
Name of Impoundment Plant McIntosh

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

New ☒ **Update** ☐

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

IMPOUNDMENT FUNCTION: Storage of sluiced coal combustion residue

Nearest Downstream Town Name: Port Wentworth, GA

Distance from the impoundment: Approx. 14 miles

Location:

Latitude	32	Degrees	21	Minutes	9.45	Seconds	**N**
Longitude	81	Degrees	10	Minutes	16.8	Seconds	**W**

State Georgia **County** Effingham

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

If So Which State Agency? GA Department of Natural Resources
Environmental Protection Division
Dam Safety Program

HAZARD POTENTIAL *(In the event the impoundment should fail, the following would occur):*

- [ ] **LESS THAN LOW HAZARD POTENTIAL:** Failure or misoperation of the dam results in no probable loss of human life or economic or environmental losses.

- [x] **LOW HAZARD POTENTIAL:** Dams assigned the low hazard potential classification are those where failure or misoperation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property.

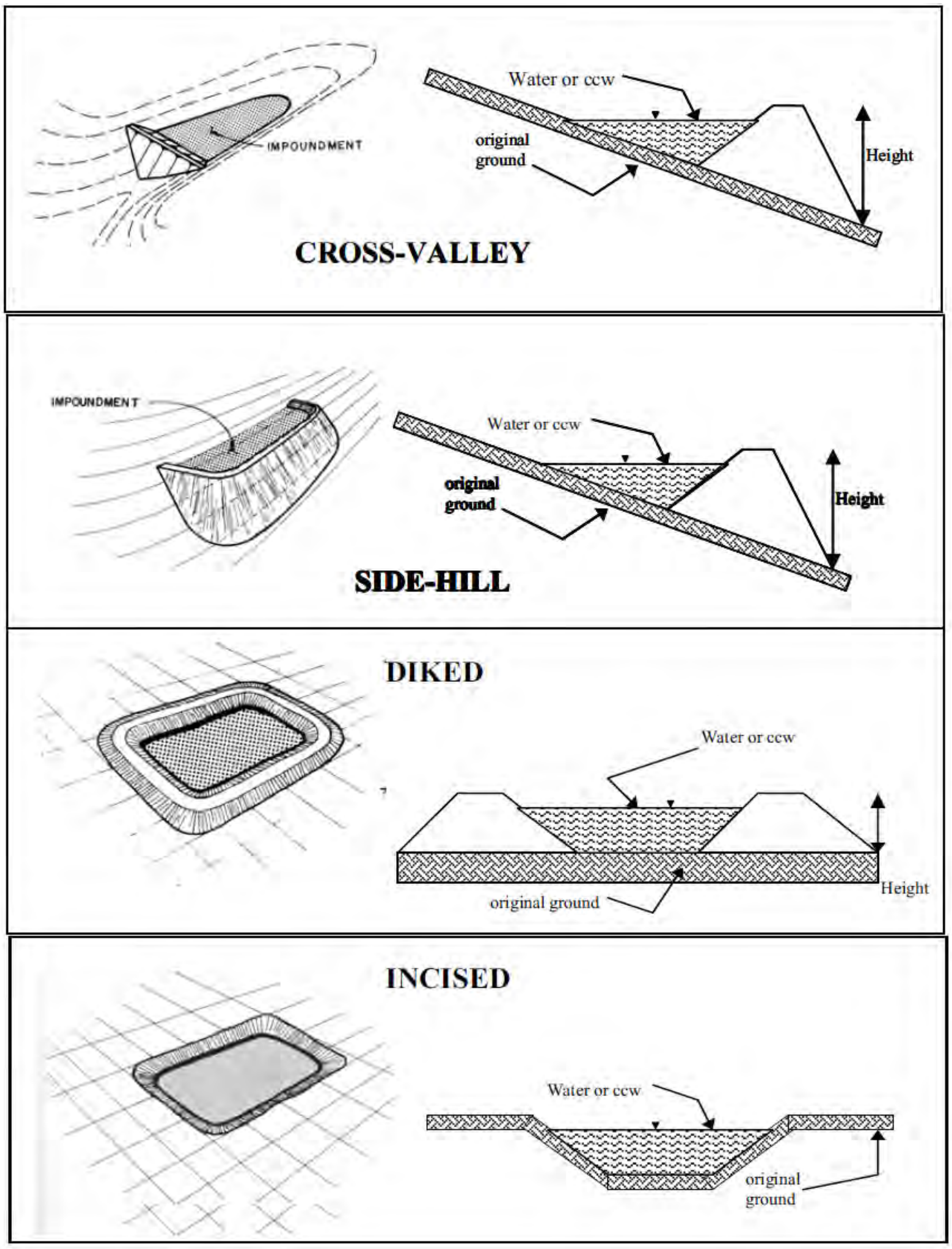
- [ ] **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure.

