

**PLANT McDONOUGH-ATKINSON  
CCR SURFACE IMPOUNDMENTS  
(CCR UNIT AP-1)  
COBB COUNTY, GEORGIA  
PART A SECTION 6 – GROUNDWATER  
MONITORING PLAN**

---

**FOR**



**Georgia  
Power**

**November 2018**

Golder Associates Inc.  
5170 Peachtree Road  
Building 100, Suite 300  
Atlanta, GA 30341  
(770) 496-1893



**GOLDER**

## Table of Contents

<b>1.0 INTRODUCTION .....</b>	<b>4</b>
<b>2.0 GEOLOGIC AND HYDROGEOLOGIC CONDITIONS .....</b>	<b>4</b>
2.1 Site Geology .....	4
2.2 Site Hydrogeology .....	5
2.3 Uppermost Aquifer .....	5
<b>3.0 SELECTION OF WELL LOCATIONS .....</b>	<b>5</b>
<b>4.0 MONITORING WELL DRILLING, CONSTRUCTION, ABANDONMENT &amp; REPORTING.....</b>	<b>6</b>
4.1 Drilling .....	6
4.2 Design and Construction.....	6
4.2.1 Well Casings and Screens .....	6
4.2.2 Well Intake Design .....	7
4.2.3 Filter Pack and Annular Seal .....	7
4.2.4 Protective Casing and Well Completion .....	8
4.2.5 Well Development.....	8
4.3 Well Abandonment.....	8
4.4 Documentation .....	9
<b>5.0 GROUNDWATER MONITORING PARAMETERS AND FREQUENCY .....</b>	<b>9</b>
<b>6.0 SAMPLE COLLECTION .....</b>	<b>11</b>
<b>7.0 CHAIN-OF-CUSTODY .....</b>	<b>12</b>
<b>8.0 FIELD AND LABORATORY QUALITY ASSURANCE/QUALITY CONTROL .....</b>	<b>12</b>
<b>9.0 REPORTING RESULTS .....</b>	<b>13</b>
<b>10.0 STATISTICAL ANALYSES .....</b>	<b>14</b>
<b>11.0 REFERENCES .....</b>	<b>18</b>

## Table of Contents (continued)

### TABLES

Table 1: GROUNDWATER MONITORING PARAMETERS & FREQUENCY .....	10
Table 2: ANALYTICAL METHODS.....	11

### FIGURES

Figure 1: STATISTICAL PLAN OVERVIEW .....	15
Figure 2: DECISION LOGIC FOR DETERMINING APPROPRIATE STATISTICAL METHOD .....	16
Figure 3: DECISION LOGIC FOR COMPUTING PREDICTION LIMITS .....	17

### APPENDICES

#### APPENDIX A MONITORING SYSTEM DETAILS

FIGURE 1	MONITORING WELL LOCATION MAP
TABLE A1	MONITORING WELL DETAILS
FIGURE 2	POTENTIOMETRIC MAP
TABLE A2	WATER LEVEL PIEZOMETER DETAILS
	MONITORING WELL LOGS
	PIEZOMETER WELL LOGS
	WELL ABANDONMENT DATA OF B-27

#### APPENDIX B GROUNDWATER MONITORING WELL DETAIL

#### APPENDIX C GROUNDWATER SAMPLING PROCEDURES

## CERTIFICATION

This Groundwater Monitoring Plan for Georgia Power Company's (Georgia Power) CCR Unit AP-1, located at Plant McDonough-Atkinson (Plant McDonough) was prepared by Golder Associates, Inc. (Golder). References to the appropriate 391-3-4 Rules are incorporated throughout this document.

I hereby certify that this Groundwater Monitoring Plan was prepared by, or under the direct supervision of, a "Qualified Groundwater Scientist," in accordance with the Rules of Solid Waste Management. According to 391-3-4-.01(57), a Qualified Groundwater Scientist is "a professional engineer or geologist registered to practice in Georgia who has received a baccalaureate or post-graduate degree in the natural sciences or engineering and has sufficient training and experience in groundwater hydrology and related fields that enable individuals to make sound professional judgments regarding groundwater monitoring, contaminant fate and transport, and corrective action." The design of the groundwater monitoring system was developed in compliance with the Georgia Environmental Protection Division (EPD) Rules of Solid Waste Management, Chapter 391-3-4.10(6).

**Golder Associates Inc.**



---

Rachel P. Kirkman, PG  
Georgia Registered Professional Geologist No. 1756



11/14/18

Date



---

Gregory L. Hebeler, PhD, PE  
Georgia Licensed Professional Engineer No. 034749



11/12/18

Date



## 1.0 INTRODUCTION

Groundwater monitoring is required by the Georgia Environmental Protection Division (EPD) to detect and quantify potential changes in groundwater chemistry. This Groundwater Monitoring Plan (plan) describes the groundwater monitoring program for the site. This plan meets the requirements of EPD rules and uses EPD's Manual for Ground Water Monitoring dated September 1991 as a guide. Monitoring well and piezometer locations are presented on Figures 1A through 2B in Appendix A for Ash Pond Unit 1 (AP-1) at Plant McDonough.

Monitoring will occur in accordance with 391-3-4-.10 of the Georgia Solid Waste Management Rules. If the monitoring requirements specified in this plan conflict with EPD rules (391-3-4), the EPD rules will take precedent.

In accordance with the United States Environmental Protection Agency (USEPA) Coal Combustion Rule (§257.90), which is incorporated by Georgia State CCR Rule by reference, a detection monitoring well network for AP-1 has been installed. The existing monitoring wells were installed following the guidelines presented herein. Additionally, this plan documents the methods for future monitoring well installation and/or replacement, and procedures for well abandonment. As required by 391-3-4.10(6)(g), a minor modification will be submitted to the EPD prior to the installation or decommissioning of monitoring wells. Well installation must be directed by a qualified groundwater scientist.

## 2.0 GEOLOGIC AND HYDROGEOLOGIC CONDITIONS

Geologic conditions for this site are described in detail in a report prepared by Southern Company Services (SCS) entitled *Site Acceptability Report* dated December 2007 as well as the Geological and Hydrogeological Report prepared by Golder Associates Inc., submitted as part of this Design and Operations plan set. Key elements of Golder's Geological and Hydrogeological Report are summarized below.

### 2.1 Site Geology

The Piedmont/Blue Ridge geologic province contains some of the oldest rock formations in the southeastern United States. These late Precambrian to late Paleozoic rocks have undergone repeated cycles of igneous intrusions and extrusions, metamorphism, folding, faulting, shearing, and silicification. Rock outcrops near the site consist of biotite gneiss, porphyritic gneiss, mica schist, and quartzite.

Based on review of site data, residual soils, primarily clayey/sandy silt, sandy silt with clay, and silty sand, occur as a variably-thick blanket overlying bedrock across most of the site. Saprolitic soils and/or saprolitic rock range in thickness across the site but are generally encountered at or near ground surface. Saprolitic rock is also considered to be transitionally weathered rock or partially weathered rock (PWR). PWR is defined by Standard Penetration Test (SPT) blow counts that exceed 50 blows/foot. Material overlying the top of rock surface, including residual soils, saprolite, and transitionally weathered rock or PWR, is collectively referred to as overburden.

Bedrock beneath the overburden north of the faulted intrusive contact is primarily characterized by Ordovician-age felsic sphene-epidote-biotite-quartz-feldspar gneiss (OZli) with well-developed foliation and an augen texture reflecting historical movement/deformation near fault and shear zones of the inactive Brevard fault zone. Bedrock beneath the overburden south of the faulted intrusive contact is primarily characterized by interlayered Ordovician-age phyllonite, button schist with well-developed shear foliation, fine-grained mylonite with poorly developed foliation, and very fine-grained mylonitic biotite gneiss with well-developed shear foliation (OZbs). The contact has had substantial movement as indicated by porphyroclastic-feldspars with sigmoidal-tails.

## 2.2 Site Hydrogeology

A regional, unconfined aquifer system is present at the site, consisting of regolith, transitional weathered rock, and shallow bedrock. A bedrock aquifer system also occurs beneath the site, consisting of deeper bedrock that is not well developed or interconnected with the unconfined aquifer system. Preferential groundwater flow is anticipated along lineaments and discontinuities. The regolith is variably comprised of porous and permeable alluvial, residual, and colluvial soils and saprolite, grading downward into a variably weathered, less permeable zone that overlies a less-weathered and more permeable transitional weathering zone (Heath, 1984). This unconfined, surficial aquifer system is recharged primarily through precipitation and subsequent infiltration, and flow is generally controlled by topography and surface water drainage and occurs mainly through intergranular pore spaces. Porosity generally ranges from about 20 to 30% and hydraulic conductivity ranges from 1 to 10-feet per day (ft/d). Groundwater is stored in pore spaces in the regolith and then percolates downward to the weathered zone between soil and bedrock and into interconnected bedrock discontinuities. The saturated soils in the regolith function as the principal storage reservoir for groundwater in the bedrock.

Groundwater occurs in a fracture network that is largely dependent on rock type, degree of differential weathering, topography, and area of catchment. Groundwater flow in the underlying bedrock occurs primarily along discontinuities such as compositional layering, foliation, joints, and fractures. Fracture porosity is minimum compared to the regolith, and thus, groundwater flow is determined by how well the fractures are inter-connected.

At the site, the water table aquifer and the upper bedrock aquifer together constitute an unconfined system. Limited groundwater level data indicate a high of 836-feet above mean sea level near the northern area and about 732-feet above mean sea level near the Chattahoochee River.

## 2.3 Uppermost Aquifer

The uppermost aquifer occurs within the overburden and upper bedrock at the site. Although the degree of connection between the overburden and underlying bedrock aquifer systems is not well known, the bedrock is generally massive with few joints available to receive groundwater from the overlying overburden. Consequently, groundwater flow within the uppermost aquifer is anticipated to occur primarily along the transitionally weathered rock zone, which is located at the interface between the overburden residual soils and massive bedrock, and upper bedrock.

Groundwater in the uppermost aquifer appears to be supporting base flow of creeks onsite (many groundwater contours cross topographic contours of similar elevation at headwaters of creek). A vertically upward hydraulic gradient appears to exist based on water level measurement data adjacent to the unnamed creek. However, generally across the site vertical gradients are assumed to be downward in topographically higher areas and upwards closer to the Chattahoochee River. Recharge to the uppermost aquifer is primarily through precipitation. Groundwater discharge appears to occur within tributary creeks onsite and the ponds. The potentiometric surface for the uppermost aquifer is generally southeast to south.

## 3.0 SELECTION OF WELL LOCATIONS

Groundwater monitoring wells are installed to monitor the uppermost aquifer beneath the site. Locations are selected based on final ash pond closure footprint and site geologic and hydrogeologic considerations. Locations are chosen to serve as upgradient (DGWA), lateral, or downgradient (DGWC) based on groundwater flow direction determined by potentiometric evaluation. As flow conditions change after pumping ceases, well designations will continue to be evaluated during each semi-annual event.

Monitoring wells will generally be located outside of areas with frequent auto traffic; however, wells may be installed in heavily trafficked areas when necessary to meet the groundwater monitoring objectives of the EPD rules.

A map depicting monitoring well locations for monitoring AP-1 is included in Appendix A, Monitoring System Details. Appendix A also includes a tabulated list of individual monitoring wells with well construction details such as location coordinates, top-of-casing elevation, well depths and screened intervals. A modification that involves the addition of or a change to the groundwater monitoring network must be made by a minor modification to the permit pursuant to 391-3-4-.02(3)(b)6.

## **4.0 MONITORING WELL DRILLING, CONSTRUCTION, ABANDONMENT & REPORTING**

The existing monitoring well network for AP-1 is currently in place. Existing monitoring wells were installed following Region 4 U.S. Environmental Protection Agency Science and Ecosystem Support Division Operating Procedure for Design and Installation of Monitoring Wells as a general guide for best practices. Monitoring well logs for the existing monitoring well network are included in Appendix A.

### **4.1 Drilling**

A variety of well drilling methods are available for installing groundwater wells. Drilling methodology may include, but not be limited to: hollow stem augers, direct push, air rotary, mud rotary, or rotosonic techniques. The drilling method shall minimize the disturbance of subsurface materials and shall not cause impact to the groundwater. Borings will be advanced using an appropriate drilling technology capable of drilling and installing a well in site-specific geology. Drilling equipment shall be decontaminated before use and between borehole locations using the procedures described in the latest version of the Region 4 U.S. Environmental Protection Agency Science and Ecosystem Support Division Operating Procedure for Field Equipment Cleaning and Decontamination as a guide.

Sampling and/or coring may be used to help determine the stratigraphy and geology. Samples will be logged under the oversight of a qualified groundwater scientist. Screen depths will be chosen based on the depth of the uppermost aquifer.

All drilling for any subsurface hydrologic investigation, installation or abandonment of groundwater monitoring wells will be performed by a driller that has, at the time of installation, a performance bond on file with the Water Well Standards Advisory Council.

Monitoring wells will be installed using the latest version of the Region 4 U.S. Environmental Protection Agency Science and Ecosystem Support Division Operating Procedure for Design and Installation of Monitoring Wells as a general guide for best practices.

### **4.2 Design and Construction**

Well construction materials will be sufficiently durable to resist chemical and physical degradation and will not interfere with the quality of groundwater samples.

#### **4.2.1 Well Casings and Screens**

American Society for Testing and Materials (ASTM), NSF rated, Schedule 40, 2-inch diameter polyvinyl chloride (PVC) pipe with flush threaded connections will be used for the well riser and screens. Compounds that can

cause PVC to deteriorate (e.g., organic compounds) are not expected at this facility. If conditions warrant, other appropriate materials may be used for construction with prior written approval from the EPD.

#### **4.2.2 Well Intake Design**

The design and construction of the intake of the groundwater wells shall: (1) allow sufficient groundwater flow to the well for sampling; (2) minimize the passage of formation materials (turbidity) into the well; and (3) ensure sufficient structural integrity to prevent the collapse of the intake structure.

Each groundwater monitoring well will include a well screen designed to limit the amount of formation material passing into the well when it is purged and sampled. Screens with 0.010-inch slots have proven effective for the earth materials at the site and will be used unless geologic conditions discovered at the time of installation dictate a different size. Screen length shall not exceed 10 feet without justification as to why a longer screen is necessary (e.g., significant variation in groundwater level). If the above techniques prove ineffective for developing a well with sufficient yield or acceptable turbidity, further steps will be taken to assure that the well screen is appropriately sized for the formation material. This may include performing sieve analysis of the formation material and determining well screen slot size based on the grain size distribution.

Pre-packed dual-wall well screens may be used for well construction. Pre-packed well screens combine a centralized inner well screen, a developed filter sand pack, and an outer conductor screen in one integrated unit composed of inert materials. Pre-packed well screens will be installed following general industry standards and using the latest version of the Region 4 U.S. Environmental Protection Agency Science and Ecosystem Support Division Operating Procedure for Design and Installation of Monitoring Wells as a general guide. If the dual-wall pre-packed-screened wells do not yield sufficient water or are excessively turbid after development, further steps will be taken to assure that the well screen is appropriately sized for the formation material. This may include performing sieve analysis of the formation material and determining well screen slot size based on the grain size distribution.

#### **4.2.3 Filter Pack and Annular Seal**

The materials used to construct the filter pack will be clean quartz sand of a size that is appropriate for the screened formation. Fabric filters will not be used as filter pack material. Sufficient filter material will be placed in the hole and measurements taken to ensure that no bridging occurs. Upon placement of the filter pack, the well may be pumped to assure settlement of the pack. If pumping is performed, the top of filter pack depth will be measured, and additional sand added if necessary. The filter pack will extend approximately one to two feet above the top of the well screen.

The materials used to seal the annular space must prevent hydraulic communication between strata and prevent migration from overlying areas into the well screen interval. A minimum of two feet of bentonite (chips, pellets, or slurry) will be placed immediately above the filter pack. The bentonite seal will extend up to the base of any overlying confining zone or the top of the water-bearing zone to prevent cementitious grout from entering the water-bearing or screened zone. If dry bentonite is used, the bentonite must be hydrated with potable water prior to grouting the remaining annulus.

The annulus above the bentonite seal will be grouted with a cement and bentonite mixture (approximately 94 pounds cement / 3 to 5 pounds bentonite / 6.5 gallons of potable water) placed via tremie pipe from the top of the bentonite seal. During grouting, care will be taken to assure that the bentonite seal is not disturbed by locating the base of the tremie pipe approximately 2 feet above the bentonite seal and injecting grout at low pressure/velocity.

#### **4.2.4 Protective Casing and Well Completion**

After allowing the grout to settle, the well will be finished by installing a flush-mount or above-ground protective casing as appropriate, and building a surface cap. The use of flush-mount wells will generally be limited to paved surfaces unless site operations warrant otherwise. The surface cap will extend from the top of the cement grout to ground surface, where it will become a concrete apron extending outward with a radius of at least 3 feet from the edge of the well casing and sloped to drain water away from the well.

Each well will be fitted with a cap that contains a hole or opening to allow the pressure in the well to equalize with atmospheric pressure. In wells with above-ground protection, the space between the well casing and the protective casing may be filled with coarse sand or pea-gravel to within approximately 6 inches of the top of the well casing. A small weep hole will be drilled at the base of the metal casing for the drainage of moisture from the casing. Above ground protective covers will be locked.

Protective bollards may be installed around each above-grade groundwater monitoring well. Well construction in high traffic areas will generally be limited unless site conditions warrant otherwise.

The groundwater monitoring well detail attached in Appendix B, Groundwater Monitoring Well Detail, illustrates the general design and construction details for a monitoring well.

#### **4.2.5 Well Development**

After well construction is completed, wells will be developed by alternately purging and surging until relatively clear discharge water with little turbidity is observed. The goal will be to achieve a turbidity of less than 10 nephelometric turbidity units (NTUs); however, formation-specific conditions may not allow this target to be accomplished. Additionally, the stabilization criteria contained in Appendix C, Groundwater Sampling Procedures, should be met. A variety of techniques may be used to develop site groundwater monitoring wells. The method used must create reversals or surges in flow to eliminate bridging by particles around the well screen. These reversals or surges can be created by using surge blocks, bailers, or pumps. The wells will be developed using a pump capable of inducing the stress necessary to achieve the development goals. Development equipment will be decontaminated prior to first use and between wells.

In low-yielding wells, potable water may be added to the well to facilitate surging of the well screen interval and removal of fine-grained sediment. If water is added, the volume will be documented and at minimum, an equal volume purged from the well.

Many geologic formations contain clay and silt particles that are small enough to work their way through the wells' filter packs over time. Therefore, the turbidity of the groundwater from the monitoring wells may gradually increase over time after initial well development. As a result, the monitoring wells may have to be redeveloped periodically to remove the silt and clay that has worked its way into the filter pack of the monitoring wells. Each monitoring well should be redeveloped when sample turbidity values have significantly increased since initial development or since prior redevelopment. The redevelopment should be performed as described above.

### **4.3 Well Abandonment**

Monitoring wells will be abandoned using industry-accepted practices and using the Manual For Groundwater Monitoring (1991) and Georgia Water Well Standards Act (1985) as guides. The wells will be abandoned under the direction of a geologist or engineer registered in Georgia. Neat Portland cement or bentonite will be used as appropriate to complete abandonment and seal the well borehole.

## 4.4 Documentation

The following information documenting the construction and development of each well will be submitted to EPD by a qualified groundwater scientist within 30 days after completing planned well installations.

- Name of drilling contractor and type of drill rig
- Documentation that the driller, at the time the monitoring wells were installed, had a bond on file with the Water Well Advisory Council
- Dates of drilling and initial well emplacement
- Drilling method and drilling fluid if used
- Well location ( $\pm 0.5$  ft.)
- Borehole diameter and well casing diameter
- Well depth ( $\pm 0.1$  ft.)
- Lithologic logs
- Well casing materials
- Screen materials and design
- Screen length
- Screen slot size
- Filter pack material/size and volume
- Sealant materials and volume
- Documentation of ground surface elevation ( $\pm 0.01$  ft.)
- Documentation of top of casing elevation ( $\pm 0.01$  ft.)
- Schematic of the well with dimensions

## 5.0 GROUNDWATER MONITORING PARAMETERS AND FREQUENCY

The following describes groundwater sampling requirements with respect to parameters for analysis, sampling frequency, sample preservation and shipment, and analytical methods. Groundwater samples used to provide compliance monitoring data will not be filtered prior to collection.

Table 1, Groundwater Monitoring Parameters and Frequency presents the groundwater monitoring parameters and sampling frequency. A minimum of eight independent samples from each groundwater well will be collected and analyzed for 40 CFR 257, Subpart D, Appendix III and Appendix IV test parameters to establish a background statistical dataset. Subsequently, in accordance with 391-3-4-.10(6), the monitoring frequency for the Appendix III parameters will be at least semi-annual during the active life of the facility and the post-closure care period. If required, assessment monitoring will be performed per Georgia Chapter 391-3-4-.10, Rules for Solid Waste Management. Georgia Power may petition for an alternate monitoring schedule for the site pursuant to applicable rules.

When referenced throughout this plan, Appendix III and Appendix IV parameters refer to the parameters contained in Appendix III and Appendix IV of 40 CFR 257, Subpart D, 80 Fed. Reg. 21468 (April 17, 2015).

As shown on Table 2, Analytical Methods, the groundwater samples will be analyzed using methods specified in USEPA Manual SW-846, EPA 600/4-79-020, Standard Methods for the Examination of Water and Wastewater (SM18-20), USEPA Methods for the Chemical Analysis of Water and Wastes (MCAWW), ASTM, or other suitable analytical methods approved by the Georgia EPD. The method used will be able to reach a suitable practical quantification limit to detect natural background conditions at the facility. Field instruments used to measure pH must be accurate and reproducible to within 0.1 Standard Units (S.U.).

**Table 1: GROUNDWATER MONITORING PARAMETERS & FREQUENCY**

MONITORING PARAMETER		GROUNDWATER MONITORING	
		Background	Semi-Annual Events
Field Parameters	Temperature	X	X
	pH	X	X
	Specific Conductance	X	X
	ORP	X	X
	Turbidity	X	X
	Dissolved Oxygen	X	X
Appendix III (Detection)	Boron	X	X
	Calcium	X	X
	Chloride	X	X
	Fluoride	X	X
	pH	X	X
	Sulfate	X	X
	Total Dissolved Solids	X	X
Appendix IV (Assessment)	Antimony	X	Assessment sampling frequency and parameter list determined in accordance with Georgia Chapter 391-3-4.10(6)
	Arsenic	X	
	Barium	X	
	Beryllium	X	
	Cadmium	X	
	Chromium	X	
	Cobalt	X	
	Fluoride	X	
	Lead	X	
	Lithium	X	
	Mercury	X	
	Molybdenum	X	
	Selenium	X	
	Thallium	X	
	Radium 226 & 228	X	



**Table 2: ANALYTICAL METHODS**

PARAMETERS	EPA METHOD NUMBER
<b>APPENDIX III</b>	
Boron	EPA 6010B/6020
Calcium	EPA 6010B/6020
Chloride	EPA 300.0/300.1/9250/9251/9253/9056A
Fluoride	EPA 300.0/300.1/9214/9056A
pH	150.1 field
Sulfate	EPA 9035/9036/9038300.0/300.1/9056A
Total Dissolved Solids (TDS)	EPA 160/2540C
<b>APPENDIX IV</b>	
Antimony	EPA 7040/7041/6010B/6020
Arsenic	EPA 7060A/7061A/6010B/6020
Barium	EPA 7080A/7081/6010B/6020
Beryllium	EPA 7090/7091/6010B/6020
Cadmium	EPA 7130/7131A/6020
Chromium	EPA 7190/7191/6010B/6020
Cobalt	EPA 7200/7201/6010B/6020
Fluoride	EPA 300.0/300.1/9214/9056/9214
Lead	EPA 7420/7421/6010B/6020
Lithium	EPA 6010/6020B
Mercury	EPA 7470
Molybdenum	EPA 6010/6020B
Selenium	EPA 7740/7741A/6010B/6020
Thallium	EPA 7840/7841/6010/6020
Radium 226 and 228 combined	EPA 903/9320/9315

## 6.0 SAMPLE COLLECTION

During each sampling event, samples will be collected and handled in accordance with the procedures specified in Appendix C, Groundwater Sampling Procedures. Sampling procedures were developed using standard industry practice and USEPA Region 4 Field Branches Quality System and Technical Procedures as a guide. Low-flow sampling methodology will be utilized for sample collection. Alternative industry accepted sampling techniques may be used when appropriate with prior EPD approval.

For groundwater sampling, positive gas displacement Teflon or stainless-steel bladder pumps will be used for purging. If dedicated bladder pumps are not used, portable bladder pumps or peristaltic pumps (with dedicated or disposable tubing) may be used. When non-dedicated equipment is used, it will be decontaminated prior to use and between wells.

Groundwater wells that are determined to be dry for two consecutive sampling events should be replaced, unless an alternate schedule has been approved by EPD.



## 7.0 CHAIN-OF-CUSTODY

Samples will be handled under chain-of-custody (COC) procedures beginning in the field. The COC record will contain the following information:

- Sample identification numbers
- Signature of collector
- Date and time of collection
- Sample type
- Sample point identification
- Number of sample containers
- Signature of person(s) involved in the chain of possession
- Dates of possession by each individual

The samples will remain in the custody of assigned personnel, an assigned agent, or the laboratory. If the samples are transferred to other employees for delivery or transport, the sampler or possessor must relinquish possession and the samples must be received by the new owner.

If the samples are being shipped, a hard copy COC will be signed and enclosed within the shipping container.

Samplers must use COC forms provided by the analytical laboratory or use a COC form similarly formatted and containing the information listed above.

## 8.0 FIELD AND LABORATORY QUALITY ASSURANCE/QUALITY CONTROL

Field quality control samples will be prepared the same as compliance samples with regards to sample volume, containers, and preservation. The following quality control samples will be collected during each sampling event:

Field Equipment Rinsate Blanks - Where sampling equipment is not new or dedicated, an equipment rinsate blank will be collected at a rate of one blank per 20 samples using non-dedicated equipment.

Field Duplicates - Field duplicates are collected by filling additional containers at the same location, and the field duplicate is assigned a unique sample identification number. One blind field duplicate will be collected for every 20 samples.

Field Blanks - Field blanks are collected in the field using the same water source that is used for decontamination. The water is poured directly into the supplied sample containers in the field and submitted to the laboratory for analysis of target constituents. One field blank will be collected for every 20 samples.

The groundwater samples will be analyzed by licensed and accredited laboratories through the National Environmental Laboratory Accreditation Program (NELAP).

## 9.0 REPORTING RESULTS

A semi-annual groundwater report that documents the results of sampling and analysis will be submitted to EPD. Semi-annual groundwater monitoring reports will be submitted to the EPD within 90 days of receipt of the groundwater analytical data from the laboratory. At a minimum, semi-annual reports will include:

- 1) A narrative describing sampling activities and findings including a summary of the number of samples collected, the dates the samples were collected and whether the samples were required by the detection or assessment monitoring programs
- 2) A brief overview of purging/sampling methodologies
- 3) Discussion of results
- 4) Recommendations for the future monitoring consistent with the Rules
- 5) Potentiometric surface contour map for the aquifer(s) being monitored, signed and sealed by a Georgia-registered P.G. or P.E.
- 6) Table of as-built information for groundwater monitoring wells including top of casing elevations, ground elevations, screened elevations, current groundwater elevations and depth to water measurements
- 7) Groundwater flow rate and direction calculations
- 8) Identification of any groundwater wells that were installed or decommissioned during the preceding year, along with a narrative description of why these actions were taken
- 9) A narrative discussion of any transition between monitoring programs (e.g., the date and circumstances for transitioning from detection monitoring to assessment monitoring in addition to identifying the constituent(s) detected at a statistically significant increase over background levels
- 10) If applicable, semi-annual assessment monitoring results
- 11) Any alternate source demonstration completed during the previous monitoring period, if applicable
- 12) Laboratory Reports
- 13) COC documentation
- 14) Field sampling logs including field instrument calibration, indicator parameters and parameter stabilization data
- 15) Documentation of non-functioning wells
- 16) Table of current analytical results for each well, highlighting statistically significant increases and concentrations above maximum contaminant level (MCL)
- 17) Statistical analyses
- 18) Certification by a qualified groundwater scientist.

## 10.0 STATISTICAL ANALYSES

Groundwater quality data from each sampling event will be statistically evaluated to determine if there has been a statistically significant change in groundwater chemistry. Historical background data will be used to determine statistical limits.

According to EPD rules (391-3-4-.10(6)(a), which incorporates the statistical analysis requirements of 40 CFR 257.93 by reference), the site must specify in the operating record the statistical methods to be used in evaluating groundwater monitoring data for each constituent. The statistical test chosen shall be conducted separately for each constituent in each well. As authorized by the rule, statistical tests that may be used include:

- 1) A prediction interval procedure in which an interval for each constituent is established from the distribution of the background data, and the level of each constituent in each compliance well is compared to the upper prediction limit (§257.93(f)(3)).
- 2) A control chart approach that gives control limits for each constituent (§257.93(f)(4)).
- 3) Another statistical test method (such as prediction limits or control charts) that meets the performance standards of §257.93(g). A justification for an alternative method will be placed in the operating record and the Director notified of the use of an alternative test. The justification will demonstrate that the alternative method meets the performance standards of §257.93(g).

Based on site-specific conditions, statistical methods may be intra-well, inter-well, or combination of both.

A site-specific statistical analysis plan that provides details regarding the statistical methods to be used will be placed in the site's operating record pursuant to 391-3-4-.10(6). Figure 1, Statistical Plan Overview, includes a flowchart that depicts the process that will be followed to develop the site-specific plan. Figure 2, Decision Logic for Determining Appropriate Statistical Method, depicts the decision logic that will be used to determine the appropriate method as required by 391-3-4-.10(6). Figure 3, Decision Logic for Computing Prediction Limits, presents the logic that will be used to calculate site-specific statistical limits and test compliance results against those limits.

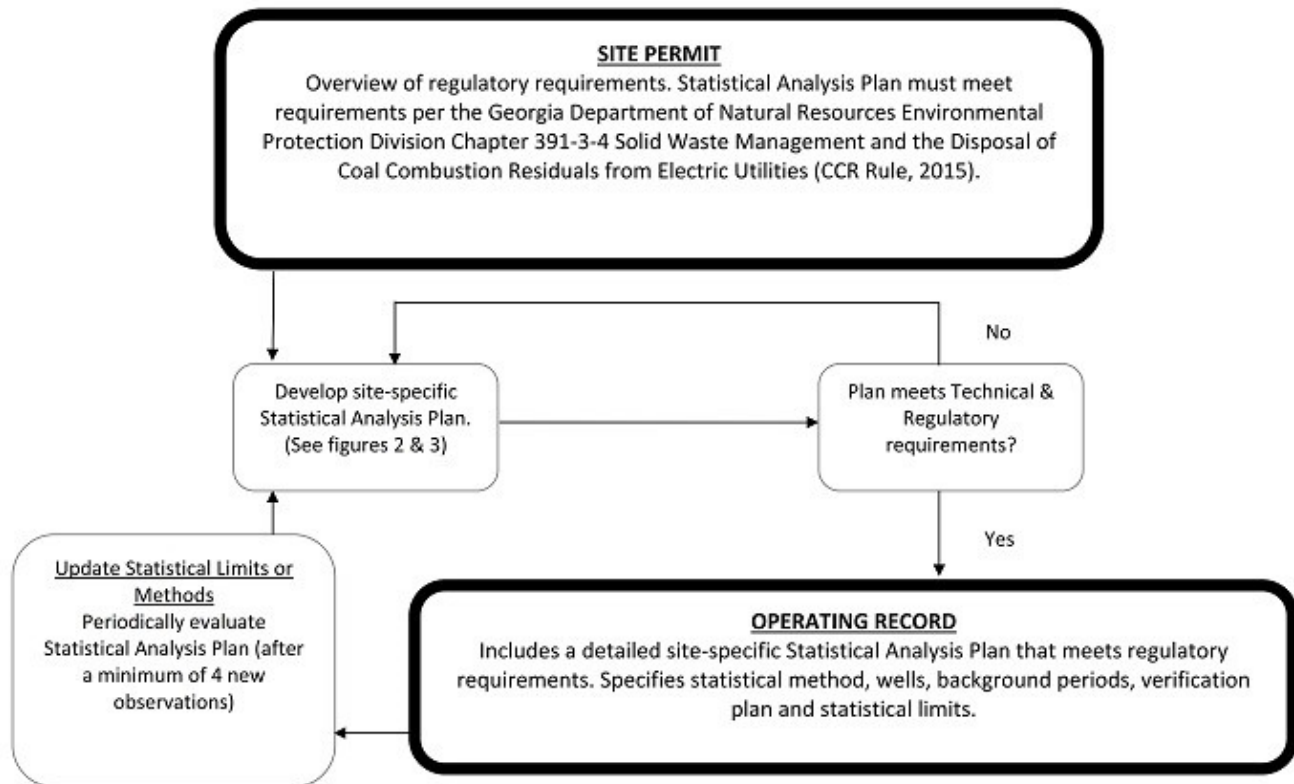


Figure 1: STATISTICAL PLAN OVERVIEW

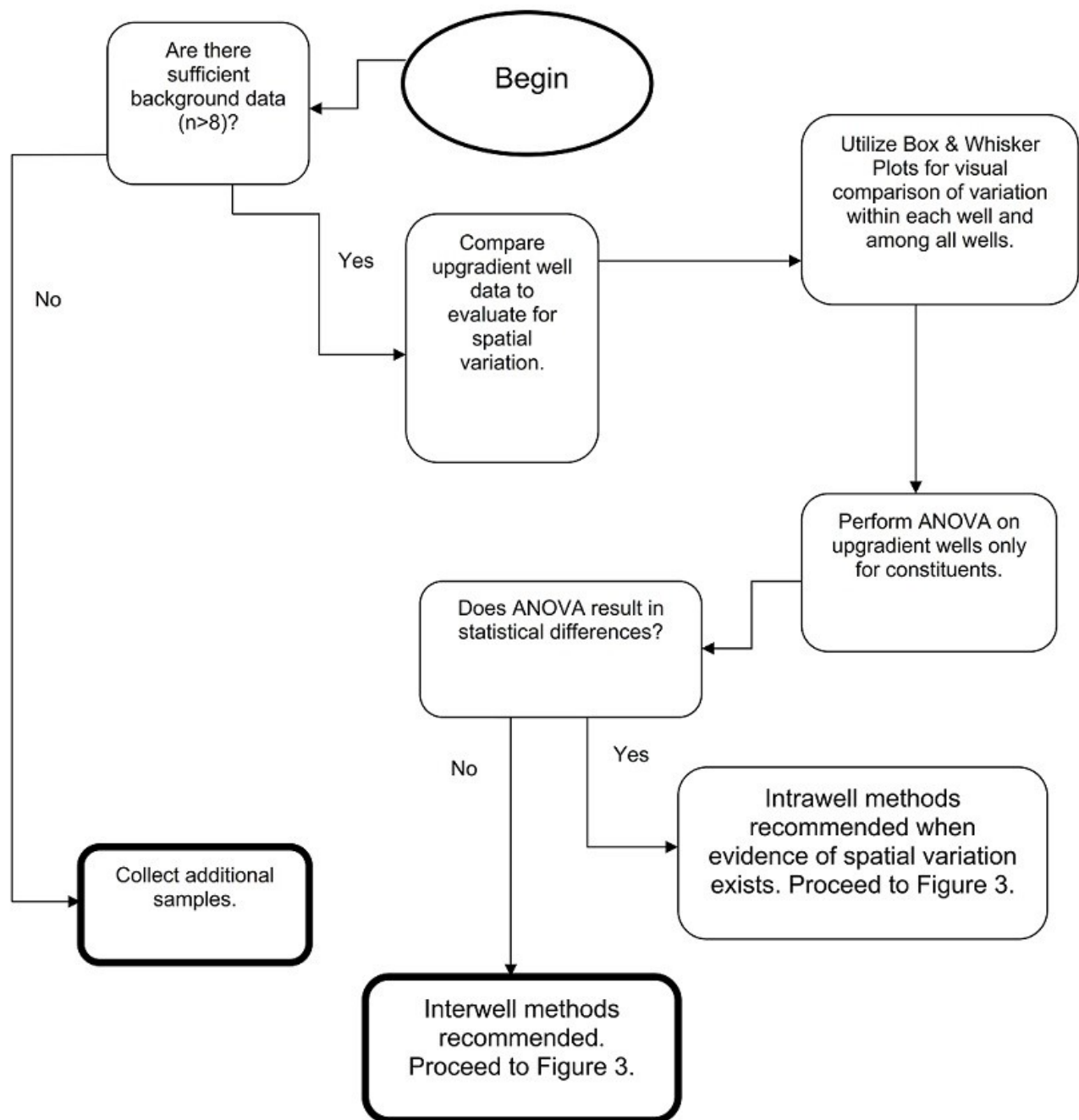


Figure 2: DECISION LOGIC FOR DETERMINING APPROPRIATE STATISTICAL METHOD

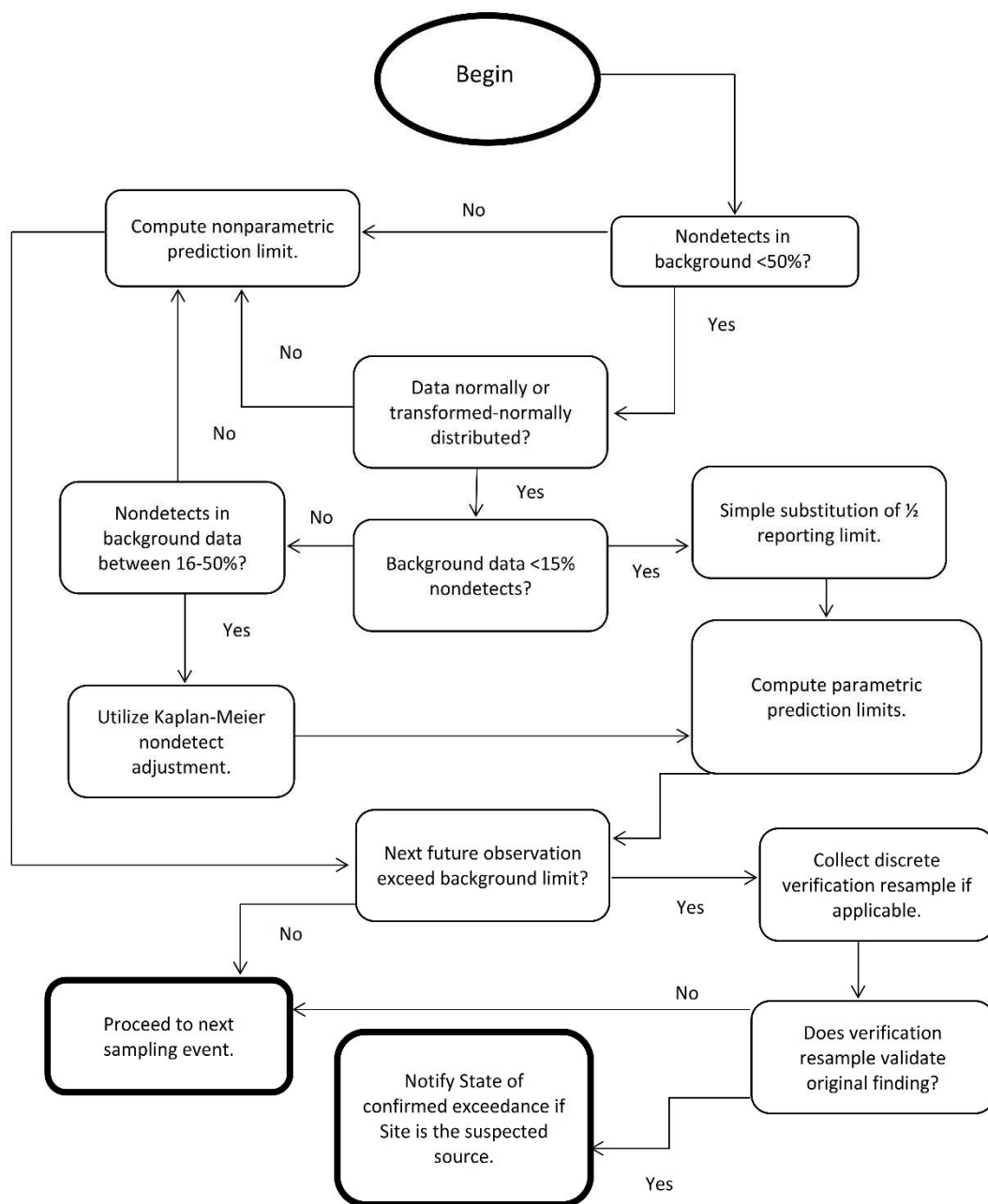


Figure 3: DECISION LOGIC FOR COMPUTING PREDICTION LIMITS

## 11.0 REFERENCES

American Society for Testing and Materials (ASTM)

Georgia (GA) Department of Natural Resources Environmental Protection Division, Rules of Solid Waste Management, Chapter 391-3-4-.10(6), Georgia Environmental Protection Division.

