Prepared for

Georgia Power Company
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DRAFT REMEDY SELECTION REPORT

GEORGIA POWER COMPANY
PLANT BOWEN ASH POND 1 (AP-1)

Prepared by

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Plant Bowen AP-1 : Executive Summary



Plant Bowen is an active coal-fired electric generation facility, located 9-miles southwest of Cartersville, Georgia, that commenced operations in the 1970s. A component of the facility is a man-made surface impoundment, or "ash pond", historically used to hold coal combustion residuals (CCR). "CCR", commonly referred to as "coal ash", is a non-hazardous material generated from burning coal for the purpose of generating electricity by electric utilities[1]. The ash pond was designed, installed, and operated to function as a treatment system for power plant wastewaters, and it has effectively served in this capacity for decades in compliance with the National Pollutant Discharge Elimination System (NPDES) permit under which the pond is regulated. As part of a comprehensive approach to managing CCR, Georgia Power has undertaken actions to close Ash Pond 1 (AP-1) in accordance with federal and state regulations and completed a detailed evaluation of corrective measures to remove cobalt and molybdenum above the Groundwater Protection Standard (GWPS) at AP-1 at Plant Bowen.

ASH POND CLOSURE

Closure construction activities for AP-1 consist of excavation and consolidation of CCR material into an approximately 144-acre fully-contained (including engineered composite-liner and final cover systems), multi-cell storage facility situated within the current footprint of AP-1. The closure of AP-1 is regulated by the United States Environmental Protection Agency (USEPA) and the Georgia Environmental Protection Division (GA EPD). Closure activities are in accordance with GA EPD approved closure permit No. 008-021D(CCR). The proposed closure approach provides source control benefits that reduce the potential for migration of CCR constituents to groundwater.

GROUNDWATER MONITORING AND ASSESSMENT

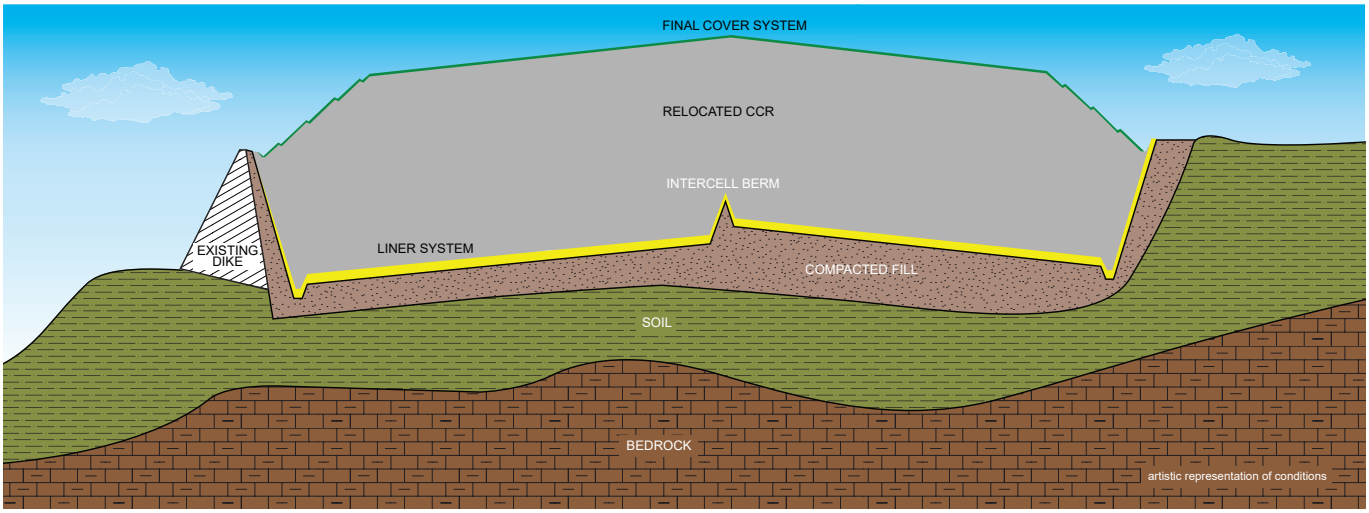
Georgia Power has performed CCR groundwater monitoring at AP-1 since June 2016. Over the period of Georgia Power's monitoring, concentrations of cobalt (Co) and molybdenum (Mo) were identified above the GWPS in two wells (BGWC-22, BGWC-43D) downgradient of AP-1. The Co and Mo groundwater concentrations above the GWPS are located wholly on Georgia Power property and do not move offsite.

RISK EVALUATION FOR HUMAN HEALTH & ENVIRONMENT

Georgia Power completed a risk evaluation that confirmed that Co and Mo identified on-site are not expected to pose a risk to human health or the environment. Extended groundwater monitoring indicates the Co and Mo groundwater concentrations identified in BGWC-22 and BGWC-43D, respectively, are horizontally and vertically delineated within the plant's property to levels below their respective GWPS. Cobalt and Mo concentrations are limited in extent due to natural physical and chemical processes currently occurring in the aquifer which reduce dissolved concentrations

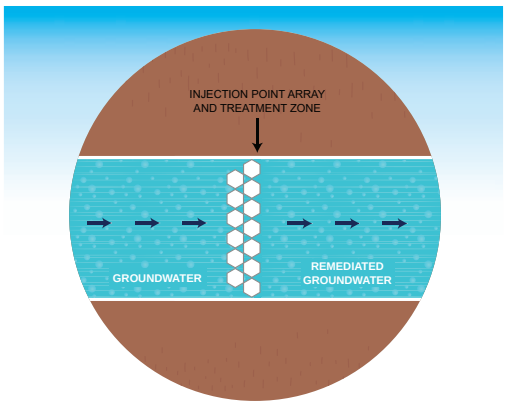
[1] 40 Code of Federal Regulations (CFR) § 257.53

POST-CLOSURE CONDITIONS

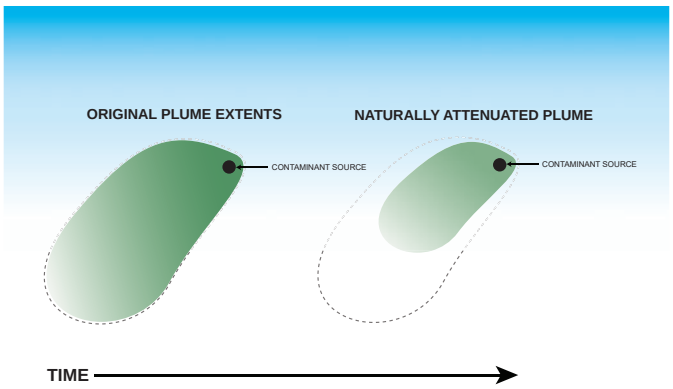


GEOCHEMICAL MANIPULATION

Overhead View



MONITORED NATURAL ATTENUATION



Georgia Power initiated an assessment of corrective measures (ACM) program for AP-1 in January 2019. Since initiating the ACM program, Georgia Power has worked with GA EPD to adhere to regulations and select a comprehensive and technically sound approach for implementing corrective measures to address Co and Mo in groundwater. Using the criteria described in the CCR Rule, 40 Code of Federal Regulations (CFR) Part 257.97, the draft remedy proposed includes:

- **Geochemical Approaches (In-situ Injections):** In-situ injections are a well-recognized remediation approach utilizing a network of injection wells to introduce reagents into the subsurface to improve groundwater quality. Georgia Power will work with GA EPD on the permitting and approval of the reagent prior to use at the site. Injections will target the areas of highest groundwater concentrations of Co and Mo to immobilize these constituents. Groundwater monitoring will be performed to confirm the effectiveness of the in-situ injections.
- **Monitored Natural Attenuation (MNA):** Natural attenuation of Co and Mo in groundwater at the site is primarily due to adsorption and co-precipitation of the dissolved metals into the aquifer matrix. These mechanisms have been demonstrated to be occurring at the site through extensive laboratory testing and study. Groundwater monitoring will continue to document natural attenuation, which is expected to be enhanced by the geochemical in-situ injections.

ADAPTIVE SITE MANAGEMENT

The remedy performance will be monitored and evaluated, and if needed, the remedy will be adjusted or augmented to meet remedial objectives.

LONG-TERM GROUNDWATER MONITORING

Georgia Power will monitor the performance of applied corrective measures in accordance with regulatory requirements.

Geosyntec
consultants

CERTIFICATION STATEMENT

I, Whitney B. Law, am a professional engineer and licensed in the State of Georgia. I hereby certify that this Draft Remedy Selection Report was prepared by, or under the direct supervision of, a Qualified Groundwater Scientist, in accordance with the Georgia Environmental Protection Division Rules of Solid Waste Management. According to 391-3-4-.01, a Qualified Groundwater Scientist is "a professional engineer or geologist registered to practice in Georgia who has received a baccalaureate or post-graduate degree in the natural sciences or engineering and has sufficient training and experience in groundwater hydrology and related fields that enable individuals to make sound professional judgments regarding groundwater monitoring, contaminant fate and transport, and corrective action." By affixing my professional seal and signature, I hereby acknowledge that this report has been prepared in conformance with the United States Environmental Protection Agency coal combustion residual rule [40 Code of Federal Regulations 257 Subpart D] and the Georgia Environmental Protection Division Rules for Solid Waste Management 391-3-4-.10.



Whitney B. Law
Georgia Professional Engineer No. 36641

July 5, 2024
Date

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LIST OF ACRONYMS AND ABBREVIATIONS

ACM	Assessment of Corrective Measures
AP-1	Ash Pond 1
As	arsenic
ASD	alternate source demonstration
CCR	coal combustion residuals
CFR	Code of Federal Regulations
Co	cobalt
CSM	conceptual site model
EPRI	Electric Power Research Institute
FeS_2	pyrite
ft/ft	feet per foot
GA EPD	Georgia Environmental Protection Division
Georgia Power	Georgia Power Company
Geosyntec	Geosyntec Consultants, Inc.
GWPS	Groundwater Protection Standard
HAR	Hydrogeologic Assessment Report
ITRC	Interstate Technology and Regulatory Council
MCL	maximum contaminant level
mg/L	milligrams per liter
MNA	monitored natural attenuation
Mo	molybdenum
NOI	notice of intent
NPDES	National Pollutant Discharge Elimination System
O&M	operations and maintenance
PDI	Pre-design Investigation
PRB	permeable reactive barrier
RCRA	Resource Conservation and Recovery Act
RSL	Regional Screening Level
SSL	statistically significant level
UIC	Underground Injection Control
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey

1.0 INTRODUCTION

Geosyntec Consultants, Inc. (Geosyntec) prepared this *Draft Remedy Selection Report* on behalf of Georgia Power Company (Georgia Power) for Plant Bowen Ash Pond 1 (AP-1 or the coal combustion residual (CCR) unit). As documented herein, Georgia Power has completed a detailed evaluation of corrective measures to address constituents in groundwater at statistically significant levels (SSLs) above the Groundwater Protection Standards (GWPS). The evaluation was completed in accordance with the United States Environmental Protection Agency's (USEPA's) CCR Rule, 40 Code of Federal Regulations (CFR) Parts 257 effective October 19, 2015 (CCR Rule) including subsequent revisions and Georgia Environmental Protection Division's (GA EPD's) Rule for Solid Waste Management Rule 391-3-4-.10 for CCR.

This *Draft Remedy Selection Report* includes an overview of ongoing geologic and hydrogeologic investigations to refine the conceptual site model (CSM), identifies Appendix IV constituents detected in groundwater at SSLs above the GWPS, discusses the nature and extent of these inorganic constituents in groundwater, evaluates potential corrective measures to address SSLs in groundwater, and presents geochemical approaches (in-situ injections) coupled with monitored natural attenuation (MNA) of cobalt (Co) and MNA of molybdenum (Mo) as the proposed groundwater remedies for preliminary review by GA EPD. At GA EPD's request, following their preliminary review, a public meeting will be held to discuss the assessment of corrective measures (ACM) and proposed remedy, after which a remedy will be selected, and the Remedy Selection Report will be submitted to GA EPD. Once a remedy is selected and implemented, the remediation will be monitored routinely and is subject to potential modification based on adaptive management strategies, as appropriate.

2.0 BACKGROUND

2.1 Remedy Selection Process

The remedy selection process involves assessment of potentially applicable groundwater remediation approaches. To date, this process has occurred as reported in previous submittals including the *Assessment of Corrective Measures Report* (ACM Report) (Geosyntec, 2019b) and *Semiannual Remedy Selection and Design Progress Reports* (Semiannual Progress Reports) (Geosyntec, 2019c; 2020a; 2020b; 2021d; 2021f; 2022a).

The remedy selected for the CCR unit must meet the following required criteria:

§257.97 Selection of Remedy [Required Criteria]
(b) Remedies must:

> *(1) Be protective of human health and the environment;*
> *(2) Attain the groundwater protection standard as specified pursuant to §257.95(h);*
> *(3) Control the source(s) of releases so as to reduce or eliminate, to the maximum extent feasible, further releases of constituents in Appendix IV to this part into the environment;*
> *(4) Remove from the environment as much of the contaminated material that was released from the CCR unit as is feasible, taking into account factors such as avoiding inappropriate disturbance of sensitive ecosystems;*
> *(5) Comply with standards for management of wastes as specified in §257.98(d).*

Technologies that meet the required criteria are then evaluated using the following comparative criteria:

§257.97 Selection of remedy [Comparative Criteria]
(c) In selecting a remedy that meets the standards of paragraph (b) of this section, the owner or operator of the CCR unit shall consider the following evaluation factors:

> *(1) The long- and short-term effectiveness and protectiveness of the potential remedy(s), along with the degree of certainty that the remedy will prove successful based on consideration of the following:*
> > *(i) magnitude of reduction of existing risks;*
> > *(ii) magnitude of residual risks in terms of likelihood of further releases due to CCR remaining following implementation of a remedy;*
> > *(iii) the type and degree of long-term management required, including monitoring, operation, and maintenance;*

(iv) short-term risks that might be posed to the community or the environment during implementation of such a remedy, including potential threats to human health and the environment associated with excavation, transportation, and re-disposal of contaminant;
(v) time until full protection is achieved;
(vi) potential for exposure of humans and environmental receptors to remaining wastes, considering the potential threat to human health and the environment associated with excavation, transportation, re-disposal, or containment;
(vii) long-term reliability of the engineering and institutional controls; and
(viii) potential need for replacement of the remedy.

(2) The effectiveness of the remedy in controlling the source to reduce further releases based on consideration of the following factors:

(i) the extent to which containment practices will reduce further releases; and
(ii) the extent to which treatment technologies may be used.

(3) The ease or difficulty of implementing a potential remedy(s) based on consideration of the following types of factors:

(i) degree of difficulty associated with constructing the technology;
(ii) expected operational reliability of the technologies;
(iii) need to coordinate with and obtain necessary approvals and permits from other agencies;
(iv) availability of necessary equipment and specialists; and
(v) available capacity and location of needed treatment, storage, and disposal services.

(4) The degree to which community concerns are addressed by a potential remedy(s).

Using the above criteria, this document evaluates the potential remedies identified in the ACM Report and subsequent updates to identify an appropriate groundwater remedy for the CCR unit. Selection of an appropriate groundwater remedy is significantly influenced by CCR constituent chemistry and characteristics of Appendix IV constituents, which are inorganic trace elements – metals and metalloids that have unique attenuation and remediation characteristics. Common chemical mechanisms of attenuation for CCR constituents include adsorption to, or coprecipitation with, oxides and hydrous oxides (oxyhydroxides) of iron and manganese; coprecipitation with, and adsorption to, iron sulfides such as pyrite (FeS_2); and precipitation as carbonates, sulfides, sulfates, and/or phosphates (USEPA, 2007; EPRI, 2018). The attenuation capacity can be evaluated through site-specific field and lab testing and geochemical modeling. Processes such as precipitation/co-precipitation and adsorption and other methods such as groundwater extraction and treatment and engineered plant uptake (phytoremediation) are also evaluated for the remediation of Appendix IV constituents. The selected remedy will meet the criteria of §257.97(b) and the effectiveness of criteria specified in §257.97(c).

An evaluation of the degree to which community concerns are addressed by a potential remedy is not included in this Draft Remedy Selection Report. A discussion of this criterion will be substantially informed by a forthcoming public meeting following GA EPD preliminary review and comment on this Draft Remedy Selection Report. Following the public meeting, the Remedy Selection Report will be prepared for submission to GA EPD and will include a discussion of the "degree to which community concerns are addressed by a potential remedy."

2.2 Unit Location and Description

Plant Bowen is located nine miles southwest of Cartersville in Bartow County, Georgia. The plant is bordered by the Etowah River to the north and east, and sparsely populated, forested, rural, and industrial land on the south and west (**Figure 1**). The physical address of the plant is 317 Covered Bridge Rd SW, Euharlee, Georgia 30120.

Plant Bowen is a four-unit, coal-fired, electric-generating facility that commenced operations in the 1970s. AP-1 occupies an area of approximately 254 acres. In preparation for AP-1 closure, the plant completed the conversion to dry ash handling in early 2019, and AP-1 no longer receives CCR. Georgia Power submitted to GA EPD a notice of intent (NOI) stating that waste stream flows are no longer directed to AP-1, effective December 31, 2020. AP-1 received CCR material from its commission in the 1970s until 2019.

2.3 Unit Closure

CCR placement in AP-1 ceased in 2019, with closure activities subsequently beginning in early 2021. Closure construction activities for AP-1 consist of excavation and consolidation of CCR material into an approximately 144-acre fully-contained (including engineered composite-liner and final cover systems), multi-cell storage facility situated within the current footprint of AP-1. Closure activities will be conducted in accordance with § 257.102 and corresponding Rule 391-3-4-.10(7)(b). The proposed closure approach reduces the potential for migration of CCR constituents to groundwater. Details of the closure approach have been summarized in the Amended Written Closure Plan and published in 2018 to Georgia Power's CCR compliance website. Georgia EPD approved the closure permit (008-021D(CCR)) on February 17, 2022. The permit specifies a closure deadline of December 31, 2025, and grants Georgia Power the option to request up to five 2-year extensions to complete the closure activity.

Following closure completion, AP-1 will enter into post-closure care for a minimum period of thirty (30) years. Post-closure care is detailed in the closure permit. Georgia Power will retain ownership of the Site following closure.

2.4 Groundwater Monitoring

The current groundwater monitoring network associated with AP-1 includes the background/upgradient and downgradient monitoring wells, as summarized in **Table 1**. Compliance monitoring well locations are shown on **Figure 2.**

CCR groundwater monitoring-related activities have been performed at AP-1 since June 2016 in accordance with the CCR Rule. The following Appendix IV SSL constituent and well pairs are currently identified:

Appendix IV SSL Constituent[1]	Well
Cobalt (Co)	BGWC-22
Molybdenum (Mo)	BGWC-43D

[1] An Appendix IV SSL Constituent is determined by comparing the confidence intervals developed to either the constituent's maximum contaminant level (MCL), if available, the USEPA Regional Screening Level (RSL), if no MCL is available, or the calculated background interwell tolerance limit in cases where background concentrations are higher than the MCL or RSL values.

Additional details regarding the statistical analyses are provided in the annual and semiannual *Groundwater and Corrective Action Monitoring Reports* submitted to GA EPD and posted on Georgia Power's website.

Monitoring well BGWC-38D exhibited SSLs in the past that are no longer present. Concentrations of molybdenum have decreased to less than the GWPS and statistical analysis no longer indicates an SSL (Geosyntec, 2022b).

In accordance with §257.95(g)(3), an alternate source demonstration (ASD) submitted in January 2021[2] to address the SSL of Arsenic (As) in delineation well BGWC-34D was approved by GA EPD on August 18, 2021. The evaluation demonstrated that the natural source of As in the site-specific rock formation caused the SSL for As and not AP-1 (Geosyntec, 2021c).

Consequently, only Co at BGWC-22 and Mo at BGWC-43D are the subject of this Draft Remedy Selection Report.

[2] The ASD was submitted under separate cover on January 29, 2021, and as an appendix to the *2020 Annual Groundwater Monitoring and Corrective Action Report – Plant Bowen Ash Pond 1 (AP-1)* (Geosyntec, 2021b).

3.0 GROUNDWATER CONCEPTUAL SITE MODEL

A CSM is a dynamic tool that contextualizes available geological, hydrogeological, and geochemical information at a site to convey how groundwater and constituents (Appendix III and IV constituents) travel in a given geologic setting. A CSM is not static and may evolve as data are collected and more is known about the setting. A CSM was developed for AP-1. As data were gathered during the ACM process, the CSM was refined and used to pre-screen remedial technologies, retaining technologies that were suitable for consideration in remedial alternatives for groundwater or adaptive site management based on site-specific conditions. The CSM for AP-1 is summarized below.

3.1 Geology

The Site is located within the Great Valley District of the Valley and Ridge Physiographic Province (Valley and Ridge) in northwest Georgia. The Valley and Ridge is characterized by Paleozoic sedimentary rocks that have been folded and faulted into the ridges and valleys that gave this region its name. The floor of the valley is underlain by shales, dolomites, and limestones of Cambrian and Ordovician age. Geologic mapping performed by Lawton et al. (1976) indicates that the Site is underlain by the Ordovician-Cambrian age Knox Dolomite and the Ordovician age Newala Limestone. Based on review of subsurface investigations at the Site, the bedrock is described as predominantly dolomite. The overall Site is underlain primarily by residuum and competent dolomite/limestone bedrock. AP-1 is underlain primarily by three units: (i) fill material consisting of earthen embankments and CCR material; (ii) residuum; and (iii) competent dolomite/limestone bedrock.

Based on subsurface investigations, the residuum at the Site is the result of in-place weathering of the underlying dolomite/limestone bedrock. The residuum consists mainly of mottled light brown to red to yellow, low to high plasticity, stiff to very stiff clay, silt, and silty clay. Most soils contain varying amounts of black chert nodules and chert gravel. The bedrock beneath the Site is described as light to dark gray, fine to medium grained, thinly bedded to massive, dense, and hard dolomite, limestone, and dolomitic limestone. Some evidence of weathering along fracture or bedding surfaces is observed, with some manganese or iron oxide staining. Abundant calcite veins and occasional zones of healed dolomite breccia are observed throughout the bedrock. Solution features such as voids in the underlying limestone/dolomite bedrock have formed in the bedrock over geological timeframes, primarily along pre-existing discontinuities such as joints and bedding planes. At the Site, these voids are typically filled with residuum from the in-place

weathering of the bedrock or the downward migration of the overlying residuum, but they may also be open, or water filled, as summarized in the *Boring Log and Borehole Geophysics Review Summary* included as **Appendix A**. Descriptions of recovered void infill material by geologists during visual logging of Site boreholes were very similar to the overlying residuum. A variety of downhole geophysical instruments were also used to log boreholes at the Site and confirmed the presence of both open and infilled voids. Identified open voids were often smaller compared to infilled features, ranging in width from a few inches to a few feet. Of the identified features, 54% were observed to be filled with clay and/or sediment, while 36% were observed to be open or not infilled[3].

Geologic cross-sections proximal to AP-1 are included as **Figures 3** and **4**, and additional details on Site geology and hydrogeology can be found in the *Hydrogeologic Assessment Report (Revision 3) – AP-1* (HAR Rev 3) (Geosyntec, 2021e).

3.2 Hydrology and Groundwater Flow

The uppermost aquifer at the Site is a regional groundwater aquifer that occurs near the interface of the residuum and the fractured and solutioned bedrock. Residuum soils at the Site consists of low to high plasticity, stiff to very stiff clays, silty clays, and silty soils with relatively low transmissivity and specific yield (Geosyntec, 2021e; USGS, 1996). Groundwater recharge is by precipitation infiltrating through the residuum to bedrock, or in bedrock outcrop areas, it infiltrates directly into the bedrock. Groundwater flow in bedrock is under unconfined to semi-confined conditions from the mantle of overlying lower-permeability residuum and is controlled by secondary porosity along fractures and solution-enhanced features that are typically filled with residuum. Based on observations of residuum soil types and horizontal hydraulic conductivity values, the movement of groundwater in the clay-rich residuum and upper weathered bedrock zone is slow and likely behaves as flow through low-permeability porous media. Based on fracture infill observations during drilling and horizontal hydraulic conductivity values, groundwater flow in the underlying dolomite/ limestone bedrock is likely controlled by the secondary porosity features that are typically filled with residuum.

A potentiometric surface map from July 2022 (**Figure 5**) presents groundwater elevations measured from the existing monitoring wells and piezometers. The regional groundwater flow direction is expected to be from south to north. Under present conditions, groundwater in the AP-1 area generally flows to the north, northwest, and west, towards

[3] The potential infilling of the remaining 10% of features was inconclusive based on available data.

Euharlee Creek. A component of flow in the southernmost portion of AP-1 is to the south and west, likely due to groundwater mounding related to historical free water storage at the former Recycle Pond at the southern end of AP-1 (now decommissioned). Under post-closure conditions, the groundwater flow direction is anticipated to resemble the regional flow regime more closely (south to north toward the Etowah River).

Based on water level measurements collected on July 25, 2022, the hydraulic gradients are approximately 0.012 feet per foot (ft/ft) northwest (between APPZ-5R and BGWC-14A), 0.015 ft/ft west (between APPZ-3R and BGWC-25), and 0.026 ft/ft south/southwest (between BGWC-24 and BGWC-40) (Geosyntec, 2022b). Using the geometric mean hydraulic conductivity in bedrock of 2.4 ft/day yields average groundwater flow velocities along the northwest, west, and south/southwest flow paths of 0.10 ft/day, 0.12 ft/day, and 0.20 ft/day, respectively (Geosyntec, 2022b).

3.3 Geochemical CSM

Groundwater monitoring data confirm that Co in BGWC-22 and Mo in BGWC-43D, respectively, are not migrating, and impacts are likely limited in extent due to natural attenuation processes in the aquifer, as supported by laboratory studies.

As detailed in the *Geochemical Conceptual Site Model Report* (**Appendix B**) (Geochemical CSM Report), the primary mechanisms governing attenuation and immobilization include sorption of Co^{2+} in groundwater to negatively charged aquifer matrix minerals under neutral to alkaline pH conditions, sorption of negatively charged Mo oxyanions to positively charged minerals present in the residuum and likely present in the bedrock, and co-precipitation and entrainment of Co and Mo oxyanions with fast growing iron and manganese oxyhydroxide crystals, which precipitate under oxidizing conditions. Characterization of aquifer solids around AP-1 confirm mineral phases present in aquifer media provide substantial attenuation capacity, and sorption and desorption studies confirm that Co and Mo are sorbed to aquifer solids.

3.4 Nature and Extent of Groundwater Above the GWPS

Based on statistical analysis of Appendix IV groundwater data, the Co and Mo SSLs identified in the compliance wells BGWC-22 and BGWC-43D, respectively, are horizontally and vertically delineated to levels below GWPS. Please refer to the July/August 2022 iso-concentration maps for Co and Mo presented on **Figures 6** and **7**.

Compliance wells with SSLs and the pertinent horizontal and vertical delineation wells are also provided below:

Detected Constituent	GWPS (1) (mg/L)	Monitoring Well ID	Concentration (2) (mg/L)	Delineation Well IDs
Co	0.006	BGWC-22	0.034	Horizontal: BGWC-32 Vertical: BGWC-35D
Mo	0.10	BGWC-43D	0.16	Horizontal: BGWC-50D Vertical: BGWC-49D

Notes:
mg/L = milligrams per liter
1. §257.95 Federal GWPS.
2. Reported concentration is from the July/August 2022 semiannual monitoring event (Geosyntec, 2022b).

4.0 ASSESSMENT OF CORRECTIVE MEASURES SUMMARY

An ACM Report was completed on June 12, 2019, in accordance with §257.96 and corrective measures identified as potentially applicable to remediate groundwater at the Site included the following:

- Geochemical Approaches (In-Situ Injection)
- Hydraulic Containment ("Pump and Treat")
- Monitored Natural Attenuation (MNA)
- Permeable Reactive Barrier (PRB)
- Phytoremediation
- Subsurface Vertical Barrier Walls

Georgia Power plans to proactively utilize adaptive site management to support the remedial strategy and address potential changes in site conditions as appropriate (**Figure 8**). Under an adaptive site management strategy, a remedial approach will be selected whereby: (1) a remedy will be installed or implemented to address current conditions; (2) the performance of the remedy will be monitored, evaluated, and reported semiannually; (3) the CSM will be updated as more data are collected; and (4) adjustments and augmentations will be made to the remedy, as warranted, to meet remedial objectives.

Further evaluations and refinements of the groundwater corrective measures were presented in *Semiannual Remedy Selection and Design Progress Reports* (Progress Reports) submitted since the ACM Report in 2019. The corrective measures identified for AP-1 in the ACM Report have been further evaluated using the criteria outlined in §257.96(c) and GA EPD Rule 391-3-4.10(6)(a). The screening of the corrective measures, as presented in the Progress Reports, is summarized in **Table 2**.

The corrective measures that were not screened out and were retained for further evaluation under the §257.97 remedy selection criteria in this document are the following:

- **Geochemical Approaches (In-Situ Injection)**: Geochemical approaches rely on a temporary or permanent injection network to introduce reagents or air into the subsurface to promote either anerobic or aerobic attenuation of inorganic constituents either as a sparingly soluble mineral or through sorption mechanisms. Geochemical injections are a proven groundwater remediation technology for

CCR constituents (including Co and Mo), and are especially effective in treating smaller localized areas, such as those present at AP-1.

- **Hydraulic Containment ("Pump and Treat")**: Hydraulic containment refers to the use of groundwater extraction to induce a hydraulic gradient for hydraulic capture or to control the migration of groundwater. This approach uses extraction to capture groundwater, which may subsequently require above-ground treatment and permitted discharge to a receiving water feature, reinjection into the groundwater, or reuse (e.g., land application, CCR conditioning, etc.). Hydraulic containment is applicable to a variable mix of inorganic constituents, including dissolved Co and Mo at AP-1. It is commonly referred to as "pump and treat" when applied to recover constituent mass and achieve GWPS throughout a plume.
- **Monitored Natural Attenuation (MNA)**: MNA relies on natural attenuation processes to achieve site-specific GWPS within a reasonable time frame relative to more active methods by effectively reducing dissolved concentrations of inorganic constituents. Attenuation mechanisms for inorganic constituents at CCR sites, including Co and Mo at AP-1, are either physical (e.g., dilution, dispersion, flushing, and related processes) or chemical (sorption, mineral precipitation, or oxidation reduction reactions) (USEPA, 2007; USEPA, 2015). As detailed in the Geochemical CSM Report provided in **Appendix B**, natural attenuation of Co and Mo is primarily due to adsorption and co-precipitation, and does not rely solely on physical means of attenuation.

5.0 CORRECTIVE MEASURES EVALUATION

The purpose of this section is to evaluate the three corrective measures using the required criteria described in §257.97(b) and rank them using the comparative criteria described in §257.97(c).

5.1 Required Criteria (§257.97(b))

As described in §257.97(b), for a groundwater corrective measure to be selected it must meet the following criteria:

1. Be protective of human health and the environment;
2. Attain the GWPS as specified pursuant to §257.95(h);
3. Control the source(s) of releases so as to reduce or eliminate, to the maximum extent feasible, further releases of constituents in Appendix IV to this part into the environment;
4. Remove from the environment as much of the contaminated material that was released from the CCR unit as is feasible, taking into account factors such as avoiding inappropriate disturbance of sensitive ecosystems; and
5. Comply with standards for management of wastes as specified in §257.98(d).

Below, the corrective measure options are evaluated against the required criteria.

5.1.1 Protective of Human Health and the Environment (§257.97(b)(1))

CCR is classified as a non-hazardous Resource Conservation and Recovery Act (RCRA) solid waste, a determination confirmed in 40 CFR §257 Preamble part III.A. Nevertheless, Georgia Power conservatively and protectively conducted a risk evaluation. A groundwater *Risk Evaluation Report* (Geosyntec, 2021a) was prepared for AP-1 and included as an appendix to the Semiannual Progress Report submitted to GA EPD in January 2021. The Risk Evaluation Report has subsequently been updated to include groundwater monitoring data collected through August 2022, and is included as **Appendix C**. This evaluation is one of many lines of evidence used herein and factored into the remedy selection process. The risk evaluation for the SSL-related constituents in groundwater at AP-1 was conducted using methods generally consistent with GA EPD and USEPA guidance and included multiple conservative assumptions. Based on the evaluation, which assessed potential receptors and exposure pathways, Co and Mo

concentrations observed in groundwater at AP-1 are not expected to pose a risk to human health or the environment.

Accordingly, no further risk evaluation of groundwater or surface water is warranted in connection with the remedy selection process. Human health and the environment will be protected through implementation of any of the corrective measures being considered because groundwater conditions at AP-1 are not expected to pose a risk to human health or the environment.

5.1.2 Attain the Groundwater Protection Standards (§257.97(b)(2))

The proposed corrective measures would each attain the GWPS at the compliance boundary (waste boundary) and throughout the area of groundwater SSL exceedances.

A progressive phased evaluation, consistent with USEPA (USEPA, 2015), Interstate Technology and Regulatory Council (ITRC, 2010), and Electric Power Research Institute (EPRI, 2018) guidance, was used to evaluate the applicability of MNA to achieve the Mo GWPS using multiple lines of evidence. Under this guidance, each phase is designed to progressively reduce uncertainty and evaluate the effectiveness of MNA. The evaluation results are detailed in the *Monitored Natural Attenuation Evaluation* (MNA Evaluation) included herein as **Appendix D** and are summarized below:

- **Phase I** – Statistical analysis of historical analytical data indicate that the Mo plume is *not expanding* due to the effectiveness of plant operations leading up to and including the initiation of closure construction.
- **Phase II** – The site-specific *attenuation mechanisms* for Appendix IV constituents include adsorption and co-precipitation (**Appendix B**) and a*ttenuation rates* are sufficient to achieve GWPS, as demonstrated by constituent transport evaluations (**Appendix E**). Attenuation rates will be evaluated and refined as closure construction progresses and more analytical data are collected over time, in accordance with adaptive site management practices.
- **Phase III** – Aquifer *attenuation capacity* was calculated from site-specific data in the absence of closure of AP-1. This conservative calculation demonstrates sufficient aquifer attenuation capacity to achieve a stable plume well beyond the 30 year long post-closure care period. Laboratory desorption data confirm the stability of immobilized Appendix IV constituents. Constituent transport

evaluations confirm sufficient *attenuation capacity* and *stability* under post-closure conditions.

- **Phase IV** – The design of a *performance monitoring program* based on the understanding of mechanism of the attenuation process, and establishment of contingency remedies tailored to site-specific characteristics will follow GA EPD approval of the Remedy Selection Report.

Constituent transport evaluations were used to predict and assess changes in constituent concentrations in groundwater over time following closure of AP-1. These transport evaluations assessed attenuation rates under varying assumed conditions in the aquifer and provide an additional line of evidence on natural attenuation mechanisms, rates, and capacity at AP-1. These evaluations demonstrate that natural attenuation is expected to achieve GWPS and provide a baseline for comparison with other corrective measures. The groundwater flow and constituent transport evaluations, and associated input parameters, are described in detail in the *Reactive Transport Model Report* included in **Appendix E.** These evaluations suggest that the GWPS can be met at the compliance boundary within 1 year and 36 years for Mo and Co, respectively, in the absence of a more active remedy.

5.1.3 Control the Source of Release (§257.97(b)(3))

In connection with a remedy, the source of the contamination must be controlled to reduce or eliminate, to the maximum extent feasible, further releases by identifying and locating the cause of the release. The following section describes how the source control required criterion is met in connection with the each evaluated alternative.

Georgia Power will close AP-1 in-place in a manner that is in compliance with applicable federal and state regulations and is protective of public health and the environment. Closure consists of the excavation and consolidation of CCR material from an area of approximately 254 acres into an approximately 144-acre lined, multi-cell storage facility situated within the current footprint of AP-1. An engineered cover system will be installed over the consolidated CCR material to substantially eliminate infiltration from surface water or rainwater, resist erosion, contain CCR materials, and prevent exposure to CCR. Any infiltration through the cover system will be captured by an engineered liner system, including leachate detection system, which will also physically contain CCR materials and prevent exposure to CCR. Physical containment of the CCR within an engineered storage facility would, over time, be supportive of declining concentrations

of Appendix IV constituents in groundwater downgradient of AP-1 and improve overall groundwater quality.

As noted above, Georgia Power also plans to proactively utilize adaptive site management to support the remedial strategy and address potential changes in site conditions as appropriate.

The control provided by the closure ensures that, for purpose of remedy selection, the control requirement is met for all corrective measures being evaluated. None of the remedies being evaluated will interfere with the control provided by the closure, and Appendix IV constituents at and beyond the waste boundary that are present within the groundwater plume will be controlled by the evaluated groundwater corrective measure:

- **Geochemical Approaches (In-Situ Injection)** – Geochemical processes can be altered to immobilize Co and Mo in groundwater through precipitation and sorption, thereby removing them from the dissolved phase in groundwater and controlling contaminant release/movement.
- **Hydraulic Containment ("Pump and Treat")** – Inducing a hydraulic gradient to capture or control the migration of impacted groundwater would limit potential contaminant release/movement from the capture zone.
- **Monitored Natural Attenuation (MNA)** – Natural attenuation processes act without human intervention to reduce the mass, toxicity, mobility, volume, or concentration of constituents in groundwater. These in-situ processes effectively attenuate the movement of inorganic CCR constituents in groundwater, thereby controlling constituent release/movement. The primary mechanisms governing attenuation and immobilization of Co and Mo at AP-1 include sorption and co-precipitation with naturally occurring minerals in the aquifer.

5.1.4 Removal of Contaminated Material from the Environment (§257.97(b)(4))

The groundwater corrective measures retained for further consideration in the ACM Progress Reports would be effective at removing Appendix IV constituents from groundwater, either through processes of physical removal, immobilization, or attenuation in groundwater. The corrective measures considered herein remove contaminated material as follows:

- **Geochemical Approaches (In-Situ Injection) –** Geochemical processes can be altered to immobilize contaminants by sorption and precipitation, thereby removing them from the dissolved phase in groundwater.
- **Hydraulic Containment ("Pump and Treat") –** Extracting groundwater would physically remove contamination from the environment by reducing the presence of contaminants in groundwater through withdrawal from the aquifer.
- **Monitored Natural Attenuation (MNA) –** Natural attenuation processes act without human intervention to reduce the mass, toxicity, mobility, volume, or concentration of contaminants groundwater. Sorption and precipitation can immobilize contaminants, thereby removing them from the dissolved phase in groundwater.

5.1.5 Comply with Waste Management Standards (§257.97(b)(5))

In accordance with §257.98(d), waste generated during the implementation of any of the remedies under consideration would be managed in a manner that complies with applicable requirements of RCRA and the Georgia Comprehensive Solid Waste Management Act.

REQUIRED CRITERIA	Corrective Measures		
	Geochemical Approaches (In-Situ Injections)	Hydraulic Containment ("Pump and Treat")	Monitored Natural Attenuation (MNA)
Be protective of human health and the environment	✓	✓	✓
Attain the groundwater protection standard	✓	✓	✓
Control the source of releases so as to reduce or eliminate, to the maximum extent feasible, further releases of Appendix IV constituents into the environment	✓	✓	✓
Remove from the environment as much of the contaminated material that was released from the CCR unit as is feasible, taking into account factors such as avoiding inappropriate disturbance of sensitive ecosystems	✓	✓	✓
Management of waste to comply with all applicable RCRA requirements	✓	✓	✓

5.2 Comparative Criteria (§257.97(c))

This section compares the corrective measure options using the comparative criteria listed in §257.97(c). Each of the comparative criteria consists of several sub-criteria listed in the CCR Rule, which are considered in this remedy selection below. The goal of this analysis is to further evaluate the corrective measures that meet the required criteria to support remedy selection. Consistent with §257.98(b), the selected and implemented remedy will be continually evaluated and, if warranted, modified consistent with adaptive management practices.

A graphic is provided within each subsection to provide a visual depiction of the favorability of each corrective measure, where dark green represents that the "option performs *highly favorably* under this criterion," medium green represents that the "option performs *favorably* under this criterion," and light green represents that the "option performs *less favorably* under this criterion."

5.2.1 Long- and Short-Term Effectiveness and Protectiveness

This comparative criterion takes into consideration the following sub-criteria relative to the long-term and short-term effectiveness of each corrective measure. Long-term effectiveness means that the remedy will protect human health and the environment after GWPS have been met and prior to completion of the remedy, as defined by §257.98(c). The completed remedy will be protective of human health and the environment after the remedial objectives have been met.

The short-term effectiveness of a potential remedy is related to the protectiveness of human health and the environment during construction and implementation, the time to achieve remedial action objectives are also considered.

5.2.1.1 Magnitude of reduction of existing risks

As indicated by the nature and extent evaluation, the most recent groundwater sampling results, and the Risk Evaluation Report summarized in Section 5.1.1, Appendix IV constituents in groundwater from AP-1 are not expected to pose a risk to human health or the environment. Therefore, this criterion is considered favorable for each of the corrective measures. In addition, each groundwater corrective measure retained for this comparative analysis will be effective at reducing concentrations to levels below the GWPS, as described in section 5.1.2 above.

5.2.1.2 Magnitude of residual risks in terms of likelihood of further releases due to CCR remaining following implementation of a remedy

CCR unit closure through closure in-place in a fully-contained storage facility provides effective source control, as described in Section 5.1.3 above and prevents further releases. Consequently, each of the remedies are considered equally favorable under this criterion.

5.2.1.3 The type and degree of long-term management required, including monitoring, operations, and maintenance

In accordance with §257.97(c)(1)(iii), this sub-criterion considers the long-term management of each groundwater corrective measure.

MNA is highly favorable with respect to this criterion, as it requires the least amount of long-term management. MNA long-term management would be limited to monitoring only as the lack of any mechanical systems avoids operations and maintenance (O&M) requirements. In-Situ Injection is considered favorable as some limited longer-term management may be required in addition to monitoring. For example, redevelopment of injection wells due to screen fouling, blower maintenance if oxygen injections are required, and maintenance injections may be required. "Pump and Treat" is the least favorable corrective measure under this criterion due to required O&M of the pumping and treatment system along with management of extracted groundwater and treatment residuals.

5.2.1.4 Short-term risks that might be posed to the community or the environment during implementation of such a remedy

In accordance with §257.97(c)(1)(iv), this sub-criterion relates to the potential for risks to human health (including, but not limited to, worker safety and the community) and the environment associated with remedy implementation.

Community impacts include general impacts, such as potentially increased truck traffic on public roads during construction of the remedies, as well as increased vehicle emissions, resource consumption, and noise.

MNA is considered highly favorable as no additional construction activities will be required beyond the existing monitoring well network. In-Situ Injection will require minor construction activities to install injection and performance monitoring wells. Deeper injection zones required to treat Mo proximal to BGWC-43D involve slightly greater construction impacts and associated risks. In-Situ Injection may result in short-term mobilization of other redox- or pH-sensitive constituents; however, this consideration would be mitigated by conducting bench- and pilot-scale testing to screen out unfavorable amendments or approaches prior to full scale field implementation. There is an additional short-term consideration of potential spills or releases of

geochemical amendments during injections, which can be mitigated with appropriate engineering controls. As such, geochemical injections are considered favorable.

"Pump and Treat" is considered less favorable as implementation will require substantial importation of materials and construction activities and is substantially limited due to geotechnical considerations in the context of the site-specific geology proximal to AP-1. Similar to In-Situ Injection, implementation of "Pump and Treat" involves slightly greater construction impacts for deeper Mo treatment zones proximal to BGWC-43D. "Pump and Treat" also entails short-term considerations related to management of extracted groundwater, for example due to potential leaks in conveyance piping, which can be mitigated with appropriate engineering controls.

5.2.1.5 Time until full protection is achieved

As Appendix IV constituents in groundwater at AP-1 are not expected to pose a risk to human health or the environment, receptors are already protected. However, in accordance with §257.98(c)(1) and (2), a remedy is considered fully complete when the GWPS is achieved at all points within the plume at and beyond the compliance boundary for three consecutive years.

The time to achieve GWPS at the waste boundary was qualitatively compared between the corrective measures. The time to achieve GWPS at the waste boundary under MNA was considered as baseline for comparison purposes. Transport modeling and professional judgement were used to estimate treatment times for MNA, In-Situ Injection, and "Pump and Treat" alternatives. A summary of the transport modeling conducted to support this evaluation is included in **Appendix E**[4].

Transport modeling results suggest that Mo may achieve the GWPS at the waste boundary within one-year post-closure under an MNA scenario. However, as discussed in Section 6.2.1, it is anticipated that MNA of Mo may require between one and ten years to demonstrate that the GWPS has been achieved within all points of the plume. Both In-Situ Injection and "Pump and Treat" are anticipated to take longer than the baseline MNA scenario to achieve the Mo GWPS.

[4] These predicted times to achieve GWPS at the waste boundary represent the upper end of the range of times considered in the model sensitivity analyses.

Transport modeling results suggest that Co may achieve the GWPS at the waste boundary within 36 years under an MNA scenario, while In-Situ Injection simulations suggest only one year may be required. Therefore, In-Situ Injection is considered highly favorable as it is likely to achieve the Co GWPS in the shortest amount of time, as evidenced by the "proof of concept" geochemical injection evaluation included in **Appendix E**. Actual reductions of constituent concentrations within a treatment area are likely to proceed very quickly, however, the total time to achieve GWPS will be dependent on many factors, such as the time to complete distribution of amendments throughout the subsurface and the attenuation kinetics of the targeted constituents. Therefore, a period of between one and five years is anticipated for Co to reach GWPS under the In-Situ Injection scenario.

Although hydraulic control can be achieved quickly with "Pump and Treat" (within 1- to 2- months of sustained pumping), achieving GWPS at all points outside of the waste boundary is likely to take substantially longer than In-Situ Injection. Applying the longest treatment time to achieve the GWPS for Mo and Co at all points within the plume estimated for each technology in the comparative analysis, In-Situ Injection technology is considered highly favorable, "Pump and Treat" is considered favorable, and MNA is considered less favorable under this criterion.

5.2.1.6 Potential for exposure of humans and environmental receptors to remaining wastes, considering the potential threat to human health and the environment associated with excavation, transportation, re-disposal, or containment

In accordance with §257.97(c)(1)(vi), this sub-criterion considers elements such as the generation and handling of wastes or potentially impacted media encountered during construction and operation of the remedy.

MNA is considered highly favorable under this criterion as no construction waste will be generated and exposure to potentially impacted groundwater would be minimal. In-Situ Injection is considered favorable as some minor quantities of construction waste would be generated during implementation although exposure to potentially impacted media would also be minimal.

"Pump and Treat" will generate similar quantities of potentially impacted construction waste as In-Situ Injection. However, "Pump and Treat" is considered less favorable as extraction of potentially impacted groundwater will require ongoing management of

multiple waste streams (e.g., extracted groundwater, spent treatment system components, and treatment residuals).

5.2.1.7 Long-term reliability of the engineering and institutional controls

The following describes the overall long-term reliability for each of the proposed groundwater corrective measures for purposes of comparison. Of note, the reliability of each of the corrective measures is bolstered by the long-term reliability of the closure method and its expected positive effect on groundwater conditions.

In-Situ Injection and MNA are considered highly favorable under this criterion as minimal long-term engineering controls would be required. "Pump and Treat" is favorable under this criterion as engineering controls will be required throughout the duration of the remedy (for example, leak detection systems in conveyance piping).

5.2.1.8 Potential need for replacement of the remedy

Any need to replace a remedy would be based on a systematic site review during the remedy implementation process if warranted to improve remedy protectiveness, effectiveness, or facilitate progress toward meeting remedy objectives. In accordance with §257.98(b), adaptive site management practices will be used to modify or replace the remedy if the requirements of §257.97(b) are not being achieved.

In-Situ Injection is considered favorable under this criterion. While a replacement remedy is unlikely to be necessary, changes in groundwater chemistry and flow conditions may promote limited short-term mobilization of Appendix IV constituents in groundwater. Bench scale treatability studies would minimize this potential occurrence by screening unfavorable amendments. Field data from a pilot study would provide additional data for optimization of geochemical strategies and indication of the long-term performance of In-Situ Injection.

MNA ranks less favorable under this criterion. Natural processes are predicted to decrease the Co and Mo concentrations in groundwater over time following closure without further intervention, reducing the likelihood that a replacement remedy would be required. However, the relatively longer time likely required to achieve the Co GWPS introduces inherent uncertainty and a greater potential that a replacement remedy may be

required to achieve remedial objectives at BGWC-22[5]. Monitored natural attenuation will still play a role in achieving GWPS under alternate corrective measures under consideration.

"Pump and Treat" has the greatest risk of requiring replacement and is thus considered less favorable. This corrective measure cannot be implemented in the immediate vicinity of AP-1 due to geotechnical considerations in the context of site-specific geology and, therefore, may be extremely difficult to achieve GWPS at the compliance boundary. Similarly, a substantial change in the groundwater flow direction or velocity may render "Pump and Treat" less effective at lowering constituent concentrations at the edges of a plume despite remaining protective.

All corrective measures will be evaluated for effectiveness following implementation, and modified if remedial objectives are not being met, in accordance with adaptive site management practices and §257.98(b).

5.2.1.9 Long- and short-term effectiveness summary

This section provides a summary of the eight §257.97(c)(1) sub-criteria relative to long- and short-term effectiveness that are discussed in Sections 5.2.1.1 to 5.2.1.8 above, and includes a summary table.

Appendix IV constituents in groundwater from AP-1 are not expected to pose an adverse risk to human health or the environment under current conditions and each of the corrective measures will be effective in reducing Co and Mo groundwater concentrations to below GWPS. Closure and consolidation into a fully-contained storage facility is an effective source control measure that will address any potential for further releases of CCR constituents. As such, relative ranking between corrective measures is driven primarily by the potential for short-term impacts to the community during implementation, reliability and O&M, potential exposure of receptors to incidental environmental risks during implementation of the remedy, and time to achieve GWPS.

MNA is considered favorable due to its certainty of success, reliability, and the minimal potential for short-term impacts to the community or environment during implementation. It is considered less favorable by the criterion of time to achieve GWPS. The longer time

[5] A less favorable ranking for MNA was conservatively applied, though this criterion is considered favorable for Mo MNA, given the reduced uncertainty around the time to achieve GWPS and potential requirement for replacement remedy to meet remedial objectives.

likely required to achieve GWPS introduces inherent uncertainty of achieving remedial objectives, potentially requiring a replacement remedy. Therefore, MNA is considered less favorable under the potential need for a replacement remedy criterion, despite being considered favorable overall under this category.

In-Situ Injection is considered favorable but would entail some short-term uncertainty during implementation. The primary favorability of this corrective measure stems from the shorter time to achieve GWPS downgradient of the groundwater monitoring system.

"Pump and Treat" will have less favorable short- and long-term effectiveness primarily due to the higher O&M requirements, geotechnical challenges in the context of site-specific geology, the marginally higher likelihood of potential exposure of receptors to potentially impacted groundwater during transport and treatment, and the time to achieve GWPS.

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Category 1 – Long- and Short-term Effectiveness Summary

	In-Situ Injection	"Pump and Treat"	Monitored Natural Attenuation
Category 1 - Sub-Criterion i) Magnitude of reduction of risks			
Category 1 - Sub-Criterion ii) Magnitude of residual risk in terms of likelihood of further release			
Category 1 - Sub-criterion iii) Type and degree of long-term management required			
Category 1 - Sub-criterion iv) Limiting short term risk to community or environment during implementation			
Category 1 - Sub-criterion v) Time until full protection is achieved			
Category 1 - Sub-criterion vi) Potential for exposure of humans and environmental receptors to remaining wastes			
Category 1 - Sub-criterion vii) Long-term reliability of engineering and institutional controls			
Category 1 - Sub-criterion viii) Potential need for replacement of the remedy			
Category 1 Summary			

Color Legend:

	Option performs *highly favorably* under this criterion
	Option performs *favorably* under this criterion
	Option performs *less favorably* under this criterion

5.2.2 Source Control Effectiveness

This comparative criterion takes into consideration the ability of the remedy to control a future release and the extensiveness of treatment technologies that will be required. CCR material will be controlled by consolidation of CCR material into a fully-contained (including engineered composite-liner and final cover systems) multi-cell storage facility situated within the current footprint of AP-1. Physical containment of the CCR would, over time, be supportive of declining concentrations of Appendix IV constituents in groundwater downgradient of AP-1 and improve overall groundwater quality. None of the corrective measures under consideration would interfere with or diminish the anticipated benefits of the closure method.

5.2.2.1 The extent to which containment practices will reduce further releases

Through closure by excavation and consolidation within an engineered multi-cell storage facility, CCR material will be fully-contained within the footprint of AP-1. Since the source material will be fully-contained at the time of AP-1's closure, the potential for further releases will be substantially eliminated. Appendix IV constituents that are currently present in groundwater at or beyond the waste boundary will be controlled by the selected groundwater remedy. Therefore, each of the groundwater corrective measures are considered equally favorable for this sub-criterion.

5.2.2.2 The extent to which treatment technologies may be used

In accordance with §257.97(c)(2)(ii), corrective measures that include more limited treatment approaches for source control may be considered less favorable. Corrective measures that rely on more extensive treatment approaches may be considered more favorable.

No treatment technologies for source material are under consideration since the source material will be fully-contained within an engineered multi-cell storage facility at the time of AP-1's closure. Therefore, all groundwater remedy alternatives are considered equally favorable for this sub-criterion.

5.2.2.3 Source Control Effectiveness Summary

This section provides a summary of the two §257.97(c)(2) sub-criteria relative to effectiveness that are discussed in Sections 5.2.2.1 and 5.2.2.2 above. Adaptive site management strategies will be implemented to ensure remedial objectives are met.

As described above source control will be achieved at AP-1 and, over time, be supportive of declining concentrations of Appendix IV constituents in groundwater downgradient of AP-1 and improve the overall groundwater quality. The corrective measures are therefore equally favorable under source control effectiveness criteria, as summarized in the following table.

Category 2 – Source Control Effectiveness

	In-Situ Injection	"Pump and Treat"	Monitored Natural Attenuation
Category 2 – Sub-criterion i) Extent to which containment practices will reduce further releases			
Category 2 – Sub-criterion ii) Extent to which treatment technologies may be used			
Category 2 Summary			

Color Legend:

	Option performs *highly favorably* under this criterion
	Option performs *favorably* under this criterion
	Option performs *less favorably* under this criterion

5.2.3 Ease of Implementation

This comparative criterion takes into consideration technical and logistical challenges required to implement a remedy, including practical considerations such as equipment availability and disposal facility capacity.

5.2.3.1 Degree of difficulty associated with constructing the technology

This sub-criterion considers the relative technical difficulty between implementing each of the remedies.

MNA is considered highly favorable as a monitoring system is already in place and no additional construction would be required. In-Situ Injection is considered favorable under this criterion as some construction would be required for the pilot and full-scale injection well network. Installation of deep injection wells to address Mo would likely

be more difficult to construct than shallower Co injection wells; however, drilling techniques are feasible at both locations. "Pump and Treat" is considered less favorable as it would require construction of extraction wells and supporting conveyance lines, which may require more contractors and time to construct. Depending on effluent discharge limits for certain constituents found in groundwater, above-ground water treatment infrastructure could be required for treatment of extracted groundwater under "Pump and Treat." Similar to In-Situ Injection, deep extraction wells required to address Mo will be more difficult to construct than shallower extraction wells capable of addressing Co impacts. However, both In-Situ Injection and "Pump and Treat" corrective measures can be constructed using common means and methods for well installation and utilities.

5.2.3.2 Expected operational reliability of the technologies

This section compares the operational reliability of each of the proposed remedies in accordance with §257.97(c)(3)(ii). Typically, simple remedies that do not require the installation of significant infrastructure are generally more reliable and do not require significant O&M. More complex remedies that rely on groundwater flow manipulation, geochemical manipulation, or mechanical systems would be considered less favorable.

MNA has a proven history of operational reliability and ranks highly favorable under this criterion. It requires little infrastructure and/or ongoing O&M.

In-Situ Injection is considered favorable under this criterion. In-Situ Injection is reliable assuming injected materials can be distributed throughout the aquifer. Injectate distribution may face challenges due to the highly heterogenous geology, which includes secondary porosity along fractures and solution-enhanced features. Pilot testing will provide valuable data on amendment distribution and reduce the potential for reliability issues. However, injection wells can be subject to fouling over time and require reconditioning to maintain performance. In addition, there are limitations and technical challenges associated with implementing injections at the required depths to address Mo proximal to BGWC-43D (i.e., >150 feet below ground surface).

"Pump and Treat" is considered less favorable under the operational reliability criterion. Pumping mechanical systems may fail and otherwise need to be temporarily shut down to conduct preventative maintenance, and as with In-Situ Injection, well screens may require reconditioning if they become fouled. Due to geotechnical challenges with pumping in the geology within the immediate vicinity of AP-1, "Pump and Treat" may

be limited to areas along Euharlee Creek and therefore may not reliably address impacted areas proximal to the compliance boundary. Groundwater treatment systems will also require ongoing operational maintenance and will need to be monitored to reliably meet discharge permit criteria.

5.2.3.3 Need to coordinate with and obtain necessary approvals and permits from other agencies

Section §257.97(c)(3)(iii) requires consideration be given and compared between remedies regarding the various agencies and type of permits that would be required for implementation of the groundwater remedy. A corrective measure that could require several permits would be considered less favorable when compared to a corrective measure that would require fewer permits.

MNA ranks highly favorable under this criterion, as no permits or additional approvals from other agencies will be required. In-Situ Injection and "Pump and Treat" perform favorably as some permitting will be required. In-Situ Injection will require an Underground Injection Control (UIC) permit, while "Pump and Treat" will likely require modifications to the Site's National Pollutant Discharge Elimination System (NPDES) permit to discharge treated groundwater.

5.2.3.4 Availability of necessary equipment and specialists

Generally speaking, remedies that could be implemented by local contractors and without specialty contractors or experts may be considered more favorable. Consideration should be given to specialty contractor/consultant proximity to the CCR unit, contractor or equipment availability, and the effectiveness of the proposed remedy on similar sites.

MNA ranks highly favorable under this criterion as no specialty equipment or personnel will be required to implement this remedy at the Site. In-Situ Injection would require equipment for drilling and well installation and may require specialists to conduct injections. "Pump and Treat" would require drilling equipment, well installation equipment, and equipment to install supporting pumping and conveyance features. Although the construction techniques required for both corrective measures are common, "Pump and Treat" would require available above-ground treatment equipment throughout the lifetime of the corrective measure. As such, In-Situ Injection is considered favorable, and "Pump and Treat" is considered less favorable under this criterion.

5.2.3.5 Available capacity and location of needed treatment, storage, and disposal services

This sub-criterion (§257.97(c)(3)(v)) considers disposal options for materials generated by the groundwater remedy and land area that is available for implementation of the remedy.

MNA and In-Situ Injection are considered highly favorable as no additional treatment, storage, and disposal services will be required and adequate land area is available to conduct in-situ treatment with injections. "Pump and Treat" is considered less favorable under this criterion. While the existing treatment system associated with the ongoing closure has sufficient capacity, the need to maintain this infrastructure will result in an ongoing waste stream of treatment residuals. Further, extracted groundwater will need to be managed, potentially requiring temporary storage areas for treated or untreated groundwater.

5.2.3.6 Ease of implementation summary

This section provides a summary of the five §257.97(c)(3) sub-criteria relative to the ease or difficulty of implementing this remedy that are discussed in Sections 5.2.3.1 to 5.2.3.5 above and includes a summary table.

The MNA ease of implementation is ranked highly favorable, as the infrastructure for this remedy is already in place. In-Situ Injection, contingent upon treatment zone depth, is considered favorable based on the relative ease of construction, anticipated operational performance, limited permitting requirements, available means and methods to construct the remedy, and the available capacity and supporting services. In-Situ Injection is more difficult in deeper zones because of technical challenges in operational reliability. "Pump and Treat" is considered less favorable based on the higher difficulty to construct, lower reliability of mechanical systems, and the limitations associated with treatment, storage, disposal services required.

Category 3 – Ease of Implementation

	In-Situ Injection	"Pump and Treat"	Monitored Natural Attenuation
Category 3 – Sub-criterion i) Degree of difficulty associated with constructing the technology			
Category 3 – Sub-criterion ii) Expected operational reliability of the technologies			
Category 3 – Sub-criterion iii) Need to coordinate with and obtain necessary approvals and permits from other agencies			
Category 3 – Sub-criterion iv) Availability of necessary equipment and specialists			
Category 3 – Sub-criterion v) Available capacity and location of needed treatment, storage, and disposal services			
Category 3 Summary			

Color Legend:

	Option performs *highly favorably* under this criterion
	Option performs *favorably* under this criterion
	Option performs *less favorably* under this criterion

5.2.4 Evaluation of Comparison Criteria

The various sub-criteria were evaluated, and relative comparisons were made between the corrective measures to determine which remedy would be expected to be the most and least favorable regarding the certainty of success. The results are included in the following table for all of the comparative criteria.

In-Situ Injection and MNA are both considered favorable under long- and short-term effectiveness (Category 1). While In-Situ Injections entail some short-term uncertainties as compared to MNA, this corrective measure is expected to achieve GWPS in the shortest time. Conversely, MNA is considered very reliable and entails minimal short-term uncertainties but will require a substantially longer time to achieve GWPS. "Pump

and Treat" is considered less favorable primarily due to short-term construction impacts, higher O&M requirements, and long time periods required to achieve GWPS.

Source control (Category 2) will be supported at AP-1 through closure in-place within a fully-contained multi-cell storage facility, which over time, will support declining concentrations of Appendix IV constituents in groundwater downgradient of AP-1 and improve overall groundwater quality. None of the corrective measures under consideration will interfere with or diminish the anticipated benefits of the closure method. Each of the corrective measures therefore rank equally with respect to source control.

The ease of implementation (Category 3) of MNA is highly favorable as the required infrastructure is already in place. In-Situ Injection is considered favorable based on the relative ease of construction and operational performance, with the exception of challenges associated with deeper aquifer zones. "Pump and Treat" is considered less favorable due to the higher difficulty to construct and the lower reliability of mechanical systems.

Category Summary

	In-Situ Injection	**"Pump and Treat"**	**Monitored Natural Attenuation**
Category 1 Long- and Short-Term Effectiveness, Protectiveness, and Certainty of Success			
Category 2 Effectiveness in controlling the source to reduce further releases			
Category 3 Ease of implementation			

Color Legend:

	Option performs *highly favorably* under this criterion
	Option performs *favorably* under this criterion
	Option performs *less favorably* under this criterion

5.3 Public Meeting and Community Engagement

As noted in Section 2.1 above, this criterion will be addressed in the Final Remedy Selection Report submitted to GA EPD after a public meeting.

6.0 PROPOSED REMEDY SELECTION

This section provides a summary of the proposed groundwater remedy and provides a schedule for remedy implementation in accordance with §257.97(d). Georgia Power will proactively utilize adaptive site management to support the remedial strategy and address potential changes in site conditions as appropriate. Under an adaptive site management strategy, a remedial approach will be selected whereby: (1) a corrective measure will be installed or implemented to address current conditions; (2) the performance of the corrective measure will be monitored, evaluated, and reported semiannually; (3) the CSM will be updated as more data are collected; and (4) adjustments and augmentations will be made to the corrective measure(s), as needed, to meet performance criteria and site remedial objectives. The remedy adaptive site management framework is included as **Figure 8**.

6.1 Summary of Proposed Remedy Selection

AP-1 closure through excavation and consolidation of CCR material into a fully-contained (including engineered composite-liner and final cover systems), multi-cell storage facility will provide effective source control that precludes further releases, as CCR will be contained within an engineered structure. Closure of the CCR unit will, over time, be supportive of declining concentrations of Appendix IV constituents in groundwater downgradient of AP-1 and improve the overall groundwater quality. The selected corrective measures will address exceedance of the GWPS at and beyond the compliance boundary.

6.1.1 Cobalt

Based on the evaluation of comparative criteria included in §257.97(c), the proposed remedy for Co comprises the following two corrective measures:

- **Geochemical Approaches (In-Situ Injections)**: A network of either temporary or permanent injection wells will be installed and utilized to introduce reagents to the subsurface to promote attenuation of constituents. Transport modeling results (presented in **Appendix E**) support the feasibility of In-Situ Injections and are indicative of shorter remediation times as compared to MNA alone. Laboratory treatability studies, including batch and column testing, are currently ongoing to aid in selection of an appropriate injection composition, dosing, and protocol. This treatability study will serve as a basis of design for this component of the

remedy. Injections will target areas with highest concentrations of Co in groundwater to immobilize and sequester this constituent in situ, effectively accelerating already ongoing attenuation processes. This remedial approach is tailored to areas around BGWC-22. A performance monitoring program will be implemented to assess treatment performance and groundwater quality within and downgradient of the proposed treatment areas for the duration of the remedy.

- **Monitored Natural Attenuation (MNA)**: Natural attenuation processes, coupled with monitoring, are already ongoing at the Site in downgradient areas. Localized concentrations of Co at BGWC-22 are expected to stabilize as closure construction progresses. Natural attenuation mechanisms of Co in groundwater are primarily adsorption and co-precipitation. Post-closure attenuation rates are sufficient to achieve GWPS, and immobilized Co is stable, as supported by transport modeling results (**Appendix E**). Groundwater monitoring will continue to document natural attenuation, which is expected to be enhanced by the in-situ injections and the closure of AP-1. MNA can be considered a "polishing" step in the context of this proposed remedy (USEPA, 2015). Reductions in constituent concentrations and attenuation mechanisms will continue to be monitored and documented for the duration of the remedy.

A conceptual remedy layout for in-situ injection arrays is shown on **Figure 9**. The MNA component of the remedy will rely on the same monitoring infrastructure as the in-situ injections. Actual remedy injection and performance monitoring well locations will be assessed during the remedy design. Remedy performance will be monitored to document that remedial objectives are being met in accordance with adaptive site management practices.

6.1.2 Molybdenum

Based on the evaluation of comparative criteria included in §257.97(c), the proposed remedy for Mo comprises the following corrective measure:

- **Monitored Natural Attenuation (MNA)**: Natural attenuation processes, coupled with monitoring, are already ongoing at the Site. Localized concentrations of Mo at BGWC-43D are stable, as documented in the Site-specific MNA Evaluation (**Appendix D**). Natural attenuation of Mo in groundwater is primarily due to adsorption and co-precipitation. Aquifer capacity and the post-closure attenuation rates are demonstrably sufficient to achieve GWPS, and immobilized Mo is stable.

Geochemical modeling results (presented in **Appendix E**) provide another line of evidence indicating that attenuation rates are sufficiently high to achieve GWPS within a reasonable timeframe, and that there is adequate long-term attenuation capacity and stability of immobilized contaminants within the aquifer matrix. Reductions in constituent concentrations and the attenuation mechanisms of the aquifer will continue to be monitored and documented for the duration of the remedy.

Monitored natural attenuation will rely on the existing monitoring infrastructure. The potential need for additional monitoring well locations will be assessed during the development of a MNA performance monitoring program, and contingency remedies tailored to Site-specific characteristics will be established. Remedy performance will be monitored to document that remedial objectives are being met in accordance with adaptive site management practices.

While In-Situ Injections are not proposed as components of the Mo remedy for the reasons detailed in Section 5, injections may be further considered through adaptive site management practices, as necessary.

6.2 Schedule

In accordance with §257.97(d), the following factors were considered when developing the schedule:

- Extent and nature of contamination: The horizontal and vertical extent of Appendix IV constituents present in groundwater are delineated. Additional characterization and refinement of the Co treatment area is required for the design and implementation of the remedy. The selected remedy will address the impacts to groundwater and adaptive site management practices will be utilized to evaluate whether to modify the remedial approach.
- Reasonable probabilities of remedial technologies in achieving compliance with the GWPS and other remedial objectives: The selected remedy is expected to achieve compliance with the Co GWPS between one and 5 years of the initiation of injections and achieve the Mo GWPS between one and 10 years of MNA. As considered in Section 5 of this report, the selected remedy is expected to address Appendix IV constituents in groundwater. If adequate progress is not being made toward addressing groundwater and achieving the GWPS at and beyond the

compliance boundary, Georgia Power will enlist adaptive management strategies to modify the remedial approach, in accordance with §257.98(b). Site and remedy-specific performance metrics will be developed and documented in the Corrective Action Groundwater Monitoring Plan.

- Availability of treatment or disposal capacity for CCR managed in connection with remedy implementation: Because CCR is not expected to be managed offsite in connection with remedy implementation, this factor should not have a material impact on the project schedule.
- Potential risks to human health and the environment from exposure to contamination prior to completion of the remedy: As described in Section 5 of this report, the risk evaluation for Co and Mo in groundwater at AP-1 was conducted using methods consistent with GA EPD and USEPA guidance, included multiple conservative assumptions, and concluded that groundwater conditions are not expected to pose a risk to human health or the environment. Thus, this factor should not have a material impact on the project schedule. Additional risks that may be present during remedy implementation were considered in Section 5 of this report, as required under §257.97(c)(1).
- Resource value of the aquifer: As summarized in Section 5 of this report and detailed in the Risk Evaluation Report, Co and Mo are not expected to pose a risk to human health or the environment. As such, considerations related to alternative drinking water supply or interim remedial measures, as outlined in §257.98(a)(3), are not currently necessary or expected to become so. Further, Georgia Power will retain ownership of the Site and future development for non-industrial purposes is not currently anticipated. Because AP-1 constituents are not expected to pose a risk to human health or the environment, this factor should not have a material impact on the project schedule.

The general approach and implementation schedule will be modified based on new groundwater quality data obtained during the remedial implementation process, following adaptive site management practices and in accordance with §257.98(b).

