



REPORT

2019 Semi-Annual Groundwater Monitoring and Corrective Action Report

*Georgia Power Company - Plant Branch
Ash Pond BCD*

Submitted to:



Georgia Power Company

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Submitted by:

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166625418

February 26, 2020

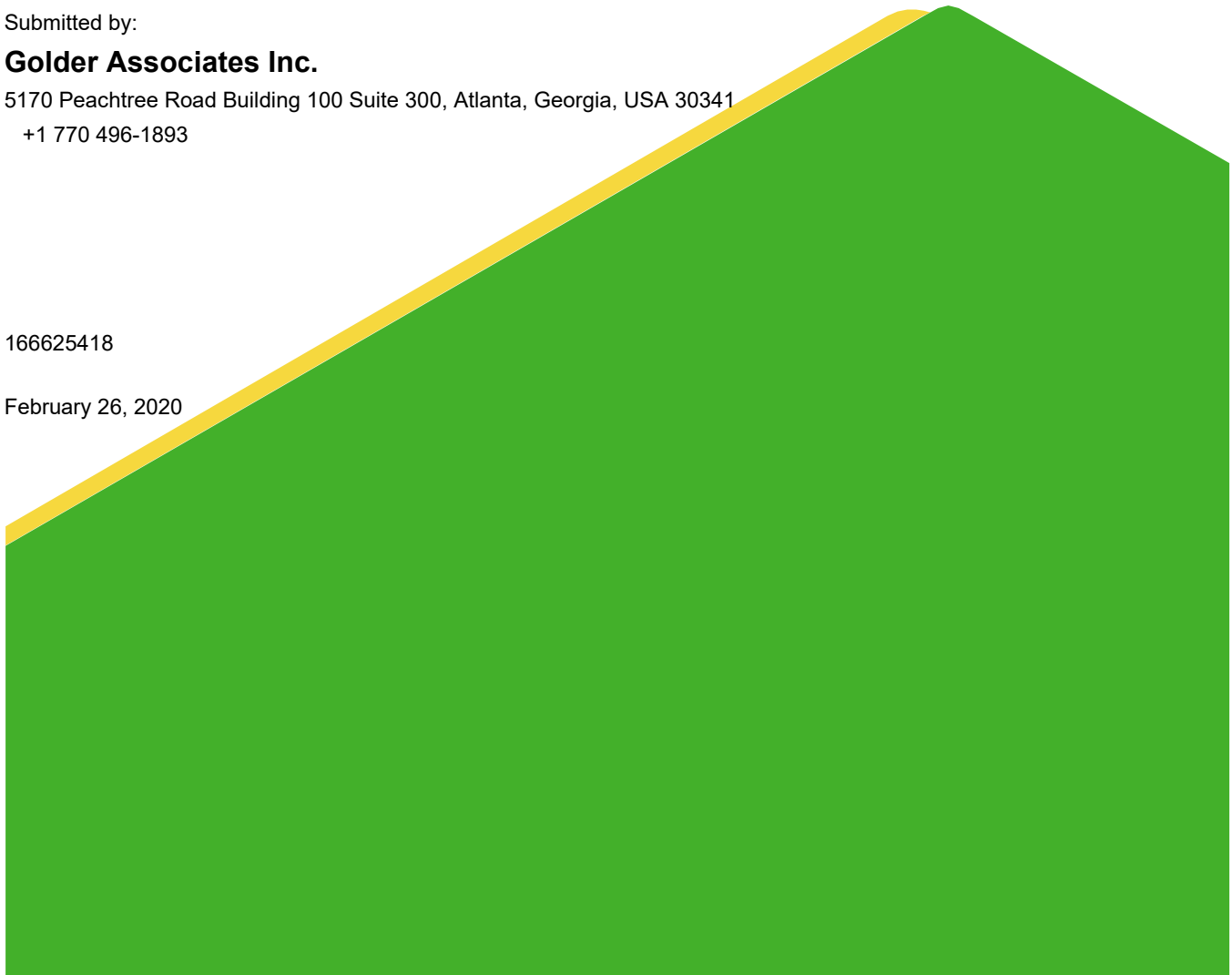


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Certification Statement

This 2019 Semi-Annual Groundwater Monitoring & Corrective Action Report, Georgia Power Company Plant Branch Ash Pond BCD (AP-BCD) has been prepared in compliance with the Georgia Environmental Protection Division Rules for Solid Waste Management 391-3-4.10(6)(a-c) by a qualified groundwater scientist or engineer with Golder Associates Inc.

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[https://golderassociates.sharepoint.com/sites/11952g/shared documents/200 reports/annual gw monitoring & corrective action rpt/branch bcd 1sa19_2.2020/final/branch 1sa19_pond bcd_final v.2 2.25.2020.docx](https://golderassociates.sharepoint.com/sites/11952g/shared%20documents/200%20reports/annual%20gw%20monitoring%20&%20corrective%20action%20rpt/branch%20bcd%201sa19_2.2020/final/branch%201sa19_pond%20bcd_final%20v.2%202.25.2020.docx)

1.0 INTRODUCTION

In accordance with the Georgia Environmental Protection Division (GA EPD) Rules of Solid Waste Management 391-3-4-.10(6)(a)-(c), this *2019 Semi-Annual Groundwater Monitoring and Corrective Action Report* has been prepared to document groundwater monitoring activities conducted at Georgia Power Company (GPC's) Plant Branch Ash Ponds, B, C, and D, together referred to as a multi-unit AP-BCD. To specify groundwater monitoring requirements, GA EPD rule 391-3-4-.10(6)(a) incorporates by reference the United States Environmental Protection Agency (US EPA) Coal Combustion Residuals (CCR) Rule 40 Code of Federal Regulations (CFR) § 257.90 through 257.91 and 257.93 through 257.94. This report documents the activities completed to establish the groundwater monitoring program in accordance with § 257.90(e) and Georgia EPD rule 391-3-4-.10(6)(a). For ease of reference, the US EPA CCR rules are cited within this report.

Two monitoring events were conducted during this monitoring period: (1) an initial assessment monitoring event was conducted in August 2019 as a result of statistical exceedances during the first detection monitoring event, and (2) the subsequent assessment event conducted in October 2019, which served as the semi-annual compliance monitoring event for the year. This report documents the activities completed through the second half of 2019.

1.1 Site Description and Background

Plant Branch is located in Putnam County, GA, approximately 8 miles north of Milledgeville. The property occupies approximately 3,200 acres and is bounded on the south and east by Lake Sinclair, which is an approximate 15,330-acre hydroelectric reservoir that was created in 1953 by the impoundment of the Oconee River. A site location map and a detailed site map is included as Figure 1.

Plant Branch formerly operated as a coal-fired power plant since the 1960's until its retirement in 2015. Plant Branch is no longer active and is currently being decommissioned. During its operation, five ash ponds were used for management of the CCR on the plant property. These ponds are identified as Ponds A, B, C, D, and E. Ash Pond A, the first ash pond constructed at the Site, was taken out of service in the late 1960's and was closed in April 2016 by the removal and relocation of its stored CCR to Ash Pond E. Ponds B, C, D, and E are currently inactive, and will be closed by removal by relocation of the stored CCR material to a proposed fully lined landfill located on the plant property. This report documents the groundwater monitoring program at the multi-unit AP-BCD.

Plant Branch ceased producing electricity prior to April 2015. Therefore, Ash Ponds B, C, and D are not subject to the Federal CCR Rule. A CCR Unit Solid Waste Handling Permit application for AP-BCD was submitted to GA EPD in November 2018 and is currently under review.

1.2 Site Geology and Hydrogeologic Setting

The following section and subsections include a general description of regional geologic and hydrogeologic characteristics of formations that occur beneath the site. Information presented in this section is based on published literature, discussion with local geologic experts, and experience working in this geologic terrain.

The site is located within the Piedmont Physiographic Province of central Georgia, which is characterized by gently rolling hills and narrow valleys, with locally pronounced linear ridges. Overall, the property slopes gently east and south toward Beaverdam Creek and Lake Sinclair. The metamorphic and igneous rocks that underlie the area have been subjected to physical and chemical weathering which has created a landscape dissected by

creeks and streams forming a dendritic drainage pattern. These rocks are deeply weathered due to the humid climate and bedrock is typically overlain by a variably thick blanket of residual soils and saprolite. The overall depth of weathering in the Piedmont/Blue Ridge is generally about 20 to 60 feet; however, the depth of weathering along discontinuities and/or very feldspathic rock units may extend to depths greater than 100 feet. Because of such variations in rock types and structure, the depth of weathering can vary significantly over short horizontal distances.

The near surface conditions were determined based upon available boring and monitoring well installation logs. Based on our review of this information, micaceous, locally saprolitic soils, consisting primarily of clay, silty clay, silt, and sandy clay occur as a variably thick blanket of residuum overlying bedrock across most of the site. The thickness of the residual soil encountered in the borings is variable, ranging from approximately 11 feet to as much as 74 feet. Saprolitic soils and/or saprolitic rock vary in thickness across the site but are generally encountered at or near ground surface. Saprolitic rock is also considered to be transitionally weathered rock (TWR) or partially weathered rock (PWR), as defined by standard penetration test data, where available. Material overlying the top of rock surface, including residual soils, saprolite, and transitionally weathered rock, is collectively referred to as overburden or regolith.

1.3 Groundwater Monitoring Well Network

Pursuant to § 257.91 of the CCR rule and 391-3-4-.10(6), a groundwater monitoring system was installed within the uppermost aquifer at AP-BCD. Wells were placed in upgradient and downgradient locations based on groundwater flow direction as determined by the potentiometric surface elevation contour maps.

A network of 12 monitoring wells were installed in 2014 to 2018 for groundwater monitoring in proximity to AP-BCD. Table 1, Monitoring Well Network Summary includes the pertinent construction details for the AP-BCD monitoring well network at Plant Branch.

Based on the site hydrogeology, the monitoring system is designed to monitor groundwater flow in the overburden, the transition-zone, and the upper bedrock as a single inter-connected aquifer system. Wells suffixed with an “S” are installed in overburden (saprolitic soil), an “I” indicates transitionally weathered rock (transition zone), and “D” indicates upper bedrock. Groundwater in the overburden, partially weathered rock, fractured bedrock, and the materials comprise a single uppermost aquifer based on site hydrogeologic conditions.

2.0 GROUNDWATER MONITORING ACTIVITIES

The following section describes monitoring-related activities performed during the previous semi-annual monitoring period (August through December 2019). Groundwater sampling was performed in accordance with § 257.93 and EPD rule 391-3-4-.10(6)(a). Samples were collected from each well in the certified monitoring system for the CCR unit. The location of each of these monitoring wells is shown on Figure 2.

Pursuant to § 257.90(e)(3) and 391-3-4-.10(6), Table 2, Groundwater Sampling Event Summary, presents a summary of groundwater sampling events completed for AP-BCD.

2.1 Monitoring Well Installation and Maintenance

For this reporting period, monitoring well-related activities included the following:

- Visual inspection of well conditions prior to sampling, recording the site conditions, and performing exterior maintenance to perform sampling under safe and clean conditions.

- Installation of additional piezometers as part of ongoing site investigations. Additional piezometers installed at Plant Branch are documented in a report, *Piezometer Installation Report, Georgia Power Company – Plant Branch, Milledgeville, Georgia*, dated September 26, 2018, and *Piezometer Installation Report for Surface Impoundment Georgia Power Plant Branch, Milledgeville, Georgia*, dated May 31, 2018. Each of these installation reports are included in Appendix A, Well/Piezometer Installation Reports.

2.2 Initial Assessment Monitoring

Statistically Significant Increases (SSI) of Appendix III constituents were identified in the initial detection monitoring event (March 2019). Pursuant to §257.94(e)(3), an assessment monitoring program has been initiated for AP-BCD based on statistically significant increases documented in the *2019 Annual Groundwater Monitoring and Corrective Action Report*, (Golder 2019). A notice of assessment monitoring was placed in the operation record on November 13, 2019.

In accordance with § 257.95, groundwater sampling events were conducted for AP-BCD during August and October 2019. During the initial assessment sampling event in August 2019, groundwater samples were collected and analyzed for Appendix IV to meet the requirement of §257.95(b). During the October 2019 semi-annual sampling event, groundwater samples from each detection monitoring well were collected for analysis of Appendix III, and the Appendix IV constituents detected during the August 2019 event. Results of sampling activities conducted in 2019 are presented in Appendix B, Analytical Results, Field Data Forms, and Data Validation Summaries.

3.0 SAMPLE METHODOLOGY AND ANALYSIS

Two monitoring events (and resampling) were conducted during this monitoring period: (1) an initial assessment monitoring event was conducted in August 2019 as a result of statistical exceedances during the first detection monitoring event, and (2) the subsequent assessment event conducted in October 2019, which served as the semi-annual compliance monitoring event for the year. Limited resampling was also performed in November and December. The following sections describe the methods used to conduct groundwater monitoring at the Site.

3.1 Groundwater Elevation Measurement

Prior to each sampling event, groundwater elevations were recorded from the monitoring well network. Groundwater elevations are summarized in Table 3, Summary of Groundwater Elevations. The October 2019 elevation data were used to develop potentiometric surface elevation contour map (Figure 3, AP-BCD Potentiometric Surface Elevation Contour Map – October 2019). The general direction of groundwater flow across AP-BCD is to the south-southeast. This groundwater flow pattern is consistent with previous observations.

3.2 Groundwater Gradient and Flow Velocity

Groundwater flow rates at the site were calculated based on hydraulic gradients, hydraulic conductivity from previous slug test results, and an estimated effective porosity of the screened horizon. Based on slug test data at the site, hydraulic conductivity ranges from 2.7 to 5.5 feet per day, which is used in the flow calculations. The hydraulic gradient was calculated between well pairs shown on Table 4, Groundwater Flow Velocity Calculations – October 2019. An effective porosity of 0.20 was used based on the default values for effective porosity recommended by USEPA for a silty sand-type soil (USEPA, 1996).

Horizontal flow velocity was calculated using the commonly used derivative of Darcy's Law:

Where:

$$V = \text{Groundwater flow velocity}$$
$$K = \text{Average hydraulic conductivity of the aquifer} \left(\frac{\text{foot}}{\text{day}} \right)$$
$$i = \text{Horizontal hydraulic gradient} \left(\frac{\text{foot}}{\text{day}} \right)$$
$$n_e = \text{Effective porosity}$$

Using this equation, groundwater flow velocities are calculated for various areas of the site and are tabulated on Table 4. Table 4 presents the velocities calculated using groundwater elevation data from the October 2019 sampling event.

As presented on Table 4 groundwater flow velocity at the site ranges from approximately 0.18 to 0.86 feet per day (or approximately 66 to 314 feet per year) across AP-BCD. The observed groundwater flow velocities calculated for this monitoring event are also generally consistent with expected velocities in the regolith-upper bedrock aquifers of Georgia Piedmont and confirm the groundwater monitoring system as properly located to monitor the uppermost aquifer for AP-BCD at Plant Branch.

3.3 Groundwater Sampling

Groundwater samples were collected during August and October with resampling events conducted in November and December 2019 in accordance with § 257.93(a) and 391-3-4-.10(6). Monitoring wells were purged and sampled using low-flow sampling procedures. Dedicated and/or non-dedicated low-flow pneumatic bladder or peristaltic pumps were used to purge and sample the wells. During the purging of each well, field measurements of temperature, specific conductance, dissolved oxygen (DO), pH, and oxidation-reduction potential (ORP) were recorded using a SmarTroll (In-Situ field instrument) along with a separate turbidity meter to verify stabilization.

Groundwater samples were collected when the following general stabilization criteria were met:

- 0.1 standard units for pH
- 5% for specific conductance
- $\pm 10\%$ for DO where $DO > 0.5$ mg/L; if $DO < 0.5$ milligrams per liter (mg/L), no stabilization criteria apply
- Turbidity measurements less than 5 nephelometric turbidity units (NTU)

Any deviation from stabilization criteria, if applicable, is identified on field sampling forms. Following well stabilization, unfiltered samples were collected directly into appropriately preserved laboratory supplied sample containers, placed in iced coolers, and submitted to the laboratory following standard chain-of-custody protocol. Field information forms generated directly from the SmarTroll® as well as chain-of-custody records are included in Appendix B.

Where sample turbidity was greater than 5 NTU and all other stabilization criteria were met, samplers continued purging for up to 3 additional hours in order to reduce the turbidity to 5 NTU or less. When turbidity remained above 5 NTU but was less than 10 NTU, and all other parameters are stabilized, the well was sampled. Where turbidity remained above 10 NTU, an additional unfiltered sample was collected followed by a filtered sample that has passed through an in-line 0.45-micron filter attached to the discharge (sample collection) tube. The unfiltered

sample data are used for compliance monitoring and in the statistical analysis database. Filtered sample data are used to assess the impacts of turbidity on groundwater quality. Additional details regarding filtered samples are recorded on the field information form and filtered samples are clearly identified as “filtered” on the laboratory reports.

3.4 Laboratory Analyses

Groundwater samples were collected in August and analyzed for Appendix IV monitoring parameters only. Samples collected during October, November and December 2019 were submitted for analysis of Appendix III and detected Appendix IV parameters. Analytical methods used for groundwater monitoring parameters can be found on the attached analytical data reports in Appendix B.

Laboratory analyses for these assessment monitoring events were performed by Pace Analytical (Pace) in Atlanta, Georgia and Greensburg, Pennsylvania. Pace is accredited by National Environmental Laboratory Accreditation Program (NELAP) and maintain a NELAP certification for all parameters analyzed for this project. NELAP certification for Pace from 2016 through 2019 are provided in Appendix B. Groundwater data and chain of custody records for the monitoring events are presented in Appendix B.

3.5 Quality Assurance and Quality Control

During each sampling event, quality assurance/quality control samples (QA/QC) are collected at a rate of one sample per every 10 samples. Equipment blanks (where non-dedicated sampling equipment is used), field blanks, and duplicate samples were also collected during each sampling event. QA/QC sample data was evaluated during data validation and is included in Appendix B.

Groundwater quality data in this report was independently validated in accordance with USEPA guidance (USEPA, 2011) and the analytical methods. Data validation generally consisted of reviewing sample integrity, holding times, laboratory method blanks, laboratory control samples, matrix spikes/matrix spike duplicate recoveries and relative percent differences, post digestions spikes, laboratory and field duplicate relative percent difference (RPDs), field and equipment blanks, and reporting limits. Where appropriate, validation qualifiers and flags are applied to the data using USEPA procedures as guidance (USEPA, 2017). Data validation summaries provided Environmental Standards and Golder are provided in Appendix B. Flagged data are identified in the statistical analysis reports described in the following section.

4.0 STATISTICAL ANALYSES

Statistical analysis of Appendix III groundwater monitoring data was performed pursuant to § 257.93 and 391-3-4-.10(6) following the established statistical method for AP-BCD. Pursuant to § 257.95(d)(2) GPC will establish groundwater protection standards for the Appendix IV monitoring parameters and complete statistical analysis of the Appendix IV groundwater monitoring data obtained during the first semi-annual assessment monitoring event within 90 days of obtaining the results. GPC will complete the assessment monitoring and statistical analysis in accordance with § 257.95 and report the results in the Annual Groundwater Monitoring and Corrective Action Report, due August 1, 2020.

Sanitas groundwater statistical software was used to perform the statistical analyses at the site. Sanitas is a decision support software package that incorporates the statistical tests required of Subtitle C and D facilities by US EPA regulations and guidance as recommended in the Unified Guidance (USEPA, 2009) document.

4.1 Statistical Method

The selected statistical method for AP-BCD was developed in accordance with § 257.93(f) and 391-3-4-.10(6) using methodology presented in Statistical Analysis of Groundwater Data at RCRA Facilities, Unified Guidance, (USEPA, 2009). The Sanitas Groundwater statistical software was used to perform the statistical analyses. Sanitas is a decision-support software package that incorporates the statistical tests required of Subtitle C and D facilities by USEPA regulations and guidance as recommended in the USEPA (2009) document.

Groundwater quality data were evaluated through use of interwell prediction limits for Appendix III parameters. Using this method, upgradient well data was pooled to establish a background statistical limit. Data from the March 2019 detection monitoring event are compared to the statistical limit to determine whether any concentrations exceed background levels. The selected statistical method uses an optional 1-of-2 verification resample plan. When an initial statistically significant increase (SSI) or questionable result occurs, a second sample may be collected to verify the initial result or determine if the result was an outlier.

If resampling is performed and the initial finding is not verified by resampling, the resampled value replaced the initial finding. When the resample confirms the initial finding, both values remain in the database and an SSI is declared. The Sen’s Slope/Mann Kendall trend test was used to statistically evaluate concentration levels over time and determine whether concentrations are increasing, decreasing, or stabilizing.

Table 4.1.1 Plant Branch AP-BCD Statistical Method Summary provides a summary of the statistical methodology used at AP-BCD for the first detection monitoring conducted in March 2019 and will be used for any routine detection monitoring in the future.

Table 4.1.1 PLANT BRANCH AP-BCD STATISTICAL METHOD SUMMARY		
Monitoring Well Network	Upgradient Wells	BRGWA-12S, BRGWA-12I, and BRGWA-23S
	Downgradient Wells	BRGWC-25I, BRGWC- 27I, BRGWC-29I, BRGWC-30I, BRGWC-32S, BRGWC-45, BRGWC-47, BRGWC-50, BRGWC-52I
CCR Monitoring Parameters	Appendix III (Detection Monitoring)	Boron, Calcium, Chloride, Fluoride, pH, Sulfate, Total Dissolved Solids
	Appendix IV (Assessment Monitoring)	Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Cobalt, Fluoride, Lead, Lithium, Mercury, Molybdenum, Selenium, Thallium, Combined Radium (226+228)
	Data Screening on Proposed Background	Evaluate outliers, trends, and seasonality when sufficient data are available
	Statistical Limits	Interwell statistical limits will be applied on a constituent basis, depending on the appropriateness of the method as determined by the Analysis of Variance.
	Prediction Limits	Parametric when data follow a normal or transformed normal distribution and when less than 50% non-detects, utilizing Kaplan Meier non-detect adjustment when applicable; nonparametric when data sets contain greater than 50% non-detects or when data are not normally or transformed-normally distributed.

Table 4.1.1 PLANT BRANCH AP-BCD STATISTICAL METHOD SUMMARY		
	Confidence Intervals	Used in Assessment and Corrective Action monitoring.
	No Statistical Testing	Statistical testing is not required for parameters with 100% non-detects.
	Verification Resample Plan	1-of-2 with minimum of 8 samples per well for interwell testing.
	Optional	<ul style="list-style-type: none"> ▪ Initial statistical exceedance warrants independent resampling within 90 days. ▪ If resample passes, well/parameter is not a confirmed statistically significant increase (SSI). ▪ If resample exceeds, well/parameter has a confirmed SSI. ▪ If no resample is collected, the original result is deemed verified.

The following guidance is also applicable to the statistical analysis method:

- Statistical analyses are not performed on analytes containing 100% non-detects (USEPA Unified Guidance, 2009, Chapter 6).
- When data contain less than or equal to 15% non-detects in background, simple substitution of one-half the reporting limit is utilized in the statistical analysis. The reporting limit utilized for non-detects is the practical quantitation limit (PQL) as reported by the laboratory.
- When data contain between 15-50% non-detects, a non-detect adjustment such as the Kaplan-Meier or Regression on Order Statistics (ROS) method for adjustment of the mean and standard deviation will be used prior to constructing a parametric prediction limit.
- Nonparametric prediction limits are used on data containing greater than 50% non-detects.

4.2 Statistical Analysis Results – Appendix III

Analytical data from the semi-annual assessment monitoring event in October 2019 at AP-BCD have been statistically analyzed in accordance with the site's Statistical Analysis Plan. The statistical results of the October 2019 monitoring event are included in Appendix C, Statistical Analyses. The verified SSIs are presented in Table 4.2.1, AP-BCD Interwell Prediction Limit Statistically Significant Increase Summary.

Table 4.2.1 AP-BCD Inter-Well Prediction Limit Statistically Significant Increase Summary	
Appendix III Parameter	AP-BCD Monitoring Wells
Boron	BRGWC-25I, BRGWC-27I, BRGWC-29I, BRGWC-30I, BRGWC-32S, BRGWC-47, BRGWC-50, BRGWC-52I
Calcium	BRGWC-25I, BRGWC-27I, BRGWC-29I, BRGWC-30I, BRGWC-32S, BRGWC-45, BRGWC-47, BRGWC-50, BRGWC-52I
Chloride	BRGWC-29I, BRGWC-32S, BRGWC-45, BRGWC-50, BRGWC-52I

Table 4.2.1 AP-BCD Inter-Well Prediction Limit Statistically Significant Increase Summary	
Fluoride	No exceedances
pH	BRGWC-29I, BRGWC-50, BRGWC-52I
Sulfate	BRGWC-25I, BRGWC-27I, BRGWC-29I, BRGWC-30I, BRGWC-32S, BRGWC-45, BRGWC-47, BRGWC-50, BRGWC-52I
Total Dissolved Solids	BRGWC-25I, BRGWC-27I, BRGWC-29I, BRGWC-30I, BRGWC-32S, BRGWC-45, BRGWC-47I, BRGWC-50, BRGWC-52I

Pursuant to §257.94(e)(3), an assessment monitoring program was initiated for AP-BCD at Plant Branch based on statistically significant increases documented in the *2019 Annual Groundwater Monitoring and Corrective Action Report*, (Golder 2019). A notice of assessment monitoring was placed in the operation record on November 13, 2019.

4.3 Appendix IV Statistical Analyses

Pursuant to §257.95 and Georgia EPD rule 391-3-4-.10(6)(a), Appendix IV groundwater quality data will be statistically analyzed and compared to groundwater protection standards within 90 days of receiving data from the first (October 2019) assessment monitoring event. GPC will complete the assessment monitoring and statistical analysis in accordance with § 257.95 and report the results in the Annual Groundwater Monitoring and Corrective Action Report, due August 1, 2020.

5.0 MONITORING PROGRAM STATUS

GPC has initiated assessment monitoring at Plant Branch AP-BCD in accordance with the requirements of § 257.94(e)(1-3) and (f) and 391-3-4-.10(6). Table 2 presents the status of each well within the certified monitoring network for AP-BCD.

6.0 CONCLUSIONS AND FUTURE ACTIONS

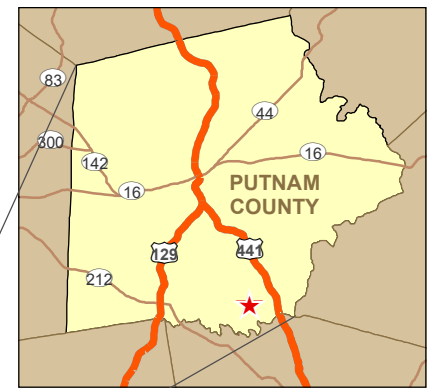
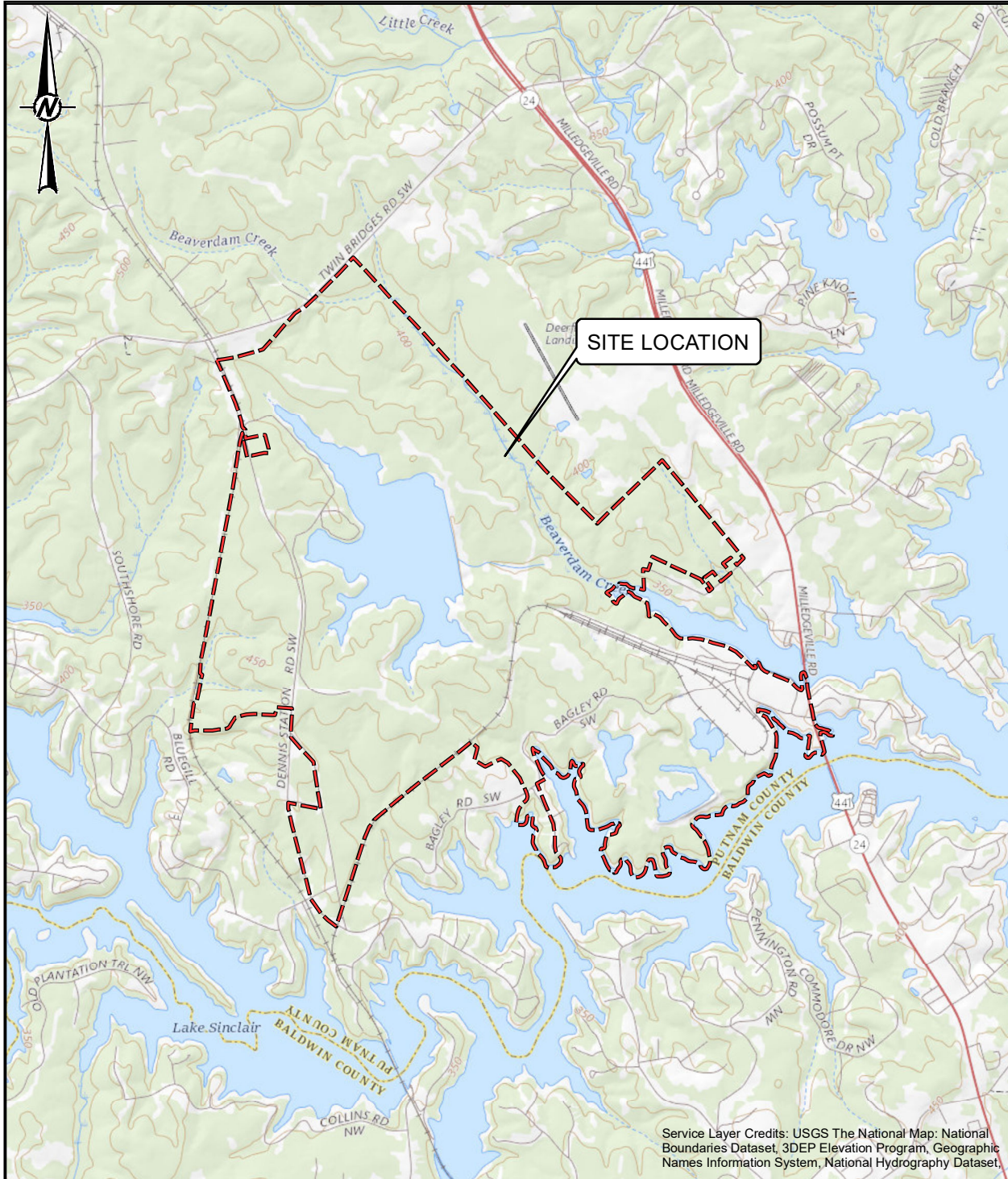
This *2019 Semi-Annual Groundwater Monitoring and Corrective Action Report, Georgia Power Plant Branch AP-BCD* has been prepared to fulfill the requirements of Georgia EPD Rules of Solid Waste Management 391-3-4-.10(6).

Statistical evaluations of the groundwater monitoring data for AP-BCD identified SSIs of Appendix III groundwater monitoring parameters. GPC initiated assessment monitoring in accordance with the requirements of § 257.95 and Georgia EPD rule 391-3-4-.10(6)(a). The next scheduled sampling event is scheduled for March 2020. During the next semi-annual reporting period of 2020, GPC will establish groundwater protection standards for Appendix IV constituents in accordance with § 257.95 and report the results in the Annual Groundwater Monitoring and Corrective Action Report, due August 1, 2020.

7.0 REFERENCES

- Golder Associates, 2018. Geologic and Hydrogeologic Summary Report, Georgia Power – Plant Branch, Putnam County, Georgia, October 2018.
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- USEPA. 2017. National Functional Guidelines for Inorganic Superfund Methods Data Review. Office of Superfund Remediation and Technology Innovation. OLEM 9355.0-135 [EPA-540-R-2017-001]. Washington. DC. January.

Figures & Tables



CLIENT
GEORGIA POWER COMPANY
 PLANT BRANCH



PROJECT
GROUNDWATER MONITORING

TITLE
SITE LOCATION MAP

CONSULTANT



YYYY-MM-DD	2019-03-15
PREPARED	DJC
DESIGN	DLP
REVIEW	DLP
APPROVED	RPK

PROJECT No.
 1666254

CONTROL
 1666254A000-GIS.mxd

Rev.
 0

FIGURE
 1

Service Layer Credits: USGS The National Map: National Boundaries Dataset, 3DEP Elevation Program, Geographic Names Information System, National Hydrography Dataset.

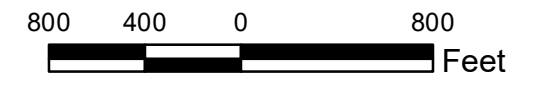


LEGEND

- PROPERTY BOUNDARY
- APPROXIMATE ASH POND BOUNDARY
- APPROXIMATE SURFACE WATER LIMITS
- POND BCD MONITORING WELL
- PIEZOMETER

REFERENCE

1. SERVICE LAYER CREDITS: SOURCE: ESRI, DIGITALGLOBE, GEOEYE, EARTHSTAR GEOGRAPHICS, CNES/AIRBUS DS, USDA, USGS, AEROGRID, IGN, AND THE GIS USER COMMUNITY ESRI, HERE, GARMIN, © OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY
2. COORDINATE SYSTEM: NAD 1983 STATE PLAN GEORGIA WEST (U.S. FEET).
3. BORING/PIEZOMETER LOCATIONS AND PROPERTY LINE PROVIDED BY SOUTHERN COMPANY SERVICES.



CLIENT
GEORGIA POWER COMPANY
 PLANT BRANCH

PROJECT
GROUNDWATER MONITORING PROGRAM

TITLE
SITE PLAN AND MONITORING WELL LOCATION MAP

CONSULTANT	YYYY-MM-DD	2019-05-30
	PREPARED	DJC
	DESIGN	DLP
	REVIEW	dlp
	APPROVED	rpk

PROJECT No. 166625418 CONTROL 1666254N001-GIS.mxd Rev. 0 FIGURE 2

Path: C:\TEMP\CAD FILES\MAY 19\1666254-GIS-Plant Branch\figure\site plan and mwl loc map\1666254N001-GIS.mxd

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community Esri, HERE, Garmin, © OpenStreetMap contributors, and the GIS user community

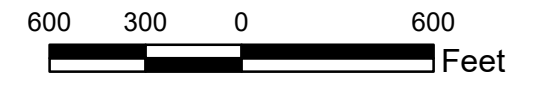
IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET HAS BEEN MODIFIED FROM ANS B



- LEGEND**
- ESTIMATED GROUNDWATER SURFACE CONTOUR (feet MSL)
 - PROPERTY BOUNDARY
 - APPROXIMATE ASH POND BOUNDARY
 - APPROXIMATE SURFACE WATER LIMITS
 - ◆ MONITORING WELL (ELEVATION feet AMSL)
 - PIEZOMETER (ELEVATION feet AMSL)

- NOTES**
1. GROUNDWATER SURFACE CONTOUR INTERVAL = 10 FEET
 2. GROUNDWATER CONTOURS BASED ON LINEAR INTERPOLATION BETWEEN AND EXTRAPOLATION FROM KNOWN DATA, AND TOPOGRAPHIC CONTOURS. THEREFORE, CONTOURS MAY NOT REFLECT ACTUAL CONDITIONS.
 3. PZ-12D* DATA NOT USED FOR CONTOURING.
 4. AMSL=ABOVE MEAN SEA LEVEL.
 5. GROUNDWATER ELEVATIONS RECORDED OCTOBER 14, 2019.

- REFERENCE**
1. SERVICE LAYER CREDITS: SOURCE: ESRI, DIGITALGLOBE, GEOEYE, EARTHSTAR GEOGRAPHICS, CNES/AIRBUS DS, USDA, USGS, AEROGRID, IGN, AND THE GIS USER COMMUNITY
 2. COORDINATE SYSTEM: NAD 1983 STATE PLAN GEORGIA WEST (U.S. FEET).
 3. BORING/PIEZOMETER LOCATIONS AND PROPERTY LINE PROVIDED BY SOUTHERN COMPANY SERVICES.



CLIENT
GEORGIA POWER COMPANY
 PLANT BRANCH

PROJECT
GROUNDWATER MONITORING PROGRAM

TITLE
PONDS B, C AND D GROUNDWATER SURFACE CONTOUR MAP
OCTOBER 14, 2019

CONSULTANT	YYYY-MM-DD	2019-11-04
GOLDER	PREPARED	DJC
	DESIGN	ED
	REVIEW	DLP
	APPROVED	RPK

PROJECT No. 166625418 CONTROL 1666254Q002-GIS.mxd Rev. 0 FIGURE 1

Path: H:\166625418\166625418-PCS-Plant Branch\figures\OCT 2019\CWY1\666254Q002-GIS.mxd

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
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1 in IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET HAS BEEN MODIFIED FROM ANSB

TABLE 1

MONITORING WELL NETWORK SUMMARY (AP-BCD)

Georgia Power - Plant Branch
Milledgeville, GA

Well-ID	Old Well-ID	Location	Geologic Unit Screened ^[3]	Latitude	Longitude	Ground Surface Elevation (feet msl) ^[1]	Top of Casing Elevation (feet msl) ^[1]	Total Depth (feet bgs) ^[2]	Top of Screen Elevation (feet msl) ^[1]	Screen Tip Elevation (feet msl) ^[1]	Screen Length	Date of Installation
POND BCD												
BRGWA-12S	PZ-12S	Upgradient ABCD	Saprolite	33.197933	-83.314864	436.31	439.69	58.3	388.01	378.01	10.0	3/4/2014
BRGWA-12I	PZ-12I	Upgradient ABCD	Biotite gneiss	33.197975	-83.314876	436.18	439.43	77.6	368.58	358.58	10.0	2/20/2014
BRGWA-23S	PZ-23S	Upgradient ABCD	Saprolite/TWR	33.194309	-83.312529	425.5	428.42	40.8	394.70	384.70	10.0	7/26/2016
BRGWC-25I	PZ-25I	Downgradient B	Saprolite/TWR/Biotite Gneiss	33.187674	-83.301326	354.95	357.46	21.0	344.45	334.45	10.0	7/25/2016
BRGWC-27I	PZ-27S	Downgradient C	Saprolite	33.185268	-83.306586	364.88	367.99	24.0	350.88	340.88	10.0	7/22/2016
BRGWC-29I	PZ-29I	Downgradient C	TWR	33.186893	-83.302200	350.37	353.30	21.0	340.37	330.37	10.0	7/23/2016
BRGWC-30I	PZ-30I	Downgradient D	Saprolite/TWR/Biotite Gneiss	33.190567	-83.313139	349.78	352.33	20.3	339.78	329.78	10.0	7/18/2016
BRGWC-32S	PZ-32S	Downgradient D	Saprolite	33.187995	-83.310532	403.51	406.51	45.0	368.51	358.51	10.0	7/20/2016
BRGWC-45	PZ-45	Downgradient B	Saprolite/TWR	33.192198	-83.302067	381.69	384.61	57.0	335.09	325.09	10.0	2/3/2018
BRGWC-47	PZ-47	Downgradient D	TWR	33.193531	-83.307344	408.87	411.32	97.0	327.27	317.27	10.0	1/25/2018
BRGWC-50	PZ-50	Downgradient B	TWR/Biotite Gneiss	33.190422	-83.297844	387.79	381.53	67.0	324.19	314.19	10.0	1/31/2018
BRGWC-52I	PZ-52	Downgradient B	Biotite Gneiss	33.189552	-83.298596	380.93	383.83	75.0	317.03	307.03	10.0	8/6/2018

Notes:

1. feet msl = feet mean sea level
2. feet bgs = feet below ground surface
3. TWR = Transitionally Weathered Rock

TABLE 2
GROUNDWATER SAMPLING EVENT SUMMARY
Georgia Power Company - Plant Branch
Milledgeville, Georgia

Well ID	Hydraulic Location	Summary of Sampling Events		Status of Monitoring Well
		August 2019	October 2019	
Purpose of Sampling Event		Assessment	Assessment	
ASH PONDS B, C, and D (AP-BCD)				
BRGWA-12S	Upgradient	A01	A02	Assessment
BRGWA-12I	Upgradient	A01	A02	Assessment
BRGWA-23S	Upgradient	A01	A02	Assessment
BRGWC-25I	Downgradient	A01	A02	Assessment
BRGWC-27I	Downgradient	A01	A02	Assessment
BRGWC-29I	Downgradient	A01	A02	Assessment
BRGWC-30I	Downgradient	A01	A02	Assessment
BRGWC-32S	Downgradient	A01	A02	Assessment
BRGWC-45	Downgradient	A01	A02	Assessment
BRGWC-47	Downgradient	A01	A02	Assessment
BRGWC-50	Downgradient	A01	A02	Assessment
BRGWC-52I	Downgradient	A01	A02	Assessment

Notes:

BG## = Background Event Number

D## = Detection Event Number

A## = Assessment Event Number

TABLE 3
Summary of Groundwater Elevations
 Georgia Power Company- Plant Branch
 Milledgeville, Georgia

Well-ID	Top of Casing Elevation (feet msl) ^[1]	GROUNDWATER ELEVATIONS (FEET MSL)												
		8/30/2016	11/21/2016	2/17/2017	6/12/2017	9/25/2017	2/7/2018	2/13/2018	6/25/2018	9/18/2018	12/17/2018	3/18/2019	8/26/2019	10/14/2019
POND BCD														
BRGWA-12S	439.69	391.26	341.94	389.54	388.88	388.42	387.14	387.43	387.01	DRY	386.87	DRY	DRY	386.99
BRGWA-12I	439.43	390.64	341.60	389.57	388.80	388.47	425.03	387.40	386.99	386.50	386.14	381.53	385.78	386.18
BRGWA-23S	428.42	395.74	361.06	394.05	392.90	392.61	390.71	390.74	390.08	389.57	389.28	392.22	392.17	391.48
BRGWC-25I	357.46	348.30	338.59	349.86	349.53	349.01	349.60	349.75	348.57	347.66	349.45	350.46	348.56	348.03
BRGWC-27I	367.99	363.35	357.29	364.60	364.91	364.63	364.40	364.23	362.54	360.67	362.95	365.40	364.59	364.04
BRGWC-29I	353.30	343.46	333.29	344.15	344.30	343.72	343.73	344.06	343.48	343.05	343.94	344.48	343.58	341.20
BRGWC-30I	352.33	347.85	343.69	348.42	348.13	348.36	348.11	348.16	347.63	347.61	348.09	348.24	348.24	348.28
BRGWC-32S	406.51	372.01	335.50	370.37	371.86	372.10	371.12	371.05	370.65	369.37	368.58	371.71	371.31	370.24
BRGWC-45	384.61	NA	NA	NA	NA	NA	373.67	373.55	374.86	372.77	374.49	374.96	373.31	372.74
BRGWC-47	411.32	NA	NA	NA	NA	NA	385.72	385.59	385.68	384.27	384.52	388.07	386.23	385.45
BRGWC-50	381.53	NA	NA	NA	NA	NA	343.47	346.10	343.70	343.45	343.73	344.48	343.73	344.56
BRGWC-52I	383.83	NA	NA	NA	NA	NA	NA	NA	NA	344.6	344.9	345.8	344.81	344.40

TABLE 3
Summary of Groundwater Elevations
 Georgia Power Company- Plant Branch
 Milledgeville, Georgia

Well-ID	Top of Casing Elevation (feet msl) ^[1]	GROUNDWATER ELEVATIONS (FEET MSL)												
		8/30/2016	11/21/2016	2/17/2017	6/12/2017	9/25/2017	2/7/2018	2/13/2018	6/25/2018	9/18/2018	12/17/2018	3/18/2019	8/26/2019	10/14/2019
POND E														
BRGWA-2S	458.02	439.6	419.5	442.40	443.20	442.31	443.65	443.75	442.82	440.63	443.97	445.12	442.58	440.90
BRGWA-2I	457.85	439.7	419.6	442.15	443.00	442.14	443.45	443.61	442.74	440.63	443.67	445.00	442.16	440.85
BRGWA-5S	448.53	436.0	422.5	436.76	436.18	435.44	435.91	435.87	436.30	435.22	436.42	438.23	435.92	435.22
BRGWA-5I	448.44	435.9	422.5	436.74	436.17	435.49	435.91	435.86	436.32	435.24	436.42	438.24	435.93	435.25
BRGWA-6S	463.63	438.5	411.0	439.65	437.92	437.74	435.11	437.60	438.12	436.36	438.74	441.74	436.81	435.87
BRGWC-17S	370.25	364.7	358.8	364.60	364.17	364.11	364.05	364.39	363.66	363.95	364.52	364.13	364.44	363.87
BRGWC-33S	416.92	408.7	400.9	410.10	409.30	408.84	409.32	409.39	409.35	408.87	410.39	410.59	409.02	408.40
BRGWC-34S	392.06	389.3	386.7	389.68	389.52	389.36	389.59	389.67	389.32	389.36	389.80	389.73	389.51	389.27
BRGWC-35S	366.54	364.4	362.2	364.44	364.40	364.34	364.44	364.51	364.39	364.37	364.79	364.75	364.58	364.33
BRGWC-36S	386.00	384.3	382.4	384.20	383.94	383.80	383.42	383.47	383.30	383.30	383.64	383.75	383.57	383.12
BRGWC-37S	447.23	400.6	352.9	398.18	399.72	396.98	395.84	395.82	395.88	395.79	395.33	397.01	396.06	396.53
BRGWC-38S	432.33	412.2	391.0	413.61	412.05	411.47	411.78	411.69	412.15	410.79	412.53	413.93	410.92	410.43

TABLE 3
Summary of Groundwater Elevations
 Georgia Power Company- Plant Branch
 Milledgeville, Georgia

Well-ID	Top of Casing Elevation (feet msl) ^[1]	GROUNDWATER ELEVATIONS (FEET MSL)												
		8/30/2016	11/21/2016	2/17/2017	6/12/2017	9/25/2017	2/7/2018	2/13/2018	6/25/2018	9/18/2018	12/17/2018	3/18/2019	8/26/2019	10/14/2019
PIEZOMETERS														
PZ-1S	470.22	431.8	392.5	430.72	431.72	431.53	431.25	431.12	432.68	NA	432.04	434.45	433.23	432.33
PZ-1I	469.85	431.4	391.9	430.16	431.11	430.22	430.47	430.53	431.88	NA	431.19	433.56	432.30	431.50
PZ-1D	468.56	429.1	389.1	428.71	429.58	429.30	429.13	429.05	430.39	NA	429.93	432.13	430.91	429.94
PZ-3S	494.63	DRY	DRY	DRY	451.05	451.09	DRY	DRY	DRY	NA	DRY	DRY	DRY	451.08
PZ-3I	493.60	469.4	418.1	441.46	440.69	440.11	439.38	439.54	439.21	NA	439.00	438.86	439.27	439.28
PZ-3D	491.59	442.1	393.5	441.91	441.55	441.18	440.60	440.76	440.36	NA	440.09	440.04	440.09	440.06
PZ-4S	487.08	DRY	DRY	DRY	451.90	433.88	DRY	DRY	DRY	NA	DRY	DRY	DRY	453.88
PZ-4I	487.22	451.6	414.6	449.32	449.23	449.01	449.90	449.61	450.89	NA	451.14	453.22	452.67	452.29
PZ-7S	456.87	429.6	400.0	428.15	428.69	427.97	428.24	428.03	429.93	NA	429.46	432.79	429.67	428.74
PZ-8S	457.37	428.4	397.4	429.74	430.30	429.89	431.33	431.15	431.38	NA	431.13	433.43	429.68	428.68
PZ-9S	474.02	438.9	402.8	437.06	436.32	435.67	434.42	434.50	451.84	NA	433.48	434.89	434.78	434.39
PZ-10S	438.95	412.3	384.5	412.83	411.85	411.41	411.31	411.24	411.72	NA	411.87	413.17	411.79	410.70
PZ-11S	398.97	381.1	361.6	381.14	379.68	378.74	377.73	377.46	376.47	NA	375.11	377.64	375.86	386.32
PZ-12D	439.17	361.2	282.0	362.18	359.97	351.36	349.45	348.93	360.34	NA	355.20	356.36	359.96	356.83
PZ-13S	415.13	387.0	356.7	387.14	387.37	386.42	387.03	386.92	388.25	NA	387.62	390.76	387.09	386.33
PZ-14S	435.51	415.5	395.8	418.16	417.20	416.53	417.17	417.24	417.41	NA	418.68	419.11	416.35	415.73
PZ-14I	434.91	416.3	397.8	416.78	417.26	416.76	417.37	417.55	417.12	NA	417.49	418.15	418.23	418.09
PZ-15S	415.77	405.6	395.7	406.37	406.08	405.88	406.21	406.36	405.82	NA	406.52	406.51	405.99	405.65
PZ-15I	415.90	406.1	396.6	406.86	406.56	406.36	406.70	406.82	406.34	NA	407.01	407.02	406.53	406.10
PZ-16S	386.97	373.9	360.6	375.04	374.59	374.20	374.84	374.99	374.43	NA	370.39	375.97	374.61	373.78
PZ-16I	386.89	374.0	360.7	375.12	374.66	374.25	374.90	375.09	374.49	NA	375.45	376.05	374.68	373.84
PZ-17I	370.07	366.4	362.8	367.34	366.98	366.57	366.95	367.27	366.44	NA	367.33	367.48	366.96	366.12
PZ-18S	367.27	346.6	325.1	347.09	346.99	346.53	346.86	346.85	346.43	NA	346.72	347.38	345.88	345.56
PZ-18I	366.75	346.2	324.9	346.71	346.92	346.19	346.47	346.51	346.07	NA	346.38	346.99	345.52	344.94
PZ-19S	376.31	360.3	342.6	361.89	362.04	361.15	362.41	362.33	361.13	NA	359.91	364.24	360.01	358.91
PZ-19I	376.73	360.1	341.8	361.69	362.02	362.24	362.20	362.09	360.95	NA	359.77	364.04	359.73	358.66
PZ-20S	370.71	355.1	339.1	357.44	356.69	356.17	356.68	356.79	355.46	NA	356.84	357.90	355.63	355.56
PZ-20I	370.64	355.3	339.6	357.63	356.89	356.35	356.86	356.97	355.63	NA	357.03	358.05	355.78	355.24
PZ-21S	358.60	353.4	342.7	355.09	354.71	354.22	354.81	354.99	353.73	NA	354.64	355.73	353.05	348.00

TABLE 3
Summary of Groundwater Elevations
 Georgia Power Company- Plant Branch
 Milledgeville, Georgia

Well-ID	Top of Casing Elevation (feet msl) ^[1]	GROUNDWATER ELEVATIONS (FEET MSL)												
		8/30/2016	11/21/2016	2/17/2017	6/12/2017	9/25/2017	2/7/2018	2/13/2018	6/25/2018	9/18/2018	12/17/2018	3/18/2019	8/26/2019	10/14/2019
PIEZOMETERS														
PZ-211	359.20	353.3	342.1	354.93	354.57	354.05	354.67	354.84	353.56	NA	354.49	355.57	353.94	348.14
PZ-231	427.90	395.2	361.0	393.75	392.87	392.40	390.70	388.76	390.02	NA	389.17	391.95	392.19	391.36
BRGWC-24S	354.00	339.5	324.6	339.81	340.08	339.76	339.93	340.10	339.79	339.36	NA	340.16	339.39	339.02
PZ-261	370.93	348.6	325.4	349.21	349.02	348.82	349.09	348.98	348.83	NA	348.95	350.56	348.68	348.21
PZ-281	364.88	350.0	334.7	352.36	351.62	351.06	351.58	351.73	350.36	NA	351.76	352.79	350.48	350.02
PZ-31S	376.94	352.8	326.9	352.38	352.42	352.12	352.16	352.13	351.77	NA	350.81	353.04	350.96	348.44
PZ-39	434.70	388.3	340.3	385.77	DRY	385.79	385.76	385.77	385.77	NA	385.75	385.74	385.79	385.74
PZ-40S	356.06	NA	NA	340.18	340.33	340.11	340.17	340.25	340.66	339.80	NA	340.56	339.77	339.44
PZ-41S	357.23	NA	NA	340.13	340.22	340.07	340.10	340.15	340.04	339.77	NA	340.50	339.75	339.45
PZ-42S	361.69	NA	NA	340.90	340.40	340.58	340.45	340.66	341.06	340.75	NA	341.53	340.45	340.21
PZ-43	383.75	NA	NA	NA	NA	NA	353.02	NA	353.78	NA	353.75	358.05	354.35	354.30
PZ-44	383.12	NA	NA	NA	NA	NA	358.14	NA	358.83	NA	358.90	360.97	358.97	358.60
PZ-46	384.70	NA	NA	NA	NA	NA	375.58	375.61	375.52	NA	376.09	376.15	375.80	374.77
PZ-48	421.05	NA	NA	NA	NA	NA	390.41	390.37	390.09	NA	390.14	392.79	390.89	389.90
PZ-49	385.06	NA	NA	NA	NA	NA	377.17	380.58	376.47	NA	376.85	376.26	371.96	370.58
PZ-51S	380.19	NA	NA	NA	NA	NA	NA	NA	NA	NA	341.6	342.3	341.79	341.49
PZ-511	380.60	NA	NA	NA	NA	NA	NA	NA	NA	NA	342.5	343.2	342.39	342.10

TABLE 3
Summary of Groundwater Elevations
 Georgia Power Company- Plant Branch
 Milledgeville, Georgia

Well-ID	Top of Casing Elevation (feet msl) ^[1]	GROUNDWATER ELEVATIONS (FEET MSL)												
		8/30/2016	11/21/2016	2/17/2017	6/12/2017	9/25/2017	2/7/2018	2/13/2018	6/25/2018	9/18/2018	12/17/2018	3/18/2019	8/26/2019	10/14/2019
Temporary Landfill Piezometers														
PB-1S	403.06	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	377.5	403.06	374.52
PB-2D	416.76	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	375.9	416.76	375.36
PB-4S	411.06	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	379.0	411.06	377.27
PB-4D	412.18	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	380.6	412.18	377.90
PB-7S	402.86	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	375.9	402.86	372.06
PB-8S	401.69	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	377.4	401.69	374.87
PB-8D	401.77	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	377.0	401.77	374.32
PB-10S	400.94	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	388.0	400.94	385.90
PB-10D	400.33	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	387.8	400.33	384.94
PB-13S	373.38	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	363.7	373.38	361.16
PB-13D	373.83	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	363.3	373.8	360.90

Notes:

1. Feet msl = feet mean sea level
2. Survey data for PZ-21S and PZ-21I were updated in January 2020.

TABLE 4
GROUNDWATER VELOCITY CALCULATIONS (October 2019)
Georgia Power - Plant Branch Ash Pond AP-BCD
Milledgeville, GA

Flow Paths	Groundwater Elevation (feet msl)	Δh (feet) ¹	Δl (feet) ²	Hydraulic Gradient ($\Delta h/\Delta l$)	Average Hydraulic Conductivity, K (feet per day) ⁵	Assumed Effective Porosity (n_e) ⁶	Average Linear Groundwater Velocity	
							(feet per day) ⁴	(feet per year) ⁴
Pond BCD October 14, 2019								
BRGWA-23S / BRGWC-30I	391.48	43.20	1374.0	0.031	2.73 to 5.47	0.2	0.43 to 0.86	156.6 to 313.9
	348.28							
BRGWC-47 / BRGWC-50	385.45	40.89	3130.0	0.013	2.73 to 5.47	0.2	0.18 to 0.36	65.1 to 130.4
	344.56							

Notes:

1. ΔH = Change in groundwater elevation.
2. ΔL = Distance along flow path.
3. $I = \Delta H / \Delta L$.
4. Velocity = $(I * K)/n_e$.
5. Hydraulic conductivity range based on historical aquifer performance tests (revised 4/2019).
6. Effective porosity based on default values for effective porosity recommended by USEPA for a silty sand-type soil (USEPA, 1996)

TABLE 5
ANALYTICAL DATA SUMMARY - POND BCD (August 2019)
GPC PLANT BRANCH
MILLDEGEVILLE, GEORGIA

Analyte	Units	PQL/RL	MDL	GROUNDWATER MONITORING WELLS											
				BRGWA-12S	BRGWA-12I	BRGWA-23S	BRGWC-25I	BRGWC-27I	BRGWC-29I	BRGWC-30I	BRGWC-32S	BRGWC-45	BRGWC-47	BRGWC-50	BRGWC-52I
				Sample Date:	8/27/2019	8/27/2019	8/29/2019	8/27/2019	8/28/2019	8/28/2019	8/27/2019	8/27/2019	8/28/2019	8/28/2019	8/29/2019
Appendix III															
BORON, TOTAL	mg/L	0.05	0.021	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CALCIUM, TOTAL	mg/L	0.25	0.13	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CHLORIDE, TOTAL	mg/L	1.0	0.89	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
FLUORIDE, TOTAL	mg/L	0.2	0.082	ND	ND	ND (0.084 J)	ND (0.15 J)	ND (0.074 J)	ND (0.055 J)	ND (0.12 J)	ND	ND	ND	0.41	ND (0.087 J)
pH	S.U.	N/R	N/R	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SULFATE, TOTAL	mg/L	1.0	0.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TOTAL DISSOLVED SOLIDS	mg/L	5.0	3.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Appendix IV															
ANTIMONY, TOTAL	mg/L	0.003	0.00078	ND	0.0072	ND	ND	ND	ND	ND	ND	ND (0.00046 J)	ND	ND (0.00052 J)	ND
ARSENIC, TOTAL	mg/L	0.005	0.00057	ND	ND	ND	ND	ND (0.0014 J)	ND (0.00051 J)	ND	ND	ND (0.00058 J)	ND (0.0018 J)	ND	ND (0.00067 J)
BARIUM, TOTAL	mg/L	0.01	0.00078	0.057	0.058	0.076	0.027	0.019	0.02	0.027	0.032	0.11	0.035	0.018	0.017
BERYLLIUM, TOTAL	mg/L	0.003	0.00005	ND	ND	ND	ND	ND (0.00012 J)	ND (0.0008 J)	ND	ND	ND	ND	ND (0.0029 J)	ND
CADMIUM, TOTAL	mg/L	0.001	0.00009	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND (0.00017 J)	0.0071	ND
CHROMIUM, TOTAL	mg/L	0.01	0.0016	ND (0.0024 J)	ND (0.0023 J)	ND (0.0016 J)	ND (0.0016 J)	ND	ND	ND (0.0051 J)	ND (0.0019 J)	ND	ND (0.00092 J)	ND	ND
COBALT, TOTAL	mg/L	0.01	0.00052	ND	ND	ND (0.0015 J)	ND (0.0042 J)	0.01	ND (0.0061 J)	ND (0.0014 J)	ND	0.011	ND (0.00037 J)	1.3	ND (0.00063 J)
LEAD, TOTAL	mg/L	0.005	0.00027	ND	ND	ND (0.00007 J)	ND (0.00011 J)	ND	ND (0.00027 J)	ND	ND	ND	ND	ND (0.000049 J)	ND
LITHIUM, TOTAL	mg/L	0.005	0.00095	ND	ND (0.0039 J)	ND (0.007 J)	ND	ND (0.0016 J)	ND (0.0033 J)	ND (0.016 J)	ND (0.0022 J)	ND (0.0034 J)	ND (0.044 J)	0.039	ND (0.0052 J)
MERCURY, TOTAL	mg/L	0.01	0.0014	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MOLYBDENUM, TOTAL	mg/L	0.005	0.00095	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
RADIUM (226 + 228)	pCi/L	1	varies	1.32	1.31	1.45 U	0.910 U	0.643 U	1.76	1.35	0.860 U	0.528 U	0.804 U	1.33	1.44
SELENIUM, TOTAL	mg/L	0.001	0.00014	ND	ND	ND (0.0023 J)	ND	ND (0.0017 J)	ND	ND (0.0038 J)	0.057	ND	ND	ND	ND
THALLIUM, TOTAL	mg/L	0.01	1.9E-03	ND	ND	ND	ND	ND	ND (0.00017 J)	ND	ND	ND	ND	ND	ND

NOTES:

1. mg/L - Milligrams per Liter
2. pCi/L - picocuries per Liter
3. J - Result is an estimated value. The result is greater than or equal to the Method Detection Limit (MDL) and less than the Practical Quantitation Limit (PQL). Values are displayed as less than the PQL with a J.
4. ND - Constituent was analyzed for, but was not detected above the MDL and is considered a non-detect.
5. Radium data is a combination of radium isotopes 226 and 228. When results are reported below the MDC (Minimum Detectable Concentration), data is displayed as less than the MDC. The MDC varies depending upon the sample amount and elapsed time of the measurement.
6. NA - Constituent was not analyzed pursuant to 257.95(d)(1).

TABLE 6
ANALYTICAL DATA SUMMARY - POND BCD (October 2019)
GPC PLANT BRANCH
MILLDEGEVILLE, GEORGIA

Analyte	Units	PQL/RL	MDL	GROUNDWATER MONITORING WELLS											
				BRGWA-12S	BRGWA-12I	BRGWA-23S	BRGWC-25I	BRGWC-27I	BRGWC-29I	BRGWC-30I	BRGWC-32S	BRGWC-45	BRGWC-47	BRGWC-50	BRGWC-52I
				Sample Date:	10/15/2019	10/15/2019	10/15/2019	10/15/2019	10/17/2019	10/16/2019	10/17/2019	10/17/2019	10/17/2019	10/16/2019	10/16/2009
Appendix III															
BORON, TOTAL	mg/L	0.04	0.0049	ND	ND (0.006 J)	ND (0.022 J)	1.2	0.89	1.2	1.6	1.6	ND (0.027 J)	0.36	0.31	1.3
CALCIUM, TOTAL	mg/L	0.25	0.13	6.2	15.9	8.6	48.3	76.8	54	92.6	52.7	43.7	338	241	48.4
CHLORIDE, TOTAL	mg/L	1.0	0.89	3.4	3.1	3.5	5	5.6	6.9	5	6.6	52.8	4.6	21.9	7
FLUORIDE, TOTAL	mg/L	0.2	0.082	ND	ND (0.047 J)	ND	ND (0.16 J)	ND (0.18 J)	ND (0.11 J)	ND (0.26 J)	ND (0.11 J)	ND (0.19 J)	ND (0.076 J)	0.39	ND (0.22 J)
pH	S.U.	N/R	N/R	6.61	6.80	5.70	6.00	6.01	4.79	6.43	6.09	5.93	5.90	5.36	7.00
SULFATE, TOTAL	mg/L	1.0	0.7	ND (0.61 J)	1.9	30	174	241	266	327	293	105	1560	1590	155
TOTAL DISSOLVED SOLIDS	mg/L	5.0	3.4	89	134	124	380	422	2030	612	526	362	2220	2280	346
Appendix IV															
ANTIMONY, TOTAL	mg/L	0.003	0.00027	ND	0.012	ND	ND	ND	ND	ND	ND	ND (0.00088 J)	ND	ND	ND
ARSENIC, TOTAL	mg/L	0.005	0.00035	ND (0.00046 J)	ND (0.00088 J)	ND (0.00075 J)	ND (0.00052 J)	ND (0.0011 J)	ND (0.00065 J)	ND (0.00056 J)	ND (0.00053 J)	ND (0.00070 J)	ND	ND	ND (0.0026 J)
BARIUM, TOTAL	mg/L	0.01	0.00049	0.053	0.06	0.069	0.027	0.016	0.019	0.021	0.028	0.099	0.032	0.017	0.015
BERYLLIUM, TOTAL	mg/L	0.003	0.000074	ND	ND	ND	ND	ND (0.00012 J)	ND (0.00072 J)	ND	ND	ND	ND	ND (0.0027 J)	ND
CADMIUM, TOTAL	mg/L	0.0025	0.00011	ND	ND	ND	ND	ND	ND	ND	ND	ND (0.00011 J)	ND (0.00018 J)	0.014	ND
CHROMIUM, TOTAL	mg/L	0.01	0.00039	ND (0.0023 J)	ND (0.0021 J)	ND (0.0017 J)	ND (0.00098 J)	ND	ND	ND	ND (0.0014 J)	ND	ND	ND (0.0005 J)	ND
COBALT, TOTAL	mg/L	0.005	0.0003	ND	ND	ND (0.0011 J)	ND (0.0043 J)	0.0086	0.0058	ND (0.0012 J)	ND	0.0076	ND (0.00032 J)	1.4	ND
LEAD, TOTAL	mg/L	0.005	0.000046	ND	ND	ND	ND	ND (0.000063 J)	ND (0.00027 J)	ND	ND	ND	ND	ND (0.000085 J)	ND
LITHIUM, TOTAL	mg/L	0.03	0.00078	ND	ND (0.0037 J)	ND (0.0069 J)	ND	ND (0.0014 J)	ND (0.0029 J)	ND (0.013 J)	ND (0.0022 J)	ND (0.0033 J)	0.038	0.034	ND (0.0023 J)
MERCURY, TOTAL	mg/L	0.01	0.0014	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MOLYBDENUM, TOTAL	mg/L	0.01	0.00095	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
RADIUM (226 + 228)	pCi/L	1	varies	1.05 U	1.13 U	1.69	1.06 U	1.07 U	1.69 U	1.25 U	1.20 U	0.977 U	1.28 U	2.51	2.13
SELENIUM, TOTAL	mg/L	0.01	0.0013	ND	ND	ND (0.0022 J)	ND	ND (0.0036 J)	ND	ND (0.0018 J)	0.1	ND (0.00029 J)	ND (0.0017 J)	ND (0.002 J)	ND
THALLIUM, TOTAL	mg/L	0.001	0.000052	ND	ND	ND	ND	ND	ND (0.00017 J)	ND	ND	ND	ND	ND	ND

NOTES:

1. mg/L - Milligrams per Liter
2. pCi/L - picocuries per Liter
3. J - Result is an estimated value. The result is greater than or equal to the Method Detection Limit (MDL) and less than the Practical Quantitation Limit (PQL). Values are displayed as less than the PQL with a J.
4. ND - Constituent was analyzed for, but was not detected above the MDL and is considered a non-detect.
5. Radium data is a combination of radium isotopes 226 and 228. When results are reported below the MDC (Minimum Detectable Concentration), data is displayed as less than the MDC. The MDC varies depending upon the sample amount and elapsed time of the measurement.
6. NA - Constituent was not detected during the August 2019 Annual Appendix IV scan and therefore is not required for analyses during semi-annual sampling events pursuant to 257.95 (d)(1).

APPENDIX A

Well/Piezometer Installation Reports

October 2, 2018

Project No. 166625403

Mr. Joju Abraham, PG

Southern Company Services
241 Ralph McGill Blvd NE
Atlanta, GA 30308
jabraham@southernco.com

**PIEZOMETER INSTALLATION REPORT
GEORGIA POWER COMPANY – PLANT BRANCH, MILLEDGEVILLE, GEORGIA**

Dear Mr. Abraham

Golder Associates Inc. (Golder) is submitting this Piezometer Installation Report to Southern Company Services, Inc. (SCS) and Georgia Power Company (GPC), which documents the construction of piezometers at Plant Branch in Milledgeville, Georgia. Piezometer construction activities were performed in general accordance with the standards described in the RCRA Technical Enforcement Guidance Document (1986) and the Georgia Water Wells Standards Act of 1985. The installation of the piezometers was conducted under the oversight and direction of Rachel Kirkman, a Georgia registered Professional Geologist (PG).

The field activities for this investigation were performed in August 2018. The field work consisted of the installation and development of three (3) piezometers. SCS conducted a survey of the recently installed piezometers. A summary of the activities is presented below. Figure 1, Piezometer Location Map (in Attachment A, Figure & Tables) presents the location of each of the newly installed piezometers.

Piezometer Drilling and Construction Activities

Piezometers PZ-51S, PZ-51I, and PZ-52I/BRGWC-52I were drilled and installed by Cascade Drilling, LP, who was contracted through SCS, at the facility in August 2018. Cascade has a current and valid bond with the Water Wells Standards Advisory Council for the state of Georgia (in Attachment B, Boring Logs & Piezometer Construction Logs). The driller's name is provided on the boring/construction diagrams presented in Attachment B.

An experienced Golder geologist was present on site to oversee and record the drilling and piezometer construction under the supervision of a professional geologist registered to practice in Georgia (Rachel Kirkman). Drilling methods employed for borehole advancement were rotasonic drilling techniques with continuous core collected. The drilling equipment consisted of a full-sized Prosonic track mounted drilling rig, equipped with 4-inch sonic rods with an outer-casing sleeve. During the drilling, continuous core samples were logged in the field for lithologic and geotechnical properties.

Prior to use, and between boreholes, downhole equipment was steam cleaned. The boring (lithologic) logs and piezometer construction records for the newly installed piezometers are included in Attachment B. The

construction data are summarized in Table 1, Summary of Piezometer Construction Details, and the locations of the piezometers are provided on Figure 1.

Piezometers were constructed within the borehole using factory-cleaned and sealed Schedule 40 polyvinyl chloride (PVC) products with flush-threaded fittings. Specifically, piezometers were constructed with a 10-foot section of 4-inch outer diameter (OD) and 2-inch inner diameter (ID), flush-threaded, 0.010-inch factory-slotted PVC pre-packed screens. The drillers filled the annulus of each pre-pack screen section with No. 10 filter sand. In each case, the screen was placed near the bottom of the borehole, with the remainder of the piezometer constructed from 10-foot sections of 2-inch ID, flush-threaded, PVC casing riser. A flush-threaded PVC end cap placed on the bottom of each piezometer to provide a 0.4-foot sump/sediment trap, and the top of the piezometers extend approximately 30 inches above grade. The PVC products used were American Society for Testing and Materials (ASTM) and National Sanitation Foundation (NSF) rated.

Following placement of the screen and casing, the annular space in each borehole adjacent to the screen was filled with U.S. Standard Sieve size No. 20-40 filter pack sand as appropriate for the formation. The filter pack sand was placed into the borehole and extends approximately 2 feet above the screen. Immediately following placement of the filter pack, each piezometer was pumped using a portable submersible pump until visibly clear water was discharged. If settling occurred during pumping, additional sand was placed so that the filter sand thickness was approximately 2 feet above the screen. A filter pack seal, composed of approximately 5 feet of hydrated time-release coated bentonite pellets, was then placed on top of the filter pack by slowly pouring the material down the borehole and tamping it into place with a tremie pipe. The bentonite was hydrated using potable water and allowed to cure for two hours prior to grouting the piezometer.

Following hydration of the bentonite, the remaining annular space was grouted with a Portland cement / Quick Gel mixture consisting of approximately 5% bentonite, and approximately 10 pounds per gallon, to 3 feet below ground surface using a tremie method. Each piezometer surface completion consists of a locked, aluminum protective casing and a 4-foot by 4-foot by 4-inch concrete pad.

Piezometer Development Activities

The newly installed piezometers were developed in August 2018 in accordance with the Monitoring Well Development Procedures prepared by Southern Company Services, Inc. (March 2016). The piezometers were surged using a Reclaimer pump system. During development, water quality measurements of pH, temperature, specific conductance, and turbidity were periodically collected using field-calibrated water quality equipment after the piezometer responded to improving conditions. Development activities were conducted utilizing an In-Situ SmarTroll and a Lamotte 2020 turbidimeter for monitoring water quality measurements. Development forms are included in Attachment C, Piezometer Development Logs, and summarized on Table 2, Summary of Piezometer Development.

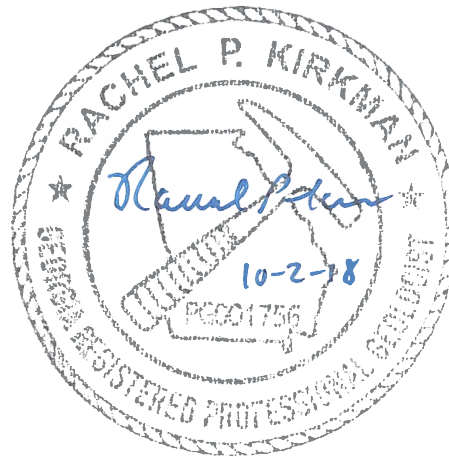
As presented on the development forms, 112.5 gallons (PZ-51S), 105 gallons (PZ- 51I), and 65 gallons (PZ-52I/BRGWC-52I) of water were removed from each piezometer during development. During development, attempts were made for each piezometer to achieve a turbidity value below 10 nephelometric turbidity units (NTUs). Water levels for the newly installed and developed piezometers was collected following development and included on the well construction diagrams. The measurements were collected using a decontaminated electronic water level indicator. The surveyed point on the top of the casing was used as reference, and the measurements were recorded to within 0.01 foot.

Piezometer Survey

The newly installed piezometers were surveyed on August 10, 2018 by SCS's Engineering and Civil Field Services group. The survey was completed using LEICA GS14 Antenna and CS15 Sensor with a positional tolerance of 0.10'H:V. Surveyed locations and elevations are presented on the boring/construction diagrams and a site map showing the locations of the newly installed piezometers is presented in Figure 1.

We appreciate the opportunity to assist SCS and GPC with this project. Should you have any questions or require additional information, please contact the undersigned at (770) 496-1893.

Golder Associates Inc.



Rachel P. Kirkman, PG
Associate and Senior Consultant

A handwritten signature in black ink, appearing to read 'Dawn L. Prell'.

Dawn L. Prell
Senior Hydrogeologist

dlp/rpk

CC: Georgia Power Company - Plant Branch
Tyler J. Boyles, Georgia Power Company

Attachments: Attachment A Figure & Tables
Attachment B Boring Logs/Piezometer Construction Diagrams
Attachment C Well Development Forms

[https://golderassociates.sharepoint.com/sites/11952g/shared documents/200 reports/1666254-03 pz50 investigation and well installation/report/1666254.03 well installation report pond b piezo_final10.2.2018.docx](https://golderassociates.sharepoint.com/sites/11952g/shared%20documents/200%20reports/1666254-03%20pz50%20investigation%20and%20well%20installation/report/1666254.03%20well%20installation%20report%20pond%20b%20piezo_final10.2.2018.docx)

ATTACHMENT A

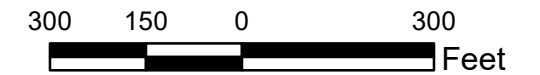
FIGURE & TABLES



- LEGEND**
- MONITORING WELL (ELEVATION feet AMSL)
 - PIEZOMETER (ELEVATION feet AMSL)
 - ESTIMATED GROUNDWATER SURFACE CONTOUR (feet AMSL)
 - PROPERTY BOUNDARY
 - APPROXIMATE SURFACE WATER LIMITS
 - APPROXIMATE ASH POND BOUNDARY

- NOTES**
1. GROUNDWATER SURFACE CONTOUR INTERVAL = 10 FEET
 2. GROUNDWATER CONTOURS BASED ON LINEAR INTERPOLATION BETWEEN AND EXTRAPOLATION FROM KNOWN DATA, AND TOPOGRAPHIC CONTOURS. THEREFORE, CONTOURS MAY NOT REFLECT ACTUAL CONDITIONS.
 3. AMSL=ABOVE MEAN SEA LEVEL.
 4. GROUNDWATER CONTOURS BASED ON ELEVATIONS MEASURED ON JUNE 25, 2018.

- REFERENCE**
1. SERVICE LAYER CREDITS: ESRI, HERE, GARMIN, © OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY
 2. COORDINATE SYSTEM: NAD 1983 STATE PLAN GEORGIA WEST (U.S. FEET).
 3. BORING/WELL/PIEZOMETER LOCATIONS AND PROPERTY LINE PROVIDED BY SOUTHERN COMPANY SERVICES, INC.
 4. TOPOGRAPHY OBTAINED BY NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION WEBSITE, WWW.COAST.NOAA.GOV, JUNE 2016.



CLIENT
GEORGIA POWER COMPANY
 PLANT BRANCH



PROJECT
GROUNDWATER MONITORING PLAN

TITLE
PIEZOMETER LOCATION MAP

CONSULTANT	YYYY-MM-DD	2018-07-15
	PREPARED	DJC
	DESIGN	DLP
	REVIEW	dlp
	APPROVED	rpk

PROJECT No. 1666254 CONTROL 1666254F002-GIS.mxd Rev. 0 FIGURE 1

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar

Path: H:\1666254-SCS-Plant Branch\GIS\MapF-Piezometer Locations\1666254F002-GIS.mxd

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET HAS BEEN MODIFIED FROM ANSIB

TABLE 1.
PIEZOMETER CONSTRUCTION DETAILS
Georgia Power Company - Plant Branch
Milledgeville, Georgia

BOREHOLE ID	LATITUDE	LONGITUDE	NAD 83 NORTHING	NAD 83 EASTING	ELEVATION TOP OF PVC (feet msl)	ELEVATION GROUND SURFACE (feet msl)	ROCK TYPE	TOTAL DEPTH (feet bgs)	DEPTH TO BEDROCK (feet bgs)	SCREENED INTERVAL (feet bgs)	FORMATION SCREENED	CORE AVAILABLE	WATER LEVEL (feet bTOC) (9/18/2018) ^[1]	DATE INSTALLED
PZ-51S	33.1904759	-83.2976469	1161613.91	2562432.18	380.19	377.63	N/A	50.0	Not Encountered	40.0-45.0	Overburden	Yes	38.90	8/2/2018
PZ-51I	33.1905240	-83.2976265	1161631.46	2562438.27	380.60	377.79	Biotite Gneiss	65.0	58.0	54.9-64.9	Weathered Rock	Yes	35.40	8/1/2018
BRGWC / PZ-52I	33.1895523	-83.2985957	1161275.44	2562144.69	383.83	380.93	Biotite Gneiss	75.0	50.0	63.9-73.9	Weathered Rock	Yes	39.26	8/6/2018

Notes:

MSL - mean sea level

NAD - North American Datum

NAVD - North American Vertical Datum

NA - Not Available

bgs - Below ground surface

bTOC - Below Top of Casing

[1] Depth to water recorded 9/18/2018 during sampling event

Table 2
Summary of Piezometer Development Data
Georgia Power Company - Plant Branch
Milledgeville, Georgia

Piezometer ID	Date Started	Time Started (hr:min)	Elapsed Time (hr:min)	Development Method	Measured Total Depth of Well (ft. bTOC)	Initial Water level (ft. bTOC)	Final Water Level (ft. bTOC)	Volume of Casing (gal)	Total Volume Removed (gal)	pH (S.U.)	Specific Conductance (mS/cm)	Temp (°C)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Comments
PZ-51S	8/2/2018	9:25	5:31	Reclaimer	45.26	36.53	37.15	1.42	112.5	6.18	180.04	23.04	8.50	97.11	4.43	Well Purged dry 3 times during development. Field parameters recorded during 1of flow sampling immediately following development.
PZ-51I	8/3/2018	8:50	3:00	Reclaimer	65.00	35.18	35.80	4.86	67.5	5.47	1940.69	24.32	4.98	155.39	1.21	Field parameters recorded during 1of flow sampling immediately following development.
BRGWC-52I / PZ-52I	8/9/2018	12:10	3:00	Reclaimer	73.60	35.88	36.23	6.15	65.0	6.28	503.21	23.12	4.86	30.12	0.21	Field parameters recorded during 1of flow sampling immediately following development.
	8/23/2018	8:25	1:23	Reclaimer	76.60	39.11	39.65	6.11	40.0	6.75	421.03	23.70	3.20	-1.41	8.84	Well Redeveloped Particulate matter observed in discharge, despite the low turbidity (<2 NTU)

Notes:

Recorded field parameter data was taken from SmarTroll Logs.

hr:min - hours:minutes

ft bTOC - feet below Top of Casing

gal - gallons

SU - Standard Units

mS/cm - millisiemens per centimeter

oC - degrees Celcius

NTU - nephelometric turbidity units

mV - millivolts

mg/L - milligrams per liter

ORP - oxygen reduction potential

DO - dissolved oxygen

ATTACHMENT B

**BORING LOGS & PIEZOMETER
CONSTRUCTION LOGS**

RECORD OF BOREHOLE PZ-511

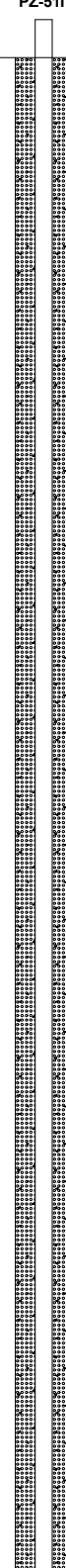
SHEET 1 of 2

PROJECT: Plant Branch
 PROJECT NUMBER: 1666254-01
 DRILLED DEPTH: 65.00 ft

DRILL RIG: 8140LC
 DATE STARTED: 8/1/18
 DATE COMPLETED: 8/1/18

NORTHING: 1,161,631.46
 EASTING: 2,562,438.27
 GS ELEVATION: 377.79 ft
 TOC ELEVATION: 380.60 ft

DEPTH W.L.: 35.20 ft
 ELEVATION W.L.: 345.40 ft
 DATE W.L.: 8/3/18
 TIME W.L.: 08:33:00

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE			SAMPLES				DIAGRAM and NOTES MONITORING WELL/ PIEZOMETER	WELL CONSTRUCTION DETAILS	
		DESCRIPTION	USCS	GRAPHIC LOG	ELEV. DEPTH (ft)	PID (ppm)	NUMBER	TYPE			REC / ATT
0		0.00 - 10.00 Soil was hydrovacuumed to 10 feet.							PZ-511 	PZ-511 Borehole Diameter: 6 WELL CASING Interval: 0-65' Material: Schedule 40 PVC Diameter: 2" Joint Type: Flush/Screen WELL SCREEN Interval: 54.9-64.9' Material: 0.010" Slotted Schedule 40 PVC Pre-Pack Screen Diameter: 2 Slot Size: 0.010 End Cap: 65.3 FILTER PACK Interval: 52.5-65.0 Type: FilterSil Quantity: 5 - 50 lb bags FILTER PACK SEAL Interval: 49.2-52.5' Type: 3/8" PEL-PLUG Quantity: 5 gallons ANNULUS SEAL Interval: 0-49.2 Type: Portland Cement and Quick Gel Bentonite Mix Quantity: Cement: 6 - 94lb bags Water: 75 gallons	
10		10.00 - 20.00 silty SAND, reddish brown with white mottling, fine to coarse, some relic structure, non-cohesive, dy, loose	SM	[Graphic Log]	367.79 10.00	No Data	S - 1	ROTO SONIC			2.70 10.00
20		20.00 - 25.00 silty SAND with trace gravel, fine to coarse	SM	[Graphic Log]	357.79 20.00	No Data	S - 2	ROTO SONIC			4.00 5.00
30		25.00 - 35.00 silty SAND with some boulders > 3inches, dark brown fine to coarse, non-cohesive, dry, loose to compact	SM	[Graphic Log]	352.79 25.00	No Data	S - 3	ROTO SONIC			8.40 10.00
40		35.00 - 45.00 silty SAND, fine to coarse, relic granitic structure, micaceous, non-cohesive, moist, loose to compact	SM	[Graphic Log]	342.79 35.00	No Data	S - 4	ROTO SONIC			5.50 10.00
		Log continued on next page								Portland Cement and Quick Gel Bentonite Mix	

AA BOREHOLE RECORD PLANT_BRANCH_20181002.GPJ GOLDBER NJ-PA 05-24-06.GDT 10/2/18

LOG SCALE: 1 in = 5 ft
 DRILLING COMPANY: Cascade Environmental, LLC
 DRILLER: M. Rodriguez

GA INSPECTOR: Ben Hodges
 CHECKED BY: Rachel Kirkman, PG
 DATE: 9/6/18



RECORD OF BOREHOLE PZ-511

SHEET 2 of 2

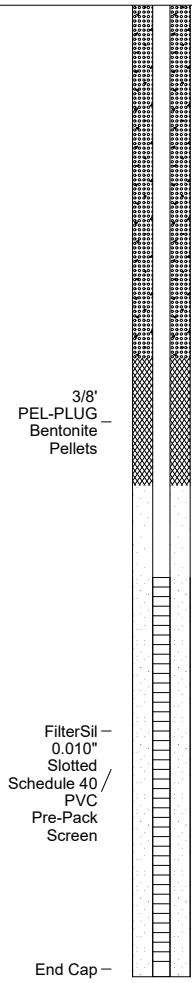
PROJECT: Plant Branch
 PROJECT NUMBER: 1666254-01
 DRILLED DEPTH: 65.00 ft

DRILL RIG: 8140LC
 DATE STARTED: 8/1/18
 DATE COMPLETED: 8/1/18

NORTHING: 1,161,631.46
 EASTING: 2,562,438.27
 GS ELEVATION: 377.79 ft
 TOC ELEVATION: 380.60 ft

DEPTH W.L.: 35.20 ft
 ELEVATION W.L.: 345.40 ft
 DATE W.L.: 8/3/18
 TIME W.L.: 08:33:00

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE			SAMPLES			DIAGRAM and NOTES MONITORING WELL/ PIEZOMETER	WELL CONSTRUCTION DETAILS
		DESCRIPTION	USCS	GRAPHIC LOG	ELEV. DEPTH (ft)	PID (ppm)	NUMBER		
40		35.00 - 45.00 silty SAND, fine to coarse, relic granitic structure, micaceous, non-cohesive, moist, loose to compact <i>(Continued)</i>	SM		332.79 45.00	No Data	S - 4	ROTO SONIC	5.50 10.00
45		45.00 - 53.50 high plastic CLAY, clay with some sand, sand fine to medium, light reddish brown, cohesive, moist to wet, stiff	CH		330	No Data	S - 5	ROTO SONIC	8.50 8.50
50		53.50 - 55.00 silty Sand, reddish brown, relic foliation, micaceous, moist, loose to compact	SM		325	No Data	S - 6	ROTO SONIC	-
55		55.00 - 58.00 Saprolite, silty SAND with some gravel, sand and gravel fine to coarse	SM		320	No Data	S - 6	ROTO SONIC	6.50
60		58.00 - 60.00 BIOTITE GNEISS, gravel, highly weathered, very weak dry	BR		315	No Data	S - 7	ROTO SONIC	3.10 5.00
65		60.00 - 65.00 BIOTITE GNEISS, banded white with dark brown, large grained, highly weathered, strong	BR		65	No Data	S - 7	ROTO SONIC	3.10 5.00
70		Boring completed at 65.00 ft							



PZ-511
 Borehole Diameter: 6

WELL CASING
 Interval: 0-65'
 Material: Schedule 40 PVC
 Diameter: 2"
 Joint Type: Flush/Screen

WELL SCREEN
 Interval: 54.9-64.9'
 Material: 0.010" Slotted Schedule 40 PVC Pre-Pack Screen
 Diameter: 2"
 Slot Size: 0.010
 End Cap: 65.3

FILTER PACK
 Interval: 52.5-65.0
 Type: FilterSil
 Quantity: 5 - 50 lb bags

FILTER PACK SEAL
 Interval: 49.2-52.5'
 Type: 3/8" PEL-PLUG
 Quantity: 5 gallons

ANNULUS SEAL
 Interval: 0-49.2
 Type: Portland Cement and Quick Gel Bentonite Mix
 Quantity: Cement: 6 - 94lb bags
 Water: 75 gallons

AA BOREHOLE RECORD PLANT_BRANCH_20181002.GPJ GOLDR NJ-PA 05-24-06.GDT 10/2/18

LOG SCALE: 1 in = 5 ft
 DRILLING COMPANY: Cascade Environmental, LLC
 DRILLER: M. Rodriguez

GA INSPECTOR: Ben Hodges
 CHECKED BY: Rachel Kirkman, PG
 DATE: 9/6/18



RECORD OF BOREHOLE PZ-51S

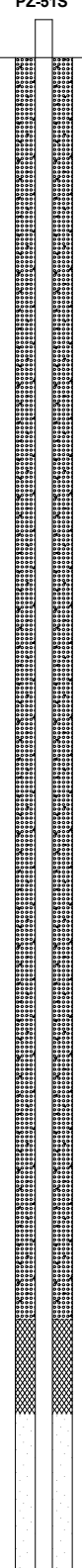
SHEET 1 of 2

PROJECT: Plant Branch
 PROJECT NUMBER: 1666254-01
 DRILLED DEPTH: 50.00 ft

DRILL RIG: 8140LC
 DATE STARTED: 8/2/18
 DATE COMPLETED: 8/2/18

NORTHING: 1,161,613.91
 EASTING: 2,562,432.18
 GS ELEVATION: 377.63 ft
 TOC ELEVATION: 380.19 ft

DEPTH W.L.: 35.60 ft
 ELEVATION W.L.: 344.59 ft
 DATE W.L.: 8/1/18
 TIME W.L.: 14:56:00

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE			SAMPLES			DIAGRAM and NOTES MONITORING WELL/ PIEZOMETER	WELL CONSTRUCTION DETAILS	
		DESCRIPTION	USCS	GRAPHIC LOG	ELEV. DEPTH (ft)	PID (ppm)	NUMBER			TYPE
0	377.63	0.00 - 10.00 Soil was hydrovacuumed to 10 feet.			367.63 10.00				<div style="text-align: center;"> PZ-51S 2.56 ft-ags Stick up  </div>	PZ-51S Borehole Diameter: 6 WELL CASING Interval: 0-50' Material: Schedule 40 PVC Diameter: 2" Joint Type: Flush/Screen WELL SCREEN Interval: 40.0-45.0' Material: 0.010" Slotted Schedule 40 PVC Pre-Pack Screen Diameter: 2 Slot Size: 0.10 End Cap: 45.4 FILTER PACK Interval: 35.7-47 Type: FilterSilt Quantity: 4 - 50lb bags FILTER PACK SEAL Interval: 45.4-47.0' Type: 3/8" PEL-PLUG Quantity: 5 gallons ANNULUS SEAL Interval: 0-33.2' Type: Portland Cement and Quick Gel Bentonite Mix Quantity: Cement: 4 - 94lb bags Water: 20 gallons
10	367.63	10.00 - 20.00 Silty SAND, reddish brown, fine to medium grained, some relic structure, micaceous, cohesive, w>PL, dry, loose	SM	No Data	S - 1	ROTO SONIC	3.70 10.00			
20	357.63	20.00 - 30.00 Silty SAND, reddish brown with black sand intrusions, fine to medium grained, micaceous, non-cohesive, moist, loose	SM	No Data	S - 2	ROTO SONIC	9.10 10.00			
30	347.63	30.00 - 35.00 silty to clayey SAND, reddish brown w/ black sand intrusions, fine to medium grain, micaeocous, non-cohesive, moist to wet	SC-SM	No Data	S - 3	ROTO SONIC	5.00 5.00			
35	342.63	35.00 - 45.00 silty SAND, reddish brown, fine to medium grained, micaceous, non-cohesive, moist to wet	SM	No Data	S - 4	ROTO SONIC	10.00 10.00			
40		Log continued on next page								

AA BOREHOLE RECORD PLANT_BRANCH_20181002.GPJ GOLDR NJ-PA 05-24-06.GDT 10/2/18

LOG SCALE: 1 in = 5 ft
 DRILLING COMPANY: Cascade Environmental, LLC
 DRILLER: M.Rodriguez

GA INSPECTOR: Ben Hodges
 CHECKED BY: Rachel Kirkman, PG
 DATE: 9/6/18



RECORD OF BOREHOLE PZ-51S

SHEET 2 of 2

PROJECT: Plant Branch
 PROJECT NUMBER: 1666254-01
 DRILLED DEPTH: 50.00 ft

DRILL RIG: 8140LC
 DATE STARTED: 8/2/18
 DATE COMPLETED: 8/2/18

NORTHING: 1,161,613.91
 EASTING: 2,562,432.18
 GS ELEVATION: 377.63 ft
 TOC ELEVATION: 380.19 ft

DEPTH W.L.: 35.60 ft
 ELEVATION W.L.: 344.59 ft
 DATE W.L.: 8/1/18
 TIME W.L.: 14:56:00

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE			SAMPLES				DIAGRAM and NOTES MONITORING WELL/ PIEZOMETER	WELL CONSTRUCTION DETAILS	
		DESCRIPTION	USCS	GRAPHIC LOG	ELEV. DEPTH (ft)	PID (ppm)	NUMBER	TYPE			REC / ATT
40		35.00 - 45.00 silty SAND, reddish brown, fine to medium grained, micaeous, non-cohesive, moist to wet <i>(Continued)</i>	SM		332.63 45.00	No Data	S - 4	ROTO SONIC	10.00 10.00	<p style="text-align: center;">PZ-51S</p>	<p>PZ-51S Borehole Diameter: 6</p> <p>WELL CASING Interval: 0-50' Material: Schedule 40 PVC Diameter: 2" Joint Type: Flush/Screen</p> <p>WELL SCREEN Interval: 40.0-45.0' Material: 0.010" Slotted Schedule 40 PVC Pre-Pack Screen Diameter: 2 Slot Size: 0.10 End Cap: 45.4</p> <p>FILTER PACK Interval: 35.7-47 Type: FilterSil Quantity: 4 - 50lb bags</p> <p>FILTER PACK SEAL Interval: 45.4-47.0' Type: 3/8" PEL-PLUG Quantity: 5 gallons</p> <p>ANNULUS SEAL Interval: 0-33.2' Type: Portland Cement and Quick Gel Bentonite Mix Quantity: Cement: 4 - 94lb bags Water: 20 gallons</p>
45		45.00 - 50.00 high plastic CLAY with some sand, dark brown, fine to coarse sand, dark brown, cohesive, dry, firm to stiff	CH		327.63	No Data	S - 5	ROTO SONIC	5.00 5.00		
50		Boring completed at 50.00 ft									

AA BOREHOLE RECORD PLANT_BRANCH_20181002.GPJ GOLDR NJ-PA 05-24-06.GDT 10/2/18

LOG SCALE: 1 in = 5 ft
 DRILLING COMPANY: Cascade Environmental, LLC
 DRILLER: M.Rodriguez

GA INSPECTOR: Ben Hodges
 CHECKED BY: Rachel Kirkman, PG
 DATE: 9/6/18



RECORD OF BOREHOLE BRGWC-521/PZ-521

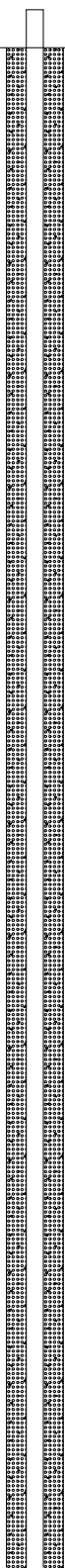
SHEET 1 of 2

PROJECT: Plant Branch
 PROJECT NUMBER: 1666254-01
 DRILLED DEPTH: 75.00 ft

DRILL RIG: 8140LC
 DATE STARTED: 8/6/18
 DATE COMPLETED: 8/6/18

NORTHING: 1,161,275.44
 EASTING: 2,562,144.69
 GS ELEVATION: 380.93 ft
 TOC ELEVATION: 383.83 ft

DEPTH W.L.: 35.99 ft
 ELEVATION W.L.: 347.84 ft
 DATE W.L.: 8/9/18
 TIME W.L.: 11:45:00

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE				SAMPLES				DIAGRAM and NOTES MONITORING WELL/ PIEZOMETER	WELL CONSTRUCTION DETAILS	
		DESCRIPTION	USCS	GRAPHIC LOG	ELEV. DEPTH (ft)	PID (ppm)	NUMBER	TYPE	REC / ATT			
0	380	0.00 - 8.00 Soil was hydrovacuum to 8 feet			372.93 8.00						PZ-521 	PZ-521 Borehole Diameter: 6 WELL CASING Interval: 0-73.9' Material: Schedule 40 PVC Diameter: 2" Joint Type: Flush/Screen WELL SCREEN Interval: 63.9-73.9' Material: 0.010" Slotted Schedule 40 PVC Pre-Pack Screen Diameter: 2 Slot Size: 0.010 End Cap: 73.9 FILTER PACK Interval: 59.7-73.9 Type: FilterSil Quantity: 5 - 50lb bags FILTER PACK SEAL Interval: 50.4-59.7 Type: 3/8" PEL-PLUG Quantity: 10 gallons ANNULUS SEAL Interval: 0.50.4' Type: Portland Cement and Quick Gel Bentonite Mix Quantity: Cement: 6 - 94lb bags Water: 75 gallons
		8.00 - 10.00 Loss of material			370.93 10.00							
		10.00 - 18.00 sandy SILT w/ trace gravel, fine to coarse, weathered, micaceous, fill, moist to dry, loose to compact, non-cohesive	MLS			No Data	S - 1	ROTO SONIC	4.00 10.00			
		18.00 - 20.00 sandy SILT, fine to coarse, weathered, dry, loose, non-cohesive, trace gravel at bottom	MLS		362.93 18.00							
		20.00 - 26.00 sandy SILT with trace gravel, dark brown, micaceous, sand/gravel fine to coarse, loose to compact	MLS		360.93 20.00							
		26.00 - 30.00 sandy SILT with trace gravel, grey to brown, less micaceous, sand/gravel fine to coarse, moist, compact	MLS		354.93 26.00	No Data	S - 2	ROTO SONIC	7.00 10.00	Portland Cement and Quick Gel Bentonite Mix		
		30.00 - 32.50 sandy SILT with trace gravel, red, sand/gravel fine to coarse, moist, compact, non-cohesive, high plasticity	MLS		350.93 30.00							
		32.50 - 37.00 CLAY with some sand, RED, cohesive, w>PL, stiff to very stiff, sand fine to coarse, high plasticity	CH		348.43 32.50	No Data	S - 3	ROTO SONIC	10.00 10.00			
		37.00 - 40.00 sandy SILT, red, w>PL, soft to firm, sand fine to coarse, cohesive, high plasticity	MLS		343.93 37.00							
		Log continued on next page			340.93							

AA BOREHOLE RECORD PLANT_BRANCH_20181002.GPJ GOLDBER NJ-PA 05-24-06.GDT 10/2/18

LOG SCALE: 1 in = 5 ft
 DRILLING COMPANY: Cascade Environmental, LLC
 DRILLER: M.Rodriguez

GA INSPECTOR: Ben Hodges
 CHECKED BY: Rachel Kirkman, PG
 DATE: 9/6/18



RECORD OF BOREHOLE BRGWC-521/PZ-521

SHEET 2 of 2

PROJECT: Plant Branch
 PROJECT NUMBER: 1666254-01
 DRILLED DEPTH: 75.00 ft

DRILL RIG: 8140LC
 DATE STARTED: 8/6/18
 DATE COMPLETED: 8/6/18

NORTHING: 1,161,275.44
 EASTING: 2,562,144.69
 GS ELEVATION: 380.93 ft
 TOC ELEVATION: 383.83 ft

DEPTH W.L.: 35.99 ft
 ELEVATION W.L.: 347.84 ft
 DATE W.L.: 8/9/18
 TIME W.L.: 11:45:00

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE			SAMPLES				DIAGRAM and NOTES MONITORING WELL/ PIEZOMETER	WELL CONSTRUCTION DETAILS
		DESCRIPTION	USCS	GRAPHIC LOG	ELEV. DEPTH (ft)	PID (ppm)	NUMBER	TYPE		
40	340	40.00 - 45.00 silty SAND with trace gravel and clay, light grey to brown, sand/gravel fine to coarse, non-cohesive, compact to dense, wet	GM		40.00	No Data	S - 4	ROTO SONIC		PZ-521 Borehole Diameter: 6 WELL CASING Interval: 0-73.9' Material: Schedule 40 PVC Diameter: 2" Joint Type: Flush/Screen WELL SCREEN Interval: 63.9-73.9' Material: 0.010" Slotted Schedule 40 PVC Pre-Pack Screen Diameter: 2 Slot Size: 0.010 End Cap: 73.9 FILTER PACK Interval: 59.7-73.9 Type: FilterSil Quantity: 5 - 50lb bags FILTER PACK SEAL Interval: 50.4-59.7 Type: 3/8" PEL-PLUG Quantity: 10 gallons ANNULUS SEAL Interval: 0.50.4' Type: Portland Cement and Quick Gel Bentonite Mix Quantity: Cement: 6 - 94lb bags Water: 75 gallons
45	335	45.00 - 47.50 Sandy Clay, red, cohesive, very stiff w> PL, sand, fine, high plasticity	SC		335.93 45.00	No Data	S - 4	ROTO SONIC	10.00 10.00	
		47.50 - 50.00 Sandy Clay with trace gravel, red, fine to coarse, cohesive, very firm to stiff, w > PL to w ~ PL, high plasticity	SC		333.43 47.50					
50	330	50.00 - 60.00 BIOTITE GNEISS, fresh to weathered, medium to coarse, banding, black/white, weak to strong	BR		330.93 50.00	No Data	S - 5	ROTO SONIC	3.00 3.00	
55	325		BR			No Data	S - 6	ROTO SONIC	2.30 7.00	
60	320	60.00 - 70.00 BIOTITE GNEISS, fresh, banded coarse and fine grain, black/white, very strong	BR		320.93 60.00	No Data	S - 7	ROTO SONIC	6.00 10.00	
65	315		BR			No Data	S - 8	ROTO SONIC	0.00 5.00	
70	310	70.00 - 75.00 BIOTITE GNEISS, fresh, banded coarse and fine grain, black/white, very strong	BR		310.93 70.00	No Data	S - 8	ROTO SONIC	0.00 5.00	
75	305	Boring completed at 75.00 ft			305.93					

AA BOREHOLE RECORD PLANT_BRANCH_20181002.GPJ GOLDR NJ-PA 05-24-06.GDT 10/2/18

LOG SCALE: 1 in = 5 ft
 DRILLING COMPANY: Cascade Environmental, LLC
 DRILLER: M.Rodriguez

GA INSPECTOR: Ben Hodges
 CHECKED BY: Rachel Kirkman, PG
 DATE: 9/6/18



ATTACHMENT C

PIEZOMETER DEVELOPMENT LOGS



WELL DEVELOPMENT FIELD RECORD

<p>JOB NAME <u>Plant Branch Pond B</u></p> <p>DEVELOPED BY <u>K. Minkara</u></p> <p>STARTED DEVEL. <u>8-2-18 / 0920</u></p> <p style="text-align: center;">DATE TIME</p> <p>W.L. BEFORE DEVEL. <u>35.76 / 8-2-18 0923</u></p> <p style="text-align: center;">DEPTH DATE TIME</p> <p>WELL DEPTH: BEFORE DEVEL. <u>45.28</u></p> <p>STANDING WATER COLUMN (FT.) <u>9.52</u></p> <p>SCREEN LENGTH <u>5' (40-45)</u></p>	<p>JOB NO. <u>1666254.04</u> WELL NO. <u>P2-515</u></p> <p>DATE OF INSTALL. <u>8-1-18</u> SHEET <u> </u> OF <u> </u></p> <p>COMPLETED DEVEL. <u>8-2-18 / 1456</u></p> <p style="text-align: center;">DATE TIME</p> <p>AFTER DEVEL. <u>DRY</u> / /</p> <p style="text-align: center;">DEPTH DATE TIME</p> <p>AFTER DEVEL. <u>526 DRY</u> WELL DIA. (in) <u>2"</u></p> <p>STANDING WELL VOLUME <u> </u> gal.</p> <p>DRILLING WATER LOSS <u> </u> gal.</p>
---	---

DATE/TIME	VOLUME REMOVED (GALS)	FIELD PARAMETERS				REMARKS
		SPEC. COND. (umhos/cm)	TEMP. (°F)	pH (s.u.)	NTU OTHER	
8-2-18/0925	5					pump @ 41.5', WL = 41.5
0945	25					pump @ 41', WL > 41'
		222.1	23.90	8.749	71000	pump @ 42', WL =
0950	30					generator dead @ 0948 0950
1015	30					resumed dev @ 1015
1030	45	204.2	23.24	7.49	139	pump @ 42', WL = 41.85
1045	60					welder @ 1045
1130	60					resumed @ 1130
1125	65	199.30	24.47	7.63	71000	pump @ 43', WL = 36.24
1200	90					1:43' WL = 27.49
1300						DRY
1310	95					continued dev @ 0.5 gal/min WL = 36.34
1330	105	186.1	23.93	8.47	67140	pump @ 42', WL = 42.56
1430	105	184.8	23.56	7.43	83.9	- paused dev for recharge @ 42' WL > TOP @ 42'
1445	112.5					WL = 36.27, pump @ 42'
						• stopped low flow development eye to low (<100 NTU) & reduced flow.
						• see pump form for sample info
	112.5	= TOTAL VOLUME REMOVED (gal.)				