Georgia Water Well Standards Act (1985)

Golder Associates Inc., Geological and Hydrogeological Report (November 2018)

Manual for Groundwater Monitoring (1991)

National Environmental Laboratory Accreditation Program (NELAP)

Region 4 U.S. Environmental Protection Agency Science and Ecosystem Support Division, Operating Procedure for Design and Installation of Monitoring Wells

Region 4 U.S. Environmental Protection Agency Science and Ecosystem Support Division, Operating Procedure for Field Equipment Cleaning and Decontamination

Region 4 U.S. Environmental Protection Agency, Field Branches Quality System and Technical Procedures

U.S. Environmental Protection Agency, 40 CFR 257, Subpart D, 80 Fed. Reg. 21468 (April 17, 2015)

U.S. Environmental Protection Agency, Manual SW-846, EPA 600/4-79-020, Standard Methods for the Examination of Water and Wastewater (SM18-20)

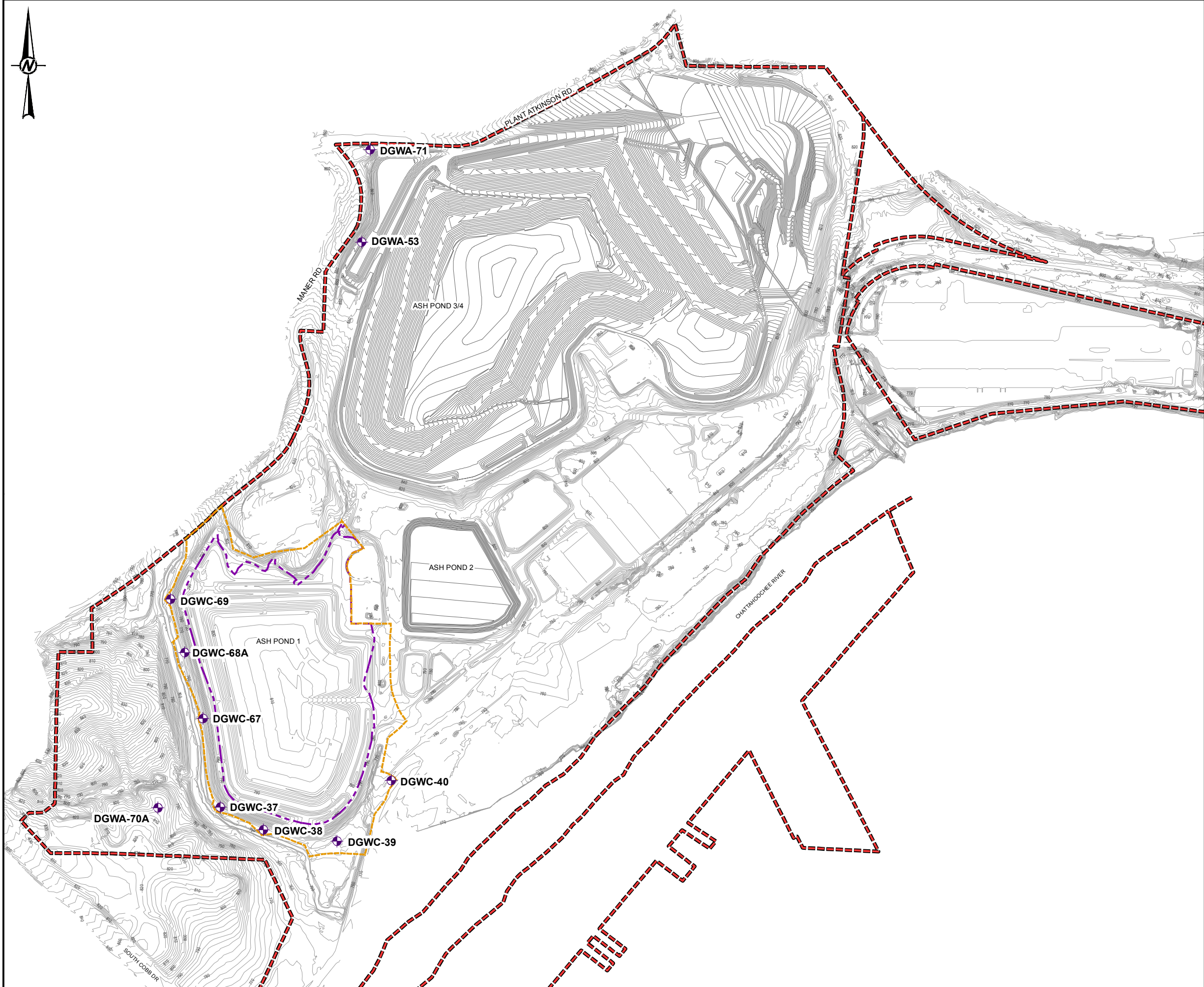
U.S. Environmental Protection Agency, Methods for the Chemical Analysis of Water and Wastes (MCAWW)

## APPENDIX A

# MONITORING SYSTEM DETAILS

FIGURE 1	MONITORING WELL LOCATION MAP
TABLE A1	MONITORING WELL DETAILS
FIGURE 2	POTENTIOMETRIC MAP
TABLE A2	WATER LEVEL PIEZOMETER DETAILS
MONITORING WELL LOGS	
PIEZOMETER WELL LOGS	
B-27 ABANDONMENT DOCUMENTATION	



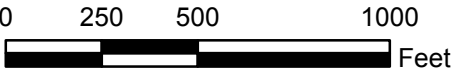


- LEGEND**
- MONITORING WELL
  - AP-1 PERMIT BOUNDARY
  - CORRIDOR PIPE
  - APPROXIMATE PRE-CLOSURE ASH LIMITS
  - PROPERTY BOUNDARY
  - FINAL CLOSURE GRADING
  - EXISTING TOPOGRAPHY

**REFERENCE**

1. THE EXISTING TOPOGRAPHY AND CONTOUR ELEVATIONS WERE PROVIDED BY GEORGIA LAND DEPARTMENT AND METRO ENGINEERING AND SURVEYING CO., INC. THE DATE OF THE SURVEY PROVIDED AND SHOWN ON THIS SET OF PLANS IS 03-18-2018. REFER TO THE SURVEY DRAWING TITLED "TOPOGRAPHIC MAP PREPARED FOR GEORGIA POWER COMPANY PLANT MCDONOUGH - GEORGIA STATE PLANE WEST SURVEY FEET - DATE OF PHOTOGRAPHY 03-18-2018.

2. GRADING SHOWN AT AP-2 AND AP-3/4 REFLECTS THE FINAL GRADING PLAN AS DESIGNED AND PRESENTED IN THE PLANT MCDONOUGH-ATKINSON ASH PONDS NO. 2, 3 & 4 CLOSURE PERMIT PLANS DATED NOVEMBER 2018.



CLIENT  
GEORGIA POWER COMPANY



PROJECT  
PLANT MCDONOUGH- ATKINSON  
ASH POND 1 (AP-1)  
GROUNDWATER MONITORING PLAN

TITLE  
**MONITORING WELL LOCATION MAP**

CONSULTANT	YYYY-MM-DD	2018-10-01
	PREPARED	DJC
	DESIGN	GFD
	REVIEW	KNJ
	APPROVED	RPK/GLH



PROJECT No. 1777449 CONTROL 1777449B001B-GIS.mxd Rev. 0

FIGURE  
**1**

**TABLE A1  
MONITORING WELL DETAILS**

**Georgia Power Company Plant McDonough  
Ash Pond Unit AP-1**



New Well-ID	Former Well-ID	Boring ID	Northing	Easting	Top of Casing Elevation (feet msl)	Ground Surface Elevation (feet msl)	Total Depth (feet bgs)	Top of Screen Elevation (feet msl)	Bottom of Screen Elevation (feet msl)	Screen Length (feet)
<b>ASH POND Unit AP-1 MONITORING WELL NETWORK</b>										
DGWA-53	B-53	B-53	1393475.82	2201668.95	850.74	847.24	29.0	830	820	10
DGWA-70A	B-70A	B-70A	1390481.13	2200590.67	808.60	805.45	59.3	757	747	10
DGWA-71	B-71	B-71	1393965.35	2201713.63	863.95	861.05	45.0	828	818	10
DGWC-37	B-37	B-37	1390483.94	2200919.39	850.93	847.62	49.0	809	799	10
DGWC-38	B-38	B-38	1390364.53	2201147.65	766.19	763.60	39.7	734	724	10
DGWC-39	B-39	B-39	1390303.39	2201538.45	757.44	754.68	25.0	740	730	10
DGWC-40	B-40	B-40	1390625.63	2201826.76	759.67	756.95	21.2	746	736	10
DGWC-67	B-67	B-67	1390954.46	2200828.90	779.07	775.49	34.9	751	741	10
DGWC-68A	B-68A	B-68A	1391301.86	2200732.41	766.76	766.34	56.3	720	710	10
DGWC-69	B-69	B-69	1391584.72	2200656.14	765.61	765.00	29.8	746	736	10
<b>Notes:</b> bgs - below ground surface; msl - mean sea level										

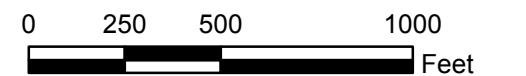




## LEGEND


**NOTE**

## REFERENCE

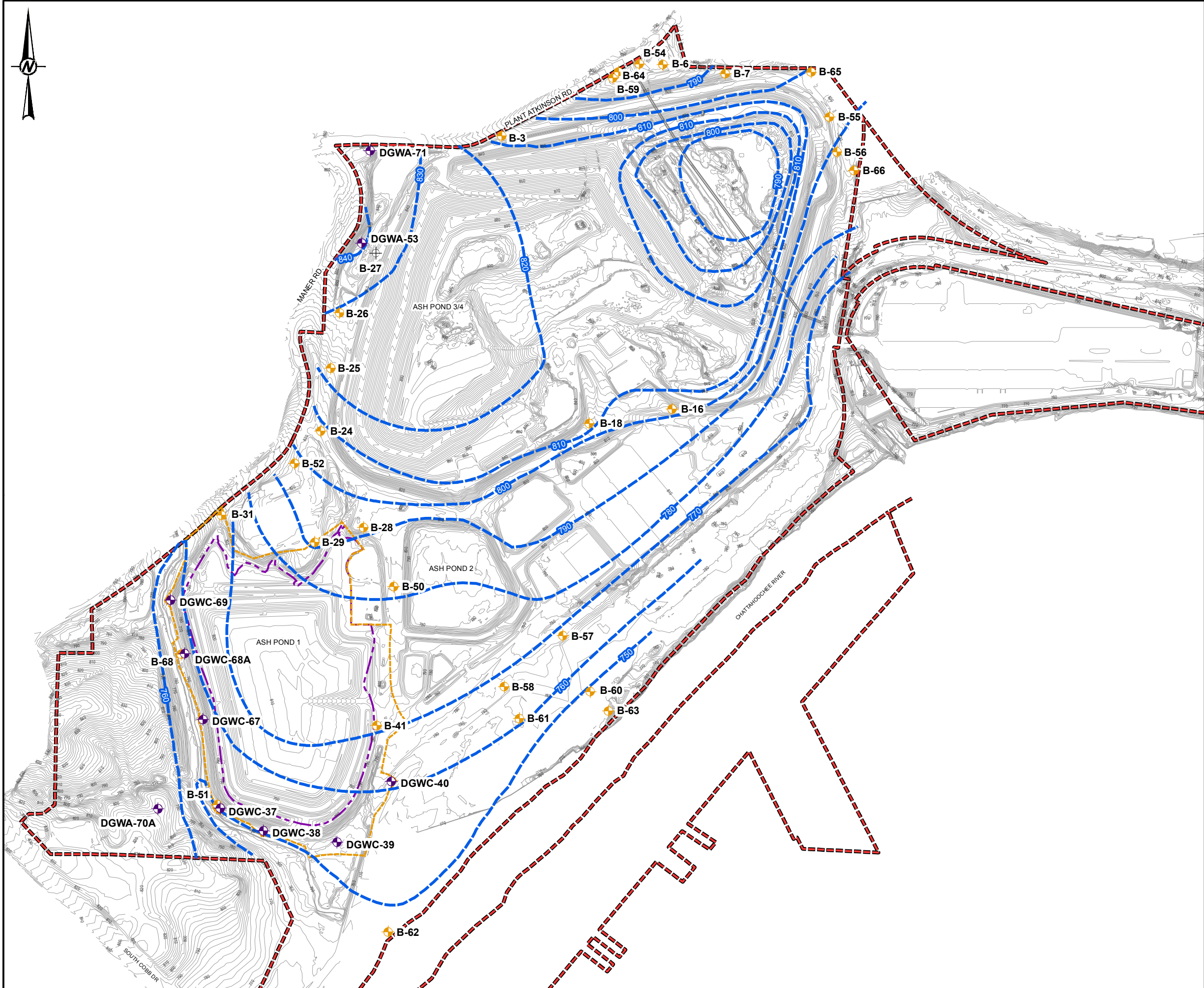


CLIENT  
GEORGIA POWER COMPANY

PROJECT  
PLANT MCDONOUGH- ATKINSON  
ASH POND 1 (AP-1)  
GROUNDWATER MONITORING PLAN

CONSULTANT	YYYY-MM-DD	2018-10-01
 <b>GOLDER</b>	PREPARED	DJC
	DESIGN	GFD
	REVIEW	KNJ
	APPROVED	RPK/GLH

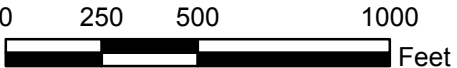




- LEGEND**
- PIEZOMETER
  - ABANDONED PIEZOMETER
  - MONITORING WELL
  - POTENTIO METRIC SURFACE ELEVATION CONTOURS (FEBRUARY 2018)
  - AP-1 PERMIT BOUNDARY
  - CORRIDOR PIPE
  - APPROXIMATE PRE-CLOSURE ASH LIMITS
  - PROPERTY BOUNDARY
  - EXISTING TOPOGRAPHY

**NOTE**  
B-27 and B-68 ARE NOT USED DUE TO WELL REPLACEMENT, PROXIMITY TO CLOSURE ACTIVITIES, OR MODIFICATIONS TO THE PROPOSED WELL NETWORK.

**REFERENCE**  
1. THE EXISTING TOPOGRAPHY AND CONTOUR ELEVATIONS WERE PROVIDED BY GEORGIA LAND DEPARTMENT AND METRO ENGINEERING AND SURVEYING CO., INC. THE DATE OF THE SURVEY PROVIDED AND SHOWN ON THIS SET OF PLANS IS 03-18-2018. REFER TO THE SURVEY DRAWING TITLED "TOPOGRAPHIC MAP PREPARED FOR GEORGIA POWER COMPANY PLANT MCDONOUGH - GEORGIA STATE PLANE WEST SURVEY FEET - DATE OF PHOTOGRAPHY 03-18-2018."



CLIENT  
GEORGIA POWER COMPANY



PROJECT  
PLANT MCDONOUGH- ATKINSON  
ASH POND 1 (AP-1)  
GROUNDWATER MONITORING PLAN

TITLE  
**POTENTIOMETRIC MAP**

CONSULTANT	YYYY-MM-DD	2018-10-01
	PREPARED	DJC
	DESIGN	GFD
	REVIEW	KNJ
	APPROVED	RPK/GLH



PROJECT No. 1777449 CONTROL 1777449B003B-GIS.mxd Rev. 0

FIGURE  
**2B**

**TABLE A2**  
**WATER LEVEL PIEZOMETER DETAILS**

**Georgia Power Company Plant McDonough**  
**Ash Pond Unit AP-1**



New Well-ID	Former Well-ID	Boring ID	Northing	Easting	Top of Casing Elevation (feet msl)	Ground Surface Elevation (feet msl)	Total Depth (feet bgs)	Top of Screen Elevation (feet msl)	Bottom of Screen Elevation (feet msl)	Screen Length (feet)
<b>PIEZOMETERS</b>										
B-3	B-3	B-3	1394043.54	2202411.14	837.82	834.46	37.0	808	798	10
B-6	B-6	B-6	1394422.57	2203265.55	789.49	785.94	35.4	761	751	10
B-7	B-7	B-7	1394373.41	2203595.17	809.24	805.43	25.2	791	781	10
B-16	B-16	B-16	1392596.21	2203313.21	826.50	823.60	43.7	790	780	10
B-18	B-18	B-18	1392521.15	2202874.99	826.54	823.88	32.6	801	791	10
B-24	B-24	B-24	1392480.23	2201451.51	822.27	818.71	79.1	750	740	10
B-25	B-25	B-25	1392813.23	2201504.19	836.62	833.10	54.8	789	779	10
B-26	DGWA-26	B-26	1393106.18	2201551.86	853.67	850.23	49.3	811	801	10
B-27	DGWA-27	B-27	1393423.51	2201744.77	850.29	846.94	34.4	823	813	10
B-28	B-28	B-28	1391970.42	2201677.59	816.10	812.76	69.4	754	744	10
B-29	B-29	B-29	1391891.93	2201420.25	816.45	813.48	54.4	769	759	10
B-31	B-31	B-31	1392035.97	2200926.82	797.42	794.80	45.1	760	750	10
B-41	B-41	B-41	1390922.38	2201749.84	795.22	792.42	60.0	743	733	10
B-50	B-50	B-50	1391656.94	2201839.72	809.78	806.28	35.2	781	771	10
B-51	B-51	B-51	1390501.61	2200904.19	765.93	763.00	65.4	708	698	10
B-52	B-52	B-52	1392309.40	2201314.05	823.22	820.07	50.0	781	771	10
B-54	B-54	B-54	1394424.75	2203140.27	785.59	782.09	34.2	758	748	10
B-55	B-55	B-55	1394143.23	2204146.61	825.11	821.96	52.0	781	771	10
B-56	B-56	B-56	1393958.64	2204186.27	823.70	820.55	45.0	786	776	10
B-57	B-57	B-57	1391397.46	2202735.64	789.22	785.76	50.5	746	736	10
B-58	B-58	B-58	1391126.84	2202425.23	788.20	784.90	45.0	750	740	10
B-59	B-59	B-59	1394349.80	2203000.17	788.16	785.30	30.2	765	755	10
B-60	B-60	B-60	1391101.88	2202880.57	782.12	778.87	49.8	740	730	10
B-61	B-61	B-61	1390958.73	2202504.81	782.03	778.58	52.4	737	727	10
B-62	B-62	B-62	1389828.91	2201810.02	763.34	759.94	39.9	730	720	10
B-63	B-63	B-63	1390999.47	2202976.11	777.15	777.45	46.0	742	732	10
B-64	B-64	B-64	1394383.12	2203029.71	786.02	785.85	30.4	765	755	10
B-65	B-65	B-65	1394382.64	2204049.66	822.02	822.27	45.4	787	777	10
B-66	B-66	B-66	1393860.16	2204276.73	815.96	813.06	55.3	768	758	10
B-68	DGWC-68	B-68	1391299.56	2200714.04	758.73	758.56	18.0	751	741	10
<b>Notes:</b> bgs - below ground surface; msl - mean sea level B-27 and B-68 are not used due to well replacement, proximity to closure activities, or modifications to the proposed well network.										



# LOG OF TEST BORING

**BORING B-37**  
PAGE 1 OF 2  
ES

SOUTHERN COMPANY SERVICES, INC.  
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

**PROJECT** Plant McDonough Hydrogeological Investigation

**LOCATION** Cobb County, GA

**DATE STARTED** 11/28/2012 **COMPLETED** 11/28/2012 **SURF. ELEV.** 763.6 **COORDINATES:** N:1,390,483.94 E:2,200,919.39

**CONTRACTOR** SCS Field Services **EQUIPMENT** CME 550 **METHOD** 4.25" Hollow Stem Auger w/pilot bit

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

**BORING DEPTH** 41 ft. **GROUND WATER DEPTH: DURING** **COMP.** **DELAYED**

**NOTES** Well installed. Refer to well data sheet.

GEOTECH ENGINEERING LOGS - ESEE DATABASE GDT - 8/8/13 09:33 - T:\ESEE MAJOR PROJECTS\PROJECTS\MCDONOUGH\_ATKINSON\2013\ES2219\_CHARACTERIZATION REPORT\_SARFIELD DATA\MW LOGS.GPJ

DEPTH (ft.)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
5		- Vacuum excavation fro 0 ft to 9.0 ft						
10		<b>Silt (ML)</b> - tan to mottled tan, brown and red, damp, soft, SILT with clay (about 5% clay); micaceous; trace schistose texture (highly weathered)	754.6	SS -1	9.5	1-1-3 (4)		residual soil.
15		- yellow tan, medium stiff, SAA		SS -2	14.5	2-2-3 (5)		residual soil.
20		- tan, yellow and green banding, soft, SAA; softer; less clay		SS -3	19.5	1-1-2 (3)		residual soil.
25				SS	24.5	2-2-4		

(Continued Next Page)



# LOG OF TEST BORING

**BORING B-37**  
PAGE 2 OF 2  
**ES**

SOUTHERN COMPANY SERVICES, INC.  
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

**PROJECT** Plant McDonough Hydrogeological Investigation  
**LOCATION** Cobb County, GA

GEOTECH ENGINEERING LOGS - ESEE DATABASE GDT - 8/8/13 09:33 - T:\ESEE MAJOR PROJECTS\PROJECTS\MCDONOUGH\_ATKINSON\2013\ES2219\_CHARACTERIZATION REPORT\_SARFIELD DATA\MW LOGS.GPJ

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		<b>Silt (ML)(con't)</b> - green-gray, moist, medium stiff, SILT; micaceous; lacks structure		-4		(6)		
30		- mottled tan, green, and white-gray, very damp, stiff, sandy SILT		SS -5	29.5	4-5-7 (12)		upper saprolite.
35		- brown, very hard, SILT with gravel; saprolite; highly weathered schist fragments		SS -6	34.5	50 (0)		lower saprolite.
40		- brown, very moist, very hard, sandy SILT, weathered schist fragments	722.6	SS -7	39.5	22-32-23 (55)		lower saprolite.
		Bottom of borehole at 41.0 feet.						
45								
50								



# WELL CONSTRUCTION LOG

Southern Company Generation

PROJECT: Plant McDonough		DRILLING CO.: SCS Field Services		WELL NAME	
Hydrogeologic Investigation		DRILLER: S. Denty			
LOCATION: Ash Pond		RIG TYPE: CME550		B-37	
LOGGER: Greg Dyer		DRILLING METHODS: HS Auger			
DATE CONSTRUCTED: 11/28/2012		N: 1390483.941 E:2200919.393			
				DEPTH FEET	ELEVATION FT, MSL
TOP OF RISER				-2.6	766.19
2" Threaded Riser Cap					
4 ft x 4 ft concrete pad					
GROUND SURFACE				0.0	763.6
PROTECTIVE CASING SIZE: 4" x 4" TYPE: aluminum					
BOTTOM OF GROUT					
BACKFILL MATERIAL TYPE: Portland cement/bentonite grout AMOUNT: 20 bags cement 10 lbs bentonite					
RISER CASING DIA: 2 inch TYPE: Schedule 40 PVC JOINT TYPE: Flush Threaded					
TOP OF SEAL				24.6	739.0
ANNULAR SEAL TYPE: PelPlug TR-30 3/8" bentonite pellets; 5-gallon buckets AMOUNT: 1.5 buckets PLACEMENT: Poured					
TOP OF FILTER PACK				27.0	736.6
FILTER PACK TYPE: Filtersil #61 Size 1A; 50 lbs/bag AMOUNT: 6.75 Bags PLACEMENT: Poured w/water					
BOTTOM OF RISER / TOP OF SCREEN				29.3	734.3
SCREEN DIA: 2" prepack (3.45" OD) TYPE: Schedule 40 PVC OPENING WIDTH: 0.01 inch OPENING TYPE: Slotted SLOT SPACING: 0.1 inch					
BOTTOM OF SCREEN				39.3	724.3
Flush-threaded end cap					
BOTTOM OF CASING				39.7	723.9
HOLE DIA: 7 inch					





# LOG OF TEST BORING

**BORING B-38**  
PAGE 1 OF 1  
**ES**

SOUTHERN COMPANY SERVICES, INC.  
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

**PROJECT** Plant McDonough Hydrogeological Investigation

**LOCATION** Cobb County, GA

**DATE STARTED** 11/28/2012 **COMPLETED** 11/28/2012 **SURF. ELEV.** 754.7 **COORDINATES:** N:1,390,364.53 E:2,201,147.65

**CONTRACTOR** SCS Field Services **EQUIPMENT** CME 550 **METHOD** 4.25" Hollow Stem Auger w/pilot bit

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

**BORING DEPTH** 24.7 ft. **GROUND WATER DEPTH: DURING** 13 ft. **COMP.** **DELAYED**

**NOTES** Well installed. Refer to well data sheet.

GEOTECH ENGINEERING LOGS - ESEE DATABASE GDT - 8/8/13 09:33 - T:\ESEE MAJOR PROJECTS\PROJECTS\MCDONOUGH\_ATKINSON\2013\ES2219\_CHARACTERIZATION REPORT\_SARFIELD DATA\MW LOGS.GPJ

DEPTH (ft.)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
5		- Vacuum excavation from 0 ft to 9.0 ft						
10		<b>Silt (ML)</b> - olive-gray to tan, moist, medium stiff, SILT; micaceous; trace schist gravel; <5% clay	745.7	SS -1	9.5	2-3-4 (7)		residual soil.
15		- more tan, wet, very soft, SAA		SS -2	14.5	WH-WH-1 (1)		
20		- tan-brown-gray, very moist, stiff, SILT; micaceous; more prevalent schistose gravel		SS -3	19.5	2-4-5 (9)		residual soil.
25		- SAA with very fine-grained sand	730.0					

Bottom of borehole at 24.7 feet.

# WELL CONSTRUCTION LOG

Southern Company Generation

PROJECT: Plant McDonough		DRILLING CO.: SCS Field Services		WELL NAME  B-38	
Hydrogeologic Investigation		DRILLER: S. Denty			
LOCATION: Ash Pond		RIG TYPE: CME550			
LOGGER: Greg Dyer		DRILLING METHODS: HS Auger			
DATE CONSTRUCTED: 11/29/2012		N: 1390364.526 E:2201147.65			
				DEPTH FEET	ELEVATION FT, MSL
TOP OF RISER				-2.8	757.44
2" Threaded Riser Cap					
4 ft x 4 ft concrete pad					
GROUND SURFACE				0.0	754.7
PROTECTIVE CASING SIZE: 4" x 4" TYPE: aluminum					
BOTTOM OF GROUT					
BACKFILL MATERIAL TYPE: Portland cement/bentonite grout AMOUNT: 4 bags cement 6 lbs bentonite					
RISER CASING DIA: 2 inch TYPE: Schedule 40 PVC JOINT TYPE: Flush Threaded					
TOP OF SEAL				10.4	744.3
ANNULAR SEAL TYPE: PelPlug TR-30 3/8" bentonite pellets; 5-gallon buckets AMOUNT: 1.25 bucket PLACEMENT: Poured					
TOP OF FILTER PACK				13.4	741.3
FILTER PACK TYPE: Filtersil #61 Size 1A; 50 lbs/bag AMOUNT: 5.25 Bags PLACEMENT: Poured w/water					
BOTTOM OF RISER / TOP OF SCREEN				14.7	740.0
SCREEN DIA: 2" prepack (3.45" OD) TYPE: Schedule 40 PVC OPENING WIDTH: 0.01 inch OPENING TYPE: Slotted SLOT SPACING: 0.1 inch					
BOTTOM OF SCREEN				24.7	730.0
Flush-threaded end cap					
BOTTOM OF CASING				25.0	729.7
HOLE DIA: 7 inch					



# LOG OF TEST BORING

**BORING B-39**  
PAGE 1 OF 2  
ES

SOUTHERN COMPANY SERVICES, INC.  
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

**PROJECT** Plant McDonough Hydrogeological Investigation

**LOCATION** Cobb County, GA

**DATE STARTED** 10/6/2012 **COMPLETED** 10/6/2012 **SURF. ELEV.** 757.0 **COORDINATES:** N:1,390,303.39 E:2,201,538.45

**CONTRACTOR** SCS Field Services **EQUIPMENT** CME 550 **METHOD** 4.25" Hollow Stem Auger w/pilot bit

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

**BORING DEPTH** 26 ft. **GROUND WATER DEPTH: DURING** 20 ft. **COMP.** **DELAYED**

**NOTES** Well installed. Refer to well data sheet.

GEOTECH ENGINEERING LOGS - ESEE DATABASE GDT - 8/8/13 09:33 - T:\ESEE MAJOR PROJECTS\PROJECTS\MCDONOUGH\_ATKINSON\2013\ES2219\_CHARACTERIZATION REPORT\_SARFIELD DATA\MW LOGS.GPJ

DEPTH (ft.)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
5		- Vacuum excavation from 0 ft to 9.5 ft						
10		<b>Elastic Silt (MH)</b> - tan, wet, medium stiff, medium plasticity, clayey SILT with fine sand	747.5	UD -1	9.5			water table in hydrovac hole at about 2 ft bgs.
15		<b>Silt (ML)</b> - tan-brown, wet, medium stiff, sandy SILT; contains schist gravel at base	741.8	SS -1	14.5	1-2-6 (8)		residual soil.
20		- mottled tan, orange and brown, wet, medium stiff, clayey SILT; micaceous		SS -2	19.5	2-2-5 (7)		residual soil/upper saprolite transition.
25		<b>Lean Clay (CL)</b>	732.5	SS	24.5	3-2-4		

(Continued Next Page)



# LOG OF TEST BORING

**BORING B-39**  
PAGE 2 OF 2  
**ES**

SOUTHERN COMPANY SERVICES, INC.  
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