6.2.1 Planning and Design

Approximately 24 months will be required to design the selected Co remedy and develop a corrective action plan. Significant planning and design activities include:

- Pre-design Investigation: A field pre-design investigation (PDI) will be conducted to further characterize and refine treatment areas. This investigation will provide valuable data for the design of geochemical injections and provide additional documentation of MNA throughout the extents of the two plumes. During the PDI, plume extents will be further refined by collecting groundwater samples, possibly using temporary monitoring wells, which will be assessed for Co. Permanent wells may be installed for further aquifer characterization, and any such permanent wells may be utilized during pilot testing as injection points or performance monitoring wells. The field component of the PDI will take approximately 2 months to complete.
- Pilot Study: To expedite remedy design and implementation, Georgia Power requests written concurrence from GA EPD to initiate pilot studies following receipt of the Draft Remedy Selection Report. Following receipt of GA EPD concurrence to proceed, a pilot study workplan will be developed and implemented for the Co plume to evaluate appropriate injection point spacing and to evaluate performance of injectates in situ. It is anticipated that the pilot study will target areas of highest Co concentrations; however, alternate pilot locations may be selected based on the results of the PDI. Injection composition (and sequencing, as needed) and spacing for the final design may be adjusted based on pilot study performance. Prior to injection, a UIC permit application will be prepared and submitted to GA EPD for review and approval (6 months total). Pilot study injections are expected to occur over a period of approximately 1 to 4 months with an additional 8 months of performance monitoring and assessment. The pilot study will be conducted consistent with adaptive site management practices. As such, a second phase pilot study may be implemented prior to completion of the anticipated 8-months of performance monitoring and prior to finalizing the injection design.
- Finalize Design and Corrective Action Plan: A corrective action plan, including detailed remedy design will be developed and submitted to GA EPD for approval. While design activities will be concurrent with the previously listed activities, the

corrective action plan will not be finalized until successful completion of the pilot study.

Approximately 6 to 12 months will be required from the approval of the final remedy to plan and develop a MNA monitoring program. Significant planning activities include:

- Establish sentinel and GWPS exceedance monitoring points: A review of data from existing wells will be conducted to determine whether additional sentinel or exceedance monitoring points are appropriate and establish proposed locations for any such additional monitoring points. The sentinel monitoring points will consist of a network of wells that will be monitored to verify that GWPS exceedances do not occur at or beyond these locations. Monitoring wells within areas of GWPS exceedances may be established to verify attenuation mechanisms, document decreasing concentrations, estimate plume mass or mass flux, and provide monitoring data to demonstrate MNA effectiveness. While it is anticipated that the existing well network will be sufficient for MNA, approximately 1 month may be required to install any additional sentinel and monitoring wells.
- Finalize Corrective Action Plan and MNA Performance Monitoring Program: A comprehensive data analysis and reporting plan identifying specific monitoring and sentinel points will be submitted to GA EPD for approval. The MNA performance monitoring program will include specific performance objectives with adaptive site management triggers which will be implemented if objectives are not met. MNA will primarily be accomplished by sampling MNA monitoring wells for Appendix IV constituents, general groundwater parameters (e.g., pH, temperature, oxidation-reduction potential, dissolved oxygen, and specific conductivity), and natural attenuation indicator parameters specific to the identified attenuation mechanisms (e.g., ferrous and ferric iron). MNA will include a minimum of one year of baseline monitoring to establish baseline conditions and trends. The performance monitoring data will be routinely reviewed as a component of the adaptive site management approach. Time for collection and evaluation of sufficient additional independent sampling results is necessary to confidently determine that evaluation of data will yield statistically valid results that are indicative of aquifer conditions and not the result of short-term closure activities or seasonality. A review of the data trends, and comparison to adaptive site management triggers will be performed following the collection of ten (10) semiannual performance monitoring events (5-years), beginning from

the time of the Corrective Action Monitoring Plan approval. This timeline is consistent with guidance for statistical analysis of groundwater monitoring data (USEPA, 2009), §257.94(b) and also approximately aligns with five-year permit reviews. Additional details, including the adaptive triggers and evaluation methods will be included in the Corrective Action Monitoring Plan.

6.2.2 Construction and Implementation

Construction of the injection and performance monitoring well network (and any additional MNA monitoring or sentinel wells) is anticipated to take approximately 1 to 2 months, with initial geochemical injections occurring over the following 2 to 3 months. Actual construction and implementation times may vary substantially based on the results of the PDI and other design activities.

6.2.3 Operation

While the estimated timeframe will be refined during design, it is anticipated that the geochemical injection phase of the Co remedy may only require 6 months to a year of operation followed by a longer period of performance monitoring and MNA polishing for any areas downgradient and/or outside of the radius of influence of injections. In total, it is estimated that between one and 5 years from the initiation of injections will be required to achieve GWPS within all points of the Co plume at and beyond the compliance boundary.

It is anticipated that MNA of Mo will require between one and 10 years to achieve GWPS within all points of the plume at and beyond the compliance boundary, based on transport modeling and professional judgement.

The groundwater remedy will be considered complete when applicable requirements listed under §257.98(c) and 391-3-4-.10(6) are satisfied. In accordance with adaptive site management practices and §257.98(b), the groundwater remedy will be modified if it is determined that GWPS are not being met or will not be met.

6.3 Reporting

In accordance with §257.105(h), Georgia Power will place the Remedy Selection Report into the Site operating record. Thereafter, Georgia Power will develop a corrective action groundwater monitoring program and implement and report on the selected remedy in accordance with applicable regulatory requirements.

7.0 REFERENCES

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TABLES

Table 1
Monitoring Well Network Summary
Plant Bowen AP-1, Bartow County, Georgia

Well ID	Hydraulic Location	Installation Date	Northing [1]	Easting [1]	Ground Surface Elevation (ft)	Top of Casing Elevation [2] (ft)	Top of Screen Elevation [2] (ft)	Bottom of Screen Elevation [2] (ft)	Well Depth (ft BTOC) [3]	Screen Interval Length
Detection Monitoring Well										
BGWA-2	Upgradient	10/29/2015	1499374.18	2068599.59	727.00	729.69	650.49	640.49	89.40	10
BGWA-29	Upgradient	8/7/2016	1498283.04	2066362.32	718.84	721.38	632.88	622.88	98.80	10
BGWA-33	Upgradient	7/10/2018	1497972.13	2064876.80	740.50	743.25	672.80	662.80	80.75	10
BGWA-47D	Upgradient	5/13/2020	1499377.79	2068612.48	726.93	729.61	585.90	575.90	154.04	10
BGWA-48D	Upgradient	5/16/2020	1499380.09	2068623.31	726.64	729.38	544.97	534.97	194.74	10
BGWC-7	Downgradient	10/1/2015	1504711.59	2066801.40	702.49	705.38	625.18	615.18	90.50	10
BGWC-8	Downgradient	11/18/2015	1504671.82	2066929.46	703.71	706.43	636.83	626.83	79.90	10
BGWC-9	Downgradient	11/13/2015	1504909.12	2066143.27	689.18	691.93	638.33	628.33	63.90	10
BGWC-10	Downgradient	10/7/2015	1505033.22	2066081.09	683.39	686.06	633.66	623.66	62.70	10
BGWC-12	Downgradient	10/21/2015	1505279.88	2065908.56	691.71	694.41	626.01	616.01	78.70	10
BGWC-14A	Downgradient	5/4/2020	1505398.54	2065015.98	715.57	718.33	629.57	619.57	98.76	10
BGWC-16	Downgradient	11/12/2015	1504656.42	2064247.67	671.65	674.31	635.31	625.31	49.30	10
BGWC-17	Downgradient	11/17/2015	1504432.00	2064259.38	671.25	673.65	615.35	605.35	68.60	10
BGWC-18	Downgradient	10/13/2015	1504118.73	2064257.00	670.32	672.88	645.08	635.08	38.10	10
BGWC-19	Downgradient	10/12/2015	1503742.25	2064244.66	671.04	673.61	628.91	618.91	55.00	10
BGWC-20	Downgradient	10/9/2015	1503367.73	2064259.55	672.29	675.14	635.14	625.14	50.30	10
BGWC-21	Downgradient	3/2/2016	1501627.51	2064348.09	688.53	691.33	648.83	638.63	53.10	10
BGWC-22	Downgradient	10/8/2015	1501323.76	2064358.05	692.64	695.50	662.60	652.60	43.20	10
BGWC-23	Downgradient	10/15/2015	1501000.57	2064350.17	693.16	695.50	654.30	644.30	51.50	10
BGWC-24	Downgradient	10/27/2015	1500621.22	2065032.84	699.46	702.27	646.27	636.27	66.30	10
BGWC-25	Downgradient	3/3/2016	1502292.73	2064244.10	677.60	680.47	632.87	622.87	57.90	10
BGWC-30	Downgradient	1/4/2017	1499815.93	2066395.86	698.39	701.06	651.58	641.58	59.78	10
BGWC-51	Downgradient	1/22/2021	1500270.09	2065455.80	708.99	711.49	654.57	644.57	67.25	10
BGWC-52	Downgradient	1/21/2021	1500156.97	2065764.13	707.77	710.75	638.88	628.88	82.20	10
Assessment Monitoring Well										
BGWA-6	Downgradient	11/6/2015	1499262.01	2065797.30	714.49	716.93	663.93	653.93	63.30	10
BGWC-31	Downgradient	7/17/2018	1503497.94	2064022.71	668.12	670.54	629.45	619.45	51.42	10
BGWC-32	Downgradient	7/18/2018	1501252.25	2064184.30	696.36	699.36	658.49	648.49	51.19	10
BGWC-34D	Downgradient	7/13/2018	1503356.51	2064257.95	672.25	675.17	606.07	596.07	79.43	10
BGWC-35D	Downgradient	7/12/2018	1501312.20	2064358.63	693.13	695.73	625.47	615.47	80.59	10
BGWC-36D	Downgradient	7/2/2018	1499807.51	2066415.10	698.07	701.01	614.89	604.89	96.45	10
BGWC-37D	Downgradient	4/25/2019	1501293.16	2064362.70	693.50	696.05	595.83	585.83	110.55	10
BGWC-38D	Downgradient	4/18/2019	1499802.36	2066430.17	697.52	700.34	584.86	574.86	125.81	10
BGWC-39	Downgradient	12/6/2019	1501241.94	2064095.41	676.58	679.12	661.91	651.91	27.54	10
BGWC-40	Downgradient	12/3/2019	1500589.93	2064317.38	687.12	689.59	637.45	627.45	62.47	10
BGWC-41D	Downgradient	4/27/2020	1501255.96	2064096.23	676.43	679.12	631.76	621.76	57.69	10
BGWC-42D	Downgradient	5/3/2020	1501280.52	2064365.25	693.98	696.90	553.31	543.31	153.92	10
BGWC-43D	Downgradient	4/24/2020	1499796.86	2066444.37	697.29	700.10	544.62	534.62	165.81	10
BGWC-44D	Downgradient	4/22/2020	1499265.15	2065811.06	714.65	717.30	584.99	574.99	142.64	10
BGWC-49D	Downgradient	2/23/2021	1499790.13	2066461.96	696.95	699.75	398.95	388.95	311.13	10
BGWC-50D	Downgradient	3/19/2021	1499269.15	2065781.87	714.68	717.43	544.68	534.68	183.09	10

Table 1
Monitoring Well Network Summary
Plant Bowen AP-1, Bartow County, Georgia

Well ID	Hydraulic Location	Installation Date	Northing [1]	Easting [1]	Ground Surface Elevation (ft)	Top of Casing Elevation [2] (ft)	Top of Screen Elevation [2] (ft)	Bottom of Screen Elevation [2] (ft)	Well Depth (ft BTOC) [3]	Screen Interval Length
Piezometer										
BGWA-1	Downgradient	11/17/2015	1499101.23	2067205.48	718.33	720.90	672.00	662.00	59.20	10
BGWA-3	Downgradient	11/5/2015	1499420.87	2065185.74	721.80	724.28	645.08	635.08	89.50	10
BGWA-4	Downgradient	3/4/2016	1499485.38	2064697.89	726.05	728.67	660.37	650.37	78.60	10
BGWA-5	Downgradient	11/3/2015	1499434.58	2065421.43	718.53	720.92	661.52	651.52	69.70	10
BGWC-11	Downgradient	10/16/2015	1504998.94	2066093.83	683.91	686.50	619.20	609.20	77.60	10
BGWC-13	Downgradient	10/21/2015	1505435.29	2065251.21	714.77	717.43	653.83	643.83	73.90	10
BGWC-15	Downgradient	10/20/2015	1505278.19	2064732.18	715.39	717.92	654.52	644.52	73.70	10
BGWA-26	Downgradient	8/5/2016	1498697.63	2064189.94	726.09	728.65	663.55	653.55	75.40	10
BGWA-27	Downgradient	8/6/2016	1498719.14	2064387.54	732.50	735.25	652.05	642.05	93.50	10
BGWA-28	Downgradient	8/7/2016	1498749.21	2064577.55	734.88	737.45	661.35	651.35	86.40	10
PZ-1	Downgradient	6/23/2016	1505600.54	2066844.10	675.35	677.87	630.65	620.65	57.52	10
PZ-2	Downgradient	6/24/2016	1503856.86	2062938.81	665.92	668.25	649.22	639.22	30.20	10
PZ-3	Downgradient	6/22/2016	1505723.97	2066071.08	705.34	707.97	658.64	648.64	59.60	10
PZ-4	Downgradient	6/23/2016	1505788.58	2064316.61	715.96	718.74	669.26	659.26	59.78	10
PZ-5	Downgradient	12/4/2019	1499885.63	2063961.22	697.23	700.12	650.53	640.53	59.89	10
PZ-6	Downgradient	12/8/2019	1500379.48	2063242.81	675.50	678.32	650.80	640.80	37.82	10
PZ-7	Downgradient	3/9/2022	1504679.33	2064125.75	672.43	675.51	636.54	626.54	49.30	10
PZ-8	Downgradient	3/9/2022	1504818.66	2064241.49	677.75	680.72	641.74	631.74	49.31	10

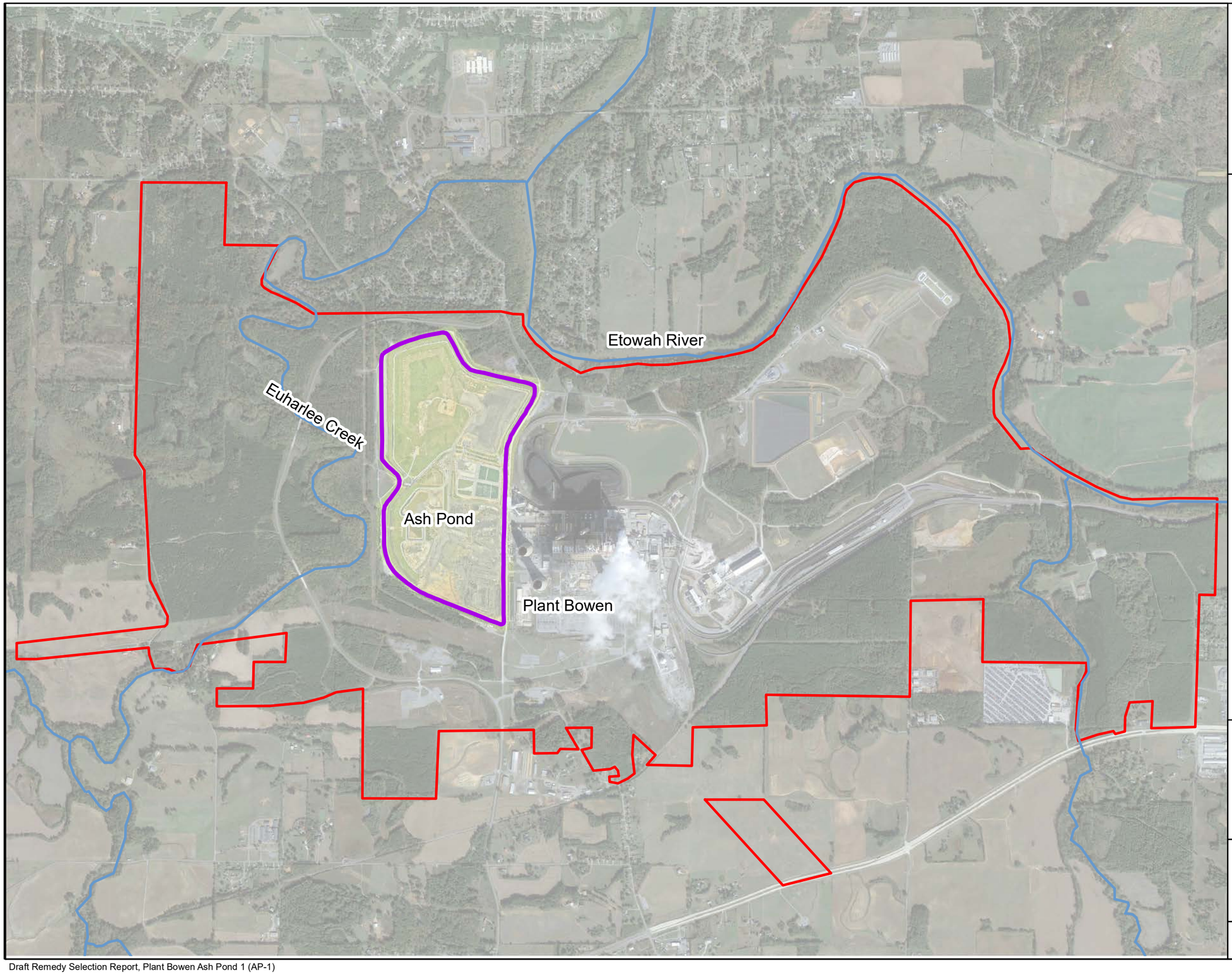
Notes:
ft = feet
ft BTOC = feet below top of casing
(1) Coordinates in North American Datum (NAD) 1983, State Plane, Georgia-West, feet. Survey completed by GEL Solutions obtained June 10, 2020. Survey for wells BGWC-51 and BGWC-52 was obtained January 28, 2021. Survey for wells BGWC-49D and BGWC-50D was obtained March 25, 2021. Survey for wells PZ-7 and PZ-8 was obtained April 11, 2022.
(2) Elevations referenced to the North American Vertical Datum of 1988 (NAVD88). Survey completed by GEL Solutions obtained June 10, 2020. Survey for wells BGWC-51 and BGWC-52 was obtained January 28, 2021. Survey for wells BGWC-49D and BGWC-50D was obtained March 25, 2021. Survey for wells PZ-7 and PZ-8 was obtained April 11, 2022.
(3) Total well depth accounts for sump if data provided on well construction logs.

Table 2
Summary of Corrective Measures Screening
Plant Bowen AP-1, Bartow County, Georgia

Corrective Measure	Description	Screening Status
Geochemical Approaches (In-Situ Injection)	Geochemical approaches rely on an injection well network to introduce reagents or air into the subsurface to promote either anaerobic or aerobic attenuation of constituents as a sparingly-soluble mineral or through sorption mechanisms.	Retained (1)
Hydraulic Containment ("Pump and Treat")	Hydraulic containment refers to the use of groundwater extraction to induce a hydraulic gradient for hydraulic capture to control the migration of impacted groundwater. This approach uses extraction wells or trenches to capture groundwater, which may subsequently require above-ground treatment and permitted discharge to a receiving water feature, reinjection into the groundwater, or reuse (e.g., land application, coal combustion residual [CCR] conditioning, etc.).	Retained
Monitored Natural Attenuation (MNA)	MNA relies on natural attenuation processes to achieve site-specific remediation objectives within a reasonable time frame relative to more active methods. Under certain conditions (e.g., through sorption, mineral precipitation or oxidation-reduction reactions), MNA effectively reduces the dissolved concentrations of inorganic constituents in groundwater. Natural attenuation mechanisms for inorganic constituents at CCR sites are either physical (e.g., dilution, dispersion, flushing, and related processes) or chemical (sorption or oxidation reduction reactions).	Retained
Permeable Reactive Barrier (PRB)	PRB technology typically involves the installation of a permeable subsurface wall constructed with reactive media for the removal of constituents as groundwater passes through.	Not retained (i) Does not address downgradient groundwater when installed along the compliance boundary; (ii) Impractical to construct at the required depths (>150 feet below ground surface [ft bgs]); (iii) Potential for increased maintenance due to potential biofouling and mineral precipitation.
Phytoremediation	Phytoremediation uses trees and other plants to degrade or immobilize constituents or achieve hydraulic control without the need for an above-ground treatment system and infrastructure.	Not retained (i) Not feasible to apply the corrective measure and meet Groundwater Protection Standard (GWPS) clean up performance standards at the compliance boundary and/or reach the required depth to treat molybdenum (Mo) in vicinity of BGWC-43D.
Subsurface Vertical Barrier Walls	This approach involves placing a barrier to groundwater flow in the subsurface, frequently around a source area, to prevent future migration of dissolved constituents in groundwater from beneath the source to downgradient areas by providing containment.	Not retained (i) Does not address downgradient groundwater when installed along the compliance boundary; and (ii) Impractical to construct at the required depths (>150 ft bgs).

Note:
(1) Geochemical approaches were previously screened out from consideration in the August 2020 Semiannual Remedy Selection and Design Progress Report (semiannual progress report). Geochemical approaches were reevaluated and retained for further consideration in the August 2022 semiannual progress report.

FIGURES



N

LEGEND

- Approximate Site Boundary
- Approximate AP-1 Boundary
- River or Stream



Note:
1. Aerial photograph source: Google Earth Pro, November 2019 and Georgia Power Company, September 2022.

0 900 1,800 3,600 Feet

SITE LOCATION MAP

GEORGIA POWER COMPANY
PLANT BOWEN AP-1
BARTOW COUNTY, GEORGIA

Prepared For: Georgia Power

Prepared By: Geosyntec consultants

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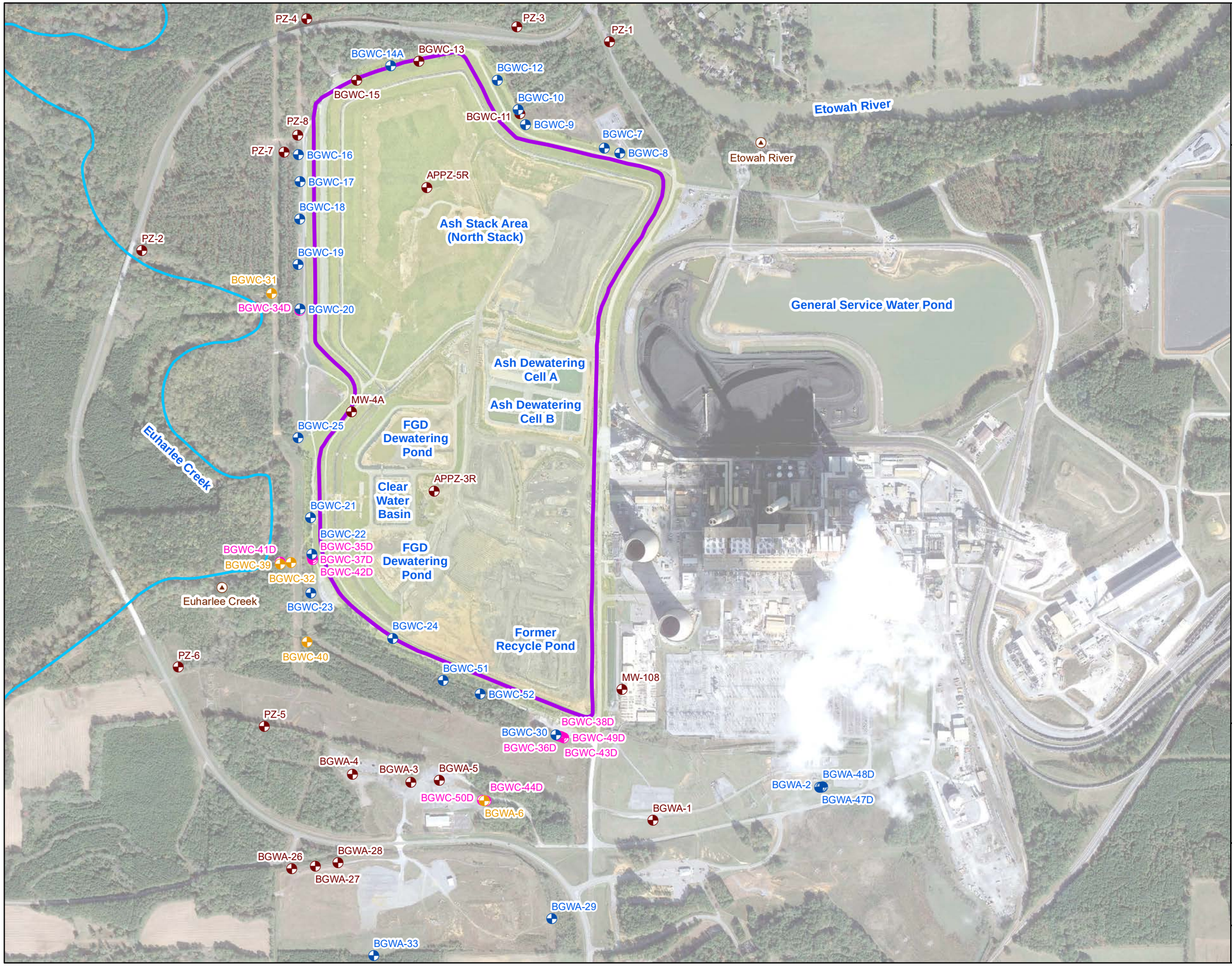
FIGURE 1



LEGEND

- Detection Monitoring Well
- Horizontal Assessment Monitoring Well
- Vertical Assessment Monitoring Well
- Piezometer
- Surface Water Transducer
- Euharlee Creek
- Approximate AP-1 Boundary

Notes:
1. All wells and piezometers presented are screeened within the weathered fractured bedrock.
2. Aerial photograph source: Google Earth Pro, November 2019 and Georgia Power Company, September 2022.

0 400 800 1,600 Feet

MONITORING WELL NETWORK MAP

GEORGIA POWER COMPANY
PLANT BOWEN AP-1
BARTOW COUNTY, GEORGIA

Prepared For: Georgia Power

Prepared By: Geosyntec consultants

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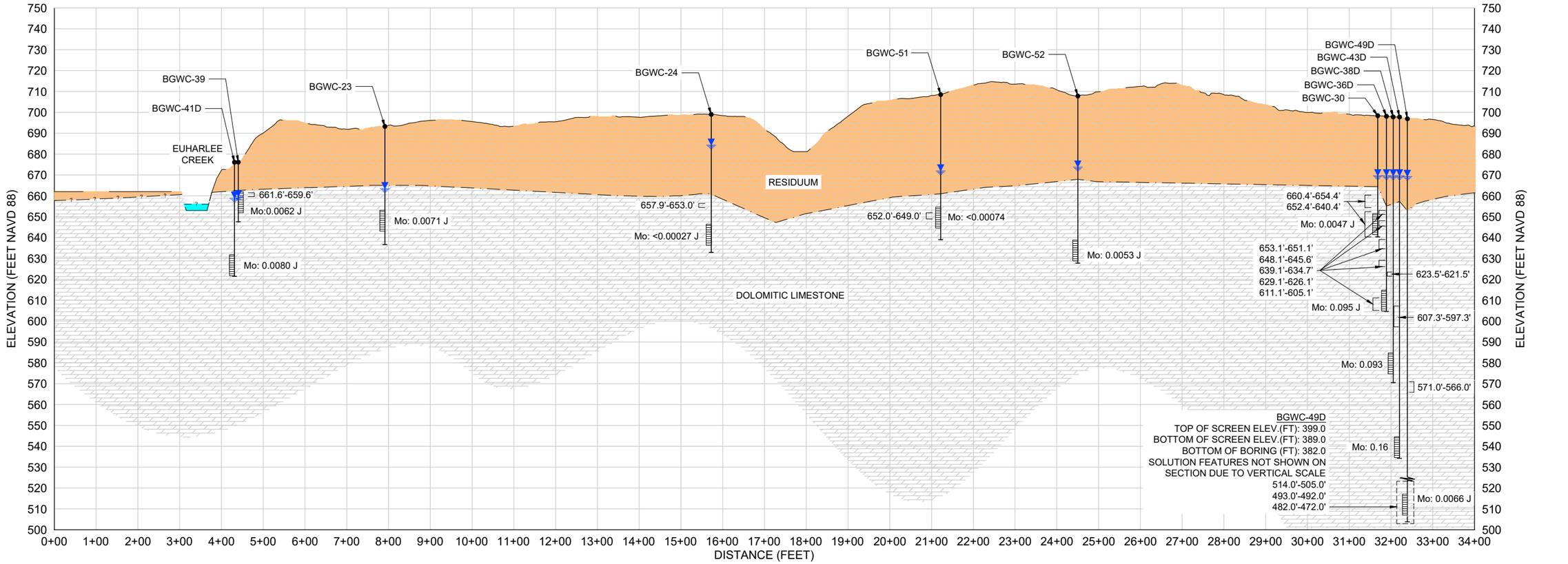
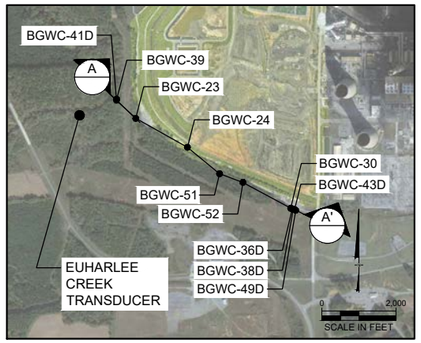
FIGURE 2



NOTES:

1. SUBSURFACE LITHOLOGIC ELEVATIONS BETWEEN BORINGS ARE BASED ON ENVIRONMENTAL VISUALIZATION SYSTEM (EVS) 3D MODEL KRIGING AND SHOULD BE CONSIDERED APPROXIMATE.
2. ELEVATION PROVIDED IN FEET REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88).
3. ELEVATIONS OF LITHOLOGIC UNITS WERE ESTIMATED BASED ON GROUND SURFACE ELEVATIONS OF SOIL BORINGS.
4. BORING LOGS AND HYDROGEOLOGIC INFORMATION FOR SOIL BORINGS AND MONITORING WELLS FOR LOCATIONS NOT INSTALLED BY GEOSYNTEC CONSULTANTS WERE PROVIDED BY GEORGIA POWER COMPANY. ADDITIONAL DETAILS REGARDING SOLUTION FEATURE DATA ARE PROVIDED IN THE HYDROGEOLOGIC ASSESSMENT REPORT, SUBMITTED IN JUNE 2021.
5. THE TOP OF ROCK SURFACE IS ESTIMATED BASED ON BORING LOGS FROM 2017 AMEC AND 2018, 2020, AND 2021 GEOSYNTEC FIELD INVESTIGATIONS, HISTORICAL BORING LOGS, AND FROM TOP OF ROCK INFORMATION PROVIDED BY SOUTHERN COMPANY SERVICES (SCS).
6. THE BOTTOM OF EUHARLEE CREEK SURFACE IS ESTIMATED BASED ON THE 2020 GEOSYNTEC BATHYMETRY STUDY. THE SURFACE WATER ELEVATION OF EUHARLEE CREEK WAS MEASURED ON 25 JULY 2022 BY AN IN-SITU® INSTRUMENTS, INC. LEVEL TROLL 500® PRESSURE TRANSDUCER INSTALLED AT THE LOCATION SHOWN ON FIGURE 2.
7. GROUNDWATER LEVELS MEASURED BY RESOLUTE ON 25 JULY 2022.
8. MOLYBDENUM (Mo) CONCENTRATION DATA ARE FROM JULY/AUGUST 2022 SEMIANNUAL GROUNDWATER MONITORING EVENT. CONCENTRATIONS ARE REPORTED IN MILLIGRAMS PER LITER (UG/L). A "<" INDICATES THE CONSTITUENT WAS NOT DETECTED ABOVE THE ANALYTICAL METHOD DETECTION LIMIT (MDL). A "J" INDICATES THE CONSTITUENT WAS ESTIMATED AND DETECTED BETWEEN THE MDL AND THE REPORTING LIMIT.
9. TOPOGRAPHY SHOWN ON THIS DRAWING SET IS FROM A LIDAR TOPOGRAPHIC SURVEY DATED 01 APRIL 2017, PROVIDED AS AN ELECTRONIC COMPUTER-AIDED DRAFTING DRAWING FILE BY SCS.
10. AERIAL PHOTOGRAPH SOURCE: GOOGLE EARTH PRO, NOVEMBER 2019 AND GEORGIA POWER COMPANY, SEPTEMBER 2022.
11. THE GROUNDWATER PROTECTION STANDARD (GWPS) FOR Mo IS 0.10 UG/L



SECTION A-A' KEY MAP

LEGEND

- GROUND SURFACE (NOTE 9)
- TOP OF BEDROCK SURFACE (NOTE 5)
- WELL
- EXTRAPOLATED SURFACE
- SCREEN INTERVAL
- GROUNDWATER LEVEL (NOTE 7)
- RESIDUUM
- DOLOMITIC LIMESTONE
- FREE WATER SURFACE
- SOLUTION FEATURE (NOTE 4)

0 250
HORIZONTAL SCALE IN FEET

0 50
VERTICAL SCALE IN FEET

GEOLOGIC SECTION A-A'

GEORGIA POWER COMPANY
PLANT BOWEN AP-1
BARTOW COUNTY, GEORGIA

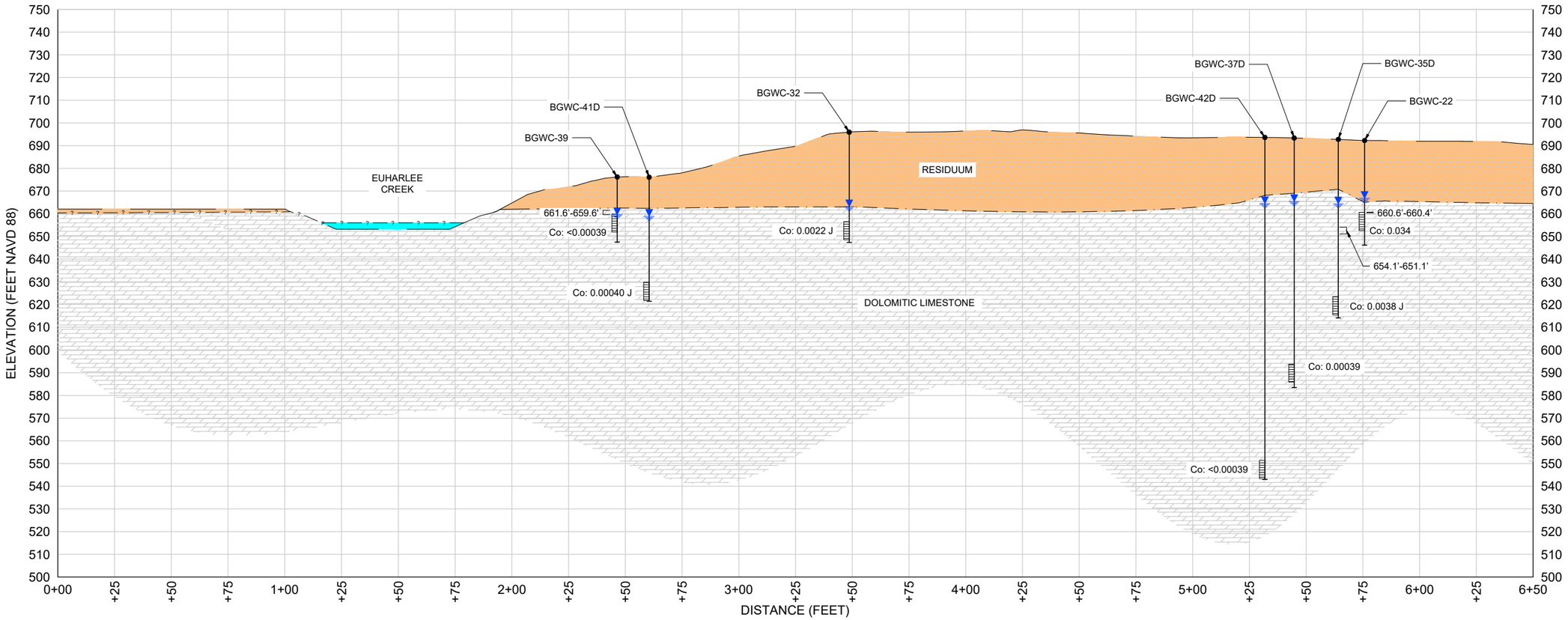
Geosyntec consultants

PROJECT NO: GW6581C | JULY 2024

FIGURE 3

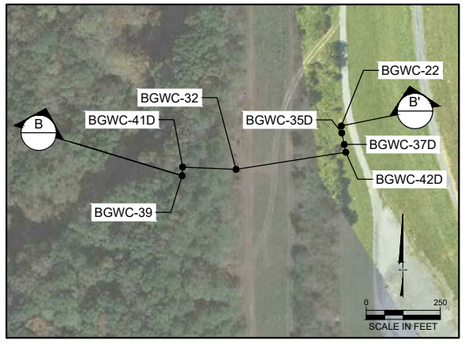
B WEST

B' EAST



NOTES:

1. SUBSURFACE LITHOLOGIC ELEVATIONS BETWEEN BORINGS ARE BASED ON ENVIRONMENTAL VISUALIZATION SYSTEM (EVS) 3D MODEL KRIGING AND SHOULD BE CONSIDERED APPROXIMATE.
2. ELEVATION PROVIDED IN FEET REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88).
3. ELEVATIONS OF LITHOLOGIC UNITS WERE ESTIMATED BASED ON GROUND SURFACE ELEVATIONS OF SOIL BORINGS.
4. BORING LOGS AND HYDROGEOLOGIC INFORMATION FOR SOIL BORINGS AND MONITORING WELLS FOR LOCATIONS NOT INSTALLED BY GEOSYNTEC CONSULTANTS WERE PROVIDED BY GEORGIA POWER COMPANY. ADDITIONAL DETAILS REGARDING SOLUTION FEATURE DATA ARE PROVIDED IN THE HYDROGEOLOGIC ASSESSMENT REPORT, SUBMITTED IN JUNE 2021.
5. THE TOP OF ROCK SURFACE IS ESTIMATED BASED ON BORING LOGS FROM 2017 AMEC AND 2018, 2020, AND 2021 GEOSYNTEC FIELD INVESTIGATIONS, HISTORICAL BORING LOGS, AND FROM TOP OF ROCK INFORMATION PROVIDED BY SOUTHERN COMPANY SERVICES (SCS).
6. THE BOTTOM OF EUHARLEE CREEK SURFACE IS ESTIMATED BASED ON THE 2020 GEOSYNTEC BATHYMETRY STUDY. THE SURFACE WATER ELEVATION OF EUHARLEE CREEK WAS MEASURED ON 25 JULY 2022 BY AN IN-SITU® INSTRUMENTS, INC. LEVEL TROLL 500® PRESSURE TRANSDUCER INSTALLED AT THE LOCATION SHOWN ON FIGURE 2.
7. GROUNDWATER LEVELS MEASURED BY RESOLUTE ON 25 JULY 2022.
8. COBALT (Co) CONCENTRATION DATA ARE FROM JULY/AUGUST 2022 SEMIANNUAL GROUNDWATER MONITORING EVENT. CONCENTRATIONS ARE REPORTED IN MILLIGRAMS PER LITER (UG/L). A "<" INDICATES THE CONSTITUENT WAS NOT DETECTED ABOVE THE ANALYTICAL METHOD DETECTION LIMIT (MDL). A "J" INDICATES THE CONSTITUENT WAS ESTIMATED AND DETECTED BETWEEN THE MDL AND THE REPORTING LIMIT.
9. TOPOGRAPHY SHOWN ON THIS DRAWING SET IS FROM A LIDAR TOPOGRAPHIC SURVEY DATED 01 APRIL 2017, PROVIDED AS AN ELECTRONIC COMPUTER-AIDED DRAFTING DRAWING FILE BY SCS.
10. AERIAL PHOTOGRAPH SOURCE: GOOGLE EARTH PRO, NOVEMBER 2019 AND GEORGIA POWER COMPANY, SEPTEMBER 2022.
11. THE GROUNDWATER PROTECTION STANDARD (GWPS) FOR Co IS 0.010 UG/L.



SECTION B-B' KEY MAP

LEGEND

- GROUND SURFACE (NOTE 9)
- TOP OF BEDROCK SURFACE (NOTE 5)
- WELL
- EXTRAPOLATED SURFACE
- SCREEN INTERVAL
- GROUNDWATER LEVEL (NOTE 7)
- RESIDUUM
- DOLOMITIC LIMESTONE
- FREE WATER SURFACE
- SOLUTION FEATURE (NOTE 4)

0 50
HORIZONTAL SCALE IN FEET

0 10
VERTICAL SCALE IN FEET

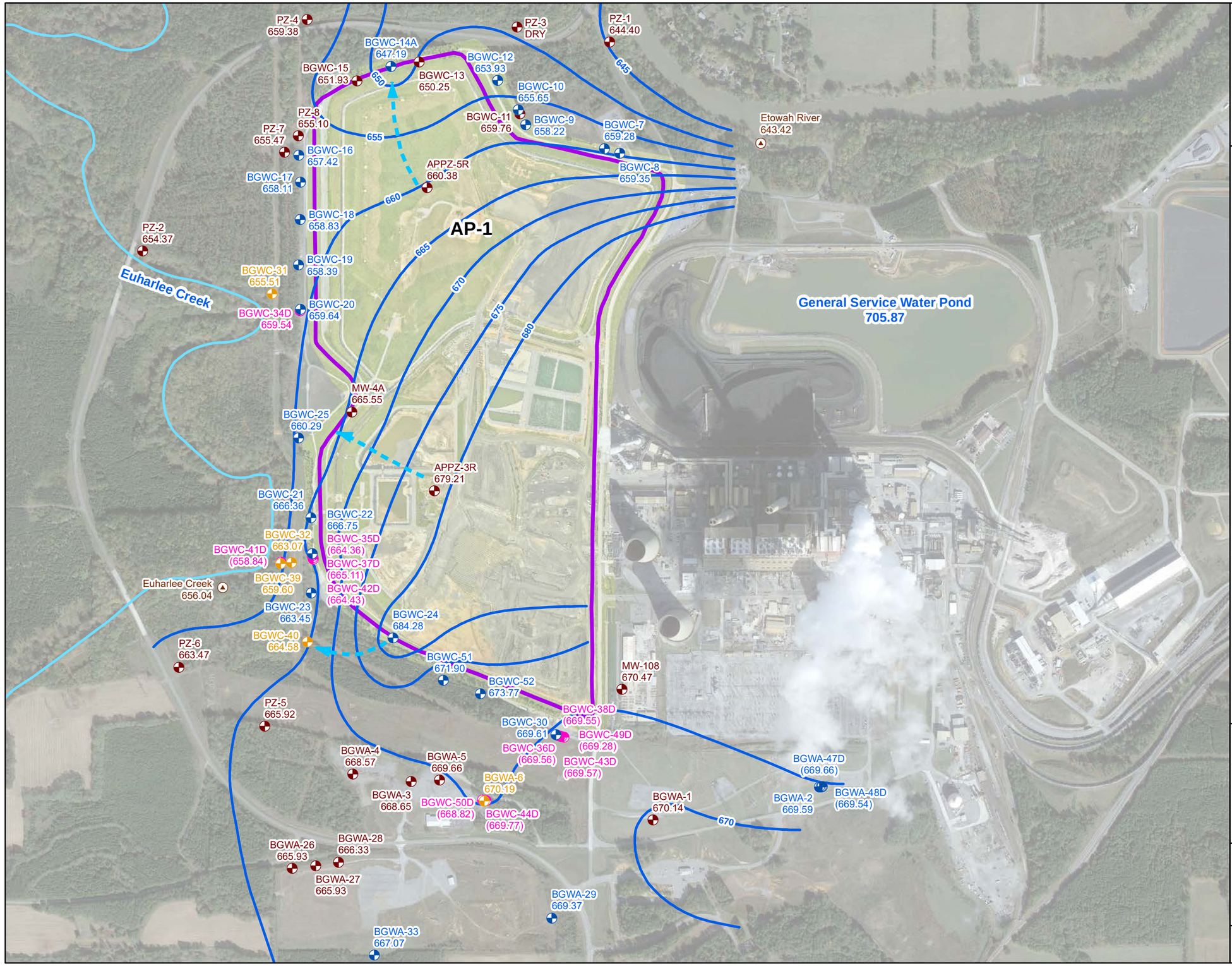
GEOLOGIC SECTION B-B'

GEORGIA POWER COMPANY
PLANT BOWEN AP-1
BARTOW COUNTY, GEORGIA

Geosyntec consultants

PROJECT NO: GW6581C | JULY 2024

FIGURE 4



N

LEGEND

- Detection Monitoring Well
- Horizontal Assessment Monitoring Well
- Vertical Assessment Monitoring Well
- Piezometer
- Surface Water Transducer
- Groundwater Elevation Contour
- Approximate Groundwater Flow Direction
- Euharlee Creek
- Approximate AP-1 Boundary

Notes:
1. Water level elevations recorded on July 25, 2022. Elevation provided in feet referenced to the North American Vertical Datum (NAVD) 88. The Former Recycle Pond has been decomissioned.
2. Surface water elevations of Etowah River, Euharlee Creek, and General Service Water Pond are recorded using In-Situ® Instruments, Inc.'s Win-Situ® or HydroVu® reporting software and Level Troll 500® pressure transducers.
3. The map shows only the wells/piezometers currently installed at the time of the gauging event.
4. Groundwater elevations in parentheses were not used in development of groundwater contours due to well being screened at a different elevation in the formation/aquifer.
5. Aerial photograph source: Google Earth Pro, November 2019 and Georgia Power Company, September 2022.

0 400 800 1,600 Feet

POTENTIOMETRIC SURFACE CONTOUR MAP - JULY 2022

GEORGIA POWER COMPANY
PLANT BOWEN AP-1
BARTOW COUNTY, GEORGIA

Prepared For: Georgia Power

Prepared By: Geosyntec consultants

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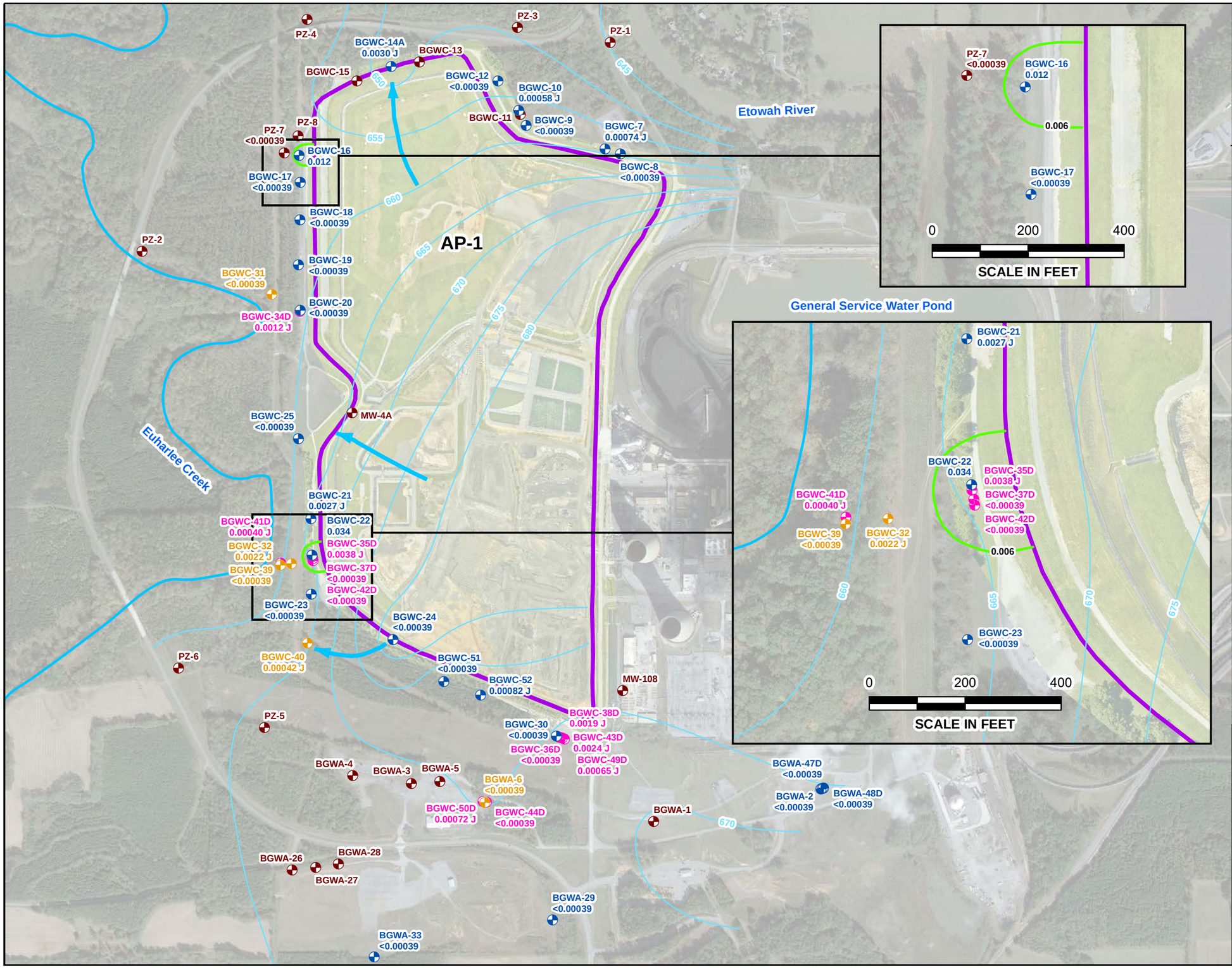
FIGURE 5



N

LEGEND

- Detection Monitoring Well
- Horizontal Assessment Monitoring
- Vertical Assessment Monitoring Well (Not Used for Contouring)
- Piezometer
- GWPS Cobalt Iso-Concentration Contour (mg/L)
- Groundwater Elevation Contour
- Approximate Groundwater Flow Direction
- Euharlee Creek
- Approximate AP-1 Boundary

Notes:

1. Concentration data is from the July/August 2022 Semiannual groundwater monitoring event. Concentrations are reported in mg/L. Water level elevations recorded July 25, 2022.
2. The Groundwater Protection Standard (GWPS) for cobalt (Co) is 0.006 mg/L.
3. Co at BGWC-16 is not present at statistically significant levels (SSL).
4. Aerial photograph source: Google Earth Pro, November 2019 and Georgia Power Company, September 2022.

0 400 800 1,600 Feet

ISO-CONCENTRATION MAP
COBALT - JULY/AUGUST 2022

GEORGIA POWER COMPANY
PLANT BOWEN AP-1
BARTOW COUNTY, GEORGIA

Prepared For: Georgia Power

Prepared By: Geosyntec consultants

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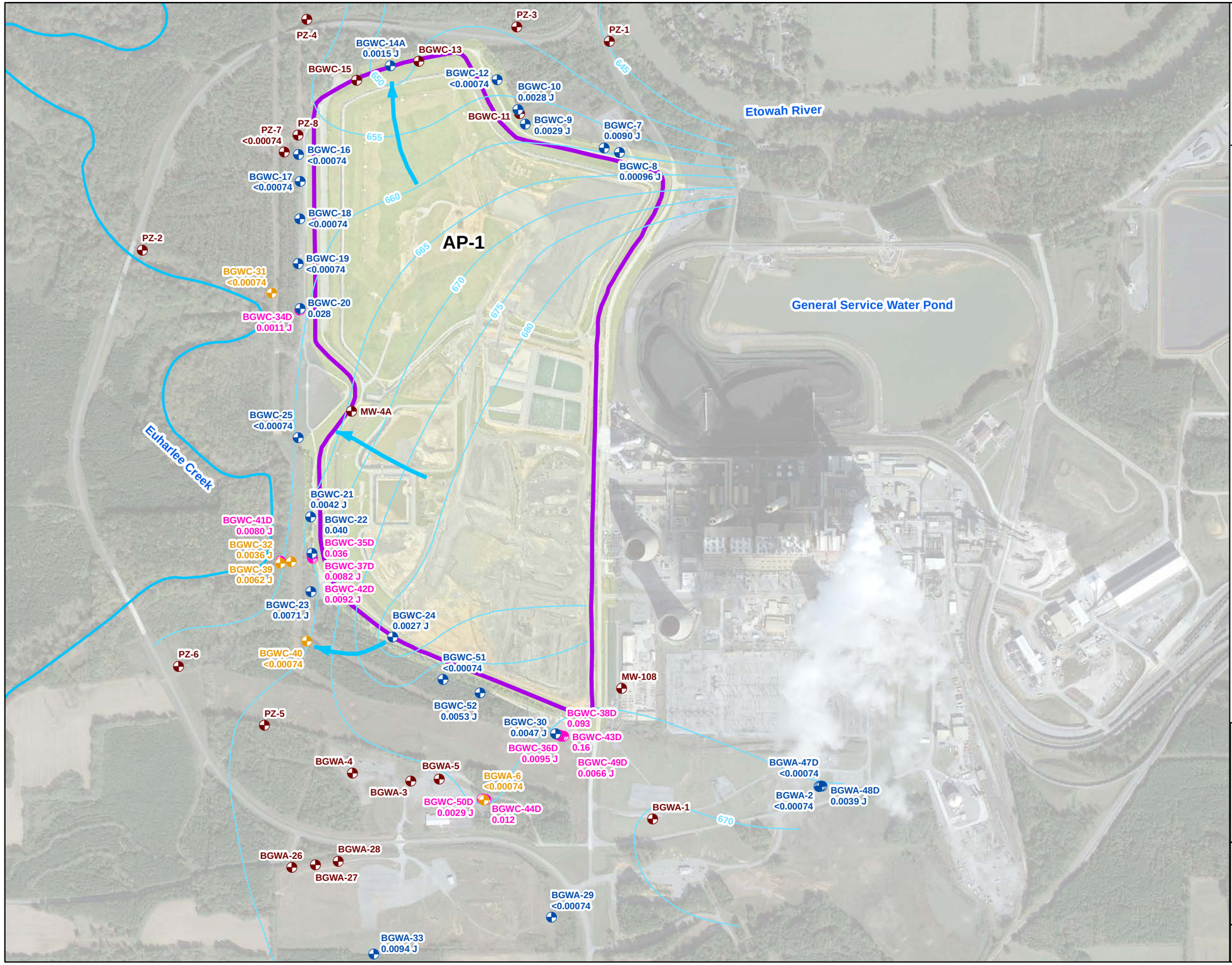
FIGURE 6



N

LEGEND

- Detection Monitoring Well
- Horizontal Assessment Monitoring Well
- Vertical Assessment Monitoring Well (Not Used for Contouring)
- Piezometer
- Groundwater Elevation Contour
- Approximate Groundwater Flow Direction
- Euharlee Creek
- Approximate AP-1 Boundary

Notes:
1. Concentration data is from the July/August 2022 Semiannual groundwater monitoring event. Concentrations are reported in mg/L. Water level elevations recorded July 25, 2022.
2. The Groundwater Protection Standard (GWPS) for molybdenum is 0.1 mg/L.
3. Aerial photograph source: Google Earth Pro, November 2019 and Georgia Power Company, September 2022.

0 400 800 1,600 Feet

ISO-CONCENTRATION MAP
MOLYBDENUM - JULY/AUGUST 2022

GEORGIA POWER COMPANY
PLANT BOWEN AP-1
BARTOW COUNTY, GEORGIA

Prepared For: Georgia Power

Prepared By: Geosyntec consultants

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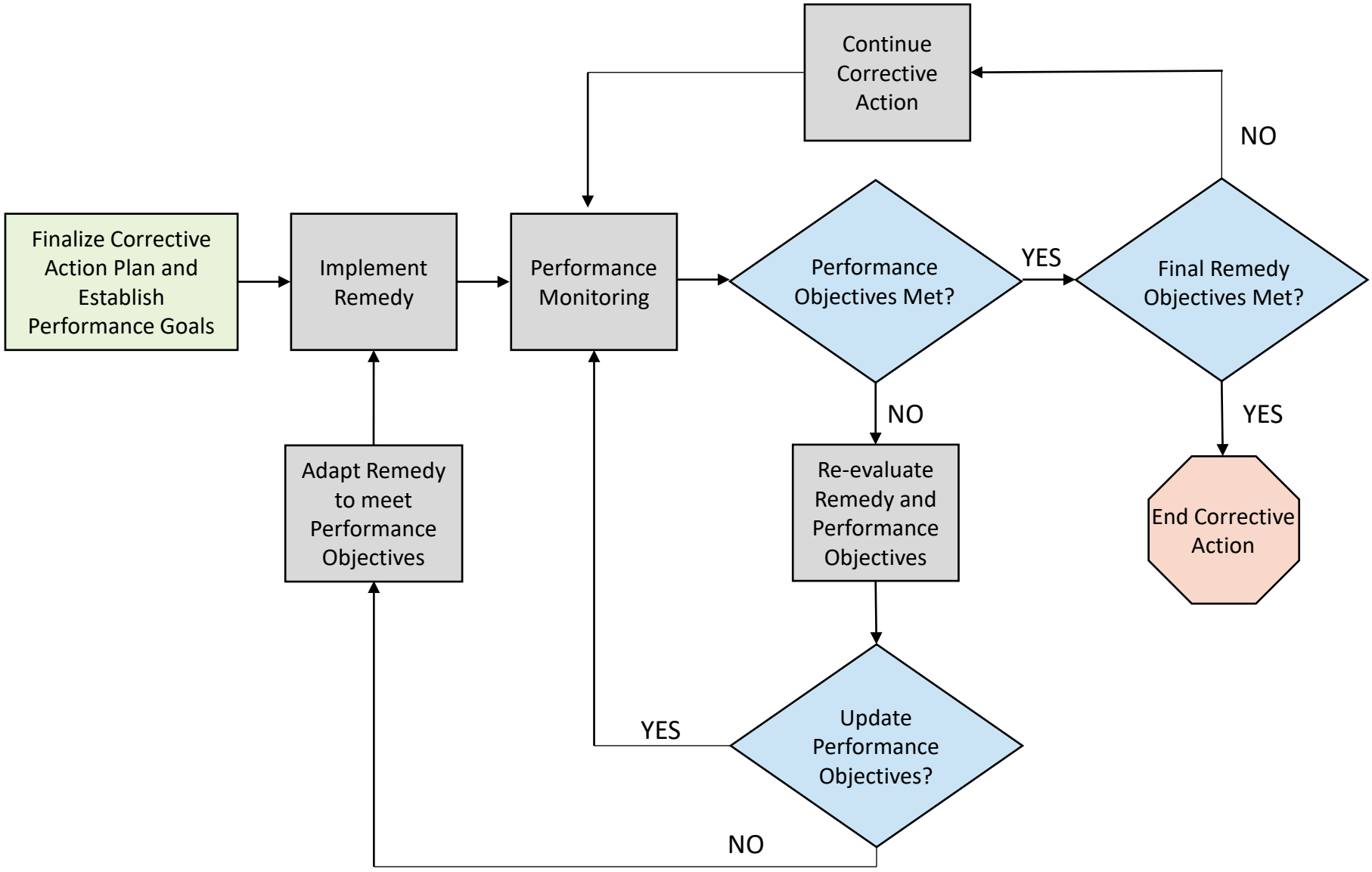
FIGURE 7



Notes:

REMEDY ADAPTIVE SITE MANAGEMENT

GEORGIA POWER COMPANY
PLANT BOWEN AP-1
BARTOW COUNTY, GEORGIA

Prepared For: Georgia Power

Prepared By: Geosyntec consultants

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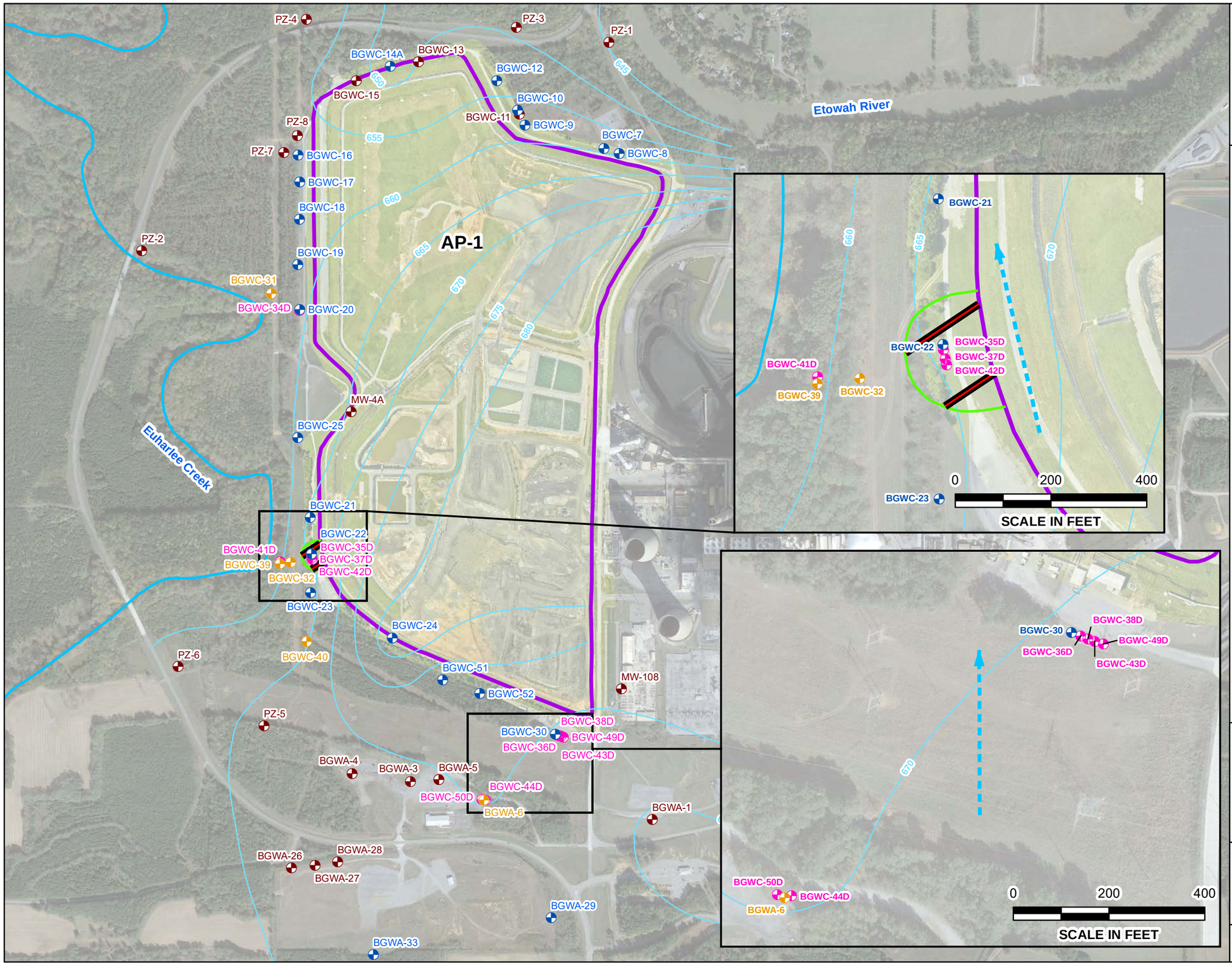
Figure 8



N

LEGEND

- Detection Monitoring Well
- Horizontal Assessment Monitoring
- Vertical Assessment Monitoring
- Piezometer
- Proposed Injection Array
- Proposed Treatment
- Groundwater Elevation Contour
- Approximate Post-Closure Groundwater Flow Direction
- Euharlee Creek
- Approximate AP-1 Boundary

Notes:
1. Water level elevations recorded July 25, 2022.
2. Proposed injection array locations are conceptual and consider post-closure groundwater flow conditions. Injection and performance monitoring well locations will be refined during pre-design investigation efforts.
3. Proposed treatment area boundary is collocated with cobalt Groundwater Protection Standard (GWPS) iso-concentration line proximal to BGWC-22 presented in Figure 6. Treatment area will be refined during pre-design investigation efforts.
4. The proposed remedy selected for molybdenum at BGWC-43D is monitored natural attenuation.
5. Aerial photograph source: Google Earth Pro, November 2019 and Georgia Power Company, September 2022.

0 400 800 1,600
Feet

REMEDY CONCEPTUAL DESIGN

GEORGIA POWER COMPANY
PLANT BOWEN AP-1
BARTOW COUNTY, GEORGIA

Prepared For: Georgia Power

Prepared By: Geosyntec consultants

KENNESAW, GA | JULY 2024

FIGURE 9

APPENDIX A

Boring Log and Borehole Geophysics Review Summary

Prepared for

Georgia Power Company
241 Ralph McGill Blvd NE
Atlanta, Georgia 30308

BORING LOG AND BOREHOLE GEOPHYSICS REVIEW SUMMARY

GEORGIA POWER COMPANY
PLANT BOWEN ASH POND 1

Prepared by

Geosyntec consultants

engineers | scientists | innovators

1255 Roberts Boulevard, Suite 200
Kennesaw, Georgia 30144

Project Number GW6581F

July 2024

Geosyntec
consultants

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Figure 1 Well Locations

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Appendix A Boring Logs
Appendix B Annotated Geophysical Logs

LIST OF ACRONYMS AND ABBREVIATIONS

AP-1	Ash Pond 1
ATV	Acoustic Televiewer
BHG	Borehole Geophysical Logging
Georgia Power	Georgia Power Company
Geosyntec	Geosyntec Consultants, Inc.
GWPS	Ground Water Protection Standard
OTV	Optical Televiewer
SCS	Southern Company Services
SSL	Statistically Significant Levels

1. INTRODUCTION

This memorandum summarizes the efforts undertaken by Geosyntec Consultants, Inc. (Geosyntec) on behalf of Southern Company Services (SCS) to conduct a review of boring logs and downhole geophysical data at Georgia Power Company's (Georgia Power's) Plant Bowen Ash Pond 1 (AP-1, or Site) located in Euharlee, Georgia. This review was conducted to refine the understanding of the subsurface geologic conditions in select areas of the Site and to identify and characterize potential solution features (namely voids and solution-enhanced fractures) near monitoring wells BGWC-22 and BGWC-43D. These wells are located along the southwestern and southern compliance boundary of AP-1 (**Figure 1**). Statistically significant levels (SSLs) of cobalt and molybdenum at groundwater concentrations exceeding the groundwater protection standards (GWPS) for the Site have been identified in BGWC-22 and BGWC-43D, respectively.

The contents of this memorandum describe the methods by which solution features observed within boreholes in the southern portion of the Site near BGWC-22 and BGWC-43D were characterized, specifically with respect to being open or filled with residuum and/or sediment.

2. DESCRIPTION OF REVIEW

A review of boring logs and downhole geophysical logs was conducted to identify the presence of potential solution features. Eighteen (18) wells were included in this evaluation (refer to **Figure 1**) based on proximity to wells BGWC-22 and BGWC-43D and the availability of data; the eighteen includes BGWC-22 and BGWC-43D. Each solution feature identified during the review of boring and geophysical logs was categorized as (i) clay- or sediment-filled, (ii) open, or (iii) inconclusive/not enough information.

3. METHODOLOGY

3.1 Boring Logs

Wells included in the evaluation were installed using the rotasonic drilling method. All components of the logs, including notes, driller remarks, lithologic descriptions, and recovery of the boring core, were considered when evaluating and categorizing possible solution features. If the driller noted "rods dropped with no resistance" then it is reasonable to assume that the feature was open or contained a loose slurry of material. Alternatively, if the "driller reports very low resistance" or "very soft drilling" then the feature is most likely filled with some material that is at least partially impeding the advance of the drill rods. In some cases, void infill material was recovered, and a detailed description of the lithologic properties was provided on the boring log. It should be noted that lack of recovery of a core sample does not necessarily indicate an open (or infilled) void, as it is common for the pressurized drilling water used in rotasonic drilling to wash out loose or soft material from the core barrel.

3.2 Downhole Geophysical Logs

"Downhole" or borehole geophysical logging (BHG) may include various technical approaches to assess the geologic and hydrogeologic properties of an open borehole. During installation of the initial monitoring well network in 2015 along the compliance boundary for AP-1 (BGWA-2 through BGWC-30), natural gamma logging was conducted in the majority of the boreholes prior to well construction. Natural gamma logging is useful in indicating the presence of clay material within many of the observed voids in the bedrock. At five locations included in the study (BGWA-2, BGWA-5, BGWC-21, BGWC-22, and BGWC-24), natural gamma logging was conducted using a downhole probe to estimate the contacts between the clayey residuum, the carbonate bedrock, and potential clay-filled solution features. This is based on the naturally occurring radioactivity that is more abundant in clay minerals than in typical limestones and dolomites.

In 2021, to inform the placement of well screens at BGWC-49D and BGWC-50D, downhole geophysical logging was conducted at these two locations prior to construction of the wells. Several instruments were used in the logging of these boreholes, with three-arm caliper, acoustic televiewer (ATV), and optical televiewer (OTV) providing the most relevant information for classification of the voids. The OTV was only used at location BGWC-49D, as the water in the borehole allowed for clear optical imaging, while ATV was used at BGWC-50D due to the cloudy water in the borehole at the time of logging. A short summary of these techniques is described below:

- ATV: Provides a 360-degree image of the boring by emitting an acoustic beam that is reflected off the borehole wall. The reflectance creates a 3D digital image of the bore wall surface and also provides a "virtual" caliper log of the borehole diameter. The ATV log is used to identify the aperture and orientation of fractures and other irregularities in the borehole wall.