DEVELOPMENT METHOD: Reclaimer

- well went dry 3 times (60 gal, 40 gal, & 105 gal)

- completed dev then went to low-flow w/ bladder pump.

NOTES: TOP of casing @ ground surface



WELL DEVELOPMENT FIELD RECORD

JOB NAME <u>Plant Branch Pond B</u> DEVELOPED BY <u>K. McKim</u> STARTED LEVEL <u>8/23/18</u> / <u>0825</u> DATE TIME W.L. BEFORE DEVEL. <u>39.02 (btoc)</u> / <u>8/23/18</u> / <u>0753</u> DEPTH DATE TIME WELL DEPTH: BEFORE DEVEL. <u>76.60 (btoc)</u> STANDING WATER COLUMN (FT.) <u>37.58</u> SCREEN LENGTH <u>10'</u>	JOB NO. <u>166625418</u> WELL NO. <u>PZ-52I</u> DATE OF INSTALL. <u>8/9/18</u> SHEET <u>1</u> OF <u>1</u> COMPLETED LEVEL <u>8/23/18</u> / <u>0948</u> DATE TIME AFTER DEVEL. <u>39.30</u> / <u>8/23/18</u> / <u>1003</u> DEPTH DATE TIME AFTER DEVEL. <u>76.60</u> WELL DIA. (In) <u>2"</u> STANDING WELL VOLUME _____ gal. DRILLING WATER LOSS _____ gal.
--	--

DATE/TIME	VOLUME REMOVED (GALS)	FIELD PARAMETERS					REMARKS
		SPEC. COND. (umhos/cm)	TEMP. (°F)	pH (s.u.)	NTU OTHER		
<u>8/23/18 / 0825</u>	<u>-</u>	<u>pump @ 76' btoc</u>			<u>36.5</u>	<u>pump rate @ 0.5 gal/min</u>	
<u>0925</u>	<u>5</u>				<u>36.5</u>	<u>DTW = 40.95</u>	
<u>0955</u>	<u>15</u>				<u>6.22</u>	<u>DTW = 46.60</u>	
<u>0905</u>	<u>20</u>	<u>500.5</u>	<u>21.05</u>	<u>6.51</u>	<u>6.83</u>	<u>DTW = 46.60, pump @ 76'</u>	
<u>0915</u>	<u>25</u>	<u>484.6</u>	<u>20.52</u>	<u>6.45</u>	<u>1.57</u>	<u>DTW = 46.90, pump @ 74'</u>	
<u>0935</u>	<u>35</u>	<u>491.9</u>	<u>20.43</u>	<u>6.40</u>	<u>1.49</u>	<u>DTW = 46.25, pump @ 72'</u>	
				<u>6.36</u>			
<u>0945</u>	<u>40</u>	<u>477</u>	<u>21.55</u>	<u>6.35</u>	<u>1.94</u>	<u>DTW = 46.35, pump @ 72'</u>	
	<u>40</u>	= TOTAL VOLUME REMOVED (gal.)					

DEVELOPMENT METHOD: Reclaimer

NOTES: White particulates observed in water, despite very low NTU (<2).
Lamotte calibrated turbine.

Product Name: Low-Flow System

Date: 2018-08-02 16:02:59

Project Information:

Operator Name K. Minkara
Company Name Golder Associates
Project Name 1666254.04
Site Name Plant Branch
Latitude 0° 0' 0"
Longitude 0° 0' 0"
Sonde SN 463453
Turbidity Make/Model LaMotte 2020we

Pump Information:

Pump Model/Type SamplePro
Tubing Type polyethylene
Tubing Diameter .170 in
Tubing Length 42.5 ft

Pump placement from TOC 42.5 ft

Well Information:

Well ID PZ-51S
Well diameter 2 in
Well Total Depth 45.26 ft
Screen Length 5 ft
Depth to Water 36.53 ft

Pumping Information:

Final Pumping Rate 100 mL/min
Total System Volume 0.4046955 L
Calculated Sample Rate 300 sec
Stabilization Drawdown 7.44 in
Total Volume Pumped 3 L

Low-Flow Sampling Stabilization Summary

	Time	Elapsed	Temp C	pH	SpCond μ S/cm	Turb NTU	DTW ft	RDO mg/L	ORP mV
Stabilization			+/- 0.5	+/- 0.1	+/- 5%	+/- 5		+/- 10%	+/- 10
Last 5	15:41:04	600.05	23.91	6.22	178.27	17.20	36.95	5.04	93.55
Last 5	15:46:04	900.03	23.30	6.19	178.54	15.60	37.02	4.85	96.80
Last 5	15:51:04	1200.00	23.07	6.18	179.01	13.40	37.05	4.70	97.78
Last 5	15:56:05	1500.99	23.03	6.18	180.05	9.39	37.12	4.66	97.46
Last 5	16:01:08	1803.98	23.04	6.18	180.04	8.50	37.15	4.43	97.11
Variance 0			-0.22	-0.00	0.47			-0.14	0.97
Variance 1			-0.05	-0.00	1.05			-0.04	-0.32
Variance 2			0.01	-0.01	-0.01			-0.23	-0.35

Notes

Sampled PZ-51S at 1600

Grab Samples

Product Name: Low-Flow System

Date: 2018-08-03 12:13:01

Project Information:

Operator Name K. Minkara
Company Name Golder Associates
Project Name 1666254.04
Site Name Plant Branch
Latitude 0° 0' 0"
Longitude 0° 0' 0"
Sonde SN 463453
Turbidity Make/Model LaMotte 2020we

Pump Information:

Pump Model/Type SamplePro
Tubing Type polyethylene
Tubing Diameter .170 in
Tubing Length 60 ft

Pump placement from TOC 60 ft

Well Information:

Well ID PZ-51I
Well diameter 2 in
Well Total Depth 65 ft
Screen Length 10 ft
Depth to Water 35.18 ft

Pumping Information:

Final Pumping Rate 120 mL/min
Total System Volume 0.4828054 L
Calculated Sample Rate 300 sec
Stabilization Drawdown 7.44 in
Total Volume Pumped 3.6 L

Low-Flow Sampling Stabilization Summary

	Time	Elapsed	Temp C	pH	SpCond μ S/cm	Turb NTU	DTW ft	RDO mg/L	ORP mV
Stabilization			+/- 0.5	+/- 0.1	+/- 5%	+/- 5		+/- 10%	+/- 10
Last 5	11:45:05	300.04	28.35	6.14	969.00	17.60	35.75	5.33	153.20
Last 5	11:55:05	900.01	25.01	5.49	1896.21	9.46	35.80	1.50	171.93
Last 5	12:00:05	1200.00	24.67	5.48	1905.40	8.14	35.80	1.36	169.03
Last 5	12:05:05	1499.99	24.38	5.48	1929.57	5.82	35.80	1.29	162.44
Last 5	12:10:06	1800.98	24.32	5.47	1940.69	4.98	35.80	1.21	155.39
Variance 0			-0.34	-0.00	9.19			-0.14	-2.90
Variance 1			-0.29	-0.01	24.18			-0.08	-6.59
Variance 2			-0.06	-0.00	11.12			-0.08	-7.05

Notes

Sampled PZ-51I at 1210

Grab Samples

Product Name: Low-Flow System

Date: 2018-08-10 08:53:39

Project Information:

Operator Name K. Minkara
Company Name Golder Associates
Project Name 1666254.04
Site Name Plant Branch
Latitude 0° 0' 0"
Longitude 0° 0' 0"
Sonde SN 463453
Turbidity Make/Model LaMotte 2020we

Pump Information:

Pump Model/Type SamplePro
Tubing Type polyethylene
Tubing Diameter .170 in
Tubing Length 69 ft

Pump placement from TOC 69 ft

Well Information:

Well ID PZ-52I
Well diameter 2 in
Well Total Depth 73.6 ft
Screen Length 10 ft
Depth to Water 35.88 ft

Pumping Information:

Final Pumping Rate 150 mL/min
Total System Volume 0.5229762 L
Calculated Sample Rate 300 sec
Stabilization Drawdown 4.2 in
Total Volume Pumped 6 L

Low-Flow Sampling Stabilization Summary

	Time	Elapsed	Temp C	pH	SpCond μ S/cm	Turb NTU	DTW ft	RDO mg/L	ORP mV
Stabilization			+/- 0.5	+/- 0.1	+/- 5%	+/- 5		+/- 10%	+/- 10
Last 5	08:30:07	1200.00	23.23	6.28	496.12	6.85	36.23	1.13	33.59
Last 5	08:35:09	1501.99	23.21	6.28	494.78	5.87	36.23	0.94	32.96
Last 5	08:40:09	1801.98	23.15	6.28	498.32	5.36	36.23	0.81	30.50
Last 5	08:45:14	2106.97	23.13	6.28	502.56	5.05	36.23	0.65	29.24
Last 5	08:50:15	2407.96	23.12	6.28	503.21	4.86	36.23	0.21	30.12
Variance 0			-0.05	0.00	3.54			-0.13	-2.46
Variance 1			-0.03	0.00	4.24			-0.16	-1.26
Variance 2			-0.01	-0.01	0.66			-0.44	0.88

Notes

Sampled PZ-52I at 0850. WL readings reflect ft below ground surface

Grab Samples

Product Name: Low-Flow System

Date: 2018-08-23 14:24:47

Project Information:

Operator Name K. Minkara
Company Name Golder Associates
Project Name 1666154
Site Name Plant Branch
Latitude 0° 0' 0"
Longitude 0° 0' 0"
Sonde SN 465016
Turbidity Make/Model Lamotte 2020we

Pump Information:

Pump Model/Type SamplePro
Tubing Type polyethylene
Tubing Diameter .17 in
Tubing Length 71 ft

Pump placement from TOC 71 ft

Well Information:

Well ID PZ-52I
Well diameter 2 in
Well Total Depth 76.6 ft
Screen Length 10 ft
Depth to Water 39.11 ft

Pumping Information:

Final Pumping Rate 200 mL/min
Total System Volume 0.5319031 L
Calculated Sample Rate 300 sec
Stabilization Drawdown 6.48 in
Total Volume Pumped 6 L

Low-Flow Sampling Stabilization Summary

	Time	Elapsed	Temp C	pH	SpCond μ S/cm	Turb NTU	DTW ft	RDO mg/L	ORP mV
Stabilization			+/- 0.5	+/- 0.1	+/- 5%	+/- 10		+/- 10%	+/- 10
Last 5	14:00:59	600.03	24.26	6.50	455.74	4.86	39.43	9.07	34.91
Last 5	14:05:59	900.03	23.92	6.63	447.68	2.99	39.43	9.50	20.71
Last 5	14:10:59	1200.03	23.79	6.70	433.09	3.07	39.45	8.92	10.18
Last 5	14:16:00	1501.03	23.71	6.74	430.09	3.05	39.60	9.00	3.21
Last 5	14:21:00	1801.03	23.70	6.75	421.03	3.20	39.65	8.84	-1.41
Variance 0			-0.13	0.07	-14.59			-0.58	-10.53
Variance 1			-0.08	0.04	-3.00			0.08	-6.97
Variance 2			-0.01	0.01	-9.07			-0.16	-4.62

Notes

Sampled PZ-52I at 1420

Grab Samples

May 31, 2018

Project No. 1666254-02

Mr. Joju Abraham, PG

Southern Company Services, Inc.
241 Ralph McGill Blvd NE
Atlanta, GA 30308
jabraham@southerco.com

**PIEZOMETER INSTALLATION REPORT FOR SURFACE IMPOUNDMENT GEORGIA POWER PLANT
BRANCH, MILLEDGEVILLE, GEORGIA**

Dear Joju:

Golder Associates Inc. (Golder) is submitting this *Piezometer Installation Report to Southern Company Services, Inc. (SCS) and Georgia Power Company (GPC)*, which documents the construction of piezometers at Plant Branch in Milledgeville, Georgia. Piezometer construction activities were performed in general accordance with the standards described in the *RCRA Technical Enforcement Guidance Document (1986)* and the *Georgia Water Wells Standards Act of 1985*. The installation of the piezometers was conducted under the oversight and direction of Timothy Richards and Rachel Kirkman, Georgia registered Professional Geologists (PGs).

The field activities for this investigation were performed in January and February 2018. The field work consisted of the installation, development, and water level gauging of eight (8) piezometers; SCS conducted a survey of the recently installed piezometers. A summary of the activities is presented below.

Piezometer drilling and Construction Activities

Piezometers PZ-43, PZ-44, PZ-45, PZ-46, PZ-47, PZ-48, PZ-49, and PZ-50 were drilled and installed by Cascade Drilling, LP, who was contracted through SCS, at the facility in January/February 2018. Cascade has a current and valid bond with the Water Wells Standards Advisory Council for the state of Georgia (Appendix A). The driller's name is provided on the boring/construction diagrams presented in Appendix B.

An experienced Golder geologist was present on site to oversee and record the drilling and piezometer construction under the supervision of professional geologists registered to practice in Georgia (Timothy Richards and Rachel Kirkman). Drilling methods employed for borehole advancement were roto-sonic drilling techniques with continuous core collected. The drilling equipment consisted of a full-sized Prosonic track mounted drilling rig, equipped with 4-inch sonic rods with an outer-casing sleeve. During the drilling, continuous core samples were logged in the field for lithologic and geotechnical properties.

Prior to use, and between boreholes, downhole equipment was steam cleaned. The boring (lithologic) logs and piezometer construction records for the newly installed piezometers are included in Appendix B. The construction data are summarized in Table 1, and the locations of the piezometers are provided on Figure 1.

Piezometers were constructed within the borehole using factory-cleaned and sealed Schedule 40 polyvinyl chloride (PVC) products with flush-threaded fittings. Specifically, piezometers were constructed with a 10 foot section of 4-inch outer diameter (OD) and 2-inch inner diameter (ID), flush-threaded, 0.010-inch factory-slotted PVC pre-packed screen with the exception of PZ-43. PZ-43 was installed using a 10-foot section of 1-inch diameter, flush threaded, 0.010-inch factory-slotted PVC. The drillers filled the annulus of each pre-pack screen section with No. 10 filter sand, and the screen interval of PZ-43 was filled with sand down hole. In each case, the screen was placed near the bottom of the borehole, with the remainder of the piezometer constructed from 10-foot sections of 2-inch ID, flush-threaded, PVC casing riser. PZ-43 was completed using similar materials, but with 1-inch diameter pipe. A flush-threaded PVC end cap placed on the bottom of each piezometer to provide a 0.4-foot sump/sediment trap, and the top of the piezometers extend approximately 30 inches above grade. Construction details for the piezometer are shown on the boring/construction logs in Appendix B. The PVC products used were American Society for Testing and Materials (ASTM) and National Sanitation Foundation (NSF) rated.

Following placement of the screen and casing, the annular space in each borehole adjacent to the screen was filled with U.S. Standard Sieve size No. 20-40 filter pack sand as appropriate for the formation. The filter pack sand was placed into the borehole and extends approximately 2 feet above the screen. Immediately following placement of the filter pack, each piezometer was pumped using a portable submersible pump until visibly clear water was discharged. If settling occurred during pumping, additional sand was placed so that the filter sand thickness was approximately 2 feet above the screen. A filter pack seal, composed of approximately 5 feet of hydrated time-release coated bentonite pellets, was then placed on top of the filter pack by slowly pouring the material down the borehole and tamping it into place with a tremie pipe. The bentonite was hydrated using potable water and allowed to cure for two hours prior to grouting the piezometer.

Following hydration of the bentonite, the remaining annular space was grouted with a Portland cement / Quick Gel mixture consisting of approximately 5% bentonite, and approximately 10 pounds per gallon, to 3 feet below ground surface using a tremie method. Each piezometer surface completion consists of a locked, aluminum protective casing and a 4-foot by 4-foot by 4-inch concrete pad with the exception of PZ-43, which has a pad only and no protective casing.

Piezometer Development Activities

The newly installed piezometers were developed in February 2018 in accordance with the Monitoring Well Development Procedures prepared by Southern Company Services, Inc. (March 2016) except for PZ-43, due to its small diameter. The piezometer were surged using a Reclaimer pump system. During development, water quality measurements of pH, temperature, specific conductance, and turbidity were periodically collected using field-calibrated water quality equipment after the piezometer responded to improving conditions. Development activities were conducted utilizing an In-Situ SmarTroll and a Lamotte 2020 turbidimeter for monitoring water quality measurements. Development forms are included in Appendix B and summarized on Table 2.

As presented on the development forms, a minimum of 80.5 gallons (PZ-49) and a maximum of 184 gallons (PZ-50) of water were removed from each piezometer during development. During development, attempts were made for each piezometer to achieve a turbidity value below 10 nephelometric turbidity units (NTUs). A full round of water levels for the newly installed and developed piezometers was collected on February 21, 2018 (Table 3). The measurements were collected using a decontaminated electronic water level indicator. The surveyed point on the top of the casing was used as reference, and the measurements were recorded to within 0.01 foot.

Aquifer Testing Activities

Aquifer tests (slug tests) were performed on February 21, 2018 for all newly installed piezometers during the field investigation by experienced Golder representatives (Table 4). The purpose of the testing was to estimate the horizontal hydraulic conductivity of aquifer materials encountered at the site. In situ rising- and falling-head slug tests were chosen for the assessment due to the relatively low yields noted during installation and development.

Falling and rising-head tests were performed on the seven newly installed piezometers (PZ-44, PZ-45, PZ-46, PZ-47, PZ-48, PZ-49, and PZ-50). PZ-43 was not slug tested due to its one-inch diameter. Prior to slug testing, the wells were opened and groundwater levels were allowed to equilibrate. Groundwater levels were then measured using an electronic water level indicator referenced to a surveyed point on the top of the casing. A 100 pounds per square inch (psi) pressure transducer was lowered inside the well casing and placed approximately 2 feet above the bottom of the well. A PVC slug measuring 5 feet in length was then used to displace water inside the well.

The first portion of the test was a falling-head test that measured the rate water levels fell back to static levels after the insertion of the PVC slug. The pressure transducer was programmed to record changes in groundwater level at fast linear time intervals. Changes in groundwater levels were also measured with hand-held electronic water level indicators to field-verify the data collected by the transducer. Falling-head tests were terminated after water levels had recovered to within at least 90% of their pre-test level. A rising-head test was performed on each piezometer after the falling-head test was completed. The rising-head test was performed with the same methodology as the falling-head test, with the exception that the PVC slug was removed simultaneously with the start of the test.

In situ rising- and falling-head tests provide a quantitative estimate of horizontal hydraulic conductivity and a qualitative estimate of aquifer anisotropy in water-bearing units. The slug test data were analyzed using the Bouwer and Rice (1976 and 1989) equation which is applicable to fully or partially penetrating piezometers in unconfined or confined aquifers. Piezometer-specific aquifer thicknesses of approximately 11 (PZ-49) to 71 feet (PZ-47) were assumed based on unconfined aquifer water column thickness.

The computer software program AQTESOLV, produced by HydroSOLVE, Inc., was used to assist in the analysis and plotting of data. The best fit lines were initially calculated by the computer software and were then adjusted manually, where necessary, to ignore skin effects typically found at the start of aquifer tests and/or to ignore stabilized water levels at the end of the tests or fluctuations in the water level as they approached stabilization. Professional judgement was used to distinguish skin effects with the fact that during many tests, there is faster recovery near the beginning of an aquifer test than when water levels approach stabilization. The individual data points and computer plots of time versus groundwater displacement are presented in Appendix C. A summary of the aquifer testing and the calculated geometric mean for hydraulic conductivity for each of the hydrogeologic units are presented in Table 4.

Piezometer Survey

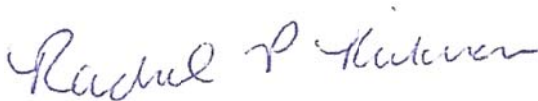
The newly installed piezometers were surveyed on February 14, 2018 by SCS's Engineering and Civil Field Services group. The survey was completed using LEICA GS14 Antenna and CS15 Sensor with a positional tolerance of 0.10'H:V. Surveyed locations and elevations are presented on the boring/construction diagrams and a site map showing the locations of the newly installed piezometers is presented in Figure 1.

Closing

We appreciate the opportunity to assist SCS and GPC with this project. Should you have any questions or require additional information, please contact the undersigned at (770) 496-1893.

Sincerely,

Golder Associates Inc.



Rachel Kirkman, P.G.
Senior Consultant & Associate



Timothy Richards, P.G.
Associate, Senior Consultant

jbh\tir\dlp

Attachments:

Figure 1 Piezometer Location Map

Table 1 Piezometer Installation Summary

Table 2 Summary of Piezometer Development Data

Table 3 Summary of Post-Development Water Level and Survey Data

Table 4 Summary of Aquifer Test Data

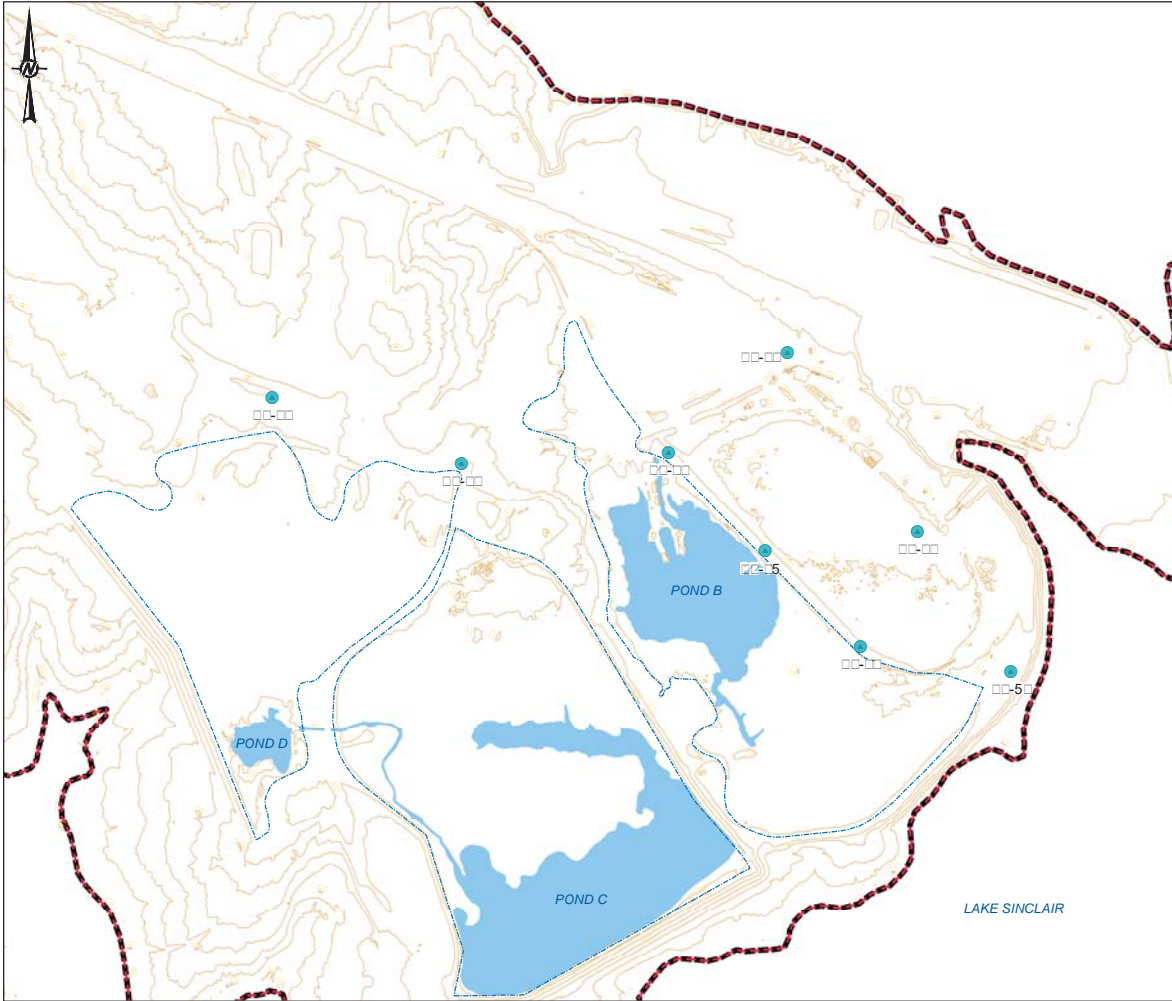
Appendix A Cascade Drilling Bond

Appendix B Boring Logs/Construction Diagrams and Development Forms

Appendix C Aquifer (Slug) Test Results

[https://golderassociates.sharepoint.com/sites/1894240/reference information/1666254-02 - branch pond b piezo installation/166625402 well installation report/branch pond b piezometer installation report_final 5.2018.docx](https://golderassociates.sharepoint.com/sites/1894240/reference%20information/1666254-02%20-%20branch%20pond%20b%20piezo%20installation/166625402%20well%20installation%20report/branch%20pond%20b%20piezometer%20installation%20report_final%205.2018.docx)

FIGURE

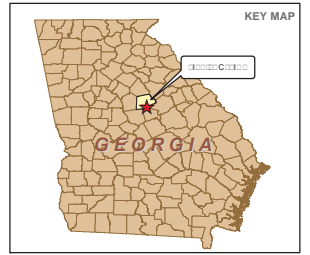


LEGEND

	DR...R...B...D...R
	DR...R...B...D...R
	DR...R...C...

REFERENCE

DR...R...C...R...D...
Z...R...R...M...D...G...R...W...
R...R...C...M...R...C...D...R...R...
R...D...B...R...C...M...R...C...



DR...R...C...M...R...C...C
DR...R...C...C
DR...R...C...M...R...C...D...R...R...
GR...D...W...R...M...R...G...R...M

Southern Company

PIEZOMETER LOCATION MAP

DR...R...C...M...R...C...C	DR...R...D	Z...R...D
DR...R...C...C	DR...R...D	D...C
DR...R...C...M...R...C...D...R...R...	DR...R...D	D...
DR...R...D...B...R...C...M...R...C...	DR...R...D	DR...R...D

GOLDER

DR...R...C...M...R...C...D...R...R...
DR...R...C...M...R...C...D...R...R...
DR...R...C...M...R...C...D...R...R...

DR...R...C...M...R...C...D...R...R...
DR...R...C...M...R...C...D...R...R...
DR...R...C...M...R...C...D...R...R...

1

TABLES

Table 1
Piezometer Installation Summary
Plant Branch

Borehole ID	Latitude	Longitude	Elevation Top of PVC (feet)	Bedrock or Overburden	Rock Type	Total Depth (feet bgs)	Screen Interval (feet bgs)	Depth to Bedrock (feet bgs)	Core Available	Water Levels (ft bgs) 2/14/2018
PZ-43	33.1919852	-83.2989422	383.75	Bedrock/Soil Interface	Biotite Gneiss	41.5	30.0 - 40.0	39.5	Yes	30.6
PZ-44	33.1907972	-83.3004071	383.12	Bedrock/Soil Interface	Biotite Gneiss	57	46.6 - 56.6	51	Yes	24.83
PZ-45	33.1921976	-83.3020666	384.61	Bedrock/Soil Interface	Biotite Gneiss	57	46.6 - 56.6	52	Yes	11.41
PZ-46	33.1936560	-83.3037406	384.70	Bedrock/Soil Interface	Biotite Gneiss	47	35.6 - 45.6	39	Yes	8.85
PZ-47	33.1935310	-83.3073442	411.32	Bedrock/Soil Interface	Biotite Gneiss	97	81.6 - 91.6	92	Yes	25.93
PZ-48	33.1945066	-83.3106408	421.05	Bedrock/Soil Interface	Biotite Gneiss	67	56.6 - 66.6	65.5	Yes	30.55
PZ-49	33.1951996	-83.3018735	385.06	Bedrock/Soil Interface	Biotite Gneiss	27	6.6 - 16.6	7	Yes	8.1
PZ-50	33.1904217	-83.2978441	381.53	Bedrock/Soil Interface	Biotite Gneiss	67	54.6 - 64.6	60	Yes	37.68

Notes:

NAD - North American Datum; NAVD - North American Vertical Datum; NA - Not available; bgs - below ground surface; TOR - Top of Rock

Table 2
Summary of Piezometer Development Data
Plant Branch

Well / Piezometer Name	Date Started	Time Started (hr:min)	Date Completed	Elapsed Time (hr:min)	Development Method	Measured Depth of Well (ft. btoc)	Initial Water Level (ft. btoc)	Final Water Level (ft. btoc)	Volume of Casing (gal)	Total Volume Removed (gal)	pH (SU)	Specific Cond (ms/cm)	Temp (°C)	Turb (NTU)	ORP (mV)	DO (mg/L)
PZ-43	1-inch Piezometer for Water Levels only - Not Developed															
PZ-44	2/12/2018	11:45	2/12/2018	4:20	Reclaimer	60.89	24.96	25.04	5.6	114.3	6.07	251.02	20.3	0.94	91.99	2.06
PZ-45	2/9/2018	9:56	2/9/2018	5:22	Reclaimer	60.48	11.12	11.49	8.0	166	5.83	501.23	19.01	4.62	123.94	0.77
PZ-46	2/8/2018	10:13	2/8/2018	4:51	Reclaimer	49.10	8.95	8.95	6.6	138	5.77	2018.19	17.81	2.90	393.00	2.54
PZ-47	2/9/2018	8:45	2/9/2018	6:15	Reclaimer	97.35	25.85	36.32	10.0	174.1	5.72	2414.53	18.75	1.48	104.81	1.66
PZ-48	2/8/2018	8:40	2/8/2018	9:00	Reclaimer	69.80	30.55	32.26	6.1	145.1	5.67	2373.43	17.89	1.55	88.54	2.08
PZ-49	2/8/2018	16:04	2/9/2018	2:41	Reclaimer	19.31	7.97	7.99	1.8	80.5	5.9	152.85	15.71	3.13	133.29	3.24
PZ-50	2/12/2018	11:22	2/12/2018	6:28	Reclaimer	69.42	38.23	38.36	5.0	184	5.49	2400.81	19.59	7.67	167.13	8.89

Notes:
 hr:min - hours:minutes; ft. btoc - feet below top of casing; gal - gallons; SU - Standard Units; mS/cm - millisiemens per centimeter; °C - degrees Celsius; NTU - nephelometric turbidity units; mv - millivolts; mg/L - milligrams per liter; Cond - conductivity; Temp - temperature; Turb - turbidity; ORP - oxygen reduction potential; DO - dissolved oxygen

Table 3
Summary of Post-Development Piezometer Water Level and Survey Data
Plant Branch

Well / Piezometer Name	Survey Date	Survey Time	Water Level (ft. btoc) (2/21/18)	Water Elevation (ft. msl)	NAD 83 Northing (ft.)	NAD 83 Easting (ft.)	Latitude (dd)	Longitude (dd)	Elevation Top of Casing (ft. msl)	Ground Surface Elevation (ft. msl)
PZ-43	2/14/2018	NA	30.73	353.02	1162159.80	2562031.35	33.1919852	-83.2989422	383.75	NA
PZ-44	2/14/2018	NA	24.98	358.14	1161723.84	2561586.79	33.1907972	-83.3004071	383.12	380.49
PZ-45	2/14/2018	NA	10.94	373.67	1162229.18	2561074.89	33.1921976	-83.3020666	384.61	381.69
PZ-46	2/14/2018	NA	9.12	375.58	1162755.59	2560558.42	33.1936560	-83.3037406	384.70	382.11
PZ-47	2/14/2018	NA	25.60	385.72	1162701.04	2559456.38	33.1935310	-83.3073442	411.32	408.87
PZ-48	2/14/2018	NA	30.64	390.41	1163047.72	2558444.99	33.1945066	-83.3106408	421.05	418.30
PZ-49	2/14/2018	NA	7.89	377.17	1163321.94	2561124.93	33.1951996	-83.3018735	385.06	382.10
PZ-50	2/14/2018	NA	38.06	343.47	1161593.68	2562372.00	33.1904217	-83.2978441	381.53	378.79

Notes:
 NA = Not Available; ft. BTOC = feet below top of casing; ft. MSL = feet mean sea level; NAD = North American Datum; dd = decimal degrees
 Survey data collected by Southern Company Services, Inc. ; Georgia NAD83 West Zone

Table 4
Summary of Aquifer Test Data
Plant Branch

PIEZOMETER IDENTIFICATION	SATURATED AQUIFER THICKNESS VALUE (feet)	SCREEN LENGTH (feet)	PIEZOMETER DIAMETER (inches)	AQUIFER ANALYSIS METHOD	AQUIFER TEST TYPE	HYDRAULIC CONDUCTIVITY (cm/sec)	SCREENED LITHOLOGY
PZ-44	35	10	2	Bouwer-Rice	Falling	5.27E-04	Sand/Gneiss
					Rising	5.44E-04	
PZ-45	50	10	2	Bouwer-Rice	Falling	4.53E-04	Sand/Gneiss
					Rising	4.11E-04	
PZ-46	40	10	2	Bouwer-Rice	Falling	1.50E-03	Silty Sand/Gneiss
					Rising	1.47E-03	
PZ-47	71	10	2	Bouwer-Rice	Falling	1.41E-04	TWR/Gneiss
					Rising	1.37E-04	
PZ-48	39	10	2	Bouwer-Rice	Falling	8.54E-05	Sand/Gneiss
					Rising	8.48E-05	
PZ-49	11	10	2	Bouwer-Rice	Falling	7.42E-03	Sand/Gneiss
					Rising	7.21E-03	
PZ-50	31	10	2	Bouwer-Rice	Falling	1.85E-03	Sand/Gneiss
					Rising	1.89E-03	
					Geomean	6.61E-04	

NOTES:

1. Geomean = geometric mean
2. cm/sec = centimeter per second

APPENDIX A

Cascade Drilling Bond

SURETY RIDER

To be attached to and form a part of

Bond No. 800031223

Type of

Bond: Performance Bond for Water Well Contractors

dated

effective June 30, 2017
(MONTH-DAY-YEAR)

executed by Michael C. Rice/Cascade Drilling, L.P.
(PRINCIPAL)

. as Principal,

and by Atlantic Specialty Insurance Company

. as Surety,

in favor of State of Georgia
(OBLIGEE)

in consideration of the mutual agreements herein contained the Principal and the Surety hereby consent to changing

Coverage under the bond to include:
Michael Coleman

Nothing herein contained shall vary, alter or extend any provision or condition of this bond except as herein expressly stated.

This rider

is effective December 21, 2017
(MONTH-DAY-YEAR)

Signed and Sealed December 21, 2017
(MONTH-DAY-YEAR)

Michael C. Rice/Cascade Drilling, L.P.
(PRINCIPAL)

By: _____
(PRINCIPAL)

Atlantic Specialty Insurance Company

By: 
Elizabeth R. Hahn, Attorney-in-Fact



Power of Attorney

KNOW ALL MEN BY THESE PRESENTS, that ATLANTIC SPECIALTY INSURANCE COMPANY, a New York corporation with its principal office in Plymouth, Minnesota, does hereby constitute and appoint: **Deanna M. French, Jill A. Wallace, Susan B. Larson, Elizabeth R. Hahn, Jana M. Roy, Scott McGilvray, Mindee L. Rankin, Ronald J. Lange, John R. Claeys, Roger Kaltenbach, Guy Armfield, Scott Fisher**, each individually if there be more than one named, its true and lawful Attorney-in-Fact, to make, execute, seal and deliver, for and on its behalf as surety, any and all bonds, recognizances, contracts of indemnity, and all other writings obligatory in the nature thereof; provided that no bond or undertaking executed under this authority shall exceed in amount the sum of: **sixty million dollars (\$60,000,000)** and the execution of such bonds, recognizances, contracts of indemnity, and all other writings obligatory in the nature thereof in pursuance of these presents, shall be as binding upon said Company as if they had been fully signed by an authorized officer of the Company and sealed with the Company seal. This Power of Attorney is made and executed by authority of the following resolutions adopted by the Board of Directors of ATLANTIC SPECIALTY INSURANCE COMPANY on the twenty-fifth day of September, 2012:

Resolved: That the President, any Senior Vice President or Vice-President (each an "Authorized Officer") may execute for and in behalf of the Company any and all bonds, recognizances, contracts of indemnity, and all other writings obligatory in the nature thereof, and affix the seal of the Company thereto; and that the Authorized Officer may appoint and authorize an Attorney-in-Fact to execute on behalf of the Company any and all such instruments and to affix the Company seal thereto; and that the Authorized Officer may at any time remove any such Attorney-in-Fact and revoke all power and authority given to any such Attorney-in-Fact.

Resolved: That the Attorney-in-Fact may be given full power and authority to execute for and in the name and on behalf of the Company any and all bonds, recognizances, contracts of indemnity, and all other writings obligatory in the nature thereof, and any such instrument executed by any such Attorney-in-Fact shall be as binding upon the Company as if signed and sealed by an Authorized Officer and, further, the Attorney-in-Fact is hereby authorized to verify any affidavit required to be attached to bonds, recognizances, contracts of indemnity, and all other writings obligatory in the nature thereof.

This power of attorney is signed and sealed by facsimile under the authority of the following Resolution adopted by the Board of Directors of ATLANTIC SPECIALTY INSURANCE COMPANY on the twenty-fifth day of September, 2012:

Resolved: That the signature of an Authorized Officer, the signature of the Secretary or the Assistant Secretary, and the Company seal may be affixed by facsimile to any power of attorney or to any certificate relating thereto appointing an Attorney-in-Fact for purposes only of executing and sealing any bond, undertaking, recognizance or other written obligation in the nature thereof, and any such signature and seal where so used, being hereby adopted by the Company as the original signature of such officer and the original seal of the Company, to be valid and binding upon the Company with the same force and effect as though manually affixed.

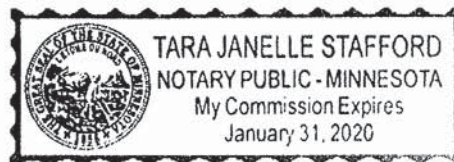
IN WITNESS WHEREOF, ATLANTIC SPECIALTY INSURANCE COMPANY has caused these presents to be signed by an Authorized Officer and the seal of the Company to be affixed this eighth day of December, 2014.



By 
Paul J. Brehm, Senior Vice President

STATE OF MINNESOTA
HENNEPIN COUNTY

On this eighth day of December, 2014, before me personally came Paul J. Brehm, Senior Vice President of ATLANTIC SPECIALTY INSURANCE COMPANY, to me personally known to be the individual and officer described in and who executed the preceding instrument, and he acknowledged the execution of the same, and being by me duly sworn, that he is the said officer of the Company aforesaid, and that the seal affixed to the preceding instrument is the seal of said Company and that the said seal and the signature as such officer was duly affixed and subscribed to the said instrument by the authority and at the direction of the Company.





Notary Public

I, the undersigned, Assistant Secretary of ATLANTIC SPECIALTY INSURANCE COMPANY, a New York Corporation, do hereby certify that the foregoing power of attorney is in full force and has not been revoked, and the resolutions set forth above are now in force.

Signed and sealed. Dated 21 day of December, 2017

This Power of Attorney expires
October 1, 2019




James G. Jordan, Assistant Secretary

APPENDIX B

**Boring Logs/Construction Diagrams
and Development Forms**

RECORD OF BOREHOLE PZ-43

SHEET 1 of 2

PROJECT: Plant Branch
 PROJECT NUMBER: 1666254-01
 DRILLED DEPTH: 41.50 ft
 LOCATION: Former Coal Pile

DRILL RIG: Pro Sonic 150
 DATE STARTED: 2/6/18
 DATE COMPLETED: 2/7/18

NORTHING: 1,162,159.80
 EASTING: 2,562,031.35
 GS ELEVATION: NA
 TOC ELEVATION: 383.75 ft

DEPTH W.L.: 30.60
 DATE W.L.: 2/14/18
 TIME W.L.:

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		
0		0.00 - 8.50 Soil was removed by Hydorvac to 8.5 ft bgs							WELL CASING Interval: 0-30 Material: Schedule 40 PVC Diameter: 1 inch Joint Type: Flush/Thread SURFACE CASING Interval: Material: Diameter: WELL SCREEN Interval: 30.0-40.0 Material: .010 Slotted Screen Diameter: 1 inch Slot Size: .010" End Cap: 40-40.4 FILTER PACK Interval: 28.0-41.5 Type: FilterSil FILTER PACK SEAL Interval: 23.0-28.0 Type: 3/8" PEL-PLUG Bentonite Pellets ANNULUS SEAL Interval: 0-23.0 Type: Portland Cement and Quick Gel Bentonite Mix WELL COMPLETION Pad: Protective Casing: DRILLING METHODS Soil Drill: Rotasonic Rock Drill: Core
5									
10		8.50 - 17.00 FILL, Silty SAND, sands fine to medium, reddish brown, micaceous, non-cohesive, moist, loose.	SM	8.50					
15									
20		17.00 - 39.50 RESIDUUM, Silty SAND, sands fine to coarse, grayish brown, micaceous, non-cohesive, moist to wet, loose. Final three inches is transitionally weathered rock.		17.00					
25									
30			SM						
35									
40			BR	39.50					

Log continued on next page

BOREHOLE RECORD 1666254-01.GPJ PIEDMONT.GDT 5/30/18

LOG SCALE: 1 in = 5 ft
 DRILLING COMPANY: Cascade
 DRILLER: Matt Pope

GA INSPECTOR: Ben Hodges
 CHECKED BY: TIR
 DATE: 2/15/18



RECORD OF BOREHOLE PZ-43



SHEET 2 of 2

PROJECT: Plant Branch
 PROJECT NUMBER: 1666254-01
 DRILLED DEPTH: 41.50 ft
 LOCATION: Former Coal Pile

DRILL RIG: Pro Sonic 150
 DATE STARTED: 2/6/18
 DATE COMPLETED: 2/7/18

NORTHING: 1,162,159.80
 EASTING: 2,562,031.35
 GS ELEVATION: NA
 TOC ELEVATION: 383.75 ft

DEPTH W.L.: 30.60
 DATE W.L.: 2/14/18
 TIME W.L.:

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	REC		
45		39.50 - 41.50 BIOTITE GNEISS, slightly weathered to fresh, very thin layer of saprolite, thinly banded, white and black, phaneritic. <i>(Continued)</i> Boring completed at 41.50 ft	BR							<p>WELL CASING Interval: 0-30 Material: Schedule 40 PVC Diameter: 1 inch Joint Type: Flush/Thread</p> <p>SURFACE CASING Interval: Material: Diameter:</p> <p>WELL SCREEN Interval: 30.0-40.0 Material: .010 Slotted Screen Diameter: 1 inch Slot Size: .010" End Cap: 40-40.4</p> <p>FILTER PACK Interval: 28.0-41.5 Type: FilterSil</p> <p>FILTER PACK SEAL Interval: 23.0-28.0 Type: 3/8" PEL-PLUG Bentonite Pellets</p> <p>ANNULUS SEAL Interval: 0-23.0 Type: Portland Cement and Quick Gel Bentonite Mix</p> <p>WELL COMPLETION Pad: Protective Casing:</p> <p>DRILLING METHODS Soil Drill: Rotosonic Rock Drill: Core</p>
50										
55										
60										
65										
70										
75										
80										

BOREHOLE RECORD 1666254-01.GPJ PIEDMONT.GDT 5/30/18

LOG SCALE: 1 in = 5 ft
 DRILLING COMPANY: Cascade
 DRILLER: Matt Pope

GA INSPECTOR: Ben Hodges
 CHECKED BY: TIR
 DATE: 2/15/18



RECORD OF BOREHOLE PZ-44

SHEET 1 of 2

PROJECT: Plant Branch
 PROJECT NUMBER: 1666254-01
 DRILLED DEPTH: 57.00 ft
 LOCATION: Former Coal Pile

DRILL RIG: Pro Sonic 150
 DATE STARTED: 2/1/18
 DATE COMPLETED: 2/2/18

NORTHING: 1,161,723.84
 EASTING: 2,561,586.79
 GS ELEVATION: 380.49
 TOC ELEVATION: 383.12 ft

DEPTH W.L.: 24.83
 DATE W.L.: 2/14/18
 TIME W.L.:

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		
0	380	0.00 - 8.00 Soil was removed by Hydrovac from 0-8 ft bgs						Grout Mix and Stainless Steel Casing	WELL CASING Interval: 0-47 Material: Schedule 40 PVC Diameter: 2" Joint Type: Flush/Thread SURFACE CASING Interval: Material: Diameter: WELL SCREEN Interval: 46.6-56.6 Material: Schedule 40 PVC Diameter: 2" Slot Size: 0.010" Slotted End Cap: 56.6-57
5	375								
10	370	8.00 - 29.00 FILL, SAND with trace silt and trace gravel, reddish brown, non-cohesive, moist.		372.49 8.00				Portland Cement and Quick Gel Bentonite Mix	FILTER PACK Interval: 45-57 Type: FilterSil FILTER PACK SEAL Interval: 40-45 Type: 3/8" PEL-PLUG Bentonite Pellets ANNULUS SEAL Interval: 0-40 Type: Portland Cement and Quick Gel Bentonite Mix WELL COMPLETION Pad: 4'x4' Protective Casing: 4"x4"x5" DRILLING METHODS Soil Drill: Rotosonic Rock Drill: Core
15	365				R1	ROTO SONIC	6.00 10.00		
20	360		SP-SM						
25	355				R2	ROTO SONIC	9.00 10.00		
30	350	29.00 - 48.00 RESIDUUM, SAND with trace silt and trace gravel, grayish brown, micaceous, non-cohesive, moist.		351.49 29.00					
35	345				R3	ROTO SONIC	9.00 10.00		
40	340		SP		R4	ROTO SONIC	10.00 10.00		

Log continued on next page

BOREHOLE RECORD 1666254-01.GPJ PIEDMONT.GDT 5/30/18

LOG SCALE: 1 in = 5 ft
 DRILLING COMPANY: Cascade
 DRILLER: Matt Pope

GA INSPECTOR: David Hannam
 CHECKED BY: TIR
 DATE: 2/15/18



RECORD OF BOREHOLE PZ-44

SHEET 2 of 2

PROJECT: Plant Branch
 PROJECT NUMBER: 1666254-01
 DRILLED DEPTH: 57.00 ft
 LOCATION: Former Coal Pile

DRILL RIG: Pro Sonic 150
 DATE STARTED: 2/1/18
 DATE COMPLETED: 2/2/18

NORTHING: 1,161,723.84
 EASTING: 2,561,586.79
 GS ELEVATION: 380.49
 TOC ELEVATION: 383.12 ft

DEPTH W.L.: 24.83
 DATE W.L.: 2/14/18
 TIME W.L.:

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			REC
45	335	29.00 - 48.00 RESIDUUM, SAND with trace silt and trace gravel, grayish brown, micaceous, non-cohesive, moist. <i>(Continued)</i>	SP		332.49 48.00	R4	ROTO SONIC	10.00 10.00		<p>WELL CASING Interval: 0-47 Material: Schedule 40 PVC Diameter: 2" Joint Type: Flush/Thread</p> <p>SURFACE CASING Interval: Material: Diameter:</p> <p>WELL SCREEN Interval: 46.6-56.6 Material: Schedule 40 PVC Diameter: 2" Slot Size: 0.010" Slotted End Cap: 56.6-57</p> <p>FILTER PACK Interval: 45-57 Type: FilterSil</p> <p>FILTER PACK SEAL Interval: 40-45 Type: 3/8" PEL-PLUG Bentonite Pellets</p> <p>ANNULUS SEAL Interval: 0-40 Type: Portland Cement and Quick Gel Bentonite Mix</p> <p>WELL COMPLETION Pad: 4'x4' Protective Casing: 4"x4"x5'</p> <p>DRILLING METHODS Soil Drill: Rotosonic Rock Drill: Core</p>
50	330	48.00 - 51.00 TRANSITIONALLY WEATHERED ROCK, recovered as rock flour, gravel, and cobbles.	TWR		329.49 51.00					
55	325	51.00 - 57.00 BIOTITE GNEISS, slightly weathered to fresh, white/black, phaneritic, strong, oxide staining on discontinuities.	BR		323.49					
		Boring completed at 57.00 ft								

BOREHOLE RECORD 1666254-01.GPJ PIEDMONT.GDT 5/30/18

LOG SCALE: 1 in = 5 ft
 DRILLING COMPANY: Cascade
 DRILLER: Matt Pope

GA INSPECTOR: David Hannam
 CHECKED BY: TIR
 DATE: 2/15/18



RECORD OF BOREHOLE PZ-45

SHEET 1 of 2

PROJECT: Plant Branch
 PROJECT NUMBER: 1666254-01
 DRILLED DEPTH: 57.00 ft
 LOCATION: Former Coal Pile

DRILL RIG: Pro Sonic 150
 DATE STARTED: 2/3/18
 DATE COMPLETED: 2/3/18

NORTHING: 1,162,229.18
 EASTING: 2,561,074.89
 GS ELEVATION: 381.69
 TOC ELEVATION: 384.61 ft

DEPTH W.L.: 11.41
 DATE W.L.: 2/14/18
 TIME W.L.:

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			REC
0	380	0.00 - 8.00 Soils removed by Hydrovac from 0-8 feet bgs.						Grout mix with stainless steel casing	WELL CASING Interval: 0-46.6 Material: Schedule 40 PVC Diameter: 2" Joint Type: Flush/Thread SURFACE CASING Interval: Material: Diameter: WELL SCREEN Interval: 46.6-56.6 Material: 0.010 Slotted Schedule 40 PVC Diameter: 2" Slot Size: 0.010" End Cap: 56.6-57 FILTER PACK Interval: 45-57 Type: FilterSil FILTER PACK SEAL Interval: 40-45 Type: 3/8" PEL-PLUG Bentonite Pellets ANNULUS SEAL Interval: 0-40 Type: Portland Cement and Quick Gel Bentonite Mix WELL COMPLETION Pad: 4'x4' Protective Casing: 4"x4"x5" DRILLING METHODS Soil Drill: Rotosonic Rock Drill: Core	
5	375	8.00 - 33.00 FILL, silty SAND, orangish brown, non-cohesive, moist.		373.69 8.00	R1	ROTO SONIC	6.00 10.00			Portland Cement and Quick Gel Bentonite Mix
10	370				R2	ROTO SONIC	10.00 10.00			
15	365	33.00 - 52.00 SAPROLITE, SAND, reddish brown with white and black relic foliation, non cohesive, moist.	SM	348.69 33.00	R3	ROTO SONIC	10.00 10.00			
20	360				R4	ROTO	10.00			
25	355	Log continued on next page	SP							
30	350									
35	345									
40										

BOREHOLE RECORD 1666254-01.GPJ PIEDMONT.GDT 5/30/18

LOG SCALE: 1 in = 5 ft
 DRILLING COMPANY: Cascade
 DRILLER: Matt Pope

GA INSPECTOR: David Hannam
 CHECKED BY: TIR
 DATE: 2/15/18



RECORD OF BOREHOLE PZ-45

SHEET 2 of 2

PROJECT: Plant Branch
 PROJECT NUMBER: 1666254-01
 DRILLED DEPTH: 57.00 ft
 LOCATION: Former Coal Pile

DRILL RIG: Pro Sonic 150
 DATE STARTED: 2/3/18
 DATE COMPLETED: 2/3/18

NORTHING: 1,162,229.18
 EASTING: 2,561,074.89
 GS ELEVATION: 381.69
 TOC ELEVATION: 384.61 ft

DEPTH W.L.: 11.41
 DATE W.L.: 2/14/18
 TIME W.L.:

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		
340		33.00 - 52.00 SAPROLITE, SAND, reddish brown with white and black relic foliation, non cohesive, moist. <i>(Continued)</i>	SP	[Graphic Log]			SONIC 10.00		<p>WELL CASING Interval: 0-46.6 Material: Schedule 40 PVC Diameter: 2" Joint Type: Flush/Thread</p> <p>SURFACE CASING Interval: Material: Diameter:</p> <p>WELL SCREEN Interval: 46.6-56.6 Material: 0.010 Slotted Schedule 40 PVC Diameter: 2" Slot Size: 0.010" End Cap: 56.6-57</p> <p>FILTER PACK Interval: 45-57 Type: FilterSil</p> <p>FILTER PACK SEAL Interval: 40-45 Type: 3/8" PEL-PLUG Bentonite Pellets</p> <p>ANNULUS SEAL Interval: 0-40 Type: Portland Cement and Quick Gel Bentonite Mix</p> <p>WELL COMPLETION Pad: 4'x4' Protective Casing: 4"x4"x5'</p> <p>DRILLING METHODS Soil Drill: Rotosonic Rock Drill: Core</p>
45							R4		
335									
50									
330		52.00 - 57.00 TRANSITIONALLY WEATHERED ROCK (BIOTITE GNEISS), moderately weathered to fresh, oxide staining, thinly bedded, black and white, phaneritic, extremely weak to medium strong.	TWR	[Graphic Log]					
55							R5	ROTO 5.00 SONIC 10.00	
325		Boring completed at 57.00 ft							
60									
320									
65									
315									
70									
310									
75									
305									
80									

BOREHOLE RECORD 1666254-01.GPJ PIEDMONT.GDT 5/30/18

LOG SCALE: 1 in = 5 ft
 DRILLING COMPANY: Cascade
 DRILLER: Matt Pope

GA INSPECTOR: David Hannam
 CHECKED BY: TIR
 DATE: 2/15/18



RECORD OF BOREHOLE PZ-46

SHEET 1 of 2

PROJECT: Plant Branch
 PROJECT NUMBER: 1666254-01
 DRILLED DEPTH: 47.00 ft
 LOCATION: Former Coal Pile

DRILL RIG: Pro Sonic 150
 DATE STARTED: 2/5/18
 DATE COMPLETED: 2/5/18

NORTHING: 1,162,755.59
 EASTING: 2,560,558.42
 GS ELEVATION: 382.11
 TOC ELEVATION: 384.70 ft

DEPTH W.L.: 8.85
 DATE W.L.: 2/14/18
 TIME W.L.:

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		
0		0.00 - 8.00 Soil was removed by Hydrovac from 0-8 ft bgs.						Grout mix and stainless steel casing	WELL CASING Interval: 0-35.6 Material: Schedule 40 PVC Diameter: 2" Joint Type: Flush/Thread SURFACE CASING Interval: Material: Diameter: WELL SCREEN Interval: 35.6-45.6 Material: 0.010" Slotted Schedule 40 PVC Diameter: 2" Slot Size: 0.010" End Cap: 45.6-47 FILTER PACK Interval: 34-46 Type: FilterSil FILTER PACK SEAL Interval: 29-34 Type: 3/8" PEL-PLUG Bentonite Pellets ANNULUS SEAL Interval: 0-29 Type: Portland Cement and Quick Gel Bentonite Mix WELL COMPLETION Pad: 4'x4' Protective Casing: 4"x4"x5" DRILLING METHODS Soil Drill: Rotasonic Rock Drill: Core
380									
5									
375									
		8.00 - 37.00 RESIDUUM, silty Sand, sands fine to coarse, dark brown, micaceous, non-cohesive, moist, loose.		374.11 8.00					
10									
370									
15									
365									
20								Portland Cement and Quick Gel Bentonite Mix	
360			SM						
25									
355									
30								3/8" PEL-PLUG Bentonite Pellets	
350									
35								FilterSil	
345		37.00 - 39.00 TRANSITIONALLY WEATHERED ROCK (BIOTITE GNEISS), core presented as rock flour, and gravel/cobbles, black and white with light green coating around rock, highly mafic, thinly laminated, fine grained, soft.	TWR	345.11 37.00					
40		39.00 - 47.00 BIOTITE GNEISS, slightly weathered to fresh, thickly banded, white and black, phaneritic, very strong. <i>Log continued on next page</i>	BR	343.11 39.00				0.010" Slotted Schedule 40 PVC	

BOREHOLE RECORD 1666254-01.GPJ | PIEDMONT.GDT 5/30/18

LOG SCALE: 1 in = 5 ft
 DRILLING COMPANY: Cascade
 DRILLER: Matt Pope

GA INSPECTOR: Ben Hodges
 CHECKED BY: TIR
 DATE: 2/15/18



RECORD OF BOREHOLE PZ-46

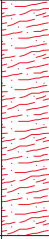
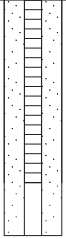
SHEET 2 of 2

PROJECT: Plant Branch
 PROJECT NUMBER: 1666254-01
 DRILLED DEPTH: 47.00 ft
 LOCATION: Former Coal Pile

DRILL RIG: Pro Sonic 150
 DATE STARTED: 2/5/18
 DATE COMPLETED: 2/5/18

NORTHING: 1,162,755.59
 EASTING: 2,560,558.42
 GS ELEVATION: 382.11
 TOC ELEVATION: 384.70 ft

DEPTH W.L.: 8.85
 DATE W.L.: 2/14/18
 TIME W.L.:

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		
340		39.00 - 47.00 BIOTITE GNEISS, slightly weathered to fresh, thickly banded, white and black, phaneritic, very strong. <i>(Continued)</i>	BR						<p>WELL CASING Interval: 0-35.6 Material: Schedule 40 PVC Diameter: 2" Joint Type: Flush/Thread</p> <p>SURFACE CASING Interval: Material: Diameter:</p> <p>WELL SCREEN Interval: 35.6-45.6 Material: 0.010" Slotted Schedule 40 PVC Diameter: 2" Slot Size: 0.010" End Cap: 45.6-47</p> <p>FILTER PACK Interval: 34-46 Type: FilterSil</p> <p>FILTER PACK SEAL Interval: 29-34 Type: 3/8" PEL-PLUG Bentonite Pellets</p> <p>ANNULUS SEAL Interval: 0-29 Type: Portland Cement and Quick Gel Bentonite Mix</p> <p>WELL COMPLETION Pad: 4'x4' Protective Casing: 4"x4"x5'</p> <p>DRILLING METHODS Soil Drill: Rotosonic Rock Drill: Core</p>
		Boring completed at 47.00 ft			335.11				
45									
335									
50									
330									
55									
325									
60									
320									
65									
315									
70									
310									
75									
305									
80									

BOREHOLE RECORD 1666254-01.GPJ PIEDMONT.GDT 5/30/18

LOG SCALE: 1 in = 5 ft
 DRILLING COMPANY: Cascade
 DRILLER: Matt Pope

GA INSPECTOR: Ben Hodges
 CHECKED BY: TIR
 DATE: 2/15/18



RECORD OF BOREHOLE PZ-47

SHEET 1 of 3

PROJECT: Plant Branch
 PROJECT NUMBER: 1666254-01
 DRILLED DEPTH: 97.00 ft
 LOCATION: Between Pond B

DRILL RIG: Pro Sonic 150
 DATE STARTED: 1/25/18
 DATE COMPLETED: 1/26/18

NORTHING: 1,162,701.04
 EASTING: 2,559,456.38
 GS ELEVATION: 408.87
 TOC ELEVATION: 411.32 ft

DEPTH W.L.: 25.93
 DATE W.L.: 2/14/18
 TIME W.L.:

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		
0		0.00 - 0.50 Ash as sand, fine, dark gray, moist, non-cohesive.	SP		408.37 0.50				WELL CASING Interval: 0-81.6 Material: Schedule 40 PVC Diameter: 2" Joint Type: Flush/Thread SURFACE CASING Interval: Material: Diameter: WELL SCREEN Interval: 81.6-91.6 Material: 0.010" Slotted Schedule 40 PVC Diameter: 2" Slot Size: 0.010" End Cap: 91.6-92 FILTER PACK Interval: 80-93 Type: FilterSil FILTER PACK SEAL Interval: 75-80 Type: 3/8" PEL-PLUG Bentonite Pellets ANNULUS SEAL Interval: 0-75 Type: Portland Cement and Quick Gel Bentonite Mix WELL COMPLETION Pad: 4'x4' Protective Casing: 4"x4"x5' DRILLING METHODS Soil Drill: Rotosonic Rock Drill: Core
405		0.50 - 15.00 RESIDUUM, silty SAND, sands fine to medium, reddish brown, micaceous, moist, non-cohesive.							
5			SM						
10					R1	ROTO SONIC	9.00		
15		15.00 - 75.00 SAPROLITE, silty SAND, reddish brown to grayish brown with intermediate white mottling, relic structure, micaceous, dry to moist, non							
15									
395									
15									
390					R2	ROTO SONIC	10.00		
20									
385									
25			SM						
380					R3	ROTO SONIC	10.00	Portland Cement and Quick Gel Bentonite Mix	
30									
375									
35									
370					R4	ROTO SONIC	10.00		
40									

Log continued on next page

BOREHOLE RECORD 1666254-01.GPJ PIEDMONT.GDT 5/30/18

LOG SCALE: 1 in = 5 ft
 DRILLING COMPANY: Cascade
 DRILLER: Matt Pope

GA INSPECTOR: David Hannam
 CHECKED BY: TIR
 DATE: 2/15/18



RECORD OF BOREHOLE PZ-47

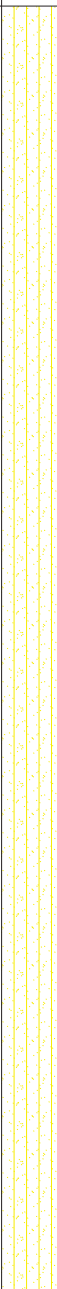

SHEET 2 of 3

PROJECT: Plant Branch
 PROJECT NUMBER: 1666254-01
 DRILLED DEPTH: 97.00 ft
 LOCATION: Between Pond B

DRILL RIG: Pro Sonic 150
 DATE STARTED: 1/25/18
 DATE COMPLETED: 1/26/18

NORTHING: 1,162,701.04
 EASTING: 2,559,456.38
 GS ELEVATION: 408.87
 TOC ELEVATION: 411.32 ft

DEPTH W.L.: 25.93
 DATE W.L.: 2/14/18
 TIME W.L.:

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)					
45	365	15.00 - 75.00 SAPROLITE, silty SAND, reddish brown to grayish brown with intermediate white mottling, relic structure, micaceous, dry to moist, non (Continued)	SM						WELL CASING Interval: 0-81.6 Material: Schedule 40 PVC Diameter: 2" Joint Type: Flush/Thread SURFACE CASING Interval: Material: Diameter: WELL SCREEN Interval: 81.6-91.6 Material: 0.010" Slotted Schedule 40 PVC Diameter: 2" Slot Size: 0.010" End Cap: 91.6-92 FILTER PACK Interval: 80-93 Type: FilterSil FILTER PACK SEAL Interval: 75-80 Type: 3/8" PEL-PLUG Bentonite Pellets ANNULUS SEAL Interval: 0-75 Type: Portland Cement and Quick Gel Bentonite Mix WELL COMPLETION Pad: 4'x4' Protective Casing: 4"x4"x5' DRILLING METHODS Soil Drill: Rotosonic Rock Drill: Core	
50	360				R5	ROTO SONIC	10.00			
55	355									
60	350				R6	ROTO SONIC	10.00			
65	345									
70	340				R7	ROTO SONIC	10.00			
75	335									
80	330	75.00 - 92.00 TRANSITIONALLY WEATHERED ROCK, shows in sample as Sand with trace gravel and trace silt, grayish brown with white mottling, micaceous, relic foliation where preserved, dry to wet, non-cohesive.	TWR		333.87 75.00			3/8" PEL-PLUG Bentonite Pellets FilterSil -		

Log continued on next page

BOREHOLE RECORD 1666254-01.GPJ, PIEDMONT.GDT 5/30/18

LOG SCALE: 1 in = 5 ft
 DRILLING COMPANY: Cascade
 DRILLER: Matt Pope

GA INSPECTOR: David Hannam
 CHECKED BY: TIR
 DATE: 2/15/18



RECORD OF BOREHOLE PZ-47

SHEET 3 of 3

PROJECT: Plant Branch
 PROJECT NUMBER: 1666254-01
 DRILLED DEPTH: 97.00 ft
 LOCATION: Between Pond B

DRILL RIG: Pro Sonic 150
 DATE STARTED: 1/25/18
 DATE COMPLETED: 1/26/18

NORTHING: 1,162,701.04
 EASTING: 2,559,456.38
 GS ELEVATION: 408.87
 TOC ELEVATION: 411.32 ft

DEPTH W.L.: 25.93
 DATE W.L.: 2/14/18
 TIME W.L.:

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		
85	325	75.00 - 92.00 TRANSITIONALLY WEATHERED ROCK, shows in sample as Sand with trace gravel and trace silt, grayish brown with white mottling, micaceous, relic foliation where preserved, dry to wet, non-cohesive. <i>(Continued)</i>	TWR	[Symbolic Log]				<p style="font-size: small;">0.010" Slotted Schedule 40 PVC</p> <p style="font-size: small;">3/8" PEL-PLUG Bentonite Pellets</p>	<p>WELL CASING Interval: 0-81.6 Material: Schedule 40 PVC Diameter: 2" Joint Type: Flush/Thread</p> <p>SURFACE CASING Interval: Material: Diameter:</p> <p>WELL SCREEN Interval: 81.6-91.6 Material: 0.010" Slotted Schedule 40 PVC Diameter: 2" Slot Size: 0.010" End Cap: 91.6-92</p> <p>FILTER PACK Interval: 80-93 Type: FilterSil</p> <p>FILTER PACK SEAL Interval: 75-80 Type: 3/8" PEL-PLUG Bentonite Pellets</p> <p>ANNULUS SEAL Interval: 0-75 Type: Portland Cement and Quick Gel Bentonite Mix</p> <p>WELL COMPLETION Pad: 4'x4' Protective Casing: 4"x4"x5'</p> <p>DRILLING METHODS Soil Drill: Rotosonic Rock Drill: Core</p>
90	320				R9	ROTO SONIC	40.00		
95	315	92.00 - 97.00 BIOTITE GNEISS, sample recovered as rock flour, cobbles, and gravel. Slightly weathered to fresh, white and black, thinly bedded, phaneritic, strong, oxide staining in discontinuities.	BR	[Symbolic Log]	316.87				
					92.00				
		Boring completed at 97.00 ft			311.87				

BOREHOLE RECORD 1666254-01.GPJ, PIEDMONT.GDT 5/30/18

LOG SCALE: 1 in = 5 ft
 DRILLING COMPANY: Cascade
 DRILLER: Matt Pope

GA INSPECTOR: David Hannam
 CHECKED BY: TIR
 DATE: 2/15/18



RECORD OF BOREHOLE PZ-48

SHEET 1 of 2

PROJECT: Plant Branch
 PROJECT NUMBER: 1666254-01
 DRILLED DEPTH: 67.00 ft
 LOCATION: South of Skills Center

DRILL RIG: Pro Sonic 150
 DATE STARTED: 1/24/18
 DATE COMPLETED: 1/25/18

NORTHING: 1,163,047.72
 EASTING: 2,558,444.99
 GS ELEVATION: 418.30
 TOC ELEVATION: 421.05 ft

DEPTH W.L.: 30.55
 DATE W.L.: 2/14/18
 TIME W.L.:

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		
0		0.00 - 8.00 Soil removed by Hydrovac from 0-8 ft bgs.						Grout mix with stainless steel casing	WELL CASING Interval: 0-56.6 Material: Schedule 40 PVC Diameter: 2" Joint Type: Flush/Thread SURFACE CASING Interval: Material: Diameter: WELL SCREEN Interval: 56.6-66.6 Material: 0.010" Slotted Schedule 40 PVC Diameter: 2" Slot Size: 0.010" End Cap: 66.6-67 FILTER PACK Interval: 55-67 Type: FilterSil FILTER PACK SEAL Interval: 50-55 Type: 3/8" PEL-PLUG Bentonite Pellets ANNULUS SEAL Interval: 0-50 Type: Portland Cement and Quick Gel Bentonite Mix WELL COMPLETION Pad: 4'x4' Protective Casing: 4"x4"x5' DRILLING METHODS Soil Drill: Rotosonic Rock Drill: Core
415									
410		8.00 - 17.00 FILL, silty SAND, reddish brown, micaceous, moist, non-cohesive.			410.3 8.00			Portland Cement and Quick Gel Bentonite Mix	
405			SM			R1	ROTO SONIC		10.00 10.00
400		17.00 - 64.50 RESIDUUM, SAND with some silt, grayish brown with white mottling, occasional relic structure, micaceous, dry, non-cohesive.			401.3 17.00				
395						R2	ROTO SONIC		10.00 10.00
390			SM						
385						R3	ROTO SONIC	10.00 10.00	
380						R4	ROTO SONIC	10.00 10.00	
40									

Log continued on next page

BOREHOLE RECORD 1666254-01.GPJ PIEDMONT.GDT 5/30/18

LOG SCALE: 1 in = 5 ft
 DRILLING COMPANY: Cascade
 DRILLER: Matt Pope

GA INSPECTOR: David Hannam
 CHECKED BY: TIR
 DATE: 2/15/18



RECORD OF BOREHOLE PZ-48

SHEET 2 of 2

PROJECT: Plant Branch
 PROJECT NUMBER: 1666254-01
 DRILLED DEPTH: 67.00 ft
 LOCATION: South of Skills Center

DRILL RIG: Pro Sonic 150
 DATE STARTED: 1/24/18
 DATE COMPLETED: 1/25/18

NORTHING: 1,163,047.72
 EASTING: 2,558,444.99
 GS ELEVATION: 418.30
 TOC ELEVATION: 421.05 ft

DEPTH W.L.: 30.55
 DATE W.L.: 2/14/18
 TIME W.L.:

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		
375		17.00 - 64.50 RESIDUUM, SAND with some silt, grayish brown with white mottling, occasional relic structure, micaceous, dry, non-cohesive. <i>(Continued)</i>							<p>WELL CASING Interval: 0-56.6 Material: Schedule 40 PVC Diameter: 2" Joint Type: Flush/Thread</p> <p>SURFACE CASING Interval: Material: Diameter:</p> <p>WELL SCREEN Interval: 56.6-66.6 Material: 0.010" Slotted Schedule 40 PVC Diameter: 2" Slot Size: 0.010" End Cap: 66.6-67</p> <p>FILTER PACK Interval: 55-67 Type: FilterSil</p> <p>FILTER PACK SEAL Interval: 50-55 Type: 3/8" PEL-PLUG Bentonite Pellets</p> <p>ANNULUS SEAL Interval: 0-50 Type: Portland Cement and Quick Gel Bentonite Mix</p> <p>WELL COMPLETION Pad: 4'x4' Protective Casing: 4"x4"x5'</p> <p>DRILLING METHODS Soil Drill: Rotosonic Rock Drill: Core</p>
45					R4	ROTO SONIC	10.00 10.00		
370								3/8" PEL-PLUG Bentonite Pellets	
50									
365			SM		R5	ROTO SONIC	10.00 10.00		
55								FilterSil	
360								0.010" Slotted Schedule 40 PVC	
60									
355					R6	ROTO SONIC	10.00 10.00		
65		64.50 - 65.50 TRANSITIONALLY WEATHERED ROCK, sampled as sand and gravel with trace silt, grayish brown, subangular, non-cohesive.	TWR	▲▼▲▼			353.8 64.50 352.8		
		65.50 - 67.00 BIOTITE GNEISS, fresh, with biotite/muscovite/feldspar/quartz, white/black, weak foliation near horizontal, phaneritic, strong.	BR	~ ~ ~ ~			65.50 351.3		
350		Boring completed at 67.00 ft							
70									
345									
75									
340									
80									

BOREHOLE RECORD 1666254-01.GPJ, PIEDMONT.GDT 5/30/18

LOG SCALE: 1 in = 5 ft
 DRILLING COMPANY: Cascade
 DRILLER: Matt Pope

GA INSPECTOR: David Hannam
 CHECKED BY: TIR
 DATE: 2/15/18



RECORD OF BOREHOLE PZ-49

SHEET 1 of 1

PROJECT: Plant Branch
 PROJECT NUMBER: 1666254-01
 DRILLED DEPTH: 27.00 ft
 LOCATION: Near former pyrite pit

DRILL RIG: Pro Sonic 150
 DATE STARTED: 1/30/18
 DATE COMPLETED: 1/30/18

NORTHING: 1,163,321.94
 EASTING: 2,561,124.93
 GS ELEVATION: 382.10
 TOC ELEVATION: 385.06 ft

DEPTH W.L.: 8.10
 DATE W.L.: 2/14/18
 TIME W.L.:

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		
0		0.00 - 2.00 FILL, silty SAND with trace gravel, reddish brown, micaceous, moist, non-cohesive.	SM		380.1			Grout mix and stainless steel casing Portland Cement and Quick Gel Bentonite Mix FilterSil 0.010" Slotted Schedule 40 PVC 3/8" PEL-PLUG Bentonite Pellets	WELL CASING Interval: 0-6.6 Material: Schedule 40 PVC Diameter: 2" Joint Type: Flush/Thread SURFACE CASING Interval: Material: Diameter: WELL SCREEN Interval: 6.6-16.6 Material: 0.010" Slotted Schedule 40 PVC Diameter: 2" Slot Size: 0.010" End Cap: 16.6-17 FILTER PACK Interval: 5-18 Type: FilterSil FILTER PACK SEAL Interval: 2-5 Type: 3/8" PEL-PLUG Bentonite Pellets ANNULUS SEAL Interval: 0-2 Type: Portland Cement and Quick Gel Bentonite Mix WELL COMPLETION Pad: 4'x4' Protective Casing: 4"x4"x5' DRILLING METHODS Soil Drill: Rotosonic Rock Drill: Core
380		2.00 - 7.00 RESIDUUM, SAND, reddish brown, micaceous, moist, non-cohesive.	SP		2.00				
5									
375		7.00 - 27.00 BIOTITE GNEISS, slightly weathered to fresh, thinly bedded, white/black, phaneritic, strong.	BR		375.1				
10									
370						R1	ROTO SONIC	6.00 10.00	
15									
365									
20									
360						R2	ROTO SONIC	8.00 10.00	
25									
355		Boring completed at 27.00 ft			355.1				
30									
350									
35									
345									
40									

BOREHOLE RECORD 1666254-01.GPJ PIEDMONT.GDT 5/30/18

LOG SCALE: 1 in = 5 ft
 DRILLING COMPANY: Cascade
 DRILLER: Matt Pope

GA INSPECTOR: David Hannam
 CHECKED BY: TIR
 DATE: 2/15/18



RECORD OF BOREHOLE PZ-50

SHEET 1 of 2

PROJECT: Plant Branch
 PROJECT NUMBER: 1666254-01
 DRILLED DEPTH: 67.00 ft
 LOCATION: South boundary of site

DRILL RIG: Pro Sonic 150
 DATE STARTED: 1/31/18
 DATE COMPLETED: 1/31/18

NORTHING: 1,161,593.68
 EASTING: 2,562,372.00
 GS ELEVATION: 378.79
 TOC ELEVATION: 381.53 ft

DEPTH W.L.: 37.68
 DATE W.L.: 2/14/18
 TIME W.L.:

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	REC		
0		0.00 - 7.00 Soil removed by Hydrovac from 0-7 ft bgs. Logged by sight. silty SAND, reddish brown, micaceous, moist, non-cohesive.	SM						Grout mix and stainless steel casing	WELL CASING Interval: 0-54.6 Material: Schedule 40 PVC Diameter: 2" Joint Type: Flush/Thread SURFACE CASING Interval: Material: Diameter: WELL SCREEN Interval: 54.6-64.6 Material: 0.010" Slotted Schedule 40 PVC Diameter: 2" Slot Size: 0.010" End Cap: 64.6-65 FILTER PACK Interval: 53-66 Type: FilterSil FILTER PACK SEAL Interval: 48-53 Type: 3/8" PEL-PLUG Bentonite Pellets ANNULUS SEAL Interval: 0-48 Type: Portland Cement and Quick Gel Bentonite Mix WELL COMPLETION Pad: 4'x4' Protective Casing: 4"x4"x5" DRILLING METHODS Soil Drill: Rotosonic Rock Drill: Core
375										
5										
10		7.00 - 47.00 RESIDUUM, silty SAND, reddish brown, micaceous, non-cohesive, moist.			371.79 7.00					
15						R1	ROTO SONIC	10.00 10.00		
20										
25			SM			R2	ROTO SONIC	10.00 10.00		
30									Portland Cement and Quick Gel Bentonite Mix	
35						R3	ROTO SONIC	10.00 10.00		
40						R4	ROTO SONIC	10.00 10.00		

Log continued on next page

BOREHOLE RECORD 1666254-01.GPJ PIEDMONT.GDT 5/30/18

LOG SCALE: 1 in = 5 ft
 DRILLING COMPANY: Cascade
 DRILLER: Matt Pope

GA INSPECTOR: David Hannam
 CHECKED BY: TIR
 DATE: 2/15/18



RECORD OF BOREHOLE PZ-50

SHEET 2 of 2

PROJECT: Plant Branch
 PROJECT NUMBER: 1666254-01
 DRILLED DEPTH: 67.00 ft
 LOCATION: South boundary of site

DRILL RIG: Pro Sonic 150
 DATE STARTED: 1/31/18
 DATE COMPLETED: 1/31/18

NORTHING: 1,161,593.68
 EASTING: 2,562,372.00
 GS ELEVATION: 378.79
 TOC ELEVATION: 381.53 ft

DEPTH W.L.: 37.68
 DATE W.L.: 2/14/18
 TIME W.L.:

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			REC
45	335	7.00 - 47.00 RESIDUUM, silty SAND, reddish brown, micaceous, non-cohesive, moist. <i>(Continued)</i>	SM		331.79	R4	ROTO SONIC	10.00	<p>3/8" PEL-PLUG Bentonite Pellets</p> <p>FilterSil</p> <p>0.010" Slotted Schedule 40 PVC</p> <p>3/8" PEL-PLUG Bentonite Pellets</p>	<p>WELL CASING Interval: 0-54.6 Material: Schedule 40 PVC Diameter: 2" Joint Type: Flush/Thread</p> <p>SURFACE CASING Interval: Material: Diameter:</p> <p>WELL SCREEN Interval: 54.6-64.6 Material: 0.010" Slotted Schedule 40 PVC Diameter: 2" Slot Size: 0.010" End Cap: 64.6-65</p> <p>FILTER PACK Interval: 53-66 Type: FilterSil</p> <p>FILTER PACK SEAL Interval: 48-53 Type: 3/8" PEL-PLUG Bentonite Pellets</p> <p>ANNULUS SEAL Interval: 0-48 Type: Portland Cement and Quick Gel Bentonite Mix</p> <p>WELL COMPLETION Pad: 4'x4' Protective Casing: 4"x4"x5'</p> <p>DRILLING METHODS Soil Drill: Rotosonic Rock Drill: Core</p>
50	330	47.00 - 55.00 RESIDUUM, SAND with trace gravel, some relic structure, light reddish brown, moist, non-cohesive.	SP		47.00	R5	ROTO SONIC	10.00		
55	325	55.00 - 60.00 TRANSITIONALLY WEATHERED ROCK (BIOTITE GNEISS), SAND with trace gravel, some relic structure, light reddish brown, moist, non-cohesive.	TWR		323.79					
60	320	60.00 - 67.00 BIOTITE GNEISS, slightly weathered to fresh, subhorizontal foliation, white/black, phaneritic, moderately strong to strong.	BR		318.79	R6	ROTO SONIC	10.00		
		Boring completed at 67.00 ft			311.79					

BOREHOLE RECORD 1666254-01.GPJ PIEDMONT.GDT 5/30/18

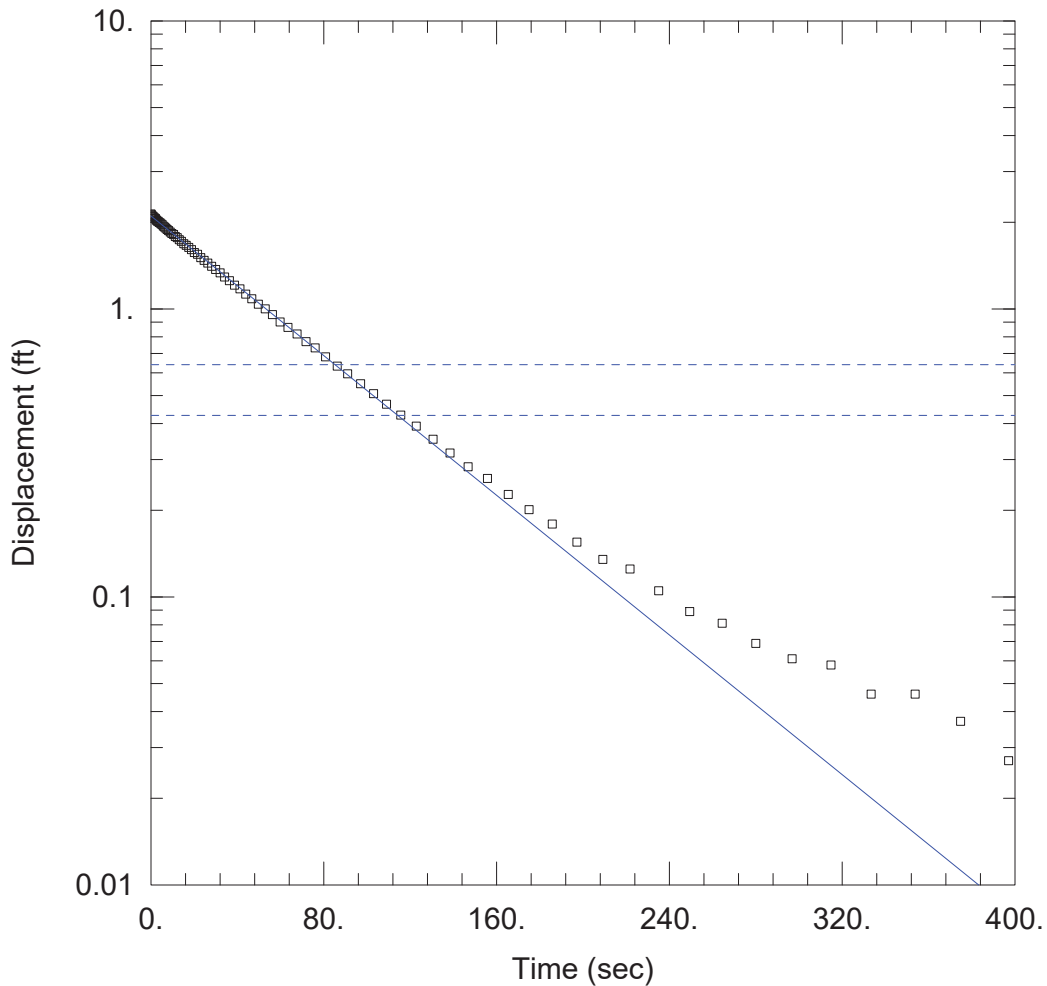
LOG SCALE: 1 in = 5 ft
 DRILLING COMPANY: Cascade
 DRILLER: Matt Pope

GA INSPECTOR: David Hannam
 CHECKED BY: TIR
 DATE: 2/15/18



APPENDIX C

Aquifer (Slug) Test Results



WELL TEST ANALYSIS

Data Set: C:\...\PZ-44 Slug In.aqt
 Date: 03/08/18

Time: 10:08:48

PROJECT INFORMATION

Company: Golder
 Client: SCS Plant Branch
 Project: 166625402
 Test Well: PZ-44
 Test Date: 2/21/18

AQUIFER DATA

Saturated Thickness: 34.64 ft

Anisotropy Ratio (K_z/K_r): 1.

WELL DATA (PZ-44)

Initial Displacement: 2.134 ft
 Total Well Penetration Depth: 59.55 ft
 Casing Radius: 0.08 ft

Static Water Column Height: 34.64 ft
 Screen Length: 10. ft
 Well Radius: 0.25 ft

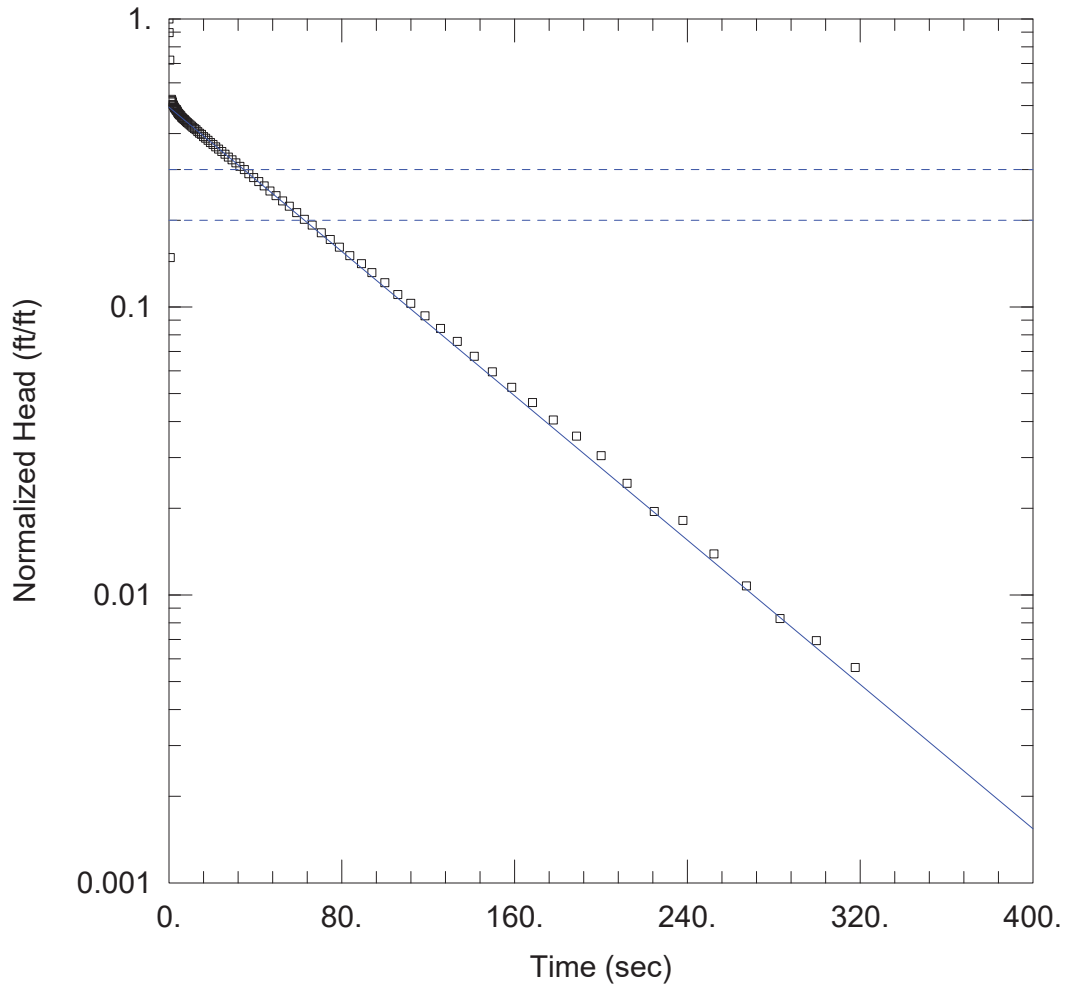
SOLUTION

Aquifer Model: Unconfined

Solution Method: Bower-Rice

$K = 0.0005268$ cm/sec

$y_0 = 2.102$ ft



WELL TEST ANALYSIS

Data Set: C:\...\PZ-44 Slug Out.aqt
 Date: 03/08/18

Time: 10:09:27

PROJECT INFORMATION

Company: Golder
 Client: SCS Plant Branch
 Project: 166625402
 Test Well: PZ-44
 Test Date: 2/21/18

AQUIFER DATA

Saturated Thickness: 34.66 ft

Anisotropy Ratio (K_z/K_r): 1.

