GROUNDWATER MONITORING PLAN

PLANT HAMMOND – ASH POND 4 (AP-4)
FLOYD COUNTY, GEORGIA

FOR

Georgia Power

SEPTEMBER 2020

Geosyntec consultants

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I. CERTIFICATION

This *Groundwater Monitoring Plan, Georgia Power Company - Plant Hammond Ash Pond 4 (AP-4)* has been prepared by a qualified groundwater scientist or engineer with Geosyntec Consultants, Inc. (Geosyntec) to meet the requirements contained in Chapter 391-3-4-.10 of the Georgia Environmental Protection Division Rules of Georgia, Solid Waste Management, Coal Combustion Residuals (i.e., State CCR Rule). References to the appropriate sections of the State CCR Rule 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 State of Georgia 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 Georgia Environmental Protection Division (EPD) Rules of Solid Waste Management, Chapter 391-3-4.10(6).

Signature: _____

Date: Sept 11, 2020

GEORGIA REGISTERED No. PE036641 PROFESSIONAL ENGINEER WHITNEY B. LAW

Signature: _____

Date: 9-11-2020

JOSEPH M. IVANOWSKI GEORGIA REGISTERED PROFESSIONAL GEOLOGIST No. 002140

GEORGIA DEPARTMENT OF NATURAL RESOURCES
ENVIRONMENTAL PROTECTION DIVISION

Approved

Solid Waste Management Program

Approved By: John Sayer Digitally signed by John Sayer Date: 2020.11.10 15:16:22 -05'00'

1. 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 Ash Pond 4 (AP-4 or Site) at Georgia Power Company's (GPC's) Plant Hammond. This plan meets the requirements of EPD rules and uses EPD's Manual for Ground Water Monitoring dated September 1991 as a guide. Groundwater monitoring well locations are presented on **Figure A-1** of **Appendix A** and well construction details on **Table A-1** of **Appendix A**.

Groundwater 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-4 has been installed and certified by a qualified professional engineer. This certification has been placed in the facility's operating record and is included in Part B of the permit application. 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 unscheduled installation or abandonment of monitoring wells. Well installation and/or abandonment must be directed by a qualified groundwater scientist.

2. GEOLOGIC AND HYDROGEOLOGIC CONDITIONS

The following section presents the geologic and hydrogeologic conditions for the Site as described in the "*Hydrogeologic Assessment Report (Revision 1)"* (HAR) tab in Section 2 of Part B of this permit application.

2.1 SITE GEOLOGY

AP-4 is located within the Great Valley and Ridge Physiographic Province (Valley and Ridge) in northwest Georgia, which is characterized by Paleozoic sedimentary rocks that have been folded and faulted into the ridges and valleys that gave this region its name. Geologic mapping performed at the Site by Petrologic Solutions, Inc. (Golder 2018) indicates that the Site is underlain by the lower units of the Cambrian age Conasauga Formation (Ccsl), consisting of mostly calcareous shale. Based on review of subsurface investigations at the Site, the bedrock was described as predominantly shale. AP-4 is underlain primarily by five lithologic units: (i) terrace alluvium, (ii) colluvium, (iii) residuum, (iv) partially weathered shale bedrock, and (v) unweathered shale bedrock.

Based on subsurface investigations, the alluvial deposits generally grade from a silt and silty clay to a clayey sand and silty sand to a sand and gravelly sand at depth. The colluvium consists of silty sand, silty clay with the presence of angular fragments of rocks/materials not expected in the lower units of the Conasauga, such as chert, sandstone, limestone, or coal. Residual or native soils have been derived from the in-place weathering of the shale bedrock. The residuum is generally described as brown to yellow brown firm clayey silt with weathered shale fragments. The partially weathered shale zone occurs as an intermediate weathering stage between the residuum and the unweathered shale bedrock. The weathered material is described as black to dark gray to dark red hard, fissile shale and claystone. Limited rock was encountered within 20 feet of the water table during previous investigations. The unweathered shale bedrock was not encountered or directly observed in the historical borings advanced at the Site. However, based on geologic conditions in the region, weathering, fracturing and jointing decreases with depth and the weathered rock material grades into competent bedrock.

2.2 SITE HYDROGEOLOGY

The uppermost aquifer at AP-4 is a regional groundwater aquifer that occurs primarily in the residuum, but also to some degree within the weathered and fractured bedrock. Under natural conditions the water table surface would be expected to be a subdued reflection of the topography. Groundwater recharge is by precipitation falling onto bedrock outcrop areas and then percolating through alluvial, colluvial, and residual soils to the bedrock. Based on observations of residuum soil types and horizontal conductivity values, the movement of groundwater in the soil can be characterized as low-to moderate permeability, porous media flow. The groundwater flow in the shallow underlying bedrock is characterized as fracture flow, and due to the preponderance of shale beneath the Site, is expected to be very low permeability. Groundwater flow direction is generally from north to south as shown in the potentiometric surface map in **Appendix A**. The potentiometric surface map represents data recorded in June 2018.

Aquifer testing was conducted by SCS in 2013 to evaluate hydraulic conditions in the vicinity of AP-4. Results of these field events are discussed in detail in the HAR. The representative groundwater hydraulic gradient for AP-4 is 0.015 feet/foot (ft/ft), averaged from hydraulic gradients calculated along the eastern, central, and western portions of the unit. The well pairs correlating to these flow areas are, respectively: GWA-14 and HGWC-118; HGWA-113 and HGWC-103; HGWA-111 and HGWC-107. Horizontal hydraulic

conductivity (K_h) was estimated for units above the top of bedrock by performing rising head tests (slug out) and falling head tests (slug in). The tests were conducted at wells screened in the terrace alluvium or colluvial material, and averages for alluvium and for colluvium were calculated. Undisturbed soil samples of the alluvial material were collected for the purpose of hydraulic conductivity testing, representing vertical hydraulic conductivity (K_v). Very little residuum was encountered beneath either the alluvial or colluvial sediments at the Site. The majority of the wells are screened in either alluvial or alluvial/colluvial materials; therefore, no hydraulic conductivity testing was conducted on the residuum, weathered shale, or unweathered shale.

The K_h measured in the alluvial material ranged from 2.4×10^{-4} to 4.9×10^{-3} cm/s, with a geometric mean of 1.2×10^{-3} cm/s. The geometric mean for K_v, as calculated from conducting three permeability tests on undisturbed soil samples, was 8.2×10^{-6} cm/s. The K_h values for the colluvium material ranged from 9.8×10^{-5} to 4.0×10^{-4} cm/s, with a geometric mean of 1.98×10^{-4} cm/s.

3. SELECTION OF WELL LOCATIONS

Groundwater monitoring wells were installed to monitor the uppermost occurrence of groundwater beneath the Site. Locations were selected based on the AP-4 footprint and geologic and hydrogeologic considerations. GPC follows the recommendation as stated in Chapter 2 of the *Manual for Groundwater Monitoring* (1991) to establish well spacings based on site-specific conditions. A map depicting the monitoring well network for AP-4 is included in **Appendix A**, Monitoring System Details. A more detailed discussion of the hydrogeological investigation conducted in support of monitoring well placement is provided in the HAR.

The groundwater monitoring network locations were chosen to monitor upgradient (HGWA), and downgradient (HGWC) conditions at the Site based on groundwater flow direction determined by potentiometric evaluation. The potentiometric surface map in **Appendix A** depicts the groundwater flow direction beneath AP-4, based on June 2018 conditions. Three wells (i.e., HGWA-111, HGWA-112, and HGWA-113) are designated for monitoring of upgradient conditions and eight wells (i.e., HGWC-101, HGWC-102, HGWC-103, HGWC-105, HGWC-107, HGWC-109, HGWC-117, and HGWC-118) are designated for monitoring of downgradient conditions. Wells are positioned to provide adequate coverage to detect potential impacts from the CCR impoundment. Both upgradient and downgradient wells are screened in the uppermost aquifer, in the alluvium, colluvium, and/or residuum above the shale bedrock.

Monitoring wells are generally 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. In addition to the potentiometric surface map, **Appendix A** also includes a tabulated list of location coordinates for the individual monitoring wells. Additional well construction details (i.e., top-of-casing elevation, well depths and screened intervals) are also provided on this table. A table of well survey data certified by a Georgia-registered professional surveyor is included in **Appendix A**.

4. MONITORING WELL DRILLING, CONSTRUCTION, ABANDONMENT AND REPORTING

The AP-4 monitoring well network described in this plan is already in place. The existing monitoring wells were installed following USEPA Region 4 Science and Ecosystem Support Division (SESD) *Operating Procedure for Design and Installation of Monitoring Wells* (USEPA, SESDGUID-101-R0) as a general guide for best practices. The monitoring wells were installed by SCS in 2012; the boring and well construction logs associated with these field efforts are included in **Appendix A**. Additional monitoring wells, if necessary, will be installed in accordance with the following procedures.

4.1 DRILLING

A variety of well drilling methods are available for the purpose of installing groundwater monitoring wells. Drilling methodologies include but are not limited to: hollow stem augers, direct push, air rotary, mud rotary, and rotosonic techniques. The drilling method will be selected to minimize the disturbance of subsurface materials and not cause impacts to groundwater. Borings will be advanced using an appropriate drilling technology capable of drilling and installing a well in the site-specific geology. Monitoring wells will be installed using the most current version of the USEPA SESD SESDGUID-101-R# as a general guide for best practices. Also, drilling equipment will be decontaminated before use and between borehole locations using the procedures described in the most current version of USEPA SESD *Operating Procedure for Field Equipment Cleaning and Decontamination* (USEPA, SESDGUID-205-R#). Well installation will be directed by a qualified groundwater scientist.

Sampling and/or coring may be used to help determine the stratigraphy and geology at the well location. Samples and cores will be logged by a qualified groundwater scientist. Screen depths will be chosen based on the depth to the uppermost aquifer.

All drilling for any subsurface hydrologic investigation, or for 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.

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.

WELL CASINGS AND SCREENS

American Society for Testing and Materials (ASTM), National Science Foundation (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.

WELL INTAKE DESIGN

Intake for groundwater monitoring wells will be designed and constructed to: (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 will not exceed 10 feet without justification as to why a longer screen is necessary (e.g., significant variation in groundwater level). If these specifications 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. If utilized, pre-packed well screens will be installed following general industry standards and using the current version of USEPA SESDGUID-101-R# 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.

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 boring 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 elevation of filter pack depth will be monitored, 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 in the boring above the well pack 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 zones. 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 two feet above the bentonite seal and injecting grout at low pressure/velocity.

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 cementitious grout to ground surface, where it will become a concrete apron extending outward with a radius of at least 2 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 air 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 will 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 will 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.

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 5 nephelometric turbidity units (NTUs); however, formation-specific conditions may not allow this target to be accomplished. Additionally, the stabilization criteria contained in **Appendix C** 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. All 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 a well's filter pack over time. Therefore, the turbidity of the groundwater from the monitoring wells may gradually increase over time after initial well development. As a result, monitoring wells may need to be redeveloped periodically to remove the silt and clay that has worked its way into the filter packs of the 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 ABANDONMENT

Monitoring wells will be abandoned using industry-accepted practices and using the EPD Manual for Groundwater Monitoring (1991) and Georgia's Well Water Standards Act of 1985 [Official Code of Georgia Annotated (O.C.G.A.) § 12-5-120, 1985] as guides. The wells will be abandoned under the direction of a professional geologist (P.G.) or engineer (P.E.) registered in Georgia. Neat Portland cement or bentonite will be used as appropriate to complete abandonment and seal the well borehole. Any piezometers or groundwater wells located within the footprint of AP-4 will be over-drilled prior to abandonment.

4.4 DOCUMENTATION

Within 60 days of the construction, development or abandonment of each new groundwater monitoring well completed under the direction of a qualified groundwater scientist or engineer, a well installation/abandonment report will be submitted to the EPD. The following information will be documented in this report.

- Well identification
- 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
- Narrative of drilling technique applied, well construction details, and well development procedures, including dates, drilling fluids used (if applicable), well casing and screen materials, screen slot size, and joint type
- Details of filter pack material/size, emplacement method (narrative), and volume
- Seal emplacement method and type/volume of sealant
- Borehole diameter and well casing diameter
- Type of protective well cap
- Surface seal and volumes/mix of annular seal material
- Screen length and interval reported in feet below ground surface and elevation
- Well location data given to within an accuracy of 0.5 feet based on survey data recorded from an acceptable survey point datum by a Georgia-registered professional surveyor
- Well elevation data given to within an accuracy of 0.01 feet based on survey data recorded from an acceptable survey point datum by a Georgia-registered professional surveyor
- Lithologic logs
- Documentation that water quality field parameters meet well development criteria (Section 4.2)
- Documentation of ground surface elevation (±0.01 feet)
- Documentation of top of casing elevation (±0.01 feet)
- Schematic of the well with dimensions for all components (e.g., casing, screen, sump, well pad)

5. 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, except for well HGWC-102 which was reclassified as a compliance monitoring well in 2019, were collected between August 2016 and October 2018 and analyzed for 40 CFR § 257, Subpart D, Appendix III and Appendix IV 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 closure activities and the post-CCR removal monitoring period. Pursuant to Chapter 391-3-4-.10(6), an assessment monitoring program was established for AP-4 based on statistically significant increases documented in the *2019 Annual Groundwater Monitoring and Corrective Action Report* (Geosyntec, 2019). GPC will conduct assessment monitoring in accordance with Chapter 391-3-4-.10(6).

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, USEPA 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 EPD. The method used will be able to reach a suitable practical quantification limit to detect natural background conditions at the facility. The groundwater samples will be analyzed by licensed and accredited laboratories through the National Environmental Laboratory Accreditation Conference (NELAC). 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
	ORP	X	X
	Turbidity	X	X
	Specific Conductance	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	USEPA Method Number
Boron	6010B/6020B
Calcium	6010B/6020B
Chloride	300.0/300.1/9250/9251/9253/9056A
Fluoride	300.0/300.1/9214/9056A
pH	150.1 field
Sulfate	9035/9036/9038/300.0/300.1/9056A
Total Dissolved Solids (TDS)	160/2540C
Antimony	EPA 7040/7041/6010B/6020B
Arsenic	EPA 7060A/7061A/6010B/6020B
Barium	EPA 7080A/7081/6010B/6020B
Beryllium	EPA 7090/7091/6010B/6020B
Cadmium	EPA 7130/7131A/6020B
Chromium	EPA 7190/7191/6010B/6020B
Cobalt	EPA 7200/7201/6010B/6020B
Fluoride	300.0/300.1/9214/9056A
Lead	EPA 7420/7421/6010B/6020B
Lithium	6010/6020B
Mercury	7470
Molybdenum	6010/6020B
Selenium	EPA 7740/7741A/6010B/6020B
Thallium	EPA 7840/7841/6010/6020B
Radium 226 and 228 combined	EPA 903/9320/9315

6. SAMPLE COLLECTION

During each sampling event, samples will be collected and handled in accordance with the procedures specified in **Appendix C**, Groundwater Sampling Procedure. 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. The applied groundwater purging and sampling methodologies will be discussed in the groundwater semi-annual monitoring reports submitted to the EPD.

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.

Per Georgia Rule 391-3-4-.10(6)(g) monitoring wells require replacement after two consecutive dry sampling events. Well installation will be directed by a qualified groundwater scientist. A minor modification will be submitted to the EPD in accordance with Rule 391-3-4-.02(3)(b)(6) prior to the installation or decommissioning of monitoring wells.

7. CHAIN-OF-CUSTODY

All 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
- Notated date(s) and time(s) of sample transfer between individuals

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

8. FIELD QUALITY ASSURANCE / QUALITY CONTROL

All field quality control samples will be prepared the same as compliance samples with regard 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 10 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).

Calibration of field instruments will occur daily and follow the recommended (specific) instrument calibration procedures provided by the manufacturer and/or equipment manual specific to each instrument. Daily calibration will be documented on field forms and these field forms will be included in all groundwater monitoring reports. Instruments will be recalibrated as necessary (e.g., when calibration checks indicate significant variability), and all checks and recalibration steps will be documented on field calibration forms. Calibration of the instruments will also be checked if any readings during sampling activities are suspect. Replacement probes and meters will be obtained as a corrective action in the event that recalibration does not improve instrument function. Completed calibration field forms will be provided with the semi-annual groundwater monitoring reports.