**PROJECT** Plant McDonough Hydrogeological Investigation

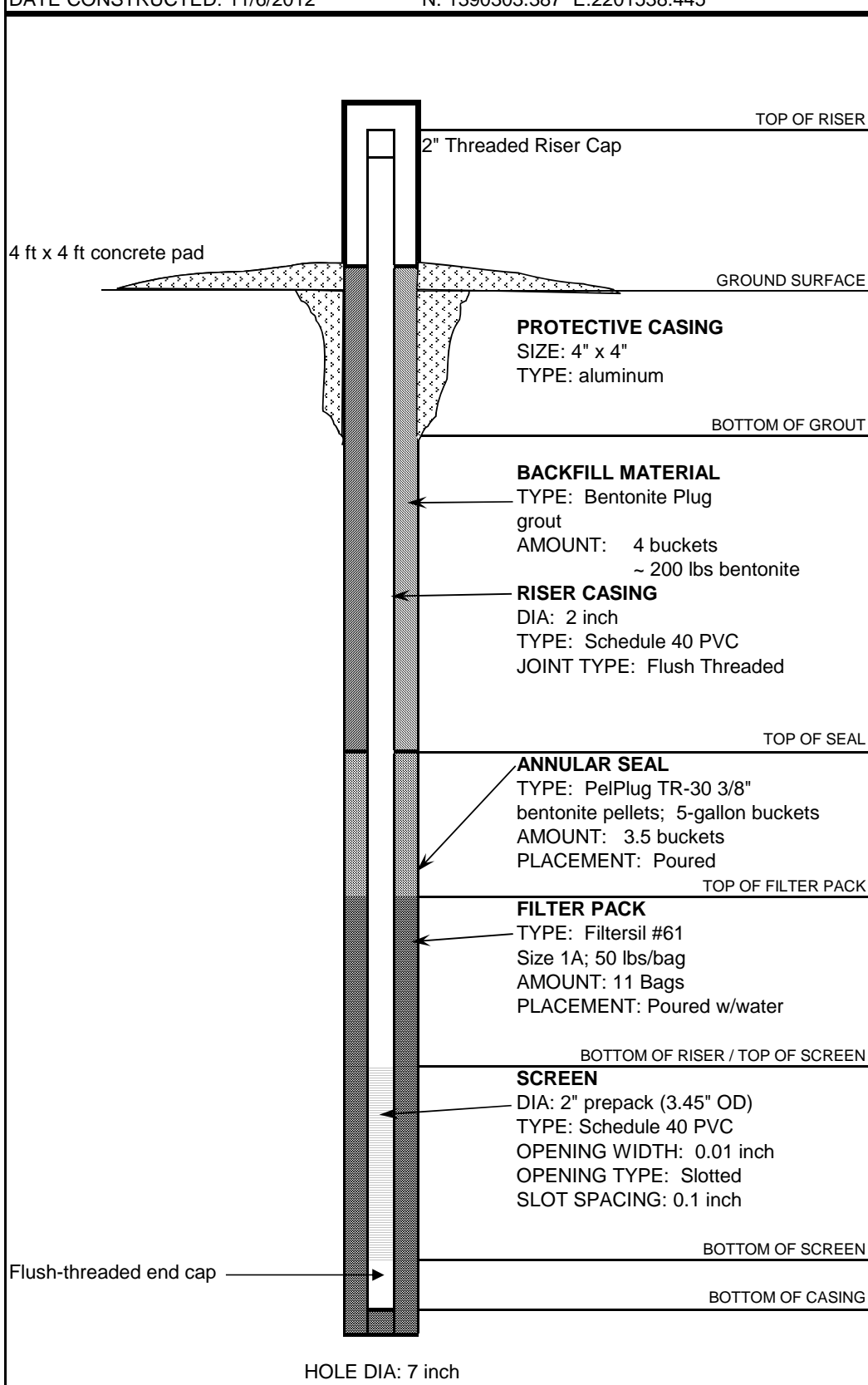
**LOCATION** Cobb County, GA

GEOTECH ENGINEERING LOGS - ESEE DATABASE GDT - 8/8/13 09:33 - T:\ESEE MAJOR PROJECTS\PROJECTS\MCDONOUGH\_ATKINSON\2013\ES2219\_CHARACTERIZATION REPORT\_SARFIELD DATA\MW LOGS.GPJ

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		- mottled tan, brown and black, damp, medium stiff, low plasticity, silty CLAY; relict structures observed; highly weathered <b>Lean Clay (CL)</b> ( <i>con't</i> )	731.0	-3		(6)		upper saprolite.
		Bottom of borehole at 26.0 feet.						
30								
35								
40								
45								
50								

# WELL CONSTRUCTION LOG

Southern Company Generation

PROJECT: Plant McDonough		DRILLING CO.: SCS Field Services		WELL NAME		
Hydrogeologic Investigation		DRILLER: S. Denty				
LOCATION: Ash Pond		RIG TYPE: CME550		B-39		
LOGGER: Greg Dyer		DRILLING METHODS: HS Auger				
DATE CONSTRUCTED: 11/6/2012		N: 1390303.387 E:2201538.445				
				DEPTH FEET	ELEVATION FT, MSL	
				TOP OF RISER	-2.7	759.67
2" Threaded Riser Cap						
4 ft x 4 ft concrete pad				GROUND SURFACE	0.0	756.9
<b>PROTECTIVE CASING</b> SIZE: 4" x 4" TYPE: aluminum				BOTTOM OF GROUT		
<b>BACKFILL MATERIAL</b> TYPE: Bentonite Plug grout AMOUNT: 4 buckets ~ 200 lbs bentonite						
<b>RISER CASING</b> DIA: 2 inch TYPE: Schedule 40 PVC JOINT TYPE: Flush Threaded						
TOP OF SEAL				4.9	752.0	
<b>ANNULAR SEAL</b> TYPE: PelPlug TR-30 3/8" bentonite pellets; 5-gallon buckets AMOUNT: 3.5 buckets PLACEMENT: Poured						
TOP OF FILTER PACK				8.0	748.9	
<b>FILTER PACK</b> TYPE: Filtersil #61 Size 1A; 50 lbs/bag AMOUNT: 11 Bags PLACEMENT: Poured w/water						
BOTTOM OF RISER / TOP OF SCREEN				10.8	746.1	
<b>SCREEN</b> DIA: 2" prepack (3.45" OD) TYPE: Schedule 40 PVC OPENING WIDTH: 0.01 inch OPENING TYPE: Slotted SLOT SPACING: 0.1 inch						
BOTTOM OF SCREEN				20.8	736.1	
Flush-threaded end cap						
BOTTOM OF CASING				21.2	735.7	
HOLE DIA: 7 inch						



# LOG OF TEST BORING

**BORING B-40**  
PAGE 1 OF 2  
**ES**

SOUTHERN COMPANY SERVICES, INC.  
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

**PROJECT** Plant McDonough Hydrogeological Investigation

**LOCATION** Cobb County, GA

**DATE STARTED** 11/5/2012 **COMPLETED** 11/5/2012 **SURF. ELEV.** 775.5 **COORDINATES:** N:1,390,625.63 E:2,201,826.76

**CONTRACTOR** SCS Field Services **EQUIPMENT** CME 550 **METHOD** 4.25" Hollow Stem Auger w/pilot bit

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

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

**NOTES** Well installed. Refer to well data sheet.

GEOTECH ENGINEERING LOGS - ESEE DATABASE GDT - 8/8/13 09:33 - T:\ESEE MAJOR PROJECTS\MCDONOUGH\_ATKINSON\2013ES2219\_CHARACTERIZATION REPORT\_SARFIELD DATA\MW LOGS.GPJ

DEPTH (ft.)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
5		- Vacuum excavation from 0 ft to 9.5 ft						
10		<b>Silt (ML)</b> - brown-tan, stiff, clayey, sandy SILT; damp to moist; contains micaceous fragments; manganese staining and nodules	766.0	SS -1	9.5	2-4-5 (9)		residual soil.
15		- tan to tan-brown, damp, stiff, sandy SILT; contains highly weathered schist; manganese staining		SS -2	14.5	4-5-6 (11)		upper saprolite.
20		- mottled tan, brown, and black, very moist, clayey SILT with sand; highly weathered schist fragments; 10% micaceous sand		SS -3	19.5	4-3-4 (7)		upper saprolite; increased water content.
25				SS	24.5	7-11-12		

(Continued Next Page)



# LOG OF TEST BORING

**BORING B-40**  
PAGE 2 OF 2  
**ES**

SOUTHERN COMPANY SERVICES, INC.  
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

**PROJECT** Plant McDonough Hydrogeological Investigation  
**LOCATION** Cobb County, GA

GEOTECH ENGINEERING LOGS - ESEE DATABASE GDT - 8/8/13 09:33 - T:\ESEE MAJOR PROJECTS\PROJECTS\MCDONOUGH - ATKINSON\2013\ES2219 - CHARACTERIZATION REPORT - SARFIELD DATA\MW LOGS.GPJ

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		<b>Silt (ML)(con't)</b> - white-gray, very moist, very stiff, SILT with clay; trace quartz sand; micaceous in parts; leached zone		-4		(23)		weathered quartz vein or feldspar rich zone.
30		- brown, very moist, very stiff, SILT with clay and trace gravel; trace quartz/feldspar gravel		SS -5	29.5	6-9-10 (19)		upper saprolite.
35		- white-gray brown, very moist, medium stiff, SILT with clay and trace gravel; clay is more plastic		SS -6	34.5	1-1-4 (5)		
			739.5					
		Bottom of borehole at 36.0 feet.						
40								
45								
50								

# WELL CONSTRUCTION LOG

Southern Company Generation

PROJECT: Plant McDonough		DRILLING CO.: SCS Field Services		WELL NAME  B-40	
Hydrogeologic Investigation		DRILLER: S. Denty			
LOCATION: Ash Pond		RIG TYPE: CME550			
LOGGER: Greg Dyer		DRILLING METHODS: HS Auger			
DATE CONSTRUCTED: 11/5/2012		N: 1390625.63 E:2201826.76			
				DEPTH FEET	ELEVATION FT, MSL
TOP OF RISER				-3.6	779.07
2" Threaded Riser Cap					
4 ft x 4 ft concrete pad					
GROUND SURFACE				0.0	775.5
PROTECTIVE CASING SIZE: 4" x 4" TYPE: aluminum					
BOTTOM OF GROUT					
BACKFILL MATERIAL TYPE: Portland cement/bentonite grout AMOUNT: 6 bags cement 6 lbs bentonite					
RISER CASING DIA: 2 inch TYPE: Schedule 40 PVC JOINT TYPE: Flush Threaded					
TOP OF SEAL				19.0	756.5
ANNULAR SEAL TYPE: PelPlug TR-30 3/8" bentonite pellets; 5-gallon buckets AMOUNT: 1 bucket PLACEMENT: Poured					
TOP OF FILTER PACK				21.4	754.1
FILTER PACK TYPE: Filtersil #61 Size 1A; 50 lbs/bag AMOUNT: 0.5 Bag filter pac 6.5 bag hole PLACEMENT: Poured w/water					
BOTTOM OF RISER / TOP OF SCREEN				24.5	751.0
SCREEN DIA: 2" prepack (3.45" OD) TYPE: Schedule 40 PVC OPENING WIDTH: 0.01 inch OPENING TYPE: Slotted SLOT SPACING: 0.1 inch					
BOTTOM OF SCREEN				34.5	741.0
Flush-threaded end cap					
BOTTOM OF CASING				34.9	740.6
HOLE DIA: 7 inch					



# RECORD OF BOREHOLE DGWC-67/B-67

SHEET 1 of 2

PROJECT: Plant McDonough  
PROJECT NUMBER: 1668496-01  
DRILLED DEPTH: 56.00 ft  
LOCATION: West Toe of AP-1

DRILL RIG: Geoprobe  
DATE STARTED: 3/8/17  
DATE COMPLETED: 3/14/17

NORTHING: 1,390,954.46  
EASTING: 2,200,828.90  
GS ELEVATION: 766.34  
TOC ELEVATION: 766.76 ft

DEPTH W.L.: 9.1' bgs  
DATE W.L.: 3/14/17  
TIME W.L.: 0850  
GW ELEVATION: 757.24

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE				SAMPLES					MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
		DESCRIPTION	USCS	GRAPHIC LOG	ELEV. DEPTH (ft)	SAMPLE NO.	TYPE	BLOWS per 6 in 140 lb hammer 30 inch drop	N-VALUE	REC		
0	765	0.00 - 10.00 Silt and Clay with some sand and pebbles, brown, highly weathered mica schist, low plastic, cohesive, dry.	ML								Flush Mounted Casing	
5	760					S1	GRAB			0.50		
10	755	10.00 - 15.00 Sandy Silt, sands fine, brown, highly weathered, micaceous, low plastic, cohesive, dry.	ML		756.34 10.00	S2	GRAB			0.50	CETCO puregold grout (70:30)	
15	750	15.00 - 20.00 Sandy Silt, sands fine, brown, highly weathered, micaceous, low plastic, cohesive, moist.			751.34 15.00	S3	SPT	6-7-12	19	1.50 1.50		
20	745	20.00 - 25.00 Sandy silt, sand f-m, brown to tan, highly weathered, micaceous, low-medium plasticity, cohesive, moist, sample spoon wet.	ML		746.34 20.00	S4	SPT	9-25-25	50	1.50 1.50		
25	740	25.00 - 30.00 Saprolite, Sandy silt, sands fine to coarse, brown to tan, highly weathered, micaceous, low plastic, cohesive, moist, sample spoon wet.			741.34 25.00	S5	SPT	6-10-14	24	1.16 1.50		
30	735	30.00 - 35.00 Saprolite, Sandy silt, sands fine to coarse, trace pebbles, reddish brown to tan, highly weathered, micaceous, low plastic, cohesive, moist, sample spoon wet.	ML		736.34 30.00	S6	SPT	13-20-22	42	1.16 1.50		
35	730	35.00 - 40.00 Saprolite, Sandy silt, sands fine to coarse, trace pebbles, reddish brown to tan, highly weathered, micaceous, low plastic, cohesive, moist, sample spoon wet.			731.34 35.00	S7	SPT	7-10-13	23	1.00 1.50		
40	725	40.00 - 45.00 Saprolite, Sandy silt, sands fine to medium, reddish brown to tan, highly weathered, micaceous, low plastic, cohesive, moist, sample spoon wet.	ML		726.34 40.00	S8	SPT	7-16-23	39	1.33 1.50	PEL-PLUG 3/8" Bentonite pellets	
45		Log continued on next page			721.34	S9	SPT	12-15-18	33	1.16 1.50		

BOREHOLE RECORD 165977801\_GRP(B-47-B-71) (1).GPJ PIEDMONT.GDT 1/15/18

LOG SCALE: 1 in = 5.5 ft  
DRILLING COMPANY: Southern Company Services  
DRILLER: S. Milam

GA INSPECTOR: Ben Hodges  
CHECKED BY: Rachel Kirkman, PG  
DATE: 1/16/18



# RECORD OF BOREHOLE DGWC-67/B-67

SHEET 2 of 2

PROJECT: Plant McDonough  
PROJECT NUMBER: 1668496-01  
DRILLED DEPTH: 56.00 ft  
LOCATION: West Toe of AP-1

DRILL RIG: Geoprobe  
DATE STARTED: 3/8/17  
DATE COMPLETED: 3/14/17

NORTHING: 1,390,954.46  
EASTING: 2,200,828.90  
GS ELEVATION: 766.34  
TOC ELEVATION: 766.76 ft

DEPTH W.L.: 9.1' bgs  
DATE W.L.: 3/14/17  
TIME W.L.: 0850  
GW ELEVATION: 757.24

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE				SAMPLES					MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
		DESCRIPTION	USCS	GRAPHIC LOG	ELEV. DEPTH (ft)	SAMPLE NO.	TYPE	BLOWS per 6 in 140 lb hammer 30 inch drop	N-VALUE	REC		
45	720	45.00 - 50.00 Saprolite, silt and sand, sands fine to coarse, grey to brown, highly weathered, micaceous, low plastic, cohesive, moist, sample spoon wet.	ML		45.00							<b>WELL CASING</b> Interval: 0'-46.3' Material: Schedule 40 PVC Diameter: 2" Joint Type: Flush/Screw  <b>WELL SCREEN</b> Interval: 46.3'-56.3' Material: Schedule 40 PVC Diameter: 2" Slot Size: .010" End Cap: Schedule 40 PVC  <b>FILTER PACK</b> Interval: 44.0'-56.7' Type: FilterSil  <b>FILTER PACK SEAL</b> Interval: 44.0'-41.8' Type: PEL-PLUG 3/8" Bentonite pellets  <b>ANNULUS SEAL</b> Interval: 0'-41.8' Type: CETCO puregold grout (70:30)  <b>WELL COMPLETION</b> Pad: 4'x4' Concrete Protective Casing: 8" Round Flush Mount  <b>DRILLING METHODS</b> Soil Drill: Hollow-stem auger Rock Drill: N/A
						S10	SPT	50/4	50/4	0.33 0.33		
50	715	50.00 - 55.00 Saprolite, silt and sand, sands fine to coarse, trace pebbles, grey to dark brown, highly weathered, micaceous, non plastic, noncohesive, moist, sample spoon wet.	PWR		716.34 50.00							
						S11	SPT	50/2	50/2	0.16 0.16		
55	710	55.00 - 56.00 Auger Refusal Boring completed at 56.00 ft	PWR		711.34 55.00 710.34							
60												
65												
70												
75												
80												
85												
90												

LOG SCALE: 1 in = 5.5 ft  
DRILLING COMPANY: Southern Company Services  
DRILLER: S. Milam

GA INSPECTOR: Ben Hodges  
CHECKED BY: Rachel Kirkman, PG  
DATE: 1/16/18



# RECORD OF BOREHOLE DGWC-68A/B-68A



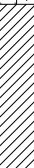


SHEET 1 of 1

PROJECT: Plant McDonough  
PROJECT NUMBER: 1668496-01  
DRILLED DEPTH: 30.00 ft  
LOCATION: ~15' East of B-68

DRILL RIG: Geoprobe 7822DT  
DATE STARTED: 4/19/17  
DATE COMPLETED: 4/20/17

NORTHING: 1,391,301.86  
EASTING: 2,200,732.41  
GS ELEVATION: 765.00  
TOC ELEVATION: 765.61 ft

DEPTH W.L.: 18.8  
DATE W.L.: 4/20/2017  
TIME W.L.: 08:48  
GW ELEVATION: 746.81

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE				SAMPLES				MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS				
		DESCRIPTION	USCS	GRAPHIC LOG	ELEV.	SAMPLE NO.	TYPE	BLOWS per 6 in 140 lb hammer 30 inch drop	N-VALUE			REC			
					DEPTH (ft)										
0	765	0.00 - 8.50 SM, Silty SAND, fine to coarse, moderate plasticity; red-orange to orange-brown, fill; non-cohesive, moist, w~PL, loose.	SM							8" Diameter Round Flush Mount		<b>WELL CASING</b> Interval: 0' - 29.8' Material: Schedule 40 PVC Diameter: 2" Joint Type: Flush/Screw			
5	760													<b>WELL SCREEN</b> Interval: 19.4' - 29.4' Material: Schedule 40 PVC pre-pack Diameter: 2" Slot Size: 0.010" End Cap: 29.4' - 29.8'	
10	755	8.50 - 13.50 CL, CLAY, with trace sand, moderate plasticity; red-orange brown, fill; cohesive, moist, w<PL, soft to firm.	CL		756.5 8.50	S1	DO	13-18-9	27	1.50 1.50		Pure Gold Grout Mixture	<b>FILTER PACK</b> Interval: 17.0' - 29.8' Type: FilterSil gravel pack		
														<b>FILTER PACK SEAL</b> Interval: 15.0' - 17.0' Type: Pel-Plug 3/8" Bentonite Pellets	
15	750	13.50 - 28.50 ML, SILT, low plasticity; brown to silver, relict structure; cohesive, moist to wet, w<PL, very soft.	ML		751.5 13.50	S2	DO	WOH-WOH-3	3	1.50 1.50		Pel-Plug 3/8" Bentonite Pellets	<b>ANNULUS SEAL</b> Interval: 0' - 15.0' Type: Pure Gold Grout Mixture		
														<b>WELL COMPLETION</b> Pad: 4' x 4' concrete Protective Casing: 8" Diameter Round Flush Mount	
20	745							S3	DO	4-6-16		22	1.33 1.50	Pre-pack 0.010" Slotted Schedule 40 PVC	<b>DRILLING METHODS</b> Soil Drill: 4.25-inch ID HSA Rock Drill: N/A
25	740							S4	DO	WOH-16-24		40	1.50 1.50	FilterSil gravel pack	
30	735	28.50 - 30.00 SM, Silty SAND, fine to coarse, non-plastic to low plasticity; gray to white to silver, weathered saprolite, gneiss; cohesive, wet, w<PL, firm.  Boring completed at 30.00 ft	SM		736.5 28.50 735	S5	DO	13-50/5	50/5	0.75 0.92					
35	730														
40	725														
45	720														

BOREHOLE RECORD 165977801\_GRP(B-47-B-71) (1).GPJ PIEDMONT.GDT 1/15/18

LOG SCALE: 1 in = 5.5 ft  
DRILLING COMPANY: Southern Company Services  
DRILLER: S. Milam

GA INSPECTOR: Michael Boatman PG  
CHECKED BY: Rachel Kirkman, PG  
DATE: 1/16/18



# RECORD OF BOREHOLE DGWC-69/B-69

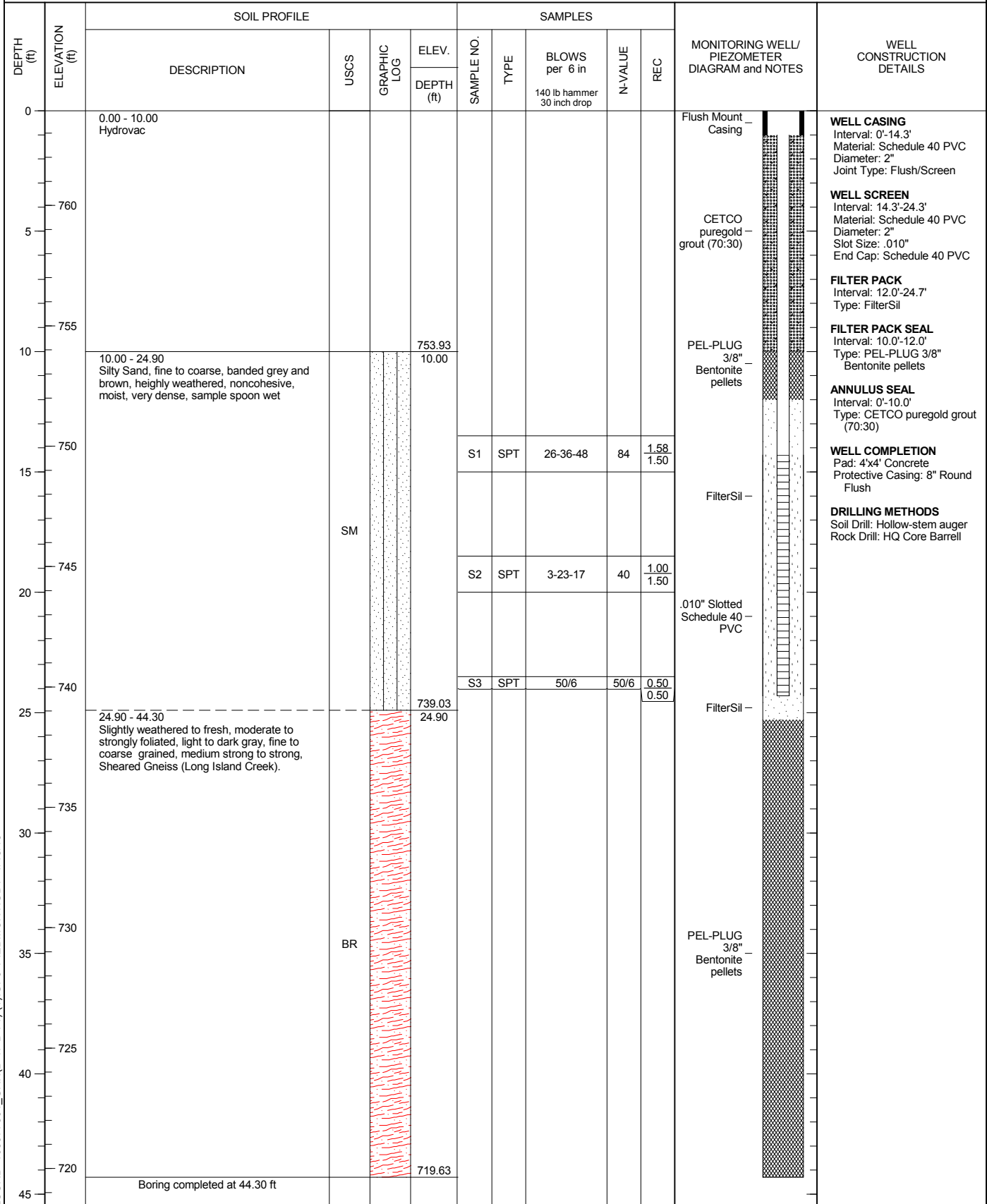
SHEET 1 of 1

PROJECT: Plant McDonough  
PROJECT NUMBER: 1668496-01  
DRILLED DEPTH: 44.30 ft  
LOCATION: West Toe of AP-1

DRILL RIG: Geoprobe  
DATE STARTED: 3/15/17  
DATE COMPLETED: 3/16/17

NORTHING: 1,391,584.72  
EASTING: 2,200,656.14  
GS ELEVATION: 763.93  
TOC ELEVATION: 763.82 ft

DEPTH W.L.: 6.0' bgs  
DATE W.L.: 3/17/17  
TIME W.L.: 0840  
GW ELEVATION: 757.93



LOG SCALE: 1 in = 5.5 ft  
DRILLING COMPANY: Southern Company Services  
DRILLER: Sean Denty

GA INSPECTOR: Ben Hodges  
CHECKED BY: Rachel Kirkman, PG  
DATE: 1/16/18



# RECORD OF BOREHOLE DGWA-53/B-53




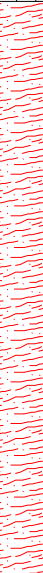
SHEET 1 of 1

PROJECT: Plant McDonough  
PROJECT NUMBER: 1659778-01  
DRILLED DEPTH: 28.90 ft  
LOCATION: in the middle of the pond of the construction area of AP3

DRILL RIG: CME 55  
DATE STARTED: 9/24/16  
DATE COMPLETED: 9/24/16

NORTHING: 1,393,475.82  
EASTING: 2,201,668.95  
GS ELEVATION: 847.24  
TOC ELEVATION: 850.74 ft

DEPTH W.L.: 10.08  
DATE W.L.: 10/6/2016  
TIME W.L.: 1233  
GW ELEVATION: 840.66

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE				SAMPLES				MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS		
		DESCRIPTION	USCS	GRAPHIC LOG	ELEV.	SAMPLE NO.	TYPE	BLOWS per 6 in 140 lb hammer 30 inch drop	N-VALUE			REC	
					DEPTH (ft)								
0		0.00 - 3.50 SM, silt SAND, fine to medium grained, non-plastic, tan, non-cohesive, dry to moist, compact	SM			1	DO	2-4-6	10	1.50	CETCO puregold grout (70:30) — / aluminum casing		<b>WELL CASING</b> Interval: 0-17.6' Material: Schedule 40 PVC Diameter: 2" Joint Type: Flush/Screw  <b>WELL SCREEN</b> Interval: 17.6'-27.6' Material: Schedule 40 PVC Diameter: 2" Slot Size: 0.010 End Cap: Schedule 40 PVC  <b>FILTER PACK</b> Interval: 12'-28.9' Type: FilterSil  <b>FILTER PACK SEAL</b> Interval: 8'-12' Type: PEL-PLUG 3/8" Bentonite pellets  <b>ANNULUS SEAL</b> Interval: 0'-8' Type: CETCO puregold grout (70:30)  <b>WELL COMPLETION</b> Pad: Protective Casing: 4"x4"x5' aluminum  <b>DRILLING METHODS</b> Soil Drill: Hollow-stem auger Rock Drill: HQ Core Barrell
845													
		3.50 - 12.20 SM, silt SAND, fine to medium grained, non-plastic, tan, non-cohesive, dry to moist, compact to dense (saprolite). Auger Refusal at 12.2	SM		843.74 3.50	2	DO	4-6-6	12	1.50	CETCO puregold grout (70:30)		
5													
840													
			BR		835.04 12.20	3	DO	5-13-35	48	1.50	PEL-PLUG 3/8" Bentonite pellets		
10		12.20 - 29.50 Bedrock; GNEISS; competent, thinly foliated.											
835													
		Boring completed at 28.90 ft			817.74 29.50						0.010" slotted screen		
15													
830													
20													
825													
25													
820													
30													
815													
35													
810													
40													
805													
45													

LOG SCALE: 1 in = 5.5 ft  
DRILLING COMPANY: Southern Company Services  
DRILLER: S. Milam

GA INSPECTOR: Nortey Yeboah  
CHECKED BY: TIR  
DATE: 12/22/17



# RECORD OF BOREHOLE DGWA-70A/B-70A







SHEET 1 of 2

PROJECT: Plant McDonough  
PROJECT NUMBER: 1668496-01  
DRILLED DEPTH: 60.00 ft  
LOCATION: ~400' west of the SW corner of AP-1

DRILL RIG: CME 550  
DATE STARTED: 5/10/17  
DATE COMPLETED: 5/10/17

NORTHING: 1,390,481.13  
EASTING: 2,200,590.67  
GS ELEVATION: 805.45  
TOC ELEVATION: 808.60 ft

DEPTH W.L.: 42.9'  
DATE W.L.: 5/10/2017  
TIME W.L.: 10:45  
GW ELEVATION: 765.70

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE				SAMPLES					MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
		DESCRIPTION	USCS	GRAPHIC LOG	ELEV. DEPTH (ft)	SAMPLE NO.	TYPE	BLOWS per 6 in 140 lb hammer 30 inch drop	N-VALUE	REC		
0	805	0.00 - 5.00 CL-CH, low to high plasticity CLAY with trace fine sand; red orange; cohesive, moist	CL-CH									<b>WELL CASING</b> Interval: 0' - 59.3' Material: Schedule 40 PVC Diameter: 2" Joint Type: Flush/Screw  <b>WELL SCREEN</b> Interval: 48.9' - 58.9' Material: Schedule 40 PVC Diameter: 2" Slot Size: 0.010" End Cap: 58.9' - 59.3'  <b>FILTER PACK</b> Interval: 46.9' - 59.3' Type: FilterSil Gravel Pack  <b>FILTER PACK SEAL</b> Interval: 43.4' - 46.9' Type: Pel-Plug 3/8" Bentonite Pellets  <b>ANNULUS SEAL</b> Interval: 0' - 43.4' Type: Pure Gold Grout Mixture  <b>WELL COMPLETION</b> Pad: 4' x 4' concrete Protective Casing: 4" x 4" x 5' Aluminum  <b>DRILLING METHODS</b> Soil Drill: 8.25 Hollow-Stem Auger Rock Drill: N/A
5	800	5.00 - 13.50 ML, SILT, trace fine sand, low plasticity; yellowish brown, contains mica; cohesive, moist, w<PL, soft.	ML		800.45 5.00							
10	795											
15	790	13.50 - 28.50 ML, SILT, trace fine to coarse sand, non to low plasticity; yellowish brown to orange brown, iron staining weathered, relict structure (gneissic); cohesive, moist, w<PL, soft.	ML		791.95 13.50	S1	DO	6-7-7	14	0.83 1.50		
20	785		ML			S2	DO	5-9-13	22	1.50 1.50		
25	780					S3	DO	5-9-10	19	1.50 1.50		
30	775	28.50 - 38.50 ML, SILT, trace sand, low plasticity; medium to dark gray, highly micaceous; cohesive, moist to wet (increase with depth), w<PL, soft.	ML		776.95 28.50	S4	DO	5-8-11	19	1.50 1.50		
35	770					S5	DO	5-11-15	26	1.50 1.50		
40	765	38.50 - 53.50 ML, SILT, trace sand, low plasticity; medium to dark gray, saprolite, highly micaceous; cohesive, moist to wet (increase with depth), w<PL, soft.	ML		766.95 38.50	S6	DO	4-8-10	18	1.50 1.50		
45						S7	DO	20-50/4	50/4	0.75 1.50		

Log continued on next page

LOG SCALE: 1 in = 5.5 ft  
DRILLING COMPANY: Southern Company Services  
DRILLER: S. Milam

GA INSPECTOR: Michael Boatman PG  
CHECKED BY: Rachel Kirkman, PG  
DATE: 1/16/18



# RECORD OF BOREHOLE DGWA-70A/B-70A

SHEET 2 of 2

PROJECT: Plant McDonough  
PROJECT NUMBER: 1668496-01  
DRILLED DEPTH: 60.00 ft  
LOCATION: ~400' west of the SW corner of AP-1

DRILL RIG: CME 550  
DATE STARTED: 5/10/17  
DATE COMPLETED: 5/10/17

NORTHING: 1,390,481.13  
EASTING: 2,200,590.67  
GS ELEVATION: 805.45  
TOC ELEVATION: 808.60 ft

DEPTH W.L.: 42.9'  
DATE W.L.: 5/10/2017  
TIME W.L.: 10:45  
GW ELEVATION: 765.70

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE				SAMPLES					MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
		DESCRIPTION	USCS	GRAPHIC LOG	ELEV. DEPTH (ft)	SAMPLE NO.	TYPE	BLOWS per 6 in 140 lb hammer 30 inch drop	N-VALUE	REC		
45	760	38.50 - 53.50 ML, SILT, trace sand, low plasticity; medium to dark gray, saprolite, highly micaceous; cohesive, moist to wet (increase with depth), w<PL, soft. (Continued)	ML								FilterSil Gravel Pack	<b>WELL CASING</b> Interval: 0' - 59.3' Material: Schedule 40 PVC Diameter: 2" Joint Type: Flush/Screw  <b>WELL SCREEN</b> Interval: 48.9' - 58.9' Material: Schedule 40 PVC Diameter: 2" Slot Size: 0.010" End Cap: 58.9' - 59.3'  <b>FILTER PACK</b> Interval: 46.9' - 59.3' Type: FilterSil Gravel Pack  <b>FILTER PACK SEAL</b> Interval: 43.4' - 46.9' Type: Pel-Plug 3/8" Bentonite Pellets  <b>ANNULUS SEAL</b> Interval: 0' - 43.4' Type: Pure Gold Grout Mixture  <b>WELL COMPLETION</b> Pad: 4' x 4' concrete Protective Casing: 4" x 4" x 5' Aluminum  <b>DRILLING METHODS</b> Soil Drill: 8.25 Hollow-Stem Auger Rock Drill: N/A
50	755					S8	DO	50/4	50/4	0.00 1.50		
55	750	53.50 - 60.00 SM, Silty SAND, fine grained, low plasticity; dark gray, contains mica; non-cohesive, moist, w<PL, dense.	PWR		751.95 53.50	S9	DO	50/3	50/3	0.25 1.50	0.010" Slotted Schedule 40 PVC	
60	745	Boring completed at 60.00 ft				S10	DO	50/2	50/2	0.17 1.50		
65	740											
70	735											
75	730											
80	725											
85	720											
90												

BOREHOLE RECORD 165977801\_GRP(B-47-B-71) (1).GPJ PIEDMONT.GDT 1/15/18

LOG SCALE: 1 in = 5.5 ft  
DRILLING COMPANY: Southern Company Services  
DRILLER: S. Milam

GA INSPECTOR: Michael Boatman PG  
CHECKED BY: Rachel Kirkman, PG  
DATE: 1/16/18



# RECORD OF BOREHOLE DGWA-71/B-71

SHEET 1 of 1





PROJECT: Plant McDonough  
PROJECT NUMBER: 1668496-01  
DRILLED DEPTH: 43.80 ft  
LOCATION: NW corner of site, inside cell tower gate.