- OTV: Provides a high-resolution optical image of the borehole, making it ideal to observe fractures and voids, as well as other physical features of the bedrock in the subsurface. Unlike the ATV, however, the OTV is only useful if the water in the borehole is sufficiently clear for the camera to record the image.

- Three-arm caliper, or summation caliper: A physical means to measure the diameter of the borehole, including very small (hairline fractures) to very large (voids) openings in the bedrock. The caliper used in these logs has a maximum extended diameter of 16 inches. The virtual caliper created by the ATV can be correlated with the three-arm caliper, which in some cases may better characterize the borehole features.

4. RESULTS

4.1 Boring Logs

Boring logs for void identification and characterization are included as **Appendix A.** Wells BGWA-2, BGWC-21, and BGWC-24 have descriptions of the void infill material very similar to that of the overlying residuum (red to brown to tan plastic clays with chert and dolomite gravels). Considering these recorded field observations where material was actually recovered, there is a high level of confidence in the presence of void infilling at these locations. Furthermore, these observations support the concept of many of the solution features in the bedrock being filled with residuum-like material.

4.2 Downhole Geophysical Logs

Natural gamma logs are presented as a column within the boring logs for wells BGWA-2, BGWA-5, BGWC-21, BGWC-22, and BGWC-24 included as **Appendix A.** Natural gamma logging indicated the presence of clay material within many of the observed voids in the bedrock. As an example, the void in the bedrock observed at location BGWC-24 from 42 to 47 feet below ground surface also shows a higher gamma signature than the competent rock above and below the feature, as would be expected from a void that is filled with clay rather than an open void filled only with water. These gamma signatures correlated with direct observation of clay infilling of the solution features. At BGWC-49D, the OTV provided high-quality images of a solution feature (172.5 to 192 feet below ground surface) which is also identified in the boring log. The image shows a solution feature that is partially open in the upper one to two feet, evident by the visible depth of the honey-combed cavities in the rock, but which is filled with sediment throughout most of the feature. With increasing depth, the OTV log becomes a pale yellow which indicates that light from the OTV is reflecting off of material in the borehole. At the same interval that the OTV shows the upper open portion of this void, the three-arm caliper is fully extended, indicating that the void is greater than a diameter of 16 inches. As the caliper is advanced into an area where the OTV has a bright reflection due possible infill material, the caliper is actuating against an uneven borehole surface which further indicates that the feature is filled with clay or mud. The competent bedrock above and below the feature is evident and distinguishable in both the OTV and caliper logs. The ATV and caliper logs at BGWC-50D also show instances of correlation that suggest infilling of solution features with clay or mud. The annotated downhole geophysical logs for BGWC-49D and BGWC-50D are included as **Appendix B.**

5. DISCUSSION

A summary of the features that were identified during this evaluation is included in Table 1. From review of the 18 boring and geophysical logs, a total of 39 voids were identified. Of the identified voids, 21 (54%) were classified as being infilled with clay or sediment. These features were generally several feet in length and could represent a primary pathway for groundwater to travel in the bedrock. Fourteen (36%) open voids were identified and were often smaller compared to the infilled features, ranging in width from a few inches to a few feet. Only four identified voids (10%) were unable to be classified based on the drilling and logging description. Cumulatively across the 18 borehole locations reviewed, these 39 voids represented a total of 268 feet of solutioned bedrock. Of this total length, 207 feet (77%) were filled with clay or sediment, 32 feet (12%) were open, and 29 feet (11%) were unable to be determined from the observations and descriptions. The information summarized in these logs supports the conceptual site model[1], in which these partially filled features contain aluminosilicate clay minerals from the weathering and accumulation of non-soluble materials.

[1] Residuum is formed from the weathering of the limestone and dolomite bedrock from both mechanical and chemical processes. As weathering occurs the calcium carbonate cations and anions enter an aqueous phase allowing the remaining non-soluble minerals, including aluminosilicate clays, to build up and form residual material in the voids. These non-soluble minerals are consistent with the reported composition of residuum underlying AP-1.

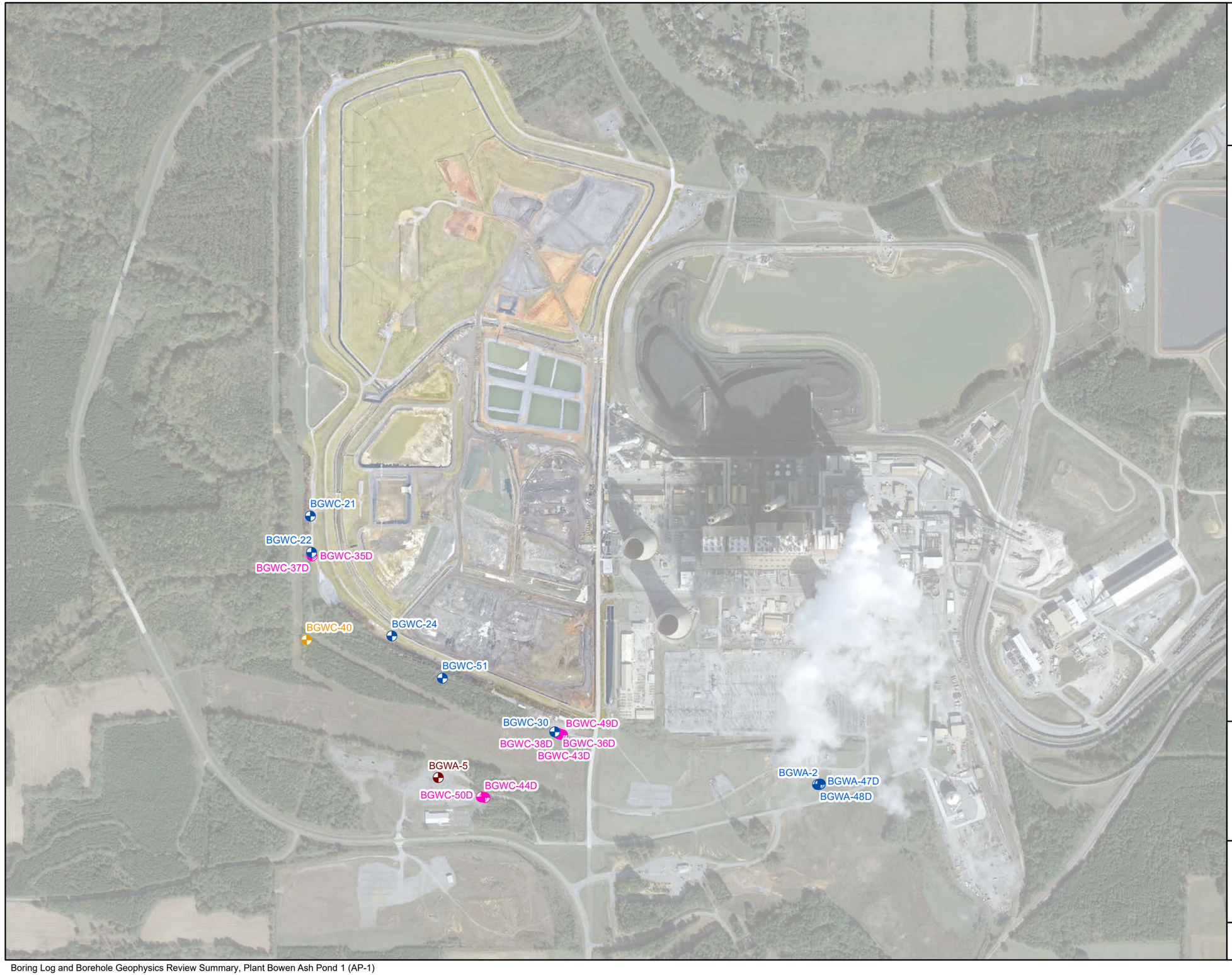
TABLE

Table 1
Summary of Observed Voids
Plant Bowen AP-1, Bartow County, Georgia

Well ID	Void Depth (ft BGS)	Length of Void (ft)	Void Condition
BGWA-2	86-138	52	Infilled
	143-151	8	Infilled
BGWA-5	51-53	2	Open
BGWA-47D	78.5-110	32	Infilled
	114-115	1	Open
	116-118	2	Open
	127.5-131	4	Open
	137-141	4	Open
	147-153	6	Inconclusive
BGWA-48D	70-71	1	Infilled
	74-76	2	Infilled
	99-105	6	Infilled
	122-139	17	Infilled
BGWC-21	27-32	5	Infilled
	41-45.5	4.5	Infilled
BGWC-22	32-32.2	0.25	Open
BGWC-24	41.6-46.5	4.9	Infilled
BGWC-30	38-44	6	Inconclusive
	46-58	12	Inconclusive
BGWC-35D	39-42	3	Infilled
BGWC-36D	45-47	2	Open
	50-52.5	2.5	Open
	59-64	5	Infilled
	69-72	3	Infilled
	87-93	6	Infilled
BGWC-37D	55-65	10	Infilled
BGWC-38D	74-76	2	Open
BGWC-40	57-60	3	Infilled
BGWC-43D	90-100	10	Infilled
	113-116	3	Infilled
BGWC-44D	45-50	5	Inconclusive
BGWC-49D	126-131	5	Open
	183-192	9	Infilled
	204-205	1	Open
	215-225	10	Infilled
BGWC-50D	52-55	3	Open
	89-90	1	Open
	96-109	13	Infilled
BGWC-51	57-60	3	Open

Notes:
ft = feet
ft bgs = feet below ground surface

FIGURE



N

LEGEND

- Detection Monitoring Well
- Horizontal Assessment Monitoring Well
- Vertical Assessment Monitoring Well
- Piezometer
- Approximate AP-1 Boundary

Notes:
1. Aerial photograph source: Google Earth Pro, November 2019 and Georgia Power Company, February 2022.

0 400 800 1,600 Feet

WELL LOCATIONS

GEORGIA POWER COMPANY
PLANT BOWEN AP-1
BARTOW COUNTY, GEORGIA

Prepared For: Georgia Power

Prepared By: Geosyntec consultants

KENNESAW, GA | JULY 2024

FIGURE 1

Boring Log and Borehole Geophysics Review Summary, Plant Bowen Ash Pond 1 (AP-1)

APPENDIX A

Boring Logs

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	**Plant Bowen Hydrogeological Investigation**	BORING NUMBER	**BGWA-2**
LOCATION	**Euharlee, Georgia**	PAGE	**1 of 9**
DRILLED BY	**Cascade Drilling, Inc.**	GROUND SURFACE ELEVATION	**727.00 ft. NAVD88**
DRILL METHOD	**Rotosonic - PS-150**	TOTAL DEPTH	**166 feet**
LOGGED BY	**Matt Wilson/Rhonda Tinsley**	DATE COMPLETED	**10/29/15**
SAMPLING METHOD	**4-in. ID by 10-ft. core barrel (CB)**	BOREHOLE DIAMETER	**6-inches**
COORDINATES	**(NAD83 WZ) Northing: 1499374.18; Easting: 2068599.59**		

SAMPLING METHOD	RECOVERY (FEET)	10% HCL SOLUTION ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG (0 30 60 90 120 150)	LITHO-LOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
NA	NA	NA					**0 to 15.0 feet: CLAY (CL)**, red, dry, low plasticity, very stiff, fissile. (RESIDUAL) (0 to 8.0 feet: verified by visual observation down hole created by vacuum truck.) @ 0 to 8.0 feet: No recovery; interval removed with vacuum truck to clear for utilities.	0	0	100
CB	8.3/8.0	N	5 10							
			15				**15.0 to 46.0 feet: CLAY (CH)**, red, dry to moist, moderate plasticity, stiff, occasional white chert nodules, trace well rounded silicic gravel. (RESIDUAL)	5	0	95
CB	11/10	N	20							

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent. NAVD88 = North American Vertical Datum of 1988. NAD83 WZ = North American Datum of 1983, West Zone.

ANCHOR QEA

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	**Plant Bowen Hydrogeological Investigation**	BORING NUMBER	**BGWA-2**
LOCATION	**Euharlee, Georgia**	PAGE	**2 of 9**
DRILLED BY	**Cascade Drilling, Inc.**	GROUND SURFACE ELEVATION	**727.00 ft. NAVD88**
DRILL METHOD	**Rotosonic - PS-150**	TOTAL DEPTH	**166 feet**
LOGGED BY	**Matt Wilson/Rhonda Tinsley**	DATE COMPLETED	**10/29/15**
SAMPLING METHOD	**4-in. ID by 10-ft. core barrel (CB)**	BOREHOLE DIAMETER	**6-inches**
COORDINATES	**(NAD83 WZ) Northing: 1499374.18; Easting: 2068599.59**		

SAMPLING METHOD	RECOVERY (FEET)	10% HCL SOLUTION ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG (0 30 60 90 120 150)	LITHO-LOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
			25				**15.0 to 46.0 feet: CLAY (CL)**, continued.	5	0	95
CB	8.8/10	N								
			30							
			35							
CB	11.3/10	N								
			40							

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent. NAVD88 = North American Vertical Datum of 1988. NAD83 WZ = North American Datum of 1983, West Zone.

ANCHOR QEA

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	**Plant Bowen Hydrogeological Investigation**	BORING NUMBER	**BGWA-2**
LOCATION	**Euharlee, Georgia**	PAGE	**3 of 9**
DRILLED BY	**Cascade Drilling, Inc.**	GROUND SURFACE ELEVATION	**727.00 ft. NAVD88**
DRILL METHOD	**Rotosonic - PS-150**	TOTAL DEPTH	**166 feet**
LOGGED BY	**Matt Wilson/Rhonda Tinsley**	DATE COMPLETED	**10/29/15**
SAMPLING METHOD	**4-in. ID by 10-ft. core barrel (CB)**	BOREHOLE DIAMETER	**6-inches**
COORDINATES	**(NAD83 WZ) Northing: 1499374.18; Easting: 2068599.59**		

SAMPLING METHOD	RECOVERY (FEET)	10% HCL SOLUTION ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG	LITHO-LOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
					0 30 60 90 120 150		**15.0 to 46.0 feet: CLAY (CL)**, continued. @ 41.0 to 46.0 feet: gradational color change from red to light reddish brown.	15	0	85
			45							
CB	**10.7/10**	N					**46.0 to 74.7 feet: CLAY WITH GRAVEL (CH)**, light reddish brown, dry, very stiff, high plasticity, occasional well rounded, fine- to cobble-sized silicic gravel, dry to moist. (RESIDUAL)	15	0	85
			50							
			55							
CB	**11/10**	N					@ 56.9 to 58.5 feet: abundant black, soft, easily crumbled nodules. (Manganese?) @ 58.5 to 61.0 feet: occasional black nodules as above.			
			60							

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent. NAVD88 = North American Vertical Datum of 1988. NAD83 WZ = North American Datum of 1983, West Zone.

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Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	**Plant Bowen Hydrogeological Investigation**	BORING NUMBER	**BGWA-2**
LOCATION	**Euharlee, Georgia**	PAGE	**4 of 9**
DRILLED BY	**Cascade Drilling, Inc.**	GROUND SURFACE ELEVATION	**727.00 ft. NAVD88**
DRILL METHOD	**Rotosonic - PS-150**	TOTAL DEPTH	**166 feet**
LOGGED BY	**Matt Wilson/Rhonda Tinsley**	DATE COMPLETED	**10/29/15**
SAMPLING METHOD	**4-in. ID by 10-ft. core barrel (CB)**	BOREHOLE DIAMETER	**6-inches**
COORDINATES	**(NAD83 WZ) Northing: 1499374.18; Easting: 2068599.59**		

SAMPLING METHOD	RECOVERY (FEET)	10% HCL SOLUTION ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG	LITHO-LOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
					0 30 60 90 120 150		**46.0 to 74.7 feet: CLAY WITH GRAVEL (CH)**, continued. @ 61.0 to 66.0 feet: gradual color change from light reddish brown to light brown.	15	0	85
			65							
CB	**10.8/10**	N					@ 66.0 feet: light brown, occasional angular black chert nodules.			
			70							
			75				**74.7 to 86.0 feet: DOLOMITE**, medium gray with calcite-filled fractures, some weathering (iron staining). (BEDROCK)	NA	NA	NA
CB	**7.3/10**	S								
			80							

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent. NAVD88 = North American Vertical Datum of 1988. NAD83 WZ = North American Datum of 1983, West Zone.

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Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	**Plant Bowen Hydrogeological Investigation**	BORING NUMBER	**BGWA-2**
LOCATION	**Euharlee, Georgia**	PAGE	**5 of 9**
DRILLED BY	**Cascade Drilling, Inc.**	GROUND SURFACE ELEVATION	**727.00 ft. NAVD88**
DRILL METHOD	**Rotosonic - PS-150**	TOTAL DEPTH	**166 feet**
LOGGED BY	**Matt Wilson/Rhonda Tinsley**	DATE COMPLETED	**10/29/15**
SAMPLING METHOD	**4-in. ID by 10-ft. core barrel (CB)**	BOREHOLE DIAMETER	**6-inches**
COORDINATES	**(NAD83 WZ) Northing: 1499374.18; Easting: 2068599.59**		

SAMPLING METHOD	RECOVERY (FEET)	10% HCL SOLUTION ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG	LITHO-LOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
					0 30 60 90 120 150		**74.7 to 86.0 feet: DOLOMITE**, continued.	NA	NA	NA
			85							
CB	**8.4/10**	N					**86.0 to 138.0 feet: GRAVELLY CLAY (CH)**, light brown, soft, very wet, loose, gravel is angular, well graded, fine to coarse, occasional zones of deep red clay, clay has fragments of dolomite and chert. (VOID INFILL)	20	0	80
			90							
			95							
CB	**5.6/10**	N								
			100							

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent. NAVD88 = North American Vertical Datum of 1988. NAD83 WZ = North American Datum of 1983, West Zone.

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Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	**Plant Bowen Hydrogeological Investigation**	BORING NUMBER	**BGWA-2**
LOCATION	**Euharlee, Georgia**	PAGE	**6 of 9**
DRILLED BY	**Cascade Drilling, Inc.**	GROUND SURFACE ELEVATION	**727.00 ft. NAVD88**
DRILL METHOD	**Rotosonic - PS-150**	TOTAL DEPTH	**166 feet**
LOGGED BY	**Matt Wilson/Rhonda Tinsley**	DATE COMPLETED	**10/29/15**
SAMPLING METHOD	**4-in. ID by 10-ft. core barrel (CB)**	BOREHOLE DIAMETER	**6-inches**
COORDINATES	**(NAD83 WZ) Northing: 1499374.18; Easting: 2068599.59**		

SAMPLING METHOD	RECOVERY (FEET)	10% HCL SOLUTION ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG	LITHO-LOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
					0 30 60 90 120 150		**86.0 to 138.0 feet: GRAVELLY CLAY (CH)**, continued.	20	0	80
			105							
CB	5.8/10									
			110				@ 108.4 to 110.0 feet: gray sandy silt.			
			115							
CB	0/0						@ 116.0 to 136.0 feet: No recovery, wet and loose.			
			120							

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent. NAVD88 = North American Vertical Datum of 1988. NAD83 WZ = North American Datum of 1983, West Zone.

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Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	**Plant Bowen Hydrogeological Investigation**	BORING NUMBER	**BGWA-2**
LOCATION	**Euharlee, Georgia**	PAGE	**7 of 9**
DRILLED BY	**Cascade Drilling, Inc.**	GROUND SURFACE ELEVATION	**727.00 ft. NAVD88**
DRILL METHOD	**Rotosonic - PS-150**	TOTAL DEPTH	**166 feet**
LOGGED BY	**Matt Wilson/Rhonda Tinsley**	DATE COMPLETED	**10/29/15**
SAMPLING METHOD	**4-in. ID by 10-ft. core barrel (CB)**	BOREHOLE DIAMETER	**6-inches**
COORDINATES	**(NAD83 WZ) Northing: 1499374.18; Easting: 2068599.59**		

SAMPLING METHOD	RECOVERY (FEET)	10% HCL SOLUTION ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG	LITHO-LOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
					0 30 60 90 120 150		**86.0 to 138.0 feet: GRAVELLY CLAY (CH)**, continued.	20	0	80
			125							
CB	0/0									
			130							
			135							
CB	5/10									
							138.0 to 143.0 feet: DOLOMITE, see description on next page.	NA	NA	NA
			140							

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent. NAVD88 = North American Vertical Datum of 1988. NAD83 WZ = North American Datum of 1983, West Zone.

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Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	**Plant Bowen Hydrogeological Investigation**	BORING NUMBER	**BGWA-2**
LOCATION	**Euharlee, Georgia**	PAGE	**8 of 9**
DRILLED BY	**Cascade Drilling, Inc.**	GROUND SURFACE ELEVATION	**727.00 ft. NAVD88**
DRILL METHOD	**Rotosonic - PS-150**	TOTAL DEPTH	**166 feet**
LOGGED BY	**Matt Wilson/Rhonda Tinsley**	DATE COMPLETED	**10/29/15**
SAMPLING METHOD	**4-in. ID by 10-ft. core barrel (CB)**	BOREHOLE DIAMETER	**6-inches**
COORDINATES	**(NAD83 WZ) Northing: 1499374.18; Easting: 2068599.59**		

SAMPLING METHOD	RECOVERY (FEET)	10% HCL SOLUTION ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG	LITHO-LOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
					0 30 60 90 120 150		**138.0 to 143.0 feet: DOLOMITE**, medium gray with assorted quartz gravel and large chert chunks, breakage along bedding planes, some algal laminations, quartzite at bottom of interval, some iron and/or manganese deposits. (BEDROCK)	NA	NA	NA
			145				**143.0 to 151.0 feet: GRAVELLY CLAY (CH)**, light brown, soft, very wet, with fragments of dolomite and chert, gravel is angular, well graded, fine to coarse. (VOID INFILL)	20	0	80
CB	6.8/10									
			150							
							151.0 to 166.0 feet: DOLOMITE, medium gray, hard, dense, fine grained, breakage along bedding planes, some weathering evident. (BEDROCK)	NA	NA	NA
			155							
CB	8.3/10	E								
			160							

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent. NAVD88 = North American Vertical Datum of 1988. NAD83 WZ = North American Datum of 1983, West Zone.

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Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	**Plant Bowen Hydrogeological Investigation**	BORING NUMBER	**BGWA-2**
LOCATION	**Euharlee, Georgia**	PAGE	**9 of 9**
DRILLED BY	**Cascade Drilling, Inc.**	GROUND SURFACE ELEVATION	**727.00 ft. NAVD88**
DRILL METHOD	**Rotosonic - PS-150**	TOTAL DEPTH	**166 feet**
LOGGED BY	**Matt Wilson/Rhonda Tinsley**	DATE COMPLETED	**10/29/15**
SAMPLING METHOD	**4-in. ID by 10-ft. core barrel (CB)**	BOREHOLE DIAMETER	**6-inches**
COORDINATES	**(NAD83 WZ) Northing: 1499374.18; Easting: 2068599.59**		

SAMPLING METHOD	RECOVERY (FEET)	10% HCL SOLUTION ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG (0 30 60 90 120 150)	LITHO-LOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
CB	8.3/10	S	165				**151.0 to 166.0 feet: DOLOMITE**, continued.	NA	NA	NA
							Total depth: 166.0 feet.			
			170							
			175							
			180							

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent. NAVD88 = North American Vertical Datum of 1988. NAD83 WZ = North American Datum of 1983, West Zone.

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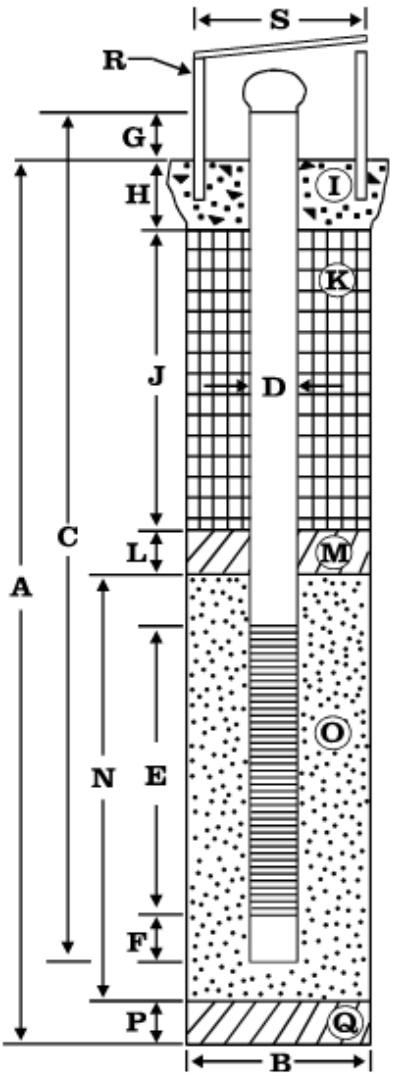
WELL DETAILS

Project Number:	151114-03	Boring/Well No.:	BGWA-2 (B4)
Client Name:	Southern Company	Top of Casing Elev.:	729.81 ft. NAVD88
Project Name:	Plant Bowen Hydrogeologic Investigation	Ground Surface Elev.:	727.1 ft. NAVD88
		Installation Date:	10/29/15
Location:	Euharlee, Georgia	Driller:	Cascade Drilling
			Leon Logan, Driller



	Depth (feet)	Elevation (feet, NAVD88)
S	+3.1	730.2
R	+2.9	730.0
G	0.0	727.1
H	1.0	726.1
J	59.8	667.3
C	72.0	655.1
L	75.0	652.1
A	76.2	650.9
N	86.2	640.9
E	86.5	640.6
F	87.0	640.1
P	166.0	561.1
B		

EXPLORATORY BORING

A. Total depth:	166.0 ft.
B. Diameter:	2 in.
Drilling method:	Rotosonic

WELL CONSTRUCTION

C. Well casing length:	89.4 ft.
Well casing material:	Schedule 40 PVC
D. Well casing diameter:	2 in.
E. Well screen length:	10.0 ft.
Well screen type:	3.5-inch OD U-Pak PVC
Well screen slot size:	0.010 in.
F. Well sump/end cap length	0.3 ft.
G. Well casing height (stickup):	2.9 ft.
H. Surface seal thickness:	1.0 ft.
I. Surface seal material:	Concrete
J. Annular seal thickness:	71.0 ft.
K. Annular seal material:	Cement/bentonite grout (1.0-59.8 ft.)
	Bentonite chips (59.8-72.0 ft.)
L. Filter pack seal thickness:	3.0 ft.
M. Filter pack seal material:	Bentonite pellets
N. Sand pack thickness:	12.0 ft.
O. Sand pack material:	#1 Silica sand
P. Bottom material thickness:	79.0 ft.
Q. Bottom material:	Bentonite chips
R. Protective casing material:	Aluminum
S. Protective casing diameter:	Square – 4 in.
Well centralizer depths:	NA

NOTES:

OD = Outside diameter. PVC = Polyvinyl chloride.
Bentonite pellets allowed to hydrate for 1 hour.
Bentonite chips allowed to hydrate for over 8 hours.
NAVD88 = North American Vertical Datum of 1988.

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	**Plant Bowen Hydrogeological Investigation**	BORING NUMBER	**BGWA-5**
LOCATION	**Euharlee, Georgia**	PAGE	**1 of 4**
DRILLED BY	**Cascade Drilling, Inc.**	GROUND SURFACE ELEVATION	**718.53 ft. NAVD88**
DRILL METHOD	**Rotosonic - PS-150**	TOTAL DEPTH	**66.7 feet**
LOGGED BY	**Matt Wilson**	DATE COMPLETED	**11/03/15**
SAMPLING METHOD	**4-in. ID by 10-ft. core barrel (CB)**	BOREHOLE DIAMETER	**6-inches**
COORDINATES	**(NAD83 WZ) Northing: 1499434.58; Easting: 2065421.43**		

SAMPLING METHOD	RECOVERY (FEET)	10% HCL SOLUTION ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG	LITHO-LOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
NA	NA	NA			0 30 60 90 120 150		**0 to 1.0 foot: ROAD BASE GRAVEL**, gray.	100	0	0
							1.0 to 23.5 feet: SILTY CLAY (CL), mottled light brown, dark red, tan and white, moist, low plasticity, some patches of dark gray, some black angular chert nodules, stiff. (RESIDUAL)	0	0	100
							@ 0 to 8.0 feet: No recovery; interval removed with vacuum truck to clear for utilities. Interval lithology verified by visual inspection down borehole.			
			5							
CB	8.0/8.5	N								
			10							
							@ 11.1 to 11.3 feet: layer of fine grained, loose, orange sand.			
			15							
CB	11.4/10	N								
			20							

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent.

ANCHOR QEA

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	**Plant Bowen Hydrogeological Investigation**	BORING NUMBER	**BGWA-5**
LOCATION	**Euharlee, Georgia**	PAGE	**2 of 4**
DRILLED BY	**Cascade Drilling, Inc.**	GROUND SURFACE ELEVATION	**718.53 ft. NAVD88**
DRILL METHOD	**Rotosonic - PS-150**	TOTAL DEPTH	**66.7 feet**
LOGGED BY	**Matt Wilson**	DATE COMPLETED	**11/03/15**
SAMPLING METHOD	**4-in. ID by 10-ft. core barrel (CB)**	BOREHOLE DIAMETER	**6-inches**
COORDINATES	**(NAD83 WZ) Northing: 1499434.58; Easting: 2065421.43**		

SAMPLING METHOD	RECOVERY (FEET)	10% HCL SOLUTION ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG	LITHO-LOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
					0 30 60 90 120 150		**1.0 to 23.5 feet: SILTY CLAY (CL)**, continued.	0	0	100
							@ 20.8 to 21.0 feet: chert nodules.			
							@ 21.7 to 22.6 feet: mostly chert nodules.			
							@ 23.2 to 23.5 feet: mostly chert nodules.			
							23.5 to 47.0 feet: SILTY CLAY (CH), light reddish brown, moist to damp, high plasticity, stiff, some chert nodules. (RESIDUAL)	0	0	100
			25							
CB	**9.4/10**	N								
			30							
			35				@ 35.5 feet: color change to brownish red, wet.			
CB	**10.6/10**	N								
			40							

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent.

ANCHOR QEA

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	**Plant Bowen Hydrogeological Investigation**	BORING NUMBER	**BGWA-5**
LOCATION	**Euharlee, Georgia**	PAGE	**3 of 4**
DRILLED BY	**Cascade Drilling, Inc.**	GROUND SURFACE ELEVATION	**718.53 ft. NAVD88**
DRILL METHOD	**Rotosonic - PS-150**	TOTAL DEPTH	**66.7 feet**
LOGGED BY	**Matt Wilson**	DATE COMPLETED	**11/03/15**
SAMPLING METHOD	**4-in. ID by 10-ft. core barrel (CB)**	BOREHOLE DIAMETER	**6-inches**
COORDINATES	**(NAD83 WZ) Northing: 1499434.58; Easting: 2065421.43**		

SAMPLING METHOD	RECOVERY (FEET)	10% HCL SOLUTION ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG (0 30 60 90 120 150)	LITHO-LOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
			45				**23.5 to 47.0 feet: SILTY CLAY (CH)**, continued.	0	0	100
CB	**9.5/10**	N					**47.0 to 48.8 feet: SILT (ML)**, wet, light brown with dark red banding, no plasticity, firm, occasional black nodules (Mn?). (RESIDUAL)	0	0	100
							48.8 to 49.9 feet: SILTY CLAY (CH), light reddish brown, moist to damp, high plasticity, stiff, some chert nodules. (RESIDUAL)	0	0	100
		S	50				**49.9 to 66.5 feet: DOLOMITE**, gray, fine grained crystals, competent, bedded, beds range from 0.25 to 0.5 feet, breakage along bedding planes, unweathered to slightly weathered. (BEDROCK)	NA	NA	NA
						VOID	@ 49.9 to 50.2 feet: heavily weathered zone. @ 50.2 to 50.7 feet: 0.5 feet bed, hard, dense, competent. @ 51.0 to 53.0 feet: driller reported a void, no clay in sample. Void may be unfilled.			
			55							
CB	**8.5/10**	S					@ 56.5 feet: evidence of slight weathering, trace iron oxide stains on surfaces.			
			60							

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent.

ANCHOR QEA

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	**Plant Bowen Hydrogeological Investigation**	BORING NUMBER	**BGWA-5**
LOCATION	**Euharlee, Georgia**	PAGE	**4 of 4**
DRILLED BY	**Cascade Drilling, Inc.**	GROUND SURFACE ELEVATION	**718.53 ft. NAVD88**
DRILL METHOD	**Rotosonic - PS-150**	TOTAL DEPTH	**66.7 feet**
LOGGED BY	**Matt Wilson**	DATE COMPLETED	**11/03/15**
SAMPLING METHOD	**4-in. ID by 10-ft. core barrel (CB)**	BOREHOLE DIAMETER	**6-inches**
COORDINATES	**(NAD83 WZ) Northing: 1499434.58; Easting: 2065421.43**		

SAMPLING METHOD	RECOVERY (FEET)	10% HCL SOLUTION ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG (0 30 60 90 120 150)	LITHO-LOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
		S	65				**49.9 to 66.5 feet: DOLOMITE**, continued. @ 63.6 to 65.1 feet: light red colored banding, not laminar, but wavy and undular.	NA	NA	NA
			70				Total depth: 66.7 feet.			
			75							
			80							

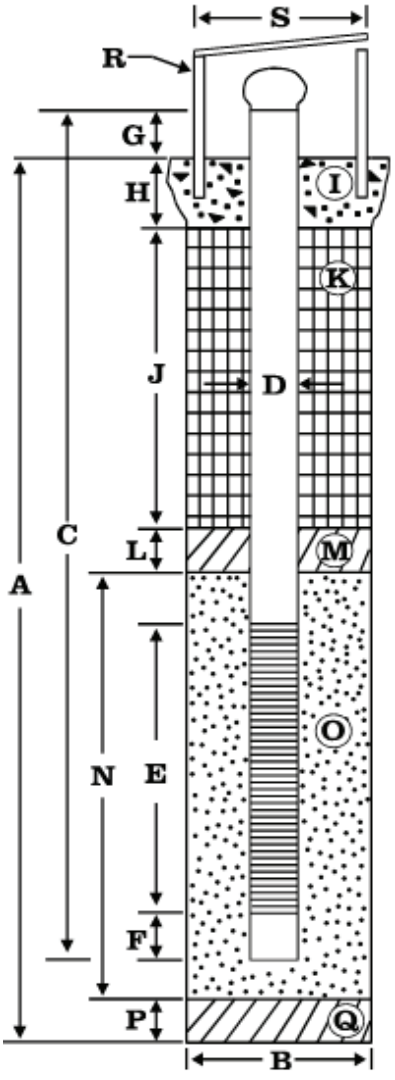
REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent.

ANCHOR QEA

Well construction Log revised with new survey data dated 6/10/2020.

WELL DETAILS

Project Number:	151114-03	Boring/Well No.:	BGWA-5
Client Name:	Southern Company	Top of Casing Elev.:	720.92 ft. NAVD88
Project Name:	Plant Bowen Hydrogeologic Investigation	Ground Surface Elev.:	718.5 ft. NAVD88
		Installation Date:	11/03/15
Location:	Euharlee, Georgia	Driller:	Cascade Drilling
			Leon Logan, Driller



	Depth (feet)	Elevation (feet, NAVD88)
S	+3.2	721.7
R	+3.0	720.92
G	0.0	717.92
H	1.0	716.92
J	39.8	678.12
C	49.3	668.62
L	54.2	663.72
A	56.4	661.52
N		
E		
F	66.4	651.52
	66.7	651.22
P	68.7	649.22
B	NA	NA

EXPLORATORY BORING

A. Total depth:	66.7 ft.
B. Diameter:	6 in.
Drilling method:	Rotosonic

WELL CONSTRUCTION

C. Well casing length:	69.7 ft.
Well casing material:	Schedule 40 PVC
D. Well casing diameter:	2 in.
E. Well screen length:	10.0 ft.
Well screen type:	3.5-inch OD U-Pak PVC
Well screen slot size:	0.010 in.
F. Well sump/end cap length	0.3 ft.
G. Well casing height (stickup):	3.0 ft.
H. Surface seal thickness:	1.0 ft.
I. Surface seal material:	Concrete
J. Annular seal thickness:	48.3 ft.
K. Annular seal material:	Cement/bentonite grout (1.0-39.8 ft.)
	Bentonite chips (39.8-49.3 ft.)
L. Filter pack seal thickness:	4.9 ft.
M. Filter pack seal material:	Bentonite pellets
N. Sand pack thickness:	12.5 ft.
O. Sand pack material:	#1 Silica sand
P. Bottom material thickness:	NA
Q. Bottom material:	NA
R. Protective casing material:	Aluminum
S. Protective casing diameter:	Square – 4 in.
Well centralizer depths:	NA

NOTES:

OD = Outside diameter. PVC = Polyvinyl chloride.
Bentonite pellets allowed to hydrate for 1 hour.
Bentonite chips allowed to hydrate for over 8 hours.
NAVD88 = North American Vertical Datum of 1988.

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BGWA-47D

CLIENT Southern Company Services
PROJECT NAME Bowen Groundwater SRV-AP1
PROJECT NUMBER GW6581C
PROJECT LOCATION Euharlee, GA
DATE STARTED 5/12/20 **COMPLETED** 5/13/20
NORTHING 1499377.79 ft **EASTING** 2068612.48 ft
DRILLER Cascade Drilling
GROUND ELEVATION 726.93 ft **BORING DIAMETER** 6 in
DRILLING METHOD Sonic
TOP OF CASING ELEVATION 729.61 ft
SAMPLING METHOD 4" core 6" override
GEOPHYSICAL CONTRACTOR ---
RIG TYPE Terra Sonic Full Size Track Mounted Rig
LOGGED BY C. Hug **CHECKED BY** J. Ivanowski

DEPTH (ft)	ELEVATION (ft)	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	CONSTRUCTION DIAGRAM
0				Hydro Excavation (0 ft to 7 ft) NO SAMPLE	
	720			719.9 CLAY, Dark red (7.5R 3/6), low to medium plasticity, firm to stiff, trace of fine sand, dry to moist.	
10				From 13 ft: Trace of fine, subrounded quartz gravel. From 15 ft: Slightly silty.	Schedule 40 PVC 2"
	710				
20				From 24 ft: Firm to stiff, less gravel, moist.	Aquaguard Sodium Bentonite Grout
	700			696.9 CLAY with GRAVEL, Dark red (7.5R, 3/6), high plasticity, firm to stiff, trace fine sand, gravel is fine to coarse, rounded to subrounded, quartz, moist.	
30				693.9 GRAVELLY CLAY, Dark red (7.5R, 3/6), high plasticity, firm to stiff, trace fine sand, gravel is fine to coarse, rounded to subrounded, quartz, moist. 691.9	
	690			CLAY, Light red (2.5YR 6/8), high plasticity, trace fine sand, moist. From 37 ft: Light red (2.5YR 7/8) and reddish yellow (5YR 7/8) mottled, with some dark red pebbles, high plasticity, trace of fine to coarse, rounded quartz gravel.	
40					
	680			47 ft: Trace fine sand.	

SCS MONITORING WELLS BGWC41 TO BGWC49_MAY2020.GPJ ACP GINT LIBRARY CH.GLB 6/5/20

(Continued Next Page)

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CLIENT Southern Company Services **PROJECT NAME** Bowen Groundwater SRV-AP1

PROJECT NUMBER GW6581C **PROJECT LOCATION** Euharlee, GA

DEPTH (ft)	ELEVATION (ft)	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	CONSTRUCTION DIAGRAM
50				CLAY, Light red (2.5YR 6/8), high plasticity, trace fine sand, moist. *(continued)*	
				From 52 ft: With occasional coarse, rounded to subrounded quartz and chert gravel, up to 4 in in length.	
	670			From 57 ft: Reddish yellow (5YR 7/8) with minor light gray (5YR 7/1) mottling, high plasticity, firm to stiff, trace fine gravel.	
				667.9	
60				CLAY with GRAVEL, Reddish yellow (5YR 7/8), some red (7.5R 5/8) mottling, minor black organic matter, high plasticity, gravel is fine to coarse grained, subrounded, quartz and angular limestone. Band of gray angular limestone gravel between 60 and 60.5 ft.	
				666.4	
				GRAVELLY CLAY, Light red (2.5YR 7/8) and reddish yellow (5YR 7/8) mottled, high plasticity, gravel is subrounded quartz and angular limestone.	
				660.9	
	660			CLAY with GRAVEL, Light red (2.5YR 7/8) and reddish yellow (5YR 7/8) mottled, high plasticity, gravel is subrounded quartz and angular limestone. Occasional larger fragments of limestone up to 6 in length.	
70					
		78.5 ft: 4 in rods falling without resistance, 6 in casing 'scraping' along the borehole sides. No returns, no recovery.			
	650				
				648.9	
				648.4	
80				LIMESTONE/DOLOMITE, Dark gray, slightly weathered, massive, very fractured, recovered with fine sand and silt.	
				VOID (78.5 ft to 110 ft)	
	640				
90					
	630				
100					

Aquaguard Sodium Bentonite Grout

Bentonite uncoated 3/8" chips

(Continued Next Page)

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BGWA-47D

CLIENT Southern Company Services **PROJECT NAME** Bowen Groundwater SRV-AP1

PROJECT NUMBER GW6581C **PROJECT LOCATION** Euharlee, GA

DEPTH (ft)	ELEVATION (ft)	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	CONSTRUCTION DIAGRAM
110		114 ft: 4 in rods and 6 in casing drop without resistance, no returns, no recovery. 117 ft: Soft but steady drilling between 118 and 127 ft, recovery of 3 ft indicates that some fines may be washed away.		VOID (78.5 ft to 110 ft) *(continued)*	
				616.9	
				LIMESTONE/DOLOMITE, Gray, slightly weathered to fresh, massive, with fine, white calcarecous veins along healed fracture planes, minor reddish yellow iron oxide staining, with calcite and aragonite crystals, some iron oxide stained.	
				612.9	
				VOID (114 ft to 115 ft)	
				611.9	
				LIMESTONE/DOLOMITE, Gray, slightly weathered to fresh, massive, with fine, white calcarecous veins along healed fracture planes, minor reddish yellow iron oxide staining, with calcite and aragonite crystals.	
	610			610.9	
				VOID (116 ft to 118 ft)	
				608.9	
120				LIMESTONE/DOLOMITE, Gray, slightly weathered to fresh, massive, with fine, white calcarecous veins along healed fracture planes, minor reddish yellow iron oxide staining, with calcite and aragonite crystals. From 122 ft: With yellow and light brown silty/clayey staining. Some calcite and aragonite crystallization along fracture planes. Minor pale green chloride mineralization in places, with abundance of pale brown iron oxide staining around 127 ft.	Bentonite uncoated 3/8" chips
	600	127.5 ft: 4 in rods and 6 in casing drop without resistance, no returns, no recovery. 131 ft: Driller reports drilling in rock, no recovery.		599.4	
				VOID (127.5 ft to 131 ft)	
130				595.9	
				LIMESTONE/DOLOMITE - No recovery, lithology based on previous core recovery.	
	590	137 ft: 4 in rods and 6 in casing drop without resistance, no returns, no recovery. 141 ft: Driller reports drilling in rock, no recovery.		589.9	Bentonite coated 3/8" pellets
				VOID (137 ft to 141 ft)	
140				585.9	
				LIMESTONE/DOLOMITE - No recovery.	20/40 Silica Sand
	580			579.9	0.010 slot size 2" Pre Pack, U-Pack Screen
				VOID (147 ft to 153 ft)	
150				573.9	

Bottom of borehole at 153.0 feet.

Easting and Northing in NAD 1983.
Elevation in NAVD 88.

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BGWA-48D

CLIENT Southern Company Services
PROJECT NAME Bowen Groundwater SRV-AP1
PROJECT NUMBER GW6581C
PROJECT LOCATION Euharlee, GA
DATE STARTED 5/14/20 **COMPLETED** 5/16/20
NORTHING 1499380.09 ft **EASTING** 2068623.31 ft
DRILLER Cascade Drilling
GROUND ELEVATION 726.63 ft **BORING DIAMETER** 6 in
DRILLING METHOD Sonic
TOP OF CASING ELEVATION 729.37 ft
SAMPLING METHOD 4" core 6" override
GEOPHYSICAL CONTRACTOR ---
RIG TYPE Terra Sonic Full Size Track Mounted Rig
LOGGED BY C. Hug **CHECKED BY** J. Ivanowski

DEPTH (ft)	ELEVATION (ft)	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	CONSTRUCTION DIAGRAM
0				Hydro Excavation (0 ft to 10 ft) NO SAMPLE	
	720				
10				716.6 CLAY, Dark red (2.5YR 3/6), low to medium plasticity, with trace fine rounded gravel, trace fine sand. Occasional fine to coarse, rounded quartz/chert gravel, moist, firm to stiff.	Schedule 40 PVC 2"
	710			17 ft: With trace of fine to coarse, subrounded to rounded quartz gravel.	
20					
	700			699.6 GRAVELLY CLAY, Reddish yellow (5YR 7/6) and yellowish red (5YR 4/6) mottled, medium to high plasticity, gravel is fine to coarse, subrounded to rounded, quartz/chert, minor black silty pebbles at 29 ft, moist.	
30				694.6 CLAY, Reddish yellow (YR 7/8), yellowish red (5YR 5/8), and pinkish white (5YR 8/2) mottled, high plasticity, trace fine sand, stiff, moist.	Aquaguard Sodium Bentonite Grout
				692.1 CLAY, Dark red (2.5YR 3/6), medium to high plasticity, trace fine sand, trace mica, moist, slightly silty.	
	690				
40				40 ft: Large, rounded sandstone fragment, with black staining, subrounded to rounded quartz and chert gravel.	
				683.6 From 42 ft: Dark red (2.5 YR 3/6) and reddish yellow (5YR 5/8) mottled.	
				GRAVELLY CLAY, Dark red (2.5 YR 3/6) and reddish yellow (5YR 5/8) mottled, medium to high plasticity, gravel is fine to coarse, rounded to subrounded, quartz and chert.	
				681.6 CLAY Dark red (2.5YR 3/6), medium to high plasticity, trace fine sand, trace fine quartz and chert gravel.	
	680				

SCS MONITORING WELLS BGWC41 TO BGWC49_MAY2020.GPJ ACP GINT LIBRARY CH.GLB 6/5/20

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CLIENT Southern Company Services **PROJECT NAME** Bowen Groundwater SRV-AP1

PROJECT NUMBER GW6581C **PROJECT LOCATION** Euharlee, GA

DEPTH (ft)	ELEVATION (ft)	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	CONSTRUCTION DIAGRAM
50				CLAY Dark red (2.5YR 3/6), medium to high plasticity, trace fine sand, trace fine quartz and chert gravel. *(continued)* At 51 ft: Some pinkish white (5YR 8/2), moist, stiff.	
	670				
60				666.6 CLAYEY GRAVEL, Dark red (2.5 YR 3/6) and reddish yellow (5YR 5/8) mottled, fine to coarse, rounded to subrounded, quartz and chert, clay is high plasticity, slightly silty. 665.6 CLAY Dark red (2.5YR 3/6), medium to high plasticity, trace fine sand, trace fine quartz gravel. 663.1 CLAYEY SAND, Brown (7.5YR 5/4), fine to medium grained, subangular, quartz, soft, wet, sharp contact with underlying rock. 661.6	Aquaguard Sodium Bentonite Grout
	660			LIMESTONE/DOLOMITE, Dark gray, massive, slightly weathered, with white, calcareous veins, with some sandy clay, recovered as pieces of rock with pale gray clayey sand and silty sand.	
70		70 ft: Driller reports very low resistance, no returns.		656.6 VOID (70 to 71 ft) Void potentially filled with soft material. 655.6	
		74 ft: Driller reports very low resistance, no returns.		LIMESTONE/DOLOMITE, Dark gray, massive, slightly weathered, with fine calcarous veins, with some yellow staining. 652.6 VOID (74 to 76 ft) Void potentially filled with soft material. 650.6	
	650			LIMESTONE/DOLOMITE, Dark gray, with fine white veins, some secondary mineralization along fracture planes, with occasional pockets up to 6 in in length of softer material between 77 ft and 87 ft.	
80					
	640			87 ft: Vertical and horizontal fracture planes, fresh rock with pieces of rock up to 7 in long.	
90					Bentonite uncoated 3/8" chips
	630	99 ft: 4 in rods falling without resistance, 6 in casing 'scraping' along the borehole sides. No returns, no recovery.		96 ft to 97 ft: Some yellow staining, with secondary calcite and aragonite crystallization along fracture planes, with some brown iron oxide staining, slightly silty. 627.6 VOID (99 ft to 105 ft)	
100				621.6	
	620				

SCS MONITORING WELLS BGWC41 TO BGWC49_MAY2020.GPJ ACP GINT LIBRARY CH.GLB 6/5/20

(Continued Next Page)

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CLIENT Southern Company Services **PROJECT NAME** Bowen Groundwater SRV-AP1

PROJECT NUMBER GW6581C **PROJECT LOCATION** Euharlee, GA

DEPTH (ft)	ELEVATION (ft)	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	CONSTRUCTION DIAGRAM
110				LIMESTONE/DOLOMITE, Dark gray with white, fine calcareous veins throughout, massive, with secondary calcite and aragonite crystallization along fracture planes, with some brown iron oxide staining, with horizontal and vertical fracture planes, slightly silty. *(continued)*	
	610			117 ft: Very broken core, vertical and horizontal fractures with calcite mineralization, silty.	
120		122 ft: 4 in rods falling without resistance, 6 in casing 'scraping' along the borehole sides. No returns, no recovery.		604.6 VOID (122 ft to 139 ft)	
	600				
130					
	590			587.6	
140				LIMESTONE/DOLOMITE, Dark gray with white, fine calcareous veins throughout, massive, with secondary calcite and aragonite crystallization along fracture planes, with some brown and yellow iron oxide staining, with horizontal and vertical fracture planes, slightly silty. From 141 ft: Larger fragments of intact core up to 7 in length, crystalline, hard, more fractured between 142 and 147 ft.	
	580			147 ft: Brown staining, with calcite and aragonte crystallization, very broken and fractured between 147 ft and 157 ft.	
150					Bentonite uncoated 3/8" chips
	570			157 ft: Minor pale brown staining, very broken and fractures, slightly silty.	
160					

(Continued Next Page)

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CLIENT Southern Company Services **PROJECT NAME** Bowen Groundwater SRV-AP1

PROJECT NUMBER GW6581C **PROJECT LOCATION** Euharlee, GA

DEPTH (ft)	ELEVATION (ft)	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	CONSTRUCTION DIAGRAM
170	560			LIMESTONE/DOLOMITE, Dark gray with white, fine calcareous veins throughout, massive, with secondary calcite and aragonite crystallization along fracture planes, with some brown and yellow iron oxide staining, with horizontal and vertical fracture planes, slightly silty. From 141 ft: Larger fragments of intact core up to 7 in length, crystalline, hard, more fractured between 142 and 147 ft. *(continued)*	Bentonite uncoated 3/8" chips
180	550			177 ft: Very broken, with vertical and horizontal fracture planes, secondary mineralization, some pale green (chloride) mineralization and calcite/aragonite crystals along undulating fracture planes.	Bentonite coated 3/8" pellets
190	540				20/40 Silica Sand 0.010 slot size 2" Pre Pack, U-Pack Screen 534.6

Bottom of borehole at 192.0 feet.

Easting and Northing in NAD 1983.
Elevation in NAVD 88.

SCS MONITORING WELLS BGWC41 TO BGWC49_MAY2020.GPJ ACP GINT LIBRARY CH.GLB 6/5/20

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	**Plant Bowen Hydrogeological Investigation**	BORING NUMBER	**BGWC-21**
LOCATION	**Euharlee, Georgia**	PAGE	**1 of 3**
DRILLED BY	**Cascade Drilling, Inc.**	GROUND SURFACE ELEVATION	**688.53 ft. NAVD88**
DRILL METHOD	**Rotosonic - PS-150**	TOTAL DEPTH	**57 feet**
LOGGED BY	**Jim Redwine**	DATE COMPLETED	**03/02/16**
SAMPLING METHOD	**4-in. ID by 10-ft. core barrel (CB)**	BOREHOLE DIAMETER	**6-inches**
COORDINATES	**(NAD83 WZ) Northing: 1501627.51; Easting: 2064348.09**		

SAMPLING METHOD	RECOVERY (FEET)	10% HCL SOLUTION ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG	LITHO-LOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
CB	7/7	N			0 30 60 90 120 150		**0 to 0.3 foot: TOPSOIL**	NA	NA	NA
		E					**0.3 to 1.0 foot: LIMESTONE GRAVEL**, gray, fine limestone, part of road base.	NA	NA	NA
		N					**1.0 to 4.6 feet: CLAY (CL)**, red to gray mottled. (RESIDUAL)	NA	NA	NA
							Acid test performed every 1.0 feet throughout boring.			
			5				**4.6 to 27.0 feet: CLAY (CL)**, reddish to yellowish, slightly mottled, stiff. (RESIDUAL)	NA	NA	NA
CB	10/10	N								
			10							
			15							
CB	10/10	N						1	4	95
			20							

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent. NAVD88 = North American Vertical Datum of 1988. NAD83 WZ = North American Datum of 1983, West Zone.

ANCHOR QEA

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	**Plant Bowen Hydrogeological Investigation**	BORING NUMBER	**BGWC-21**
LOCATION	**Euharlee, Georgia**	PAGE	**2 of 3**
DRILLED BY	**Cascade Drilling, Inc.**	GROUND SURFACE ELEVATION	**688.53 ft. NAVD88**
DRILL METHOD	**Rotosonic - PS-150**	TOTAL DEPTH	**57 feet**
LOGGED BY	**Jim Redwine**	DATE COMPLETED	**03/02/16**
SAMPLING METHOD	**4-in. ID by 10-ft. core barrel (CB)**	BOREHOLE DIAMETER	**6-inches**
COORDINATES	**(NAD83 WZ) Northing: 1501627.51; Easting: 2064348.09**		

SAMPLING METHOD	RECOVERY (FEET)	10% HCL SOLUTION ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG	LITHO-LOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
CB	**10/10**	N			0 30 60 90 120 150		**4.6 to 25.3 feet: CLAY (CL)**, continued.	1	4	95
		N	25				@ 25.3 to 25.5 feet: gray to red silt zone, possibly weathered dolomite, no reaction to hydrochloric acid.			
CB	**10/10**	N					**27.0 to 32.0 feet: CLAY (CH)**, brown, very soft, soupy mud (toothpaste consistency) in sleeve. Rods dropped from 27.0 to 32.0 feet. (VOID INFILL)	2	2	96
		S E S	30				**32.0 to 41.0 feet: DOLOMITE**, light to dark gray, medium-grained, no effervescence without scratching. (BEDROCK)	NA	NA	NA
		S	35				@ 32.8 to 33.0 feet: light gray grout, reacts with hydrochloric acid.			
CB	**6/10**	S								
			40							

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent. NAVD88 = North American Vertical Datum of 1988. NAD83 WZ = North American Datum of 1983, West Zone.

ANCHOR QEA

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	**Plant Bowen Hydrogeological Investigation**	BORING NUMBER	**BGWC-21**
LOCATION	**Euharlee, Georgia**	PAGE	**3 of 3**
DRILLED BY	**Cascade Drilling, Inc.**	GROUND SURFACE ELEVATION	**688.53 ft. NAVD88**
DRILL METHOD	**Rotosonic - PS-150**	TOTAL DEPTH	**57 feet**
LOGGED BY	**Jim Redwine**	DATE COMPLETED	**03/02/16**
SAMPLING METHOD	**4-in. ID by 10-ft. core barrel (CB)**	BOREHOLE DIAMETER	**6-inches**
COORDINATES	**(NAD83 WZ) Northing: 1501627.51; Easting: 2064348.09**		

SAMPLING METHOD	RECOVERY (FEET)	10% HCL SOLUTION ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG	LITHO-LOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
CB	**6/10**						**32.0 to 41.0 feet: DOLOMITE**, continued.	NA	NA	NA
							41.0 to 45.5 feet: DOLOMITE, weathered zone, tan mud on top, tripoli (silt-sized weathered dolomite residuum) on bottom. (WEATHERED BEDROCK)	NA	NA	NA
			45				@ Approximately 44.0 feet: trace mottled dolomite.			
							45.5 to 57.0 feet: DOLOMITE, light to dark gray, medium-grained with occasional horizontal lighter-colored coarse-grained dolomite beds and occasional near vertical healed fractures. Fracture filling has a slight reaction to hydrochloric acid.	NA	NA	NA
CB	**10/10**	S								
		S	50							
		S	55							
							Total depth: 57.0 feet.			
			60							

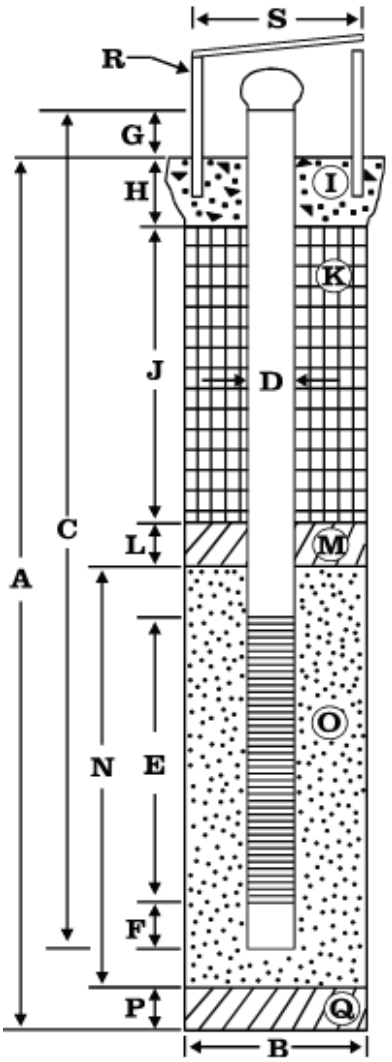
REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent. NAVD88 = North American Vertical Datum of 1988. NAD83 WZ = North American Datum of 1983, West Zone.

ANCHOR QEA

Well construction Log revised with new survey data dated 6/10/2020.

WELL DETAILS

Project Number:	151114-03	Boring/Well No.:	BGWC-21
Client Name:	Southern Company	Top of Casing Elev.:	691.33 ft. NAVD88
Project Name:	Plant Bowen Hydrogeologic Investigation	Ground Surface Elev.:	688.6 ft. NAVD88
		Installation Date:	03/02/2016
Location:	Euharlee, Georgia	Driller:	Cascade Drilling
			Thomas Ardito, Driller



	Depth (feet)	Elevation (feet, NAVD88)
S	NA	NA
R	+2.8	691.33
G	0.0	688.53
H	1.0	687.53
J	23.0	665.53
C	33.5	655.03
L	37.0	651.53
M	39.7	648.83
A		
N		
E		
O		
F	49.9	638.63
	50.3	638.23
P	51.0	637.53
Q	57.0	631.53
B		

EXPLORATORY BORING

A. Total depth:	57.0 ft.
B. Diameter:	6 in.
Drilling method:	Rotosonic

WELL CONSTRUCTION

C. Well casing length:	53.4 ft.
Well casing material:	Schedule 40 PVC
D. Well casing diameter:	2 in.
E. Well screen length:	10 ft.
Well screen type:	3.5-inch OD U-Pak PVC
Well screen slot size:	0.010 in.
F. Well sump/end cap length	0.3 ft.
G. Well casing height (stickup):	2.8 ft.
H. Surface seal thickness:	1.0 ft.
I. Surface seal material:	Concrete
J. Annular seal thickness:	32.5 ft.
K. Annular seal material:	Cement/bentonite grout (1.0-23.0 ft.)
	Bentonite chips (23.0-33.5 ft.)
L. Filter pack seal thickness:	3.5 ft.
M. Filter pack seal material:	Bentonite pellets
N. Sand pack thickness:	14.0 ft.
O. Sand pack material:	#1 Silica sand
P. Bottom material thickness:	6.0 ft.
Q. Bottom material:	Bentonite chips
R. Protective casing material:	Aluminum
S. Protective casing diameter:	Square – 4 in.
Well centralizer depths:	NA

NOTES:

SS = silica sand.
OD = Outside diameter. PVC = Polyvinyl chloride.
Bentonite pellets allowed to hydrate for 1 hour.
Bentonite chips allowed to hydrate for over 8 hours.
Bottom material bentonite chips allowed to hydrate for 1 hour.
NAVD88 = North American Vertical Datum of 1988.

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	**Plant Bowen Hydrogeological Investigation**	BORING NUMBER	**BGWC-22**
LOCATION	**Euharlee, Georgia**	PAGE	**1 of 3**
DRILLED BY	**Cascade Drilling, Inc.**	GROUND SURFACE ELEVATION	**692.64 ft. NAVD88**
DRILL METHOD	**Rotosonic - PS-150**	TOTAL DEPTH	**46.5 feet**
LOGGED BY	**Matt Wilson**	DATE COMPLETED	**10/08/15**
SAMPLING METHOD	**4-in. ID by 10-ft. core barrel (CB)**	BOREHOLE DIAMETER	**6-inches**
COORDINATES	**(NAD83 WZ) Northing: 1501323.76; Easting: 2064358.05**		

SAMPLING METHOD	RECOVERY (FEET)	10% HCL SOLUTION ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG (0 30 60 90 120 150)	LITHO-LOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
								NA	NA	NA
CB	5.1/6.5	NA					**0 to 0.3 foot: TOPSOIL**, abundant plant debris.			
		N					**0.3 to 2.9 feet: CLAYEY SILT (ML)**, reddish brown, dry, no plasticity, stiff. (FILL)	0	0	100
		N					**2.9 to 26.5 feet: CLAY (CH)**, red with yellow and tan mottling, dry, hard, moderate plasticity. (RESIDUAL)	0	0	100
			5							
CB	12.1/10	N					@ 8.2 feet: color change to light red with red, yellow and tan mottling.			
			10				@ 10.6 feet: color change to light brown with red, yellow and tan mottling.			
			15							
CB	12.0/10	N					@ 18.6 feet: moist, consistency change to stiff.			
			20							

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent. NAVD88 = North American Vertical Datum of 1988. NAD83 WZ = North American Datum of 1983, West Zone.

ANCHOR QEA

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	**Plant Bowen Hydrogeological Investigation**	BORING NUMBER	**BGWC-22**
LOCATION	**Euharlee, Georgia**	PAGE	**2 of 3**
DRILLED BY	**Cascade Drilling, Inc.**	GROUND SURFACE ELEVATION	**692.64 ft. NAVD88**
DRILL METHOD	**Rotosonic - PS-150**	TOTAL DEPTH	**46.5 feet**
LOGGED BY	**Matt Wilson**	DATE COMPLETED	**10/08/15**
SAMPLING METHOD	**4-in. ID by 10-ft. core barrel (CB)**	BOREHOLE DIAMETER	**6-inches**
COORDINATES	**(NAD83 WZ) Northing: 1501323.76; Easting: 2064358.05**		

SAMPLING METHOD	RECOVERY (FEET)	10% HCL SOLUTION ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG (0 30 60 90 120 150)	LITHO-LOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
		N	25				**2.9 to 26.5 feet: CLAY (CH)**, continued. @ 20.6 feet: consistency change to soft. @ 22.3 feet: consistency change to stiff, occasional chert nodules, highly plastic.	0	0	100
CB	1.9/2.5	N					**26.5 to 27.6 feet: GRAVELLY SILT (ML)**, light reddish brown, soft, wet, angular coarse gravel, slightly plastic. (WEATHERED BEDROCK)	40	0	60
		S					**27.6 to 46.5 feet: DOLOMITE**, dark gray, hard, dense, very fine crystals, ribboned with horizontal calcite veins, some vertical calcite veins, sample is broken along bedding planes, beds range from 0.5- to 5-inches thick. (BEDROCK) @ 27.6 to 29.6 feet: slightly weathered, rust colored deposits on bedding surfaces. @ 29.6 to 46.5 feet: unweathered	NA	NA	NA
CB	6.7/7.5	S	30							
		S								
		S								
		S								
		S					@ 32.0 feet: 2- to 3-inch void. @ 32.3 to 43.3 feet: no calcite veins.			
		S	35							
		S								
CB	9.3/10	S								
		S								
		S								
		S	40							

VOID

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent. NAVD88 = North American Vertical Datum of 1988. NAD83 WZ = North American Datum of 1983, West Zone.

ANCHOR QEA

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	**Plant Bowen Hydrogeological Investigation**	BORING NUMBER	**BGWC-22**
LOCATION	**Euharlee, Georgia**	PAGE	**3 of 3**
DRILLED BY	**Cascade Drilling, Inc.**	GROUND SURFACE ELEVATION	**692.64 ft. NAVD88**
DRILL METHOD	**Rotosonic - PS-150**	TOTAL DEPTH	**46.5 feet**
LOGGED BY	**Matt Wilson**	DATE COMPLETED	**10/08/15**
SAMPLING METHOD	**4-in. ID by 10-ft. core barrel (CB)**	BOREHOLE DIAMETER	**6-inches**
COORDINATES	**(NAD83 WZ) Northing: 1501323.76; Easting: 2064358.05**		

SAMPLING METHOD	RECOVERY (FEET)	10% HCL SOLUTION ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG	LITHO-LOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
		S			0 30 60 90 120 150		**27.6 to 46.5 feet: DOLOMITE**, continued.	NA	NA	NA
		S								
		S								
		S					@ 43.3 to 46.5 feet: some vertical calcite veins.			
		S								
		S	45							
		S								
							Total depth: 46.5 feet.			
			50							
			55							
			60							

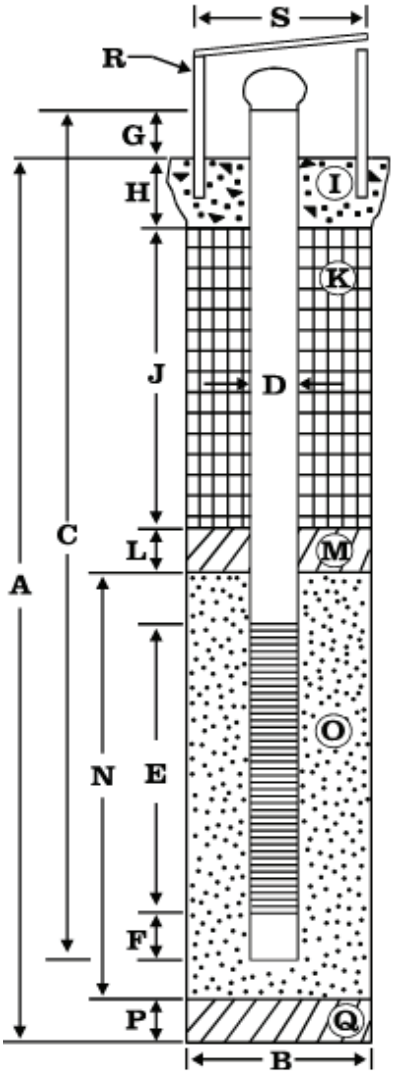
REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent. NAVD88 = North American Vertical Datum of 1988. NAD83 WZ = North American Datum of 1983, West Zone.

ANCHOR QEA

Well construction Log revised with new survey data dated 6/10/2020.

WELL DETAILS

Project Number:	151114-03	Boring/Well No.:	BGWC-22
Client Name:	Southern Company	Top of Casing Elev.:	695.50 ft. NAVD88
Project Name:	Plant Bowen Hydrogeologic Investigation	Ground Surface Elev.:	692.6 ft. NAVD88
		Installation Date:	10/08/15
Location:	Euharlee, Georgia	Driller:	Cascade Drilling
			Leon Logan, Driller



	Depth (feet)	Elevation (feet, NAVD88)
S	+3.2	695.8
R	+3.0	695.6
G	0.0	692.6
H	1.0	691.6
J	20.5	672.1
C	24.8	667.8
L	28.5	664.1
A	29.9	662.7
N	39.9	652.7
E	40.2	652.4
F	40.5	652.1
P	46.5	646.1
B		

EXPLORATORY BORING

A. Total depth:	46.5 ft.
B. Diameter:	6 in.
Drilling method:	Rotosonic

WELL CONSTRUCTION

C. Well casing length:	43.3 ft.
Well casing material:	Schedule 40 PVC
D. Well casing diameter:	2 in.
E. Well screen length:	10.0 ft.
Well screen type:	3.5-inch OD U-Pak PVC
Well screen slot size:	0.010 in.
F. Well sump/end cap length	0.3 ft.
G. Well casing height (stickup):	3.0 ft.
H. Surface seal thickness:	1.0 ft.
I. Surface seal material:	Concrete
J. Annular seal thickness:	23.8 ft.
K. Annular seal material:	Cement/bentonite grout (1.0-20.5 ft.)
	Bentonite chips (20.5-24.8 ft.)
L. Filter pack seal thickness:	3.7 ft.
M. Filter pack seal material:	Bentonite pellets
N. Sand pack thickness:	12.0 ft.
O. Sand pack material:	#1 Silica sand
P. Bottom material thickness:	6.0 ft.
Q. Bottom material:	Bentonite chips
R. Protective casing material:	Aluminum
S. Protective casing diameter:	Square – 4 in.
Well centralizer depths:	NA

NOTES:

OD = Outside diameter. PVC = Polyvinyl chloride.
Bentonite pellets allowed to hydrate for 1 hour.
Bentonite chips allowed to hydrate for over 8 hours.
NAVD88 = North American Vertical Datum of 1988.