WELL DATA (PZ-44)

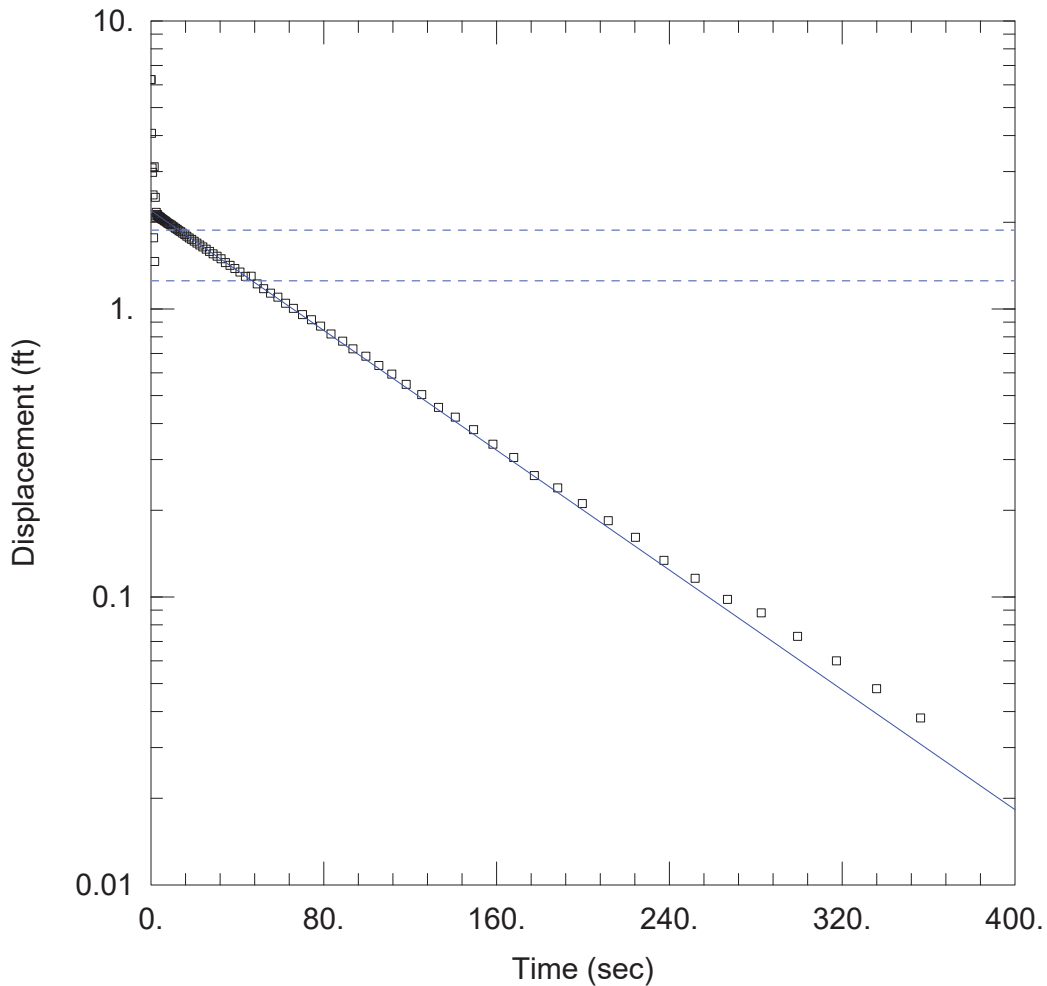
Initial Displacement: -4.467 ft
 Total Well Penetration Depth: 59.55 ft
 Casing Radius: 0.08 ft

Static Water Column Height: 34.66 ft
 Screen Length: 10. ft
 Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
 $K = 0.0005443$ cm/sec

Solution Method: Bower-Rice
 $y_0 = -2.205$ ft



WELL TEST ANALYSIS

Data Set: C:\...\PZ-45 Slug In.aqt
 Date: 03/08/18

Time: 10:02:28

PROJECT INFORMATION

Company: Golder
 Client: SCS Plant Branch
 Project: 166625402
 Test Well: PZ-45
 Test Date: 2/21/18

AQUIFER DATA

Saturated Thickness: 49.54 ft

Anisotropy Ratio (K_z/K_r): 1.

WELL DATA (PZ-45)

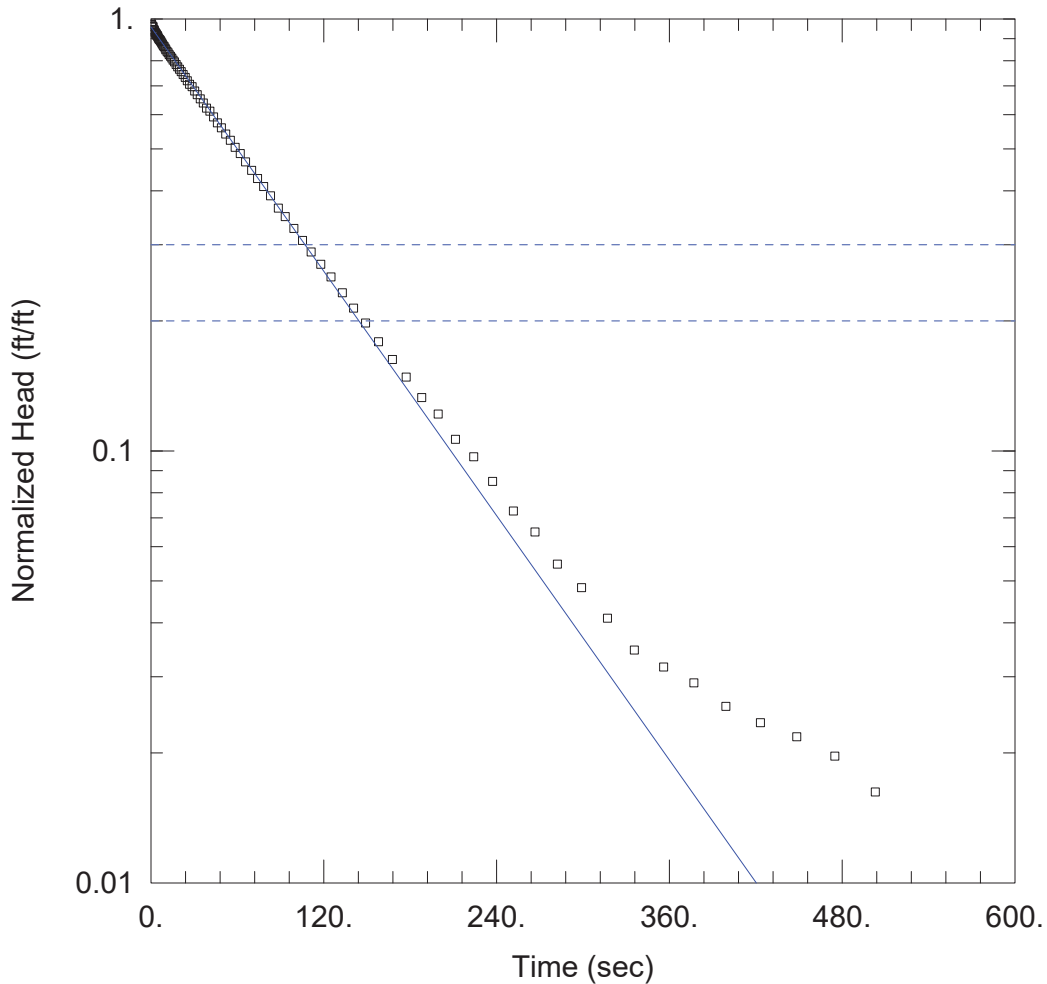
Initial Displacement: 6.259 ft
 Total Well Penetration Depth: 60.45 ft
 Casing Radius: 0.08 ft

Static Water Column Height: 49.54 ft
 Screen Length: 10. ft
 Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
 K = 0.0004529 cm/sec

Solution Method: Bower-Rice
 $y_0 =$ 2.194 ft



WELL TEST ANALYSIS

Data Set: C:\...\PZ-45 Slug Out.aqt
 Date: 03/08/18

Time: 10:10:33

PROJECT INFORMATION

Company: Golder
 Client: SCS Plant Branch
 Project: 166625402
 Test Well: PZ-45
 Test Date: 2/21/18

AQUIFER DATA

Saturated Thickness: 49.58 ft

Anisotropy Ratio (K_z/K_r): 1.

WELL DATA (PZ-45)

Initial Displacement: -2.341 ft
 Total Well Penetration Depth: 60.45 ft
 Casing Radius: 0.08 ft

Static Water Column Height: 49.58 ft
 Screen Length: 10. ft
 Well Radius: 0.25 ft

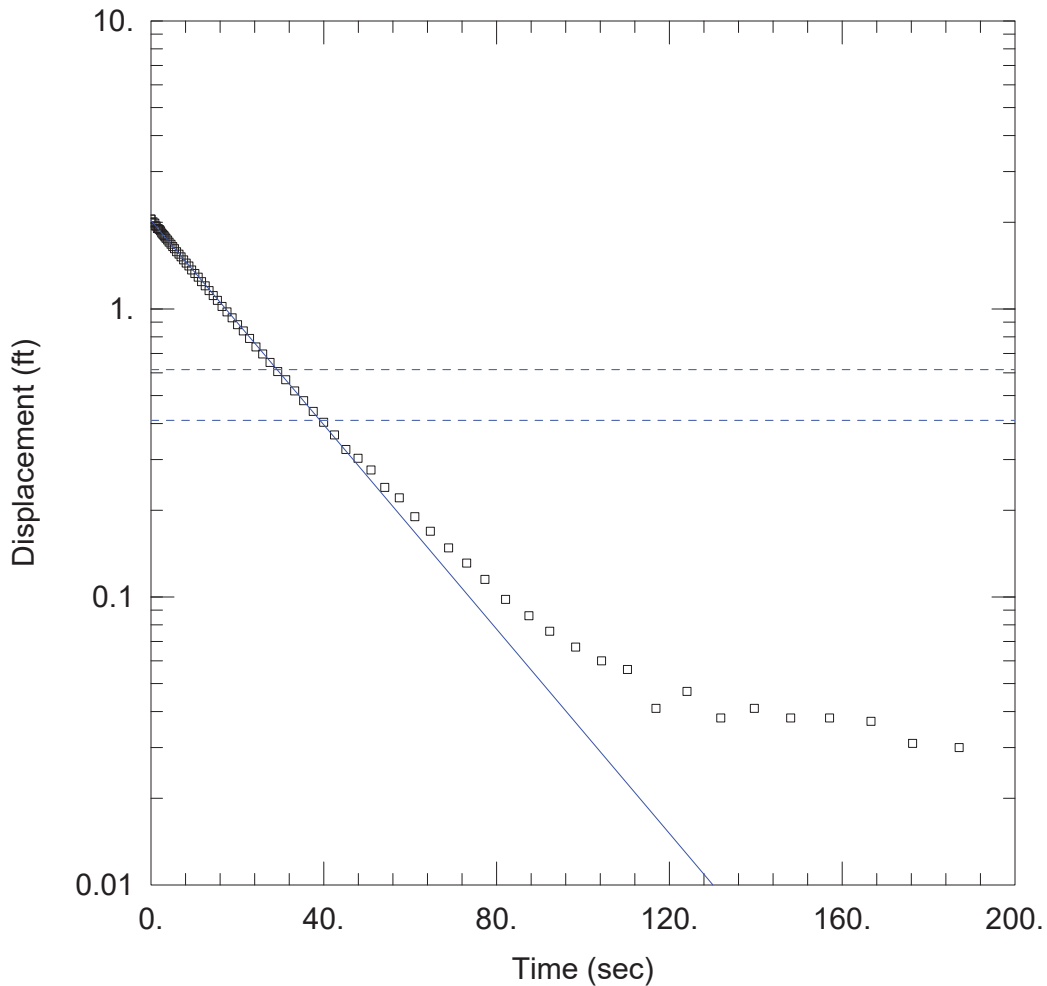
SOLUTION

Aquifer Model: Unconfined

Solution Method: Bower-Rice

$K =$ 0.0004106 cm/sec

$y_0 =$ -2.243 ft



WELL TEST ANALYSIS

Data Set: C:\...\PZ-46 Slug In (3).aqt
 Date: 03/08/18

Time: 10:15:53

PROJECT INFORMATION

Company: Golder
 Client: SCS Plant Branch
 Project: 166625402
 Test Well: PZ-46
 Test Date: 2/21/18

AQUIFER DATA

Saturated Thickness: 40.09 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (PZ-46)

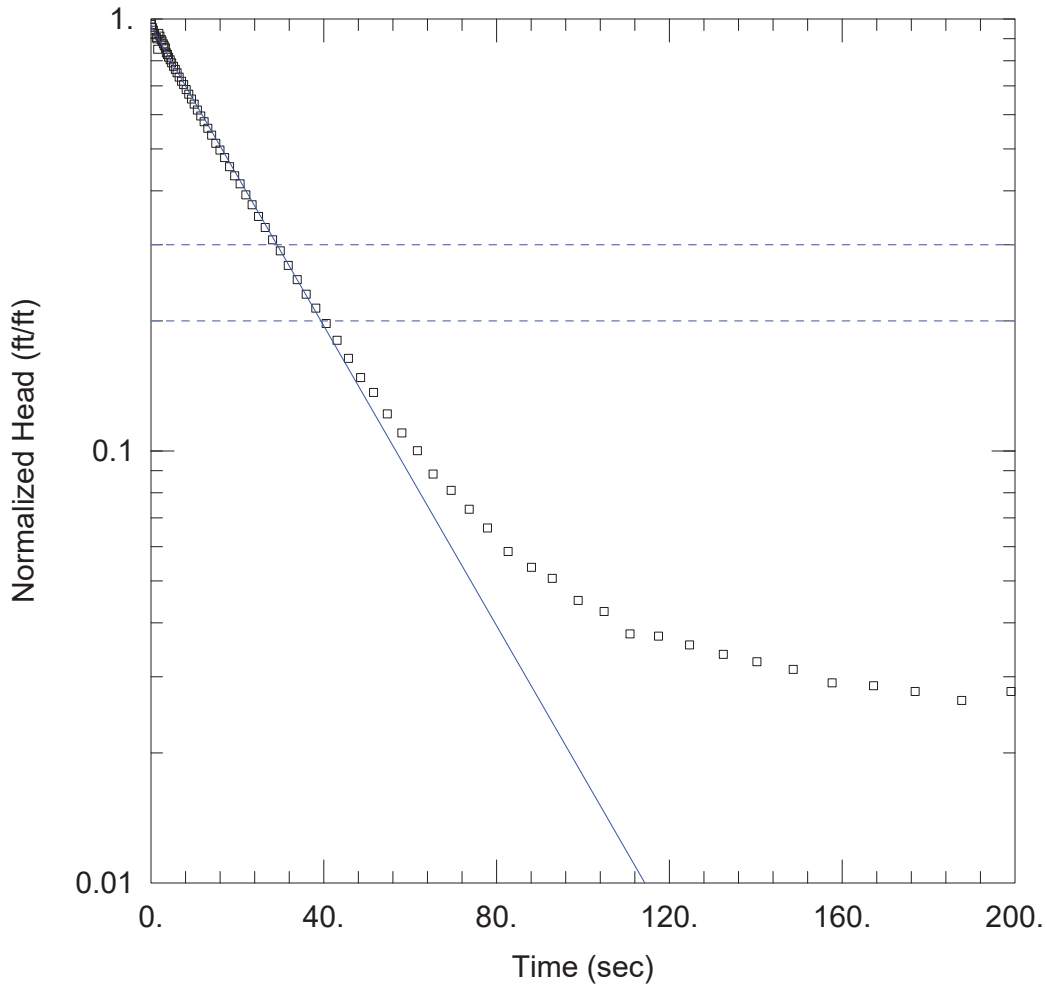
Initial Displacement: 2.052 ft
 Total Well Penetration Depth: 49.08 ft
 Casing Radius: 0.08 ft

Static Water Column Height: 40.09 ft
 Screen Length: 10. ft
 Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
 K = 0.001499 cm/sec

Solution Method: Bower-Rice
 y0 = 2.028 ft



WELL TEST ANALYSIS

Data Set: C:\...\PZ-46 Slug Out (3).aqt
 Date: 03/08/18

Time: 10:17:15

PROJECT INFORMATION

Company: Golder
 Client: SCS Plant Branch
 Project: 166625402
 Test Well: PZ-46
 Test Date: 2/21/18

AQUIFER DATA

Saturated Thickness: 40.08 ft

Anisotropy Ratio (K_z/K_r): 1.

WELL DATA (PZ-46)

Initial Displacement: -2.307 ft
 Total Well Penetration Depth: 49.08 ft
 Casing Radius: 0.08 ft

Static Water Column Height: 40.08 ft
 Screen Length: 10. ft
 Well Radius: 0.25 ft

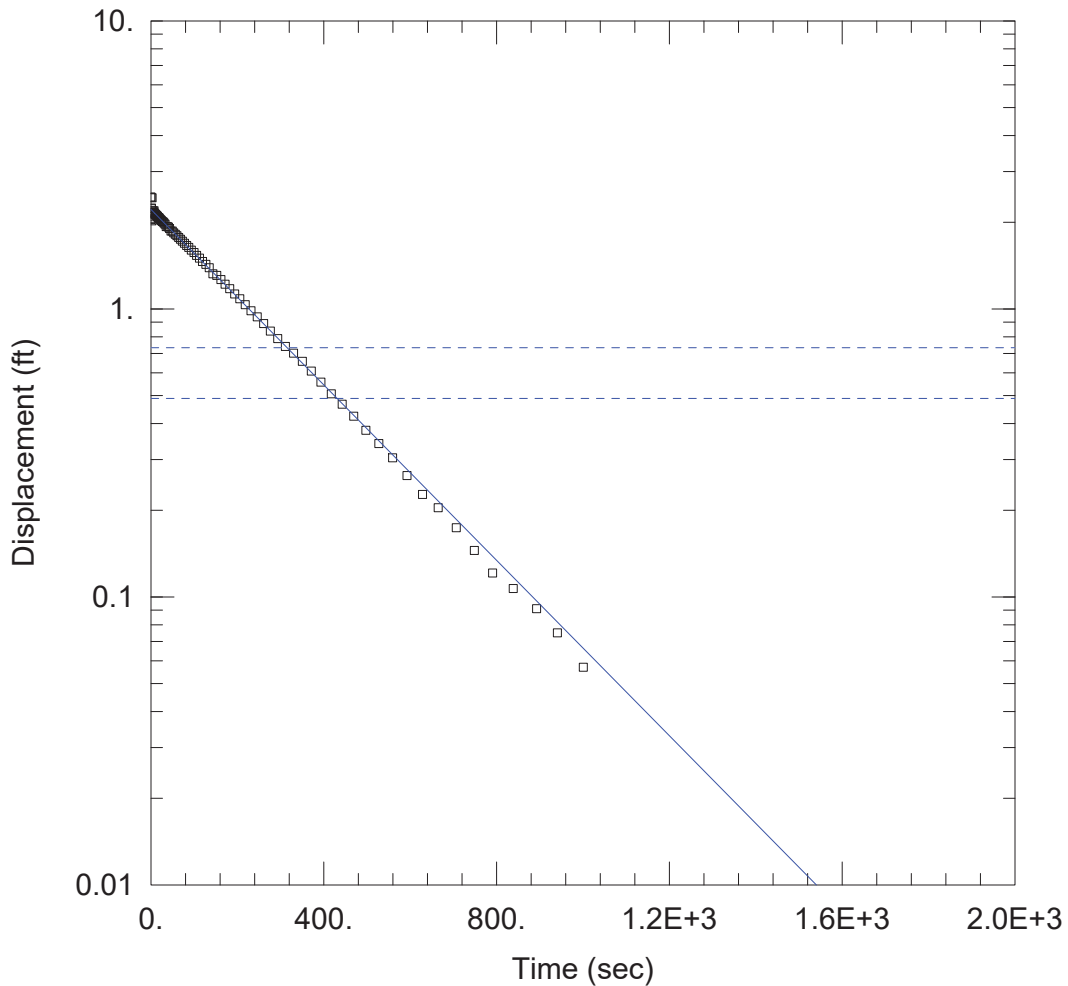
SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

$K =$ 0.001467 cm/sec

$y_0 =$ -2.221 ft



WELL TEST ANALYSIS

Data Set: C:\...\PZ-47 Slug In.aqt
 Date: 03/08/18

Time: 10:18:18

PROJECT INFORMATION

Company: Golder
 Client: SCS Plant Branch
 Project: 166625402
 Test Well: PZ-47
 Test Date: 2/21/18

AQUIFER DATA

Saturated Thickness: 71.49 ft

Anisotropy Ratio (K_z/K_r): 1.

WELL DATA (PZ-47)

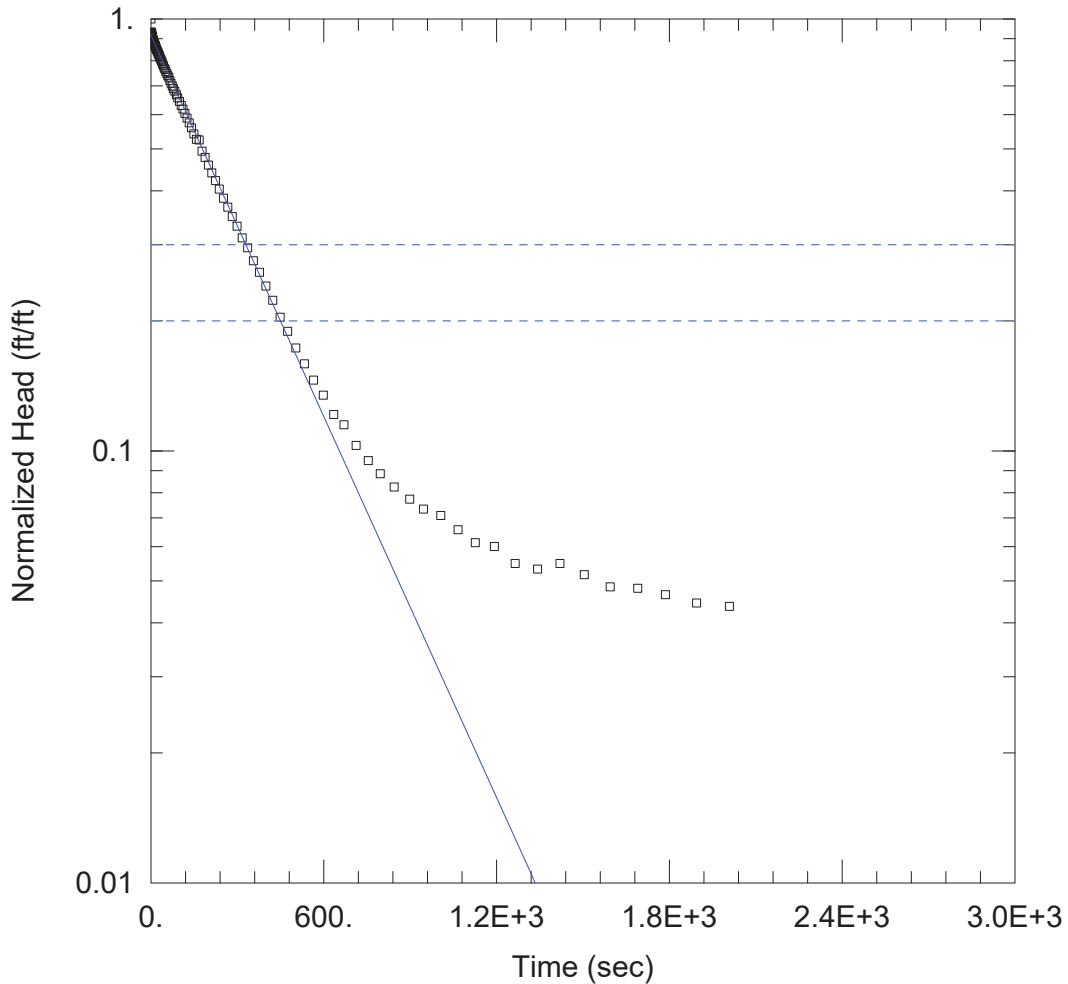
Initial Displacement: 2.443 ft
 Total Well Penetration Depth: 97.08 ft
 Casing Radius: 0.08 ft

Static Water Column Height: 71.49 ft
 Screen Length: 10. ft
 Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
 K = 0.0001414 cm/sec

Solution Method: Bower-Rice
 y_0 = 2.214 ft



WELL TEST ANALYSIS

Data Set: C:\...\PZ-47 Slug Out.aqt
 Date: 03/08/18

Time: 10:19:46

PROJECT INFORMATION

Company: Golder
 Client: SCS Plant Branch
 Project: 166625402
 Test Well: PZ-47
 Test Date: 2/21/18

AQUIFER DATA

Saturated Thickness: 71.57 ft

Anisotropy Ratio (K_z/K_r): 1.

WELL DATA (PZ-47)

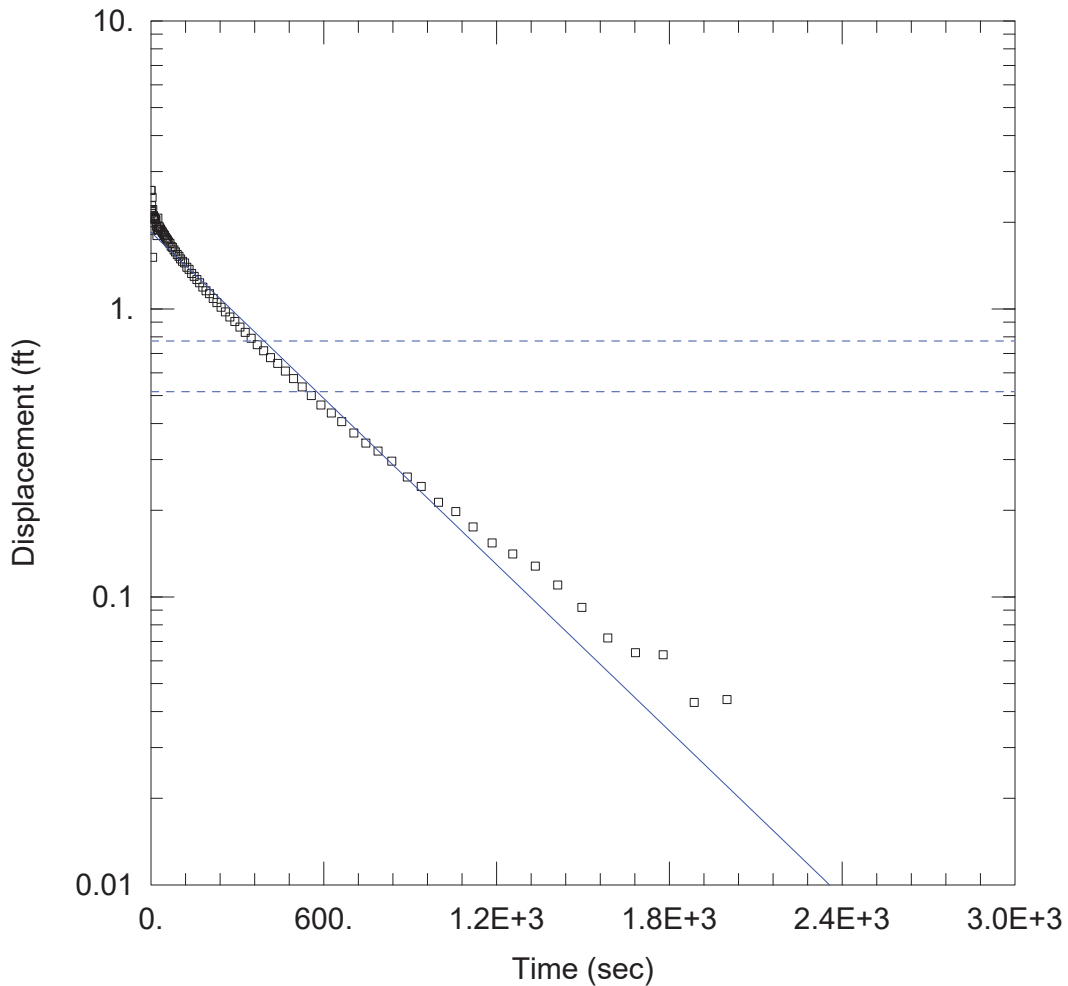
Initial Displacement: -2.496 ft
 Total Well Penetration Depth: 97.08 ft
 Casing Radius: 0.08 ft

Static Water Column Height: 71.57 ft
 Screen Length: 10. ft
 Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
 $K = 0.0001365$ cm/sec

Solution Method: Bower-Rice
 $y_0 = -2.285$ ft



WELL TEST ANALYSIS

Data Set: C:\...\PZ-48 Slug In.aqt
 Date: 03/08/18

Time: 10:22:24

PROJECT INFORMATION

Company: Golder
 Client: SCS Plant Branch
 Project: 166625402
 Test Well: PZ-48
 Test Date: 2/21/18

AQUIFER DATA

Saturated Thickness: 39.01 ft

Anisotropy Ratio (K_z/K_r): 1.

WELL DATA (PZ-48)

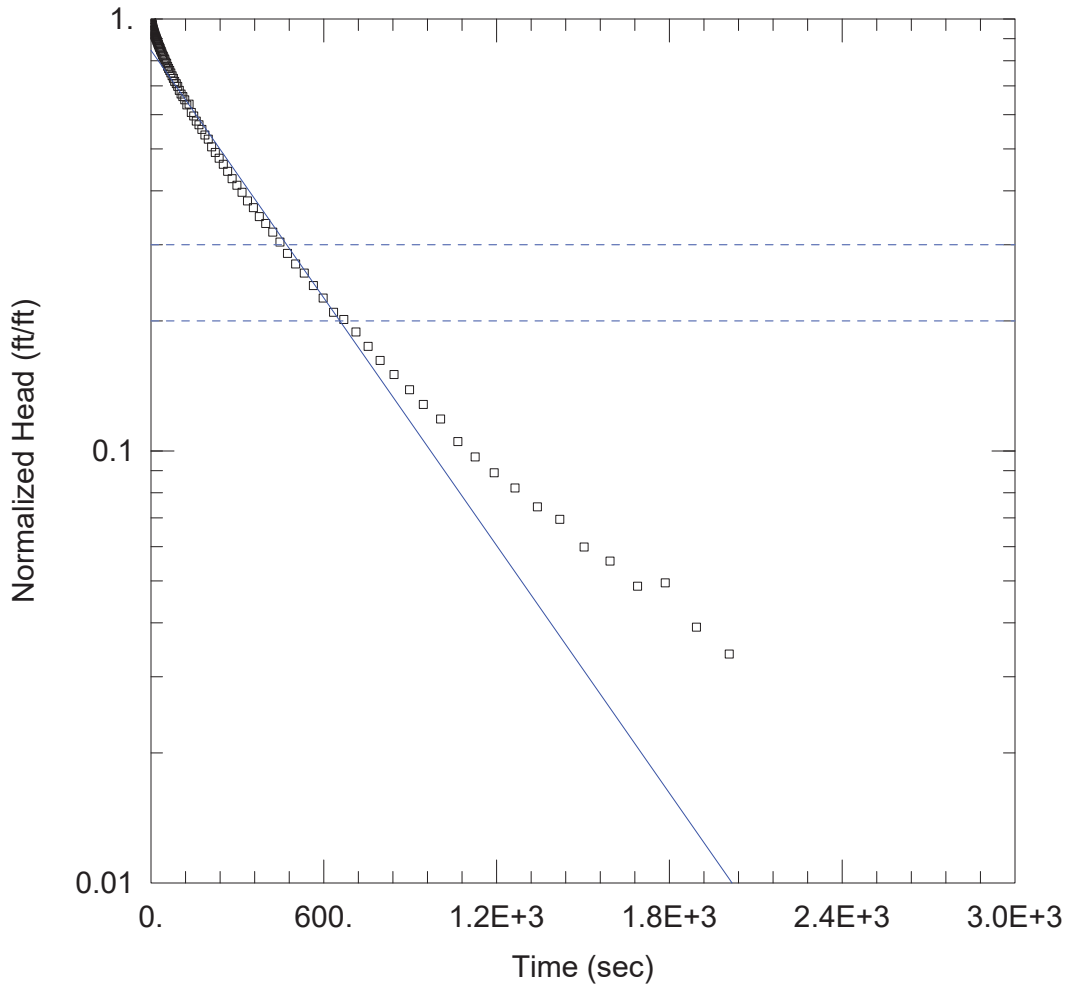
Initial Displacement: 2.58 ft
 Total Well Penetration Depth: 69.65 ft
 Casing Radius: 0.08 ft

Static Water Column Height: 39.01 ft
 Screen Length: 10. ft
 Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
 $K = 8.544E-5$ cm/sec

Solution Method: Bower-Rice
 $y_0 = 1.846$ ft



WELL TEST ANALYSIS

Data Set: \...\PZ-48 Slug Out.aqt
Date: 05/29/18

Time: 11:28:22

PROJECT INFORMATION

Company: Golder
Client: SCS Plant Branch
Project: 166625402
Test Well: PZ-48
Test Date: 2/21/18

AQUIFER DATA

Saturated Thickness: 39.11 ft

Anisotropy Ratio (K_z/K_r): 1.

WELL DATA (PZ-48)

Initial Displacement: -2.303 ft
Total Well Penetration Depth: 69.65 ft
Casing Radius: 0.08 ft

Static Water Column Height: 39.11 ft
Screen Length: 10. ft
Well Radius: 0.25 ft

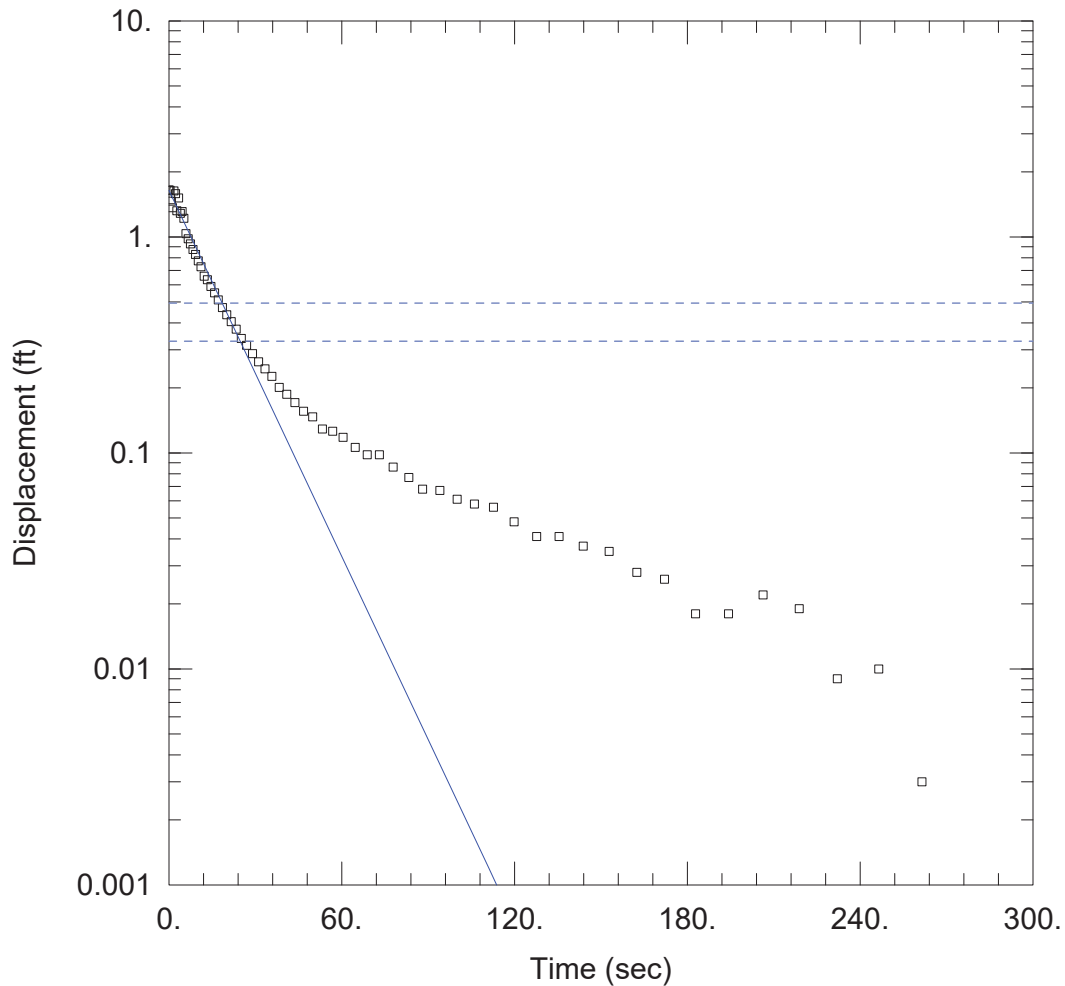
SOLUTION

Aquifer Model: Unconfined

Solution Method: Bower-Rice

$K = 8.486E-5$ cm/sec

$y_0 = -1.948$ ft



WELL TEST ANALYSIS

Data Set: C:\...\PZ-49 Slug In.aqt
 Date: 03/08/18

Time: 10:32:50

PROJECT INFORMATION

Company: Golder
 Client: SCS Plant Branch
 Project: 166625402
 Test Well: PZ-49
 Test Date: 2/21/18

AQUIFER DATA

Saturated Thickness: 11.48 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (PZ-49)

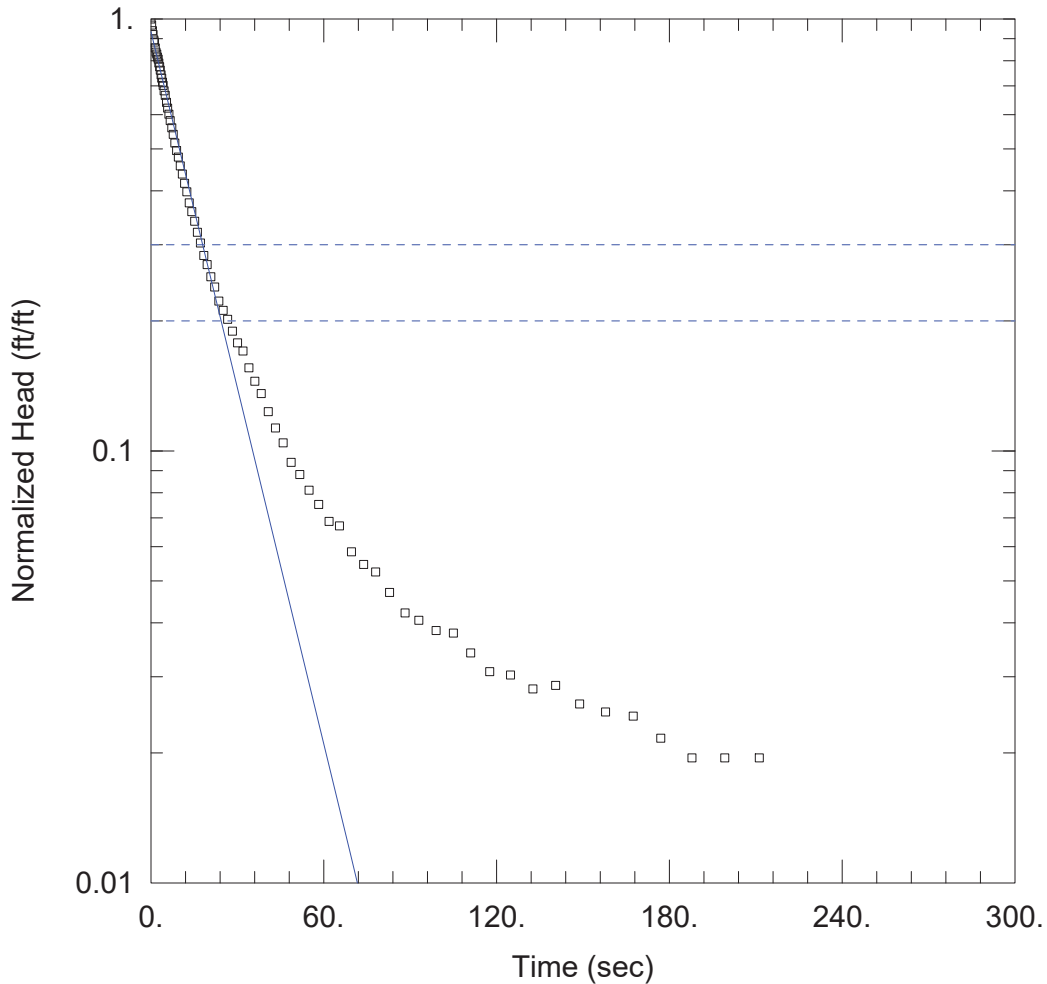
Initial Displacement: 1.646 ft
 Total Well Penetration Depth: 19.3 ft
 Casing Radius: 0.08 ft

Static Water Column Height: 11.48 ft
 Screen Length: 10. ft
 Well Radius: 0.25 ft
 Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined
 K = 0.007417 cm/sec

Solution Method: Bower-Rice
 y0 = 1.642 ft



WELL TEST ANALYSIS

Data Set: C:\...\PZ-49 Slug Out.aqt
 Date: 03/08/18

Time: 10:34:08

PROJECT INFORMATION

Company: Golder
 Client: SCS Plant Branch
 Project: 166625402
 Test Well: PZ-49
 Test Date: 2/21/18

AQUIFER DATA

Saturated Thickness: 11.49 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (PZ-49)

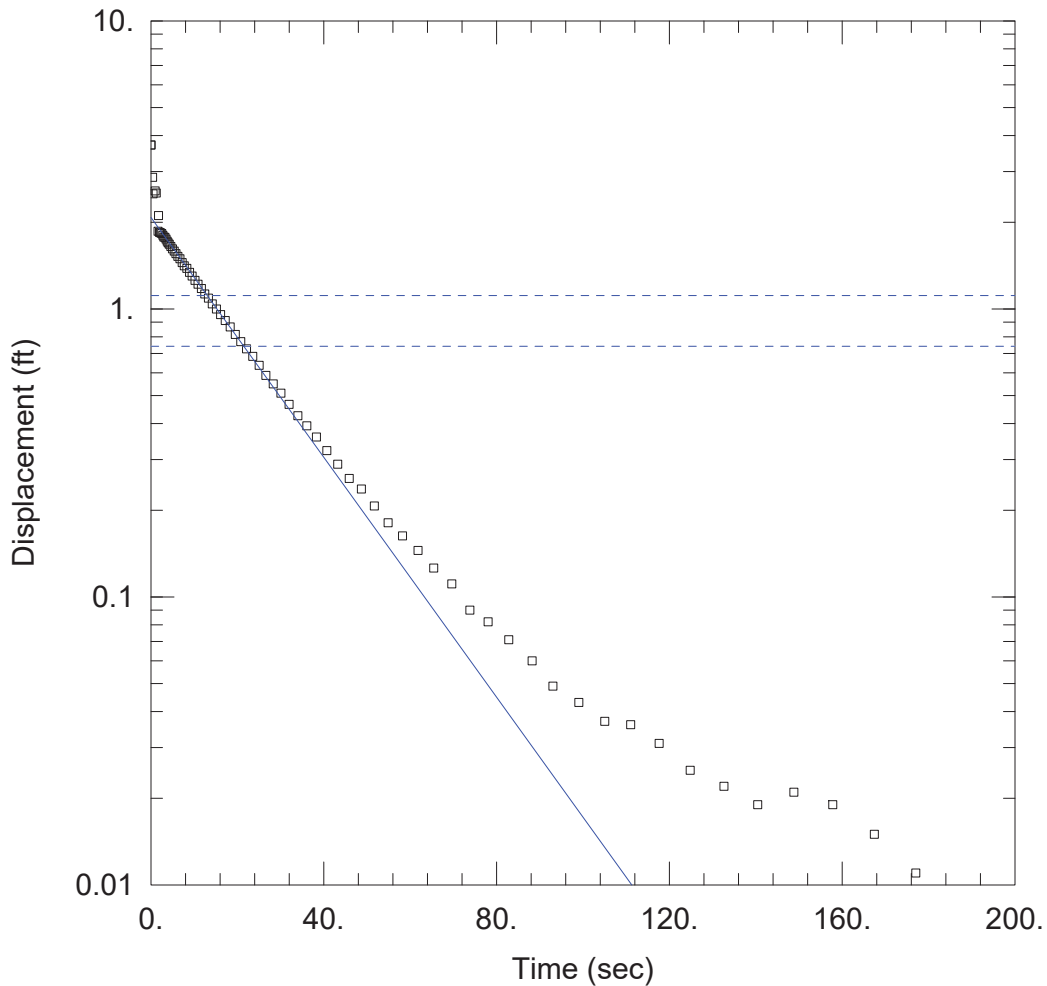
Initial Displacement: -1.849 ft
 Total Well Penetration Depth: 19.3 ft
 Casing Radius: 0.08 ft

Static Water Column Height: 11.49 ft
 Screen Length: 10. ft
 Well Radius: 0.25 ft
 Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined
 K = 0.007214 cm/sec

Solution Method: Bower-Rice
 y0 = -1.726 ft



WELL TEST ANALYSIS

Data Set: C:\...\PZ-50 Slug In (2).aqt
 Date: 03/08/18

Time: 10:36:19

PROJECT INFORMATION

Company: Golder
 Client: SCS Plant Branch
 Project: 166625402
 Test Well: PZ-50
 Test Date: 2/21/18

AQUIFER DATA

Saturated Thickness: 30.73 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (PZ-50)

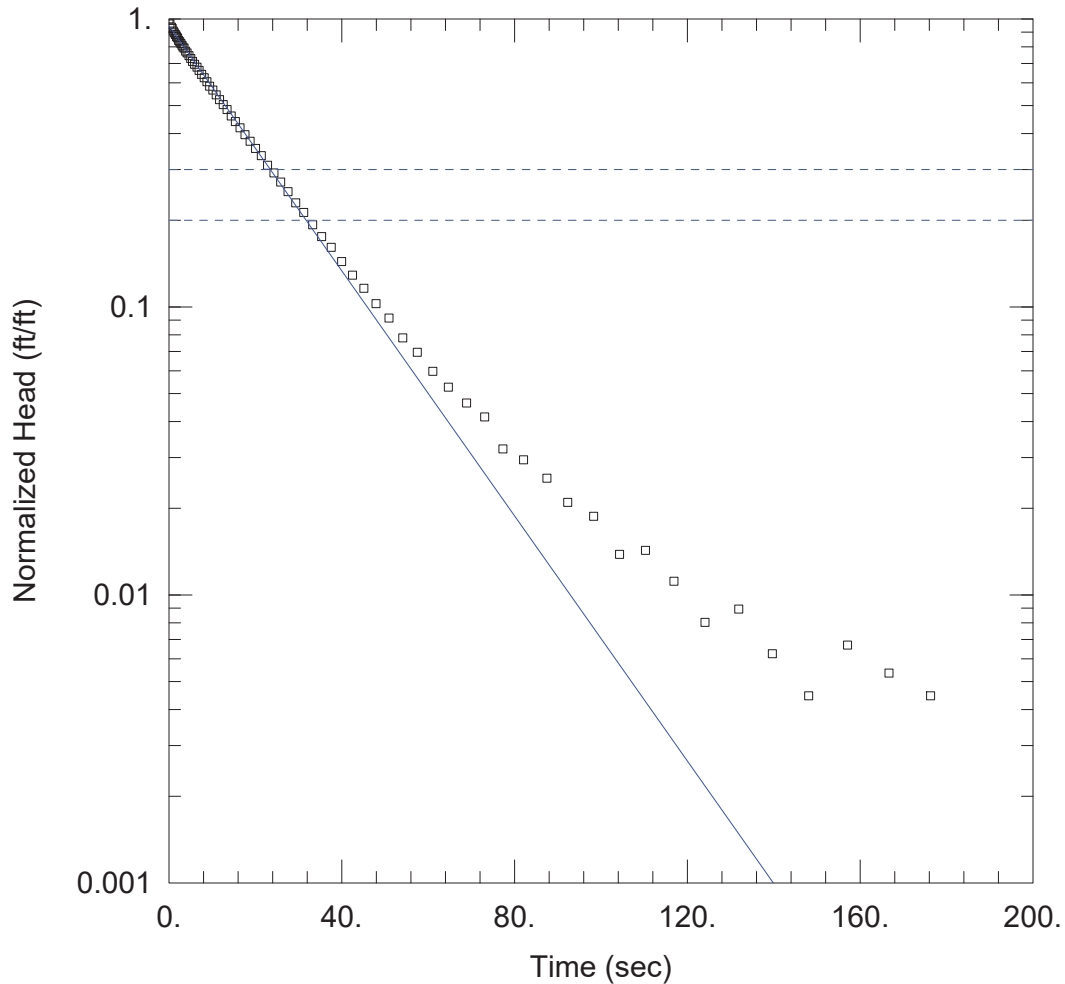
Initial Displacement: 3.709 ft
 Total Well Penetration Depth: 68.75 ft
 Casing Radius: 0.08 ft

Static Water Column Height: 30.73 ft
 Screen Length: 10. ft
 Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
 K = 0.001847 cm/sec

Solution Method: Bower-Rice
 y0 = 2.078 ft



WELL TEST ANALYSIS

Data Set: C:\...\PZ-50 Slug Out.aqt
 Date: 03/08/18

Time: 10:37:30

PROJECT INFORMATION

Company: Golder
 Client: SCS Plant Branch
 Project: 166625402
 Test Well: PZ-50
 Test Date: 2/21/18

AQUIFER DATA

Saturated Thickness: 30.73 ft

Anisotropy Ratio (K_z/K_r): 1.

WELL DATA (PZ-50)

Initial Displacement: -2.241 ft
 Total Well Penetration Depth: 68.75 ft
 Casing Radius: 0.08 ft

Static Water Column Height: 30.73 ft
 Screen Length: 10. ft
 Well Radius: 0.25 ft

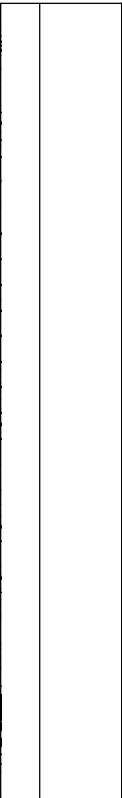
SOLUTION

Aquifer Model: Unconfined
 K = 0.001886 cm/sec

Solution Method: Bower-Rice
 y_0 = -2.121 ft

BORING AND WELL LOG LEGEND

LITHOLOGY	WATER LEVEL	WELL/BORING COMPLETION	SAMPLE TYPE	DESCRIPTION
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ASPHALT
CONCRETE
FILL
TOPSOIL
COBBLES
IGNEOUS Rock
METAMORPHIC Rock
SEDIMENTARY Rock
Well-graded GRAVEL (GW)
Poorly graded GRAVEL (GP)
Silty GRAVEL (GM)
Clayey GRAVEL (GC)
Well-graded GRAVEL with silt (GW-GM)
Poorly graded GRAVEL with silt (GP-GM)
Well-graded GRAVEL with clay (GW-GC)
Poorly graded GRAVEL with clay (GP-GC)
Well-graded SAND (SW)
Poorly graded SAND (SP)
Silty SAND (SM)
Clayey SAND (SC)
Well-graded SAND with silt (SW-SM)
Poorly graded SAND with silt (SP-SM)
Well-graded SAND with clay (SW-SC)
Poorly graded SAND with clay (SP-SC)
SILT (ML)
Lean CLAY (CL)
Organic SOIL (OL)
Elastic SILT (MH)
Fat CLAY (CH)
Organic SOIL (OH)
PEAT (PT)
Volume Descriptors: Trace = <5% Few = 5-10% Little = 15-25% Some = 30-45% Mostly = >=50%
Static Water Level (ft): 31.54/29.62; static water level for shallow and deep well, respectively DTW After Drilling (ft): 31.70/31.00; depth to water after drilling for shallow and deep well, respectively
Cap
Riser
Screen
Cement
Bentonite Grout
Bentonite Seal
Filter Pack
Backfill/Slough
GR Grab
EN Encore
SS Split Spoon
SH Shelby Tube
CO Core Barrel
DP Direct Push
ID Lab Sample and ID

NOTES:

Drilling Start Date: 01/18/2019	Boring Depth (ft): 96	Well Depth (ft): 38/NA
Drilling End Date: 01/22/2019	Boring Diameter (in): 6.50	Well Diam. (in)/Screen Slot (in): 2.0/0.010
Drilling Company: Thompson Engineering	Static Water Level (ft): 24.54/NA	Riser Material: Sch 40 PVC
Drilling Method: Hollow Stem Auger	DTW After Drilling (ft): 24.4/NA	Screen Material: Sch 40 PVC Slotted
Drilling Equipment: CME-550	Top of Casing Elev. (ft) 403.06/NA	Sanitary Seal: Bentonite Chips/Pellets
Driller: Stan White	Ground Elev. (ft): 400.26/NA	Filter Pack: Sand
Logged By: Joseph Ivanowski	Location (X,Y): 1164916.83, 2556350.54	Sampling Method(s): SS/SH/CO

DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT				SOIL/ROCK VISUAL DESCRIPTION	MEASURE Lab Sample	ELEV. (ft msl)
				Sample Type	Recovery (ft)	Blow Counts	N Value RQD (%)			
0				SS	0.58	1	2	(0') Clayey SAND (SC); moist, reddish-brown, organic material.	PB-1 (0-2)	400
1				SS	1.66	1	7	(2') Sandy lean CLAY (CL); medium plasticity, medium stiff, dry, reddish-brown, micaceous, some quartz gravel in lenses.	PB-1 (2-4)	
3				SS	2	3	13		PB-1 (4-6)	
5				SS	2	3	8	(6') Clayey SAND (SC); mostly medium grained sand, few coarse gravel, few clay, medium dense, dry, light reddish-brown, some coarse quartz sand lenses.	PB-1 (6-8)	395
7				SS	1.84	2	7	(8') SILT (ML); mostly silt, nonplastic, medium stiff, dry, yellowish-brown, small iron oxide concretions throughout (10 mm).	PB-1 (8-10)	
9				SS	1.84	3	9	(10') SILT (ML); mostly silt, nonplastic, medium stiff, dry, yellowish-brown, small iron oxide concretions throughout (10 mm), more fine sand and mica.	PB-1 (10-12)	390
11				SS	2	3	9	(12') Silty SAND (SM); medium dense, dry, pale reddish-brown, weak relict structure, micaceous, some gravel quartz lenses.	PB-1 (12-14)	
13				SS	2	4	8		PB-1 (14-16)	
15				SS	1.66	3	12	(16') Silty SAND (SM); dense, moist, pale reddish-brown, relict rock structure more evident, micaceous, some gravel quartz lenses.	PB-1 (16-18)	385
17				SS	2	4	10		PB-1 (18-20)	
19						4				
20						4				

NOTES: PB-1S is a stickup well located ~10ft away from PB-1 borehole.
NA = Not Applicable

Drilling Start Date: 01/18/2019	Boring Depth (ft): 96	Well Depth (ft): 38/NA
Drilling End Date: 01/22/2019	Boring Diameter (in): 6.50	Well Diam. (in)/Screen Slot (in): 2.0/0.010
Drilling Company: Thompson Engineering	Static Water Level (ft): 24.54/NA	Riser Material: Sch 40 PVC
Drilling Method: Hollow Stem Auger	DTW After Drilling (ft): 24.4/NA	Screen Material: Sch 40 PVC Slotted
Drilling Equipment: CME-550	Top of Casing Elev. (ft) 403.06/NA	Sanitary Seal: Bentonite Chips/Pellets
Driller: Stan White	Ground Elev. (ft): 400.26/NA	Filter Pack: Sand
Logged By: Joseph Ivanowski	Location (X,Y): 1164916.83, 2556350.54	Sampling Method(s): SS/SH/CO

DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT				SOIL/ROCK VISUAL DESCRIPTION	MEASURE Lab Sample	ELEV. (ft msl)
				Sample Type	Recovery (ft)	Blow Counts	N Value RQD (%)			
20			SH	2					PB-1 (20-22)	380
			SS	2	4	13		(22') Silty SAND (SM); dense, moist, pale reddish-brown, micaceous with relict rock fabric.	PB-1 (22-24)	
			SS	2	6					
			SS	2	7					
			SS	2	8					
			SS	2	5	19		(24') Silty SAND (SM); dense, wet, pale reddish-brown, micaceous with relict rock fabric, weathered quartz lens at 25.5 ft.	PB-1 (24-26)	
25			SS	2	8					375
			SS	2	11					
			SS	2	15					
			SS	2	6	31			PB-1 (26-28)	
			SS	2	11					
			SS	2	20					
			SS	2	24					
			SS	1.34	17	86		(28') Silty SAND (SM); dense, wet, pale reddish-brown, material becoming harder, more rock like, highly weathered Gneiss. (28') Top of PWR.	PB-1 (28-30)	
			SS	1.34	36					
			SS	1.26	50/4					
30			SS	1.26	11	87			PB-1 (30-32)	370
					37					
					50			(32') Switched to 5ft-center for SPT (SS) sampling due to PWR.		
35			SS	1.58	16	77		(35') Weathered Gneiss, abundant quartz, mica with biotite.	PB-1 (35-37)	365
					37					
					40					
					38					
40										

NOTES: PB-1S is a stickup well located ~10ft away from PB-1 borehole.
NA = Not Applicable

Drilling Start Date: 01/18/2019	Boring Depth (ft): 96	Well Depth (ft): 38/NA
Drilling End Date: 01/22/2019	Boring Diameter (in): 6.50	Well Diam. (in)/Screen Slot (in): 2.0/0.010
Drilling Company: Thompson Engineering	Static Water Level (ft): 24.54/NA	Riser Material: Sch 40 PVC
Drilling Method: Hollow Stem Auger	DTW After Drilling (ft): 24.4/NA	Screen Material: Sch 40 PVC Slotted
Drilling Equipment: CME-550	Top of Casing Elev. (ft) 403.06/NA	Sanitary Seal: Bentonite Chips/Pellets
Driller: Stan White	Ground Elev. (ft): 400.26/NA	Filter Pack: Sand
Logged By: Joseph Ivanowski	Location (X,Y): 1164916.83, 2556350.54	Sampling Method(s): SS/SH/CO

DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT				SOIL/ROCK VISUAL DESCRIPTION	MEASURE Lab Sample	ELEV. (ft msl)
				Sample Type	Recovery (ft)	Blow Counts	N Value RQD (%)			
40				SS	0	19 39 50/5	89		PB-1 (40-42)	360
45				SS	0.92	15 45 50/4	95	(45') Silty SAND (SM); very dense, wet, mottled, weathered Gneiss with quartz, biotite, and feldspar.	PB-1 (45-47)	355
50				SS	0.34	31 50/5	50		PB-1 (50-52)	350
55				SS	0.5	50/5		(55') No bag sample collected.		345
60										

NOTES: PB-1S is a stickup well located ~10ft away from PB-1 borehole.
NA = Not Applicable

Drilling Start Date: 01/18/2019	Boring Depth (ft): 96	Well Depth (ft): 38/NA
Drilling End Date: 01/22/2019	Boring Diameter (in): 6.50	Well Diam. (in)/Screen Slot (in): 2.0/0.010
Drilling Company: Thompson Engineering	Static Water Level (ft): 24.54/NA	Riser Material: Sch 40 PVC
Drilling Method: Hollow Stem Auger	DTW After Drilling (ft): 24.4/NA	Screen Material: Sch 40 PVC Slotted
Drilling Equipment: CME-550	Top of Casing Elev. (ft) 403.06/NA	Sanitary Seal: Bentonite Chips/Pellets
Driller: Stan White	Ground Elev. (ft): 400.26/NA	Filter Pack: Sand
Logged By: Joseph Ivanowski	Location (X,Y): 1164916.83, 2556350.54	Sampling Method(s): SS/SH/CO

DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT				SOIL/ROCK VISUAL DESCRIPTION	MEASURE Lab Sample	ELEV. (ft msl)
				Sample Type	Recovery (ft)	Blow Counts	N Value RQD (%)			
60				SS	0.16	44 50/4	50	(60') No bag sample collected.		340
65				SS	5.5	50/2		(65') Silty SAND (SM); very dense, wet, some coarse quartz sand, weathered Gneiss with relict banding, quartz, feldspar, and biotite. PWR becomes more competent. Very slow drilling, effective auger refusal at 67ft. (67') Began mud rotary drilling.		335
70								(72') No bag sample collected.		330
75								(79') Very hard drilling.		325
80										

NOTES: PB-1S is a stickup well located ~10ft away from PB-1 borehole.
NA = Not Applicable

Drilling Start Date: 01/18/2019	Boring Depth (ft): 96	Well Depth (ft): 38/NA
Drilling End Date: 01/22/2019	Boring Diameter (in): 6.50	Well Diam. (in)/Screen Slot (in): 2.0/0.010
Drilling Company: Thompson Engineering	Static Water Level (ft): 24.54/NA	Riser Material: Sch 40 PVC
Drilling Method: Hollow Stem Auger	DTW After Drilling (ft): 24.4/NA	Screen Material: Sch 40 PVC Slotted
Drilling Equipment: CME-550	Top of Casing Elev. (ft) 403.06/NA	Sanitary Seal: Bentonite Chips/Pellets
Driller: Stan White	Ground Elev. (ft): 400.26/NA	Filter Pack: Sand
Logged By: Joseph Ivanowski	Location (X,Y): 1164916.83, 2556350.54	Sampling Method(s): SS/SH/CO

DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT				SOIL/ROCK VISUAL DESCRIPTION	MEASURE		
				Sample Type	Recovery (ft)	Blow Counts	N Value RQD (%)		Lab Sample	ELEV. (ft msl)	
80										320	
				CO	4.5		100	Top of competent rock at 81.5 (81.5') MET ROCK (GNEISS); coarse grained, moderately bedded, fresh, hard, slightly fractured, dark gray to white, poorly jointed, few low angle fractures, abundant qtz, feldspar phenocrysts or augen, biotite, pyroxene, little evidence of water flow in fractures at 82.3, 82.7, 84.5, and 87 ft. Cable tool (rock coring) started at 81.5 ft below ground surface. Fractures at 82.3 and 82.7 Fracture at 84.5			
85				CO	4.5		100	Fracture at 87			315
90				CO	1.3		100				310
95											305
100								(96') Boring terminated. Well installed on 01/24/2019			

NOTES: PB-1S is a stickup well located ~10ft away from PB-1 borehole.
NA = Not Applicable

Drilling Start Date: 11/29/2018	Boring Depth (ft): 61	Well Depth (ft): 57
Drilling End Date: 12/04/2018	Boring Diameter (in): 6.50	Well Diam. (in)/Screen Slot (in): 2.0/0.010
Drilling Company: Thompson Engineering	Static Water Level (ft): 39.50	Riser Material: Sch 40 PVC
Drilling Method: Hollow Stem Auger	DTW After Drilling (ft): 12.40	Screen Material: Sch 40 PVC Slotted
Drilling Equipment: D-50	Top of Casing Elev. (ft) 416.76	Sanitary Seal: Bentonite Pellets
Driller: Phil Pitts	Ground Elev. (ft): 414.86	Filter Pack: Sand
Logged By: Nardos Tilahun	Location (X,Y): 1164853.32, 2556913.92	Sampling Method(s): SS/SH/CO

DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT				SOIL/ROCK VISUAL DESCRIPTION	MEASURE Lab Sample	ELEV. (ft msl)
				Sample Type	Recovery (ft)	Blow Counts	N Value RQD (%)			
0				SS	2	3	7	(0') Elastic SILT (MH); few medium sand, mostly silt, low plasticity, soft, moist, reddish, abundant mica.		
				SS	2	1	2	(2') Elastic SILT (MH); few medium sand, mostly silt, low plasticity, soft, moist, reddish, abundant mica.	PB-2 (2-4)	
				SH	1					410
				SS	2	2	8	(6') Elastic SILT (MH); few medium sand, mostly silt, low plasticity, soft, moist, reddish, abundant mica.		
				SS	2	2	10		PB-2 (8-10)	
5				SS	2	3	8	(10') Lean CLAY with sand (CL); few fine sand, some silt, mostly clay, medium plasticity, soft, moist, yellowish-brown to red.		405
				SS	2	3	5	(12') Elastic SILT with sand (MH); trace fine sand, mostly silt, few clay, soft, moist, yellow brown to red.	PB-2 (12-14)	
				SS	2	4	11			
10				SS	2	6	11	(15') Silty SAND (SM); mostly fine-coarse grained sand, some silt, trace clay, medium dense, dry, brownish-white, weathered rock fragments, black mottles.	PB-2 (15-16)	400
15				SS	2	6	11			
				SS	2	5	11			
				SS	2	5	11			
20				SS	2	6	11			395

NOTES: PB-2D is a stickup well.
NA = Not Applicable

Drilling Start Date: 11/29/2018	Boring Depth (ft): 61	Well Depth (ft): 57
Drilling End Date: 12/04/2018	Boring Diameter (in): 6.50	Well Diam. (in)/Screen Slot (in): 2.0/0.010
Drilling Company: Thompson Engineering	Static Water Level (ft): 39.50	Riser Material: Sch 40 PVC
Drilling Method: Hollow Stem Auger	DTW After Drilling (ft): 12.40	Screen Material: Sch 40 PVC Slotted
Drilling Equipment: D-50	Top of Casing Elev. (ft) 416.76	Sanitary Seal: Bentonite Pellets
Driller: Phil Pitts	Ground Elev. (ft): 414.86	Filter Pack: Sand
Logged By: Nardos Tilahun	Location (X,Y): 1164853.32, 2556913.92	Sampling Method(s): SS/SH/CO

DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT				SOIL/ROCK VISUAL DESCRIPTION	MEASURE	
				Sample Type	Recovery (ft)	Blow Counts	N Value RQD (%)		Lab Sample	ELEV. (ft msl)
20				SS	2	7	8			
21.5				SS	2	5	11	(21.5') SILT (ML); trace fine sand, mostly silt, few clay, nonplastic, soft, dry, reddish-brown, abundant mica.		
22				SS	2	5	11	(22') SILT with sand (ML); few fine-coarse sand, mostly silt, trace clay, nonplastic, stiff, dry, brownish-white, black mottles, abundant mica.		
24				SS	2	5	13	(24') SILT with sand (ML); few fine-coarse sand, mostly silt, trace clay, nonplastic, stiff, dry, brownish-white to light gray, abundant mica.	PB-2 (24-26)	390
26				SS	2	5	10	(26') SILT with sand (ML); few fine-coarse sand, mostly silt, trace clay, nonplastic, soft, dry, white to yellow brown.		
28				SS	1.5	6	16	(28') SILT with sand (ML); few fine-coarse sand, mostly silt, trace clay, nonplastic, stiff, dry, brownish-white.		
30				SS	1.5	7	21	(30') SILT (ML); few fine-coarse sand, mostly silt, trace clay, nonplastic, stiff, moist, yellow brown to brownish-white, black mottles, abundant laminated mica.	PB-2 (30-32)	385
32				SS	2	9	47	(32') SILT (ML); few fine-coarse sand, mostly silt, trace clay, nonplastic, hard, moist, brown to yellow brown to white, black mottles, mica, laminated, weathered white quartz rock fragments.		
34				SS	2	8	28	(34') SILT (ML); few fine-coarse sand, mostly silt, trace clay, nonplastic, stiff, moist, gray to white.		
36				SS	2	13	38	(36') SILT with sand (ML); few fine-coarse sand, mostly silt, trace clay, nonplastic, stiff, moist, yellowish-brown to white, abundant mica, quartz, laminated.	PB-2 (36-38)	
38				SS	1	30	50	(38') Well-graded SAND (SW); mostly fine-coarse grained sand, few silt, trace clay, very dense, moist, brown to dark gray, black mottles, quartz.	PB-2 (38-40)	
39						50/5.5		(39') Top of PWR.		

NOTES: PB-2D is a stickup well.
NA = Not Applicable




Drilling Start Date: 11/29/2018	Boring Depth (ft): 61	Well Depth (ft): 57
Drilling End Date: 12/04/2018	Boring Diameter (in): 6.50	Well Diam. (in)/Screen Slot (in): 2.0/0.010
Drilling Company: Thompson Engineering	Static Water Level (ft): 39.50	Riser Material: Sch 40 PVC
Drilling Method: Hollow Stem Auger	DTW After Drilling (ft): 12.40	Screen Material: Sch 40 PVC Slotted
Drilling Equipment: D-50	Top of Casing Elev. (ft) 416.76	Sanitary Seal: Bentonite Pellets
Driller: Phil Pitts	Ground Elev. (ft): 414.86	Filter Pack: Sand
Logged By: Nardos Tilahun	Location (X,Y): 1164853.32, 2556913.92	Sampling Method(s): SS/SH/CO

DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT				SOIL/ROCK VISUAL DESCRIPTION	MEASURE	ELEV. (ft msl)
				Sample Type	Recovery (ft)	Blow Counts	N Value RQD (%)			
40				SS	0.2	50/2.5				
64				CO	2.75		(42.9') Auger refusal.			
45				CO	4.3		(43') MET ROCK (GNEISS); moderately bedded, fresh, hard, slightly fractured, dark gray to white, dark biotite and white feldspar minerals, strong, dark and light banding, trace red, flow banding, slightly decomposed near top, competent, fine to medium grain. Cable tool (rock coring) started at 43 ft below ground surface.			370
87				CO	4.3		(46.5') MET ROCK (GNEISS); moderately bedded, fresh, hard, unfractured, dark gray to white, dark biotite and white feldspar minerals, strong, dark and light banding, flow banding, competent, medium to coarse grain.			
50				CO	3.3		Couldn't retrieve core, redrilled with new core catcher and bit, then retrieved core, as a result Run 3 has several mechanical fractures.			365
66				CO	3.3		(51') MET ROCK (GNEISS); fresh, hard, unfractured, dark white, dark biotite and white feldspar minerals, strong, dark and light banding, flow banding, competent, medium to coarse grain, several mechanical breaks from redrilling. 51-52 ft was drilled (not cored) due to a weathered layer (mostly sand) jamming core bit.			360
55				CO	4.75		(56') MET ROCK (GNEISS); fresh, hard, unfractured, dark white, dark biotite and white feldspar minerals, strong, dark and light banding, flow banding, competent, medium to coarse grain.			355
60										

NOTES: PB-2D is a stickup well.
NA = Not Applicable

Drilling Start Date: 11/29/2018	Boring Depth (ft): 61	Well Depth (ft): 57
Drilling End Date: 12/04/2018	Boring Diameter (in): 6.50	Well Diam. (in)/Screen Slot (in): 2.0/0.010
Drilling Company: Thompson Engineering	Static Water Level (ft): 39.50	Riser Material: Sch 40 PVC
Drilling Method: Hollow Stem Auger	DTW After Drilling (ft): 12.40	Screen Material: Sch 40 PVC Slotted
Drilling Equipment: D-50	Top of Casing Elev. (ft) 416.76	Sanitary Seal: Bentonite Pellets
Driller: Phil Pitts	Ground Elev. (ft): 414.86	Filter Pack: Sand
Logged By: Nardos Tilahun	Location (X,Y): 1164853.32, 2556913.92	Sampling Method(s): SS/SH/CO

DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT				SOIL/ROCK VISUAL DESCRIPTION	MEASURE	ELEV. (ft msl)
				Sample Type	Recovery (ft)	Blow Counts	N Value RQD (%)		Lab Sample	

60								(61') Boring terminated. Well installed on 12/05/2018		350
65										

NOTES: PB-2D is a stickup well.
NA = Not Applicable

Drilling Start Date: 01/14/2019	Boring Depth (ft): 121	Well Depth (ft): 48/114.5
Drilling End Date: 01/16/2019	Boring Diameter (in): 6.50	Well Diam. (in)/Screen Slot (in): 2.0/0.010
Drilling Company: Thompson Engineering	Static Water Level (ft): 31.54/29.62	Riser Material: Sch 40 PVC
Drilling Method: Hollow Stem Auger	DTW After Drilling (ft): 31.70/31.00	Screen Material: Sch 40 PVC Slotted
Drilling Equipment: CME-550	Top of Casing Elev. (ft) 411.06/412.18	Sanitary Seal: Bentonite Pellets
Driller: Stan White	Ground Elev. (ft): 409.26/409.08	Filter Pack: Sand
Logged By: Joseph Ivanowski	Location (X,Y): 1164335.02, 2556069.22	Sampling Method(s): SS/SH/CO

DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT				SOIL/ROCK VISUAL DESCRIPTION	MEASURE Lab Sample	ELEV. (ft msl)
				Sample Type	Recovery (ft)	Blow Counts	N Value RQD (%)			
0				SS	1.34	1	4	(0') Clayey SAND (SC); some fine-coarse grained sand, some silt, little clay, moist, reddish.	PB-4 (0-2)	
				SS	1.76	1	14	(2') Lean CLAY (CL); trace fine sand, mostly clay, medium plasticity, stiff, moist, dark reddish, micaceous with trace quartz fragments.	PB-4 (2-4)	
				SS	1.76	3	13		PB-4 (4-6)	405
5				SS	1.66	5	11	(6') Elastic SILT (MH); little fine sand, mostly silt, trace clay, low plasticity, stiff, moist, dark reddish, more micaceous.	PB-4 (6-8)	
				SS	1.5	2	8		PB-4 (8-10)	400
10				SS	1.76	3	9		PB-4 (10-12)	
				SS	2	2	8	(11') Silty SAND (SM); mostly fine grained sand, trace coarse gravel, some silt, trace clay, dense, dry, mottled red to pink brown, trace quartz gravel.	PB-4 (12-14)	
				SS	1.58	3	9	(12') Silty SAND (SM); mostly fine grained sand, trace coarse gravel, some silt, trace clay, moist, yellowish-white, 1 inch thick clay lens 14.6 to 14.7.		395
15								Attempted Shelby Tube, only 10 in recovery, discarded.		
				SH	1.92					390
20										

NOTES: PB-4S and PB-4D are stickup wells, PB-4S is ~10ft away from PB-4D well.
NA = Not Applicable

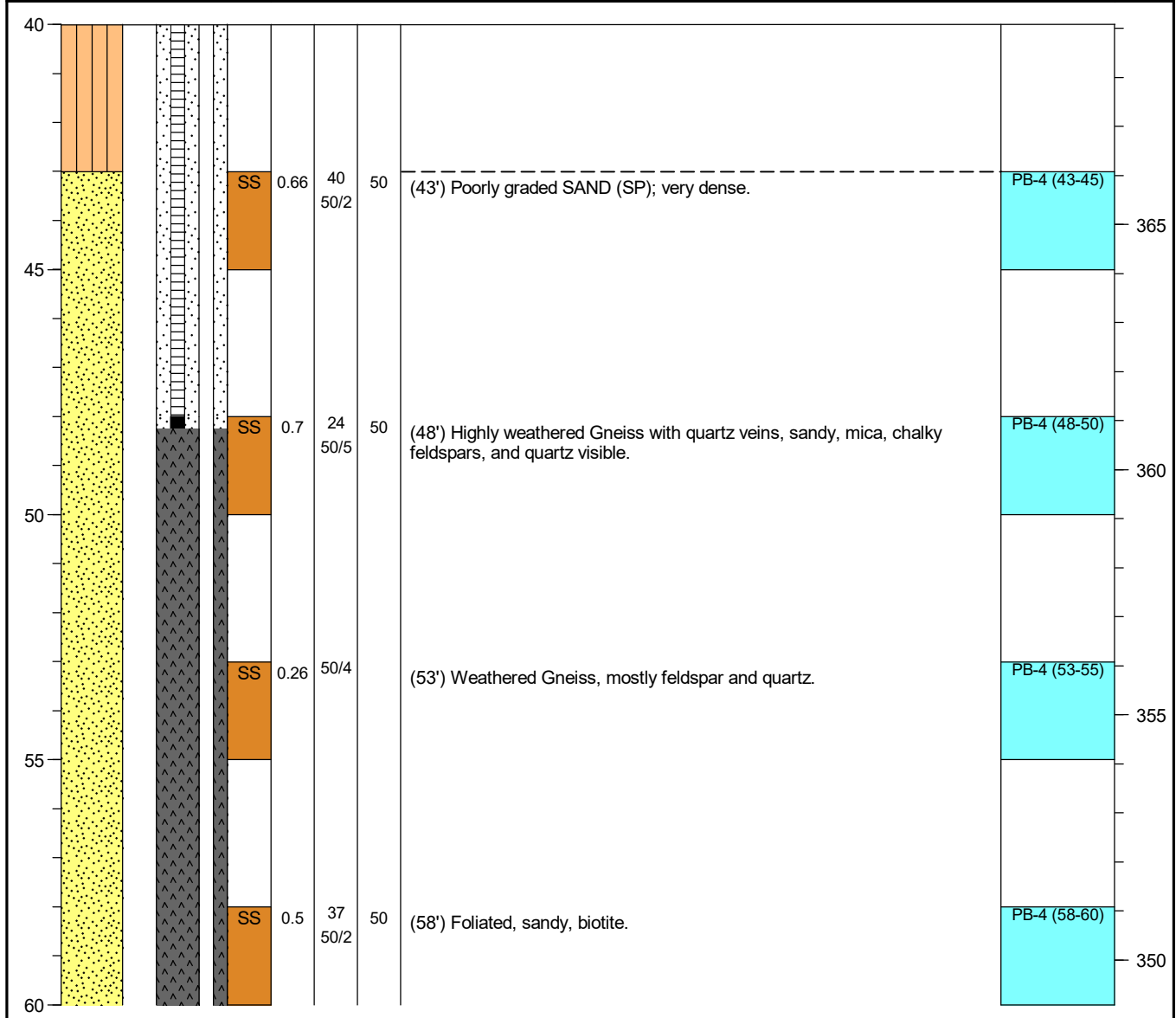
Drilling Start Date: 01/14/2019	Boring Depth (ft): 121	Well Depth (ft): 48/114.5
Drilling End Date: 01/16/2019	Boring Diameter (in): 6.50	Well Diam. (in)/Screen Slot (in): 2.0/0.010
Drilling Company: Thompson Engineering	Static Water Level (ft): 31.54/29.62	Riser Material: Sch 40 PVC
Drilling Method: Hollow Stem Auger	DTW After Drilling (ft): 31.70/31.00	Screen Material: Sch 40 PVC Slotted
Drilling Equipment: CME-550	Top of Casing Elev. (ft) 411.06/412.18	Sanitary Seal: Bentonite Pellets
Driller: Stan White	Ground Elev. (ft): 409.26/409.08	Filter Pack: Sand
Logged By: Joseph Ivanowski	Location (X,Y): 1164335.02, 2556069.22	Sampling Method(s): SS/SH/CO

DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT				SOIL/ROCK VISUAL DESCRIPTION	MEASURE	ELEV. (ft msl)
				Sample Type	Recovery (ft)	Blow Counts	N Value RQD (%)			
20				SS	2	3	14	(20') Silty SAND (SM); mostly fine grained sand, trace coarse gravel, some silt, trace clay, moist, yellowish-white, relict structure more pronounced.	PB-4 (20-22)	
				SS	2	6	15		PB-4 (22-24)	
				SS	2	7	15		PB-4 (24-26)	385
25				SS	2	5	17	(24.5') SILT from 24.5 to 25 ft.		
				SS	2	8	24	(25') SILT with sand (ML); trace coarse gravel, some fine-coarse sand, mostly silt, nonplastic, very stiff, moist, mottled pale brown to gray to white, relict rock fabric.	PB-4 (26-28)	
				SS	2	10	24		PB-4 (28-30)	
				SS	2	11	24		PB-4 (30-32)	380
30				SS	2	7	25	(31') SILT with sand (ML); trace coarse gravel, some fine-coarse sand, mostly silt, nonplastic, very stiff, wet, pale brown, rock fabric becoming stronger.	PB-4 (32-34)	
				SS	2	10	26		PB-4 (34-36)	375
				SS	2	8	34	(34') Sandy zone of weathered rock at 33.7 ft.	PB-4 (36-38)	
35				SS	1.58	8	80	(36') Very stiff, grading to PWR.	PB-4 (38-40)	
				SS	1.66	12	50/5	(39') Top of PWR.		370

NOTES: PB-4S and PB-4D are stickup wells, PB-4S is ~10ft away from PB-4D well.
NA = Not Applicable

Drilling Start Date: 01/14/2019	Boring Depth (ft): 121	Well Depth (ft): 48/114.5
Drilling End Date: 01/16/2019	Boring Diameter (in): 6.50	Well Diam. (in)/Screen Slot (in): 2.0/0.010
Drilling Company: Thompson Engineering	Static Water Level (ft): 31.54/29.62	Riser Material: Sch 40 PVC
Drilling Method: Hollow Stem Auger	DTW After Drilling (ft): 31.70/31.00	Screen Material: Sch 40 PVC Slotted
Drilling Equipment: CME-550	Top of Casing Elev. (ft) 411.06/412.18	Sanitary Seal: Bentonite Pellets
Driller: Stan White	Ground Elev. (ft): 409.26/409.08	Filter Pack: Sand
Logged By: Joseph Ivanowski	Location (X,Y): 1164335.02, 2556069.22	Sampling Method(s): SS/SH/CO

DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT				SOIL/ROCK VISUAL DESCRIPTION	MEASURE	ELEV. (ft msl)
				Sample Type	Recovery (ft)	Blow Counts	N Value RQD (%)			



NOTES: PB-4S and PB-4D are stickup wells, PB-4S is ~10ft away from PB-4D well.
NA = Not Applicable

Drilling Start Date: 01/14/2019	Boring Depth (ft): 121	Well Depth (ft): 48/114.5
Drilling End Date: 01/16/2019	Boring Diameter (in): 6.50	Well Diam. (in)/Screen Slot (in): 2.0/0.010
Drilling Company: Thompson Engineering	Static Water Level (ft): 31.54/29.62	Riser Material: Sch 40 PVC
Drilling Method: Hollow Stem Auger	DTW After Drilling (ft): 31.70/31.00	Screen Material: Sch 40 PVC Slotted
Drilling Equipment: CME-550	Top of Casing Elev. (ft) 411.06/412.18	Sanitary Seal: Bentonite Pellets
Driller: Stan White	Ground Elev. (ft): 409.26/409.08	Filter Pack: Sand
Logged By: Joseph Ivanowski	Location (X,Y): 1164335.02, 2556069.22	Sampling Method(s): SS/SH/CO

DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT				SOIL/ROCK VISUAL DESCRIPTION	MEASURE Lab Sample	ELEV. (ft msl)
				Sample Type	Recovery (ft)	Blow Counts	N Value RQD (%)			
60	[Yellow dotted pattern]	[Grey hatched pattern]	[Grey hatched pattern]	SS	0.3	50/3.5		(63') Biotite, foliated, sandy, mostly feldspar.	PB-4 (63-65)	345
65				SS	0.62	17 50/5	50	(68') Moderately weathered biotite gneiss foliated, mostly feldspars.	PB-4 (68-70)	340
70				SS	0.38	50/5		(73') Poorly graded SAND (SP); very dense, mostly felsic minerals, sandy texture.	PB-4 (73-75)	335
75				SS	0.2	50/3		(78') Biotite, sandy texture.	PB-4 (78-80)	330
80										

NOTES: PB-4S and PB-4D are stickup wells, PB-4S is ~10ft away from PB-4D well.
NA = Not Applicable

Drilling Start Date: 01/14/2019	Boring Depth (ft): 121	Well Depth (ft): 48/114.5
Drilling End Date: 01/16/2019	Boring Diameter (in): 6.50	Well Diam. (in)/Screen Slot (in): 2.0/0.010
Drilling Company: Thompson Engineering	Static Water Level (ft): 31.54/29.62	Riser Material: Sch 40 PVC
Drilling Method: Hollow Stem Auger	DTW After Drilling (ft): 31.70/31.00	Screen Material: Sch 40 PVC Slotted
Drilling Equipment: CME-550	Top of Casing Elev. (ft) 411.06/412.18	Sanitary Seal: Bentonite Pellets
Driller: Stan White	Ground Elev. (ft): 409.26/409.08	Filter Pack: Sand
Logged By: Joseph Ivanowski	Location (X,Y): 1164335.02, 2556069.22	Sampling Method(s): SS/SH/CO

DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT				SOIL/ROCK VISUAL DESCRIPTION	MEASURE	ELEV. (ft msl)
				Sample Type	Recovery (ft)	Blow Counts	N Value RQD (%)			
80										
83-85				SS	0.58	44 50/3.5	50	(83') Biotite, sandy, predominately mafic minerals.	PB-4 (83-85)	325
88-90				SS	0.16	50/4		(88') Mostly felsic minerals, sandy.	PB-4 (88-90)	320
93-95				SS	0.04	50/0.5		(94') Hard, mostly quartz and feldspar.	PB-4 (93-95)	315
96								(96') Began mud rotary drilling.		
100										310

NOTES: PB-4S and PB-4D are stickup wells, PB-4S is ~10ft away from PB-4D well.
NA = Not Applicable




Drilling Start Date: 01/14/2019	Boring Depth (ft): 121	Well Depth (ft): 48/114.5
Drilling End Date: 01/16/2019	Boring Diameter (in): 6.50	Well Diam. (in)/Screen Slot (in): 2.0/0.010
Drilling Company: Thompson Engineering	Static Water Level (ft): 31.54/29.62	Riser Material: Sch 40 PVC
Drilling Method: Hollow Stem Auger	DTW After Drilling (ft): 31.70/31.00	Screen Material: Sch 40 PVC Slotted
Drilling Equipment: CME-550	Top of Casing Elev. (ft) 411.06/412.18	Sanitary Seal: Bentonite Pellets
Driller: Stan White	Ground Elev. (ft): 409.26/409.08	Filter Pack: Sand
Logged By: Joseph Ivanowski	Location (X,Y): 1164335.02, 2556069.22	Sampling Method(s): SS/SH/CO

DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT				SOIL/ROCK VISUAL DESCRIPTION	MEASURE	ELEV. (ft msl)
				Sample Type	Recovery (ft)	Blow Counts	N Value RQD (%)			
100										
105				CO	2		55	(104') MET ROCK (GNEISS); fresh, hard, very slightly fractured, dark gray, some quartz and feldspar, phenocrysts, weak banding, low angle fractures at 104.5 and 106 ft.		305
				CO	9.7		89			
110								(110') Low angle fractures, some healed high angle fractures, very few fractures, very hard, fractures at 110, 111, and 113.5 ft.		300
115				CO	5		100	(116') No natural fractures from 116 to 121 ft.		295
120										290

NOTES: PB-4S and PB-4D are stickup wells, PB-4S is ~10ft away from PB-4D well.
NA = Not Applicable

Drilling Start Date: 01/14/2019	Boring Depth (ft): 121	Well Depth (ft): 48/114.5
Drilling End Date: 01/16/2019	Boring Diameter (in): 6.50	Well Diam. (in)/Screen Slot (in): 2.0/0.010
Drilling Company: Thompson Engineering	Static Water Level (ft): 31.54/29.62	Riser Material: Sch 40 PVC
Drilling Method: Hollow Stem Auger	DTW After Drilling (ft): 31.70/31.00	Screen Material: Sch 40 PVC Slotted
Drilling Equipment: CME-550	Top of Casing Elev. (ft) 411.06/412.18	Sanitary Seal: Bentonite Pellets
Driller: Stan White	Ground Elev. (ft): 409.26/409.08	Filter Pack: Sand
Logged By: Joseph Ivanowski	Location (X,Y): 1164335.02, 2556069.22	Sampling Method(s): SS/SH/CO

DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT				SOIL/ROCK VISUAL DESCRIPTION	MEASURE	ELEV. (ft msl)
				Sample Type	Recovery (ft)	Blow Counts	N Value RQD (%)		Lab Sample	

120								(121') Boring terminated. Well installed on 01/17/2019		285
125										

NOTES: PB-4S and PB-4D are stickup wells, PB-4S is ~10ft away from PB-4D well.
NA = Not Applicable

Drilling Start Date: 01/10/2019	Boring Depth (ft): 59.6	Well Depth (ft): 33
Drilling End Date: 01/14/2019	Boring Diameter (in): 6.50	Well Diam. (in)/Screen Slot (in): 2.0/0.010
Drilling Company: Thompson Engineering	Static Water Level (ft): 24.51/NA	Riser Material: Sch 40 PVC
Drilling Method: Hollow Stem Auger	DTW After Drilling (ft): 24.60/NA	Screen Material: Sch 40 PVC Slotted
Drilling Equipment: D-50	Top of Casing Elev. (ft) 402.86/NA	Sanitary Seal: Bentonite Pellets
Driller: Phil Pitts	Ground Elev. (ft): 399.86/399.55	Filter Pack: Sand
Logged By: Nardos Tilahun	Location (X,Y): 1163831.32, 2556176.27	Sampling Method(s): SS/SH/CO

DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT				SOIL/ROCK VISUAL DESCRIPTION	MEASURE Lab Sample	ELEV. (ft msl)
				Sample Type	Recovery (ft)	Blow Counts	N Value RQD (%)			
0				SS	1.5	1	4	(0') Lean CLAY (CL); few fine-coarse sand, few silt, mostly clay, medium plasticity, very soft, moist, reddish, few roots and organic matter.	PB-7 (0-2)	
				SS	2	3	11	(2') Lean CLAY (CL); few fine-coarse sand, few silt, mostly clay, medium plasticity, stiff, moist, reddish, trace mica.	PB-7 (2-4)	
				SS	2	3	7	(4') Lean CLAY (CL); few fine-coarse sand, few silt, mostly clay, medium plasticity, soft, moist, reddish, abundant mica.	PB-7 (4-6)	395
5				SS	2	3	7	(6') Lean CLAY (CL); few fine-coarse sand, few silt, medium plasticity, soft, moist, yellowish-red, abundant mica.	PB-7 (6-8)	
				SS	2	2	5	(8') Lean CLAY (CL); few fine-medium sand, some silt, mostly clay, medium plasticity, soft, moist, yellow to yellowish-brown, back mottles, abundant mica.	PB-7 (8-10)	390
10				SH	1.76	4		(12') CEC		
				SS	1.5	2	6	(12') SILT (ML); some fine-coarse sand, mostly silt, trace clay, soft, moist, yellowish-brown, black mottles, abundant mica.	PB-7 (12-14)	
15				SS	1.6	3	10	(14') SILT (ML); some fine-coarse sand, mostly silt, trace clay, soft, moist, yellowish-brown, black mottles, abundant mica.	PB-7 (14-16)	385
				SS	2	3	11	(16') SILT (ML); some fine-coarse sand, mostly silt, trace clay, soft, moist, yellowish-brown, black mottles, abundant mica, more sand.	PB-7 (16-18)	
20				SS	1.5	4	8	(18') SILT (ML); some fine-coarse sand, mostly silt, trace clay, soft, moist, yellowish-brown, black mottles, abundant mica.	PB-7 (18-20)	380

NOTES: PB-7S is a stickup well located ~10ft away from PB-7 borehole.
NA = Not Applicable

Drilling Start Date: 01/10/2019	Boring Depth (ft): 59.6	Well Depth (ft): 33
Drilling End Date: 01/14/2019	Boring Diameter (in): 6.50	Well Diam. (in)/Screen Slot (in): 2.0/0.010
Drilling Company: Thompson Engineering	Static Water Level (ft): 24.51/NA	Riser Material: Sch 40 PVC
Drilling Method: Hollow Stem Auger	DTW After Drilling (ft): 24.60/NA	Screen Material: Sch 40 PVC Slotted
Drilling Equipment: D-50	Top of Casing Elev. (ft) 402.86/NA	Sanitary Seal: Bentonite Pellets
Driller: Phil Pitts	Ground Elev. (ft): 399.86/399.55	Filter Pack: Sand
Logged By: Nardos Tilahun	Location (X,Y): 1163831.32, 2556176.27	Sampling Method(s): SS/SH/CO

DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT				SOIL/ROCK VISUAL DESCRIPTION	MEASURE Lab Sample	ELEV. (ft msl)
				Sample Type	Recovery (ft)	Blow Counts	N Value RQD (%)			
20				SH	1.84			(20') Silty SAND (SM); 5-gallon bucket soil sample collected from approximately 15 to 20 feet below ground surface.		
				SS	1.6	5	11	(22') CEC (22') Silty SAND (SM); mostly fine-coarse grained sand, some silt, trace clay, well-graded, medium dense, moist, white to gray, abundant mica and quartz.	PB-7 (22-24)	
				SS	1.7	6	17	(24') Silty SAND (SM); mostly fine-coarse grained sand, some silt, trace clay, well-graded, medium dense, moist, white to gray, abundant mica and quartz.	PB-7 (24-26)	375
25				SS	1.4	7	31	(25') 5-gallon bucket soil sample collected from approximately 20 to 25 feet below ground surface.	PB-7 (26-28)	
				SS	1.4	14		(26') Silty SAND (SM); mostly fine-coarse grained sand, some silt, trace clay, well-graded, dense, wet, white to gray, abundant mica and quartz.		
				SS	1	3	41	(28') Silty SAND (SM); mostly fine-coarse grained sand, some silt, trace clay, dense, wet, white to light brown to whitish-gray, abundant mica and quartz.	PB-7 (28-30)	370
30				SS	1	14	50	(30') Silty SAND (SM); mostly fine-coarse grained sand, some silt, trace clay, very dense, wet, white to light brown to whitish-gray, abundant mica and quartz.	PB-7 (30-32)	
				SS	0.1	37	50/5	(32') Silty SAND (SM); mostly fine-coarse grained sand, some silt, trace clay, very dense, wet, white to light brown to whitish-gray, abundant mica and quartz.	PB-7 (32-34)	
				CO	3	50/2.5	100	(37') MET ROCK (GNEISS); coarse grained, slightly weathered, hard, slightly fractured, dark biotite, light feldspar minerals, strong, light and dark banding, competent, fracture at ~37.8 and ~38.5 ft (not healed, narrow, clean, rough). Auger refusal at 37 feet below ground surface, cable tool (rock coring) started. Fractures at 37.8 and 38.5		365
40										360

NOTES: PB-7S is a stickup well located ~10ft away from PB-7 borehole.
NA = Not Applicable

Drilling Start Date: 01/10/2019	Boring Depth (ft): 59.6	Well Depth (ft): 33
Drilling End Date: 01/14/2019	Boring Diameter (in): 6.50	Well Diam. (in)/Screen Slot (in): 2.0/0.010
Drilling Company: Thompson Engineering	Static Water Level (ft): 24.51/NA	Riser Material: Sch 40 PVC
Drilling Method: Hollow Stem Auger	DTW After Drilling (ft): 24.60/NA	Screen Material: Sch 40 PVC Slotted
Drilling Equipment: D-50	Top of Casing Elev. (ft) 402.86/NA	Sanitary Seal: Bentonite Pellets
Driller: Phil Pitts	Ground Elev. (ft): 399.86/399.55	Filter Pack: Sand
Logged By: Nardos Tilahun	Location (X,Y): 1163831.32, 2556176.27	Sampling Method(s): SS/SH/CO

DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT				SOIL/ROCK VISUAL DESCRIPTION	MEASURE	ELEV. (ft msl)
				Sample Type	Recovery (ft)	Blow Counts	N Value RQD (%)			
40				CO	5		100	(40') MET ROCK (GNEISS); coarse grained, fresh, hard, unfractured, dark biotite, light feldspar minerals, strong, light and dark banding, competent, mechanical break.		355
45				CO	4.5		90	(45') MET ROCK (GNEISS); coarse grained, fresh, hard, unfractured, dark biotite, light feldspar minerals, strong, light and dark banding, competent, mechanical break.		350
50				CO	5		100	(50') MET ROCK (GNEISS); coarse grained, fresh, hard, unfractured, dark biotite, light feldspar minerals, strong, light and dark banding, competent, mechanical break.		345
55				CO	4.6		100	(55') MET ROCK (GNEISS); coarse grained, fresh, hard, unfractured, dark biotite, light feldspar minerals, strong, light and dark banding, competent, mechanical break.		340
60							(59.6') Boring terminated. Well installed on 01/14/2019			

NOTES: PB-7S is a stickup well located ~10ft away from PB-7 borehole.
NA = Not Applicable

Drilling Start Date: 01/06/2019	Boring Depth (ft): 106	Well Depth (ft): 35/106
Drilling End Date: 01/08/2019	Boring Diameter (in): 6.50	Well Diam. (in)/Screen Slot (in): 2.0/0.010
Drilling Company: Thompson Engineering	Static Water Level (ft): 22.05/22.11	Riser Material: Sch 40 PVC
Drilling Method: Hollow Stem Auger	DTW After Drilling (ft): 22.60/14.00	Screen Material: Sch 40 PVC Slotted
Drilling Equipment: D-50	Top of Casing Elev. (ft) 401.69/401.77	Sanitary Seal: Bentonite Pellets
Driller: Phil Pitts	Ground Elev. (ft): 398.69/398.47	Filter Pack: Sand
Logged By: Nardos Tilahun	Location (X,Y): 1163024.59, 2556786.55	Sampling Method(s): SS/SH/CO

DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT				SOIL/ROCK VISUAL DESCRIPTION	MEASURE	
				Sample Type	Recovery (ft)	Blow Counts	N Value RQD (%)		Lab Sample	ELEV. (ft msl)
0				SS	2	3	7	(0') Elastic SILT (MH); trace fine-coarse sand, mostly silt, few clay, low plasticity, soft, moist, reddish, few roots and mica.		
				SS	2	3	10	(2') Elastic SILT (MH); trace fine-coarse sand, mostly silt, few clay, low plasticity, soft, moist, reddish, abundant mica.	PB-8 (2-4)	395
				SS	2	5	19	(4') Elastic SILT (MH); trace fine-coarse sand, mostly silt, few clay, low plasticity, stiff, moist, reddish, black mottles.		
5				SS	2	11	11	(5') 5-gallon bucket soil sample collected from approximately 0 to 5 feet below ground surface		
				SS	2	4	11	(6') Elastic SILT (MH); trace fine-coarse sand, mostly silt, few clay, low plasticity, stiff, moist, reddish, black mottles.		
				SS	2	3	8	(8') Elastic SILT with sand (MH); few fine-coarse sand, mostly silt, few clay, low plasticity, soft, moist, yellowish-brown, abundant mica.	PB-8 (8-10)	390
10				SH	0.84			Switched from 4 1/4 auger to 3 1/4 auger. Shelby tube discarded.		
				SS	2	3	6	(12.5') SILT (ML); few fine-coarse sand, mostly silt, few clay, nonplastic, soft, moist, yellowish-brown, abundant mica.	PB-8 (12-12.5) PB-8 (12.5-14)	385
15				SH	1.58					
				SS	1.8	4	19	(16') Well-graded SAND (SW); mostly fine-coarse grained sand, some silt, trace clay, medium dense, wet, yellowish-brown, abundant mica and quartz.	PB-8 (16-18)	
				SS	1.5	7	19	(18') Well-graded SAND (SW); mostly fine-coarse grained sand, some silt, trace clay, medium dense, wet, yellowish-brown, abundant mica and quartz.	PB-8 (18-22)	380