DRILL RIG: CME 550  
DATE STARTED: 2/28/17  
DATE COMPLETED: 2/28/17

NORTHING: 1,393,965.35  
EASTING: 2,201,713.63  
GS ELEVATION: 861.05  
TOC ELEVATION: 863.95 ft

DEPTH W.L.: 27.1'  
DATE W.L.: 2/28/17  
TIME W.L.: 1245  
GW ELEVATION: 836.85

BOREHOLE RECORD 165977801\_GRP(B-47-B-71) (1).GPJ PIEDMONT.GDT 1/15/18

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE				SAMPLES				MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS			
		DESCRIPTION	USCS	GRAPHIC LOG	ELEV.	SAMPLE NO.	TYPE	BLOWS per 6 in 140 lb hammer 30 inch drop	N-VALUE			REC		
					DEPTH (ft)									
0	860	0.00 - 10.50 Hydrovac									CETCO puregold – grout (70:30)	<b>WELL CASING</b> Interval: 0'-33.4' Material: Schedule 40 PVC Diameter: 2" Joint Type: Flush/Screen		
5	855												<b>WELL SCREEN</b> Interval: 33.4'-43.4' Material: Schedule 40 PVC Diameter: 2" Slot Size: 0.010" End Cap: Schedule 40 PVC	
10	850	10.50 - 20.00 Sand with some silt, sands fine, white/black/grey weathered granite/granite gneiss, non plastic, moist, compact.	SP-SM		850.55 10.50								<b>FILTER PACK</b> Interval: 32.6'-43.8' Type: FilterSil	
15	845				S1	SPT	4-8-10	18	1.50 1.50					<b>FILTER PACK SEAL</b> Interval: 30.6'-32.6' Type: PEL-PLUG 3/8" Bentonite pellets
20	840	20.00 - 30.00 Silty Sand, sands fine, white/black/grey weathered granite/granite gneiss, non plastic, moist, dense.			SM		841.05 20.00							<b>ANNULUS SEAL</b> Interval: 1'-30.6' Type: CETCO puregold grout (70:30)
25	835		S3	SPT			4-7-11	18	1.50 1.50					<b>WELL COMPLETION</b> Pad: 4'x4' Concrete Protective Casing: 4" x 4" x 5' Aluminum
30	830	30.00 - 35.00 Sand with trace to some silt, sands fine to medium, white/black/grey, non plastic, moist, very dense.	SP-SM				831.05 30.00							<b>DRILLING METHODS</b> Soil Drill: Hollow-stem auger Rock Drill: N/A
35	825	35.00 - 43.80 Sand with trace silt and gravel (rock fragments), sands fine to medium, white/black/grey, non plastic, wet, very dense, and some iron staining in samples.			PWR		826.05 35.00							
40	820						S6	SPT	50/3	50/3	0.25 0.25			
45		Boring completed at 43.80 ft	S7	SPT			50/3	50/3	0.25 0.25					

LOG SCALE: 1 in = 5.5 ft  
DRILLING COMPANY: Southern Company Services  
DRILLER: S. Milam

GA INSPECTOR: Michael Boatman PG  
CHECKED BY: Rachel Kirkman, PG  
DATE: 1/16/18







# LOG OF TEST BORING

**BORING B-03**  
PAGE 1 OF 2  
**ES**

SOUTHERN COMPANY SERVICES, INC.  
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

**PROJECT** Plant McDonough Hydrogeological Investigation

**LOCATION** Cobb County, GA

**DATE STARTED** 10/2/2012 **COMPLETED** 10/3/2012 **SURF. ELEV.** 834.5 **COORDINATES:** N:1,394,043.54 E:2,202,411.14

**CONTRACTOR** SCS Field Services **EQUIPMENT** CME 550 **METHOD** 4.25" Hollow Stem Auger w/pilot bit; HQ Rock Core

**DRILLED BY** S. Denty **LOGGED BY** R. Tinsley **CHECKED BY** **ANGLE** **BEARING**

**BORING DEPTH** 42 ft. **GROUND WATER DEPTH: DURING** 23 ft. **COMP.** **DELAYED** 22.5 ft. after 24 hrs.

**NOTES** Well installed. Refer to well data sheet.

GEOTECH ENGINEERING LOGS - ESEE DATABASE GDT - 8/8/13 09:32 - T:\ESEE MAJOR PROJECTS\PROJECTS\MCDONOUGH\_ATKINSON\2013\ES2219\_CHARACTERIZATION REPORT\_SARFIELD DATA\MW LOGS.GPJ

DEPTH (ft.)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
5		<b>Silt (ML)</b> - Grass - brownish yellow, dry, SILT		SS -1	4.5	3-2-3 (5)		upper saprolite.
10		- brownish yellow, dry, medium stiff, SILT saprolite with relic bedding.		SS -2	9.5	2-3-3 (6)		10YR; powdery; Upper Saprolite.
15		- SAA		SS -3	14.5	2-3-4 (7)		upper saprolite.
20		- mottled deep red and gray, damp, stiff, SILT; with coarse grains of angular quartz; gneiss saprolite.		SS -4	19.5	1-6-5 (11)		upper saprolite.
25		<b>Silt (ML)</b>	810.0	SS	24.5	6-6-8		

(Continued Next Page)



# LOG OF TEST BORING

**BORING B-03**  
PAGE 2 OF 2  
**ES**

SOUTHERN COMPANY SERVICES, INC.  
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

**PROJECT** Plant McDonough Hydrogeological Investigation

**LOCATION** Cobb County, GA

GEOTECH ENGINEERING LOGS - ESEE DATABASE GDT - 8/8/13 09:32 - T:\ESEE MAJOR PROJECTS\PROJECTS\MCDONOUGH\_ATKINSON\2013\ES2219\_CHARACTERIZATION REPORT\_SARFIELD DATA\MW LOGS.GPJ

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		<b>Silt (ML)(con't)</b> - gray and white, stiff, micaceous SILT; weathered; contains fine to coarse-grained quartz and feldspar fragments		-5		(14)		good relic banding; lower saprolite.
30		- SAA		SS -6	29.5	9-7-7 (14)		
		- Refusal @ 32.2'. Start coring @ 32'.	802.3	RC -1	32.0			
35		<b>Gneiss</b> - gray and white, hard, slightly weathered, augen gneiss; water (iron, manganese) staining along partings.						
		- Soft weathered zone at bottom of run with some decomposition.		RC -2	37.0			
40		- gray and white, hard, slightly weathered, augen gneiss; water (iron, manganese) staining along partings. Approx. 35 to 45 degree angle.						
			792.5					
		Bottom of borehole at 42.0 feet.						
45								
50								

## WELL CONSTRUCTION LOG

Southern Company Generation

PROJECT: Plant McDonough		DRILLING CO.: SCS Field Services		WELL NAME  B-3		
Hydrogeologic Investigation		DRILLER: S. Denty				
LOCATION: Ash Pond		RIG TYPE: CME550				
LOGGER: Rhonda Tinsley		DRILLING METHODS: HS Auger/HQ Rock Core				
DATE CONSTRUCTED: 10/3/2012		N: 134043.543 E:2200411.14				
				DEPTH FEET	ELEVATION FT, MSL	
				TOP OF RISER	-3.36	837.82
				2" Threaded Riser Cap		
				GROUND SURFACE	0.0	834.5
				PROTECTIVE CASING SIZE: 4" x 4" TYPE: aluminum		
				BOTTOM OF GROUT		
				BACKFILL MATERIAL TYPE: Portland cement/bentonite grout AMOUNT: 6 bags cement 9 lbs bentonite		
				RISER CASING DIA: 2 inch TYPE: Schedule 40 PVC JOINT TYPE: Flush Threaded		
				TOP OF SEAL	20.0	814.5
				ANNULAR SEAL TYPE: PelPlug TR-30 3/8" bentonite pellets; 5-gallon buckets AMOUNT: 2.25 buckets PLACEMENT: Poured		
				TOP OF FILTER PACK	24.2	810.3
				FILTER PACK TYPE: Filtersil #61 Size 1A; 50 lbs/bag AMOUNT: 2.5 Bags PLACEMENT: Poured		
				BOTTOM OF RISER / TOP OF SCREEN	26.7	807.8
				SCREEN DIA: 2" prepack (3.45" OD) TYPE: Schedule 40 PVC OPENING WIDTH: 0.01 inch OPENING TYPE: Slotted SLOT SPACING: 0.1 inch		
				BOTTOM OF SCREEN	36.7	797.8
				Flush-threaded end cap		
BOTTOM OF CASING	37.0	797.5				
HOLE DIA: 7 inch (auger) 3.8 inch (HQ core)						



# LOG OF TEST BORING

**BORING B-06**  
PAGE 1 OF 2  
**ES**

SOUTHERN COMPANY SERVICES, INC.  
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

**PROJECT** Plant McDonough Hydrogeological Investigation

**LOCATION** Cobb County, GA

**DATE STARTED** 10/9/2012 **COMPLETED** 10/9/2012 **SURF. ELEV.** 785.9 **COORDINATES:** N:1,394,422.57 E:2,203,265.55

**CONTRACTOR** SCS Field Services **EQUIPMENT** CME 550 **METHOD** 4.25" Hollow Stem Auger w/pilot bit

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

**BORING DEPTH** 35.8 ft. **GROUND WATER DEPTH: DURING** **COMP.** **DELAYED** 7 ft. after 3 hrs.

**NOTES** Well installed. Refer to well data sheet.

GEOTECH ENGINEERING LOGS - ESEE DATABASE GDT - 8/8/13 09:32 - T:\ESEE MAJOR PROJECTS\PROJECTS\MCDONOUGH\_ATKINSON\2013\ES2219\_CHARACTERIZATION REPORT\_SARFIELD DATA\MW LOGS.GPJ

DEPTH (ft.)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		<b>Clayey Sand (SC)</b> - red-brown, damp, very loose, silty, clayey SAND; approximately 50% fine-grained sand, 20% clay, 20% silt, 10% organics. Organic rich horizon.	782.4					
5		<b>Silt (ML)</b> - red-tan, damp, clayey SILT with fine-grained sand - gray to brownish yellow, stiff, clayey SILT to silty CLAY; 60% silt, 30% clay; 10% sand/gravel; contains small (1 to 2 mm) quartz feldspar gravel		SS -1	4.5	4-4-8 (12)		A horizon of residual soil.
10		- tan-brown w/orange and gray, very moist, very soft, clayey SILT, micaceous; 70% silt, 25% clay, 5% fine-grained sand		SS -2	9.5	1-1-1 (2)		B horizon of residual soil.
15		- tan-brown, very moist, very soft, clayey SILT to silty CLAY; 55% clay, 40% silt, approximately 5% fine-grained sand		SS -3	14.5	1-1-1 (2)		B horizon of residual soil.
20		- olive gray to tan--brown, dry, stiff, clayey SILT, weathered with some relic structure; 60% silt, 35% clay, 5% fine-grained sand		SS -4	19.5	3-5-6 (11)		Top of upper saprolite zone.
25				SS	24.5	12-32-46		

(Continued Next Page)



# LOG OF TEST BORING

**BORING B-06**  
PAGE 2 OF 2  
**ES**

SOUTHERN COMPANY SERVICES, INC.  
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

**PROJECT** Plant McDonough Hydrogeological Investigation  
**LOCATION** Cobb County, GA

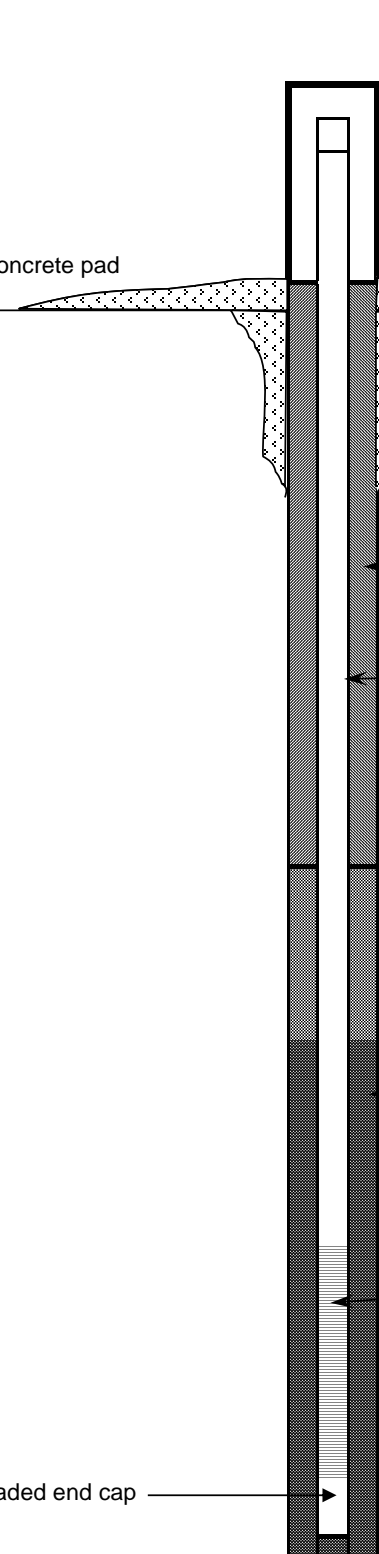
GEOTECH ENGINEERING LOGS - ESEE DATABASE GDT - 8/8/13 09:32 - T:\ESEE MAJOR PROJECTS\PROJECTS\MCDONOUGH - ATKINSON\2013\ES2219 - CHARACTERIZATION REPORT - SARIFIELD DATA\MMW LOGS.GPJ

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		<b>Silt (ML)(con't)</b> - tan-brown, very hard, clayey SILT with sand and gravel; contains highly weathered schist fragments; micaceous; 50% silt, 30% clay, 20% sand/gravel		-5		(78)		mid-lower saprolite.
30		- tan-brown, damp, very hard, sandy, gravelly, clayey SILT; 50% clayey silt, 50% sandy gravel; gravels are 1 mm to 10 mm in size, angular and gneissic in origin; highly weathered; contains some white leached quartz		SS -6	29.5	50 (0)		lower saprolite.
35		- brown, damp, very hard, clayey SILT; 40% clay, 60% silt; micaceous, contains relic structures		SS -7	34.5	27-50 (50)		lower saprolite.
			750.1					
		Bottom of borehole at 35.8 feet.						
40								
45								
50								

## WELL CONSTRUCTION LOG

Southern Company Generation

PROJECT: Plant McDonough		DRILLING CO.: SCS Field Services		WELL NAME	
Hydrogeologic Investigation		DRILLER: S. Denty			
LOCATION: Ash Pond		RIG TYPE: CME550		B-6	
LOGGER: Greg Dyer		DRILLING METHODS: HS Auger			
DATE CONSTRUCTED: 10/9/2012		N: 134422.573 E:2203265.55			
				DEPTH	ELEVATION
				FEET	FT, MSL
TOP OF RISER				-3.5	789.49
2" Threaded Riser Cap					
GROUND SURFACE				0.0	785.9
PROTECTIVE CASING SIZE: 4" x 4" TYPE: aluminum					
BOTTOM OF GROUT					
BACKFILL MATERIAL TYPE: Portland cement/bentonite grout AMOUNT: 5 bags cement 7.5 lbs bentonite					
RISER CASING DIA: 2 inch TYPE: Schedule 40 PVC JOINT TYPE: Flush Threaded					
TOP OF SEAL				16.8	769.1
ANNULAR SEAL TYPE: PelPlug TR-30 3/8" bentonite pellets; 5-gallon buckets AMOUNT: 2 buckets PLACEMENT: Tremie					
TOP OF FILTER PACK				21.7	764.2
FILTER PACK TYPE: Filtersil #61 Size 1A; 50 lbs/bag AMOUNT: 6 Bags PLACEMENT: Tremie					
BOTTOM OF RISER / TOP OF SCREEN				25.0	760.9
SCREEN DIA: 2" prepack (3.45" OD) TYPE: Schedule 40 PVC OPENING WIDTH: 0.01 inch OPENING TYPE: Slotted SLOT SPACING: 0.1 inch					
BOTTOM OF SCREEN				35.0	750.9
BOTTOM OF CASING				35.4	750.5



4 ft x 4 ft concrete pad

PROTECTIVE CASING  
SIZE: 4" x 4"  
TYPE: aluminum

BACKFILL MATERIAL  
TYPE: Portland cement/bentonite grout  
AMOUNT: 5 bags cement  
7.5 lbs bentonite

RISER CASING  
DIA: 2 inch  
TYPE: Schedule 40 PVC  
JOINT TYPE: Flush Threaded

ANNULAR SEAL  
TYPE: PelPlug TR-30 3/8" bentonite pellets; 5-gallon buckets  
AMOUNT: 2 buckets  
PLACEMENT: Tremie

FILTER PACK  
TYPE: Filtersil #61  
Size 1A; 50 lbs/bag  
AMOUNT: 6 Bags  
PLACEMENT: Tremie

SCREEN  
DIA: 2" prepack (3.45" OD)  
TYPE: Schedule 40 PVC  
OPENING WIDTH: 0.01 inch  
OPENING TYPE: Slotted  
SLOT SPACING: 0.1 inch

Flush-threaded end cap

HOLE DIA: 7 inch



# LOG OF TEST BORING

**BORING B-07**  
PAGE 1 OF 2  
**ES**

SOUTHERN COMPANY SERVICES, INC.  
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

**PROJECT** Plant McDonough Hydrogeological Investigation

**LOCATION** Cobb County, GA

**DATE STARTED** 10/9/2012 **COMPLETED** 10/9/2012 **SURF. ELEV.** 805.4 **COORDINATES:** N:1,394,373.41 E:2,203,595.17

**CONTRACTOR** SCS Field Services **EQUIPMENT** CME 550 **METHOD** 4.25" Hollow Stem Auger w/pilot bit

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

**BORING DEPTH** 26 ft. **GROUND WATER DEPTH: DURING** 18.5 ft. **COMP.** **DELAYED** 3.8 ft. after 18 hrs.

**NOTES** Well installed. Refer to well data sheet.

GEOTECH ENGINEERING LOGS - ESEE DATABASE GDT - 8/8/13 09:32 - T:\ESEE MAJOR PROJECTS\PROJECTS\MCDONOUGH\_ATKINSON\2013\ES2219\_CHARACTERIZATION REPORT\_SARIFIELD DATA\MW LOGS.GPJ

DEPTH (ft.)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		<b>Silt (ML)</b> - brown to red-brown, damp, very soft, clayey SILT with trace sand; organic rich  - red to red-tan, damp, soft, clayey SILT  ▽	800.9	SS -1	4.5	3-3-3 (6)		O Horizon.
5		<b>Fat Clay (CH)</b> - tan, brown and orange, damp, medium stiff, silty CLAY; micaceous; relic foliations; 60% clay, 40% silt						A-B Horizon / residual soils.
			795.9	SS -2	9.5	1-1-2 (3)		becomes very moist at 8.5'.  residual soil.
10		<b>Silt (ML)</b> - red-tan, very moist, soft, clayey SILT with trace fine sand; slightly micaceous; contains manganese		SS -3	14.5	1-1-3 (4)		residual soil.
15		- brown-red, very moist, soft, clayey SILT to silty CLAY with trace gravel; micaceous; prevalent manganese staining  ▽		SS -4	19.5	1-1-5 (6)		saturated from 18.5 to 19.5'.  residual soil.
20		- olive gray (greenish), wet, medium stiff, clayey SILT; micaceous; contains relic schist fragments						
25		- olive gray to tan-brown, wet, stiff, clayey, gravelly SILT; contains manganese and moderately		SS	24.5	7-7-8		

(Continued Next Page)



# LOG OF TEST BORING

**BORING B-07**  
PAGE 2 OF 2  
**ES**

SOUTHERN COMPANY SERVICES, INC.  
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

**PROJECT** Plant McDonough Hydrogeological Investigation

**LOCATION** Cobb County, GA

GEOTECH ENGINEERING LOGS - ESEE DATABASE GDT - 8/8/13 09:32 - T:\ESEE MAJOR PROJECTS\PROJECTS\MCDONOUGH\_ATKINSON\2013\ES2219\_CHARACTERIZATION REPORT\_SARFIELD DATA\MW LOGS.GPJ

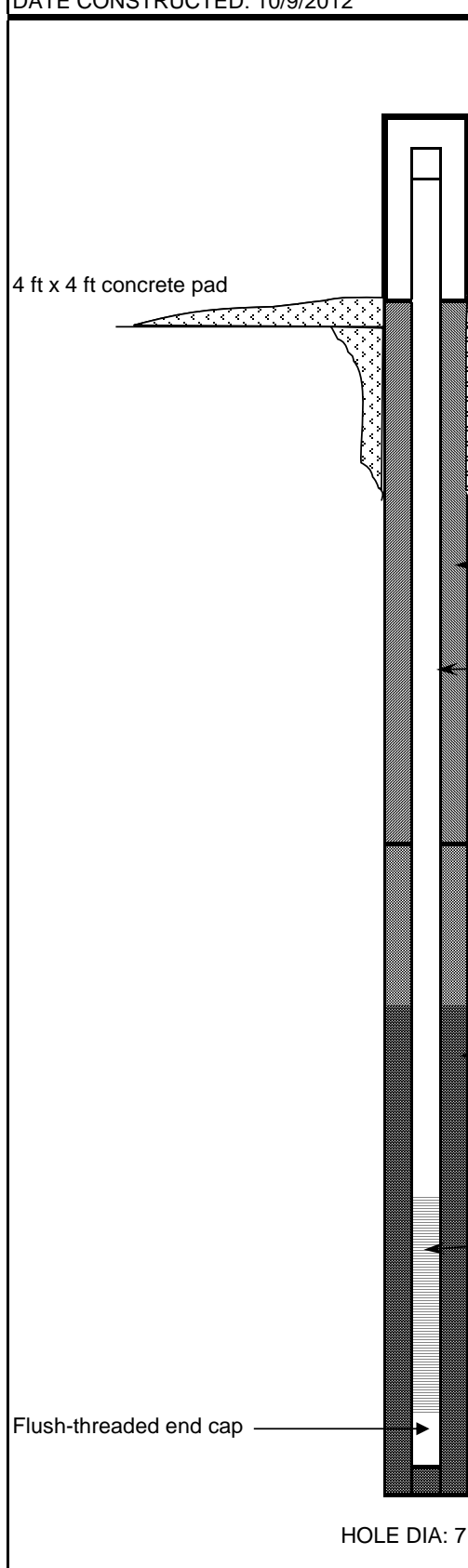
DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		weathered gneissic fragments; relic structures preserved in some instances <b>Silt (ML)</b> (cont)	779.4	-5		(15)		upper saprolite.
		Bottom of borehole at 26.0 feet.						
30								
35								
40								
45								
50								



## WELL CONSTRUCTION LOG

Southern Company Generation

PROJECT: Plant McDonough		DRILLING CO.: SCS Field Services		WELL NAME	
Hydrogeologic Investigation		DRILLER: S. Denty			
LOCATION: Ash Pond		RIG TYPE: CME550		B-7	
LOGGER: Greg Dyer		DRILLING METHODS: HS Auger			
DATE CONSTRUCTED: 10/9/2012		N: 1394373.41 E: 2203595.17			
				DEPTH	ELEVATION
				FEET	FT, MSL
TOP OF RISER				-3.8	809.24
2" Threaded Riser Cap					
GROUND SURFACE				0.0	805.4
PROTECTIVE CASING SIZE: 4" x 4" TYPE: aluminum					
BOTTOM OF GROUT					
BACKFILL MATERIAL TYPE: Portland cement/bentonite grout AMOUNT: 3 bags cement 1.75 lbs bentonite					
RISER CASING DIA: 2 inch TYPE: Schedule 40 PVC JOINT TYPE: Flush Threaded					
TOP OF SEAL				7.6	797.8
ANNULAR SEAL TYPE: PelPlug TR-30 3/8" bentonite pellets; 5-gallon buckets AMOUNT: 1.75 buckets PLACEMENT: Poured					
TOP OF FILTER PACK				12.7	792.7
FILTER PACK TYPE: Filtersil #61 Size 1A; 50 lbs/bag AMOUNT: 7 Bags PLACEMENT: Poured					
BOTTOM OF RISER / TOP OF SCREEN				14.8	790.6
SCREEN DIA: 2" prepack (3.45" OD) TYPE: Schedule 40 PVC OPENING WIDTH: 0.01 inch OPENING TYPE: Slotted SLOT SPACING: 0.1 inch					
BOTTOM OF SCREEN				24.8	780.6
BOTTOM OF CASING				25.2	780.2



4 ft x 4 ft concrete pad

PROTECTIVE CASING  
SIZE: 4" x 4"  
TYPE: aluminum

BACKFILL MATERIAL  
TYPE: Portland cement/bentonite grout  
AMOUNT: 3 bags cement  
1.75 lbs bentonite

RISER CASING  
DIA: 2 inch  
TYPE: Schedule 40 PVC  
JOINT TYPE: Flush Threaded

ANNULAR SEAL  
TYPE: PelPlug TR-30 3/8" bentonite pellets; 5-gallon buckets  
AMOUNT: 1.75 buckets  
PLACEMENT: Poured

FILTER PACK  
TYPE: Filtersil #61  
Size 1A; 50 lbs/bag  
AMOUNT: 7 Bags  
PLACEMENT: Poured

SCREEN  
DIA: 2" prepack (3.45" OD)  
TYPE: Schedule 40 PVC  
OPENING WIDTH: 0.01 inch  
OPENING TYPE: Slotted  
SLOT SPACING: 0.1 inch

Flush-threaded end cap

HOLE DIA: 7 inch



# LOG OF TEST BORING

**BORING B-16**  
PAGE 1 OF 2  
ES

SOUTHERN COMPANY SERVICES, INC.  
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

**PROJECT** Plant McDonough Hydrogeological Investigation

**LOCATION** Cobb County, GA

**DATE STARTED** 12/19/2012 **COMPLETED** 12/19/2012 **SURF. ELEV.** 823.6 **COORDINATES:** N:1,392,596.21 E:2,203,313.21

**CONTRACTOR** SCS Field Services **EQUIPMENT** CME 550 **METHOD** 4.25" Hollow Stem Auger w/pilot bit

**DRILLED BY** T. Milam **LOGGED BY** G. Dyer **CHECKED BY** **ANGLE** **BEARING**

**BORING DEPTH** 46 ft. **GROUND WATER DEPTH: DURING** **COMP.** **DELAYED**

**NOTES** Well installed. Refer to well data sheet.

GEOTECH ENGINEERING LOGS - ESEE DATABASE GDT - 8/8/13 09:33 - T:\ESEE MAJOR PROJECTS\PROJECTS\MCDONOUGH\_ATKINSON\2013\ES2219\_CHARACTERIZATION REPORT\_SARFIELD DATA\MW LOGS.GPJ

DEPTH (ft.)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
5		- Vacuum excavation from 0 ft to 9 ft						
10		<b>Silt (ML)</b> - tan and brown, dry, stiff, SILT; slightly micaceous; trace manganese oxides	814.6	SS -1	9.5	3-4-5 (9)		residual soil.
15		- tan, brown and orange, dry, medium stiff, sandy SILT; sand is fine to very fine-grained; slightly micaceous; trace schistosity		SS -2	14.5	3-3-5 (8)		residual soil.
20		- light tan to brown, dry, medium stiff, SILT with clay (about 10%); clay is slightly plastic; slightly micaceous; trace schistose gravel; trace manganese oxide		SS -3	19.5	3-3-3 (6)		residual soil.
25				SS	24.5	2-3-3		

(Continued Next Page)



# LOG OF TEST BORING

**BORING B-16**  
PAGE 2 OF 2  
**ES**

SOUTHERN COMPANY SERVICES, INC.  
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

**PROJECT** Plant McDonough Hydrogeological Investigation  
**LOCATION** Cobb County, GA

GEOTECH ENGINEERING LOGS - ESEE DATABASE GDT - 8/8/13 09:33 - T:\ESEE MAJOR PROJECTS\PROJECTS\MCDONOUGH\_ATKINSON\2013\ES2219\_CHARACTERIZATION REPORT\_SARFIELD DATA\MW LOGS.GPJ

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		<b>Silt (ML)(con't)</b> - medium stiff, SAA; silt more elastic		-4		(6)		
30		- mottled tan, brown and black, moist, stiff, SILT; saprolite like relict structures; micaceous; weathered schistose foliations; trace gravel; trace manganese oxides		SS -5	29.5	7-5-6 (11)		upper saprolite.
35		- wet, stiff, SAA		SS -6	34.5	6-5-5 (10)		
40		- wet, stiff, SAA; more schist gravel and slightly less weathered		SS -7	39.5	5-6-5 (11)		
45		- wet, very stiff, SAA; slightly less weathered trend		SS -8	44.5	5-9-8 (17)		
			777.6					
		Bottom of borehole at 46.0 feet.						
50								

# WELL CONSTRUCTION LOG

Southern Company Generation

PROJECT: Plant McDonough		DRILLING CO.: SCS Field Services		WELL NAME	
Hydrogeologic Investigation		DRILLER: T. Milam			
LOCATION: Ash Pond		RIG TYPE: CME550		B-16	
LOGGER: Greg Dyer		DRILLING METHODS: HS Auger			
DATE CONSTRUCTED: 12/19/2012		N: 1392596.21 E:2203313.211			
				DEPTH	ELEVATION
				FEET	FT, MSL
TOP OF RISER				-2.9	826.50
2" Threaded Riser Cap					
4 ft x 4 ft concrete pad					
GROUND SURFACE				0.0	823.6
PROTECTIVE CASING SIZE: 4" x 4" TYPE: aluminum					
BOTTOM OF GROUT					
BACKFILL MATERIAL TYPE: Portland cement/bentonite grout AMOUNT: 5.5 bags cement 8 lbs bentonite					
RISER CASING DIA: 2 inch TYPE: Schedule 40 PVC JOINT TYPE: Flush Threaded					
TOP OF SEAL				26.5	797.1
ANNULAR SEAL TYPE: PelPlug TR-30 3/8" bentonite pellets; 5-gallon buckets AMOUNT: 0.75 bucket PLACEMENT: Poured					
TOP OF FILTER PACK				29.2	794.4
FILTER PACK TYPE: Filtersil #61 Size 1A; 50 lbs/bag AMOUNT: 4.5 Bag PLACEMENT: Poured w/water					
BOTTOM OF RISER / TOP OF SCREEN				33.4	790.2
SCREEN DIA: 2" prepack (3.45" OD) TYPE: Schedule 40 PVC OPENING WIDTH: 0.01 inch OPENING TYPE: Slotted SLOT SPACING: 0.1 inch					
BOTTOM OF SCREEN				43.4	780.2
Flush-threaded end cap					
BOTTOM OF CASING				43.7	779.9
HOLE DIA: 7 inch					



# LOG OF TEST BORING

**BORING B-18**  
PAGE 1 OF 2  
**ES**

SOUTHERN COMPANY SERVICES, INC.  
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

**PROJECT** Plant McDonough Hydrogeological Investigation

**LOCATION** Cobb County, GA

**DATE STARTED** 1/9/2012 **COMPLETED** 1/9/2012 **SURF. ELEV.** 823.9 **COORDINATES:** N:1,392,521.15 E:2,202,874.99

**CONTRACTOR** SCS Field Services **EQUIPMENT** CME 550 **METHOD** 4.25" Hollow Stem Auger w/pilot bit

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

**BORING DEPTH** 31 ft. **GROUND WATER DEPTH: DURING** **COMP.** **DELAYED** 11 ft. after 24 hrs.

**NOTES** Well installed. Refer to well data sheet.

GEOTECH ENGINEERING LOGS - ESEE DATABASE GDT - 8/8/13 09:33 - T:\ESEE MAJOR PROJECTS\PROJECTS\MCDONOUGH\_ATKINSON\2013\ES2219\_CHARACTERIZATION REPORT\_SARFIELD DATA\MW LOGS.GPJ

DEPTH (ft.)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
0		- Vacuum excavation from 0 ft to 18.0 ft						
5								
10								
15								
20		<b>Silt (ML)</b>  - tan-orange, wet, medium stiff, SILT with clay; trace quartz gravel; mica flakes; trace relict structures but highly weathered	805.9	SS -1	19.5	2-3-5 (8)		residual soil-upper saprolite transition.
25				SS	24.5	3-5-6		

(Continued Next Page)



# LOG OF TEST BORING

**BORING B-18**  
PAGE 2 OF 2  
**ES**

SOUTHERN COMPANY SERVICES, INC.  
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

**PROJECT** Plant McDonough Hydrogeological Investigation

**LOCATION** Cobb County, GA

GEOTECH ENGINEERING LOGS - ESEE DATABASE GDT - 8/8/13 09:33 - T:\ESEE MAJOR PROJECTS\PROJECTS\MCDONOUGH\_ATKINSON\2013\ES2219\_CHARACTERIZATION REPORT\_SARFIELD DATA\MW LOGS.GPJ

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
30		<b>Silt (ML)(con't)</b> - mottled tan, green, gray and black, very moist, stiff, SILT; highly weathered relict structures; prevalent manganese oxides; trace gravel and clay  - more tan-gray, soft, SAA	792.9	-2  SS -3	29.5	(11)  1-2-2 (4)		residual soil-upper saprolite transition.
35		Bottom of borehole at 31.0 feet.						
40								
45								
50								

# WELL CONSTRUCTION LOG

Southern Company Generation

PROJECT: Plant McDonough		DRILLING CO.: SCS Field Services		WELL NAME	
Hydrogeologic Investigation		DRILLER: S. Denty			
LOCATION: Ash Pond		RIG TYPE: CME550		B-18	
LOGGER: Greg Dyer		DRILLING METHODS: HS Auger			
DATE CONSTRUCTED: 1/9-10/2013		N: 1392521.15 E:2202874.993			
				DEPTH	ELEVATION
				FEET	FT, MSL
				TOP OF RISER	-2.7 826.54
2" Threaded Riser Cap					
4 ft x 4 ft concrete pad					
GROUND SURFACE				0.0	823.9
PROTECTIVE CASING SIZE: 4" x 4" TYPE: aluminum					
BOTTOM OF GROUT					
BACKFILL MATERIAL TYPE: Portland cement/bentonite grout AMOUNT: 28 bags cement 42 lbs bentonite					
RISER CASING DIA: 2 inch TYPE: Schedule 40 PVC JOINT TYPE: Flush Threaded					
TOP OF SEAL				18.0	805.9
ANNULAR SEAL TYPE: PelPlug TR-30 1/4" bentonite pellets; 5-gallon buckets AMOUNT: 1 bucket PLACEMENT: Poured					
TOP OF FILTER PACK				19.2	804.7
FILTER PACK TYPE: Filtersil #61 Size 1A; 50 lbs/bag AMOUNT: 0.5 Bag filter pac 5.5 bags hole PLACEMENT: Poured w/water					
BOTTOM OF RISER / TOP OF SCREEN				22.4	801.5
SCREEN DIA: 2" prepack (3.45" OD) TYPE: Schedule 40 PVC OPENING WIDTH: 0.01 inch OPENING TYPE: Slotted SLOT SPACING: 0.1 inch					
BOTTOM OF SCREEN				32.4	791.5
Flush-threaded end cap					
BOTTOM OF CASING				32.6	791.3
HOLE DIA: 7 inch					



# LOG OF TEST BORING

**BORING B-24**  
PAGE 1 OF 3  
**ES**

SOUTHERN COMPANY SERVICES, INC.  
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

**PROJECT** Plant McDonough Hydrogeological Investigation

**LOCATION** Cobb County, GA

**DATE STARTED** 10/24/2012 **COMPLETED** 10/24/2012 **SURF. ELEV.** 818.7 **COORDINATES:** N:1,392,480.23 E:2,201,451.51

**CONTRACTOR** SCS Field Services **EQUIPMENT** CME 550 **METHOD** 4.25" Hollow Stem Auger w/pilot bit; HQ Rock Core

**DRILLED BY** S. Denty **LOGGED BY** C. Sellers **CHECKED BY** **ANGLE** **BEARING**

**BORING DEPTH** 79.1 ft. **GROUND WATER DEPTH: DURING** **COMP.** **DELAYED**

**NOTES** Well installed. Refer to well data sheet.

GEOTECH ENGINEERING LOGS - ESEE DATABASE GDT - 8/8/13 09:33 - T:\ESEE MAJOR PROJECTS\PROJECTS\MCDONOUGH\_ATKINSON\2013\ES2219\_CHARACTERIZATION REPORT\_SARFIELD DATA\MW LOGS.GPJ

DEPTH (ft.)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
5		- Vacuum excavation from 0 ft to 9.5 ft						
10		<b>Silt (ML)</b> - light gray, very soft, SILT with very fine to fine-grained sand	809.2	SS -1	9.5	WH-1-1 (2)		
15		- stiff, SAA; very micaceous		SS -2	14.5	3-4-6 (10)		
20		- light tan to brown, medium stiff, SILT; very fine to fine-grained; micaceous; 2" quartz		SS -3	19.5	5-4-4 (8)		
25				SS	24.5	19-37-50		

(Continued Next Page)







# LOG OF TEST BORING

**BORING B-24**  
PAGE 3 OF 3  
**ES**

SOUTHERN COMPANY SERVICES, INC.  
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

**PROJECT** Plant McDonough Hydrogeological Investigation

**LOCATION** Cobb County, GA

GEOTECH ENGINEERING LOGS - ESEE DATABASE GDT - 8/8/13 09:33 - T:\ESEE MAJOR PROJECTS\PROJECTS\MCDONOUGH\_ATKINSON\2013\ES2219\_CHARACTERIZATION REPORT\_SARFIELD DATA\MMW LOGS.GPJ

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
55		<b>Silt (ML)(con't)</b> - SAA		SS -10	54.5	50 (0)		
60			759.6	RC -1	59.1			
		<b>Gneiss</b> - light gray to orange, highly weathered, GNEISS; highly fractured, vertical and horizontal						
65		- light gray with red staining, SAA		RC -2	64.1			
70		- SAA		RC -3	69.1			
75				RC -4	74.1			
			739.6					
80		Bottom of borehole at 79.1 feet.						