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	**Plant Bowen Hydrogeological Investigation**	BORING NUMBER	**BGWC-24**
LOCATION	**Euharlee, Georgia**	PAGE	**1 of 4**
DRILLED BY	**Cascade Drilling, Inc.**	GROUND SURFACE ELEVATION	**699.46 ft. NAVD88**
DRILL METHOD	**Rotosonic - PS-150**	TOTAL DEPTH	**66.5 feet**
LOGGED BY	**Matt Wilson**	DATE COMPLETED	**10/27/15**
SAMPLING METHOD	**4-in. ID by 10-ft. core barrel (CB)**	BOREHOLE DIAMETER	**6-inches**
COORDINATES	**(NAD83 WZ) Northing: 1500621.22; Easting: 2065032.84**		

SAMPLING METHOD	RECOVERY (FEET)	10% HCL SOLUTION ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG	LITHO-LOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
CB	6.5/6.5	N			0 30 60 90 120 150		**0 to 3.0 feet: MIX OF CLAY, SILT, SAND AND FINE GRAVEL**, dark gray and reddish brown, moist. (FILL)	10	20	70
		N					**3.0 to 37.7 feet: CLAY (CH)**, light grayish brown with red and light gray mottling, dry, high plasticity, stiff. (RESIDUAL)	0	0	100
			5							
CB	10.8/10	N					@ 6.5 feet: color change to light reddish brown with light gray mottling.			
			10							
							@ 12.5 feet: consistency change to very stiff.			
			15							
CB	10.9/10	N								
			20							

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent. NAVD88 = North American Vertical Datum of 1988. NAD83 WZ = North American Datum of 1983, West Zone.

ANCHOR QEA

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	**Plant Bowen Hydrogeological Investigation**	BORING NUMBER	**BGWC-24**
LOCATION	**Euharlee, Georgia**	PAGE	**2 of 4**
DRILLED BY	**Cascade Drilling, Inc.**	GROUND SURFACE ELEVATION	**699.46 ft. NAVD88**
DRILL METHOD	**Rotosonic - PS-150**	TOTAL DEPTH	**66.5 feet**
LOGGED BY	**Matt Wilson**	DATE COMPLETED	**10/27/15**
SAMPLING METHOD	**4-in. ID by 10-ft. core barrel (CB)**	BOREHOLE DIAMETER	**6-inches**
COORDINATES	**(NAD83 WZ) Northing: 1500621.22; Easting: 2065032.84**		

SAMPLING METHOD	RECOVERY (FEET)	10% HCL SOLUTION ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG (0 30 60 90 120 150)	LITHO-LOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
		N	25				**3.0 to 37.7 feet: CLAY (CH)**, continued.	0	0	100
CB	**10/10**	N					@ 26.0 to 26.1 feet: black chert nodules. @ 26.0 to 29.2 feet: abundant chert nodules. @ 26.5 feet: moist to wet.			
			30				@ 29.2 to 37.7 feet: occasional chert nodules.			
CB	**8.2/10**	N S	35				**37.7 to 41.6 feet: DOLOMITE**, gray, moderately weathered, wet, few beds can be discerned approximately 0.5- to 3-inches thick, moderately competent, drilling broke sample up into angular gravel sized pieces. (BEDROCK)	NA	NA	NA
			40							

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent. NAVD88 = North American Vertical Datum of 1988. NAD83 WZ = North American Datum of 1983, West Zone.

ANCHOR QEA

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	**Plant Bowen Hydrogeological Investigation**	BORING NUMBER	**BGWC-24**
LOCATION	**Euharlee, Georgia**	PAGE	**3 of 4**
DRILLED BY	**Cascade Drilling, Inc.**	GROUND SURFACE ELEVATION	**699.46 ft. NAVD88**
DRILL METHOD	**Rotosonic - PS-150**	TOTAL DEPTH	**66.5 feet**
LOGGED BY	**Matt Wilson**	DATE COMPLETED	**10/27/15**
SAMPLING METHOD	**4-in. ID by 10-ft. core barrel (CB)**	BOREHOLE DIAMETER	**6-inches**
COORDINATES	**(NAD83 WZ) Northing: 1500621.22; Easting: 2065032.84**		

SAMPLING METHOD	RECOVERY (FEET)	10% HCL SOLUTION ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG (0 30 60 90 120 150)	LITHO-LOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
		S					**37.7 to 41.6 feet: (top of rock) DOLOMITE**, continued.	NA	NA	NA
		N					**41.6 to 46.5 feet: GRAVELLY CLAY (CH)**, light reddish brown, wet, soft, moderate plasticity, sticky, gravel is angular, heavily weathered dolomite. (VOID INFILL) @ 41.6 to 41.8 feet: extremely weathered dolomite zone, can break apart with hands.	40	0	60
			45							
CB	**7.4/10**	E					**46.5 to 66.5 feet: LIMESTONE**, dark gray, microcrystalline, thinly bedded, beds approximately 0.5- to 3-inches thick, breakage along bedding planes, surface of beds has powdery appearance. (BEDROCK)	NA	NA	NA
			50							
							@ 52.5 to 52.7 feet: very thin black and white laminations, algal structures? @ 53.8 to 63.0 feet: abundant light red vein and fracture infillings. Slightly weathered surfaces.			
			55							
CB	**8.6/10**	E								
			60							

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent. NAVD88 = North American Vertical Datum of 1988. NAD83 WZ = North American Datum of 1983, West Zone.

ANCHOR QEA

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	**Plant Bowen Hydrogeological Investigation**	BORING NUMBER	**BGWC-24**
LOCATION	**Euharlee, Georgia**	PAGE	**4 of 4**
DRILLED BY	**Cascade Drilling, Inc.**	GROUND SURFACE ELEVATION	**699.46 ft. NAVD88**
DRILL METHOD	**Rotosonic - PS-150**	TOTAL DEPTH	**66.5 feet**
LOGGED BY	**Matt Wilson**	DATE COMPLETED	**10/27/15**
SAMPLING METHOD	**4-in. ID by 10-ft. core barrel (CB)**	BOREHOLE DIAMETER	**6-inches**
COORDINATES	**(NAD83 WZ) Northing: 1500621.22; Easting: 2065032.84**		

SAMPLING METHOD	RECOVERY (FEET)	10% HCL SOLUTION ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG	LITHO-LOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
		E	65		0 30 60 90 120 150		**46.5 to 66.5 feet: LIMESTONE**, continued. @ 63.0 to 63.6 feet: 0.6-foot thick bed.	NA	NA	NA
			70				Total depth: 66.5 feet.			
			75							
			80							

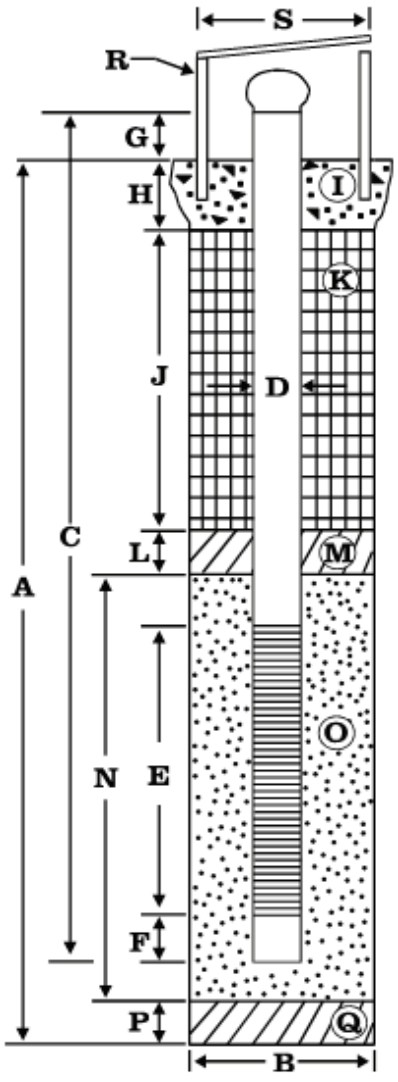
REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent. NAVD88 = North American Vertical Datum of 1988. NAD83 WZ = North American Datum of 1983, West Zone.

ANCHOR QEA

Well construction Log revised with new survey data dated 6/10/2020.

WELL DETAILS

Project Number:	151114-03	Boring/Well No.:	BGWC-24
Client Name:	Southern Company	Top of Casing Elev.:	702.27 ft. NAVD88
Project Name:	Plant Bowen Hydrogeologic Investigation	Ground Surface Elev.:	699.5 ft. NAVD88
		Installation Date:	10/27/15
Location:	Euharlee, Georgia	Driller:	Cascade Drilling
			David Wilcox, Driller



	Depth (feet)	Elevation (feet, NAVD88)
S	+3.2	702.7
R	+3.0	702.27
G	0.0	699.27
H	1.0	698.27
J	20.2	679.07
C	47.5	651.77
L	50.5	648.77
A	53.0	646.27
N	63.0	636.27
E	63.3	635.97
F	64.0	635.27
P	66.5	632.77
B		

EXPLORATORY BORING

A. Total depth:	66.5 ft.
B. Diameter:	6 in.
Drilling method:	Rotosonic

WELL CONSTRUCTION

C. Well casing length:	66.4 ft.
Well casing material:	Schedule 40 PVC
D. Well casing diameter:	2 in.
E. Well screen length:	10.0 ft.
Well screen type:	3.5-inch OD U-Pak PVC
Well screen slot size:	0.010 in.
F. Well sump/end cap length	0.3 ft.
G. Well casing height (stickup):	3.0 ft.
H. Surface seal thickness:	1.1 ft.
I. Surface seal material:	Concrete
J. Annular seal thickness:	46.5 ft.
K. Annular seal material:	Cement/bentonite grout (1.0-20.2 ft.)
	Bentonite chips (20.2-47.5 ft.)
L. Filter pack seal thickness:	3.0 ft.
M. Filter pack seal material:	Bentonite pellets
N. Sand pack thickness:	13.5 ft.
O. Sand pack material:	#1 Silica sand
P. Bottom material thickness:	2.5 ft.
Q. Bottom material:	Bentonite chips
R. Protective casing material:	Aluminum
S. Protective casing diameter:	Square – 4 in.
Well centralizer depths:	NA

NOTES:

OD = Outside diameter. PVC = Polyvinyl chloride.
Bentonite pellets allowed to hydrate for 1 hour.
Bentonite chips allowed to hydrate for over 8 hours.
NAVD88 = North American Vertical Datum of 1988.

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	**Plant Bowen Hydrogeological Investigation**	BORING NUMBER	**BGWC-30**
LOCATION	**Euharlee, Georgia**	PAGE	**1 of 3**
DRILLED BY	**Cascade Drilling, Inc.**	GROUND SURFACE ELEVATION	**698.39 ft NAVD88**
DRILL METHOD	**Rotosonic - PS-150**	TOTAL DEPTH	**58 feet**
LOGGED BY	**Jim Redwine**	DATE COMPLETED	**1/4/17**
SAMPLING METHOD	**4-in. ID by 10-ft. core barrel**	BOREHOLE DIAMETER	**6-inches**
COORDINATES	**(NAD83) WZ Northing: 1499815.93; Easting: 2066395.86**		

SAMPLING METHOD	RECOVERY (FEET)	ACID TEST RESULT	DEPTH (FEET)	WELL DETAILS	LITHO-LOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
CB	9.25/7	N	5			0 to 10.0 feet: CLAY (CH), overburden, stiff plastic, orange to red to yellow (minor) Acid tested with 10% hydrochloric acid at least every foot	0	5	95
CB	11.0/10	N	10			@ 10.0 feet: Contact gradational 10.0 to 34.0 feet: CLAY (CH), yellow stiff silty to plastic with rare gravel	5	25	70
CB	12.0/10	N	15						
			20						

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent.

ANCHOR QEA

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	**Plant Bowen Hydrogeological Investigation**	BORING NUMBER	**BGWC-30**
LOCATION	**Euharlee, Georgia**	PAGE	**2 of 3**
DRILLED BY	**Cascade Drilling, Inc.**	GROUND SURFACE ELEVATION	**698.39 ft NAVD88**
DRILL METHOD	**Rotosonic - PS-150**	TOTAL DEPTH	**58 feet**
LOGGED BY	**Jim Redwine**	DATE COMPLETED	**1/4/17**
SAMPLING METHOD	**4-in. ID by 10-ft. core barrel (CB)**	BOREHOLE DIAMETER	**6-inches**
COORDINATES	**(NAD83) WZ Northing: 1499815.93; Easting: 2066395.86**		

SAMPLING METHOD	RECOVERY (FEET)	ACID TEST RESULT	DEPTH (FEET)	WELL DETAILS	LITHO-LOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
CB		N	25			10.0 to 34.0 feet: CLAY (CH), yellow stiff silty to plastic with rare gravel Acid tested with 10% hydrochloric acid at least every foot			
CB	9.0/7	N E	30			33.0 to 33.5 feet: DOLOMITE, weathered, pebbles @ 33.0 to 34.0 feet: ground rock due to drilling @ approximately 34.0 feet: top of rock	1	4	95
CB	2.0/3	W	35			34.0 to 38.0 feet: DOLOMITE, fine to medium grained, gray, occasional thin (1") black chert layers @ 34.5 and 36.4 feet, approximate: CHERT, black			
CB	0.0/10		40			@ 38.0 to 44.0 feet: VOID, no recovery			

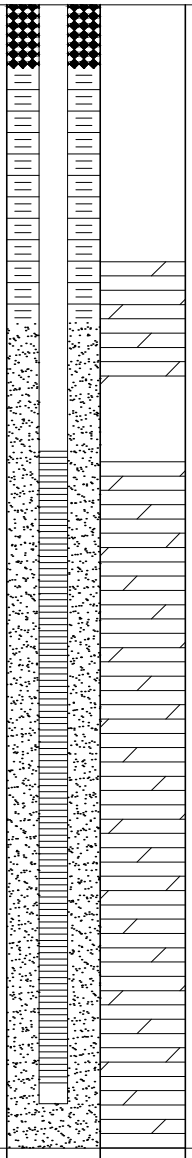
REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent.

ANCHOR QEA

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	**Plant Bowen Hydrogeological Investigation**	BORING NUMBER	**BGWC-30**
LOCATION	**Euharlee, Georgia**	PAGE	**3 of 3**
DRILLED BY	**Cascade Drilling, Inc.**	GROUND SURFACE ELEVATION	**698.39 ft NAVD88**
DRILL METHOD	**Rotosonic - PS-150**	TOTAL DEPTH	**58 feet**
LOGGED BY	**Jim Redwine**	DATE COMPLETED	**1/4/17**
SAMPLING METHOD	**4-in. ID by 10-ft. core barrel (CB)**	BOREHOLE DIAMETER	**6-inches**
COORDINATES	**(NAD83) WZ Northing: 1499815.93; Easting: 2066395.86**		

SAMPLING METHOD	RECOVERY (FEET)	ACID TEST RESULT	DEPTH (FEET)	WELL DETAILS	LITHO-LOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
CB			45			@ 38.0 to 44.0 feet: VOID, no recovery 44.0 to 58.0 feet: DOLOMITE, fine to medium grained, gray @ 46.0 to 47.0 feet: VOID, no recovery @ 47.0 to 58.0 feet: some voids likely, but not easily noticeable by driller; partial recovery			
CB	4.0/11	W/E	50			Acid tested with 10% hydrochloric acid at least every foot			
			55						
			60			Total depth: 58.0 feet			

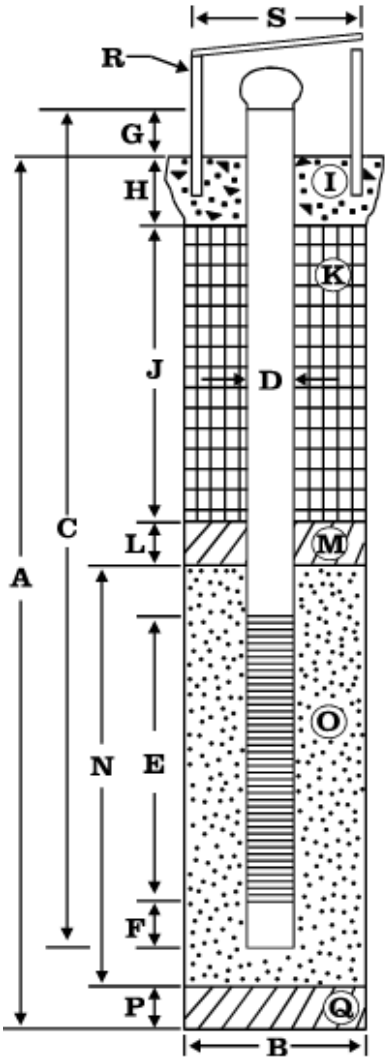
REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent.

ANCHOR QEA

Well construction Log revised with new survey data dated 6/10/2020.

WELL DETAILS

Project Number:	151114-03	Boring/Well No.:	BGWC-30
Client Name:	Southern Company	Top of Casing Elev.:	701.06 ft
Project Name:	Plant Bowen Hydrogeologic Investigation	Ground Surface Elev.:	698.50 ft. NAVD88
		Installation Date:	01/04/17 - 01/09/17
Location:	Cartersville, Georgia	Driller:	Cascade Drilling



	Depth (feet)	Elevation (feet, NAVD88)
S	+2.68	701.18
R	+2.48	701.06
G	0.0	698.58
H	2.0	696.58
J	29.0	669.58
C	41.0	657.58
L	45.0	653.58
A	47.0	651.58
N	57.0	641.58
E	57.3	641.28
F	58.0	640.58
P	58.0	640.58
B		

EXPLORATORY BORING

A. Total depth:	58.0 ft.
B. Diameter:	6 in.
Drilling method:	Rotosonic PS-150

WELL CONSTRUCTION

C. Well casing length:	59.8 ft.
Well casing material:	Schedule 40 PVC
D. Well casing diameter:	2 in.
E. Well screen length:	10 ft.
Well screen type:	Pre-pack
Well screen slot size:	0.010 in.
F. Well sump/end cap length	0.3 ft.
G. Well casing height (stickup):	2.5 ft.
H. Surface seal thickness:	2.0 ft.
I. Surface seal material:	Concrete
J. Annular seal thickness:	39.0 ft.
K. Annular seal material:	Bentonite grout (2.0-29.0 ft.)
	3/8" Bentonite chips (29.0-41.0 ft.)
L. Filter pack seal thickness:	4.0 ft.
M. Filter pack seal material:	Bentonite pellets
N. Sand pack thickness:	13.0 ft.
O. Sand pack material:	#1 SS
P. Bottom material thickness:	N/A
Q. Bottom material:	N/A
R. Protective casing material:	Aluminum
S. Protective casing diameter:	Square – 4 in.
Well centralizer depths:	N/A

NOTES:

SS = Silica Sand.
OD = Outside diameter. PVC = Polyvinyl chloride.
Bentonite pellets allowed to hydrate at least 1 hour.
Bentonite chips allowed to hydrate at least 4 hours.
NAVD88 = North American Vertical Datum of 1988.

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BGWC-35D

CLIENT Southern Company
PROJECT NAME Plant Bowen
Services **PROJECT NUMBER**
PROJECT LOCATION Euharlee Georgia
GW6581C **DATE STARTED** **COMPLETED** 7/12/18
NORTHING 1501312.20 ft **EASTING** 2064358.63 ft
7/12/18
DRILLER Cascade Drilling
GROUND ELEVATION 693.13 ft **BORING DIAMETER** 6 in
DRILLING METHOD Sonic
TOP OF CASING ELEVATION 695.73 ft
SAMPLING METHOD 4" core 6" overide
GEOPHYSICAL CONTRACTOR ---
RIG TYPE Terrasonic 10S1181
LOGGED BY C. Hug **CHECKED BY** J. Ivanowski

DEPTH (ft)	ELEVATION (ft msl)	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	CONSTRUCTION DIAGRAM
0				Air vacuum to clear utilities. No Recovery.	
5	690				Bentonite grout
10	685			CLAY, Orange brown, some gray mottling, medium to high plasticity, with trace fine angular sand.	Schedule 40 PVC 2"
15	680			From 16.5' : With some pale brown, some black fine lamination, silty patches, trace fine angular gravel and some red mottling.	
20	675			From 21': Red.	
25	670			LIMESTONE, Dark gray, massive, some orange (iron oxide) staining and some mineralization of calcite. recovered as fine to coarse gravel, angular and disc shaped pieces of core up to 1" length.	
30	665			29': Slightly more pale gray.	
	660				

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CLIENT Southern Company Services
PROJECT NAME Plant Bowen
PROJECT NUMBER GW6581C
PROJECT LOCATION Euharlee Georgia

DEPTH (ft)	ELEVATION (ft msl)	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	CONSTRUCTION DIAGRAM
35	655			LIMESTONE, Dark gray, massive, some orange (iron oxide) staining and some mineralization of calcite. recovered as fine to coarse gravel, angular and disc shaped pieces of core up to 1" length. *(continued)* 37': Dark gray with white quartz filled veins and secondary calcite mineralization along fracture lanes/surfaces.	
40				POTENTIAL VOID (39'-42').	
	650			LIMESTONE, Gray, dark gray massive with white quartz veins and secondary calcite mineralization, fresh.	- Bentonite 3/8" chips
45	645				
50				Dark gray, massive sections with no to minor white veins in upper part of run, increased white, secondary calcite mineralization in lower parts of run, fresh to slightly weathered.	
55	640				
60	635			59': Gray, dark gray with white veins and secondary mineralization along fractured planes/ surfaces, recovered as rounded gravel and pebbles of limestone.	
65	630			62': White calcareous and quartz rich veins, recovered as angular and subangular gravel and cobbles.	
70	625			69': Dark gray, recovered as angular fine to coarse grained gravel and cobbles, massive, fresh with white calcite veins.	- 20/40 Silica Sand - 0.010 slot size 2" Pre Pack, U-Pack Screen
	620				

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CLIENT Southern Company Services
PROJECT NAME Plant Bowen
PROJECT NUMBER GW6581C
PROJECT LOCATION Euharlee Georgia

DEPTH (ft)	ELEVATION (ft msl)	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	CONSTRUCTION DIAGRAM
75					
	615			LIMESTONE, Gray, dark gray massive with white quartz veins and secondary calcite mineralization, fresh. *(continued)*	Sump
				Bottom of borehole at 79.0 feet.	
80	610				
85	605				
90	600				
95	595				
100	590				
105	585				
110	580				

Easting and Northing in NAD 1983.
Elevation in NAVD 1988.

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BGWC-36D

CLIENT Southern Company Services
PROJECT NAME Plant Bowen
PROJECT NUMBER GW6581C
PROJECT LOCATION Euharlee Georgia
DATE STARTED 7/2/18 **COMPLETED** 7/3/18
NORTHING 1499807.51 ft **EASTING** 2066415.10 ft
DRILLER Cascade Drilling
GROUND ELEVATION 698.07 ft **BORING DIAMETER** 6 in
DRILLING METHOD Sonic
TOP OF CASING ELEVATION 701.01 ft
SAMPLING METHOD 4" core 6" overide
GEOPHYSICAL CONTRACTOR ---
RIG TYPE Terrasonic 10S1181
LOGGED BY C. Hug **CHECKED BY** J. Ivanowski

DEPTH (ft)	ELEVATION (ft msl)	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	CONSTRUCTION DIAGRAM
0				CLAY, Orange red to red brown, trace fine angular sand, medium to high plasticity.	
	695				
5				From 4': Red, some white weakly cemented pebbles and trace fine grained angular gravel.	
				Mottled red and orange, trace fine gravel.	
	690				
10				From 11': Trace fine to medium grained gravel, red and orange mottled.	
	685			From 13': With some white and pale gray, highly weathered, moderately cemented calcareous pebbles, up to 0.5" in diameter.	
15					- Bentonite grout
	680			From 18': Predominantly gray and orange, trace fine grained sand.	
20					- Schedule 40 PVC 2"
	675				
25					
	670				
30					
	665				

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BGWC-36D

CLIENT Southern Company Services **PROJECT NAME** Plant Bowen

PROJECT NUMBER GW6581C **PROJECT LOCATION** Euharlee Georgia

DEPTH (ft)	ELEVATION (ft msl)	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	CONSTRUCTION DIAGRAM
40	660			CLAY, Orange red to red brown, trace fine angular sand, medium to high plasticity. *(continued)* 35': With angular rock fragments up to 3" in diameter (limestone) and quartz gravel, slightly more silty. 37.5': Gray, angular, quartz rich limestone fragment.	
	655			LIMESTONE, Gray, white, massive, white calcareous veins throughout, drilled as pieces of rock.	
45				POTENTIAL VOID (45'-47'). Driller reports dropping rods, no resistance.	
	650			LIMESTONE, Gray, with white calcareous veins, massive, fresh to slightly weathered, minor brown iron oxide staining. Drilled as discs of core and fragments up to 3" length, angular medium to high strength.	
50				POTENTIAL VOID (50'-52.5'). Driller reports dropping rods, no resistance.	
	645			LIMESTONE Gray, white calcareous veins, massive, breaking angular, fresh, high strength, minor iron oxide staining. Recovered as discs of rock fragments.	
55					
	640				
60				POTENTIAL VOID (59'-64'). Potential SILT. Driller reports very low resistance during drilling.	Bentonite 3/8" chips
	635				
65				LIMESTONE, Gray, white spotted and calcareous veins throughout, massive fresh, high strength, recovered as angular rock core fragments , up to 3" length.	
	630				
70				POTENTIAL VOID (69'-72'). Driller reports very low resistance during drilling.	
	625			LIMESTONE, Gray, white massive, fresh to slightly weathered, medium to high strength, coarse gravel sized, angular, recovered as disc shaped core fragments up to 2" length.	

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CLIENT Southern Company Services
PROJECT NAME Plant Bowen
PROJECT NUMBER GW6581C
PROJECT LOCATION Euharlee Georgia

DEPTH (ft)	ELEVATION (ft msl)	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	CONSTRUCTION DIAGRAM
80	620			LIMESTONE, Gray, white massive, fresh to slightly weathered, medium to high strength, coarse gravel sized, angular, recovered as disc shaped core fragments up to 2" length. *(continued)*	
85	615				- 20/40 Silica Sand
	610			POTENTIAL VOID (87'-93'). Driller reports very low resistance during drilling.	- 0.010 slot size 2" Pre Pack, U-Pack Screen
90	605			LIMESTONE, Gray, white, massive, slightly weathered with calcareous white veins, and some brown iron oxide staining, recovered with some brown/ orange clayey sand.	- Sump
95	600			Bottom of borehole at 93.5 feet.	
100	595				
105	590				
110	585				

75
80
85
90

Easting and Northing in NAD 1983.
Elevation in NAVD 1988.

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BGWC-37D

CLIENT Southern Company Services
PROJECT NAME Groundwater SRV-AP1
PROJECT NUMBER GW6581C
PROJECT LOCATION Euharlee, GA
DATE STARTED 4/24/19 **COMPLETED** 4/25/19
NORTHING 1501293.16 ft **EASTING** 2064362.70 ft
DRILLER Cascade Drilling
GROUND ELEVATION 693.50 ft **BORING DIAMETER** 6 in
DRILLING METHOD Sonic
TOP OF CASING ELEVATION 696.05 ft
SAMPLING METHOD 4" core 6" override
GEOPHYSICAL CONTRACTOR ---
RIG TYPE Terrasonic 11-38212
LOGGED BY C. Hug **CHECKED BY** J. Ivanowski

DEPTH (ft)	ELEVATION (ft msl)	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	CONSTRUCTION DIAGRAM
0	693			Hydro Excavation (0 to 15 ft) NO SAMPLE	
5	690				
10	685				Bentonite grout
15	680	Water added at top of run.		CLAY/SANDY CLAY, Brown, reddish-brown, low to medium plasticity, sand is fine to medium grained, subrounded, quartz, trace fine gravel, moist.	Schedule 40 PVC 2"
20	675			CLAY, Red-brown, yellow mottled, low to medium plasticity, with trace of fine to medium grained sand, moist. 22 ft: With grey, angular limestone fragments up to 2 inches long.	
25	670	25 to 35 ft: No voids reported.		LIMESTONE, Dark grey, minor white calcareous veins, massive, fine grained, recovered as angular fragments and disc shaped pieces of rock up to 4 inch in diameter.	
30	665				Bentonite uncoated 3/8" chips
35	660	35-45 ft: No voids or soft drilling reported.		More competent fragments of limestone at 35 ft. 35 to 37 ft: With yellow/brown iron oxide staining.	
	655				

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BGWC-37D

CLIENT Southern Company Services **PROJECT NAME** Groundwater SRV-AP1

PROJECT NUMBER GW6581C **PROJECT LOCATION** Euharlee, GA

DEPTH (ft)	ELEVATION (ft msl)	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	CONSTRUCTION DIAGRAM
45	650	25 to 35 ft: No voids reported.		LIMESTONE, Dark grey, minor white calcareous veins, massive, fine grained, recovered as angular fragments and disc shaped pieces of rock up to 4 inch in diameter. *(continued)* 41 ft: With white, calcareous mineralization along healed fracture planes.	
50	645				
55	640	No recovery, run was not lost in hole. Very soft drilling with some resistance.		54 ft: Dark grey, some calcareous veins and secondary mineralization along fracture planes, fresh, moderate strength. NO RECOVERY (55 to 65 ft)	
60	635				
65	630	65 to 75 ft: No voids reported.		LIMESTONE, Dark grey, some black, massive, fine grained, minor white calcareous veins, recovered as subrounded gravel sized core fragments and cobbles. Recovered with pale grey, silty coating. Minor yellowish-brown iron oxide staining at 65 ft.	
70	625				
75	620	75 to 85 ft: No voids reported.		With pale grey, silty coating and some secondary calcite mineralization along fracture planes.	Bentonite uncoated 3/8" chips
80	615				
85	610	85 to 95 ft: No voids reported.			

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BGWC-37D

CLIENT Southern Company Services **PROJECT NAME** Groundwater SRV-AP1

PROJECT NUMBER GW6581C **PROJECT LOCATION** Euharlee, GA

DEPTH (ft)	ELEVATION (ft msl)	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	CONSTRUCTION DIAGRAM
90	605	95 to 110 ft: No voids reported.		LIMESTONE, Dark grey, some black, massive, fine grained, minor white calcareous veins, recovered as subrounded gravel sized core fragments and cobbles. Recovered with pale grey, silty coating. *(continued)*	Bentonite 3/8" chips
95	600				
100	595				20/40 Silica Sand
105	590				0.010 slot size 2" Pre Pack, U-Pack Screen
110	585			Bottom of borehole at 110.0 feet.	
115	580				
120	575				
125	570				
130	565				

Easting and Northing in NAD 1983.
Elevation in NAVD 1988.

SCS GEORGIA GW6581C_PLANT BOWEN DEEP WELL INSTALL_APRIL 2019.GPJ ACP GINT LIBRARY_FROM ASHWIN.GLB 5/8/19

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BGWC-38D

CLIENT Southern Company Services
PROJECT NAME Groundwater SRV-AP1
PROJECT NUMBER GW6581C
PROJECT LOCATION Euharlee, GA
DATE STARTED 4/16/19 **COMPLETED** 4/18/19
NORTHING 1499802.36 ft **EASTING** 2066430.17 ft
GROUND ELEVATION 697.52 ft **BORING DIAMETER** 6 in
DRILLER Cascade Drilling
TOP OF CASING ELEVATION 700.34 ft
DRILLING METHOD Sonic
GEOPHYSICAL CONTRACTOR ---
SAMPLING METHOD 4" core 6" override
RIG TYPE Terrasonic 11-38212
LOGGED BY C. Hug **CHECKED BY** J. Ivanowski

DEPTH (ft)	ELEVATION (ft msl)	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	CONSTRUCTION DIAGRAM
0	695			Hydro Excavation (0-10 ft) NO SAMPLE	
5	690				Bentonite grout
10	685			CLAY, Reddish-brown, some yellow, low to medium plasticity, trace fine sand, moist. With fine, angular gravel sized chert and dolomite fragments, pale grey to white, angular.	
15	680			Red and yellow, some grey mottles, low to medium plasticity, trace fine grained, angular sand, moist. With some fine grained, angular chert and dolomite gravel. 18 ft: Large chert-rich limestone fragment, 4 inches long, 2 inches in diameter, increasing yellow mottling, slightly more sandy.	Schedule 40 PVC 2"
20	675				
25	670	25 ft: End drilling 4/16/2019		24.8 ft: Large, chert rich limestone fragment, dark grey, some white, angular 5 inches x 3 inches. Between 27 and 30 ft: Pale grey and red mottled. From 29 ft: Occasional pale grey mottling.	
30	665			From 30 ft: With fine sand lenses and depositional layering (1-2mm), trace of fine limestone gravel, moist, stiff.	
35	660			From 36 ft: Brown, yellowish brown, medium to high plasticity, trace fine sand, moist to wet, soft to firm, with angular, dark grey limestone fragments up to 2 inches long. 39-40 ft: With grey, sandy silty areas of weathered limestone fragments.	

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BGWC-38D

CLIENT Southern Company Services **PROJECT NAME** Groundwater SRV-AP1

PROJECT NUMBER GW6581C **PROJECT LOCATION** Euharlee, GA

DEPTH (ft)	ELEVATION (ft msl)	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	CONSTRUCTION DIAGRAM
40				CLAY, Reddish-brown, some yellow, low to medium plasticity, trace fine sand, moist. With fine, angular gravel sized chert and dolomite fragments, pale grey to white, angular. *(continued)*	
	655			43 ft: Dark grey, angular limestone fragments up to 5 inches long.	
45				45 ft: Angular limestone fragment, 5 inches x 3 inches.	
	650			48-49 ft: With fine to coarse grainded gravel sized limestone fragments, angular, grey, up to 5 inches in diameter.	
50				51 ft: Large, angular chert fragment, white to pale grey, 5 inches in diameter.	
	645			53 ft: Angular limestone fragment, 4 inches long.	
55					Bentonite grout
	640			56 ft: With dark brown SANDY CLAY, sand is fine to coarse grained, subangular, quartz. From 57 ft: CLAY with SAND, Brown red and yellow, medium to high plasticity, sand is fine to medium grained, subangular, trace of fine limestone gravel.	
60					
	635			63 to 64 ft: Lens of fine to coarse gravel sized limestone fragments in sandy, silty clay matrix.	
65		67 to 77 ft: Driller reports general 'easy' drilling, with softer and harder patches.			
	630			LIMESTONE, Dark grey, grey, white, massive, with calcareous veins, minor yellowish-brown iron oxide staining, drilled as angular fragments of rock and disc shaped core fragments, with some chert rich fragments.	
70					
	625	Driller reports rods dropping between 74 and 76 ft, no resistance.			
75				Potential VOID (74 to 76 ft)	
		Softer and harder drilling, but no rod dropping.		LIMESTONE, Dark grey, grey, white, massive, with calcareous veins, minor yellowish-brown iron oxide staining, drilled as angular fragments of rock and disc shaped core fragments, with some chert rich fragments.	
	620				
80					Bentonite uncoated 3/8" chips
	615				
85					

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BGWC-38D

CLIENT Southern Company Services
PROJECT NAME Groundwater SRV-AP1
PROJECT NUMBER GW6581C
PROJECT LOCATION Euharlee, GA

DEPTH (ft)	ELEVATION (ft msl)	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	CONSTRUCTION DIAGRAM
90	610			LIMESTONE, Dark grey, grey, white, massive, with calcareous veins, minor yellowish-brown iron oxide staining, drilled as angular fragments of rock and disc shaped core fragments, with some chert rich fragments. *(continued)*	
95	605	From 97': Harder drilling, slow progress.		From 97: Larger, competent pieces of limestone up to 4 inches in length, grey, white, massive, fresh.	
100	600				
105	595	107 to 117 ft: Fast drilling throughout run, no voids reported.		From 105 to 107 ft: Drilled as three competent pieces of intact limestone core up to 12 inches long, fresh, no fractures to slightly fractured.	
110	590			Between 109 and 113 ft: Some brown and yellow iron oxide staining along fracture planes. Rock is generally recovered as grey, angular fragments of rock up to 4 inches long, with white calcareous veins and discs of core up to 1 inch length. No staining between 115 and 117 ft.	- Bentonite 3/8" chips
115	585				- 0.010 slot size 2" Pre Pack, U-Pack Screen - 20/40 Silica Sand
120	580				
125	575				
130	570			Bottom of borehole at 127.0 feet.	

Easting and Northing in NAD 1983.
Elevation in NAVD 1988.

SCS GEORGIA GW6581C_PLANT BOWEN DEEP WELL INSTALL_APRIL 2019.GPJ ACP GINT LIBRARY_FROM ASHWIN.GLB 5/8/19

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BGWC-40

CLIENT Southern Company Services
PROJECT NAME Groundwater SRV-AP1
PROJECT NUMBER GW6581C
PROJECT LOCATION Euharlee, GA
DATE STARTED 12/3/19 **COMPLETED** 12/3/19
NORTHING 1500589.949 ft **EASTING** 2064315.825 ft
DRILLER Cascade Drilling
GROUND ELEVATION 686.5 ft **BORING DIAMETER** 6 in
DRILLING METHOD Sonic
TOP OF CASING ELEVATION 689.64 ft
SAMPLING METHOD 4" core 6" override
GEOPHYSICAL CONTRACTOR ---
RIG TYPE 1051181 Compact Crawler
LOGGED BY N.Tilahun **CHECKED BY** J. Ivanowski

DEPTH (ft)	ELEVATION (ft)	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	CONSTRUCTION DIAGRAM
0	685	Hand Auger 0-10 ft.		CLAY, Reddish brown, medium plasticity, firm to stiff, trace silt and fine sand, moist.	
5	680			4 ft: Trace yellow mottling.	
				8-9 ft: Yellowish brown.	
10	675			CLAY, Yellowish brown to reddish brown, low to medium plasticity, trace silt, sand and angular gravel, firm to stiff, trace black and whitle mottles, moist.	
15	670				Schedule 40 PVC 2"
20	665			CLAY, Yellowish brown to reddish brown, black mottles, high plasticity, trace silt and fine sand, few angular to subangular rock fragments, stiff, moist to wet.	Bentonite grout
25	660				
				GRAVELLY CLAY, Brown, medium to high plasticity, stiff, some limestone and dolomite rock fragments, wet.	

(Continued Next Page)

SCS MONITORING WELLS BGWC39 AND BGWC40_DECEMBER 2019.GPJ ACP GINT LIBRARY CH.GLB 12/23/19

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CLIENT Southern Company Services **PROJECT NAME** Groundwater SRV-AP1

PROJECT NUMBER GW6581C **PROJECT LOCATION** Euharlee, GA

DEPTH (ft)	ELEVATION (ft)	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	CONSTRUCTION DIAGRAM
30	655	31-33 ft: Very soft drilling - potential void filling.		GRAVELLY CLAY, Brown, medium to high plasticity, stiff, some limestone and dolomite rock fragments, wet. *(continued)*	
				PARTIALLY WEATHERED ROCK, Limestone and dolomite, dry.	
35	650	35-38 ft: Very soft drilling - potential void filling.		GRAVELLY CLAY, Brown, medium to high plasticity, stiff, some limestone and dolomite rock fragments, wet.	Bentonite grout
40	645	39-45 ft: Very soft drilling - potential void filling.		GRAVELLY CLAY, Brown, high plasticity, stiff, few limetone and dolomite rock fragments, firm to stiff, wet.	
45	640			LIMESTONE, Light gray, white calcite veins, few iron staining, hard, moderately bedded (breaking along bedding), broken pieces due to drilling.	Bentonite 3/8" chips
50	635				
55	630	57-60 ft: Soft drilling, lost circulation (approx 100 gal of water) - potential void.			20/40 Silica Sand 0.010 slot size 2" Pre Pack, U-Pack Screen
60				Bottom of borehole at 60.0 feet.	

SCS MONITORING WELLS BGWC39 AND BGWC40_DECEMBER 2019.GPJ ACP GINT LIBRARY CH.GLB 12/23/19

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BGWC-43D

CLIENT Southern Company Services
PROJECT NAME Bowen Groundwater SRV-AP1
PROJECT NUMBER GW6581C
PROJECT LOCATION Euharlee, GA
DATE STARTED 4/23/20 **COMPLETED** 4/24/20
NORTHING 1499796.85 ft **EASTING** 2066444.37 ft
DRILLER Cascade Drilling
GROUND ELEVATION 697.29 ft **BORING DIAMETER** 6 in
DRILLING METHOD Sonic
TOP OF CASING ELEVATION 700.10 ft
SAMPLING METHOD 4" core 6" override
GEOPHYSICAL CONTRACTOR ---
RIG TYPE Terra Sonic Compact Crawler
LOGGED BY N.Tilahun **CHECKED BY** J. Ivanowski

DEPTH (ft)	ELEVATION (ft)	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	CONSTRUCTION DIAGRAM
0	690			Hydro Excavation (0 ft to 10 ft) NO SAMPLE	
10	680			687.3 CLAY, Yellowish and reddish brown, low to medium plasticity, trace fine to coarse sand, trace angular chert, firm, moist.	Schedule 40 PVC 2" Aquaguard Sodium Bentonite Grout
20	670			20 ft: Few black mottles, laminated, few rock fragments of chert and dolomite.	
30	660			30 ft: Yellowish brown, trace black mottles.	
40	650			657.3 LIMESTONE/DOLOMITE, Dark gray, fine grained, platy rock fragments, hard, slightly weathered, with iron oxide staining.	Bentonite uncoated 3/8" chips

SCS MONITORING WELLS BGWC41 TO BGWC49_MAY2020.GPJ ACP GINT LIBRARY CH.GLB 6/5/20

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CLIENT Southern Company Services **PROJECT NAME** Bowen Groundwater SRV-AP1

PROJECT NUMBER GW6581C **PROJECT LOCATION** Euharlee, GA

DEPTH (ft)	ELEVATION (ft)	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	CONSTRUCTION DIAGRAM
50				LIMESTONE/DOLOMITE, Dark gray, fine grained, platy rock fragments, hard, slightly weathered, with iron oxide staining. *(continued)*	
	640			50 ft: Calcite fillings.	
60					
	630				
70					
	620				
80				617.3	
				NO RECOVERY (90 ft to 100 ft)	
	610				
90		90 ft: Potential void filling.		605.3	
				LIMESTONE/DOLOMITE, Dark gray, fine grained, platy rock fragments, hard, slightly weathered, with iron oxide staining.	
	600				
100				100 ft: Slightly weathered, some iron oxide staining, trace calcite fillings, few small pieces of rock fragments.	

Bentonite uncoated 3/8" chips

SCS MONITORING WELLS BGWC41 TO BGWC49_MAY2020.GPJ ACP GINT LIBRARY CH.GLB 6/5/20

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BGWC-43D

CLIENT Southern Company Services **PROJECT NAME** Bowen Groundwater SRV-AP1

PROJECT NUMBER GW6581C **PROJECT LOCATION** Euharlee, GA

DEPTH (ft)	ELEVATION (ft)	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	CONSTRUCTION DIAGRAM
110				LIMESTONE/DOLOMITE, Dark gray, fine grained, platy rock fragments, hard, slightly weathered, with iron oxide staining. *(continued)*	
				113 ft to 116 ft: Soft zone, mostly clay, dry recovery below.	
	580				
120				120 ft: Few calcite fillings, yellowish gray, iron oxide staining.	Bentonite uncoated 3/8" chips
	570				
130				130 ft: Yellowish gray to gray, few calcite fillings, some weathering and iron oxide staining.	
	560				
140				140 ft: Yellowish gray to gray, few calcite fillings, some weathering and iron oxide staining.	
	550				Bentonite coated 3/8" pellets
150				150 ft: Yellowish gray to gray, few calcite fillings, some weathering and iron oxide staining.	20/40 Silica Sand
	540				0.010 slot size 2" Pre Pack, U-Pack Screen
160					534.3
				Bottom of borehole at 163.0 feet.	

Easting and Northing in NAD 1983.
Elevation in NAVD 1988.

SCS MONITORING WELLS BGWC41 TO BGWC49_MAY2020.GPJ ACP GINT LIBRARY CH.GLB 6/5/20

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BGWC-44D

CLIENT Southern Company Services
PROJECT NAME Bowen Groundwater SRV-AP1
PROJECT NUMBER GW6581C
PROJECT LOCATION Euharlee, GA
DATE STARTED 4/20/20 **COMPLETED** 4/22/20
NORTHING 1499265.14 ft **EASTING** 2065811.06 ft
DRILLER Cascade Drilling
GROUND ELEVATION 714.65 ft **BORING DIAMETER** 6 in
DRILLING METHOD Sonic
TOP OF CASING ELEVATION 717.29 ft
SAMPLING METHOD 4" core 6" override
GEOPHYSICAL CONTRACTOR ---
RIG TYPE Terra Sonic Compact Crawler
LOGGED BY N.Tilahun **CHECKED BY** J. Ivanowski

DEPTH (ft)	ELEVATION (ft)	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	CONSTRUCTION DIAGRAM
0	710			Hydro Excavation (0 ft to 10 ft) NO SAMPLE	
10	700			704.7 SILTY CLAY, Light brown, low plasticity, trace gravel and few fine to coarse sand, moist, firm, trace chert.	Schedule 40 PVC 2" Aquaguard Sodium Bentonite Grout
20	690	20 ft: No void reported.		694.7 NO RECOVERY (20 ft to 30 ft)	
30	680			684.7 GRAVELLY CLAY, Yellowish brown, low to medium plasticity, few to some fragments of gravel, wet, firm to soft. 682.7 PARTIALLY WEATHERED ROCK, Light gray, angular fragments of dolomite, dry to moist, gravel size increase with depth.	
40	670			674.7 DOLOMITE/LIMESTONE, Light gray, fine grained, platy rock fragments, few iron oxide staining, few calcile fillings. 669.7 VOID (45 ft to 50 ft) 664.7	

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CLIENT Southern Company Services **PROJECT NAME** Bowen Groundwater SRV-AP1

PROJECT NUMBER GW6581C **PROJECT LOCATION** Euharlee, GA

DEPTH (ft)	ELEVATION (ft)	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	CONSTRUCTION DIAGRAM
50				DOLOMITE/LIMESTONE, Light gray, fine grained, platy rock fragments, few iron oxide staining, few calcile fillings. 50 ft to 52 ft: Yellowish gray, massive rock fragments.	
	660				Bentonite uncoated 3/8" chips
60				60 ft: Hard drilling.	
	650				
70				70 ft: More massive and less platy rock fragments.	
	640				
80				80 ft: More massive and less platy rock fragments, yellowish gray to gray.	
	630				
90				90 ft: More massive and less platy rock fragments, yellow gray to gray.	
	620				
100					
	610				

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CLIENT Southern Company Services **PROJECT NAME** Bowen Groundwater SRV-AP1

PROJECT NUMBER GW6581C **PROJECT LOCATION** Euharlee, GA

DEPTH (ft)	ELEVATION (ft)	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	CONSTRUCTION DIAGRAM
110	600			DOLOMITE/LIMESTONE, Light gray, fine grained, platy rock fragments, few iron oxide staining, few calcile fillings. *(continued)*	Bentonite uncoated 3/8" chips
120	590			120 ft: Platy rock fragments.	Bentonite coated 3/8" pellets
130	580			584.7 DOLOMITE/LIMESTONE, Yellowish gray to gray, some calcite fillings, some rock gragments and platy, fine grained, trace iron oxide staining.	20/40 Silica Sand 0.010 slot size 2" Pre Pack, U-Pack Screen
140				574.7 Bottom of borehole at 140.0 feet.	

Easting and Northing in NAD 1983.
Elevation in NAVD 1988.

SCS MONITORING WELLS BGWC41 TO BGWC49_MAY2020.GPJ ACP GINT LIBRARY CH.GLB 6/5/20

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BGWC-49D

CLIENT Southern Company Services
PROJECT NAME Plant Bowen Well Installation
PROJECT NUMBER GW6581C
PROJECT LOCATION Euharlee, GA
DATE STARTED 1/23/21 **COMPLETED** 2/23/21
NORTHING 1499790.13 ft **EASTING** 2066461.96 ft
DRILLER Tom Ardito, Cascade Drilling
GROUND ELEVATION 696.95 ft **BORING DIAMETER** 6 in
DRILLING METHOD Sonic
TOP OF CASING ELEVATION 699.75 ft
SAMPLING METHOD 4 in core 6 in override
GEOPHYSICAL CONTRACTOR GEL Solutions
RIG TYPE Terrasonic 1051181
LOGGED BY T. Kessler and A. Ramsey **CHECKED BY** J. Ivanowski

DEPTH (ft)	SAMPLE TYPE NUMBER	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	CONSTRUCTION DIAGRAM
0		Geophysical logging consisted of acoustic televiewer, optical televiewer, caliper, fluid conductivity, fluid temperature, single point resistance (SPR), spontaneous potential (SP), and heat pulse flowmeter (HPF). Refer to separate report.		Air Knife Excavation (0 to 10 ft) NO SAMPLE	
10				687.0 SILTY CLAY, Brownish yellow with white mottling, medium plasticity, iron oxide staining throughout, with rock fragments, trace sand, firm, moist.	
20				16 ft: Some fine gravel.	Bentonite grout
30				30 ft: With highly weathered rock gravel throughout, color changes to brownish yellow.	WL: 35.3 ft bgs (4.5.2021)
40		Increased rig chatter, slower drilling rate, some loss of circulation.		40 to 43 ft: With large, brownish yellow rock fragments. 653.0	WL: 42.1 ft bgs (4.1.2021)
50				DOLOMITE, Gray, fine to medium grained, with some fractures, and visible iron oxide staining at 44 ft, with white calcite veins at 44 ft and 45 ft, weak reaction with HCL. 50 ft: White calcite veins throughout.	Bentonite uncoated 3/8" chips Schedule 40 2" PVC
60		Rig chatters, no returns.		58 ft: Light gray, with iron oxide staining and moderately weathered. 60 ft: Medium to coarse grained, friable.	
70		From 70 ft: Logger: A. Ramsey		70 ft: Gray with some dark gray, fine to medium grained, visible iron staining at 71 ft, calcite veins throughout, massive.	
80				80 ft: Some iron oxide staining throughout, fracture at 80 ft.	
90				90 ft: Trace calcite fillings, some iron oxide staining, fractured at 96 ft, massive.	
100					

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CLIENT Southern Company Services **PROJECT NAME** Plant Bowen Well Installation

PROJECT NUMBER GW6581C **PROJECT LOCATION** Euharlee, GA

DEPTH (ft)	SAMPLE TYPE NUMBER	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	CONSTRUCTION DIAGRAM
100		140 to 150 ft: 3 ft recovery, voides reported by the driller.		DOLOMITE, Gray, fine to medium grained, with some fractures, and visible iron oxide staining at 44 ft, with white calcite veins at 44 ft and 45 ft, weak reaction with HCL. *(continued)*	
110				112 ft: Fracture.	
120					
				571.0	
130				NO RECOVERY (VOID 126 to 131 ft) Driller reports no resistance during drop	
				566.0	
				DOLOMITE, Gray, trace calcite fillings and iron oxide staining, massive.	
140				140 ft: Thin laminations, with some voids.	
150				150 ft: Some iron oxide staining.	
160					
170					Bentonite uncoated 3/8" chips
180					
				514.0	
190				NO RECOVERY (VOID 183 to 192 ft) Driller reports no resistance during drop.	
				505.0	
200				DOLOMITE, Gray, trace calcite fillings and iron oxide staining, massive.	
				493.0	
				492.0	
210				NO RECOVERY (VOID 204 to 205 ft) Driller reports no resistance during drop.	
				DOLOMITE, Gray, abundance of calcite fillings up to 1 inch thick and significant iron oxide staining, increasing with depth.	

ASHWINS_LOG BGWC-49D AND BGWC-50D_MARCH 2021.GPJ ACP GINT LIBRARY CH.GLB 5/5/21

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CLIENT Southern Company Services **PROJECT NAME** Plant Bowen Well Installation

PROJECT NUMBER GW6581C **PROJECT LOCATION** Euharlee, GA

DEPTH (ft)	SAMPLE TYPE NUMBER	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	CONSTRUCTION DIAGRAM
220				482.0 NO RECOVERY (VOID 215 to 225 ft) Driller reports no resistance during drop.	
				472.0 DOLOMITE, Dark gray and white, partially weathered, fine to medium grained, thinly laminated, abundant iron oxide staining.	
230				230 ft: Trace iron oxide staining, unweathered to fresh.	
				234 to 240 ft: Trace iron oxide staining and calcite filling.	
240					Bentonite uncoated 3/8" chips
250					
260		260 ft: Very slow drilling (10 ft in 50 min)		260 ft: Fine to medium grained, massive.	
270				270 ft: With some calcite filled veins.	
280					
290					Bentonite coated 1/2" pellets
300				297 ft: Trace fractures visible with iron oxide staining from 302 to 307 ft.	Top of screen elev: 398.95 ft Bottom of screen elev: 388.95 ft Bottom of well elev: 388.62 ft 0.010 slot size 2" Pre Pack, U-Pack Screen 4" sump
310				307 ft: With some iron oxide staining. 310 ft: Abundant calcite filled fractures.	20/40 Silica Sand
				380.0 DOLOMITE, Gray, fine to medium grained, massive, with some calcite filled veins and abundant fractures with visible iron oxide staining.	
320					Bentonite uncoated 3/8" chips backfill

ASHWINS_LOG BGWC-49D AND BGWC-50D_MARCH 2021.GPJ ACP GINT LIBRARY CH.GLB 5/5/21

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CLIENT Southern Company Services **PROJECT NAME** Plant Bowen Well Installation

PROJECT NUMBER GW6581C **PROJECT LOCATION** Euharlee, GA

DEPTH (ft)	SAMPLE TYPE NUMBER	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	CONSTRUCTION DIAGRAM
330		Drill cuttings settled in open hole after pumping/flushing of borehole.		DOLOMITE, Gray, fine to medium grained, massive, with some calcite filled veins and abundant fractures with visible iron oxide staining. *(continued)*	Bentonite uncoated 3/8" chips backfill
340				342 ft: Significant calcite filled fractures.	
350				352 ft: Dark gray, fine to medium grained, thinly laminated to massive, calcite filled veins throughout, abundant iron oxide staining.	
360					
370					Natural backfill/drill cuttings
380				315.0	

Bottom of borehole at 382.0 feet.

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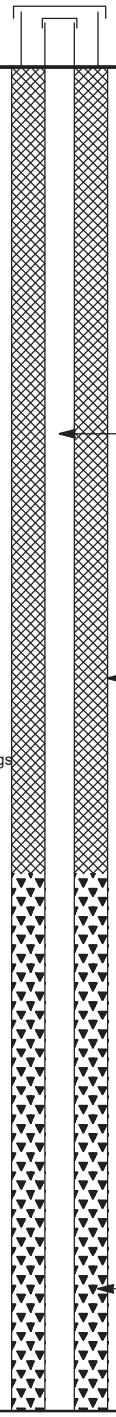
BGWC-50D

CLIENT Southern Company Services
PROJECT NAME Plant Bowen Well Installation
PROJECT NUMBER GW6581C
PROJECT LOCATION Euharlee, GA
DATE STARTED 3/2/21 **COMPLETED** 3/19/21
NORTHING 1499269.15 ft **EASTING** 2065781.87 ft
DRILLER Donald Hall, Cascade Drilling
GROUND ELEVATION 714.67 ft **BORING DIAMETER** 6 in
DRILLING METHOD Sonic
TOP OF CASING ELEVATION 717.43 ft
SAMPLING METHOD 4 in core 6 in override
GEOPHYSICAL CONTRACTOR GEL Solutions
RIG TYPE Pro Sonic 150 Full Size
LOGGED BY C. Cain **CHECKED BY** J. Ivanowski

DEPTH (ft)	ELEVATION (ft)	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION
0	710	Geophysical logging consisted of acoustic televiewer, caliper, fluid conductivity, fluid temperature, single point resistance (SPR), spontaneous potential (SP), and heat pulse flowmeter (HPF). Refer to separate report.		Air Knife Excavation (0 to 10 ft) NO SAMPLE
10	700			704.7 SILTY CLAY, Yellowish brown, medium plasticity, some iron oxide staining throughout, with gravel sized rock fragments throughout and few sand, moist.
20	690			25 ft: Layer of coarse gravel with yellowish brown sand.
30	680			30 ft: Increased iron oxide staining, some mottling, few gravel. 35 ft: Dark gray gravel layer (8 inch thick), comprised of angular rock fragments. 678.7 DOLOMITE, Gray, fine to medium grained, small veins of calcite.
40	670			45 ft: Visible iron oxide staining. 47 ft: Light gray, with calcite veins throughout, some iron oxide staining.
50	660	52-55 ft: Driller reports dropping rods, no resistance.		662.7 NO RECOVERY (VOID 52 to 55 ft) 659.7

CONSTRUCTION DIAGRAM



SCS MONITORING WELLS BGWC-49D AND BGWC-50D_MARCH 2021.GPJ ACP GINT LIBRARY CH.GLB 4/21/21

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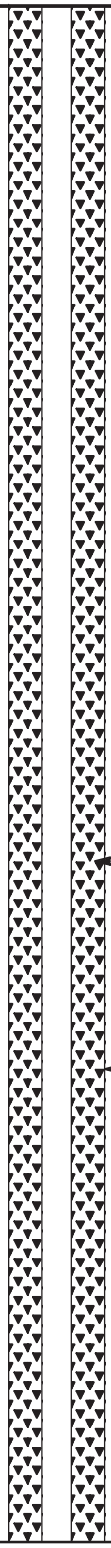
CLIENT Southern Company Services **PROJECT NAME** Plant Bowen Well Installation

PROJECT NUMBER GW6581C **PROJECT LOCATION** Euharlee, GA

DEPTH (ft)	ELEVATION (ft)	REMARKS	MATERIAL DESCRIPTION
			DOLOMITE, Dark gray, fine to medium grained, with calcite filled veins and occasional calcite crystals throughout, with heavy iron oxide staining, becoming lighter gray with depth.
60	650	66 ft: Slow drilling, heavy rig chatter, no water returns.	
70	640		75 ft: Heavy iron oxide staining, some calcite filled veins.
80	630		80 to 82 ft: Heavy iron oxide staining, some large calcite filled veins.
			86 to 88 ft: Little iron oxide staining, small calcite filled veins.
		89-90 ft: Driller reports dropping rods, no returns.	625.7
90			NO RECOVERY (VOID 89 to 90 ft) 624.7
			DOLOMITE, Light gray, fine to medium grained, with calcite filled veins, massive, wet.
	620	96 ft: Very soft zone.	
100			
		103 ft: Very soft drilling, no water returns.	
	610	106 to 136 ft: No water returns.	103 to 106 ft: Iron oxide staining.
110		110 ft: No water returns.	110 to 116 ft: Light gray, few minor areas of iron oxide staining, small calcite filled veins throughout.
	600		116 and 121 ft: Iron oxide staining.

CONSTRUCTION DIAGRAM



SCS MONITORING WELLS BGWC-49D AND BGWC-50D_MARCH 2021.GPJ ACP GINT LIBRARY CH.GLB 4/21/21

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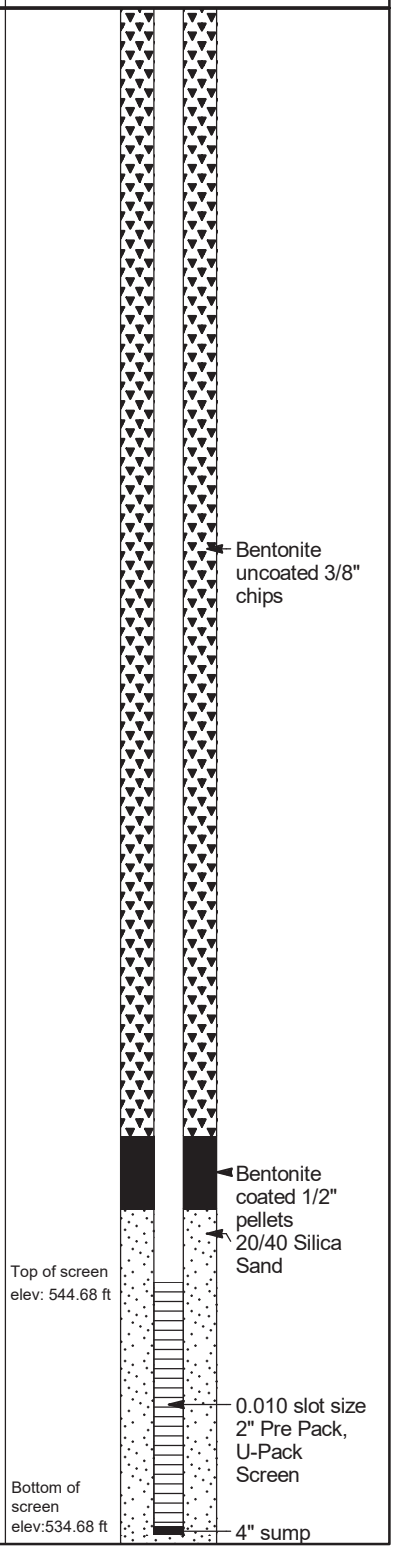
CLIENT Southern Company Services **PROJECT NAME** Plant Bowen Well Installation

PROJECT NUMBER GW6581C **PROJECT LOCATION** Euharlee, GA

DEPTH (ft)	ELEVATION (ft)	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION
120				DOLOMITE, Light gray, fine to medium grained, with calcite filled veins, massive, wet. *(continued)*
				119 ft: Larger calcite crystals.
	590			
				128 to 131 ft: Heavy iron oxide staining.
130				
	580	136 ft: Water returns, slow drilling.		
				136 ft: Large calcite veins, little iron oxide staining.
140				
	570	146 ft: Very slow drilling.		
				146 ft: Iron oxide staining
150				
	560	156 ft: Heavy rig chatter.		
				154 ft: Iron oxide staining.
160				
	550			
170				
	540	176 ft: Slow drilling.		
180				

CONSTRUCTION DIAGRAM



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CLIENT Southern Company Services **PROJECT NAME** Plant Bowen Well Installation

PROJECT NUMBER GW6581C **PROJECT LOCATION** Euharlee, GA

DEPTH (ft)	ELEVATION (ft)	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	CONSTRUCTION DIAGRAM
190	530			DOLOMITE, Light gray, fine to medium grained, with calcite filled veins, massive, wet. *(continued)*	Bottom of well elev: 534.35 ft
				190 to 193 ft: Fine grained, calcite throughout, with iron oxide staining.	Bentonite uncoated 3/8" chips backfill
200	520			196 ft: Minor iron oxide staining throughout.	Natural backfill/drill cuttings
	510			508.7	

Bottom of borehole at 206.0 feet.

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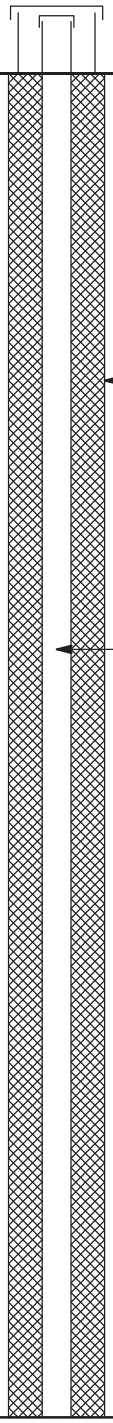
BGWC-51

CLIENT Southern Company Services
PROJECT NAME Plant Bowen Well Installation
PROJECT NUMBER GW6581C
PROJECT LOCATION Euharlee, GA
DATE STARTED 1/22/21 **COMPLETED** 1/22/21
NORTHING 1500270.09 ft **EASTING** 2065455.80 ft
DRILLER Cascade Drilling
GROUND ELEVATION 708.99 ft **BORING DIAMETER** 6 in
DRILLING METHOD Sonic
TOP OF CASING ELEVATION 711.49 ft
SAMPLING METHOD 4 in core 6 in override
GEOPHYSICAL CONTRACTOR ---
RIG TYPE Terrasonic 11-38212
LOGGED BY T. Kessler **CHECKED BY** J. Ivanowski

DEPTH (ft)	ELEVATION (ft)	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION
0				Air Knife Excavation (0 to 10 ft) NO SAMPLE
	705			
5				
	700			
10				699.0 SILTY CLAY, Red with yellow and black mottling throughout, stiff, medium plasticity, trace sand, highly weathered rock fragments, moist.
	695			697.0 SAPROLITE, Pink, low plasticity clay, trace silts and sands, iron staining, remnant rock structures, moist.
15				
	690	20 ft: Increased drill chatter.		
20				20 ft: Dark reddish brown.
	685			
25				683.0 SANDY CLAY, Yellow, stiff, low plasticity, trace chert gravel, moist.
	680	30 to 40 ft: Intermittant increase of drill chatter.		
30				30 ft: Strong brown with black mottling, trace silt and sand.
	675			

CONSTRUCTION DIAGRAM



SCS MONITORING WELLS BGWC51 AND 52_JANUARY 2021.GPJ ACP GINT LIBRARY CH.GLB 2/9/21

(Continued Next Page)

Geosyntec consultants
engineers | scientists | innovators
Geosyntec Consultants
1255 Roberts Boulevard
Kennesaw, GA 30144

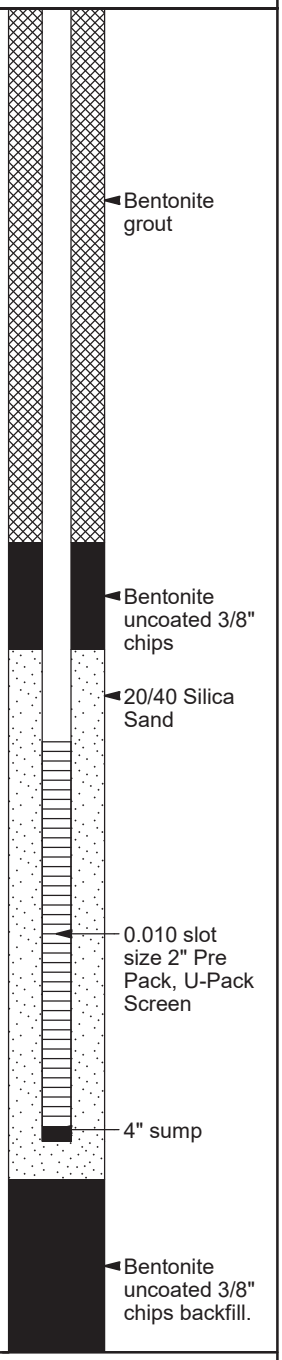
PIEZOMETER BGWC-51

CLIENT Southern Company Services **PROJECT NAME** Plant Bowen Well Installation

PROJECT NUMBER GW6581C **PROJECT LOCATION** Euharlee, GA

DEPTH (ft)	ELEVATION (ft)	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION
35				SANDY CLAY, Yellow, stiff, low plasticity, trace chert gravel, moist. *(continued)*
				37 ft: Yellow.
	670			
40				40 ft: Reddish yellow.
	665			
45				
				661.0
	660			DOLOMITE/DOLOMITIC LIMESTONE, White, pink, gray, thinly laminated, iron staining, fractures present.
50				
	655			
55		55 ft: Highly weathered. 57 to 60 ft: Void space encountered. Rods dropping without resistance.		652.0 NO RECOVERY (VOID 57-60 ft)
	650			
60		60 to 70 ft: Very soft drilling, no drill chatter.		NO RECOVERY (60 - 70 ft)
	645			
65				
	640			
70				639.0

CONSTRUCTION DIAGRAM

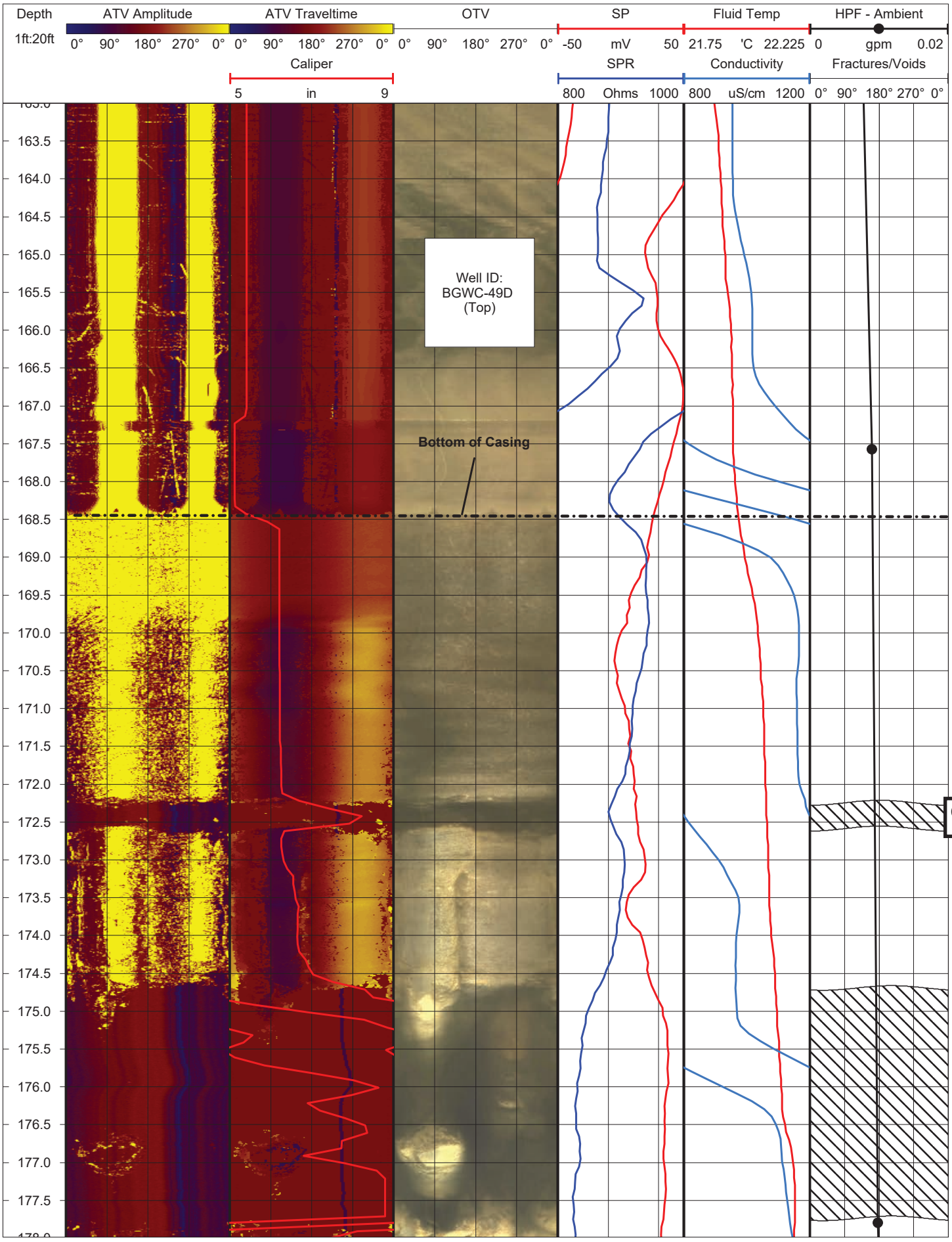


Bottom of borehole at 70.0 feet.