NOTES: PB-8S and PB-8D are stickup wells, PB-8S is ~10ft away from PB-8D well. Depth to water at PB-8S is 22.6 feet below ground surface.
NA = Not Applicable

Drilling Start Date: 01/06/2019	Boring Depth (ft): 106	Well Depth (ft): 35/106
Drilling End Date: 01/08/2019	Boring Diameter (in): 6.50	Well Diam. (in)/Screen Slot (in): 2.0/0.010
Drilling Company: Thompson Engineering	Static Water Level (ft): 22.05/22.11	Riser Material: Sch 40 PVC
Drilling Method: Hollow Stem Auger	DTW After Drilling (ft): 22.60/14.00	Screen Material: Sch 40 PVC Slotted
Drilling Equipment: D-50	Top of Casing Elev. (ft) 401.69/401.77	Sanitary Seal: Bentonite Pellets
Driller: Phil Pitts	Ground Elev. (ft): 398.69/398.47	Filter Pack: Sand
Logged By: Nardos Tilahun	Location (X,Y): 1163024.59, 2556786.55	Sampling Method(s): SS/SH/CO

DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT				SOIL/ROCK VISUAL DESCRIPTION	MEASURE Lab Sample	ELEV. (ft msl)
				Sample Type	Recovery (ft)	Blow Counts	N Value RQD (%)			
20	Poorly graded SAND (SP); mostly fine-medium grained sand, some silt, few clay, medium dense, wet, gray to white, abundant mica and quartz.	▽	SS	1.5	5	17	PB-8 (20-22)	375		
6				11	17					
22	Poorly graded SAND (SP); mostly fine-medium grained sand, some silt, few clay, dense, wet, gray to white, some quartz.	▽	SS	1.2	14	36	PB-8 (26-28)	370		
14				16	20					
24	Poorly graded SAND (SP); mostly fine-medium grained sand, some silt, few clay, dense, wet, gray to white, some quartz.	▽	SS	1.4	14	40	PB-8 (26-28)	365		
17				17	23					
26	Well-graded SAND (SW); mostly fine-coarse grained sand, few silt, trace clay, very dense, wet, gray to white, some quartz.	▽	SS	1	17	81	PB-8 (26-28)	360		
31				50/2	50					
27	Well-graded SAND (SW); mostly fine-coarse grained sand, few silt, trace clay, very dense, wet, gray to white, some quartz.	▽	SS	1.5	25	63	PB-8 (26-28)	360		
23				40	50/4					
33	Well-graded SAND (SW); mostly fine-coarse grained sand, few silt, trace clay, very dense, wet, gray to white, some quartz.	▽	SS	0.8	34	50	PB-8 (26-28)	360		
50/5.5				50	50					
38	Well-graded SAND (SW); mostly fine-coarse grained sand, few silt, trace clay, very dense, wet, gray to white, some quartz.	▽	SS	0.5	44	50	PB-8 (26-28)	360		
50/5				50	50					

NOTES: PB-8S and PB-8D are stickup wells, PB-8S is ~10ft away from PB-8D well. Depth to water at PB-8S is 22.6 feet below ground surface.
NA = Not Applicable

Drilling Start Date: 01/06/2019	Boring Depth (ft): 106	Well Depth (ft): 35/106
Drilling End Date: 01/08/2019	Boring Diameter (in): 6.50	Well Diam. (in)/Screen Slot (in): 2.0/0.010
Drilling Company: Thompson Engineering	Static Water Level (ft): 22.05/22.11	Riser Material: Sch 40 PVC
Drilling Method: Hollow Stem Auger	DTW After Drilling (ft): 22.60/14.00	Screen Material: Sch 40 PVC Slotted
Drilling Equipment: D-50	Top of Casing Elev. (ft) 401.69/401.77	Sanitary Seal: Bentonite Pellets
Driller: Phil Pitts	Ground Elev. (ft): 398.69/398.47	Filter Pack: Sand
Logged By: Nardos Tilahun	Location (X,Y): 1163024.59, 2556786.55	Sampling Method(s): SS/SH/CO

DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT				SOIL/ROCK VISUAL DESCRIPTION	MEASURE Lab Sample	ELEV. (ft msl)
				Sample Type	Recovery (ft)	Blow Counts	N Value RQD (%)			
40										
43				SS	0.2	50/3.5		(43') Well-graded SAND (SW); mostly fine-coarse grained sand, few silt, trace clay, very dense, wet, gray to white, some quartz.		355
45										
48				SS	0.3	50/3		(48') Well-graded SAND (SW); mostly fine-coarse grained sand, few silt, trace clay, very dense, wet, gray to white, some quartz.		350
50										
53				SS	0.3	50/3.5		(53') Well-graded SAND (SW); mostly fine-coarse grained sand, few silt, trace clay, very dense, wet, gray to white, some quartz.		345
55										
58				SS	0	50/2		(58') Well-graded SAND (SW); mostly fine-coarse grained sand, few silt, trace clay, very dense, wet, gray to white, some quartz.		340
60										

NOTES: PB-8S and PB-8D are stickup wells, PB-8S is ~10ft away from PB-8D well. Depth to water at PB-8S is 22.6 feet below ground surface.
NA = Not Applicable

Drilling Start Date: 01/06/2019	Boring Depth (ft): 106	Well Depth (ft): 35/106
Drilling End Date: 01/08/2019	Boring Diameter (in): 6.50	Well Diam. (in)/Screen Slot (in): 2.0/0.010
Drilling Company: Thompson Engineering	Static Water Level (ft): 22.05/22.11	Riser Material: Sch 40 PVC
Drilling Method: Hollow Stem Auger	DTW After Drilling (ft): 22.60/14.00	Screen Material: Sch 40 PVC Slotted
Drilling Equipment: D-50	Top of Casing Elev. (ft) 401.69/401.77	Sanitary Seal: Bentonite Pellets
Driller: Phil Pitts	Ground Elev. (ft): 398.69/398.47	Filter Pack: Sand
Logged By: Nardos Tilahun	Location (X,Y): 1163024.59, 2556786.55	Sampling Method(s): SS/SH/CO

DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT				SOIL/ROCK VISUAL DESCRIPTION	MEASURE Lab Sample	ELEV. (ft msl)
				Sample Type	Recovery (ft)	Blow Counts	N Value RQD (%)			
60										
63				SS	0.3	50/4		(63') Well-graded SAND (SW); mostly fine-coarse grained sand, few silt, trace clay, very dense, wet, gray to white, some quartz.	335	
65										
68				SS	0.2	50/2.5		(68') Well-graded SAND (SW); mostly fine-coarse grained sand, few silt, trace clay, very dense, wet, gray to white, some quartz, trace rock fragments .	330	
70										
73				SS	0.3	50/3		(73') Well-graded SAND (SW); mostly fine-coarse grained sand, few silt, trace clay, very dense, wet, gray to white, some quartz.	325	
75								(75') Began mud rotary drilling		
78				SS	0	50/1.5		(78') No recovery, hard drilling	320	
80										

NOTES: PB-8S and PB-8D are stickup wells, PB-8S is ~10ft away from PB-8D well. Depth to water at PB-8S is 22.6 feet below ground surface.
NA = Not Applicable


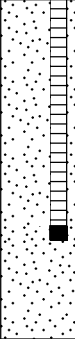

Drilling Start Date: 01/06/2019	Boring Depth (ft): 106	Well Depth (ft): 35/106
Drilling End Date: 01/08/2019	Boring Diameter (in): 6.50	Well Diam. (in)/Screen Slot (in): 2.0/0.010
Drilling Company: Thompson Engineering	Static Water Level (ft): 22.05/22.11	Riser Material: Sch 40 PVC
Drilling Method: Hollow Stem Auger	DTW After Drilling (ft): 22.60/14.00	Screen Material: Sch 40 PVC Slotted
Drilling Equipment: D-50	Top of Casing Elev. (ft) 401.69/401.77	Sanitary Seal: Bentonite Pellets
Driller: Phil Pitts	Ground Elev. (ft): 398.69/398.47	Filter Pack: Sand
Logged By: Nardos Tilahun	Location (X,Y): 1163024.59, 2556786.55	Sampling Method(s): SS/SH/CO

DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT				SOIL/ROCK VISUAL DESCRIPTION	MEASURE Lab Sample	ELEV. (ft msl)
				Sample Type	Recovery (ft)	Blow Counts	N Value RQD (%)			
80										
83				SS	0.8	39	50	(83') Well-graded SAND (SW); mostly fine-coarse grained sand, trace silt, trace clay, very dense, moist, greenish-white.	PB-8 (83-85)	315
83.5				CO	6	50/3.5	100	(83.5') Clayey SAND (SC); mostly fine-coarse grained sand, trace silt, some clay, well-graded, very dense, wet, green to white, some quartz.		
86								(86') MET ROCK (GNEISS); coarse grained, fresh, hard, unfractured, dark biotite and light feldspar minerals, dark gray and white banding, competent. Cable tool (rock coring) started.		310
91				CO	5		100	(91') MET ROCK (GNEISS); coarse grained, fresh, hard, unfractured, dark biotite and light feldspar minerals, dark gray and white banding, competent. Cable tool (rock coring) started.		305
96				CO	4.5		66	(96') MET ROCK (GNEISS); coarse grained, fresh, hard, slightly fractured, dark biotite and light feldspar minerals, dark gray and white banding, competent, slightly decomposed and integrated near fracture, fracture at ~98 ft and fracture zone from 99 to 100 ft (fractures are not healed, narrow, stained/decomposed, and rough). (97') Lost some drilling fluid. Fracture at 98 ft bgs with weathering around fracture,		300
100										

NOTES: PB-8S and PB-8D are stickup wells, PB-8S is ~10ft away from PB-8D well. Depth to water at PB-8S is 22.6 feet below ground surface.
NA = Not Applicable

Drilling Start Date: 01/06/2019	Boring Depth (ft): 106	Well Depth (ft): 35/106
Drilling End Date: 01/08/2019	Boring Diameter (in): 6.50	Well Diam. (in)/Screen Slot (in): 2.0/0.010
Drilling Company: Thompson Engineering	Static Water Level (ft): 22.05/22.11	Riser Material: Sch 40 PVC
Drilling Method: Hollow Stem Auger	DTW After Drilling (ft): 22.60/14.00	Screen Material: Sch 40 PVC Slotted
Drilling Equipment: D-50	Top of Casing Elev. (ft) 401.69/401.77	Sanitary Seal: Bentonite Pellets
Driller: Phil Pitts	Ground Elev. (ft): 398.69/398.47	Filter Pack: Sand
Logged By: Nardos Tilahun	Location (X,Y): 1163024.59, 2556786.55	Sampling Method(s): SS/SH/CO

DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT				SOIL/ROCK VISUAL DESCRIPTION	MEASURE	
				Sample Type	Recovery (ft)	Blow Counts	N Value RQD (%)		Lab Sample	ELEV. (ft msl)

100				CO	4.7		88	(101') MET ROCK (GNEISS); coarse grained, fresh, hard, slightly fractured, dark biotite and light feldspar minerals, dark gray and white banding, competent, slightly decomposed and integrated near fracture, fracture at ~103, 104.5, and 104.7 ft (fractures are not healed, narrow, stained/decomposed, and rough) .		295
105								(102') Lost some drilling fluid Fracture at 103, 104.5, and 104.7 ft bgs.		
110								(106') Boring terminated.		290

NOTES: PB-8S and PB-8D are stickup wells, PB-8S is ~10ft away from PB-8D well. Depth to water at PB-8S is 22.6 feet below ground surface.
NA = Not Applicable

Drilling Start Date: 01/16/2019	Boring Depth (ft): 91	Well Depth (ft): 33/85
Drilling End Date: 01/17/2019	Boring Diameter (in): 6.50	Well Diam. (in)/Screen Slot (in): 2.0/0.010
Drilling Company: Thompson Engineering	Static Water Level (ft): 9.91/10.04	Riser Material: Sch 40 PVC
Drilling Method: Hollow Stem Auger	DTW After Drilling (ft): 9.70/9.70	Screen Material: Sch 40 PVC Slotted
Drilling Equipment: D-50	Top of Casing Elev. (ft) 400.94/400.33	Sanitary Seal: Bentonite Pellets
Driller: Phil Pitts	Ground Elev. (ft): 398.04/397.98	Filter Pack: Sand
Logged By: Nardos Tilahun	Location (X,Y): 1163593.00, 2558546.51	Sampling Method(s): SS/SH/CO

DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT				SOIL/ROCK VISUAL DESCRIPTION	MEASURE Lab Sample	ELEV. (ft msl)
				Sample Type	Recovery (ft)	Blow Counts	N Value RQD (%)			
0				SS	2	3	3	(0') Elastic SILT (MH); few fine-coarse sand, mostly silt, few clay, low plasticity, very soft, moist, reddish, some roots.	PB-10 (0-2)	
				SS	2	2	7	(2') Elastic SILT (MH); few fine-coarse sand, mostly silt, few clay, low plasticity, soft, moist, reddish.	PB-10 (2-4)	395
				SS	2	3	10	(4') Elastic SILT (MH); few fine-coarse sand, mostly silt, few clay, low plasticity, soft, moist, yellowish-brown. (5') 5-gallon bucket soil sample collected from approximately 0 to 5 feet below ground surface.	PB-10 (4-6)	
				SS	2	8	26	(6') Elastic SILT (MH); few fine-coarse sand, mostly silt, few clay, low plasticity, medium stiff, moist, yellowish-brown, black mottles.	PB-10 (6-8)	390
				SH	2			(10') CEC		
				SS	2	4	14	(10') Elastic SILT (MH); few fine-coarse sand, mostly silt, few clay, low plasticity, medium stiff, wet, yellowish-brown, few mica.	PB-10 (10-12)	
				SS	1.6	3	11	(12') Elastic SILT (MH); few fine-coarse sand, mostly silt, few clay, low plasticity, medium stiff, wet, yellowish-brown, abundant mica.	PB-10 (12-14)	385
				SS	2	6	23	(14') Elastic SILT (MH); few fine-coarse sand, mostly silt, few clay, medium plasticity, medium stiff, wet, light gray to light brown, abundant mica.	PB-10 (14-16)	
				SS	2	8	17	(15') 5-gallon bucket soil sample collected from approximately 10 to 15 feet below ground surface.	PB-10 (16-18)	
				SH	1.66	8		(16') Clayey SAND (SC); mostly fine grained sand, trace silt, some clay, medium dense, wet, greenish-gray, abundant mica.		380
20								(20') CEC		

NOTES: PB-10S and PB-10D are stickup wells, PB-10S is ~10ft away from PB-10D well. Depth to water at PB-10S is 9.7 feet below ground surface.
NA = Not Applicable

Drilling Start Date: 01/16/2019	Boring Depth (ft): 91	Well Depth (ft): 33/85
Drilling End Date: 01/17/2019	Boring Diameter (in): 6.50	Well Diam. (in)/Screen Slot (in): 2.0/0.010
Drilling Company: Thompson Engineering	Static Water Level (ft): 9.91/10.04	Riser Material: Sch 40 PVC
Drilling Method: Hollow Stem Auger	DTW After Drilling (ft): 9.70/9.70	Screen Material: Sch 40 PVC Slotted
Drilling Equipment: D-50	Top of Casing Elev. (ft) 400.94/400.33	Sanitary Seal: Bentonite Pellets
Driller: Phil Pitts	Ground Elev. (ft): 398.04/397.98	Filter Pack: Sand
Logged By: Nardos Tilahun	Location (X,Y): 1163593.00, 2558546.51	Sampling Method(s): SS/SH/CO

DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT				SOIL/ROCK VISUAL DESCRIPTION	MEASURE Lab Sample	ELEV. (ft msl)
				Sample Type	Recovery (ft)	Blow Counts	N Value RQD (%)			
20				SS	2	4	19	(20') Clayey SAND (SC); mostly fine grained sand, trace silt, some clay, medium dense, wet, greenish-gray to light brown, black mottles, abundant mica. 5-gallon bucket soil sample collected from approximately 15 to 20 feet below ground surface.	PB-10 (20-22)	
				SS	1.6	3	37	(22') Well-graded SAND (SW); mostly fine-coarse grained sand, trace silt, few clay, dense, wet, light brown, abundant mica.	PB-10 (22-24)	375
				SS	1.4	41	72	(24') Well-graded SAND (SW); mostly fine-coarse grained sand, trace silt, few clay, very dense, wet, light brown, abundant mica.	PB-10 (24-26)	
25				SS	0.3	50/3		(26') Well-graded SAND (SW); mostly fine-coarse grained sand, trace silt, few clay, very dense, wet, light brown, abundant mica.	PB-10 (26-28)	370
30				SS	0.3	50/3		(30') Well-graded SAND (SW); mostly fine-coarse grained sand, trace silt, few clay, very dense, wet, dark brown, abundant mica.	PB-10 (30-32)	
35				SS	0.3	50/3		(35') Well-graded SAND (SW); mostly fine-coarse grained sand, trace silt, few clay, very dense, wet, dark brown, abundant mica, soft drilling (30-35).	PB-10 (35-37)	365
40										360

NOTES: PB-10S and PB-10D are stickup wells, PB-10S is ~10ft away from PB-10D well. Depth to water at PB-10S is 9.7 feet below ground surface.
NA = Not Applicable

Drilling Start Date: 01/16/2019	Boring Depth (ft): 91	Well Depth (ft): 33/85
Drilling End Date: 01/17/2019	Boring Diameter (in): 6.50	Well Diam. (in)/Screen Slot (in): 2.0/0.010
Drilling Company: Thompson Engineering	Static Water Level (ft): 9.91/10.04	Riser Material: Sch 40 PVC
Drilling Method: Hollow Stem Auger	DTW After Drilling (ft): 9.70/9.70	Screen Material: Sch 40 PVC Slotted
Drilling Equipment: D-50	Top of Casing Elev. (ft) 400.94/400.33	Sanitary Seal: Bentonite Pellets
Driller: Phil Pitts	Ground Elev. (ft): 398.04/397.98	Filter Pack: Sand
Logged By: Nardos Tilahun	Location (X,Y): 1163593.00, 2558546.51	Sampling Method(s): SS/SH/CO

DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT				SOIL/ROCK VISUAL DESCRIPTION	MEASURE Lab Sample	ELEV. (ft msl)
				Sample Type	Recovery (ft)	Blow Counts	N Value RQD (%)			
40				SS	0	50/1.5		(40') No Recovery.		355
45				SS	0.2	50/2		(45') Well-graded SAND (SW); mostly fine-coarse grained sand, trace silt, few clay, very dense, wet, dark brown, abundant mica.	PB-10 (45-47)	350
50				SS	0.1	50/2		(50') Well-graded SAND (SW); mostly fine-coarse grained sand, trace silt, few clay, very dense, wet, dark brown, abundant mica.	PB-10 (50-52)	345
55				SS	0	50/1		(55') No Recovery.		340
60										

NOTES: PB-10S and PB-10D are stickup wells, PB-10S is ~10ft away from PB-10D well. Depth to water at PB-10S is 9.7 feet below ground surface.
NA = Not Applicable

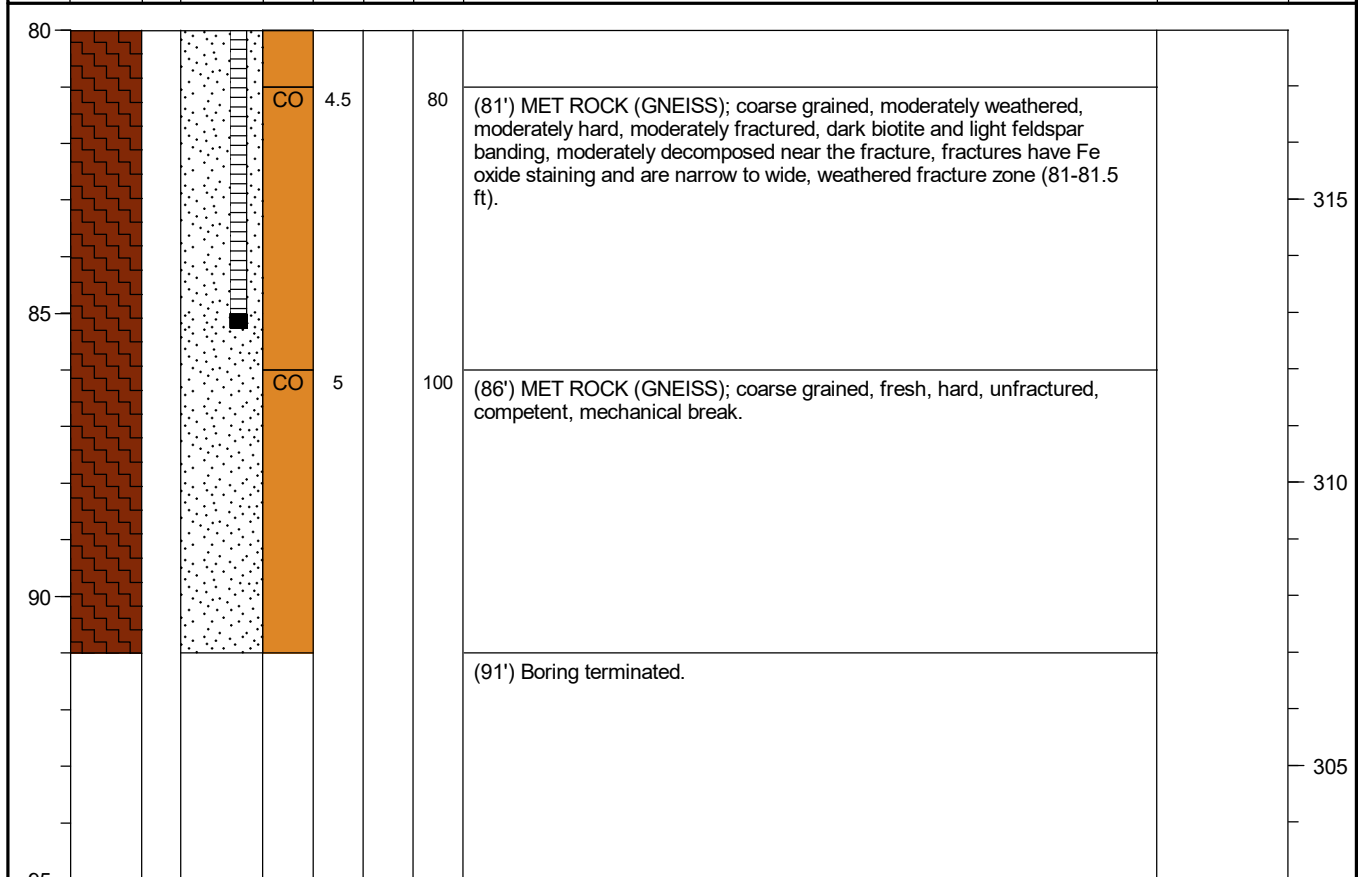
Drilling Start Date: 01/16/2019	Boring Depth (ft): 91	Well Depth (ft): 33/85
Drilling End Date: 01/17/2019	Boring Diameter (in): 6.50	Well Diam. (in)/Screen Slot (in): 2.0/0.010
Drilling Company: Thompson Engineering	Static Water Level (ft): 9.91/10.04	Riser Material: Sch 40 PVC
Drilling Method: Hollow Stem Auger	DTW After Drilling (ft): 9.70/9.70	Screen Material: Sch 40 PVC Slotted
Drilling Equipment: D-50	Top of Casing Elev. (ft) 400.94/400.33	Sanitary Seal: Bentonite Pellets
Driller: Phil Pitts	Ground Elev. (ft): 398.04/397.98	Filter Pack: Sand
Logged By: Nardos Tilahun	Location (X,Y): 1163593.00, 2558546.51	Sampling Method(s): SS/SH/CO

DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT				SOIL/ROCK VISUAL DESCRIPTION	MEASURE Lab Sample	ELEV. (ft msl)
				Sample Type	Recovery (ft)	Blow Counts	N Value RQD (%)			
60				SS	0.2	50/2		(60') Well-graded SAND (SW); mostly fine-coarse grained sand, trace silt, few clay, very dense, wet, dark brown, abundant mica.	PB-10 (60-62)	
								(62') Began mud rotary drilling.		
				SS	1.3	20 38 50/4	88	(63') Poorly graded SAND (SP); mostly fine-coarse grained sand, very dense, wet, light gray to white, weathered rock fragments (gneiss), abundant mica and quartz.	PB-10 (63-65)	335
65										
				CO	2.5		14	(67.5') MET ROCK (GNEISS); coarse grained, moderately weathered, moderately hard, intensely fractured, dark biotite and light feldspar banding, moderately decomposed near the top, fractures have Fe oxide staining and are narrow to wide. Cable tool (rock coring) started.		330
70				CO	3.5		20	(71') MET ROCK (GNEISS); coarse grained, moderately weathered, moderately hard, moderately fractured, dark biotite and light feldspar banding, moderately decomposed near fracture, fractures have clay filling and are narrow to wide.		325
75				CO	4.75		54	(76') MET ROCK (GNEISS); coarse grained, moderately weathered, moderately hard, moderately fractured, dark biotite and light feldspar banding, fractures have clay filling and Fe oxide staining and are narrow to wide.		320
80										

NOTES: PB-10S and PB-10D are stickup wells, PB-10S is ~10ft away from PB-10D well. Depth to water at PB-10S is 9.7 feet below ground surface.
NA = Not Applicable

Drilling Start Date: 01/16/2019	Boring Depth (ft): 91	Well Depth (ft): 33/85
Drilling End Date: 01/17/2019	Boring Diameter (in): 6.50	Well Diam. (in)/Screen Slot (in): 2.0/0.010
Drilling Company: Thompson Engineering	Static Water Level (ft): 9.91/10.04	Riser Material: Sch 40 PVC
Drilling Method: Hollow Stem Auger	DTW After Drilling (ft): 9.70/9.70	Screen Material: Sch 40 PVC Slotted
Drilling Equipment: D-50	Top of Casing Elev. (ft) 400.94/400.33	Sanitary Seal: Bentonite Pellets
Driller: Phil Pitts	Ground Elev. (ft): 398.04/397.98	Filter Pack: Sand
Logged By: Nardos Tilahun	Location (X,Y): 1163593.00, 2558546.51	Sampling Method(s): SS/SH/CO

DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT				SOIL/ROCK VISUAL DESCRIPTION	MEASURE	
				Sample Type	Recovery (ft)	Blow Counts	N Value RQD (%)		Lab Sample	ELEV. (ft msl)



NOTES: PB-10S and PB-10D are stickup wells, PB-10S is ~10ft away from PB-10D well. Depth to water at PB-10S is 9.7 feet below ground surface.
NA = Not Applicable

Drilling Start Date: 12/10/2018	Boring Depth (ft): 107.8	Well Depth (ft): 50/97
Drilling End Date: 12/18/2018	Boring Diameter (in): 6.50	Well Diam. (in)/Screen Slot (in): 2.0/0.010
Drilling Company: Thompson Engineering	Static Water Level (ft): 7.19/7.74	Riser Material: Sch 40 PVC
Drilling Method: Hollow Stem Auger	DTW After Drilling (ft): 7.40/7.40	Screen Material: Sch 40 PVC Slotted
Drilling Equipment: D-50	Top of Casing Elev. (ft) 373.38/373.83	Sanitary Seal: Bentonite Pellets
Driller: Phil Pitts	Ground Elev. (ft): 370.88/371.13	Filter Pack: Sand
Logged By: Nardos Tilahun	Location (X,Y): 1162084.45, 2556638.75	Sampling Method(s): SS/SH/CO

DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT				SOIL/ROCK VISUAL DESCRIPTION	MEASURE Lab Sample	ELEV. (ft msl)
				Sample Type	Recovery (ft)	Blow Counts	N Value RQD (%)			
0				SS	2	2	10	(0') Sandy elastic SILT (MH); some fine-coarse sand, mostly silt, few clay, low plasticity, soft, moist, reddish, some organic matter.		370
2				SS	2	6	16	(2') Sandy elastic SILT (MH); some fine-coarse sand, mostly silt, few clay, low plasticity, medium stiff, moist, yellowish-red to red, mica.	PB-13 (2-4)	
4				SS	2	4	15	(4') Sandy elastic SILT (MH); some fine-coarse sand, mostly silt, few clay, low plasticity, medium stiff, moist, yellowish-red to red, mica.		
5				SS	2	8	10	(5') Elastic SILT with sand (MH); little fine sand, mostly silt, few clay, low plasticity, medium stiff, moist, yellowish-brown, 5-gallon bucket soil sample collected from approximately 0 to 5 feet below ground surface.	PB-13 (6-8)	365
6				SS	2	2	10	(6') Elastic SILT with sand (MH); little fine sand, mostly silt, few clay, low plasticity, medium stiff, moist, yellowish-brown.		
8				SS	2	3	14	(8') Sandy lean CLAY (CL); some fine sand, trace silt, mostly clay, medium plasticity, medium stiff, moist, light greenish.		
10				SS	2	3	18	(10') Lean CLAY (CL); some fine-coarse sand, trace silt, mostly clay, medium plasticity, stiff, moist, light greenish.	PB-13 (10-12)	360
10.5				SH	2	10	12	(10.5') Clayey SAND (SC); mostly fine-coarse grained sand, trace silt, some clay, well-graded, medium dense, moist, light greenish.		
12				SH	2	12		(12') Clayey SAND (SC).		
14				SS	2	2	7	(14') Clayey SAND (SC); mostly fine-coarse grained sand, trace silt, some clay, well-graded, loose, moist, light green to light brown.		
15				SS	2	3	7	(15') 5-gallon bucket soil sample collected from approximately 10 to 15 feet below ground surface.		
16				SS	1.5	3	7	(16') Well-graded SAND (SW); mostly fine-coarse grained sand, few silt, trace clay, loose, wet, dark gray to grayish-white, abundant mica and quartz.	PB-13 (16-18)	355
18				SH	2	2	6		PB-13 (18-20)	

NOTES: PB-13S and PB-13D are stickup wells, PB-13S is ~10ft away from PB-13D well. Depth to water at PB-13S is 7.4 feet below ground surface.
NA = Not Applicable

Drilling Start Date: 12/10/2018	Boring Depth (ft): 107.8	Well Depth (ft): 50/97
Drilling End Date: 12/18/2018	Boring Diameter (in): 6.50	Well Diam. (in)/Screen Slot (in): 2.0/0.010
Drilling Company: Thompson Engineering	Static Water Level (ft): 7.19/7.74	Riser Material: Sch 40 PVC
Drilling Method: Hollow Stem Auger	DTW After Drilling (ft): 7.40/7.40	Screen Material: Sch 40 PVC Slotted
Drilling Equipment: D-50	Top of Casing Elev. (ft) 373.38/373.83	Sanitary Seal: Bentonite Pellets
Driller: Phil Pitts	Ground Elev. (ft): 370.88/371.13	Filter Pack: Sand
Logged By: Nardos Tilahun	Location (X,Y): 1162084.45, 2556638.75	Sampling Method(s): SS/SH/CO

DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT				SOIL/ROCK VISUAL DESCRIPTION	MEASURE	
				Sample Type	Recovery (ft)	Blow Counts	N Value RQD (%)		Lab Sample	ELEV. (ft msl)
20				SS	1.5	3	12	(20') Silty SAND (SM); mostly fine-medium grained sand, some silt, trace clay, poorly graded, medium dense, wet, light gray.		350
				SS	1.2	4	14	(22') Silty SAND (SM); mostly fine-medium grained sand, some silt, trace clay, poorly graded, medium dense, wet, light gray.		
				SS	0.8	4	16	(24') Well-graded SAND (SW); mostly fine-coarse grained sand, trace silt, trace clay, medium dense, wet, grayish-white, abundant mica, 5-gallon bucket soil sample collected from approximately 20 to 24 feet below ground surface.		
25				SS	1	5	15	(26') Well-graded SAND (SW); mostly fine-coarse grained sand, trace silt, trace clay, medium dense, wet, grayish-white to yellow gray.		345
				SS	0.8	2	12	(28') Well-graded SAND (SW); mostly fine-coarse grained sand, few silt, few clay, medium dense, wet, grayish-white to yellowish-gray, abundant mica and quartz.	PB-13 (28-30)	
30				SH	2	5			PB-13 (30-32)	340
				SS	0.7	9	28	(32') Well-graded SAND (SW); mostly fine-coarse grained sand, trace silt, trace clay, medium dense, wet, grayish-white to white, abundant mica and quartz.		
				SS	0.8	5	23	(34') Well-graded SAND (SW); mostly fine-coarse grained sand, trace silt, trace clay, medium dense, wet, grayish-white to white, abundant mica and quartz, laminated.		
35				SS	0.8	6	17	(36') Well-graded SAND (SW); mostly fine-coarse grained sand, trace silt, trace clay, medium dense, wet, grayish-white to white, abundant mica and quartz, laminated.		335
				SS	1	6	17	(38') Well-graded SAND (SW); mostly fine-coarse grained sand, trace silt, trace clay, medium dense, wet, grayish-white to white, abundant mica and quartz.		
40										

NOTES: PB-13S and PB-13D are stickup wells, PB-13S is ~10ft away from PB-13D well. Depth to water at PB-13S is 7.4 feet below ground surface.
NA = Not Applicable

Drilling Start Date: 12/10/2018	Boring Depth (ft): 107.8	Well Depth (ft): 50/97
Drilling End Date: 12/18/2018	Boring Diameter (in): 6.50	Well Diam. (in)/Screen Slot (in): 2.0/0.010
Drilling Company: Thompson Engineering	Static Water Level (ft): 7.19/7.74	Riser Material: Sch 40 PVC
Drilling Method: Hollow Stem Auger	DTW After Drilling (ft): 7.40/7.40	Screen Material: Sch 40 PVC Slotted
Drilling Equipment: D-50	Top of Casing Elev. (ft) 373.38/373.83	Sanitary Seal: Bentonite Pellets
Driller: Phil Pitts	Ground Elev. (ft): 370.88/371.13	Filter Pack: Sand
Logged By: Nardos Tilahun	Location (X,Y): 1162084.45, 2556638.75	Sampling Method(s): SS/SH/CO

DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT				SOIL/ROCK VISUAL DESCRIPTION	MEASURE Lab Sample	ELEV. (ft msl)
				Sample Type	Recovery (ft)	Blow Counts	N Value RQD (%)			
40				SS	0.8	8	23	(40') Well-graded SAND (SW); mostly fine-coarse grained sand, trace silt, trace clay, medium dense, wet, grayish-white to white, abundant mica and quartz.		330
				SS	1.3	7	16	(42') Silty SAND (SM); mostly fine-coarse grained sand, some silt, trace clay, well-graded, medium dense, wet, green to white, abundant mica and quartz.	PB-13 (42-44)	
				SS	1	10	47	(44') Silty SAND (SM); mostly fine-coarse grained sand, some silt, trace clay, well-graded, dense, wet, greenish, abundant mica and quartz.		
45				SS	0.3	5	22	(46') Silty SAND (SM); mostly fine-coarse grained sand, some silt, trace clay, well-graded, medium dense, wet, green to white, abundant mica and quartz, laminated.		325
				SS	1.1	32	57	(48') Silty SAND (SM); mostly fine-coarse grained sand, some silt, trace clay, well-graded, very dense, wet, dark gray to dark brown to white, abundant mica and quartz, laminated.		
50				SS	0.4	21	50	(53') Silty SAND (SM); mostly fine-coarse grained sand, some silt, trace clay, very dense, wet, grayish-white, abundant mica and quartz, laminated, black mottles. (54') Top of PWR.		320
55				SS	0.3	50/5				315
60				SS	0.3	50/4		(58') Silty SAND (SM); mostly fine-coarse grained sand, some silt, trace clay, very dense, wet, grayish-white, abundant mica and quartz, laminated, black mottles.		

NOTES: PB-13S and PB-13D are stickup wells, PB-13S is ~10ft away from PB-13D well. Depth to water at PB-13S is 7.4 feet below ground surface.
NA = Not Applicable

Drilling Start Date: 12/10/2018	Boring Depth (ft): 107.8	Well Depth (ft): 50/97
Drilling End Date: 12/18/2018	Boring Diameter (in): 6.50	Well Diam. (in)/Screen Slot (in): 2.0/0.010
Drilling Company: Thompson Engineering	Static Water Level (ft): 7.19/7.74	Riser Material: Sch 40 PVC
Drilling Method: Hollow Stem Auger	DTW After Drilling (ft): 7.40/7.40	Screen Material: Sch 40 PVC Slotted
Drilling Equipment: D-50	Top of Casing Elev. (ft) 373.38/373.83	Sanitary Seal: Bentonite Pellets
Driller: Phil Pitts	Ground Elev. (ft): 370.88/371.13	Filter Pack: Sand
Logged By: Nardos Tilahun	Location (X,Y): 1162084.45, 2556638.75	Sampling Method(s): SS/SH/CO

DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT				SOIL/ROCK VISUAL DESCRIPTION	MEASURE	
				Sample Type	Recovery (ft)	Blow Counts	N Value RQD (%)		Lab Sample	ELEV. (ft msl)
60										310
63				SS	0.3	50/3.5		(63') Silty SAND (SM); mostly fine-coarse grained sand, some silt, trace clay, very dense, wet, grayish-white, abundant mica and quartz, laminated, black mottles.		
65										305
68				SS	0.7	38 50/5	50	(68') Well-graded SAND (SW); mostly fine-coarse grained sand, few silt, trace clay, very dense, wet, gray, abundant mica, quartz, black mottles.	PB-13 (68-70)	
70								(70') Began mud rotary drilling.		300
73				SS	0.2	50/2		(73') Well-graded SAND (SW); mostly fine-coarse grained sand, few silt, trace clay, well-graded, very dense, wet, gray, abundant mica, quartz, black mottles.		
75										295
78				SS	0.2	50/2		(78') Well-graded SAND (SW); mostly fine-coarse grained sand, few silt, trace clay, well-graded, very dense, wet, gray, abundant mica, quartz, black mottles. Cable tool (rock coring) started at 78.1 ft below ground surface.		
80								(78.1') No Recovery.		

NOTES: PB-13S and PB-13D are stickup wells, PB-13S is ~10ft away from PB-13D well. Depth to water at PB-13S is 7.4 feet below ground surface.
NA = Not Applicable

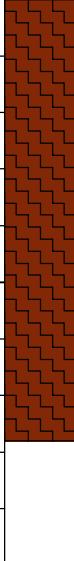
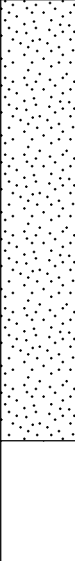
Drilling Start Date: 12/10/2018	Boring Depth (ft): 107.8	Well Depth (ft): 50/97
Drilling End Date: 12/18/2018	Boring Diameter (in): 6.50	Well Diam. (in)/Screen Slot (in): 2.0/0.010
Drilling Company: Thompson Engineering	Static Water Level (ft): 7.19/7.74	Riser Material: Sch 40 PVC
Drilling Method: Hollow Stem Auger	DTW After Drilling (ft): 7.40/7.40	Screen Material: Sch 40 PVC Slotted
Drilling Equipment: D-50	Top of Casing Elev. (ft) 373.38/373.83	Sanitary Seal: Bentonite Pellets
Driller: Phil Pitts	Ground Elev. (ft): 370.88/371.13	Filter Pack: Sand
Logged By: Nardos Tilahun	Location (X,Y): 1162084.45, 2556638.75	Sampling Method(s): SS/SH/CO

DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT				SOIL/ROCK VISUAL DESCRIPTION	MEASURE	ELEV. (ft msl)
				Sample Type	Recovery (ft)	Blow Counts	N Value RQD (%)			
80				CO	0			(82') No Recovery.		290
85				CO	3		8	(87') MET ROCK (GNEISS); coarse grained, moderately weathered, hard, intensely fractured, wet, dark biotite and white feldspar minerals, competent, iron oxidation on fracture surface, fractures not healed. Coring recovery from 78 to 87 feet below ground surface (ft bgs) was zero, top of competent rock could be at 87 ft bgs.		285
90				CO	2.2		0	(92') MET ROCK (GNEISS); coarse grained, moderately weathered, hard, intensely fractured, wet, dark biotite and white feldspar minerals, competent, iron oxidation on fracture surface, fractures not healed.		280
95				CO	5		100	(97') MET ROCK (GNEISS); coarse grained, fresh, hard, unfractured, dark biotite and white feldspar minerals, competent, strong, flow banding.		275
100										

NOTES: PB-13S and PB-13D are stickup wells, PB-13S is ~10ft away from PB-13D well. Depth to water at PB-13S is 7.4 feet below ground surface.
NA = Not Applicable

Drilling Start Date: 12/10/2018	Boring Depth (ft): 107.8	Well Depth (ft): 50/97
Drilling End Date: 12/18/2018	Boring Diameter (in): 6.50	Well Diam. (in)/Screen Slot (in): 2.0/0.010
Drilling Company: Thompson Engineering	Static Water Level (ft): 7.19/7.74	Riser Material: Sch 40 PVC
Drilling Method: Hollow Stem Auger	DTW After Drilling (ft): 7.40/7.40	Screen Material: Sch 40 PVC Slotted
Drilling Equipment: D-50	Top of Casing Elev. (ft) 373.38/373.83	Sanitary Seal: Bentonite Pellets
Driller: Phil Pitts	Ground Elev. (ft): 370.88/371.13	Filter Pack: Sand
Logged By: Nardos Tilahun	Location (X,Y): 1162084.45, 2556638.75	Sampling Method(s): SS/SH/CO

DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT				SOIL/ROCK VISUAL DESCRIPTION	MEASURE	ELEV. (ft msl)
				Sample Type	Recovery (ft)	Blow Counts	N Value RQD (%)		Lab Sample	

100			CO	5			100	(102') MET ROCK (GNEISS); coarse grained, fresh, hard, unfractured, dark biotite and white feldspar minerals, competent, strong, flow banding.		270
105				0.8			100	(107') MET ROCK (GNEISS); coarse grained, fresh, hard, unfractured, dark biotite and white feldspar minerals, competent, strong, flow banding. (107.8') Boring terminated.		265
110										

NOTES: PB-13S and PB-13D are stickup wells, PB-13S is ~10ft away from PB-13D well. Depth to water at PB-13S is 7.4 feet below ground surface.
NA = Not Applicable

APPENDIX B

**Analytical Results, Field Data Forms &
Data Validation Summaries**

December 17, 2019

Joju Abraham
Georgia Power - Coal Combustion Residuals
2480 Maner Road
Atlanta, GA 30339

RE: Project: Plant Branch
Pace Project No.: 2624392

Dear Joju Abraham:

Enclosed are the analytical results for sample(s) received by the laboratory on October 16, 2019. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Kevin Herring for
Betsy McDaniel
betsy.mcdaniel@pacelabs.com
(770)734-4200
Project Manager

Enclosures

cc: Julie Lehrman, Golder Associates Inc.
Dawn Prell, Golder Associates Inc.
Eric Rolle, Georgia Power - Coal Combustion Residuals
Rebecca Thornton, Pace Analytical Atlanta



REPORT OF LABORATORY ANALYSIS

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CERTIFICATIONS

Project: Plant Branch

Pace Project No.: 2624392

Pace Analytical Services Atlanta

110 Technology Parkway Peachtree Corners, GA 30092

Florida DOH Certification #: E87315

Georgia DW Inorganics Certification #: 812

Georgia DW Microbiology Certification #: 812

North Carolina Certification #: 381

South Carolina Certification #: 98011001

Virginia Certification #: 460204

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SAMPLE SUMMARY

Project: Plant Branch
Pace Project No.: 2624392

Lab ID	Sample ID	Matrix	Date Collected	Date Received
2624392001	BRGWA-12S	Water	10/15/19 12:30	10/16/19 12:30
2624392002	BRGWA-12I	Water	10/15/19 15:45	10/16/19 12:30
2624392003	BRGWA-23S	Water	10/15/19 13:42	10/16/19 12:30
2624392004	FB-1	Water	10/15/19 14:10	10/16/19 12:30
2624392005	BRGWC-25I	Water	10/15/19 15:08	10/16/19 12:30

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SAMPLE ANALYTE COUNT

Project: Plant Branch
Pace Project No.: 2624392

Lab ID	Sample ID	Method	Analysts	Analytes Reported
2624392001	BRGWA-12S	EPA 6020B	CSW	14
		SM 2540C	ALW	1
		EPA 300.0	MWB	3
2624392002	BRGWA-12I	EPA 6020B	CSW	14
		SM 2540C	ALW	1
		EPA 300.0	MWB	3
2624392003	BRGWA-23S	EPA 6020B	CSW	14
		SM 2540C	ALW	1
		EPA 300.0	MWB	3
2624392004	FB-1	EPA 6020B	CSW	14
		SM 2540C	ALW	1
		EPA 300.0	MWB	3
2624392005	BRGWC-25I	EPA 6020B	CSW	14
		SM 2540C	ALW	1
		EPA 300.0	MWB	3

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ANALYTICAL RESULTS

Project: Plant Branch
Pace Project No.: 2624392

Sample: BRGWA-12S		Lab ID: 2624392001		Collected: 10/15/19 12:30	Received: 10/16/19 12:30	Matrix: Water				
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual	
6020B MET ICPMS		Analytical Method: EPA 6020B Preparation Method: EPA 3005A								
Antimony	ND	mg/L	0.0030	0.00027	1	10/20/19 16:44	10/22/19 21:21	7440-36-0		
Arsenic	0.00046J	mg/L	0.0050	0.00035	1	10/20/19 16:44	10/22/19 21:21	7440-38-2	B	
Barium	0.053	mg/L	0.010	0.00049	1	10/20/19 16:44	10/22/19 21:21	7440-39-3		
Beryllium	ND	mg/L	0.0030	0.000074	1	10/20/19 16:44	10/22/19 21:21	7440-41-7		
Boron	ND	mg/L	0.040	0.0049	1	10/20/19 16:44	10/22/19 21:21	7440-42-8		
Cadmium	ND	mg/L	0.0025	0.00011	1	10/20/19 16:44	10/22/19 21:21	7440-43-9		
Calcium	6.2	mg/L	0.10	0.011	1	10/20/19 16:44	10/22/19 21:21	7440-70-2		
Chromium	0.0023J	mg/L	0.010	0.00039	1	10/20/19 16:44	10/22/19 21:21	7440-47-3		
Cobalt	ND	mg/L	0.0050	0.00030	1	10/20/19 16:44	10/22/19 21:21	7440-48-4		
Lead	ND	mg/L	0.0050	0.000046	1	10/20/19 16:44	10/22/19 21:21	7439-92-1		
Lithium	ND	mg/L	0.030	0.00078	1	10/20/19 16:44	10/22/19 21:21	7439-93-2		
Molybdenum	ND	mg/L	0.010	0.00095	1	10/20/19 16:44	10/22/19 21:21	7439-98-7		
Selenium	ND	mg/L	0.010	0.0013	1	10/20/19 16:44	10/22/19 21:21	7782-49-2		
Thallium	ND	mg/L	0.0010	0.000052	1	10/20/19 16:44	10/22/19 21:21	7440-28-0		
2540C Total Dissolved Solids		Analytical Method: SM 2540C								
Total Dissolved Solids	89.0	mg/L	10.0	10.0	1		10/18/19 10:46			
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0								
Chloride	3.4	mg/L	1.0	0.024	1		10/21/19 22:48	16887-00-6		
Fluoride	ND	mg/L	0.30	0.029	1		10/21/19 22:48	16984-48-8		
Sulfate	0.61J	mg/L	1.0	0.017	1		10/21/19 22:48	14808-79-8		

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: Plant Branch
Pace Project No.: 2624392

Sample: BRGWA-12I		Lab ID: 2624392002		Collected: 10/15/19 15:45		Received: 10/16/19 12:30		Matrix: Water		
Parameters	Results	Units	Report			Prepared	Analyzed	CAS No.	Qual	
			Limit	MDL	DF					
6020B MET ICPMS		Analytical Method: EPA 6020B Preparation Method: EPA 3005A								
Antimony	0.012	mg/L	0.0030	0.00027	1	10/20/19 16:44	10/22/19 21:44	7440-36-0		
Arsenic	0.00088J	mg/L	0.0050	0.00035	1	10/20/19 16:44	10/22/19 21:44	7440-38-2	B	
Barium	0.060	mg/L	0.010	0.00049	1	10/20/19 16:44	10/22/19 21:44	7440-39-3		
Beryllium	ND	mg/L	0.0030	0.000074	1	10/20/19 16:44	10/22/19 21:44	7440-41-7		
Boron	0.0060J	mg/L	0.040	0.0049	1	10/20/19 16:44	10/22/19 21:44	7440-42-8		
Cadmium	ND	mg/L	0.0025	0.00011	1	10/20/19 16:44	10/22/19 21:44	7440-43-9		
Calcium	15.9	mg/L	5.0	0.55	50	10/20/19 16:44	10/22/19 21:49	7440-70-2		
Chromium	0.0021J	mg/L	0.010	0.00039	1	10/20/19 16:44	10/22/19 21:44	7440-47-3		
Cobalt	ND	mg/L	0.0050	0.00030	1	10/20/19 16:44	10/22/19 21:44	7440-48-4		
Lead	ND	mg/L	0.0050	0.000046	1	10/20/19 16:44	10/22/19 21:44	7439-92-1		
Lithium	0.0037J	mg/L	0.030	0.00078	1	10/20/19 16:44	10/22/19 21:44	7439-93-2		
Molybdenum	ND	mg/L	0.010	0.00095	1	10/20/19 16:44	10/22/19 21:44	7439-98-7		
Selenium	ND	mg/L	0.010	0.0013	1	10/20/19 16:44	10/22/19 21:44	7782-49-2		
Thallium	ND	mg/L	0.0010	0.000052	1	10/20/19 16:44	10/22/19 21:44	7440-28-0		
2540C Total Dissolved Solids		Analytical Method: SM 2540C								
Total Dissolved Solids	134	mg/L	10.0	10.0	1		10/18/19 10:46			
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0								
Chloride	3.1	mg/L	1.0	0.024	1		10/21/19 23:10	16887-00-6		
Fluoride	0.047J	mg/L	0.30	0.029	1		10/21/19 23:10	16984-48-8		
Sulfate	1.9	mg/L	1.0	0.017	1		10/21/19 23:10	14808-79-8		

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: Plant Branch
Pace Project No.: 2624392

Sample: BRGWA-23S		Lab ID: 2624392003		Collected: 10/15/19 13:42		Received: 10/16/19 12:30		Matrix: Water		
Parameters	Results	Units	Report			Prepared	Analyzed	CAS No.	Qual	
			Limit	MDL	DF					
6020B MET ICPMS		Analytical Method: EPA 6020B Preparation Method: EPA 3005A								
Antimony	ND	mg/L	0.0030	0.00027	1	10/20/19 16:44	10/22/19 21:55	7440-36-0		
Arsenic	0.00075J	mg/L	0.0050	0.00035	1	10/20/19 16:44	10/22/19 21:55	7440-38-2	B	
Barium	0.069	mg/L	0.010	0.00049	1	10/20/19 16:44	10/22/19 21:55	7440-39-3		
Beryllium	ND	mg/L	0.0030	0.000074	1	10/20/19 16:44	10/22/19 21:55	7440-41-7		
Boron	0.022J	mg/L	0.040	0.0049	1	10/20/19 16:44	10/22/19 21:55	7440-42-8		
Cadmium	ND	mg/L	0.0025	0.00011	1	10/20/19 16:44	10/22/19 21:55	7440-43-9		
Calcium	8.6	mg/L	0.10	0.011	1	10/20/19 16:44	10/22/19 21:55	7440-70-2		
Chromium	0.0017J	mg/L	0.010	0.00039	1	10/20/19 16:44	10/22/19 21:55	7440-47-3		
Cobalt	0.0011J	mg/L	0.0050	0.00030	1	10/20/19 16:44	10/22/19 21:55	7440-48-4		
Lead	ND	mg/L	0.0050	0.000046	1	10/20/19 16:44	10/22/19 21:55	7439-92-1		
Lithium	0.0069J	mg/L	0.030	0.00078	1	10/20/19 16:44	10/22/19 21:55	7439-93-2		
Molybdenum	ND	mg/L	0.010	0.00095	1	10/20/19 16:44	10/22/19 21:55	7439-98-7		
Selenium	0.0022J	mg/L	0.010	0.0013	1	10/20/19 16:44	10/22/19 21:55	7782-49-2		
Thallium	ND	mg/L	0.0010	0.000052	1	10/20/19 16:44	10/22/19 21:55	7440-28-0		
2540C Total Dissolved Solids		Analytical Method: SM 2540C								
Total Dissolved Solids	124	mg/L	10.0	10.0	1		10/18/19 10:46			
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0								
Chloride	3.5	mg/L	1.0	0.024	1		10/21/19 23:33	16887-00-6		
Fluoride	ND	mg/L	0.30	0.029	1		10/21/19 23:33	16984-48-8		
Sulfate	30.0	mg/L	1.0	0.017	1		10/21/19 23:33	14808-79-8		

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: Plant Branch
Pace Project No.: 2624392

Sample: FB-1 Lab ID: 2624392004 Collected: 10/15/19 14:10 Received: 10/16/19 12:30 Matrix: Water									
Parameters	Results	Units	Report			Prepared	Analyzed	CAS No.	Qual
			Limit	MDL	DF				
6020B MET ICPMS Analytical Method: EPA 6020B Preparation Method: EPA 3005A									
Antimony	ND	mg/L	0.0030	0.00027	1	10/20/19 16:44	10/22/19 22:06	7440-36-0	
Arsenic	0.00060J	mg/L	0.0050	0.00035	1	10/20/19 16:44	10/22/19 22:06	7440-38-2	B
Barium	ND	mg/L	0.010	0.00049	1	10/20/19 16:44	10/22/19 22:06	7440-39-3	
Beryllium	ND	mg/L	0.0030	0.000074	1	10/20/19 16:44	10/22/19 22:06	7440-41-7	
Boron	ND	mg/L	0.040	0.0049	1	10/20/19 16:44	10/22/19 22:06	7440-42-8	
Cadmium	ND	mg/L	0.0025	0.00011	1	10/20/19 16:44	10/22/19 22:06	7440-43-9	
Calcium	ND	mg/L	0.10	0.011	1	10/20/19 16:44	10/22/19 22:06	7440-70-2	
Chromium	0.00039J	mg/L	0.010	0.00039	1	10/20/19 16:44	10/22/19 22:06	7440-47-3	
Cobalt	ND	mg/L	0.0050	0.00030	1	10/20/19 16:44	10/22/19 22:06	7440-48-4	
Lead	ND	mg/L	0.0050	0.000046	1	10/20/19 16:44	10/22/19 22:06	7439-92-1	
Lithium	ND	mg/L	0.030	0.00078	1	10/20/19 16:44	10/22/19 22:06	7439-93-2	
Molybdenum	0.0020J	mg/L	0.010	0.00095	1	10/20/19 16:44	10/22/19 22:06	7439-98-7	
Selenium	ND	mg/L	0.010	0.0013	1	10/20/19 16:44	10/22/19 22:06	7782-49-2	
Thallium	ND	mg/L	0.0010	0.000052	1	10/20/19 16:44	10/22/19 22:06	7440-28-0	
2540C Total Dissolved Solids Analytical Method: SM 2540C									
Total Dissolved Solids	25.0	mg/L	10.0	10.0	1		10/18/19 10:46		
300.0 IC Anions 28 Days Analytical Method: EPA 300.0									
Chloride	0.035J	mg/L	1.0	0.024	1		10/21/19 23:55	16887-00-6	
Fluoride	ND	mg/L	0.30	0.029	1		10/21/19 23:55	16984-48-8	
Sulfate	0.035J	mg/L	1.0	0.017	1		10/21/19 23:55	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: Plant Branch
Pace Project No.: 2624392

Sample: BRGWC-25I		Lab ID: 2624392005		Collected: 10/15/19 15:08		Received: 10/16/19 12:30		Matrix: Water		
Parameters	Results	Units	Report			Prepared	Analyzed	CAS No.	Qual	
			Limit	MDL	DF					
6020B MET ICPMS		Analytical Method: EPA 6020B Preparation Method: EPA 3005A								
Antimony	ND	mg/L	0.0030	0.00027	1	10/20/19 16:44	10/22/19 22:52	7440-36-0		
Arsenic	0.00052J	mg/L	0.0050	0.00035	1	10/20/19 16:44	10/22/19 22:52	7440-38-2	B	
Barium	0.027	mg/L	0.010	0.00049	1	10/20/19 16:44	10/22/19 22:52	7440-39-3		
Beryllium	ND	mg/L	0.0030	0.000074	1	10/20/19 16:44	10/22/19 22:52	7440-41-7		
Boron	1.2	mg/L	0.040	0.0049	1	10/20/19 16:44	10/22/19 22:52	7440-42-8		
Cadmium	ND	mg/L	0.0025	0.00011	1	10/20/19 16:44	10/22/19 22:52	7440-43-9		
Calcium	48.3	mg/L	5.0	0.55	50	10/20/19 16:44	10/22/19 22:58	7440-70-2		
Chromium	0.00098J	mg/L	0.010	0.00039	1	10/20/19 16:44	10/22/19 22:52	7440-47-3		
Cobalt	0.0043J	mg/L	0.0050	0.00030	1	10/20/19 16:44	10/22/19 22:52	7440-48-4		
Lead	ND	mg/L	0.0050	0.000046	1	10/20/19 16:44	10/22/19 22:52	7439-92-1		
Lithium	ND	mg/L	0.030	0.00078	1	10/20/19 16:44	10/22/19 22:52	7439-93-2		
Molybdenum	ND	mg/L	0.010	0.00095	1	10/20/19 16:44	10/22/19 22:52	7439-98-7		
Selenium	ND	mg/L	0.010	0.0013	1	10/20/19 16:44	10/22/19 22:52	7782-49-2		
Thallium	ND	mg/L	0.0010	0.000052	1	10/20/19 16:44	10/22/19 22:52	7440-28-0		
2540C Total Dissolved Solids		Analytical Method: SM 2540C								
Total Dissolved Solids	380	mg/L	10.0	10.0	1		10/18/19 10:47			
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0								
Chloride	5.0	mg/L	1.0	0.024	1		10/24/19 17:44	16887-00-6		
Fluoride	0.16J	mg/L	0.30	0.029	1		10/24/19 17:44	16984-48-8		
Sulfate	174	mg/L	10.0	0.17	10		10/28/19 22:39	14808-79-8		

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: Plant Branch
Pace Project No.: 2624392

QC Batch: 37136 Analysis Method: EPA 6020B
QC Batch Method: EPA 3005A Analysis Description: 6020B MET
Associated Lab Samples: 2624392001, 2624392002, 2624392003, 2624392004, 2624392005

METHOD BLANK: 167849 Matrix: Water
Associated Lab Samples: 2624392001, 2624392002, 2624392003, 2624392004, 2624392005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Antimony	mg/L	ND	0.0030	0.00027	10/22/19 18:23	
Arsenic	mg/L	0.00059J	0.0050	0.00035	10/22/19 18:23	
Barium	mg/L	ND	0.010	0.00049	10/22/19 18:23	
Beryllium	mg/L	ND	0.0030	0.000074	10/22/19 18:23	
Boron	mg/L	ND	0.040	0.0049	10/22/19 18:23	
Cadmium	mg/L	ND	0.0025	0.00011	10/22/19 18:23	
Calcium	mg/L	ND	0.10	0.011	10/22/19 18:23	
Chromium	mg/L	ND	0.010	0.00039	10/22/19 18:23	
Cobalt	mg/L	ND	0.0050	0.00030	10/22/19 18:23	
Lead	mg/L	ND	0.0050	0.000046	10/22/19 18:23	
Lithium	mg/L	ND	0.030	0.00078	10/22/19 18:23	
Molybdenum	mg/L	ND	0.010	0.00095	10/22/19 18:23	
Selenium	mg/L	ND	0.010	0.0013	10/22/19 18:23	
Thallium	mg/L	ND	0.0010	0.000052	10/22/19 18:23	

LABORATORY CONTROL SAMPLE: 167850

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	mg/L	0.1	0.098	98	80-120	
Arsenic	mg/L	0.1	0.098	98	80-120	
Barium	mg/L	0.1	0.098	98	80-120	
Beryllium	mg/L	0.1	0.099	99	80-120	
Boron	mg/L	1	0.96	96	80-120	
Cadmium	mg/L	0.1	0.097	97	80-120	
Calcium	mg/L	1	0.96	96	80-120	
Chromium	mg/L	0.1	0.098	98	80-120	
Cobalt	mg/L	0.1	0.098	98	80-120	
Lead	mg/L	0.1	0.098	98	80-120	
Lithium	mg/L	0.1	0.095	95	80-120	
Molybdenum	mg/L	0.1	0.10	101	80-120	
Selenium	mg/L	0.1	0.10	101	80-120	
Thallium	mg/L	0.1	0.098	98	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 168476 168477

Parameter	Units	2624389004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Antimony	mg/L	ND	0.1	0.1	0.098	0.097	97	97	75-125	0	20	

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QUALITY CONTROL DATA

Project: Plant Branch
Pace Project No.: 2624392

Parameter	Units	MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 168476		168477		MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		2624389004 Result	MS Spike Conc.	MSD Spike Conc.									
Arsenic	mg/L	0.00063J	0.1	0.1	0.095	0.098	95	97	75-125	3	20		
Barium	mg/L	0.0091J	0.1	0.1	0.11	0.11	100	103	75-125	3	20		
Beryllium	mg/L	ND	0.1	0.1	0.092	0.094	92	94	75-125	2	20		
Boron	mg/L	ND	1	1	0.89	0.94	88	93	75-125	6	20		
Cadmium	mg/L	ND	0.1	0.1	0.099	0.098	99	98	75-125	0	20		
Calcium	mg/L	3.7	1	1	4.5	4.5	88	82	75-125	1	20		
Chromium	mg/L	0.0083J	0.1	0.1	0.11	0.11	97	100	75-125	2	20		
Cobalt	mg/L	0.00097J	0.1	0.1	0.096	0.096	95	95	75-125	0	20		
Lead	mg/L	ND	0.1	0.1	0.095	0.098	95	98	75-125	3	20		
Lithium	mg/L	ND	0.1	0.1	0.092	0.094	91	93	75-125	3	20		
Molybdenum	mg/L	ND	0.1	0.1	0.10	0.10	100	100	75-125	1	20		
Selenium	mg/L	ND	0.1	0.1	0.093	0.10	93	100	75-125	7	20		
Thallium	mg/L	ND	0.1	0.1	0.095	0.098	95	98	75-125	3	20		

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QUALITY CONTROL DATA

Project: Plant Branch
Pace Project No.: 2624392

QC Batch: 37181 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 2624392001, 2624392002, 2624392003, 2624392004, 2624392005

LABORATORY CONTROL SAMPLE: 168196

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	400	412	103	84-108	

SAMPLE DUPLICATE: 168197

Parameter	Units	2624388001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	1520	1570	3	10	

SAMPLE DUPLICATE: 168198

Parameter	Units	2624392001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	89.0	86.0	3	10	

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QUALITY CONTROL DATA

Project: Plant Branch
Pace Project No.: 2624392

QC Batch: 37138 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 2624392001, 2624392002, 2624392003, 2624392004

METHOD BLANK: 167857 Matrix: Water
Associated Lab Samples: 2624392001, 2624392002, 2624392003, 2624392004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	ND	1.0	0.024	10/21/19 16:11	
Fluoride	mg/L	ND	0.30	0.029	10/21/19 16:11	
Sulfate	mg/L	ND	1.0	0.017	10/21/19 16:11	

LABORATORY CONTROL SAMPLE: 167858

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	10	9.9	99	90-110	
Fluoride	mg/L	10	10.2	102	90-110	
Sulfate	mg/L	10	9.9	99	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 167859 167860

Parameter	Units	2624388001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	20.9	10	10	28.1	28.1	72	72	90-110	0	15	M1
Fluoride	mg/L	ND	10	10	10.0	10.1	100	101	90-110	1	15	

MATRIX SPIKE SAMPLE: 167861

Parameter	Units	2624389005 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L		2.2	10	12.2	100	90-110
Fluoride	mg/L		ND	10	10.3	103	90-110
Sulfate	mg/L		5.2	10	14.8	96	90-110

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: Plant Branch
Pace Project No.: 2624392

QC Batch: 37374 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 2624392005

METHOD BLANK: 169142 Matrix: Water
Associated Lab Samples: 2624392005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	ND	1.0	0.024	10/24/19 14:46	
Fluoride	mg/L	ND	0.30	0.029	10/24/19 14:46	
Sulfate	mg/L	ND	1.0	0.017	10/24/19 14:46	

LABORATORY CONTROL SAMPLE: 169143

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	10	10.0	100	90-110	
Fluoride	mg/L	10	10.4	104	90-110	
Sulfate	mg/L	10	9.7	97	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 169144 169145

Parameter	Units	2623721001		2623721002		MS		MSD		% Rec Limits	RPD	Max RPD	Qual
		Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	% Rec	% Rec					
Chloride	mg/L	25.1	10	10	31.5	31.5	63	63	90-110	0	15	H1,M1	
Fluoride	mg/L	0.075J	10	10	10.6	10.7	106	106	90-110	0	15	H1	

MATRIX SPIKE SAMPLE: 169146

Parameter	Units	2623721002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	23.6	10	30.3	67	90-110	H1,M1
Fluoride	mg/L	0.13J	10	10.4	103	90-110	H1

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REPORT OF LABORATORY ANALYSIS

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QUALIFIERS

Project: Plant Branch
Pace Project No.: 2624392

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

ANALYTE QUALIFIERS

B Analyte was detected in the associated method blank.

H1 Analysis conducted outside the EPA method holding time.

M1 Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Plant Branch
Pace Project No.: 2624392

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
2624392001	BRGWA-12S	EPA 3005A	37136	EPA 6020B	37255
2624392002	BRGWA-12I	EPA 3005A	37136	EPA 6020B	37255
2624392003	BRGWA-23S	EPA 3005A	37136	EPA 6020B	37255
2624392004	FB-1	EPA 3005A	37136	EPA 6020B	37255
2624392005	BRGWC-25I	EPA 3005A	37136	EPA 6020B	37255
2624392001	BRGWA-12S	SM 2540C	37181		
2624392002	BRGWA-12I	SM 2540C	37181		
2624392003	BRGWA-23S	SM 2540C	37181		
2624392004	FB-1	SM 2540C	37181		
2624392005	BRGWC-25I	SM 2540C	37181		
2624392001	BRGWA-12S	EPA 300.0	37138		
2624392002	BRGWA-12I	EPA 300.0	37138		
2624392003	BRGWA-23S	EPA 300.0	37138		
2624392004	FB-1	EPA 300.0	37138		
2624392005	BRGWC-25I	EPA 300.0	37374		

REPORT OF LABORATORY ANALYSIS

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WO#: 2624392



CHAIN-OF-CUSTODY Analytical Request Document



Company: Georgia Power - Coal Combustion Residuals
 Chain-of-Custody is a LEGAL DOCUMENT - Complete all relevant fields
 Billing Information:

Address: 2480 Maner Road
 Atlanta, GA 30339
 Report To: Joju Abraham
 Copy To: Golder

Phone: (404) 506-7239
 Email: jabraham@southemco.com
 Project Name: Plant Branch BCD
 Project #
 Site Collection Info/Address: Plant Branch

State: Georgia City: Millidgeville Time Zone Collected:
 [] PT [] MT [] CT [] ET
 Pace Project Manager:
 betsy.mcdaniel@pacelabs.com
 Immediately Packed on Ice:
 [X] Yes [] No
 Field Filtered (if applicable):
 [] Yes [] No
 Analysis:

* Matrix Codes (insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Wastewater (WW),
 Product (P), Soil/Solid (SL), Oil (OL), Wipe (WP), Air (AR), Tissue (TS), Blossom (B), Water (WT), Other (OT)

Customer Sample ID	Matrix *	Comp / Grb	Collected (or Composite Start)		Composite End		Res CI	# of Cns
			Date	Time	Date	Time		
BRGWA-125	GW	G	10/15/2019	12:30				4
BRGWA-121	GW	G	10/15/2019	15:45				4
BRGWA-235	GW	G	10/15/2019	13:42				4
FB-1	W	G	10/15/2019	14:10				4

(App III Metals): B, Ca, (App IV Metals): Sb, As, Ba, Be, Cd, Cr, Co,
 Pb, Li, Mo, Se, Ti, V, Zn

Type of Ice Used: WET Blue Dry None
 Packing Material Used: N/A

Radiation sample(s) screened (<500 cpm): Y N NA
 Received by/Company: Signature
 Date/Time: 10-16-19 / 0815
 Received by/Company: Signature
 Date/Time: 10-16-19 / 0815

Relinquished by/Company: Signature
 Date/Time: 10-16-19 / 0815
 Relinquished by/Company: Signature
 Date/Time: 10-16-19 / 0815

Workorder Number or
E ONLY
 Container Preservative Type **
 1 1
 Lab Project Manager:
 ** Preservative Types: (1) nitric acid, (2) sulfuric acid, (3) hydrochloric acid, (4) sodium hydroxide, (5) zinc acetate,
 (6) methanol, (7) sodium bisulfate, (8) sodium thiosulfate, (9) hexane, (A) ascorbic acid, (B) ammonium sulfate,
 (C) ammonium hydroxide, (D) TSP, (U) Unpreserved, (O) Other

Analyses	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Metals App III/IV - See COMMENTS																				
Chloride, Fluoride, Sulfate, TDS																				
Radium 226, 228																				

Lab Profile/Line:
 Lab Sample Receipt Checklist:
 Custody Seals Present/Intact: Y NA
 Custody Signatures Present/Intact: Y NA
 Collector Signatures Present/Intact: Y NA
 Bottles Intact: Y NA
 Correct Bottles: Y NA
 Sufficient Volume: Y NA
 Samples Received on Ice: Y NA
 VOA - Headspace Acceptable: Y NA
 USDA Required Seals: Y NA
 Samples in Holding Time: Y NA
 Residual Chlorine Present: Y NA
 CI Strips: Y NA
 Sample pH Acceptable: Y NA
 pH Strips: Y NA
 Lead Acetate Strips: Y NA
 LAB USE ONLY:
 Lab Sample #/ Comments:

LAB Sample Temperature (Info):
 Therm ID#: 2310
 Cooler 1 Temp Upon Receipt: 23.0 °C
 Cooler 1 Therm Corr. Factor: 0 °C
 Cooler 1 Corrected Temp: 23.0 °C
 Comments:
 Trip Blank Received: Y N NA
 HCL MeOH TSP Other
 Non Conformance(s):
 YES / NO Page: ___ of: ___



Sample Condition Upon Receipt

Client Name: GIA Power Project # _____

Courier: Fed Ex UPS USPS Client Commercial Pace Other _____

Tracking #: _____

Custody Seal on Cooler/Box Present: yes no Seals intact: yes no

Packing Material: Bubble Wrap Bubble Bags None Other _____

Thermometer Used 83 Type of Ice: Wet Blue None Samples on ice, cooling process has begun

Cooler Temperature 1:0 Biological Tissue is Frozen: Yes No

Temp should be above freezing to 6°C

Optional	
Proj. Due Date:	
Proj. Name:	

Date and Initials of person examining contents: 10/16/19 MR

Chain of Custody Present:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	1.	
Chain of Custody Filled Out:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	2.	
Chain of Custody Relinquished:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	3.	
Sampler Name & Signature on COC:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	4.	
Samples Arrived within Hold Time:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	5.	
Short Hold Time Analysis (<72hr):	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	6.	
Rush Turn Around Time Requested:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	7.	
Sufficient Volume:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	8.	
Correct Containers Used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	9.	
-Pace Containers Used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		
Containers Intact:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	10.	
Filtered volume received for Dissolved tests	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	11.	
Sample Labels match COC:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	12.	<u>see comment</u>
-Includes date/time/ID/Analysis Matrix:	<u>W</u>		
All containers needing preservation have been checked.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	13.	
All containers needing preservation are found to be in compliance with EPA recommendation.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		
exceptions: VOA, coliform, TOC, O&G, WI-DRO (water)	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Initial when completed	Lot # of added preservative
Samples checked for dechlorination:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	14.	
Headspace in VOA Vials (>6mm):	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	15.	
Trip Blank Present:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	16.	
Trip Blank Custody Seals Present	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A		
Pace Trip Blank Lot # (if purchased):	_____		

Client Notification/ Resolution: _____ Field Data Required? Y I N

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: OR GWC-25T collected on 10/15/19 @ 1508 hrs Rad, Metals, Diss. Metals, IC-300 and TD's per container labels was present but was not listed on the COC. That was added to the report per client's request.

Project Manager Review: _____ Date: _____

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers)

November 14, 2019

Joju Abraham
Georgia Power - Coal Combustion Residuals
2480 Maner Road
Atlanta, GA 30339

RE: Project: Plant Branch
Pace Project No.: 2624393

Dear Joju Abraham:

Enclosed are the analytical results for sample(s) received by the laboratory on October 16, 2019. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Betsy McDaniel
betsy.mcdaniel@pacelabs.com
(770)734-4200
Project Manager

Enclosures

cc: Julie Lehrman, Golder Associates Inc.
Dawn Prell, Golder Associates Inc.
Eric Rolle, Georgia Power - Coal Combustion Residuals
Rebecca Thornton, Pace Analytical Atlanta



REPORT OF LABORATORY ANALYSIS

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CERTIFICATIONS

Project: Plant Branch
Pace Project No.: 2624393

Pennsylvania Certification IDs

1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601
ANAB DOD-ELAP Rad Accreditation #: L2417
Alabama Certification #: 41590
Arizona Certification #: AZ0734
Arkansas Certification
California Certification #: 04222CA
Colorado Certification #: PA01547
Connecticut Certification #: PH-0694
Delaware Certification
EPA Region 4 DW Rad
Florida/TNI Certification #: E87683
Georgia Certification #: C040
Florida: Cert E871149 SEKS WET
Guam Certification
Hawaii Certification
Idaho Certification
Illinois Certification
Indiana Certification
Iowa Certification #: 391
Kansas/TNI Certification #: E-10358
Kentucky Certification #: KY90133
KY WW Permit #: KY0098221
KY WW Permit #: KY0000221
Louisiana DHH/TNI Certification #: LA180012
Louisiana DEQ/TNI Certification #: 4086
Maine Certification #: 2017020
Maryland Certification #: 308
Massachusetts Certification #: M-PA1457
Michigan/PADEP Certification #: 9991

Missouri Certification #: 235
Montana Certification #: Cert0082
Nebraska Certification #: NE-OS-29-14
Nevada Certification #: PA014572018-1
New Hampshire/TNI Certification #: 297617
New Jersey/TNI Certification #: PA051
New Mexico Certification #: PA01457
New York/TNI Certification #: 10888
North Carolina Certification #: 42706
North Dakota Certification #: R-190
Ohio EPA Rad Approval: #41249
Oregon/TNI Certification #: PA200002-010
Pennsylvania/TNI Certification #: 65-00282
Puerto Rico Certification #: PA01457
Rhode Island Certification #: 65-00282
South Dakota Certification
Tennessee Certification #: 02867
Texas/TNI Certification #: T104704188-17-3
Utah/TNI Certification #: PA014572017-9
USDA Soil Permit #: P330-17-00091
Vermont Dept. of Health: ID# VT-0282
Virgin Island/PADEP Certification
Virginia/VELAP Certification #: 9526
Washington Certification #: C868
West Virginia DEP Certification #: 143
West Virginia DHHR Certification #: 9964C
Wisconsin Approve List for Rad
Wyoming Certification #: 8TMS-L

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SAMPLE SUMMARY

Project: Plant Branch

Pace Project No.: 2624393

Lab ID	Sample ID	Matrix	Date Collected	Date Received
2624393001	BRGWA-12S	Water	10/15/19 12:30	10/16/19 12:30
2624393002	BRGWA-12I	Water	10/15/19 15:45	10/16/19 12:30
2624393003	BRGWA-23S	Water	10/15/19 13:42	10/16/19 12:30
2624393004	FB-1	Water	10/15/19 14:10	10/16/19 12:30
2624393005	BRGWC-25I	Water	10/15/19 15:08	10/16/19 12:30

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SAMPLE ANALYTE COUNT

Project: Plant Branch
Pace Project No.: 2624393

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
2624393001	BRGWA-12S	EPA 9315	LAL	1	PASI-PA
		EPA 9320	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
2624393002	BRGWA-12I	EPA 9315	LAL	1	PASI-PA
		EPA 9320	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
2624393003	BRGWA-23S	EPA 9315	LAL	1	PASI-PA
		EPA 9320	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
2624393004	FB-1	EPA 9315	LAL	1	PASI-PA
		EPA 9320	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
2624393005	BRGWC-25I	EPA 9315	LAL	1	PASI-PA
		EPA 9320	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: Plant Branch

Pace Project No.: 2624393

Sample: BRGWA-12S **Lab ID: 2624393001** Collected: 10/15/19 12:30 Received: 10/16/19 12:30 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 9315	0.179 ± 0.196 (0.383) C:95% T:NA	pCi/L	11/07/19 07:47	13982-63-3	
Radium-228	EPA 9320	0.873 ± 0.519 (0.954) C:68% T:72%	pCi/L	11/07/19 14:59	15262-20-1	
Total Radium	Total Radium Calculation	1.05 ± 0.715 (1.34)	pCi/L	11/12/19 10:42	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: Plant Branch

Pace Project No.: 2624393

Sample: BRGWA-12I **Lab ID: 2624393002** Collected: 10/15/19 15:45 Received: 10/16/19 12:30 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 9315	0.475 ± 0.290 (0.431) C:89% T:NA	pCi/L	11/07/19 07:47	13982-63-3	
Radium-228	EPA 9320	0.656 ± 0.436 (0.823) C:66% T:82%	pCi/L	11/07/19 15:00	15262-20-1	
Total Radium	Total Radium Calculation	1.13 ± 0.726 (1.25)	pCi/L	11/12/19 10:42	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: Plant Branch

Pace Project No.: 2624393

Sample: BRGWA-23S **Lab ID: 2624393003** Collected: 10/15/19 13:42 Received: 10/16/19 12:30 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 9315	0.659 ± 0.328 (0.412) C:91% T:NA	pCi/L	11/07/19 07:47	13982-63-3	
Radium-228	EPA 9320	1.03 ± 0.432 (0.660) C:76% T:73%	pCi/L	11/11/19 12:30	15262-20-1	
Total Radium	Total Radium Calculation	1.69 ± 0.760 (1.07)	pCi/L	11/12/19 10:42	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: Plant Branch

Pace Project No.: 2624393

Sample: FB-1 **Lab ID: 2624393004** Collected: 10/15/19 14:10 Received: 10/16/19 12:30 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 9315	0.209 ± 0.203 (0.373) C:93% T:NA	pCi/L	11/07/19 07:47	13982-63-3	
Radium-228	EPA 9320	-0.742 ± 0.835 (2.10) C:63% T:69%	pCi/L	11/07/19 20:08	15262-20-1	
Total Radium	Total Radium Calculation	0.209 ± 1.04 (2.47)	pCi/L	11/12/19 10:42	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: Plant Branch

Pace Project No.: 2624393

Sample: BRGWC-25I **Lab ID: 2624393005** Collected: 10/15/19 15:08 Received: 10/16/19 12:30 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 9315	0.537 ± 0.311 (0.457) C:87% T:NA	pCi/L	11/07/19 07:47	13982-63-3	
Radium-228	EPA 9320	0.525 ± 0.864 (1.88) C:66% T:76%	pCi/L	11/07/19 20:08	15262-20-1	
Total Radium	Total Radium Calculation	1.06 ± 1.18 (2.34)	pCi/L	11/12/19 10:42	7440-14-4	

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QUALITY CONTROL - RADIOCHEMISTRY

Project: Plant Branch

Pace Project No.: 2624393

QC Batch: 368367 Analysis Method: EPA 9315

QC Batch Method: EPA 9315 Analysis Description: 9315 Total Radium

Associated Lab Samples: 2624393001, 2624393002, 2624393003, 2624393004, 2624393005

METHOD BLANK: 1787254 Matrix: Water

Associated Lab Samples: 2624393001, 2624393002, 2624393003, 2624393004, 2624393005

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	0.416 ± 0.262 (0.396) C:98% T:NA	pCi/L	11/07/19 07:47	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL - RADIOCHEMISTRY

Project: Plant Branch

Pace Project No.: 2624393

QC Batch: 368368

Analysis Method: EPA 9320

QC Batch Method: EPA 9320

Analysis Description: 9320 Radium 228

Associated Lab Samples: 2624393001, 2624393002, 2624393003, 2624393004, 2624393005

METHOD BLANK: 1787255

Matrix: Water

Associated Lab Samples: 2624393001, 2624393002, 2624393003, 2624393004, 2624393005

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.536 ± 0.405 (0.790) C:74% T:76%	pCi/L	11/07/19 14:59	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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QUALIFIERS

Project: Plant Branch
Pace Project No.: 2624393

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty: SDWA = 1.96 sigma count uncertainty, all other matrices = Expanded Uncertainty (95% confidence interval).

Gamma Spec = Expanded Uncertainty (95.4% Confidence Interval)

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-PA Pace Analytical Services - Greensburg

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Plant Branch
Pace Project No.: 2624393

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
2624393001	BRGWA-12S	EPA 9315	368367		
2624393002	BRGWA-12I	EPA 9315	368367		
2624393003	BRGWA-23S	EPA 9315	368367		
2624393004	FB-1	EPA 9315	368367		
2624393005	BRGWC-25I	EPA 9315	368367		
2624393001	BRGWA-12S	EPA 9320	368368		
2624393002	BRGWA-12I	EPA 9320	368368		
2624393003	BRGWA-23S	EPA 9320	368368		
2624393004	FB-1	EPA 9320	368368		
2624393005	BRGWC-25I	EPA 9320	368368		
2624393001	BRGWA-12S	Total Radium Calculation	370511		
2624393002	BRGWA-12I	Total Radium Calculation	370511		
2624393003	BRGWA-23S	Total Radium Calculation	370511		
2624393004	FB-1	Total Radium Calculation	370511		
2624393005	BRGWC-25I	Total Radium Calculation	370511		

REPORT OF LABORATORY ANALYSIS

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Sample Condition Upon Receipt

Client Name: GIA Power Project # _____

Courier: Fed Ex UPS USPS Client Commercial Pace Other _____

Tracking #: _____

Custody Seal on Cooler/Box Present: yes no Seals intact: yes no

Optional
Proj. Data Date:
Proj. Name:

Packing Material: Bubble Wrap Bubble Bags None Other _____

Thermometer Used 83 Type of Ice: Wet Blue None Samples on ice, cooling process has begun

Cooler Temperature 1.0 Biological Tissue is Frozen: Yes No Date and Initials of person examining contents: 10/16/19 ml

		Comments:
Chain of Custody Present:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	1.
Chain of Custody Filled Out:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	2.
Chain of Custody Relinquished:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	3.
Sampler Name & Signature on COC:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	4.
Samples Arrived within Hold Time:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	5.
Short Hold Time Analysis (<72hr):	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	6.
Rush Turn Around Time Requested:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	7.
Sufficient Volume:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	8.
Correct Containers Used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	9.
-Pace Containers Used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Containers Intact:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	10.
Filtered volume received for Dissolved tests	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	11.
Sample Labels match COC:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	12. <u>see comment</u>
-Includes date/time/ID/Analysis Matrix:	<u>W</u>	
All containers needing preservation have been checked.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	13.
All containers needing preservation are found to be in compliance with EPA recommendation.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
exceptions: VOA, coliform, TOC, O&G, WI-DRO (water)	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Initial when completed
		Lot # of added preservative
Samples checked for dechlorination:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	14.
Headspace in VOA Vials (>6mm):	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	15.
Trip Blank Present:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	16.
Trip Blank Custody Seals Present	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Pace Trip Blank Lot # (if purchased):		

Client Notification/ Resolution: _____ Field Data Required? Y / I / N

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: BRGWC-25T collected on 10/15/19 @ 1508 hrs Rad, Metals, Diss. Metals, IC-300 and TD's per Container labels was present but was not listed on the COC. That was added to the report per client's request.