# WELL CONSTRUCTION LOG

Southern Company Generation

PROJECT: Plant McDonough		DRILLING CO.: SCS Field Services		WELL NAME	
Hydrogeologic Investigation		DRILLER: S. Denty			
LOCATION: Ash Pond		RIG TYPE: CME550		B-24	
LOGGER: Cale Sellers		DRILLING METHODS: HS Auger/HQ Rock Core			
DATE CONSTRUCTED: 10/24/2012		N: 1392480.23 E:2201451.51			
				DEPTH FEET	ELEVATION FT, MSL
TOP OF RISER				-3.6	822.27
2" Threaded Riser Cap					
GROUND SURFACE				0.0	818.7
<b>PROTECTIVE CASING</b> SIZE: 4" x 4" TYPE: aluminum					
BOTTOM OF GROUT					
<b>BACKFILL MATERIAL</b> TYPE: Portland cement/bentonite grout AMOUNT: 21 bags cement 30 lbs bentonite					
<b>RISER CASING</b> DIA: 2 inch TYPE: Schedule 40 PVC JOINT TYPE: Flush Threaded					
TOP OF SEAL				60.8	757.9
<b>ANNULAR SEAL</b> TYPE: PelPlug TR-30 3/8" bentonite pellets; 5-gallon buckets AMOUNT: 0.25 bucket PLACEMENT: Poured					
TOP OF FILTER PACK				65.9	752.8
<b>FILTER PACK</b> TYPE: Filtersil #61 Size 1A; 50 lbs/bag AMOUNT: 2.5 Bags PLACEMENT: Poured w/water					
BOTTOM OF RISER / TOP OF SCREEN				68.3	750.4
<b>SCREEN</b> DIA: 2" prepack (3.45" OD) TYPE: Schedule 40 PVC OPENING WIDTH: 0.01 inch OPENING TYPE: Slotted SLOT SPACING: 0.1 inch					
BOTTOM OF SCREEN				78.3	740.4
BOTTOM OF CASING				79.1	739.6
HOLE DIA: 7 inch (auger) 3.8 inch (HQ core)					



# LOG OF TEST BORING

**BORING B-25**  
PAGE 1 OF 3  
**ES**

SOUTHERN COMPANY SERVICES, INC.  
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

**PROJECT** Plant McDonough Hydrogeological Investigation

**LOCATION** Cobb County, GA

**DATE STARTED** 10/23/2012 **COMPLETED** 10/24/2012 **SURF. ELEV.** 833.1 **COORDINATES:** N:1,392,813.23 E:2,201,504.19

**CONTRACTOR** SCS Field Services **EQUIPMENT** CME 550 **METHOD** 4.25" Hollow Stem Auger w/pilot bit; HQ Rock Core

**DRILLED BY** S. Denty **LOGGED BY** B. Gallagher **CHECKED BY** **ANGLE** **BEARING**

**BORING DEPTH** 54.8 ft. **GROUND WATER DEPTH: DURING** **COMP.** **DELAYED**

**NOTES** Well installed. Refer to well data sheet.

GEOTECH ENGINEERING LOGS - ESEE DATABASE GDT - 8/8/13 09:33 - T:\ESEE MAJOR PROJECTS\PROJECTS\MCDONOUGH\_ATKINSON\2013\ES2219\_CHARACTERIZATION REPORT\_SARFIELD DATA\MW LOGS.GPJ

DEPTH (ft.)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
5		- Vacuum excavation from 0 ft to 9.5 ft						
10		Silt (ML)	823.6	SS -1	9.5	1-2-2 (4)		no recovery.
15		- tan, dry, very hard, saprolite; micaceous, sandy with 1 inch lense of white feldspar at 14.8 ft.		SS -2	14.5	22-50 (50)		
20		- black and white, very hard, SAA; weathered gneiss saprolite		SS -3	19.5	18-36-50 (86)		
25				SS	24.5	25		

(Continued Next Page)



# LOG OF TEST BORING

**BORING B-25**  
PAGE 2 OF 3  
**ES**

SOUTHERN COMPANY SERVICES, INC.  
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

**PROJECT** Plant McDonough Hydrogeological Investigation

**LOCATION** Cobb County, GA

GEOTECH ENGINEERING LOGS - ESEE DATABASE GDT - 8/8/13 09:33 - T:\ESEE MAJOR PROJECTS\PROJECTS\MCDONOUGH\_ATKINSON\2013\ES2219\_CHARACTERIZATION REPORT\_SARFIELD DATA\MW LOGS.GPJ

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		<b>Silt (ML)(con't)</b> - black and white, dry, weathered gneiss		-4		(0)		
			806.1	RC -1	27.0			
		<b>Gneiss</b>  - black and white, medium hard to hard, slightly weathered - two 1/2" augers and weathered joints at 28.5 ft		RC -2	29.8			
30		- soft, weathered and broken from 29.1 to 30.2 ft - joint filled with secondary minerals from 30.2 to 30.7 ft - slightly weathered joints at 31.0, 31.3, and 31.6 ft						
		- 1/4" auger with four slightly weathered joints across foliation from 32.3 to 33.0 ft		RC -3	34.8			
35		- 3 inch weathered soft zone @ 34.5 ft						
				RC -4	39.8			
40		- 2" quartzite at 42 ft; very little staining; vertical fractures from 40ft to 42ft						
				RC -5	44.8			
45		- SAA						
				RC -6	49.8			
50		- weathered; staining in and around fractures						

(Continued Next Page)



## WELL CONSTRUCTION LOG

Southern Company Generation

PROJECT: Plant McDonough		DRILLING CO.: SCS Field Services		WELL NAME	
Hydrogeologic Investigation		DRILLER: S. Denty			
LOCATION: Ash Pond		RIG TYPE: CME550			
LOGGER:		DRILLING METHODS: HS Auger/HQ Rock Core		B-25	
DATE CONSTRUCTED:		N: 1392813.23 E:2201504.19			
				DEPTH	ELEVATION
				FEET	FT, MSL
TOP OF RISER				-3.5	836.62
2" Threaded Riser Cap					
4 ft x 4 ft concrete pad					
GROUND SURFACE				0.0	833.1
PROTECTIVE CASING SIZE: 4" x 4" TYPE: aluminum					
BOTTOM OF GROUT					
BACKFILL MATERIAL TYPE: Portland cement/bentonite grout AMOUNT: 10 bags cement 14 lbs bentonite					
RISER CASING DIA: 2 inch TYPE: Schedule 40 PVC JOINT TYPE: Flush Threaded					
TOP OF SEAL				40.1	793.0
ANNULAR SEAL TYPE: PelPlug TR-30 3/8" bentonite pellets; 5-gallon buckets AMOUNT: 0.25 bucket PLACEMENT: Tremie					
TOP OF FILTER PACK				42.4	790.7
FILTER PACK TYPE: Filtersil #61 Size 1A; 50 lbs/bag AMOUNT: 1 Bag; 50 lbs/bag PLACEMENT: Tremie					
BOTTOM OF RISER / TOP OF SCREEN				44.4	788.7
SCREEN DIA: 2" prepack (3.45" OD) TYPE: Schedule 40 PVC OPENING WIDTH: 0.01 inch OPENING TYPE: Slotted SLOT SPACING: 0.1 inch					
BOTTOM OF SCREEN				54.4	778.7
Flush-threaded end cap					
BOTTOM OF CASING				54.8	778.3
HOLE DIA: 7 inch (auger) 3.8 inch (HQ core)					



# LOG OF TEST BORING

**BORING B-26**  
PAGE 1 OF 2  
**ES**

SOUTHERN COMPANY SERVICES, INC.  
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

**PROJECT** Plant McDonough Hydrogeological Investigation

**LOCATION** Cobb County, GA

**DATE STARTED** 10/16/2012 **COMPLETED** 10/23/2012 **SURF. ELEV.** 850.2 **COORDINATES:** N:1,393,106.18 E:2,201,551.86

**CONTRACTOR** SCS Field Services **EQUIPMENT** CME 550 **METHOD** 4.25" Hollow Stem Auger w/pilot bit; HQ Rock Core

**DRILLED BY** S. Denty **LOGGED BY** Sellers/Byrd/Gallager **CHECKED BY** **ANGLE** **BEARING**

**BORING DEPTH** 49.3 ft. **GROUND WATER DEPTH: DURING** **COMP.** **DELAYED**

**NOTES** Well installed. Refer to well data sheet.

GEOTECH ENGINEERING LOGS - ESEE DATABASE GDT - 8/8/13 09:33 - T:\ESEE MAJOR PROJECTS\PROJECTS\MCDONOUGH\_ATKINSON\2013\ES2219\_CHARACTERIZATION REPORT\_SARFIELD DATA\MW LOGS.GPJ

DEPTH (ft.)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
5		- Vacuum excavation from 0 ft to 9.5 ft						
10		<b>Silt (ML)</b> - tan with white, pink and dark brown layering, stiff, sandy SILT; heavily weathered; micaceous; fine-grained	840.7	SS -1	9.5	4-4-6 (10)		
15		- stiff, SAA; heavily weathered gneiss		SS -2	14.5	3-5-9 (14)		
20		- dry, very hard, SAA; more compact with better foliation than previous samples; less sand		SS -3	19.5	17-24-27 (51)		
25				SS	24.5	50		

(Continued Next Page)





# LOG OF TEST BORING

**BORING B-26**  
PAGE 2 OF 2  
**ES**

SOUTHERN COMPANY SERVICES, INC.  
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

**PROJECT** Plant McDonough Hydrogeological Investigation  
**LOCATION** Cobb County, GA

GEOTECH ENGINEERING LOGS - ESEE DATABASE GDT - 8/8/13 09:33 - T:\ESEE MAJOR PROJECTS\PROJECTS\MCDONOUGH\_ATKINSON\2013\ES2219\_CHARACTERIZATION REPORT\_SARFIELD DATA\MW LOGS.GPJ

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		<b>Silt (ML)(con't)</b> - dry, very hard, SAA; powdered rock	824.2	RC -4	26.0	(0)		
30		<b>Gneiss</b> - black and white, fine grain, medium hard to hard, slightly to moderately weathered, banded, GNEISS - from 27.0' to 27.3' - soft, weathered, leached of biotite, stained below; 1.4" thick augen - 1/2" thick augen with remnant, healed fractures across foliation at 28'; slight staining on joint across foliation from 28.6' to 28.7' - stain on joints, one joint on foliation and one joint across foliation at 29.3' to 29.7'		RC -2	28.9			
35		- 3 stained and leached, weathered joints from 31.4' to 32.2'; augen - 3 stained joints across foliation from 32.7' to 33.0', including a soil coated joint at 33' - slightly stained joints on foliation at 33.1', 33.6', and 34.1' to 34.7'		RC -3	33.9			
40		- stained, leached, weathered zone with many 1/4" quartz phenocysts from 35.8' to 36.6'		RC -4	39.0			
45		- soft weathered zone with staining from 39.0' to 39.7' - heavily stained, soft joints across foliation at 41.3' - 1/2" augen at 42.0' - weathered broken zone from 43.6' to 44.1' - below 44.1' heavily stained with many quartz phenocysts - stained joint across foliation at 45.5'		RC -5	44.1			
50		Bottom of borehole at 49.3 feet.	800.9					

## WELL CONSTRUCTION LOG

Southern Company Generation

PROJECT: Plant McDonough		DRILLING CO.: SCS Field Services		WELL NAME	
Hydrogeologic Investigation		DRILLER: S. Denty			
LOCATION: Ash Pond		RIG TYPE: CME550		B-26	
LOGGER: Ben Gallagher		DRILLING METHODS: HS Auger/HQ Rock Core			
DATE CONSTRUCTED: 10/23/2012		N: 1393106.18 E:2201551.86			
				DEPTH	ELEVATION
				FEET	FT, MSL
				TOP OF RISER	-3.4 853.67
2" Threaded Riser Cap					
4 ft x 4 ft concrete pad					
GROUND SURFACE				0.0	850.2
PROTECTIVE CASING SIZE: 4" x 4" TYPE: aluminum					
BOTTOM OF GROUT					
BACKFILL MATERIAL TYPE: Portland cement/bentonite grout AMOUNT: 7 bags cement 10 lbs bentonite					
RISER CASING DIA: 2 inch TYPE: Schedule 40 PVC JOINT TYPE: Flush Threaded					
TOP OF SEAL				30.5	819.7
ANNULAR SEAL TYPE: PelPlug TR-30 3/8" bentonite pellets; 5-gallon buckets AMOUNT: 0.25 bucket PLACEMENT: Tremie					
TOP OF FILTER PACK				34.8	815.4
FILTER PACK TYPE: Filtersil #61 Size 1A; 50 lbs/bag AMOUNT: 0.5 Bag filter pac 0.5 bag hole PLACEMENT: Tremie					
BOTTOM OF RISER / TOP OF SCREEN				38.9	811.3
SCREEN DIA: 2" prepack (3.45" OD) TYPE: Schedule 40 PVC OPENING WIDTH: 0.01 inch OPENING TYPE: Slotted SLOT SPACING: 0.1 inch					
BOTTOM OF SCREEN				48.9	801.3
Flush-threaded end cap					
BOTTOM OF CASING				49.3	800.9
HOLE DIA: 7 inch (auger) 3.8 inch (HQ core)					



# LOG OF TEST BORING

**BORING B-27**  
PAGE 1 OF 2  
**ES**

SOUTHERN COMPANY SERVICES, INC.  
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

**PROJECT** Plant McDonough Hydrogeological Investigation

**LOCATION** Cobb County, GA

**DATE STARTED** 10/16/2012 **COMPLETED** 10/16/2012 **SURF. ELEV.** 846.9 **COORDINATES:** N:1,393,423.51 E:2,201,744.77

**CONTRACTOR** SCS Field Services **EQUIPMENT** CME 550 **METHOD** 4.25" Hollow Stem Auger w/pilot bit

**DRILLED BY** S. Denty **LOGGED BY** C. Sellers/K. Byrd **CHECKED BY** **ANGLE** **BEARING**

**BORING DEPTH** 34.4 ft. **GROUND WATER DEPTH: DURING** **COMP.** **DELAYED**

**NOTES** Well installed. Refer to well data sheet.

GEOTECH ENGINEERING LOGS - ESEE DATABASE GDT - 8/8/13 09:33 - T:\ESEE MAJOR PROJECTS\PROJECTS\MCDONOUGH\_ATKINSON\2013\ES2219\_CHARACTERIZATION REPORT\_SARFIELD DATA\MW LOGS.GPJ

DEPTH (ft.)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
5		- Vacuum excavation from 0 ft to 9.5 ft						
10		<b>Gneiss</b> - dark gray, biotite GNEISS; heavily weathered	837.4	SS -1	9.5	50 (0)		
15		- tan brown, weathered GNEISS; reddish brown quartz vein at 14.5'; sparse mica		SS -2	14.5	9-22-44 (66)		
20		- SAA; micaceous		SS -3	19.5	6-9-14 (23)		oxidation features.
25				RC -1	24.4			

(Continued Next Page)



# LOG OF TEST BORING

**BORING B-27**  
PAGE 2 OF 2  
**ES**

SOUTHERN COMPANY SERVICES, INC.  
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

**PROJECT** Plant McDonough Hydrogeological Investigation

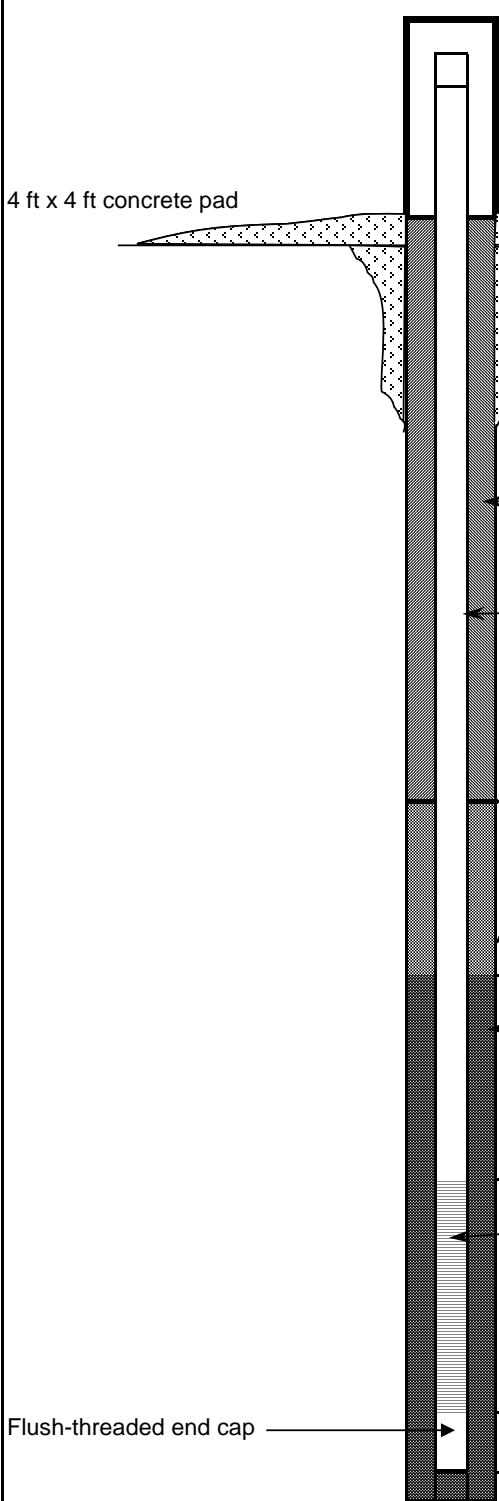
**LOCATION** Cobb County, GA

GEOTECH ENGINEERING LOGS - ESEE DATABASE GDT - 8/8/13 09:33 - T:\ESEE MAJOR PROJECTS\PROJECTS\MCDONOUGH\_ATKINSON\2013\ES2219\_CHARACTERIZATION REPORT\_SARFIELD DATA\MW LOGS.GPJ

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
30		<b>Gneiss</b> (con't) - GNEISS; micaceous flakes; fractures and iron (red) staining  - SAA; feldspar throughout	812.5	RC -2	29.4			only fragments recovered; started coring.  90% feldspar layers, 3.5" thick @ 25 ft and 29 ft.
35		Bottom of borehole at 34.4 feet.						
40								
45								
50								

## WELL CONSTRUCTION LOG

Southern Company Generation

PROJECT: Plant McDonough		DRILLING CO.: SCS Field Services		WELL NAME	
Hydrogeologic Investigation		DRILLER: S. Denty			
LOCATION: Ash Pond		RIG TYPE: CME550			
LOGGER: C. Sellers/K. Byrd		DRILLING METHODS: HS Auger		B-27	
DATE CONSTRUCTED: 10/16/2012		N: 1393423.51 E:2201744.77			
				DEPTH FEET	ELEVATION FT, MSL
				-3.3	850.29
2" Threaded Riser Cap					
4 ft x 4 ft concrete pad					
GROUND SURFACE				0.0	846.9
<b>PROTECTIVE CASING</b> SIZE: 4" x 4" TYPE: aluminum					
BOTTOM OF GROUT					
<b>BACKFILL MATERIAL</b> TYPE: Portland cement/bentonite grout AMOUNT: 5.5 bags cement 8 lbs bentonite					
<b>RISER CASING</b> DIA: 2 inch TYPE: Schedule 40 PVC JOINT TYPE: Flush Threaded					
TOP OF SEAL				17.0	829.9
<b>ANNULAR SEAL</b> TYPE: PelPlug TR-30 3/8" bentonite pellets; 5-gallon buckets AMOUNT: 0.5 bucket PLACEMENT: Tremie					
TOP OF FILTER PACK				21.0	825.9
<b>FILTER PACK</b> TYPE: Filtersil #61 Size 1A; 50 lbs/bag AMOUNT: 0.5 Bag filter pac 0.5 bag hole PLACEMENT: Tremie					
BOTTOM OF RISER / TOP OF SCREEN				24.0	822.9
<b>SCREEN</b> DIA: 2" prepack (3.45" OD) TYPE: Schedule 40 PVC OPENING WIDTH: 0.01 inch OPENING TYPE: Slotted SLOT SPACING: 0.1 inch					
BOTTOM OF SCREEN				34.0	812.9
Flush-threaded end cap					
BOTTOM OF CASING				34.4	812.5
HOLE DIA: 7 inch					



# LOG OF TEST BORING

**BORING B-28**  
PAGE 1 OF 4  
**ES**

SOUTHERN COMPANY SERVICES, INC.  
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

**PROJECT** Plant McDonough Hydrogeological Investigation

**LOCATION** Cobb County, GA

**DATE STARTED** 10/30/2012 **COMPLETED** 10/30/2012 **SURF. ELEV.** 812.8 **COORDINATES:** N:1,391,970.42 E:2,201,677.59

**CONTRACTOR** SCS Field Services **EQUIPMENT** CME 550 **METHOD** 4.25" Hollow Stem Auger w/pilot bit; HQ Rock Core

**DRILLED BY** S. Denty **LOGGED BY** D. Brooks **CHECKED BY** **ANGLE** **BEARING**

**BORING DEPTH** 94.3 ft. **GROUND WATER DEPTH: DURING** **COMP.** **DELAYED**

**NOTES** Well installed. Refer to well data sheet.

GEOTECH ENGINEERING LOGS - ESEE DATABASE GDT - 8/8/13 09:33 - T:\ESEE MAJOR PROJECTS\PROJECTS\MCDONOUGH\_ATKINSON\2013\ES2219\_CHARACTERIZATION REPORT\_SARFIELD DATA\MW LOGS.GPJ

DEPTH (ft.)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
5		- Vacuum excavation from 0 ft to 9.5 ft						
10		<b>Gneiss</b> - no recovery; encountered boulder	803.3 801.8	SS -1	9.5			
15		<b>Silty Sand (SM)</b>  - green and black, saprolite; relict structure present		SS -2	14.5			
20		- brown and tan, damp, silty SAND; micaceous; fine-grained		SS -3	19.5			
25				SS	24.5	4-5-7		

(Continued Next Page)



# LOG OF TEST BORING

**BORING B-28**  
PAGE 2 OF 4  
**ES**

SOUTHERN COMPANY SERVICES, INC.  
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

**PROJECT** Plant McDonough Hydrogeological Investigation  
**LOCATION** Cobb County, GA

GEOTECH ENGINEERING LOGS - ESEE DATABASE GDT - 8/8/13 09:33 - T:\ESEE MAJOR PROJECTS\PROJECTS\MCDONOUGH\_ATKINSON\2013\ES2219\_CHARACTERIZATION REPORT\_SARFIELD DATA\MW LOGS.GPJ

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
30		<b>Silty Sand (SM)</b> (con't) - SC-SM: tan, orange, and black, damp, medium dense, silty, clayey SAND; fine to very fine-grained		SS -4		(12)		
		- medium dense, SAA; micaceous; clay content increases		SS -5	29.5	7-7-7 (14)		
35			778.3	SS -6	34.5	5-16-23 (39)		
		<b>Silt (ML)</b> - green and black, damp, hard, sandy SILT; relict structure present		SS -7	39.5	5-5-6 (11)		
40		- tan, orange, and black, stiff, sandy SILT; micaceous; some relict structure		SS -8	44.5	7-16-20 (36)		
45		- hard, SAA		SS -9	49.5	20-20 (20)		
50		- very hard, SAA						

(Continued Next Page)



# LOG OF TEST BORING

**BORING B-28**  
PAGE 3 OF 4  
**ES**

SOUTHERN COMPANY SERVICES, INC.  
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

**PROJECT** Plant McDonough Hydrogeological Investigation  
**LOCATION** Cobb County, GA

GEOTECH ENGINEERING LOGS - ESEE DATABASE GDT - 8/8/13 09:33 - T:\ESEE MAJOR PROJECTS\PROJECTS\MCDONOUGH\_ATKINSON\2013\ES2219\_CHARACTERIZATION REPORT\_SARFIELD DATA\MW LOGS.GPJ

DEPTH (ft.)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
55		<b>Silt (ML)(con't)</b> - very hard, minimal recovery; partially weathered rock		SS -10	54.5	50 (0)		
60		<b>Gneiss</b> - black and gray, mylonite GNEISS (schistic zone); weathering noted along small joints and along foliations (saprock), otherwise fresh; no staining seen	753.6	RC -1	59.2			
65		- black and gray, hard, mylonite GNEISS; fresh		RC -2	64.3			
70		- SAA		RC -3	69.3			
75		- SAA		RC -4	74.3			
80		- SAA with small iron-stained joint at 83'		RC -5	79.3			

(Continued Next Page)





# LOG OF TEST BORING

**BORING B-28**  
PAGE 4 OF 4  
**ES**

SOUTHERN COMPANY SERVICES, INC.  
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

**PROJECT** Plant McDonough Hydrogeological Investigation

**LOCATION** Cobb County, GA

GEOTECH ENGINEERING LOGS - ESEE DATABASE GDT - 8/8/13 09:33 - T:\ESEE MAJOR PROJECTS\PROJECTS\MCDONOUGH - ATKINSON\2013\ES2219 - CHARACTERIZATION REPORT - SARIFIELD DATA\MMW LOGS.GPJ

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
85		Gneiss (cont')		RC -6	84.3			
90		- black and gray, hard, GNEISS; fresh		RC -7	89.3			
95		Bottom of borehole at 94.3 feet.	718.5					
100								
105								
110								

# WELL CONSTRUCTION LOG

Southern Company Generation

PROJECT: Plant McDonough		DRILLING CO.: SCS Field Services		WELL NAME	
Hydrogeologic Investigation		DRILLER: S. Denty			
LOCATION: Ash Pond		RIG TYPE: CME550		B-28	
LOGGER: Dustin Brooks		DRILLING METHODS: HS Auger/HQ Rock Core			
DATE CONSTRUCTED: 10/31/2012		N: 1391970.42 E:2201677.59			
				DEPTH FEET	ELEVATION FT, MSL
TOP OF RISER				-3.3	816.10
2" Threaded Riser Cap					
4 ft x 4 ft concrete pad					
GROUND SURFACE				0.0	812.8
<b>PROTECTIVE CASING</b> SIZE: 4" x 4" TYPE: aluminum					
BOTTOM OF GROUT					
<b>BACKFILL MATERIAL</b> TYPE: Portland cement/bentonite grout AMOUNT: 14 bags cement 19 lbs bentonite					
<b>RISER CASING</b> DIA: 2 inch TYPE: Schedule 40 PVC JOINT TYPE: Flush Threaded					
TOP OF SEAL				53.0	759.8
<b>ANNULAR SEAL</b> TYPE: PelPlug TR-30 3/8" bentonite pellets; 5-gallon buckets AMOUNT: 0.5 bucket PLACEMENT: Tremie					
TOP OF FILTER PACK				55.6	757.2
<b>FILTER PACK</b> TYPE: Filtersil #61 Size 1A; 50 lbs/bag AMOUNT: 0.5 Bag filter pac 0.5 bag hole PLACEMENT: Tremie					
BOTTOM OF RISER / TOP OF SCREEN				59.0	753.8
<b>SCREEN</b> DIA: 2" prepack (3.45" OD) TYPE: Schedule 40 PVC OPENING WIDTH: 0.01 inch OPENING TYPE: Slotted SLOT SPACING: 0.1 inch					
BOTTOM OF SCREEN				69.0	743.8
Flush-threaded end cap					
BOTTOM OF CASING				69.4	743.4
HOLE DIA: 7 inch (auger) 3.8 inch (HQ core)					



# LOG OF TEST BORING

**BORING B-29**  
PAGE 1 OF 3  
**ES**

SOUTHERN COMPANY SERVICES, INC.  
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

**PROJECT** Plant McDonough Hydrogeological Investigation

**LOCATION** Cobb County, GA

**DATE STARTED** 1/10/2012 **COMPLETED** 1/11/2012 **SURF. ELEV.** 813.5 **COORDINATES:** N:1,391,891.93 E:2,201,420.25

**CONTRACTOR** SCS Field Services **EQUIPMENT** CME 550 **METHOD** 4.25" Hollow Stem Auger w/pilot bit

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

**BORING DEPTH** 55.7 ft. **GROUND WATER DEPTH: DURING** **COMP.** **DELAYED**

**NOTES** Well installed. Refer to well data sheet.

GEOTECH ENGINEERING LOGS - ESEE DATABASE GDT - 8/8/13 09:33 - T:\ESEE MAJOR PROJECTS\PROJECTS\MCDONOUGH\_ATKINSON\2013\ES2219\_CHARACTERIZATION REPORT\_SARFIELD DATA\MW LOGS.GPJ

DEPTH (ft.)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
0		- Vacuum excavation from 0 ft to 10 ft						
5								
10			803.5					
15		<b>Silt (ML)</b>  - tan-red, damp, medium stiff, clayey SILT, no structures or staining		SS -1	12.0	2-2-4 (6)		residual soil.
20		- tan, brown, and orange-red, damp, stiff, SILT with clay; vertical manganese oxide bands; highly weathered relict structure; slightly micaceous		SS -2	14.5	2-5-6 (11)		residual soil - upper saprolite.
25		- red, green and gray, very hard, sandy SILT; highly weathered schist fragments; relict structure intact; moderately to well cemented; trace partially weathered rock fragments		SS -3	19.5	9-28-29 (57)		lower saprolite.
				SS	24.5	2-11-14		

(Continued Next Page)



# LOG OF TEST BORING

**BORING B-29**  
PAGE 2 OF 3  
**ES**

SOUTHERN COMPANY SERVICES, INC.  
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

**PROJECT** Plant McDonough Hydrogeological Investigation  
**LOCATION** Cobb County, GA

GEOTECH ENGINEERING LOGS - ESEE DATABASE GDT - 8/8/13 09:33 - T:\ESEE MAJOR PROJECTS\PROJECTS\MCDONOUGH\_ATKINSON\2013\ES2219\_CHARACTERIZATION REPORT\_SARFIELD DATA\MW LOGS.GPJ

DEPTH (ft.)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
30		<b>Silt (ML)(con't)</b> - green-gray and tan, dry, very stiff, sandy SILT; moderately to well cemented; structure intact; lacks rock fragments; micaceous; trace quartz sand		SS -4		(25)		lower saprolite.
35		- green-gray, moist, very hard, GRAVEL and SILT; moderately weathered schist fragments		SS -5	29.5	28-50 (50)		lower saprolite/transitioning to saprock.
40		- very damp, very hard, SAA		SS -6	34.5	24-50 (50)		spoon moist to wet.
45		- dry, very hard, SAA		SS -7	39.5	50 (0)		saprock transition.
50		- green-gray, wet, very hard, fine SILT with gravel; noticeably softer than previous runs; isolated schist fragments near base; little to no structure		SS -8	49.5	11-29-50 (79)		noticeable sound of water flowing.

(Continued Next Page)



# LOG OF TEST BORING

**BORING B-29**  
PAGE 3 OF 3  
**ES**

SOUTHERN COMPANY SERVICES, INC.  
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

**PROJECT** Plant McDonough Hydrogeological Investigation

**LOCATION** Cobb County, GA

GEOTECH ENGINEERING LOGS - ESEE DATABASE.GDT - 8/8/13 09:33 - T:\ESEE MAJOR PROJECTS\PROJECTS\MCDONOUGH\_ATKINSON\2013\ES2219\_CHARACTERIZATION REPORT\_SARFIELD DATA\MMW LOGS.GPJ

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
55		- very hard, SAPROCK; schist fragments <b>Silt (ML)</b> (con't)	757.8	SS -9	54.5	50 (0)		
		Bottom of borehole at 55.7 feet.						
60								
65								
70								
75								
80								

# WELL CONSTRUCTION LOG

Southern Company Generation

PROJECT: Plant McDonough		DRILLING CO.: SCS Field Services		WELL NAME	
Hydrogeologic Investigation		DRILLER: S. Denty			
LOCATION: Ash Pond		RIG TYPE: CME550		B-29	
LOGGER: Greg Dyer		DRILLING METHODS: HS Auger			
DATE CONSTRUCTED: 1/11/2013		N: 1391891.933 E:2201420.254			
				DEPTH	ELEVATION
				FEET	FT, MSL
TOP OF RISER				-3.0	816.45
2" Threaded Riser Cap					
4 ft x 4 ft concrete pad					
GROUND SURFACE				0.0	813.5
PROTECTIVE CASING SIZE: 4" x 4" TYPE: aluminum					
BOTTOM OF GROUT					
BACKFILL MATERIAL TYPE: Portland cement/bentonite grout AMOUNT: 10 bags cement 13.5 lbs bentonite					
RISER CASING DIA: 2 inch TYPE: Schedule 40 PVC JOINT TYPE: Flush Threaded					
TOP OF SEAL				40.0	773.5
ANNULAR SEAL TYPE: PelPlug TR-30 1/4" bentonite pellets; 5-gallon buckets AMOUNT: 1 bucket PLACEMENT: Poured					
TOP OF FILTER PACK				42.0	771.5
FILTER PACK TYPE: Filtersil #61 Size 1A; 50 lbs/bag AMOUNT: 5.5 Bags PLACEMENT: Poured w/water					
BOTTOM OF RISER / TOP OF SCREEN				44.1	769.4
SCREEN DIA: 2" prepack (3.45" OD) TYPE: Schedule 40 PVC OPENING WIDTH: 0.01 inch OPENING TYPE: Slotted SLOT SPACING: 0.1 inch					
BOTTOM OF SCREEN				54.1	759.4
Flush-threaded end cap					
BOTTOM OF CASING				54.4	759.1
HOLE DIA: 7 inch					



# LOG OF TEST BORING

**BORING B-31**  
PAGE 1 OF 2  
**ES**

SOUTHERN COMPANY SERVICES, INC.  
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

**PROJECT** Plant McDonough Hydrogeological Investigation

**LOCATION** Cobb County, GA

**DATE STARTED** 1/22/2013 **COMPLETED** 1/22/2013 **SURF. ELEV.** 794.8 **COORDINATES:** N:1,392,035.97 E:2,200,926.82

**CONTRACTOR** SCS Field Services **EQUIPMENT** CME 550 **METHOD** 4.25" Hollow Stem Auger w/pilot bit; HQ Rock Core

**DRILLED BY** S. Denty **LOGGED BY** B. Gallagher **CHECKED BY** **ANGLE** **BEARING**

**BORING DEPTH** 45.1 ft. **GROUND WATER DEPTH: DURING** **COMP.** **DELAYED**

**NOTES** Drilled near North Abutment of Ash Pond 1 dike Well installed. Refer to well data sheet.

GEOTECH ENGINEERING LOGS - ESEE DATABASE GDT - 8/8/13 09:33 - T:\ESEE MAJOR PROJECTS\PROJECTS\MCDONOUGH\_ATKINSON\2013\ES2219\_CHARACTERIZATION REPORT\_SARFIELD DATA\MW LOGS.GPJ

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
5		Silt (ML)						
10		- white and tan, moist, foliated; saprolite		SS -1	10.0	8-7-6 (13)		Vacuum excavation from 0 ft to 10 ft.
15				SS -2	14.5	7-8-17 (25)		
20		- tan, damp, stained below 20.5 ft		SS -3	19.5	7-17-12 (29)		
25				SS	24.5	3-6-12		

(Continued Next Page)



# LOG OF TEST BORING

**BORING B-31**  
PAGE 2 OF 2  
**ES**

SOUTHERN COMPANY SERVICES, INC.  
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

**PROJECT** Plant McDonough Hydrogeological Investigation  
**LOCATION** Cobb County, GA

GEOTECH ENGINEERING LOGS - ESEE DATABASE GDT - 8/8/13 09:33 - T:\ESEE MAJOR PROJECTS\PROJECTS\MCDONOUGH\_ATKINSON\2013\ES2219\_CHARACTERIZATION REPORT\_SARFIELD DATA\MW LOGS.GPJ

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
		<b>Silt (ML)(con't)</b> - wet	768.3	RC -1	26.0	(18)		
30		<b>Gneiss</b> - black and white - slightly weathred to fresh; w/????; hard ???? from 26.5 to 26.6 ft, 27.2 to 27.3 ft, 30.0 to 30.1 ft, and 31.4 to 32.4 ft		RC -2	28.7			
35		- soft, highly weathered with sand; stained from 32.4 to 33.5 ft		RC -3	33.7			
40		- 3 thick quartz intrusions/secondary fill; hard to soft; weathered; stained from 33.7 to 34.9 ft		RC -4	38.7			
45			749.7	RC -5	43.7			
		Bottom of borehole at 45.1 feet.						
50								