SCS MONITORING WELLS BGWC51 AND 52_JANUARY 2021.GPJ ACP GINT LIBRARY CH.GLB 2/9/21

APPENDIX B

Annotated Geophysical Logs


Depth
1ft:20ft
ATV Amplitude
0° 90° 180° 270° 0°
ATV Traveltime
0° 90° 180° 270° 0°
OTV
0° 90° 180° 270° 0°
SP
-50 mV 50
Fluid Temp
21.75 'C 22.225
HPF - Ambient
0 gpm 0.02
Caliper
5 in 9
SPR
800 Ohms 1000
Conductivity
800 uS/cm 1200
Fractures/Voids
0° 90° 180° 270° 0°
163.5
164.0
164.5
165.0
165.5
166.0
166.5
167.0
167.5
168.0
168.5
169.0
169.5
170.0
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173.5
174.0
174.5
175.0
175.5
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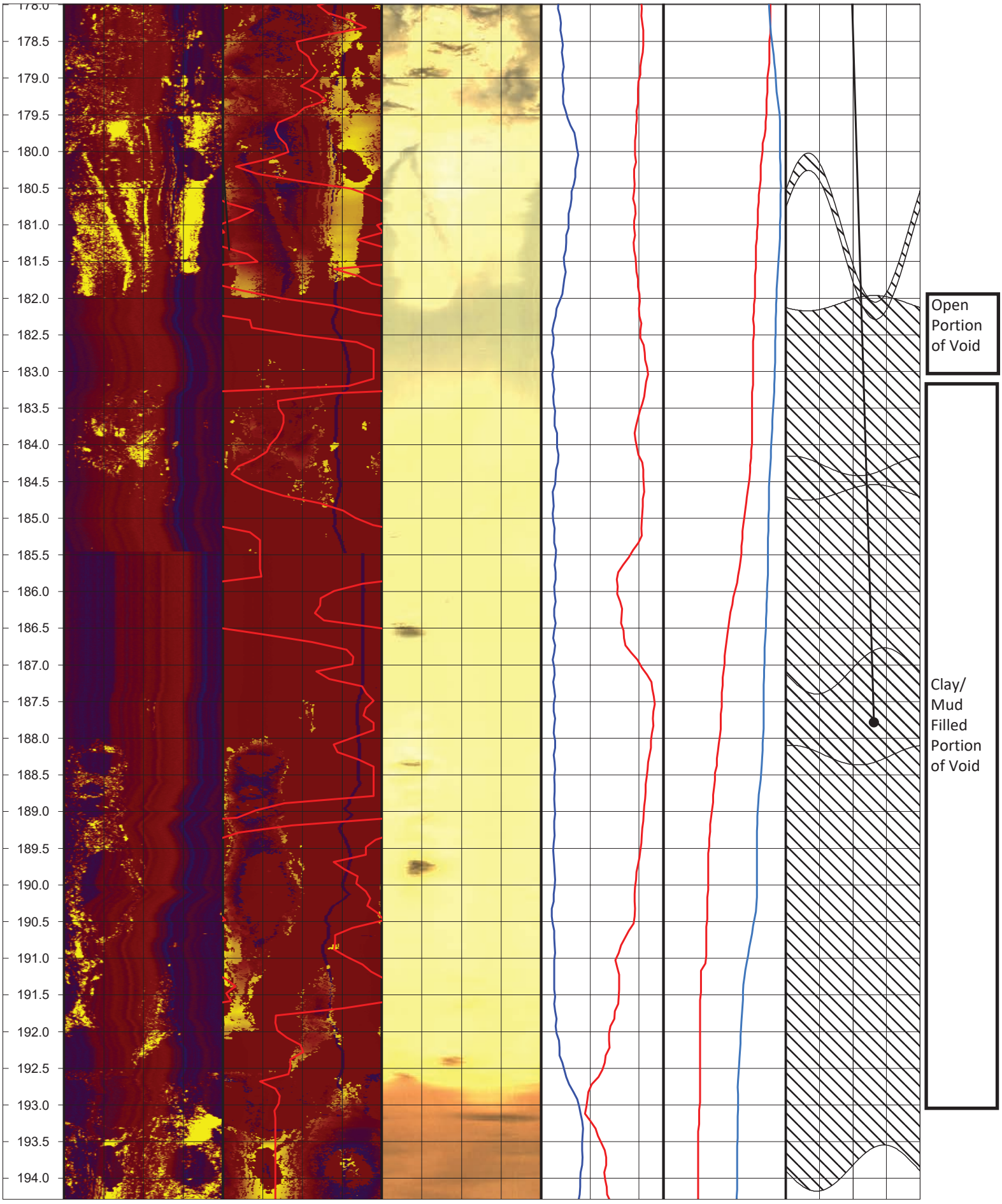
177.0
177.5
Well ID:
BGWC-49D
(Top)
Bottom of Casing
Open Void
Open
Portion
of Void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189.0
189.5
190.0
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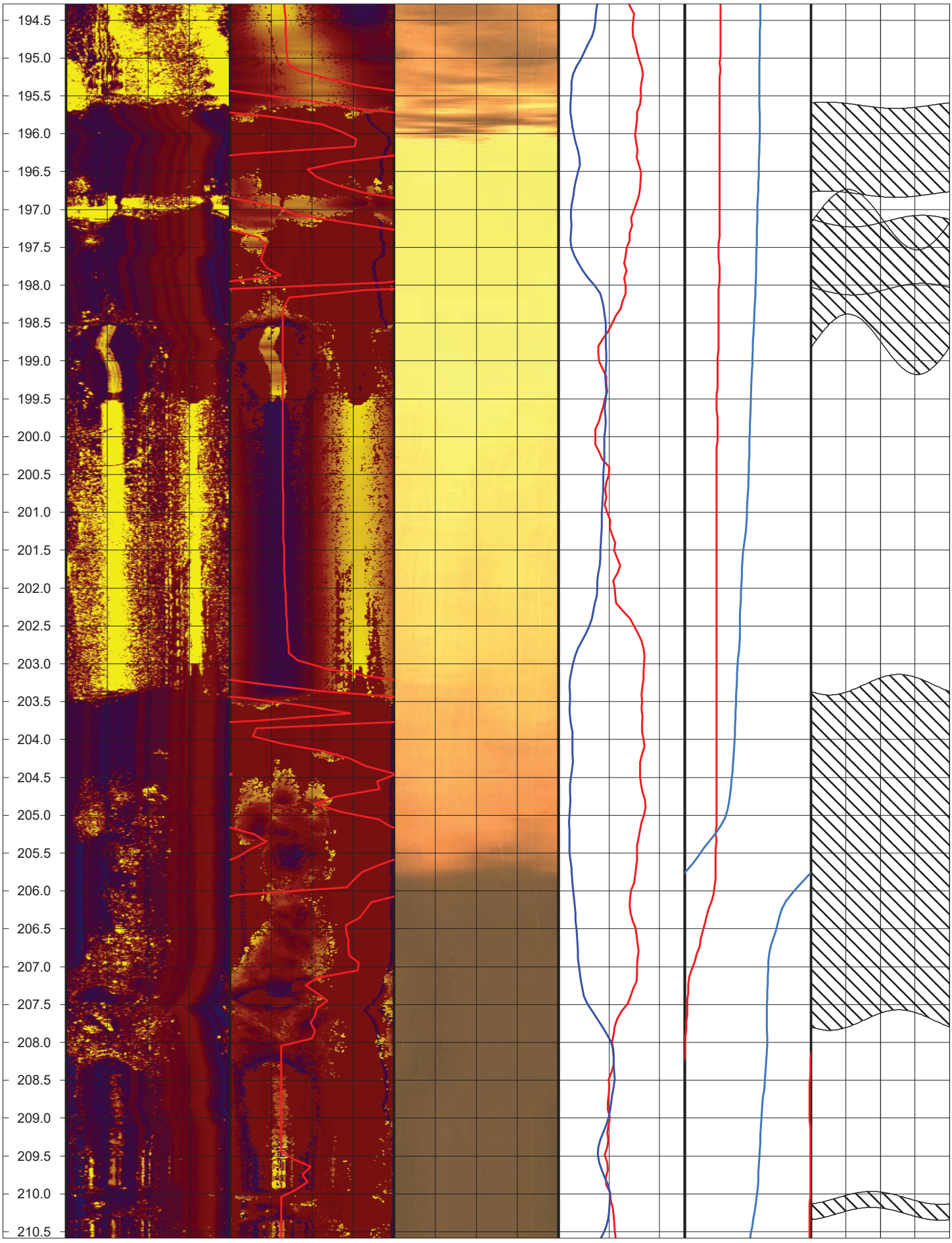
193.5
194.0
Open Portion of Void
Clay/ Mud Filled Portion of Void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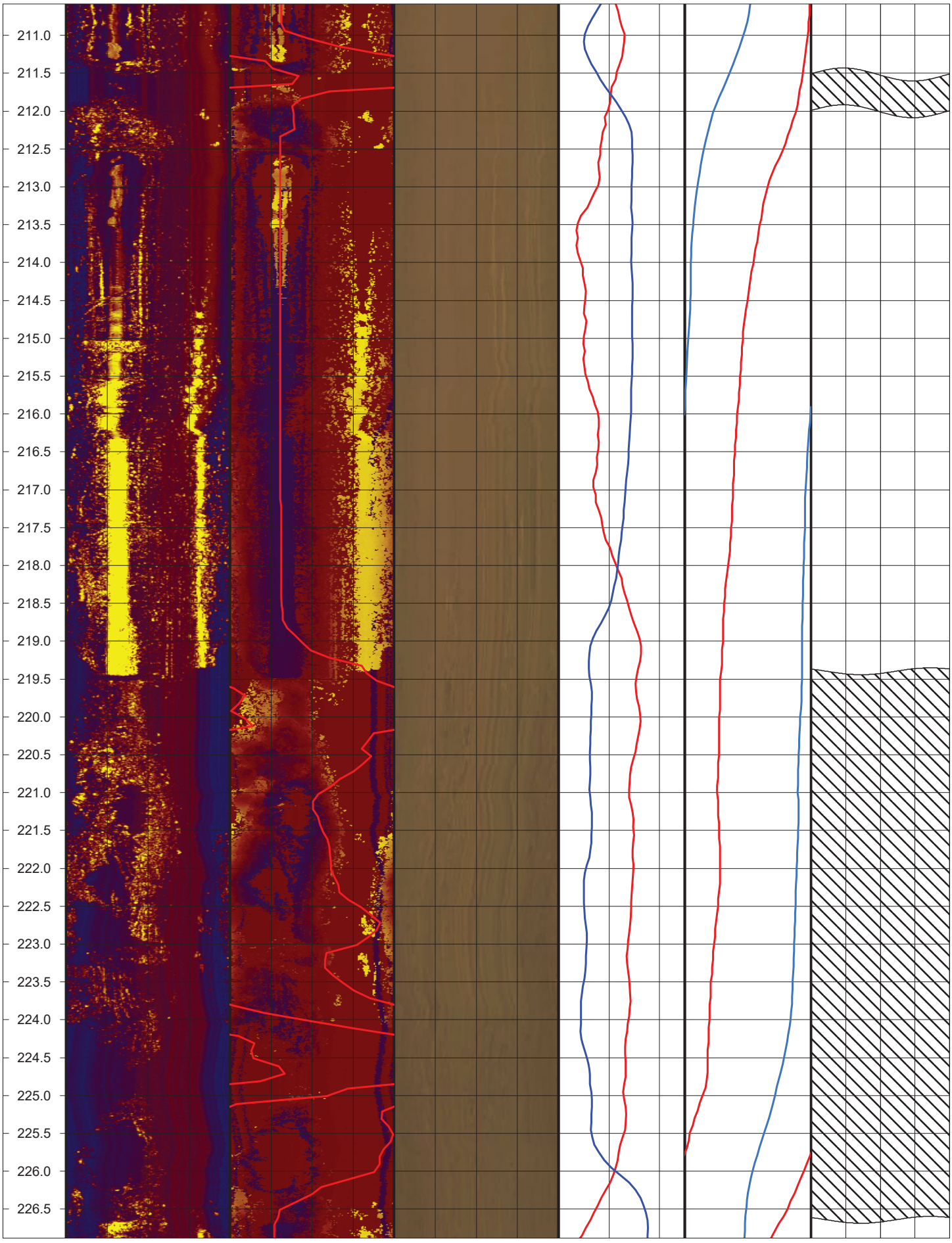
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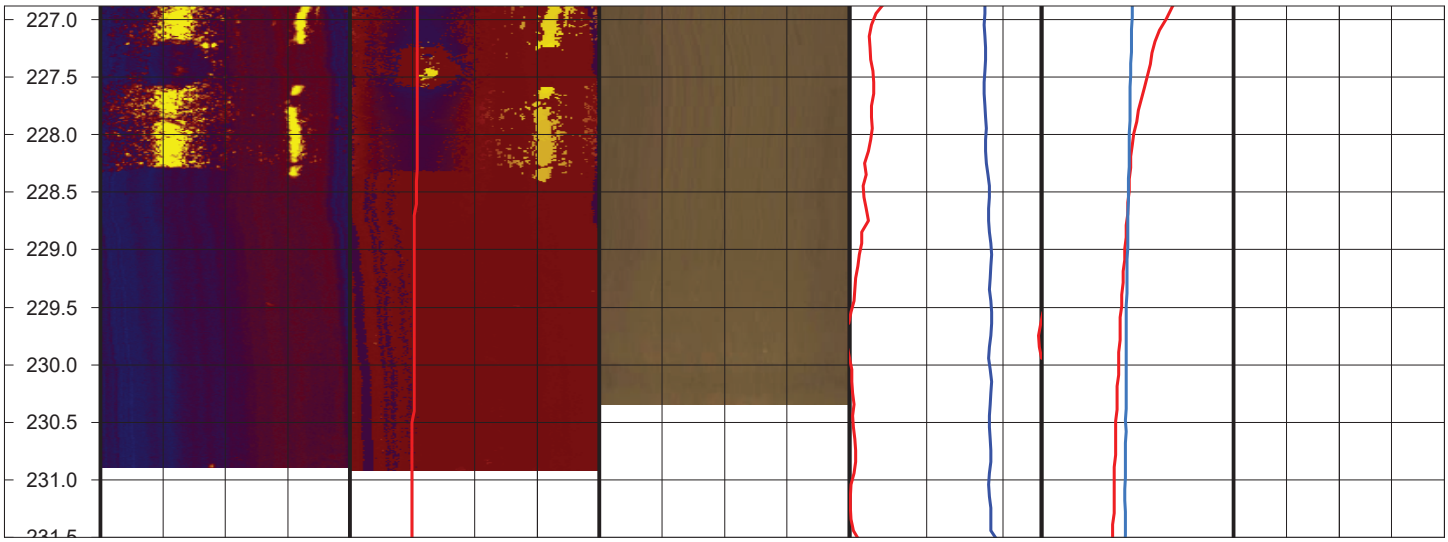
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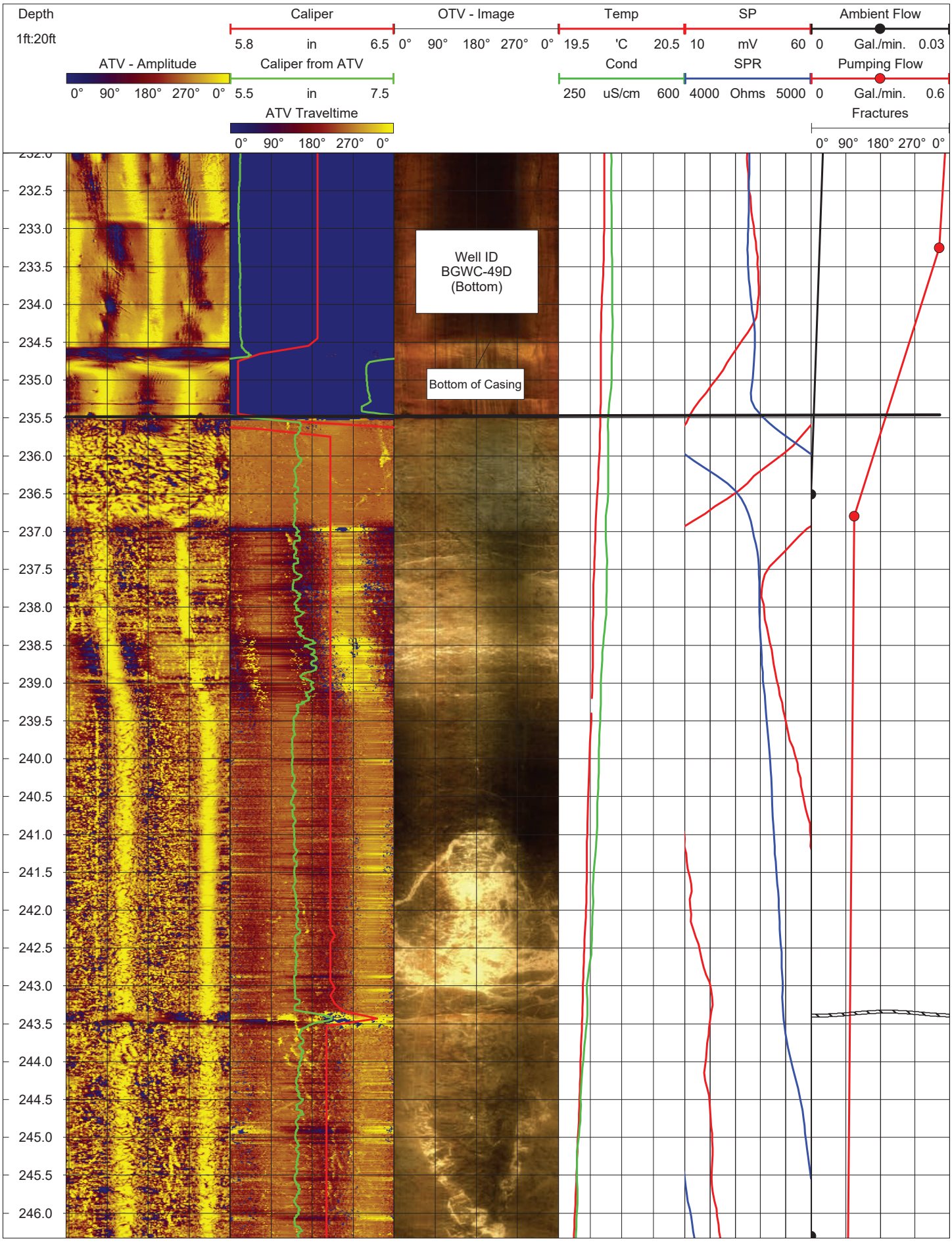
Depth
1ft:20ft
Caliper
5.8 in 6.5
OTV - Image
0° 90° 180° 270° 0°
Temp
19.5 'C 20.5
SP
10 mV 60
Ambient Flow
0 Gal./min. 0.03
ATV - Amplitude
0° 90° 180° 270° 0°
Caliper from ATV
5.5 in 7.5
Cond
250 uS/cm 600
SPR
4000 Ohms 5000
Pumping Flow
0 Gal./min. 0.6
ATV Traveltime
0° 90° 180° 270° 0°
Fractures
0° 90° 180° 270° 0°
232.5
233.0
233.5
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234.5
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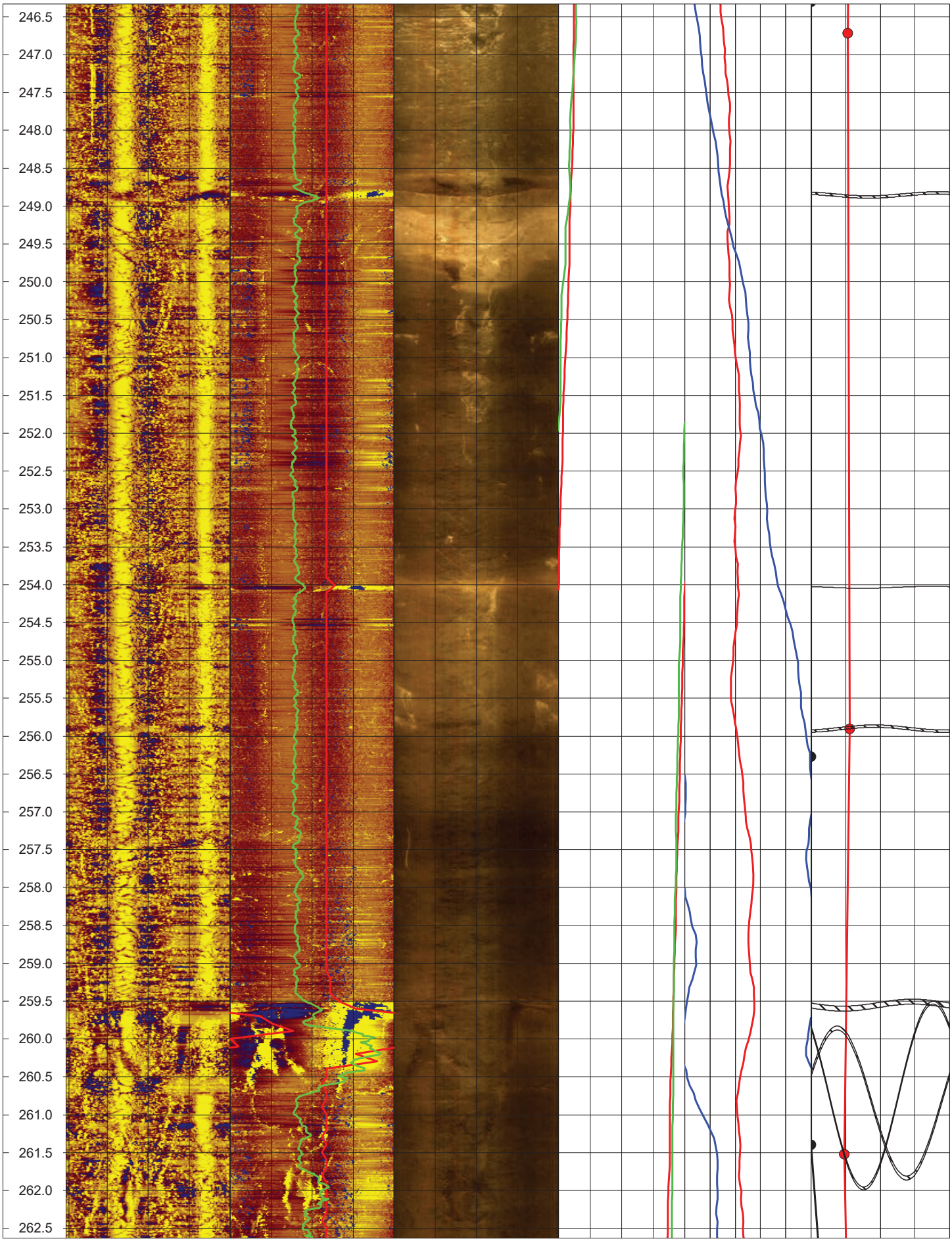
Well ID
BGWC-49D
(Bottom)
Bottom of Casing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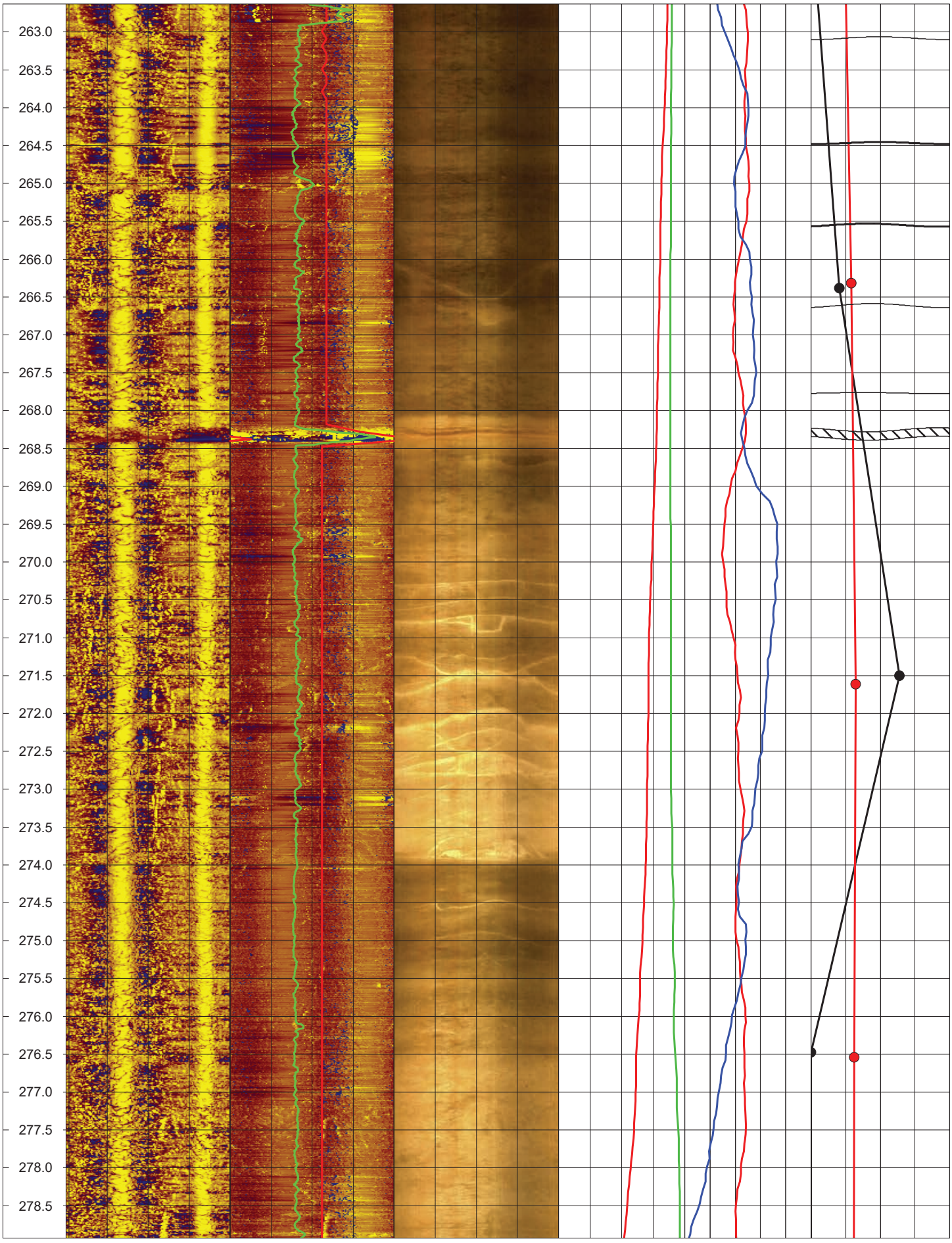
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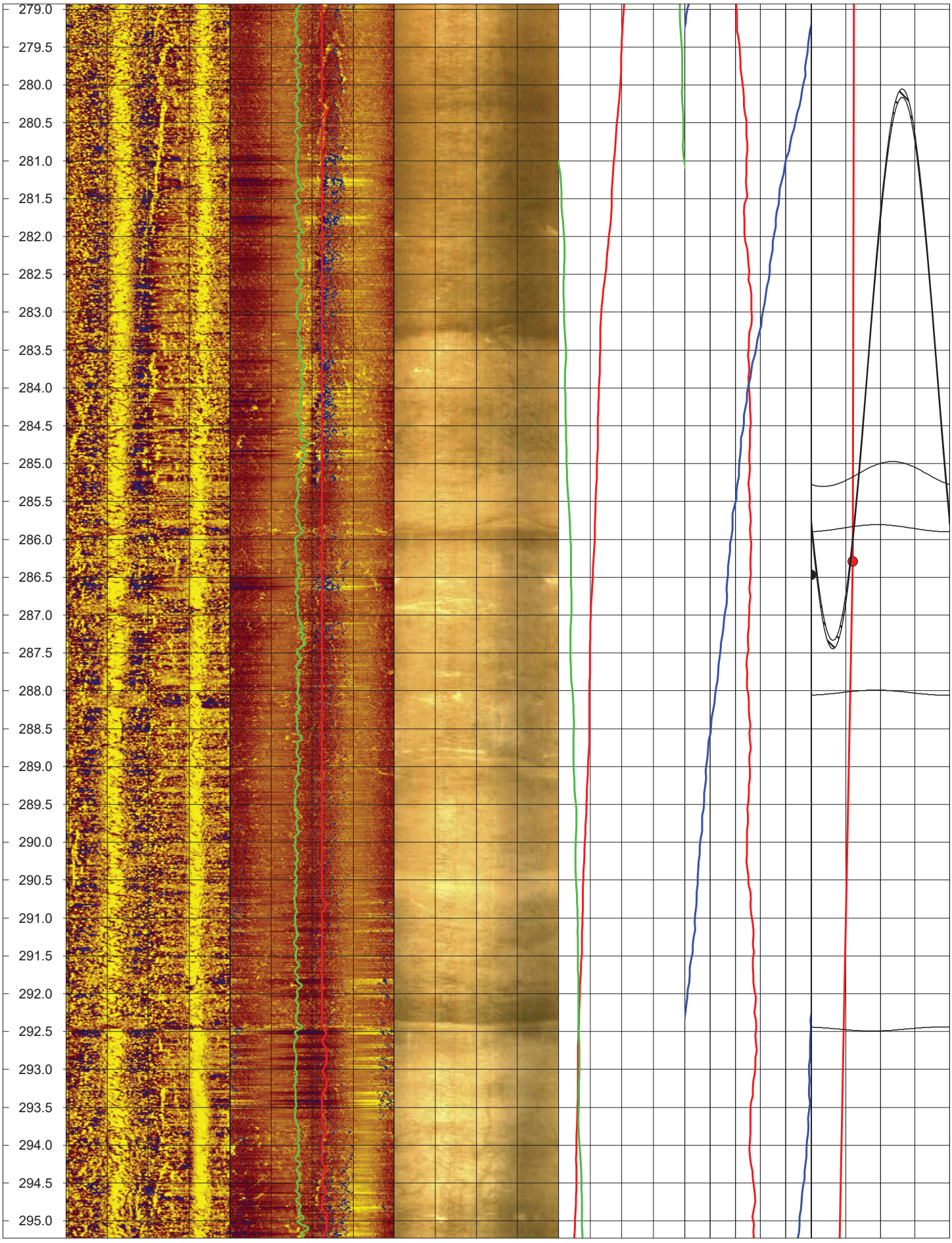
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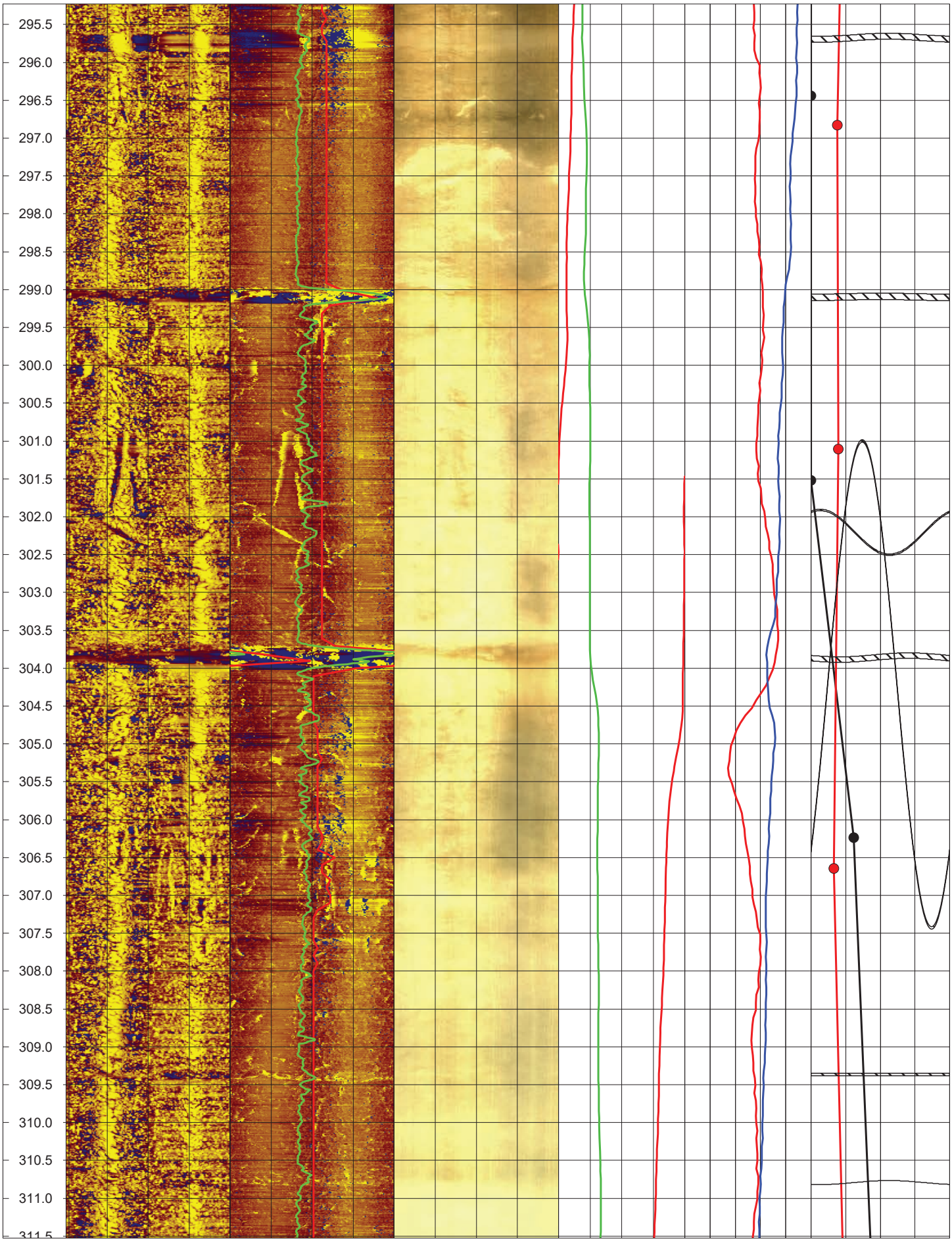
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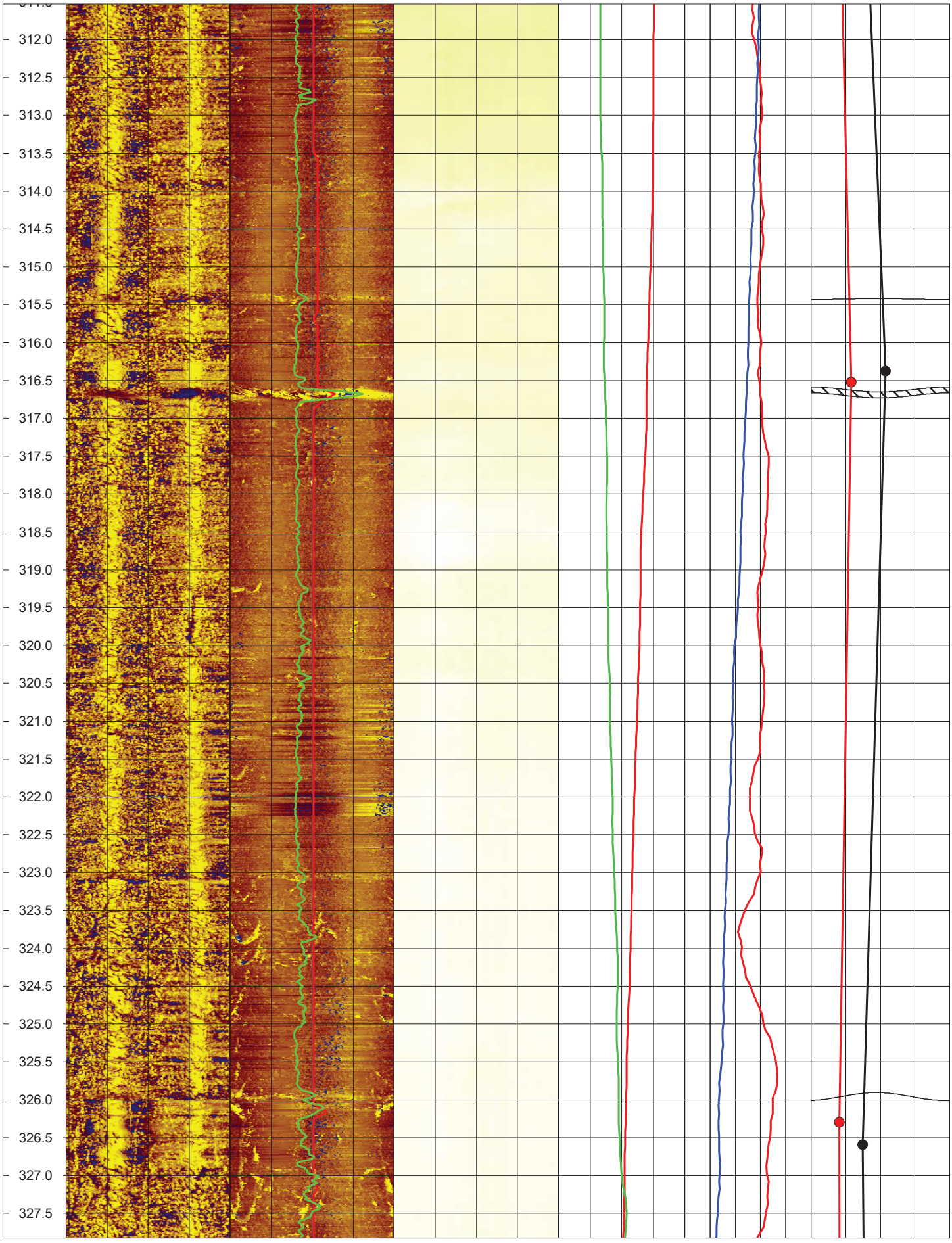
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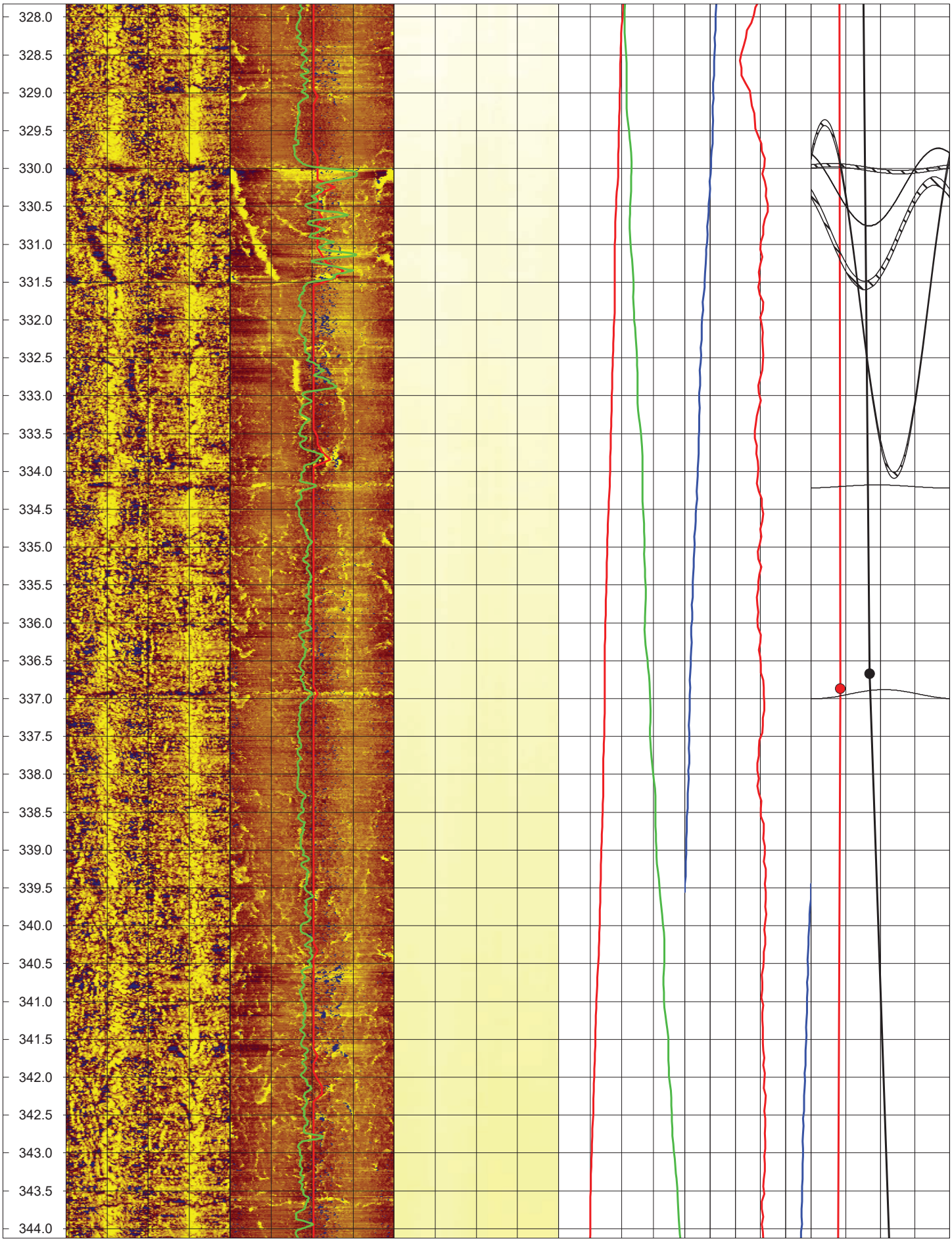
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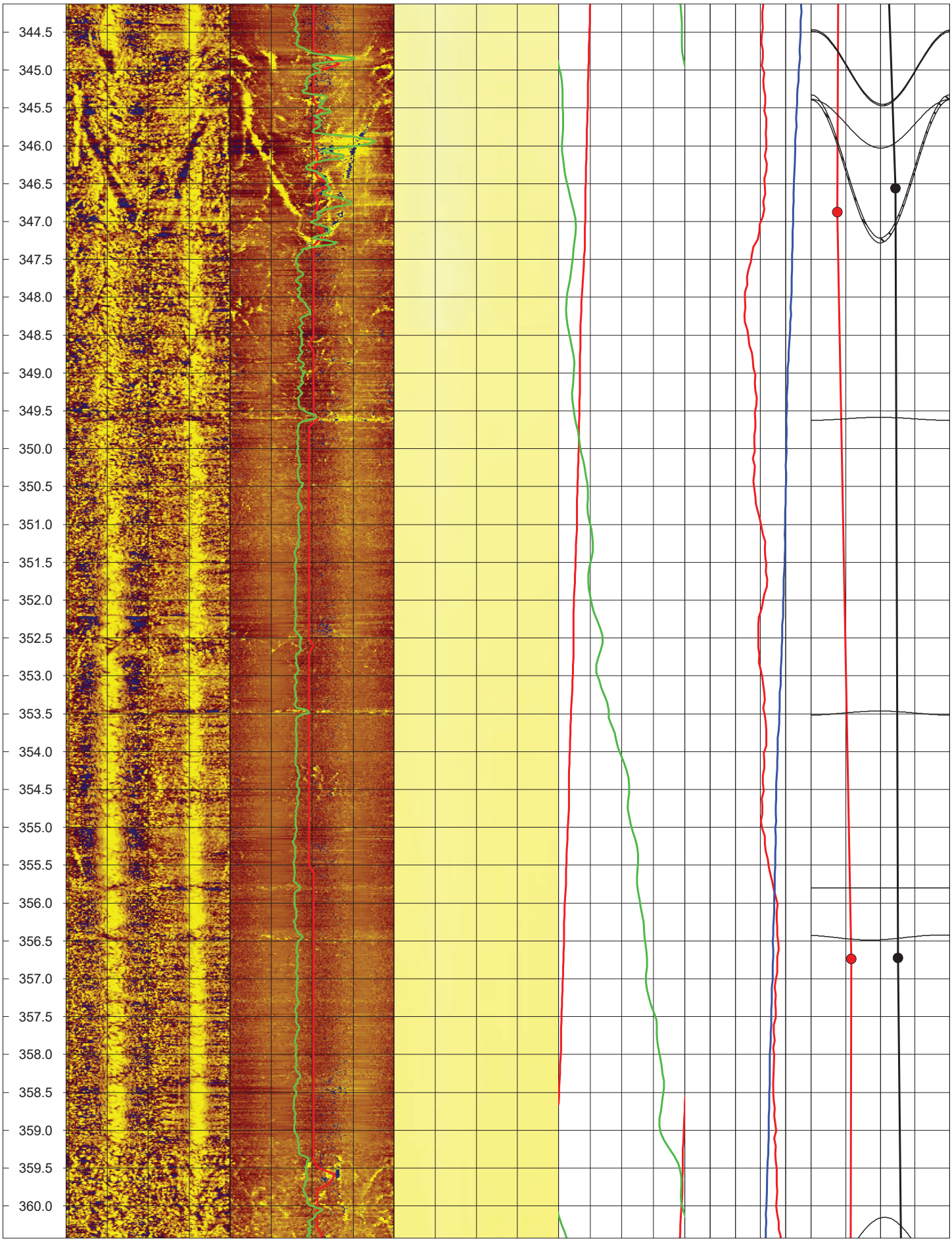
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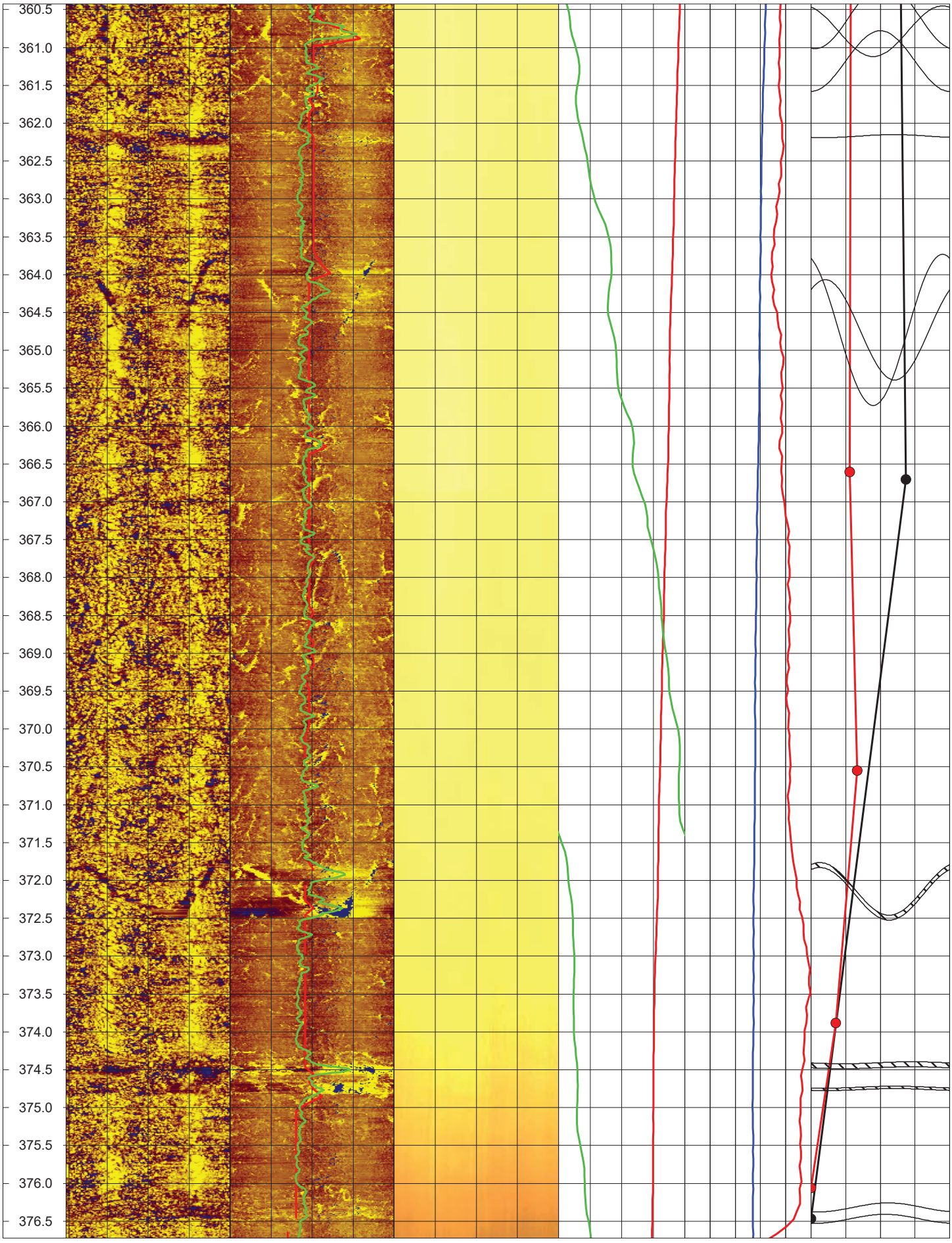
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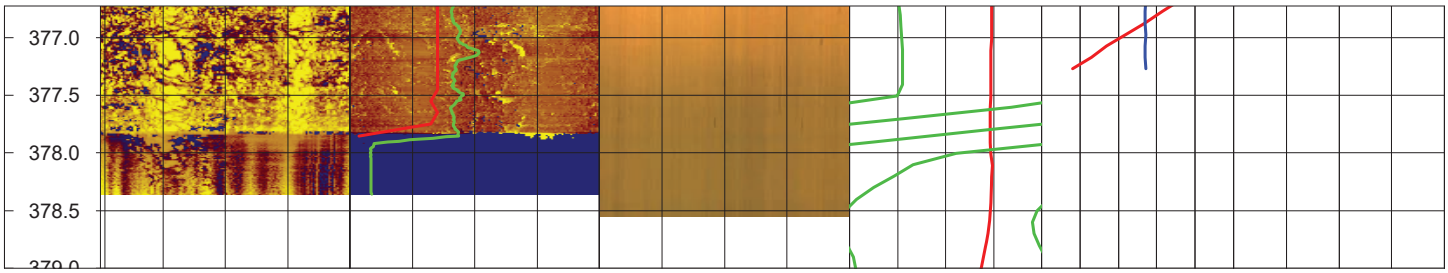
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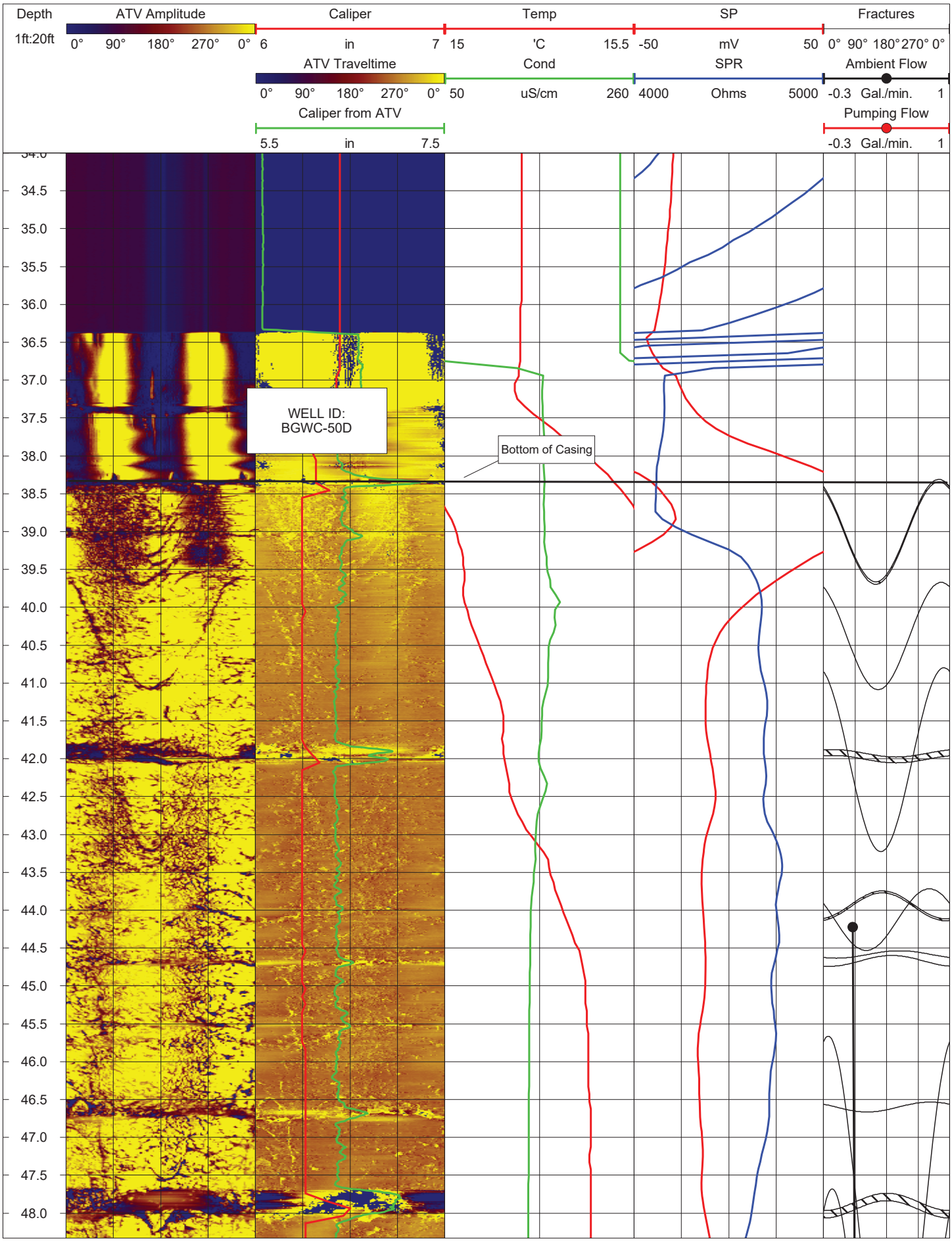
Depth
1ft:20ft
ATV Amplitude
0° 90° 180° 270° 0°
Caliper
6 in 7
Temp
15 'C 15.5
SP
-50 mV 50
Fractures
0° 90° 180° 270° 0°
ATV Traveltime
0° 90° 180° 270° 0°
Cond
50 uS/cm 260
SPR
4000 Ohms 5000
Ambient Flow
-0.3 Gal./min. 1
Caliper from ATV
5.5 in 7.5
Pumping Flow
-0.3 Gal./min. 1
34.5
35.0
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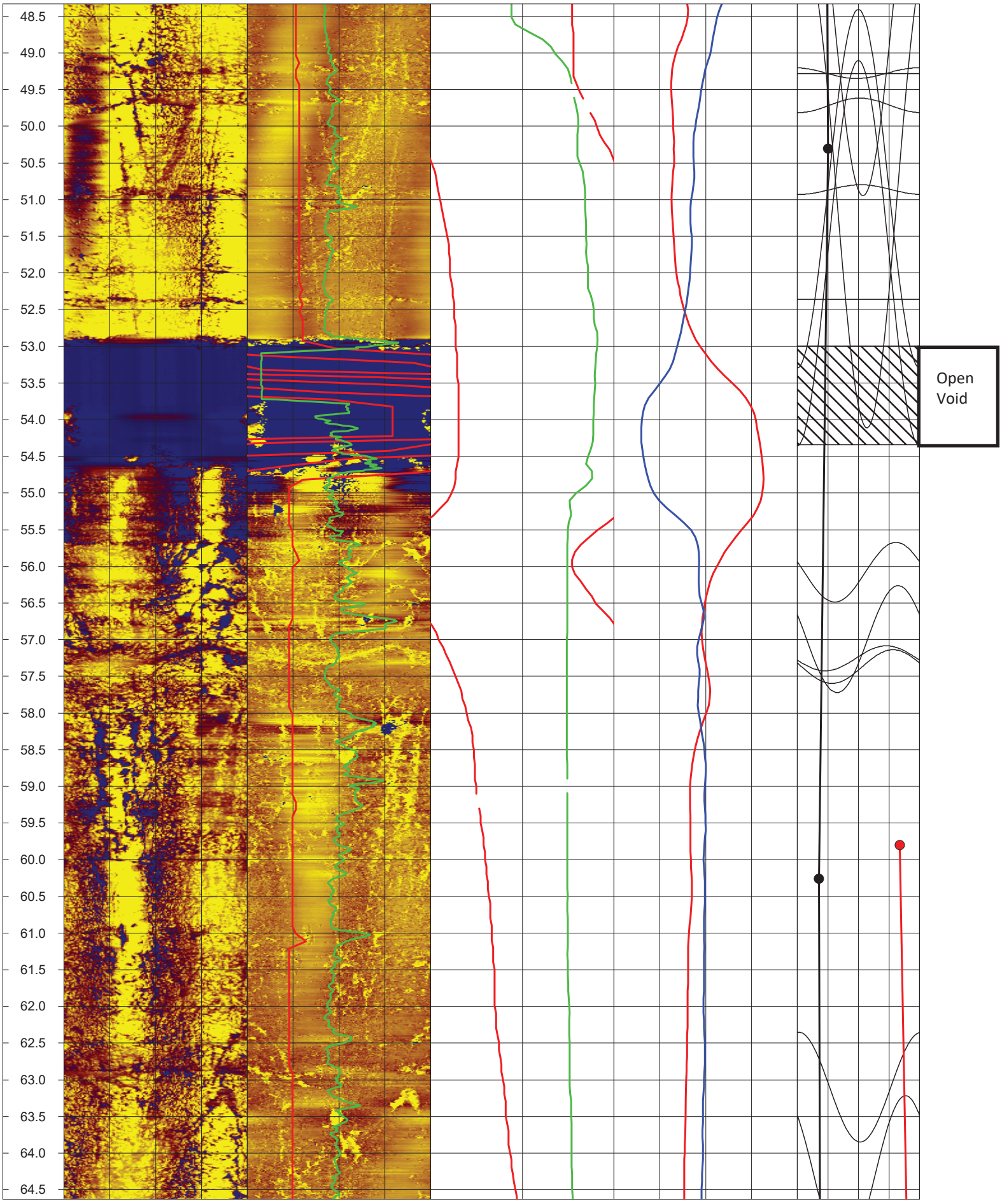
WELL ID:
BGWC-50D
Bottom of Casing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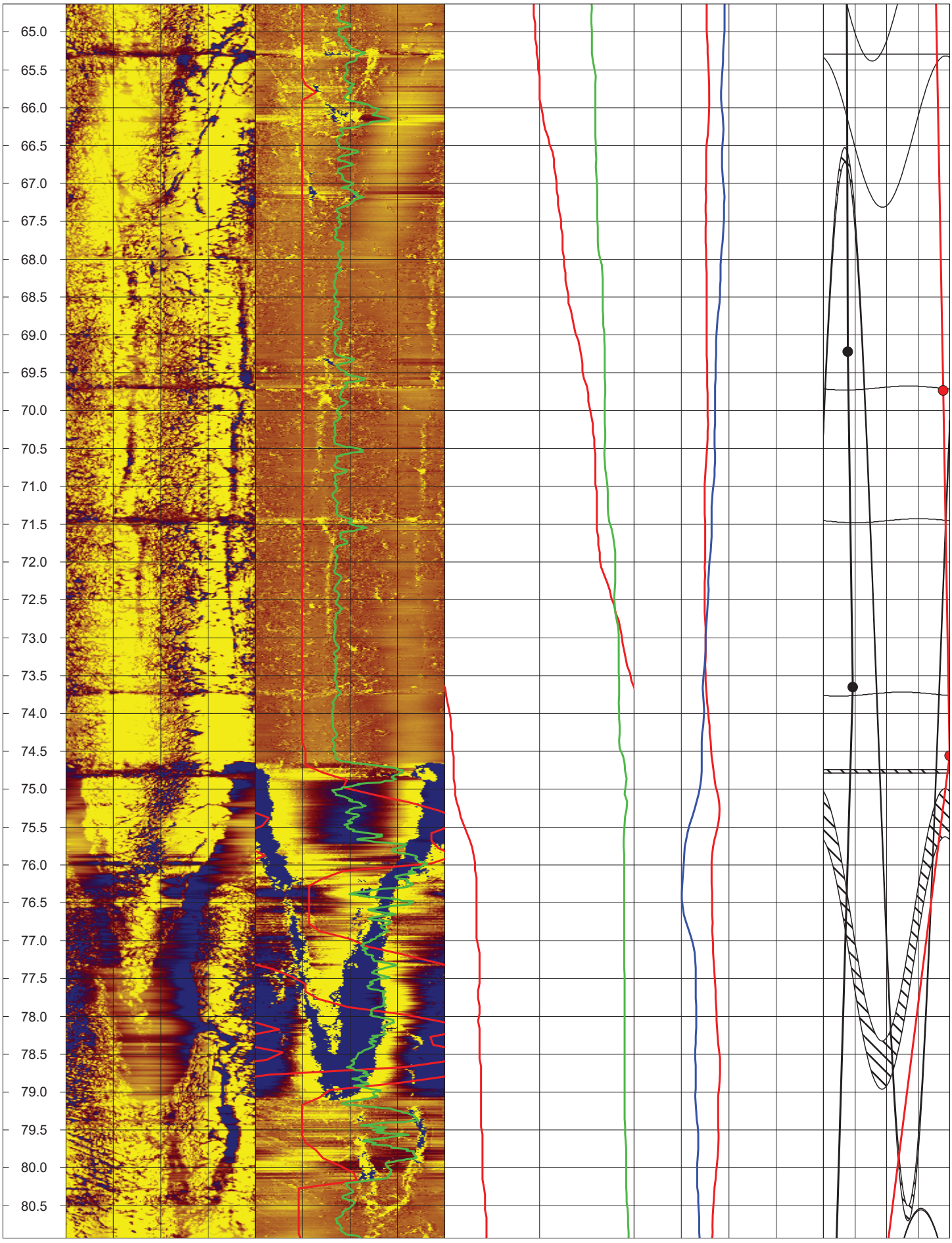
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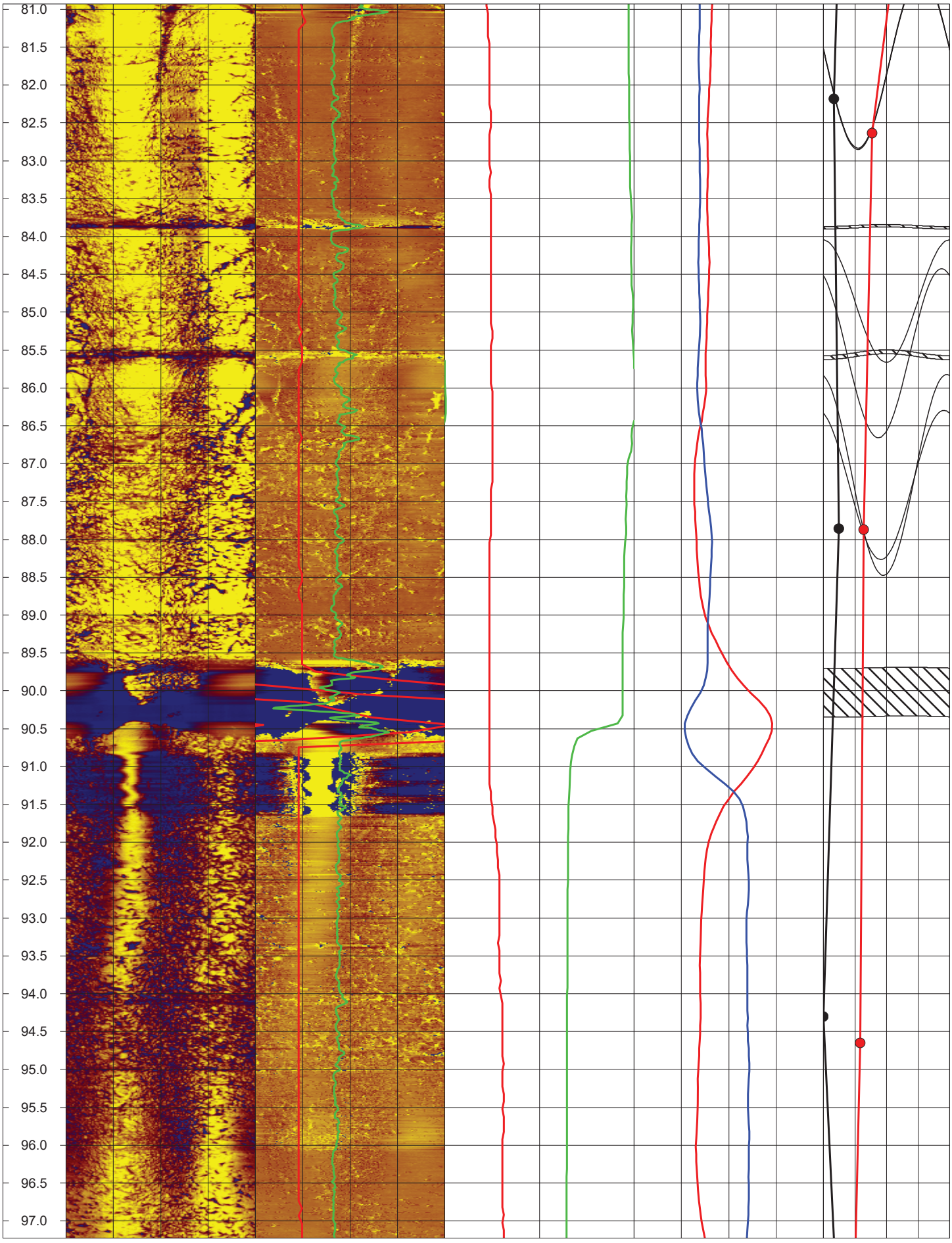
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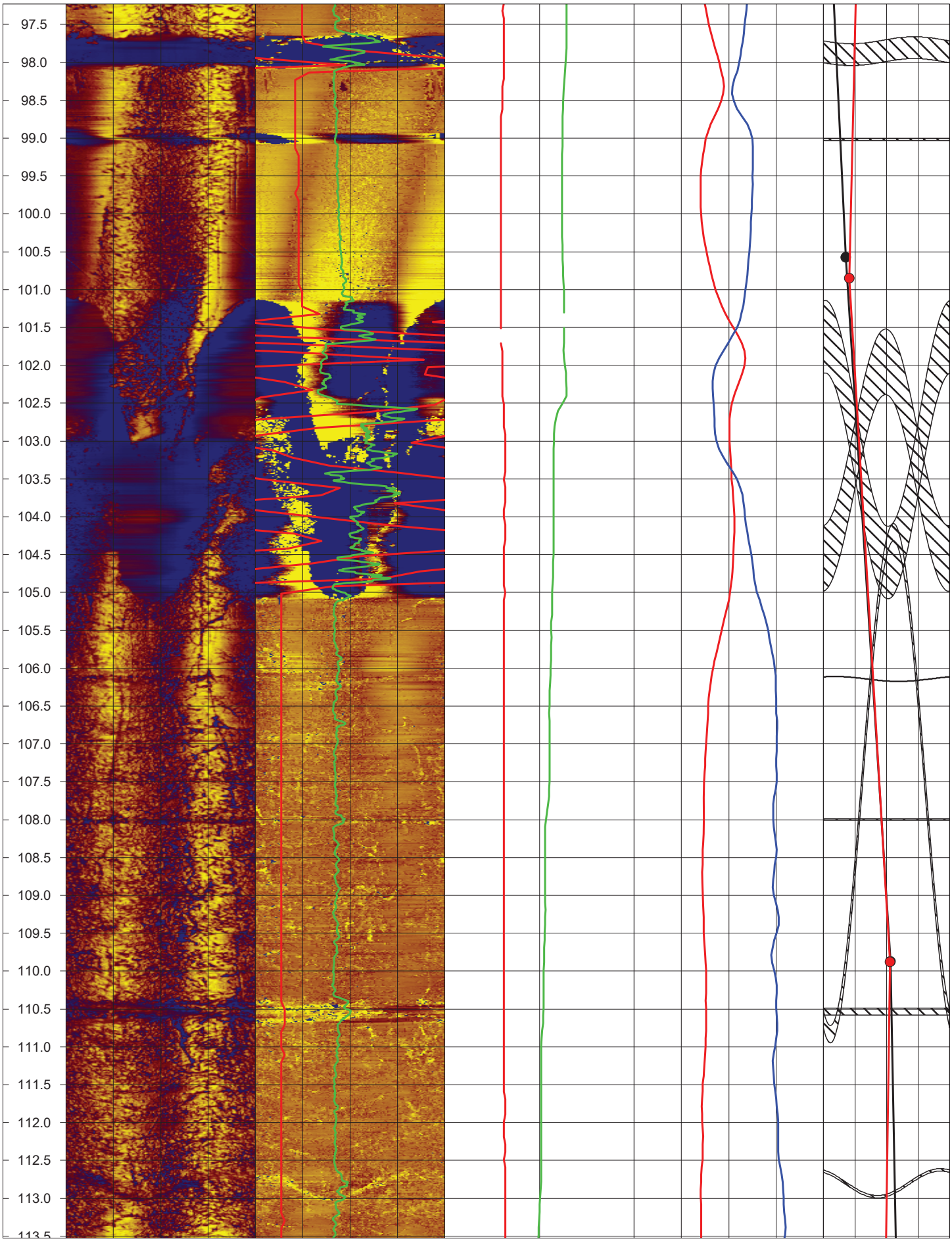
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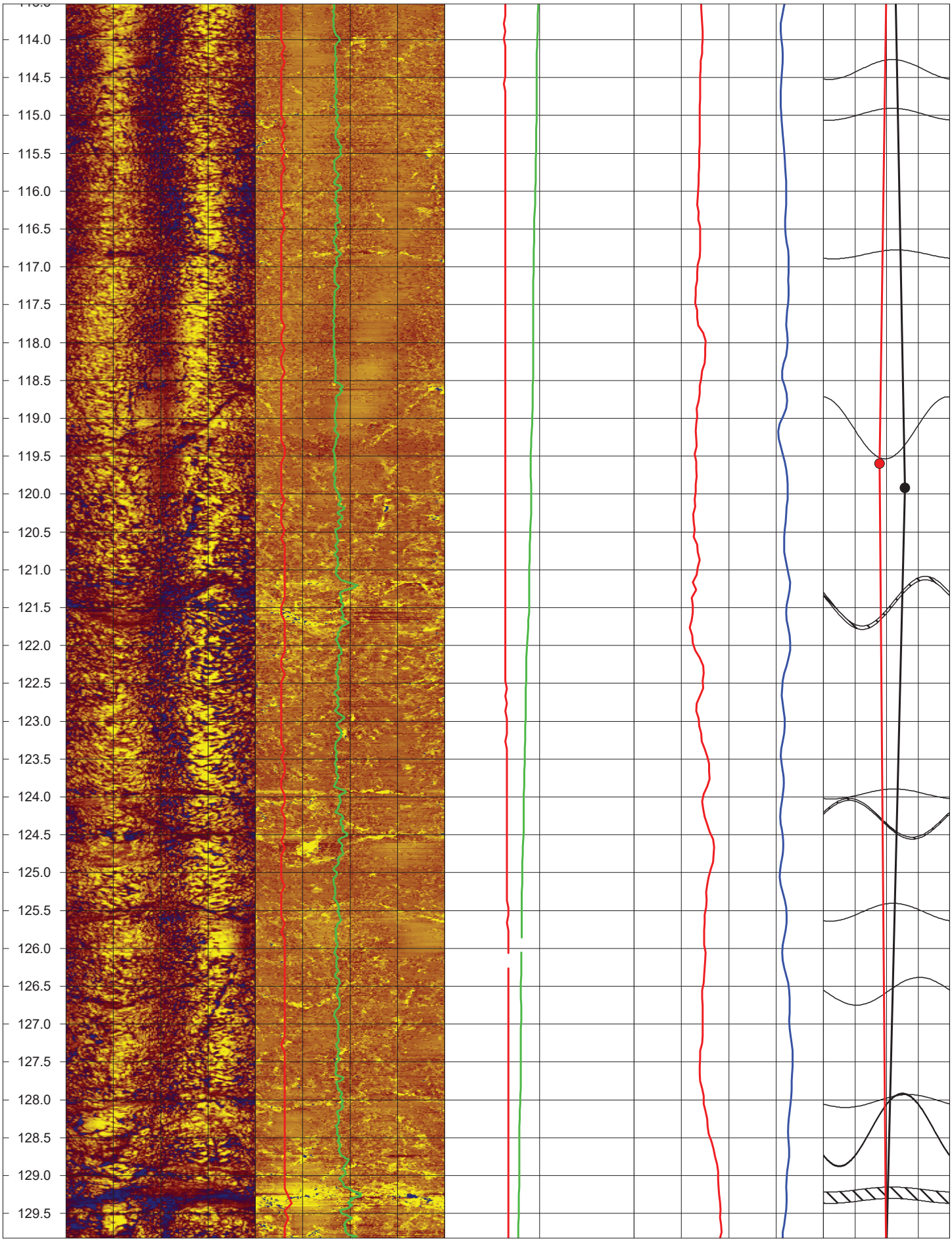
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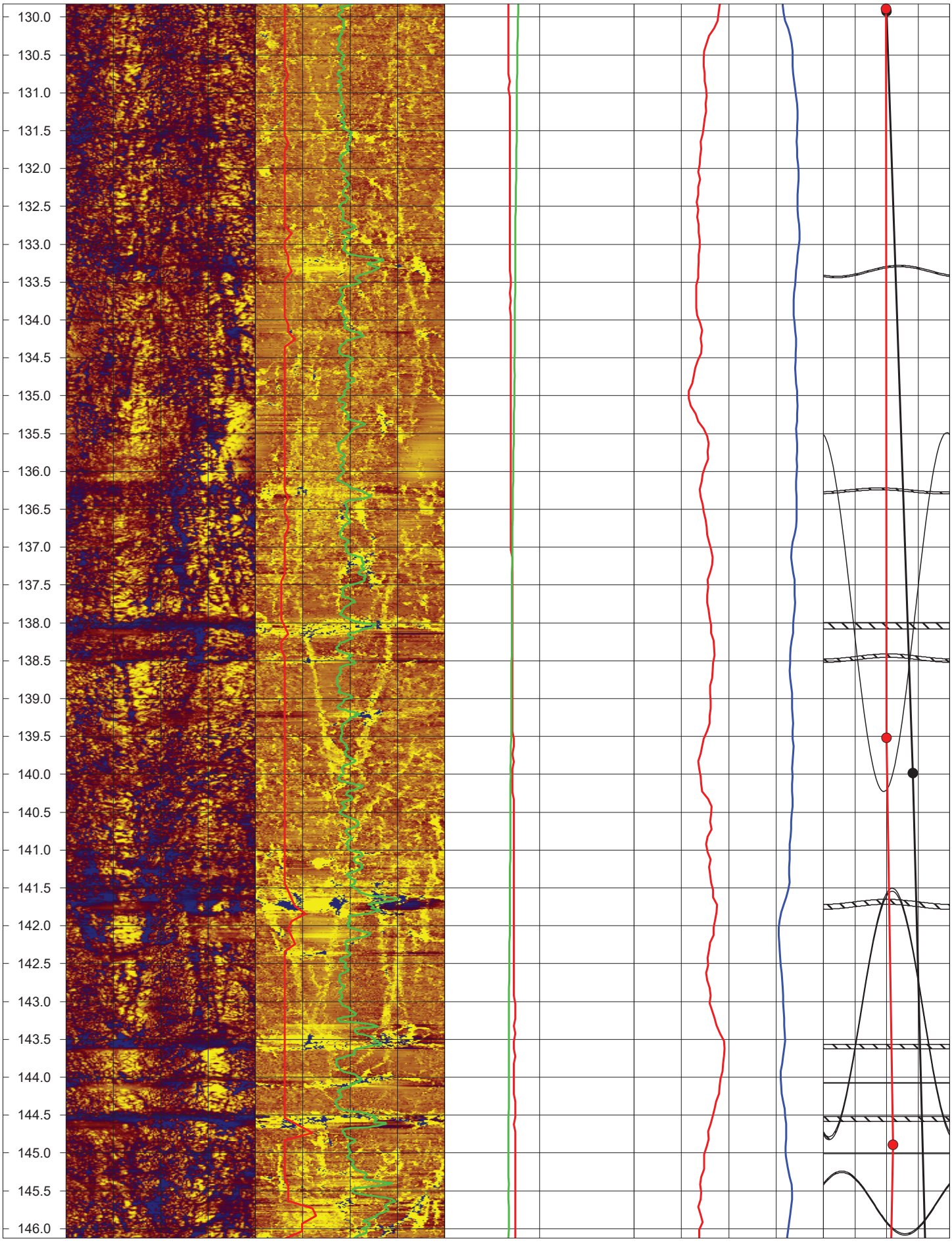
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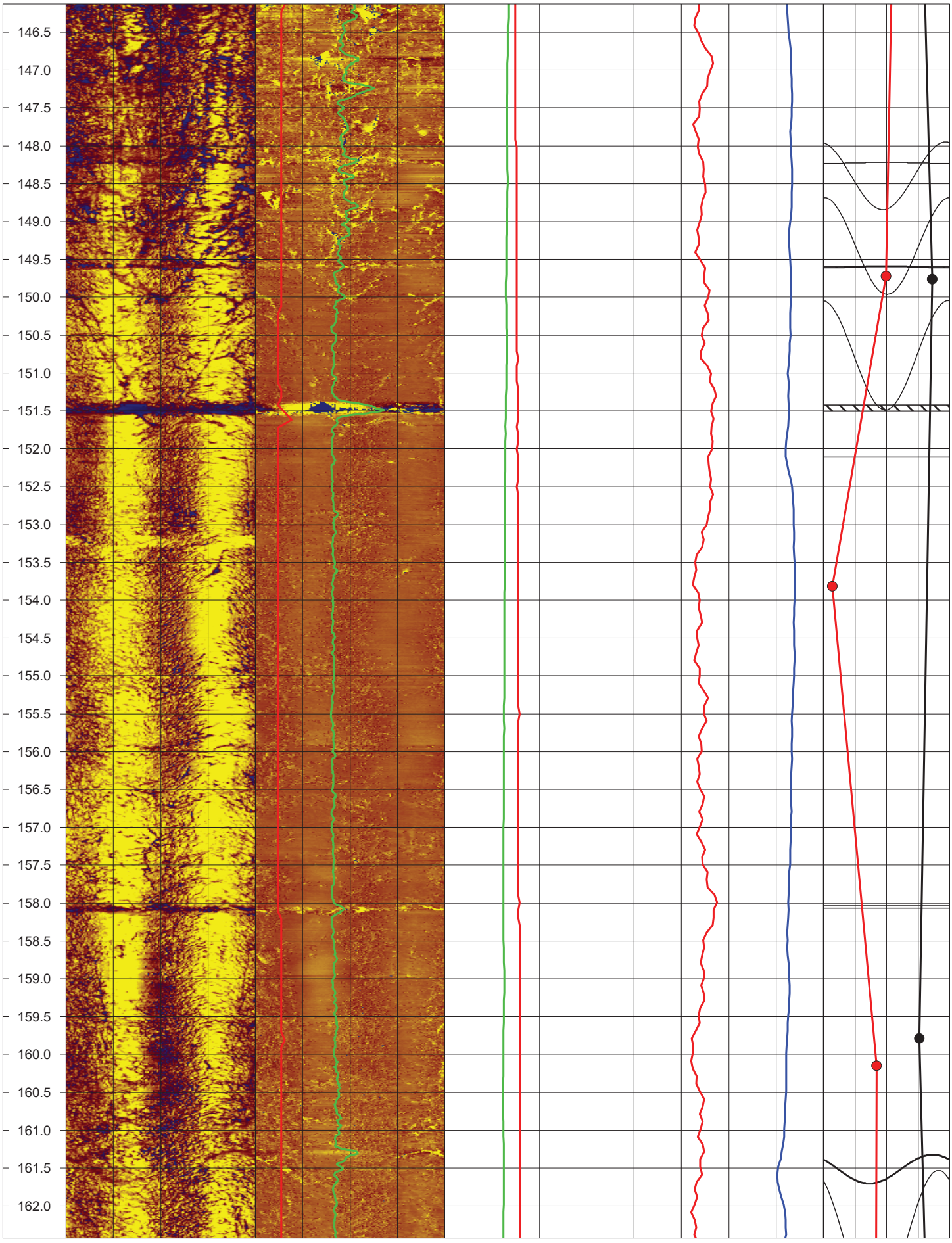
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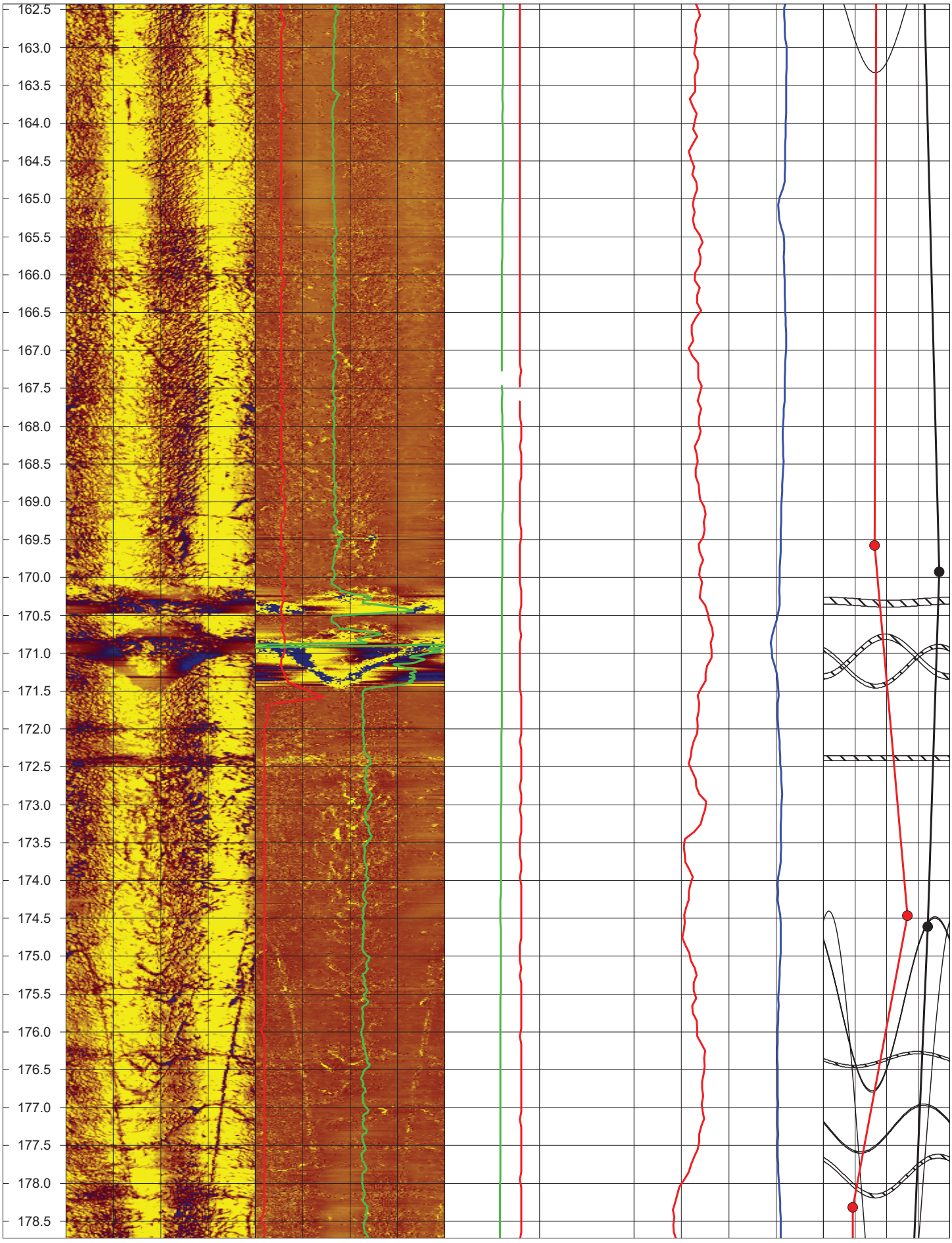
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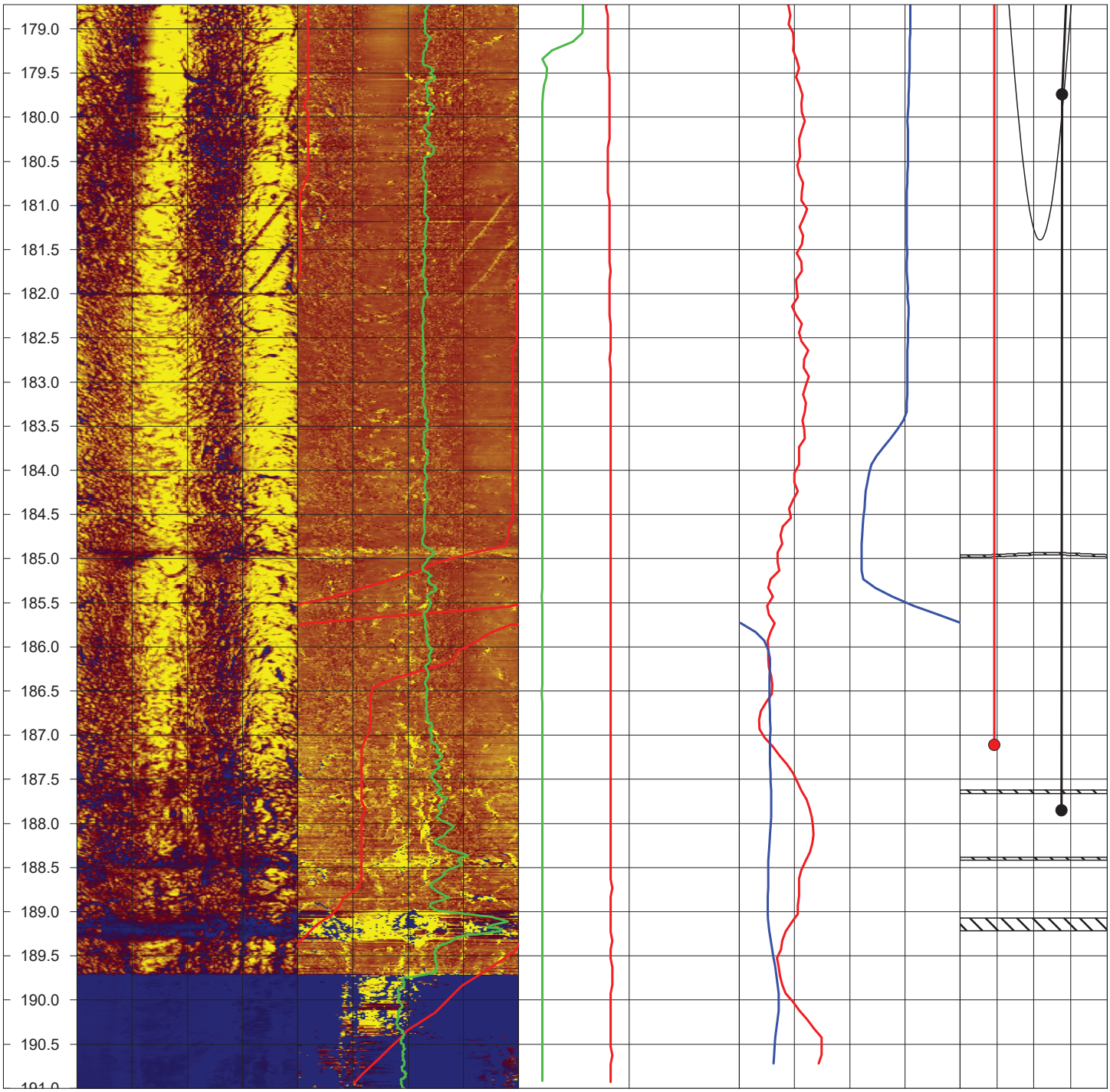
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APPENDIX B