Project Manager Review: _____ Date: _____

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

December 17, 2019

Joju Abraham
Georgia Power - Coal Combustion Residuals
2480 Maner Road
Atlanta, GA 30339

RE: Project: Plant Branch
Pace Project No.: 2624487

Dear Joju Abraham:

Enclosed are the analytical results for sample(s) received by the laboratory on October 17, 2019. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Kevin Herring for
Betsy McDaniel
betsy.mcdaniel@pacelabs.com
(770)734-4200
Project Manager

Enclosures

cc: Julie Lehrman, Golder Associates Inc.
Dawn Prell, Golder Associates Inc.
Eric Rolle, Georgia Power - Coal Combustion Residuals
Rebecca Thornton, Pace Analytical Atlanta



REPORT OF LABORATORY ANALYSIS

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CERTIFICATIONS

Project: Plant Branch

Pace Project No.: 2624487

Pace Analytical Services Atlanta

110 Technology Parkway Peachtree Corners, GA 30092

Florida DOH Certification #: E87315

Georgia DW Inorganics Certification #: 812

Georgia DW Microbiology Certification #: 812

North Carolina Certification #: 381

South Carolina Certification #: 98011001

Virginia Certification #: 460204

REPORT OF LABORATORY ANALYSIS

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SAMPLE SUMMARY

Project: Plant Branch

Pace Project No.: 2624487

Lab ID	Sample ID	Matrix	Date Collected	Date Received
2624487001	BRGWC-29I	Water	10/16/19 09:50	10/17/19 11:35
2624487002	BRGWC-47	Water	10/16/19 11:35	10/17/19 11:35
2624487003	BRGWC-50	Water	10/16/19 13:25	10/17/19 11:35
2624487004	BRGWC-52I	Water	10/16/19 14:55	10/17/19 11:35
2624487005	Dup-2	Water	10/16/19 00:00	10/17/19 11:35

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SAMPLE ANALYTE COUNT

Project: Plant Branch
Pace Project No.: 2624487

Lab ID	Sample ID	Method	Analysts	Analytes Reported
2624487001	BRGWC-29I	EPA 6020B	CSW	14
		SM 2540C	MZP	1
		EPA 300.0	MWB	3
2624487002	BRGWC-47	EPA 6020B	CSW	14
		SM 2540C	MZP	1
		EPA 300.0	MWB	3
2624487003	BRGWC-50	EPA 6020B	CSW	14
		SM 2540C	MZP	1
		EPA 300.0	MWB	3
2624487004	BRGWC-52I	EPA 6020B	CSW	14
		SM 2540C	MZP	1
		EPA 300.0	MWB	3
2624487005	Dup-2	EPA 6020B	CSW	14
		SM 2540C	MZP	1
		EPA 300.0	MWB	3

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: Plant Branch
Pace Project No.: 2624487

Sample: BRGWC-291		Lab ID: 2624487001		Collected: 10/16/19 09:50	Received: 10/17/19 11:35	Matrix: Water			
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020B MET ICPMS		Analytical Method: EPA 6020B Preparation Method: EPA 3005A							
Antimony	ND	mg/L	0.0030	0.00027	1	10/21/19 16:03	10/23/19 20:20	7440-36-0	
Arsenic	0.00065J	mg/L	0.0050	0.00035	1	10/21/19 16:03	10/23/19 20:20	7440-38-2	
Barium	0.019	mg/L	0.010	0.00049	1	10/21/19 16:03	10/23/19 20:20	7440-39-3	
Beryllium	0.00072J	mg/L	0.0030	0.000074	1	10/21/19 16:03	10/23/19 20:20	7440-41-7	
Boron	1.2	mg/L	0.040	0.0049	1	10/21/19 16:03	10/23/19 20:20	7440-42-8	
Cadmium	ND	mg/L	0.0025	0.00011	1	10/21/19 16:03	10/23/19 20:20	7440-43-9	
Calcium	54.0	mg/L	5.0	0.55	50	10/21/19 16:03	10/23/19 20:26	7440-70-2	
Chromium	ND	mg/L	0.010	0.00039	1	10/21/19 16:03	10/23/19 20:20	7440-47-3	
Cobalt	0.0058	mg/L	0.0050	0.00030	1	10/21/19 16:03	10/23/19 20:20	7440-48-4	
Lead	0.00027J	mg/L	0.0050	0.000046	1	10/21/19 16:03	10/23/19 20:20	7439-92-1	
Lithium	0.0029J	mg/L	0.030	0.00078	1	10/21/19 16:03	10/23/19 20:20	7439-93-2	
Molybdenum	ND	mg/L	0.010	0.00095	1	10/21/19 16:03	10/23/19 20:20	7439-98-7	
Selenium	ND	mg/L	0.010	0.0013	1	10/21/19 16:03	10/23/19 20:20	7782-49-2	
Thallium	0.00017J	mg/L	0.0010	0.000052	1	10/21/19 16:03	10/23/19 20:20	7440-28-0	
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	2030	mg/L	10.0	10.0	1		10/23/19 15:47		
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	6.9	mg/L	1.0	0.024	1		10/24/19 21:42	16887-00-6	
Fluoride	0.11J	mg/L	0.30	0.029	1		10/24/19 21:42	16984-48-8	
Sulfate	266	mg/L	20.0	0.34	20		10/25/19 05:18	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: Plant Branch
Pace Project No.: 2624487

Sample: BRGWC-47		Lab ID: 2624487002		Collected: 10/16/19 11:35	Received: 10/17/19 11:35	Matrix: Water			
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020B MET ICPMS		Analytical Method: EPA 6020B Preparation Method: EPA 3005A							
Antimony	ND	mg/L	0.0030	0.00027	1	10/21/19 16:03	10/23/19 20:43	7440-36-0	
Arsenic	ND	mg/L	0.0050	0.00035	1	10/21/19 16:03	10/23/19 20:43	7440-38-2	
Barium	0.032	mg/L	0.010	0.00049	1	10/21/19 16:03	10/23/19 20:43	7440-39-3	
Beryllium	ND	mg/L	0.0030	0.000074	1	10/21/19 16:03	10/23/19 20:43	7440-41-7	
Boron	0.36	mg/L	0.040	0.0049	1	10/21/19 16:03	10/23/19 20:43	7440-42-8	
Cadmium	0.00018J	mg/L	0.0025	0.00011	1	10/21/19 16:03	10/23/19 20:43	7440-43-9	
Calcium	338	mg/L	5.0	0.55	50	10/21/19 16:03	10/23/19 20:49	7440-70-2	
Chromium	ND	mg/L	0.010	0.00039	1	10/21/19 16:03	10/23/19 20:43	7440-47-3	
Cobalt	0.00032J	mg/L	0.0050	0.00030	1	10/21/19 16:03	10/23/19 20:43	7440-48-4	
Lead	ND	mg/L	0.0050	0.000046	1	10/21/19 16:03	10/23/19 20:43	7439-92-1	
Lithium	0.038	mg/L	0.030	0.00078	1	10/21/19 16:03	10/25/19 09:50	7439-93-2	
Molybdenum	ND	mg/L	0.010	0.00095	1	10/21/19 16:03	10/23/19 20:43	7439-98-7	
Selenium	0.0017J	mg/L	0.010	0.0013	1	10/21/19 16:03	10/23/19 20:43	7782-49-2	
Thallium	ND	mg/L	0.0010	0.000052	1	10/21/19 16:03	10/23/19 20:43	7440-28-0	
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	2220	mg/L	10.0	10.0	1		10/23/19 15:47		
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	4.6	mg/L	1.0	0.024	1		10/24/19 22:04	16887-00-6	
Fluoride	0.076J	mg/L	0.30	0.029	1		10/24/19 22:04	16984-48-8	
Sulfate	1560	mg/L	50.0	0.85	50		10/25/19 06:45	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: Plant Branch
Pace Project No.: 2624487

Sample: BRGWC-50		Lab ID: 2624487003		Collected: 10/16/19 13:25	Received: 10/17/19 11:35	Matrix: Water			
Parameters	Results	Units	Report			Prepared	Analyzed	CAS No.	Qual
			Limit	MDL	DF				
6020B MET ICPMS		Analytical Method: EPA 6020B Preparation Method: EPA 3005A							
Antimony	ND	mg/L	0.0030	0.00027	1	10/21/19 16:03	10/23/19 20:55	7440-36-0	
Arsenic	ND	mg/L	0.0050	0.00035	1	10/21/19 16:03	10/23/19 20:55	7440-38-2	
Barium	0.017	mg/L	0.010	0.00049	1	10/21/19 16:03	10/23/19 20:55	7440-39-3	
Beryllium	0.0027J	mg/L	0.0030	0.000074	1	10/21/19 16:03	10/23/19 20:55	7440-41-7	
Boron	0.31	mg/L	0.040	0.0049	1	10/21/19 16:03	10/23/19 20:55	7440-42-8	
Cadmium	0.014	mg/L	0.0025	0.00011	1	10/21/19 16:03	10/23/19 20:55	7440-43-9	
Calcium	241	mg/L	5.0	0.55	50	10/21/19 16:03	10/23/19 21:00	7440-70-2	
Chromium	0.00050J	mg/L	0.010	0.00039	1	10/21/19 16:03	10/23/19 20:55	7440-47-3	
Cobalt	1.4	mg/L	0.0050	0.00030	1	10/21/19 16:03	10/23/19 20:55	7440-48-4	
Lead	0.000085J	mg/L	0.0050	0.000046	1	10/21/19 16:03	10/23/19 20:55	7439-92-1	
Lithium	0.034	mg/L	0.030	0.00078	1	10/21/19 16:03	10/25/19 09:56	7439-93-2	
Molybdenum	ND	mg/L	0.010	0.00095	1	10/21/19 16:03	10/23/19 20:55	7439-98-7	
Selenium	0.0020J	mg/L	0.010	0.0013	1	10/21/19 16:03	10/23/19 20:55	7782-49-2	
Thallium	ND	mg/L	0.0010	0.000052	1	10/21/19 16:03	10/23/19 20:55	7440-28-0	
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	2280	mg/L	10.0	10.0	1		10/23/19 15:47		
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	21.9	mg/L	1.0	0.024	1		10/24/19 22:47	16887-00-6	
Fluoride	0.39	mg/L	0.30	0.029	1		10/24/19 22:47	16984-48-8	
Sulfate	1590	mg/L	50.0	0.85	50		10/25/19 07:07	14808-79-8	

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ANALYTICAL RESULTS

Project: Plant Branch
Pace Project No.: 2624487

Sample: BRGWC-52I		Lab ID: 2624487004		Collected: 10/16/19 14:55		Received: 10/17/19 11:35		Matrix: Water		
Parameters	Results	Units	Report			Prepared	Analyzed	CAS No.	Qual	
			Limit	MDL	DF					
6020B MET ICPMS		Analytical Method: EPA 6020B Preparation Method: EPA 3005A								
Antimony	ND	mg/L	0.0030	0.00027	1	10/21/19 16:03	10/23/19 21:06	7440-36-0		
Arsenic	0.0026J	mg/L	0.0050	0.00035	1	10/21/19 16:03	10/23/19 21:06	7440-38-2		
Barium	0.015	mg/L	0.010	0.00049	1	10/21/19 16:03	10/23/19 21:06	7440-39-3		
Beryllium	ND	mg/L	0.0030	0.000074	1	10/21/19 16:03	10/23/19 21:06	7440-41-7		
Boron	1.3	mg/L	0.040	0.0049	1	10/21/19 16:03	10/23/19 21:06	7440-42-8		
Cadmium	ND	mg/L	0.0025	0.00011	1	10/21/19 16:03	10/23/19 21:06	7440-43-9		
Calcium	48.4	mg/L	5.0	0.55	50	10/21/19 16:03	10/23/19 21:12	7440-70-2		
Chromium	ND	mg/L	0.010	0.00039	1	10/21/19 16:03	10/23/19 21:06	7440-47-3		
Cobalt	ND	mg/L	0.0050	0.00030	1	10/21/19 16:03	10/23/19 21:06	7440-48-4		
Lead	ND	mg/L	0.0050	0.000046	1	10/21/19 16:03	10/23/19 21:06	7439-92-1		
Lithium	0.0023J	mg/L	0.030	0.00078	1	10/21/19 16:03	10/25/19 10:01	7439-93-2		
Molybdenum	ND	mg/L	0.010	0.00095	1	10/21/19 16:03	10/23/19 21:06	7439-98-7		
Selenium	ND	mg/L	0.010	0.0013	1	10/21/19 16:03	10/23/19 21:06	7782-49-2		
Thallium	ND	mg/L	0.0010	0.000052	1	10/21/19 16:03	10/23/19 21:06	7440-28-0		
2540C Total Dissolved Solids		Analytical Method: SM 2540C								
Total Dissolved Solids	346	mg/L	10.0	10.0	1		10/23/19 15:47			
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0								
Chloride	7.0	mg/L	1.0	0.024	1		10/24/19 23:09	16887-00-6		
Fluoride	0.22J	mg/L	0.30	0.029	1		10/24/19 23:09	16984-48-8		
Sulfate	155	mg/L	10.0	0.17	10		10/25/19 07:29	14808-79-8		

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: Plant Branch
Pace Project No.: 2624487

Sample: Dup-2		Lab ID: 2624487005		Collected: 10/16/19 00:00		Received: 10/17/19 11:35		Matrix: Water		
Parameters	Results	Units	Report			Prepared	Analyzed	CAS No.	Qual	
			Limit	MDL	DF					
6020B MET ICPMS		Analytical Method: EPA 6020B Preparation Method: EPA 3005A								
Antimony	ND	mg/L	0.0030	0.00027	1	10/21/19 16:03	10/23/19 21:17	7440-36-0		
Arsenic	ND	mg/L	0.0050	0.00035	1	10/21/19 16:03	10/23/19 21:17	7440-38-2		
Barium	0.018	mg/L	0.010	0.00049	1	10/21/19 16:03	10/23/19 21:17	7440-39-3		
Beryllium	0.00061J	mg/L	0.0030	0.000074	1	10/21/19 16:03	10/23/19 21:17	7440-41-7		
Boron	1.1	mg/L	0.040	0.0049	1	10/21/19 16:03	10/23/19 21:17	7440-42-8		
Cadmium	ND	mg/L	0.0025	0.00011	1	10/21/19 16:03	10/23/19 21:17	7440-43-9		
Calcium	53.5	mg/L	5.0	0.55	50	10/21/19 16:03	10/23/19 21:23	7440-70-2		
Chromium	ND	mg/L	0.010	0.00039	1	10/21/19 16:03	10/23/19 21:17	7440-47-3		
Cobalt	0.0056	mg/L	0.0050	0.00030	1	10/21/19 16:03	10/23/19 21:17	7440-48-4		
Lead	0.00027J	mg/L	0.0050	0.000046	1	10/21/19 16:03	10/23/19 21:17	7439-92-1		
Lithium	0.0027J	mg/L	0.030	0.00078	1	10/21/19 16:03	10/25/19 10:07	7439-93-2		
Molybdenum	ND	mg/L	0.010	0.00095	1	10/21/19 16:03	10/23/19 21:17	7439-98-7		
Selenium	ND	mg/L	0.010	0.0013	1	10/21/19 16:03	10/23/19 21:17	7782-49-2		
Thallium	0.00016J	mg/L	0.0010	0.000052	1	10/21/19 16:03	10/23/19 21:17	7440-28-0		
2540C Total Dissolved Solids		Analytical Method: SM 2540C								
Total Dissolved Solids	393	mg/L	10.0	10.0	1		10/23/19 15:48			
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0								
Chloride	6.9	mg/L	1.0	0.024	1		10/24/19 23:31	16887-00-6		
Fluoride	0.12J	mg/L	0.30	0.029	1		10/24/19 23:31	16984-48-8		
Sulfate	275	mg/L	20.0	0.34	20		10/25/19 07:51	14808-79-8		

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QUALITY CONTROL DATA

Project: Plant Branch
Pace Project No.: 2624487

QC Batch: 37286 Analysis Method: EPA 6020B
QC Batch Method: EPA 3005A Analysis Description: 6020B MET
Associated Lab Samples: 2624487001, 2624487002, 2624487003, 2624487004, 2624487005

METHOD BLANK: 168679 Matrix: Water
Associated Lab Samples: 2624487001, 2624487002, 2624487003, 2624487004, 2624487005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Antimony	mg/L	ND	0.0030	0.00027	10/23/19 18:31	
Arsenic	mg/L	ND	0.0050	0.00035	10/23/19 18:31	
Barium	mg/L	ND	0.010	0.00049	10/23/19 18:31	
Beryllium	mg/L	ND	0.0030	0.000074	10/23/19 18:31	
Boron	mg/L	ND	0.040	0.0049	10/23/19 18:31	
Cadmium	mg/L	ND	0.0025	0.00011	10/23/19 18:31	
Calcium	mg/L	ND	0.10	0.011	10/23/19 18:31	
Chromium	mg/L	ND	0.010	0.00039	10/23/19 18:31	
Cobalt	mg/L	ND	0.0050	0.00030	10/23/19 18:31	
Lead	mg/L	ND	0.0050	0.000046	10/23/19 18:31	
Lithium	mg/L	ND	0.030	0.00078	10/23/19 18:31	
Molybdenum	mg/L	ND	0.010	0.00095	10/23/19 18:31	
Selenium	mg/L	ND	0.010	0.0013	10/23/19 18:31	
Thallium	mg/L	ND	0.0010	0.000052	10/23/19 18:31	

LABORATORY CONTROL SAMPLE: 168680

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	mg/L	0.1	0.10	102	80-120	
Arsenic	mg/L	0.1	0.098	98	80-120	
Barium	mg/L	0.1	0.10	101	80-120	
Beryllium	mg/L	0.1	0.10	103	80-120	
Boron	mg/L	1	0.99	99	80-120	
Cadmium	mg/L	0.1	0.10	100	80-120	
Calcium	mg/L	1	1.0	101	80-120	
Chromium	mg/L	0.1	0.099	99	80-120	
Cobalt	mg/L	0.1	0.098	98	80-120	
Lead	mg/L	0.1	0.10	101	80-120	
Lithium	mg/L	0.1	0.10	103	80-120	
Molybdenum	mg/L	0.1	0.10	101	80-120	
Selenium	mg/L	0.1	0.095	95	80-120	
Thallium	mg/L	0.1	0.10	100	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 168681 168682

Parameter	Units	2624484003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Antimony	mg/L	ND	0.1	0.1	0.10	0.10	100	100	75-125	0	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: Plant Branch

Pace Project No.: 2624487

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 168681												168682	
Parameter	Units	2624484003 Result	MS	MSD	MS	MSD	MS	MSD	% Rec	Max	Qual		
			Spike Conc.	Spike Conc.	Result	Result	% Rec	% Rec	Limits	RPD			
Arsenic	mg/L	0.00040J	0.1	0.1	0.10	0.10	100	100	75-125	0	20		
Barium	mg/L	0.037	0.1	0.1	0.15	0.14	109	107	75-125	1	20		
Beryllium	mg/L	0.00015J	0.1	0.1	0.095	0.094	95	94	75-125	0	20		
Boron	mg/L	2.2	1	1	3.1	3.1	90	90	75-125	0	20		
Cadmium	mg/L	ND	0.1	0.1	0.10	0.10	100	100	75-125	1	20		
Calcium	mg/L	61.2	1	1	62.7	66.1	145	485	75-125	5	20 M6		
Chromium	mg/L	0.0064J	0.1	0.1	0.11	0.10	100	98	75-125	2	20		
Cobalt	mg/L	ND	0.1	0.1	0.097	0.097	97	97	75-125	0	20		
Lead	mg/L	ND	0.1	0.1	0.097	0.097	97	97	75-125	0	20		
Lithium	mg/L	0.0022J	0.1	0.1	0.096	0.095	94	93	75-125	1	20		
Molybdenum	mg/L	ND	0.1	0.1	0.10	0.10	104	101	75-125	3	20		
Selenium	mg/L	ND	0.1	0.1	0.096	0.096	96	95	75-125	0	20		
Thallium	mg/L	ND	0.1	0.1	0.098	0.098	98	98	75-125	0	20		

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: Plant Branch
Pace Project No.: 2624487

QC Batch: 37419 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 2624487001, 2624487002, 2624487003, 2624487004, 2624487005

LABORATORY CONTROL SAMPLE: 169291

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	400	391	98	84-108	

SAMPLE DUPLICATE: 169292

Parameter	Units	2624484007 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	ND	ND		10	

SAMPLE DUPLICATE: 169293

Parameter	Units	2624491004 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	500	501	0	10	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: Plant Branch
Pace Project No.: 2624487

QC Batch: 37461 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 2624487001, 2624487002, 2624487003, 2624487004, 2624487005

METHOD BLANK: 169631 Matrix: Water
Associated Lab Samples: 2624487001, 2624487002, 2624487003, 2624487004, 2624487005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	0.043J	1.0	0.024	10/24/19 16:21	
Fluoride	mg/L	ND	0.30	0.029	10/24/19 16:21	
Sulfate	mg/L	ND	1.0	0.017	10/24/19 16:21	

LABORATORY CONTROL SAMPLE: 169632

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	10	10.6	106	90-110	
Fluoride	mg/L	10	10.9	109	90-110	
Sulfate	mg/L	10	10.4	104	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 169633 169634

Parameter	Units	2624484001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	5.4	10	10	15.3	15.3	99	100	90-110	0	15	
Fluoride	mg/L	0.17J	10	10	11.1	11.1	110	110	90-110	0	15	

MATRIX SPIKE SAMPLE: 169635

Parameter	Units	2624487002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	4.6	10	14.7	101	90-110	
Fluoride	mg/L	0.076J	10	10.6	106	90-110	

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REPORT OF LABORATORY ANALYSIS

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QUALIFIERS

Project: Plant Branch

Pace Project No.: 2624487

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

ANALYTE QUALIFIERS

M6 Matrix spike and Matrix spike duplicate recovery not evaluated against control limits due to sample dilution.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Plant Branch
Pace Project No.: 2624487

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
2624487001	BRGWC-29I	EPA 3005A	37286	EPA 6020B	37308
2624487002	BRGWC-47	EPA 3005A	37286	EPA 6020B	37308
2624487003	BRGWC-50	EPA 3005A	37286	EPA 6020B	37308
2624487004	BRGWC-52I	EPA 3005A	37286	EPA 6020B	37308
2624487005	Dup-2	EPA 3005A	37286	EPA 6020B	37308
2624487001	BRGWC-29I	SM 2540C	37419		
2624487002	BRGWC-47	SM 2540C	37419		
2624487003	BRGWC-50	SM 2540C	37419		
2624487004	BRGWC-52I	SM 2540C	37419		
2624487005	Dup-2	SM 2540C	37419		
2624487001	BRGWC-29I	EPA 300.0	37461		
2624487002	BRGWC-47	EPA 300.0	37461		
2624487003	BRGWC-50	EPA 300.0	37461		
2624487004	BRGWC-52I	EPA 300.0	37461		
2624487005	Dup-2	EPA 300.0	37461		

REPORT OF LABORATORY ANALYSIS

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Sample Condition Upon Receipt



Client Name: GRAPOWER Project # _____

Courier: Fed Ex UPS USPS Client Commercial Pace Other _____

Tracking #: _____

Custody Seal on Cooler/Box Present: yes no Seals intact: yes no

Packing Material: Bubble Wrap Bubble Bags None Other _____

Thermometer Used 83 Type of Ice: Wet Blue None Samples on ice, cooling process has begun

Cooler Temperature 0.8 Biological Tissue is Frozen: Yes No

Temp should be above freezing to 6°C

Date and Initials of person examining contents: 10/17/19

		Comments:
Chain of Custody Present:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	1.
Chain of Custody Filled Out:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	2.
Chain of Custody Relinquished:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	3.
Sampler Name & Signature on COC:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	4.
Samples Arrived within Hold Time:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	5.
Short Hold Time Analysis (<72hr):	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	6.
Rush Turn Around Time Requested:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	7.
Sufficient Volume:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	8.
Correct Containers Used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	9.
-Pace Containers Used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Containers Intact:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	10.
Filtered volume received for Dissolved tests	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	11.
Sample Labels match COC:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	12.
-Includes date/time/ID/Analysis Matrix:	<u>W</u>	
All containers needing preservation have been checked.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	13.
All containers needing preservation are found to be in compliance with EPA recommendation.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
exceptions: VOA, coliform, TOC, O&G, WI-DRO (water)	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Initial when completed
		Lot # of added preservative
Samples checked for dechlorination:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	14.
Headspace in VOA Vials (>6mm):	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	15.
Trip Blank Present:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	16.
Trip Blank Custody Seals Present	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Pace Trip Blank Lot # (if purchased):		

Client Notification/ Resolution: _____ Field Data Required? Y / N

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

3000 W28

Project Manager Review: _____ Date: _____

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers)

November 15, 2019

Joju Abraham
Georgia Power - Coal Combustion Residuals
2480 Maner Road
Atlanta, GA 30339

RE: Project: Plant Branch
Pace Project No.: 2624488

Dear Joju Abraham:

Enclosed are the analytical results for sample(s) received by the laboratory on October 17, 2019. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Betsy McDaniel
betsy.mcdaniel@pacelabs.com
(770)734-4200
Project Manager

Enclosures

cc: Julie Lehrman, Golder Associates Inc.
Dawn Prell, Golder Associates Inc.
Eric Rolle, Georgia Power - Coal Combustion Residuals
Rebecca Thornton, Pace Analytical Atlanta



REPORT OF LABORATORY ANALYSIS

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CERTIFICATIONS

Project: Plant Branch
Pace Project No.: 2624488

Pennsylvania Certification IDs

1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601
ANAB DOD-ELAP Rad Accreditation #: L2417
Alabama Certification #: 41590
Arizona Certification #: AZ0734
Arkansas Certification
California Certification #: 04222CA
Colorado Certification #: PA01547
Connecticut Certification #: PH-0694
Delaware Certification
EPA Region 4 DW Rad
Florida/TNI Certification #: E87683
Georgia Certification #: C040
Florida: Cert E871149 SEKS WET
Guam Certification
Hawaii Certification
Idaho Certification
Illinois Certification
Indiana Certification
Iowa Certification #: 391
Kansas/TNI Certification #: E-10358
Kentucky Certification #: KY90133
KY WW Permit #: KY0098221
KY WW Permit #: KY0000221
Louisiana DHH/TNI Certification #: LA180012
Louisiana DEQ/TNI Certification #: 4086
Maine Certification #: 2017020
Maryland Certification #: 308
Massachusetts Certification #: M-PA1457
Michigan/PADEP Certification #: 9991

Missouri Certification #: 235
Montana Certification #: Cert0082
Nebraska Certification #: NE-OS-29-14
Nevada Certification #: PA014572018-1
New Hampshire/TNI Certification #: 297617
New Jersey/TNI Certification #: PA051
New Mexico Certification #: PA01457
New York/TNI Certification #: 10888
North Carolina Certification #: 42706
North Dakota Certification #: R-190
Ohio EPA Rad Approval: #41249
Oregon/TNI Certification #: PA200002-010
Pennsylvania/TNI Certification #: 65-00282
Puerto Rico Certification #: PA01457
Rhode Island Certification #: 65-00282
South Dakota Certification
Tennessee Certification #: 02867
Texas/TNI Certification #: T104704188-17-3
Utah/TNI Certification #: PA014572017-9
USDA Soil Permit #: P330-17-00091
Vermont Dept. of Health: ID# VT-0282
Virgin Island/PADEP Certification
Virginia/VELAP Certification #: 9526
Washington Certification #: C868
West Virginia DEP Certification #: 143
West Virginia DHHR Certification #: 9964C
Wisconsin Approve List for Rad
Wyoming Certification #: 8TMS-L

REPORT OF LABORATORY ANALYSIS

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SAMPLE SUMMARY

Project: Plant Branch

Pace Project No.: 2624488

Lab ID	Sample ID	Matrix	Date Collected	Date Received
2624488001	BRGWC-29I	Water	10/16/19 09:50	10/17/19 11:35
2624488002	BRGWC-47	Water	10/16/19 11:35	10/17/19 11:35
2624488003	BRGWC-50	Water	10/16/19 13:25	10/17/19 11:35
2624488004	BRGWC-52I	Water	10/16/19 14:55	10/17/19 11:35
2624488005	Dup-2	Water	10/16/19 00:00	10/17/19 11:35

REPORT OF LABORATORY ANALYSIS

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SAMPLE ANALYTE COUNT

Project: Plant Branch

Pace Project No.: 2624488

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
2624488001	BRGWC-29I	EPA 9315	LAL	1	PASI-PA
		EPA 9320	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
2624488002	BRGWC-47	EPA 9315	LAL	1	PASI-PA
		EPA 9320	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
2624488003	BRGWC-50	EPA 9315	LAL	1	PASI-PA
		EPA 9320	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
2624488004	BRGWC-52I	EPA 9315	LAL	1	PASI-PA
		EPA 9320	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
2624488005	Dup-2	EPA 9315	LAL	1	PASI-PA
		EPA 9320	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: Plant Branch

Pace Project No.: 2624488

Sample: BRGWC-29I **Lab ID: 2624488001** Collected: 10/16/19 09:50 Received: 10/17/19 11:35 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 9315	0.549 ± 0.312 (0.454) C:87% T:NA	pCi/L	11/07/19 08:56	13982-63-3	
Radium-228	EPA 9320	1.14 ± 0.846 (1.66) C:67% T:84%	pCi/L	11/07/19 20:14	15262-20-1	
Total Radium	Total Radium Calculation	1.69 ± 1.16 (2.11)	pCi/L	11/12/19 10:42	7440-14-4	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: Plant Branch

Pace Project No.: 2624488

Sample: BRGWC-47 **Lab ID: 2624488002** Collected: 10/16/19 11:35 Received: 10/17/19 11:35 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 9315	0.572 ± 0.304 (0.422) C:94% T:NA	pCi/L	11/07/19 08:56	13982-63-3	
Radium-228	EPA 9320	0.703 ± 0.701 (1.44) C:74% T:79%	pCi/L	11/07/19 20:14	15262-20-1	
Total Radium	Total Radium Calculation	1.28 ± 1.01 (1.86)	pCi/L	11/12/19 10:42	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: Plant Branch

Pace Project No.: 2624488

Sample: BRGWC-50 **Lab ID: 2624488003** Collected: 10/16/19 13:25 Received: 10/17/19 11:35 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 9315	0.880 ± 0.359 (0.359) C:90% T:NA	pCi/L	11/07/19 07:21	13982-63-3	
Radium-228	EPA 9320	1.63 ± 0.552 (0.762) C:83% T:75%	pCi/L	11/14/19 11:03	15262-20-1	
Total Radium	Total Radium Calculation	2.51 ± 0.911 (1.12)	pCi/L	11/14/19 15:46	7440-14-4	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: Plant Branch

Pace Project No.: 2624488

Sample: BRGWC-52I **Lab ID: 2624488004** Collected: 10/16/19 14:55 Received: 10/17/19 11:35 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 9315	0.513 ± 0.296 (0.417) C:90% T:NA	pCi/L	11/07/19 07:22	13982-63-3	
Radium-228	EPA 9320	1.62 ± 0.568 (0.813) C:85% T:70%	pCi/L	11/14/19 11:03	15262-20-1	
Total Radium	Total Radium Calculation	2.13 ± 0.864 (1.23)	pCi/L	11/14/19 15:46	7440-14-4	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: Plant Branch

Pace Project No.: 2624488

Sample: Dup-2 **Lab ID: 2624488005** Collected: 10/16/19 00:00 Received: 10/17/19 11:35 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 9315	0.536 ± 0.304 (0.443) C:92% T:NA	pCi/L	11/07/19 07:22	13982-63-3	
Radium-228	EPA 9320	1.02 ± 0.429 (0.690) C:84% T:80%	pCi/L	11/14/19 11:03	15262-20-1	
Total Radium	Total Radium Calculation	1.56 ± 0.733 (1.13)	pCi/L	11/14/19 15:46	7440-14-4	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL - RADIOCHEMISTRY

Project: Plant Branch

Pace Project No.: 2624488

QC Batch: 368367

Analysis Method: EPA 9315

QC Batch Method: EPA 9315

Analysis Description: 9315 Total Radium

Associated Lab Samples: 2624488001, 2624488002

METHOD BLANK: 1787254

Matrix: Water

Associated Lab Samples: 2624488001, 2624488002

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	0.416 ± 0.262 (0.396) C:98% T:NA	pCi/L	11/07/19 07:47	

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QUALITY CONTROL - RADIOCHEMISTRY

Project: Plant Branch

Pace Project No.: 2624488

QC Batch: 368370 Analysis Method: EPA 9320

QC Batch Method: EPA 9320 Analysis Description: 9320 Radium 228

Associated Lab Samples: 2624488003, 2624488004, 2624488005

METHOD BLANK: 1787257 Matrix: Water

Associated Lab Samples: 2624488003, 2624488004, 2624488005

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	-0.0477 ± 0.582 (1.37) C:76% T:75%	pCi/L	11/08/19 19:28	

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QUALITY CONTROL - RADIOCHEMISTRY

Project: Plant Branch

Pace Project No.: 2624488

QC Batch: 368369

Analysis Method: EPA 9315

QC Batch Method: EPA 9315

Analysis Description: 9315 Total Radium

Associated Lab Samples: 2624488003, 2624488004, 2624488005

METHOD BLANK: 1787256

Matrix: Water

Associated Lab Samples: 2624488003, 2624488004, 2624488005

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	0.352 ± 0.285 (0.530) C:94% T:NA	pCi/L	11/07/19 07:21	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL - RADIOCHEMISTRY

Project: Plant Branch

Pace Project No.: 2624488

QC Batch: 368368

Analysis Method: EPA 9320

QC Batch Method: EPA 9320

Analysis Description: 9320 Radium 228

Associated Lab Samples: 2624488001, 2624488002

METHOD BLANK: 1787255

Matrix: Water

Associated Lab Samples: 2624488001, 2624488002

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.536 ± 0.405 (0.790) C:74% T:76%	pCi/L	11/07/19 14:59	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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QUALIFIERS

Project: Plant Branch
Pace Project No.: 2624488

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty: SDWA = 1.96 sigma count uncertainty, all other matrices = Expanded Uncertainty (95% confidence interval).

Gamma Spec = Expanded Uncertainty (95.4% Confidence Interval)

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-PA Pace Analytical Services - Greensburg

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Plant Branch
Pace Project No.: 2624488

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
2624488001	BRGWC-29I	EPA 9315	368367		
2624488002	BRGWC-47	EPA 9315	368367		
2624488003	BRGWC-50	EPA 9315	368369		
2624488004	BRGWC-52I	EPA 9315	368369		
2624488005	Dup-2	EPA 9315	368369		
2624488001	BRGWC-29I	EPA 9320	368368		
2624488002	BRGWC-47	EPA 9320	368368		
2624488003	BRGWC-50	EPA 9320	368370		
2624488004	BRGWC-52I	EPA 9320	368370		
2624488005	Dup-2	EPA 9320	368370		
2624488001	BRGWC-29I	Total Radium Calculation	370512		
2624488002	BRGWC-47	Total Radium Calculation	370512		
2624488003	BRGWC-50	Total Radium Calculation	371088		
2624488004	BRGWC-52I	Total Radium Calculation	371088		
2624488005	Dup-2	Total Radium Calculation	371088		

REPORT OF LABORATORY ANALYSIS

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CHAIN-OF-CUSTODY Analytical Request Document

Chain-of-Custody is a LEGAL DOCUMENT - Complete all relevant fields

Company: Georgia Power - Coal Combustion Residuals

Address: 2480 Manor Road

Atlanta, GA 30339

Report To: Joju Abraham

Copy To: Golder

Phone: (404) 506-7239

Email: jlabraham@southernco.com

Phone: (404) 506-7239

Email: jlabraham@southernco.com

Collected By (print): *Joju Abraham*

Collected By (signature): *[Signature]*

Turnaround Date Required:

Rush: Same Day Next Day

1 Day 3 Day 4 Day 5 Day

(Expedite Charges Apply)

Analysis:

* Matrix Codes (Insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Wastewater (WW), Product (P), Soil/Solid (SL), Oil (OL), Wipe (WP), Air (AR), Tissue (TS), Bioassay (B), Water (WT), Other (OT)

Workorder Number or

SE ONLY

Project Manager:

** Preservative types: (1) nitric acid, (2) sulfuric acid, (3) hydrochloric acid, (4) sodium hydroxide, (5) zinc acetate, (6) methanol, (7) sodium bisulfate, (8) sodium thiosulfate, (9) hexane, (A) ascorbic acid, (B) ammonium sulfate, (C) ammonium hydroxide, (D) TSP, (U) Unpreserved, (O) Other

Lab Profile/Line:

Lab Sample Receipt Checklist: Custody Seal Present/Intact: Y N/A
Custody Signatures Present: Y N/A
Collector Signature Present: Y N/A
Bottles Intact: Y N/A
Correct Bottles: Y N/A
Sufficient Volume: Y N/A
Samples Received on Ice: Y N/A
VOA - Headspace Acceptable: Y N/A
USDA Registered Soils: Y N/A
Samples in Holding Time: Y N/A
Residual Chlorine Present: Y N/A
Cl Strips: Y N/A
Sample pH Acceptable: Y N/A
pH Strips: Y N/A
Sulfide Present: Y N/A
Lead Acetate Strips: Y N/A
LAB USE ONLY:
Lab Sample # / Comments:

Analysis

Metals App III/IV - see comments
Radium 226,228
Chloride, Fluoride, Sulfate, TDS

Customer Sample ID	Matrix *	Comp / Grab	Collected (or Composite Start)		Composite End	Res Cl	# of Ctns
			Date	Time			
BRGWC-291	GW	G	10/16/2019	9:50			4
BRGWC-47	GW	G	10/16/2019	11:35			6
BRGWC-50	GW	G	10/16/2019	13:25			4
BRGWC-521	GW	G	10/16/2019	14:55			4
DUP-2	GW	G	10/16/2019	--			4

Type of Ice Used: W B D N
Packing Material Used:

Radchem sample(s) screened (<500 cpm): Y N NA

Received by/Company: *[Signature]* (Signature)

Date/Time: 10-17-19 10:15

Relinquished by/Company: *[Signature]* (Signature)

Date/Time: 10-17-19 10:15

Relinquished by/Company: *[Signature]* (Signature)

Date/Time: 10-17-19 10:15

Relinquished by/Company: *[Signature]* (Signature)

Date/Time: 10-17-19 10:15

LAB Sample Temperature Info:
Temp Blank Received: *[Signature]*
Therm ID#: *[Signature]*
Cooler 1 Temp Upon Receipt: *[Signature]*
Cooler 1 Therm Corr. Factor: *[Signature]*
Cooler 1 Corrected Temp: *[Signature]*
Comments:

Trip Blank Received: Y N NA
HCL MeOH TSP Other

Non Conformance(s):
YES / NO
Page: 1 of 1

NO#: 2624488
Barcode
2624488



Sample Condition Upon Receipt

Client Name: G. A. Power Project # _____

Courier: Fed Ex UPS USPS Client Commercial Pace Other _____

Tracking #: _____

Optional
Proj. Due Date:
Proj. Name:

Custody Seal on Cooler/Box Present: yes no Seals intact: yes no

Packing Material: Bubble Wrap Bubble Bags None Other _____

Thermometer Used 83 Type of Ice: Wet Blue None Samples on ice, cooling process has begun

Cooler Temperature 0.8 Biological Tissue is Frozen: Yes No

Temp should be above freezing to 6°C

Date and Initials of person examining contents: 10/17/19

Comments:

Chain of Custody Present:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	1.
Chain of Custody Filled Out:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	2.
Chain of Custody Relinquished:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	3.
Sampler Name & Signature on COC:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	4.
Samples Arrived within Hold Time:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	5.
Short Hold Time Analysis (<72hr):	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	6.
Rush Turn Around Time Requested:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	7.
Sufficient Volume:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	8.
Correct Containers Used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	9.
-Pace Containers Used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Containers Intact:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	10.
Filtered volume received for Dissolved tests	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	11.
Sample Labels match COC:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	12.
-Includes date/time/ID/Analysis Matrix:	<u>W</u>	
All containers needing preservation have been checked.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	13.
All containers needing preservation are found to be in compliance with EPA recommendation.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
exceptions: VOA, coliform, TOC, O&G, WI-DRO (water)	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Initial when completed
		Lot # of added preservative
Samples checked for dechlorination:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	14.
Headspace in VOA Vials (>6mm):	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	15.
Trip Blank Present:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	16.
Trip Blank Custody Seals Present	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Pace Trip Blank Lot # (if purchased):		

Client Notification/ Resolution: _____ Field Data Required? Y / N

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

3000 W28

Project Manager Review: _____ Date: _____

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers)

November 21, 2019

Joju Abraham
Georgia Power - Coal Combustion Residuals
2480 Maner Road
Atlanta, GA 30339

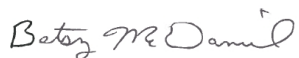
RE: Project: PLANT BRANCH RADS
Pace Project No.: 2624861

Dear Joju Abraham:

Enclosed are the analytical results for sample(s) received by the laboratory on October 18, 2019. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Betsy McDaniel
betsy.mcdaniel@pacelabs.com
(770)734-4200
Project Manager

Enclosures

cc: Julie Lehrman, Golder Associates Inc.
Dawn Prell, Golder Associates Inc.
Eric Rolle, Georgia Power - Coal Combustion Residuals
Rebecca Thornton, Pace Analytical Atlanta



REPORT OF LABORATORY ANALYSIS

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CERTIFICATIONS

Project: PLANT BRANCH RADS
Pace Project No.: 2624861

Pace Analytical Services Pennsylvania

1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601
ANAB DOD-ELAP Rad Accreditation #: L2417
Alabama Certification #: 41590
Arizona Certification #: AZ0734
Arkansas Certification
California Certification #: 04222CA
Colorado Certification #: PA01547
Connecticut Certification #: PH-0694
Delaware Certification
EPA Region 4 DW Rad
Florida/TNI Certification #: E87683
Georgia Certification #: C040
Florida: Cert E871149 SEKS WET
Guam Certification
Hawaii Certification
Idaho Certification
Illinois Certification
Indiana Certification
Iowa Certification #: 391
Kansas/TNI Certification #: E-10358
Kentucky Certification #: KY90133
KY WW Permit #: KY0098221
KY WW Permit #: KY0000221
Louisiana DHH/TNI Certification #: LA180012
Louisiana DEQ/TNI Certification #: 4086
Maine Certification #: 2017020
Maryland Certification #: 308
Massachusetts Certification #: M-PA1457
Michigan/PADEP Certification #: 9991

Missouri Certification #: 235
Montana Certification #: Cert0082
Nebraska Certification #: NE-OS-29-14
Nevada Certification #: PA014572018-1
New Hampshire/TNI Certification #: 297617
New Jersey/TNI Certification #: PA051
New Mexico Certification #: PA01457
New York/TNI Certification #: 10888
North Carolina Certification #: 42706
North Dakota Certification #: R-190
Ohio EPA Rad Approval: #41249
Oregon/TNI Certification #: PA200002-010
Pennsylvania/TNI Certification #: 65-00282
Puerto Rico Certification #: PA01457
Rhode Island Certification #: 65-00282
South Dakota Certification
Tennessee Certification #: 02867
Texas/TNI Certification #: T104704188-17-3
Utah/TNI Certification #: PA014572017-9
USDA Soil Permit #: P330-17-00091
Vermont Dept. of Health: ID# VT-0282
Virgin Island/PADEP Certification
Virginia/VELAP Certification #: 9526
Washington Certification #: C868
West Virginia DEP Certification #: 143
West Virginia DHHR Certification #: 9964C
Wisconsin Approve List for Rad
Wyoming Certification #: 8TMS-L

REPORT OF LABORATORY ANALYSIS

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SAMPLE SUMMARY

Project: PLANT BRANCH RADS

Pace Project No.: 2624861

Lab ID	Sample ID	Matrix	Date Collected	Date Received
2624861001	BRGWC-27I	Water	10/17/19 09:50	10/18/19 15:00
2624861002	BRGWC-30I	Water	10/17/19 12:00	10/18/19 15:00
2624861003	BRGWC-32S	Water	10/17/19 10:50	10/18/19 15:00
2624861004	BRGWC-45	Water	10/17/19 14:08	10/18/19 15:00
2624861005	EB-3	Water	10/17/19 14:41	10/18/19 15:00
2624861006	FB-3	Water	10/17/19 14:13	10/18/19 15:00

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SAMPLE ANALYTE COUNT

Project: PLANT BRANCH RADS

Pace Project No.: 2624861

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
2624861001	BRGWC-27I	EPA 9315	LAL	1	PASI-PA
		EPA 9320	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
2624861002	BRGWC-30I	EPA 9315	LAL	1	PASI-PA
		EPA 9320	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
2624861003	BRGWC-32S	EPA 9315	LAL	1	PASI-PA
		EPA 9320	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
2624861004	BRGWC-45	EPA 9315	LAL	1	PASI-PA
		EPA 9320	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
2624861005	EB-3	EPA 9315	LAL	1	PASI-PA
		EPA 9320	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
2624861006	FB-3	EPA 9315	LAL	1	PASI-PA
		EPA 9320	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: PLANT BRANCH RADS

Pace Project No.: 2624861

Sample: BRGWC-271 **Lab ID: 2624861001** Collected: 10/17/19 09:50 Received: 10/18/19 15:00 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 9315	0.725 ± 0.342 (0.411) C:88% T:NA	pCi/L	11/15/19 08:46	13982-63-3	
Radium-228	EPA 9320	0.347 ± 0.487 (1.04) C:79% T:86%	pCi/L	11/12/19 17:52	15262-20-1	
Total Radium	Total Radium Calculation	1.07 ± 0.829 (1.45)	pCi/L	11/20/19 14:11	7440-14-4	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: PLANT BRANCH RADS

Pace Project No.: 2624861

Sample: BRGWC-30I **Lab ID: 2624861002** Collected: 10/17/19 12:00 Received: 10/18/19 15:00 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 9315	0.720 ± 0.324 (0.322) C:94% T:NA	pCi/L	11/15/19 07:57	13982-63-3	
Radium-228	EPA 9320	0.529 ± 0.475 (0.965) C:81% T:83%	pCi/L	11/12/19 17:53	15262-20-1	
Total Radium	Total Radium Calculation	1.25 ± 0.799 (1.29)	pCi/L	11/20/19 14:11	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: PLANT BRANCH RADS

Pace Project No.: 2624861

Sample: BRGWC-32S **Lab ID: 2624861003** Collected: 10/17/19 10:50 Received: 10/18/19 15:00 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 9315	0.306 ± 0.229 (0.366) C:92% T:NA	pCi/L	11/15/19 07:57	13982-63-3	
Radium-228	EPA 9320	0.892 ± 0.527 (0.974) C:81% T:82%	pCi/L	11/12/19 17:54	15262-20-1	
Total Radium	Total Radium Calculation	1.20 ± 0.756 (1.34)	pCi/L	11/20/19 14:11	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: PLANT BRANCH RADS

Pace Project No.: 2624861

Sample: BRGWC-45 **Lab ID: 2624861004** Collected: 10/17/19 14:08 Received: 10/18/19 15:00 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 9315	0.487 ± 0.337 (0.581) C:89% T:NA	pCi/L	11/15/19 07:57	13982-63-3	
Radium-228	EPA 9320	0.490 ± 0.487 (1.00) C:80% T:79%	pCi/L	11/12/19 17:54	15262-20-1	
Total Radium	Total Radium Calculation	0.977 ± 0.824 (1.58)	pCi/L	11/20/19 14:11	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: PLANT BRANCH RADS

Pace Project No.: 2624861

Sample: EB-3 **Lab ID: 2624861005** Collected: 10/17/19 14:41 Received: 10/18/19 15:00 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 9315	0.887 ± 0.405 (0.569) C:92% T:NA	pCi/L	11/14/19 08:07	13982-63-3	
Radium-228	EPA 9320	0.464 ± 0.389 (0.780) C:79% T:88%	pCi/L	11/11/19 17:23	15262-20-1	
Total Radium	Total Radium Calculation	1.35 ± 0.794 (1.35)	pCi/L	11/20/19 14:11	7440-14-4	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: PLANT BRANCH RADS

Pace Project No.: 2624861

Sample: FB-3 **Lab ID: 2624861006** Collected: 10/17/19 14:13 Received: 10/18/19 15:00 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 9315	0.503 ± 0.280 (0.382) C:96% T:NA	pCi/L	11/14/19 09:20	13982-63-3	
Radium-228	EPA 9320	0.461 ± 0.418 (0.849) C:77% T:85%	pCi/L	11/11/19 17:23	15262-20-1	
Total Radium	Total Radium Calculation	0.964 ± 0.698 (1.23)	pCi/L	11/20/19 14:11	7440-14-4	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL - RADIOCHEMISTRY

Project: PLANT BRANCH RADS

Pace Project No.: 2624861

QC Batch: 369310

Analysis Method: EPA 9315

QC Batch Method: EPA 9315

Analysis Description: 9315 Total Radium

Associated Lab Samples: 2624861001, 2624861002, 2624861003, 2624861004

METHOD BLANK: 1791698

Matrix: Water

Associated Lab Samples: 2624861001, 2624861002, 2624861003, 2624861004

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	0.590 ± 0.307 (0.405) C:93% T:NA	pCi/L	11/15/19 07:34	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

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QUALITY CONTROL - RADIOCHEMISTRY

Project: PLANT BRANCH RADS

Pace Project No.: 2624861

QC Batch: 369692

Analysis Method: EPA 9315

QC Batch Method: EPA 9315

Analysis Description: 9315 Total Radium

Associated Lab Samples: 2624861005, 2624861006

METHOD BLANK: 1793514

Matrix: Water

Associated Lab Samples: 2624861005, 2624861006

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	0.566 ± 0.293 (0.358) C:93% T:NA	pCi/L	11/14/19 08:25	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

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QUALITY CONTROL - RADIOCHEMISTRY

Project: PLANT BRANCH RADS

Pace Project No.: 2624861

QC Batch: 369311

Analysis Method: EPA 9320

QC Batch Method: EPA 9320

Analysis Description: 9320 Radium 228

Associated Lab Samples: 2624861001, 2624861002, 2624861003, 2624861004

METHOD BLANK: 1791699

Matrix: Water

Associated Lab Samples: 2624861001, 2624861002, 2624861003, 2624861004

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.174 ± 0.362 (0.799) C:80% T:87%	pCi/L	11/12/19 15:54	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL - RADIOCHEMISTRY

Project: PLANT BRANCH RADS

Pace Project No.: 2624861

QC Batch: 369693

Analysis Method: EPA 9320

QC Batch Method: EPA 9320

Analysis Description: 9320 Radium 228

Associated Lab Samples: 2624861005, 2624861006

METHOD BLANK: 1793517

Matrix: Water

Associated Lab Samples: 2624861005, 2624861006

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.182 ± 0.310 (0.675) C:83% T:83%	pCi/L	11/11/19 16:33	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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QUALIFIERS

Project: PLANT BRANCH RADS
Pace Project No.: 2624861

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty: SDWA = 1.96 sigma count uncertainty, all other matrices = Expanded Uncertainty (95% confidence interval).

Gamma Spec = Expanded Uncertainty (95.4% Confidence Interval)

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-PA Pace Analytical Services - Greensburg

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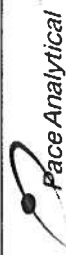
QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: PLANT BRANCH RADS
Pace Project No.: 2624861

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
2624861001	BRGWC-271	EPA 9315	369310		
2624861002	BRGWC-30I	EPA 9315	369310		
2624861003	BRGWC-32S	EPA 9315	369310		
2624861004	BRGWC-45	EPA 9315	369310		
2624861005	EB-3	EPA 9315	369692		
2624861006	FB-3	EPA 9315	369692		
2624861001	BRGWC-271	EPA 9320	369311		
2624861002	BRGWC-30I	EPA 9320	369311		
2624861003	BRGWC-32S	EPA 9320	369311		
2624861004	BRGWC-45	EPA 9320	369311		
2624861005	EB-3	EPA 9320	369693		
2624861006	FB-3	EPA 9320	369693		
2624861001	BRGWC-271	Total Radium Calculation	371954		
2624861002	BRGWC-30I	Total Radium Calculation	371954		
2624861003	BRGWC-32S	Total Radium Calculation	371954		
2624861004	BRGWC-45	Total Radium Calculation	371954		
2624861005	EB-3	Total Radium Calculation	371954		
2624861006	FB-3	Total Radium Calculation	371954		

REPORT OF LABORATORY ANALYSIS

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CHAIN-OF-CUSTODY Analytical Request Document

Chain-of-Custody is a LEGAL DOCUMENT - Complete all relevant fields

Company: Georgia Power - Coal Combustion Residuals
 Address: 2480 Maner Road
 Atlanta, GA 30339
 Report To: Jolu Abraham

Billing Information:

Email To: scsinvoice@southernco.com

Site Collection Info/Address: Plant Branch

State: Georgia City: Milledgeville Time Zone Collected:

Project Name: Plant Branch BCD Project #

Project Name: Plant Branch BCD Project #

Project Name: Plant Branch BCD Project #

Purchase Order # : Pace Project Manager:

Quote #: betsy.mcdaniel@pacelabs.com

Turnaround Date Required: Immediately Packed on Ice:

Rush: () Same Day () Next Day () 2 Day () 3 Day () 4 Day () 5 Day (Expedite Charges Apply)

Field Filtered (if applicable): () Yes () No

Analysis:

* Matrix Codes (insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Wastewater (WW), Product (P), Soil/Solid (SL), Oil (OL), Wipe (WP), Air (AR), Tissue (TS), Bioassay (B), Water (WT), Other (OT)

Customer Sample ID	Matrix *	Comp / Grab	Collected (or Composite)		Composite End Date	Res Cl	# of Ctns
			Date	Time			
BRGWC-271	GW	G	10/17/2019	9:50			4
BRGWC-301	GW	G	10/17/2019	12:00			4
BRGWC-325	GW	G	10/17/2019	10:50			4
BRGWC-45	GW	G	10/17/2019	14:08			6
EB-3	W	G	10/17/2019	14:41			4
FB-3	W	G	10/17/2019	14:13			4

(App III Metals): B, Ca, (App IV Metals): Sb, As, Ba, Be, Cd, Cr, Co, Pb, Li, Mo, Se, Tl

Type of ice Used: Wet Blue Dry None

Packing Material Used:

Radchem sample(s) screened (<500 cpm): Y N NA

Received by/Company: (Signature)

Received by/Company: (Signature)

Received by/Company: (Signature)

Received by/Company: (Signature)

Received by/Company: (Signature)

Received by/Company: (Signature)

Date/Time: 10-18-19/14:50

Date/Time:

Date/Time:

Date/Time:

Date/Time:

Date/Time:

LAB USE ONLY - Affix Workorder/Login Label Here or List Pace Workorder Number or MTJL Log-In Number Here

ALL SHADED AREAS are for LAB USE ONLY

Container Preservative Type **

Lab Project Manager:

** Preservative Types: (1) nitric acid, (2) sulfuric acid, (3) hydrochloric acid, (4) sodium hydroxide, (5) zinc acetate, (6) methanol, (7) sodium bisulfate, (8) sodium thiosulfate, (9) hexane, (A) ascorbic acid, (B) ammonium sulfate, (C) ammonium hydroxide, (D) TSP, (U) Unpreserved, (O) Other

Analyses

Lab Profile/Line:	Lab Sample Receipt Checklist:
Customary Seals Present/Intact Y N NA	Customary Signatures Present Y N NA
Collector Signature Present Y N NA	Bottles Intact Y N NA
Correct Bottles Y N NA	Sufficient Volume Y N NA
Samples Received on Ice Y N NA	VOA - Headspace Acceptable Y N NA
VOA - Headspace Acceptable Y N NA	USDA Regulated Soils Y N NA
Samples in Holding Time Y N NA	Residual Chlorine Present Y N NA
CI Strips: Y N NA	Sample pH Acceptable Y N NA
pH Strips: Y N NA	Sulfide Present Y N NA
Lead Acetate Strips: Y N NA	LAB USE ONLY:
LAB Sample # / Comments:	

Metals App III/IV - see comments

Radium 226, 228

Chloride, Fluoride, Sulfate, TDS

LAB Sample Temperature Info:

Temp Blank Received: Y N NA

Therm ID#: _____

Cooler 1 Temp Upon Receipt: 00 21

Cooler 1 Therm Corr. Factor: 00 00

Cooler 1 Corrected Temp: 00 00

Comments:

Trip Blank Received: Y N NA

HCL MeOH TSP Other

Non Conformance(s): Page: 1

YFS / N/A of: 1

WO#: 2624861



2624861

January 03, 2020

Joju Abraham
Georgia Power - Coal Combustion Residuals
2480 Maner Road
Atlanta, GA 30339

RE: Project: PLANT BRANCH
Pace Project No.: 2626395

Dear Joju Abraham:

Enclosed are the analytical results for sample(s) received by the laboratory on December 04, 2019. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Kevin Herring
kevin.herring@pacelabs.com
(704)875-9092
HORIZON Database Administrator

Enclosures

cc: Julie Lehrman, Golder Associates Inc.
Dawn Prell, Golder Associates Inc.
Eric Rolle, Georgia Power - Coal Combustion Residuals
Rebecca Thornton, Pace Analytical Atlanta



REPORT OF LABORATORY ANALYSIS

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CERTIFICATIONS

Project: PLANT BRANCH

Pace Project No.: 2626395

Pace Analytical Services Atlanta

110 Technology Parkway Peachtree Corners, GA 30092

Florida DOH Certification #: E87315

Georgia DW Inorganics Certification #: 812

Georgia DW Microbiology Certification #: 812

North Carolina Certification #: 381

South Carolina Certification #: 98011001

Virginia Certification #: 460204

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SAMPLE SUMMARY

Project: PLANT BRANCH
Pace Project No.: 2626395

Lab ID	Sample ID	Matrix	Date Collected	Date Received
2626395001	BRGWC-27I	Water	12/04/19 10:16	12/04/19 13:03
2626395002	BRGWC-30I	Water	12/04/19 08:28	12/04/19 13:03
2626395003	BRGWC-32S	Water	12/04/19 09:19	12/04/19 13:03
2626395004	BRGWC-45	Water	12/03/19 16:15	12/04/19 13:03
2626395005	EB-3	Water	12/04/19 10:09	12/04/19 13:03
2626395006	FB-3	Water	12/04/19 10:03	12/04/19 13:03

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SAMPLE ANALYTE COUNT

Project: PLANT BRANCH

Pace Project No.: 2626395

Lab ID	Sample ID	Method	Analysts	Analytes Reported
2626395001	BRGWC-27I	EPA 6020B	CSW	14
		SM 2540C	ALW	1
		EPA 300.0	MWB	3
2626395002	BRGWC-30I	EPA 6020B	CSW	14
		SM 2540C	ALW	1
		EPA 300.0	MWB	3
2626395003	BRGWC-32S	EPA 6020B	CSW	14
		SM 2540C	ALW	1
		EPA 300.0	MWB	3
2626395004	BRGWC-45	EPA 6020B	CSW	14
		SM 2540C	ALW	1
		EPA 300.0	MWB	3
2626395005	EB-3	EPA 6020B	CSW	14
		SM 2540C	ALW	1
		EPA 300.0	MWB	3
2626395006	FB-3	EPA 6020B	CSW	14
		SM 2540C	ALW	1
		EPA 300.0	MWB	3

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ANALYTICAL RESULTS

Project: PLANT BRANCH

Pace Project No.: 2626395

Sample: BRGWC-271		Lab ID: 2626395001		Collected: 12/04/19 10:16		Received: 12/04/19 13:03		Matrix: Water	
Parameters	Results	Units	Report			Prepared	Analyzed	CAS No.	Qual
			Limit	MDL	DF				
6020B MET ICPMS		Analytical Method: EPA 6020B Preparation Method: EPA 3005A							
Antimony	ND	mg/L	0.0030	0.00027	1	12/06/19 16:36	12/09/19 19:04	7440-36-0	
Arsenic	0.0011J	mg/L	0.0050	0.00035	1	12/06/19 16:36	12/09/19 19:04	7440-38-2	
Barium	0.016	mg/L	0.010	0.00049	1	12/06/19 16:36	12/09/19 19:04	7440-39-3	
Beryllium	0.00012J	mg/L	0.0030	0.000074	1	12/06/19 16:36	12/09/19 19:04	7440-41-7	
Boron	0.89	mg/L	0.040	0.0049	1	12/06/19 16:36	12/09/19 19:04	7440-42-8	
Cadmium	ND	mg/L	0.0025	0.00011	1	12/06/19 16:36	12/09/19 19:04	7440-43-9	
Calcium	76.8	mg/L	1.0	0.11	10	12/06/19 16:36	12/10/19 13:33	7440-70-2	
Chromium	ND	mg/L	0.010	0.00039	1	12/06/19 16:36	12/09/19 19:04	7440-47-3	
Cobalt	0.0086	mg/L	0.0050	0.00030	1	12/06/19 16:36	12/09/19 19:04	7440-48-4	
Lead	0.000063J	mg/L	0.0050	0.000046	1	12/06/19 16:36	12/09/19 19:04	7439-92-1	
Lithium	0.0014J	mg/L	0.030	0.00078	1	12/06/19 16:36	12/09/19 19:04	7439-93-2	
Molybdenum	ND	mg/L	0.010	0.00095	1	12/06/19 16:36	12/09/19 19:04	7439-98-7	
Selenium	0.0036J	mg/L	0.010	0.0013	1	12/06/19 16:36	12/09/19 19:04	7782-49-2	
Thallium	ND	mg/L	0.0010	0.000052	1	12/06/19 16:36	12/09/19 19:04	7440-28-0	
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	422	mg/L	10.0	10.0	1		12/06/19 12:52		
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	5.6	mg/L	1.0	0.024	1		12/10/19 07:31	16887-00-6	
Fluoride	0.18J	mg/L	0.30	0.029	1		12/10/19 07:31	16984-48-8	
Sulfate	241	mg/L	10.0	0.17	10		12/10/19 17:49	14808-79-8	

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ANALYTICAL RESULTS

Project: PLANT BRANCH
Pace Project No.: 2626395

Sample: BRGWC-30I		Lab ID: 2626395002		Collected: 12/04/19 08:28		Received: 12/04/19 13:03		Matrix: Water	
Parameters	Results	Units	Report			Prepared	Analyzed	CAS No.	Qual
			Limit	MDL	DF				
6020B MET ICPMS		Analytical Method: EPA 6020B Preparation Method: EPA 3005A							
Antimony	ND	mg/L	0.0030	0.00027	1	12/06/19 16:36	12/09/19 19:10	7440-36-0	
Arsenic	0.00056J	mg/L	0.0050	0.00035	1	12/06/19 16:36	12/09/19 19:10	7440-38-2	
Barium	0.021	mg/L	0.010	0.00049	1	12/06/19 16:36	12/09/19 19:10	7440-39-3	
Beryllium	ND	mg/L	0.0030	0.000074	1	12/06/19 16:36	12/09/19 19:10	7440-41-7	
Boron	1.6	mg/L	0.040	0.0049	1	12/06/19 16:36	12/09/19 19:10	7440-42-8	
Cadmium	ND	mg/L	0.0025	0.00011	1	12/06/19 16:36	12/09/19 19:10	7440-43-9	
Calcium	92.6	mg/L	1.0	0.11	10	12/06/19 16:36	12/10/19 13:38	7440-70-2	
Chromium	ND	mg/L	0.010	0.00039	1	12/06/19 16:36	12/09/19 19:10	7440-47-3	
Cobalt	0.0012J	mg/L	0.0050	0.00030	1	12/06/19 16:36	12/09/19 19:10	7440-48-4	
Lead	ND	mg/L	0.0050	0.000046	1	12/06/19 16:36	12/09/19 19:10	7439-92-1	
Lithium	0.013J	mg/L	0.030	0.00078	1	12/06/19 16:36	12/09/19 19:10	7439-93-2	
Molybdenum	ND	mg/L	0.010	0.00095	1	12/06/19 16:36	12/09/19 19:10	7439-98-7	
Selenium	0.0018J	mg/L	0.010	0.0013	1	12/06/19 16:36	12/09/19 19:10	7782-49-2	
Thallium	ND	mg/L	0.0010	0.000052	1	12/06/19 16:36	12/09/19 19:10	7440-28-0	
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	612	mg/L	10.0	10.0	1		12/06/19 12:53		
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	5.0	mg/L	1.0	0.024	1		12/10/19 07:53	16887-00-6	
Fluoride	0.26J	mg/L	0.30	0.029	1		12/10/19 07:53	16984-48-8	
Sulfate	327	mg/L	10.0	0.17	10		12/10/19 18:11	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: PLANT BRANCH
Pace Project No.: 2626395

Sample: BRGWC-32S		Lab ID: 2626395003		Collected: 12/04/19 09:19		Received: 12/04/19 13:03		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020B MET ICPMS		Analytical Method: EPA 6020B Preparation Method: EPA 3005A							
Antimony	ND	mg/L	0.0030	0.00027	1	12/06/19 16:36	12/09/19 19:15	7440-36-0	
Arsenic	0.00053J	mg/L	0.0050	0.00035	1	12/06/19 16:36	12/09/19 19:15	7440-38-2	
Barium	0.028	mg/L	0.010	0.00049	1	12/06/19 16:36	12/09/19 19:15	7440-39-3	
Beryllium	ND	mg/L	0.0030	0.000074	1	12/06/19 16:36	12/09/19 19:15	7440-41-7	
Boron	1.6	mg/L	0.040	0.0049	1	12/06/19 16:36	12/09/19 19:15	7440-42-8	
Cadmium	ND	mg/L	0.0025	0.00011	1	12/06/19 16:36	12/09/19 19:15	7440-43-9	
Calcium	52.7	mg/L	1.0	0.11	10	12/06/19 16:36	12/10/19 13:44	7440-70-2	
Chromium	0.0014J	mg/L	0.010	0.00039	1	12/06/19 16:36	12/09/19 19:15	7440-47-3	
Cobalt	ND	mg/L	0.0050	0.00030	1	12/06/19 16:36	12/09/19 19:15	7440-48-4	
Lead	ND	mg/L	0.0050	0.000046	1	12/06/19 16:36	12/09/19 19:15	7439-92-1	
Lithium	0.0022J	mg/L	0.030	0.00078	1	12/06/19 16:36	12/09/19 19:15	7439-93-2	
Molybdenum	ND	mg/L	0.010	0.00095	1	12/06/19 16:36	12/09/19 19:15	7439-98-7	
Selenium	0.10	mg/L	0.010	0.0013	1	12/06/19 16:36	12/09/19 19:15	7782-49-2	
Thallium	ND	mg/L	0.0010	0.000052	1	12/06/19 16:36	12/09/19 19:15	7440-28-0	
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	526	mg/L	10.0	10.0	1		12/06/19 12:53		
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	6.6	mg/L	1.0	0.024	1		12/10/19 08:15	16887-00-6	
Fluoride	0.11J	mg/L	0.30	0.029	1		12/10/19 08:15	16984-48-8	
Sulfate	293	mg/L	10.0	0.17	10		12/10/19 18:34	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: PLANT BRANCH
Pace Project No.: 2626395

Sample: BRGWC-45		Lab ID: 2626395004		Collected: 12/03/19 16:15		Received: 12/04/19 13:03		Matrix: Water	
Parameters	Results	Units	Report			Prepared	Analyzed	CAS No.	Qual
			Limit	MDL	DF				
6020B MET ICPMS		Analytical Method: EPA 6020B Preparation Method: EPA 3005A							
Antimony	0.00088J	mg/L	0.0030	0.00027	1	12/06/19 16:36	12/09/19 19:32	7440-36-0	
Arsenic	0.00070J	mg/L	0.0050	0.00035	1	12/06/19 16:36	12/09/19 19:32	7440-38-2	
Barium	0.099	mg/L	0.010	0.00049	1	12/06/19 16:36	12/09/19 19:32	7440-39-3	
Beryllium	ND	mg/L	0.0030	0.000074	1	12/06/19 16:36	12/09/19 19:32	7440-41-7	
Boron	0.027J	mg/L	0.040	0.0049	1	12/06/19 16:36	12/09/19 19:32	7440-42-8	
Cadmium	0.00011J	mg/L	0.0025	0.00011	1	12/06/19 16:36	12/09/19 19:32	7440-43-9	
Calcium	43.7	mg/L	1.0	0.11	10	12/06/19 16:36	12/10/19 13:50	7440-70-2	
Chromium	ND	mg/L	0.010	0.00039	1	12/06/19 16:36	12/09/19 19:32	7440-47-3	
Cobalt	0.0076	mg/L	0.0050	0.00030	1	12/06/19 16:36	12/09/19 19:32	7440-48-4	
Lead	ND	mg/L	0.0050	0.000046	1	12/06/19 16:36	12/09/19 19:32	7439-92-1	
Lithium	0.0033J	mg/L	0.030	0.00078	1	12/06/19 16:36	12/09/19 19:32	7439-93-2	
Molybdenum	ND	mg/L	0.010	0.00095	1	12/06/19 16:36	12/09/19 19:32	7439-98-7	
Selenium	0.0029J	mg/L	0.010	0.0013	1	12/06/19 16:36	12/09/19 19:32	7782-49-2	
Thallium	ND	mg/L	0.0010	0.000052	1	12/06/19 16:36	12/09/19 19:32	7440-28-0	
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	362	mg/L	10.0	10.0	1		12/06/19 12:52		
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	52.8	mg/L	10.0	0.24	10		12/10/19 18:56	16887-00-6	
Fluoride	0.19J	mg/L	0.30	0.029	1		12/10/19 08:37	16984-48-8	
Sulfate	105	mg/L	10.0	0.17	10		12/10/19 18:56	14808-79-8	

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ANALYTICAL RESULTS

Project: PLANT BRANCH
Pace Project No.: 2626395

Sample: EB-3		Lab ID: 2626395005		Collected: 12/04/19 10:09		Received: 12/04/19 13:03		Matrix: Water		
Parameters	Results	Units	Report			Prepared	Analyzed	CAS No.	Qual	
			Limit	MDL	DF					
6020B MET ICPMS		Analytical Method: EPA 6020B Preparation Method: EPA 3005A								
Antimony	ND	mg/L	0.0030	0.00027	1	12/06/19 16:36	12/09/19 19:44	7440-36-0		
Arsenic	0.00047J	mg/L	0.0050	0.00035	1	12/06/19 16:36	12/09/19 19:44	7440-38-2		
Barium	ND	mg/L	0.010	0.00049	1	12/06/19 16:36	12/09/19 19:44	7440-39-3		
Beryllium	ND	mg/L	0.0030	0.000074	1	12/06/19 16:36	12/09/19 19:44	7440-41-7		
Boron	ND	mg/L	0.040	0.0049	1	12/06/19 16:36	12/09/19 19:44	7440-42-8		
Cadmium	ND	mg/L	0.0025	0.00011	1	12/06/19 16:36	12/09/19 19:44	7440-43-9		
Calcium	0.012J	mg/L	0.10	0.011	1	12/06/19 16:36	12/09/19 19:44	7440-70-2		
Chromium	ND	mg/L	0.010	0.00039	1	12/06/19 16:36	12/09/19 19:44	7440-47-3		
Cobalt	ND	mg/L	0.0050	0.00030	1	12/06/19 16:36	12/09/19 19:44	7440-48-4		
Lead	ND	mg/L	0.0050	0.000046	1	12/06/19 16:36	12/09/19 19:44	7439-92-1		
Lithium	ND	mg/L	0.030	0.00078	1	12/06/19 16:36	12/09/19 19:44	7439-93-2		
Molybdenum	ND	mg/L	0.010	0.00095	1	12/06/19 16:36	12/09/19 19:44	7439-98-7		
Selenium	0.0018J	mg/L	0.010	0.0013	1	12/06/19 16:36	12/09/19 19:44	7782-49-2		
Thallium	ND	mg/L	0.0010	0.000052	1	12/06/19 16:36	12/09/19 19:44	7440-28-0		
2540C Total Dissolved Solids		Analytical Method: SM 2540C								
Total Dissolved Solids	22.0	mg/L	10.0	10.0	1		12/06/19 12:53			
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0								
Chloride	0.029J	mg/L	1.0	0.024	1		12/10/19 08:59	16887-00-6	B	
Fluoride	ND	mg/L	0.30	0.029	1		12/10/19 08:59	16984-48-8		
Sulfate	0.063J	mg/L	1.0	0.017	1		12/10/19 08:59	14808-79-8		

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ANALYTICAL RESULTS

Project: PLANT BRANCH
Pace Project No.: 2626395

Sample: FB-3		Lab ID: 2626395006		Collected: 12/04/19 10:03		Received: 12/04/19 13:03		Matrix: Water		
Parameters	Results	Units	Report			Prepared	Analyzed	CAS No.	Qual	
			Limit	MDL	DF					
6020B MET ICPMS		Analytical Method: EPA 6020B Preparation Method: EPA 3005A								
Antimony	ND	mg/L	0.0030	0.00027	1	12/06/19 16:36	12/09/19 19:50	7440-36-0		
Arsenic	0.00045J	mg/L	0.0050	0.00035	1	12/06/19 16:36	12/09/19 19:50	7440-38-2		
Barium	ND	mg/L	0.010	0.00049	1	12/06/19 16:36	12/09/19 19:50	7440-39-3		
Beryllium	ND	mg/L	0.0030	0.000074	1	12/06/19 16:36	12/09/19 19:50	7440-41-7		
Boron	ND	mg/L	0.040	0.0049	1	12/06/19 16:36	12/09/19 19:50	7440-42-8		
Cadmium	ND	mg/L	0.0025	0.00011	1	12/06/19 16:36	12/09/19 19:50	7440-43-9		
Calcium	0.013J	mg/L	0.10	0.011	1	12/06/19 16:36	12/09/19 19:50	7440-70-2		
Chromium	ND	mg/L	0.010	0.00039	1	12/06/19 16:36	12/09/19 19:50	7440-47-3		
Cobalt	ND	mg/L	0.0050	0.00030	1	12/06/19 16:36	12/09/19 19:50	7440-48-4		
Lead	ND	mg/L	0.0050	0.000046	1	12/06/19 16:36	12/09/19 19:50	7439-92-1		
Lithium	ND	mg/L	0.030	0.00078	1	12/06/19 16:36	12/09/19 19:50	7439-93-2		
Molybdenum	ND	mg/L	0.010	0.00095	1	12/06/19 16:36	12/09/19 19:50	7439-98-7		
Selenium	ND	mg/L	0.010	0.0013	1	12/06/19 16:36	12/09/19 19:50	7782-49-2		
Thallium	ND	mg/L	0.0010	0.000052	1	12/06/19 16:36	12/09/19 19:50	7440-28-0		
2540C Total Dissolved Solids		Analytical Method: SM 2540C								
Total Dissolved Solids	ND	mg/L	10.0	10.0	1		12/06/19 12:53			
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0								
Chloride	ND	mg/L	1.0	0.024	1		12/10/19 09:21	16887-00-6		
Fluoride	ND	mg/L	0.30	0.029	1		12/10/19 09:21	16984-48-8		
Sulfate	0.027J	mg/L	1.0	0.017	1		12/10/19 09:21	14808-79-8		

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: PLANT BRANCH
Pace Project No.: 2626395

QC Batch: 40094 Analysis Method: EPA 6020B
QC Batch Method: EPA 3005A Analysis Description: 6020B MET
Associated Lab Samples: 2626395001, 2626395002, 2626395003, 2626395004, 2626395005, 2626395006

METHOD BLANK: 182248 Matrix: Water
Associated Lab Samples: 2626395001, 2626395002, 2626395003, 2626395004, 2626395005, 2626395006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Antimony	mg/L	ND	0.0030	0.00027	12/09/19 18:24	
Arsenic	mg/L	ND	0.0050	0.00035	12/09/19 18:24	
Barium	mg/L	ND	0.010	0.00049	12/09/19 18:24	
Beryllium	mg/L	ND	0.0030	0.000074	12/09/19 18:24	
Boron	mg/L	ND	0.040	0.0049	12/09/19 18:24	
Cadmium	mg/L	ND	0.0025	0.00011	12/09/19 18:24	
Calcium	mg/L	ND	0.10	0.011	12/09/19 18:24	
Chromium	mg/L	ND	0.010	0.00039	12/09/19 18:24	
Cobalt	mg/L	ND	0.0050	0.00030	12/09/19 18:24	
Lead	mg/L	ND	0.0050	0.000046	12/09/19 18:24	
Lithium	mg/L	ND	0.030	0.00078	12/09/19 18:24	
Molybdenum	mg/L	ND	0.010	0.00095	12/09/19 18:24	
Selenium	mg/L	ND	0.010	0.0013	12/09/19 18:24	
Thallium	mg/L	ND	0.0010	0.000052	12/09/19 18:24	

LABORATORY CONTROL SAMPLE: 182249

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	mg/L	0.1	0.098	98	80-120	
Arsenic	mg/L	0.1	0.094	94	80-120	
Barium	mg/L	0.1	0.095	95	80-120	
Beryllium	mg/L	0.1	0.10	100	80-120	
Boron	mg/L	1	1.0	100	80-120	
Cadmium	mg/L	0.1	0.096	96	80-120	
Calcium	mg/L	1	0.94	94	80-120	
Chromium	mg/L	0.1	0.10	100	80-120	
Cobalt	mg/L	0.1	0.099	99	80-120	
Lead	mg/L	0.1	0.097	97	80-120	
Lithium	mg/L	0.1	0.096	96	80-120	
Molybdenum	mg/L	0.1	0.099	99	80-120	
Selenium	mg/L	0.1	0.097	97	80-120	
Thallium	mg/L	0.1	0.099	99	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 182250 182251

Parameter	Units	2626394001 Result	MS	MSD	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
			Spike Conc.	Spike Conc.								
Antimony	mg/L	ND	0.1	0.1	0.097	0.10	97	100	75-125	3	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: PLANT BRANCH

Pace Project No.: 2626395

Parameter	Units	MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 182250		182251		MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	Max RPD	RPD	Qual
		2626394001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result								
Arsenic	mg/L	0.00058J	0.1	0.1	0.096	0.098	95	97	75-125	2	20		
Barium	mg/L	0.043	0.1	0.1	0.13	0.13	87	91	75-125	3	20		
Beryllium	mg/L	ND	0.1	0.1	0.091	0.097	91	97	75-125	7	20		
Boron	mg/L	0.0063J	1	1	0.90	0.96	90	96	75-125	6	20		
Cadmium	mg/L	ND	0.1	0.1	0.096	0.10	96	100	75-125	4	20		
Calcium	mg/L	37.7	1	1	36.4	38.8	-129	115	75-125	7	20		
Chromium	mg/L	0.011	0.1	0.1	0.11	0.11	96	103	75-125	7	20		
Cobalt	mg/L	ND	0.1	0.1	0.096	0.10	96	101	75-125	5	20		
Lead	mg/L	ND	0.1	0.1	0.092	0.097	92	97	75-125	5	20		
Lithium	mg/L	0.0010J	0.1	0.1	0.086	0.094	85	93	75-125	9	20		
Molybdenum	mg/L	ND	0.1	0.1	0.097	0.099	97	98	75-125	2	20		
Selenium	mg/L	0.0041J	0.1	0.1	0.099	0.099	95	95	75-125	0	20		
Thallium	mg/L	0.000066J	0.1	0.1	0.096	0.098	96	98	75-125	2	20		

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: PLANT BRANCH
Pace Project No.: 2626395

QC Batch: 40059 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 2626395001, 2626395002, 2626395003, 2626395004, 2626395005, 2626395006

LABORATORY CONTROL SAMPLE: 182120

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	400	405	101	84-108	

SAMPLE DUPLICATE: 182121

Parameter	Units	2626394001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	378	352	7	10	

SAMPLE DUPLICATE: 182122

Parameter	Units	2626443001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	66.0	70.0	6	10	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: PLANT BRANCH
Pace Project No.: 2626395

QC Batch: 40125 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 2626395001, 2626395002, 2626395003, 2626395004, 2626395005, 2626395006

METHOD BLANK: 182354 Matrix: Water
Associated Lab Samples: 2626395001, 2626395002, 2626395003, 2626395004, 2626395005, 2626395006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	0.040J	1.0	0.024	12/10/19 04:56	
Fluoride	mg/L	ND	0.30	0.029	12/10/19 04:56	
Sulfate	mg/L	ND	1.0	0.017	12/10/19 04:56	

LABORATORY CONTROL SAMPLE: 182355

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	5.0	100	90-110	
Fluoride	mg/L	5	4.8	97	90-110	
Sulfate	mg/L	5	5.4	108	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 182356 182357

Parameter	Units	2626394001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	4.8	10	10	13.9	13.8	91	90	90-110	1	15	
Fluoride	mg/L	0.20J	10	10	9.3	9.1	91	89	90-110	2	15	M1
Sulfate	mg/L	180	10	10	120	120	-594	-593	90-110	0	15	

MATRIX SPIKE SAMPLE: 182358

Parameter	Units	2626394002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	7.7	10	16.6	89	90-110	M1
Fluoride	mg/L	0.15J	10	9.7	96	90-110	
Sulfate	mg/L	256	10	188	-673	90-110	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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QUALIFIERS

Project: PLANT BRANCH

Pace Project No.: 2626395

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

ANALYTE QUALIFIERS

B Analyte was detected in the associated method blank.

M1 Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: PLANT BRANCH
Pace Project No.: 2626395

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
2626395001	BRGWC-27I	EPA 3005A	40094	EPA 6020B	40112
2626395002	BRGWC-30I	EPA 3005A	40094	EPA 6020B	40112
2626395003	BRGWC-32S	EPA 3005A	40094	EPA 6020B	40112
2626395004	BRGWC-45	EPA 3005A	40094	EPA 6020B	40112
2626395005	EB-3	EPA 3005A	40094	EPA 6020B	40112
2626395006	FB-3	EPA 3005A	40094	EPA 6020B	40112
2626395001	BRGWC-27I	SM 2540C	40059		
2626395002	BRGWC-30I	SM 2540C	40059		
2626395003	BRGWC-32S	SM 2540C	40059		
2626395004	BRGWC-45	SM 2540C	40059		
2626395005	EB-3	SM 2540C	40059		
2626395006	FB-3	SM 2540C	40059		
2626395001	BRGWC-27I	EPA 300.0	40125		
2626395002	BRGWC-30I	EPA 300.0	40125		
2626395003	BRGWC-32S	EPA 300.0	40125		
2626395004	BRGWC-45	EPA 300.0	40125		
2626395005	EB-3	EPA 300.0	40125		
2626395006	FB-3	EPA 300.0	40125		

REPORT OF LABORATORY ANALYSIS

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CHAIN-OF-CUSTODY Analytical Request Document

Chain-of-Custody is a LEGAL DOCUMENT - Complete all relevant fields

Company: Georgia Power - Coal Combustion Residuals

Billing Information:

Address: 2480 Maner Road
Atlanta, GA 30339

Email To: scslivoces@southernco.com

Report To: Joju Abraham

Site Collection Info/Address: Plant Branch

Phone: (404) 506-7239

State: Georgia City: Milledgeville Time Zone Collected:

Email: jabraham@southernco.com

Project Name: Plant Branch E Project # CCR Pace Profile#

Collected By (Print): Travis Martinez

Purchase Order #: _____

Turnaround Date Required:

Pace Project Manager: kevin.herring@pacelabs.com

Quote #:

Immediately Packed on Ice: Yes No

Field Filtered (if applicable):

Yes No

Rush:

Same Day Next Day
 1 Day 2 Day 3 Day 4 Day 5 Day
(Expedite Charges Apply)

* Matrix Codes (insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Wastewater (WW), Product (P), Soil/Solid (SL), Oil (OL), Wipe (WP), Air (AR), Tissue (TS), Biossary (B), Water (WT), Other (OT)

Customer Sample ID	Matrix *	Comp / Grab	Collected (or Composite Start)		Composite End		Res Cl	# of Cns
			Date	Time	Date	Time		
BRGWC-175	GW	G	12/3/2019	15:15				3
BRGWC-365	GW	G	12/3/2019	14:06				3

[App III Metals]: B, Ca, [App IV Metals]: Sb, As, Ba, Be, Cd, Cr, Co, Pb, Li, Mo, Se, Ti

Type of Ice Used: Wet Blue Dry None
Packing Material Used: _____
Radchem sample(s) screened (<500 cpm): Y N NA

LAB USE ONLY - Affix Workorder/Login Label Here or List Pace Workorder Number or MTL Log-In Number Here

ALL SHADED AREAS are for LAB USE ONLY

Container Preservative Type **

Lab Project Manager:

** Preservative Types: (1) nitric acid, (2) sulfuric acid, (3) hydrochloric acid, (4) sodium hydroxide, (5) zinc acetate, (6) methanol, (7) sodium bisulfate, (8) sodium thiosulfate, (9) hexane, (A) ascorbic acid, (B) ammonium sulfite, (C) ammonium hydroxide, (D) TSP, (U) Unpreserved, (O) Other _____

Relinquished by/Company (Signature): *Joju Abraham*
Date/Time: 12-4-19 1302
Received by/Company (Signature): *J. WELLS/GTM/PRCE*
Date/Time: 12/4/19 1309

Relinquished by/Company (Signature): _____
Date/Time: _____
Received by/Company (Signature): _____
Date/Time: _____

Lab Profile/Line:	Lab Sample Receipt Checklist:
Lab Sample Receipt Checklist:	Custody Seals Present/Intact Y N NA
Custody Signatures Present Y N NA	Collector Signature Present Y N NA
Bottles Intact Y N NA	Correct bottles Y N NA
Sufficient Volume Y N NA	Samples Received on Ice Y N NA
VOA - Headspace Acceptable Y N NA	USDA Regulated Soils Y N NA
Samples in Holding Time Y N NA	Residual Chlorine Present Y N NA
CI Strips: _____	Sample pH Acceptable Y N NA
pH Strips: _____	Sulfide Present Y N NA
Lead Acetate Strips: _____	Lab Sample # / Comments:

SHORT HOLDS PRESENT (<72 hours): Y N N/A
Lab Tracking #: _____

Samples received via: FEDEX UPS Client Courier Pace Courier
MTL LAB USE ONLY
Table #: _____

LAB Sample Temperature Info:
Temp Blank Received: Y N NA
Therm ID#: TH2083
Cooler 1 Temp Upon Receipt: 0C 1.9
Cooler 1 Therm Corr. Factor: 0C
Cooler 1 Corrected Temp: 0C
Comments: _____



Client Name: _____

Project # _____

Courier: Fed Ex UPS USPS Client Commercial Pace Other _____

Tracking #: _____

Custody Seal on Cooler/Box Present: yes no Seals intact: yes no

Packing Material: Bubble Wrap Bubble Bags None Other plastic bags

Thermometer Used THRO83 Type of Ice: Wet Blue None Samples on ice, cooling process has begun

Cooler Temperature 1.9 Biological Tissue is Frozen: Yes No

Date and initials of person examining contents: _____

Temp should be above freezing to 6°C

Comments:

Chain of Custody Present:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	1.
Chain of Custody Filled Out:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	2.
Chain of Custody Relinquished:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	3.
Sampler Name & Signature on COC:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	4.
Samples Arrived within Hold Time:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	5.
Short Hold Time Analysis (<72hr):	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	6.
Rush Turn Around Time Requested:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	7.
Sufficient Volume:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	8.
Correct Containers Used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	9.
-Pace Containers Used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Containers Intact:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	10.
Filtered volume received for Dissolved tests	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	11.
Sample Labels match COC:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	12.
-Includes date/time/ID/Analysis Matrix: <u>GW</u>		
All containers needing preservation have been checked.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	13.
All containers needing preservation are found to be in compliance with EPA recommendation.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
exceptions: VOA, coliform, TOC, O&G, WI-DRO (water)	<input type="checkbox"/> Yes <input type="checkbox"/> No	Initial when completed
		Lot # of added preservative
Samples checked for dechlorination:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	14.
Headspace in VOA Vials (>6mm):	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	15.
Trip Blank Present:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	16.
Trip Blank Custody Seals Present	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Pace Trip Blank Lot # (if purchased):		

Client Notification/ Resolution:

Field Data Required? Y / N

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

3000 W28

Project Manager Review: _____

Date: _____

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

F-ALLC003rev.3, 11September2006



Document Name:
Bottle Identification Form (BIF)
 Document No.:
F-CAR-CS-043-Rev.00

Document Issued: March 14, 2019
 Page 1 of 1
 Issuing Authority:
 Pace Carolinas Quality Office

*Check mark top half of box if pH and/or dechlorination is verified and within the acceptance range for preservation samples.

Project #

Project # []

Exceptions: VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC, LLHg

**Bottom half of box is to list number of bottle

Matrix	Item#	BP4U-125 mL Plastic Unpreserved (N/A) (Cl-)	BP3U-250 mL Plastic Unpreserved (N/A)	BP2U-500 mL Plastic Unpreserved (N/A)	BP1U-1 liter Plastic Unpreserved (N/A)	BP4S-125 mL Plastic H2SO4 (pH < 2) (Cl-)	BP3N-250 mL plastic HNO3 (pH < 2)	BP4Z-125 mL Plastic ZN Acetate & NaOH (>9)	BP4C-125 mL Plastic NaOH (pH > 12) (Cl-)	WGFU-Wide-mouthed Glass jar Unpreserved	AG1U-1 liter Amber Unpreserved (N/A) (Cl-)	AG1H-1 liter Amber HCl (pH < 2)	AG3U-250 mL Amber Unpreserved (N/A) (Cl-)	AG1S-1 liter Amber H2SO4 (pH < 2)	AG3S-250 mL Amber H2SO4 (pH < 2)	AG3A(DG3A)-250 mL Amber NH4Cl (N/A)(Cl-)	DG9H-40 mL VOA HCl (N/A)	VG9T-40 mL VOA Na2S2O3 (N/A)	VG9U-40 mL VOA Unp (N/A)	DG9P-40 mL VOA H3PO4 (N/A)	VOAK (6 vials per kit)-5035 kit (N/A)	V/GK (3 vials per kit)-VPH/Gas kit (N/A)	SP5T-125 mL Sterile Plastic (N/A - lab)	SP2T-250 mL Sterile Plastic (N/A - lab)	BP3A-250 mL Plastic (NH4)2SO4 (9.3-9.7)	AG0U-100 mL Amber Unpreserved vials (N/A)	AG0U-50 mL Scintillation vials (N/A)	
	1																											
	2																											
	3																											
	4																											
	5																											
	6																											
	7																											
	8																											
	9																											
	10																											
	11																											
	12																											

pH Adjustment Log for Preserved Samples

Sample ID	Type of Preservative	pH upon receipt	Date preservation adjusted	Time preservation adjusted	Amount of Preservative added	Lot

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Of Out of hold, incorrect preservative, out of temp, incorrect containers.



State of Florida

Department of Health, Bureau of Public Health Laboratories
This is to certify that



E87315

**ANALYTICAL SERVICES, INC.
110 TECHNOLOGY PARKWAY
NORCROSS, GA 30092**


**has complied with Florida Administrative Code 64E-1,
for the examination of environmental samples in the following categories**

DRINKING WATER - MICROBIOLOGY, DRINKING WATER - PRIMARY INORGANIC CONTAMINANTS, DRINKING WATER - SECONDARY INORGANIC CONTAMINANTS, NON-POTABLE WATER - EXTRACTABLE ORGANICS, NON-POTABLE WATER - GENERAL CHEMISTRY, NON-POTABLE WATER - METALS, NON-POTABLE WATER - MICROBIOLOGY, NON-POTABLE WATER - PESTICIDES-HERBICIDES-PCB'S, NON-POTABLE WATER - VOLATILE ORGANICS, SOLID AND CHEMICAL MATERIALS - EXTRACTABLE ORGANICS, SOLID AND CHEMICAL MATERIALS - GENERAL CHEMISTRY, SOLID AND CHEMICAL MATERIALS - METALS, SOLID AND CHEMICAL MATERIALS - MICROBIOLOGY, SOLID AND CHEMICAL MATERIALS - PESTICIDES-HERBICIDES-PCB'S, SOLID AND CHEMICAL MATERIALS - VOLATILE ORGANICS

Continued certification is contingent upon successful on-going compliance with the NELAC Standards and FAC Rule 64E-1 regulations. Specific methods and analytes certified are cited on the Laboratory Scope of Accreditation for this laboratory and are on file at the Bureau of Public Health Laboratories, P. O. Box 210, Jacksonville, Florida 32231. Clients and customers are urged to verify with this agency the laboratory's certification status in Florida for particular methods and analytes.

Date Issued: July 01, 2015 Expiration Date: June 30, 2016




Carina Blackmore, DVM, PhD, Dipl. ACVPM, CPM
Chief, Bureau of Public Health Laboratories
DH Form 1697, 7/04
NON-TRANSFERABLE E87315-31-07/01/2015
Supersedes all previously issued certificates



State of Florida
 Department of Health, Bureau of Public Health Laboratories
 This is to certify that



E87315

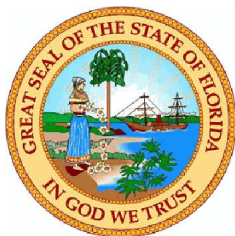
PACE ANALYTICAL SERVICES, INC. - ATLANTA
 110 TECHNOLOGY PARKWAY
 PEACHTREE CORNERS, GA 30092

has complied with Florida Administrative Code 64E-1,
 for the examination of environmental samples in the following categories

DRINKING WATER - MICROBIOLOGY, DRINKING WATER - PRIMARY INORGANIC CONTAMINANTS, DRINKING WATER - SECONDARY INORGANIC CONTAMINANTS, NON-POTABLE WATER - EXTRACTABLE ORGANICS, NON-POTABLE WATER - GENERAL CHEMISTRY, NON-POTABLE WATER - METALS, NON-POTABLE WATER - MICROBIOLOGY, NON-POTABLE WATER - PESTICIDES-HERBICIDES-PCB'S, NON-POTABLE WATER - VOLATILE ORGANICS, SOLID AND CHEMICAL MATERIALS - EXTRACTABLE ORGANICS, SOLID AND CHEMICAL MATERIALS - GENERAL CHEMISTRY, SOLID AND CHEMICAL MATERIALS - METALS, SOLID AND CHEMICAL MATERIALS - MICROBIOLOGY, SOLID AND CHEMICAL MATERIALS - PESTICIDES-HERBICIDES-PCB'S, SOLID AND CHEMICAL MATERIALS - VOLATILE ORGANICS

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Date Issued: July 01, 2016 Expiration Date: June 30, 2017



Susanne Crowe

Susanne Crowe, MHA
 Acting Chief, Bureau of Public Health Laboratories
 DH Form 1697, 7/04
 NON-TRANSFERABLE E87315-33-07/01/2016
 Supersedes all previously issued certificates



State of Florida
 Department of Health, Bureau of Public Health Laboratories
 This is to certify that



E87315

PACE ANALYTICAL SERVICES, LLC- ATLANTA GA
 110 TECHNOLOGY PARKWAY
 PEACHTREE CORNERS, GA 30092

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Date Issued: July 01, 2017 Expiration Date: June 30, 2018



Susanne Crowe

Susanne Crowe, MHA
 Acting Chief, Bureau of Public Health Laboratories
 DH Form 1697, 7/04

NON-TRANSFERABLE E87315-37-07/01/2017
 Supersedes all previously issued certificates



State of Florida
 Department of Health, Bureau of Public Health Laboratories
 This is to certify that



E87315

PACE ANALYTICAL SERVICES, LLC- ATLANTA GA
 110 TECHNOLOGY PARKWAY
 PEACHTREE CORNERS, GA 30092

has complied with Florida Administrative Code 64E-1,
 for the examination of environmental samples in the following categories

DRINKING WATER - MICROBIOLOGY, DRINKING WATER - PRIMARY INORGANIC CONTAMINANTS, DRINKING WATER - SECONDARY INORGANIC CONTAMINANTS, NON-POTABLE WATER - EXTRACTABLE ORGANICS, NON-POTABLE WATER - GENERAL CHEMISTRY, NON-POTABLE WATER - METALS, NON-POTABLE WATER - MICROBIOLOGY, NON-POTABLE WATER - PESTICIDES-HERBICIDES-PCB'S, NON-POTABLE WATER - VOLATILE ORGANICS, SOLID AND CHEMICAL MATERIALS - EXTRACTABLE ORGANICS, SOLID AND CHEMICAL MATERIALS - GENERAL CHEMISTRY, SOLID AND CHEMICAL MATERIALS - METALS, SOLID AND CHEMICAL MATERIALS - MICROBIOLOGY, SOLID AND CHEMICAL MATERIALS - PESTICIDES-HERBICIDES-PCB'S, SOLID AND CHEMICAL MATERIALS - VOLATILE ORGANICS

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Date Issued: July 01, 2018 Expiration Date: June 30, 2019



Patty A. Lewandowski, MBA, MT(ASCP)
 Chief Bureau of Public Health Laboratories
 DH Form 1697, 7/04

NON-TRANSFERABLE E87315-39-07/01/2018
 Supersedes all previously issued certificates

APPENDIX B

Field Data Forms

Product Name: Low-Flow System

Date: 2019-10-15 12:28:38

Project Information:

Operator Name D.Thomas
Company Name Golder Associates
Project Name 166625418
Site Name Plant Branch
Latitude 0° 0' 0"
Longitude 0° 0' 0"
Sonde SN 541714
Turbidity Make/Model LaMotte 2020we

Pump Information:

Pump Model/Type QED Well Wizard
Tubing Type poly
Tubing Diameter .170 in
Tubing Length 56 ft

Pump placement from TOC 56 ft

Well Information:

Well ID BRGWA-12S
Well diameter 2 in
Well Total Depth 61.01 ft
Screen Length 10 ft
Depth to Water 52.70 ft

Pumping Information:

Final Pumping Rate 200 mL/min
Total System Volume 0.7349517 L
Calculated Sample Rate 300 sec
Stabilization Drawdown 0 in
Total Volume Pumped 15 L

Low-Flow Sampling Stabilization Summary

	Time	Elapsed	Temp C	pH	SpCond μ S/cm	Turb NTU	DTW ft	RDO mg/L	ORP mV
Stabilization			+/- 0.5	+/- 0.1	+/- 5%	+/- 10		+/- 10%	+/- 10
Last 5	12:02:13	2999.96	19.92	6.62	91.74	0.80	52.70	7.58	60.72
Last 5	12:07:14	3300.95	19.91	6.62	91.71	0.75	52.70	7.58	64.35
Last 5	12:12:14	3600.94	19.92	6.61	91.79	0.45	52.70	7.59	63.03
Last 5	12:22:14	4200.93	19.88	6.61	91.70	0.32	52.70	7.59	60.89
Last 5	12:27:14	4500.92	19.88	6.61	91.80	0.28	52.70	7.58	60.04
Variance 0			0.01	-0.00	0.09			0.00	-1.31
Variance 1			-0.04	-0.00	-0.09			-0.00	-2.14
Variance 2			-0.00	-0.00	0.09			-0.01	-0.84

Notes

Started purging at 1112
Stopped purging and began sampling at 1230

Grab Samples

Product Name: Low-Flow System

Date: 2019-10-15 15:47:18

Project Information:

Operator Name D.Thomas
Company Name Golder Associates
Project Name 166625418
Site Name Plant Branch
Latitude 0° 0' 0"
Longitude 0° 0' 0"
Sonde SN 541714
Turbidity Make/Model LaMotte 2020we

Pump Information:

Pump Model/Type QED Well Wizard
Tubing Type poly
Tubing Diameter .170 in
Tubing Length 75 ft

Pump placement from TOC 75 ft

Well Information:

Well ID BRGWA-12I
Well diameter 2 in
Well Total Depth 80.54 ft
Screen Length 10 ft
Depth to Water 53.30 ft

Pumping Information:

Final Pumping Rate 120 mL/min
Total System Volume 0.8197567 L
Calculated Sample Rate 300 sec
Stabilization Drawdown 117.6 in
Total Volume Pumped 9.6 L

Low-Flow Sampling Stabilization Summary

	Time	Elapsed	Temp C	pH	SpCond μ S/cm	Turb NTU	DTW ft	RDO mg/L	ORP mV
Stabilization			+/- 0.5	+/- 0.1	+/- 5%	+/- 10		+/- 10%	+/- 10
Last 5	15:25:02	3599.94	19.86	6.74	145.46	0.12	61.55	3.21	29.21
Last 5	15:30:02	3899.93	19.79	6.75	148.70	0.13	61.95	3.32	29.51
Last 5	15:35:02	4199.93	19.70	6.77	153.31	0.11	62.14	3.59	29.50
Last 5	15:40:02	4499.92	19.65	6.78	158.20	0.17	62.76	3.55	28.50
Last 5	15:45:02	4799.91	19.62	6.80	160.62	0.13	63.10	3.71	28.88
Variance 0			-0.09	0.02	4.61			0.27	-0.01
Variance 1			-0.05	0.01	4.89			-0.04	-0.99
Variance 2			-0.04	0.02	2.43			0.16	0.38

Notes

Started purging and began sampling at 1425
Stopped purging and began sampling at 1545

Grab Samples

Product Name: Low-Flow System

Date: 2019-10-15 13:43:53

Project Information:

Operator Name Travis Martinez
Company Name Golder
Project Name Plant Branch
Site Name Default Site
Latitude 0° 0' 0"
Longitude 0° 0' 0"
Sonde SN 647057
Turbidity Make/Model Lamotte 2020we

Pump Information:

Pump Model/Type QED
Tubing Type poly
Tubing Diameter 0.17 in
Tubing Length 43.80 ft

Pump placement from TOC 38.80 ft

Well Information:

Well ID BRGWA-23S
Well diameter 2 in
Well Total Depth 43.80 ft
Screen Length 10 ft
Depth to Water 37.09 ft

Pumping Information:

Final Pumping Rate 135 mL/min
Total System Volume 0.4794979 L
Calculated Sample Rate 300 sec
Stabilization Drawdown 23.88 in
Total Volume Pumped 12.42 L

Low-Flow Sampling Stabilization Summary

	Time	Elapsed	Temp C	pH	SpCond μ S/cm	Turb NTU	DTW ft	RDO mg/L	ORP mV
Stabilization			+/- 0	+/- 0.1	+/- 5%	+/- 5		+/- 10%	+/- 0
Last 5	13:22:35	4803.55	20.24	5.70	135.14	0.41	39.02	3.82	70.53
Last 5	13:27:35	5103.55	20.26	5.71	136.11	0.27	39.04	3.76	70.86
Last 5	13:32:35	5403.55	20.19	5.70	137.14	0.36	39.06	3.74	71.56
Last 5	13:37:35	5703.55	20.15	5.69	138.35	0.29	39.08	3.75	72.26
Last 5	13:42:35	6003.55	20.13	5.70	139.59	0.46	39.10	3.72	72.47
Variance 0			-0.07	-0.01	1.03			-0.02	0.70
Variance 1			-0.04	-0.01	1.21			0.00	0.70
Variance 2			-0.02	0.01	1.24			-0.03	0.21

Notes

Purge three well volumes
3X well volumes

Grab Samples

Product Name: Low-Flow System

Date: 2019-10-15 15:09:32

Project Information:

Operator Name Travis Martinez
Company Name Golder
Project Name Plant Branch
Site Name Default Site
Latitude 0° 0' 0"
Longitude 0° 0' 0"
Sonde SN 647057
Turbidity Make/Model Lamotte 2020we

Pump Information:

Pump Model/Type QED
Tubing Type poly
Tubing Diameter 0.17 in
Tubing Length 24.41 ft

Pump placement from TOC 19.41 ft

Well Information:

Well ID BRGWC-251
Well diameter 2 in
Well Total Depth 24.41 ft
Screen Length 10 ft
Depth to Water 9.47 ft

Pumping Information:

Final Pumping Rate 200 mL/min
Total System Volume 0.3929521 L
Calculated Sample Rate 300 sec
Stabilization Drawdown 1.2 in
Total Volume Pumped 6 L

Low-Flow Sampling Stabilization Summary

	Time	Elapsed	Temp C	pH	SpCond μ S/cm	Turb NTU	DTW ft	RDO mg/L	ORP mV
Stabilization			+/- 0	+/- 0.1	+/- 5%	+/- 5		+/- 10%	+/- 0
Last 5	14:47:43	600.89	19.97	5.97	546.50	6.05	9.56	0.62	89.25
Last 5	14:52:43	900.89	19.99	5.99	550.25	3.24	9.62	0.53	89.48
Last 5	14:57:43	1200.89	20.02	6.00	552.65	2.18	9.61	0.31	88.88
Last 5	15:02:44	1501.89	20.01	6.00	554.00	1.43	9.57	0.17	88.81
Last 5	15:07:44	1801.89	20.00	6.00	554.85	1.20	9.57	0.15	89.00
Variance 0			0.03	0.01	2.40			-0.22	-0.60
Variance 1			-0.00	-0.00	1.35			-0.14	-0.07
Variance 2			-0.02	-0.00	0.85			-0.02	0.19

Notes

Grab Samples

Product Name: Low-Flow System

Date: 2019-10-17 09:50:23

Project Information:

Operator Name D.Thomas
Company Name Golder Associates
Project Name 166625418
Site Name Plant Branch
Latitude 0° 0' 0"
Longitude 0° 0' 0"
Sonde SN 541714
Turbidity Make/Model LaMotte 2020we

Pump Information:

Pump Model/Type QED Well Wizard
Tubing Type poly
Tubing Diameter .170 in
Tubing Length 28 ft

Pump placement from TOC 28 ft

Well Information:

Well ID BRGWC-21I
Well diameter 2 in
Well Total Depth 33.41 ft
Screen Length 10 ft
Depth to Water 3.94 ft

Pumping Information:

Final Pumping Rate 200 mL/min
Total System Volume 0.6099758 L
Calculated Sample Rate 300 sec
Stabilization Drawdown 0.72 in
Total Volume Pumped 8 L

Low-Flow Sampling Stabilization Summary

	Time	Elapsed	Temp C	pH	SpCond μ S/cm	Turb NTU	DTW ft	RDO mg/L	ORP mV
Stabilization			+/- 0.5	+/- 0.1	+/- 5%	+/- 10		+/- 10%	+/- 10
Last 5	09:28:09	1200.00	20.03	6.19	609.37	0.48	4.00	0.28	66.36
Last 5	09:33:09	1499.99	19.91	6.15	605.85	0.45	4.00	0.25	59.03
Last 5	09:38:09	1799.99	20.00	6.09	607.17	0.34	4.00	0.24	54.27
Last 5	09:43:09	2099.98	19.97	6.05	604.04	0.42	4.00	0.24	50.27
Last 5	09:48:09	2399.97	19.96	6.01	601.16	0.45	4.00	0.21	47.95
Variance 0			0.09	-0.06	1.32			-0.01	-4.76
Variance 1			-0.03	-0.04	-3.14			0.01	-4.00
Variance 2			-0.01	-0.04	-2.88			-0.03	-2.32

Notes

Started purging at 0908
Stopped purging and began sampling at 0950

Grab Samples

Product Name: Low-Flow System

Date: 2019-10-16 09:52:34

Project Information:

Operator Name D.Thomas
Company Name Golder Associates
Project Name 166625418
Site Name Plant Branch
Latitude 0° 0' 0"
Longitude 0° 0' 0"
Sonde SN 541714
Turbidity Make/Model LaMotte 2020we

Pump Information:

Pump Model/Type QED Well Wizard
Tubing Type poly
Tubing Diameter .170 in
Tubing Length 17 ft

Pump placement from TOC 17 ft

Well Information:

Well ID BRGWC-29I
Well diameter 2 in
Well Total Depth 22.35 ft
Screen Length 10 ft
Depth to Water 9.40 ft

Pumping Information:

Final Pumping Rate 200 mL/min
Total System Volume 0.5608782 L
Calculated Sample Rate 300 sec
Stabilization Drawdown 7.2 in
Total Volume Pumped 4 L

Low-Flow Sampling Stabilization Summary

	Time	Elapsed	Temp C	pH	SpCond μ S/cm	Turb NTU	DTW ft	RDO mg/L	ORP mV
Stabilization			+/- 0.5	+/- 0.1	+/- 5%	+/- 10		+/- 10%	+/- 10
Last 5	09:35:01	300.05	21.66	4.69	538.38	0.55	10.00	0.40	80.71
Last 5	09:40:01	600.00	21.64	4.73	542.56	0.36	10.00	0.32	64.56
Last 5	09:45:01	900.01	21.62	4.77	544.13	0.25	10.00	0.28	56.92
Last 5	09:50:01	1200.00	21.63	4.79	546.11	0.20	10.00	0.24	53.44
Last 5									
Variance 0			-0.02	0.04	4.18			-0.07	-16.15
Variance 1			-0.02	0.04	1.57			-0.04	-7.63
Variance 2			0.02	0.02	1.98			-0.04	-3.49

Notes

Started purging at 0930
Stopped purging and began sampling at 0950

Grab Samples

Product Name: Low-Flow System

Date: 2019-10-17 11:59:49

Project Information:

Operator Name D.Thomas
Company Name Golder Associates
Project Name 166625418
Site Name Plant Branch
Latitude 0° 0' 0"
Longitude 0° 0' 0"
Sonde SN 541714
Turbidity Make/Model LaMotte 2020we

Pump Information:

Pump Model/Type QED Well Wizard
Tubing Type poly
Tubing Diameter .170 in
Tubing Length 17 ft

Pump placement from TOC 17 ft

Well Information:

Well ID BRGWC-301
Well diameter 2 in
Well Total Depth 22.35 ft
Screen Length 10 ft
Depth to Water 4.05 ft

Pumping Information:

Final Pumping Rate 200 mL/min
Total System Volume 0.5608782 L
Calculated Sample Rate 300 sec
Stabilization Drawdown 1.2 in
Total Volume Pumped 5 L

Low-Flow Sampling Stabilization Summary

	Time	Elapsed	Temp C	pH	SpCond μ S/cm	Turb NTU	DTW ft	RDO mg/L	ORP mV
Stabilization			+/- 0.5	+/- 0.1	+/- 5%	+/- 10		+/- 10%	+/- 10
Last 5	11:37:27	300.03	20.50	6.40	859.38	3.76	4.15	0.49	34.47
Last 5	11:42:27	600.01	20.47	6.42	856.04	2.74	4.15	0.41	35.66
Last 5	11:47:27	900.00	20.46	6.42	855.14	1.97	4.15	0.36	35.77
Last 5	11:52:27	1200.00	20.44	6.42	853.29	1.31	4.15	0.33	35.91
Last 5	11:57:27	1499.99	20.45	6.43	851.87	1.02	4.15	0.33	36.13
Variance 0			-0.01	0.00	-0.90			-0.06	0.11
Variance 1			-0.02	0.01	-1.85			-0.03	0.14
Variance 2			0.02	0.01	-1.42			0.00	0.22

Notes

Started purging at 1132
Stopped purging and began sampling at 1200

Grab Samples

Product Name: Low-Flow System

Date: 2019-10-17 10:50:50

Project Information:

Operator Name D.Thomas
Company Name Golder Associates
Project Name 166625418
Site Name Plant Branch
Latitude 0° 0' 0"
Longitude 0° 0' 0"
Sonde SN 541714
Turbidity Make/Model LaMotte 2020we

Pump Information:

Pump Model/Type QED Well Wizard
Tubing Type poly
Tubing Diameter .170 in
Tubing Length 43 ft

Pump placement from TOC 43 ft

Well Information:

Well ID BRGWC-32S
Well diameter 2 in
Well Total Depth 48 ft
Screen Length 10 ft
Depth to Water 36.30 ft

Pumping Information:

Final Pumping Rate 100 mL/min
Total System Volume 0.6769272 L
Calculated Sample Rate 300 sec
Stabilization Drawdown 5.28 in
Total Volume Pumped 3 L

Low-Flow Sampling Stabilization Summary

	Time	Elapsed	Temp C	pH	SpCond μ S/cm	Turb NTU	DTW ft	RDO mg/L	ORP mV
Stabilization			+/- 0.5	+/- 0.1	+/- 5%	+/- 10		+/- 10%	+/- 10
Last 5	10:28:12	600.01	17.60	5.96	686.60	0.65	36.74	6.16	78.47
Last 5	10:33:12	900.00	17.70	6.01	683.66	0.56	36.74	5.84	75.87
Last 5	10:38:12	1200.00	17.65	6.03	684.63	0.58	36.74	5.64	74.52
Last 5	10:43:12	1499.99	17.70	6.07	685.48	0.58	36.74	5.46	72.95
Last 5	10:48:12	1799.99	17.70	6.09	687.70	0.43	36.74	5.32	71.64
Variance 0			-0.04	0.02	0.97			-0.20	-1.34
Variance 1			0.04	0.04	0.85			-0.18	-1.57
Variance 2			0.00	0.02	2.21			-0.14	-1.31

Notes

Started purging at 1018
Stopped purging and began sampling at 1050

Grab Samples

Product Name: Low-Flow System

Date: 2019-10-17 14:11:31

Project Information:

Operator Name Travis Martinez
Company Name Golder
Project Name Plant Branch
Site Name Default Site
Latitude 0° 0' 0"
Longitude 0° 0' 0"
Sonde SN 647057
Turbidity Make/Model Lamotte 2020we

Pump Information:

Pump Model/Type Alexis
Tubing Type poly
Tubing Diameter 0.17 in
Tubing Length 57.00 ft

Pump placement from TOC 52.00 ft

Well Information:

Well ID BRGWC-45
Well diameter 2 in
Well Total Depth 57.00 ft
Screen Length 10 ft
Depth to Water 11.89 ft

Pumping Information:

Final Pumping Rate 200 mL/min
Total System Volume 0.34444151 L
Calculated Sample Rate 300 sec
Stabilization Drawdown 3.96 in
Total Volume Pumped 6 L

Low-Flow Sampling Stabilization Summary

	Time	Elapsed	Temp C	pH	SpCond μ S/cm	Turb NTU	DTW ft	RDO mg/L	ORP mV
Stabilization			+/- 0	+/- 0.1	+/- 5%	+/- 5		+/- 10%	+/- 0
Last 5	13:48:51	600.02	22.96	5.94	571.84	4.21	12.22	0.23	91.98
Last 5	13:53:51	900.02	22.98	5.93	543.12	9.22	12.22	0.18	91.59
Last 5	13:58:51	1200.45	22.87	5.93	529.13	4.29	12.22	0.16	90.27
Last 5	14:03:51	1500.45	22.91	5.93	519.03	1.78	12.22	0.15	88.47
Last 5	14:08:51	1800.45	22.99	5.93	515.31	4.08	12.22	0.13	87.00
Variance 0			-0.11	-0.00	-13.99			-0.02	-1.32
Variance 1			0.04	0.00	-10.09			-0.01	-1.80
Variance 2			0.08	-0.01	-3.72			-0.01	-1.47

Notes

Grab Samples

Product Name: Low-Flow System

Date: 2019-10-16 11:36:25

Project Information:

Operator Name D.Thomas
Company Name Golder Associates
Project Name 166625418
Site Name Plant Branch
Latitude 0° 0' 0"
Longitude 0° 0' 0"
Sonde SN 541714
Turbidity Make/Model LaMotte 2020we

Pump Information:

Pump Model/Type SamplePro
Tubing Type poly
Tubing Diameter .170 in
Tubing Length 92 ft

Pump placement from TOC 92 ft

Well Information:

Well ID BRGWC-47
Well diameter 2 in
Well Total Depth 97.08 ft
Screen Length 10 ft
Depth to Water 25.93 ft

Pumping Information:

Final Pumping Rate 100 mL/min
Total System Volume 0.6256349 L
Calculated Sample Rate 300 sec
Stabilization Drawdown 5.16 in
Total Volume Pumped 3.5 L

Low-Flow Sampling Stabilization Summary

	Time	Elapsed	Temp C	pH	SpCond μ S/cm	Turb NTU	DTW ft	RDO mg/L	ORP mV
Stabilization			+/- 0.5	+/- 0.1	+/- 5%	+/- 10		+/- 10%	+/- 10
Last 5	11:13:57	900.01	22.06	6.04	2233.32	0.40	26.35	0.78	-71.60
Last 5	11:18:57	1200.00	22.86	5.97	2227.44	0.38	26.35	0.73	-63.82
Last 5	11:23:57	1500.00	23.36	5.93	2225.29	0.35	26.35	0.61	-48.95
Last 5	11:28:57	1799.99	23.48	5.91	2218.67	0.33	26.35	0.59	-43.55
Last 5	11:33:57	2099.98	23.23	5.90	2222.39	0.49	26.36	0.55	-36.48
Variance 0			0.50	-0.04	-2.16			-0.12	14.87
Variance 1			0.12	-0.02	-6.62			-0.02	5.40
Variance 2			-0.25	-0.01	3.72			-0.04	7.07

Notes

Started purging at 1058
Stopped purging and began sampling at 1135

Grab Samples

Product Name: Low-Flow System

Date: 2019-10-16 13:25:11

Project Information:

Operator Name D.Thomas
Company Name Golder Associates
Project Name 166625418
Site Name Plant Branch
Latitude 0° 0' 0"
Longitude 0° 0' 0"
Sonde SN 541714
Turbidity Make/Model LaMotte 2020we

Pump Information:

Pump Model/Type SamplePro
Tubing Type poly
Tubing Diameter .170 in
Tubing Length 63 ft

Pump placement from TOC 63 ft

Well Information:

Well ID BRGWC-50
Well diameter 2 in
Well Total Depth 68.76 ft
Screen Length 10 ft
Depth to Water 38.05 ft

Pumping Information:

Final Pumping Rate 120 mL/min
Total System Volume 0.4961957 L
Calculated Sample Rate 300 sec
Stabilization Drawdown 1.2 in
Total Volume Pumped 4.2 L

Low-Flow Sampling Stabilization Summary

	Time	Elapsed	Temp C	pH	SpCond μ S/cm	Turb NTU	DTW ft	RDO mg/L	ORP mV
Stabilization			+/- 0.5	+/- 0.1	+/- 5%	+/- 10		+/- 10%	+/- 10
Last 5	12:57:56	600.01	23.46	5.41	2319.88	1.46	38.15	0.57	-1.77
Last 5	13:02:56	900.01	23.52	5.40	2315.46	1.25	38.15	0.44	17.53
Last 5	13:07:56	1200.00	23.68	5.37	2325.21	1.18	38.15	0.40	27.74
Last 5	13:12:56	1500.00	23.94	5.37	2320.62	1.05	38.15	0.37	34.78
Last 5	13:22:56	2099.98	24.17	5.36	2317.34	0.94	38.15	0.32	38.62
Variance 0			0.16	-0.02	9.76			-0.04	10.21
Variance 1			0.27	-0.00	-4.59			-0.03	7.04
Variance 2			0.23	-0.01	-3.28			-0.05	3.84

Notes

Started purging at 1247
Stopped purging and began sampling at 1325

Grab Samples

Product Name: Low-Flow System

Date: 2019-10-16 14:54:26

Project Information:

Operator Name D.Thomas
Company Name Golder Associates
Project Name 166625418
Site Name Plant Branch
Latitude 0° 0' 0"
Longitude 0° 0' 0"
Sonde SN 541714
Turbidity Make/Model LaMotte 2020we

Pump Information:

Pump Model/Type SamplePro
Tubing Type poly
Tubing Diameter .170 in
Tubing Length 71 ft

Pump placement from TOC 71 ft

Well Information:

Well ID BRGWC-521
Well diameter 2 in
Well Total Depth 76.60 ft
Screen Length 10 ft
Depth to Water 39.28 ft

Pumping Information:

Final Pumping Rate 120 mL/min
Total System Volume 0.5319031 L
Calculated Sample Rate 300 sec
Stabilization Drawdown 3.84 in
Total Volume Pumped 4.8 L

Low-Flow Sampling Stabilization Summary

	Time	Elapsed	Temp C	pH	SpCond μ S/cm	Turb NTU	DTW ft	RDO mg/L	ORP mV
Stabilization			+/- 0.5	+/- 0.1	+/- 5%	+/- 10		+/- 10%	+/- 10
Last 5	14:32:39	1200.00	24.02	6.72	495.42	0.84	39.60	0.42	-167.99
Last 5	14:37:39	1500.03	23.40	6.90	496.51	0.65	39.60	0.39	-161.72
Last 5	14:42:39	1800.02	23.09	6.98	500.27	0.57	39.60	0.37	-158.62
Last 5	14:47:39	2099.98	22.91	7.02	502.54	0.48	39.60	0.35	-155.51
Last 5	14:52:39	2399.97	23.07	7.00	504.49	0.35	39.60	0.33	-151.75
Variance 0			-0.31	0.08	3.76			-0.02	3.10
Variance 1			-0.18	0.04	2.27			-0.02	3.11
Variance 2			0.16	-0.02	1.95			-0.02	3.76

Notes

Started purging at 1412
Stopped purging and began sampling at 1455

Grab Samples

APPENDIX B

Data Validation Summaries

Quality Control Review of Analytical Data- Ash Pond BCD Submitted by Pace Analytical Services August - December 2019

This narrative presents results of the quality control (QC) data review performed on analytical data submitted by Pace Analytical Services, LLC, for groundwater samples collected at Plant Branch CCR Ash Pond BCD (Site) between August 27, 2019 and December 4, 2019. The chemical data were reviewed to identify quality issues which could affect the use of the data for decision making purposes.