## Southern Company Generation

Section 6 - Page 81



# LOG OF TEST BORING

**BORING B-41**  
PAGE 1 OF 3  
**ES**

SOUTHERN COMPANY SERVICES, INC.  
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

**PROJECT** Plant McDonough Hydrogeological Investigation

**LOCATION** Cobb County, GA

**DATE STARTED** 11/13/2012 **COMPLETED** 11/14/2012 **SURF. ELEV.** 792.4 **COORDINATES:** N:1,390,922.38 E:2,201,749.84

**CONTRACTOR** SCS Field Services **EQUIPMENT** CME 550 **METHOD** 4.25" Hollow Stem Auger w/pilot bit

**DRILLED BY** S. Denty **LOGGED BY** C. Sellers **CHECKED BY** **ANGLE** **BEARING**

**BORING DEPTH** 61 ft. **GROUND WATER DEPTH: DURING** 35 ft. **COMP.** **DELAYED**

**NOTES** Well installed. Refer to well data sheet.

GEOTECH ENGINEERING LOGS - ESEE DATABASE GDT - 8/8/13 09:33 - T:\ESEE MAJOR PROJECTS\PROJECTS\MCDONOUGH\_ATKINSON\2013\ES2219\_CHARACTERIZATION REPORT\_SARFIELD DATA\MW LOGS.GPJ

DEPTH (ft.)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
5		- Vacuum excavation from 0 ft to 9.5 ft						
10		<b>Lean Clay (CL)</b> - light tan/orange, very soft, silty CLAY (fill for parking lot)	782.9	SS -1	9.5	WH-WH-1 (1)		
15		<b>Silt (ML)</b> - no recovery - medium stiff	777.9	SS -2	14.5	3-2-4 (6)		
20		- brownish orange, dry, stiff, clayey SILT with mica		SS -3	19.5	4-4-5 (9)		
25				SS	24.5			

(Continued Next Page)



# LOG OF TEST BORING

**BORING B-41**  
PAGE 2 OF 3  
**ES**

SOUTHERN COMPANY SERVICES, INC.  
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

**PROJECT** Plant McDonough Hydrogeological Investigation  
**LOCATION** Cobb County, GA

GEOTECH ENGINEERING LOGS - ESEE DATABASE GDT - 8/8/13 09:33 - T:\ESEE MAJOR PROJECTS\PROJECTS\MCDONOUGH\_ATKINSON\2013\ES2219\_CHARACTERIZATION REPORT\_SARFIELD DATA\MW LOGS.GPJ

DEPTH (ft.)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
30		<b>Silt (ML)(con't)</b> - light tan, SILT; micaceous		SS -4				
35		- stiff, SAA; with very fine-grained sand		SS -5	29.5	2-4-9 (13)		
40		$\nabla$ - wet, medium stiff, SAA		SS -6	34.5	2-2-3 (5)		
45		- brown, wet, stiff, SILT with fine to very fine sand		SS -7	39.5	2-3-6 (9)		
50		- stiff, SAA		SS -8	44.5	2-5-7 (12)		
		- light tan, damp, hard, sandy SILT (saprolite); fine to very fine-grained sand		SS -9	49.5	11-18-23 (41)		

(Continued Next Page)



# LOG OF TEST BORING

**BORING B-41**  
PAGE 3 OF 3  
**ES**

SOUTHERN COMPANY SERVICES, INC.  
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

**PROJECT** Plant McDonough Hydrogeological Investigation

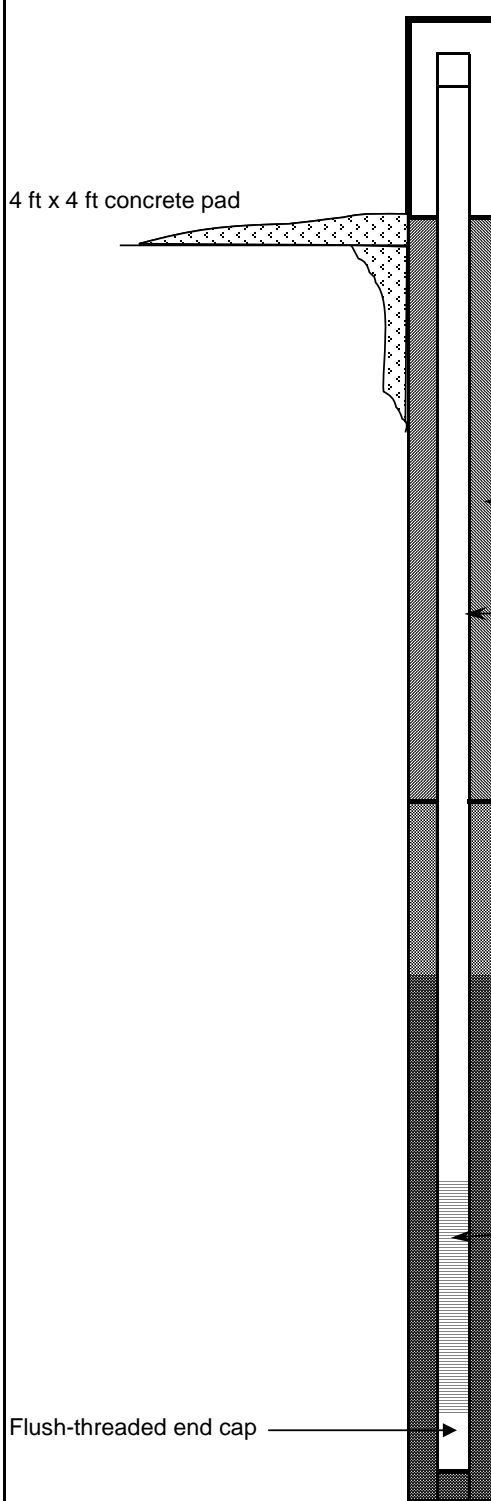
**LOCATION** Cobb County, GA

GEOTECH ENGINEERING LOGS - ESEE DATABASE.GDT - 8/8/13 09:33 - T:\ESEE MAJOR PROJECTS\PROJECTS\MCDONOUGH\_ATKINSON\2013\ES2219\_CHARACTERIZATION REPORT\_SARFIELD DATA\MW LOGS.GPJ

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	COMMENTS
55		<b>Silt (ML)(con't)</b> - light tan, damp, hard, SILT; contains fine to very fine-grained sand and angular quartz gravel		SS -10	54.5	10-17-26 (43)		
60		- light tan, damp, saprolite; contains fine to medium-grained sand	731.4	SS -11	59.5	11-24-50 (74)		
		Bottom of borehole at 61.0 feet.						
65								
70								
75								
80								

## WELL CONSTRUCTION LOG

Southern Company Generation

PROJECT: Plant McDonough		DRILLING CO.: SCS Field Services		WELL NAME	
Hydrogeologic Investigation		DRILLER: S. Denty			
LOCATION: Ash Pond		RIG TYPE: CME550			
LOGGER: Cale Sellers		DRILLING METHODS: HS Auger			
DATE CONSTRUCTED: 11/14/2012		N: 1390922.378 E:2201749.838		B-41	
				DEPTH FEET	ELEVATION FT, MSL
TOP OF RISER				-2.8	795.22
2" Threaded Riser Cap					
4 ft x 4 ft concrete pad				GROUND SURFACE	0.0 792.4
					
<b>PROTECTIVE CASING</b> SIZE: 4" x 4" TYPE: aluminum					
BOTTOM OF GROUT					
<b>BACKFILL MATERIAL</b> TYPE: Portland cement/bentonite grout AMOUNT: 7 bags cement 10 lbs bentonite					
<b>RISER CASING</b> DIA: 2 inch TYPE: Schedule 40 PVC JOINT TYPE: Flush Threaded					
TOP OF SEAL				45.2	747.2
<b>ANNULAR SEAL</b> TYPE: PelPlug TR-30 3/8" bentonite pellets; 5-gallon buckets AMOUNT: 1.25 buckets PLACEMENT: Tremie					
TOP OF FILTER PACK				47.3	745.1
<b>FILTER PACK</b> TYPE: Filtersil #61 Size 1A; 50 lbs/bag AMOUNT: 7 Bags PLACEMENT: Tremie					
BOTTOM OF RISER / TOP OF SCREEN				49.4	743.0
<b>SCREEN</b> DIA: 2" prepack (3.45" OD) TYPE: Schedule 40 PVC OPENING WIDTH: 0.01 inch OPENING TYPE: Slotted SLOT SPACING: 0.1 inch					
Flush-threaded end cap				BOTTOM OF SCREEN	59.4 733.0
				BOTTOM OF CASING	60.0 732.4
HOLE DIA: 7 inch					

# RECORD OF BOREHOLE B-50

SHEET 1 of 1

PROJECT: Plant McDonough  
PROJECT NUMBER: 1659778  
DRILLED DEPTH: 36.00 ft  
LOCATION: Smyrna, GA

DRILL RIG: 100C Track Mounted Rig  
DATE STARTED: 6/24/16  
DATE COMPLETED: 6/24/16

NORTHING: 1,391,656.94  
EASTING: 2,201,839.72  
GS ELEVATION: 806.28  
TOC ELEVATION: 809.78 ft

DEPTH W.L.: 20.8  
DATE W.L.: 6/24/2016  
TIME W.L.: 10:50

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE				SAMPLES			MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS		
		DESCRIPTION	USCS	GRAPHIC LOG	ELEV.	SAMPLE NO.	TYPE	REC				
					DEPTH (ft)							
0	805	0.00 - 12.00 SILT; grayish brown, dry, soft (fill)	ML						<p>Portland Type I/Protective Casing</p> <p>Portland Type I/ Type II/ Bentonite Gel mix</p> <p>3/8" Bentonite Pellets</p> <p>Filtersil std #61</p> <p>0.010" slot screen</p> <p>Sump</p>	<p><b>WELL CASING</b> Interval: 0'-35.2' Material: Schedule 40 PVC Diameter: 2" Joint Type: Flush threaded with O-ring</p> <p><b>SURFACE CASING</b> Interval: Material: Diameter:</p> <p><b>WELL SCREEN</b> Interval: 24.8'-34.8' Material: Schedule 40 PVC Diameter: 2" Slot Size: 0.010" End Cap: Schedule 40 PVC</p> <p><b>FILTER PACK</b> Interval: 21.8'-36' Type: Filtersil std61</p> <p><b>FILTER PACK SEAL</b> Interval: 15.9'-21.8' Type: 3/8" Bentonite Pellets</p> <p><b>ANNULUS SEAL</b> Interval: 3'-15.9' Type: Portland Type I/Type II/Bentonite Gel Mix</p> <p><b>WELL COMPLETION</b> Pad: 4'x4'x4" Protective Casing: Aluminum</p> <p><b>DRILLING METHODS</b> Soil Drill: Sonic Rock Drill: Sonic</p>		
5	800											
10	795						794.28					
		12.00 - 29.50 SILT; organish gray, some fine to coarse sand, micaceous, moist to wet, soft to firm (saprolite)	ML		12.00							
15	790											
20	785											
			SM		776.78							
25	780											
30	775	29.50 - 36.00 SILTY SAND; brownish gray, fine sand, wet, very soft				29.50						
35	770											
		Boring completed at 36.00 ft			770.28							
40												

LOG SCALE: 1 in = 5 ft  
DRILLING COMPANY: Cascade Drilling  
DRILLER: Bill Lindsey

GA INSPECTOR: K. Jurinko  
CHECKED BY: Rachel P. Kirkman, P.G.  
DATE: 12/22/17



# RECORD OF BOREHOLE B-51

SHEET 1 of 2

PROJECT: Plant McDonough  
PROJECT NUMBER: 1659778  
DRILLED DEPTH: 66.00 ft  
LOCATION: Smyrna, GA

DRILL RIG: 100C Track Mounted Rig  
DATE STARTED: 6/27/16  
DATE COMPLETED: 6/27/16

NORTHING: 1,390,501.61  
EASTING: 2,200,904.19  
GS ELEVATION: 763.00  
TOC ELEVATION: 765.93 ft

DEPTH W.L.: 8.85  
DATE W.L.: 6/28/2016  
TIME W.L.: 13:22

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE				SAMPLES			MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS	
		DESCRIPTION	USCS	GRAPHIC LOG	ELEV.	SAMPLE NO.	TYPE	REC			
					DEPTH (ft)						
0		0.00 - 3.00 SILT; brown, some fine to coarse sand, dry, soft, micaceous (topsoil)	ML						Portland Type I/ Alumiumum Casing	<b>WELL CASING</b> Interval: 0'-65' Material: Schedule 40 PVC Diameter: 2" Joint Type: Flush threaded with O-ring  <b>SURFACE CASING</b> Interval: Material: Diameter:  <b>WELL SCREEN</b> Interval: 55'-65' Material: Schedule 40 PVC Diameter: 2" Slot Size: 0.010" End Cap: Schedule 40 PVC  <b>FILTER PACK</b> Interval: 53'-65.4' Type: Filtersil std61  <b>FILTER PACK SEAL</b> Interval: 47.5'-53' Type: 3/8" Bentonite Pellets  <b>ANNULUS SEAL</b> Interval: 3'-47.5' Type: Portland Type I/Type II/Gel Mix  <b>WELL COMPLETION</b> Pad: 4'x4'x4" Protective Casing: Aluminum  <b>DRILLING METHODS</b> Soil Drill: Sonic Rock Drill: Sonic	
760		3.00 - 15.00 SILT; red to reddish brown, some fine to coarse gravel, black, subrounded, some clayey silt, orangish white and balck, dry, soft, micaceous (saprolite)	ML			760 3.00					
5											
755											
10											
750											
15		15.00 - 58.00 SILT and SAND; orangish brown, brown, and grey, fine to medium sand, some laminations and black mottling, micaceous, some biotite schist gravel, fine to coarse, dry to wet, very soft to very stiff				748 15.00			Portland Type I/ Type II/ Bentonite Gel mix		
745											
20											
740											
25											
735			SP-SM								
30											
730											
35											
725											
40		Log continued on next page									

BOREHOLE RECORD MCDONOUGH\_GRN(B-47-B-51).GPJ PIEDMONT.GDT 12/19/17

LOG SCALE: 1 in = 5 ft  
DRILLING COMPANY: Cascade Drilling  
DRILLER: Scotty Vermillion

GA INSPECTOR: K. Jurinko  
CHECKED BY: Rachel P. Kirkman, P.G.  
DATE: 12/22/17





# RECORD OF BOREHOLE B-51

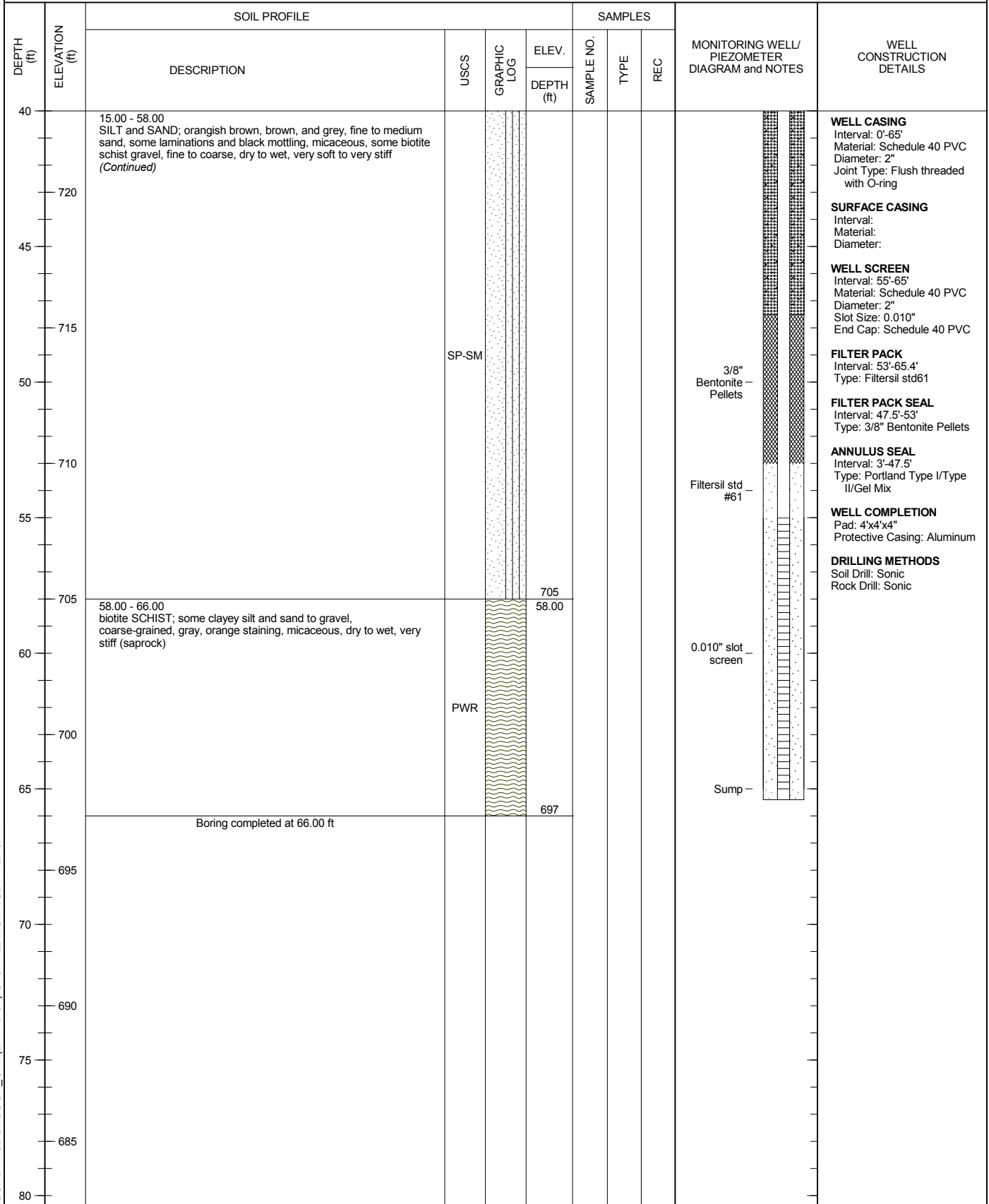
SHEET 2 of 2

PROJECT: Plant McDonough  
PROJECT NUMBER: 1659778  
DRILLED DEPTH: 66.00 ft  
LOCATION: Smyrna, GA

DRILL RIG: 100C Track Mounted Rig  
DATE STARTED: 6/27/16  
DATE COMPLETED: 6/27/16

NORTHING: 1,390,501.61  
EASTING: 2,200,904.19  
GS ELEVATION: 763.00  
TOC ELEVATION: 765.93 ft

DEPTH W.L.: 8.85  
DATE W.L.: 6/28/2016  
TIME W.L.: 13:22



LOG SCALE: 1 in = 5 ft  
DRILLING COMPANY: Cascade Drilling  
DRILLER: Scotty Vermillion

GA INSPECTOR: K. Jurinko  
CHECKED BY: Rachel P. Kirkman, P.G.  
DATE: 12/22/17



# RECORD OF BOREHOLE B-52

SHEET 1 of 2

PROJECT: Plant McDonough  
PROJECT NUMBER: 1659778-01  
DRILLED DEPTH: 50.00 ft  
LOCATION: Northside of the Lab Parking lot

DRILL RIG: CME 55  
DATE STARTED: 9/27/16  
DATE COMPLETED: 9/28/16

NORTHING: 1,392,309.40  
EASTING: 2,201,314.05  
GS ELEVATION: 820.07  
TOC ELEVATION: 823.22 ft

DEPTH W.L.: 25.72'  
DATE W.L.: 10/6/2016  
TIME W.L.: 1330  
GW ELEVATION: 797.50

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE			SAMPLES					MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS	
		DESCRIPTION	USCS	GRAPHIC LOG	ELEV.	SAMPLE NO.	TYPE	BLOWS per 6 in 140 lb hammer 30 inch drop	N-VALUE			REC
					DEPTH (ft)							
0	820	0.00 - 10.00 Top 10' were Hydrovac for utilities.									CETCO puregold grout (70:30) – / aluminum casing	<b>WELL CASING</b> Interval: 0'-38.9' Material: Schedule 40 PVC Diameter: 2 Joint Type: FLUSH/SCREW  <b>WELL SCREEN</b> Interval: 38.9'-48.9' Material: Schedule 40 PVC Diameter: 2 Slot Size: 0.010 End Cap: Schedule 40 PVC  <b>FILTER PACK</b> Interval: 35.7-50' Type: FilterSil  <b>FILTER PACK SEAL</b> Interval: 31.0-35.7 Type: PEL-PLUG 3/8" Bentonite pellets  <b>ANNULUS SEAL</b> Interval: 0-31' Type: CETCO puregold grout (70:30)  <b>WELL COMPLETION</b> Pad: 2' x 2' concrete Protective Casing: 4"x4"x5' aluminum  <b>DRILLING METHODS</b> Soil Drill: Hollow-stem auger Rock Drill: N/A
5	815											
10	810	10.00 - 15.00 SM, silty SAND, fine to medium grained, non to low plasticity, tan, non-cohesive, dry, W<PL, loose	SM		810.07 10.00							
15	805	15.00 - 33.50 ML, SILT with some SAND, fine to coarse, non to moderate plasticity, orange-brown to white to silver, slightly weathered, highly micaceous, cohesive, dry to wet (increasing with detpth), W<PL, firm to stiff, PWR.			805.07 15.00	1	DO	8-8-4	12	1.50 1.50		
20	800					2	DO	7-9-8	17	1.50 1.50	CETCO puregold – grout (70:30)	
25	795		ML			3	DO	7-13-11	24	1.50 1.50		
30	790					4	DO	18-50/3	68/9	0.75 1.50		
35	785	33.50 - 50.00 SM, silty SAND, fine to coarse, non to moderate plasticity, trace rock fragments, yellow-orange, non-cohesive, dry to moist, W<PL, compact to very dense, PWR			786.57 33.50	5	DO	17-20-50/4	70/10	1.50 1.50	PEL-PLUG 3/8" – Bentonite pellets	
40	780		SM			6	DO	50/5	50/5	0.41 0.41		
45						7	DO	50/2	50/2	0.16 0.16	FilterSil –	

Log continued on next page

Log continued on next page

LOG SCALE: 1 in = 5.5 ft  
DRILLING COMPANY: Southern Company Services  
DRILLER: Shawn Milam

GA INSPECTOR: M.L. Boatman  
CHECKED BY: TIR  
DATE: 12/22/17



# RECORD OF BOREHOLE B-52


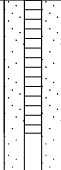
SHEET 2 of 2

PROJECT: Plant McDonough  
PROJECT NUMBER: 1659778-01  
DRILLED DEPTH: 50.00 ft  
LOCATION: Northside of the Lab Parking lot

DRILL RIG: CME 55  
DATE STARTED: 9/27/16  
DATE COMPLETED: 9/28/16

NORTHING: 1,392,309.40  
EASTING: 2,201,314.05  
GS ELEVATION: 820.07  
TOC ELEVATION: 823.22 ft

DEPTH W.L.: 25.72'  
DATE W.L.: 10/6/2016  
TIME W.L.: 1330  
GW ELEVATION: 797.50

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE				SAMPLES					MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
		DESCRIPTION	USCS	GRAPHIC LOG	ELEV. DEPTH (ft)	SAMPLE NO.	TYPE	BLOWS per 6 in 140 lb hammer 30 inch drop	N-VALUE	REC		
45	775	33.50 - 50.00 SM, silty SAND, fine to coarse, non to moderate plasticity, trace rock fragments, yellow-orange, non-cohesive, dry to moist, W<PL, compact to very dense, PWR (Continued)	SM								0.010 Slotted Screen 	<b>WELL CASING</b> Interval: 0'-38.9' Material: Schedule 40 PVC Diameter: 2 Joint Type: FLUSH/SCREW  <b>WELL SCREEN</b> Interval: 38.9'-48.9' Material: Schedule 40 PVC Diameter: 2 Slot Size: 0.010 End Cap: Schedule 40 PVC  <b>FILTER PACK</b> Interval: 35.7-50' Type: FilterSil  <b>FILTER PACK SEAL</b> Interval: 31.0-35.7 Type: PEL-PLUG 3/8" Bentonite pellets  <b>ANNULUS SEAL</b> Interval: 0-31' Type: CETCO puregold grout (70:30)  <b>WELL COMPLETION</b> Pad: 2' x 2' concrete Protective Casing: 4"x4"x5' aluminum  <b>DRILLING METHODS</b> Soil Drill: Hollow-stem auger Rock Drill: N/A
50	770	Boring completed at 50.00 ft			770.07	8	DO	50/3	50/3	0.25 0.25		
55	765											
60	760											
65	755											
70	750											
75	745											
80	740											
85	735											
90												

BOREHOLE RECORD 165977801\_GRP(B-47-B-71).GPJ\_PIEDMONT.GDT 12/22/17

LOG SCALE: 1 in = 5.5 ft  
DRILLING COMPANY: Southern Company Services  
DRILLER: Shawn Milam

GA INSPECTOR: M.L. Boatman  
CHECKED BY: TIR  
DATE: 12/22/17



# RECORD OF BOREHOLE B-54

SHEET 1 of 1

PROJECT: Plant McDonough  
PROJECT NUMBER: 1659778-01  
DRILLED DEPTH: 34.20 ft  
LOCATION: Eastside of the stream north of AP4

DRILL RIG: CME 55  
DATE STARTED: 9/26/16  
DATE COMPLETED: 9/26/16

NORTHING: 1,394,424.75  
EASTING: 2,203,140.27  
GS ELEVATION: 782.09  
TOC ELEVATION: 785.59 ft

DEPTH W.L.: 4.56'  
DATE W.L.: 10/6/2016  
TIME W.L.: 8:39  
GW ELEVATION: 781.03

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE				SAMPLES					MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
		DESCRIPTION	USCS	GRAPHIC LOG	ELEV. DEPTH (ft)	SAMPLE NO.	TYPE	BLOWS per 6 in 140 lb hammer 30 inch drop	N-VALUE	REC		
0		0.00 - 13.50 Top 10' were Hydrovac for utilities.									Portland Type I/Type II/Gel Mix / — aluminum casing	<b>WELL CASING</b> Interval: 0'-23.8' Material: Schedule 40 PVC Diameter: 2 Joint Type: Flush/Screw  <b>WELL SCREEN</b> Interval: 23.8'-33.8' Material: Schedule 40 PVC Diameter: 2 Slot Size: 0.010 End Cap: Schedule 40 PVC  <b>FILTER PACK</b> Interval: 21.9'-34.2' Type: FilterSil  <b>FILTER PACK SEAL</b> Interval: 17.8'-21.9' Type: PEL-PLUG 3/8" Bentonite pellets  <b>ANNULUS SEAL</b> Interval: 0-17.8' Type: Portland Type I/Type II/Gel Mix  <b>WELL COMPLETION</b> Pad: 2' x 2' concrete Protective Casing: 4"x4"x5' aluminum  <b>DRILLING METHODS</b> Soil Drill: Hollow-stem auger Rock Drill: HQ Core Barrell
780												
5											Portland Type I/Type II/Gel Mix	
775												
10											PEL-PLUG 3/8" Bentonite pellets	
770												
15		13.50 - 28.50 SM, silty SAND, fine to coarse, non to low plasticity; white to gray, weathered, well foliated gneissic saprolite; cohesive, moist, w<PL, stiff.			768.59 13.50	1	DO	6-7-6	13	0.83 1.50	FilterSil —	
765												
20			SM			2	DO	5-9-8	17	1.33 1.50		
760												
25						3	DO	4-5-11	15	0.00 1.50		
755												
30		28.50 - 29.00 GPS, poorly-graded sandy GRAVEL, fine to coarse, non plastic, some silt; white to tan to pink, K-spar and Quartz; non-cohesive, wet, w<PL, dense., PWR. Auger Refusal at 29.0	GP-GM		753.59 753.09 29.00	4	DO	21-50/1	71/7	0.50 0.58	0.010 Slotted Screen	
750		29.00 - 34.20 Bedrock; AUGEN GNEISS; fresh to slightly weathered, well foliated, gray, fine grained, medium strong to strong, (locally contains pegamitite zones).	BR		747.89							
35		Boring completed at 34.20 ft										
745												
40												
740												
45												

BOREHOLE RECORD 165977801\_GRP(B-47-B-71).GPJ\_PIEDMONT.GDT 12/22/17

LOG SCALE: 1 in = 5.5 ft  
DRILLING COMPANY: Terracon  
DRILLER: Shep Becker

GA INSPECTOR: M.L. Boatman  
CHECKED BY: TIR  
DATE: 12/22/17



# RECORD OF BOREHOLE B-55

SHEET 1 of 2

PROJECT: Plant McDonough  
PROJECT NUMBER: 1659778-01  
DRILLED DEPTH: 52.00 ft  
LOCATION: West of the cement plant

DRILL RIG: CME 55  
DATE STARTED: 9/21/16  
DATE COMPLETED: 9/22/16

NORTHING: 1,394,143.23  
EASTING: 2,204,146.61  
GS ELEVATION: 821.96  
TOC ELEVATION: 825.11 ft

DEPTH W.L.: 12.05'  
DATE W.L.: 10/6/2016  
TIME W.L.: 850  
GW ELEVATION: 813.06

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE				SAMPLES					MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
		DESCRIPTION	USCS	GRAPHIC LOG	ELEV. DEPTH (ft)	SAMPLE NO.	TYPE	BLOWS per 6 in 140 lb hammer 30 inch drop	N-VALUE	REC		
0		0.00 - 3.50 SM, silty SAND, non to low plasticity; red-brown; cohesive, moist, w<PL, soft.	SM			1	DO	4-8-11	19	0.75 1.50	Portland Type I/Type II/Gel Mix / -- aluminum casing	<b>WELL CASING</b> Interval: 0' - 41' Material: Schedule 40 PVC Diameter: 2 Joint Type: Flush/Screw  <b>WELL SCREEN</b> Interval: 41' - 51' Material: Schedule 40 PVC Diameter: 2 Slot Size: 0.010 End Cap: Schedule 40 PVC  <b>FILTER PACK</b> Interval: 39'-52' Type: FilterSil  <b>FILTER PACK SEAL</b> Interval: 32'-39' Type: PEL-PLUG 3/8" Bentonite pellets  <b>ANNULUS SEAL</b> Interval: 0'-32' Type: Portland Type I/Type II/Gel Mix  <b>WELL COMPLETION</b> Pad: 2' x 2' concrete Protective Casing: 4"x4"x5' aluminum  <b>DRILLING METHODS</b> Soil Drill: Hollow-stem auger Rock Drill: N/A
820					818.46							
		3.50 - 13.50 ML, SILT, trace some sand and clay, non to low plasticity; light brown to red-brown to silverish gray; cohesive, dry to moist, w<PL, soft to firm.	ML		3.50	2	DO	7-7-9	16	1.00 1.50		
5						3	DO	7-11-12	23	1.33 1.50		
815						4	DO	5-8-11	19	1.50 1.50	Portland Type I/Type II/Gel Mix	
		13.50 - 23.50 ML, SILT, trace fine to coarse sand, non plastic; light brown, deeply weathered, foliated, schist saprolite; cohesive, dry to moist, w<PL, soft to firm.	ML		808.46	5	DO	8-17-24	41	1.50 1.50		
10					13.50							
						6	DO	9-10-11	21	1.50 1.50		
810						7	DO	5-12-12	24	1.50 1.50	PEL-PLUG 3/8" Bentonite pellets	
15		23.50 - 52.00 ML, SILT, some sand, non plastic; light brown to tan to silverish gray, schist saprolite; cohesive, moist to wet (increases with depth), w<PL, soft to firm.	ML		798.46	8	DO	8-12-15	27	1.50 1.50		
805					23.50							
						9	DO	9-14-17	31	1.50 1.50		
20						10	DO	10-12-16	28	1.50 1.50	FilterSil --	
800												
						11	DO	7-12-23	35	1.50 1.50		
25												
795												
30												
790												
35												
785												
40												
780												
45												

Log continued on next page

LOG SCALE: 1 in = 5.5 ft  
DRILLING COMPANY: Terracon  
DRILLER: Shep Becker

GA INSPECTOR: M.L. Boatman  
CHECKED BY: TIR  
DATE: 12/22/17



# RECORD OF BOREHOLE B-55


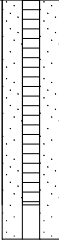
SHEET 2 of 2

PROJECT: Plant McDonough  
PROJECT NUMBER: 1659778-01  
DRILLED DEPTH: 52.00 ft  
LOCATION: West of the cement plant

DRILL RIG: CME 55  
DATE STARTED: 9/21/16  
DATE COMPLETED: 9/22/16

NORTHING: 1,394,143.23  
EASTING: 2,204,146.61  
GS ELEVATION: 821.96  
TOC ELEVATION: 825.11 ft

DEPTH W.L.: 12.05'  
DATE W.L.: 10/6/2016  
TIME W.L.: 850  
GW ELEVATION: 813.06

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE				SAMPLES				MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS	
		DESCRIPTION	USCS	GRAPHIC LOG	ELEV.	SAMPLE NO.	TYPE	BLOWS per 6 in 140 lb hammer 30 inch drop	N-VALUE			REC
					DEPTH (ft)							
45		23.50 - 52.00 ML, SILT, some sand, non plastic; light brown to tan to silverish gray, schist saprolite; cohesive, moist to wet (increases with depth), w<PL, soft to firm. (Continued)	ML									<b>WELL CASING</b> Interval: 0' - 41' Material: Schedule 40 PVC Diameter: 2 Joint Type: Flush/Screw  <b>WELL SCREEN</b> Interval: 41' - 51' Material: Schedule 40 PVC Diameter: 2 Slot Size: 0.010 End Cap: Schedule 40 PVC  <b>FILTER PACK</b> Interval: 39'-52' Type: FilterSil  <b>FILTER PACK SEAL</b> Interval: 32'-39' Type: PEL-PLUG 3/8" Bentonite pellets  <b>ANNULUS SEAL</b> Interval: 0'-32' Type: Portland Type I/Type II/Gel Mix  <b>WELL COMPLETION</b> Pad: 2' x 2' concrete Protective Casing: 4"x4"x5' aluminum  <b>DRILLING METHODS</b> Soil Drill: Hollow-stem auger Rock Drill: N/A
775												
50												
770		Boring completed at 52.00 ft			769.96							
55												
765												
60												
760												
65												
755												
70												
750												
75												
745												
80												
740												
85												
735												
90												

LOG SCALE: 1 in = 5.5 ft  
DRILLING COMPANY: Terracon  
DRILLER: Shep Becker

GA INSPECTOR: M.L. Boatman  
CHECKED BY: TIR  
DATE: 12/22/17



# RECORD OF BOREHOLE B-56


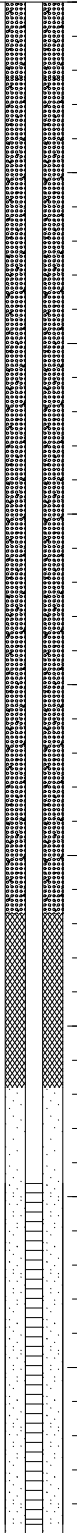



SHEET 1 of 1

PROJECT: Plant McDonough  
PROJECT NUMBER: 1659778-01  
DRILLED DEPTH: 45.00 ft  
LOCATION: SW of the cement plant