Geochemical Conceptual Site Model Report

Prepared for

Georgia Power Company
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Atlanta, Georgia 30308

GEOCHEMICAL CONCEPTUAL SITE MODEL REPORT

PLANT BOWEN ASH POND 1 (AP-1)

Prepared by

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Project Number GW7629

July 2024

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LIST OF ACRONYMS AND ABBREVIATIONS

ACM	Assessment of Corrective Measures
AEC	Anion Exchange Capacity
AGI	American Geosciences Institute
Al	aluminum
AP-1	Ash Pond 1
Ca	calcium
Ca-SO_4	calcium-sulfate
CCR	Coal Combustion Residual
CEC	Cation Exchange Capacity
Co	cobalt
CSM	Conceptual Site Model
DPT	direct-push technology
EDXA	Energy Dispersive X-Ray Analysis
Fe	iron
GA EPD	Georgia Environmental Protection Division
Georgia Power	Georgia Power Company
GWPS	Ground Water Protection Standard
HAR	Hydrogeologic Assessment Report
meq/100g	milliequivalents per 100 grams
mg/kg	milligram per kilogram
Mn	manganese
Mo	molybdenum
mV	millivolts
ORP	Oxidation-reduction potential
SEM	Scanning Electron Microscopy
SEP	Sequential Extraction Procedure
SSL	Statistically Significant Levels
TDS	Total Dissolved Solids
TOC	Total Organic Carbon
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
WRA	Whole Rock Analysis
XRD	X-Ray Diffraction

1.0 INTRODUCTION

1.1 Purpose

This geochemical conceptual site model (CSM) report has been prepared for Georgia Power Company (Georgia Power) Plant Bowen Ash Pond 1 (AP-1 or Site) to support the remedy selection efforts being completed at the Site. The purpose of this geochemical CSM report is to document site-specific geochemical conditions influencing the fate and transport of cobalt (Co) and molybdenum (Mo). This report summarizes data previously submitted to the Georgia Environmental Protection Division (GA EPD) as part of routine Semiannual Remedy Selection and Design Progress Reports as well as recent data.

1.2 Site Background and Overview of AP-1 Pond Closure

Plant Bowen is located nine miles southwest of Cartersville in Bartow County, Georgia. The plant is bordered by the Etowah River to the north and east, and sparsely populated, forested, rural, and industrial land on the south and west. A site location map is provided in the *Draft Remedy Selection Report – Plant Bowen Ash Pond 1 (AP-1)* (See Figure 1, Draft Remedy Selection Report, Geosyntec, 2023a), to which this CSM is attached.

AP-1 occupies an area of approximately 254 acres. In preparation for AP-1 closure, the plant completed the conversion to dry ash handling in early 2019, and AP-1 no longer receives ash. Georgia Power submitted a notice of intent (NOI) to GA EPD stating that waste stream flows are no longer directed to AP-1, effective December 31, 2020. Georgia Power will close AP-1 by excavation and consolidation of Coal Combustion Residual (CCR) material into an approximately 144-acre fully-contained (including engineered composite-liner and final cover systems), multi-cell storage facility situated within the current footprint of AP-1. Removal of CCR in the vicinity of BGWC-43D is ongoing and is anticipated to be completed in early 2023. Removal of CCR in the vicinity of BGWC-22 is scheduled to be completed in 2024-2025. Closure of AP-1 is anticipated to be completed in 2035.

1.3 Geology and Hydrogeologic Setting

The following section summarizes the geologic and hydrogeologic conditions at AP-1 as described in the *Hydrogeologic Assessment Report (Revision 3) – AP-1* (HAR Rev 3) (Geosyntec, 2021a) prepared in support of the AP-1 solid waste handling permit.

1.3.1 Regional Geology

The Site is located within the Great Valley District of the Valley and Ridge Physiographic Province (Valley and Ridge) in northwest Georgia. The Valley and Ridge is characterized by Paleozoic sedimentary rocks that have been folded and faulted into ridges and valleys that gave this region its name. The floor of the valley is underlain by shales, dolomites, and limestones of Cambrian and Ordovician age. Geologic mapping performed by Lawton et al. (1976) indicates that the Site is underlain by the Ordovician-Cambrian age Knox Dolomite and the Ordovician age Newala Limestone. The composition and weathering of the Knox Dolomite and the Newala Limestone are discussed below.

1.3.1.1 Knox Dolomite

The Knox Dolomite is a thick-bedded gray dolostone which yields upon weathering large amounts of grey chert in small and large masses (Furcron, 1942). The Knox Dolomite is highly siliceous and produces a cherty, silty, clayey residuum that is 25 to 200 ft thick. (Croft, 1963). Typically, the weathering of Knox Dolomite is considered a slow process and produces smaller features as compared to other carbonate bedrock formations (e.g., the Newala Limestone).

1.3.1.2 Newala Limestone

The Newala Limestone occurs in isolated areas in the southwestern part of Bartow County and is about 200 feet thick (Croft, 1963). The Newala Formation weathers rapidly and as such, features in the formation are typically large and well developed (Croft, 1963). The Newala Limestone upon weathering is reported to produce residuum that is predominantly clayey with only a thin layer of chert (Croft, 1963).

1.3.2 Site Geology

The overall Site is underlain primarily by three units: (i) fill material consisting of earthen embankments and CCR material; (ii) residuum; and (iii) dolomite/limestone bedrock. Based on review of subsurface investigations at the Site, the bedrock is described as predominantly Knox Dolomite, with the smaller area in the S-SW corner of AP-1 underlain by the Newala Limestone. Additional lithology descriptions of these units can be found in the HAR Rev 3 (Geosyntec, 2021a).

As documented in the HAR Rev 3 (Geosyntec, 2021a), the Knox Dolomite underlying the Site has been reported to produce a characteristic orange to red clayey residuum that

is often cherty, consistent with the literature. Additionally, manganese and iron oxide staining has been observed along fractures and bedding surfaces at the Site suggesting the presence of iron and manganese minerals in the bedrock.

A review of borehole boring logs and geophysical data in the vicinity of BGWC-22 and BGWC-43D suggests that a majority of fractures and solution-enhanced features in the bedrock are completely or partially filled (Geosyntec, 2023b). To assess the nature of secondary porosity features (i.e., voids and solution enhanced fractures), data were evaluated that were generated during the advancement of 18 boreholes along the southern and southwestern boundary of AP-1 (Geosyntec 2023b). A total of 39 voids were identified from reviewing the logs and categorized as (i) clay- or sediment-filled, (ii) open, or (iii) inconclusive/not enough information. Cumulatively across the 18 borehole locations reviewed, these 39 voids represented a total of 268 feet of solutioned bedrock. Of this total length, 207 feet (77%) were filled with clay or sediment, 32 feet (12%) were open, and 29 feet (11%) were unable to be determined from the observations and descriptions. The information summarized in these logs supports the conceptual site model[1], in which these partially filled features contain an accumulation of relatively insoluble materials derived from the in-place weathering of bedrock material. In turn, the data indicating that a majority of the voids are filled supports the theory that groundwater flow within the bedrock mimics the porous media flow conditions identified in the clay-rich residuum and upper weathered bedrock zone.

Groundwater monitoring results at AP-1 demonstrate that the statistically significant levels (SSLs) for Co and Mo groundwater concentrations are limited in extent and attenuated, indicating that the constituents are interacting with aquifer solids present in infilled voids. If groundwater (and with it, dissolved Co and Mo) were to flow through interconnected open voids or in open channel-flow, minimal interaction with infilled residuum and/or sediments (and attenuation) would be expected. The observed attenuation based on groundwater monitoring is consistent with the sorptive behavior of aquifer solids observed during the laboratory sorption and desorption studies discussed below in detail. Therefore, it is likely that groundwater flow is predominantly through infilled voids.

[1] Residuum is formed from the weathering of the limestone and dolomite bedrock from both mechanical and chemical processes. As weathering occurs the calcium carbonate cations and anions enter an aqueous phase allowing the remaining insoluble minerals, including aluminosilicate clays, to build up and form residual material in the voids. These insoluble minerals are consistent with the reported composition of residuum underlying AP-1.

Based on these observations and horizontal hydraulic conductivity values, groundwater flow in the underlying dolomite/limestone bedrock is likely controlled by the secondary porosity features that are typically filled with residuum. There is no evidence that the identified open features are laterally extensive and interconnected. Additional findings specific to the wells of interest in this geochemical CSM are described in later sections.

Groundwater elevation data and potentiometric surface contours that depict groundwater flow direction are provided in the Draft Remedy Selection Report (Geosyntec, 2023a), to which this CSM is attached. Interpretation of the potentiometric surface contours indicates that groundwater generally flows to the north, northwest, and west, towards Euharlee Creek. A component of flow in the southernmost portion of AP-1 is to the south and west, likely due to groundwater mounding related to historical free water storage at the recycle pond at the southern end of AP-1 (now decommissioned).

1.4 Groundwater Exceedances

CCR compliance groundwater monitoring-related activities have been performed for AP-1 since June 2016 pursuant to the CCR Rule. The CCR groundwater monitoring wells are installed at appropriate locations and depths to yield groundwater samples from the uppermost aquifer (i.e., at the interface of residuum and weathered and fractured bedrock). A summary of CCR groundwater monitoring well network is presented in the Draft Remedy Selection Report (Table 1, Geosyntec 2023a).

According to the *2022 Semiannual Groundwater Monitoring and Corrective Action Report* (Geosyntec, 2022b), statistical analysis of the February 2022 assessment monitoring event identified SSLs of Appendix IV[2] constituents exceeding the federal groundwater protection standards (GWPSs) in certain wells, including Co above the GWPS of 0.006 milligrams per liter (mg/L) at detection monitoring well BGWC-22 and Mo above the GWPS of 0.1 mg/L at detection monitoring well BGWC-43D. Thus, Co and Mo were identified as constituents of interest for this geochemical CSM. Time series graphs of Co concentrations at well BGWC-22 and Mo concentrations at well BGWC-43D are depicted on **Figure 1** and **Figure 2**, respectively.

[2] Appendix IV constituents per 40 CFR 257 Subpart D.

2.0 SUMMARY OF SITE CHARACTERIZATION

The following section summarizes the field investigations and data evaluations completed at the Site that have been used to develop the current geochemical CSM. This material is presented in the Assessment of Corrective Measures (ACM) Report, Semiannual Remedy Selection and Design Progress Reports, and/or the Annual and Semiannual Groundwater Monitoring and Corrective Action Reports. These reports are available on the Bowen AP-1 public website[3]. References are provided below where additional information may be found which is pertinent to the materials discussed.

2.1 Groundwater and CCR Pore Water Geochemistry

2.1.1 Groundwater and Pore Water Analysis

During select sampling events, additional geochemical constituents were collected from groundwater and pore water sampling locations to supplement the Appendix III and Appendix IV constituents. The analytical data for these sampling events are presented in **Table 1**. A Site map depicting monitoring well and sample collection locations is presented on **Figure 3**. Additional data collected to support the remedy selection process, but which were not used in the geochemical evaluation, are provided in **Appendix A**. Analytical laboratory reports for the supplemental data are available as **Appendix B**.

Data from select locations, including three representative upgradient wells (BGWA-2, BGWA-29, and BGWA-33), one pore water piezometer screened within AP-1 CCR material (APPZ-2S), and the two downgradient wells of interest (BGWC-22 and BGWC-43D) were used to construct Piper and Stiff diagrams. These diagrams help evaluate the predominant chemical composition and geochemical similarities and differences between aqueous samples. The resulting Piper diagram is presented on **Figure 4**, and the Stiff diagrams for these locations are presented on **Figure 5**.

As can be seen on **Figure 4** and **Figure 5**, the groundwater samples from the background detection monitoring wells (shaded blue) reflect a calcium-bicarbonate ($Ca\text{-}HCO_3$) type water, as would be expected from wells screened within dolomite/limestone and unimpacted by AP-1. The downgradient detection monitoring wells of interest (shaded orange) reflect a calcium-sulfate ($Ca\text{-}SO_4$) type water. These downgradient wells have calcium as the dominant cation but sulfate and chloride as the dominant anions compared to the upgradient locations. In general, the downgradient detection monitoring wells

[3] https://www.georgiapower.com/company/environmental-compliance/plant-list/plant-bowen.html

(shaded orange) have higher concentrations of major cations and anions than the background monitoring well locations (shaded blue). The chemical composition of CCR pore water data from AP-1 (shaded green) show a Ca-SO_4 type water, similar to the downgradient wells on **Figure 4** and **Figure 5**. These results suggest the downgradient wells of interest are likely impacted by pore water from AP-1.

2.2 Aquifer Solids Characterizations

2.2.1 Aquifer Solids Sample Collection Rationale

The wells of interest (BGWC-22 and BGWC-43D) are screened in bedrock to yield water samples from the uppermost aquifer. As discussed in Section 1, groundwater flow in the underlying dolomite/limestone bedrock is likely controlled by the secondary porosity features, a majority of which are partially or completely filled (Geosyntec, 2023b). Specific to the monitoring wells of interest (BGWC-22 and BGWC-43D), a review of boring and geophysical logs indicated that a majority of secondary porosity features appeared to be infilled with clay and/or residuum (i.e., sediment) materials. Of the 18 boring logs evaluated as part of the study (Geosyntec, 2023b), four boreholes were evaluated in the vicinity of BGWC-22, and five boreholes were evaluated in the vicinity of BGWC-43D.

The four boring logs in the vicinity of BGWC-22 that were evaluated were BGWC-21, BGWC-22, BGWC-35D, and BGWC-37D (Geosyntec, 2023b). From these four boring logs, a total of five solution enhanced features or voids were identified of which only one (with a size of approximately 2 to 3 inches) was identified as an open void. In contrast, infilled voids ranged from 3 feet to 10 feet (Geosyntec, 2023b). Normalized for size of the features, a significant majority (approximately 99%) of secondary porosity features in the vicinity of BGWC-22 were observed to be infilled with clay or sediment materials.

The five boring logs in the vicinity of BGWC-43D that were evaluated were BGWC-30, BGWC-36D, BGWC-38D, BGWC-43D, and BGWC-49D (Geosyntec, 2023b). A total of fourteen solution enhanced features were identified from these boring logs. Seven features were classified as filled, while five features were classified as open, and two features were classified as inconclusive. The size of the open features ranged from 1 to 5 feet, while the size of infilled features ranged from 2 to 10 feet. The size of inconclusive features ranged from 1 to 6 feet. Normalized for the size of features, a majority (approximately 60%) of secondary porosity features were observed to be infilled, while approximately 16% were found to be open, and 24% were inconclusive.

Based on the evaluation of secondary porosity features and generally low horizontal hydraulic conductivity values, the geochemical mechanisms that could affect the fate and transport of constituents in groundwater are likely to be dominated by the interaction of groundwater with residuum (i.e., clay and/or sediments) that fills the secondary porosity features. Infill materials from secondary porosity features within bedrock samples routinely washed out during well installation activities and could not be directly collected or sampled. As a result, to evaluate the composition of aquifer solids that are likely to interact with groundwater in the vicinity of BGWC-22 and BGWC-43D, five samples of residuum overlying the bedrock were collected.

2.2.2 Residuum (Weathered Bedrock) Solids

Residuum samples were collected using a direct-push technology (DPT) rig in August 2020 from the unconsolidated zone at five locations in the vicinity of AP-1 (indicated as DPT-01 to DPT-05 as shown on **Figure 3**). The sample depths were selected based on review of available boring logs from monitoring wells in the vicinity of the DPT boreholes to target the residuum and/or highly weathered bedrock zones. DPT boring depths are presented in **Table 2**. Four borehole locations (DPT-01 to DPT-04) were selected to provide representative materials from areas downgradient of AP-1. A sample was also collected from one location (DPT-05) upgradient of the unit to be representative of background conditions near BGWA-33. Boring logs are presented in **Appendix C**.

The residuum samples were sent to SiREM analytical laboratory (Guelph, Ontario) for a baseline chemical and mineralogical characterization by application of the following analytical/testing methods.

- *Cation and Anion Exchange Capacity (CEC/AEC)*: Ion exchange capacity (both AEC and CEC) of a soil or aquifer is an important variable to understand when evaluating attenuation processes. It is generally defined as the capacity of a soil to retain both positively and negatively charged ions, such as many metals, (micro-) nutrients, and anions such as sulfate or chloride. Understanding the capacity of solids in the subsurface to retain positively and negatively charged solutes helps in the evaluation of attenuation mechanisms and capacity.

- *Total Sulfur, Sulfide*: The presence of sulfur, and especially sulfide in the aquifer materials may give an indication whether metals prone to precipitation as sulfides or co-precipitation with sulfidic minerals, might be present in the aquifer matrix. The results represent the total amount of oxidized and reduced sulfur relevant to

metals that are prone to coprecipitate with and/or form sulfide minerals. Understanding the presence and speciation of sulfur compounds allows an estimation of whether certain metals are likely to form sparingly soluble sulfide minerals as a possible attenuation mechanism.

- *Organic Carbon Content*: This analyte represents the presence of substrate for sorption and energy source for microbially mediated metal(loid)s transformations. Organic carbon in the subsurface can serve to sorb/retain metals, but it can also provide food to microorganisms that use certain metal(loid)s as electron acceptors and therefore change their oxidation-reduction (redox) state, which affects their mobilization/ immobilization. Organic carbon, if present, can contribute to the CEC and AEC of a soil.

- *Total Metals Concentration*: This represents the total concentrations of targeted constituents in the solid phase. The solid samples at Bowen were analyzed for Mo, Co, iron (Fe), aluminum (Al), and manganese (Mn). This analysis helps to understand the presence of site-specific constituents in aquifer solids as well as the elements Fe, Al, and Mn that form major mineral phases known to sorb/retain many metals.

- *X-Ray Diffraction (XRD), Scanning Electron Microscopy (SEM), Energy Dispersive X-Ray Analysis (EDXA), and Whole Rock Analysis (WRA)*: This represents qualitative and quantitative confirmation of mineral phases present, including WRA for quantitative confirmation of XRD results. Identifying crystalline and non-crystalline mineral phases aids in the evaluation of attenuation mechanisms and capacity.

A summary of the residuum characterization results is provided below, and the complete SiREM report is included in **Appendix D** of this report. The laboratory results are included in **Table 3** through **Table 6**.

2.2.2.1 Anion and Cation Exchange Capacity

The CEC of soils is dependent on the amount and type of clay minerals, organic matter, and amorphous minerals, while the sources of AEC in soils include clay minerals (primarily 1:1 clays such as kaolinite), metal oxides, and amorphous materials. In general, the CEC of a soil is higher than the AEC, but highly weathered and acidic soils can have substantial AEC (Sparks, 1995).

As summarized in **Table 3**, the CEC in the residuum immediately overlying bedrock ranges from 4.90 milliequivalents per 100 grams (meq/100 g) in boring DPT-04 to 28.0 meq/100 g in boring DPT-02. Similarly, the AEC ranges from 5.50 meq/100 g in DPT-01 to 8.13 meq/ 100 g in DPT-04. Generally, the CEC is within the range typically observed in kaolinite clays (Sonon et. al., 2017), while the AEC is lower than the CEC, as would be expected. Given the low to non-detect Total Organic Carbon (TOC) content of these materials (Section 2.2.1.2), the ion exchange capacities appear to be mostly dominated by clay minerals and metal oxides. As a result of the relatively low values in residuum, CEC and AEC are anticipated to play a somewhat limited role in the attenuation of site-specific constituents in bedrock secondary porosity features typically filled with residuum.

2.2.2.2 Total Sulfur, Total Sulfide, and TOC

As summarized in **Table 3**, neither total sulfur nor total sulfide were detected at their detection limits of 0.005% and 0.04%, respectively, in the five borings. The TOC content of these materials is low, ranging from non-detect (<0.025%) in background boring DPT-05 to 0.10% in DPT-02 (**Table 3**). These low concentrations are not unexpected given that the samples were collected in the residuum immediately overlying bedrock. As a result, organic carbon is not expected to play a major role in the attenuation of site-specific constituents in bedrock secondary porosity features typically filled with residuum.

2.2.2.3 Total Metals and Whole Rock Analyses

The total metals results are summarized in **Table 4.** The metals include the site-specific constituents of interest Mo and Co. In addition, Fe, Al, and Mn were also analyzed to assess if oxides/oxyhydroxides of these metals may be present, as these mineral phases can be a significant source of attenuation capacity for metal(loid)s.

Results indicate that the residuum (from weathering of bedrock) contains appreciable concentrations of site-specific constituents of interest. Mo detections ranged from 2.2 milligram per kilogram (mg/kg) in residuum collected from the background boring DPT-05 to 8.8 mg/kg in residuum at the downgradient boring DPT-01. Site-specific concentrations of Co in residuum samples range from 12 mg/kg in boring DPT-02 to 29 mg/kg in boring DPT-04. As described in Section 1, residuum is derived by the weathering of carbonate bedrock. As such, the presence of Mo and Co in the background residuum sample (DPT-05) indicates that naturally occurring Mo and Co are likely

present in the parent bedrock. The weathering process at a minimum, partially contributes to the concentrations of Mo and Co detected in residuum underlying AP-1. The total metals analysis suggests that the parent bedrock as well as secondary porosity features filled with residuum are likely to contain detectable concentrations of Co and Mo at the Site.

As expected for residuum and highly weathered bedrock materials, the Fe and Al contents are substantial, with Fe concentrations ranging from 17,000 mg/kg (1.7%) in background boring DPT-05 to 40,000 mg/kg (4.0%) in DPT-02 and DPT-04. Aluminum concentrations range from 37,000 mg/kg (3.7%) in DPT-05 to 93,000 mg/kg (9.3%) in DPT-04. These results are approximately one order of magnitude higher than the average Fe and Al content of carbonates (i.e., 0.38% and 0.42%, respectively; AGI, 2016). The high concentrations of Fe and Al suggest that the weathering of carbonate bedrock material likely results in the enrichment of non-soluble minerals including clays and aluminosilicates, consistent with the reported composition of residuum underlying AP-1. The clay minerals and aluminosilicates are likely to provide substantial attenuation capacity for site-specific constituents at AP-1. Manganese concentrations range from 210 mg/kg in boring DPT-03 to 960 mg/kg in boring DPT-01 and are moderately lower than average Mn concentrations for carbonates (i.e., 1,100 mg/kg; American Geosciences Institute (AGI), 2016). As described earlier, residuum at the Site is derived through the weathering of bedrock. As a result, similar to Mo and Co, the total metals analysis of the background residuum sample (DPT-05) indicates that the parent bedrock as well as secondary porosity features filled with residuum likely contain clays, iron minerals, and aluminosilicates that could attenuate Co and Mo.

Whole Rock Analysis (WRA) was included as a chemical assay to confirm and reconcile the quantitative mineral analysis obtained through XRD. While the name might imply "rock" samples, the analysis of DPT solid samples was conducted on the residuum overlying the bedrock and not on bedrock materials. The WRA of the residuum (summarized in **Table 5**) confirms the presence of major mineral phases. With this analytical method, each element is reported as an oxide (i.e., not as its mineral form in the sample). The most abundant elements detected include silicon (Si) followed by Al and Fe. Other constituents, including Ca, K, and titanium (Ti) were consistently detected at relatively low levels. The WRA analysis further supports the likely presence of mineral phases in parent bedrock and secondary porosity features likely filled with residuum that could attenuate Co and Mo. The low concentration of Ca in residuum is likely a result of the weathering process where Ca from the carbonate bedrock is dissolved over time

resulting in a residuum that is enriched in low solubility minerals (e.g., silicates) and deficient in Ca containing minerals (e.g., dolomite and calcite). As such, bedrock secondary porosity features are anticipated to be filled with material enriched in silicate minerals and deficient in carbonate minerals consistent with the literature (Section 1).

2.2.2.4 XRD and SEM/EDXA Analyses

XRD as well as SEM/EDXA analyses were performed to characterize both the crystalline and non-crystalline mineralogy/phases that are present in the residuum. Overall, the analysis of the residuum samples indicates the abundance of quartz, muscovite, kaolinite, and goethite (**Table 6**). The quantitative XRD data (**Table 6**) indicate that the largest percentage of the residuum is made up of quartz, ranging from 39.9% (by weight) in boring DPT-03 to 79.2% (by weight) in boring DPT-01. The second-highest percentage of the mineralogy was characterized by muscovite, a hydrous silicate of aluminum and potassium mica, and kaolinite, an aluminosilicate clay mineral. Muscovite ranged from 11.1% in boring DPT-01 to 21.6% in background boring DPT-05. Kaolinite was detected between 6.6% in DPT-01 and 24.5% in DPT-03. Goethite (α-FeOOH) was detected in three of the five borings between 10.4% and 17.5% but was not detected in borings DPT-01 and DPT-05. Other consistently detected minerals include the feldspar minerals albite and orthoclase, and occasional detections include the feldspar mineral microcline (one of five borings), magnetite (two of five borings), and the titanium oxide (TiO_2) mineral rutile (three of five borings).

The SEM/EDXA images and results are included in the SiREM report (**Appendix D**). SEM/EDXA has the advantage of also identifying amorphous (i.e., non-crystalline) phases that cannot be identified using XRD and therefore supplements the XRD results. The identified minerals and amorphous phases were generally consistent across all five residuum samples. The main minerals identified include quartz, various feldspar minerals and silicates (including mica, amphibole, zircon), titanium-containing minerals such as rutile and ilmenite, and an abundance of non-crystalline Fe- and Mn-oxides that are either present within the soil matrix or as coatings on quartz and feldspar grains. Pyrite was identified in one boring (i.e., DPT-04), demonstrating that sulfide minerals can still be present even though total sulfide concentrations were non-detect in the residuum samples.

The XRD and SEM/EDXA data of the residuum are consistent with weathering of the highly siliceous Knox dolomite as discussed in **Section 1** and suggests that the parent carbonate bedrock is the source of mineral phases including silicates, clay minerals, and Fe- and Mn-oxides observed in the residuum samples. The XRD and SEM/EDXA results

are generally consistent with the total metals analysis and WRA, and further support the presence of attenuation phases in parent bedrock and secondary porosity features typically filled with residuum.

2.2.2.5 Sequential Extraction Procedure

Residuum solids collected from DPT-02 (located downgradient of well BGWC-22) and DPT-05 (background location) were submitted for a sequential extraction procedure (SEP) at the Eurofins/TestAmerica laboratory in Knoxville, Tennessee to assess the geochemical fractionation of trace elements within aquifer solids. SEPs are chemical extractions used to dissolve metals from specific solid-associated phases. SEPs use progressively stronger reagents to solubilize metals from increasingly recalcitrant phases. Although these procedures do not identify the specific metal phases in a soil/aquifer matrix, they do provide a means to evaluate the class of solids and relative stability in relation to oxidation/reduction (redox) potential and pH fluctuations (Tessier et al, 1979; Kuo et al., 1983; Sposito et al., 1984; Hickey and Kittrick, 1984; Gruebel et al., 1988).

SEP data can be used to interpret the mechanism and potential reversibility of attenuation processes. These data also supplement information collected during the baseline characterization, such as CEC and AEC, as well as the presence of certain minerals and/or metal oxyhydroxides observed with XRD and SEM/EDXA. Note that the extracted fractions during the SEP analysis were measured only for the metals of interest (i.e., Co and Mo). Analysis of additional metals including iron, manganese, and aluminum is anticipated to be performed during the remedy design and implementation process. Eurofins/TestAmerica uses a 7-step extraction procedure, which is briefly described in **Appendix D**. The results of the SEP analysis are provided in **Table 7**.

As a first step to evaluate data quality in an SEP analysis, the sum of individual extraction steps from the SEP was compared to the total concentration of a metal. The sum of SEP is not expected to be exactly equal to the total metals analysis but should generally be consistent with the total metals analysis. As seen in **Table 7**, the total metals analyses for Co and Mo, and the sum of these individual metals from extraction steps 1 through 7 match reasonably well, indicating good metal recovery in the SEP steps and data quality. There was little variation in the extraction patterns for Co and Mo within the two samples. While the individual constituents showed some variation in recovery associated with the extraction steps, the extraction patterns were similar in background boring DPT-05 and downgradient boring DPT-02.

Cobalt was not recovered during the first two extraction steps (i.e., Exchangeable Phase and Carbonate Phase), with the bulk of Co being extracted in Step 3 (Non-Crystalline Phase) and Step 4 (Metal Hydroxide Phase), indicating that Co is mostly associated with amorphous and crystalline metal oxides and oxyhydroxides in the residuum. Naturally-occurring Co tends to be associated with Mn oxides, which would be extracted in Step 4 of the SEP. No Co was extracted in the Organic Phase (Step 5) and about 10% Co was extracted in the Acid/Sulfide Phase (Step 6) and the Residual Phase (Step 7). Note that although Co was not detected in the first two steps of the SEP, the detection limit for Co was elevated. As such, it is possible that low concentrations (i.e., lower than the detection limit) of Co could be associated with the Exchangeable and Carbonate Phases.

Similar to Co, Mo was not recovered during the first two extraction steps (i.e., Exchangeable Phase and Carbonate Phase), and given the low total concentrations of Mo in both samples (i.e., 2.8 and 1.6 J mg/kg), only trace detections were recovered in subsequent extraction steps with no recoveries in the Organic Phase (Step 5). The highest concentrations of Mo, which were estimated concentrations, were recovered in Step 4 (Metal Hydroxide Phase) indicating that Mo is mostly associated with crystalline metal oxides and oxyhydroxides. Note that although Mo was not detected in the first two steps of the SEP, the detection limit for Mo was elevated. As such, it is possible that low concentrations (i.e., lower than the detection limit) of Mo could be associated with the Exchangeable and Carbonate Phases.

2.3 Sorption and Desorption Batch Studies

At AP-1, groundwater flow in bedrock is likely to be controlled by flow through secondary porosity features that are typically filled with residuum. As a result, the geochemical interaction of groundwater and residuum is anticipated to play a major role in the attenuation of site-specific constituents. To evaluate the attenuation capacity and potential geochemical mechanisms, select residuum samples and groundwater samples were shipped to SiREM for laboratory studies to assess the sorption and desorption behavior of Co and Mo. In general, sorption studies use soils collected from background locations and groundwater with constituent concentrations above GWPSs to evaluate attenuation mechanisms and capacity. Desorption studies can be used to assess attenuation stability of the constituents of interest, and generally utilize soils collected proximal to areas with exceedances of GWPSs and groundwater with background constituent concentrations. Sorption tests are used to calculate a site-specific distribution coefficient (K_d) between the solid phase and the aqueous phase. The K_d values can be

used to evaluate the ability of site soils to attenuate specific constituents (Co and Mo herein). Generally, high K_d values indicate strong sorption and attenuation.

2.3.1 Sorption Studies

Prior to selecting solids for the sorption studies, the lithology as well as the chemical and mineralogical characterization data for the residuum samples collected from DPT-01 through DPT-05 were evaluated for potential differences in characteristics. Both the lithology and the characterization data were generally consistent among the five DPT locations; however, some variability in chemical composition was observed (**Table 4**). The concentration of iron was lowest in background location DPT-05. As stated earlier, iron minerals are anticipated to attenuate both Co and Mo, and hence DPT-05 was selected for the sorption studies to conservatively evaluate sorption characteristics of residuum material. Unimpacted (but spiked) groundwater from background well BGWA-2 was used together with unimpacted solids from DPT-05 to construct batch reactors to evaluate sorption of Co and Mo.

Groundwater from BGWA-2 was spiked with Mo and Co at six concentration levels. The highest spike concentration level (Level 6) of each constituent was at least twice as high as the highest Co or Mo concentration observed at the Site for the constituent of interest, either within CCR pore water or groundwater, whichever was higher. Reactors were constructed in duplicate and incubated for seven days under laboratory atmospheric (i.e., ambient) conditions. Samples were collected from the reactors at the beginning of the study (i.e., Day 0) and at the end of the study (Day 7). The samples were analyzed for dissolved Co and Mo, pH, and oxidation-reduction potential (ORP). The concentrations of Co and Mo sorbed to the solids were calculated based on the concentration difference in the aqueous phase between the initial spike and Day 7 and the mass of aquifer solids in each reactor. Note that the reactors were not pH buffered (i.e., no buffering agent was added to the reactors to maintain a set pH). As such, some variability in pH with time was anticipated and observed during the sorption tests and may have influenced mobilization and immobilization of Co and Mo observed during the sorption tests. pH buffering may be considered if additional sorption or treatability studies are conducted during the remedy design and implementation phase of this project. A detailed description of the methods and materials used to complete the sorption study is included in the SiREM report provided in **Appendix D**.

Based on the results of the laboratory batch testing, the concentrations of sorbed constituents (in mg/kg) and dissolved constituents remaining in aqueous solution (in

mg/L) were plotted for each spiked concentration level. These graphs represent sorption isotherms that can be used to calculate K_d values between the solid phase and the aqueous phase. Linear regression lines were fit to the data using the method of least squares in Microsoft Excel, and the slopes of these regression lines represent the K_d values for each constituent (United States Environmental Protection Agency (USEPA), 2005).

Cobalt sorption results are summarized in **Table 8A** and depicted on **Figure 6A**, with dissolved concentrations (in mg/L) plotted on the x-axis and the sorbed concentrations (in mg/kg) plotted on the y-axis. The Co results indicate sorption onto residuum and suggest a linear sorption isotherm with a calculated K_d value of approximately 82 liters per kilogram (L/kg). This value is within the range of K_d values reported by USEPA (2005) for Co in soil/water systems and suggests strong sorption of Co in the residuum underlying AP-1 and is consistent with groundwater monitoring results downgradient of BGWC-22, which is delineated at the first downgradient assessment monitoring well (i.e., BGWC-32) and indicates Co attenuation prior to migrating offsite.

Molybdenum sorption results are summarized in **Table 8B** and depicted on **Figure 6B**. The Mo results suggest a linear sorption isotherm with a very high calculated K_d value of 45,523 L/kg. This value is outside the range of K_d values reported by USEPA (2005) for Mo in soil/water systems, possibly due the decrease in pH observed during the sorption testing. Although some variability was observed in the sorption test data, Mo sorption was observed during Day 0 (Table 8B), indicating that Mo sorbed to the aquifer solids.

2.3.2 Desorption Studies

Similar to the sorption studies, the lithology as well as the chemical and mineralogical characterization data of the five DPT samples were evaluated to assess which residuum sample should be used for the desorption studies. One of the important characteristics for this evaluation was the total concentrations of Co and Mo reported in the samples collected from these borings. The DPT-02 boring was selected for this study given that it is located downgradient of well BGWC-22 and the associated residuum sample reports the second highest concentrations of Co and Mo amongst the five borings.

Batch reactors were constructed under laboratory atmospheric (ambient) conditions in duplicate using the residuum solids from DPT-02, and background groundwater from BGWA-2 to evaluate desorption behavior of Co and Mo. As noted previously, more detailed descriptions of the methods and materials are included in the SiREM report provided in **Appendix D**.

The results of the desorption batch study are summarized in **Tables 9A** and **9B**. Additionally, the total concentrations of these elements obtained through the baseline characterization of these samples and the background groundwater concentration from BGWA-2 are included in **Tables 9A** and **9B** to provide some context for the desorption results. As can be seen in **Tables 9A** and **9B**, non-detect to low concentrations of the constituents of interest were reported after seven days of reaction with background groundwater. Dissolved Co (total Co is present at 19 mg/kg within the tested solid sample) and dissolved Mo (total Mo is present at 7.6 mg/kg within the tested solid sample) concentrations decreased between Day 0 and Day 7 of the batch study, suggesting that these two constituents are not available for desorption under experimental conditions. The desorption results are generally consistent with the SEP results and groundwater monitoring data that indicate Co and Mo attenuation along the groundwater flow path.

3.0 GEOCHEMICAL CONCEPTUAL SITE MODEL

3.1 Cobalt

3.1.1 Geochemistry and Fate and Transport Properties

Cobalt speciation in natural surface and near-surface environments is predominated by the aqueous cation $Co^{2+}_{(aq)}$. However, Co can also be oxidized to Co^{3+}, although this form of Co has very low solubility and typically precipitates out of solution (Collins and Kinsela, 2010). Cobalt may also precipitate out with carbonates and crystalline or amorphous oxhydroxide phases (ATSDR, 2004; Krupke and Serne, 2002). Cobalt is also known to undergo isomorphic substitution for Fe in crystalline Fe minerals such as pyrite due to their similar ionic radii (Hitzman et al, 2017). These processes are affected by a number of environmental factors such as pH, ORP, and the presence of organics (e.g., humic substances). Cobalt mobility increases with decreasing pH and ORP and in the presence of chelating/complexing agents.

The pH of groundwater at the Site ranges from 6.4 to 8.4 standard units (s.u.), while the ORP ranges from approximately -140 millivolts (mV) to approximately +121 mV (**Table 1**). The dissolved oxygen (DO) at the Site ranges from 0.1 mg/L to 7.9 mg/L (**Table 1**). Under site-specific pH and ORP conditions, Co in groundwater at BGWC-22 is predominantly present as Co^{2+} (**Figure 7)**, while Fe is likely to be present as iron oxides and oxyhydroxides (**Figure 8**). Under site conditions, Co is therefore likely to be present as either dissolved Co^{2+} or adsorbed (complexed) with oxide phases of Fe, consistent with the literature (ATSDR, 2004; Krupke and Serne, 2002).

3.1.2 Site-Specific Mobilization and Attenuation Processes

Cobalt is present above the GWPS in groundwater at well BGWC-22. BGWC-22 has a similar geochemical composition to the CCR pore water (**Figure 4**), which indicates that groundwater at that location may be influenced by AP-1. Total cobalt was detected in residuum collected from background location DPT-05 (**Table 4**), suggesting Co is naturally occurring at the Site. SEP data (**Table 7**) suggest that a large fraction of the Co (approximately 87% to 90% in DPT-02 and DPT-05, respectively) in the residuum is associated with non-crystalline and metal hydroxide phases, suggesting that the residuum could attenuate Co through surface complexation to metal hydroxides and non-crystalline mineral phases.

The groundwater monitoring data suggest that Co is not migrating far from the waste boundary and appears to be limited to the immediate vicinity of well BGWC-22. As shown in **Table 1**, Co is frequently not detected or only measured at low concentrations in detection monitoring wells at the Site, which suggests that the residuum associated with secondary porosity features in bedrock provides substantial attenuation capacity for Co.

Results from the site-specific geochemical characterization described in **Section 2** indicate that the primary mechanisms governing Co attenuation at Bowen AP-1 include the following:

- Sorption – Under neutral to alkaline pH conditions, Co^{2+} in groundwater bonds to surface species of aquifer matrix materials. Alkaline pH conditions induce a negative surface charge on these mineral surfaces, allowing Co cations to adsorb/complex.

- Co-precipitation – Similar to sorption, Co initially bonded to mineral surfaces become entrained in the crystal structure as the mineral continues to grow. This process more commonly occurs with poorly crystalline, fast growing iron and manganese oxyhydroxides that precipitate under oxidizing conditions.

These mechanisms are illustrated in **Figure 10**. While cation exchange (measured as CEC) may play a somewhat limited role in the attenuation of Co, multiple lines of evidence (SEP, XRD, SEM/EDXA, and sorption and desorption studies) point to interactions with iron and potentially aluminum and manganese oxyhydroxides as the primary driver of Co attenuation. These mineral phases are likely to be associated with the bedrock and secondary porosity features filled with residuum.

The composition of the residuum (as determined by total metals, whole rock analysis, XRD, and SEM/EDXA) consists of relatively high proportions of iron-bearing minerals, including iron oxyhydroxides and clay minerals (muscovite, kaolinite, and goethite), and to a lesser degree, manganese oxyhydroxides. Many of these minerals are also likely to be present in the parent bedrock. Both crystalline and amorphous iron/manganese oxyhydroxides as well as clay minerals typically have high surface areas, and would be expected to exhibit relatively high sorption capacities for Co. The presence of high attenuation capacities for Co is further supported by the sorption batch studies. These studies conducted with site-specific background material (DPT-05/BGWA-2) and Co-

spiked background groundwater containing up to 0.095 mg/L Co show that Co was attenuated by aquifer materials within a matter of days.

The interaction of Co with Fe-/Mn-oxides and oxyhydroxides, and clay minerals is supported by the results of the SEP. The SEP data were used to evaluate the fractionation of Co in aquifer materials collected upgradient and downgradient of AP-1 and showed that the majority of Co was associated with non-crystalline materials (i.e., amorphous iron/manganese oxyhydroxides) and the metal (iron/manganese) hydroxide phase.

The sorption of Co to iron oxyhydroxides in the vicinity of BGWC-22 appears to be stable under current conditions at the Site. As shown on **Figure 8**, Fe is likely to be present as iron oxides/oxyhydroxides under site-specific ORP and pH conditions. This is supported by the abundance of the iron oxyhydroxides identified via XRD and SEM/EDXA. While hematite is one of the more stable iron oxides (i.e., least soluble), a mixture of different iron oxides and oxyhydroxides are commonly found in aquifers due to variations in crystallinity, crystal size, solid solution formation, and slow crystallization kinetics for some of the more stable phases (Appelo and Postma, 2005). The stability of Co attenuation is further supported by site-specific desorption testing results. Desorption tests demonstrate that Co is not released when background groundwater was exposed to the residuum samples containing appreciable Co concentrations (19 mg/kg from DPT-02) after seven days of incubation.

AP-1 will be closed by excavation and consolidation of CCR material into a lined storage facility with a protective cover, thereby providing a source control measure that minimizes the potential for migration of CCR-related constituents to groundwater. Under current site conditions, Co is limited to the immediate vicinity of BGWC-22. Geochemical conditions downgradient of AP-1 are not anticipated to change as the result of pond closure. Measurements of the ORP in groundwater vary between -140 mV to + 121 mV, while pH ranges from 6.4 s.u. to 8.1 s.u. Iron (and manganese) oxyhydroxides are stable under these conditions. Removal of the CCR material upgradient of BGWC-22, as well as anticipated changes in general groundwater flow direction, will effectively remove the potential contribution of Co from AP-1, and the Co remaining in groundwater at BGWC-22 is expected to be attenuated by the residuum associated with secondary porosity features in bedrock.

3.2 Molybdenum

3.2.1 Geochemistry and Fate and Transport Properties

Molybdenum in groundwater under oxidizing conditions is present as the molybdate oxyanion (MoO_4^{2-}) (Smedley and Kinniburgh, 2017). Molybdenum tends to be more mobile under alkaline conditions with increasing sorption under neutral to acidic conditions (due to the formation of positively charged surface sites in lower pH conditions). Molybdenum strongly binds to organic matter and readily sorbs to oxyhydroxide minerals (Goldberg et. al., 1996; ATSDR, 2020).

While Mo can also form Mo(V) and Mo(IV) species, $Mo(VI)O_4^{2-}$ is anticipated to be the predominant species at BGWC-43D based on groundwater conditions (**Figure 9**). Iron is likely to be present as iron oxides and oxyhydroxides (**Figure 8**).

3.2.2 Site-Specific Mobilization and Attenuation Processes

Well BGWC-43D is currently the only well in which an SSL of Mo has been identified in excess of the 0.1 mg/L GWPS. Given that BGWC-43D has a similar geochemical composition to the CCR pore water (**Figure 4**), it is likely that groundwater at that location may have been influenced by AP-1.

Total metals analysis found higher concentrations of Mo associated with the residuum sample collected from DPT-04, which is located near BGWC-43D, than the background location DPT-05 (**Table 3**), suggesting that Mo is likely attenuated by aquifer materials along the groundwater flow path.

Results from the site-specific geochemical characterization described in **Section 2** indicate that the primary mechanisms governing Mo attenuation and immobilization downgradient of Bowen AP-1 include the following:

- Sorption – The negatively-charged molybdate oxyanion in solution form bonds with positively charged species on the surfaces of minerals present in the residuum and likely present in the bedrock. SEP analyses demonstrate that Mo is most strongly associated with amorphous and crystalline metal oxides and oxyhydroxides.

- Co-precipitation – Similar to sorption, Mo oxyanions initially bonded to mineral surfaces become entrained in the crystal structure as the mineral continues to

grow. This process more commonly occurs with poorly crystalline, fast growing iron and manganese oxyhydroxides that precipitate under oxidizing conditions.

These mechanisms are illustrated in **Figure 11**. While anion exchange (measured as AEC) may play a somewhat limited role in attenuation, multiple lines of evidence (SEP, XRD, SEM/EDXA, sorption and desorption studies) point to interactions with metals oxyhydroxides and non-crystalline phases as the primary driver of Mo attenuation.

As explained in **Section 3.1.2**, the residuum, which is also contained within the secondary porosity of the bedrock, contains relatively high concentrations of iron oxyhydroxides and clay minerals, which can readily sorb Mo under site conditions. Many of these mineral phases are also likely to be present in the parent bedrock. The presence of attenuation capacity of Mo in the residuum is further supported by the early results of the sorption batch studies.

The interaction of Mo with Fe-oxides and oxyhydroxides, is supported by the results of the SEP. The SEP data were used to evaluate the fractionation of Mo in aquifer materials collected upgradient and downgradient of AP-1 and showed that the majority of Mo was associated with the metal (e.g., iron/manganese) hydroxide and non-crystalline phases.

The sorption of Mo to residuum materials appears to be stable at the Site. As shown on **Figure 8**, Fe is likely to be present as iron oxides/oxyhydroxides under site-specific ORP and pH conditions. This is supported by solid characterization data discussed earlier. Desorption batch studies conducted with residuum collected downgradient of BGWC-22 and incubated with background groundwater indicated that Mo is unavailable for desorption from these materials under the experimental conditions tested. This observation, along with the prevalence and stability of iron oxyhydroxide minerals, suggest that Mo sorption is stable under current site conditions. Furthermore, as described in Section 3.1.2, these conditions are not expected to change with the consolidation and capping of CCR within AP-1.

3.3 Summary of Geochemical CSM

The geochemical CSM indicates that, under current conditions, Co and Mo are likely to be attenuated by residuum associated with secondary porosity features in the bedrock. Illustrations depicting the geochemical CSM for Co and Mo are provided on **Figure 10** and **Figure 11**, respectively. Key details to support the CSM include:

- The wells of interest (BGWC-22 and BGWC-43D) are screened in bedrock and groundwater flow in bedrock is anticipated to be controlled by secondary porosity features typically filled with residuum.

- The in-place weathering of siliceous carbonate bedrock underlying AP-1 results in the formation of residuum enriched in silicate and aluminosilicate minerals.

- The interaction of residuum associated with secondary porosity features in bedrock with groundwater is likely to dominate attenuation of site-specific constituents.

- The composition of residuum in the vicinity of AP-1 indicates the presence of mineral phases that provide substantial attenuation capacity (i.e., iron oxyhydroxides and clay minerals). Owing to the nature of residuum formation (i.e., weathering of bedrock), many of these mineral phases are also anticipated to be present in the parent bedrock.

- The SEP conducted for select residuum samples representative of conditions at AP-1 suggests that Co and Mo are likely to be associated with amorphous and crystalline metal oxides and oxyhydroxides under site conditions. This observation indicates strong sorption and/or incorporation of Co and Mo into immobile mineral phases.

- The sorption and desorption studies presented above confirm that Co and Mo are sorbed, with Co and Mo unavailable for desorption under the experimental conditions of these batch studies. The measured partition coefficient for Co (i.e., 82 L/kg) was within the range of values reported in the literature and indicative of aquifer attenuation capacity for Co. The early results of the Mo sorption testing shows that Mo is sorbed to the residuum. As such, the parent bedrock and the residuum associated with secondary porosity features in bedrock are expected to attenuate Co and Mo downgradient of AP-1.

- The laboratory studies presented to date are consistent with groundwater monitoring results that indicate attenuation of Co and Mo is occurring in the bedrock downgradient of AP-1.

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TABLES

Table 1

Summary of Relevant Groundwater Analytical Data

Plant Bowen AP-1, Bartow County, Georgia

	Background Groundwater						Downgradient Groundwater												
	BGWA-2	**BGWA-6**	**BGWA-29**	**BGWA-33**	**BGWA-47D**	**BGWA-48D**	**BGWC-7**	**BGWC-8**	**BGWC-9**	**BGWC-10**	**BGWC-12**	**BGWC-14A**	**BGWC-16**	**BGWC-17**	**BGWC-18**	**BGWC-19**	**BGWC-20**	**BGWC-21**	**BGWC-22**
	9/23/2020	9/23/2020	9/23/2020	9/25/2020	9/2/2020	9/3/2020	9/25/2020	9/23/2020	9/24/2020	9/24/2020	9/25/2020	9/2/2020	9/24/2020	9/24/2020	9/24/2020	9/28/2020	9/28/2020	9/24/2020	9/24/2020
Parameter[1,2,3]																			
Boron	0.0086 J	0.0081 J	<0.0052	0.020 J	0.022 J	0.022 J	1.3	0.054 J	0.44	0.47	1.0	1.1	1.3	1.5	0.72	0.40	3.7	0.037 J	18.8
Calcium	45.2	67.3	20.1	51.8	109	51.8	138	41.6	59.0	58.8	135	159	141	84.9	68.7	50.1	273	42.0	750
Chloride	4.2	8.4	1.1	3.3	6.0	6.3	13.1	1.5	9.2	25.4	20.2	18.9	28.8	50.1	30.3	8.6	152	4.0	1050
Cobalt	<0.00038	<0.00038	<0.00038	<0.00038	<0.00038	<0.00038	0.00077 J	<0.00038	<0.00038	<0.00038	0.00049 J	0.0010 J	0.0095	<0.00038	<0.00038	<0.00038	<0.00038	0.00098 J	0.041
Fluoride	<0.05	<0.05	<0.05	0.068 J	<0.05	0.11	0.11	<0.05	0.091 J	<0.05	<0.05	0.061 J	0.059 J	0.12	0.058 J	<0.05	<0.05	<0.05	0.24
Iron	0.46	0.090	<0.016	0.13	-	-	1.2	0.034 J	0.49	0.38	0.017 J	-	0.036 J	<0.016	0.016 J	<0.016	0.43	0.083	0.48
Magnesium	19.8	36.4	10.7	27.3	-	-	42.1	14.4	24.1	25.6	47.2	-	27.4	27.9	20.5	18.7	41.7	24.7	99.4
Manganese	0.078	0.032 J	<0.0017	0.014 J	-	-	0.032 J	<0.0017	0.088	0.020 J	0.0018 J	-	3.2	0.12	0.025 J	<0.0017	0.77	0.046	6.5
Molybdenum	<0.00069	<0.00069	<0.00069	0.032	<0.00069	0.0074 J	0.0099 J	<0.00069	0.0034 J	0.0032 J	<0.00069	0.0013 J	<0.00069	<0.00069	<0.00069	<0.00069	0.018	0.0036 J	0.04
pH	7.32	7.36	8.08	7.62	6.95	7.35	7.01	7.67	7.34	7.54	7.10	6.97	6.66	7.20	7.05	6.45	7.26	7.78	6.82
Potassium	1.6	0.5	0.6	1.3	-	-	3.0	2.7	2.6	2.0	2.6	-	4.6	2.7	1.8	3.0	6.8	1.4	16.0
Sodium	2.9	3.0	6.2	2.6	-	-	23.7	4.9	19.6	18.7	24.9	-	27.5	15.4	5.0	2.7	28.9	2.3	45.7
Sulfate	12.9	24.6	5.3	22.6	70.2	24.4	298	33.5	84.8	98.6	320	360	338	156	69.9	70.3	578	57.8	864
ORP	24.3	14.9	42.8	0.7	27.4	-80.9	-16	19.9	-43.2	-69	20.2	-0.5	27.8	29.4	27.1	39.5	-9.1	19.2	33.2
TDS	237	296	114	233	389	303	726	187	322	356	740	814	732	481	310	243	1060	243	3490
DO	2.7	0.4	7.9	3.1	-	-	0.7	4.7	0.2	1.8	2.3	-	0.2	0.2	0.2	1.3	0.3	0.5	0.3
Total Alkalinity	202	312	112	227	-	-	300	156	219	175	272	-	147	153	181	138	90.3	179	77.3

Notes:

- = parameter was not analyzed

< = parameter was not detected above the specified method detection limit (MDL)

J = indicates the parameter was estimated and detected between the MDL and the reporting limit (RL)

TDS = total dissolved solids

ORP refers to oxidation-reduction potential and reported unit is mV.