Information regarding the primary sample locations, analytical parameters, QC samples, sampling dates, and laboratory sample delivery group (SDG) designations is summarized in Table 1. In accordance with groundwater monitoring and corrective action procedures discussed in Title 40 CFR, Subpart D - Standards for the Disposal of Coal Combustion Residuals in Landfills and Surface Impoundments, the samples were analyzed for detection monitoring constituents listed in 40 CFR, Part 257, Appendix III and assessment monitoring constituents listed in 40 CFR, Part 257, Appendix IV. Test methods included Inductively Coupled Plasma- Mass Spectrometry (USEPA Method 6020B), Mercury in Liquid Wastes (USEPA Method 7470A), Determination of Inorganic Anions By Ion Chromatography (USEPA Method 300.0), Total Dissolved Solids (Standard Methods 2540C), Radium-226 (USEPA Method 9315) and Radium-228 (USEPA Method 9320).

Data were reviewed in accordance with the US EPA Region IV Data Validation Standard Operating Procedures for Contract Laboratory Program (CLP) Inorganic Data by Inductively Coupled Plasma – Atomic Emission Spectroscopy and Inductively Coupled Plasma – Mass Spectroscopy (September 2011, Rev. 2.0), US EPA Region IV Data Validation Standard Operating Procedures for CLP Mercury Data by Cold Vapor Atomic Absorption (September 2011, Rev. 2.0), the National Functional Guidelines for Inorganic Superfund Methods Data Review (January 2017), and US Department of Energy, Evaluation of Radiochemical Data Usability (April 1997). The review included an assessment of the results for completeness, precision (laboratory duplicates, matrix spike/matrix spike duplicates), accuracy (laboratory control samples and matrix spike samples), and blank contamination (including field, equipment and laboratory blanks). Additionally, sample procedures, holding times and chains-of-custody were reviewed. Where there was a discrepancy between the QC criteria in the guidelines and the QC criterion established in the analytic methodology, method-specific criteria or professional judgment was used.

DATA QUALITY OBJECTIVES

Laboratory Precision:	Laboratory goals for precision were met.
Field Precision:	Field goals for precision were met with the exception of total dissolved solids (TDS) for BRGWC-29I as described in the qualifications section below.
Accuracy:	Laboratory goals for accuracy were met with the exception of fluoride for BRGWC-29I as described in the qualifications section below.
Detection Limits:	Project goals for detection limits were met. Certain samples were diluted due to elevated concentrations of target analytes. Dilutions do not require qualifications based on USEPA guidelines. Detection and reporting limits of non-detect compounds are elevated proportional to the dilution when undiluted sample results are not provided by the laboratory. The data usability of diluted results was evaluated by the data user in the context of site-wide characterization.
Completeness:	There were no rejected analytical results for this event, resulting in a completion of 100%.

Holding Times: All holding time requirements were met in accordance with specific analytical methods.

QUALIFICATIONS

In general, chemical results for the samples collected at the Site were qualified on the basis of low precision or accuracy, or on the basis of professional judgment. The following definitions provide brief explanations of the qualifiers which may have been assigned to data by the laboratory during the data validation process.

- J** The analyte was positively identified above the method detection limit; however, the associated numerical value is the approximate concentration of the analyte in the sample.
- J+** The analyte was reported above the method detection limit; however, the concentration reported is an estimated value that may be biased high.
- U** The analyte was not detected above the method detection limit.

The data generated as part of this sampling event met the QC criteria established in the respective analytical methods and data validation guidelines except as specified below. Although these qualifications were applied to some data from samples collected at the Site and reported in the SDGs, qualifications may not have been required or applied to all samples collected. A summary of sample qualifications can be found in Table 2.

- Certain arsenic, chromium, selenium, total dissolved solid (TDS), radium-226, radium-228 and total radium results were qualified as non-detect (U) when the analyte was detected at a similar level in an associated blank sample. As shown in Table 2, if the original sample results were below the reporting limit (RL) or the minimum detectable concentration (MDC), the results were qualified as non-detect (U) and the results were raised to the RL or MDC. If results were above the RL or MDC, the results were qualified U and the RL or MDC was raised to the sample result.
- Total radium was qualified as biased high (J+) in certain samples when one radium isotope was detected above the MDC and the other isotope was U qualified.
- Fluoride for DGWC-29I was qualified as estimated biased high (J+) as the associated matrix spike/matrix spike duplicate (MS/MSD) recoveries were above the QC criteria.
- TDS for BRGWC-29I was qualified as estimated (J) as the field duplicate relative percent difference was outside QC criteria.

Golder reviewed the data from samples collected at Plant Branch CCR Ash Pond BCD between August 27, 2019 and December 4, 2019 in accordance with the analytical methods, the laboratory specific QC criteria, and the guidelines. As described above, 100% of the results were acceptable for project use.

REFERENCE

Paar, J.G. & Porterfield, D.R. *Evaluation of Radiochemical Data Usability*. United States Department of Energy, Office of Environmental Restoration and Waste Management, Oak Ridge National Laboratory, April 1997.

USEPA, January 2017, National, Office of Superfund Remediation and Technology Innovation, *National Functional Guidelines for Inorganic Superfund Methods Data Review*, Revision 0.0.

USEPA, September 2011, Region 4, Science and Ecosystem Support Division, Quality Assurance Section, MTSB, *Data Validation Standard Operating Procedures for Contract Laboratory Program Inorganic Data By Inductively Coupled Plasma – Atomic Emission Spectroscopy and Inductively Coupled Plasma – Mass Spectroscopy*, Revision 2.0.

USEPA, September 2011, Region 4, Science and Ecosystem Support Division, Quality Assurance Section, MTSB, *Data Validation Standard Operating Procedures for Contract Laboratory Program Mercury Data By Cold Vapor Atomic Absorption*, Revision 2.0.

TABLE 1

Sample Summary Table
SCS Plant Branch - Pond BCD

SDGs	Field Identification	Collection Date	Lab Identification	Matrix	QC Samples	Analyses			
						Total Metals (6020)	Anions (300.0)	TDS (SM 2540C)	Radium 226, Radium 228 (9315, 9320)
2622485/2622486	BRGWA-12I	8/27/2019	2622485001/2622486001	GW	-	X	X	-	X
2622485/2622486	BRGWA-12S	8/27/2019	2622485002/2622486002	GW	-	X	X	-	X
2622485/2622486	BRGWC-25I	8/27/2019	2622485005/2622486005	GW	-	X	X	-	X
2622485/2622486	BRGWC-30I	8/27/2019	2622485004/2622486004	GW	-	X	X	-	X
2622485/2622486	BRGWC-32S	8/27/2019	2622485006/2622486006	GW	-	X	X	-	X
2622563/2622564	BRGWC-27I	8/28/2019	2622561001/2622562001	GW	-	X	X	-	X
2622561/2622562	BRGWC-29I	8/28/2019	2622561002/2622562002	GW	-	X	X	-	X
2622561/2622562	BRGWC-45	8/28/2019	2622561003/2622562003	GW	-	X	X	-	X
2622561/2622562	BRGWC-47	8/28/2019	2622561004/2622562004	GW	-	X	X	-	X
2622561/2622562	Dup-3	8/28/2019	2622561007/2622562007	GW	DUP (BRGWC-45)	X	X	-	X
2622596/2622597	BRGWA-23S	8/29/2019	2622596001/2622597001	GW	-	X	X	-	X
2622596/2622597	BRGWC-50	8/29/2019	2622596002/2622597002	GW	-	X	X	-	X
2622596/2622597	BRGWC-52I	8/29/2019	2622596003/2622597003	GW	-	X	X	-	X
2622596/2622597	Dup-2	8/29/2019	2622596004/2622597004	GW	DUP (BRGWC-50)	X	X	-	X
2624392/2624393	BRGWA-12I	10/15/2019	2624392002/2624393002	GW	-	X	X	X	X
2624392/2624393	BRGWA-12S	10/15/2019	2624392001/2624393001	GW	-	X	X	X	X
2624392/2624393	BRGWA-23S	10/15/2019	2624392003/2624393003	GW	-	X	X	X	X
2624392/2624393	BRGWC-25I	10/15/2019	2624392005/2624393005	GW	-	X	X	X	X
2624487/2624488	BRGWC-29I	10/16/2019	2624487001/2624488001	GW	-	X	X	X	X
2624487/2624488	BRGWC-47	10/16/2019	2624487002/2624488002	GW	-	X	X	X	X
2624487/2624488	BRGWC-50	10/16/2019	2624487003/2624488003	GW	-	X	X	X	X
2624487/2624488	BRGWC-52I	10/16/2019	2624487004/2624488004	GW	-	X	X	X	X
2624487/2624488	Dup-2	10/16/2019	2624487005/2624488005	GW	DUP (BRGWC-29I)	X	X	X	X
2624861	BRGWC-27I	10/17/2019	2624861001	GW	-	-	-	-	X
2624861	BRGWC-30I	10/17/2019	2624861002	GW	-	-	-	-	X
2624861	BRGWC-32S	10/17/2019	2624861003	GW	-	-	-	-	X
2624861	BRGWC-45	10/17/2019	2624861004	GW	-	-	-	-	X
2626395	BRGWC-45	12/3/2019	2626395004	GW	-	X	X	-	X
2626395	BRGWC-27I	12/4/2019	2626395001	GW	-	X	X	-	X
2626395	BRGWC-30I	12/4/2019	2626395002	GW	-	X	X	-	X
2626395	BRGWC-32S	12/4/2019	2626395003	GW	-	X	X	-	X

Abbreviations:

- DUP - Field duplicate
- GW - Groundwater
- TDS - Total Dissolved Solids
- SDG - Sample Delivery Group
- QC - Quality Control

TABLE 2
Qualifier Summary Table
Plant Branch - Pond BCD

<i>SDG</i>	<i>Sample Name</i>	<i>Constituent</i>	<i>New Result</i>	<i>New RL or MDC</i>	<i>Qualifier</i>	<i>Reason</i>
2622486	BRGWA-12I	Radium-226	-	0.367	U	Blank contamination
2622486	BRGWA-12S	Radium-226	-	0.422	U	Blank contamination
2622486	BRGWC-30I	Radium-226	-	0.572	U	Blank contamination
2622486	BRGWA-12I	Radium-228	-	0.938	U	Blank contamination
2622486	BRGWA-12S	Radium-228	-	0.899	U	Blank contamination
2622486	BRGWC-25I	Radium-228	-	0.680	U	Blank contamination
2622486	BRGWC-30I	Radium-228	-	0.777	U	Blank contamination
2622486	BRGWA-12I	Total Radium	-	1.31	U	Blank contamination
2622486	BRGWA-12S	Total Radium	-	1.32	U	Blank contamination
2622486	BRGWC-30I	Total Radium	-	1.35	U	Blank contamination
2622561	BRGWC-27I	Arsenic	0.005	-	U	Blank contamination
2622561	BRGWC-29I	Arsenic	0.005	-	U	Blank contamination
2622561	BRGWC-45	Arsenic	0.005	-	U	Blank contamination
2622561	BRGWC-47	Arsenic	0.005	-	U	Blank contamination
2622561	BRGWC-47	Chromium	0.01	-	U	Blank contamination
2622562	BRGWC-27I	Radium-226	-	0.643	U	Blank contamination
2622562	BRGWC-29I	Radium-226	-	0.652	U	Blank contamination
2622562	BRGWC-45	Radium-226	-	0.499	U	Blank contamination
2622562	BRGWC-47	Radium-226	-	0.804	U	Blank contamination
2622562	BRGWC-29I	Total Radium	-	1.76	U	Blank contamination
2622597	BRGWA-23S	Radium-226	-	0.582	U	Blank contamination
2622597	BRGWC-50	Radium-226	-	0.556	U	Blank contamination
2622597	BRGWC-52I	Radium-226	-	0.566	U	Blank contamination
2622597	BRGWC-50	Total Radium	-	-	J+	Blank contamination
2622597	BRGWC-52I	Total Radium	-	-	J+	Blank contamination
2624488	BRGWC-29I	Radium-226	-	0.549	U	Blank contamination
2624488	BRGWC-47	Radium-226	-	0.572	U	Blank contamination
2624488	BRGWC-50	Radium-226	-	0.88	U	Blank contamination
2624488	BRGWC-52I	Radium-226	-	0.513	U	Blank contamination
2624488	BRGWC-50	Radium-228	-	1.63	U	Blank contamination
2624488	BRGWC-52I	Radium-228	-	1.62	U	Blank contamination
2624488	BRGWC-50	Total Radium	-	2.51	U	Blank contamination
2624488	BRGWC-52I	Total Radium	-	2.13	U	Blank contamination
2624861	BRGWC-27I	Radium-226	-	0.725	U	Blank contamination
2624861	BRGWC-30I	Radium-226	-	0.72	U	Blank contamination
2624861	BRGWC-32S	Radium-226	-	0.306	U	Blank contamination
2624861	BRGWC-45	Radium-226	-	0.487	U	Blank contamination
2626395	BRGWC-27I	Arsenic	0.005	-	U	Blank contamination
2626395	BRGWC-30I	Arsenic	0.005	-	U	Blank contamination
2626395	BRGWC-32S	Arsenic	0.005	-	U	Blank contamination
2626395	BRGWC-27I	Selenium	0.01	-	U	Blank contamination
2626395	BRGWC-30I	Selenium	0.01	-	U	Blank contamination
2622597	Dup-2	Radium-226	-	0.823	U	Blank contamination
2622597	Dup-2	Total Radium	-	1.310	U	Blank contamination
2624488	Dup-2	Radium-226	-	0.536	U	Blank contamination
2624488	Dup-2	Radium-228	-	1.02	U	Blank contamination
2624488	Dup-2	Total Radium	-	1.56	U	Blank contamination
2622561	Dup-3	Arsenic	0.005	-	U	Blank contamination
2624392	BRGWA-12I	Chromium	0.01	-	U	Blank contamination
2624392	BRGWA-12S	Chromium	0.01	-	U	Blank contamination
2624392	BRGWA-23S	Chromium	0.01	-	U	Blank contamination
2624392	BRGWC-25I	Chromium	0.01	-	U	Blank contamination
2624392	BRGWA-12I	TDS	-	134	U	Blank contamination
2624392	BRGWA-12S	TDS	-	89	U	Blank contamination
2624392	BRGWA-23S	TDS	-	124	U	Blank contamination
2624487	BRGWC-29I	Arsenic	0.005	-	U	Blank contamination
2624487	BRGWC-52I	Arsenic	0.005	-	U	Blank contamination
2624392	BRGWA-12I	Arsenic	0.005	-	U	Blank contamination
2624392	BRGWA-12S	Arsenic	0.005	-	U	Blank contamination

TABLE 2
Qualifier Summary Table
Plant Branch - Pond BCD

<i>SDG</i>	<i>Sample Name</i>	<i>Constituent</i>	<i>New Result</i>	<i>New RL or MDC</i>	<i>Qualifier</i>	<i>Reason</i>
2624392	BRGWA-23S	Arsenic	0.005	-	U	Blank contamination
2624392	BRGWC-25I	Arsenic	0.005	-	U	Blank contamination
2624393	BRGWA-12I	Radium-226	-	0.475	U	Blank contamination
2624393	BRGWA-23S	Radium-226	-	0.659	U	Blank contamination
2624393	BRGWC-25I	Radium-226	-	0.537	U	Blank contamination
2624393	BRGWA-23S	Total Radium	-	-	J+	Blank contamination
2622561	BRGWC-29I	Fluoride	-	-	J+	MS and/or MSD recovered above upper limit
2624484	BRGWC-29I	TDS	-	-	J	RPD exceedance between field duplicate and parent sample
2624484	Dup-2	TDS	-	-	J	RPD exceedance between field duplicate and parent sample

Abbreviations:

MDC: Minimum detectable concentration
MDL: Method detection limit
RL : Reporting limit
SDG : Sample delivery group

Qualifiers:

J+ : Estimated result, biased high
J : Estimated result
U : Non-detect result

APPENDIX C

Statistical Analyses

Interwell Prediction Limit

Branch Client: Golder Associates Data: Plant Branch Ash Pond Printed 1/14/2020, 10:51 AM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	%NDs	ND Adj.	Transform	Alpha	Method
Boron (mg/L)	BRGWC-25I	0.1	n/a	10/15/2019	1.2	Yes	30	43.33	n/a	n/a	0.001881	NP (normality) 1 of 2
Boron (mg/L)	BRGWC-27I	0.1	n/a	12/4/2019	0.89	Yes	30	43.33	n/a	n/a	0.001881	NP (normality) 1 of 2
Boron (mg/L)	BRGWC-29I	0.1	n/a	10/16/2019	1.2	Yes	30	43.33	n/a	n/a	0.001881	NP (normality) 1 of 2
Boron (mg/L)	BRGWC-30I	0.1	n/a	12/4/2019	1.6	Yes	30	43.33	n/a	n/a	0.001881	NP (normality) 1 of 2
Boron (mg/L)	BRGWC-32S	0.1	n/a	12/4/2019	1.6	Yes	30	43.33	n/a	n/a	0.001881	NP (normality) 1 of 2
Boron (mg/L)	BRGWC-47	0.1	n/a	10/16/2019	0.36	Yes	30	43.33	n/a	n/a	0.001881	NP (normality) 1 of 2
Boron (mg/L)	BRGWC-52I	0.1	n/a	10/16/2019	1.3	Yes	30	43.33	n/a	n/a	0.001881	NP (normality) 1 of 2
Boron (mg/L)	BRGWC-50	0.1	n/a	10/16/2019	0.31	Yes	30	43.33	n/a	n/a	0.001881	NP (normality) 1 of 2
Calcium (mg/L)	BRGWC-25I	26.84	n/a	10/15/2019	48.3	Yes	32	9.375	None	No	0.000...	Param 1 of 2
Calcium (mg/L)	BRGWC-27I	26.84	n/a	12/4/2019	76.8	Yes	32	9.375	None	No	0.000...	Param 1 of 2
Calcium (mg/L)	BRGWC-29I	26.84	n/a	10/16/2019	54	Yes	32	9.375	None	No	0.000...	Param 1 of 2
Calcium (mg/L)	BRGWC-30I	26.84	n/a	12/4/2019	92.6	Yes	32	9.375	None	No	0.000...	Param 1 of 2
Calcium (mg/L)	BRGWC-32S	26.84	n/a	12/4/2019	52.7	Yes	32	9.375	None	No	0.000...	Param 1 of 2
Calcium (mg/L)	BRGWC-45	26.84	n/a	12/3/2019	43.7	Yes	32	9.375	None	No	0.000...	Param 1 of 2
Calcium (mg/L)	BRGWC-47	26.84	n/a	10/16/2019	338	Yes	32	9.375	None	No	0.000...	Param 1 of 2
Calcium (mg/L)	BRGWC-52I	26.84	n/a	10/16/2019	48.4	Yes	32	9.375	None	No	0.000...	Param 1 of 2
Calcium (mg/L)	BRGWC-50	26.84	n/a	10/16/2019	241	Yes	32	9.375	None	No	0.000...	Param 1 of 2
Chloride (mg/L)	BRGWC-29I	5.8	n/a	10/16/2019	6.9	Yes	32	0	n/a	n/a	0.001697	NP (normality) 1 of 2
Chloride (mg/L)	BRGWC-32S	5.8	n/a	12/4/2019	6.6	Yes	32	0	n/a	n/a	0.001697	NP (normality) 1 of 2
Chloride (mg/L)	BRGWC-45	5.8	n/a	12/3/2019	52.8	Yes	32	0	n/a	n/a	0.001697	NP (normality) 1 of 2
Chloride (mg/L)	BRGWC-52I	5.8	n/a	10/16/2019	7	Yes	32	0	n/a	n/a	0.001697	NP (normality) 1 of 2
Chloride (mg/L)	BRGWC-50	5.8	n/a	10/16/2019	21.9	Yes	32	0	n/a	n/a	0.001697	NP (normality) 1 of 2
pH (S.U)	BRGWC-29I	6.826	5.396	10/16/2019	4.79	Yes	36	0	None	No	0.000...	Param 1 of 2
pH (S.U)	BRGWC-52I	6.826	5.396	10/16/2019	7	Yes	36	0	None	No	0.000...	Param 1 of 2
pH (S.U)	BRGWC-50	6.826	5.396	10/16/2019	5.36	Yes	36	0	None	No	0.000...	Param 1 of 2
Sulfate (mg/L)	BRGWC-25I	89	n/a	10/15/2019	174	Yes	32	3.125	n/a	n/a	0.001697	NP (normality) 1 of 2
Sulfate (mg/L)	BRGWC-27I	89	n/a	12/4/2019	241	Yes	32	3.125	n/a	n/a	0.001697	NP (normality) 1 of 2
Sulfate (mg/L)	BRGWC-29I	89	n/a	10/16/2019	266	Yes	32	3.125	n/a	n/a	0.001697	NP (normality) 1 of 2
Sulfate (mg/L)	BRGWC-30I	89	n/a	12/4/2019	327	Yes	32	3.125	n/a	n/a	0.001697	NP (normality) 1 of 2
Sulfate (mg/L)	BRGWC-32S	89	n/a	12/4/2019	293	Yes	32	3.125	n/a	n/a	0.001697	NP (normality) 1 of 2
Sulfate (mg/L)	BRGWC-45	89	n/a	12/3/2019	105	Yes	32	3.125	n/a	n/a	0.001697	NP (normality) 1 of 2
Sulfate (mg/L)	BRGWC-47	89	n/a	10/16/2019	1560	Yes	32	3.125	n/a	n/a	0.001697	NP (normality) 1 of 2
Sulfate (mg/L)	BRGWC-52I	89	n/a	10/16/2019	155	Yes	32	3.125	n/a	n/a	0.001697	NP (normality) 1 of 2
Sulfate (mg/L)	BRGWC-50	89	n/a	10/16/2019	1590	Yes	32	3.125	n/a	n/a	0.001697	NP (normality) 1 of 2
Total Dissolved Solids (mg/L)	BRGWC-25I	219.3	n/a	10/15/2019	380	Yes	32	0	None	No	0.000...	Param 1 of 2
Total Dissolved Solids (mg/L)	BRGWC-27I	219.3	n/a	12/4/2019	422	Yes	32	0	None	No	0.000...	Param 1 of 2
Total Dissolved Solids (mg/L)	BRGWC-29I	219.3	n/a	10/16/2019	2030	Yes	32	0	None	No	0.000...	Param 1 of 2
Total Dissolved Solids (mg/L)	BRGWC-30I	219.3	n/a	12/4/2019	612	Yes	32	0	None	No	0.000...	Param 1 of 2
Total Dissolved Solids (mg/L)	BRGWC-32S	219.3	n/a	12/4/2019	526	Yes	32	0	None	No	0.000...	Param 1 of 2
Total Dissolved Solids (mg/L)	BRGWC-45	219.3	n/a	12/3/2019	362	Yes	32	0	None	No	0.000...	Param 1 of 2
Total Dissolved Solids (mg/L)	BRGWC-47	219.3	n/a	10/16/2019	2220	Yes	32	0	None	No	0.000...	Param 1 of 2
Total Dissolved Solids (mg/L)	BRGWC-52I	219.3	n/a	10/16/2019	346	Yes	32	0	None	No	0.000...	Param 1 of 2
Total Dissolved Solids (mg/L)	BRGWC-50	219.3	n/a	10/16/2019	2280	Yes	32	0	None	No	0.000...	Param 1 of 2

Interwell Prediction Limit

Branch Client: Golder Associates Data: Plant Branch Ash Pond Printed 1/14/2020, 10:51 AM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	%NDs	ND Adj.	Transform	Alpha	Method
Boron (mg/L)	BRGWC-25I	0.1	n/a	10/15/2019	1.2	Yes	30	43.33	n/a	n/a	0.001881	NP (normality) 1 of 2
Boron (mg/L)	BRGWC-27I	0.1	n/a	12/4/2019	0.89	Yes	30	43.33	n/a	n/a	0.001881	NP (normality) 1 of 2
Boron (mg/L)	BRGWC-29I	0.1	n/a	10/16/2019	1.2	Yes	30	43.33	n/a	n/a	0.001881	NP (normality) 1 of 2
Boron (mg/L)	BRGWC-30I	0.1	n/a	12/4/2019	1.6	Yes	30	43.33	n/a	n/a	0.001881	NP (normality) 1 of 2
Boron (mg/L)	BRGWC-32S	0.1	n/a	12/4/2019	1.6	Yes	30	43.33	n/a	n/a	0.001881	NP (normality) 1 of 2
Boron (mg/L)	BRGWC-45	0.1	n/a	12/3/2019	0.027	No	30	43.33	n/a	n/a	0.001881	NP (normality) 1 of 2
Boron (mg/L)	BRGWC-47	0.1	n/a	10/16/2019	0.36	Yes	30	43.33	n/a	n/a	0.001881	NP (normality) 1 of 2
Boron (mg/L)	BRGWC-52I	0.1	n/a	10/16/2019	1.3	Yes	30	43.33	n/a	n/a	0.001881	NP (normality) 1 of 2
Boron (mg/L)	BRGWC-50	0.1	n/a	10/16/2019	0.31	Yes	30	43.33	n/a	n/a	0.001881	NP (normality) 1 of 2
Calcium (mg/L)	BRGWC-25I	26.84	n/a	10/15/2019	48.3	Yes	32	9.375	None	No	0.000...	Param 1 of 2
Calcium (mg/L)	BRGWC-27I	26.84	n/a	12/4/2019	76.8	Yes	32	9.375	None	No	0.000...	Param 1 of 2
Calcium (mg/L)	BRGWC-29I	26.84	n/a	10/16/2019	54	Yes	32	9.375	None	No	0.000...	Param 1 of 2
Calcium (mg/L)	BRGWC-30I	26.84	n/a	12/4/2019	92.6	Yes	32	9.375	None	No	0.000...	Param 1 of 2
Calcium (mg/L)	BRGWC-32S	26.84	n/a	12/4/2019	52.7	Yes	32	9.375	None	No	0.000...	Param 1 of 2
Calcium (mg/L)	BRGWC-45	26.84	n/a	12/3/2019	43.7	Yes	32	9.375	None	No	0.000...	Param 1 of 2
Calcium (mg/L)	BRGWC-47	26.84	n/a	10/16/2019	338	Yes	32	9.375	None	No	0.000...	Param 1 of 2
Calcium (mg/L)	BRGWC-52I	26.84	n/a	10/16/2019	48.4	Yes	32	9.375	None	No	0.000...	Param 1 of 2
Calcium (mg/L)	BRGWC-50	26.84	n/a	10/16/2019	241	Yes	32	9.375	None	No	0.000...	Param 1 of 2
Chloride (mg/L)	BRGWC-25I	5.8	n/a	10/15/2019	5	No	32	0	n/a	n/a	0.001697	NP (normality) 1 of 2
Chloride (mg/L)	BRGWC-27I	5.8	n/a	12/4/2019	5.6	No	32	0	n/a	n/a	0.001697	NP (normality) 1 of 2
Chloride (mg/L)	BRGWC-29I	5.8	n/a	10/16/2019	6.9	Yes	32	0	n/a	n/a	0.001697	NP (normality) 1 of 2
Chloride (mg/L)	BRGWC-30I	5.8	n/a	12/4/2019	5	No	32	0	n/a	n/a	0.001697	NP (normality) 1 of 2
Chloride (mg/L)	BRGWC-32S	5.8	n/a	12/4/2019	6.6	Yes	32	0	n/a	n/a	0.001697	NP (normality) 1 of 2
Chloride (mg/L)	BRGWC-45	5.8	n/a	12/3/2019	52.8	Yes	32	0	n/a	n/a	0.001697	NP (normality) 1 of 2
Chloride (mg/L)	BRGWC-47	5.8	n/a	10/16/2019	4.6	No	32	0	n/a	n/a	0.001697	NP (normality) 1 of 2
Chloride (mg/L)	BRGWC-52I	5.8	n/a	10/16/2019	7	Yes	32	0	n/a	n/a	0.001697	NP (normality) 1 of 2
Chloride (mg/L)	BRGWC-50	5.8	n/a	10/16/2019	21.9	Yes	32	0	n/a	n/a	0.001697	NP (normality) 1 of 2
Fluoride (mg/L)	BRGWC-25I	0.42	n/a	10/15/2019	0.16	No	33	54.55	n/a	n/a	0.001605	NP (NDs) 1 of 2
Fluoride (mg/L)	BRGWC-27I	0.42	n/a	12/4/2019	0.18	No	33	54.55	n/a	n/a	0.001605	NP (NDs) 1 of 2
Fluoride (mg/L)	BRGWC-29I	0.42	n/a	10/16/2019	0.11	No	33	54.55	n/a	n/a	0.001605	NP (NDs) 1 of 2
Fluoride (mg/L)	BRGWC-30I	0.42	n/a	12/4/2019	0.26	No	33	54.55	n/a	n/a	0.001605	NP (NDs) 1 of 2
Fluoride (mg/L)	BRGWC-32S	0.42	n/a	12/4/2019	0.11	No	33	54.55	n/a	n/a	0.001605	NP (NDs) 1 of 2
Fluoride (mg/L)	BRGWC-45	0.42	n/a	12/3/2019	0.19	No	33	54.55	n/a	n/a	0.001605	NP (NDs) 1 of 2
Fluoride (mg/L)	BRGWC-47	0.42	n/a	10/16/2019	0.076	No	33	54.55	n/a	n/a	0.001605	NP (NDs) 1 of 2
Fluoride (mg/L)	BRGWC-52I	0.42	n/a	10/16/2019	0.22	No	33	54.55	n/a	n/a	0.001605	NP (NDs) 1 of 2
Fluoride (mg/L)	BRGWC-50	0.42	n/a	10/16/2019	0.39	No	33	54.55	n/a	n/a	0.001605	NP (NDs) 1 of 2
pH (S.U)	BRGWC-25I	6.826	5.396	10/15/2019	6	No	36	0	None	No	0.000...	Param 1 of 2
pH (S.U)	BRGWC-27I	6.826	5.396	10/17/2019	6.01	No	36	0	None	No	0.000...	Param 1 of 2
pH (S.U)	BRGWC-29I	6.826	5.396	10/16/2019	4.79	Yes	36	0	None	No	0.000...	Param 1 of 2
pH (S.U)	BRGWC-30I	6.826	5.396	10/17/2019	6.43	No	36	0	None	No	0.000...	Param 1 of 2
pH (S.U)	BRGWC-32S	6.826	5.396	10/17/2019	6.09	No	36	0	None	No	0.000...	Param 1 of 2
pH (S.U)	BRGWC-45	6.826	5.396	10/17/2019	5.93	No	36	0	None	No	0.000...	Param 1 of 2
pH (S.U)	BRGWC-47	6.826	5.396	10/16/2019	5.9	No	36	0	None	No	0.000...	Param 1 of 2
pH (S.U)	BRGWC-52I	6.826	5.396	10/16/2019	7	Yes	36	0	None	No	0.000...	Param 1 of 2
pH (S.U)	BRGWC-50	6.826	5.396	10/16/2019	5.36	Yes	36	0	None	No	0.000...	Param 1 of 2
Sulfate (mg/L)	BRGWC-25I	89	n/a	10/15/2019	174	Yes	32	3.125	n/a	n/a	0.001697	NP (normality) 1 of 2
Sulfate (mg/L)	BRGWC-27I	89	n/a	12/4/2019	241	Yes	32	3.125	n/a	n/a	0.001697	NP (normality) 1 of 2
Sulfate (mg/L)	BRGWC-29I	89	n/a	10/16/2019	266	Yes	32	3.125	n/a	n/a	0.001697	NP (normality) 1 of 2
Sulfate (mg/L)	BRGWC-30I	89	n/a	12/4/2019	327	Yes	32	3.125	n/a	n/a	0.001697	NP (normality) 1 of 2
Sulfate (mg/L)	BRGWC-32S	89	n/a	12/4/2019	293	Yes	32	3.125	n/a	n/a	0.001697	NP (normality) 1 of 2

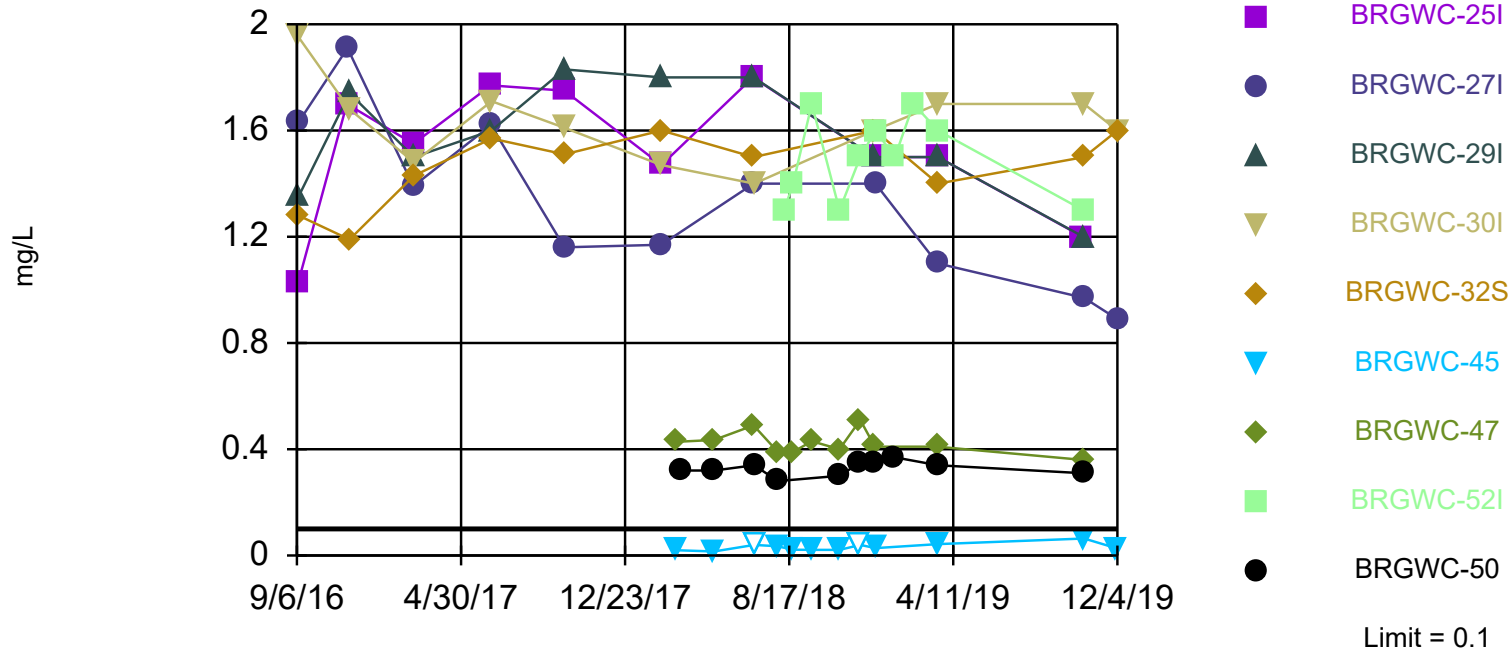
Interwell Prediction Limit

Branch Client: Golder Associates Data: Plant Branch Ash Pond Printed 1/14/2020, 10:51 AM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	%NDs	ND Adj.	Transform	Alpha	Method
Sulfate (mg/L)	BRGWC-45	89	n/a	12/3/2019	105	Yes	32	3.125	n/a	n/a	0.001697	NP (normality) 1 of 2
Sulfate (mg/L)	BRGWC-47	89	n/a	10/16/2019	1560	Yes	32	3.125	n/a	n/a	0.001697	NP (normality) 1 of 2
Sulfate (mg/L)	BRGWC-52I	89	n/a	10/16/2019	155	Yes	32	3.125	n/a	n/a	0.001697	NP (normality) 1 of 2
Sulfate (mg/L)	BRGWC-50	89	n/a	10/16/2019	1590	Yes	32	3.125	n/a	n/a	0.001697	NP (normality) 1 of 2
Total Dissolved Solids (mg/L)	BRGWC-25I	219.3	n/a	10/15/2019	380	Yes	32	0	None	No	0.000...	Param 1 of 2
Total Dissolved Solids (mg/L)	BRGWC-27I	219.3	n/a	12/4/2019	422	Yes	32	0	None	No	0.000...	Param 1 of 2
Total Dissolved Solids (mg/L)	BRGWC-29I	219.3	n/a	10/16/2019	2030	Yes	32	0	None	No	0.000...	Param 1 of 2
Total Dissolved Solids (mg/L)	BRGWC-30I	219.3	n/a	12/4/2019	612	Yes	32	0	None	No	0.000...	Param 1 of 2
Total Dissolved Solids (mg/L)	BRGWC-32S	219.3	n/a	12/4/2019	526	Yes	32	0	None	No	0.000...	Param 1 of 2
Total Dissolved Solids (mg/L)	BRGWC-45	219.3	n/a	12/3/2019	362	Yes	32	0	None	No	0.000...	Param 1 of 2
Total Dissolved Solids (mg/L)	BRGWC-47	219.3	n/a	10/16/2019	2220	Yes	32	0	None	No	0.000...	Param 1 of 2
Total Dissolved Solids (mg/L)	BRGWC-52I	219.3	n/a	10/16/2019	346	Yes	32	0	None	No	0.000...	Param 1 of 2
Total Dissolved Solids (mg/L)	BRGWC-50	219.3	n/a	10/16/2019	2280	Yes	32	0	None	No	0.000...	Param 1 of 2

Exceeds Limit: BRGWC-25I, BRGWC-27I,
BRGWC-29I, BRGWC-30I, BRGWC-32S,
BRGWC-47, BRGWC-52I, BRGWC-50

Prediction Limit Interwell Non-parametric

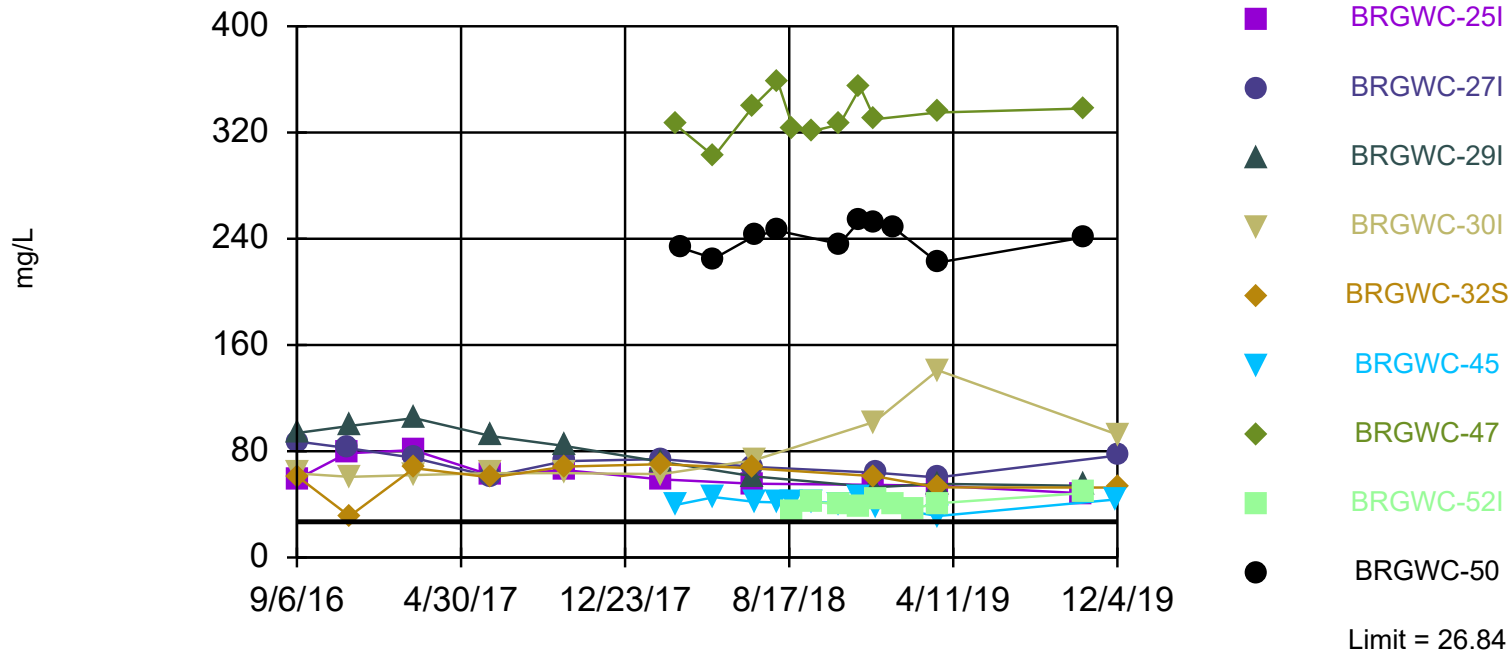


Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 30 background values. 43.33% NDs. Annual per-constituent alpha = 0.03331. Individual comparison alpha = 0.001881 (1 of 2). Comparing 9 points to limit. Seasonality was not detected with 95% confidence.

Constituent: Boron Analysis Run 1/14/2020 10:45 AM View: Pond BCD Appendix III
Branch Client: Golder Associates Data: Plant Branch Ash Pond

Exceeds Limit: BRGWC-25I, BRGWC-27I,
BRGWC-29I, BRGWC-30I, BRGWC-32S,
BRGWC-45, BRGWC-47, BRGWC-52I,..

Prediction Limit
Interwell Parametric

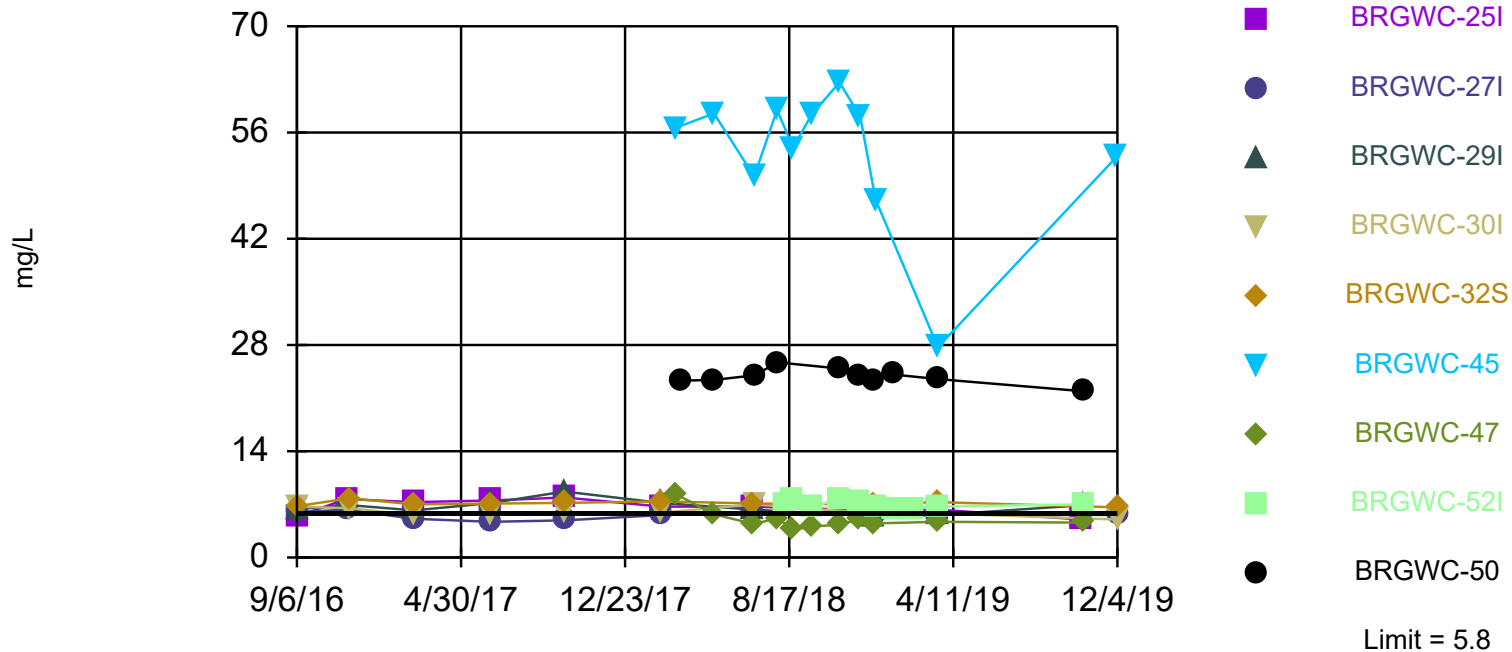


Background Data Summary: Mean=13.17, Std. Dev.=6.557, n=32, 9.375% NDs. Seasonality was not detected with 95% confidence. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9066, critical = 0.904. Kappa = 2.085 (c=7, w=9, 1 of 2, event alpha = 0.05132). Report alpha = 0.007498. Individual comparison alpha = 0.0008358. Comparing 9 points to limit.

Constituent: Calcium Analysis Run 1/14/2020 10:45 AM View: Pond BCD Appendix III
Branch Client: Golder Associates Data: Plant Branch Ash Pond

Exceeds Limit: BRGWC-29I, BRGWC-32S,
BRGWC-45, BRGWC-52I, BRGWC-50

Prediction Limit Interwell Non-parametric

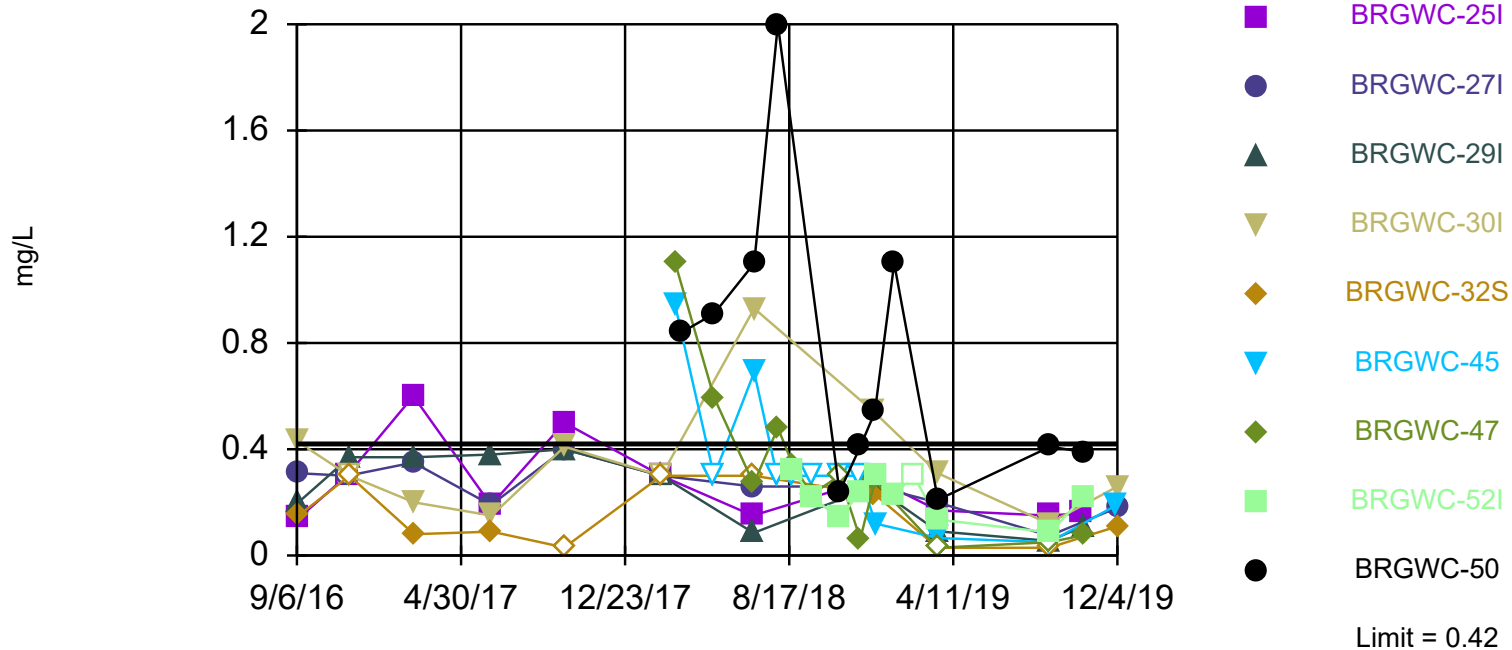


Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 32 background values. Annual per-constituent alpha = 0.03011. Individual comparison alpha = 0.001697 (1 of 2). Comparing 9 points to limit. Seasonality was not detected with 95% confidence.

Constituent: Chloride Analysis Run 1/14/2020 10:45 AM View: Pond BCD Appendix III
Branch Client: Golder Associates Data: Plant Branch Ash Pond

Within Limit

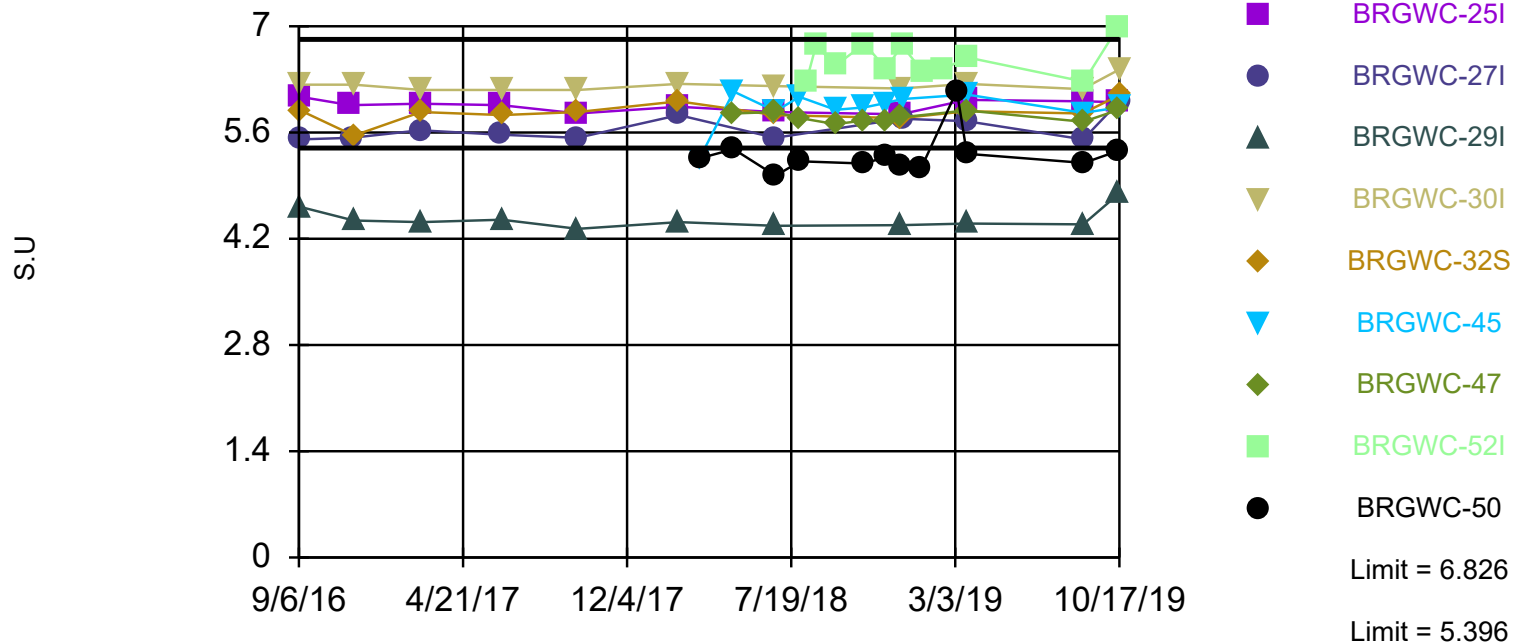
Prediction Limit Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 33 background values. 54.55% NDs. Annual per-constituent alpha = 0.02851. Individual comparison alpha = 0.001605 (1 of 2). Comparing 9 points to limit. Seasonality was not detected with 95% confidence.

Exceeds Limits: BRGWC-29I, BRGWC-52I,
BRGWC-50

Prediction Limit Interwell Parametric



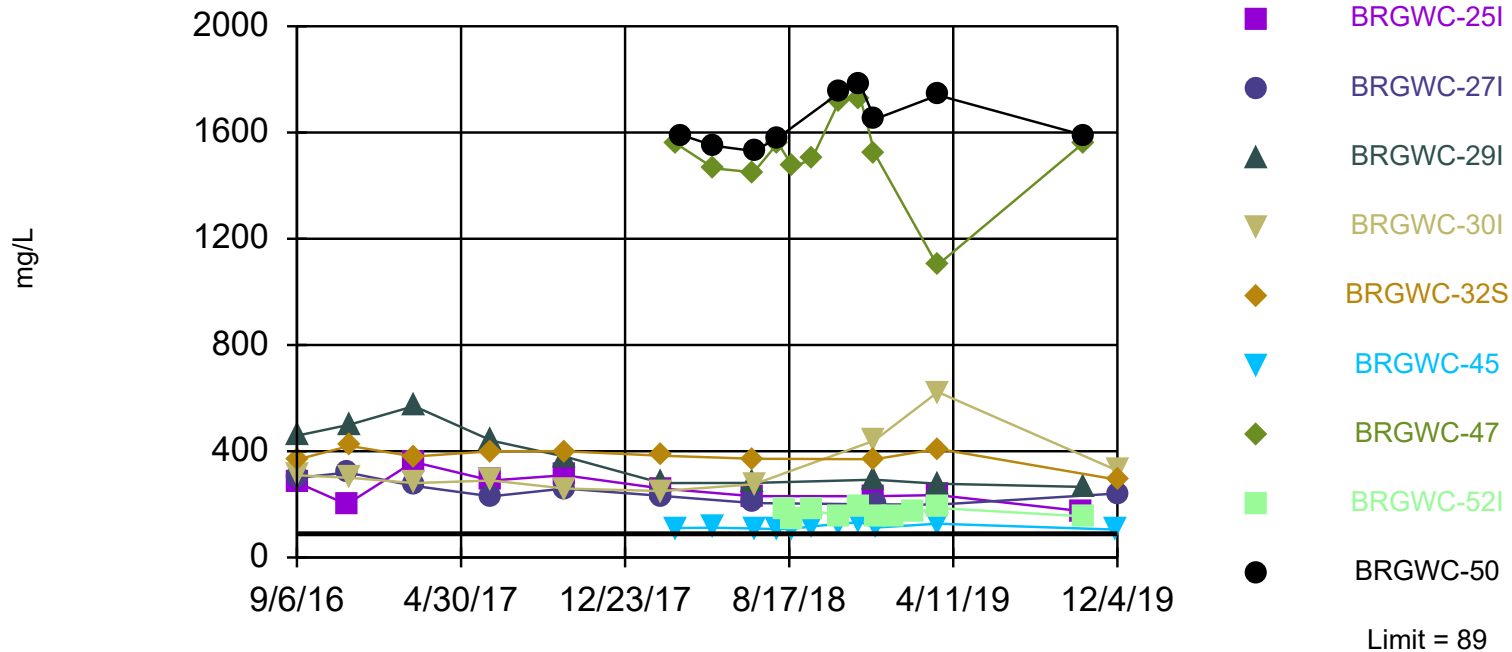
Background Data Summary: Mean=6.111, Std. Dev.=0.3473, n=36. Seasonality was not detected with 95% confidence. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9708, critical = 0.912. Kappa = 2.059 (c=7, w=9, 1 of 2, event alpha = 0.05132). Report alpha = 0.007498. Individual comparison alpha = 0.0004179. Comparing 9 points to limit.

Constituent: pH Analysis Run 1/14/2020 10:45 AM View: Pond BCD Appendix III

Branch Client: Golder Associates Data: Plant Branch Ash Pond

Exceeds Limit: BRGWC-25I, BRGWC-27I,
BRGWC-29I, BRGWC-30I, BRGWC-32S,
BRGWC-45, BRGWC-47, BRGWC-52I,..

Prediction Limit Interwell Non-parametric



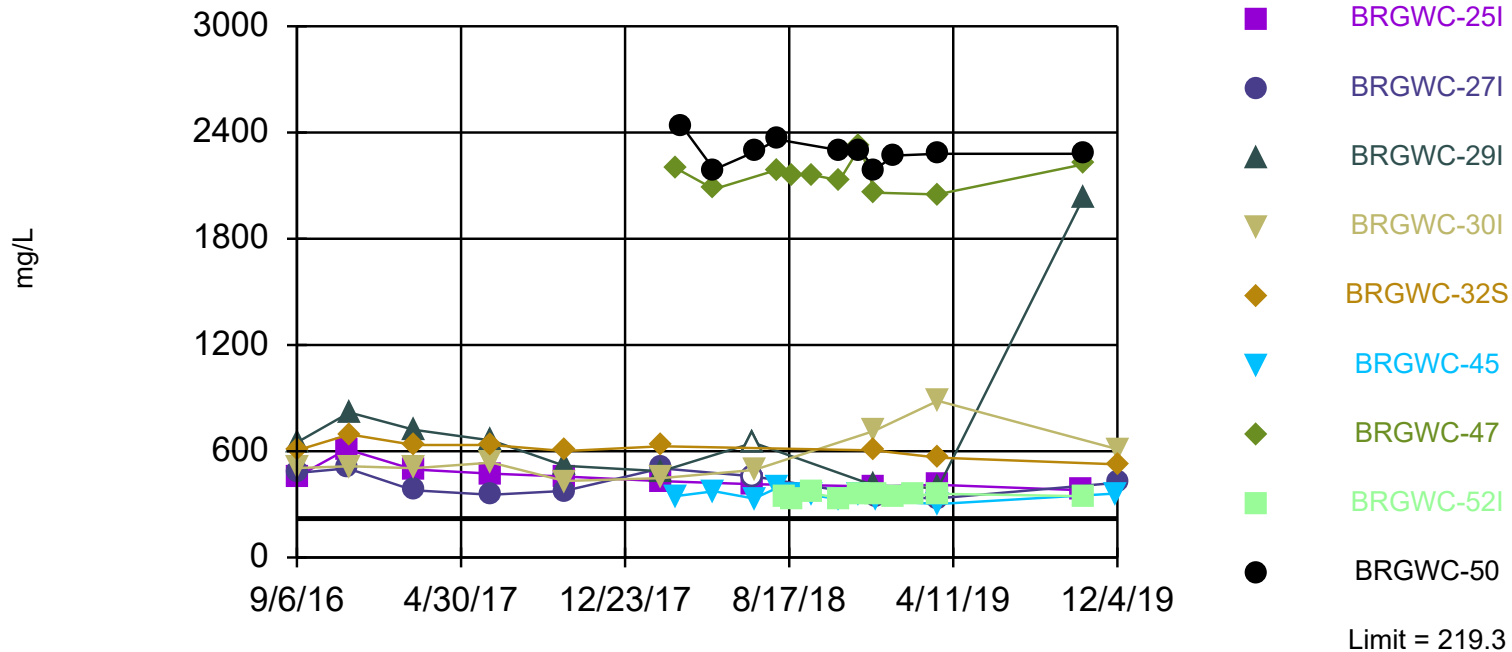
Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 32 background values. 3.125% NDs. Annual per-constituent alpha = 0.03011. Individual comparison alpha = 0.001697 (1 of 2). Comparing 9 points to limit. Seasonality was not detected with 95% confidence.

Constituent: Sulfate Analysis Run 1/14/2020 10:45 AM View: Pond BCD Appendix III
Branch Client: Golder Associates Data: Plant Branch Ash Pond

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 Hollow symbols indicate censored values.

Exceeds Limit: BRGWC-25I, BRGWC-27I,
 BRGWC-29I, BRGWC-30I, BRGWC-32S,
 BRGWC-45, BRGWC-47, BRGWC-52I,..

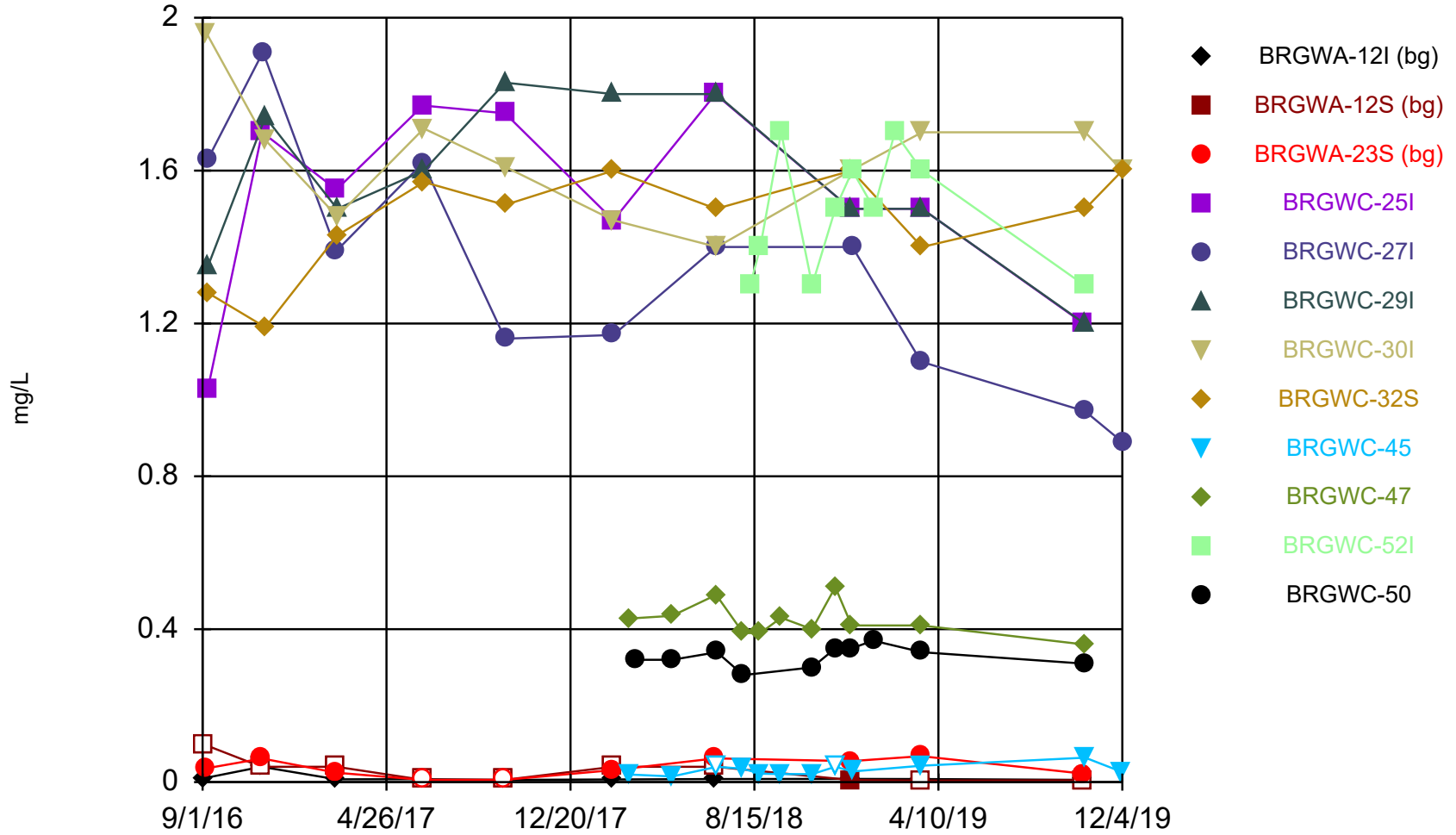
Prediction Limit
 Interwell Parametric



Background Data Summary: Mean=126.4, Std. Dev.=44.56, n=32. Seasonality was not detected with 95% confidence. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9534, critical = 0.904. Kappa = 2.085 (c=7, w=9, 1 of 2, event alpha = 0.05132). Report alpha = 0.007498. Individual comparison alpha = 0.0008358. Comparing 9 points to limit.

Constituent: Total Dissolved Solids Analysis Run 1/14/2020 10:45 AM View: Pond BCD Appendix III
 Branch Client: Golder Associates Data: Plant Branch Ash Pond

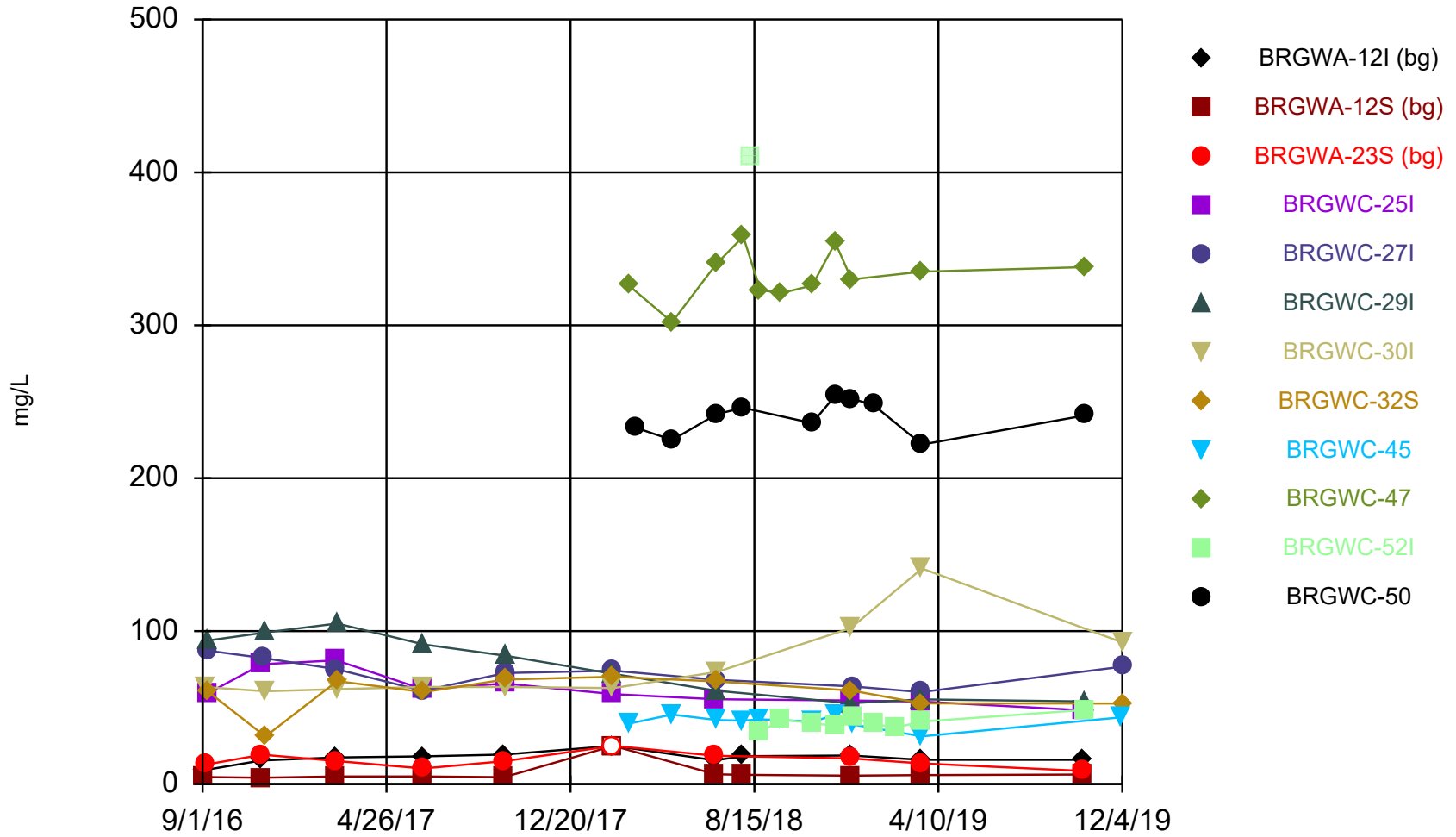
Time Series



Constituent: Boron Analysis Run 1/14/2020 10:43 AM View: Pond BCD Appendix III

Branch Client: Golder Associates Data: Plant Branch Ash Pond

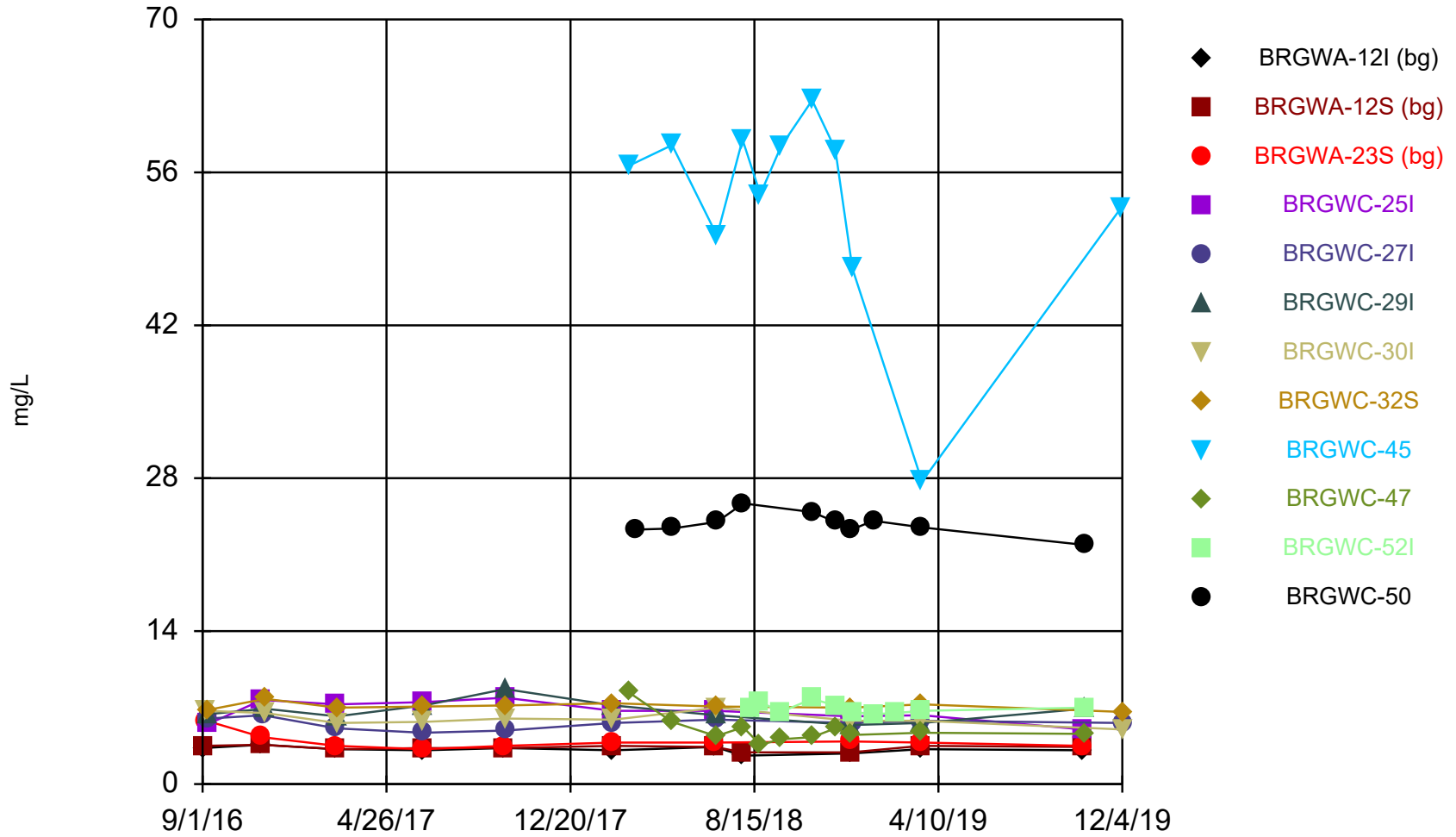
Time Series



Constituent: Calcium Analysis Run 1/14/2020 10:43 AM View: Pond BCD Appendix III

Branch Client: Golder Associates Data: Plant Branch Ash Pond

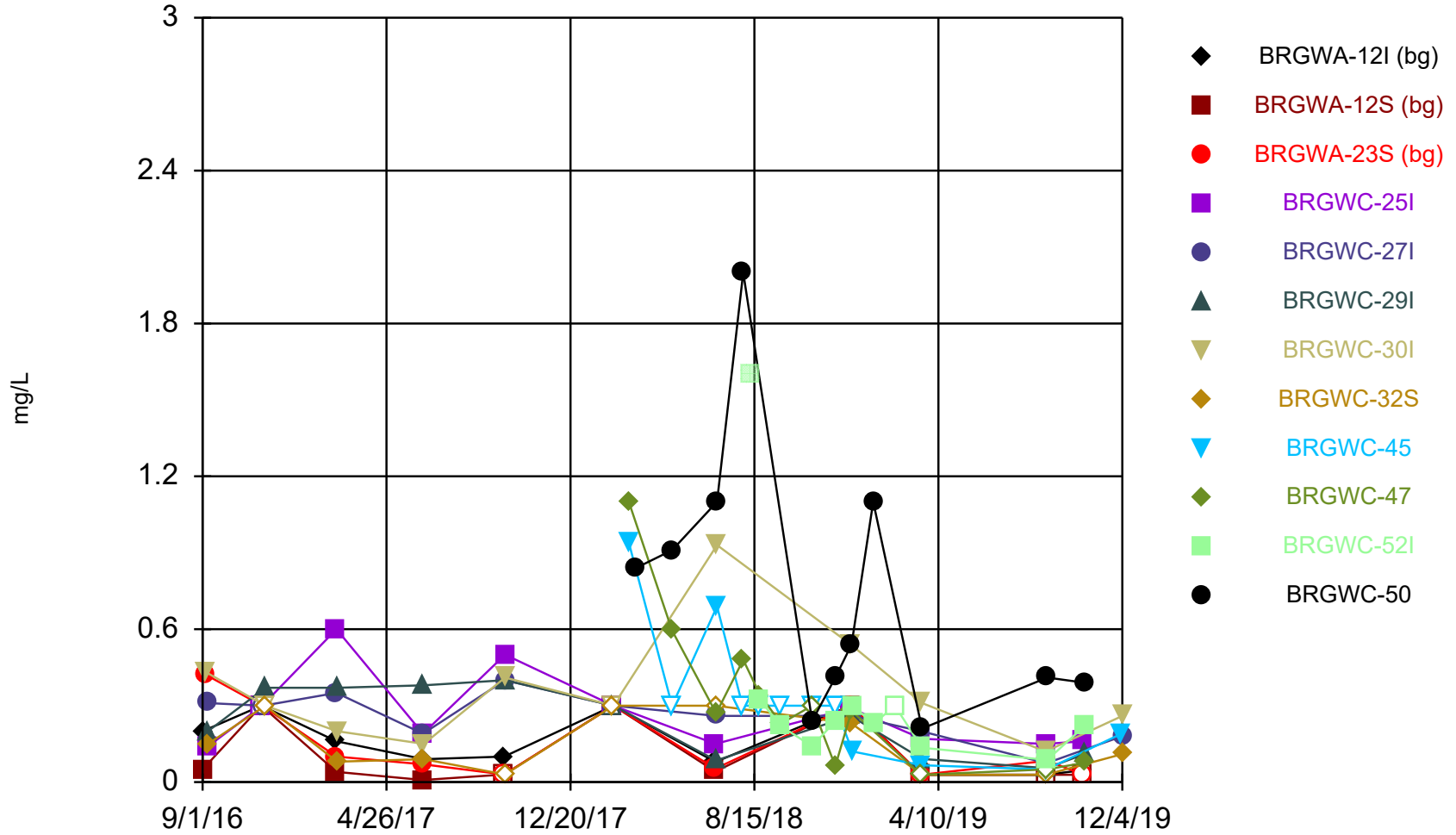
Time Series



Constituent: Chloride Analysis Run 1/14/2020 10:43 AM View: Pond BCD Appendix III

Branch Client: Golder Associates Data: Plant Branch Ash Pond

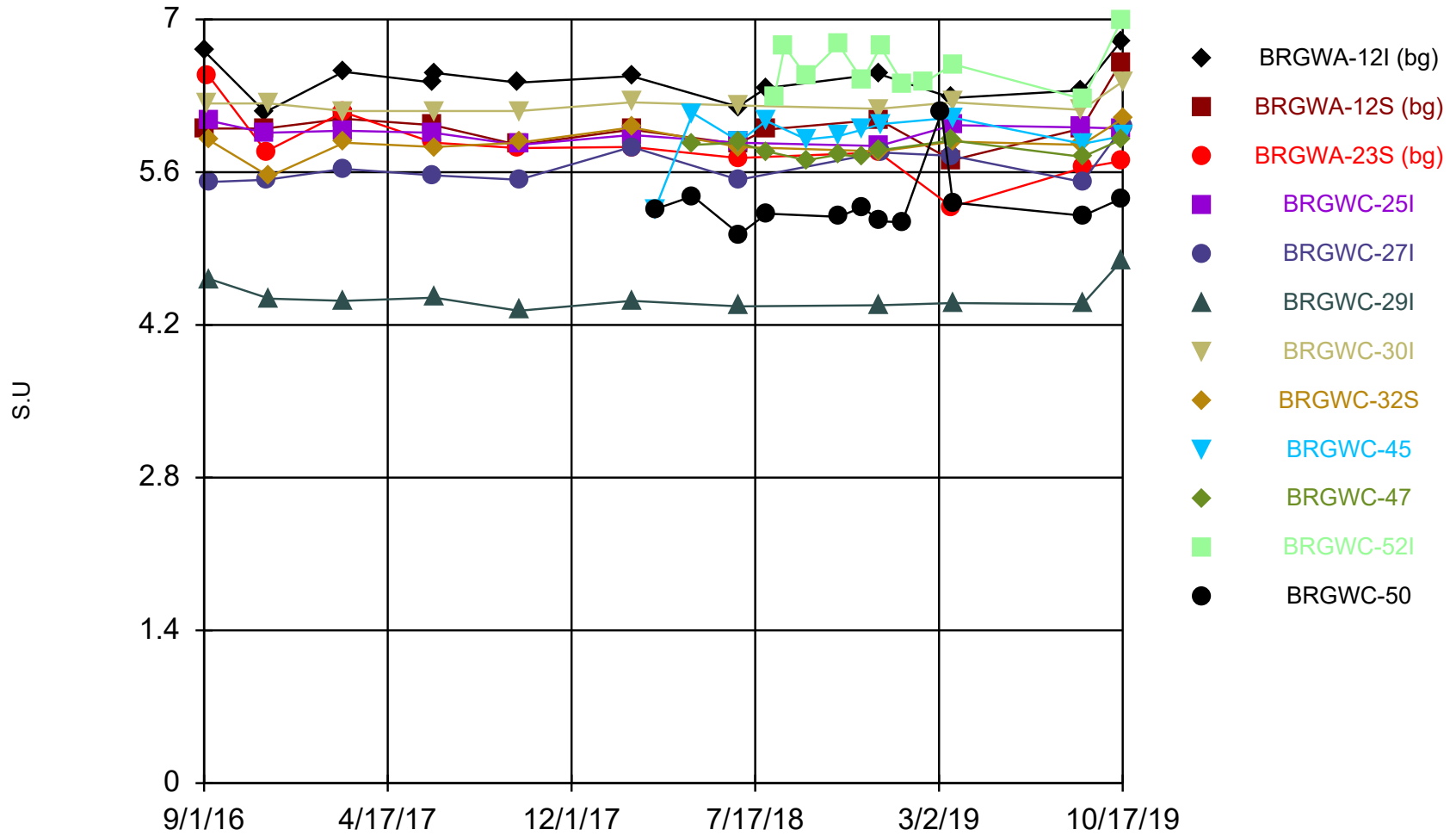
Time Series



Constituent: Fluoride Analysis Run 1/14/2020 10:43 AM View: Pond BCD Appendix III

Branch Client: Golder Associates Data: Plant Branch Ash Pond

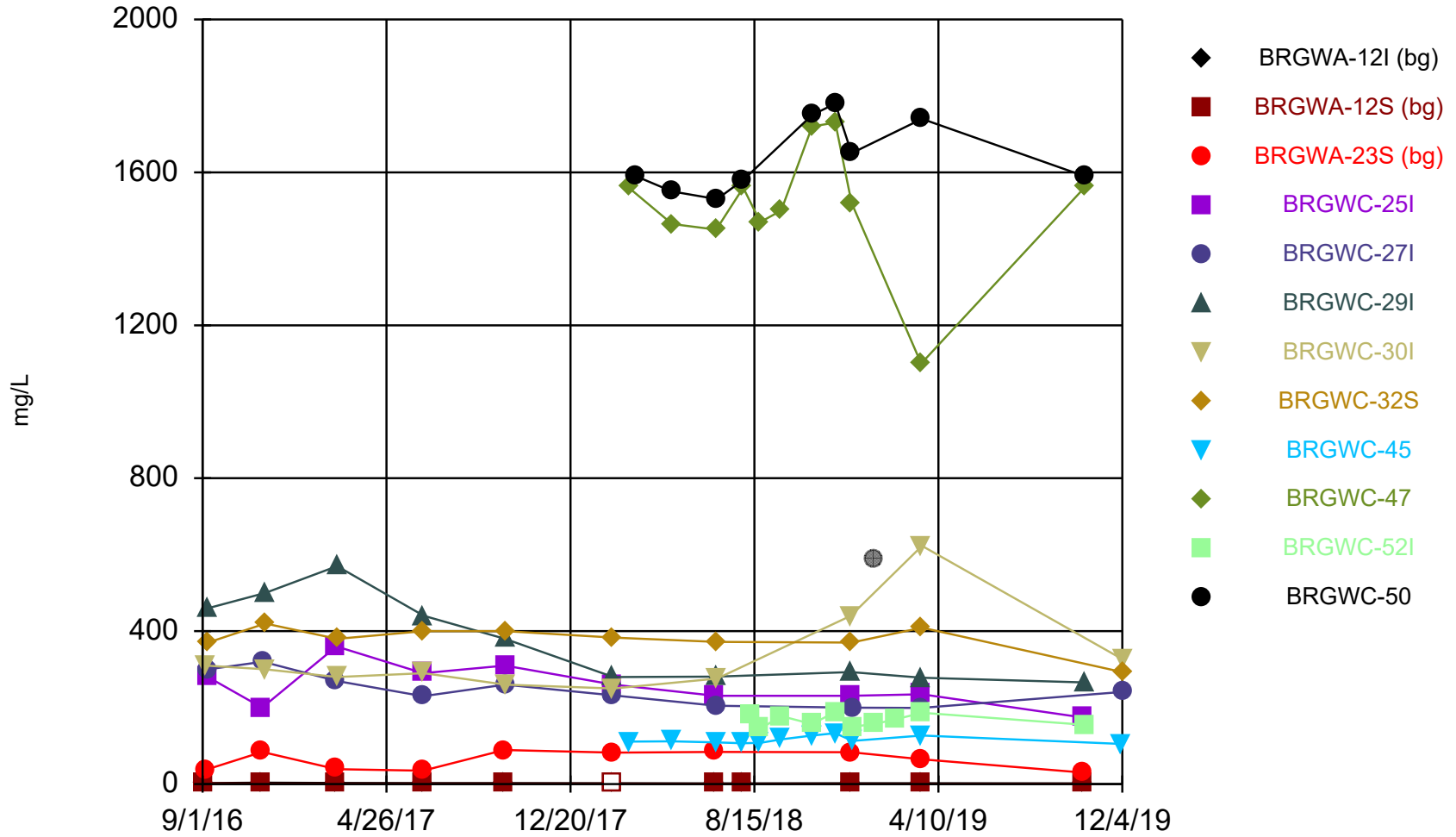
Time Series



Constituent: pH Analysis Run 1/14/2020 10:43 AM View: Pond BCD Appendix III

Branch Client: Golder Associates Data: Plant Branch Ash Pond

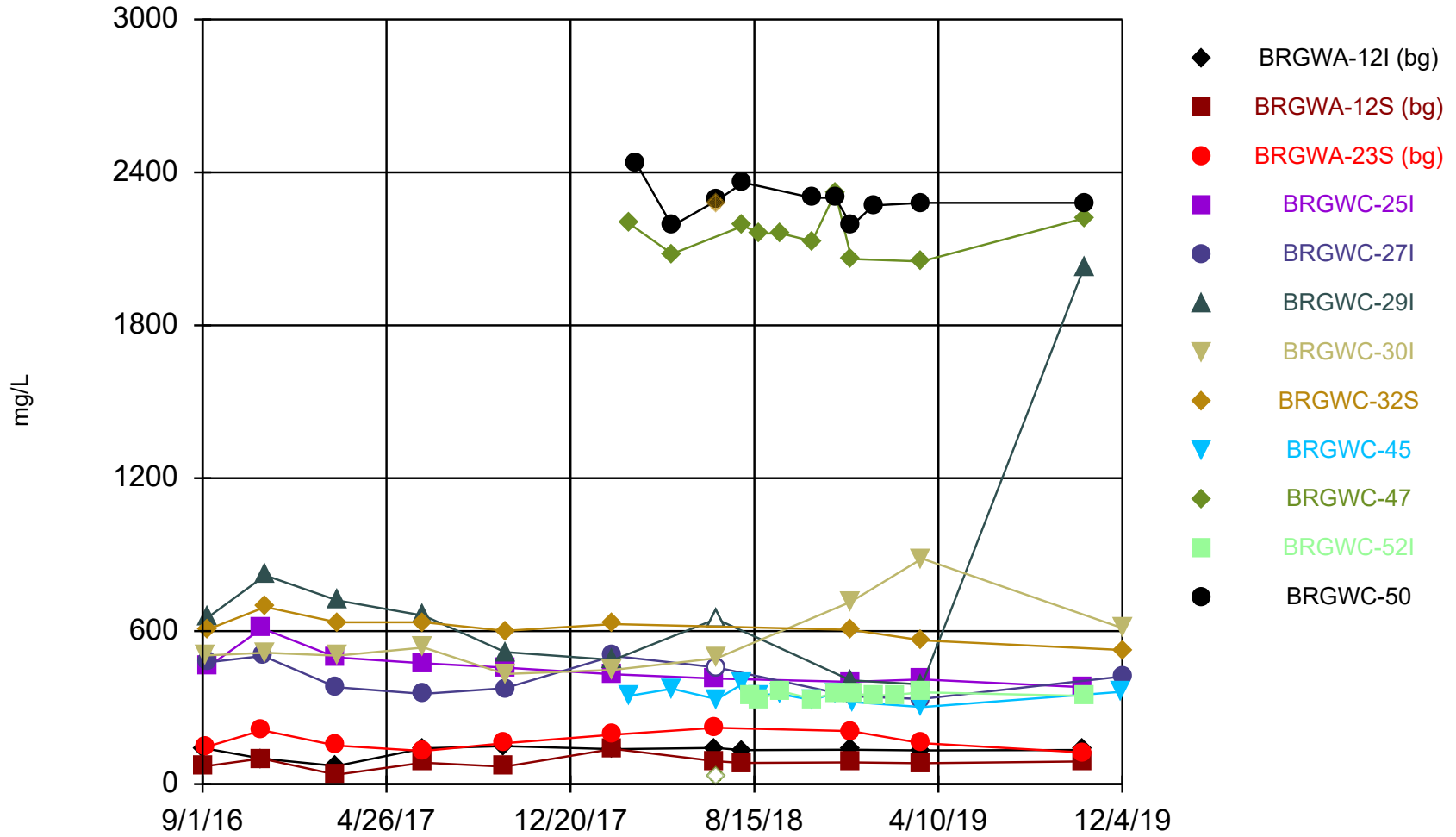
Time Series



Constituent: Sulfate Analysis Run 1/14/2020 10:43 AM View: Pond BCD Appendix III

Branch Client: Golder Associates Data: Plant Branch Ash Pond

Time Series



Constituent: Total Dissolved Solids Analysis Run 1/14/2020 10:43 AM View: Pond BCD Appendix III