9. REPORTING RESULTS

A semi-annual groundwater report that documents the results of sampling and analysis will be submitted to the 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 narrative of purging/sampling methodologies, which will include the type of sampling equipment used.

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 abandoned 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. Field logs and forms will be kept for each sampling event, and will include the following, but not be limited to, well signage, well access, sampling and purging equipment condition, and any site conditions that may affect sampling.

16. Documentation of non-functioning wells.

17. Table of current analytical results for each well, highlighting statistically significant increases and concentrations above maximum contaminant level (MCL).

18. Statistical analyses.

19. Certification by a qualified groundwater scientist.

10. STATISTICAL ANALYSIS

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 establish statistical limits. Statistical analysis techniques will be consistent with the USEPA document *Statistical Analysis of Groundwater Data at RCRA Facilities Unified Guidance* (Unified Guidance) (USEPA, 2009).

According to GA EPD rules (391-3-4-.10(6)(a)), the Site must specify in the operating record the statistical methods to be used in evaluating groundwater monitoring data for each hazardous constituent. The statistical test chosen will be conducted separately for each hazardous constituent in each well. As authorized by the rule, statistical tests that will 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 tolerance or prediction limit. [§257.93(f)(3)];

2. A control chart approach that gives control limits for each constituent. [§257.93(f)(4)]; and

3. Another statistical test method (such as prediction limits or control charts) that meets the performance standards of §257.93(g) [§257.93(f)(5)]. 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).

An interwell statistical method will be used to compare Appendix III groundwater monitoring data to background conditions. Confidence intervals will be constructed for each downgrardient well and used to compare Appendix IV groundwater monitoring data to groundwater protection standards.

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 Analysis Plan Overview*, presents a flowchart that depicts the process that will be followed to develop the site-specific plan. **Figure 2**, *Decision Logic for Computing Prediction Limits*, presents the logic that will be used to calculate site-specific statistical limits and test groundwater results from compliance monitoring wells against those limits.

FIGURE 1. STATISTICAL ANALYSIS PLAN OVERVIEW

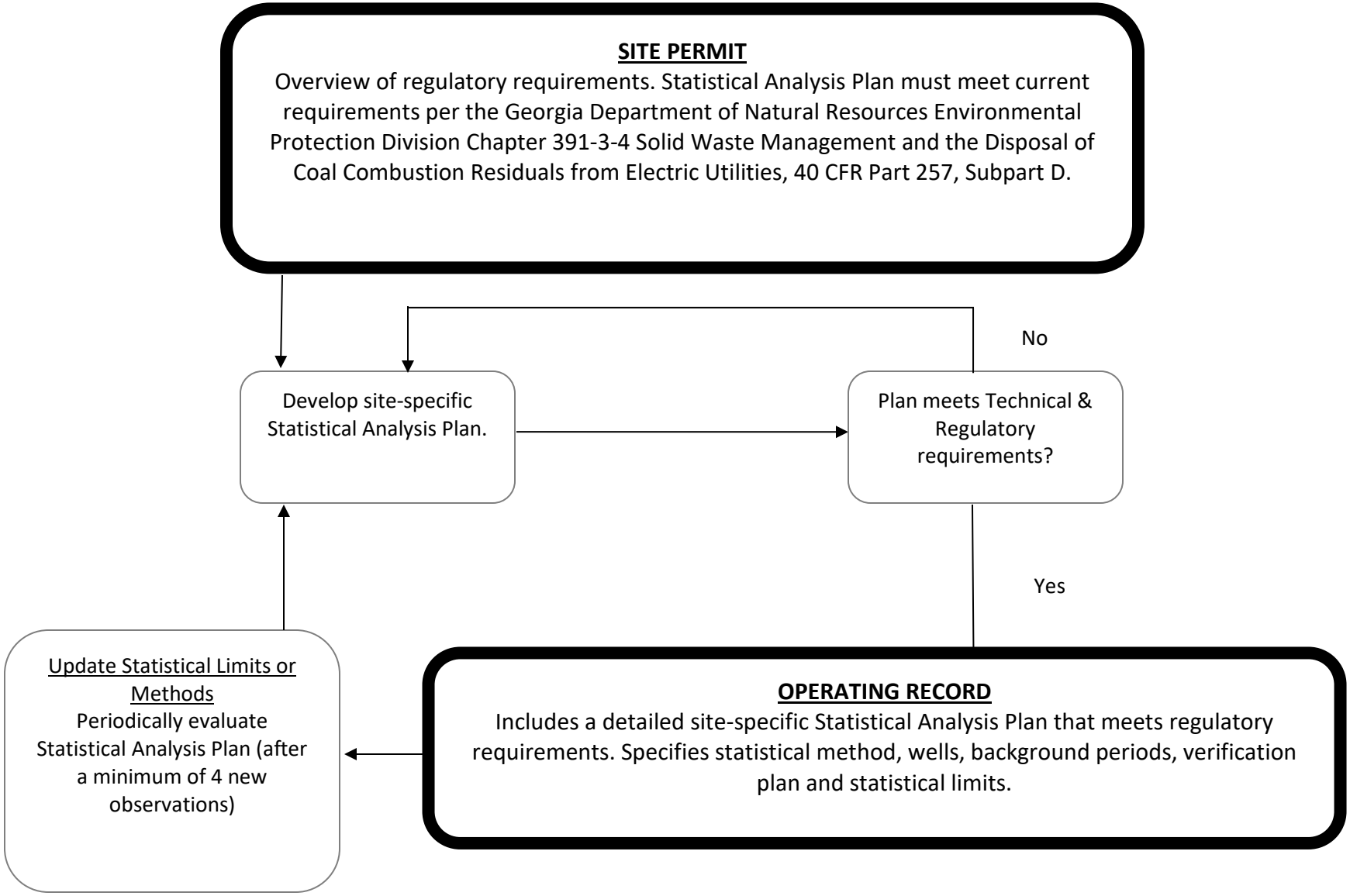
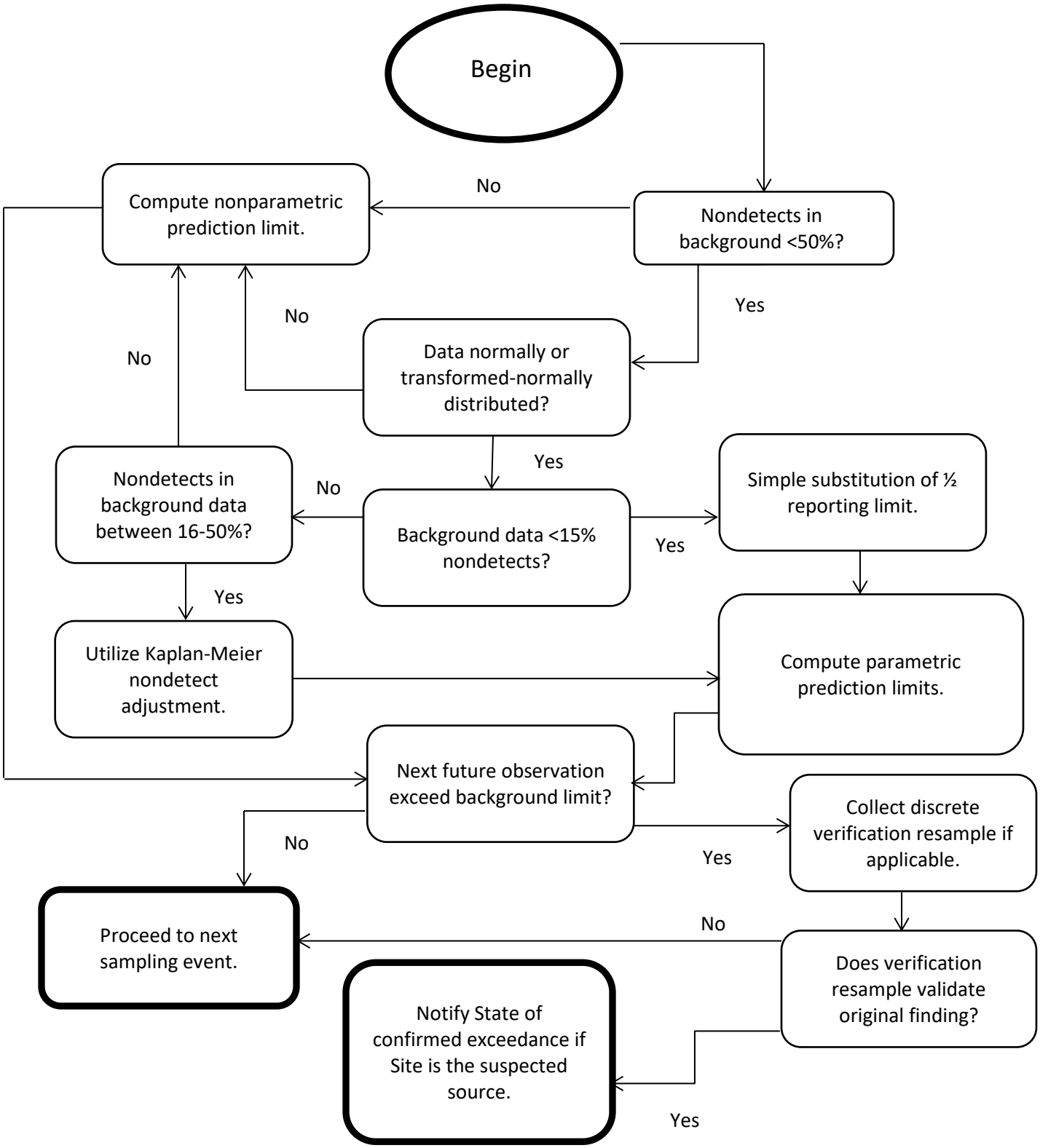


FIGURE 2. DECISION LOGIC FOR COMPUTING TOLERANCE OR PREDICTION INTERVALS



11. REFERENCES

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APPENDIX

A. MONITORING SYSTEM DETAILS
B. GROUNDWATER MONITORING WELL DETAIL
C. GROUNDWATER SAMPLING PROCEDURE

A. MONITORING SYSTEM DETAILS

FIGURE A-1 COMPLIANCE MONITORING NETWORK

FIGURE A-2 POTENTIOMETRIC SURFACE MAP – JUNE 2018

TABLE A-1 AP-4 MONITORING NETWORK WELL DETAILS

TABLE A-2 AP-4 WATER LEVEL MONITORING NETWORK PIEZOMETER DETAILS

AP-4 BORING AND WELL CONSTRUCTION LOGS

CERTIFIED WELL NETWORK SURVEY DATA

N

LEGEND

AP-4 Monitoring Well

0 150 300 600

SCALE IN FEET

COMPLIANCE MONITORING NETWORK
AP-4 GROUNDWATER MONITORING PLAN

GEORGIA POWER COMPANY
PLANT HAMMOND AP-4
ROME, FLOYD COUNTY, GEORGIA

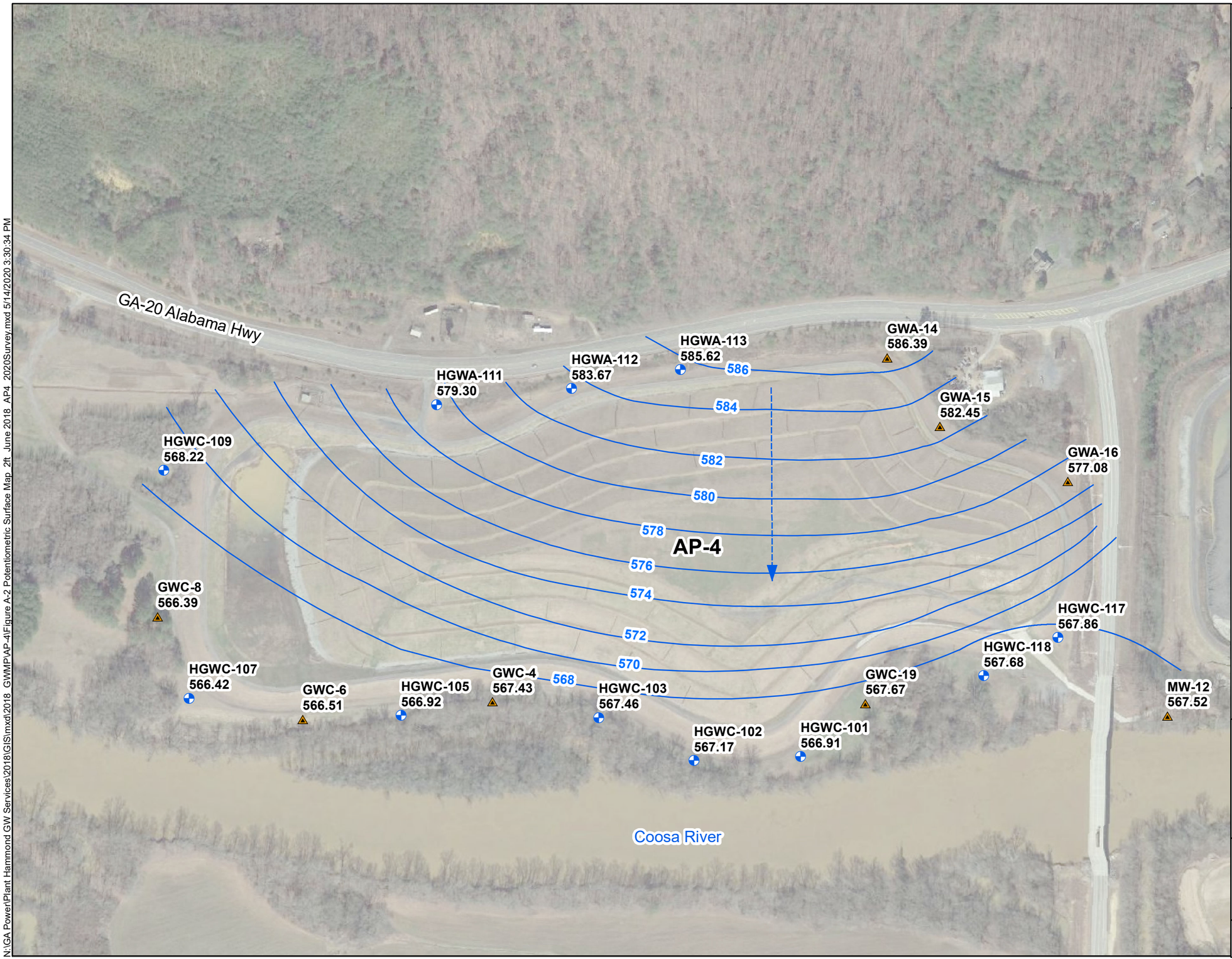
Prepared For: Georgia Power

Prepared By: Geosyntec consultants

KENNESAW, GA | AUGUST 2019

FIGURE A-1

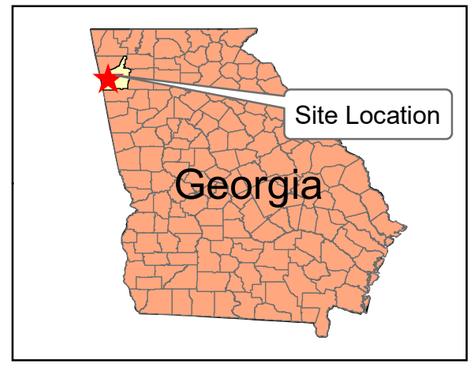
N:\GA Power\Plant Hammond GW Services\2018\GIS\mxd\2018 GWMP\AP-4\Figure A-1 Compliance Monitoring Network AP4.mxd 8/26/2019 3:46:17 PM



N

LEGEND

- AP-4 Monitoring Well (Groundwater elevation, ft NAVD88);
- Piezometer (Groundwater elevation, ft NAVD88)
- Groundwater Elevation Contour (ft NAVD88)
- Approximate Groundwater Flow Direction



Note:
1. Water level elevation recorded on June 4, 2018. Elevation provided in feet (ft) referenced to the North American Vertical Datum 1988 (NAVD88).
2. Groundwater elevations calculated using well survey data certified May 11, 2020.