DO refers to dissolved oxygen.

(1) Parameters are reported in units of milligrams per liter (mg/L), except for pH reported as s.u. (standard units).

(2) Metals were analyzed by EPA Method 6020B, anions were analyzed by EPA Method 300.0, and TDS was analyzed by SM2540C.

(3) The pH value presented was recorded at the time of sample collection in the field.

Table 1

Summary of Relevant Groundwater Analytical Data

Plant Bowen AP-1, Bartow County, Georgia

	Downgradient Groundwater																	CCR Pore Water	
	BGWC-23	**BGWC-24**	**BGWC-25**	**BGWC-30**	**BGWC-31**	**BGWC-32**	**BGWC-34D**	**BGWC-35D**	**BGWC-36D**	**BGWC-37D**	**BGWC-38D**	**BGWC-39**	**BGWC-40**	**BGWC-41D**	**BGWC-42D**	**BGWC-43D**	**BGWC-44D**	**APPZ-2S**	**GSB-3PZ**
	9/24/2020	9/25/2020	9/28/2020	9/25/2020	9/28/2020	9/25/2020	9/28/2020	9/25/2020	9/28/2020	9/25/2020	9/2/2020	9/29/2020	9/29/2020	9/2/2020	9/3/2020	9/3/2020	9/3/2020	5/7/2020	5/7/2020
Parameter[1,2,3]																			
Boron	13.7	30.8	0.049 J	2.1	0.66	5.5	0.28	3.2	4.8	1.6	7.8	11.1	2.7	0.91	1.6	14.6	0.083 J	17.6	40.3
Calcium	647	998	50.7	93.3	77.8	338	117	169	165	99.9	228	576	165	159	100	383	50.2	529	643
Chloride	988	1640	5.6	127	34.5	449	36.6	435	277	105	309	792	218	210	115	564	18.6	783	52.3
Cobalt	<0.00038	0.0038 J	<0.00038	<0.00038	0.00046 J	0.0081	0.00048 J	0.00082 J	0.00038 J	0.0011 J	0.0043 J	0.00061 J	0.00044 J	0.00075 J	<0.00038	0.0020 J	<0.00038	0.00069 J	-
Fluoride	0.062 J	0.054 J	<0.05	<0.05	<0.05	0.097 J	<0.05	0.17	0.10	0.34	0.47	<0.05	<0.05	0.088 J	0.50	0.87	<0.05	-	-
Iron	0.27	0.053	1.5	0.11	1.8	0.13	0.91	0.94	0.11	1.3	0.75	0.076	0.20	0.055	0.98	0.71	0.37	1.2	0.13
Magnesium	115	125	22.7	28.6	34.6	61.8	30.4	39.6	49.5	36.6	53.8	82.3	49.6	75.0	37.2	81.8	27.9	68.9	18.9
Manganese	0.39	4.0	0.36	0.0088 J	0.23	0.21	0.022 J	0.14	0.12	0.14	1.3	1.3	0.020 J	0.048	0.092	1.2	0.14	0.38	3.4
Molybdenum	0.011	0.00081 J	<0.00069	0.0027 J	<0.00069	0.0030 J	0.00078 J	0.024	0.0084 J	0.0088 J	0.10	0.010	0.00069 J	0.015	0.018	0.11	0.0055 J	0.18	-
pH	7.09	6.56	7.35	7.34	7.32	6.82	7.24	7.03	7.29	7.25	6.49	6.73	7.15	7.45	7.37	7.21	7.60	7.85	8.43
Potassium	10.7	9.2	1.2	2.3	1.5	5.0	1.9	18.9	3.8	2.3	3.2	11.8	2.0	1.4	2.0	6.4	1.4	14.7	36.8
Sodium	41.6	27.9	1.9	6.0	8.0	20.5	5.5	91.7	15.7	44.3	14.6	34.3	19.2	19.5	38.1	29.0	34.5	30.6	72.2
Sulfate	676	613	8.8	53.6	115	393	115	394	135	175	188	619	130	224	141	358	31.0	478	1640
ORP	10.4	34	-140.4	29.4	-75.4	23.9	-83.1	78.6	34.1	-87.8	47.7	121.2	20.4	26.5	-61.6	-2.5	-57.5	-	-
TDS	3160	5020	223	482	405	1690	466	880	938	594	982	2520	908	829	611	1980	312	-	-
DO	0.4	0.3	0.1	3.4	0.2	0.8	0.2	0.2	0.5	0.2	0.8	0.9	0.4	0.6	0.2	0.1	0.1	-	-
Total Alkalinity	115	146	237	183	195	186	263	231	128	200	92.8	141	226	138	158	86.8	247	51.1	40.3

Notes:

- = Parameter was not analyzed

< = Parameter was not detected above the specified method detection limit (MDL)

J = Indicates the parameter was estimated and detected between the MDL and the reporting limit (RL)

TDS = total dissolved solids

ORP refers to oxidation-reduction potential and reported unit is mV.

DO refers to dissolved oxygen.

(1) Parameters are reported in units of milligrams per liter (mg/L), except for pH reported as s.u. (standard units).

(2) Metals were analyzed by EPA Method 6020B, anions were analyzed by EPA Method 300.0, and TDS was analyzed by SM2540C.

(3) The pH value presented was recorded at the time of sample collection in the field.

Table 2

DPT Sample Collection Depths and Select Groundwater Monitoring Well Details

Plant Bowen AP-1, Bartow County, Georgia

Well/DPT ID	Ground Surface Elevation (ft)	Top of Screen Elevation (ft)	Bottom of Screen Elevation (ft)	Top of Screen Depth (ft bgs)	Bottom of Screen Depth (ft bgs)	Sample Collection Depth (ft bgs)
DPT-01	--	--	--	--	--	12-15
BGWC-31	668.12	629.45	619.45	38.67	48.67	--
DPT-02	--	--	--	--	--	10-17
BGWC-41D	676.43	631.76	621.76	44.67	54.67	--
DPT-03	--	--	--	--	--	12-22
BGWC-22	692.94	662.60	652.60	30.34	40.34	--
DPT-04	--	--	--	--	--	25-35
BGWC-38D	697.52	584.86	574.86	112.66	122.66	--
DPT-05	--	--	--	--	--	42-52
BGWA-33	740.50	661.18	651.18	79.32	89.32	--
BGWC-43D	697.29	544.62	534.62	152.67	162.67	--

Notes:
ft = feet
ft bgs = feet below ground surface
DPT locations and adjacent wells grouped together for comparison
* DPT-01 was originally installed to evaluate groundwater data at compliance well BGWC-34D

Table 3

Baseline Characterization Results - Ionic Exchange Capacity, Total Sulfur, Total Sulfide, Total Organic Carbon
Plant Bowen AP-1, Bartow County, Georgia

Sample Location	DPT01	DPT02	DPT03	DPT04	DPT05
Adjacent Well ID	BWGC-31*	BGWC-41D	BGWC-22	BGWC-38D	BGWA-33
Anion Exchange Capacity (meq/100g)	5.50	6.79	7.52	8.13	7.79
Cation Exchange Capacity (meq/100g)	6.70	28.00	27.70	4.90	17.50
Total Sulfur (%)	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Total Sulfide (%)	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04
Total Organic Carbon (%)	0.05	0.10	0.05	0.03	< 0.025

Notes:
% = percentage
< = Indicates the constituent was not detected above the analytical method detection limit (MDL)
meq/100g = milliequivalents per 100 grams
* DPT-01 was originally installed to evaluate groundwater data at compliance well BGWC-34D

Table 4

Baseline Characterization Results - Total Metals

Plant Bowen AP-1, Bartow County, Georgia

Sample ID	DPT01	DPT02	DPT03	DPT04	DPT05
Adjacent Well ID	BGWC-31*	BGWC-41D	BGWC-22	BGWC-38D	BGWA-33
Molybdenum (mg/kg)	8.8	7.6	4.1	4.4	2.2
Cobalt (mg/kg)	13	19	14	29	12
Iron (mg/kg)	28,000	40,000	38,000	40,000	17,000
Aluminum (mg/kg)	39,000	72,000	77,000	93,000	37,000
Manganese (mg/kg)	960	550	210	250	700

Notes:

mg/kg = milligrams per kilogram

* DPT-01 was originally installed to evaluate groundwater data at compliance well BGWC-34D

Table 5
Baseline Characterization Results - Whole Rock Analysis
Plant Bowen AP-1, Bartow County, Georgia

Sample ID	DPT01	DPT02	DPT03	DPT04	DPT05
Adjacent Well ID	BGWC-31*	BGWC-41D	BGWC-22	BGWC-38D	BGWA-33
Quartz (SiO_2) (%)	82.4	65.3	66.2	64.6	74.8
Aluminum Oxide (Al_2O_3) (%)	7.32	16.10	17.3	17.1	11.9
Ferric Oxide (Fe_2O_3) (%)	3.87	5.69	5.61	5.61	3.59
Magnesium Oxide (MgO) (%)	0.62	0.85	0.71	1.16	1.34
Calcium Oxide (CaO) (%)	0.19	0.17	0.05	0.07	0.02
Sodium Oxide (Na_2O) (%)	0.06	0.05	0.05	0.04	0.06
Potassium Oxide (K_2O) (%)	1.39	3.42	1.22	2.38	2.72
Titanium Dioxide (TiO_2) (%)	0.63	0.75	0.66	0.52	0.43
Phosphorous Pentoxide (P_2O_5) (%)	0.04	0.07	0.06	0.10	0.07
Manganese Oxide (MnO) (%)	0.12	0.07	0.03	0.02	0.14
Chromium (III) Oxide (Cr_2O_3) (%)	< 0.01	0.01	< 0.01	0.01	< 0.01
Vanadium Oxide (V_2O_5) (%)	< 0.01	0.02	0.02	0.01	0.01
Loss on Ignition (%)	3.56	7.18	8.39	7.94	4.77

Notes:
% = percentage
< = Indicates the constituent was not detected above the analytical method detection limit (MDL)
* DPT-01 was originally installed to evaluate groundwater data at compliance well BGWC-34D

Table 6

Baseline Characterization Results - Rietveld Quantitative X-Ray Diffraction
Plant Bowen AP-1, Bartow County, Georgia

Sample ID	DPT01 (12'-15')	DPT02 (10'-17')	DPT03 (12'-22')	DPT04 (25'-35')	DPT05 (42'-52')
Adjacent Well ID	BGWC-31*	BGWC-41D	BGWC-22	BGWC-38D	BGWA-33
Quartz (wt%)	79.24	43.56	39.87	42.57	66.69
Albite (wt%)	0.84	1.10	2.22	2.29	1.51
Microcline (wt%)	2.28	--	--	--	--
Muscovite (wt%)	11.07	14.02	13.71	20.06	21.63
Kaolinite (wt%)	6.57	17.19	24.48	16.18	9.22
Goethite (wt%)	--	10.431	17.525	14.751	--
Orthoclase (wt%)	--	13.71	1.41	3.65	0.28
Magnetite (wt%)	--	--	0.216	0.105	--
Rutile (wt%)	--	--	0.58	0.41	0.68

Notes:
-- = Not identified by analyst
wt % = weight percent
* DPT-01 was originally installed to evaluate groundwater data at compliance well BGWC-34D

Table 7
Sequential Extraction Procedure Results
Plant Bowen AP-1, Bartow County, Georgia

	Cobalt		Molybdenum	
Sample ID	**DPT02 (10-17)**	**DPT05 (42-52)**	**DPT02 (10-17)2**	**DPT05 (42-52)2**
Adjacent Well ID	BGWC-41D	BGWA-33	BGWC-41D	BGWA-33
Sample Collection Date	8/13/2020	8/14/2020	8/13/2020	8/14/2020
SEP Step 1 (Exchangeable Phase) (2)	<0.21	<0.23	<0.39	<0.42
SEP Step 2 (Carbonate Phase) (2)	<0.22	<0.24	<0.29	<0.32
SEP Step 3 (Non-Crystalline Materials Phase) (2)	8.0	4.1	0.36 J	0.42 J
SEP Step 4 (Metal Hydroxide Phase) (2)	4.2	5.9	1.6 J	1.3 J
SEP Step 5 (Organic Phase) (2)	<0.71	<0.77	<1.5	<1.6
SEP Step 6 (Acid/Sulfide Fraction) (2)	1.4 J	1.0 J	0.70 J	0.22 J
SEP Step 7 (Residual Fraction) (2)	0.73 J	<0.033	0.23 J	<0.11
Sum of SEP Steps 1-7	14	11	2.9	1.9 J
Total Metals Concentration (3)	12	9.0	2.8	1.6 J

Notes:
< = Indicates the constituent was not detected above the analytical method detection limit (MDL)
J = Indicates the constituent was estimated and detected between the MDL and the reporting limit (RL)
mg/kg = milligrams per kilogram
SEP = Sequential extraction procedure
(1) All results are reported in mg/kg
(2) SEP Steps include:
1: Exchangeable Fraction: addition of 1M MgSO4 to extract elements reversibly bound to mineral surfaces by ion exchange;
2: Carbonate Fraction: addition of mild acidic solution (1 M acetate in 25% acetic acid at pH 5) to extract elements bound to carbonate minerals;
3: Non-crystalline Fraction: addition of 25 ml of 0.2M ammonium oxalate (pH 3) to extract elements complexed by, and co-precipitated with amorphous solids (e.g. iron oxides);
4: Metal Hydroxide Fraction: addition of 1M $HONH_2$-HCL in 25% acetic acid to extract elements bound to crystalline hydroxides;
5: Organic-bound Fraction: addition of 5% Nicoll (pH 9.5) to extract elements strongly bound to organic functional groups;
6: Acid/Sulfide Fraction: addition of 3:1:2 v/v solution of HCl:HNO3:H20 solution to dissolve metal sulfide minerals;
7: Residual Fraction: total dissolution of sample in HF, HCl, HNO_3 and H_3BO_3 to remove remaining elements distributed between silicates, phosphates, and refractory oxides.
(3) Total Metals: separate aliquot digested using HF, HNO_3, HCl, and H_3BO_3.

Table 8A
Summary of Sorption Test Results: Cobalt
Plant Bowen AP-1, Bartow County, Georgia

Groundwater Sample ID	Site Material Sample ID	Treatment [1]	Date	Day [2]	Replicate	Dissolved Cobalt (mg/L)	Mass of Aquifer Solids in Reactor (g)	Mass of Water in Reactor (g)	Sorbed Cobalt (mg/kg) [3]	pH (s.u.)	ORP (mV)
BGWA-2	DPT05(42-52)	Concentration Level 1	7/22/2021	0	***Spiked Aqueous Concentration***	***0.0102***	--	--	--	--	--
					BAP1DPT05_43a	0.00527	98.97	152.10	0.01	6.86	182
					BAP1DPT05_44a	0.00540	101.82	149.99	0.01	6.92	182
					Average Concentration	**0.00534**	**100.40**	**151.05**	**0.007**	**6.89**	**182**
			7/29/2021	7	BAP1DPT05_43b	0.000516	100.24	148.50	0.014	5.33	149
					BAP1DPT05_44b	0.000283	98.95	150.00	0.015	5.25	146
					Average Concentration	**0.000400**	**99.60**	**149.25**	**0.015**	**5.29**	**148**
		Concentration Level 2	7/29/2021	0	***Spiked Aqueous Concentration***	***0.0194***	--	--	--	--	--
					BAP1DPT05_45a	0.0090	99.58	148.19	0.016	6.68	181
					BAP1DPT05_46a	0.0090	99.82	148.23	0.015	6.77	190
					Average Concentration	**0.0090**	**99.70**	**148.21**	**0.015**	**6.73**	**186**
			8/5/2021	7	BAP1DPT05_45b	0.000669	100.66	146.82	0.027	5.51	136
					BAP1DPT05_46b	0.000754	100.31	147.66	0.027	5.42	126
					Average Concentration	**0.000712**	**100.49**	**147.24**	**0.027**	**5.47**	**131**
		Concentration Level 3	7/29/2021	0	***Spiked Aqueous Concentration***	***0.0384***	--	--	--	--	--
					BAP1DPT05_47a	0.016	99.02	103.67	0.023	6.82	224
					BAP1DPT05_48a	0.016	99.28	144.96	0.033	6.66	238
					Average Concentration	**0.016**	**99.15**	**124.32**	**0.028**	**6.74**	**231**
			8/5/2021	7	BAP1DPT05_47b	0.000998	100.66	147.03	0.055	5.32	132
					BAP1DPT05_48b	0.000715	98.61	148.02	0.057	5.30	139
					Average Concentration	**0.000857**	**99.64**	**147.53**	**0.056**	**5.31**	**136**
		Concentration Level 4	7/30/2021	0	***Spiked Aqueous Concentration***	***0.059***	--	--	--	--	--
					BAP1DPT05_49a	0.028	98.38	146.56	0.045	6.96	194
					BAP1DPT05_50a	0.030	101.22	146.31	0.041	7.11	223
					Average Concentration	**0.029**	**99.80**	**146.44**	**0.043**	**7.04**	**209**
			8/6/2021	7	BAP1DPT05_49b	0.000723	99.46	144.50	0.084	5.45	133
					BAP1DPT05_50b	0.00121	99.29	146.31	0.085	5.33	125
					Average Concentration	**0.000967**	**99.38**	**145.41**	**0.084**	**5.39**	**129**
		Concentration Level 5	7/30/2021	0	***Spiked Aqueous Concentration***	***0.0761***	--	--	--	--	--
					BAP1DPT05_51a	0.035	100.36	149.03	0.061	6.82	211
					BAP1DPT05_52a	0.036	100.66	147.65	0.059	6.86	209
					Average Concentration	**0.035**	**100.51**	**148.34**	**0.060**	**6.84**	**210**
			8/6/2021	7	BAP1DPT05_51b	0.00149	99.81	145.36	0.109	5.32	128
					BAP1DPT05_52b	0.00121	100.34	147.67	0.110	5.30	136
					Average Concentration	**0.00135**	**100.08**	**146.52**	**0.109**	**5.31**	**132**
		Concentration Level 6	8/3/2021	0	***Spiked Aqueous Concentration***	***0.0950***	--	--	--	--	--
					BAP1DPT05_53a	0.042	98.71	148.94	0.081	6.84	169
					BAP1DPT05_54a	0.046	100.05	151.83	0.075	6.94	163
					Average Concentration	**0.044**	**99.38**	**150.39**	**0.078**	**6.89**	**166**
			8/10/2021	7	BAP1DPT05_53b	0.00140	99.43	150.79	0.142	5.42	158
					BAP1DPT05_54b	0.00122	99.71	142.95	0.134	5.29	130
					Average Concentration	**0.00131**	**99.57**	**146.87**	**0.138**	**5.36**	**144**

Notes:

-- = not applicable
< = indicates the constituent was not detected above the analytical method detection limit (MDL)
g = grams
s.u. = standard units
mg/L = milligrams per liter
mg/kg = milligrams per kilogram
ORP = oxidation reduction potential

(1) The highest spike concentration (Level 6) of cobalt was at least two times greater than the highest cobalt concentration observed in either coal combustion residue pore water or groundwater at the Site.

(2) Day 0 samples were collected approximately one hour after reactor setup.

(3) The sorbed concentration per unit mass of aquifer solids is calculated as shown in the equation to the right. Non-detect concentrations were assumed to be equal to ½ of the MDL for calculating sorbed mass.

(4) The test was conducted under laboratory atmospheric conditions.

$$S_{Solids} = \frac{(C_{Spike} - C_{Final}) \times M_{Water}}{M_{Solids} \times \rho_{Water}}$$

Where:
S_{Solids} = sorbed concentration per unit mass of aquifer solids (mg/kg)
$C_{Spike,Final}$ = dissolved concentration of the intial spike or final dissolved concentration at Day 0 or Day 7 (mg/L)
$M_{Solids,Water}$ = mass of water or aquifer solids in reactor (g)
ρ_{Water} = density of water (equal to 1 L/kg)

Table 8B
Summary of Sorption Test Results: Molybdenum
Plant Bowen AP-1, Bartow County, Georgia

Groundwater Sample ID	Site Material Sample ID	Treatment [1]	Date	Day [2]	Replicate	Dissolved Molybdenum (mg/L)	Mass of Aquifer Solids in Reactor (g)	Mass of Water in Reactor (g)	Sorbed Molybdenum (mg/kg) [3]	pH (s.u.)	ORP (mV)
BGWA-2	DPT05(42-52)	Concentration Level 1	7/22/2021	0	***Spiked Aqueous Concentration***	***0.113***	--	--	--	--	--
					BAP1DPT05_43a	0.0286	98.97	152.10	0.13	6.86	182
					BAP1DPT05_44a	0.0346	101.82	149.99	0.12	6.92	182
					Average Concentration	**0.0316**	**100.40**	**151.05**	**0.12**	**6.89**	**182**
			7/29/2021	7	BAP1DPT05_43b	0.00027	100.24	148.50	0.17	5.33	149
					BAP1DPT05_44b	0.00013	98.95	150.00	0.17	5.25	146
					Average Concentration	**0.00020**	**99.60**	**149.25**	**0.17**	**5.29**	**148**
		Concentration Level 2	7/29/2021	0	***Spiked Aqueous Concentration***	***0.276***	--	--	--	--	--
					BAP1DPT05_45a	0.042	99.58	148.19	0.35	6.68	181
					BAP1DPT05_46a	0.057	99.82	148.23	0.33	6.77	190
					Average Concentration	**0.050**	**99.70**	**148.21**	**0.34**	**6.73**	**186**
			8/5/2021	7	BAP1DPT05_45b	<0.00004	100.66	146.82	0.40	5.51	136
					BAP1DPT05_46b	<0.00004	100.31	147.66	0.41	5.42	126
					Average Concentration	**<0.00004**	**100.49**	**147.24**	**0.40**	**5.47**	**131**
		Concentration Level 3	7/29/2021	0	***Spiked Aqueous Concentration***	***0.566***	--	--	--	--	--
					BAP1DPT05_47a	0.200	99.02	103.67	0.38	6.82	224
					BAP1DPT05_48a	0.157	99.28	144.96	0.60	6.66	238
					Average Concentration	**0.179**	**99.15**	**124.32**	**0.49**	**6.74**	**231**
			8/5/2021	7	BAP1DPT05_47b	<0.00004	100.66	147.03	0.83	5.32	132
					BAP1DPT05_48b	<0.00004	98.61	148.02	0.85	5.30	139
					Average Concentration	**<0.00004**	**99.64**	**147.53**	**0.84**	**5.31**	**136**
		Concentration Level 4	7/30/2021	0	***Spiked Aqueous Concentration***	***0.860***	--	--	--	--	--
					BAP1DPT05_49a	0.378	98.38	146.56	0.72	6.96	194
					BAP1DPT05_50a	0.510	101.22	146.31	0.51	7.11	223
					Average Concentration	**0.444**	**99.80**	**146.44**	**0.61**	**7.04**	**209**
			8/6/2021	7	BAP1DPT05_49b	<0.00004	99.46	144.50	1.25	5.45	133
					BAP1DPT05_50b	<0.00004	99.29	146.31	1.27	5.33	125
					Average Concentration	**<0.00004**	**99.38**	**145.41**	**1.26**	**5.39**	**129**
		Concentration Level 5	7/30/2021	0	***Spiked Aqueous Concentration***	***1.39***	--	--	--	--	--
					BAP1DPT05_51a	0.599	100.36	149.03	1.17	6.82	211
					BAP1DPT05_52a	0.635	100.66	147.65	1.11	6.86	209
					Average Concentration	**0.617**	**100.51**	**148.34**	**1.14**	**6.84**	**210**
			8/6/2021	7	BAP1DPT05_51b	0.00004	99.81	145.36	2.02	5.32	128
					BAP1DPT05_52b	0.00006	100.34	147.67	2.05	5.30	136
					Average Concentration	**0.00005**	**100.08**	**146.52**	**2.03**	**5.31**	**132**
		Concentration Level 6	8/3/2021	0	***Spiked Aqueous Concentration***	***2.18***	--	--	--	--	--
					BAP1DPT05_53a	0.940	98.71	148.94	1.87	6.84	169
					BAP1DPT05_54a	1.120	100.05	151.83	1.61	6.94	163
					Average Concentration	**1.030**	**99.38**	**150.39**	**1.74**	**6.89**	**166**
			8/10/2021	7	BAP1DPT05_53b	0.00007	99.43	150.79	3.31	5.42	158
					BAP1DPT05_54b	0.00006	99.71	142.95	3.13	5.29	130
					Average Concentration	**0.00007**	**99.57**	**146.87**	**3.22**	**5.36**	**144**

Notes:

-- = not applicable
< = indicates the constituent was not detected above the analytical method detection limit (MDL)
g = grams
s.u. = standard units
mg/L = milligrams per liter
mg/kg = milligrams per kilogram
ORP = oxidation reduction potential

$$S_{Solids} = \frac{(C_{Spike} - C_{Final}) \times M_{Water}}{M_{Solids} \times \rho_{Water}}$$

Where:
S_{Solids} = sorbed concentration per unit mass of aquifer solids (mg/kg)
$C_{Spike,Final}$ = dissolved concentration of the intial spike or final dissolved concentration at Day 0 or Day 7 (mg/L)
$M_{Solids,Water}$ = mass of water or aquifer solids in reactor (g)
ρ_{Water} = density of water (equal to 1 L/kg)

(1) The highest spike concentration (Level 6) of cobalt was at least two times greater than the highest cobalt concentration observed in either coal combustion residue pore water or groundwater at the Site.
(2) Day 0 samples were collected approximately one hour after reactor setup.
(3) The sorbed concentration per unit mass of aquifer solids is calculated as shown in the equation to the right. Non-detect concentrations were assumed to be equal to ½ of the MDL for calculating sorbed mass.
(4) The test was conducted under laboratory atmospheric conditions.

Table 9A
Summary of Desorption Test Results: Cobalt
Plant Bowen AP-1, Bartow County, Georgia

Groundwater Sample ID	Site Material Sample ID	Chemical Characteristics (Baseline Characterization) [1]	Treatment	Date	Day [2]	Replicate	Dissolved Cobalt (mg/L)	pH (s.u.)	ORP (mV)
BGWA-2 Batch	**DPT02 (10-17)**	**Aquifer Solids:** **Cobalt:** 19 mg/kg **Groundwater:** **Cobalt:** <0.00038 to <0.00039 mg/L **pH:** 7.49 s.u. **ORP:** 45.0 mV	**Ambient Conditions**	8/31/2021	0	BAP1DPT02_11a	0.000142	7.10	230
						BAP1DPT02_12a	0.000164	7.09	231
						Average Concentration (mg/L)	**0.000153**	**7.10**	**231**
				9/15/2021	7	BAP1DPT02_11b	0.000005	5.79	146
						BAP1DPT02_12b	0.000012	5.82	156
						Average Concentration (mg/L)	**0.000009**	**5.81**	**151**

Notes:

< = indicates the constituent was not detected above the analytical method detection limit (MDL)

mg/kg = milligrams per kilogram

mg/L = milligrams per liter

mV = millivolts

ORP = oxidation reduction potential

s.u. = standard units

(1) Reported total cobalt concentrations in BGWA-2 groundwater were measured during the 2021 semiannual sampling events. Reported pH and ORP values were measured during batch sample collection on 5/26/21 and are consistent with values observed during the 2021 semiannual sampling events.

(2) Day 0 samples were collected approximately one hour after reactor setup.

(3) The test was conducted under laboratory atmospheric conditions.

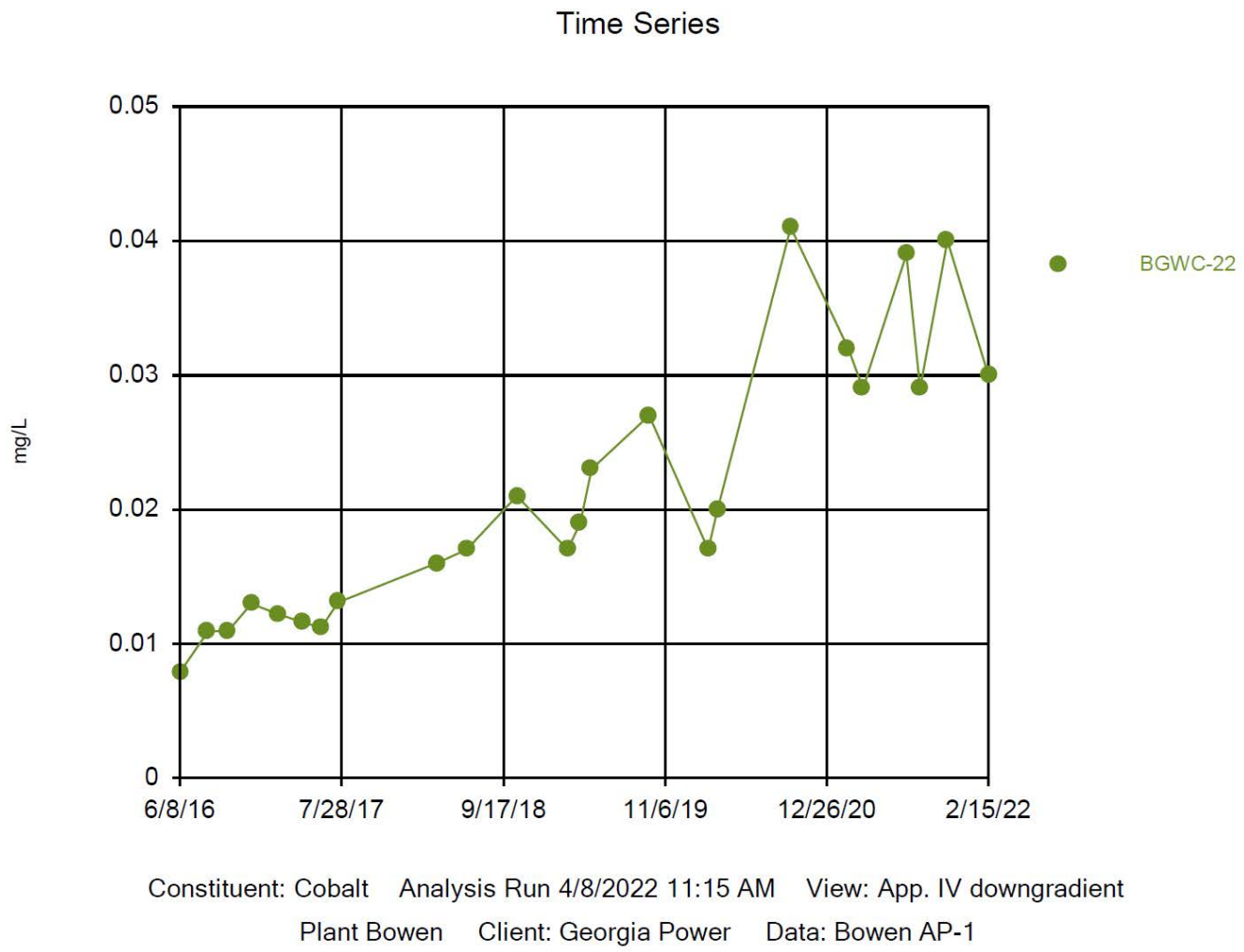
Table 9B
Summary of Desorption Test Results: Molybdenum
Plant Bowen AP-1, Bartow County, Georgia

Groundwater Sample ID	Site Material Sample ID	Chemical Characteristics (Baseline Characterization) [1]	Treatment	Date	Day [2]	Replicate	Dissolved Molybdenum (mg/L)	pH (s.u.)	ORP (mV)
BGWA-2 Batch	DPT02 (10-17)	**Aquifer Solids:** **Molybdenum:** 7.6 mg/kg **Groundwater:** **Molybdenum:** <0.00074 to 0.00092 J mg/L **pH:** 7.49 s.u. **ORP:** 45.0 mV	Ambient Conditions	8/31/2021	0	BAP1DPT02_11a	0.00026	7.10	230
						BAP1DPT02_12a	0.00029	7.09	231
						Average Concentration (mg/L)	**0.00028**	**7.10**	**231**
				9/15/2021	7	BAP1DPT02_11b	0.00005	5.79	146
						BAP1DPT02_12b	0.00010	5.82	156
						Average Concentration (mg/L)	**0.00008**	**5.81**	**151**

Notes:
< = indicates the constituent was not detected above the analytical method detection limit (MDL)
mg/kg = milligrams per kilogram
mg/L = milligrams per liter
mV = millivolts
ORP = oxidation reduction potential
s.u. = standard units
(1) Reported total molybdenum concentrations in BGWA-2 groundwater were measured during the 2021 semiannual sampling events. Reported pH and ORP values were measured during batch sample collection on 5/26/21 and are consistent with values observed during the 2021 semiannual sampling events.
(2) Day 0 samples were collected approximately one hour after reactor setup.
(3) The test was conducted under laboratory atmospheric conditions.

FIGURES

Sanitas™ v.9.6.32 Sanitas software licensed to Geosyntec Consultants. UG



Notes:
1. mg/L = milligrams of constituent per liter
2. This figure was created using the Sanitas™ Statistical Software Version 9.6.32

TIME SERIES – BGWC-22 COBALT

GEORGIA POWER COMPANY
PLANT BOWEN AP-1
BARTOW COUNTY, GEORGIA

Prepared For:	Prepared By:	Figure
Georgia Power	Geosyntec consultants	1
Kennesaw, GA	JULY 2024	

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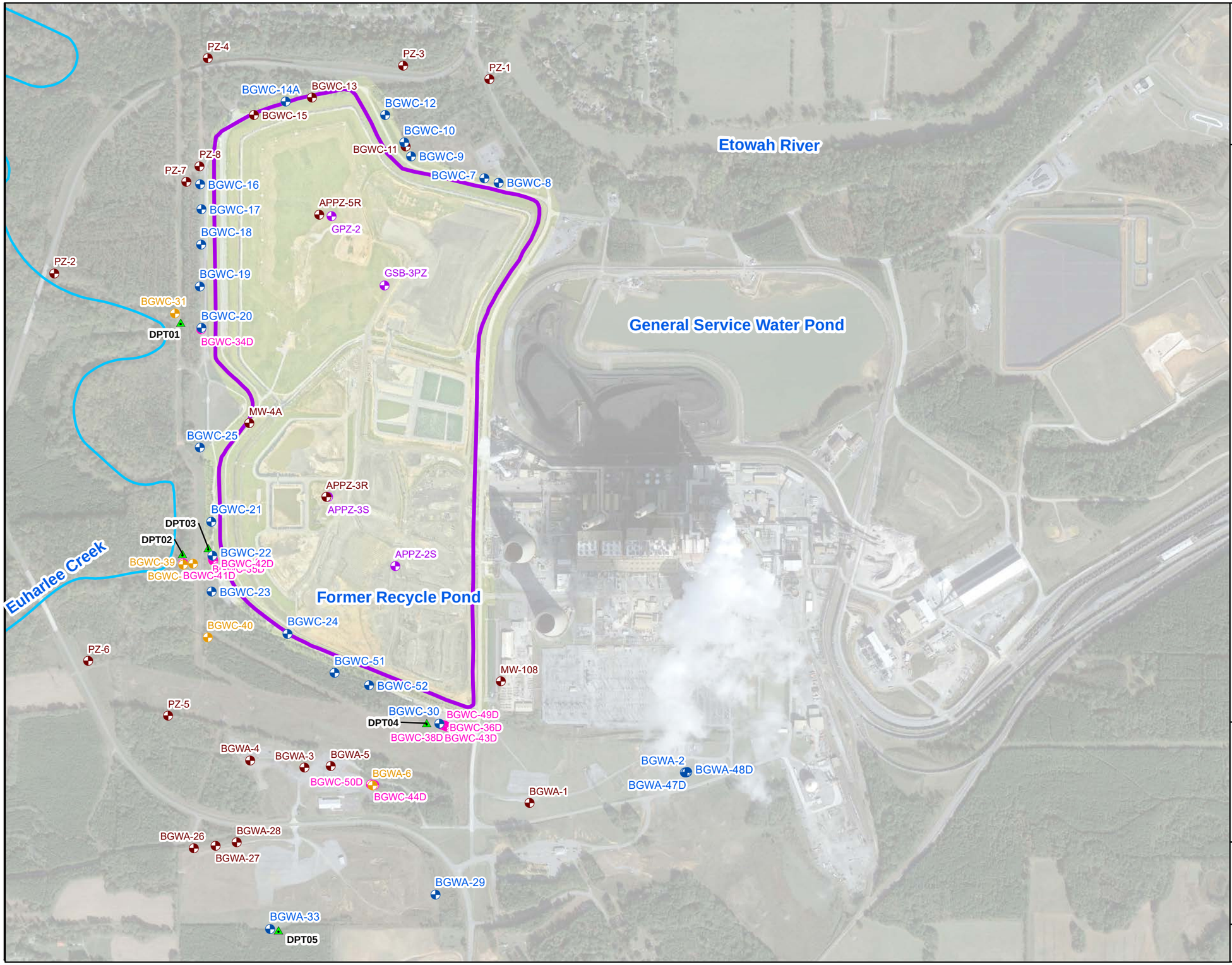
Notes:
1. mg/L = milligrams of constituent per liter
2. This figure was created using the Sanitas™ Statistical Software Version 9.6.32

TIME SERIES – BGWC-43D MOLYBDENUM

GEORGIA POWER COMPANY
PLANT BOWEN AP-1
BARTOW COUNTY, GEORGIA

Prepared For:	Prepared By:	Figure
Georgia Power	Geosyntec consultants	2
Kennesaw, GA	JULY 2024	



N

LEGEND

- Detection Monitoring Well
- Horizontal Assessment Monitoring Well
- Vertical Assessment Monitoring Well
- Piezometer
- Pore Water Piezometer
- DPT Borehole Sample Location (Approximate Location)
- Approximate AP-1 Boundary
- Euharlee Creek

Note:
1. Aerial photograph source: Google Earth Pro, November 2019 and Georgia Power Company, September 2023.

0 430 860 1,720
Feet

MONITORING WELL NETWORK AND LOCATION SAMPLING MAP

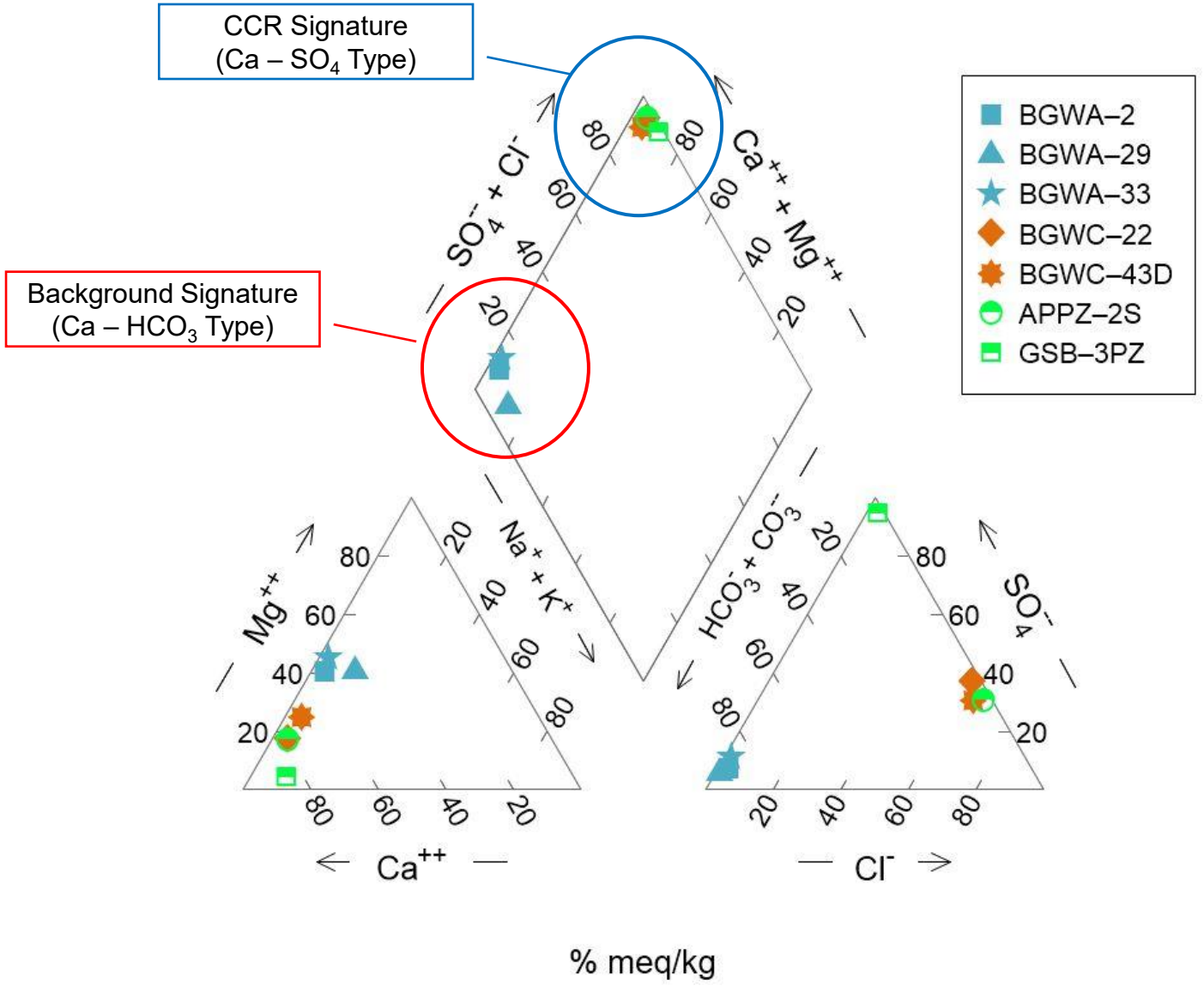
GEORGIA POWER COMPANY
PLANT BOWEN AP-1
BARTOW COUNTY, GEORGIA

Prepared For: Georgia Power

Prepared By: Geosyntec consultants

KENNESAW, GA | JULY 2024

FIGURE 3



Notes:
1. Results are shown in relative percentage of milliequivalents per kilogram water (meq/kg).
2. Upgradient wells are displayed in blue.
3. Downgradient compliance wells are displayed in orange.
4. CCR pore water samples are displayed in green.

Piper Trilinear Plot

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PLANT BOWEN AP-1
BARTOW COUNTY, GEORGIA

Prepared For: Georgia Power

Prepared By: Geosyntec consultants

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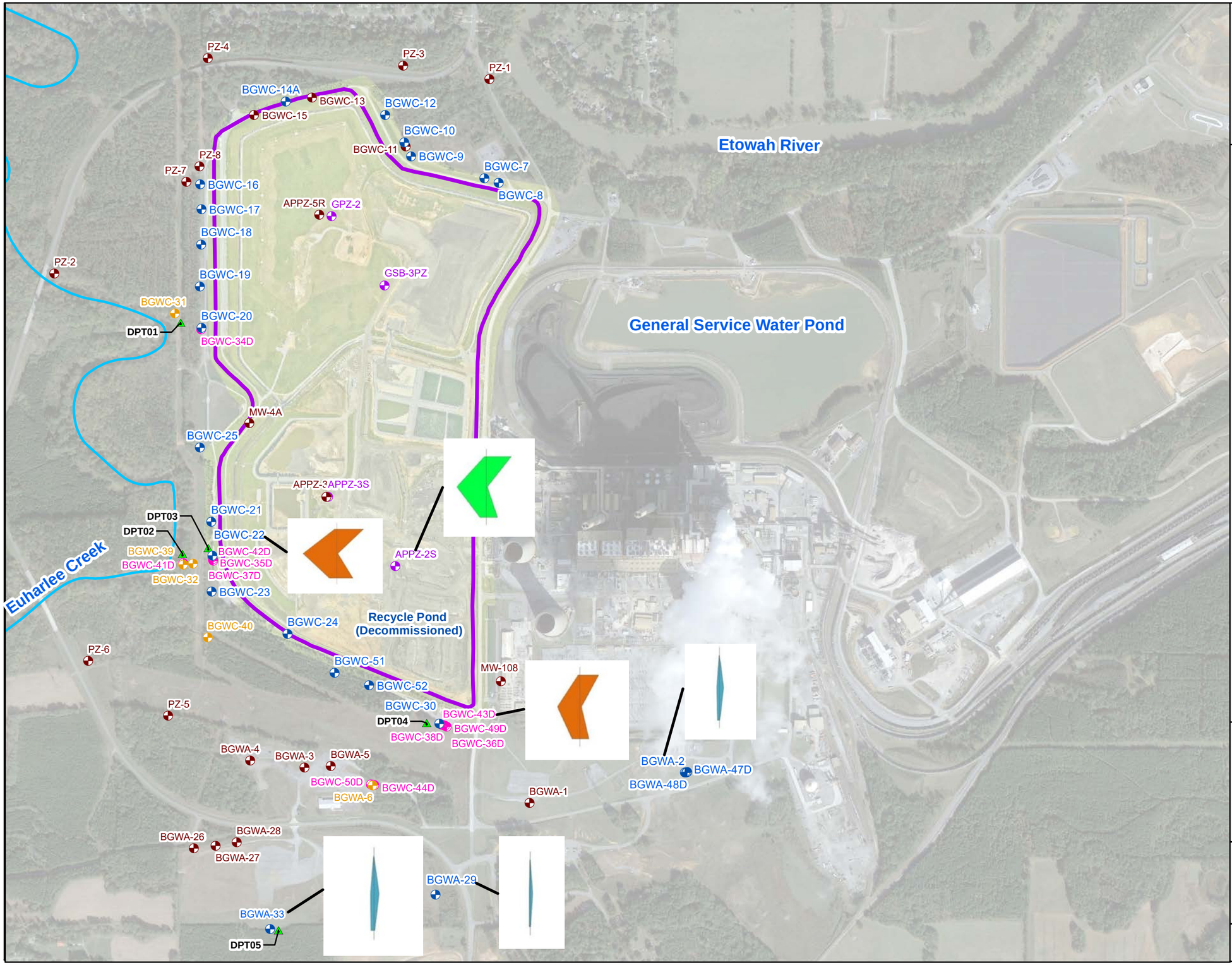
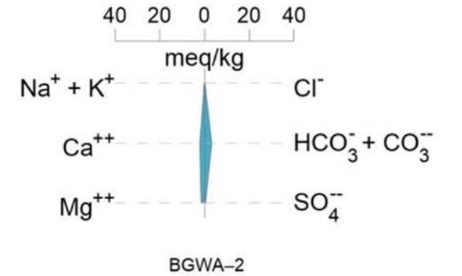
Figure 4



N

LEGEND

- Detection Monitoring Well
- Horizontal Assessment Monitoring Well
- Vertical Assessment Monitoring Well
- Piezometer
- Pore Water Piezometer
- DPT Borehole Sample Location (Approximate Location)
- Approximate AP-1 Boundary
- Euharlee Creek



Note:
1. Aerial photograph source: Google Earth Pro, November 2019 and Georgia Power Company, September 2023.

0 430 860 1,720
Feet

STIFF DIAGRAMS

GEORGIA POWER COMPANY
PLANT BOWEN AP-1
BARTOW COUNTY, GEORGIA

Prepared For: Georgia Power

Prepared By: Geosyntec consultants

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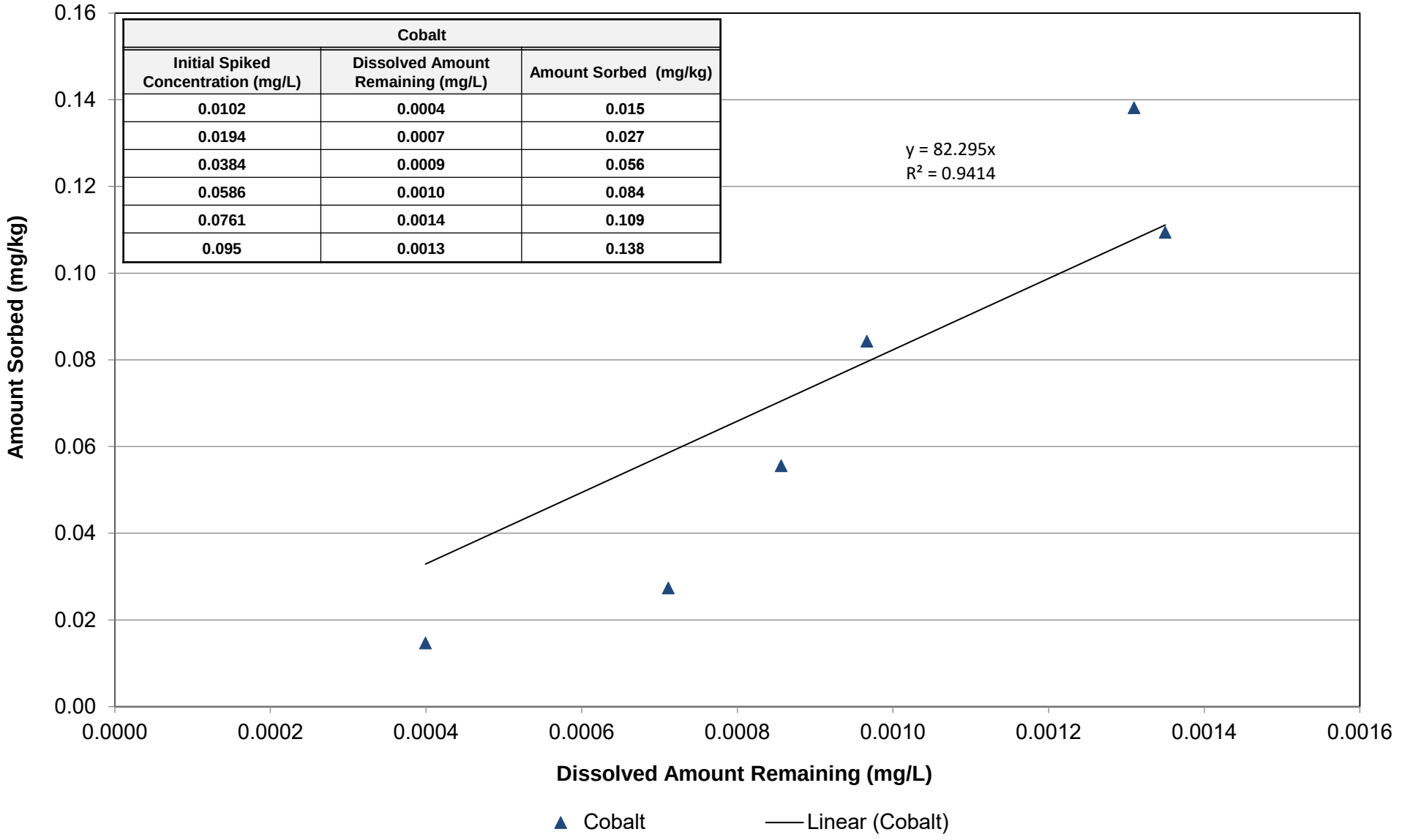
FIGURE 5

Cobalt		
Initial Spiked Concentration (mg/L)	Dissolved Amount Remaining (mg/L)	Amount Sorbed (mg/kg)
0.0102	0.0004	0.015
0.0194	0.0007	0.027
0.0384	0.0009	0.056
0.0586	0.0010	0.084
0.0761	0.0014	0.109
0.095	0.0013	0.138



Notes:
1. mg/L = milligrams of constituent per liter; mg/kg = milligrams of constituent per kilogram of solids.
2. The distribution coefficient (K_d) is the ratio of sorbed and dissolved concentrations under equilibrium conditions. The bulk K_d is equal to the slope of a line through individual measurements of sorbed and dissolved concentrations.
3. Non-detect concentrations are plotted as ½ the method detection limit.

SORPTION TEST RESULTS – COBALT

GEORGIA POWER COMPANY
PLANT BOWEN AP-1
BARTOW COUNTY, GEORGIA

Prepared For: Georgia Power

Prepared By: Geosyntec consultants

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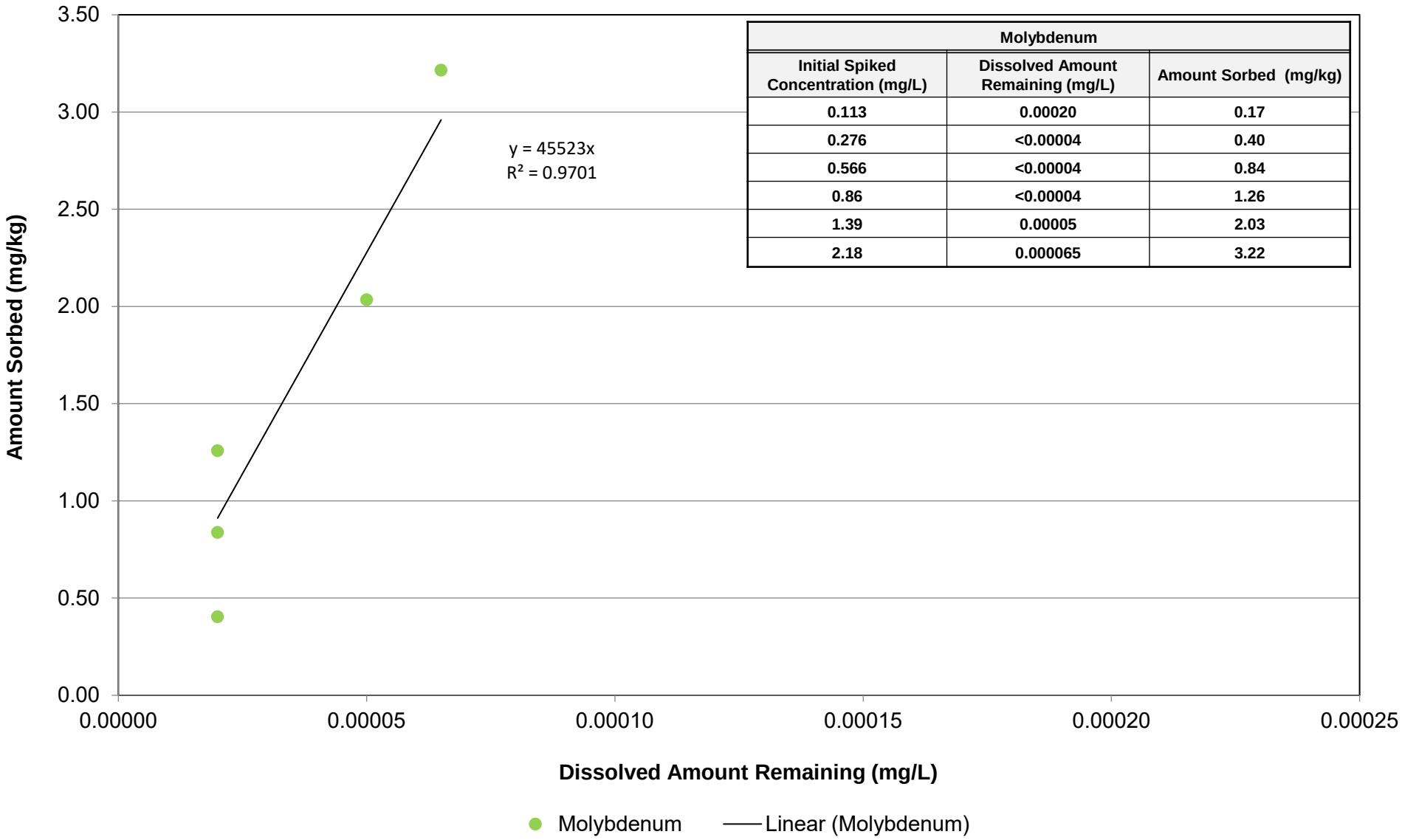
Figure 6A



Molybdenum		
Initial Spiked Concentration (mg/L)	Dissolved Amount Remaining (mg/L)	Amount Sorbed (mg/kg)
0.113	0.00020	0.17
0.276	<0.00004	0.40
0.566	<0.00004	0.84
0.86	<0.00004	1.26
1.39	0.00005	2.03
2.18	0.000065	3.22

Notes:
1. mg/L = milligrams of constituent per liter; mg/kg = milligrams of constituent per kilogram of aquifer solids.
2. The distribution coefficient (K_d) is the ratio of sorbed and dissolved concentrations under equilibrium conditions. The bulk K_d is equal to the slope of a line through individual measurements of sorbed and dissolved concentrations.
3. The results for Concentration Level 1 were excluded from the analysis as the results were inconsistent with the results from the other five concentration levels.
4. The calculated molybdenum K_d value is higher than typical literature values, however, molybdenum sorption was observed in Day Zero test results indicating sorption to aquifer solids.
5. Non-detect concentrations are plotted as ½ the method detection limit.

SORPTION TEST RESULTS – MOLYBDENUM

GEORGIA POWER COMPANY
PLANT BOWEN AP-1
BARTOW COUNTY, GEORGIA

Prepared For: Georgia Power

Prepared By: Geosyntec consultants

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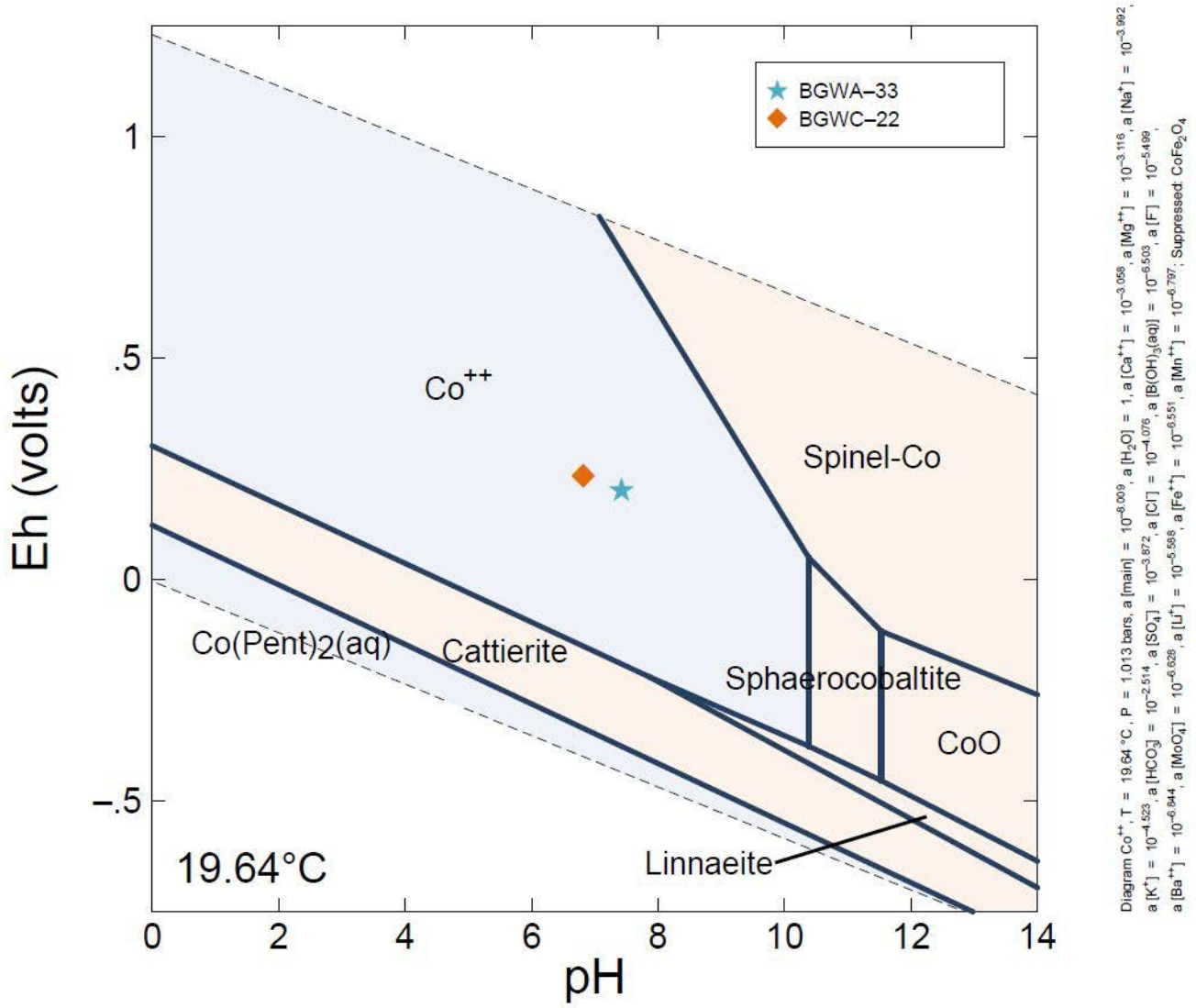
Figure 6B

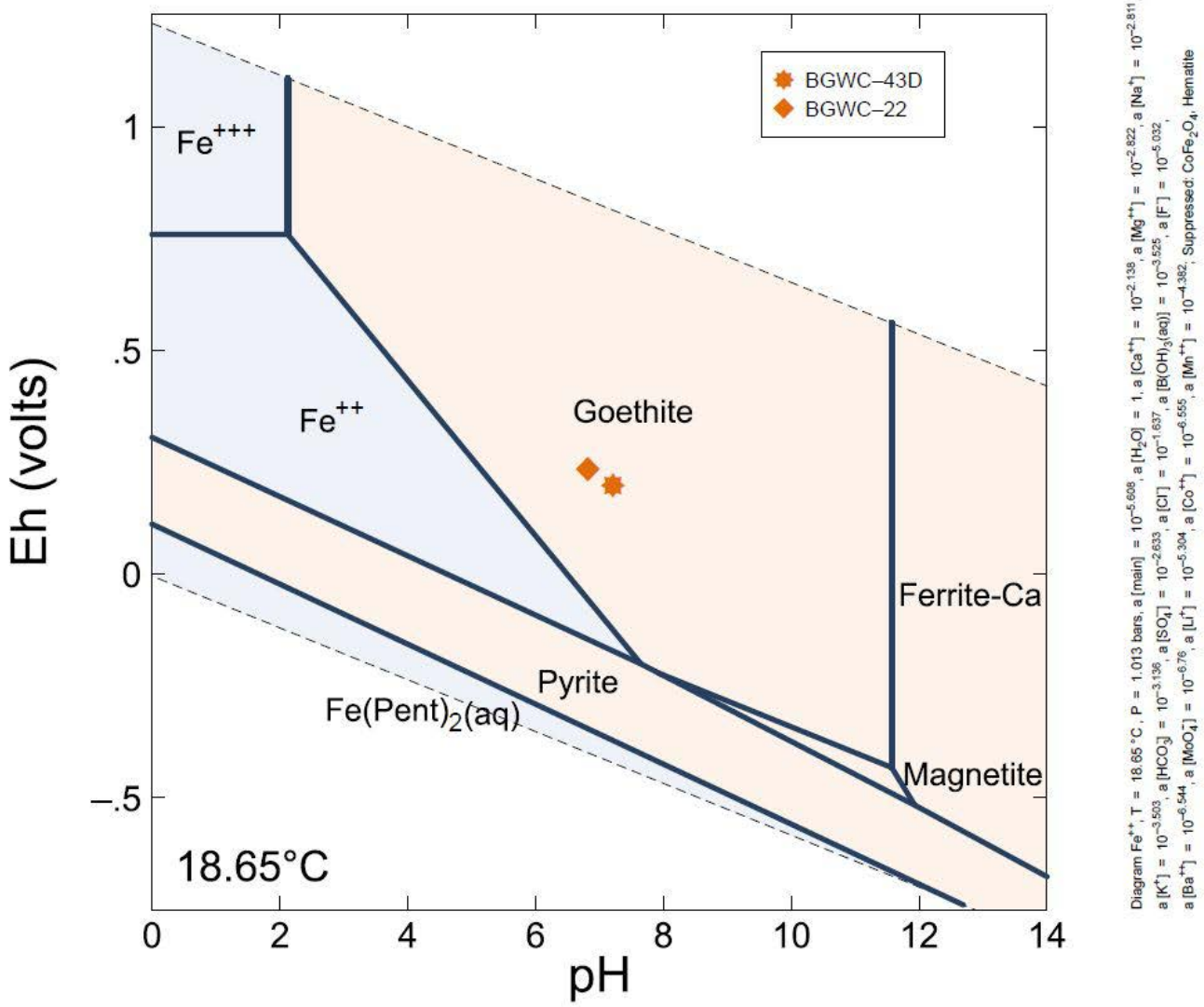


Notes:
1. Monitoring well BGWA-33 water quality data were used to establish baseline conditions for the diagram.
2. Eh-pH diagram created using the Act2 module of Geochemist's Workbench software package.

EH-PH DIAGRAM - COBALT

GEORGIA POWER COMPANY
PLANT BOWEN AP-1
BARTOW COUNTY, GEORGIA

Prepared For:	Prepared By:	Figure
Georgia Power	Geosyntec consultants	7
Kennesaw, GA	JULY 2024	



Notes:
1. Monitoring well BGWA-33 water quality data were used to establish baseline conditions for the diagram.
2. Eh-pH diagram created using the Act2 module of Geochemist's Workbench software package.
3. Hematite phase manually suppressed based on solid phase characterization data.

EH-PH DIAGRAM - IRON

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PLANT BOWEN AP-1
BARTOW COUNTY, GEORGIA

Prepared For: Georgia Power

Prepared By: Geosyntec consultants

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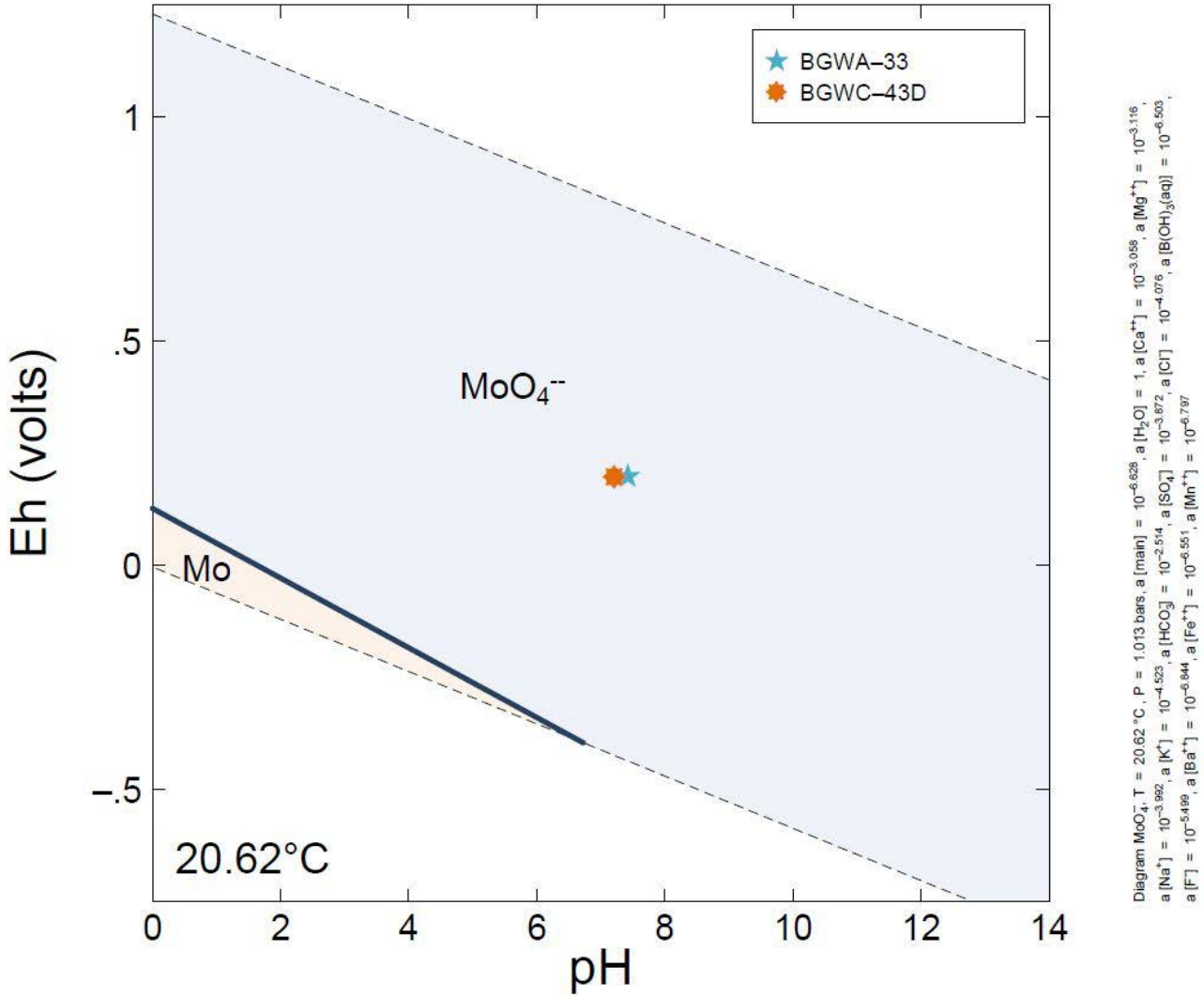
Figure 8



Notes:
1. Monitoring well BGWA-33 water quality data were used to establish baseline conditions for the diagram.
2. Eh-pH diagram created using the Act2 module of Geochemist's Workbench software package.