Branch Client: Golder Associates Data: Plant Branch Ash Pond

Trend Test

Branch Client: Golder Associates Data: Plant Branch Ash Pond Printed 1/28/2020, 8:25 PM

<u>Constituent</u>	<u>Well</u>	<u>Slope</u>	<u>Calc.</u>	<u>Critical</u>	<u>Sig.</u>	<u>N</u>	<u>%NDs</u>	<u>Normality</u>	<u>Xform</u>	<u>Alpha</u>	<u>Method</u>
Boron (mg/L)	BRGWC-271	-0.2243	-36	-31	Yes	11	0	n/a	n/a	0.02	NP
Calcium (mg/L)	BRGWC-251	-6.303	-33	-27	Yes	10	0	n/a	n/a	0.02	NP
Calcium (mg/L)	BRGWC-291	-18.22	-35	-27	Yes	10	0	n/a	n/a	0.02	NP
Calcium (mg/L)	BRGWC-301	10.51	30	27	Yes	10	0	n/a	n/a	0.02	NP
Fluoride (mg/L)	BRGWA-121...	-0.04458	-33	-31	Yes	11	45.45	n/a	n/a	0.02	NP
Fluoride (mg/L)	BRGWC-47	-0.4291	-46	-35	Yes	12	25	n/a	n/a	0.02	NP
pH (S.U)	BRGWA-23S...	-0.1352	-37	-31	Yes	11	0	n/a	n/a	0.02	NP
Sulfate (mg/L)	BRGWA-121...	-0.3862	-37	-31	Yes	11	0	n/a	n/a	0.02	NP
Sulfate (mg/L)	BRGWA-12S...	-0.2511	-32	-31	Yes	11	9.091	n/a	n/a	0.02	NP
Sulfate (mg/L)	BRGWC-271	-38.02	-29	-27	Yes	10	0	n/a	n/a	0.02	NP
Sulfate (mg/L)	BRGWC-291	-80.65	-33	-27	Yes	10	0	n/a	n/a	0.02	NP
Total Dissolved Solids (mg/L)	BRGWC-251	-44.21	-37	-27	Yes	10	0	n/a	n/a	0.02	NP

Trend Test

Branch Client: Golder Associates Data: Plant Branch Ash Pond Printed 1/28/2020, 8:25 PM

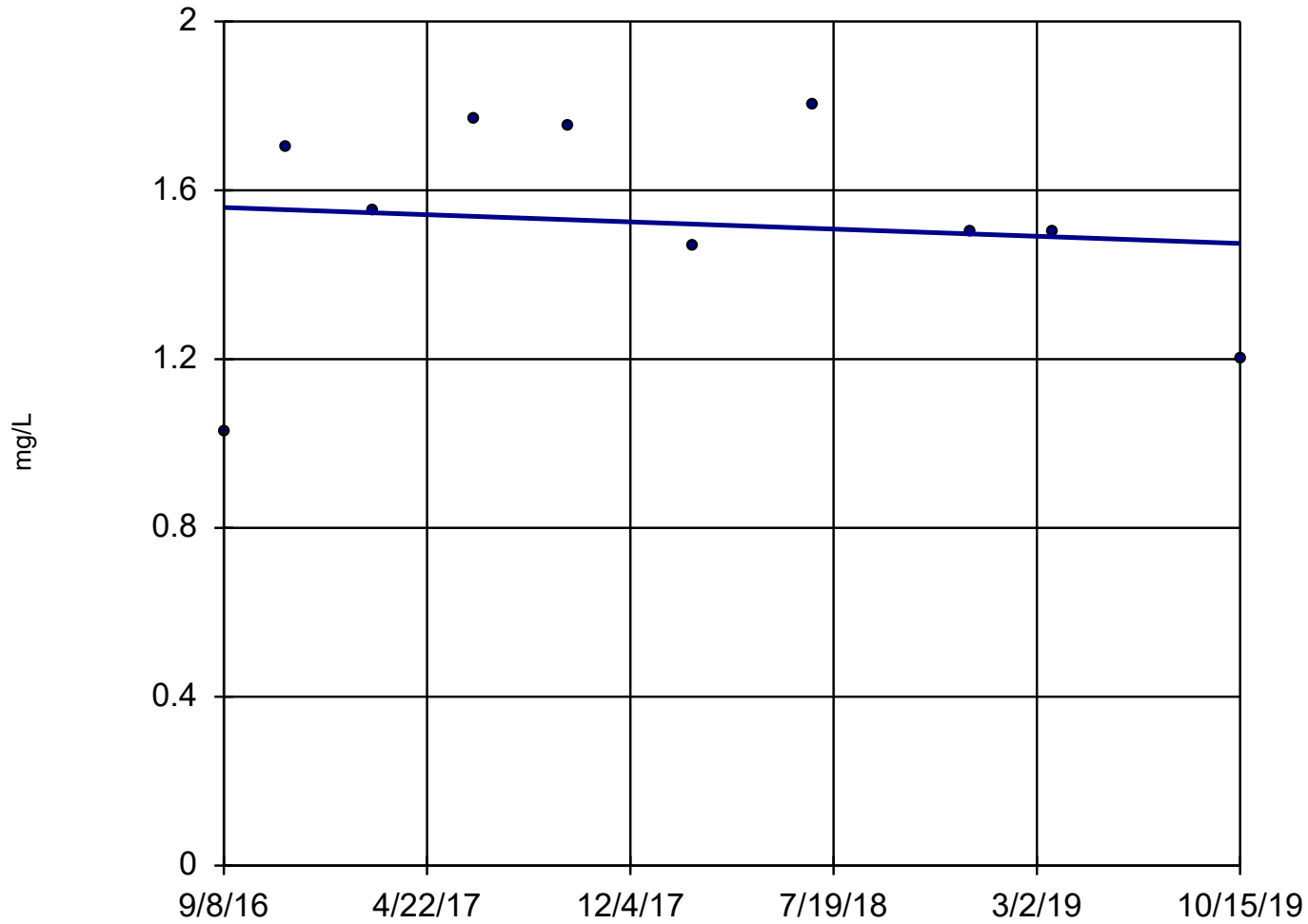
<u>Constituent</u>	<u>Well</u>	<u>Slope</u>	<u>Calc.</u>	<u>Critical</u>	<u>Sig.</u>	<u>N</u>	<u>%NDs</u>	<u>Normality</u>	<u>Xform</u>	<u>Alpha</u>	<u>Method</u>
Boron (mg/L)	BRGWA-12L...	-0.00...	-10	-27	No	10	20	n/a	n/a	0.02	NP
Boron (mg/L)	BRGWA-12S...	-0.00...	-24	-27	No	10	90	n/a	n/a	0.02	NP
Boron (mg/L)	BRGWA-23S...	0.007035	6	27	No	10	20	n/a	n/a	0.02	NP
Boron (mg/L)	BRGWC-25I	-0.02744	-4	-27	No	10	0	n/a	n/a	0.02	NP
Boron (mg/L)	BRGWC-27I	-0.2243	-36	-31	Yes	11	0	n/a	n/a	0.02	NP
Boron (mg/L)	BRGWC-29I	-0.04011	-5	-27	No	10	0	n/a	n/a	0.02	NP
Boron (mg/L)	BRGWC-30I	-0.01022	-11	-31	No	11	0	n/a	n/a	0.02	NP
Boron (mg/L)	BRGWC-32S	0.06952	21	31	No	11	0	n/a	n/a	0.02	NP
Boron (mg/L)	BRGWC-45	0.01123	34	35	No	12	16.67	n/a	n/a	0.02	NP
Boron (mg/L)	BRGWC-47	-0.02613	-11	-31	No	11	0	n/a	n/a	0.02	NP
Boron (mg/L)	BRGWC-52I	0.3259	9	27	No	10	0	n/a	n/a	0.02	NP
Boron (mg/L)	BRGWC-50	0.0226	10	27	No	10	0	n/a	n/a	0.02	NP
Calcium (mg/L)	BRGWA-12L...	0.5562	16	31	No	11	9.091	n/a	n/a	0.02	NP
Calcium (mg/L)	BRGWA-12S...	0.5214	23	31	No	11	9.091	n/a	n/a	0.02	NP
Calcium (mg/L)	BRGWA-23S...	-0.7725	-9	-27	No	10	10	n/a	n/a	0.02	NP
Calcium (mg/L)	BRGWC-25I	-6.303	-33	-27	Yes	10	0	n/a	n/a	0.02	NP
Calcium (mg/L)	BRGWC-27I	-7.194	-21	-27	No	10	0	n/a	n/a	0.02	NP
Calcium (mg/L)	BRGWC-29I	-18.22	-35	-27	Yes	10	0	n/a	n/a	0.02	NP
Calcium (mg/L)	BRGWC-30I	10.51	30	27	Yes	10	0	n/a	n/a	0.02	NP
Calcium (mg/L)	BRGWC-32S	-0.3925	-5	-27	No	10	0	n/a	n/a	0.02	NP
Calcium (mg/L)	BRGWC-45	-1.381	-8	-31	No	11	0	n/a	n/a	0.02	NP
Calcium (mg/L)	BRGWC-47	13.07	14	31	No	11	0	n/a	n/a	0.02	NP
Calcium (mg/L)	BRGWC-52I	7.431	10	23	No	9	0	n/a	n/a	0.02	NP
Calcium (mg/L)	BRGWC-50	5.185	7	27	No	10	0	n/a	n/a	0.02	NP
Chloride (mg/L)	BRGWA-12L...	-0.1375	-20	-31	No	11	0	n/a	n/a	0.02	NP
Chloride (mg/L)	BRGWA-12S...	-0.04279	-9	-31	No	11	0	n/a	n/a	0.02	NP
Chloride (mg/L)	BRGWA-23S...	-0.1801	-7	-27	No	10	0	n/a	n/a	0.02	NP
Chloride (mg/L)	BRGWC-25I	-0.6038	-18	-27	No	10	0	n/a	n/a	0.02	NP
Chloride (mg/L)	BRGWC-27I	0	-2	-27	No	10	0	n/a	n/a	0.02	NP
Chloride (mg/L)	BRGWC-29I	-0.1798	-7	-27	No	10	0	n/a	n/a	0.02	NP
Chloride (mg/L)	BRGWC-30I	-0.2829	-14	-27	No	10	0	n/a	n/a	0.02	NP
Chloride (mg/L)	BRGWC-32S	-0.06176	-3	-27	No	10	0	n/a	n/a	0.02	NP
Chloride (mg/L)	BRGWC-45	-4.38	-15	-31	No	11	0	n/a	n/a	0.02	NP
Chloride (mg/L)	BRGWC-47	-0.7533	-11	-31	No	11	0	n/a	n/a	0.02	NP
Chloride (mg/L)	BRGWC-52I	-0.6083	-10	-27	No	10	0	n/a	n/a	0.02	NP
Chloride (mg/L)	BRGWC-50	-0.6887	-5	-27	No	10	0	n/a	n/a	0.02	NP
Fluoride (mg/L)	BRGWA-12L...	-0.04458	-33	-31	Yes	11	45.45	n/a	n/a	0.02	NP
Fluoride (mg/L)	BRGWA-12S...	-0.00...	-15	-31	No	11	63.64	n/a	n/a	0.02	NP
Fluoride (mg/L)	BRGWA-23S...	-0.04294	-27	-31	No	11	54.55	n/a	n/a	0.02	NP
Fluoride (mg/L)	BRGWC-25I	-2.1e-9	1	31	No	11	18.18	n/a	n/a	0.02	NP
Fluoride (mg/L)	BRGWC-27I	-0.04355	-15	-31	No	11	18.18	n/a	n/a	0.02	NP
Fluoride (mg/L)	BRGWC-29I	-0.06389	-22	-31	No	11	9.091	n/a	n/a	0.02	NP
Fluoride (mg/L)	BRGWC-30I	-1.1e-8	-2	-31	No	11	18.18	n/a	n/a	0.02	NP
Fluoride (mg/L)	BRGWC-32S	-0.00...	-10	-31	No	11	54.55	n/a	n/a	0.02	NP
Fluoride (mg/L)	BRGWC-45	-0.1212	-31	-35	No	12	58.33	n/a	n/a	0.02	NP
Fluoride (mg/L)	BRGWC-47	-0.4291	-46	-35	Yes	12	25	n/a	n/a	0.02	NP
Fluoride (mg/L)	BRGWC-52I	-0.1167	-20	-27	No	10	10	n/a	n/a	0.02	NP
Fluoride (mg/L)	BRGWC-50	-0.3561	-17	-31	No	11	0	n/a	n/a	0.02	NP
pH (S.U)	BRGWA-12L...	-0.03202	-9	-39	No	13	0	n/a	n/a	0.02	NP
pH (S.U)	BRGWA-12S...	0	0	35	No	12	0	n/a	n/a	0.02	NP

Trend Test

Branch Client: Golder Associates Data: Plant Branch Ash Pond Printed 1/28/2020, 8:25 PM

<u>Constituent</u>	<u>Well</u>	<u>Slope</u>	<u>Calc.</u>	<u>Critical</u>	<u>Sig.</u>	<u>N</u>	<u>%NDs</u>	<u>Normality</u>	<u>Xform</u>	<u>Alpha</u>	<u>Method</u>
pH (S.U)	BRGWA-23S...	-0.1352	-37	-31	Yes	11	0	n/a	n/a	0.02	NP
pH (S.U)	BRGWC-25I	-0.01604	-6	-31	No	11	0	n/a	n/a	0.02	NP
pH (S.U)	BRGWC-27I	0.09436	17	31	No	11	0	n/a	n/a	0.02	NP
pH (S.U)	BRGWC-29I	-0.01807	-10	-31	No	11	0	n/a	n/a	0.02	NP
pH (S.U)	BRGWC-30I	0.00454	12	31	No	11	0	n/a	n/a	0.02	NP
pH (S.U)	BRGWC-32S	0.01714	9	31	No	11	0	n/a	n/a	0.02	NP
pH (S.U)	BRGWC-45	0.0472	6	31	No	11	0	n/a	n/a	0.02	NP
pH (S.U)	BRGWC-47	0.023	4	27	No	10	0	n/a	n/a	0.02	NP
pH (S.U)	BRGWC-52I	0	0	31	No	11	0	n/a	n/a	0.02	NP
pH (S.U)	BRGWC-50	0.06623	8	35	No	12	0	n/a	n/a	0.02	NP
Sulfate (mg/L)	BRGWA-12I...	-0.3862	-37	-31	Yes	11	0	n/a	n/a	0.02	NP
Sulfate (mg/L)	BRGWA-12S...	-0.2511	-32	-31	Yes	11	9.091	n/a	n/a	0.02	NP
Sulfate (mg/L)	BRGWA-23S...	-1.447	-3	-27	No	10	0	n/a	n/a	0.02	NP
Sulfate (mg/L)	BRGWC-25I	-34.48	-18	-27	No	10	0	n/a	n/a	0.02	NP
Sulfate (mg/L)	BRGWC-27I	-38.02	-29	-27	Yes	10	0	n/a	n/a	0.02	NP
Sulfate (mg/L)	BRGWC-29I	-80.65	-33	-27	Yes	10	0	n/a	n/a	0.02	NP
Sulfate (mg/L)	BRGWC-30I	14.96	5	27	No	10	0	n/a	n/a	0.02	NP
Sulfate (mg/L)	BRGWC-32S	-15.41	-11	-27	No	10	0	n/a	n/a	0.02	NP
Sulfate (mg/L)	BRGWC-45	11.12	10	31	No	11	0	n/a	n/a	0.02	NP
Sulfate (mg/L)	BRGWC-47	55.87	8	31	No	11	0	n/a	n/a	0.02	NP
Sulfate (mg/L)	BRGWC-52I	0	0	27	No	10	0	n/a	n/a	0.02	NP
Sulfate (mg/L)	BRGWC-50	133.5	11	23	No	9	0	n/a	n/a	0.02	NP
Total Dissolved Solids (mg/L)	BRGWA-12I...	-2.378	-8	-31	No	11	0	n/a	n/a	0.02	NP
Total Dissolved Solids (mg/L)	BRGWA-12S...	4.966	7	31	No	11	0	n/a	n/a	0.02	NP
Total Dissolved Solids (mg/L)	BRGWA-23S...	4.828	3	27	No	10	0	n/a	n/a	0.02	NP
Total Dissolved Solids (mg/L)	BRGWC-25I	-44.21	-37	-27	Yes	10	0	n/a	n/a	0.02	NP
Total Dissolved Solids (mg/L)	BRGWC-27I	-26.61	-16	-27	No	10	10	n/a	n/a	0.02	NP
Total Dissolved Solids (mg/L)	BRGWC-29I	-116.3	-17	-27	No	10	10	n/a	n/a	0.02	NP
Total Dissolved Solids (mg/L)	BRGWC-30I	41.71	13	27	No	10	0	n/a	n/a	0.02	NP
Total Dissolved Solids (mg/L)	BRGWC-32S	-34.29	-23	-23	No	9	0	n/a	n/a	0.02	NP
Total Dissolved Solids (mg/L)	BRGWC-45	-27.68	-11	-31	No	11	0	n/a	n/a	0.02	NP
Total Dissolved Solids (mg/L)	BRGWC-47	-40.56	-8	-27	No	10	0	n/a	n/a	0.02	NP
Total Dissolved Solids (mg/L)	BRGWC-52I	9.777	7	27	No	10	0	n/a	n/a	0.02	NP
Total Dissolved Solids (mg/L)	BRGWC-50	-36.14	-12	-27	No	10	0	n/a	n/a	0.02	NP

Sen's Slope Estimator BRGWC-25I



n = 10

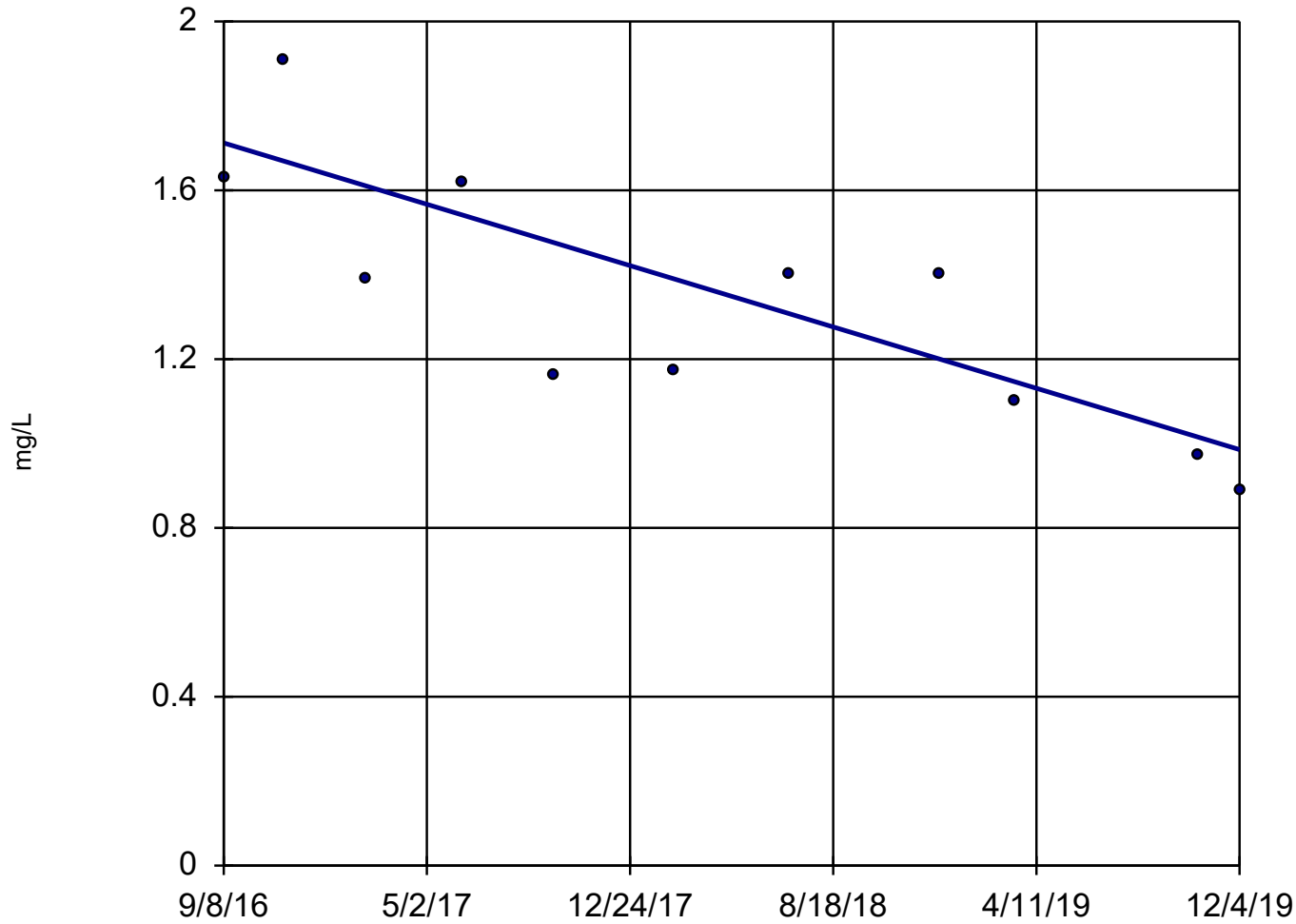
Slope = -0.02744
units per year.

Mann-Kendall
statistic = -4
critical = -27

Trend not sig-
nificant at 98%
confidence level
($\alpha = 0.01$ per
tail).

Constituent: Boron Analysis Run 1/28/2020 6:26 PM View: Default
Branch Client: Golder Associates Data: Plant Branch Ash Pond

Sen's Slope Estimator BRGWC-27I



n = 11

Slope = -0.2243
units per year.

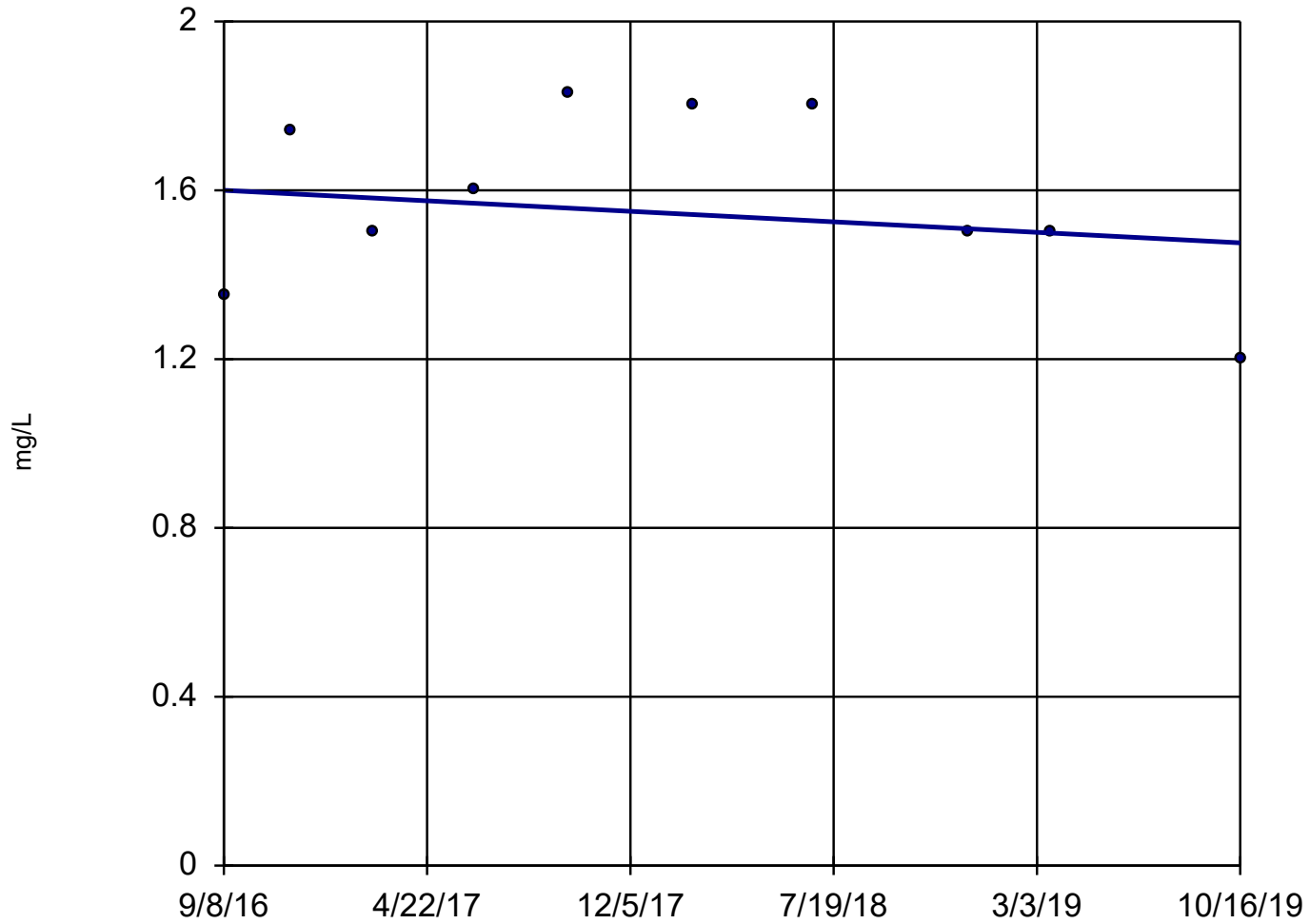
Mann-Kendall
statistic = -36
critical = -31

Decreasing trend
significant at 98%
confidence level
($\alpha = 0.01$ per
tail).

Constituent: Boron Analysis Run 1/28/2020 6:26 PM View: Default
Branch Client: Golder Associates Data: Plant Branch Ash Pond

Sen's Slope Estimator

BRGWC-29I



n = 10

Slope = -0.04011
units per year.

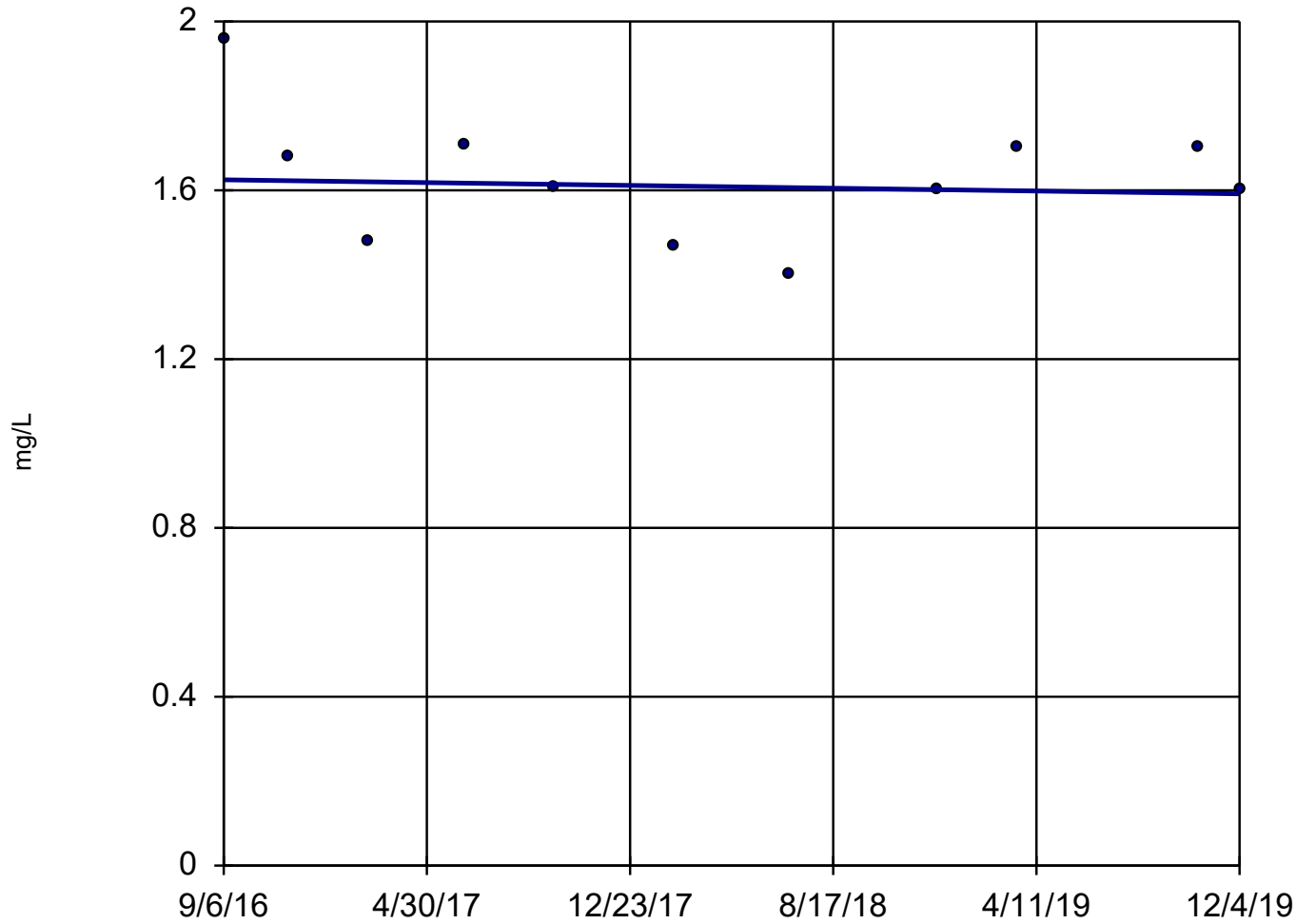
Mann-Kendall
statistic = -5
critical = -27

Trend not sig-
nificant at 98%
confidence level
($\alpha = 0.01$ per
tail).

Constituent: Boron Analysis Run 1/28/2020 6:26 PM View: Default

Branch Client: Golder Associates Data: Plant Branch Ash Pond

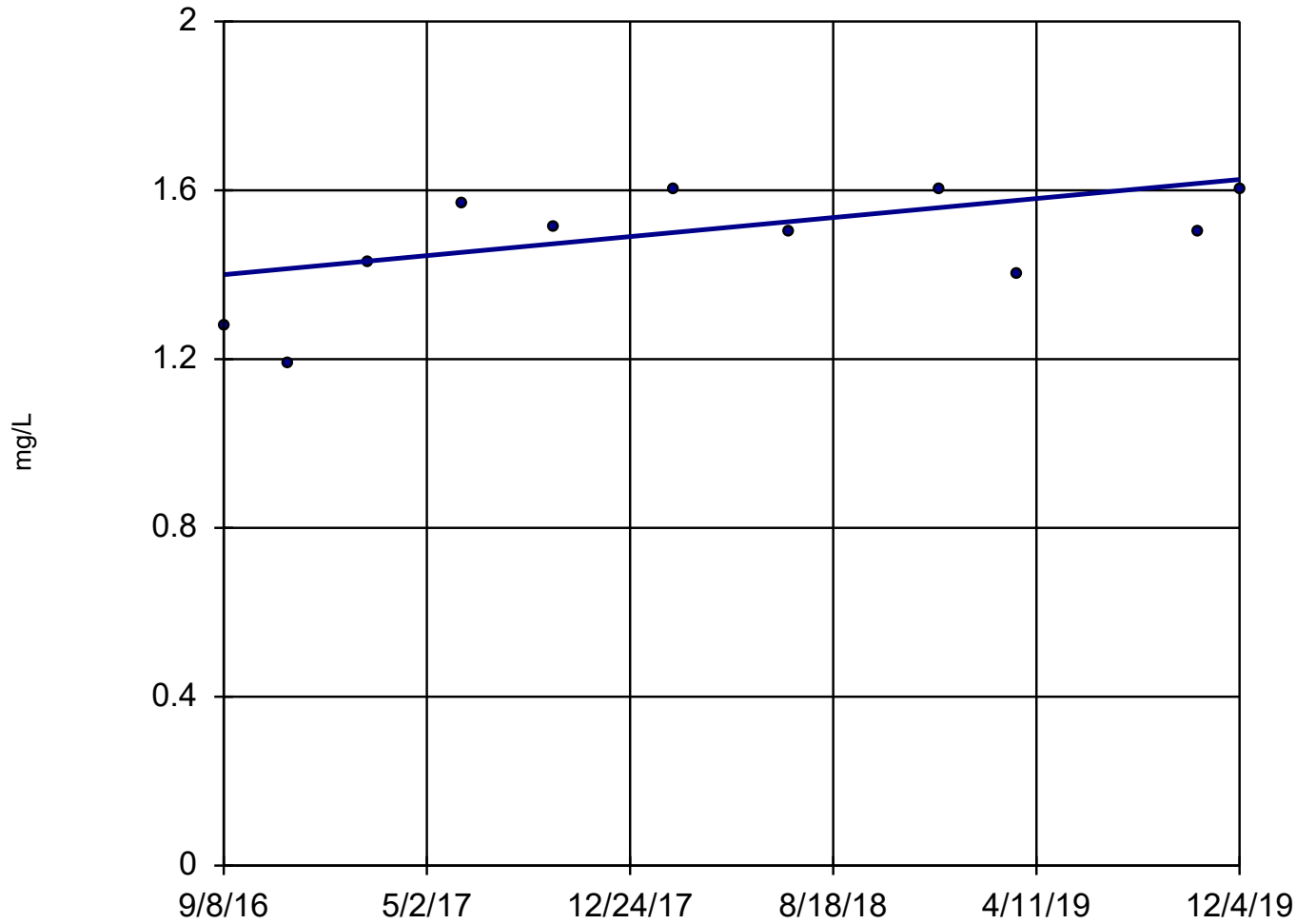
Sen's Slope Estimator BRGWC-30I



n = 11
Slope = -0.01022
units per year.
Mann-Kendall
statistic = -11
critical = -31
Trend not sig-
nificant at 98%
confidence level
($\alpha = 0.01$ per
tail).

Constituent: Boron Analysis Run 1/28/2020 6:27 PM View: Default
Branch Client: Golder Associates Data: Plant Branch Ash Pond

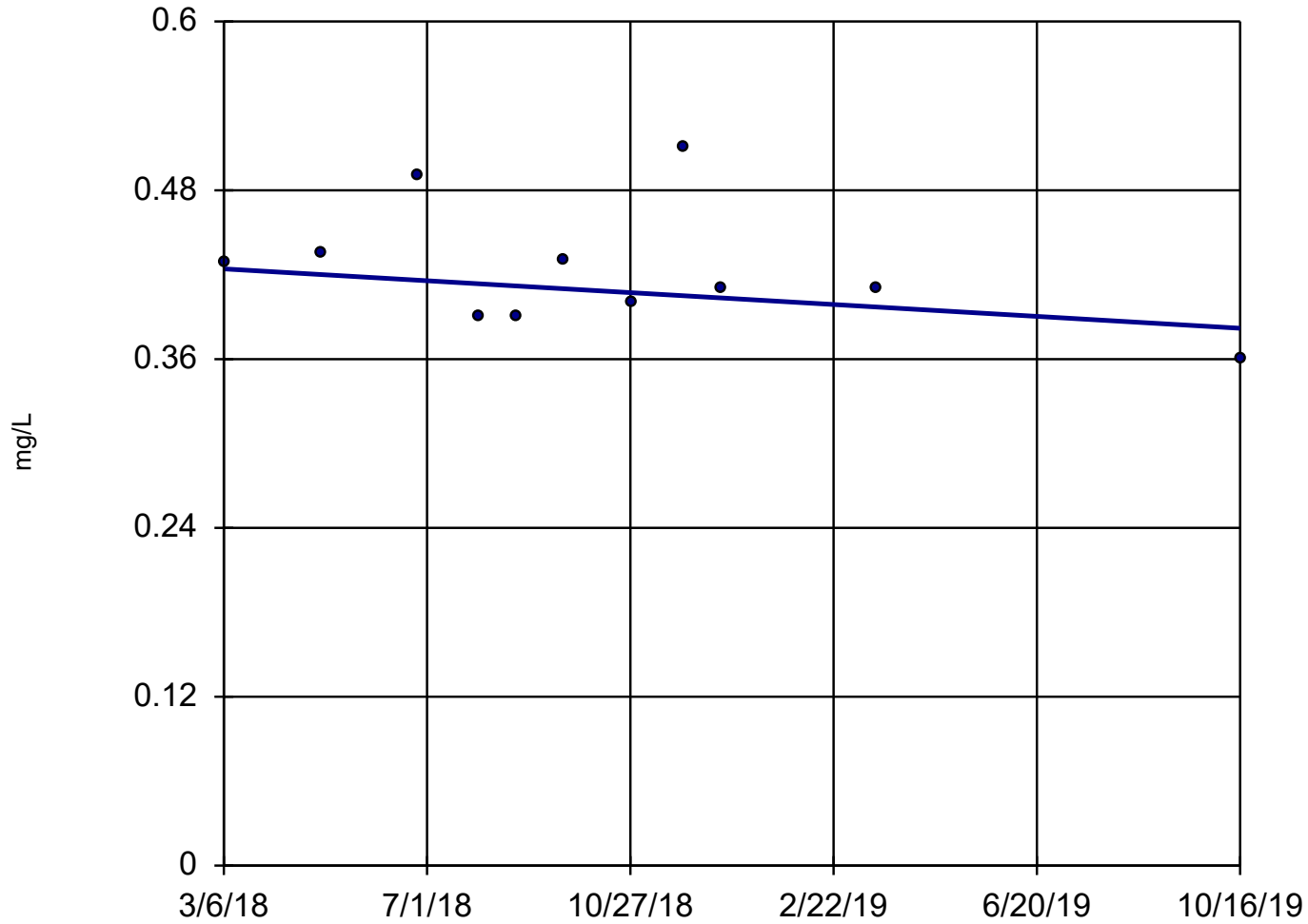
Sen's Slope Estimator BRGWC-32S



n = 11
Slope = 0.06952
units per year.
Mann-Kendall
statistic = 21
critical = 31
Trend not sig-
nificant at 98%
confidence level
($\alpha = 0.01$ per
tail).

Constituent: Boron Analysis Run 1/28/2020 6:27 PM View: Default
Branch Client: Golder Associates Data: Plant Branch Ash Pond

Sen's Slope Estimator BRGWC-47



n = 11

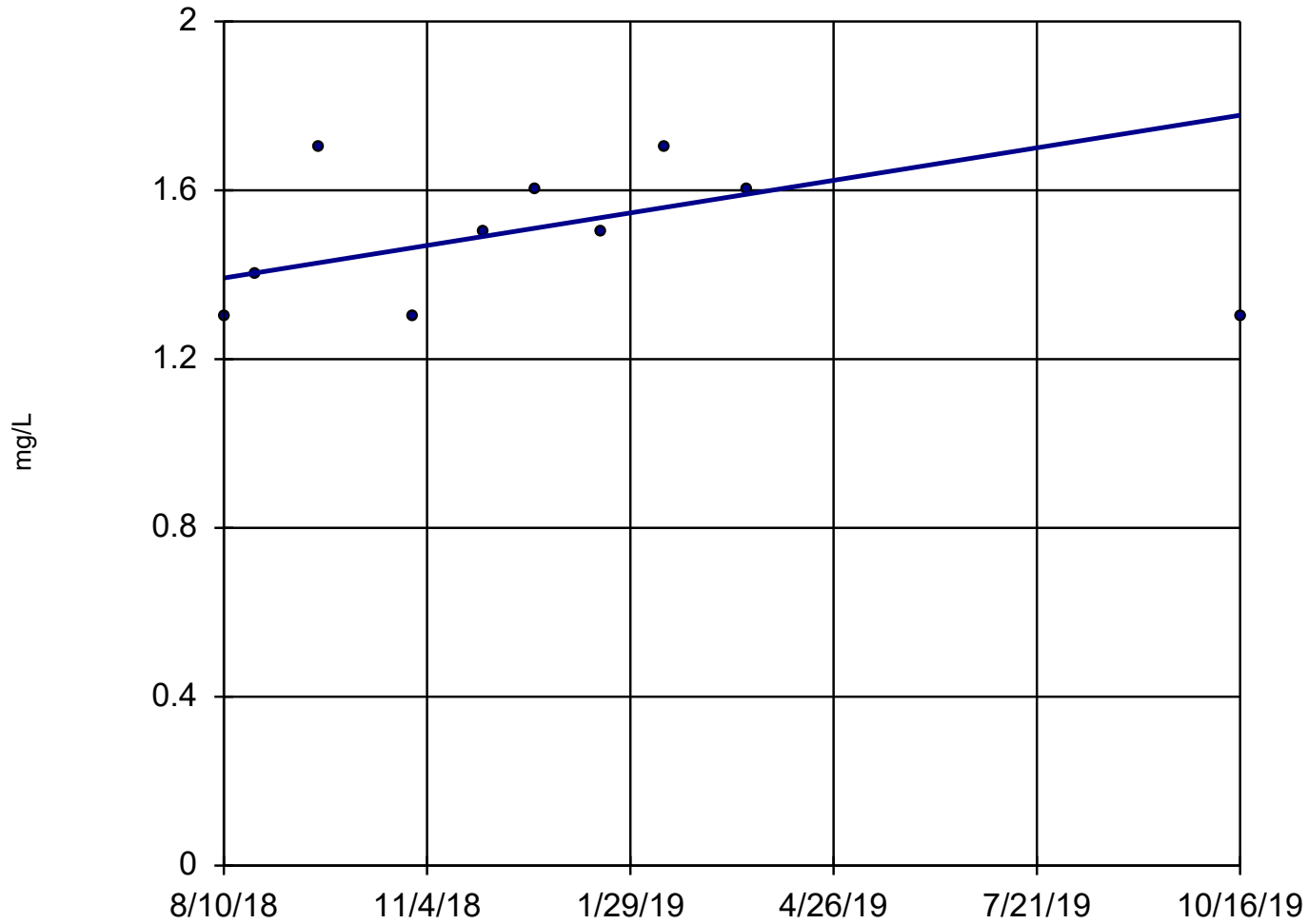
Slope = -0.02613
units per year.

Mann-Kendall
statistic = -11
critical = -31

Trend not sig-
nificant at 98%
confidence level
($\alpha = 0.01$ per
tail).

Constituent: Boron Analysis Run 1/28/2020 6:27 PM View: Default
Branch Client: Golder Associates Data: Plant Branch Ash Pond

Sen's Slope Estimator BRGWC-52I



n = 10

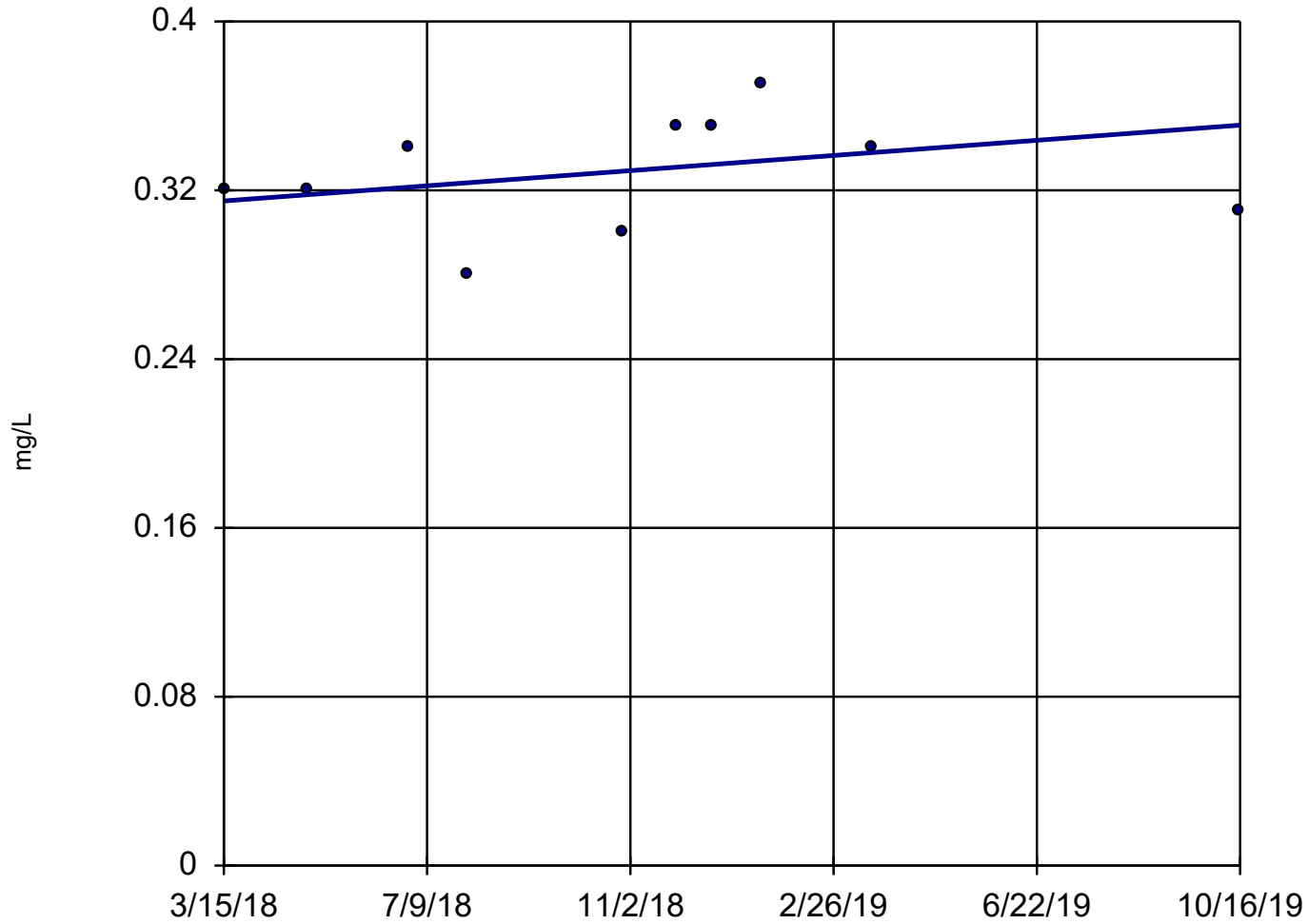
Slope = 0.3259
units per year.

Mann-Kendall
statistic = 9
critical = 27

Trend not sig-
nificant at 98%
confidence level
($\alpha = 0.01$ per
tail).

Constituent: Boron Analysis Run 1/28/2020 6:27 PM View: Default
Branch Client: Golder Associates Data: Plant Branch Ash Pond

Sen's Slope Estimator BRGWC-50



n = 10

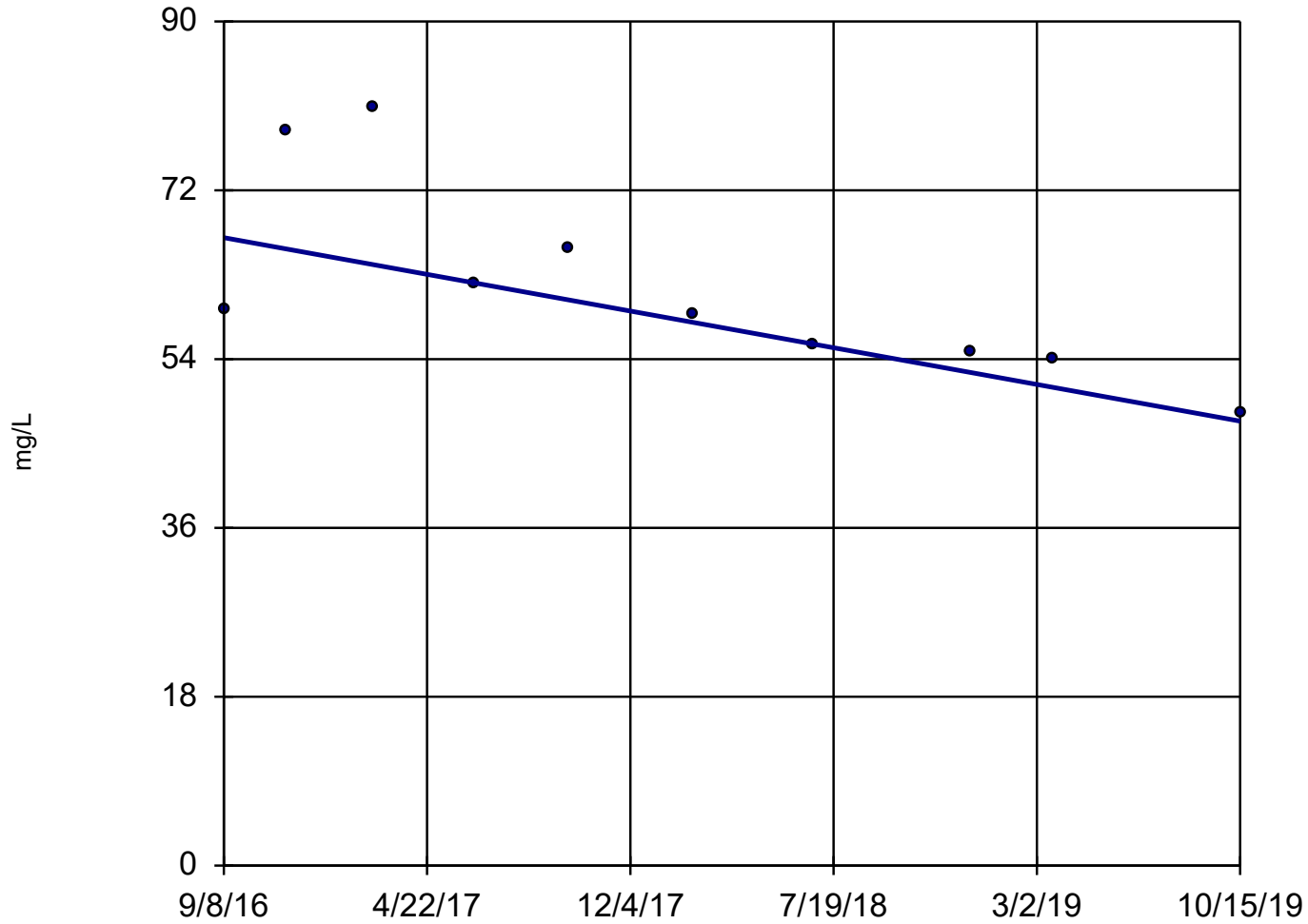
Slope = 0.0226
units per year.

Mann-Kendall
statistic = 10
critical = 27

Trend not sig-
nificant at 98%
confidence level
($\alpha = 0.01$ per
tail).

Constituent: Boron Analysis Run 1/28/2020 6:27 PM View: Default
Branch Client: Golder Associates Data: Plant Branch Ash Pond

Sen's Slope Estimator BRGWC-25I



n = 10

Slope = -6.303
units per year.

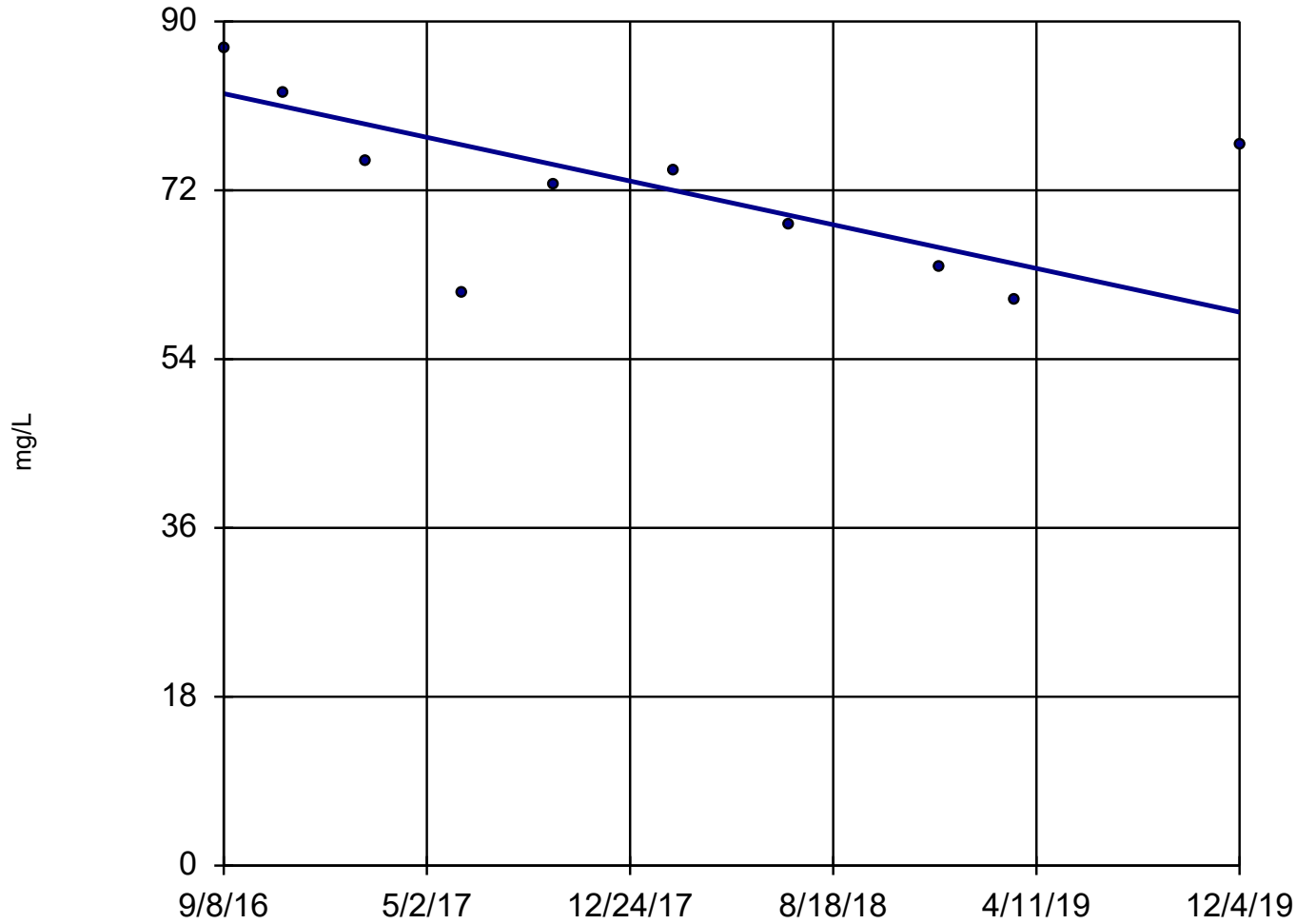
Mann-Kendall
statistic = -33
critical = -27

Decreasing trend
significant at 98%
confidence level
($\alpha = 0.01$ per
tail).

Constituent: Calcium Analysis Run 1/28/2020 6:27 PM View: Default

Branch Client: Golder Associates Data: Plant Branch Ash Pond

Sen's Slope Estimator BRGWC-27I



n = 10

Slope = -7.194
units per year.

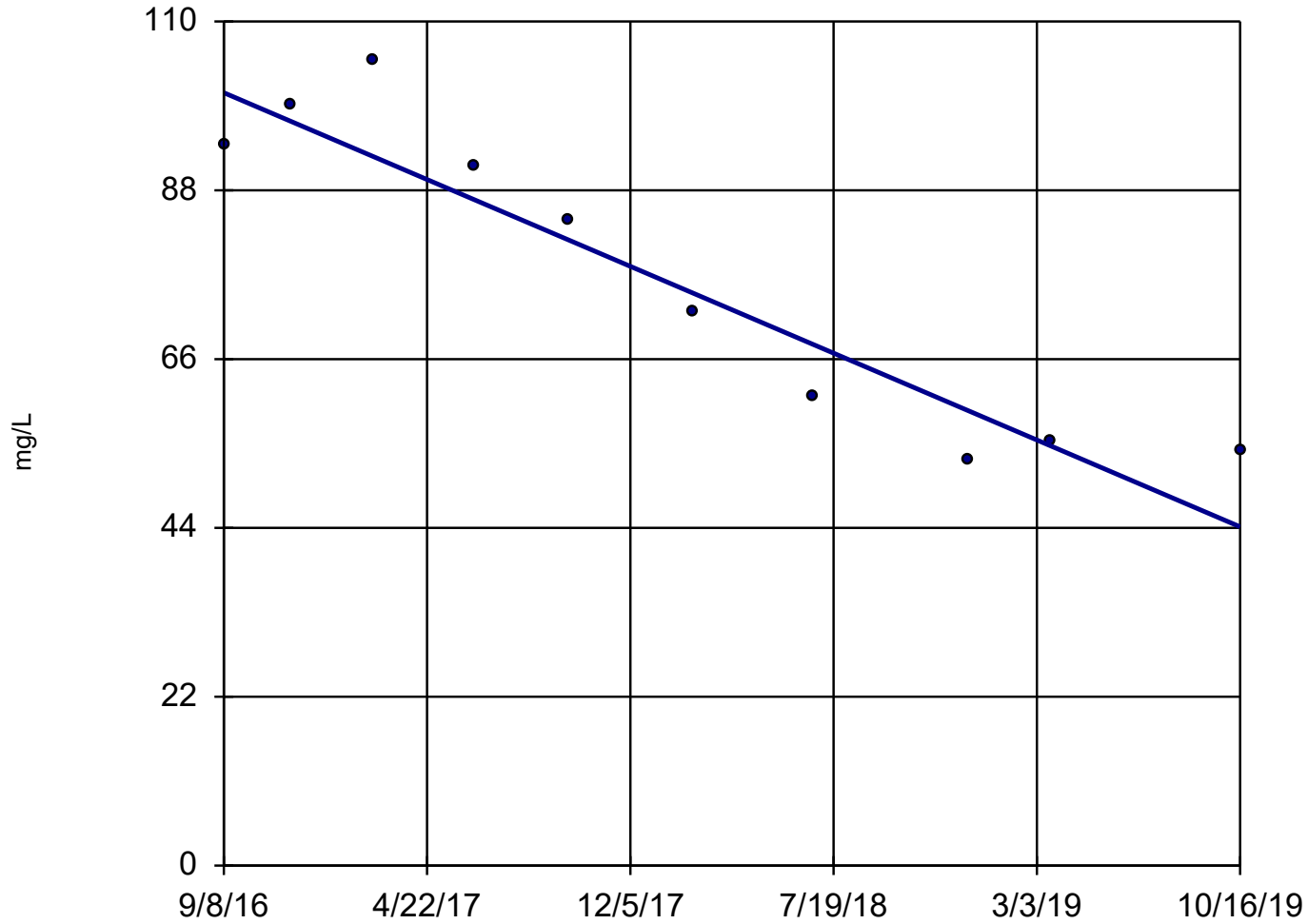
Mann-Kendall
statistic = -21
critical = -27

Trend not sig-
nificant at 98%
confidence level
($\alpha = 0.01$ per
tail).

Constituent: Calcium Analysis Run 1/28/2020 6:27 PM View: Default

Branch Client: Golder Associates Data: Plant Branch Ash Pond

Sen's Slope Estimator BRGWC-29I



n = 10

Slope = -18.22
units per year.

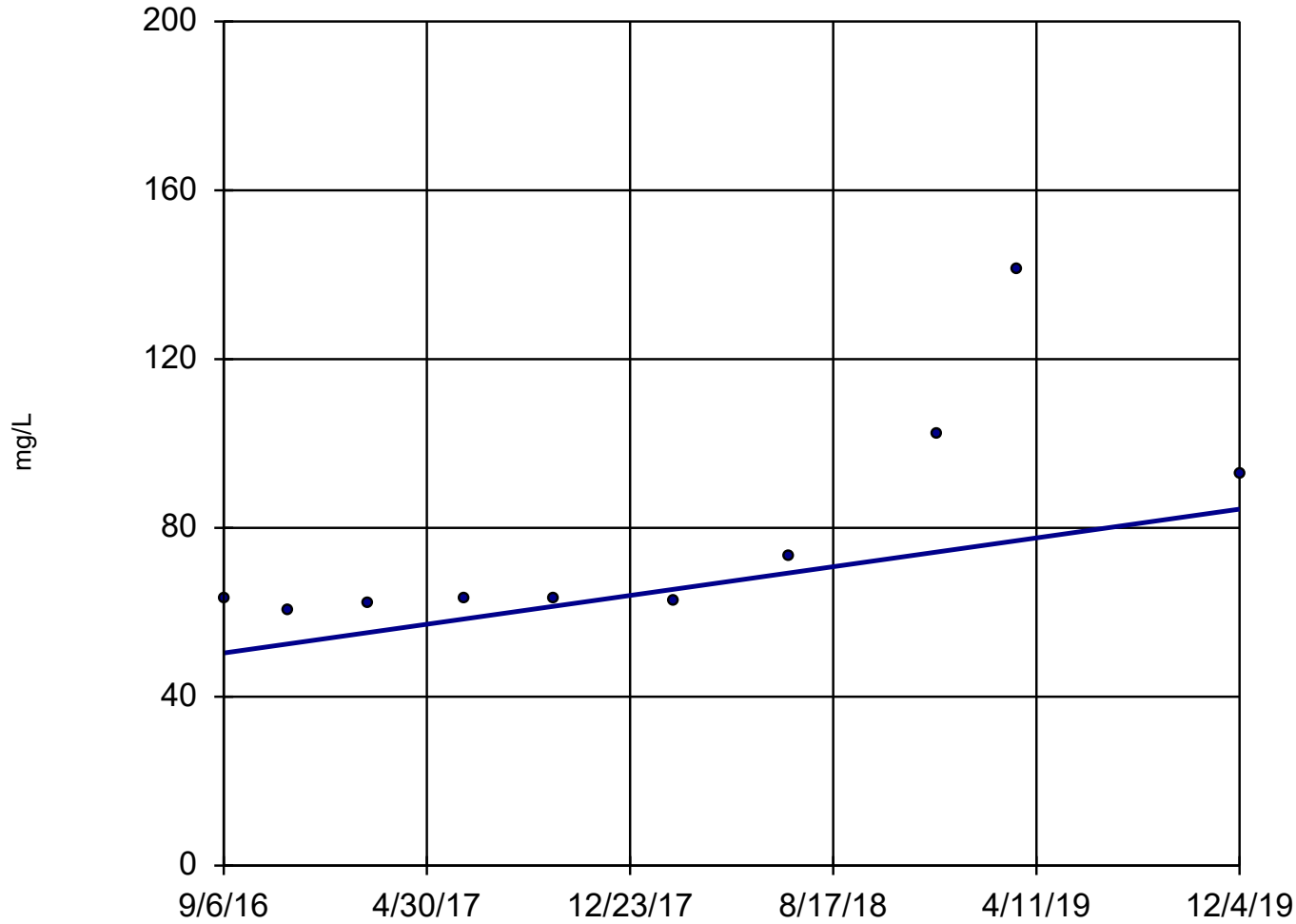
Mann-Kendall
statistic = -35
critical = -27

Decreasing trend
significant at 98%
confidence level
($\alpha = 0.01$ per
tail).

Constituent: Calcium Analysis Run 1/28/2020 6:27 PM View: Default

Branch Client: Golder Associates Data: Plant Branch Ash Pond

Sen's Slope Estimator BRGWC-30I



n = 10

Slope = 10.51
units per year.

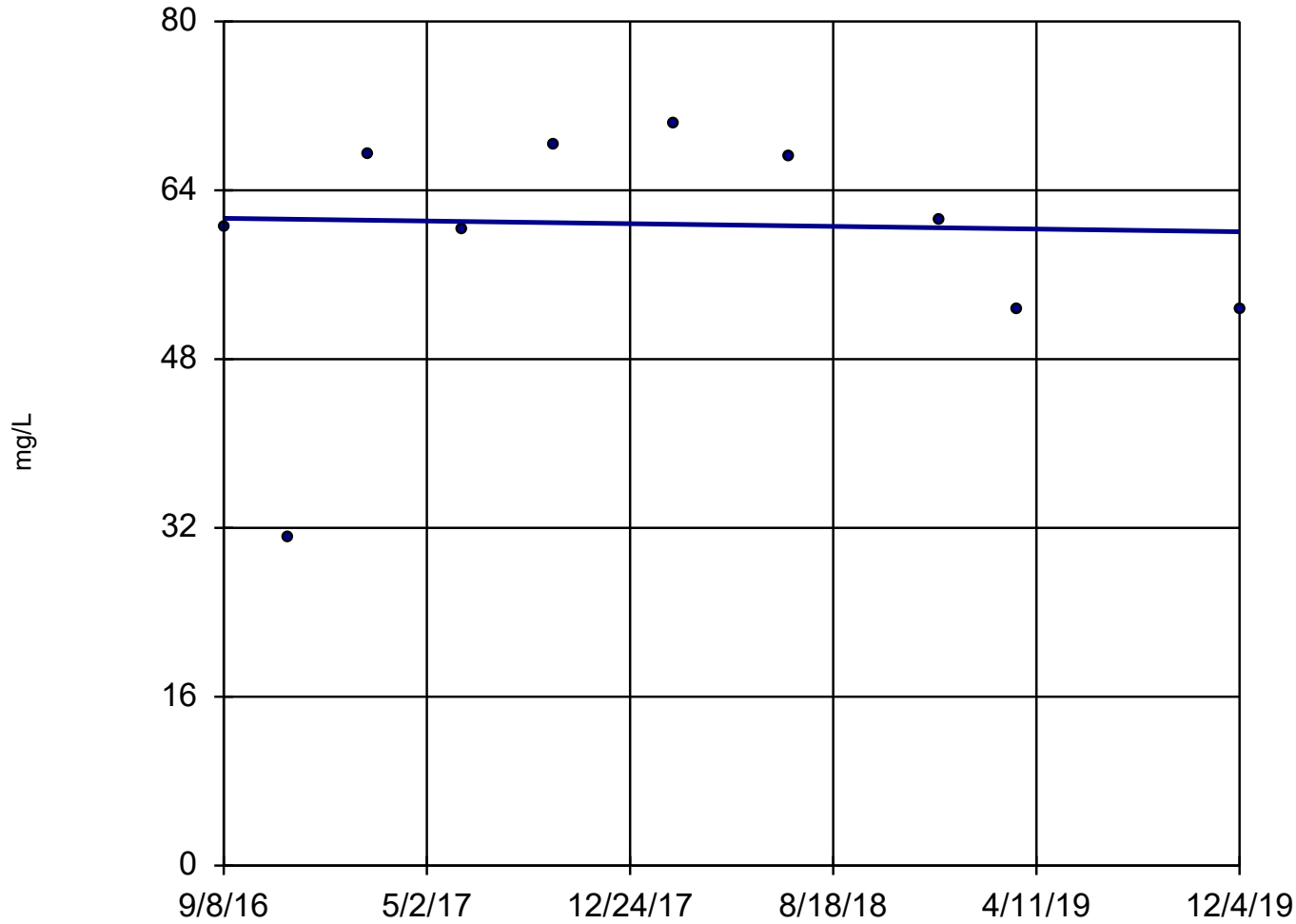
Mann-Kendall
statistic = 30
critical = 27

Increasing trend
significant at 98%
confidence level
($\alpha = 0.01$ per
tail).

Constituent: Calcium Analysis Run 1/28/2020 6:27 PM View: Default

Branch Client: Golder Associates Data: Plant Branch Ash Pond

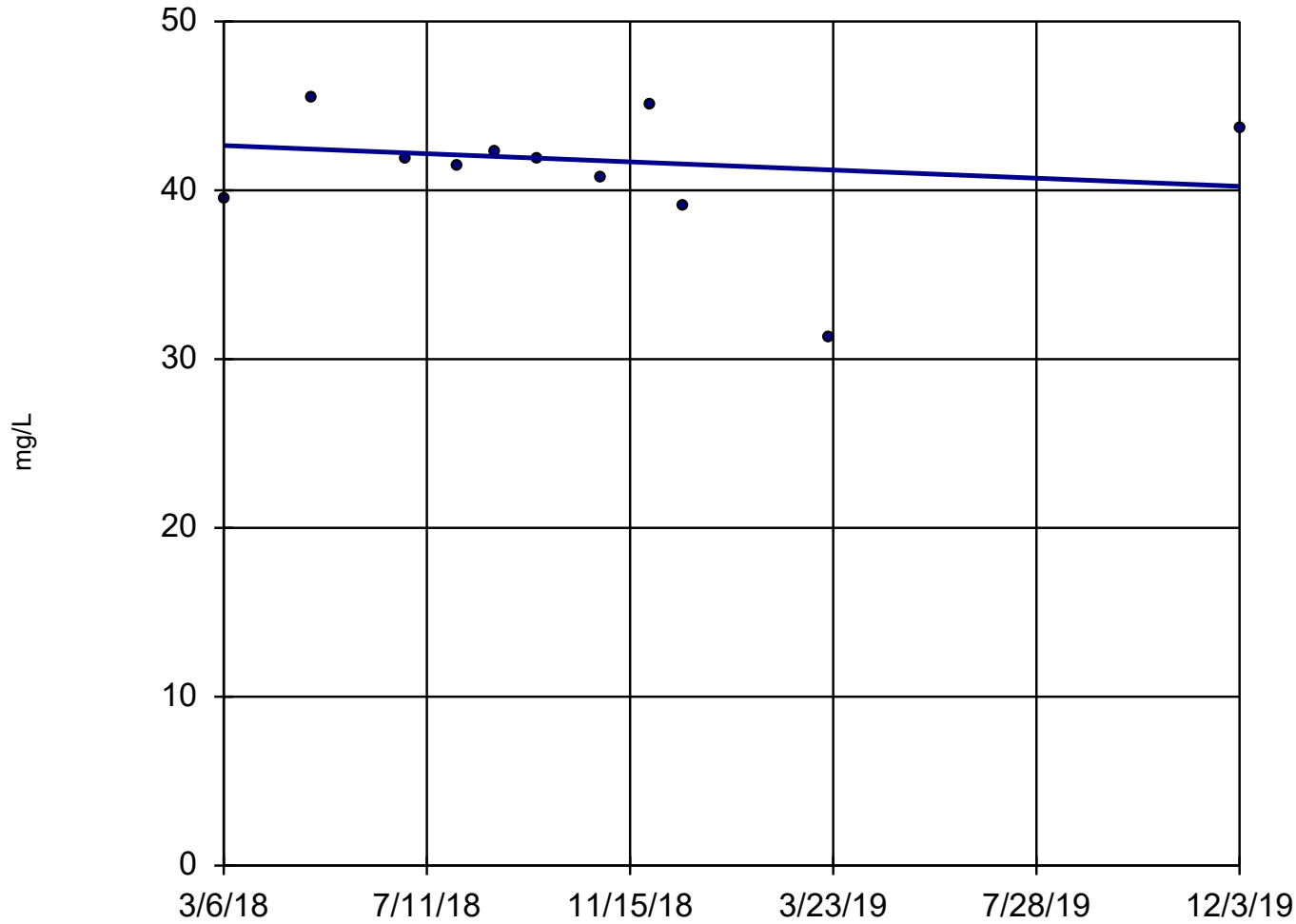
Sen's Slope Estimator BRGWC-32S



n = 10
Slope = -0.3925
units per year.
Mann-Kendall
statistic = -5
critical = -27
Trend not sig-
nificant at 98%
confidence level
($\alpha = 0.01$ per
tail).

Constituent: Calcium Analysis Run 1/28/2020 6:27 PM View: Default
Branch Client: Golder Associates Data: Plant Branch Ash Pond

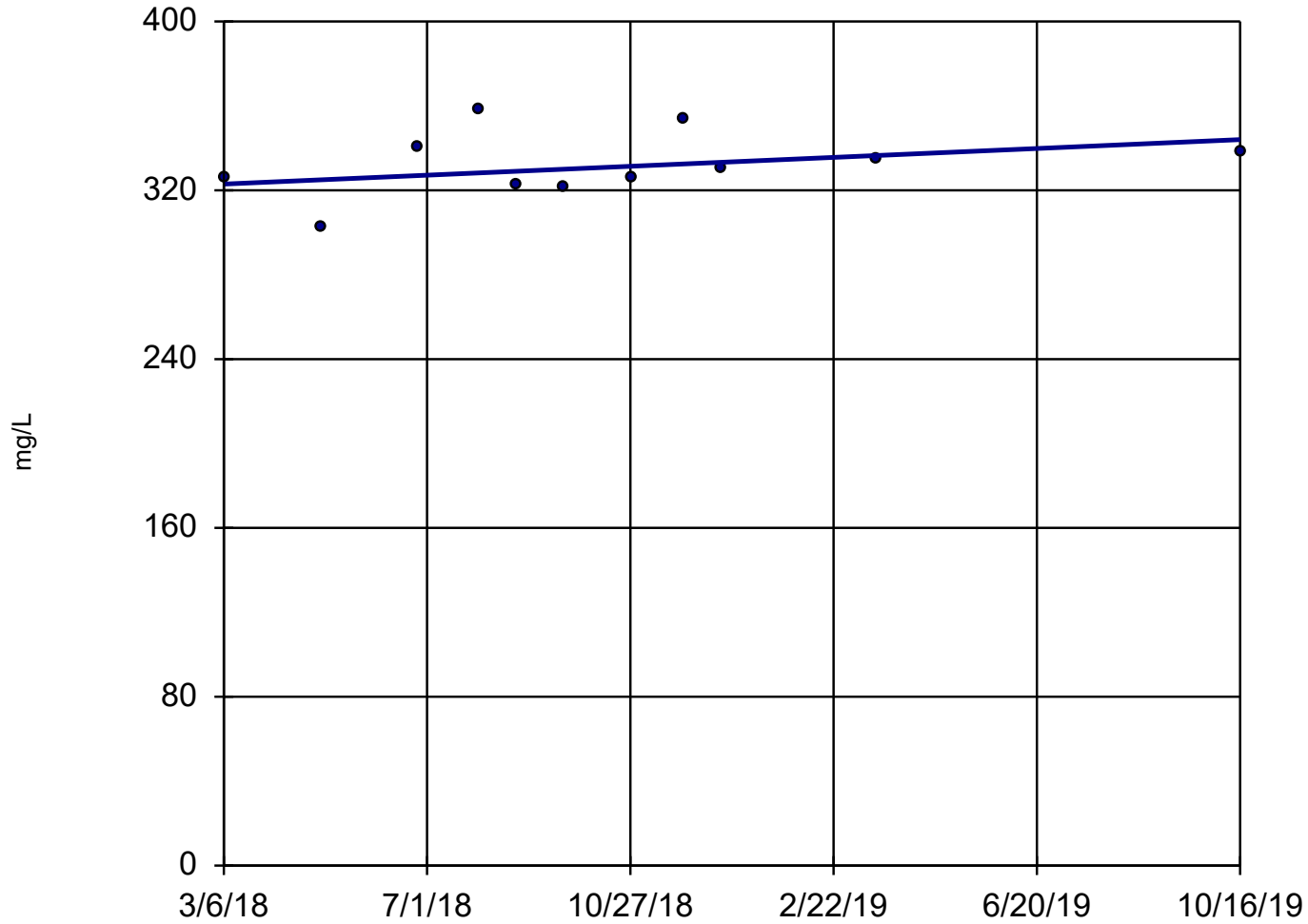
Sen's Slope Estimator BRGWC-45



n = 11
Slope = -1.381
units per year.
Mann-Kendall
statistic = -8
critical = -31
Trend not sig-
nificant at 98%
confidence level
($\alpha = 0.01$ per
tail).

Constituent: Calcium Analysis Run 1/28/2020 6:27 PM View: Default
Branch Client: Golder Associates Data: Plant Branch Ash Pond

Sen's Slope Estimator BRGWC-47



n = 11

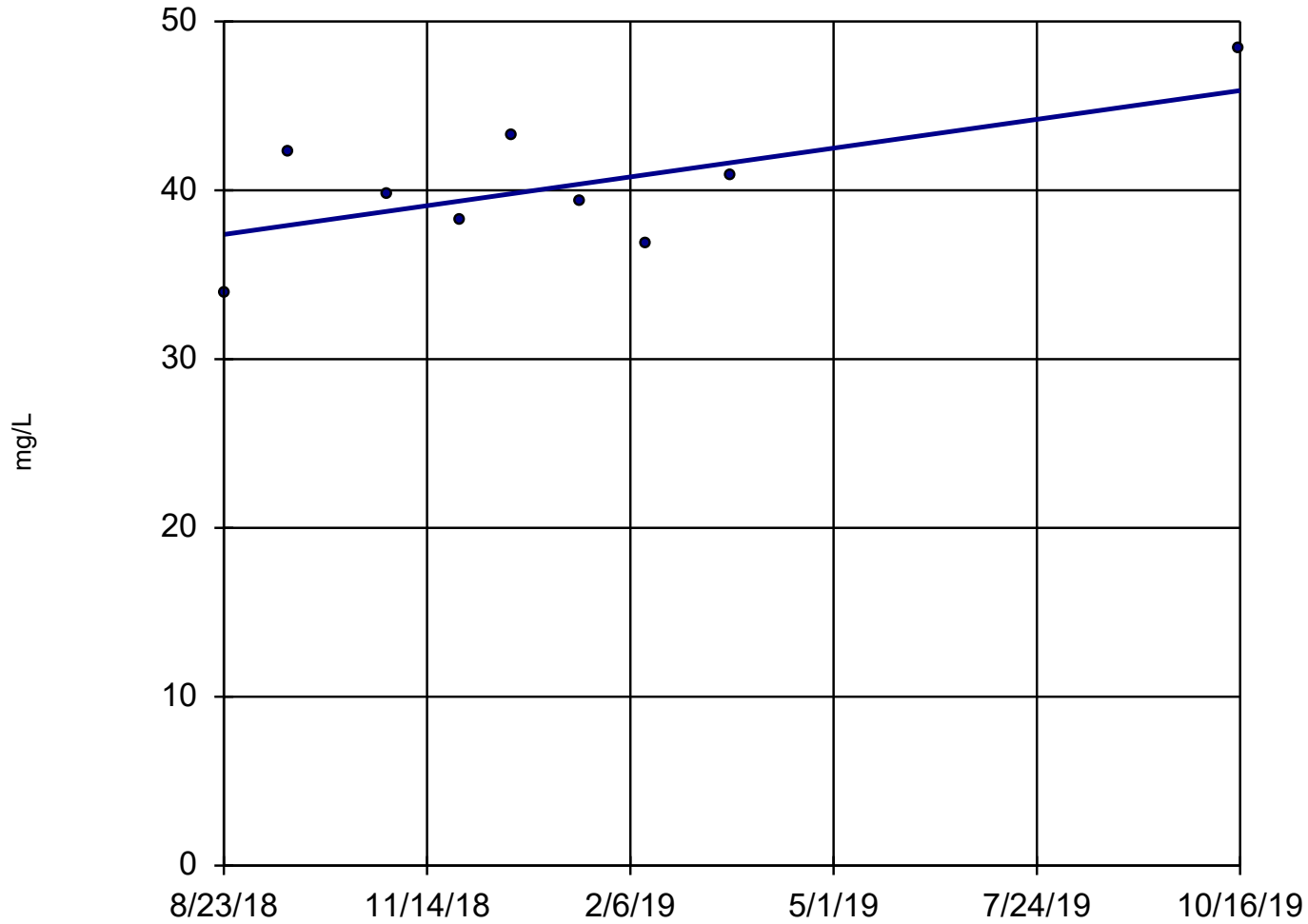
Slope = 13.07
units per year.

Mann-Kendall
statistic = 14
critical = 31

Trend not sig-
nificant at 98%
confidence level
($\alpha = 0.01$ per
tail).

Constituent: Calcium Analysis Run 1/28/2020 6:27 PM View: Default
Branch Client: Golder Associates Data: Plant Branch Ash Pond

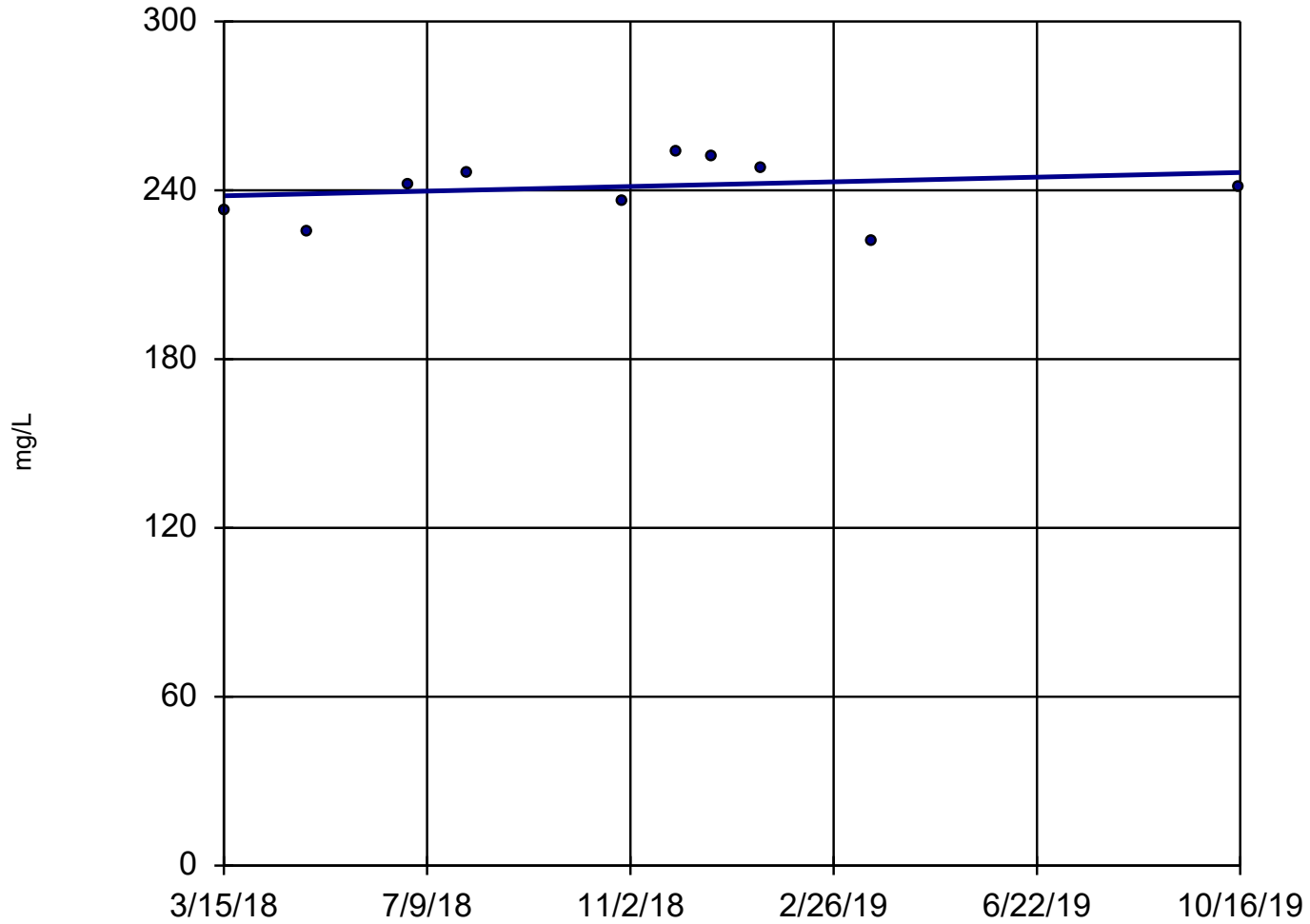
Sen's Slope Estimator BRGWC-52I



n = 9
Slope = 7.431
units per year.
Mann-Kendall
statistic = 10
critical = 23
Trend not sig-
nificant at 98%
confidence level
($\alpha = 0.01$ per
tail).

Constituent: Calcium Analysis Run 1/28/2020 6:27 PM View: Default
Branch Client: Golder Associates Data: Plant Branch Ash Pond

Sen's Slope Estimator BRGWC-50

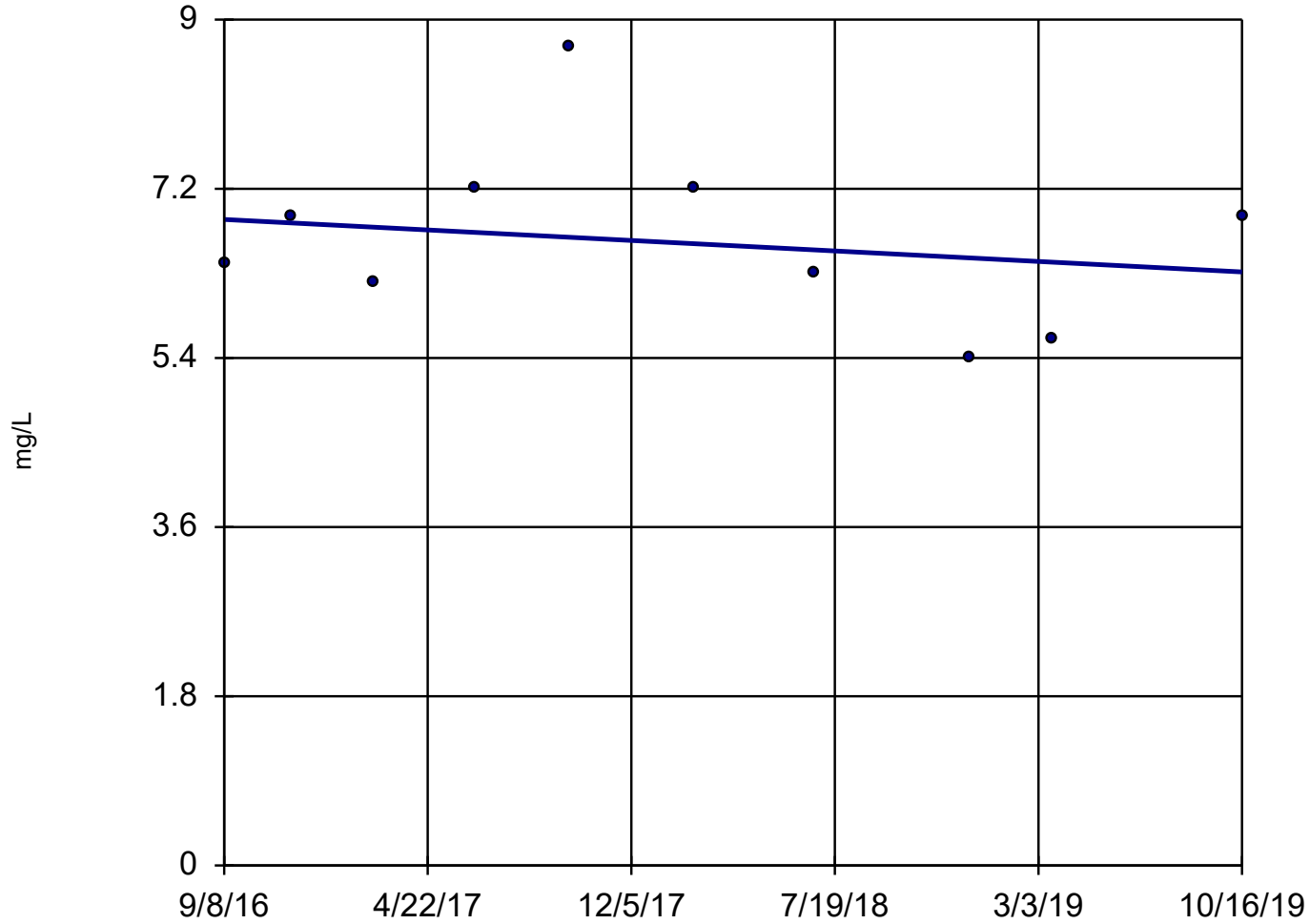


n = 10
Slope = 5.185
units per year.
Mann-Kendall
statistic = 7
critical = 27
Trend not sig-
nificant at 98%
confidence level
($\alpha = 0.01$ per
tail).

Constituent: Calcium Analysis Run 1/28/2020 6:27 PM View: Default
Branch Client: Golder Associates Data: Plant Branch Ash Pond

Sen's Slope Estimator

BRGWC-29I

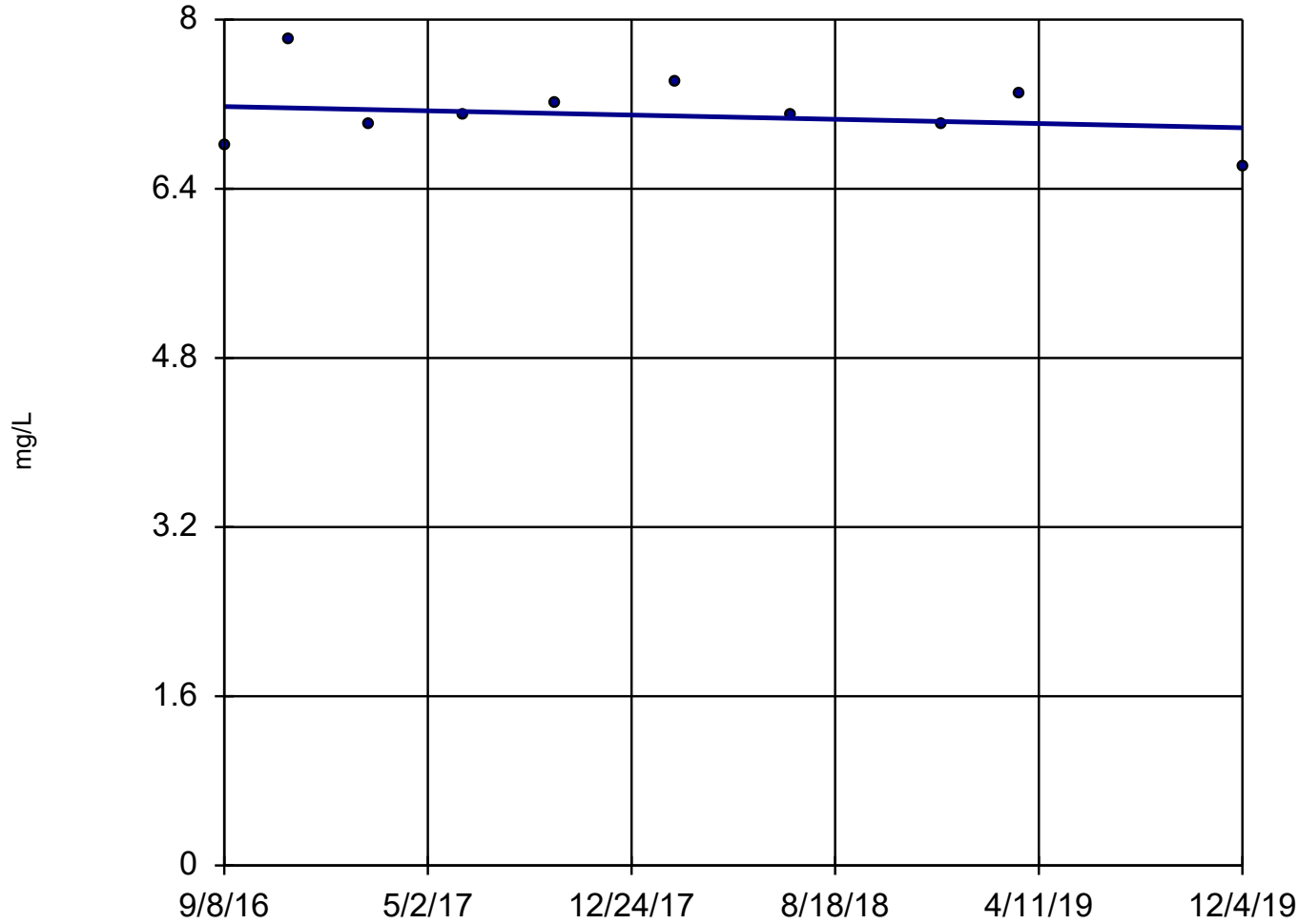


n = 10
Slope = -0.1798
units per year.
Mann-Kendall
statistic = -7
critical = -27
Trend not sig-
nificant at 98%
confidence level
($\alpha = 0.01$ per
tail).

Constituent: Chloride Analysis Run 1/28/2020 6:27 PM View: Default

Branch Client: Golder Associates Data: Plant Branch Ash Pond

Sen's Slope Estimator BRGWC-32S



n = 10

Slope = -0.06176
units per year.