DRILL RIG: CME 55  
DATE STARTED: 10/3/16  
DATE COMPLETED: 10/3/16

NORTHING: 1,393,958.64  
EASTING: 2,204,186.27  
GS ELEVATION: 820.55  
TOC ELEVATION: 823.70 ft

DEPTH W.L.: 16.39'  
DATE W.L.: 10/6/2016  
TIME W.L.: 900  
GW ELEVATION: 807.31

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE				SAMPLES				MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS		
		DESCRIPTION	USCS	GRAPHIC LOG	ELEV.	SAMPLE NO.	TYPE	BLOWS per 6 in 140 lb hammer 30 inch drop	N-VALUE			REC	
					DEPTH (ft)								
0	820	0.00 - 13.50 ML, SILT, trace fine sand, non to low plasticity; brownish red, micaceous, fill; cohesive, dry to moist, w<PL, firm.	ML		807.05						CETCO puregold grout (70:30) – / aluminum casing		<b>WELL CASING</b> Interval: 0'-34.6' Material: Schedule 40 PVC Diameter: 2 Joint Type: Flush/Screw  <b>WELL SCREEN</b> Interval: 34.6'-44.6' Material: Schedule 40 PVC Diameter: 2 Slot Size: 0.010 End Cap: Schedule 40 PVC  <b>FILTER PACK</b> Interval: 31.8' - 45' Type: FilterSil  <b>FILTER PACK SEAL</b> Interval: 26.7'-31.8' Type: PEL-PLUG 3/8" Bentonite pellets  <b>ANNULUS SEAL</b> Interval: 0'-26.7' Type: CETCO puregold grout (70:30)  <b>WELL COMPLETION</b> Pad: 2' x 2' concrete Protective Casing: 4"x4"x5' aluminum  <b>DRILLING METHODS</b> Soil Drill: Hollow-stem auger Rock Drill: N/A
						1	DO	2-5-5	10	<u>1.08</u> 1.50			
5	815												
						2	DO	2-4-4	8	<u>0.75</u> 1.50			
10	810												
			ML		807.05 13.50	3	DO	3-5-11	16	<u>1.50</u> 1.50	CETCO puregold – grout (70:30)		
15	805	13.50 - 23.50 ML, SILT, trace fine to coarse sand, non to low plasticity; red to brown to black to silver, micaceous, schist/schistose gneiss saprolite; cohesive, moist to wet, soft to stiff.											
						4	DO	3-5-9	16	<u>1.50</u> 1.50			
20	800												
			ML		797.05 23.50	5	DO	7-8-14	22	<u>1.33</u> 1.50	PEL-PLUG 3/8" Bentonite pellets		
25	795	23.50 - 45.00 ML, SILT, trace fine to coarse sand, non to low plasticity; brown to silvery brown, deeply weathered, micaceous, schist saprolite; cohesive, wet, w<PL, soft to firm. (locally contains pegmatite veins)											
						6	DO	7-6-12	18	<u>1.33</u> 1.50			
30	790												
			ML		775.55	7	DO	7-8-14	22	<u>1.00</u> 1.50	FilterSil –		
35	785												
						8	DO	14-32-50	82	<u>1.00</u> 1.50			
40	780												
										0.010" slotted – screen			
			9	DO	7-12-33	42	<u>1.25</u> 1.50						
		Boring completed at 45.00 ft											

LOG SCALE: 1 in = 5.5 ft  
DRILLING COMPANY: Southern Company Services  
DRILLER: S. Milam

GA INSPECTOR: M.L. Boatman  
CHECKED BY: TIR  
DATE: 12/22/17





# RECORD OF BOREHOLE B-57

SHEET 1 of 2

PROJECT: Plant McDonough  
PROJECT NUMBER: 1659778-01  
DRILLED DEPTH: 50.50 ft  
LOCATION: North of the 4-wide construction trailer

DRILL RIG: CME 55  
DATE STARTED: 9/24/16  
DATE COMPLETED: 9/24/16

NORTHING: 1,391,397.46  
EASTING: 2,202,735.64  
GS ELEVATION: 785.76  
TOC ELEVATION: 789.22 ft

DEPTH W.L.: 21.49'  
DATE W.L.: 10/6/2016  
TIME W.L.: 9:20  
GW ELEVATION: 767.73

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE			SAMPLES					MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS		
		DESCRIPTION	USCS	GRAPHIC LOG	ELEV.	SAMPLE NO.	TYPE	BLOWS per 6 in 140 lb hammer 30 inch drop	N-VALUE			REC	
					DEPTH (ft)								
0	785	0.00 - 10.00 Boring was hydrovac'd to 10' bgs (material appears to be SM-ML)	SM-ML		775.76 10.00						Portland Type I/Type II/Gel Mix / – aluminum casing	<b>WELL CASING</b> Interval: 0'-40' Material: Schedule 40 PVC Diameter: 2 Joint Type: Flush/Screw  <b>WELL SCREEN</b> Interval: 40'-50' Material: Schedule 40 PVC Diameter: 2 Slot Size: 0.010 End Cap: Schedule 40 PVC  <b>FILTER PACK</b> Interval: 34.6'-50.5' Type: FilterSil  <b>FILTER PACK SEAL</b> Interval: 29'-34.6' Type: PEL-PLUG 3/8" Bentonite pellets  <b>ANNULUS SEAL</b> Interval: 0'-29' Type: Portland Type I/Type II/Gel Mix  <b>WELL COMPLETION</b> Pad: 2' x 2' concrete Protective Casing: 4"x4"x5' aluminum  <b>DRILLING METHODS</b> Soil Drill: Hollow-stem auger Rock Drill: HQ Core Barrel	
5	780						1	DO	4-10-14	24			1.00 1.50
10	775	10.00 - 30.00 ML- Sandy Clayey SILT, fine to coarse sand, some fine gravel; reddish-brown to brown, dense, dry; micaceous, PWR	ML										
15	770					2	DO	11-24-50/5	74/11	1.00 1.50			
20	765												
25	760					3	DO	4-8-14	22	1.33 1.50			
30	755	30.00 - 34.50 CL- Silty CLAY, SOME fine to medium SAND, trace gravel; brown; loose, W<PL; micaceous, PWR. Auger Refusal at 34.5	CL		755.76 30.00						PEL-PLUG 3/8" – Bentonite pellets		
35	750	34.50 - 50.50 Bedrock; SCHIST; strong to very strong, light to dark gray with white and black laminations, sub-parallel; slightly weathered top with red oxidation on fractured surfaces to fresh and unfractured at the bottom.				4	DO	4-4-8	12	1.33 1.50			
					751.26 34.50	5	DO	50/3	50/3	0.00 0.25	FilterSil –  0.010 Slotted Screen		
40	745		BR										
45													
Log continued on next page													

Log continued on next page

LOG SCALE: 1 in = 5.5 ft  
DRILLING COMPANY: Terracon  
DRILLER: Shep Becker

GA INSPECTOR: Aubrey Ellis  
CHECKED BY: TIR  
DATE: 12/22/17



# RECORD OF BOREHOLE B-57

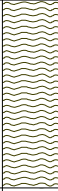
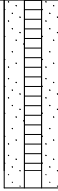
SHEET 2 of 2

PROJECT: Plant McDonough  
PROJECT NUMBER: 1659778-01  
DRILLED DEPTH: 50.50 ft  
LOCATION: North of the 4-wide construction trailer

DRILL RIG: CME 55  
DATE STARTED: 9/24/16  
DATE COMPLETED: 9/24/16

NORTHING: 1,391,397.46  
EASTING: 2,202,735.64  
GS ELEVATION: 785.76  
TOC ELEVATION: 789.22 ft

DEPTH W.L.: 21.49'  
DATE W.L.: 10/6/2016  
TIME W.L.: 920  
GW ELEVATION: 767.73

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE				SAMPLES					MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
		DESCRIPTION	USCS	GRAPHIC LOG	ELEV. DEPTH (ft)	SAMPLE NO.	TYPE	BLOWS per 6 in 140 lb hammer 30 inch drop	N-VALUE	REC		
45	740	34.50 - 50.50 Bedrock; SCHIST; strong to very strong, light to dark gray with white and black laminations, sub-parallel; slightly weathered top with red oxidation on fractured surfaces to fresh and unfractured at the bottom. (Continued)	BR									<b>WELL CASING</b> Interval: 0'-40' Material: Schedule 40 PVC Diameter: 2 Joint Type: Flush/Screw  <b>WELL SCREEN</b> Interval: 40'-50' Material: Schedule 40 PVC Diameter: 2 Slot Size: 0.010 End Cap: Schedule 40 PVC  <b>FILTER PACK</b> Interval: 34.6'-50.5' Type: FilterSil  <b>FILTER PACK SEAL</b> Interval: 29'-34.6' Type: PEL-PLUG 3/8" Bentonite pellets  <b>ANNULUS SEAL</b> Interval: 0'-29' Type: Portland Type I/Type II/Gel Mix  <b>WELL COMPLETION</b> Pad: 2' x 2' concrete Protective Casing: 4"x4"x5' aluminum  <b>DRILLING METHODS</b> Soil Drill: Hollow-stem auger Rock Drill: HQ Core Barrel
50	735	Boring completed at 50.50 ft			735.26							
55	730											
60	725											
65	720											
70	715											
75	710											
80	705											
85	700											
90												

LOG SCALE: 1 in = 5.5 ft  
DRILLING COMPANY: Terracon  
DRILLER: Shep Becker

GA INSPECTOR: Aubrey Ellis  
CHECKED BY: TIR  
DATE: 12/22/17



# RECORD OF BOREHOLE B-58

SHEET 1 of 2

PROJECT: Plant McDonough  
PROJECT NUMBER: 1659778-01  
DRILLED DEPTH: 45.00 ft  
LOCATION: SW corner of the new overflow parking lot of the NEW admin building

DRILL RIG: CME 55  
DATE STARTED: 9/22/16  
DATE COMPLETED: 9/23/16

NORTHING: 1,391,126.84  
EASTING: 2,202,425.23  
GS ELEVATION: 784.90  
TOC ELEVATION: 788.20 ft

DEPTH W.L.: 22.30'  
DATE W.L.: 10/6/2016  
TIME W.L.: 940  
GW ELEVATION: 765.90

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE				SAMPLES				MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
		DESCRIPTION	USCS	GRAPHIC LOG	ELEV.	SAMPLE NO.	TYPE	BLOWS per 6 in 140 lb hammer 30 inch drop	N-VALUE			REC																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
					DEPTH (ft)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
0		0.00 - 13.50 Top 10' were Hydrovac for utilities.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															

Bottom completed at 45.00 ft

LOG SCALE: 1 in = 5.5 ft  
DRILLING COMPANY: Southern Company Services  
DRILLER: S. Milam

GA INSPECTOR: M.L. Boatman  
CHECKED BY: TIR  
DATE: 12/22/17



# RECORD OF BOREHOLE B-58

SHEET 2 of 2

PROJECT: Plant McDonough  
 PROJECT NUMBER: 1659778-01  
 DRILLED DEPTH: 45.00 ft  
 LOCATION: SW corner of the new overflow parking lot of the NEW admin building

DRILL RIG: CME 55  
 DATE STARTED: 9/22/16  
 DATE COMPLETED: 9/23/16

NORTHING: 1,391,126.84  
 EASTING: 2,202,425.23  
 GS ELEVATION: 784.90  
 TOC ELEVATION: 788.20 ft

DEPTH W.L.: 22.30'  
 DATE W.L.: 10/6/2016  
 TIME W.L.: 940  
 GW ELEVATION: 765.90

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE				SAMPLES					MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
		DESCRIPTION	USCS	GRAPHIC LOG	ELEV. DEPTH (ft)	SAMPLE NO.	TYPE	BLOWS per 6 in 140 lb hammer 30 inch drop	N-VALUE	REC		
45												<b>WELL CASING</b> Interval: 0'-34.5' Material: Schedule 40 PVC Diameter: 2 Joint Type: Flush/Screw  <b>WELL SCREEN</b> Interval: 34.5'-44.5' Material: Schedule 40 PVC Diameter: 2 Slot Size: 0.010 End Cap: Schedule 40 PVC  <b>FILTER PACK</b> Interval: 31.7'-45.' Type: FilterSil  <b>FILTER PACK SEAL</b> Interval: 24.1'-31.7' Type: PEL-PLUG 3/8" Bentonite pellets  <b>ANNULUS SEAL</b> Interval: 0'-24.1' Type: CETCO puregold grout (70:30)  <b>WELL COMPLETION</b> Pad: 2' x 2' concrete Protective Casing: 4"x4"x5' aluminum  <b>DRILLING METHODS</b> Soil Drill: Hollow-stem auger Rock Drill: N/A
50	735											
55	730											
60	725											
65	720											
70	715											
75	710											
80	705											
85	700											
90	695											

BOREHOLE RECORD 165977801\_GRP(B-47-B-71).GPJ\_PIEDMONT.GDT 12/22/17

LOG SCALE: 1 in = 5.5 ft  
 DRILLING COMPANY: Southern Company Services  
 DRILLER: S. Milam

GA INSPECTOR: M.L. Boatman  
 CHECKED BY: TIR  
 DATE: 12/22/17



# RECORD OF BOREHOLE B-59

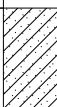




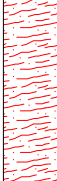
SHEET 1 of 1

PROJECT: Plant McDonough  
PROJECT NUMBER: 1659778-01  
DRILLED DEPTH: 30.25 ft  
LOCATION: westside of the stream north of AP4

DRILL RIG: CME 55  
DATE STARTED: 9/23/16  
DATE COMPLETED: 9/23/16

NORTHING: 1,394,349.80  
EASTING: 2,203,000.17  
GS ELEVATION: 785.30  
TOC ELEVATION: 788.16 ft

DEPTH W.L.: 5.56'  
DATE W.L.: 10/6/2016  
TIME W.L.: 828  
GW ELEVATION: 782.60

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE				SAMPLES					MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
		DESCRIPTION	USCS	GRAPHIC LOG	ELEV.	SAMPLE NO.	TYPE	BLOWS per 6 in 140 lb hammer 30 inch drop	N-VALUE	REC		
					DEPTH (ft)							
0	785	0.00 - 3.50 SC, clayly SAND, fine to coarse, non plastic; red, micaceous, fill; cohesive, dry, w<PL, stiff.	SC			1	DO	3-5-7	12	1.16 1.50	CETCO puregold grout (70:30) — / aluminum casing	<b>WELL CASING</b> Interval: 0'-20.2' Material: Schedule 40 PVC Diameter: 2 Joint Type: Flush/Screw
					781.8 3.50							
5	780	3.50 - 9.00 CH, CLAY, moderate to high plasticity; aark brown to red brown, fill; cohesive, moist, w>PL, soft.	CH			2	DO	2-1-1	2	0.75 1.50	CETCO puregold grout (70:30)	<b>WELL SCREEN</b> Interval: 20.2'-30.2' Material: Schedule 40 PVC Diameter: 2 Slot Size: 0.010 End Cap: Schedule 40 PVC
					776.3 9.00							
10	775	9.00 - 14.00 SM, SAND and SILT, fine, trace organics, non to low plasticity; gray; cohesive, wet, w<PL, very soft.	SM			3	DO	WOH-1-1	2	1.50 1.50	PEL-PLUG 3/8" Bentonite pellets	<b>FILTER PACK SEAL</b> Interval: 12'-17' Type: PEL-PLUG 3/8" Bentonite pellets
					771.3 14.00							
15	770	14.00 - 19.00 SP-SW, moderate- graded SAND, fine to coarse, non plastic; tan to white; non-cohesive, wet, w<PL, loose.	SP-SW			4	DO	4-5-7	12	1.50 1.50	FilterSil —	<b>ANNULUS SEAL</b> Interval: 0'-12' Type: CETCO puregold grout (70:30)
					766.3 19.00							
20	765	19.00 - 24.50 SM, silty SAND, low plasticity; gray to black, deeply weathered, gneissic saprolite; cohesive, moist to wet, w<PL, firm to very stiff, PWR. Auger Refusal at 24.3	SM			5	DO	5-4-5	9	1.00 1.50	0.010 Slotted Screen	<b>WELL COMPLETION</b> Pad: 2' x 2' concrete Protective Casing: 4"x4"x5' aluminum
					760.8 24.50							
25	760	24.50 - 30.25 Bedrock; AUGEN GNEISS; slightly weathered, foliated, gray to dark gray, fine to medium grained, medium strong.	BR			6	DO	50/4	50/4	0.66 0.33		<b>DRILLING METHODS</b> Soil Drill: Hollow-stem auger Rock Drill: HQ Core Barrell
					755.05							
30	755	Boring completed at 30.25 ft										
35	750											
40	745											
45												

BOREHOLE RECORD 165977801\_GRP(B-47-B-71).GPJ\_PIEDMONT.GDT 12/22/17

LOG SCALE: 1 in = 5.5 ft  
DRILLING COMPANY: Southern Company Services  
DRILLER: S. Milam

GA INSPECTOR: M.L. Boatman  
CHECKED BY: TIR  
DATE: 12/22/17



# RECORD OF BOREHOLE B-60

SHEET 1 of 2

PROJECT: Plant McDonough  
PROJECT NUMBER: 1668496-01  
DRILLED DEPTH: 49.80 ft  
LOCATION: Almost due south of B-58 ~ 300 to 400 feet

DRILL RIG: CME 55  
DATE STARTED: 9/29/16  
DATE COMPLETED: 9/29/16

NORTHING: 1,391,101.88  
EASTING: 2,202,880.57  
GS ELEVATION: 778.87  
TOC ELEVATION: 782.12 ft

DEPTH W.L.: 33.35'  
DATE W.L.: 10/6/2016  
TIME W.L.: 955  
GW ELEVATION: 748.77

BOREHOLE RECORD 165977801\_GRP(B-47-B-71) (1).GPJ PIEDMONT.GDT 9/18/18

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE				SAMPLES				MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS	
		DESCRIPTION	USCS	GRAPHIC LOG	ELEV.	SAMPLE NO.	TYPE	BLOWS per 6 in 140 lb hammer 30 inch drop	N-VALUE			REC
					DEPTH (ft)							
0		0.00 - 13.50 Top 10' were Hydrovac for utilities.									CETCO puregold grout (70:30) – / aluminum casing	<b>WELL CASING</b> Interval: 0'-39.3' Material: Schedule 40 PVC Diameter: 2 Joint Type: Flush/Screw  <b>WELL SCREEN</b> Interval: 39.3' - 49.3' Material: Schedule 40 PVC Diameter: 2 Slot Size: 0.010 End Cap: Schedule 40 PVC  <b>FILTER PACK</b> Interval: 36.9'-50' Type: FilterSil  <b>FILTER PACK SEAL</b> Interval: 30.2'-36.9' Type: PEL-PLUG 3/8" Bentonite pellets  <b>ANNULUS SEAL</b> Interval: 0'-30.2' Type: CETCO puregold grout (70:30)  <b>WELL COMPLETION</b> Pad: 2' x 2' concrete Protective Casing: 4"x4"x5' aluminum  <b>DRILLING METHODS</b> Soil Drill: Hollow-stem auger Rock Drill: N/A
775												
5												
770												
10												
765		13.50 - 23.50 SC-SM, clayey SAND - silty SAND; brown to red brown; non-cohesive, moist, loose.			765.37 13.50	1	DO	4-3-4	7	0.66 1.50	CETCO puregold – grout (70:30)	
15			SC-SM									
760						2	DO	3-2-3	5	1.33 1.50		
20												
755		23.50 - 28.50 CL, silty CLAY, low plasticity; contains mica; moist, W<PL.			755.37 23.50	3	DO	1-3-5	8	1.50 1.50		
25			CL									
750		28.50 - 33.50 SC-SM, clayey SAND - silty SAND, fine grained, low to non-plastic; brown to gray; non-cohesive, moist, compact.			750.37 28.50	4	DO	2-8-10	18	1.50 1.50		
30			SC-SM									
745		33.50 - 48.50 SM, silty SAND; brown to red brown, saprolite; non-cohesive, moist to wet (increases with depth), dense, PWR.			745.37 33.50	5	DO	50/4	50/4	0.33 0.33	PEL-PLUG 3/8" – Bentonite pellets	
35												
740			SM			6	DO	50/4	50/4	0.33 0.33		
40											FilterSil –	
735						7	DO	50/4	50/4	0.25 0.33		
45												

Log continued on next page

Log continued on next page

LOG SCALE: 1 in = 5.5 ft  
DRILLING COMPANY: Southern Company Services  
DRILLER: S. Milam

GA INSPECTOR: Nortey Yeboah  
CHECKED BY: TIR  
DATE: 12/22/17



# RECORD OF BOREHOLE B-60

SHEET 2 of 2

PROJECT: Plant McDonough  
PROJECT NUMBER: 1668496-01  
DRILLED DEPTH: 49.80 ft  
LOCATION: Almost due south of B-58 ~ 300 to 400 feet

DRILL RIG: CME 55  
DATE STARTED: 9/29/16  
DATE COMPLETED: 9/29/16

NORTHING: 1,391,101.88  
EASTING: 2,202,880.57  
GS ELEVATION: 778.87  
TOC ELEVATION: 782.12 ft

DEPTH W.L.: 33.35'  
DATE W.L.: 10/6/2016  
TIME W.L.: 955  
GW ELEVATION: 748.77

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE				SAMPLES					MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
		DESCRIPTION	USCS	GRAPHIC LOG	ELEV. DEPTH (ft)	SAMPLE NO.	TYPE	BLOWS per 6 in 140 lb hammer 30 inch drop	N-VALUE	REC		
45		33.50 - 48.50 SM, silty SAND; brown to red brown, saprolite; non-cohesive, moist to wet (increases with depth), dense, PWR. (Continued)	SM								0.010 Slotted Screen	<b>WELL CASING</b> Interval: 0'-39.3' Material: Schedule 40 PVC Diameter: 2 Joint Type: Flush/Screw  <b>WELL SCREEN</b> Interval: 39.3' - 49.3' Material: Schedule 40 PVC Diameter: 2 Slot Size: 0.010 End Cap: Schedule 40 PVC  <b>FILTER PACK</b> Interval: 36.9'-50' Type: FilterSil  <b>FILTER PACK SEAL</b> Interval: 30.2'-36.9' Type: PEL-PLUG 3/8" Bentonite pellets  <b>ANNULUS SEAL</b> Interval: 0'-30.2' Type: CETCO puregold grout (70:30)  <b>WELL COMPLETION</b> Pad: 2' x 2' concrete Protective Casing: 4"x4"x5' aluminum  <b>DRILLING METHODS</b> Soil Drill: Hollow-stem auger Rock Drill: N/A
730		48.50 - 49.80 SM, silty SAND; gray to brown, saprolite, contains mica; non-cohesive, moist to wet (increases with depth), dense, PWR Boring completed at 49.80 ft	SM		730.37 48.50 729.07	8	DO	50/3	50/3	0.16 0.25		
50												
725												
55												
720												
60												
715												
65												
710												
70												
705												
75												
700												
80												
695												
85												
690												
90												

BOREHOLE RECORD 165977801\_GRP(B-47-B-71)(1).GPJ PIEDMONT.GDT 9/18/18

LOG SCALE: 1 in = 5.5 ft  
DRILLING COMPANY: Southern Company Services  
DRILLER: S. Milam

GA INSPECTOR: Nortey Yeboah  
CHECKED BY: TIR  
DATE: 12/22/17



# RECORD OF BOREHOLE B-61





SHEET 1 of 2

PROJECT: Plant McDonough  
PROJECT NUMBER: 1668496-01  
DRILLED DEPTH: 52.40 ft  
LOCATION: SSW of B-57. on the NE corner of the switch yard

DRILL RIG: CME 55  
DATE STARTED: 9/28/16  
DATE COMPLETED: 9/29/16

NORTHING: 1,390,958.73  
EASTING: 2,202,504.81  
GS ELEVATION: 778.58  
TOC ELEVATION: 782.03 ft

DEPTH W.L.: 22.25'  
DATE W.L.: 10/6/2016  
TIME W.L.: 950  
GW ELEVATION: 759.78

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE			SAMPLES					MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS			
		DESCRIPTION	USCS	GRAPHIC LOG	ELEV.	SAMPLE NO.	TYPE	BLOWS per 6 in 140 lb hammer 30 inch drop	N-VALUE			REC		
					DEPTH (ft)									
0		0.00 - 13.50 Top 10' were Hydrovac for utilities.									CETCO puregold grout (70:30) – / aluminum casing	<div><div>WELL CASING</div><div>Interval: 0'-41.5' Material: Schedule 40 PVC Diameter: 2 Joint Type: Flush/Screw</div><div>WELL SCREEN</div><div>Interval: 41.5'-51.5' Material: Schedule 40 PVC Diameter: 2 Slot Size: 0.010 End Cap: Schedule 40 PVC</div><div>FILTER PACK</div><div>Interval: 39.5'-51.9' Type: FilterSil</div><div>FILTER PACK SEAL</div><div>Interval: 35'-39.5' Type: PEL-PLUG 3/8" Bentonite pellets</div><div>ANNULUS SEAL</div><div>Interval: 0'-35' Type: CETCO puregold grout (70:30)</div><div>WELL COMPLETION</div><div>Pad: 2' x 2' concrete Protective Casing: 4"x4"x5' aluminum</div><div>DRILLING METHODS</div><div>Soil Drill: Hollow-stem auger Rock Drill: N/A</div></div>		
775														
5														
770														
10														
765		13.50 - 18.50 CL-CH, CLAY, trace sand and silt, fine to coarse, moderate plasticity; dark red brown, fill; cohesive, moist, w~PL, soft.	CL-CH		765.08 13.50	1	DO	3-4-6	10	1.50 1.50				
15														
760		18.50 - 23.50 SM, silty SAND, fine, non to low plasticity, trace organics (tree root); dark gray to black; cohesive, dry to moist, w<PL, firm	SM		760.08 18.50	2	DO	5-8-13	21	1.50 1.50				
20														
755		23.50 - 38.50 ML, SILT, trace fine to coarse sand, non to low plasticity; red-brown to gray to black; cohesive, dry to moist, w<PL, firm.	ML		755.08 23.50	3	DO	6-8-13	21	1.16 1.50				
750														
30								4	DO	3-2-5	7		1.16 1.50	
745														
35								5	DO	3-3-5	8		1.00 1.50	
740		38.50 - 52.40 SM, silty SAND, fine to coarse, non to low plasticity; dark brown to gray to black, deeply weathered, schistose gneiss / schist saprolite; non-cohesive to cohesive, moist, w<PL, compact to dense / firm to stiff, PWR.	SM		740.08 38.50	6	DO	7-10-23	33	1.33 1.50				
40														
735								7	DO	6-19-50/3	69/9	1.25 0.75		
45		Log continued on next page												

LOG SCALE: 1 in = 5.5 ft  
DRILLING COMPANY: Southern Company Services  
DRILLER: S. Milam

GA INSPECTOR: M.L. Boatman  
CHECKED BY: TIR  
DATE: 12/22/17





# RECORD OF BOREHOLE B-61

SHEET 2 of 2

PROJECT: Plant McDonough  
PROJECT NUMBER: 1668496-01  
DRILLED DEPTH: 52.40 ft  
LOCATION: SSW of B-57. on the NE corner of the switch yard

DRILL RIG: CME 55  
DATE STARTED: 9/28/16  
DATE COMPLETED: 9/29/16

NORTHING: 1,390,958.73  
EASTING: 2,202,504.81  
GS ELEVATION: 778.58  
TOC ELEVATION: 782.03 ft

DEPTH W.L.: 22.25'  
DATE W.L.: 10/6/2016  
TIME W.L.: 950  
GW ELEVATION: 759.78

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE				SAMPLES				MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS	
		DESCRIPTION	USCS	GRAPHIC LOG	ELEV.	SAMPLE NO.	TYPE	BLOWS per 6 in 140 lb hammer 30 inch drop	N-VALUE			REC
					DEPTH (ft)							
45		38.50 - 52.40 SM, silty SAND, fine to coarse, non to low plasticity; dark brown to gray to black, deeply weathered, schistose gneiss / schist saprolite; non-cohesive to cohesive, moist, w<PL, compact to dense / firm to stiff, PWR. (Continued)	SM							0.010 Slotted Screen		<b>WELL CASING</b> Interval: 0'-41.5' Material: Schedule 40 PVC Diameter: 2 Joint Type: Flush/Screw  <b>WELL SCREEN</b> Interval: 41.5'-51.5' Material: Schedule 40 PVC Diameter: 2 Slot Size: 0.010 End Cap: Schedule 40 PVC  <b>FILTER PACK</b> Interval: 39.5'-51.9' Type: FilterSil  <b>FILTER PACK SEAL</b> Interval: 35'-39.5' Type: PEL-PLUG 3/8" Bentonite pellets  <b>ANNULUS SEAL</b> Interval: 0'-35' Type: CETCO puregold grout (70:30)  <b>WELL COMPLETION</b> Pad: 2' x 2' concrete Protective Casing: 4"x4"x5' aluminum  <b>DRILLING METHODS</b> Soil Drill: Hollow-stem auger Rock Drill: N/A
730					8	DO	14-9-14	23	1.50 1.50			
50		Boring completed at 52.40 ft										
725					726.18							
55												
720												
60												
715												
65												
710												
70												
705												
75												
700												
80												
695												
85												
690												
90												

BOREHOLE RECORD 165977801\_GRP(B-47-B-71) (1).GPJ PIEDMONT.GDT 9/18/18

LOG SCALE: 1 in = 5.5 ft  
DRILLING COMPANY: Southern Company Services  
DRILLER: S. Milam

GA INSPECTOR: M.L. Boatman  
CHECKED BY: TIR  
DATE: 12/22/17



# RECORD OF BOREHOLE B-62





SHEET 1 of 1

PROJECT: Plant McDonough  
PROJECT NUMBER: 1659778-01  
DRILLED DEPTH: 39.90 ft  
LOCATION: South of the Main road.

DRILL RIG: CME 55  
DATE STARTED: 10/4/16  
DATE COMPLETED: 10/4/16

NORTHING: 1,389,828.91  
EASTING: 2,201,810.02  
GS ELEVATION: 759.94  
TOC ELEVATION: 763.34 ft

DEPTH W.L.: 21.57'  
DATE W.L.: 10/6/2016  
TIME W.L.: 1000  
GW ELEVATION: 741.77

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE				SAMPLES				MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS	
		DESCRIPTION	USCS	GRAPHIC LOG	ELEV.	SAMPLE NO.	TYPE	BLOWS per 6 in 140 lb hammer 30 inch drop	N-VALUE			REC
					DEPTH (ft)							
0		0.00 - 13.50 Top 10' were Hydrovac for utilities.									CETCO puregold grout (70:30) — / aluminum casing	<b>WELL CASING</b> Interval: 0'-30' Material: Schedule 40 PVC Diameter: 2 Joint Type: Flush/Screw  <b>WELL SCREEN</b> Interval: 29.7'-39.7' Material: Schedule 40 PVC Diameter: 2 Slot Size: 0.010 End Cap: Schedule 40 PVC  <b>FILTER PACK</b> Interval: 25.5'-40.1' Type: FilterSil  <b>FILTER PACK SEAL</b> Interval: 19.6'-25.5' Type: PEL-PLUG 3/8" Bentonite pellets  <b>ANNULUS SEAL</b> Interval: 0'-19.6' Type: CETCO puregold grout (70:30)  <b>WELL COMPLETION</b> Pad: 2' x 2' concrete Protective Casing: 8" Round Ground Flush  <b>DRILLING METHODS</b> Soil Drill: Hollow-stem auger Rock Drill: HQ Core Barrel
5	755											
10	750											
15	745	13.50 - 18.50 SM, silty SAND, fine, low to moderate plasticity; red-brown; cohesive, wet, w~PL, very soft to soft.	SM		746.44 13.50	1	DO	3-1-3	4	1.00 1.50	CETCO puregold — grout (70:30)	
20	740	18.50 - 23.50 CL, CLAY, trace silt and fine sand, moderate plasticity; red-brown; cohesive, moist to wet, w~PL, soft to firm.	CL		741.44 18.50	2	DO	1-1-1	2	1.50 1.50		
25	735	23.50 - 24.60 SP, poorly-graded SAND, fine to coarse, non plastic; gray to black; non-cohesive, wet, w<PL, very dense, PWR. Auger Refusal at 24.2  24.60 - 39.90 Bedrock; SCHIST fresh to slightly weathered, foliated, dark green to black, fine to medium grained.	SP		736.44 23.50 735.34 24.60	3	DO	50/4	50/4	0.16 0.33	PEL-PLUG 3/8" — Bentonite pellets	
30	730		BR								FilterSil —	
35	725										0.010 Slotted Screen	
40	720	Boring completed at 39.90 ft			720.04							
45	715											

BOREHOLE RECORD 165977801\_GRP(B-47-B-71).GPJ\_PIEDMONT.GDT 12/22/17

LOG SCALE: 1 in = 5.5 ft  
DRILLING COMPANY: Southern Company Services  
DRILLER: S. Milam

GA INSPECTOR: M.L. Boatman  
CHECKED BY: TIR  
DATE: 12/22/17



# RECORD OF BOREHOLE B-63




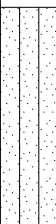
SHEET 1 of 2

PROJECT: Plant McDonough  
PROJECT NUMBER: 1659778-01  
DRILLED DEPTH: 46.00 ft  
LOCATION: Due south of B-61. Flush mounted in the roadway.

DRILL RIG: CME 55  
DATE STARTED: 10/6/16  
DATE COMPLETED: 10/6/16

NORTHING: 1,390,999.47  
EASTING: 2,202,976.11  
GS ELEVATION: 777.46  
TOC ELEVATION: 777.15 ft

DEPTH W.L.: 34.2'  
DATE W.L.: 10/6/2016  
TIME W.L.: 1745  
GW ELEVATION: 742.95

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE				SAMPLES				MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS	
		DESCRIPTION	USCS	GRAPHIC LOG	ELEV.	SAMPLE NO.	TYPE	BLOWS per 6 in 140 lb hammer 30 inch drop	N-VALUE			REC
					DEPTH (ft)							
0		0.00 - 13.50 Top 12' were Hydrovac for utilities.									CETCO puregold grout (70:30) – / aluminum casing	<div>WELL CASING Interval: 0' - 35.5' Material: Schedule 40 PVC Diameter: 2 Joint Type: Flush/Screw</div> <div>WELL SCREEN Interval: 35.5'-45.5' Material: Schedule 40 PVC Diameter: 2 Slot Size: 0.010 End Cap: Schedule 40 PVC</div> <div>FILTER PACK Interval: 33'- 45.9' Type: FilterSil</div> <div>FILTER PACK SEAL Interval: 27.6'-33' Type: PEL-PLUG 3/8" Bentonite pellets</div> <div>ANNULUS SEAL Interval: 0' - 27.6' Type: CETCO puregold grout (70:30)</div> <div>WELL COMPLETION Pad: 2' x 2' concrete Protective Casing: 8" Round Flush Mount</div> <div>DRILLING METHODS Soil Drill: Hollow-stem auger Rock Drill: N/A</div>
775												
5												
770												
10												
765												
15		13.50 - 18.50 CL-CH, CLAY, trace to some fine to coarse sand, moderate plasticity; reddish brown, fill; cohesive, moist, w<PL, firm	CL-CH		763.96 13.50	1	DO	3-2-2	4	0.75 1.50		
760												
20		18.50 - 24.50 ML, SILT, trace clay and sand, low plasticity; reddish brown; cohesive, moist, w< PL, firm.	ML		758.96 18.50	2	DO	1-1-2	3	1.50 1.50		
755												
25		24.50 - 25.00 SM, silty SAND, fine to coarse, non-plastic, trace silt; dark gray to black; non-cohesive, moist, w<PL, loose.	SM		752.96 25.00	3	DO	8-20-10	30	1.50 1.50		
750		25.00 - 38.50 No samples were collected, due to the hole traveling on the driller.										
30						4	DO	0-0-0	0	0.00 1.50		
745												
35						5	DO	0-0-0	0	0.00 1.50		
740												
40		38.50 - 46.00 SM, silty SAND, fine to coarse, non-plastic, trace gravel; dark gray; non-cohesive, wet, w<PL, very loose, PWR.	SM		738.96 38.50	6	DO	8-9-16	25	0.66 1.50		
735												
45						7	DO	50/1	50/1	0.08 0.08		

Log continued on next page

Log continued on next page

LOG SCALE: 1 in = 5.5 ft  
DRILLING COMPANY: Southern Company Services  
DRILLER: S. Milam

GA INSPECTOR: M.L. Boatman  
CHECKED BY: TIR  
DATE: 12/22/17



# RECORD OF BOREHOLE B-63



SHEET 2 of 2

PROJECT: Plant McDonough  
PROJECT NUMBER: 1659778-01  
DRILLED DEPTH: 46.00 ft  
LOCATION: Due south of B-61. Flush mounted in the roadway.