0 150 300 600

SCALE IN FEET

POTENTIOMETRIC SURFACE MAP (JUNE 2018) AP-4 GROUNDWATER MONITORING PLAN

GEORGIA POWER COMPANY
PLANT HAMMOND AP-4
ROME, FLOYD COUNTY, GEORGIA

Prepared For: Georgia Power

Prepared By: Geosyntec consultants

KENNESAW, GA | MAY 2020

FIGURE A-2

N:\GA Power\Plant Hammond GW Services\2018\GIS\mxd\2018_GWMP\AP-4\Figure A-2 Potentiometric Surface Map_2ft_June 2018_AP4_2020Survey.mxd 5/14/2020 3:30:34 PM

Table A-1
AP-4 Monitoring Network Well Details
Plant Hammond, Floyd County, Georgia

Well ID	Purpose	Northing [1]	Easting [1]	Top of Casing Elevation (ft NAVD88)	Ground Surface Elevation [2] (ft NAVD88)	Top of Screen Elevation (ft NAVD88)	Bottom of Screen Elevation (ft NAVD88)	Well Depth [3] (ft BTOC)	Screened Media
HGWA-111	Monitoring, upgradient	1548834.26	1935222.81	591.75	588.79	558.48	548.48	43.67	Alluvium, Residuum
HGWA-112	Monitoring, upgradient	1548885.63	1935647.00	596.27	593.46	566.52	556.52	40.15	Alluvium
HGWA-113	Monitoring, upgradient	1548944.62	1935990.09	594.58	592.07	568.87	558.87	36.11	Alluvium
HGWC-101	Monitoring, downgradient	1547725.50	1936369.58	578.85	575.91	551.31	541.31	37.94	Alluvium
HGWC-102	Monitoring, downgradient	1547713.50	1936033.33	577.54	574.54	550.51	540.51	37.43	Alluvium
HGWC-103	Monitoring, downgradient	1547848.88	1935732.96	580.79	577.76	553.51	543.51	37.68	Alluvium
HGWC-105	Monitoring, downgradient	1547855.56	1935110.36	582.09	579.08	547.72	537.72	44.67	Alluvium, Residuum
HGWC-107	Monitoring, downgradient	1547909.99	1934442.24	579.31	576.43	551.51	541.51	38.20	Alluvium
HGWC-109	Monitoring, downgradient	1548627.41	1934362.77	576.77	573.66	555.81	545.81	31.36	Alluvium
HGWC-117	Monitoring, downgradient	1548100.77	1937180.43	581.98	579.31	552.12	542.12	40.26	Alluvium
HGWC-118	Monitoring, downgradient	1547980.56	1936946.37	579.02	576.52	548.51	538.51	40.91	Alluvium, Residuum

Notes:
ft = feet
ft BTOC = feet below top of casing
(1) Coordinates in North American Datum (NAD) 1983, State Plane, Georgia West Zone, feet. Survey data certified May 11, 2020.
(2) Vertical elevations are in feet relative to the North American Vertical Datum (NAVD) 1988. "Ground surface" elevation defined at the survey nail installed within the well pad. Survey data certified May 11, 2020.
(3) Total well depth accounts for sump if data provided on well construction logs.

Table A-2

AP-4 Water Level Monitoring Network Piezometer Details

Plant Hammond, Floyd County, Georgia

Well ID	Purpose	Northing [1]	Easting [1]	Ground Surface Elevation [2] (ft NAVD88)	Top of Casing Elevation (ft NAVD88)	Top of Screen Elevation (ft NAVD88)	Bottom of Screen Elevation (ft NAVD88)	Well Depth [3] (ft BTOC)	Screened Media
MW-12	Water level	1547853.78	1937525.46	580.59	583.27	555.84	545.84	37.83	Alluvium
GWC-4	Water level	1547898.31	1935398.70	577.73	580.65	543.47	533.47	47.58	Alluvium, Weathered shale
GWC-6	Water level	1547843.93	1934800.45	578.55	581.63	553.90	543.90	38.13	Alluvium
GWC-8	Water level	1548167.13	1934342.94	577.13	579.99	549.47	539.47	40.92	Alluvium
GWA-14	Water level	1548982.59	1936642.58	589.70	592.14	561.40	551.40	41.14	Alluvium, Residuum
GWA-15	Water level	1548766.17	1936808.47	588.37	591.56	571.44	561.44	30.52	Alluvium
GWA-16	Water level	1548592.74	1937210.99	579.58	582.55	569.94	559.94	23.01	Alluvium, Weathered shale
GWC-19	Water level	1547892.89	1936572.97	576.90	579.83	554.04	544.04	36.19	Alluvium

Notes:

ft = feet

ft BTOC = feet below top of casing

(1) Coordinates in North American Datum (NAD) 1983, State Plane, Georgia West Zone, feet. Survey data certified May 11, 2020.

(2) Vertical elevations are in feet relative to the North American Vertical Datum (NAVD) 1988. "Ground surface" elevation defined at the survey nail installed within the well pad. Survey data certified May 11, 2020.

(3) Total well depth accounts for sump if data provided on well construction logs.

Log updated with revised survey certified 5/11/2020.

BORING NO.: HGWA-111

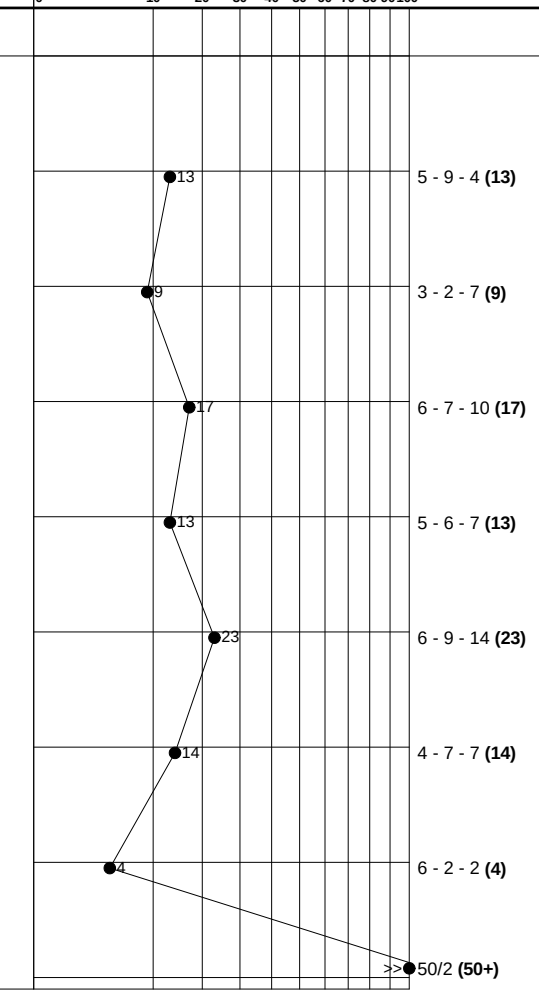
TEST BORING RECORD

PROJECT: Plant Hammond Ash Pond #4 Well Installation		JOB NO: 1811-12-153	SHEET 1 OF 1
PROJECT LOCATION: Rome, Georgia			
ELEVATION: 588.79 feet	BORING STARTED: 8/20/2012	RIG TYPE: CME-550	AUGER DIA. (IN): 6.75
DRILLING METHOD: Hollow-Stem Augers	BORING COMPLETED: 8/20/2012	HAMMER: Automatic	

GROUNDWATER:
- 30 feet ATD
- 7.3 feet on 8/21/12

Remarks: Monitoring well set at 40.4 feet below ground surface
Elevation in NAVD 88.

G	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	L	S	R	M	PI	STANDARD PENETRATION RESISTANCE (N) BLOWS/6"
	588.5	0	CLAYEY SILT (ML) with rounded to subrounded chert pebbles and yellow shale fragments, brown, damp, stiff	ALLUVIUM					
	578.5	10	10' CLAYEY SILT/SILTY CLAY (CH-MH), with scattered round pebbles and trace fine sand, yellow-brown with black oxidation staining, damp, stiff						
	574.5	15	14' CLAYEY SILT (ML) with trace fine sand, yellow-brown, orange, and gray with black oxidaiton staining, damp, very stiff						
	569.5	20	19' SANDY CLAYEY SILT (ML) with trace mica, weathered light gray and yellow-brown dolomite fragments, yellow-brown with zones of light blue-gray clayey sand, damp to moist, stiff to very stiff						
	558.5	30	30' SILTY CLAY (CH), with dark gray dolomite and claystone fragments, yellow-brown and orange, wet, stiff, soft and hard	RESIDUUM					
	548.0	40	*Boring terminated at 40.5 feet*						
		45							
		50							



BORING RECORD S&ME 12-153.GPJ S&ME 1-18-2012.GDT 10/22/12

Borehole ID: 11

Project Manager: J. Heywood, PE

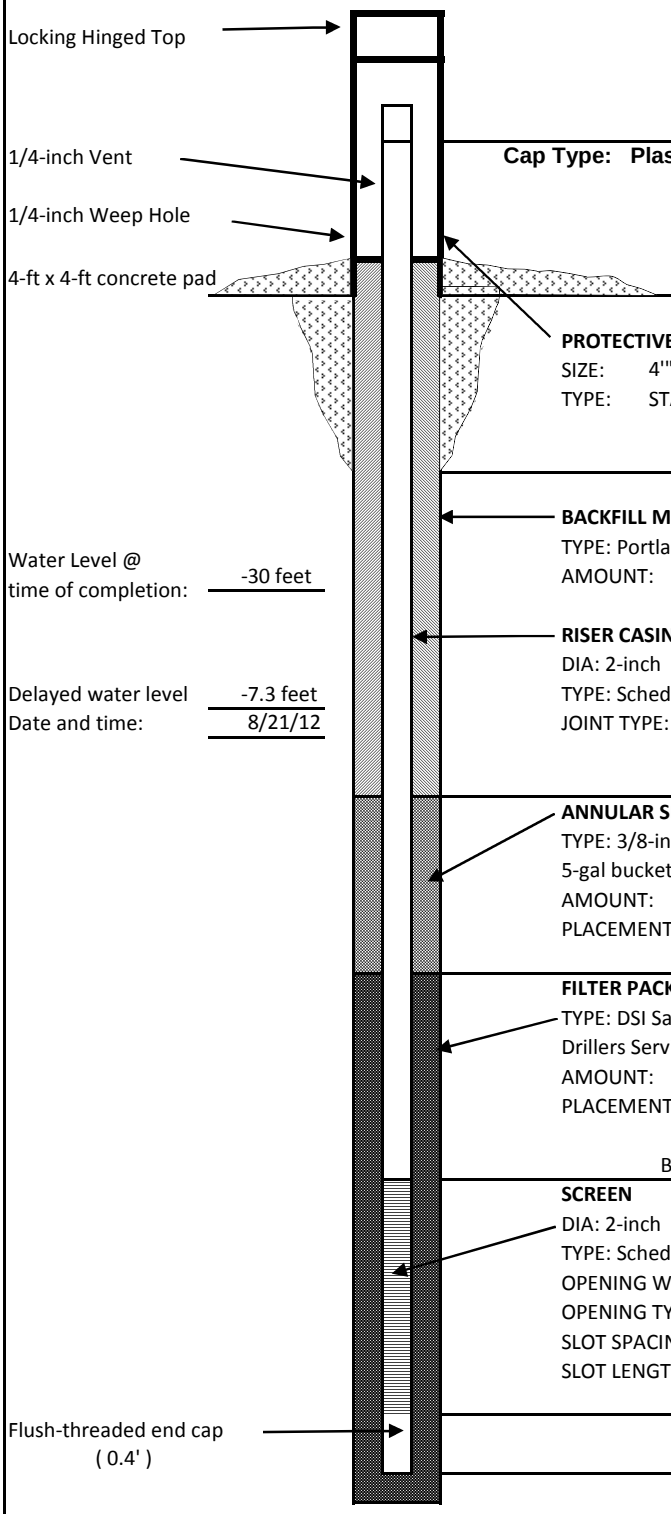
Logged by: P. Gribben, PG

Log updated with revised survey certified 5/11/2020.

GEORGIA POWER PLANT HAMMOND ASH POND #4
ROME, GEORGIA

WELL CONSTRUCTION LOG

CLIENT: SOUTHERN COMPANY		WELL ID:
DRILLED BY: Chad Odom (S&ME)	LOGGED BY: PAT GRIBBEN (S&ME)	**HGWA-111**
RIG TYPE: CME-550	DRILLING METHOD: 4.25" HOLLOW STEM AUGERS	
DATE CONSTRUCTED: August 21, 2012		



	DEPTH FEET	ELEVATION FEET
TOP OF RISER	3.27	591.75
Cap Type: Plastic Locking		
TOP OF NAIL	0.31	588.79
GROUND SURFACE	0.0	588.48
PROTECTIVE CASING SIZE: 4'" x 4" x 5' TYPE: STAINLESS STEEL LOCKING		
BOTTOM OF PROTECTIVE CASING	-1.25	587.23
BACKFILL MATERIAL TYPE: Portland Cement Grout AMOUNT: 50 gallons		
RISER CASING DIA: 2-inch TYPE: Schedule 40 PVC JOINT TYPE: Flush Threaded		
TOP OF SEAL	-23.5	564.98
ANNULAR SEAL TYPE: 3/8-inch coated bentonite pellets 5-gal buckets AMOUNT: 50 lbs PLACEMENT: 4.4 feet		
TOP OF FILTER PACK	-27.9	560.58
FILTER PACK TYPE: DSI Sand - 1A (20/30) Drillers Services, Inc. AMOUNT: 4.5 bags PLACEMENT: 12.5 feet		
BOTTOM OF RISER/TOP OF SCREEN	-30.0	558.48
SCREEN (10.0') 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	-40.0	548.48
BOTTOM OF CASING	-40.4	548.08

Elevation in NAVD 88.

Log updated with revised survey certified 5/11/2020.

BORING NO.: HGWA-112

TEST BORING RECORD

PROJECT: Plant Hammond Ash Pond #4 Well Installation		JOB NO: 1811-12-153	SHEET 1 OF 1
PROJECT LOCATION: Rome, Georgia			
ELEVATION: 593.46 feet	BORING STARTED: 8/21/2012	RIG TYPE: CME-550	AUGER DIA. (IN): 6.75
DRILLING METHOD: Hollow-Stem Augers	BORING COMPLETED: 8/21/2012	HAMMER: Automatic	

GROUNDWATER:
▽ 16 feet ATD

Remarks: Monitoring well set at 37.0 feet below ground surface

Elevation in NAVD 88.