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

DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

The impoundment is in a relatively remote location. Based on the location and size of the impoundment, loss of life due to a failure or misoperation is not probable and the economic and/or environmental losses are expected to be limited to the owner's property.

CONFIGURATION:



- [ ] Cross-Valley
- [ ] Side-Hill
- [ ] Diked
- [ ] Incised (form completion optional)
- [x] Combination Incised/Diked

Embankment Height (ft)	36	**Embankment Material**	Silty clay
Pool Area (ac)	27	**Liner**	None
Current Freeboard (ft)	3.5	**Liner Permeability**	N/A

TYPE OF OUTLET (Mark all that apply)

☐ **Open Channel Spillway**

☐ Trapezoidal

☐ Triangular

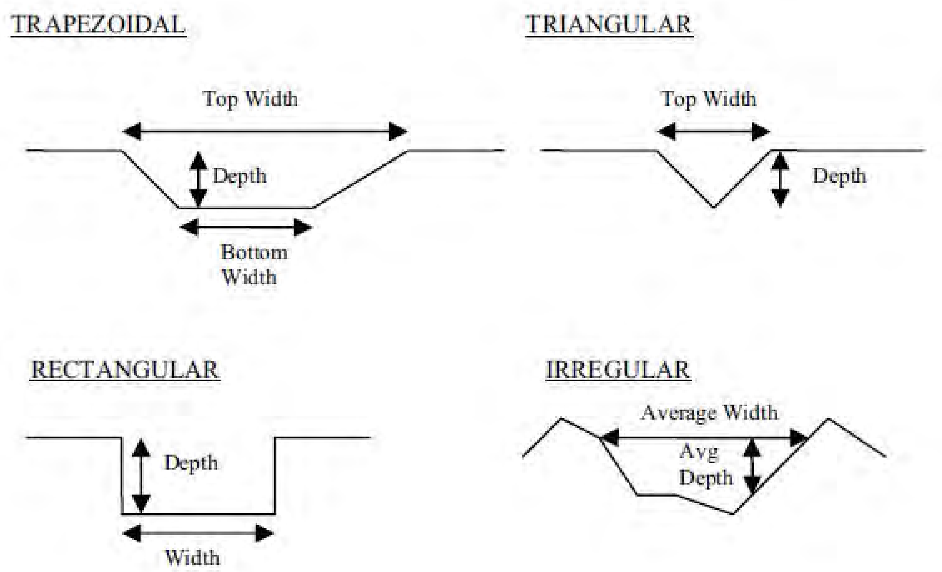
☐ Rectangular

☐ Irregular

depth (ft)

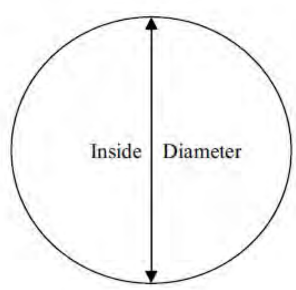
average bottom width (ft)

top width (ft)



☒ **Outlet**

48-inch diameter



Material

☐ corrugated metal

☐ welded steel

☒ concrete

☐ plastic (hdpe, pvc, etc.)

☐ other (specify):

	Yes	No
Is water flowing through the outlet?	☒	☐

☐ **No Outlet**

☐ **Other Type of Outlet** (specify):

The Impoundment was Designed By Reynolds, Smith and Hills Jacksonville, FL

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

If So Please Describe :

	Yes	No
Has there ever been significant seepages at this site?	☐	☒
If So When?		

If So Please Describe :

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

If So Please Describe :

New toe drain installed along eastern dike (Dike "C") in response to observed seepage. Piezometers installed to monitor groundwater levels.

<u>**ADDITIONAL INSPECTION QUESTIONS**</u>

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.

No.

Construction photographs show embankment subgrade consisting to natural soils.

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

No

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

No