DRILL RIG: CME 55  
DATE STARTED: 10/6/16  
DATE COMPLETED: 10/6/16

NORTHING: 1,390,999.47  
EASTING: 2,202,976.11  
GS ELEVATION: 777.46  
TOC ELEVATION: 777.15 ft

DEPTH W.L.: 34.2'  
DATE W.L.: 10/6/2016  
TIME W.L.: 1745  
GW ELEVATION: 742.95

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE				SAMPLES					MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
		DESCRIPTION	USCS	GRAPHIC LOG	ELEV. DEPTH (ft)	SAMPLE NO.	TYPE	BLOWS per 6 in 140 lb hammer 30 inch drop	N-VALUE	REC		
45		Boring completed at 46.00 ft	SM		731.46							<b>WELL CASING</b> Interval: 0' - 35.5' Material: Schedule 40 PVC Diameter: 2 Joint Type: Flush/Screw  <b>WELL SCREEN</b> Interval: 35.5' - 45.5' Material: Schedule 40 PVC Diameter: 2 Slot Size: 0.010 End Cap: Schedule 40 PVC  <b>FILTER PACK</b> Interval: 33' - 45.9' Type: FilterSil  <b>FILTER PACK SEAL</b> Interval: 27.6' - 33' Type: PEL-PLUG 3/8" Bentonite pellets  <b>ANNULUS SEAL</b> Interval: 0' - 27.6' Type: CETCO puregold grout (70:30)  <b>WELL COMPLETION</b> Pad: 2' x 2' concrete Protective Casing: 8" Round Flush Mount  <b>DRILLING METHODS</b> Soil Drill: Hollow-stem auger Rock Drill: N/A
730												
50												
725												
55												
720												
60												
715												
65												
710												
70												
705												
75												
700												
80												
695												
85												
690												
90												

LOG SCALE: 1 in = 5.5 ft  
DRILLING COMPANY: Southern Company Services  
DRILLER: S. Milam

GA INSPECTOR: M.L. Boatman  
CHECKED BY: TIR  
DATE: 12/22/17



**DRILLING LOG  
GEOLOGICAL SERVICES**

Hole No. **B-64**  
Sheet 1 of 2

**SITE** Plant McDonough **HOLE DEPTH** 31' **SURFELEV** 785.85

**LOCATION** North of AP-4, near property line at Atkinson Rd **COORDINATES** 33.8328592 -84.4747518

**ANGLE** \_\_\_\_\_ **BEARING** \_\_\_\_\_ **CONTRACTOR** SCS **DRILL NO.** \_\_\_\_\_

**DRILLING METHOD** HSA **NO. SAMPLES** \_\_\_\_\_ **NO. U.D. SAMPLES** 0

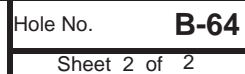
**CASING SIZE** 2" **LENGTH** 10' **CORE SIZE** \_\_\_\_\_ **TOTAL % REC.** \_\_\_\_\_

**WATER TABLE DEPTH** 4.9' BLS **ELEV.** 780.95' NAVD88 **TIME AFTER COMP.** 24 hr **DATE TAKEN** 11/3/2016

**TYPE GROUT** Bentonite **QUANTITY** \_\_\_\_\_ **MIX** - **DRILLING START DATE** 11/2/2016

**DRILLER** Milam **RECORDER** Abraham **APPROVED** \_\_\_\_\_ **DRILLING COMP. DATE** 11/2/2016

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From To	Blows	N			
0	785.85								
1	784.85								
2	783.85								
3	782.85								
4	781.85								
5	780.85	<b>HYDRO-EXCAVATION</b> Hydrovac from land surface to 20-feet below land. No samples							
6	779.85								
7	778.85								
8	777.85								
9	776.85								
10	775.85								
11	774.85								
12	773.85								
13	772.85								
14	771.85								
15	770.85								
16	769.85								
17	768.85								
18	767.85								
19	766.85								
20	765.85								
21	764.85								
22	763.85	<b>SANDY SILT SAPROLITE</b> Light gray sandy silt saprolite; minor quartz & feldspar grains, micaceous; oxidation along relict foliations; Fe stains; 2.5Y/6/1; SM.							
23	762.85		S-1	23.5 - 25	1-1-2			85	
24	761.85								

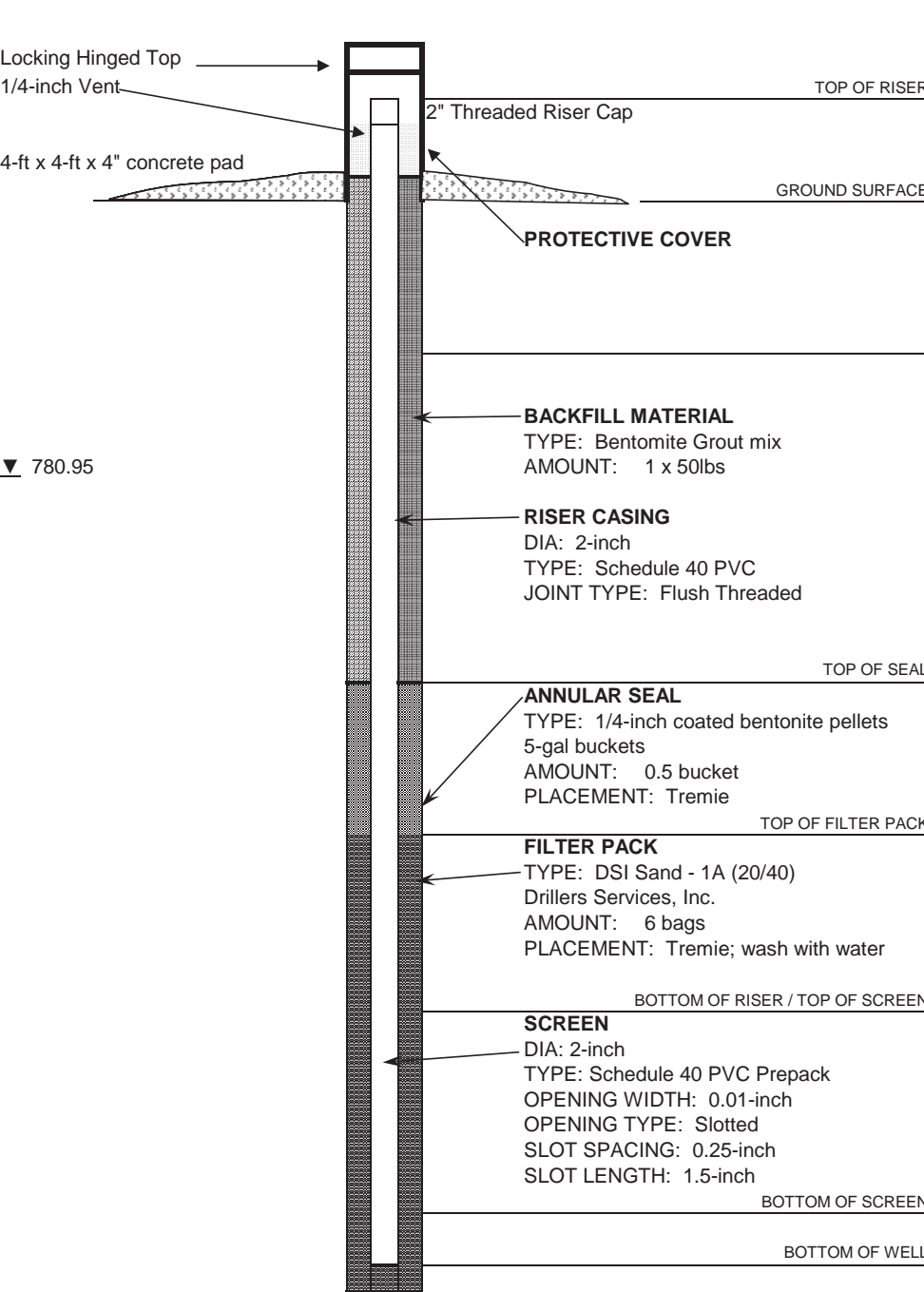


SITE		Plant McDonough		TOTAL DEPTH		31'		SURF.ELEV.		785.85	
Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD		
				From To	Blows	N					
25	797.27	SANDY SILT SAPROLITE  Light brown sandy silt saprolite; micaceous; highly weathered biotite gneiss; quartz, feldspar, biotite, FeO; 2.5Y/8/1; SM.	S-2	28.5 - 30	1-2-2			90			
26	796.27										
27	795.27										
28	794.27										
29	793.27										
30	792.27	END OF BORING AT 30.4-FT REGOLITH WELL									
31	791.27										
53	769.27										
54	768.27										
55	767.27										
56	766.27										

# WELL CONSTRUCTION LOG

Southern Company Generation

PROJECT: Plant McDonough	DRILLING CO.: SCS, Inc.	WELL NAME
North of AP-4, at Atkinson Rd	DRILLER: Milam	
LOCATION: 33.8328592 / -84.4747518	RIG TYPE: CME 550	<b>B-64</b>
LOGGER: Abraham	DRILLING METHOD: HSA	
DATE CONSTRUCTED: 11/2/2016		

		DEPTH FEET	ELEVATION FT, MSL	
 <p>Locking Hinged Top</p> <p>1/4-inch Vent</p> <p>4-ft x 4-ft x 4" concrete pad</p> <p>2" Threaded Riser Cap</p> <p>GROUND SURFACE</p> <p>PROTECTIVE COVER</p> <p>BACKFILL MATERIAL TYPE: Bentomite Grout mix AMOUNT: 1 x 50lbs</p> <p>RISER CASING DIA: 2-inch TYPE: Schedule 40 PVC JOINT TYPE: Flush Threaded</p> <p>ANNULAR SEAL TYPE: 1/4-inch coated bentonite pellets 5-gal buckets AMOUNT: 0.5 bucket PLACEMENT: Tremie</p> <p>FILTER PACK TYPE: DSI Sand - 1A (20/40) Drillers Services, Inc. AMOUNT: 6 bags PLACEMENT: Tremie; wash with water</p> <p>SCREEN DIA: 2-inch TYPE: Schedule 40 PVC Prepack OPENING WIDTH: 0.01-inch OPENING TYPE: Slotted SLOT SPACING: 0.25-inch SLOT LENGTH: 1.5-inch</p> <p>780.95</p> <p>HOLE DIA: 9"</p>	TOP OF RISER	-0.17	786.02	
		GROUND SURFACE	0.00	785.85
			3.00	782.85
		TOP OF SEAL	8.10	777.75
		TOP OF FILTER PACK	16.50	769.35
		BOTTOM OF RISER / TOP OF SCREEN	20.00	765.85
		BOTTOM OF SCREEN	30.00	755.85
		BOTTOM OF WELL	30.40	755.45

**DRILLING LOG  
GEOLOGICAL SERVICES**

Hole No. **B-65**  
Sheet 1 of 2

**SITE** Plant McDonough **HOLE DEPTH** 50' **SURFELEV** 822.27

**LOCATION** North of AP-4, near property line, NW end of parking lo **COORDINATES** 33.8328662 -84.471393

**ANGLE** \_\_\_\_\_ **BEARING** \_\_\_\_\_ **CONTRACTOR** SCS **DRILL NO.** \_\_\_\_\_

**DRILLING METHOD** HSA **NO. SAMPLES** \_\_\_\_\_ **NO. U.D. SAMPLES** 0

**CASING SIZE** 2" **LENGTH** 10' **CORE SIZE** \_\_\_\_\_ **TOTAL % REC.** \_\_\_\_\_

**WATER TABLE DEPTH** 10.5' BLS **ELEV.** 811.77' NAVD88 **TIME AFTER COMP.** 24 HR **DATE TAKEN** 11/16/2016

**TYPE GROUT** \_\_\_\_\_ **QUANTITY** \_\_\_\_\_ **MIX** - **DRILLING START DATE** 11/15/2016

**DRILLER** Milam **RECORDER** Abraham **APPROVED** \_\_\_\_\_ **DRILLING COMP. DATE** 11/15/2016

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From To	Blows	N			
0	822.27								
1	821.27								
2	820.27								
3	819.27								
4	818.27								
5	817.27	<b>HYDRO-EXCAVATION</b> Hydrovac from land surface to 10-feet below land. No samples							
6	816.27								
7	815.27								
8	814.27								
9	813.27								
10	812.27								
11	811.27								
12	810.27								
13	809.27								
14	808.27	<b>SILTY SAND SAPROLITE</b> Light brown silty sand with minor clay; weathered schist fragments; minor oxidation bands; minor quartz fragments 10YR/3/2; SM; At 15-ft, large rock fragments brownish black color; damp.	S-1	13.5-15	13-50/3			90	
15	807.27								
16	806.27								
17	805.27								
18	804.27								
19	803.27	<b>SILTY SAND SAPROLITE</b> Blackish brown silty sand saprolite; large micas with a greenish tinge; highly oxidized with FeO parallel to foliations; 10YR/3/2; SM; damp to moist.	S-2	18.5-20	24-30-31	61		90	
20	802.27								
21	801.27								
22	800.27	<b>CLAYEY SILT</b> Dark gray to reddish brown silty sand saprolite; micas abundant; softer than interval above; few gravel-size rock fragments; FeO bands with minor MnO streaks; 2.5Y/3/2; SM; moist to saturated.	S-3	23.5 - 25	2-16-50/2			90	
23	799.27								
24	798.27								



**DRILLING LOG**  
**GEOLOGICAL SERVICES**

Hole No. **B-65**

Sheet 2 of 2

SITE		Plant McDonough	TOTAL DEPTH		50'	SURF.ELEV.		822.27	
Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From To	Blows	N			
25	797.27	<b>SILTY SAND SAPROLITE</b>  Dark gray to reddish brown silty sand with minor clay; few structures; 2.5Y/3/2; SM; saturated.	S-4	28.5-30	50/2			90	
26	796.27								
27	795.27								
28	794.27								
29	793.27								
30	792.27	<b>SILTY SAND SAPROLITE</b>  Dark gray to reddish brown silty sand with minor gravel; damp to saturated; 2.5Y/3/2	S-5	33.5 - 35	50/2			90	
31	791.27								
32	790.27								
33	789.27								
34	788.27								
35	787.27	<b>SILTY SAND SAPROLITE</b>  Dark gray to reddish brown silty sand with minor clay; saprolite; saturated; 2.5YR/3/2	S-6	38.5 - 40	6-9-32			90	
36	786.27								
37	785.27								
38	784.27								
39	783.27								
40	782.27	Top of Rock - 42-ft	S-7	40 - 42	50/2			90	
41	781.27								
42	780.27								
43	779.27								
44	778.27								
45	777.27	BACKFILLED & SET REGOLITH WELL		42 - 49.9				95	
46	776.27								
47	775.27								
48	774.27								
49	773.27								
50	772.27	END OF BORING - 49.9-FT							
51	771.27								
52	770.27								
53	769.27								
54	768.27								
55	767.27								
56	766.27								

# WELL CONSTRUCTION LOG

Southern Company Generation

PROJECT: Plant McDonough		DRILLING CO.: SCS, Inc.		WELL NAME		
NE of AP-4 at Argos, nr N corner parking lot		DRILLER: Milam				
LOCATION: 33.832866225 / -84.471392955		RIG TYPE: CME 550				
LOGGER: Abraham		DRILLING METHOD: HSA		B-65		
DATE CONSTRUCTED: 11/15/2016						
<p>Locking Hinged Top</p> <p>1/4-inch Vent</p> <p>1/4-inch Weep Hole</p> <p>6-ft x 6-ft x 4" concrete pad</p> <p>2" Threaded Riser Cap</p> <p>PROTECTIVE COVER</p> <p>BACKFILL MATERIAL TYPE: Grout-bentonite mix AMOUNT: 3 x 50lbs (1.5 bag bentonite; 1.5 bag grout)</p> <p>RISER CASING DIA: 2-inch TYPE: Schedule 40 PVC JOINT TYPE: Flush Threaded</p> <p>ANNULAR SEAL TYPE: 1/4-inch coated bentonite pellets 5-gal buckets AMOUNT: 0.5 bucket PLACEMENT: Tremie</p> <p>FILTER PACK TYPE: DSI Sand - 1A (20/40) Drillers Services, Inc. AMOUNT: 5 bags PLACEMENT: Tremie; wash with water</p> <p>SCREEN DIA: 2-inch TYPE: Schedule 40 PVC Prepack OPENING WIDTH: 0.01-inch OPENING TYPE: Slotted SLOT SPACING: 0.25-inch SLOT LENGTH: 1.5-inch</p> <p>HOLE DIA: 9"</p> <p>TYPE: 1/4-inch coated bentonite pellets between 45.4' and 49.9'.</p>	DEPTH FEET	ELEVATION FT, MSL				
	TOP OF RISER		-0.25	822.02		
	BELOW GROUND					
	GROUND SURFACE			822.27		
	PROTECTIVE COVER					
			3.00	819.27		
	BACKFILL MATERIAL TYPE: Grout-bentonite mix AMOUNT: 3 x 50lbs (1.5 bag bentonite; 1.5 bag grout)					
	RISER CASING DIA: 2-inch TYPE: Schedule 40 PVC JOINT TYPE: Flush Threaded					
	TOP OF SEAL		26.80	795.47		
	ANNULAR SEAL TYPE: 1/4-inch coated bentonite pellets 5-gal buckets AMOUNT: 0.5 bucket PLACEMENT: Tremie					
	TOP OF FILTER PACK		31.80	790.47		
	FILTER PACK TYPE: DSI Sand - 1A (20/40) Drillers Services, Inc. AMOUNT: 5 bags PLACEMENT: Tremie; wash with water					
BOTTOM OF RISER / TOP OF SCREEN		34.40	787.87			
SCREEN DIA: 2-inch TYPE: Schedule 40 PVC Prepack OPENING WIDTH: 0.01-inch OPENING TYPE: Slotted SLOT SPACING: 0.25-inch SLOT LENGTH: 1.5-inch						
BOTTOM OF SCREEN		44.40	777.87			
TYPE: DSI Sand - 1A (20/40) BOTTOM OF WELL		45.40	776.87			
		49.90	772.37			

**DRILLING LOG  
GEOLOGICAL SERVICES**

Hole No. **B-66**  
Sheet 1 of 2

**SITE** Plant McDonough **HOLE DEPTH** 55.5' **SURFELEV** 813.06

**LOCATION** North of AP-4, near property line concrete pile **COORDINATES** 33.8314322 -84.4706401

**ANGLE** \_\_\_\_\_ **BEARING** \_\_\_\_\_ **CONTRACTOR** SCS **DRILL NO.** \_\_\_\_\_

**DRILLING METHOD** HSA **NO. SAMPLES** \_\_\_\_\_ **NO. U.D. SAMPLES** 0

**CASING SIZE** 2" **LENGTH** 10' **CORE SIZE** \_\_\_\_\_ **TOTAL % REC.** \_\_\_\_\_

**WATER TABLE DEPTH** 14.8' BLS **ELEV.** 798.26' NAVD88 **TIME AFTER COMP.** \_\_\_\_\_ **DATE TAKEN** \_\_\_\_\_

**TYPE GROUT** \_\_\_\_\_ **QUANTITY** \_\_\_\_\_ **MIX** \_\_\_\_\_ **DRILLING START DATE** 11/16/2016

**DRILLER** Milam **RECORDER** Abraham **APPROVED** \_\_\_\_\_ **DRILLING COMP. DATE** 11/16/2016

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From To	Blows	N			
0	813.06								
1	812.06								
2	811.06								
3	810.06								
4	809.06								
5	808.06	<b>HYDRO-EXCAVATION</b> Hydrovac from land surface to 10-feet below land. No samples							
6	807.06								
7	806.06								
8	805.06								
9	804.06								
10	803.06								
11	802.06								
12	801.06								
13	800.06								
14	799.06	<b>CLAYEY SILT</b> Light Brown to reddish brown clayey silt; 10R/5/6; damp; FeO along fracture traces & relict foliations; organics absent.	S-1	13.5-15	2-1-1	2		85	
15	798.06								
16	797.06								
17	796.06								
18	795.06								
19	794.06	<b>CLAYEY SILT</b> Light Brown to reddish brown clayey silt; 10R/5/6; damp; FeO along fracture traces & relict foliations;	S-2	18.5-20	2-1-5	6		90	
20	793.06								
21	792.06								
22	791.06	<b>CLAYEY SILT</b> Brownish gray with reddish streaks clayey silt grading to brownsh gray saprolite; 10YR/6/3; moist; FeO bands with minor MnO streaks along fracutre traces; distinct MnO layer at 25-ft parallel to foliation; fractures increase at 25-ft.	S-3	3-4-9	3-4-9	14		90	
23	790.06								
24	789.06								

**DRILLING LOG  
GEOLOGICAL SERVICES**

Hole No. **B-66**

Sheet 2 of 2

SITE		Plant McDonough		TOTAL DEPTH		55.5'	SURF.ELEV.		813.06
Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From To	Blows	N			
25	788.06	<b>SILTY SAND</b>  Medium to dark gray silty sand with minor clay; 2.5Y/5/2; few brownish-black weathered minerals; micaceous texture; MnO bands along fracture & foliations; saprolite between 28 and 30 feet.	S-4	4-5-10	15	80			
26	787.06								
27	786.06								
28	785.06								
29	784.06								
30	783.06	<b>SILTY SAND SAPROLITE</b>  Light to dark gray SILTY SAND; 5Y/5/3; moist to wet saprolite; gravel-size rock frags; weathered feldspars & quartz; increasing biotite & MnO at 35-feet.	S-5	7-9-16	25	90			
31	782.06								
32	781.06								
33	780.06								
34	779.06								
35	778.06	Grayish brown - brownish-black SILTY SAND with minor clay; 5Y/3/2; fewer rock fragments than above; moist to wet.	S-6	6-8-10	18	90			
36	777.06								
37	776.06								
38	775.06								
39	774.06								
40	773.06	<b>SILTY SAPROLITE</b> Yellowish brown silt with minor clay saprolite; 2.5Y/6/3; lighter than above; abundant MnO streaks; wet but not saturated.	S-7	5-6-9	16	90			
41	772.06								
42	771.06								
43	770.06								
44	769.06								
45	768.06	<b>SILTY SAND SAPROLITE</b> Yellowish to blackish brown SILTY SAND saprolite; 2.5Y/6/3; minor rock fragments; saturated	S-8	6-7-17	24	90			
46	767.06								
47	766.06								
48	765.06								
49	764.06								
50	763.06	<b>SILTY SAND SAPROLITE</b> Yellowish brown silty sand saprolite; minor clay; 2.5Y/6/3; abundant MnO streaks parallel to relict foliations; saturated.	S-9	7-8-18	26	90			
51	762.06								
52	761.06								
53	760.06								
54	759.06								
55	758.06	<b>END OF BORING: REGOLITH WELL</b>							
56	757.06								



# RECORD OF BOREHOLE DGWC-68/B-68

SHEET 1 of 1

PROJECT: Plant McDonough  
PROJECT NUMBER: 1668496-01  
DRILLED DEPTH: 40.40 ft  
LOCATION: West Toe of AP-1

DRILL RIG: Geoprobe  
DATE STARTED: 3/16/17  
DATE COMPLETED: 3/16/17

NORTHING: 1,391,299.56  
EASTING: 2,200,714.04  
GS ELEVATION: 758.56  
TOC ELEVATION: 758.73 ft

DEPTH W.L.: 3.5' bgs  
DATE W.L.: 3/16/17  
TIME W.L.: 1700  
GW ELEVATION: 755.06

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE				SAMPLES					MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
		DESCRIPTION	USCS	GRAPHIC LOG	ELEV. DEPTH (ft)	SAMPLE NO.	TYPE	BLOWS per 6 in 140 lb hammer 30 inch drop	N-VALUE	REC		
0		0.00 - 10.00 Hydrovac									Flush Mounted Casing CETCO puregold grout (70:30)	<b>WELL CASING</b> Interval: 0'-8' Material: Schedule 40 PVC Diameter: 2" Joint Type: Flush/Screen
5											PEL-PLUG 3/8" Bentonite pellets	<b>WELL SCREEN</b> Interval: 8.0'-18.0' Material: Schedule 40 PVC Diameter: 2" Slot Size: .010" End Cap: Schedule 40 PVC
10		10.00 - 15.00 Sandy Silt, fine to medium sand, dark brown, highly weathered, micaceous, cohesive, moist, firm, sample spoon wet	ML		748.56 10.00						FilterSil	<b>FILTER PACK</b> Interval: 6.1'-18.4' Type: FilterSil
15		15.00 - 18.80 Silty Sand, fine to coarse, trace gravel, greenish grey, weathered, thinly bedded, noncohesive, very dense, (weathered gneiss)	PWR		743.56 15.00	S1	SPT	5-6-5	11	1.08 1.50	.010" Slotted Schedule 40 PVC	<b>FILTER PACK SEAL</b> Interval: 4.1'-6.1' Type: PEL-PLUG 3/8" Bentonite pellets
20		18.80 - 19.20 19.20 - 22.80 Slightly weathered to fresh, weakly foliated, light gray to white, fine to very fine grained, medium strong to strong, MYLONITE (White Mylonite).	PWR BR		739.76 19.20	S2	SPT	50/3	50/3	0.25 0.25	FilterSil	<b>ANNULUS SEAL</b> Interval: 0'-4.1' Type: CETCO puregold grout (70:30)
25		22.80 - 24.10 Slight to moderately weathered, weakly foliated, dary gray to black, fine to very fine grained, medium strong, MYLONITE (Black Mylonite).	BR		735.76 22.80 734.46 24.10							<b>WELL COMPLETION</b> Pad: 4'x4' Concrete Protective Casing: 8" Round Flush Mount
30		24.10 - 28.90 Slightly weathered to fresh, weakly foliated, interlayered with vein quartz (~1"), light grey to white, fine to very fine grained, medium strong to strong, MYLONITE (White Mylonite).	BR		729.66 28.90						PEL-PLUG 3/8" Bentonite pellets	<b>DRILLING METHODS</b> Soil Drill: Hollow-stem auger Rock Drill: HQ Core Barrel
35		28.90 - 38.00 Slightly weathered to fresh, moderate to strongly foliated, interlayered with Black Mylonite (~1") and pegmatites (~1 to 2"), light to dark gray, fine to coarse grained, medium strong to strong, Sheared Gneiss (Long Island Creek).	BR									
40		38.00 - 39.20 Slight to moderately weathered, weakly foliated, dary gray to black, fine to very fine grained, medium strong, MYLONITE (Black Mylonite).	BR		720.56 38.00 719.36 39.20 718.16							
45		39.20 - 40.40 Slightly weathered to fresh, moderate to strongly foliated, light to dark gray, fine to coarse grained, medium strong to strong, Sheared Gneiss (Long Island Creek). Boring completed at 40.40 ft										

BOREHOLE RECORD 165977801\_GRP(B-47-B-71) (1).GPJ\_PIEDMONT.GDT 1/15/18

LOG SCALE: 1 in = 5.5 ft  
DRILLING COMPANY: Southern Company Services  
DRILLER: Sean Denty

GA INSPECTOR: Ben Hodges  
CHECKED BY: Rachel Kirkman, PG  
DATE: 1/16/18

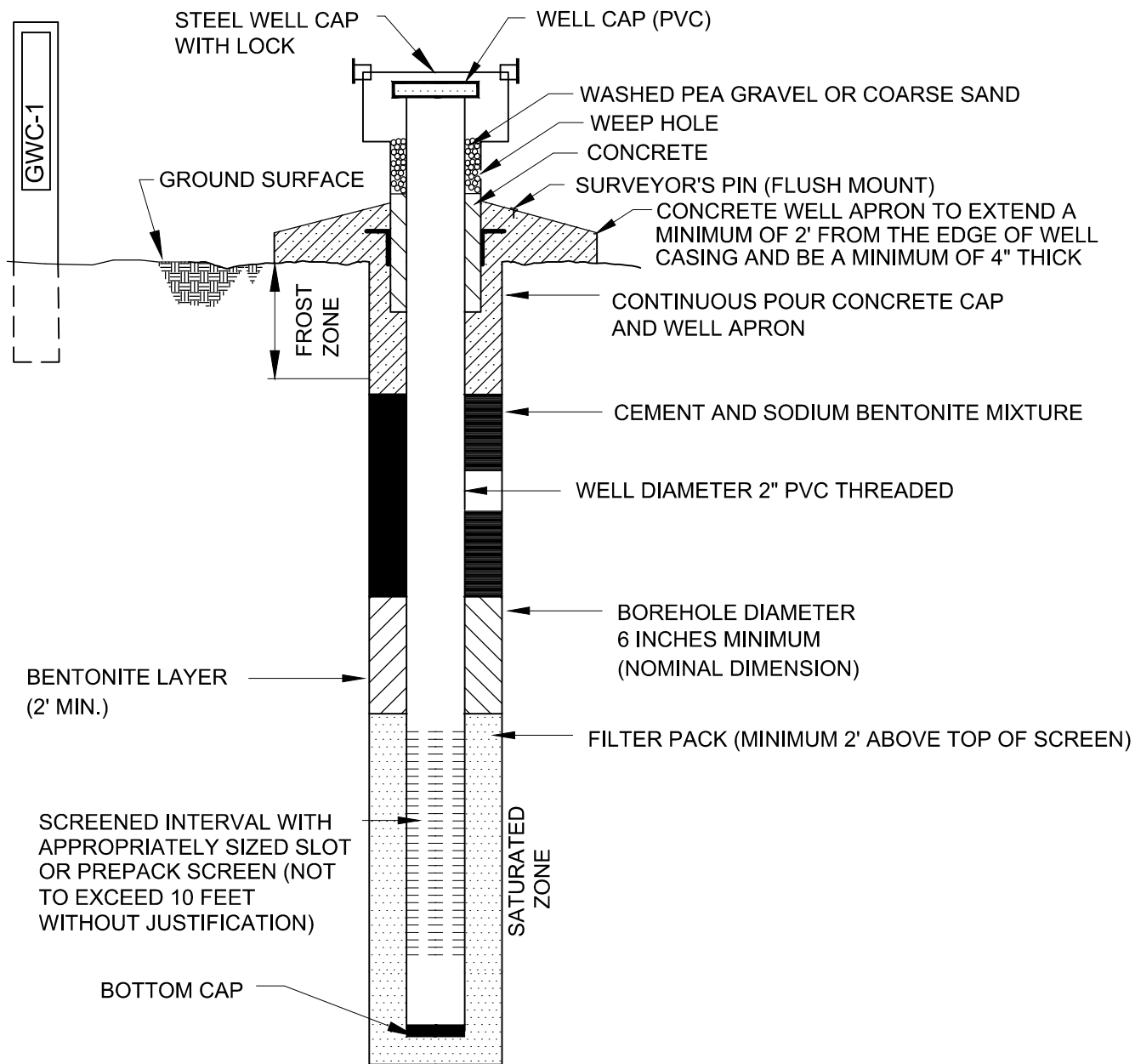




**APPENDIX B**

# GROUNDWATER MONITORING WELL DETAIL





GROUNDWATER MONITORING WELL (TYP.)

**APPENDIX C**

# GROUNDWATER SAMPLING PROCEDURES

## APPENDIX C. GROUNDWATER SAMPLING PROCEDURES

Groundwater sampling will be conducted using USEPA Region 4 Field Quality and Technical Procedures as a guide. The following procedures describe the general methods associated with groundwater sampling at the site. Prior to sampling, the well must be evacuated (purged) to ensure that representative groundwater is obtained. Any item coming in contact with the inside of the well casing or the well water will be kept in a clean container and handled only with gloved hands.

Georgia Power will follow the procedures below at each well to ensure that a representative sample is collected:

- 1) Check the well, the lock, and the locking cap for damage or evidence of tampering. Record observations and notify Georgia Power if it appears that the well has been compromised.
- 2) Measure and record the depth to water in all wells to be sampled prior to purging. Static water levels will be measured from each well, within a 24-hour period. The water level measuring device will be decontaminated prior to lowering in each well.
- 3) Install Pump: If a dedicated pump is not present, slowly lower the pump into the well to the midpoint of the well screen or a depth otherwise approved by the hydrogeologist or project scientist. The pump intake must be kept at least two (2) feet above the bottom of the well to prevent disturbance and suspension of any sediment present in the bottom of the well. Record the depth to which the pump is lowered. Non-dedicated pumps and wiring will be decontaminated before use and between well locations using procedures described in the latest version of the Region 4 U.S. Environmental Protection Agency Science and Ecosystem Support Division (SESD) Operating Procedure for Field Equipment Cleaning and Decontamination as a guide.
- 4) Measure Water Level: Immediately prior to purging, measure the water level again with the pump in the well. Leave the water level measuring device in the well.
- 5) Purge Well: Begin pumping the well at approximately 100 to 500 milliliters per minute (ml/min). Monitor the water level continually. Maintain a steady flow rate that results in a stabilized water level with 0.3 ft. or less of variability. Avoid entraining air in the tubing. Record each adjustment made to the pumping rate and the water level measured immediately after each adjustment.
- 6) Monitor Indicator Parameters: Monitor and record the field indicator parameters (turbidity, temperature, specific conductance, pH, ORP, and DO) approximately every three to five minutes. The well is considered stabilized and ready for sample collection when the indicator parameters have stabilized for three consecutive readings at a minimum:
  - $\pm 0.1$  S.U. for pH
  - $\pm 5\%$  for specific conductance (conductivity)
  - $\pm 10\%$  for DO where  $DO > 0.5 \text{ mg/L}$ . If  $DO < 0.5 \text{ mg/L}$  no stabilization criteria apply
  - $\leq 10$  NTUs for turbidity
  - Temperature – Record only, not used for stabilization criteria
  - ORP – Record only, not used for stabilization criteria
- 7) Collect samples at a flow rate between 50 and 250 ml/min and such that drawdown of the water level within the well is stable. Flow rate must be reduced if excessive drawdown is observed during sampling. Sample

containers should be filled with minimal turbulence by allowing the groundwater to flow from the tubing gently down the inside of the container.

- 8) Compliance samples will be unfiltered; however, to determine if turbidity is affecting sample results, duplicate samples may be filtered in the field prior to being placed in a sample container, clearly marked as filtered and preserved. Filtering will be accomplished by the use of 0.45-micron filters on the sampling line. At least two filter volumes of sample will pass through before filling sample containers. Filtered samples are not considered compliance samples and are only used to evaluate the effects of turbidity.
- 9) Sample bottles will be filled, capped, and placed in an ice containing cooler immediately after sampling where temperature control is required. Samples that do not require temperature control will be placed in a clean and secure container.
- 10) Sample containers and preservative will be appropriate for the analytical method being used.
- 11) Information contained on sample container labels will include:
  - a) Name of facility
  - b) Date and time of sampling
  - c) Sample description (well number)
  - d) Sampler's initials
  - e) Preservatives
  - f) Analytical method(s)
- 12) After samples are collected, samplers will remove non-dedicated equipment. Upon completion of field activity the well will be closed and locked.
- 13) Samples will be delivered to the laboratory following appropriate chain-of-custody (COC) and temperature control requirements. The goal for sample delivery will be within 48 hours of collection; however, at no time will samples be analyzed after the method-prescribed hold time.

Throughout the sampling process new nitrile gloves will be worn by the sampling personnel. A clean pair of new, disposable gloves will be worn each time a different location is sampled and new gloves donned prior to filling sample bottles. Gloves will be discarded after sampling each well and before sampling the next well.

The goal when sampling is to attain a turbidity of less than 5 NTUs however, samples may be collected where turbidity is less than 10 NTUs and the stabilization criteria described above are met.

If sample turbidity is greater than 5 NTUs and other stabilization criteria have been met, samplers will continue purging for 3 additional hours in order to reduce the turbidity to 5 NTUs or less.

- If turbidity remains above 5 NTUs but is less than 10 NTUs, and other parameters are stabilized, the well can be sampled.
- Where turbidity remains above 10 NTUs, an unfiltered sample will be collected followed by a filtered sample that has passed through an in-line 0.45-micron filter attached to the discharge (sample collection) tube. Data from filtered samples will only be used to quantify the effects of turbidity on sample results.

Samplers will identify the sample bottle as containing a filtered sample on the sample bottle label and COC form.