G	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	L	S	R	M	PI	STANDARD PENETRATION RESISTANCE (N) 0 10 20 30 40 50 60 70 80 90 100	BLOWS/6"
	593.1	0	0.5' TOPSOIL, dark brown, grass, roots							
			CLAYEY SILT-SILTY CLAY (CL-ML) with dolomite, chert, shale, and coal fragments, yellow-brown, orange, gray, damp to moist, firm	FILL						
	587.1	5	6' SILTY CLAY (CH) with scattered subrounded chert fragments, orange-brown, moist, firm	ALLUVIUM					6	3 - 3 - 3 **(6)**
		10							8	4 - 4 - 4 **(8)**
▽	578.6	15	14.5' CLAYEY SILT/SANDY SILT (ML) with trace mica and scattered chert fragments, yellow-brown, orange, light blue-gray, dry to wet, very stiff to stiff						29	9 - 12 - 17 **(29)**
		20							11	5 - 5 - 6 **(11)**
	568.6	25	24.5' SANDY CLAY (CL) with trace mica, brown and light blue gray, moist to wet, firm to soft						7	3 - 3 - 4 **(7)**
		30							4	3 - 2 - 2 **(4)**
	558.4	35	34.7' CLAYEY FINE SAND (SC) with trace mica and scattered subround pebble, gray and orange, wet, firm						13	3 - 5 - 8 **(13)**
	556.1		*Boring terminated at 37 feet*							
		40								
		45								
		50								

BORING RECORD S&ME 12-153.GPJ S&ME 1-18-2012.GDT 10/22/12

Borehole ID: 12

Project Manager: J. Heywood, PE

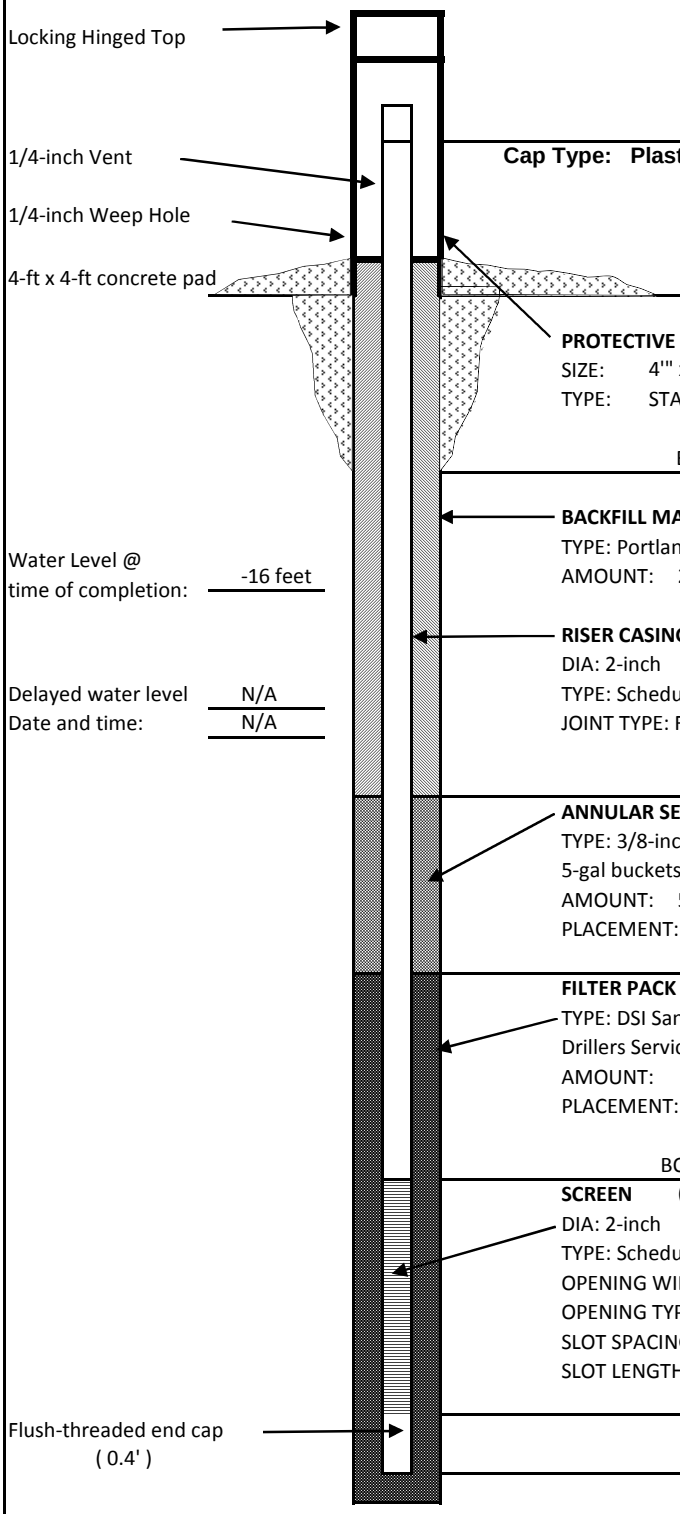
Logged by: P. Gribben, PG

Log updated with revised survey certified 5/11/2020.

GEORGIA POWER PLANT HAMMOND ASH POND #4
ROME, GEORGIA

WELL CONSTRUCTION LOG

CLIENT: SOUTHERN COMPANY		WELL ID:
DRILLED BY: Chad Odom (S&ME)	LOGGED BY: PAT GRIBBEN (S&ME)	**HGWA-112**
RIG TYPE: CME-550	DRILLING METHOD: 4.25" HOLLOW STEM AUGERS	
DATE CONSTRUCTED: August 21, 2012		



	DEPTH FEET	ELEVATION FEET
TOP OF RISER	3.15	596.27
Cap Type: Plastic Locking		
TOP OF NAIL	0.34	593.46
GROUND SURFACE	0.0	593.12
PROTECTIVE CASING SIZE: 4'" x 4" x 5' TYPE: STAINLESS STEEL LOCKING		
BOTTOM OF PROTECTIVE CASING	-1.45	591.67
BACKFILL MATERIAL TYPE: Portland Cement Grout AMOUNT: 26 gallons		
RISER CASING DIA: 2-inch TYPE: Schedule 40 PVC JOINT TYPE: Flush Threaded		
TOP OF SEAL	-21.5	571.62
ANNULAR SEAL TYPE: 3/8-inch coated bentonite pellets 5-gal buckets AMOUNT: 50 lbs PLACEMENT: 2.8 feet		
TOP OF FILTER PACK	-24.3	568.82
FILTER PACK TYPE: DSI Sand - 1A (20/30) Drillers Services, Inc. AMOUNT: 5.5 bags PLACEMENT: 12.7 feet		
BOTTOM OF RISER/TOP OF SCREEN	-26.6	566.52
SCREEN (10.0') 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	-36.6	556.52
BOTTOM OF CASING	-37.0	556.12

Elevation in NAVD 88.

Log updated with revised survey certified 5/11/2020.

BORING NO.: HGWA-113

TEST BORING RECORD

PROJECT: Plant Hammond Ash Pond #4 Well Installation		JOB NO: 1811-12-153	SHEET 1 OF 1
PROJECT LOCATION: Rome, Georgia			
ELEVATION: 592.07 feet	BORING STARTED: 10/2/2012	RIG TYPE: CME-550	AUGER DIA. (IN): 6¼
DRILLING METHOD: Hollow Stem Augers	BORING COMPLETED: 10/2/2012	HAMMER: Automatic	

GROUNDWATER:
- 10 feet ATD
- 10.75 feet on 10/3/12

Remarks: Monitoring well set at 33.7 feet below ground surface

Elevation in NAVD 88.

G	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	L	S	R	M	PI	STANDARD PENETRATION RESISTANCE (N) BLOWS/6"
	591.8	0	SILTY CLAY (CH) with rock fragments, orange-brown, wet (vacuum excavated and backfilled for underground utility clearance) FILL						
	581.8	10 10'	SILTY CLAY (CL) with sandstone fragments and trace sand, orange-brown, wet, firm ALLUVIUM						7 — 2 - 3 - 4 **(7)**
	576.8	15 15'	CLAYEY SILT (ML), yellow-brown, damp to moist, very stiff						18 — 6 - 8 - 10 **(18)**
	570.5	20 21.3'	CLAYEY SANDY SILT (ML) with trace mica, yellow-brown and orange, moist, very stiff to stiff						16 — 6 - 7 - 9 **(16)**
		25							14 — 4 - 7 - 7 **(14)**
	560.8	30 31'	SANDY CLAY (CL) with trace mica, gray-brown, moist, firm						5 — 3 - 2 - 3 **(5)**
	558.1	35	*Boring terminated at 33.7 feet*						
		40							
		45							
		50							

BORING RECORD S&ME 12-153.GPJ S&ME 1-18-2012.GDT 10/22/12

Borehole ID: 13

Project Manager: J. Heywood, PE

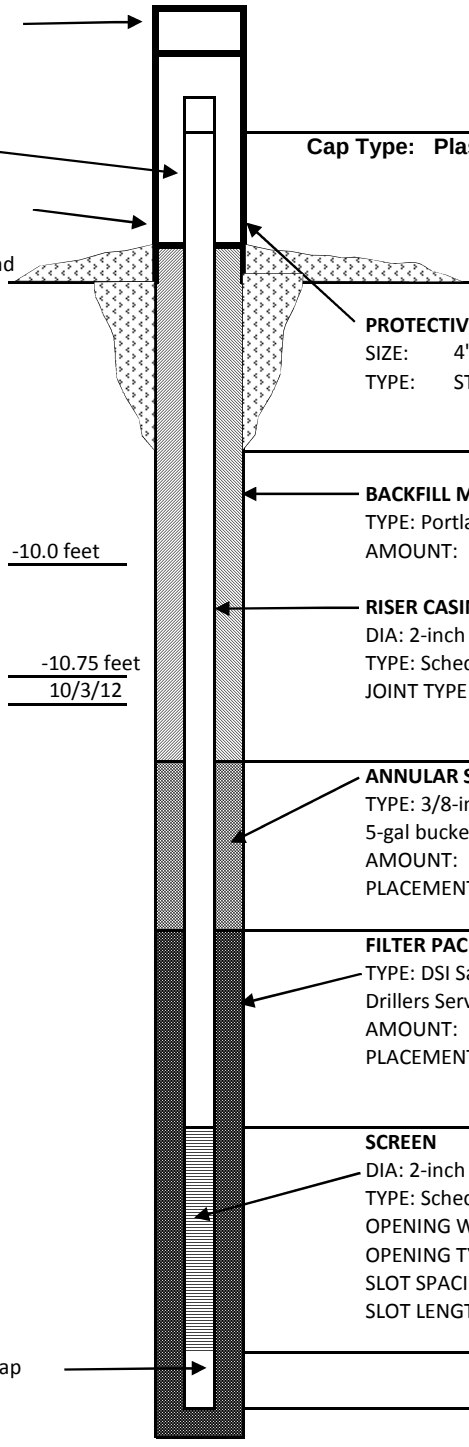
Logged by: P. Gribben, PG

Log updated with revised survey certified 5/11/2020.

GEORGIA POWER PLANT HAMMOND ASH POND #4
ROME, GEORGIA

WELL CONSTRUCTION LOG

CLIENT: SOUTHERN COMPANY	WELL ID:
DRILLED BY: Chad Odom (S&ME) LOGGED BY: PAT GRIBBEN (S&ME)	**HGWA-113**
RIG TYPE: CME-550 DRILLING METHOD: 4.25" HOLLOW STEM AUGERS	
DATE CONSTRUCTED: October 2, 2012	



	DEPTH FEET	ELEVATION FEET
TOP OF RISER	2.83	594.58
Cap Type: Plastic Locking		
TOP OF NAIL	0.32	592.07
GROUND SURFACE	0.0	591.75
PROTECTIVE CASING SIZE: 4'" x 4" x 5' TYPE: STAINLESS STEEL LOCKING		
BOTTOM OF PROTECTIVE CASING	-1.7	590.05
BACKFILL MATERIAL TYPE: Portland Cement Grout AMOUNT: 31.25 gallons		
RISER CASING DIA: 2-inch TYPE: Schedule 40 PVC JOINT TYPE: Flush Threaded		
TOP OF SEAL	-18.7	573.05
ANNULAR SEAL TYPE: 3/8-inch coated bentonite pellets 5-gal buckets AMOUNT: 50 lbs PLACEMENT: 2.9 feet		
TOP OF FILTER PACK	-21.6	570.15
FILTER PACK TYPE: DSI Sand - 1A (20/30) Drillers Services, Inc. AMOUNT: 6 bags PLACEMENT: 11.68 feet		
BOTTOM OF RISER/TOP OF SCREEN	-22.88	568.87
SCREEN (10.0') 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	-32.88	558.87
BOTTOM OF CASING	-33.28	558.47

Elevation in NAVD 88.

Log updated with revised survey certified 5/11/2020.

S&ME

TEST BORING RECORD

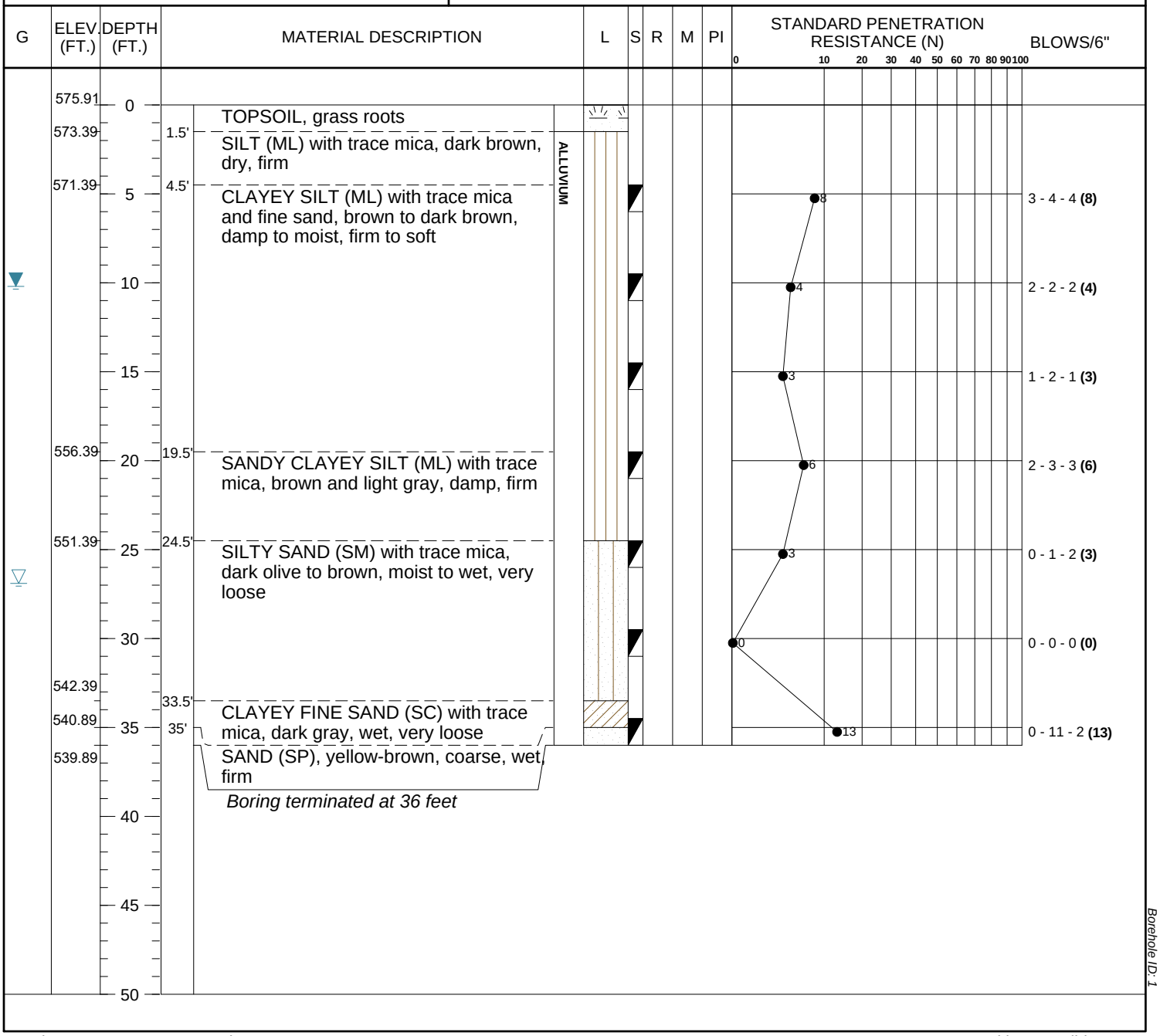
BORING NO.: HGWC-101

PROJECT: Plant Hammond Ash Pond #4 Well Installation		JOB NO: 1811-12-153	SHEET 1 OF 1
PROJECT LOCATION: Rome, Georgia			
ELEVATION: 575.91 feet	BORING STARTED: 8/7/2012	RIG TYPE: CME-55	AUGER DIA. (IN): 6.75
DRILLING METHOD: Hollow-Stem Augers	BORING COMPLETED: 8/7/2012	HAMMER: Automatic	

GROUNDWATER:
- 26.9 feet ATD
- 10.2 feet on 8/7/12

Remarks: Monitoring well set at 34.7 feet below ground surface

Elevation in NAVD 88.