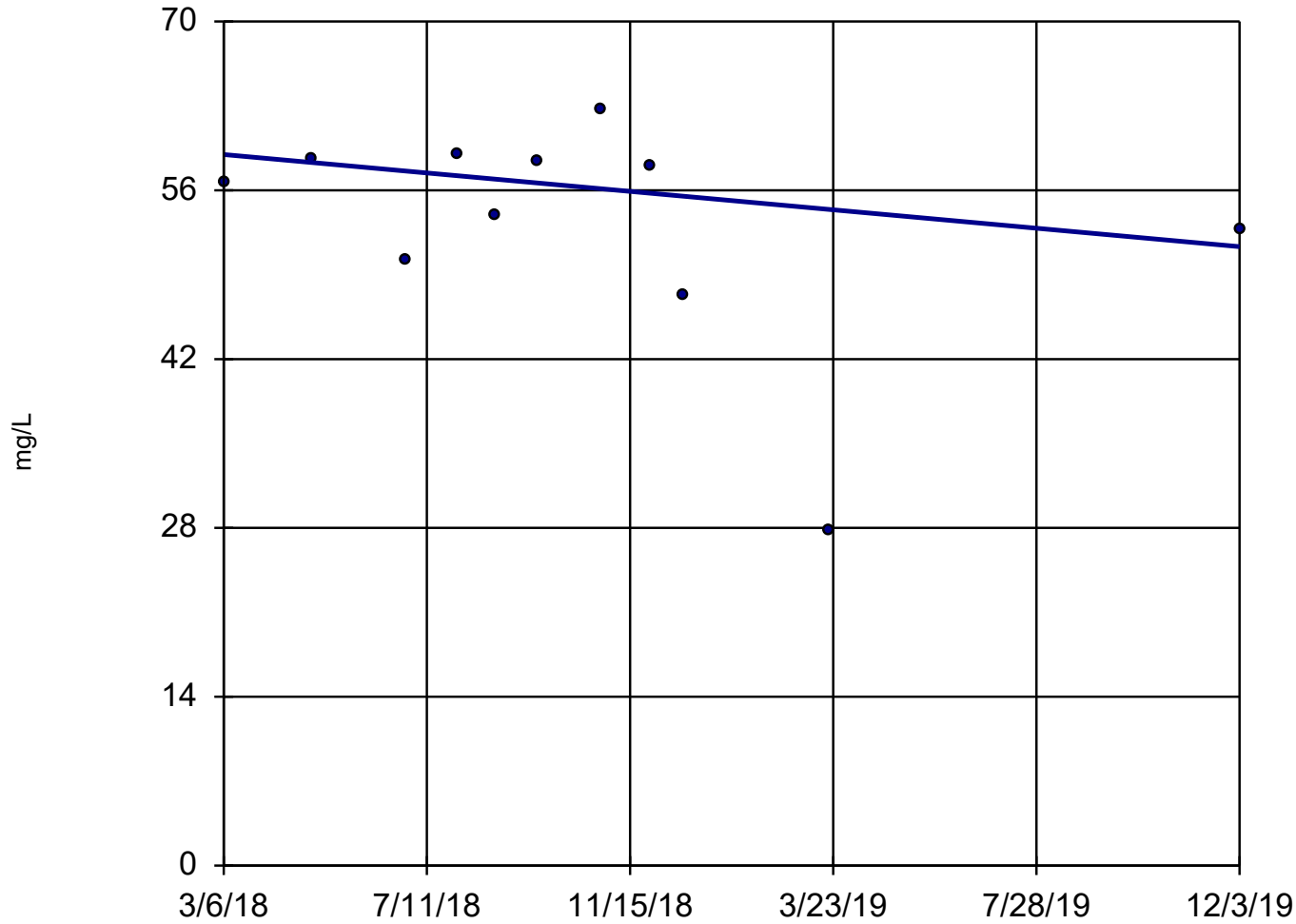
Mann-Kendall
statistic = -3
critical = -27

Trend not sig-
nificant at 98%
confidence level
($\alpha = 0.01$ per
tail).

Constituent: Chloride Analysis Run 1/28/2020 6:27 PM View: Default

Branch Client: Golder Associates Data: Plant Branch Ash Pond

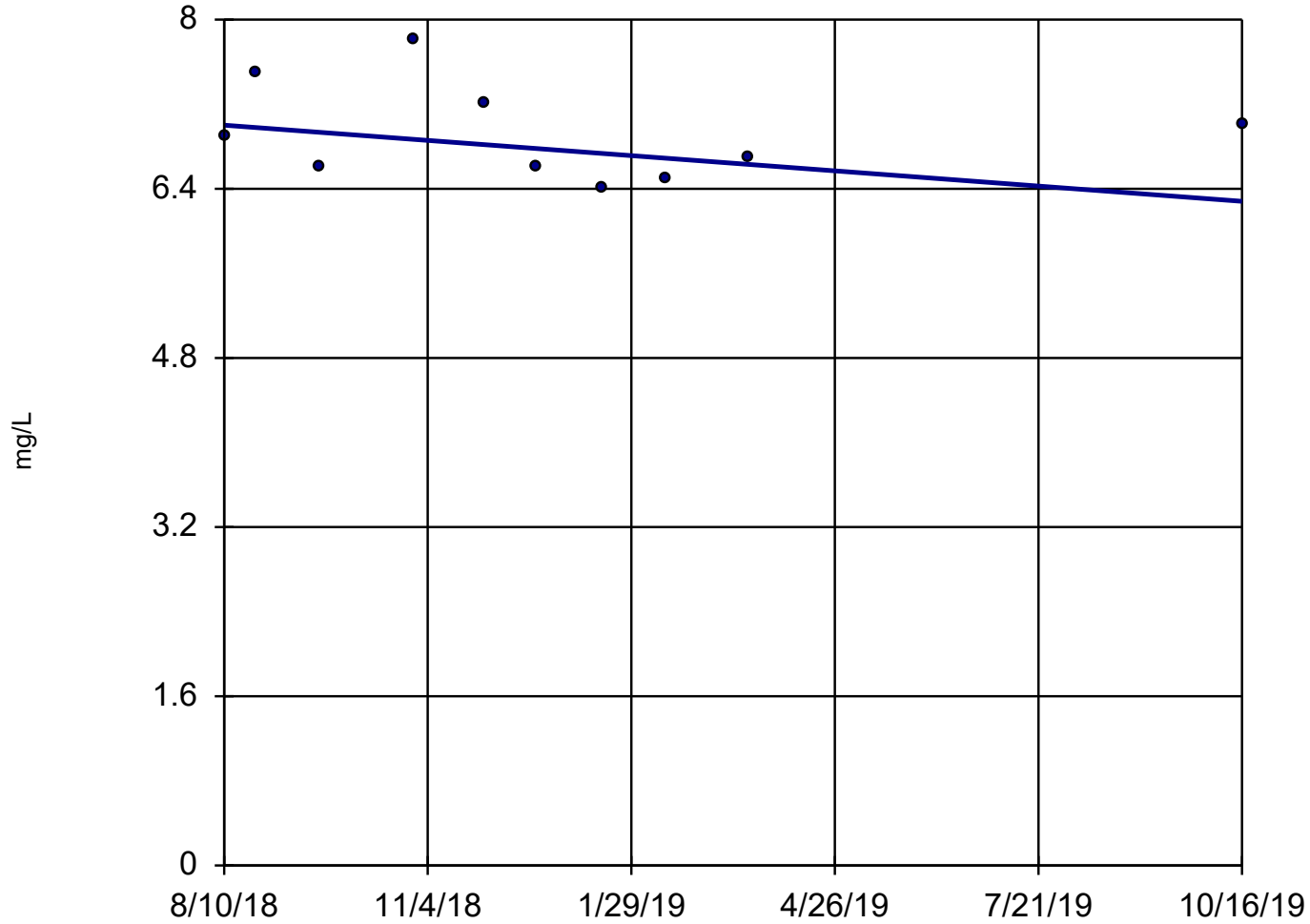
Sen's Slope Estimator BRGWC-45



n = 11
Slope = -4.38
units per year.
Mann-Kendall
statistic = -15
critical = -31
Trend not sig-
nificant at 98%
confidence level
($\alpha = 0.01$ per
tail).

Constituent: Chloride Analysis Run 1/28/2020 6:27 PM View: Default
Branch Client: Golder Associates Data: Plant Branch Ash Pond

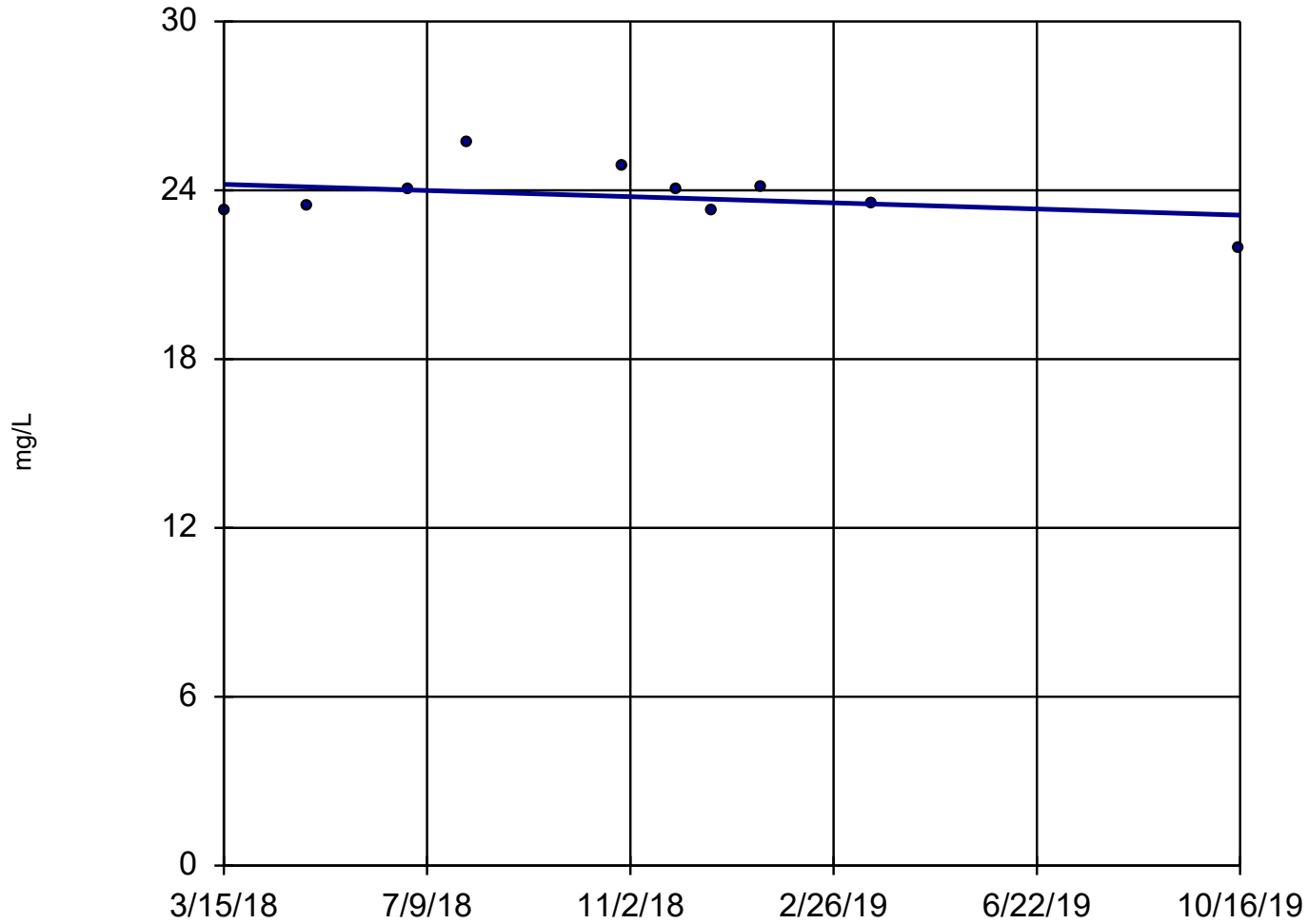
Sen's Slope Estimator BRGWC-52I



n = 10
Slope = -0.6083
units per year.
Mann-Kendall
statistic = -10
critical = -27
Trend not sig-
nificant at 98%
confidence level
($\alpha = 0.01$ per
tail).

Constituent: Chloride Analysis Run 1/28/2020 6:27 PM View: Default
Branch Client: Golder Associates Data: Plant Branch Ash Pond

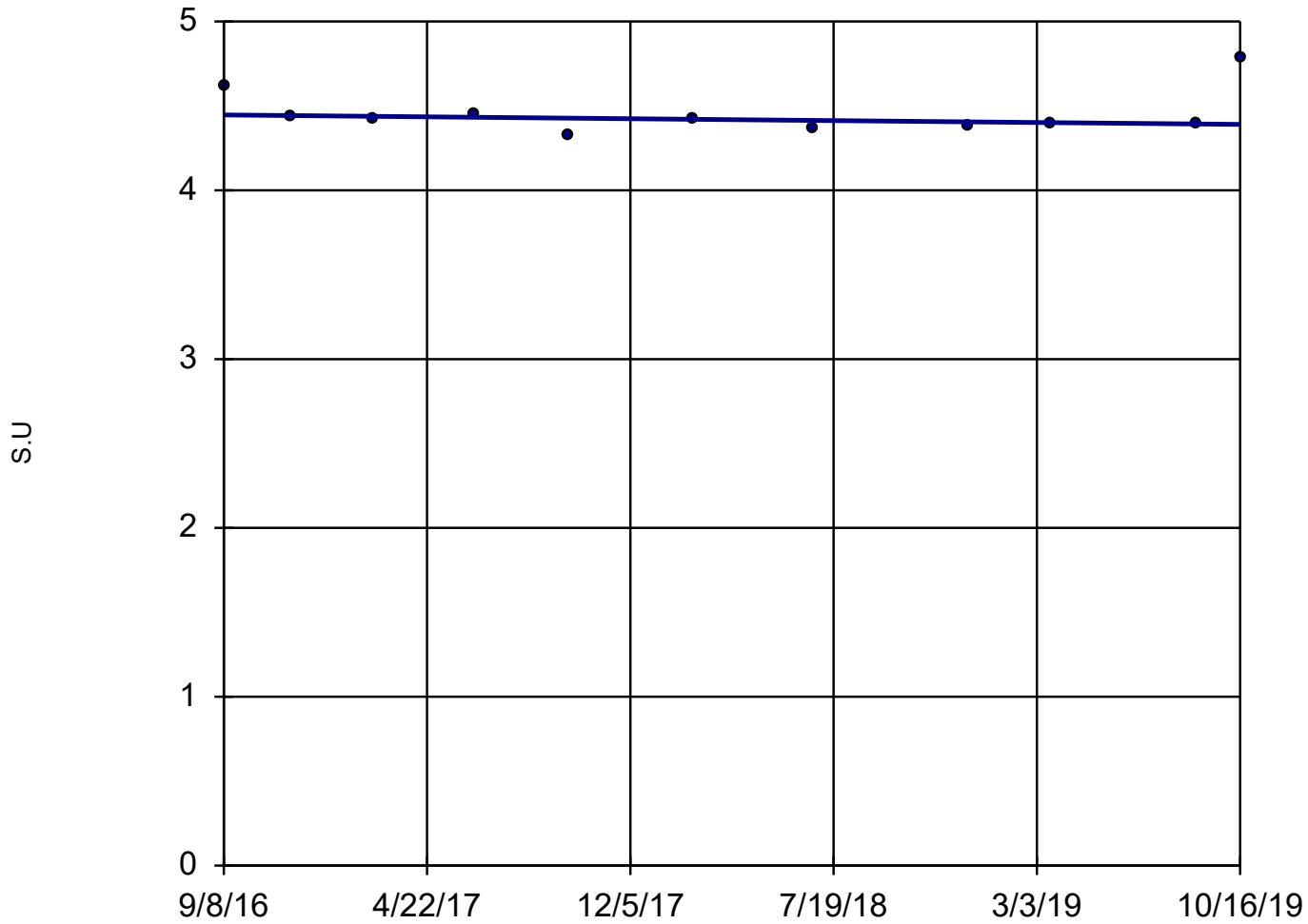
Sen's Slope Estimator BRGWC-50



n = 10
Slope = -0.6887
units per year.
Mann-Kendall
statistic = -5
critical = -27
Trend not sig-
nificant at 98%
confidence level
($\alpha = 0.01$ per
tail).

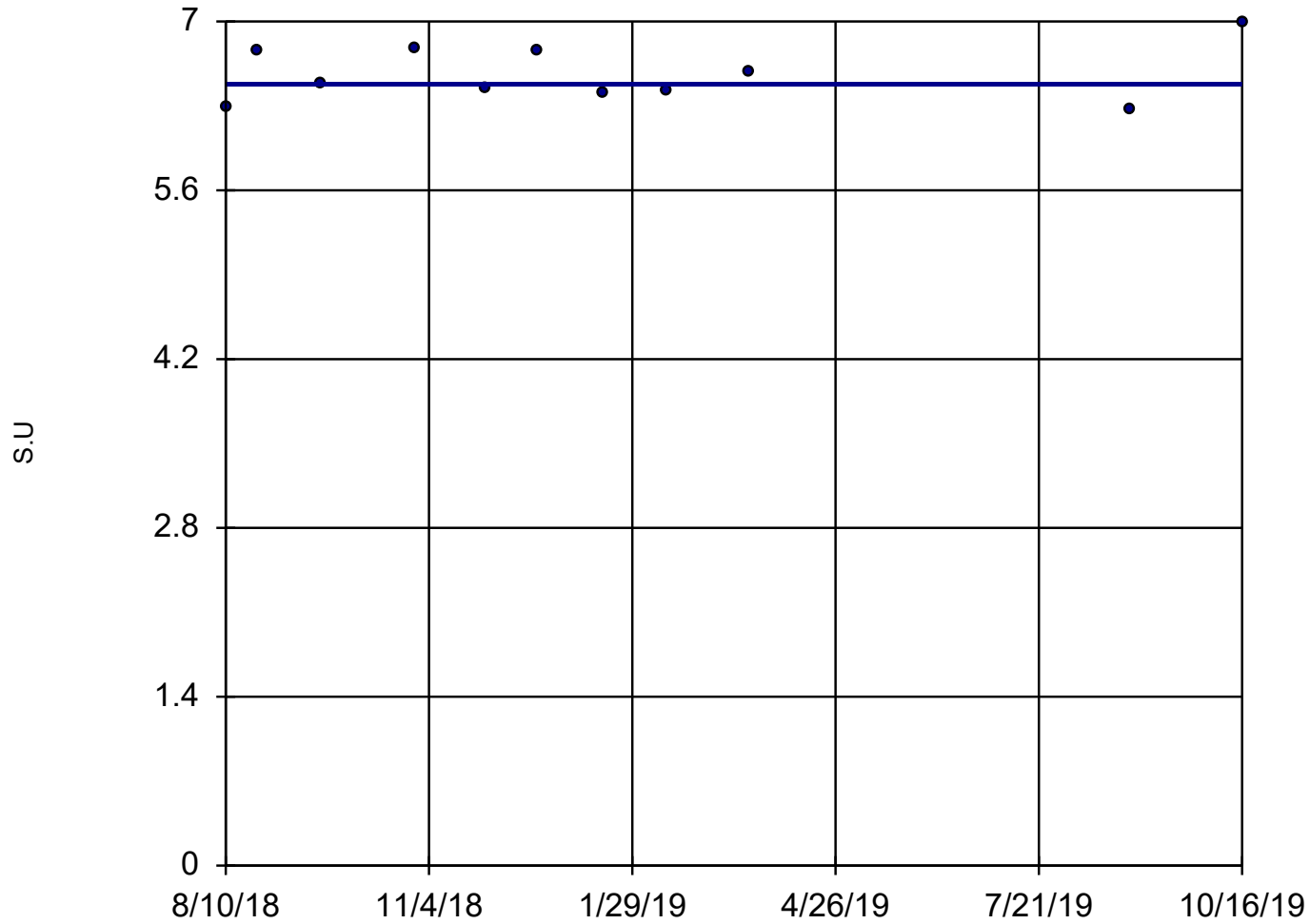
Constituent: Chloride Analysis Run 1/28/2020 6:27 PM View: Default
Branch Client: Golder Associates Data: Plant Branch Ash Pond

Sen's Slope Estimator BRGWC-29I



Sen's Slope Estimator

BRGWC-52I



n = 11

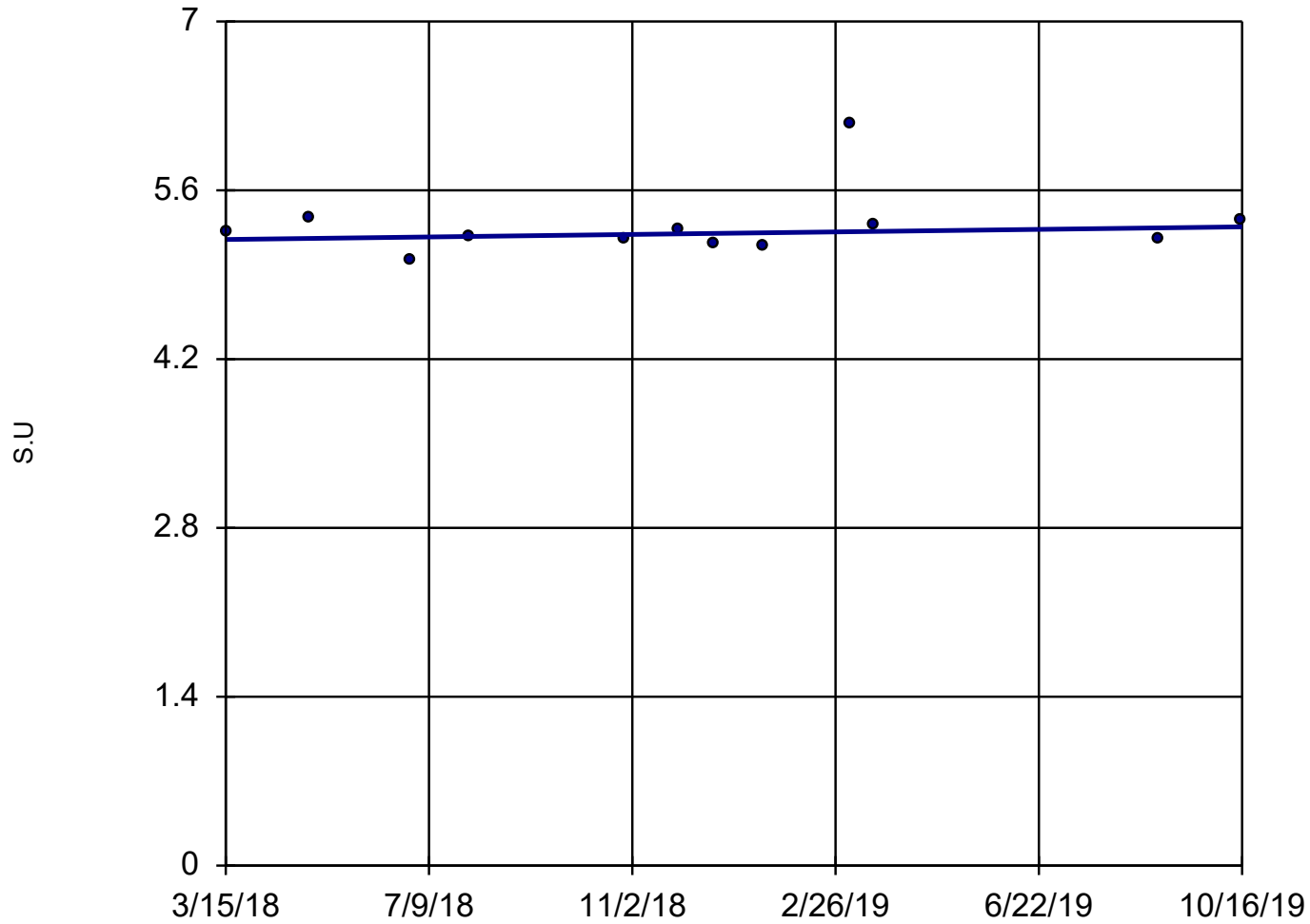
Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 31

Trend not sig-
nificant at 98%
confidence level
($\alpha = 0.01$ per
tail).

Constituent: pH Analysis Run 1/28/2020 6:28 PM View: Default
Branch Client: Golder Associates Data: Plant Branch Ash Pond

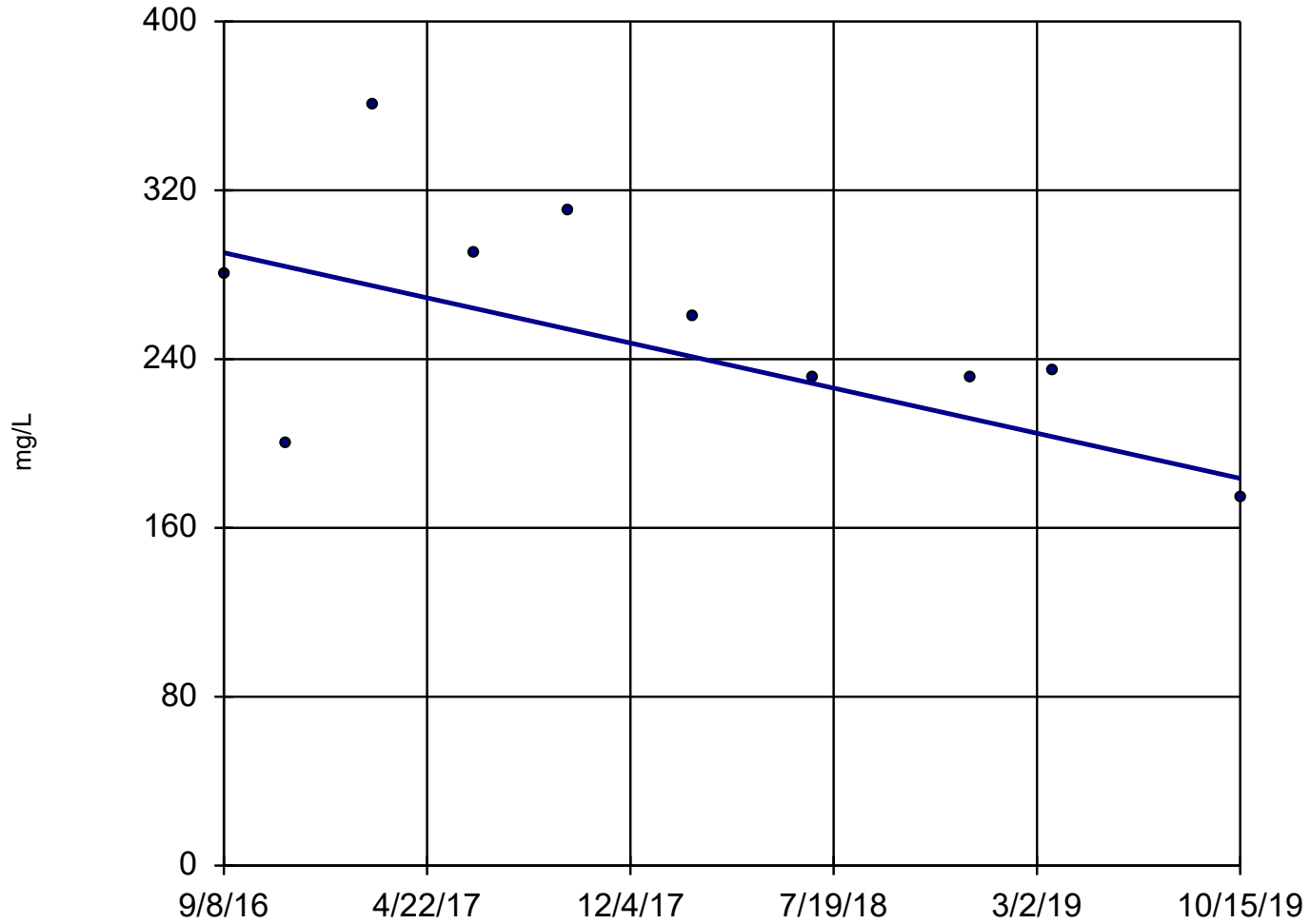
Sen's Slope Estimator BRGWC-50



n = 12
Slope = 0.06623
units per year.
Mann-Kendall
statistic = 8
critical = 35
Trend not sig-
nificant at 98%
confidence level
($\alpha = 0.01$ per
tail).

Constituent: pH Analysis Run 1/28/2020 6:28 PM View: Default
Branch Client: Golder Associates Data: Plant Branch Ash Pond

Sen's Slope Estimator BRGWC-25I



n = 10

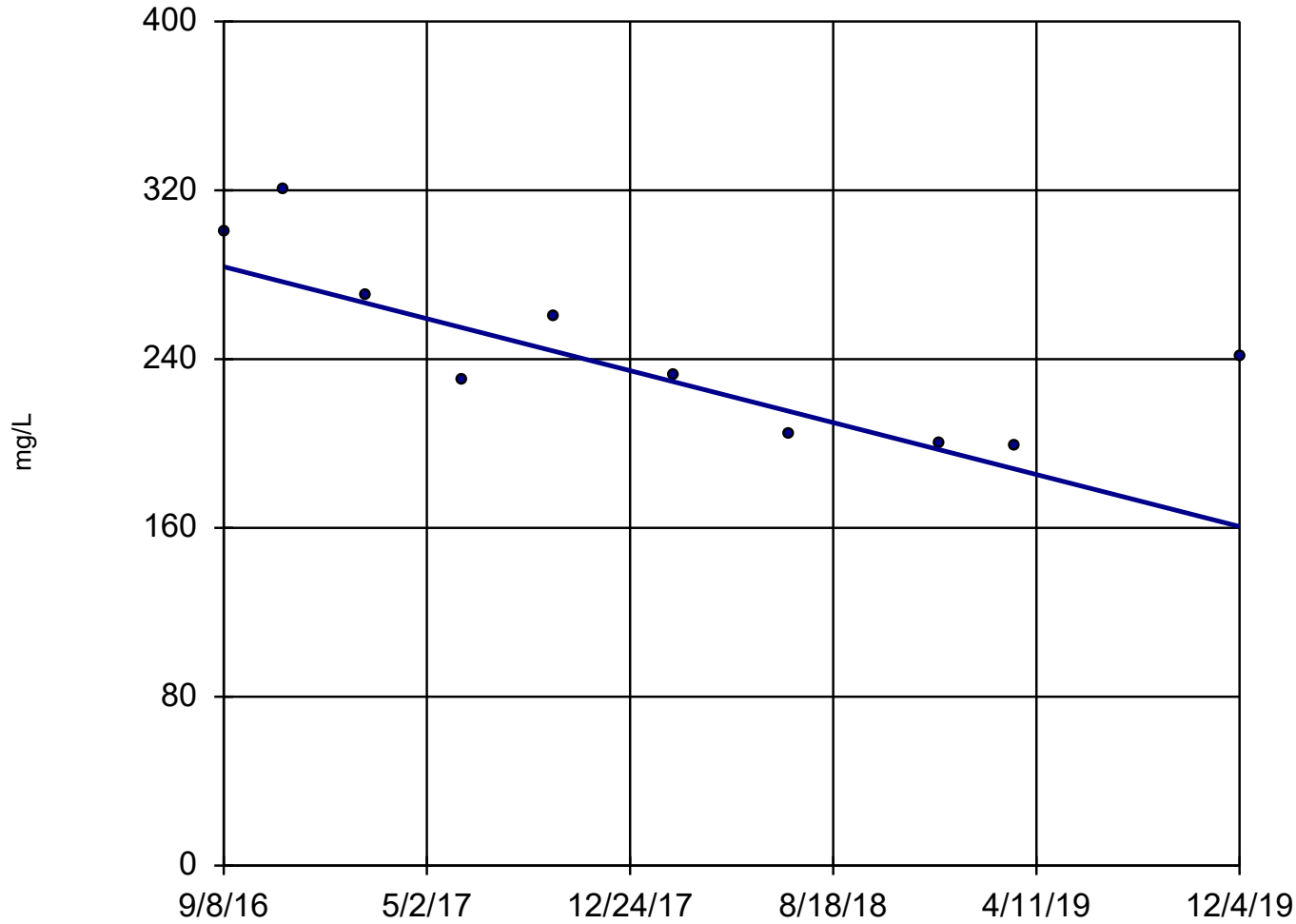
Slope = -34.48
units per year.

Mann-Kendall
statistic = -18
critical = -27

Trend not sig-
nificant at 98%
confidence level
($\alpha = 0.01$ per
tail).

Constituent: Sulfate Analysis Run 1/28/2020 6:28 PM View: Default
Branch Client: Golder Associates Data: Plant Branch Ash Pond

Sen's Slope Estimator BRGWC-27I



n = 10

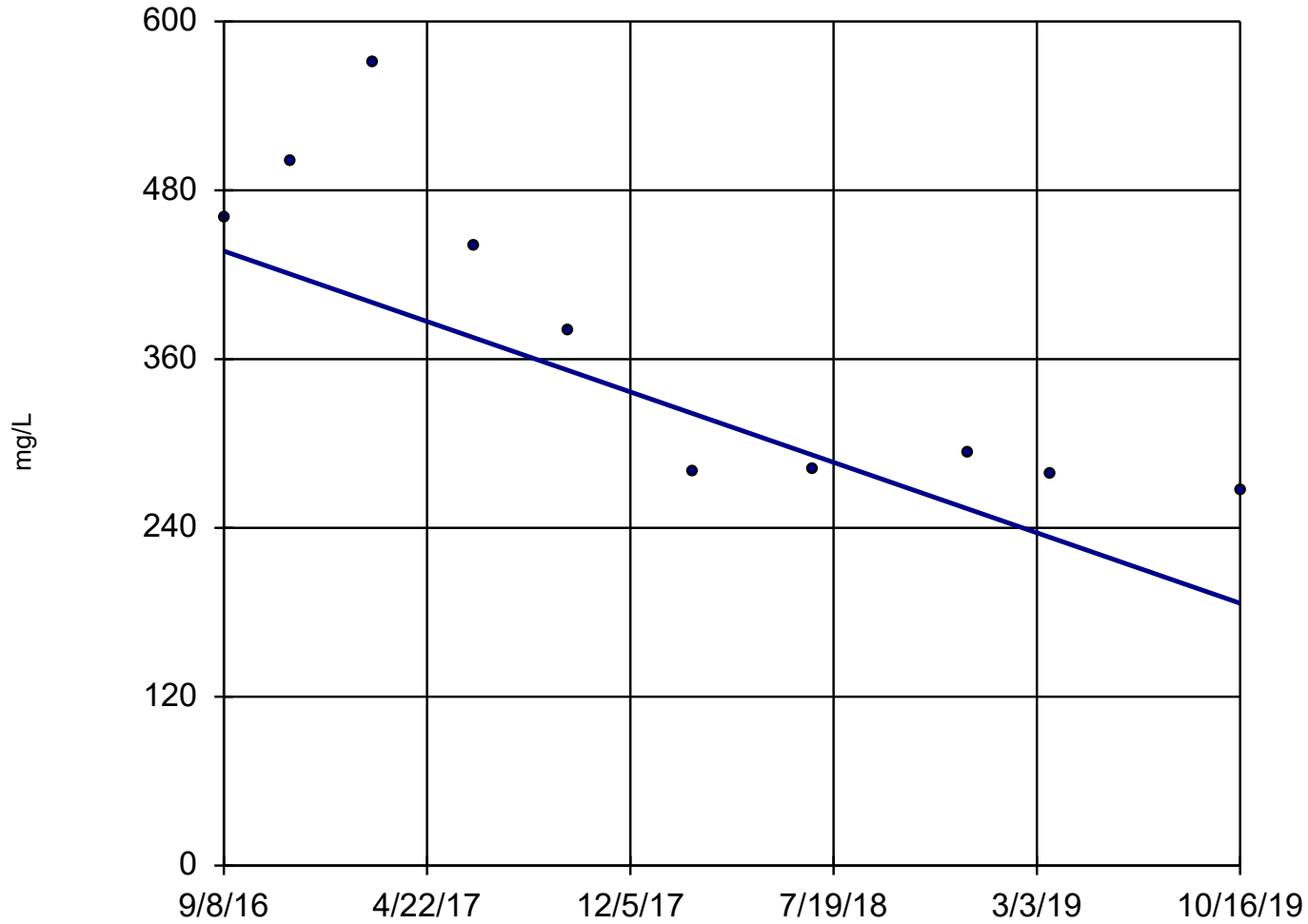
Slope = -38.02
units per year.

Mann-Kendall
statistic = -29
critical = -27

Decreasing trend
significant at 98%
confidence level
($\alpha = 0.01$ per
tail).

Constituent: Sulfate Analysis Run 1/28/2020 6:28 PM View: Default
Branch Client: Golder Associates Data: Plant Branch Ash Pond

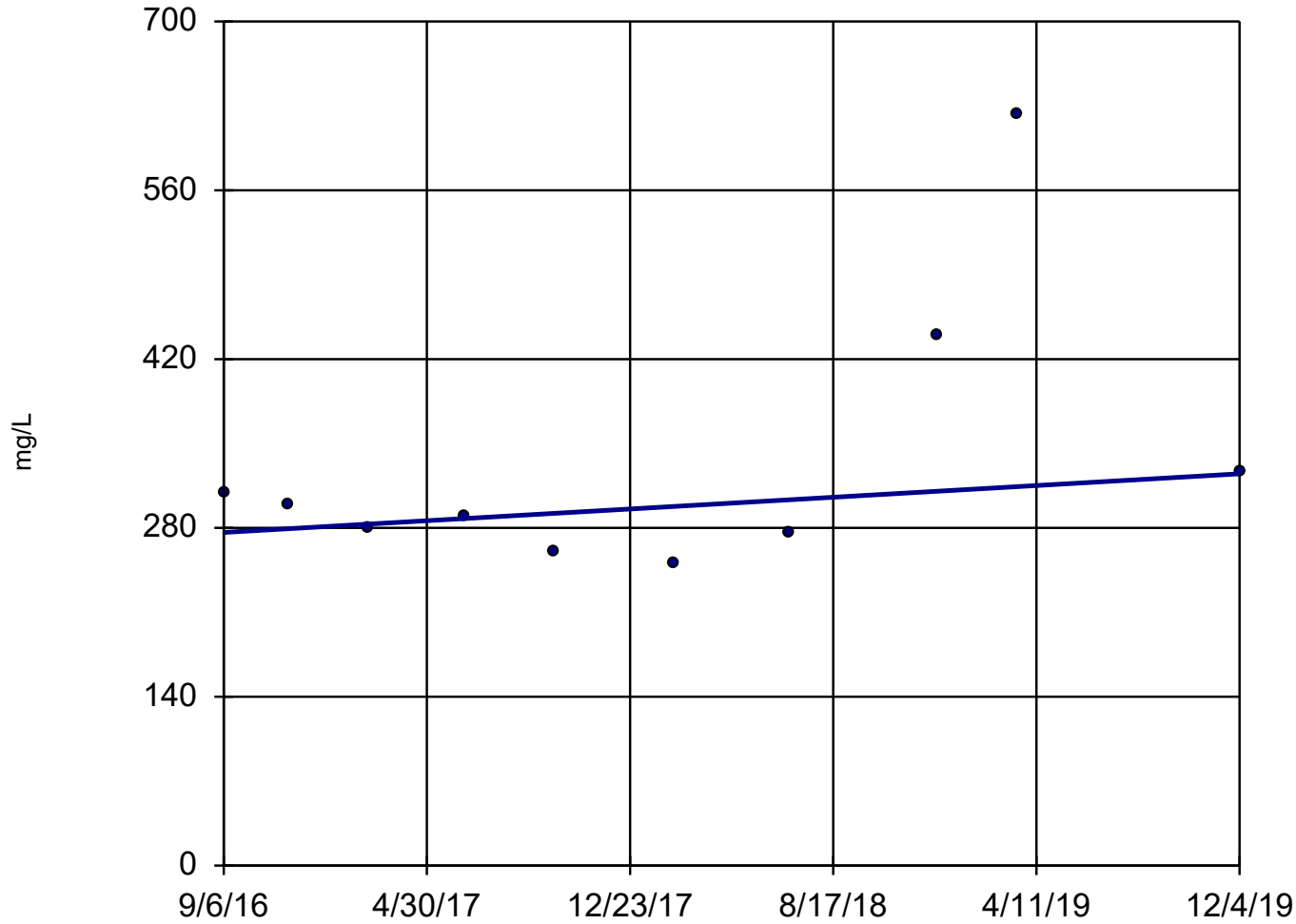
Sen's Slope Estimator BRGWC-29I



n = 10
Slope = -80.65
units per year.
Mann-Kendall
statistic = -33
critical = -27
Decreasing trend
significant at 98%
confidence level
($\alpha = 0.01$ per
tail).

Constituent: Sulfate Analysis Run 1/28/2020 6:28 PM View: Default
Branch Client: Golder Associates Data: Plant Branch Ash Pond

Sen's Slope Estimator BRGWC-30I



n = 10

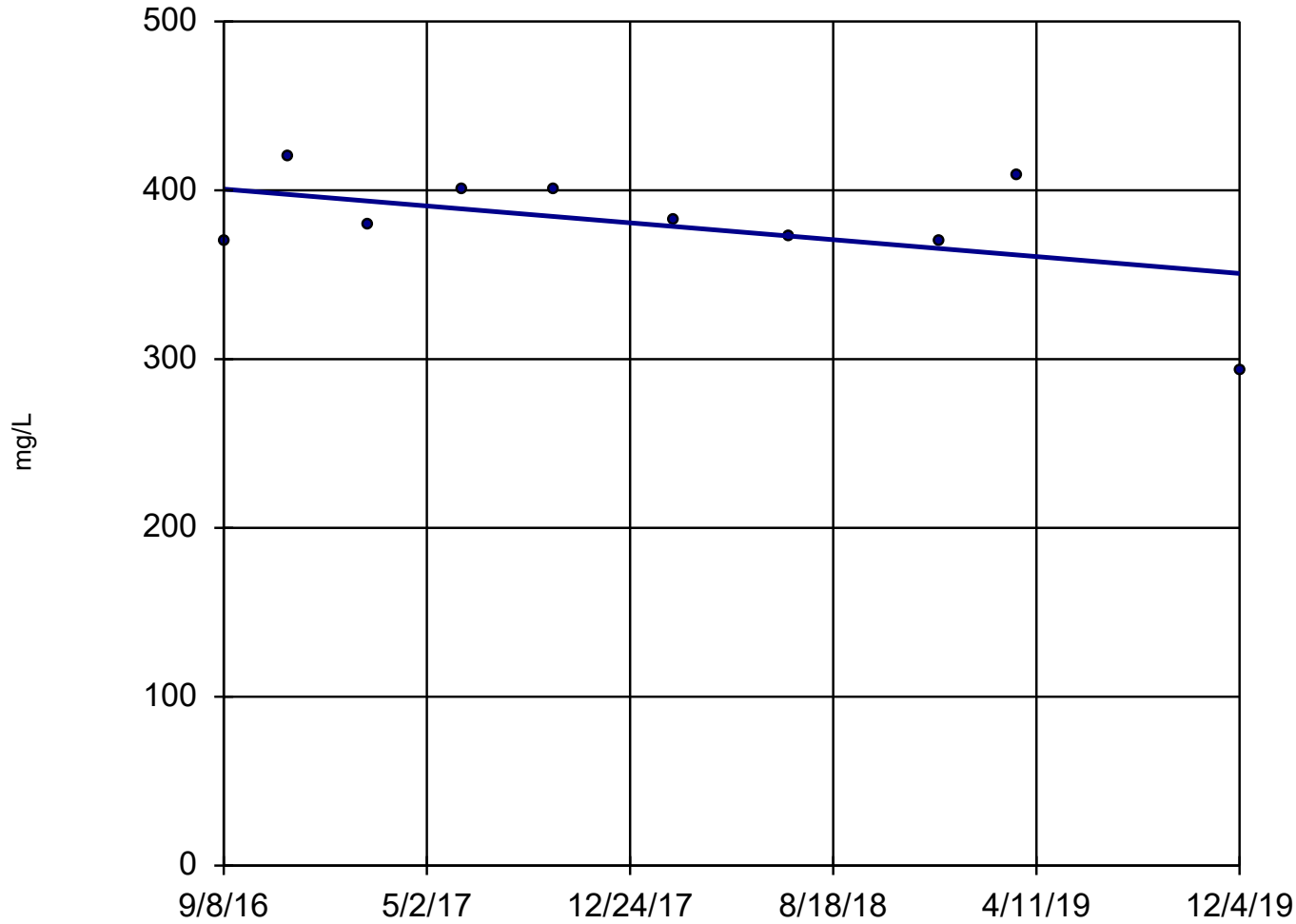
Slope = 14.96
units per year.

Mann-Kendall
statistic = 5
critical = 27

Trend not sig-
nificant at 98%
confidence level
($\alpha = 0.01$ per
tail).

Constituent: Sulfate Analysis Run 1/28/2020 6:28 PM View: Default
Branch Client: Golder Associates Data: Plant Branch Ash Pond

Sen's Slope Estimator BRGWC-32S



n = 10

Slope = -15.41
units per year.

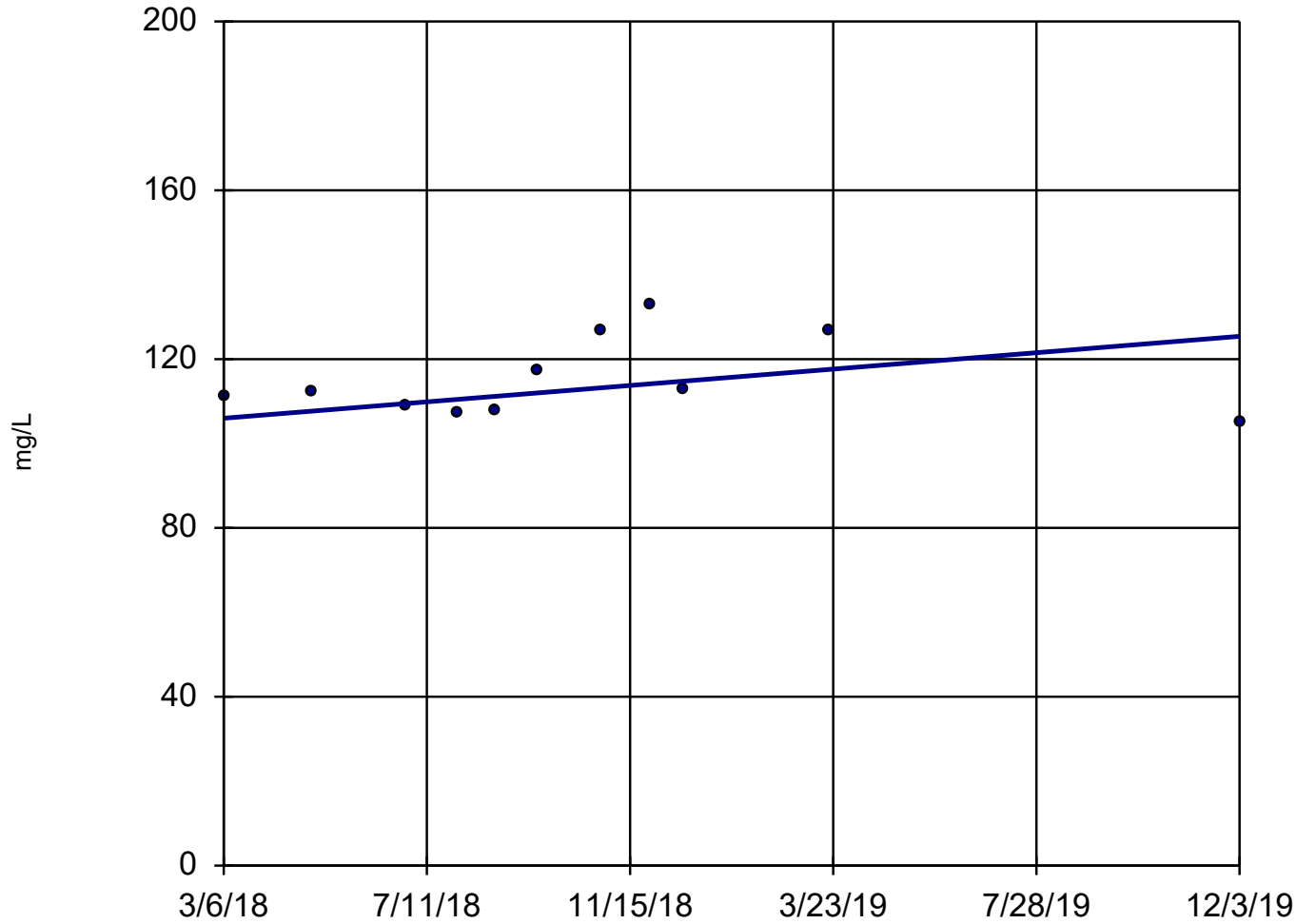
Mann-Kendall
statistic = -11
critical = -27

Trend not sig-
nificant at 98%
confidence level
($\alpha = 0.01$ per
tail).

Constituent: Sulfate Analysis Run 1/28/2020 6:28 PM View: Default

Branch Client: Golder Associates Data: Plant Branch Ash Pond

Sen's Slope Estimator BRGWC-45



n = 11

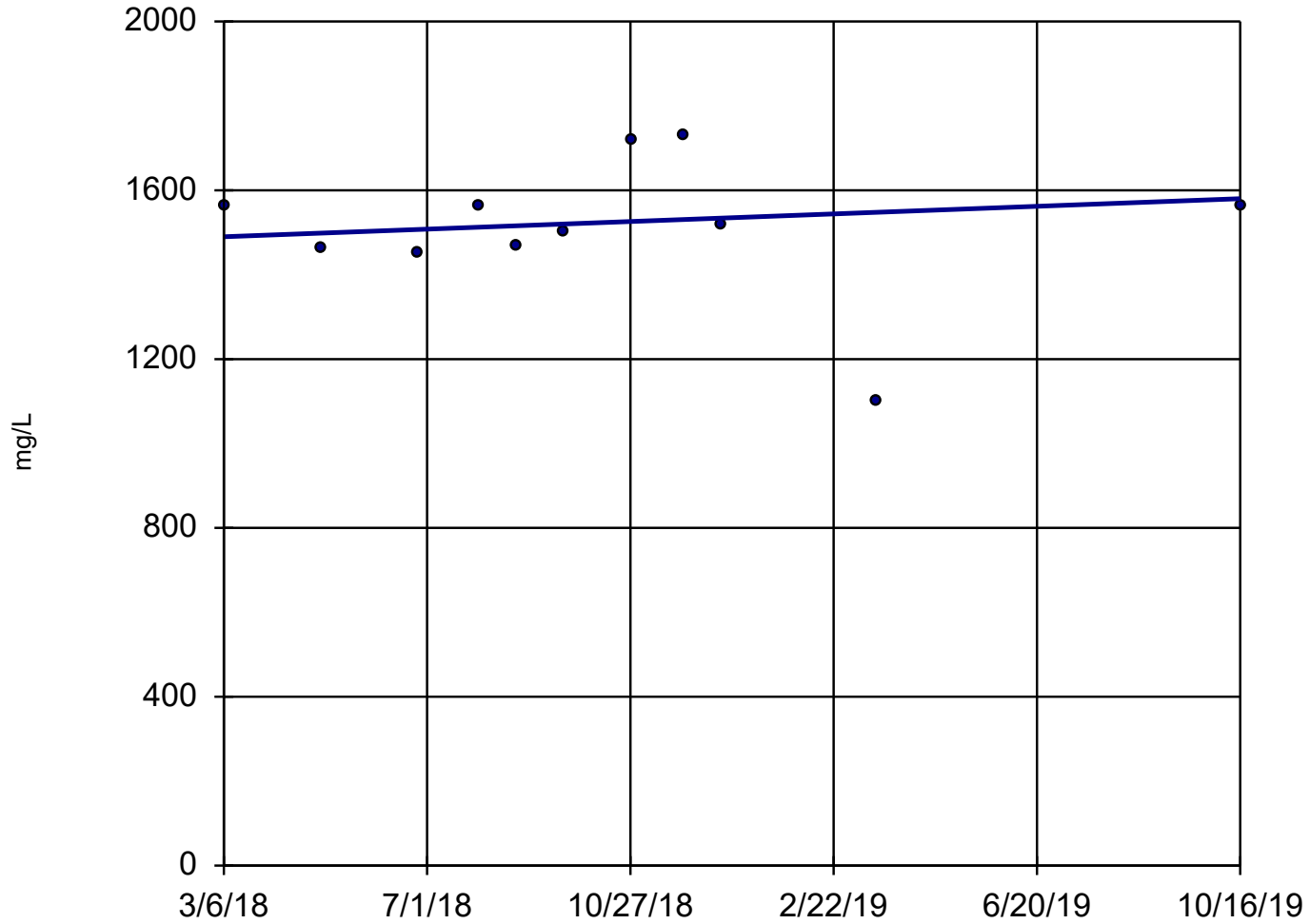
Slope = 11.12
units per year.

Mann-Kendall
statistic = 10
critical = 31

Trend not sig-
nificant at 98%
confidence level
($\alpha = 0.01$ per
tail).

Constituent: Sulfate Analysis Run 1/28/2020 6:28 PM View: Default
Branch Client: Golder Associates Data: Plant Branch Ash Pond

Sen's Slope Estimator BRGWC-47

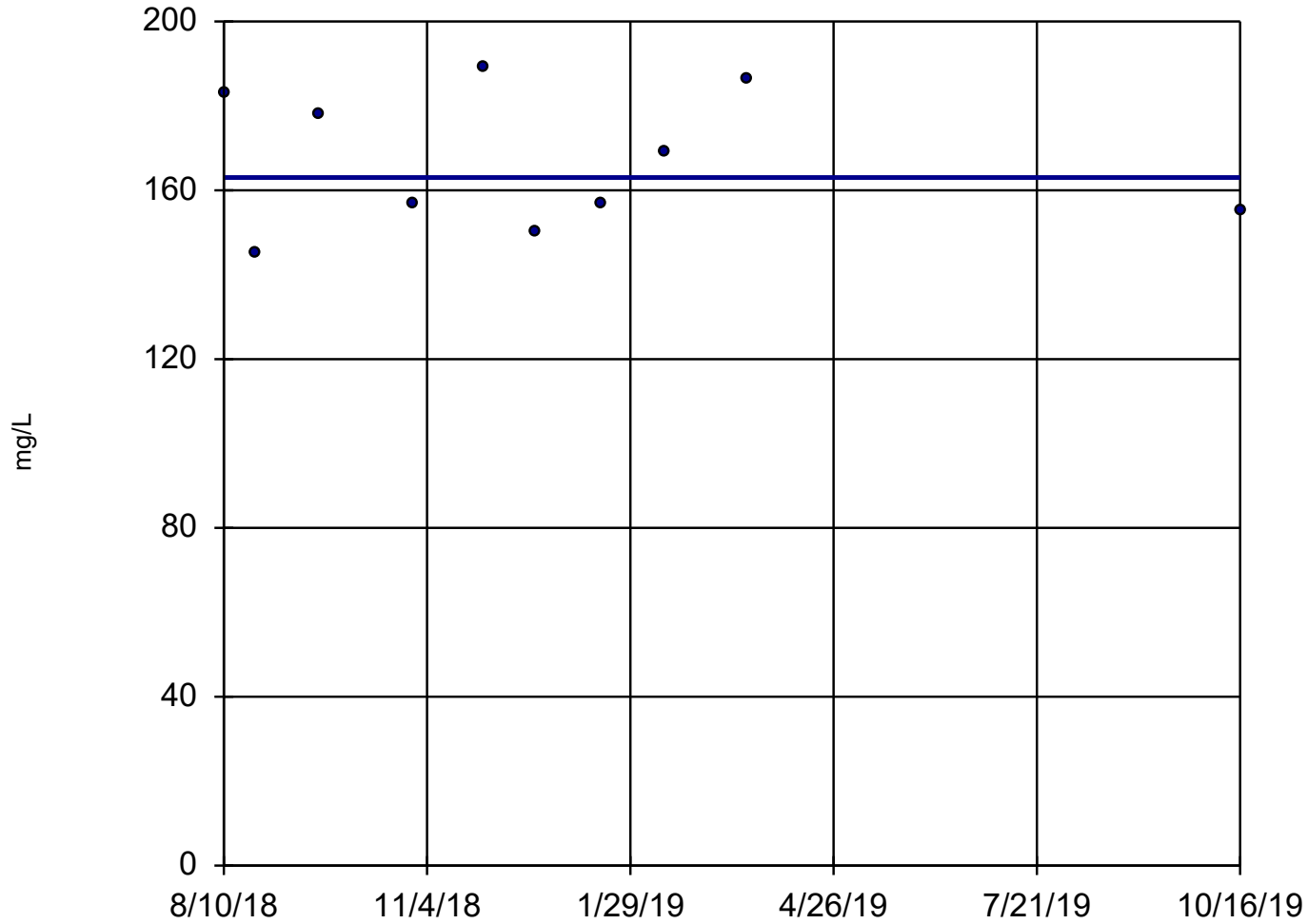


n = 11
Slope = 55.87
units per year.
Mann-Kendall
statistic = 8
critical = 31
Trend not sig-
nificant at 98%
confidence level
($\alpha = 0.01$ per
tail).

Constituent: Sulfate Analysis Run 1/28/2020 6:28 PM View: Default
Branch Client: Golder Associates Data: Plant Branch Ash Pond

Sen's Slope Estimator

BRGWC-52I



n = 10

Slope = 0
units per year.

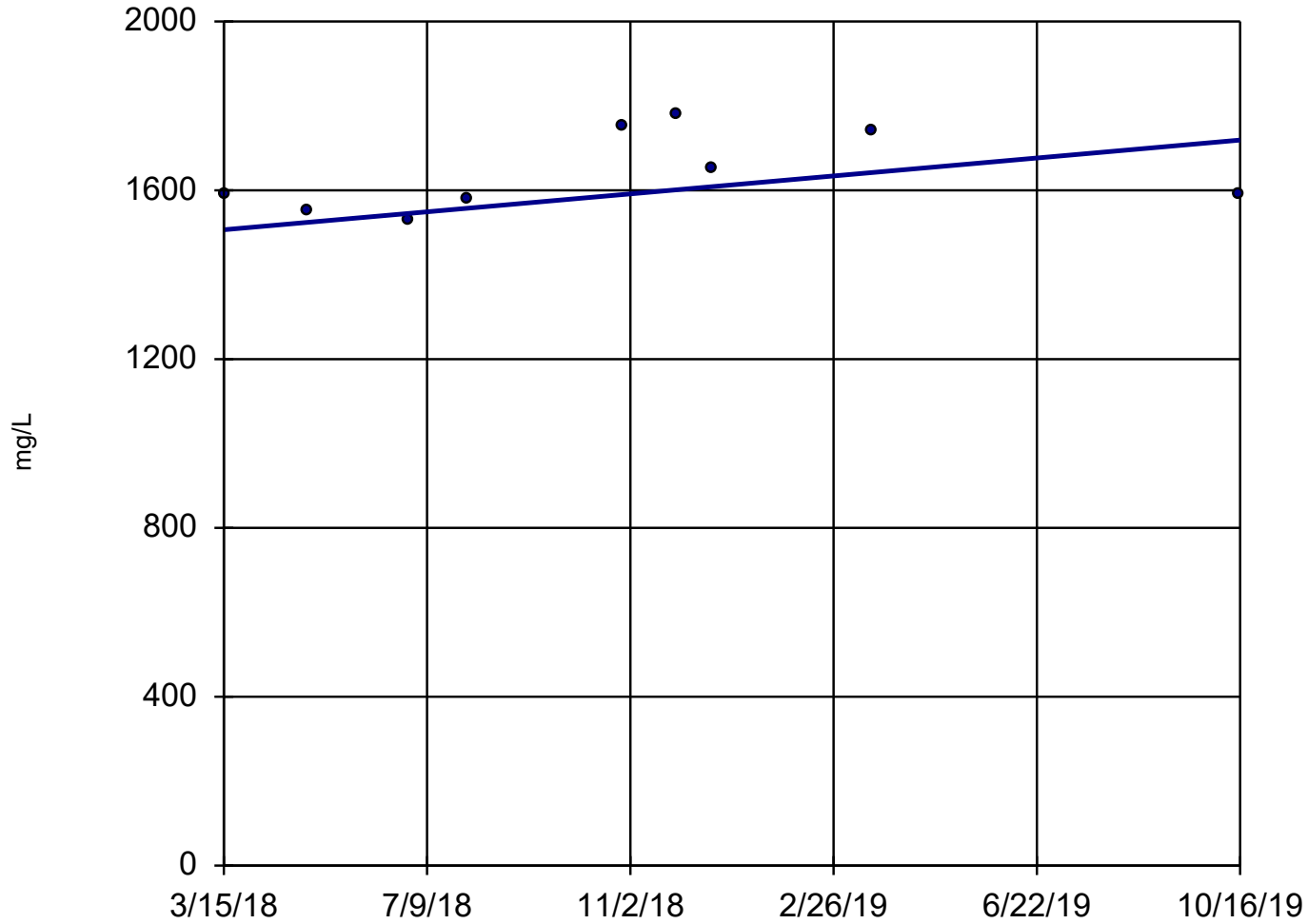
Mann-Kendall
statistic = 0
critical = 27

Trend not sig-
nificant at 98%
confidence level
($\alpha = 0.01$ per
tail).

Constituent: Sulfate Analysis Run 1/28/2020 6:28 PM View: Default

Branch Client: Golder Associates Data: Plant Branch Ash Pond

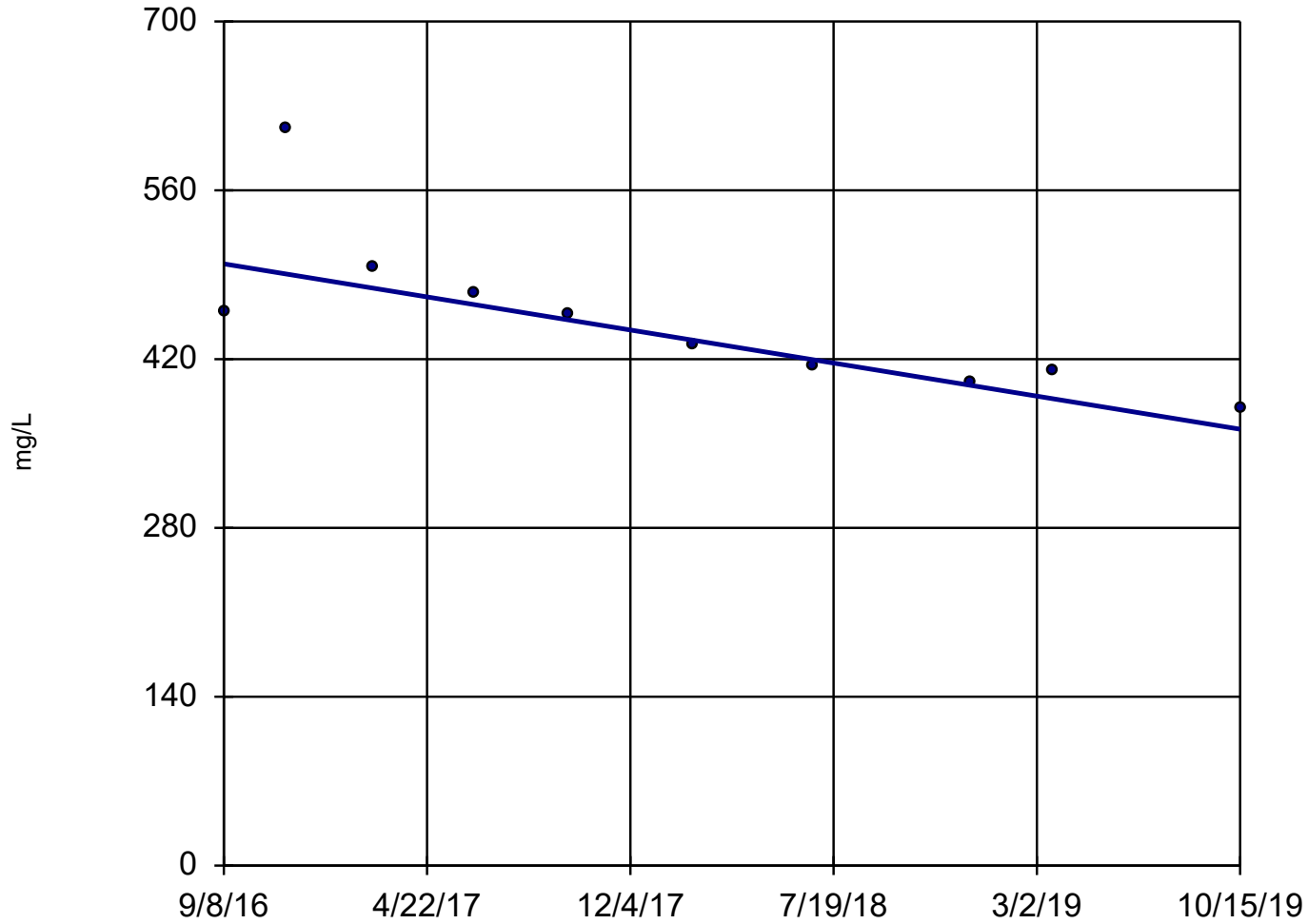
Sen's Slope Estimator BRGWC-50



n = 9
Slope = 133.5 units per year.
Mann-Kendall statistic = 11
critical = 23
Trend not significant at 98% confidence level ($\alpha = 0.01$ per tail).

Constituent: Sulfate Analysis Run 1/28/2020 6:28 PM View: Default
Branch Client: Golder Associates Data: Plant Branch Ash Pond

Sen's Slope Estimator BRGWC-25I



n = 10

Slope = -44.21
units per year.

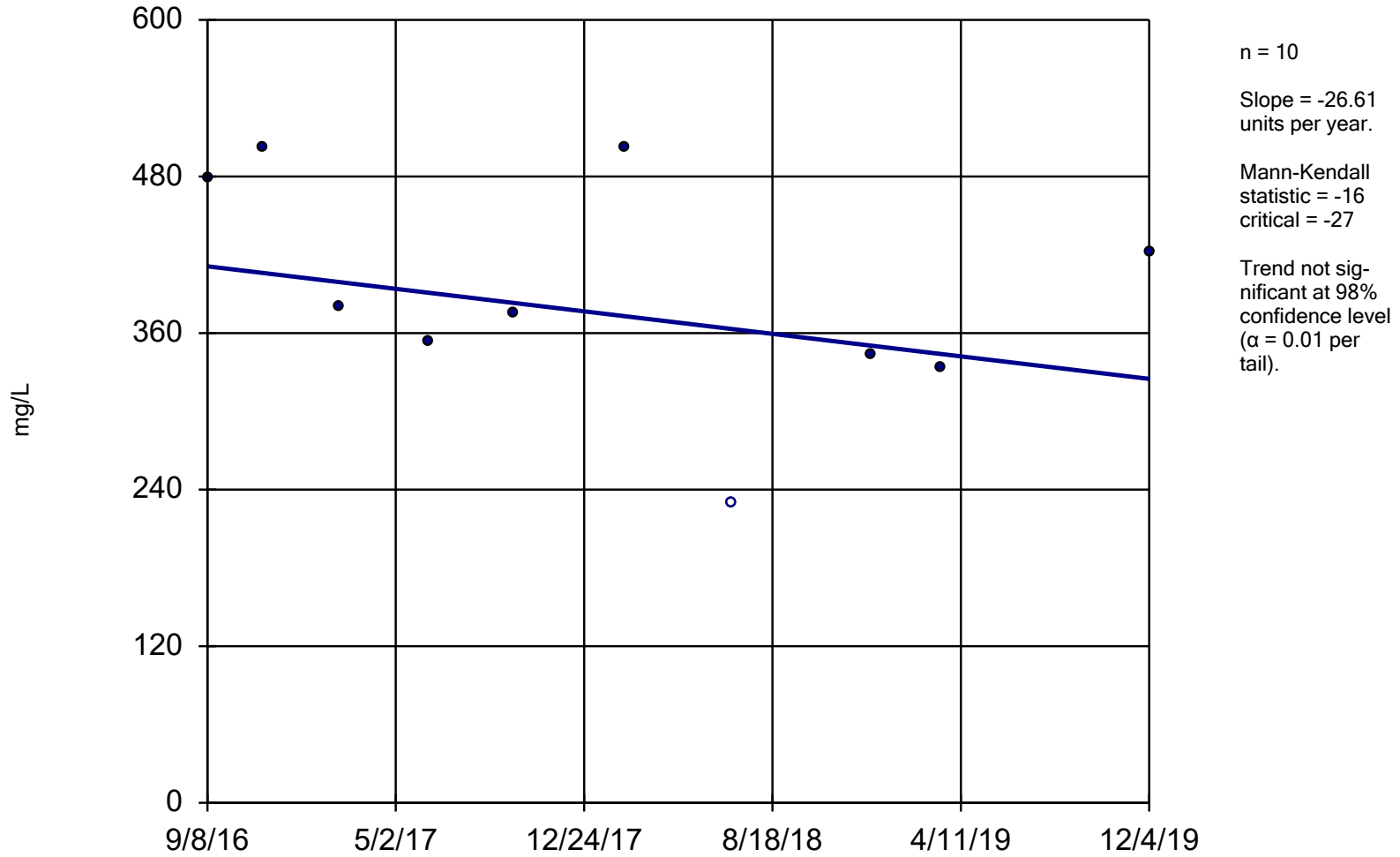
Mann-Kendall
statistic = -37
critical = -27

Decreasing trend
significant at 98%
confidence level
($\alpha = 0.01$ per
tail).

Constituent: Total Dissolved Solids Analysis Run 1/28/2020 6:28 PM View: Default

Branch Client: Golder Associates Data: Plant Branch Ash Pond

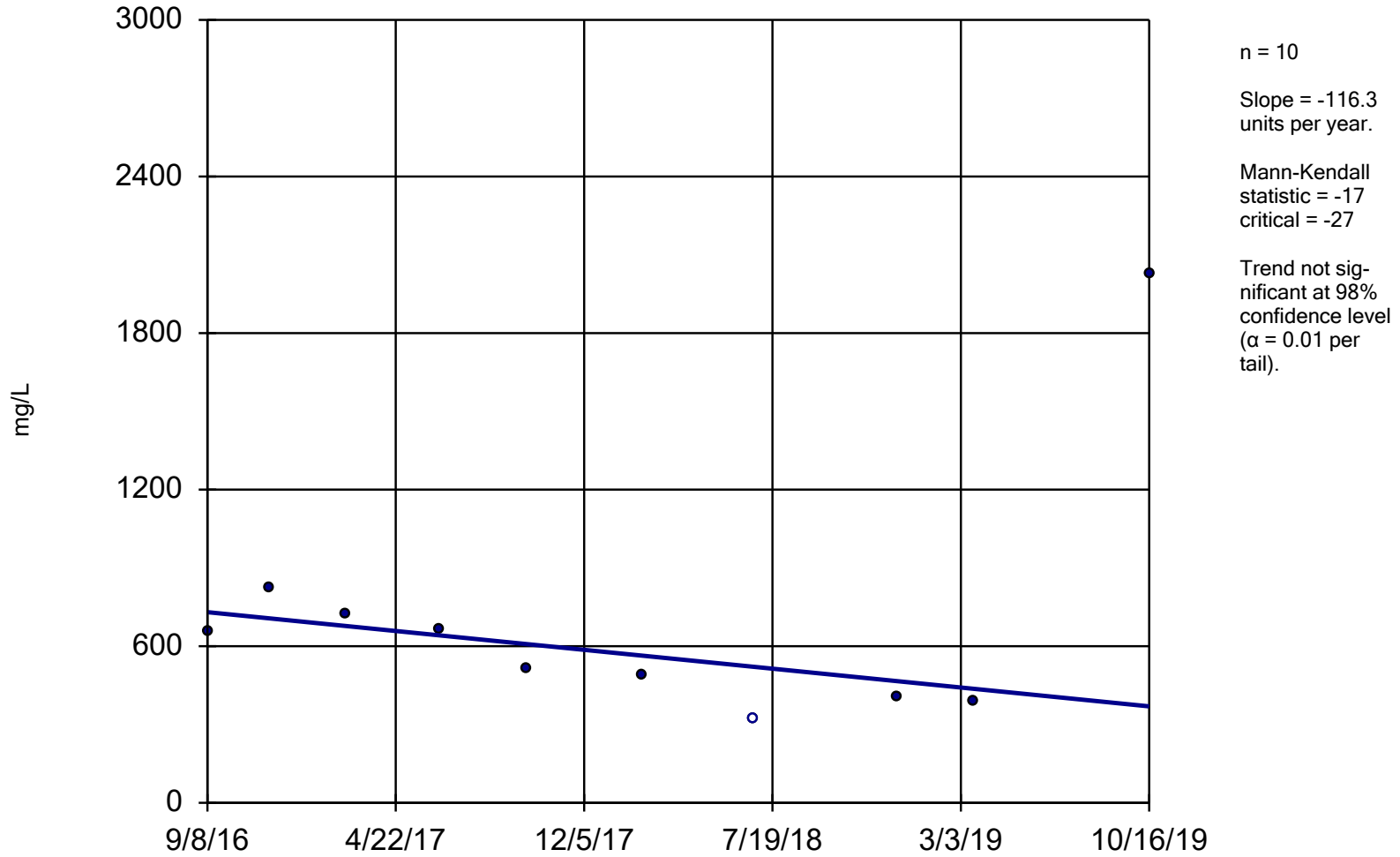
Sen's Slope Estimator BRGWC-27I



Constituent: Total Dissolved Solids Analysis Run 1/28/2020 6:28 PM View: Default

Branch Client: Golder Associates Data: Plant Branch Ash Pond

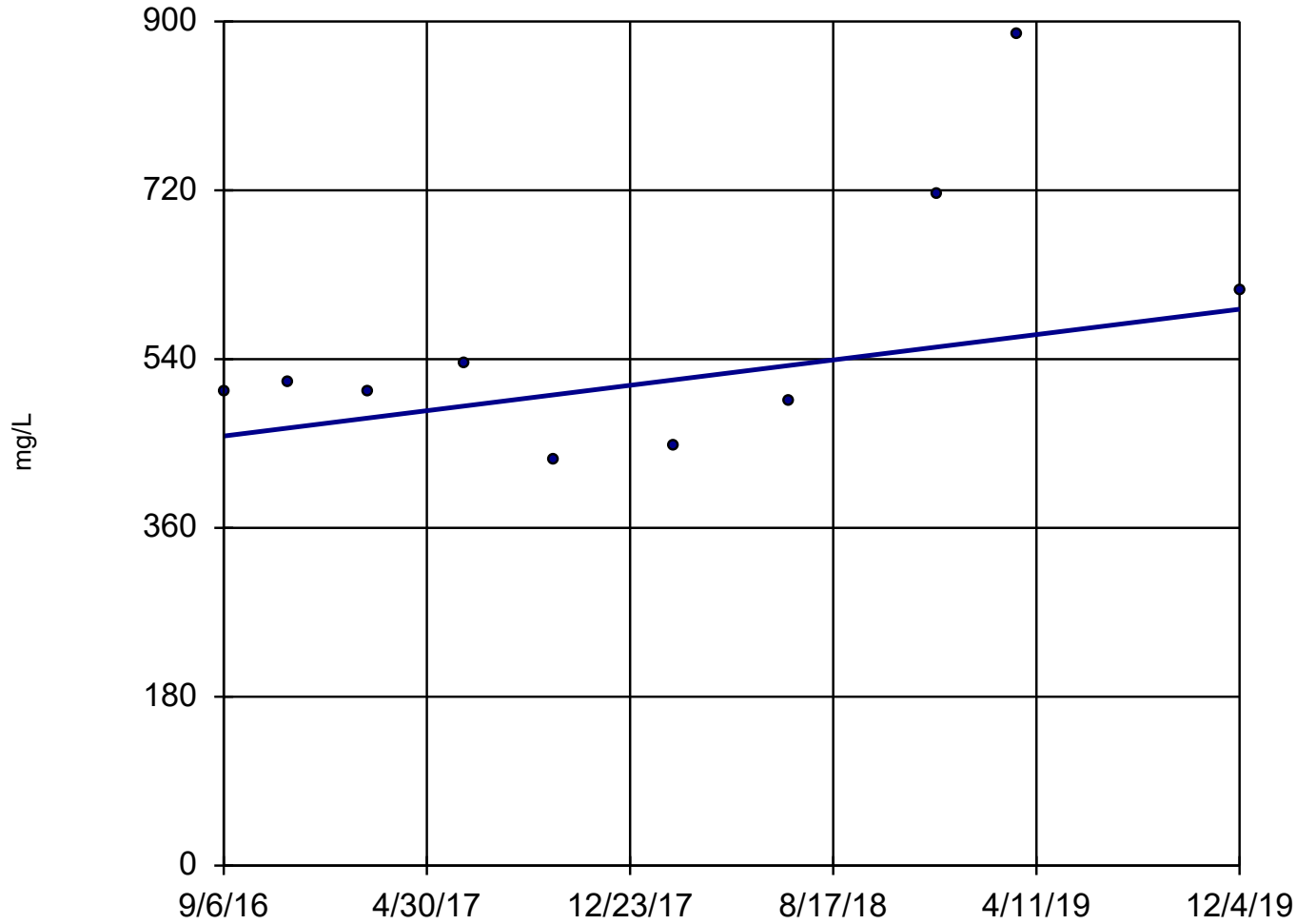
Sen's Slope Estimator BRGWC-29I



Constituent: Total Dissolved Solids Analysis Run 1/28/2020 6:28 PM View: Default

Branch Client: Golder Associates Data: Plant Branch Ash Pond

Sen's Slope Estimator BRGWC-30I



n = 10

Slope = 41.71
units per year.

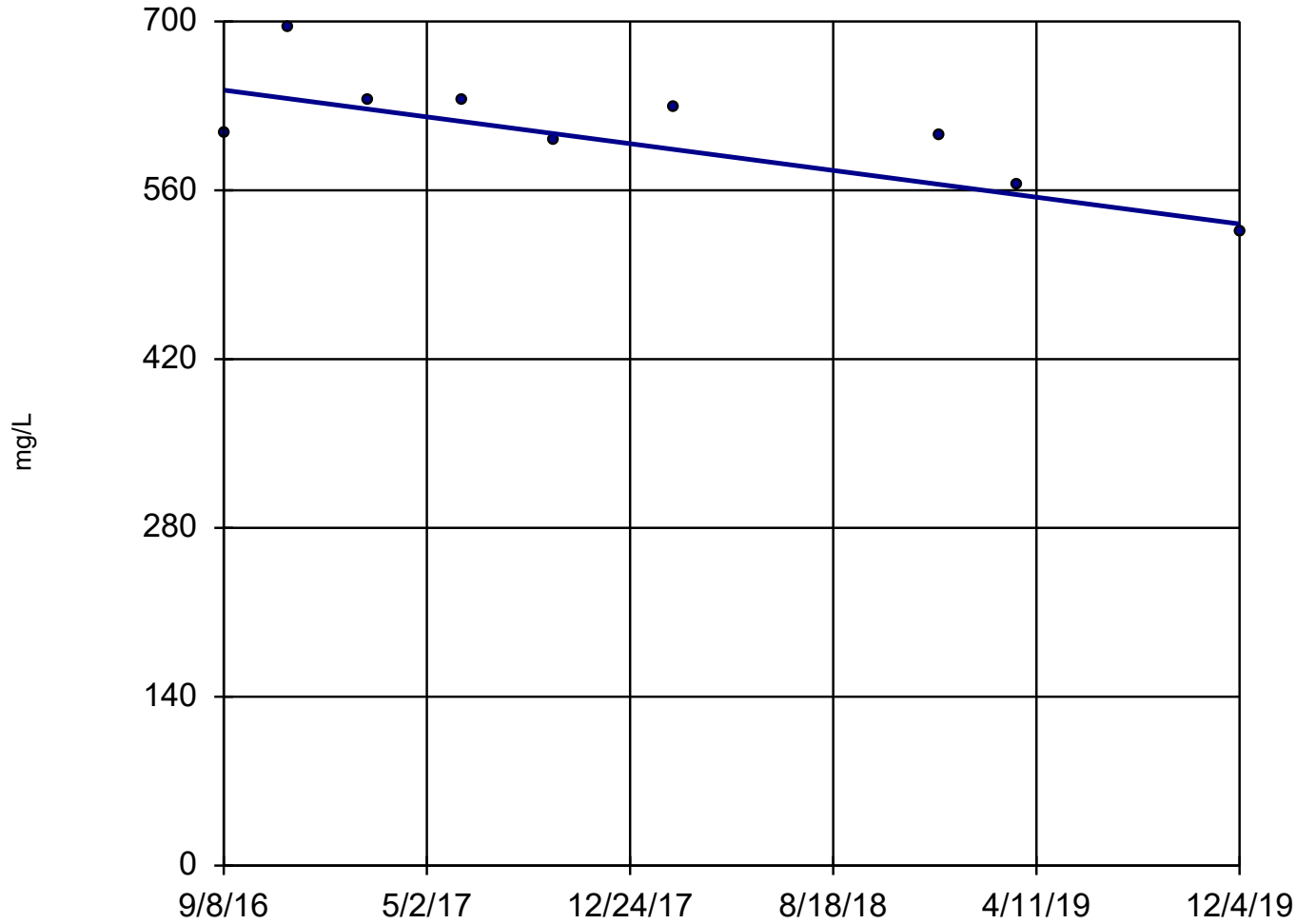
Mann-Kendall
statistic = 13
critical = 27

Trend not sig-
nificant at 98%
confidence level
($\alpha = 0.01$ per
tail).

Constituent: Total Dissolved Solids Analysis Run 1/28/2020 6:28 PM View: Default

Branch Client: Golder Associates Data: Plant Branch Ash Pond

Sen's Slope Estimator BRGWC-32S

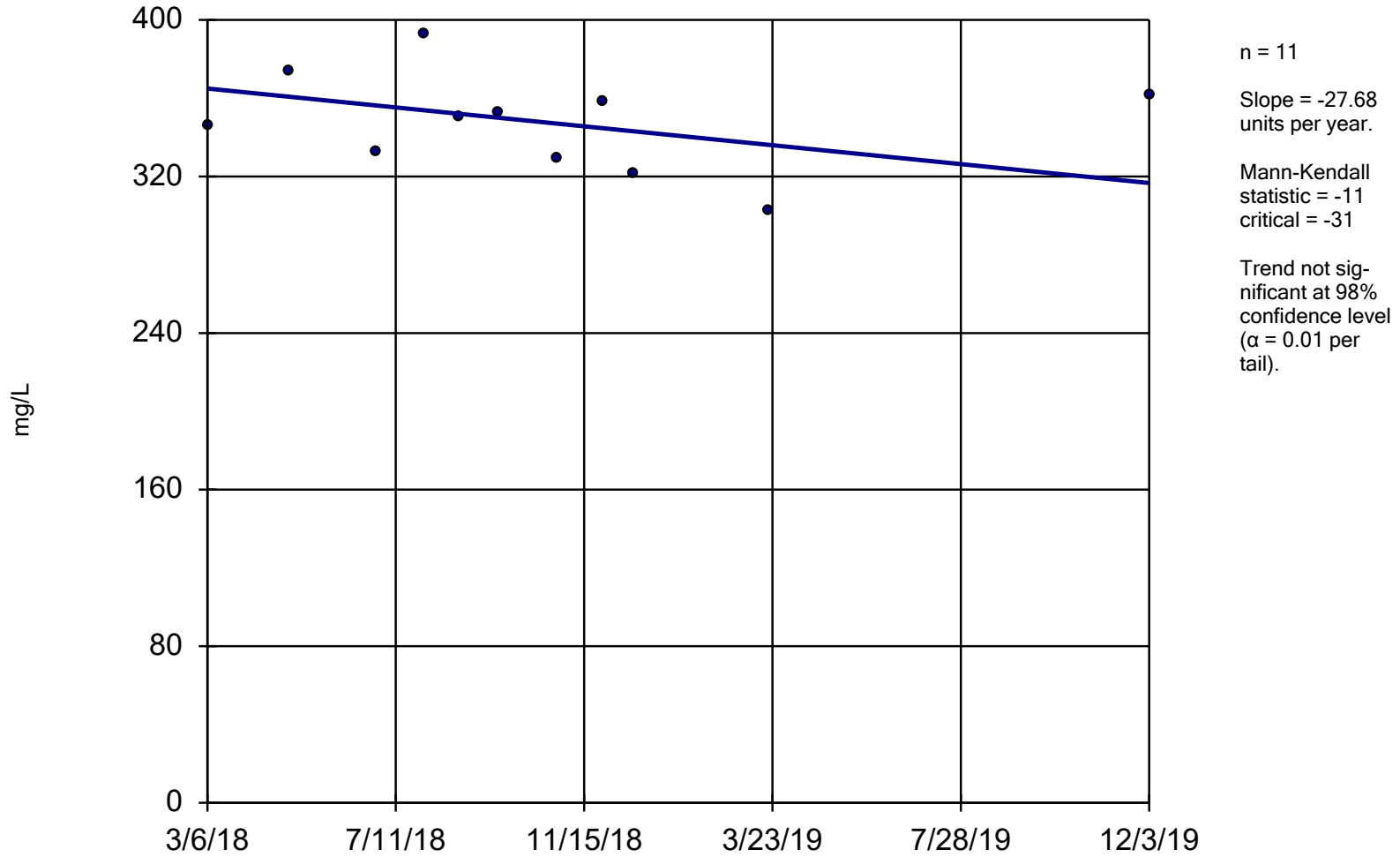


n = 9
Slope = -34.29
units per year.
Mann-Kendall
statistic = -23
critical = -23
Trend not sig-
nificant at 98%
confidence level
($\alpha = 0.01$ per
tail).

Constituent: Total Dissolved Solids Analysis Run 1/28/2020 6:28 PM View: Default

Branch Client: Golder Associates Data: Plant Branch Ash Pond

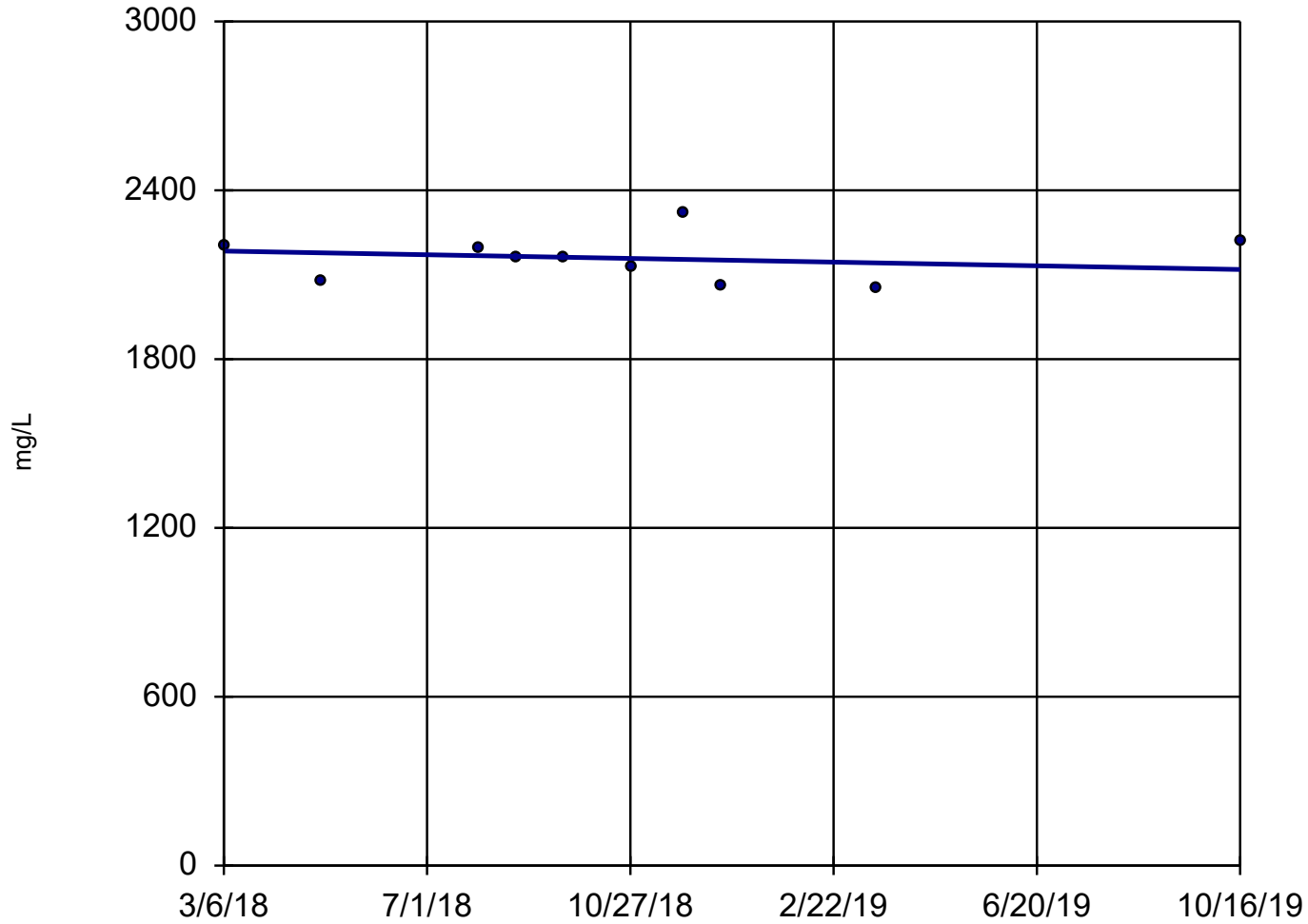
Sen's Slope Estimator BRGWC-45



Constituent: Total Dissolved Solids Analysis Run 1/28/2020 6:28 PM View: Default

Branch Client: Golder Associates Data: Plant Branch Ash Pond

Sen's Slope Estimator BRGWC-47

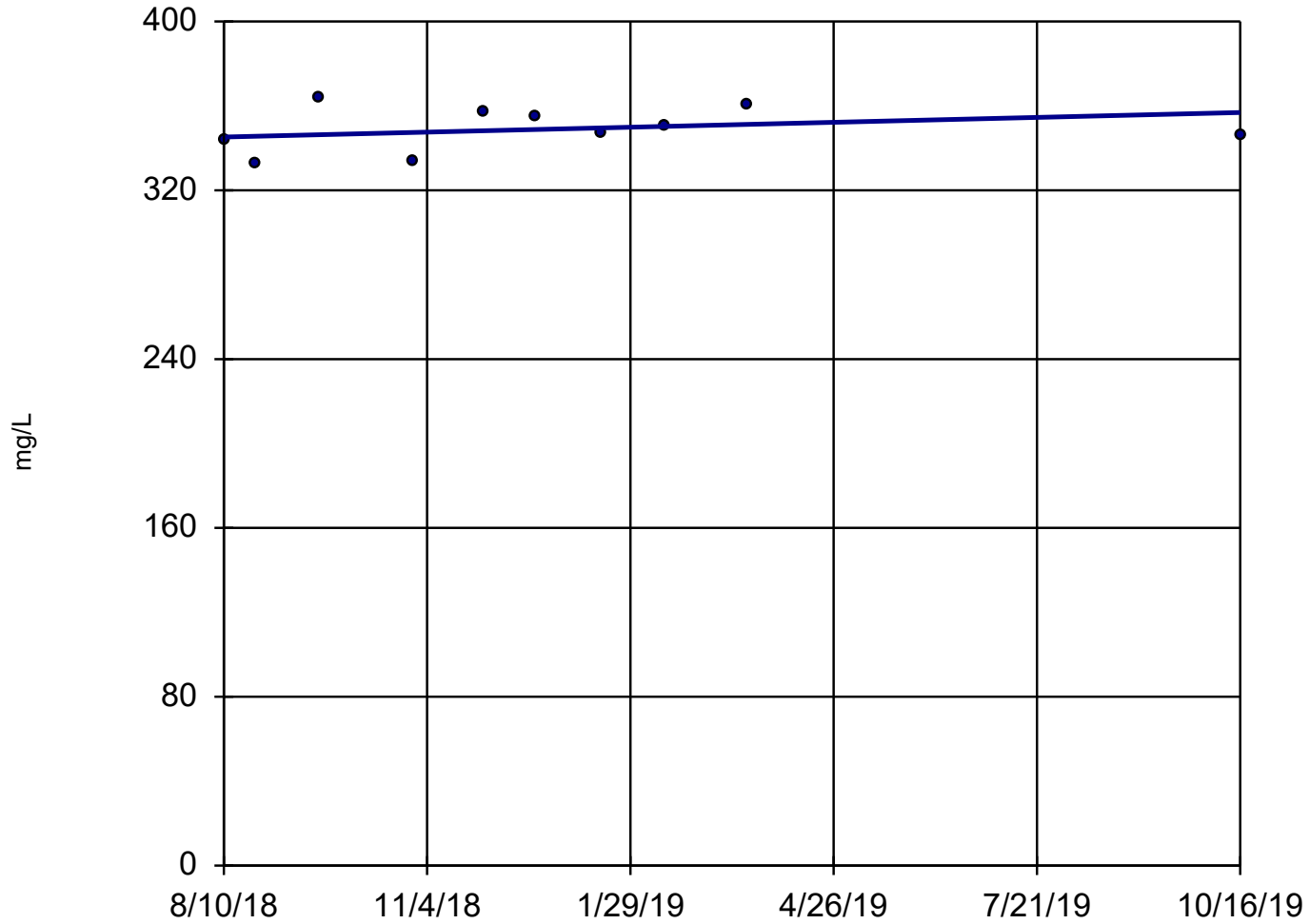


n = 10
Slope = -40.56
units per year.
Mann-Kendall
statistic = -8
critical = -27
Trend not sig-
nificant at 98%
confidence level
($\alpha = 0.01$ per
tail).

Constituent: Total Dissolved Solids Analysis Run 1/28/2020 6:28 PM View: Default

Branch Client: Golder Associates Data: Plant Branch Ash Pond

Sen's Slope Estimator BRGWC-52I



n = 10

Slope = 9.777
units per year.

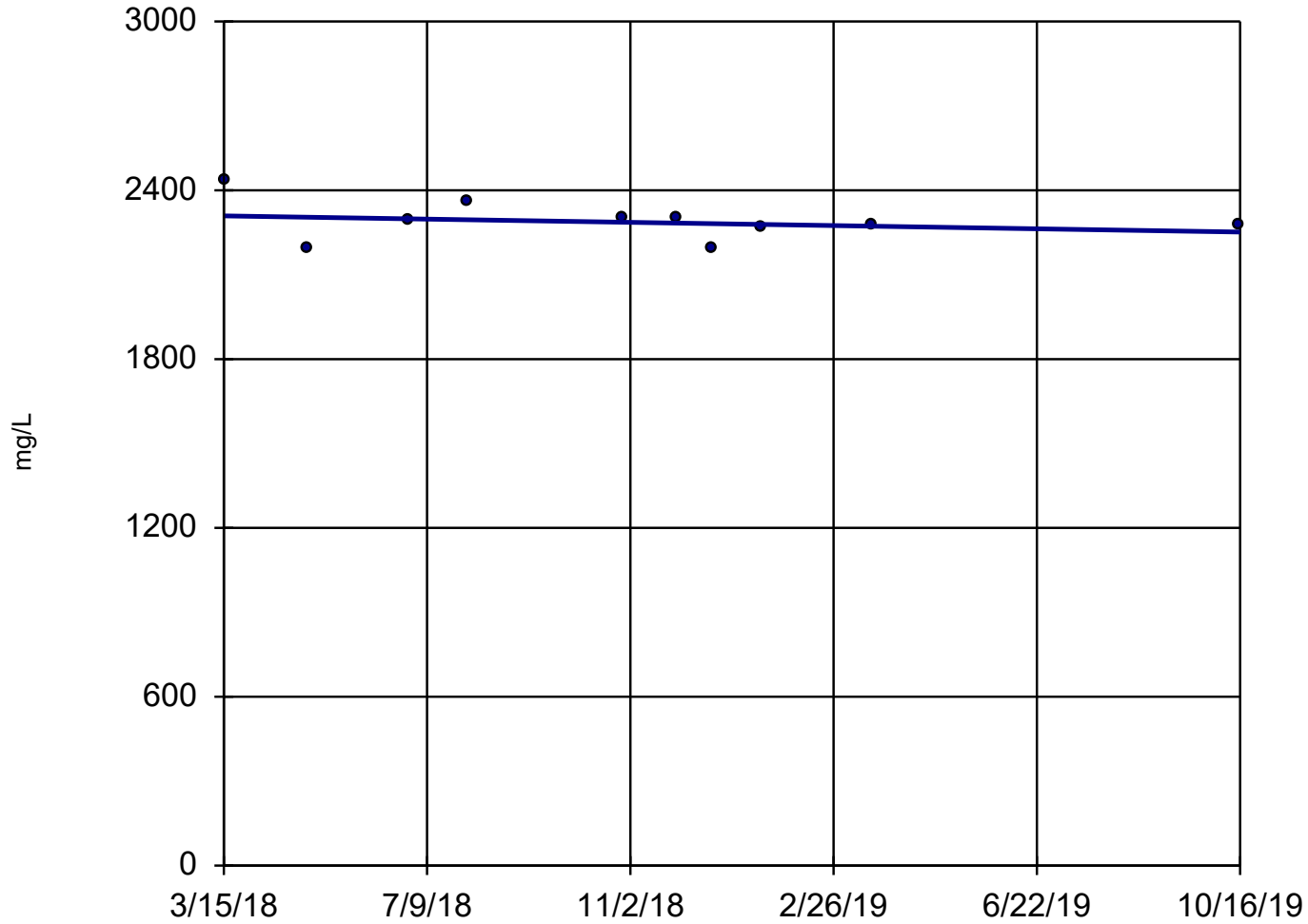
Mann-Kendall
statistic = 7
critical = 27

Trend not sig-
nificant at 98%
confidence level
($\alpha = 0.01$ per
tail).

Constituent: Total Dissolved Solids Analysis Run 1/28/2020 6:28 PM View: Default

Branch Client: Golder Associates Data: Plant Branch Ash Pond

Sen's Slope Estimator BRGWC-50



n = 10
Slope = -36.14 units per year.
Mann-Kendall statistic = -12
critical = -27
Trend not significant at 98% confidence level ($\alpha = 0.01$ per tail).

Constituent: Total Dissolved Solids Analysis Run 1/28/2020 6:28 PM View: Default

Branch Client: Golder Associates Data: Plant Branch Ash Pond



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