BORING SOUTHERN 12-153.GPJ S&ME 1-18-2012.GDT 9/18/12

Borehole ID: 1

Project Manager: J. Heywood, PE

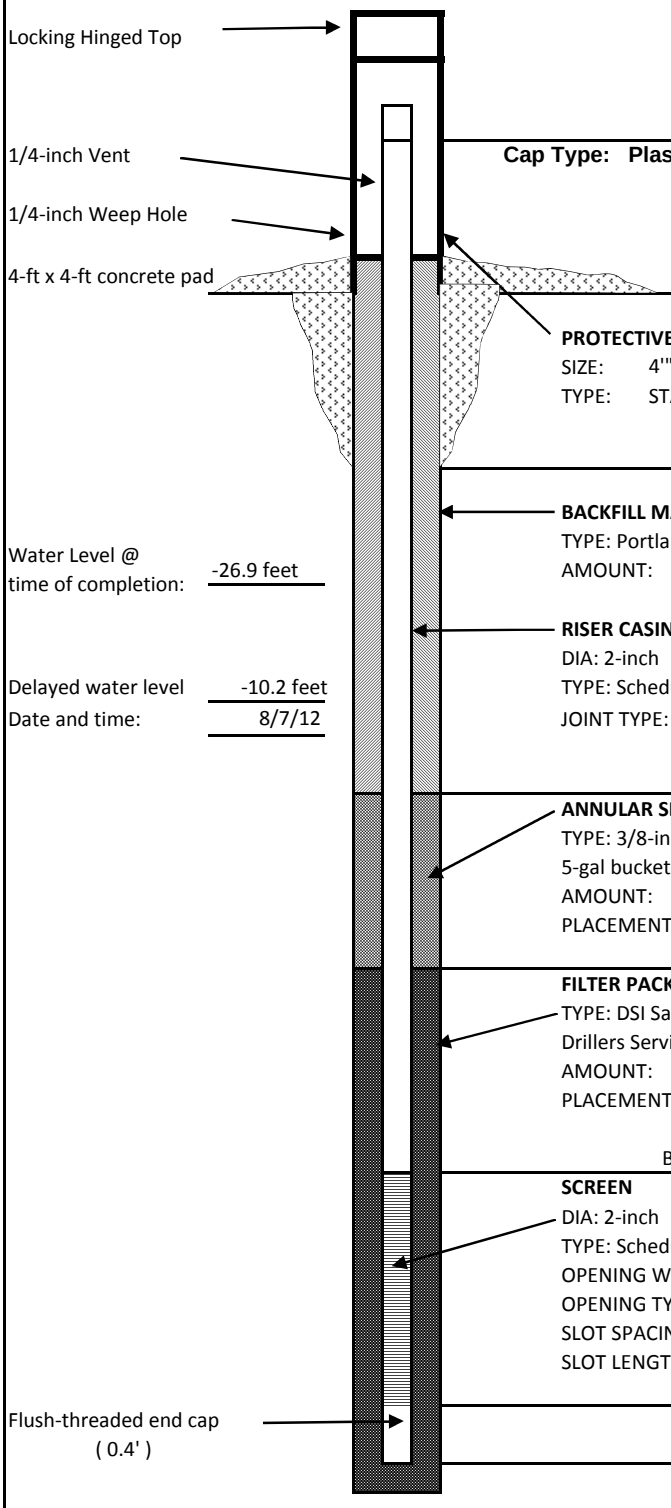
Logged by: P. Gribben, PG

Log updated with revised survey certified 5/11/2020.

GEORGIA POWER PLANT HAMMOND ASH POND #4
ROME, GEORGIA

WELL CONSTRUCTION LOG

CLIENT: SOUTHERN COMPANY	WELL ID:
DRILLED BY: CHAD ODOM (S&ME) LOGGED BY: PAT GRIBBEN (S&ME)	**HGWC-101**
RIG TYPE: CME-55 DRILLING METHOD: 4.25" HOLLOW STEM AUGERS	
DATE CONSTRUCTED: August 7, 2012	



	DEPTH FEET	ELEVATION FEET
TOP OF RISER	3.24	578.85
Cap Type: Plastic Locking		
TOP OF NAIL	0.30	575.91
GROUND SURFACE	0.0	575.61
PROTECTIVE CASING SIZE: 4'" x 4" x 5' TYPE: STAINLESS STEEL LOCKING		
BOTTOM OF PROTECTIVE CASING	-1.25	574.36
BACKFILL MATERIAL TYPE: Portland Cement Grout AMOUNT: 26 gallons		
RISER CASING DIA: 2-inch TYPE: Schedule 40 PVC JOINT TYPE: Flush Threaded		
TOP OF SEAL	-19.2	556.41
ANNULAR SEAL TYPE: 3/8-inch coated bentonite pellets 5-gal buckets AMOUNT: 50 lbs PLACEMENT: 2.8 feet		
TOP OF FILTER PACK	-22.0	553.91
FILTER PACK TYPE: DSI Sand - 1A (20/30) Drillers Services, Inc. AMOUNT: 6 bags PLACEMENT: 12.7 feet		
BOTTOM OF RISER/TOP OF SCREEN	-24.3	551.31
SCREEN (10.0') 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	-34.3	541.31
BOTTOM OF CASING	-34.7	540.91

Elevation in NAVD 88.

Log updated with revised survey certified 5/11/2020.

BORING NO.: HGWC-102

TEST BORING RECORD

PROJECT: Plant Hammond Ash Pond #4 Well Installation		JOB NO: 1811-12-153	SHEET 1 OF 1
PROJECT LOCATION: Rome, Georgia			
ELEVATION: 574.54 feet	BORING STARTED: 8/7/2012	RIG TYPE: CME-550	AUGER DIA. (IN): 6.75
DRILLING METHOD: Hollow-Stem Augers	BORING COMPLETED: 8/7/2012	HAMMER: Automatic	

GROUNDWATER:
- 11.9 feet ATD
- 10.15 feet on 8/15/12

Remarks: Monitoring well set at 34.1 feet below ground surface

Elevation in NAVD 88.

G	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	L	S	R	M	PI	STANDARD PENETRATION RESISTANCE (N) BLOWS/6"
	574.54	0	SILT (ML) with trace mica, dark brown, dry, soft — ALLUVIUM						
	565.04	9.5'	CLAYEY SILT (ML) with trace mica and fine sand, brown, very moist, soft to very soft						2 - 2 - 2 **(4)**; 0 - 0 - 2 **(2)**; 0 - 0 - 0 **(0)**
	555.04	19.5'	SILTY SAND (SM) with trace mica, brown, moist to damp, very loose						1 - 0 - 1 **(1)**
	548.54	26'	CLAYEY FINE SAND (SC) with trace mica, dark gray, moist to wet, very loose						0 - 0 - 2 **(2)**
	543.34	31.2'	Saturated wood at 31'						7 - 2 - 2 **(4)**
	538.54		SAND (SP), coarse to medium, brown to yellow-brown, very firm						7 - 13 - 9 **(22)**
			Clayey silt and weathered shale, green-gray at 36'						
			Boring terminated at 36 feet						

BORING RECORD S&ME 12-153.GPJ S&ME 1-18-2012.GDT 10/22/12

Borehole ID: 2

Project Manager: J. Heywood, PE

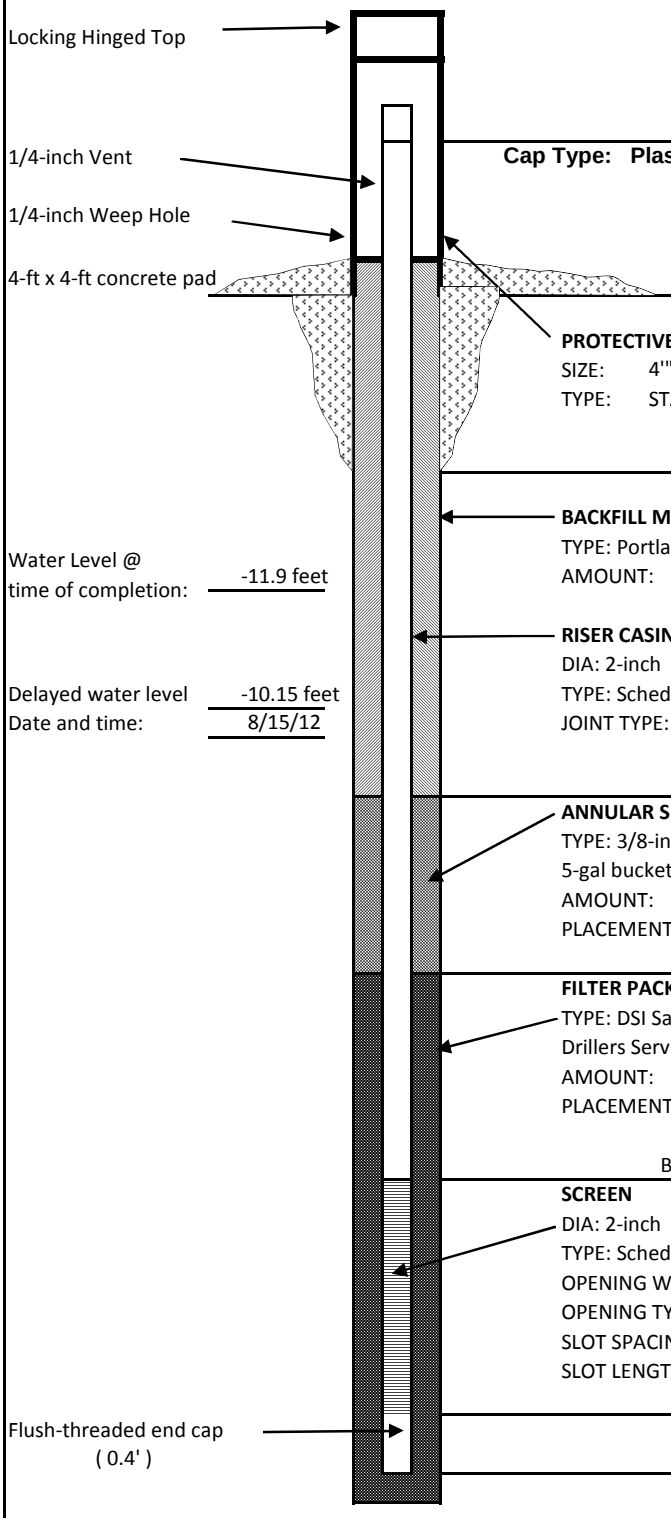
Logged by: P. Gribben, PG

Log updated with revised survey certified 5/11/2020.

GEORGIA POWER PLANT HAMMOND ASH POND #4
ROME, GEORGIA

WELL CONSTRUCTION LOG

CLIENT: SOUTHERN COMPANY	WELL ID: HGWC-102
DRILLED BY: Sean Denty (Southern Co.) LOGGED BY: PAT GRIBBEN (S&ME)	
RIG TYPE: CME-550 DRILLING METHOD: 4.25" HOLLOW STEM AUGERS	
DATE CONSTRUCTED: August 7, 2012	



	DEPTH FEET	ELEVATION FEET
TOP OF RISER	3.33	577.54
Cap Type: Plastic Locking		
TOP OF NAIL	0.33	574.54
GROUND SURFACE	0.0	574.21
PROTECTIVE CASING SIZE: 4'" x 4" x 5' TYPE: STAINLESS STEEL LOCKING		
BOTTOM OF PROTECTIVE CASING	-1.35	572.86
BACKFILL MATERIAL TYPE: Portland Cement Grout AMOUNT: 51 gallons		
RISER CASING DIA: 2-inch TYPE: Schedule 40 PVC JOINT TYPE: Flush Threaded		
TOP OF SEAL	-18.2	556.01
ANNULAR SEAL TYPE: 3/8-inch coated bentonite pellets 5-gal buckets AMOUNT: 50 lbs PLACEMENT: 2.7 feet		
TOP OF FILTER PACK	-20.9	553.31
FILTER PACK TYPE: DSI Sand - 1A (20/30) Drillers Services, Inc. AMOUNT: 6.5 bags PLACEMENT: 13.2 feet		
BOTTOM OF RISER/TOP OF SCREEN	-23.7	550.51
SCREEN (10.0') 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	-33.7	540.51
BOTTOM OF CASING	-34.1	540.11

Elevation in NAVD 88.

Log updated with revised survey certified 5/11/2020.

BORING NO.: HGWC-103

TEST BORING RECORD

PROJECT: Plant Hammond Ash Pond #4 Well Installation		JOB NO: 1811-12-153	SHEET 1 OF 1
PROJECT LOCATION: Rome, Georgia			
ELEVATION: 577.76 feet	BORING STARTED: 8/7/2012	RIG TYPE: CME-55	AUGER DIA. (IN): 6.75
DRILLING METHOD: Hollow-Stem Augers	BORING COMPLETED: 8/7/2012	HAMMER: Automatic	

GROUNDWATER:
- 11.5 feet ATD
- 12.60 feet on 8/16/12

Remarks: Monitoring well set at 34.3 feet below ground surface

Elevation in NAVD 88.

G	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	L	S	R	M	PI	STANDARD PENETRATION RESISTANCE (N) BLOWS/6"
	577.8	0	0.4' TOPSOIL, grass, roots						
			SILT (ML) with trace mica, dark brown to brown, dry, stiff	ALLUVIUM					
	571.5	5	6' CLAYEY SILT (ML) with trace mica, brown and light gray, damp to moist, stiff to firm						2 - 4 - 5 **(9)**
		10							7 - 5 - 4 **(9)**
		15							2 - 3 - 4 **(7)**
	557.5	20	20' CLAYEY SILT (ML) with trace mica and fine sand, brown, moist, soft						2 - 2 - 2 **(4)**
	552.5	25	25' CLAYEY FINE SAND (SC), micaceous, brown, moist, very loose						1 - 1 - 1 **(2)**
	548.0	30	29.5' SANDY CLAYEY SILT (MH), organic with trace mica and shell fragments, dark gray, moist, very soft						0 - 0 - 0 **(0)**
	543.0	35	34.5' SAND (SP), medium to coarse, yellow-brown, wet, firm						6 - 8 - 7 **(15)**
	541.5		*Boring terminated at 36 feet*						
		40							
		45							
		50							

STANDARD PENETRATION RESISTANCE (N) scale: 0 10 20 30 40 50 60 70 80 90 100

BORING RECORD S&ME 12-153.GPJ S&ME 1-18-2012.GDT 10/22/12

Borehole ID: 3

Project Manager: J. Heywood, PE

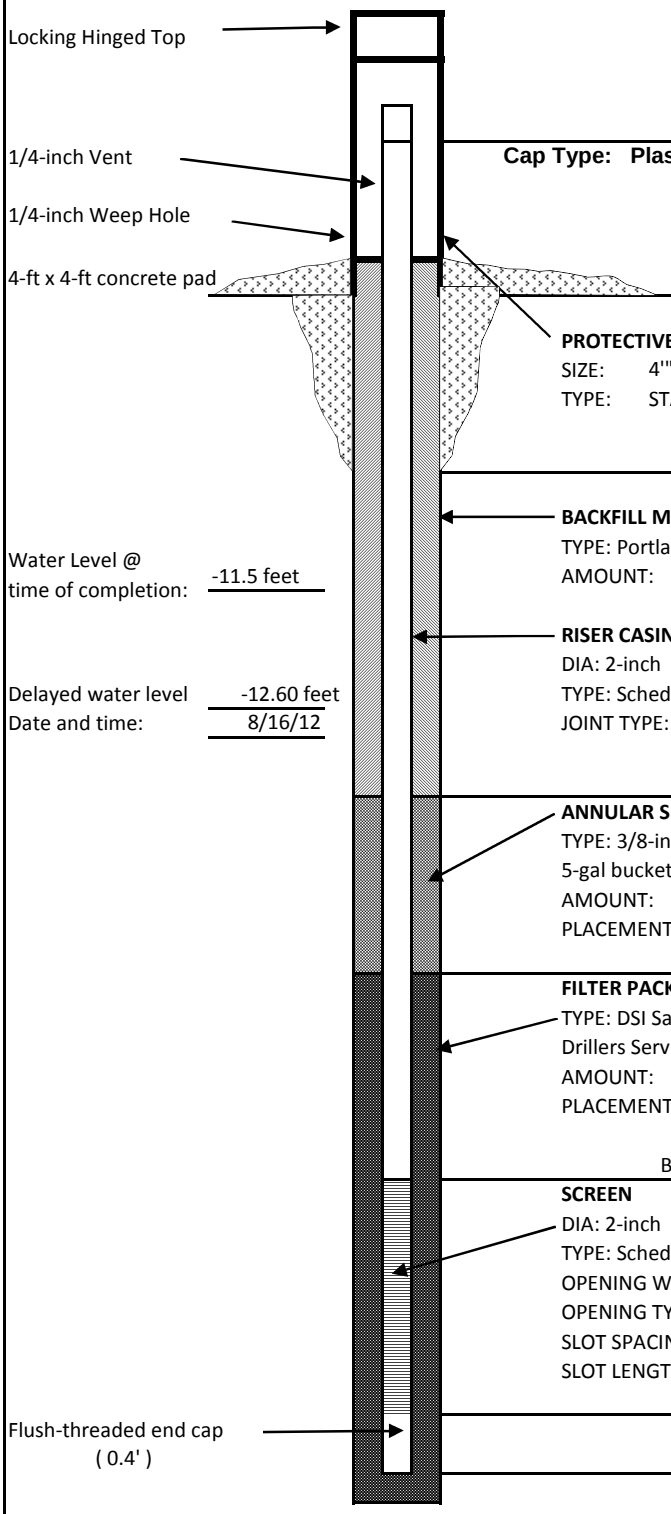
Logged by: P. Gribben, PG

Log updated with revised survey certified 5/11/2020.

GEORGIA POWER PLANT HAMMOND ASH POND #4
ROME, GEORGIA

WELL CONSTRUCTION LOG

CLIENT: SOUTHERN COMPANY		WELL ID:
DRILLED BY: Chad Odom (S&ME)	LOGGED BY: PAT GRIBBEN (S&ME)	**HGWC-103**
RIG TYPE: CME-55	DRILLING METHOD: 4.25" HOLLOW STEM AUGERS	
DATE CONSTRUCTED: August 8, 2012		



	DEPTH FEET	ELEVATION FEET
TOP OF RISER	3.38	580.79
Cap Type: Plastic Locking		
TOP OF NAIL	0.35	577.76
GROUND SURFACE	0.0	577.41
PROTECTIVE CASING SIZE: 4'" x 4" x 5' TYPE: STAINLESS STEEL LOCKING		
BOTTOM OF PROTECTIVE CASING	-1.3	576.11
BACKFILL MATERIAL TYPE: Portland Cement Grout AMOUNT: 43 gallons		
RISER CASING DIA: 2-inch TYPE: Schedule 40 PVC JOINT TYPE: Flush Threaded		
TOP OF SEAL	-19.7	557.71
ANNULAR SEAL TYPE: 3/8-inch coated bentonite pellets 5-gal buckets AMOUNT: 50 lbs PLACEMENT: 2.2 feet		
TOP OF FILTER PACK	-21.9	555.88
FILTER PACK TYPE: DSI Sand - 1A (20/30) Drillers Services, Inc. AMOUNT: 5.5 bags PLACEMENT: 12.4 feet		
BOTTOM OF RISER/TOP OF SCREEN	-23.9	553.51
SCREEN (10.0') 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	-33.9	543.51
BOTTOM OF CASING	-34.3	543.11

Elevation in NAVD 88.

Log updated with revised survey certified 5/11/2020.

BORING NO.: HGWC-105

TEST BORING RECORD

PROJECT: Plant Hammond Ash Pond #4 Well Installation		JOB NO: 1811-12-153	SHEET 1 OF 1
PROJECT LOCATION: Rome, Georgia			
ELEVATION: 579.08 feet	BORING STARTED: 8/8/2012	RIG TYPE: CME-55	AUGER DIA. (IN): 6.75
DRILLING METHOD: Hollow-Stem Augers	BORING COMPLETED: 8/8/2012	HAMMER: Automatic	

GROUNDWATER:
- 18 feet ATD
- 15.12 feet on 8/16/12

Remarks: Monitoring well set at 41.4 feet below ground surface

Elevation in NAVD 88.

G	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	L	S	R	M	PI	STANDARD PENETRATION RESISTANCE (N) BLOWS/6"
	579.08	0	0.1' TOPSOIL, grass, roots SILT (ML) with trace mica and fine sand, brown to light brown, damp, firm	ALLUVIUM					2 - 3 - 4 **(7)**
		5							
		10							2 - 2 - 3 **(5)**
	567.1		12' Undisturbed sample						
	565.0	15	14' CLAYEY SILT (ML) with trace mica and fine sand, light brown, moist, soft						0 - 1 - 2 **(3)**
	561.0	20	18' SILTY CLAY (CH) with trace mica, brown, wet, very soft						0 - 0 - 0 **(0)**
	555.0	25	24' CLAYEY SILT (MH) with trace mica and fine sand, light brown, wet, very soft						0 - 0 - 0 **(0)**
	551.0	30	28' CLAYEY FINE SAND (SC) with trace mica, dark gray, wet, very loose						0 - 1 - 2 **(3)**
	543.5	35	35.5' SAND (SP) intermittent layers of yellow-brown coarse sand and light brown medium sand, wet, firm						0 - 2 - 6 **(8)**
	538.7	40	40.3' WEATHERED SHALE with clayey silt, yellow-brown, moist, stiff - RESIDUUM	RES.					5 - 6 - 8 **(14)**
	538.0	45	*Boring terminated at 41 feet*						
		50							

BORING RECORD S&ME 12-153.GPJ S&ME 1-18-2012.GDT 10/22/12

Borehole ID: 5

Project Manager: J. Heywood, PE

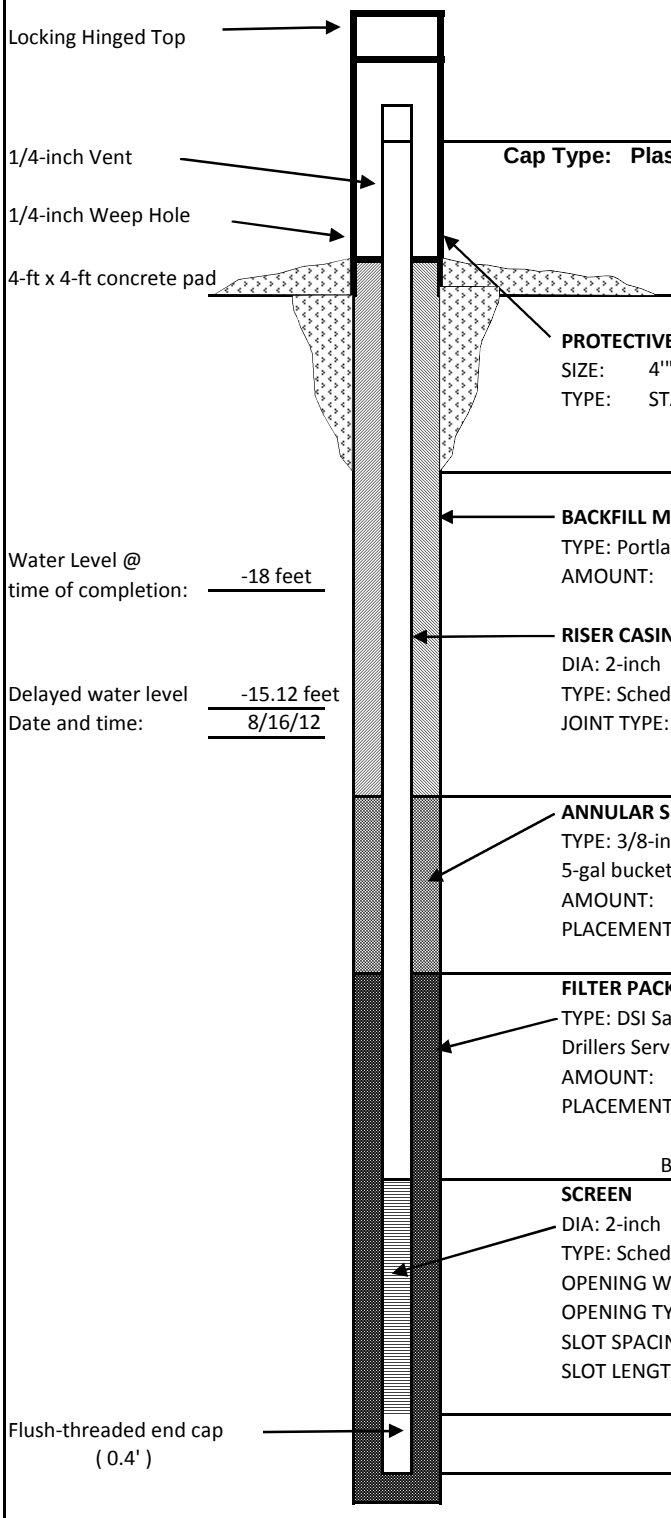
Logged by: P. Gribben, PG

Log updated with revised survey certified 5/11/2020.

GEORGIA POWER PLANT HAMMOND ASH POND #4
ROME, GEORGIA

WELL CONSTRUCTION LOG

CLIENT: SOUTHERN COMPANY		WELL ID:
DRILLED BY: Chad Odom (S&ME)	LOGGED BY: PAT GRIBBEN (S&ME)	**HGWC-105**
RIG TYPE: CME-55	DRILLING METHOD: 4.25" HOLLOW STEM AUGERS	
DATE CONSTRUCTED: August 8, 2012		



	DEPTH FEET	ELEVATION FEET
TOP OF RISER	(3.37)	582.09
Cap Type: Plastic Locking		
TOP OF NAIL	0.36	579.08
GROUND SURFACE	0.0	578.72
PROTECTIVE CASING SIZE: 4'" x 4" x 5' TYPE: STAINLESS STEEL LOCKING		
BOTTOM OF PROTECTIVE CASING	-1.45	577.27
BACKFILL MATERIAL TYPE: Portland Cement Grout AMOUNT: 55 gallons		
RISER CASING DIA: 2-inch TYPE: Schedule 40 PVC JOINT TYPE: Flush Threaded		
TOP OF SEAL	-25.0	553.72
ANNULAR SEAL TYPE: 3/8-inch coated bentonite pellets 5-gal buckets AMOUNT: 50 lbs PLACEMENT: 2 feet		
TOP OF FILTER PACK	-27.0	552.09
FILTER PACK TYPE: DSI Sand - 1A (20/30) Drillers Services, Inc. AMOUNT: 5.5 bags PLACEMENT: 14.4 feet		
BOTTOM OF RISER/TOP OF SCREEN	-31.0	547.72
SCREEN (10.0') 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	-41.0	537.72
BOTTOM OF CASING	-41.3	537.42

Elevation in NAVD 88.

Log updated with revised survey certified 5/11/2020.

BORING NO.: HGWC-107

TEST BORING RECORD

PROJECT: Plant Hammond Ash Pond #4 Well Installation		JOB NO: 1811-12-153	SHEET 1 OF 1
PROJECT LOCATION: Rome, Georgia			
ELEVATION: 576.43feet	BORING STARTED: 8/8/2012	RIG TYPE:CME-55	AUGER DIA. (IN): 6.75
DRILLING METHOD: Hollow-Stem Augers	BORING COMPLETED: 8/8/2012	HAMMER: Automatic	

GROUNDWATER:
- 14.5 feet ATD
- 12.35 feet on 8/14/12

Remarks: Monitoring well set at 35.0 feet below ground surface
Elevation in NAVD 88.

G	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	L	S	R	M	PI	STANDARD PENETRATION RESISTANCE (N) BLOWS/6"
	576.4	0	0.3' TOPSOIL, roots, grass SILT (ML) with trace mica and fine sand, brown, damp, firm	ALLUVIUM					
	566.9	10	9.5' SILTY FINE SAND (SM), with trace mica, light brown to brown, damp, loose						3 - 4 - 3 **(7)**
	561.9	15	14.5' CLAYEY FINE SAND (SC) with trace mica, brown, wet, very loose						3 - 3 - 2 **(5)**
	557.9	20	19.5' SAND (SP), medium to fine with trace mica, brown, wet, very loose						2 - 2 - 2 **(4)**
	551.9	25	24.5' CLAYEY FINE SAND (SC), brown to light brown, wet, very loose						1 - 2 - 2 **(4)**
	546.4	30	30' SAND (SP) with some gravel increasing with depth, medium to coarse, yellow-brown, wet, very firm to dense						2 - 2 - 2 **(4)**
	540.4	35	*Boring terminated at 36 feet*						6 - 12 - 11 **(23)**
		40							12 - 19 - 24 **(43)**
		45							
		50							

BORING RECORD S&ME 12-153.GPJ S&ME 1-18-2012.GDT 10/22/12

Borehole ID: 7

Project Manager: J. Heywood, PE

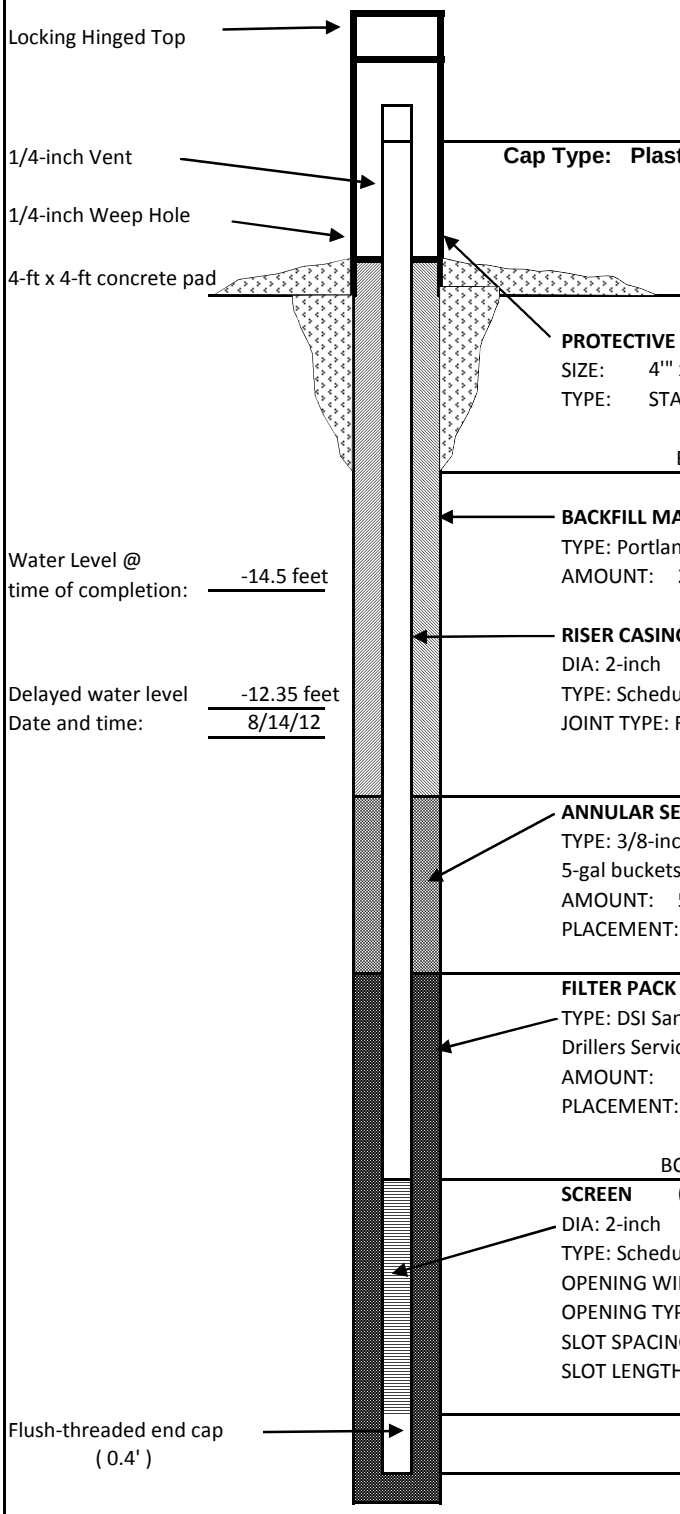
Logged by: P. Gribben, PG

Log updated with revised survey certified 5/11/2020.

GEORGIA POWER PLANT HAMMOND ASH POND #4
ROME, GEORGIA

WELL CONSTRUCTION LOG

CLIENT: SOUTHERN COMPANY		WELL ID:
DRILLED BY: Chad Odom (S&ME)	LOGGED BY: PAT GRIBBEN (S&ME)	**HGWC-107**
RIG TYPE: CME-55	DRILLING METHOD: 4.25" HOLLOW STEM AUGERS	
DATE CONSTRUCTED: August 8, 2012		



	DEPTH FEET	ELEVATION FEET
TOP OF RISER	3.2	579.31
Cap Type: Plastic Locking		
TOP OD NAIL	0.32	576.43
GROUND SURFACE	0.0	576.11
PROTECTIVE CASING SIZE: 4'" x 4" x 5' TYPE: STAINLESS STEEL LOCKING		
BOTTOM OF PROTECTIVE CASING	-1.5	574.61
BACKFILL MATERIAL TYPE: Portland Cement Grout AMOUNT: 22 gallons		
RISER CASING DIA: 2-inch TYPE: Schedule 40 PVC JOINT TYPE: Flush Threaded		
TOP OF SEAL	-20.0	556.11
ANNULAR SEAL TYPE: 3/8-inch coated bentonite pellets 5-gal buckets AMOUNT: 50 lbs PLACEMENT: 2 feet		
TOP OF FILTER PACK	-22.0	554.11
FILTER PACK TYPE: DSI Sand - 1A (20/30) Drillers Services, Inc. AMOUNT: 6.25 bags PLACEMENT: 13 feet		
BOTTOM OF RISER/TOP OF SCREEN	-24.6	551.51
SCREEN (10.0') 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	-34.6	541.51
BOTTOM OF CASING	-35	541.11

Elevation in NAVD 88.

Log updated with revised survey certified 5/11/2020.

BORING NO.: HGWC-109

TEST BORING RECORD

PROJECT: Plant Hammond Ash Pond #4 Well Installation		JOB NO: 1811-12-153	SHEET 1 OF 1
PROJECT LOCATION: Rome, Georgia			
ELEVATION: 573.66 feet	BORING STARTED: 8/14/2012	RIG TYPE: CME-55	AUGER DIA. (IN): 6.75
DRILLING METHOD: Hollow-Stem Augers	BORING COMPLETED: 8/14/2012	HAMMER: Automatic	

GROUNDWATER:
- 24.5 feet ATD
- 6.0 feet on 8/16/12

Remarks: Monitoring well set at 27.9 feet below ground surface

Elevation in NAVD 88.

G	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	L	S	R	M	PI	STANDARD PENETRATION RESISTANCE (N) BLOWS/6"
	573.6	0	0.4' TOPSOIL, grass, roots						
			SILTY CLAY (CH) with scattered angular pebbles, orange-brown, damp	FILL					
	569.1	5	4.5' SILTY CLAY (OH), organic, with trace mica, dark gray-brown, damp to moist, soft	ALLUVIUM					2 - 1 - 2 **(3)**
	563.9	10	9.7' CLAYEY SILT (MH) with trace mica, yellow-brown and gray with black oxidation staining, damp to moist (thin vertical zones of free water), firm						2 - 3 - 4 **(7)**
		15							2 - 3 - 4 **(7)**
		20							2 - 2 - 3 **(5)**
	549.1								
		25	24.5' SANDY SILT (MH) with trace mica, dark gray, wet, firm						0 - 0 - 7 **(7)**
	548.1		25.5' SAND AND GRAVEL (SP-GP) with silt, poorly sorted, angular to rounded, coarse, brown to gray, wet, loose to very firm						
	542.6	30	*Boring terminated at 31 feet*						11 - 12 - 13 **(25)**
		35							
		40							
		45							
		50							

BORING RECORD S&ME 12-153.GPJ S&ME 1-18-2012.GDT 10/22/12

Borehole ID: 9

Project Manager: J. Heywood, PE

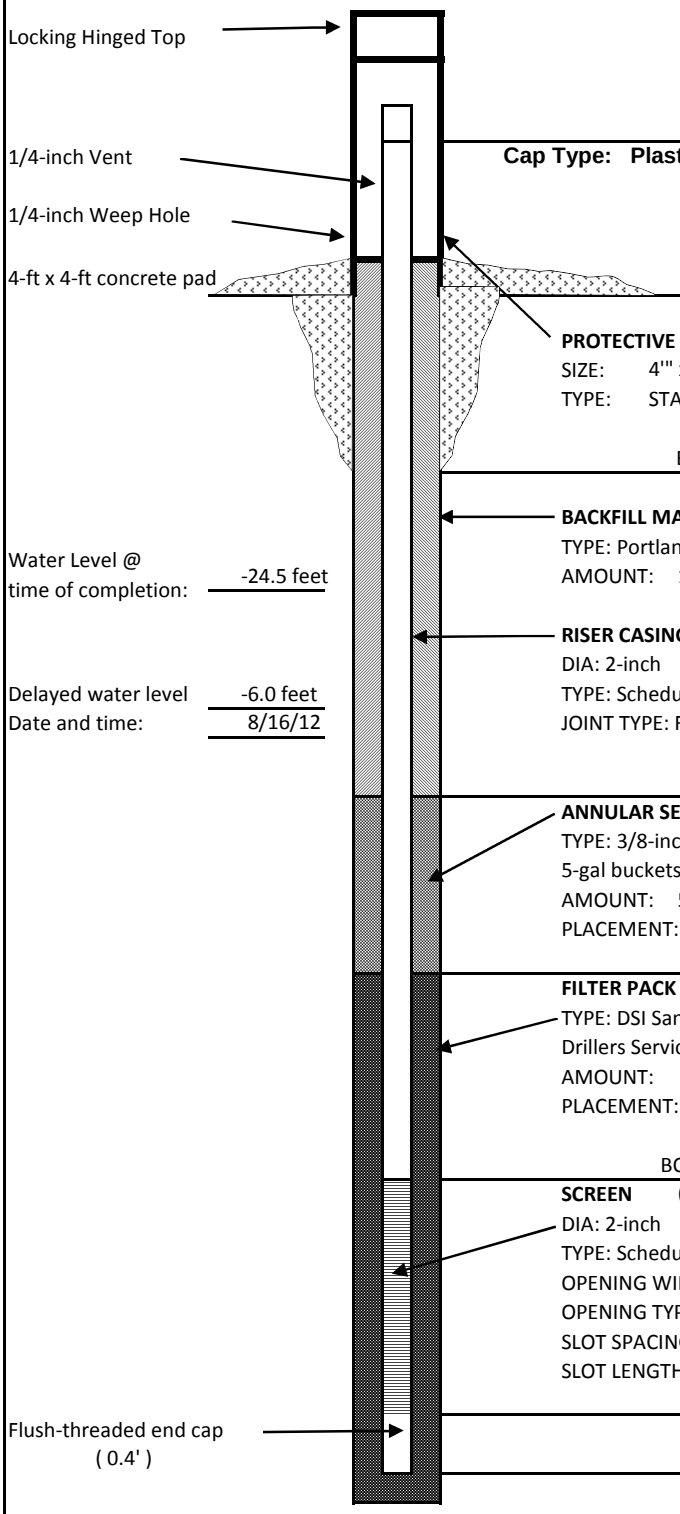
Logged by: P. Gribben, PG

Log updated with revised survey certified 5/11/2020.

GEORGIA POWER PLANT HAMMOND ASH POND #4
ROME, GEORGIA

WELL CONSTRUCTION LOG

CLIENT: SOUTHERN COMPANY		WELL ID:
DRILLED BY: Chad Odom (S&ME)	LOGGED BY: PAT GRIBBEN (S&ME)	**HGWC-109**
RIG TYPE: CME-55	DRILLING METHOD: 4.25" HOLLOW STEM AUGERS	
DATE CONSTRUCTED: August 15, 2012		



	DEPTH FEET	ELEVATION FEET
TOP OF RISER	3.46	576.77
Cap Type: Plastic Locking		
TOP OF NAIL	0.35	573.66
GROUND SURFACE	0.0	573.31
PROTECTIVE CASING SIZE: 4'" x 4" x 5' TYPE: STAINLESS STEEL LOCKING		
BOTTOM OF PROTECTIVE CASING	-1.3	572.01
BACKFILL MATERIAL TYPE: Portland Cement Grout AMOUNT: 13.5 gallons		
RISER CASING DIA: 2-inch TYPE: Schedule 40 PVC JOINT TYPE: Flush Threaded		
TOP OF SEAL	-13.4	559.91
ANNULAR SEAL TYPE: 3/8-inch coated bentonite pellets 5-gal buckets AMOUNT: 50 lbs PLACEMENT: 2.1 feet		
TOP OF FILTER PACK	-15.5	557.81
FILTER PACK TYPE: DSI Sand - 1A (20/30) Drillers Services, Inc. AMOUNT: 7 bags PLACEMENT: 12.4 feet		
BOTTOM OF RISER/TOP OF SCREEN	-17.5	555.81
SCREEN (10.0') 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	-27.5	545.81
BOTTOM OF CASING	-27.9	545.41

Elevation in NAVD 88.

Log updated with revised survey certified 5/11/2020.

BORING NO.: HGWC-117

TEST BORING RECORD

PROJECT: Plant Hammond Ash Pond #4 Well Installation		JOB NO: 1811-12-153	SHEET 1 OF 1
PROJECT LOCATION: Rome, Georgia			
ELEVATION: 579.31 feet	BORING STARTED: 8/14/2012	RIG TYPE: CME-55	AUGER DIA. (IN): 6.75
DRILLING METHOD: Hollow-Stem Augers	BORING COMPLETED: 8/14/2012	HAMMER: Automatic	

GROUNDWATER:
- 18.5 feet ATD
- 13.70 feet on 8/20/12

Remarks: Monitoring well set at 37.3 feet below ground surface

Elevation in NAVD 88.

G	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	L	S	R	M	PI	STANDARD PENETRATION RESISTANCE (N) BLOWS/6"
	579.3	0	0.3' TOPSOIL, grass, roots CLAYEY SILT (ML) yellow-brown, gray, and brown, damp, stiff	ALLUVIUM					5 - 7 - 8 **(15)**
	572.3	5	7' SANDY SILT (ML) with trace mica, yellow-brown, damp to moist, firm						2 - 3 - 3 **(6)**
▼	563.7	10	15' CLAYEY FINE SAND (SC) with trace mica, yellow-brown to light brown, moist to wet, loose to very loose, visible layering from 29.5-35.5						2 - 2 - 2 **(4)**
▽		15							2 - 3 - 4 **(7)**
		20							0 - 0 - 2 **(2)**
		25							1 - 2 - 1 **(3)**
	543.2	30	35.5' SAND AND GRAVEL (SP-GP) medium to coarse angular to rounded, brown to yellow-brown, wet, very firm						13 - 13 - 17 **(30)**
	538.6	35	40.7' CLAYEY SILT (ML)/WEATHERED SHALE, dark brown, wet, very stiff	RESIDUUM					4 - 17 - 4 **(21)**
	538.3	40	*Boring terminated at 41 feet*						
		45							
		50							

BORING RECORD S&ME 12-153.GPJ S&ME 1-18-2012.GDT 10/22/12

Borehole ID: 17

Project Manager: J. Heywood, PE

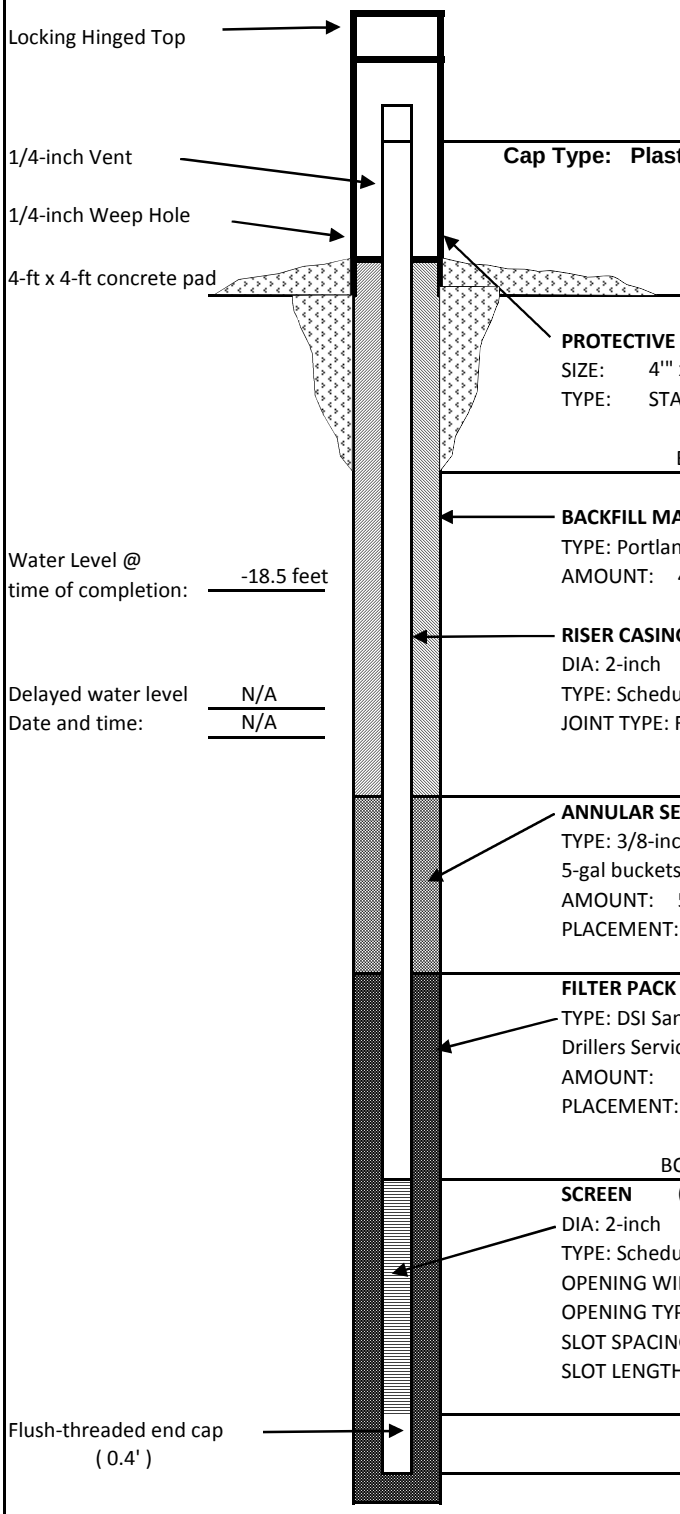
Logged by: P. Gribben, PG

Log updated with revised survey certified 5/11/2020.

GEORGIA POWER PLANT HAMMOND ASH POND #4
ROME, GEORGIA

WELL CONSTRUCTION LOG

CLIENT: SOUTHERN COMPANY		WELL ID:
DRILLED BY: Chad Odom (S&ME)	LOGGED BY: PAT GRIBBEN (S&ME)	**HGWC-117**
RIG TYPE: CME-55	DRILLING METHOD: 4.25" HOLLOW STEM AUGERS	
DATE CONSTRUCTED: August 14, 2012		



	DEPTH FEET	ELEVATION FEET
TOP OF RISER	2.96	581.98
Cap Type: Plastic Locking		
GROUND SURFACE	0.29	579.31
GROUND SURFACE	0.0	579.02
PROTECTIVE CASING SIZE: 4'" x 4" x 5' TYPE: STAINLESS STEEL LOCKING		
BOTTOM OF PROTECTIVE CASING	-1.5	577.52
BACKFILL MATERIAL TYPE: Portland Cement Grout AMOUNT: 41 gallons		
RISER CASING DIA: 2-inch TYPE: Schedule 40 PVC JOINT TYPE: Flush Threaded		
TOP OF SEAL	-21.7	557.32
ANNULAR SEAL TYPE: 3/8-inch coated bentonite pellets 5-gal buckets AMOUNT: 50 lbs PLACEMENT: 3.2 feet		
TOP OF FILTER PACK	-24.9	554.12
FILTER PACK TYPE: DSI Sand - 1A (20/30) Drillers Services, Inc. AMOUNT: 6 bags PLACEMENT: 12.4 feet		
BOTTOM OF RISER/TOP OF SCREEN	-26.9	552.12
SCREEN (10.0') 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	-36.9	542.12
BOTTOM OF CASING	-37.3	541.72

Elevation in NAVD 88.

Log updated with revised survey certified 5/11/2020.

BORING NO.: HGWC-118

TEST BORING RECORD

PROJECT: Plant Hammond Ash Pond #4 Well Installation		JOB NO: 1811-12-153	SHEET 1 OF 1
PROJECT LOCATION: Rome, Georgia			
ELEVATION: 576.52 feet	BORING STARTED: 10/1/2012	RIG TYPE: CME-550	AUGER DIA. (IN): 6¼
DRILLING METHOD: Hollow Stem Augers	BORING COMPLETED: 10/1/2012	HAMMER: Automatic	

GROUNDWATER:
- 20 feet ATD
- 13.85 feet on 10/3/12

Remarks: Monitoring well set at 38.2 feet below ground surface

Elevation in NAVD 88.

G	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	L	S	R	M	PI	STANDARD PENETRATION RESISTANCE (N) BLOWS/6"
	576.5	0	0.5' CRUSHED LIMESTONE						
			SILTY CLAY-CLAYEY SILT (CL-ML) with trace mica, red-brown to orange-brown, damp to moist, stiff — ALLUVIUM						3 - 4 - 5 **(9)**
		5							
		10							4 - 5 - 6 **(11)**
	561.7	15	15' CLAYEY SILT (ML) with trace mica, orange-brown, moist, firm						3 - 3 - 5 **(8)**
	557.4	20	19.5' SANDY CLAYEY SILT (ML) with trace mica, orange-brown, wet, soft						1 - 1 - 1 **(2)**
	552.0	25	24.5' SILTY FINE SAND (SM) with trace mica, orange-brown, wet, very loose						2 - 1 - 2 **(3)**
	547.2	30	29.3' SAND (SW) well sorted, medium and coarse grained with trace mica, dark brown to orange, dense						6 - 20 - 22 **(42)**
	541.4	35	35.1' SAND AND GRAVEL (SP-GP), brown, wet, firm						9 - 9 - 6 **(15)**
	535.7	40	40.8' Weathered gray dolomite with yellow-brown silty clay — RESIDUUM						29 - 7 - 50/1 **(50+)**
	533.5		*Boring terminated at 43 feet*						
		45							
		50							

BORING RECORD S&ME 12-153.GPJ S&ME 1-18-2012.GDT 10/22/12

Borehole ID: 18

Project Manager: J. Heywood, PE

Logged by: P. Gribben, PG

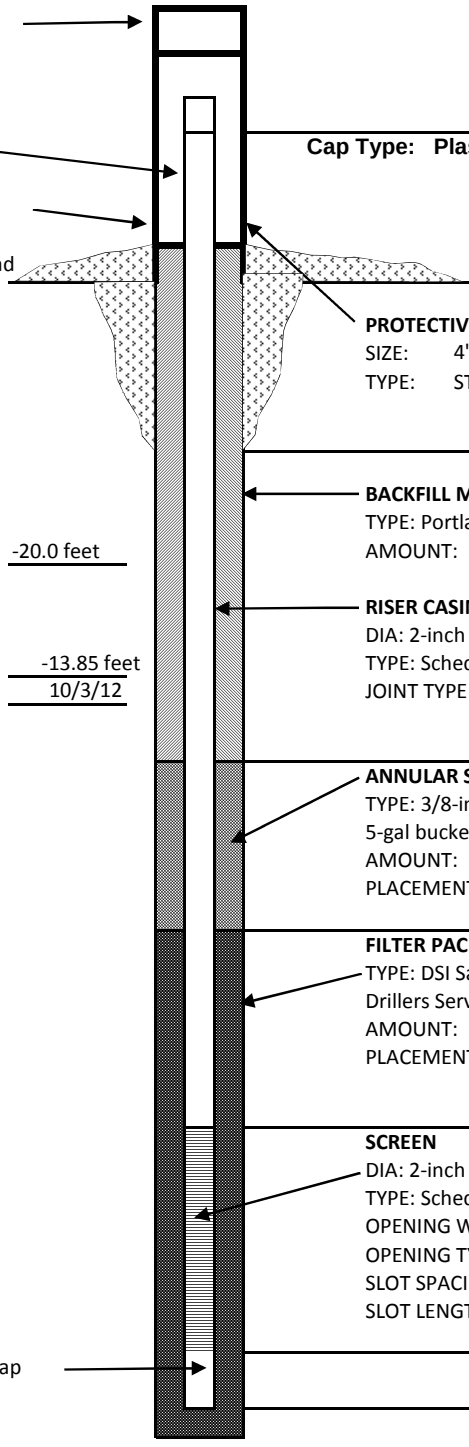
Log updated with revised survey certified 5/11/2020.

GEORGIA POWER PLANT HAMMOND ASH POND #4
ROME, GEORGIA

WELL CONSTRUCTION LOG

S&ME

CLIENT: SOUTHERN COMPANY	WELL ID:
DRILLED BY: Chad Odom (S&ME) LOGGED BY: PAT GRIBBEN (S&ME)	**HGWC-118**
RIG TYPE: CME-550 DRILLING METHOD: 4.25" HOLLOW STEM AUGERS	
DATE CONSTRUCTED: October 1, 2012	



	DEPTH FEET	ELEVATION FEET
TOP OF RISER	2.85	579.02
Cap Type: Plastic Locking		
TOP OF NAIL	0.35	576.52
GROUND SURFACE	0.0	576.17
PROTECTIVE CASING SIZE: 4'" x 4" x 5' TYPE: STAINLESS STEEL LOCKING		
BOTTOM OF PROTECTIVE CASING	-1.8	574.37
BACKFILL MATERIAL TYPE: Portland Cement Grout AMOUNT: 37.5 gallons		
RISER CASING DIA: 2-inch TYPE: Schedule 40 PVC JOINT TYPE: Flush Threaded		
TOP OF SEAL	-21.9	554.27
ANNULAR SEAL TYPE: 3/8-inch coated bentonite pellets 5-gal buckets AMOUNT: 50 lbs PLACEMENT: 4.1 feet		
TOP OF FILTER PACK	-26.0	550.17
FILTER PACK TYPE: DSI Sand - 1A (20/30) Drillers Services, Inc. AMOUNT: 6.5 bags PLACEMENT: 12.06 feet		
BOTTOM OF RISER/TOP OF SCREEN	-27.66	548.51
SCREEN (10.0') 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	-37.66	538.51
BOTTOM OF CASING	-38.06	538.11

Elevation in NAVD 88.

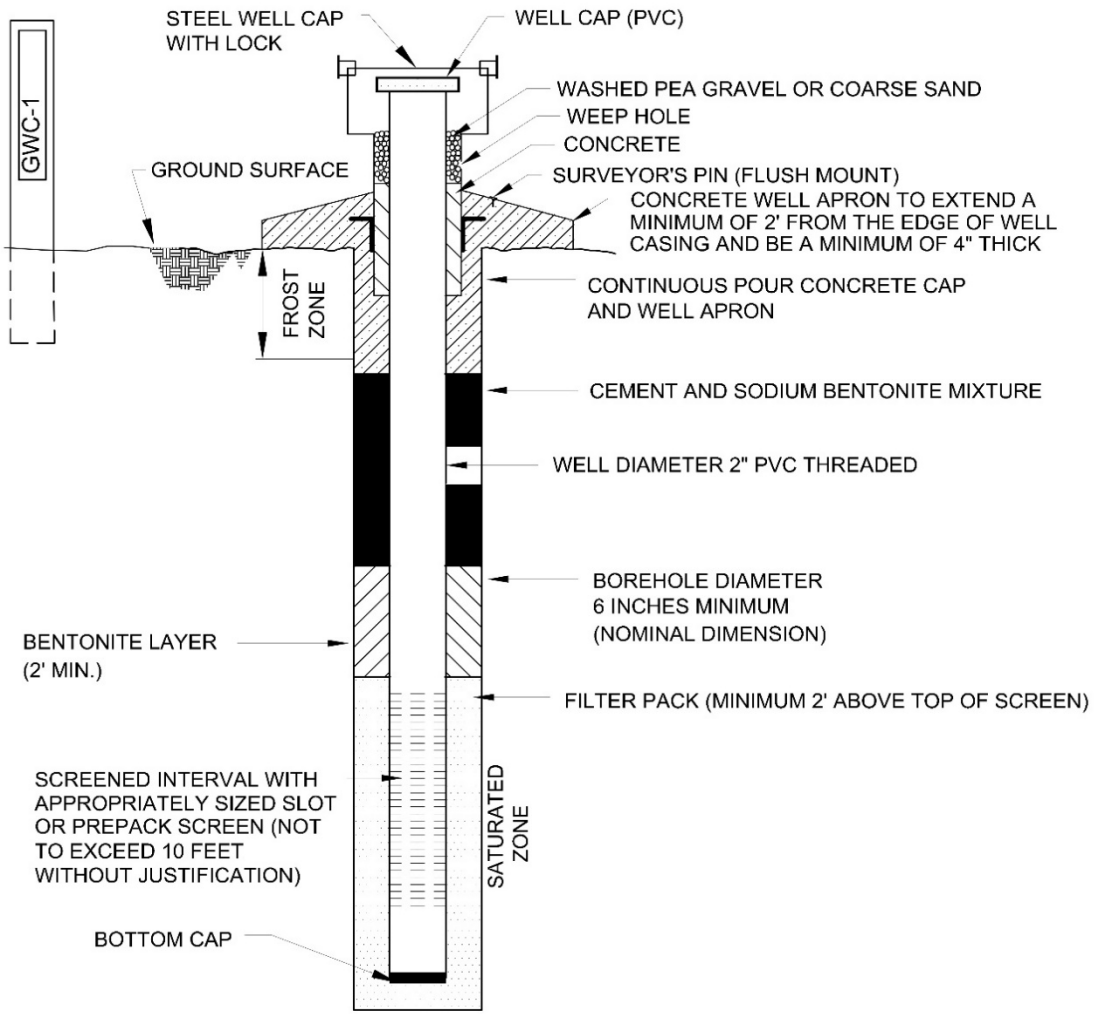
Well ID	Casing Northing	Casing Easting	Top of Casing Elevation	Nail on Pad Northing	Nail on Pad Easting	Nail on Pad Elevation
GWA-14	1548982.5890	1936642.5820	592.14	1548981.4550	1936642.2230	589.70
GWA-15	1548766.1700	1936808.4740	591.56	1548765.2100	1936807.8670	588.37
GWA-16	1548592.7400	1937210.9880	582.55	1548592.0540	1937209.9470	579.58
GWC-19	1547892.8940	1936572.9730	579.83	1547893.7790	1936572.0390	576.90
GWC-4	1547898.3050	1935398.6960	580.65	1547899.6900	1935398.5510	577.73
GWC-6	1547843.9320	1934800.4510	581.63	1547845.1020	1934800.3890	578.55
GWC-8	1548167.1270	1934342.9370	579.99	1548167.2960	1934344.1910	577.13
HGWA-111	1548834.2570	1935222.8050	591.75	1548833.1050	1935222.9840	588.79
HGWA-112	1548885.6280	1935646.9960	596.27	1548884.5350	1935647.2640	593.46
HGWA-113	1548944.6240	1935990.0870	594.58	1548943.4750	1935990.3010	592.07
HGWC-101	1547725.4970	1936369.5810	578.85	1547726.4760	1936369.0200	575.91
HGWC-102	1547713.5040	1936033.3300	577.54	1547714.8560	1936033.7180	574.54
HGWC-103	1547848.8830	1935732.9610	580.79	1547850.1990	1935733.3030	577.76
HGWC-105	1547855.5570	1935110.3560	582.09	1547856.9860	1935110.3600	579.08
HGWC-107	1547909.9900	1934442.2410	579.31	1547911.2040	1934442.9490	576.43
HGWC-109	1548627.4120	1934362.7670	576.77	1548627.0470	1934361.5230	573.66
HGWC-117	1548100.7710	1937180.4260	581.98	1548099.5300	1937180.3100	579.31
HGWC-118	1547980.5610	1936946.3660	579.02	1547981.8380	1936946.8290	576.52
MW-12	1547853.7790	1937525.4620	583.27	1547855.2080	1937525.2430	580.59

Benchmark	Northing	Easting	Elevation
BM H-1	1547964.9650	1937219.0690	579.02

SURVEY DATA CERTIFICATION FOR SOUTHERN COMPANY TO DETERMINE NORTHING, EASTING, AND VERTICAL ELEVATION OF THE NAIL IN THE CONCRETE PAD & THE PVC WELL CASING.
DATE OF FIELD SURVEY & INSPECTION: 05/04/2020-05/06/2020
FIELD SURVEY POSITIONAL TOLERANCE=0.5 FEET HORIZONTAL-NAD'83, 0.01 VERTICAL-NAVD'88
EQUIPMENT USED FOR HORIZONTAL LOCATION: TRIMBLE R10 RTK GPS & TRIMBLE S5 ROBOTIC TOTAL STATION.
THE VERTICAL LOCATION OF EACH SURVEYED POINT WAS ESTABLISHED BASED UPON LEVEL RUNS WITH A DIGITAL LEVEL LOOP FROM VERTICAL CONTROL ESTABLISHED BY ON-SITE BENCHMARK BM H-1 SET BY GEL SOLUTIONS USING A TRIMBLE DINI LEVEL

5/11/2020

B. GROUNDWATER MONITORING WELL DETAIL



GROUNDWATER MONITORING WELL (TYP.)

C. GROUNDWATER SAMPLING PROCEDURE

Groundwater sampling will be conducted using the most current applicable USEPA Region 4 SESD Field Branches Quality System and Technical Procedures as a guide (https://www.epa.gov/quality/quality-system-and-technical-procedures-sesd-field-branches). 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.

GPC 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 GPC 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 using a water measuring device consisting of probe and measuring tape capable of measuring water levels with accuracy to 0.1 foot. 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 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. All non-dedicated pumps and wiring will be decontaminated before use and between well locations in general accordance with USEPA Region 4 SESD guidance document, *Operating Procedure - Field Equipment Cleaning and Decontamination* (EPA, SESDGUID-205-R3), or the latest version of the document.

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 feet 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, oxidation-reduction potential (ORP), and dissolved oxygen (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:

   ±0.1 for pH

   ±5% for specific conductance (conductivity)

±10% or ±0.2 mg/L (whichever is greater) for DO where DO>0.5mg/L. If DO<0.5mg/L no stabilization criteria apply

<5 NTU 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 100 and 200 mL/min according to the most current version of USEPA Region 4 SESD guidance document, *Operating Procedure – Groundwater Sampling* (EPA, SESDPROC-301-R#), 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. All 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 (i.e., >10 NTU), 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. A new filter must be used for each well and each sampling event. Filtered samples are not considered compliance samples and are only used to evaluate the effects of turbidity. Additional details related to managing for elevated turbidity is discussed below.

9. All 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 all non-dedicated equipment. Upon completion of all activity the well will be closed and locked.

13. Samples will be delivered to the laboratory following appropriate 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 latex or 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 NTU; however, samples may be collected where turbidity is less than 10 NTU and the stabilization criteria described above are met.

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

- If turbidity remains above 5 NTU but is less than 10 NTU, and all other parameters are stabilized, the well can be sampled.
- Where turbidity remains above 10 NTU, 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 on the COC form.