EH-PH DIAGRAM - MOLYBDENUM

GEORGIA POWER COMPANY
PLANT BOWEN AP-1
BARTOW COUNTY, GEORGIA

Prepared For:	Prepared By:	Figure
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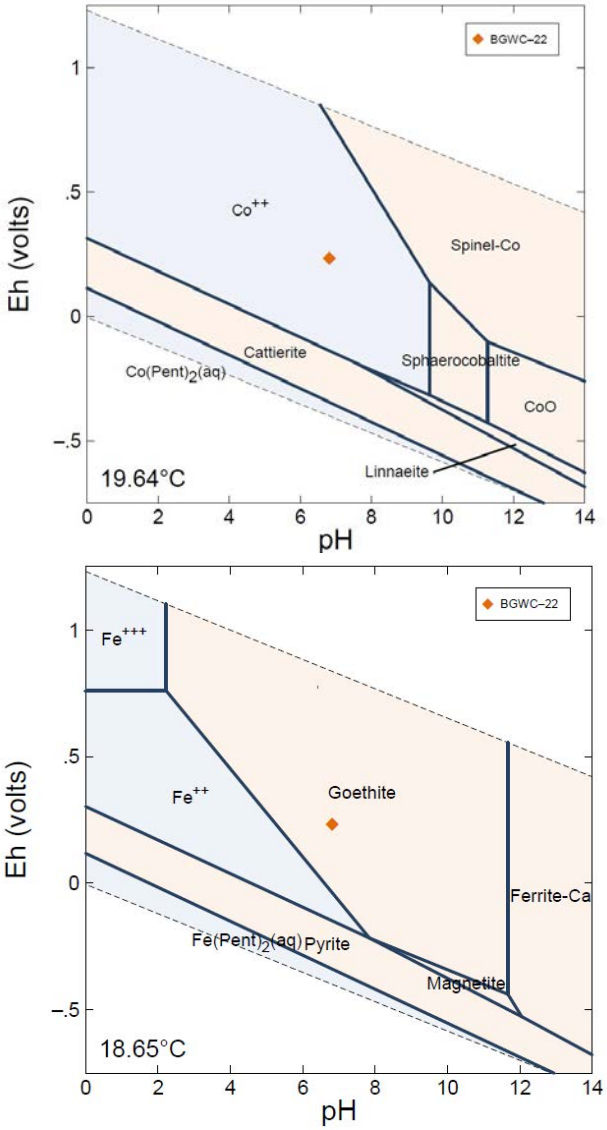
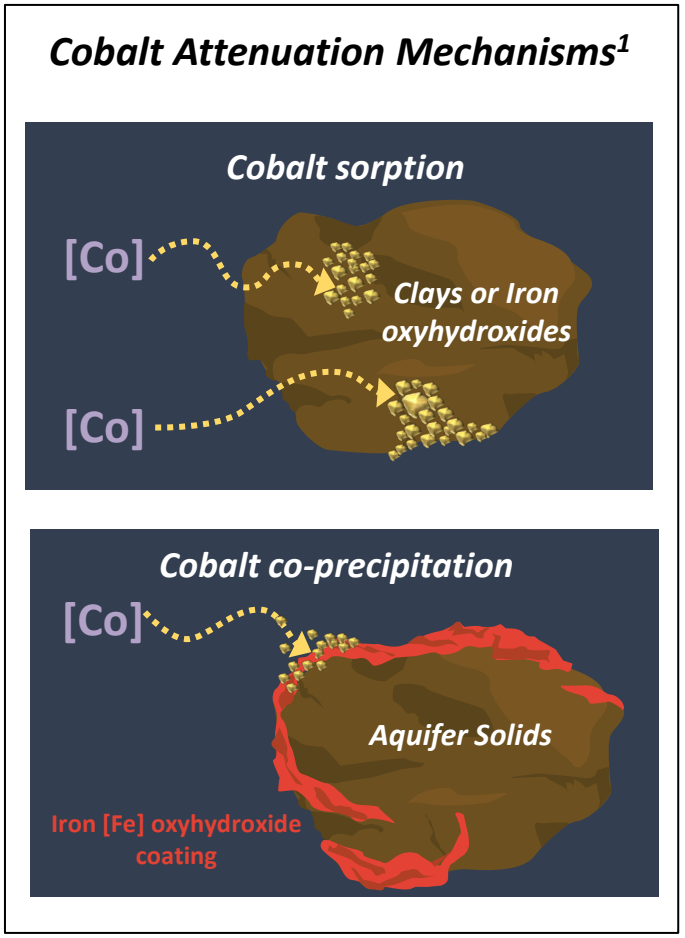




Notes:

1. The schematic presents the anticipated conceptual mechanism of Co sorption in the subsurface.
2. Eh-pH diagrams indicate that geochemical conditions are favorable for the presence of iron oxide/oxyhydroxide minerals in bedrock and residuum. Residuum filled secondary porosity features in bedrock are anticipated to attenuate Co. Additional details on Eh-pH diagrams provided in Figures 8 and 9.

GEOCHEMICAL CONCEPTUAL SITE MODEL ILLUSTRATION – COBALT

GEORGIA POWER COMPANY
PLANT BOWEN AP-1
BARTOW COUNTY, GEORGIA

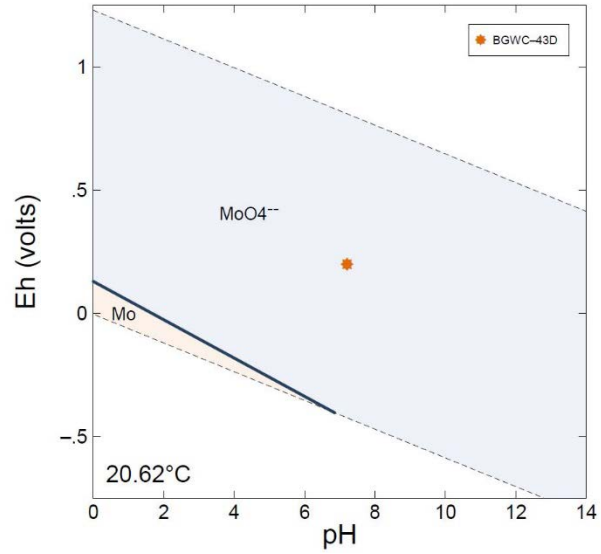
Prepared For: Georgia Power

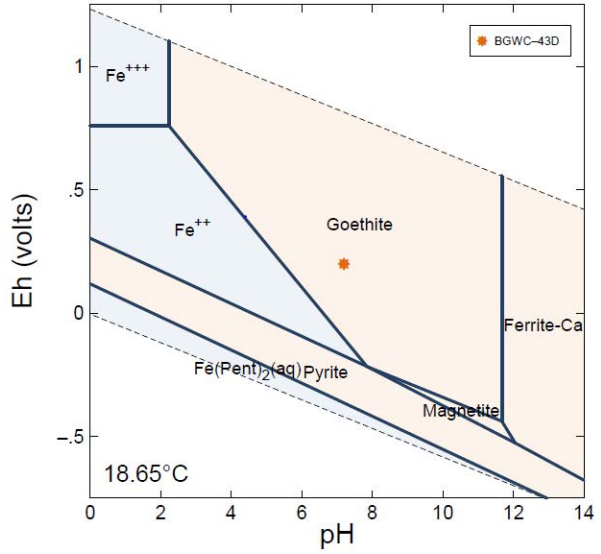
Prepared By: Geosyntec consultants

KENNESAW, GA

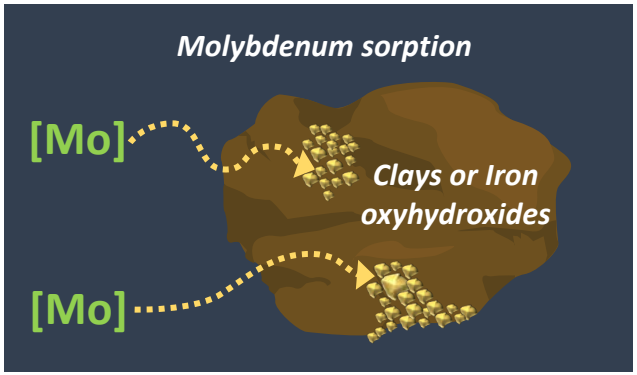
JULY 2024

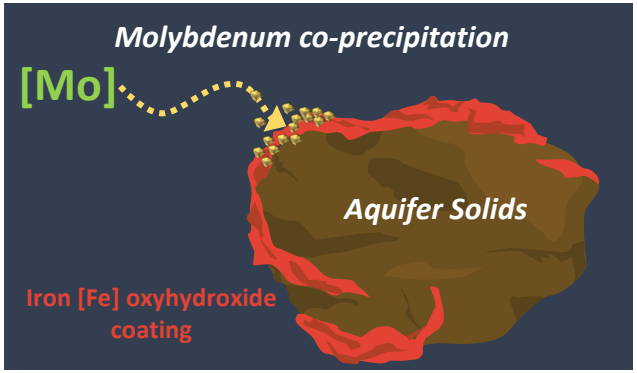
Figure 10





Molybdenum Attenuation Mechanisms[1]





Notes:

1. The schematic presents the anticipated conceptual mechanism of Mo sorption in the subsurface.
2. Eh-pH diagrams indicate that geochemical conditions are favorable for the presence of iron oxide/oxyhydroxide minerals in bedrock and residuum. Residuum filled secondary porosity features in bedrock are anticipated to attenuate Mo. Additional details on Eh-pH diagrams is provided in Figures 8 and 9.

GEOCHEMICAL CONCEPTUAL SITE MODEL ILLUSTRATION – MOLYBDENUM

GEORGIA POWER COMPANY
PLANT BOWEN AP-1
BARTOW COUNTY, GEORGIA

Prepared For: Georgia Power

Prepared By: Geosyntec consultants

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Figure 11

APPENDIX A

Supplemental Analytical Data Tables

Table A1

Summary of Groundwater Analytical Data - Agronomic Parameter Evaluation

Plant Bowen AP-1, Bartow County, Georgia

Well ID	BGWC-22	BGWC-23	BGWC-30
Sample Date	9/27/2019	9/27/2019	9/27/2019
Parameter[(1)]			
Nitrogen, Ammonia	1.4	0.63	ND
Copper	ND	ND	ND
Nitrate as N	ND	0.076	1.0
Nitrite as N	ND	ND	ND
Total Dissolved Solids	3,260	2,540	629
Total Hardness as $CaCO_3$ (SM 2340B)	2,240	2,060	430
Zinc	0.0040 J	0.0023 J	0.0020 J

Notes:

J = Indicates the parameter was estimated and detected between the method detection limit (MDL) and the reporting limit (RL)

ND = Indicates the parameter was not detected above the analytical MDL

(1) Parameters are reported in units of milligrams per liter (mg/L).

Table A2

Summary of Groundwater Analytical Data - NPDES Compliance Evaluation
Plant Bowen AP-1, Bartow County, Georgia

Well ID	BGWC-22	BGWC-30
Sample Date	9/27/2019	9/27/2019
Parameter[(1)]		
Nitrogen, Ammonia	1.4	ND
BOD, 5 day	ND	ND
Oil and Grease	ND	ND
Mercury	ND	ND
Residual Chlorine	-	-
Total Kjeldahl Nitrogen	1.2	ND
Total Organic Nitrogen	ND	ND
Total Suspended Solids	13.0	8.0

Notes:
- = Indicates the parameter was not measured
ND = Indicates the parameter was not detected above the analytical method detection limit (MDL)
NPDES = National Pollutant Discharge Elimination System
(1) Parameters are reported in units of milligrams per liter (mg/L).

APPENDIX B

Analytical Laboratory Reports

Pace Analytical Services, LLC
110 Technology Parkway
Peachtree Corners, GA 30092
(770)734-4200

November 19, 2019

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

RE: Project: Plant Bowen
Pace Project No.: 2623698

Dear Joju Abraham:
Enclosed are the analytical results for sample(s) received by the laboratory on September 27, 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.

This report was revised 10/22/19 to remove compounds not requested on the COC.

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: Whitney Law, Geosyntec Consultants
Noelia Muskus, Geosyntec Consultants
Rebecca Thornton, Pace Analytical Atlanta

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110 Technology Parkway
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(770)734-4200

CERTIFICATIONS

Project: Plant Bowen
Pace Project No.: 2623698

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

Pace Analytical Services Ormond Beach
8 East Tower Circle, Ormond Beach, FL 32174
Alaska DEC- CS/UST/LUST
Alabama Certification #: 41320
Arizona Certification# AZ0819
Colorado Certification: FL NELAC Reciprocity
Connecticut Certification #: PH-0216
Delaware Certification: FL NELAC Reciprocity
Florida Certification #: E83079
Georgia Certification #: 955
Guam Certification: FL NELAC Reciprocity
Hawaii Certification: FL NELAC Reciprocity
Illinois Certification #: 200068
Indiana Certification: FL NELAC Reciprocity
Kansas Certification #: E-10383
Kentucky Certification #: 90050
Louisiana Certification #: FL NELAC Reciprocity
Louisiana Environmental Certificate #: 05007
Maryland Certification: #346
Michigan Certification #: 9911
Mississippi Certification: FL NELAC Reciprocity
Missouri Certification #: 236
Montana Certification #: Cert 0074
Nebraska Certification: NE-OS-28-14
New Hampshire Certification #: 2958
New Jersey Certification #: FL022
New York Certification #: 11608
North Carolina Environmental Certificate #: 667
North Carolina Certification #: 12710
North Dakota Certification #: R-216
Oklahoma Certification #: D9947
Pennsylvania Certification #: 68-00547
Puerto Rico Certification #: FL01264
South Carolina Certification: #96042001
Tennessee Certification #: TN02974
Texas Certification: FL NELAC Reciprocity
US Virgin Islands Certification: FL NELAC Reciprocity
Virginia Environmental Certification #: 460165
West Virginia Certification #: 9962C
Wisconsin Certification #: 399079670
Wyoming (EPA Region 8): FL NELAC Reciprocity

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SAMPLE SUMMARY

Project: Plant Bowen
Pace Project No.: 2623698

Lab ID	Sample ID	Matrix	Date Collected	Date Received
2623698001	**BGWC-22**	Water	09/27/19 10:06	09/27/19 16:00
2623698002	**BGWC-23**	Water	09/27/19 11:45	09/27/19 16:00
2623698003	**BGWC-30**	Water	09/27/19 09:45	09/27/19 16:00
2623698004	**BGWC-36D**	Water	09/27/19 12:02	09/27/19 16:00
2623698005	**BGWA-33**	Water	09/27/19 13:08	09/27/19 16:00

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SAMPLE ANALYTE COUNT

Project: Plant Bowen
Pace Project No.: 2623698

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
2623698001	**BGWC-22**	EPA 6010	LEC	7	PASI-O
		EPA 6020B	CSW	3	PASI-GA
		EPA 7470A	DRB	1	PASI-GA
		EPA 1664B	SJS	1	PASI-GA
		SM 2320B	S1A	2	PASI-GA
		SM 2540C	ALW	1	PASI-GA
		SM 2540D	ALW	1	PASI-GA
		SM 4500-P	JAD	1	PASI-GA
		SM 4500-S2 D	KN	1	PASI-GA
		SM 5210B	KN	1	PASI-GA
		TKN-NH3 Calculation	LPH	1	PASI-GA
		EPA 300.0	MWB	2	PASI-GA
		EPA 350.1	ANB	1	PASI-GA
		EPA 351.2	ANB	1	PASI-GA
		SM 5310B	SA1	1	PASI-O
2623698002	**BGWC-23**	EPA 6010	LEC	7	PASI-O
		EPA 6020B	CSW	2	PASI-GA
		SM 2320B	S1A	2	PASI-GA
		SM 2540C	ALW	1	PASI-GA
		SM 4500-P	JAD	1	PASI-GA
		SM 4500-S2 D	KN	1	PASI-GA
		EPA 300.0	MWB	2	PASI-GA
		EPA 350.1	ANB	1	PASI-GA
		SM 5310B	SA1	1	PASI-O
2623698003	**BGWC-30**	EPA 6010	LEC	7	PASI-O
		EPA 6020B	CSW	3	PASI-GA
		EPA 7470A	DRB	1	PASI-GA
		EPA 1664B	SJS	1	PASI-GA
		SM 2320B	S1A	2	PASI-GA
		SM 2540C	ALW	1	PASI-GA
		SM 2540D	ALW	1	PASI-GA
		SM 4500-P	JAD	1	PASI-GA
		SM 4500-S2 D	KN	1	PASI-GA
		SM 5210B	KN	1	PASI-GA
		TKN-NH3 Calculation	LPH	1	PASI-GA
		EPA 300.0	MWB	2	PASI-GA
		EPA 350.1	ANB	1	PASI-GA

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SAMPLE ANALYTE COUNT

Project: Plant Bowen
Pace Project No.: 2623698

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		EPA 351.2	ANB	1	PASI-GA
		SM 5310B	SA1	1	PASI-O
2623698004	**BGWC-36D**	EPA 6010	LEC	6	PASI-O
		SM 2320B	S1A	2	PASI-GA
		SM 4500-P	JAD	1	PASI-GA
		SM 4500-S2 D	KN	1	PASI-GA
		SM 5310B	SA1	1	PASI-O
2623698005	**BGWA-33**	EPA 6010	KPP	6	PASI-O
		SM 2320B	S1A	2	PASI-GA

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ANALYTICAL RESULTS

Project: Plant Bowen
Pace Project No.: 2623698

Sample: BGWC-22 **Lab ID: 2623698001** Collected: 09/27/19 10:06 Received: 09/27/19 16:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Iron	**0.46**	mg/L	0.040	0.0092	1	10/08/19 14:00	10/09/19 18:38	7439-89-6	
Magnesium	**95.5**	mg/L	0.50	0.084	1	10/08/19 14:00	10/09/19 18:38	7439-95-4	
Manganese	**6.8**	mg/L	0.10	0.0084	20	10/08/19 14:00	10/09/19 18:43	7439-96-5	
Phosphorus	ND	mg/L	0.045	0.014	1	10/08/19 14:00	10/09/19 18:38	7723-14-0	N2
Potassium	**14.9**	mg/L	1.0	0.15	1	10/08/19 14:00	10/09/19 18:38	7440-09-7	
Sodium	**47.2**	mg/L	2.0	0.27	1	10/08/19 14:00	10/09/19 18:38	7440-23-5	
Tot Hardness asCaCO3 (SM 2340B	**2240**	mg/L	64.2	10.1	20	10/08/19 14:00	10/09/19 18:43		
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3005A								
Copper	ND	mg/L	0.025	0.00019	1	09/30/19 13:30	10/03/19 17:05	7440-50-8	
Lead	**0.000054J**	mg/L	0.0050	0.000046	1	09/30/19 13:30	10/03/19 17:05	7439-92-1	
Zinc	**0.0040J**	mg/L	0.010	0.0015	1	09/30/19 13:30	10/03/19 17:05	7440-66-6	B
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A								
Mercury	ND	mg/L	0.00050	0.00014	1	10/03/19 17:10	10/04/19 10:51	7439-97-6	
HEM, Oil and Grease	Analytical Method: EPA 1664B								
Oil and Grease	ND	mg/L	4.9	4.9	1		10/02/19 08:00		
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity,Bicarbonate (CaCO3)	**72.0**	mg/L	20.0	20.0	1		10/01/19 18:37		
Alkalinity, Total as CaCO3	**72.0**	mg/L	20.0	20.0	1		10/01/19 18:37		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**3260**	mg/L	10.0	10.0	1		10/03/19 20:30		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**13.0**	mg/L	5.0	5.0	1		09/30/19 12:16		
4500PE Ortho Phosphorus	Analytical Method: SM 4500-P								
Orthophosphate as P	ND	mg/L	0.020	0.020	1		09/28/19 13:55		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2 D								
Sulfide	ND	mg/L	0.20	0.20	1		10/03/19 13:43	18496-25-8	M1
5210B BOD, 5 day	Analytical Method: SM 5210B Preparation Method: SM 5210B								
BOD, 5 day	ND	mg/L	2.0	2.0	1	09/27/19 21:37	10/02/19 14:47		1A
Total Organic Nitrogen Calc.	Analytical Method: TKN-NH3 Calculation								
Total Organic Nitrogen	ND	mg/L	0.40	0.40	1		10/07/19 23:42		
300.0 IC Anions	Analytical Method: EPA 300.0								
Nitrate as N	ND	mg/L	0.050	0.0050	1		09/28/19 09:55	14797-55-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: Plant Bowen
Pace Project No.: 2623698

Sample: BGWC-22 **Lab ID: 2623698001** Collected: 09/27/19 10:06 Received: 09/27/19 16:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC Anions	Analytical Method: EPA 300.0								
Nitrite as N	ND	mg/L	0.050	0.011	1		09/28/19 09:55	14797-65-0	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**1.4**	mg/L	0.10	0.10	1		09/30/19 11:26	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	**1.2**	mg/L	0.40	0.40	1	10/01/19 09:05	10/01/19 13:12	7727-37-9	
5310B Dissolved Organic Carbon	Analytical Method: SM 5310B								
Dissolved Organic Carbon	ND	mg/L	1.0	0.50	1		10/02/19 21:58		

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ANALYTICAL RESULTS

Project: Plant Bowen
Pace Project No.: 2623698

Sample: BGWC-23 **Lab ID: 2623698002** Collected: 09/27/19 11:45 Received: 09/27/19 16:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Iron	**0.32**	mg/L	0.040	0.0092	1	10/08/19 14:00	10/09/19 18:57	7439-89-6	
Magnesium	**120**	mg/L	10.0	1.7	20	10/08/19 14:00	10/09/19 19:02	7439-95-4	
Manganese	**0.52**	mg/L	0.0050	0.00042	1	10/08/19 14:00	10/09/19 18:57	7439-96-5	
Phosphorus	ND	mg/L	0.045	0.014	1	10/08/19 14:00	10/09/19 18:57	7723-14-0	N2
Potassium	**10.1**	mg/L	1.0	0.15	1	10/08/19 14:00	10/09/19 18:57	7440-09-7	
Sodium	**41.2**	mg/L	2.0	0.27	1	10/08/19 14:00	10/09/19 18:57	7440-23-5	
Tot Hardness asCaCO3 (SM 2340B	**2060000**	ug/L	64200	10100	20	10/08/19 14:00	10/09/19 19:02		
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3005A								
Copper	ND	mg/L	0.025	0.00019	1	09/30/19 13:30	10/03/19 18:03	7440-50-8	
Zinc	**0.0023J**	mg/L	0.010	0.0015	1	09/30/19 13:30	10/03/19 18:03	7440-66-6	B
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity,Bicarbonate (CaCO3)	**96.0**	mg/L	20.0	20.0	1		10/01/19 18:39		
Alkalinity, Total as CaCO3	**96.0**	mg/L	20.0	20.0	1		10/01/19 18:39		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**2540**	mg/L	10.0	10.0	1		10/03/19 20:30		
4500PE Ortho Phosphorus	Analytical Method: SM 4500-P								
Orthophosphate as P	ND	mg/L	0.020	0.020	1		09/28/19 13:55		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2 D								
Sulfide	ND	mg/L	0.20	0.20	1		10/03/19 13:47	18496-25-8	
300.0 IC Anions	Analytical Method: EPA 300.0								
Nitrate as N	**0.076**	mg/L	0.050	0.0050	1		09/28/19 10:15	14797-55-8	
Nitrite as N	ND	mg/L	0.050	0.011	1		09/28/19 10:15	14797-65-0	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	**0.63**	mg/L	0.10	0.10	1		09/30/19 11:27	7664-41-7	
5310B Dissolved Organic Carbon	Analytical Method: SM 5310B								
Dissolved Organic Carbon	ND	mg/L	1.0	0.50	1		10/02/19 22:13		

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ANALYTICAL RESULTS

Project: Plant Bowen
Pace Project No.: 2623698

Sample: BGWC-30 **Lab ID: 2623698003** Collected: 09/27/19 09:45 Received: 09/27/19 16:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Iron	**0.11**	mg/L	0.040	0.0092	1	10/08/19 14:00	10/09/19 19:07	7439-89-6	
Magnesium	**34.1**	mg/L	0.50	0.084	1	10/08/19 14:00	10/09/19 19:07	7439-95-4	
Manganese	**0.0076**	mg/L	0.0050	0.00042	1	10/08/19 14:00	10/09/19 19:07	7439-96-5	
Phosphorus	ND	mg/L	0.045	0.014	1	10/08/19 14:00	10/09/19 19:07	7723-14-0	N2
Potassium	**3.0**	mg/L	1.0	0.15	1	10/08/19 14:00	10/09/19 19:07	7440-09-7	
Sodium	**8.2**	mg/L	2.0	0.27	1	10/08/19 14:00	10/09/19 19:07	7440-23-5	
Tot Hardness asCaCO3 (SM 2340B	**430000**	ug/L	64200	10100	20	10/08/19 14:00	10/09/19 19:11		
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3005A								
Copper	ND	mg/L	0.025	0.00019	1	09/30/19 13:30	10/03/19 18:14	7440-50-8	
Lead	**0.00018J**	mg/L	0.0050	0.000046	1	09/30/19 13:30	10/03/19 18:14	7439-92-1	
Zinc	**0.0020J**	mg/L	0.010	0.0015	1	09/30/19 13:30	10/03/19 18:14	7440-66-6	B
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A								
Mercury	ND	mg/L	0.00050	0.00014	1	10/03/19 17:10	10/04/19 11:03	7439-97-6	
HEM, Oil and Grease	Analytical Method: EPA 1664B								
Oil and Grease	ND	mg/L	4.9	4.9	1		10/02/19 08:00		
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity,Bicarbonate (CaCO3)	**171**	mg/L	20.0	20.0	1		10/01/19 18:45		
Alkalinity, Total as CaCO3	**171**	mg/L	20.0	20.0	1		10/01/19 18:45		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**629**	mg/L	11.1	11.1	1		10/03/19 20:30		
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	**8.0**	mg/L	5.0	5.0	1		10/02/19 18:43		
4500PE Ortho Phosphorus	Analytical Method: SM 4500-P								
Orthophosphate as P	ND	mg/L	0.020	0.020	1		09/28/19 13:56		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2 D								
Sulfide	ND	mg/L	0.20	0.20	1		10/03/19 13:47	18496-25-8	
5210B BOD, 5 day	Analytical Method: SM 5210B Preparation Method: SM 5210B								
BOD, 5 day	ND	mg/L	2.0	2.0	1	09/27/19 21:37	10/02/19 14:48		1A
Total Organic Nitrogen Calc.	Analytical Method: TKN-NH3 Calculation								
Total Organic Nitrogen	ND	mg/L	0.40	0.40	1		10/07/19 23:42		
300.0 IC Anions	Analytical Method: EPA 300.0								
Nitrate as N	**1.0**	mg/L	0.050	0.0050	1		09/28/19 10:36	14797-55-8	

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ANALYTICAL RESULTS

Project: Plant Bowen
Pace Project No.: 2623698

Sample: BGWC-30 **Lab ID: 2623698003** Collected: 09/27/19 09:45 Received: 09/27/19 16:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC Anions	Analytical Method: EPA 300.0								
Nitrite as N	ND	mg/L	0.050	0.011	1		09/28/19 10:36	14797-65-0	
350.1 Ammonia	Analytical Method: EPA 350.1								
Nitrogen, Ammonia	ND	mg/L	0.10	0.10	1		09/30/19 11:29	7664-41-7	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Nitrogen, Kjeldahl, Total	ND	mg/L	0.40	0.40	1	10/01/19 09:05	10/01/19 13:13	7727-37-9	
5310B Dissolved Organic Carbon	Analytical Method: SM 5310B								
Dissolved Organic Carbon	ND	mg/L	1.0	0.50	1		10/02/19 21:46		

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ANALYTICAL RESULTS

Project: Plant Bowen
Pace Project No.: 2623698

Sample: BGWC-36D **Lab ID: 2623698004** Collected: 09/27/19 12:02 Received: 09/27/19 16:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Iron	**0.19**	mg/L	0.040	0.0092	1	10/08/19 14:00	10/09/19 19:16	7439-89-6	
Magnesium	**59.8**	mg/L	0.50	0.084	1	10/08/19 14:00	10/09/19 19:16	7439-95-4	
Manganese	**0.14**	mg/L	0.0050	0.00042	1	10/08/19 14:00	10/09/19 19:16	7439-96-5	
Phosphorus	ND	mg/L	0.045	0.014	1	10/08/19 14:00	10/09/19 19:16	7723-14-0	N2
Potassium	**4.7**	mg/L	1.0	0.15	1	10/08/19 14:00	10/09/19 19:16	7440-09-7	
Sodium	**26.2**	mg/L	2.0	0.27	1	10/08/19 14:00	10/09/19 19:16	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity,Bicarbonate (CaCO3)	**153**	mg/L	20.0	20.0	1		10/04/19 12:31		
Alkalinity, Total as CaCO3	**153**	mg/L	20.0	20.0	1		10/04/19 12:31		
4500PE Ortho Phosphorus	Analytical Method: SM 4500-P								
Orthophosphate as P	ND	mg/L	0.020	0.020	1		09/28/19 13:56		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2 D								
Sulfide	ND	mg/L	0.20	0.20	1		10/03/19 13:48	18496-25-8	
5310B Dissolved Organic Carbon	Analytical Method: SM 5310B								
Dissolved Organic Carbon	**0.56J**	mg/L	1.0	0.50	1		10/02/19 22:29		

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ANALYTICAL RESULTS

Project: Plant Bowen
Pace Project No.: 2623698

Sample: BGWA-33 **Lab ID: 2623698005** Collected: 09/27/19 13:08 Received: 09/27/19 16:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Iron	**0.033J**	mg/L	0.040	0.0092	1	10/09/19 08:23	10/11/19 06:22	7439-89-6	
Magnesium	**31.6**	mg/L	0.50	0.084	1	10/09/19 08:23	10/11/19 06:22	7439-95-4	
Manganese	**0.014**	mg/L	0.0050	0.00042	1	10/09/19 08:23	10/11/19 06:22	7439-96-5	
Phosphorus	ND	mg/L	0.045	0.014	1	10/09/19 08:23	10/11/19 06:22	7723-14-0	N2
Potassium	**1.8**	mg/L	1.0	0.15	1	10/09/19 08:23	10/11/19 06:22	7440-09-7	
Sodium	**2.1**	mg/L	2.0	0.27	1	10/09/19 08:23	10/11/19 06:22	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity,Bicarbonate (CaCO3)	**230**	mg/L	20.0	20.0	1		10/01/19 18:54		
Alkalinity, Total as CaCO3	**230**	mg/L	20.0	20.0	1		10/01/19 18:54		

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QUALITY CONTROL DATA

Project: Plant Bowen
Pace Project No.: 2623698

QC Batch: 36428
QC Batch Method: EPA 7470A
Analysis Method: EPA 7470A
Analysis Description: 7470 Mercury
Associated Lab Samples: 2623698001, 2623698003

METHOD BLANK: 164509 Matrix: Water
Associated Lab Samples: 2623698001, 2623698003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00050	0.00014	10/04/19 10:46	

LABORATORY CONTROL SAMPLE: 164510

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	0.0025	0.0025	101	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 164511 164512

Parameter	Units	2623696001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	ND	0.0025	0.0025	0.0022	0.0022	88	88	75-125	0	20	

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QUALITY CONTROL DATA

Project: Plant Bowen
Pace Project No.: 2623698

QC Batch: 576597 Analysis Method: EPA 6010
QC Batch Method: EPA 3010 Analysis Description: 6010 MET
Associated Lab Samples: 2623698001, 2623698002, 2623698003, 2623698004

METHOD BLANK: 3133444 Matrix: Water
Associated Lab Samples: 2623698001, 2623698002, 2623698003, 2623698004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Iron	mg/L	ND	0.040	0.0092	10/09/19 08:23	
Magnesium	mg/L	ND	0.50	0.084	10/09/19 08:23	
Manganese	mg/L	ND	0.0050	0.00042	10/09/19 08:23	
Phosphorus	mg/L	ND	0.045	0.014	10/09/19 08:23	N2
Potassium	mg/L	ND	1.0	0.15	10/09/19 08:23	
Sodium	mg/L	ND	2.0	0.27	10/09/19 08:23	
Tot Hardness asCaCO3 (SM 2340B	ug/L	ND	3210	506	10/09/19 08:23	

LABORATORY CONTROL SAMPLE: 3133445

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Iron	mg/L	2.5	2.5	101	80-120	
Magnesium	mg/L	12.5	12.4	100	80-120	
Manganese	mg/L	0.25	0.25	101	80-120	
Phosphorus	mg/L	0.25	0.24	95	80-120	N2
Potassium	mg/L	12.5	12.2	98	80-120	
Sodium	mg/L	12.5	12.4	100	80-120	
Tot Hardness asCaCO3 (SM 2340B	ug/L	82700	82600	100	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3133609 3133610

Parameter	Units	2623708004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Iron	mg/L	0.049	2.5	2.5	2.7	2.7	104	104	75-125	0	20	
Magnesium	mg/L	49.1	12.5	12.5	61.6	62.2	100	105	75-125	1	20	
Manganese	mg/L	ND	0.25	0.25	0.27	0.26	107	104	75-125	3	20	
Phosphorus	mg/L	ND	0.25	0.25	0.27	0.26	106	103	75-125	3	20	N2
Potassium	mg/L	2.4	12.5	12.5	15.5	15.6	105	105	75-125	1	20	
Sodium	mg/L	24.4	12.5	12.5	37.3	37.8	104	107	75-125	1	20	
Tot Hardness asCaCO3 (SM 2340B	ug/L	526000	82700	82700	600000	603000	90	93	75-125	0	20	

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QUALITY CONTROL DATA

Project: Plant Bowen
Pace Project No.: 2623698

QC Batch: 576808
QC Batch Method: EPA 3010
Analysis Method: EPA 6010
Analysis Description: 6010 MET
Associated Lab Samples: 2623698005

METHOD BLANK: 3135137 Matrix: Water
Associated Lab Samples: 2623698005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Iron	mg/L	ND	0.040	0.0092	10/11/19 06:29	
Magnesium	mg/L	ND	0.50	0.084	10/11/19 06:29	
Manganese	mg/L	ND	0.0050	0.00042	10/11/19 06:29	
Phosphorus	mg/L	ND	0.045	0.014	10/11/19 06:29	N2
Potassium	mg/L	ND	1.0	0.15	10/11/19 06:29	
Sodium	mg/L	ND	2.0	0.27	10/11/19 06:29	

LABORATORY CONTROL SAMPLE: 3135138

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Iron	mg/L	2.5	2.5	102	80-120	
Magnesium	mg/L	12.5	12.8	103	80-120	
Manganese	mg/L	0.25	0.26	104	80-120	
Phosphorus	mg/L	0.25	0.24	98	80-120	N2
Potassium	mg/L	12.5	12.6	101	80-120	
Sodium	mg/L	12.5	12.9	103	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3135139 3135140

Parameter	Units	35502685001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Iron	mg/L	1940000 ug/L	125	125	2000	1990	50	43	75-125	0	20	M1
Magnesium	mg/L	4200U ug/L	625	625	647	652	103	104	75-125	1	20	
Manganese	mg/L	3610 ug/L	12.5	12.5	16.3	16.8	102	105	75-125	3	20	
Phosphorus	mg/L	700U ug/L	12.5	12.5	12.8	12.8	101	101	75-125	0	20	N2
Potassium	mg/L	906000 ug/L	625	625	1580	1570	107	106	75-125	0	20	
Sodium	mg/L	444000 ug/L	625	625	1120	1120	108	109	75-125	1	20	

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QUALITY CONTROL DATA

Project: Plant Bowen
Pace Project No.: 2623698

QC Batch: 36173 Analysis Method: EPA 6020B
QC Batch Method: EPA 3005A Analysis Description: 6020B MET
Associated Lab Samples: 2623698001, 2623698002, 2623698003

METHOD BLANK: 163347 Matrix: Water
Associated Lab Samples: 2623698001, 2623698002, 2623698003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Copper	mg/L	ND	0.025	0.00019	10/03/19 16:32	
Lead	mg/L	ND	0.0050	0.000046	10/03/19 16:32	
Zinc	mg/L	0.0016J	0.010	0.0015	10/03/19 16:32	

LABORATORY CONTROL SAMPLE: 163348

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Copper	mg/L	0.1	0.099	99	80-120	
Lead	mg/L	0.1	0.098	98	80-120	
Zinc	mg/L	0.1	0.10	100	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 163349 163350

Parameter	Units	2623696001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Copper	mg/L	ND	0.1	0.1	0.088	0.090	88	90	75-125	3	20	
Lead	mg/L	0.000054J	0.1	0.1	0.089	0.094	89	94	75-125	5	20	
Zinc	mg/L	0.0040J	0.1	0.1	0.091	0.096	87	91	75-125	5	20	

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QUALITY CONTROL DATA

Project: Plant Bowen
Pace Project No.: 2623698

QC Batch: 36282 Analysis Method: EPA 1664B
QC Batch Method: EPA 1664B Analysis Description: 1664 HEM, Oil and Grease
Associated Lab Samples: 2623698001, 2623698003

METHOD BLANK: 163839 Matrix: Water
Associated Lab Samples: 2623698001, 2623698003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Oil and Grease	mg/L	ND	5.0	5.0	10/02/19 08:00	

LABORATORY CONTROL SAMPLE: 163840

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Oil and Grease	mg/L	40	39.8	100	78-114	

MATRIX SPIKE SAMPLE: 163842

Parameter	Units	2623558001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Oil and Grease	mg/L	23.1	40	80.3	143	78-114	M3

SAMPLE DUPLICATE: 163841

Parameter	Units	2623698001 Result	Dup Result	RPD	Max RPD	Qualifiers
Oil and Grease	mg/L	ND	ND		75	

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QUALITY CONTROL DATA

Project: Plant Bowen
Pace Project No.: 2623698

QC Batch: 36284 Analysis Method: SM 2320B
QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity
Associated Lab Samples: 2623698001, 2623698002, 2623698003, 2623698005

METHOD BLANK: 163853 Matrix: Water
Associated Lab Samples: 2623698001, 2623698002, 2623698003, 2623698005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	ND	20.0	20.0	10/01/19 17:35	

LABORATORY CONTROL SAMPLE: 163854

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	100	98.0	98	85-115	

SAMPLE DUPLICATE: 163855

Parameter	Units	2623635002 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	165	164	1	10	

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QUALITY CONTROL DATA

Project: Plant Bowen
Pace Project No.: 2623698

QC Batch: 36486 Analysis Method: SM 2320B
QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity
Associated Lab Samples: 2623698004

METHOD BLANK: 164845 Matrix: Water
Associated Lab Samples: 2623698004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	ND	20.0	20.0	10/04/19 12:28	

LABORATORY CONTROL SAMPLE: 164846

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	100	102	102	85-115	

SAMPLE DUPLICATE: 164847

Parameter	Units	2623698004 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	153	152	1	10	

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QUALITY CONTROL DATA

Project: Plant Bowen
Pace Project No.: 2623698

QC Batch: 36464 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 2623698001, 2623698002, 2623698003

LABORATORY CONTROL SAMPLE: 164734

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	400	408	102	84-108	

SAMPLE DUPLICATE: 164735

Parameter	Units	2623714002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	13.0	ND		10	

SAMPLE DUPLICATE: 164763

Parameter	Units	2623696005 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	275	262	5	10	

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QUALITY CONTROL DATA

Project: Plant Bowen
Pace Project No.: 2623698

QC Batch: 36165
QC Batch Method: SM 2540D
Analysis Method: SM 2540D
Analysis Description: 2540D Total Suspended Solids
Associated Lab Samples: 2623698001

METHOD BLANK: 163320
Matrix: Water
Associated Lab Samples: 2623698001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	5.0	5.0	09/30/19 12:16	

LABORATORY CONTROL SAMPLE: 163321

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/L	100	99.5	100	90-110	

SAMPLE DUPLICATE: 163322

Parameter	Units	2623465001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	10.0	ND		10	

SAMPLE DUPLICATE: 163323

Parameter	Units	2623682001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	6.5	ND		10	

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QUALITY CONTROL DATA

Project: Plant Bowen
Pace Project No.: 2623698

QC Batch: 36383
QC Batch Method: SM 2540D
Analysis Method: SM 2540D
Analysis Description: 2540D Total Suspended Solids
Associated Lab Samples: 2623698003

METHOD BLANK: 164324
Matrix: Water
Associated Lab Samples: 2623698003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	5.0	5.0	10/02/19 18:43	

LABORATORY CONTROL SAMPLE: 164325

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/L	100	99.0	99	90-110	

SAMPLE DUPLICATE: 164326

Parameter	Units	2623856001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	ND	ND		10	

SAMPLE DUPLICATE: 164327

Parameter	Units	2623677002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	ND	ND		10	

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QUALITY CONTROL DATA

Project: Plant Bowen
Pace Project No.: 2623698

QC Batch: 36125 Analysis Method: SM 4500-P
QC Batch Method: SM 4500-P Analysis Description: 4500PE Ortho Phosphorus
Associated Lab Samples: 2623698001, 2623698002, 2623698003, 2623698004

METHOD BLANK: 163138 Matrix: Water
Associated Lab Samples: 2623698001, 2623698002, 2623698003, 2623698004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Orthophosphate as P	mg/L	ND	0.020	0.020	09/28/19 13:30	

LABORATORY CONTROL SAMPLE: 163139

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Orthophosphate as P	mg/L	0.5	0.51	101	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 163140 163141

Parameter	Units	2623698004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Orthophosphate as P	mg/L	ND	0.5	0.5	0.50	0.50	100	101	80-120	1	10	

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QUALITY CONTROL DATA

Project: Plant Bowen
Pace Project No.: 2623698

QC Batch: 36416 Analysis Method: SM 4500-S2 D
QC Batch Method: SM 4500-S2 D Analysis Description: 4500S2D Sulfide Water
Associated Lab Samples: 2623698001, 2623698002, 2623698003, 2623698004

METHOD BLANK: 164448 Matrix: Water
Associated Lab Samples: 2623698001, 2623698002, 2623698003, 2623698004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Sulfide	mg/L	ND	0.20	0.20	10/03/19 13:40	

LABORATORY CONTROL SAMPLE: 164449

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfide	mg/L	0.5	0.43	87	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 164450 164451

Parameter	Units	2623698001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfide	mg/L	ND	0.5	0.5	ND	ND	17	15	30-129		10	M1

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QUALITY CONTROL DATA

Project: Plant Bowen
Pace Project No.: 2623698

QC Batch: 36102 Analysis Method: SM 5210B
QC Batch Method: SM 5210B Analysis Description: 5210B BOD, 5 day
Associated Lab Samples: 2623698001, 2623698003

METHOD BLANK: 162918 Matrix: Water
Associated Lab Samples: 2623698001, 2623698003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
BOD, 5 day	mg/L	ND	2.0	2.0	10/02/19 14:17	1A

LABORATORY CONTROL SAMPLE: 162920

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
BOD, 5 day	mg/L	198	205	104	85-115	1A

SAMPLE DUPLICATE: 163019

Parameter	Units	2623686001 Result	Dup Result	RPD	Max RPD	Qualifiers
BOD, 5 day	mg/L	831	690	19	20	1A

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QUALITY CONTROL DATA

Project: Plant Bowen
Pace Project No.: 2623698

QC Batch: 36067 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 2623698001, 2623698002, 2623698003

METHOD BLANK: 162737 Matrix: Water
Associated Lab Samples: 2623698001, 2623698002, 2623698003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Nitrate as N	mg/L	ND	0.050	0.0050	09/27/19 18:48	
Nitrite as N	mg/L	ND	0.050	0.011	09/27/19 18:48	

LABORATORY CONTROL SAMPLE: 162738

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrate as N	mg/L	10	10.5	105	90-110	
Nitrite as N	mg/L	10	10.7	107	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 162739 162740

Parameter	Units	2623562005 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrate as N	mg/L	0.74			11.2	11.2				0	15	H1
Nitrite as N	mg/L	0.030J			10.7	10.5				2	15	H1

MATRIX SPIKE SAMPLE: 163021

Parameter	Units	2623704001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Nitrate as N	mg/L	ND	10	10.5	105	90-110	
Nitrite as N	mg/L	0.017J	10	10.8	108	90-110	

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QUALITY CONTROL DATA

Project: Plant Bowen
Pace Project No.: 2623698

QC Batch: 36150 Analysis Method: EPA 350.1
QC Batch Method: EPA 350.1 Analysis Description: 350.1 Ammonia
Associated Lab Samples: 2623698001, 2623698002, 2623698003

METHOD BLANK: 163273 Matrix: Water
Associated Lab Samples: 2623698001, 2623698002, 2623698003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Nitrogen, Ammonia	mg/L	ND	0.10	0.10	09/30/19 11:18	

LABORATORY CONTROL SAMPLE: 163274

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, Ammonia	mg/L	10	10.3	103	90-110	

MATRIX SPIKE SAMPLE: 163275

Parameter	Units	2623698001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Nitrogen, Ammonia	mg/L	1.4	10	12.0	106	90-110	

MATRIX SPIKE SAMPLE: 163276

Parameter	Units	2623682001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Nitrogen, Ammonia	mg/L	0.96	10	11.5	105	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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110 Technology Parkway
Peachtree Corners, GA 30092
(770)734-4200

QUALITY CONTROL DATA

Project: Plant Bowen
Pace Project No.: 2623698

QC Batch: 36222 Analysis Method: EPA 351.2
QC Batch Method: EPA 351.2 Analysis Description: 351.2 TKN
Associated Lab Samples: 2623698001, 2623698003

METHOD BLANK: 163614 Matrix: Water
Associated Lab Samples: 2623698001, 2623698003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Nitrogen, Kjeldahl, Total	mg/L	ND	0.40	0.40	10/01/19 13:03	

LABORATORY CONTROL SAMPLE: 163615

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, Kjeldahl, Total	mg/L	10	10.7	107	90-110	

MATRIX SPIKE SAMPLE: 163616

Parameter	Units	2623680001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Nitrogen, Kjeldahl, Total	mg/L	2.3	10	10.5	82	90-110	M1

MATRIX SPIKE SAMPLE: 163621

Parameter	Units	2623680003 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Nitrogen, Kjeldahl, Total	mg/L	3.5	10	12.3	88	90-110	M1

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QUALITY CONTROL DATA

Project: Plant Bowen
Pace Project No.: 2623698

QC Batch: 575017 Analysis Method: SM 5310B
QC Batch Method: SM 5310B Analysis Description: 5310B Dissolved Organic Carbon
Associated Lab Samples: 2623698001, 2623698002, 2623698003, 2623698004

METHOD BLANK: 3124986 Matrix: Water
Associated Lab Samples: 2623698001, 2623698002, 2623698003, 2623698004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Dissolved Organic Carbon	mg/L	ND	1.0	0.50	10/02/19 15:06	

LABORATORY CONTROL SAMPLE: 3124987

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Dissolved Organic Carbon	mg/L	20	19.0	95	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3124988 3124989

Parameter	Units	2623704001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Dissolved Organic Carbon	mg/L	0.65J	20	20	19.6	19.8	95	96	80-120	1	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3124990 3124991

Parameter	Units	2623708004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Dissolved Organic Carbon	mg/L	ND	20	20	19.6	19.4	96	96	80-120	1	20	

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QUALIFIERS

Project: Plant Bowen
Pace Project No.: 2623698

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.

LABORATORIES

PASI-GA	Pace Analytical Services - Atlanta, GA
PASI-O	Pace Analytical Services - Ormond Beach

BATCH QUALIFIERS

Batch: 36345

[1]	The calculated SCF was below the desired range of 0.6 to 1.0 mg/L. All other QC indicators, including the LCS, were within acceptance criteria

ANALYTE QUALIFIERS

1A	The calculated SCF was below the desired range of 0.6 to 1.0 mg/L. All other QC indicators, including the LCS, were within acceptance criteria
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.
M3	Matrix spike recovery was outside laboratory control limits due to matrix interferences.
N2	The lab does not hold NELAC/TNI accreditation for this parameter but other accreditations/certifications may apply. A complete list of accreditations/certifications is available upon request.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Plant Bowen
Pace Project No.: 2623698

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
2623698001	BGWC-22	EPA 3010	576597	EPA 6010	576709
2623698002	BGWC-23	EPA 3010	576597	EPA 6010	576709
2623698003	BGWC-30	EPA 3010	576597	EPA 6010	576709
2623698004	BGWC-36D	EPA 3010	576597	EPA 6010	576709
2623698005	BGWA-33	EPA 3010	576808	EPA 6010	576923
2623698001	BGWC-22	EPA 3005A	36173	EPA 6020B	36203
2623698002	BGWC-23	EPA 3005A	36173	EPA 6020B	36203
2623698003	BGWC-30	EPA 3005A	36173	EPA 6020B	36203
2623698001	BGWC-22	EPA 7470A	36428	EPA 7470A	36481
2623698003	BGWC-30	EPA 7470A	36428	EPA 7470A	36481
2623698001	BGWC-22	EPA 1664B	36282		
2623698003	BGWC-30	EPA 1664B	36282		
2623698001	BGWC-22	SM 2320B	36284		
2623698002	BGWC-23	SM 2320B	36284		
2623698003	BGWC-30	SM 2320B	36284		
2623698004	BGWC-36D	SM 2320B	36486		
2623698005	BGWA-33	SM 2320B	36284		
2623698001	BGWC-22	SM 2540C	36464		
2623698002	BGWC-23	SM 2540C	36464		
2623698003	BGWC-30	SM 2540C	36464		
2623698001	BGWC-22	SM 2540D	36165		
2623698003	BGWC-30	SM 2540D	36383		
2623698001	BGWC-22	SM 4500-P	36125		
2623698002	BGWC-23	SM 4500-P	36125		
2623698003	BGWC-30	SM 4500-P	36125		
2623698004	BGWC-36D	SM 4500-P	36125		
2623698001	BGWC-22	SM 4500-S2 D	36416		
2623698002	BGWC-23	SM 4500-S2 D	36416		
2623698003	BGWC-30	SM 4500-S2 D	36416		
2623698004	BGWC-36D	SM 4500-S2 D	36416		
2623698001	BGWC-22	SM 5210B	36102	SM 5210B	36345
2623698003	BGWC-30	SM 5210B	36102	SM 5210B	36345
2623698001	BGWC-22	TKN-NH3 Calculation	36593		
2623698003	BGWC-30	TKN-NH3 Calculation	36593		
2623698001	BGWC-22	EPA 300.0	36067		
2623698002	BGWC-23	EPA 300.0	36067		
2623698003	BGWC-30	EPA 300.0	36067		
2623698001	BGWC-22	EPA 350.1	36150		
2623698002	BGWC-23	EPA 350.1	36150		
2623698003	BGWC-30	EPA 350.1	36150		

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Plant Bowen
Pace Project No.: 2623698

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
2623698001	**BGWC-22**	EPA 351.2	36222	EPA 351.2	36226
2623698003	**BGWC-30**	EPA 351.2	36222	EPA 351.2	36226
2623698001	**BGWC-22**	SM 5310B	575017		
2623698002	**BGWC-23**	SM 5310B	575017		
2623698003	**BGWC-30**	SM 5310B	575017		
2623698004	**BGWC-36D**	SM 5310B	575017		

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Pace Analytical

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page : Of

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company:	Georgia Power - Coal Combustion Residuals	Report To:	Joju Abraham	Attention:	
Address:	2480 Maner Road	Copy To:	Geosyntec	Company Name:	
	Atlanta, GA 30339			Address:	
Email:	jabraham@southernco.com	Purchase Order #:	SCS10382775	Pace Quote:	
Phone:	(404)506-7239 Fax:	Project Name:	Plant Bowen Additional Parameters	Pace Project Manager:	betsy.mcdaniel@pacelabs.com,
Requested Due Date:		Project #:	Ash Pond	Pace Profile #:	315.5

Regulatory Agency

State / Location: GA

ITEM #	SAMPLE ID (One Character per box. (A-Z, 0-9 / , -) Sample ids must be unique)	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED START DATE	COLLECTED START TIME	COLLECTED END DATE	COLLECTED END TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H2SO4	HNO3	HCl	NaOH + Zinc Acetate	Na2S2O3	Methanol	Other	Requested Analysis Filtered (Y/N): Y/N	Analyses Test: Metals (6010) *	Metals (6010/6020) **	Ortho Phosphorus (filtered)	Sulfide	Alkalinity, Bicarb	DOC (filtered)	TDS, NO3, NO2	Ammonia	TKN	TSS	BOD	Oil/ Grease	Residual Chlorine (Y/N)
	MATRIX: Drinking Water DW; Water WT; Waste Water WW; Product P; Soil/Solid SL; Oil OL; Wipe WP; Air AR; Other OT; Tissue TS																												
1	BGWC-22	WT	G	9/27/19	1004				10	3	1	1	4	1						X	X	X	X	X	X	X	X	X	X	
2	BGWC-23	WT	G	9/27/19	1145				7	2	1	1	2	1						X	X	X	X	X	X	X				
3	BGWC-30	WT	G	9/27/19	0945				10	3	1	1	4	1						X	X	X	X	X	X	X	X	X	X	
4	BGWC-36D	WT	G	9/27/19	1202				6	2		1	2	1					X		X	X	X	X						
5	BGWA-33	WT	G	9/27/19	1308				2	1		1							X				X							
6																														
7																														
8																														
9																														
10																														
11																														
12																														

WO# : 2623698

2623698

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS: TEMP in C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
* (6010) Fe, Mg, Mn, P, K, Na	Audrey Crafton	9/27/19	1600	Chanle Hent	9/27/19	1600				
** (6010) Fe, Mg, Mn, P, K, Na, Hardness (6020) Cu, Zn										
							2.5	Y	Y	Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Audrey Crafton, Joe Booth

SIGNATURE of SAMPLER: Audrey Crafton DATE Signed: 9/27/19

Sample Condition Upon Receipt

Pace Analytical

Client Name: GA Power

Project #

WO# : 2623698

PM: BM Due Date: 10/04/19

CLIENT: GAPower-CCR

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☑ Client ☐ Commercial ☐ Pace Other

Tracking #:

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

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 2.5 Biological Tissue is Frozen: Yes No

Date and Initials of person examining contents: 9/27/19 NR

Temp should be above freezing to 6°C

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

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

Person Contacted: Date/Time:

Comments/ Resolution:

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)

Pace Analytical Services, LLC
110 Technology Parkway
Peachtree Corners, GA 30092
(770)734-4200

May 22, 2020

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

RE: Project: PLANT BOWEN
Pace Project No.: 2631748

Dear Joju Abraham:

Enclosed are the analytical results for sample(s) received by the laboratory on May 08, 2020. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

The test results provided in this final report were generated by each of the following laboratories within the Pace Network:

- Pace Analytical Services - Asheville
- Pace Analytical Services - Atlanta, GA

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: Kristen Jurinko
Whitney Law, Geosyntec Consultants
Noelia Muskus, Geosyntec Consultants
Lauren Petty, Southern Company Services, Inc.

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CERTIFICATIONS

Project: PLANT BOWEN
Pace Project No.: 2631748

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

Pace Analytical Services Asheville
2225 Riverside Drive, Asheville, NC 28804
Florida/NELAP Certification #: E87648
Massachusetts Certification #: M-NC030
North Carolina Drinking Water Certification #: 37712
North Carolina Wastewater Certification #: 40
South Carolina Certification #: 99030001
Virginia/VELAP Certification #: 460222

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SAMPLE SUMMARY

Project: PLANT BOWEN
Pace Project No.: 2631748

Lab ID	Sample ID	Matrix	Date Collected	Date Received
2631748001	**SW-1**	Water	05/06/20 15:12	05/08/20 13:52
2631748002	**SW-4**	Water	05/06/20 15:40	05/08/20 13:52
2631748003	**APPZ-2S**	Water	05/07/20 11:58	05/08/20 13:52
2631748004	**APPZ-3S**	Water	05/07/20 11:19	05/08/20 13:52
2631748005	**SW-5**	Water	05/07/20 09:00	05/08/20 13:52
2631748006	**DUP-1**	Water	05/07/20 00:00	05/08/20 13:52
2631748007	**FBL050720**	Water	05/07/20 16:03	05/08/20 13:52
2631748008	**EQBL050720**	Water	05/07/20 16:08	05/08/20 13:52
2631748009	**BGWA-33**	Water	05/08/20 09:44	05/08/20 13:52
2631748010	**FBL050820**	Water	05/08/20 10:52	05/08/20 13:52
2631748011	**EQBL050820**	Water	05/08/20 10:57	05/08/20 13:52

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SAMPLE ANALYTE COUNT

Project: PLANT BOWEN
Pace Project No.: 2631748

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
2631748001	**SW-1**	EPA 6010D	DRB	5	PASI-GA
		EPA 6020B	DRB, KLH	2	PASI-GA
		SM 2320B-2011	ECH	2	PASI-A
		SM 4500-S2D-2011	LMS1	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	2	PASI-A
2631748002	**SW-4**	EPA 6010D	DRB	5	PASI-GA
		EPA 6020B	DRB, KLH	2	PASI-GA
		SM 2320B-2011	ECH	2	PASI-A
		SM 4500-S2D-2011	LMS1	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	2	PASI-A
2631748003	**APPZ-2S**	EPA 6010D	DRB	5	PASI-GA
		EPA 6020B	DRB, KLH	2	PASI-GA
		SM 2320B-2011	ECH	2	PASI-A
		SM 4500-S2D-2011	LMS1	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	2	PASI-A
2631748004	**APPZ-3S**	EPA 6010D	DRB	5	PASI-GA
		EPA 6020B	KLH	2	PASI-GA
		SM 2320B-2011	ECH	2	PASI-A
		SM 4500-S2D-2011	LMS1	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	2	PASI-A
2631748005	**SW-5**	EPA 6010D	DRB	5	PASI-GA
		EPA 6020B	KLH	2	PASI-GA
		SM 2320B-2011	ECH	2	PASI-A
		SM 4500-S2D-2011	LMS1	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	2	PASI-A
2631748006	**DUP-1**	EPA 6010D	DRB	5	PASI-GA
		EPA 6020B	KLH	2	PASI-GA
		SM 2320B-2011	ECH	2	PASI-A
		SM 4500-S2D-2011	LMS1	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	2	PASI-A
2631748007	**FBL050720**	EPA 6010D	DRB	5	PASI-GA
		EPA 6020B	KLH	2	PASI-GA
		SM 2320B-2011	ECH	2	PASI-A
		SM 4500-S2D-2011	LMS1	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	2	PASI-A
2631748008	**EQBL050720**	EPA 6010D	DRB	5	PASI-GA
		EPA 6020B	KLH	2	PASI-GA

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SAMPLE ANALYTE COUNT

Project: PLANT BOWEN
Pace Project No.: 2631748

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		SM 2320B-2011	ECH	2	PASI-A
		SM 4500-S2D-2011	LMS1	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	2	PASI-A
2631748009	**BGWA-33**	EPA 6010D	DRB	5	PASI-GA
		EPA 6020B	KLH	2	PASI-GA
		SM 2320B-2011	ECH	2	PASI-A
		SM 4500-S2D-2011	LMS1	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	2	PASI-A
2631748010	**FBL050820**	EPA 6010D	DRB	5	PASI-GA
		EPA 6020B	KLH	2	PASI-GA
		SM 2320B-2011	ECH	2	PASI-A
		SM 4500-S2D-2011	LMS1	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	2	PASI-A
2631748011	**EQBL050820**	EPA 6010D	DRB	5	PASI-GA
		EPA 6020B	KLH	2	PASI-GA
		SM 2320B-2011	ECH	2	PASI-A
		SM 4500-S2D-2011	LMS1	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	2	PASI-A

PASI-A = Pace Analytical Services - Asheville
PASI-GA = Pace Analytical Services - Atlanta, GA

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110 Technology Parkway
Peachtree Corners, GA 30092
(770)734-4200

SUMMARY OF DETECTION

Project: PLANT BOWEN
Pace Project No.: 2631748

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
2631748001	**SW-1**					
	Field pH	6.64	Std. Units		05/13/20 09:07	
EPA 6010D	Calcium	1120	mg/L	10.0	05/14/20 14:35	
EPA 6010D	Magnesium	134	mg/L	0.50	05/14/20 14:35	
EPA 6010D	Manganese	0.039J	mg/L	0.040	05/13/20 12:37	
EPA 6010D	Potassium	4.6	mg/L	0.20	05/13/20 12:37	
EPA 6010D	Sodium	12.3	mg/L	1.0	05/13/20 12:37	
EPA 6020B	Boron	39.3	mg/L	1.0	05/15/20 13:34	
EPA 6020B	Iron	0.016J	mg/L	0.040	05/13/20 18:23	
SM 2320B-2011	Alkalinity,Bicarbonate (CaCO3)	32.3	mg/L	5.0	05/15/20 23:09	
SM 2320B-2011	Alkalinity, Total as CaCO3	32.3	mg/L	5.0	05/15/20 23:09	
EPA 300.0 Rev 2.1 1993	Chloride	1630	mg/L	25.0	05/15/20 10:50	
EPA 300.0 Rev 2.1 1993	Sulfate	777	mg/L	25.0	05/15/20 10:50	
2631748002	**SW-4**					
	Field pH	7.92	Std. Units		05/13/20 09:07	
EPA 6010D	Calcium	895	mg/L	10.0	05/14/20 14:38	
EPA 6010D	Magnesium	70.6	mg/L	0.50	05/14/20 14:38	
EPA 6010D	Manganese	0.29	mg/L	0.040	05/13/20 12:41	
EPA 6010D	Potassium	3.8	mg/L	0.20	05/13/20 12:41	
EPA 6010D	Sodium	5.7	mg/L	1.0	05/13/20 12:41	
EPA 6020B	Boron	18.1	mg/L	1.0	05/15/20 13:40	
EPA 6020B	Iron	0.34	mg/L	0.040	05/13/20 18:28	
SM 2320B-2011	Alkalinity,Bicarbonate (CaCO3)	30.3	mg/L	5.0	05/15/20 23:16	
SM 2320B-2011	Alkalinity, Total as CaCO3	30.3	mg/L	5.0	05/15/20 23:16	
EPA 300.0 Rev 2.1 1993	Chloride	689	mg/L	25.0	05/14/20 20:11	
EPA 300.0 Rev 2.1 1993	Sulfate	1100	mg/L	25.0	05/14/20 20:11	
2631748003	**APPZ-2S**					
	Field pH	7.85	Std. Units		05/13/20 09:07	
EPA 6010D	Calcium	529	mg/L	10.0	05/14/20 14:42	
EPA 6010D	Magnesium	68.9	mg/L	0.50	05/14/20 14:42	
EPA 6010D	Manganese	0.38	mg/L	0.040	05/13/20 13:04	
EPA 6010D	Potassium	14.7	mg/L	0.20	05/13/20 13:04	
EPA 6010D	Sodium	30.6	mg/L	1.0	05/13/20 13:04	
EPA 6020B	Boron	17.6	mg/L	1.0	05/15/20 13:46	
EPA 6020B	Iron	1.2	mg/L	0.040	05/13/20 18:34	
SM 2320B-2011	Alkalinity,Bicarbonate (CaCO3)	51.1	mg/L	5.0	05/19/20 13:50	
SM 2320B-2011	Alkalinity, Total as CaCO3	51.1	mg/L	5.0	05/19/20 13:50	
EPA 300.0 Rev 2.1 1993	Chloride	783	mg/L	20.0	05/14/20 20:31	
EPA 300.0 Rev 2.1 1993	Sulfate	478	mg/L	20.0	05/14/20 20:31	
2631748004	**APPZ-3S**					
	Field pH	7.09	Std. Units		05/13/20 09:07	
EPA 6010D	Calcium	743	mg/L	10.0	05/14/20 14:46	
EPA 6010D	Magnesium	29.9	mg/L	0.50	05/14/20 14:46	
EPA 6010D	Manganese	1.8	mg/L	0.040	05/13/20 13:09	
EPA 6010D	Potassium	28.5	mg/L	0.20	05/13/20 13:09	
EPA 6010D	Sodium	12.4	mg/L	1.0	05/13/20 13:09	
EPA 6020B	Boron	2.9	mg/L	0.10	05/13/20 18:40	

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SUMMARY OF DETECTION

Project: PLANT BOWEN
Pace Project No.: 2631748

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
2631748004	**APPZ-3S**					
EPA 6020B	Iron	1.2	mg/L	0.040	05/13/20 18:40	
SM 2320B-2011	Alkalinity,Bicarbonate (CaCO3)	479	mg/L	5.0	05/21/20 14:33	
SM 2320B-2011	Alkalinity, Total as CaCO3	479	mg/L	5.0	05/21/20 14:33	
EPA 300.0 Rev 2.1 1993	Chloride	34.6	mg/L	1.0	05/14/20 14:18	
EPA 300.0 Rev 2.1 1993	Sulfate	1290	mg/L	25.0	05/14/20 20:52	
2631748005	**SW-5**					
	Field pH	8.20	Std. Units		05/13/20 09:07	
EPA 6010D	Calcium	165	mg/L	1.0	05/13/20 13:13	
EPA 6010D	Magnesium	16.4	mg/L	0.050	05/13/20 13:13	
EPA 6010D	Manganese	0.011J	mg/L	0.040	05/13/20 13:13	
EPA 6010D	Potassium	5.3	mg/L	0.20	05/13/20 13:13	
EPA 6010D	Sodium	13.9	mg/L	1.0	05/13/20 13:13	
EPA 6020B	Boron	2.5	mg/L	0.10	05/13/20 18:46	
EPA 6020B	Iron	0.15	mg/L	0.040	05/13/20 18:46	
SM 2320B-2011	Alkalinity,Bicarbonate (CaCO3)	65.7	mg/L	5.0	05/19/20 14:12	
SM 2320B-2011	Alkalinity, Total as CaCO3	65.7	mg/L	5.0	05/19/20 14:12	
EPA 300.0 Rev 2.1 1993	Chloride	88.1	mg/L	1.0	05/14/20 14:33	
EPA 300.0 Rev 2.1 1993	Sulfate	275	mg/L	25.0	05/14/20 21:12	
2631748006	**DUP-1**					
EPA 6010D	Calcium	731	mg/L	10.0	05/14/20 14:50	
EPA 6010D	Magnesium	29.4	mg/L	0.50	05/14/20 14:50	
EPA 6010D	Manganese	1.8	mg/L	0.040	05/13/20 13:17	
EPA 6010D	Potassium	27.5	mg/L	0.20	05/13/20 13:17	
EPA 6010D	Sodium	12.2	mg/L	1.0	05/13/20 13:17	
EPA 6020B	Boron	2.7	mg/L	0.10	05/13/20 18:51	
EPA 6020B	Iron	1.2	mg/L	0.040	05/13/20 18:51	
SM 2320B-2011	Alkalinity,Bicarbonate (CaCO3)	517	mg/L	5.0	05/19/20 16:52	
SM 2320B-2011	Alkalinity, Total as CaCO3	517	mg/L	5.0	05/19/20 16:52	
EPA 300.0 Rev 2.1 1993	Chloride	34.9	mg/L	1.0	05/14/20 14:48	
EPA 300.0 Rev 2.1 1993	Sulfate	1270	mg/L	26.0	05/14/20 21:36	
2631748007	**FBL050720**					
EPA 6010D	Calcium	0.30J	mg/L	1.0	05/13/20 13:21	
EPA 6010D	Magnesium	0.011J	mg/L	0.050	05/13/20 13:21	
EPA 6010D	Potassium	0.080J	mg/L	0.20	05/13/20 13:21	B
EPA 6020B	Boron	0.037J	mg/L	0.10	05/13/20 18:57	
2631748008	**EQBL050720**					
EPA 6010D	Potassium	0.062J	mg/L	0.20	05/13/20 13:25	B
EPA 6020B	Boron	0.023J	mg/L	0.10	05/13/20 19:03	
2631748009	**BGWA-33**					
	Field pH	7.35	Std. Units		05/13/20 09:07	
EPA 6010D	Calcium	47.6	mg/L	1.0	05/13/20 13:28	
EPA 6010D	Magnesium	25.3	mg/L	0.050	05/13/20 13:28	
EPA 6010D	Manganese	0.0099J	mg/L	0.040	05/13/20 13:28	
EPA 6010D	Potassium	1.3	mg/L	0.20	05/13/20 13:28	

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SUMMARY OF DETECTION

Project: PLANT BOWEN
Pace Project No.: 2631748

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
2631748009	**BGWA-33**					
EPA 6010D	Sodium	3.3	mg/L	1.0	05/13/20 13:28	
EPA 6020B	Boron	0.028J	mg/L	0.10	05/13/20 19:08	
EPA 6020B	Iron	0.081	mg/L	0.040	05/13/20 19:08	
SM 2320B-2011	Alkalinity,Bicarbonate (CaCO3)	223	mg/L	5.0	05/19/20 14:31	
SM 2320B-2011	Alkalinity, Total as CaCO3	223	mg/L	5.0	05/19/20 14:31	
EPA 300.0 Rev 2.1 1993	Chloride	4.3	mg/L	1.0	05/14/20 16:02	
EPA 300.0 Rev 2.1 1993	Sulfate	24.2	mg/L	1.0	05/14/20 16:02	
2631748010	**FBL050820**					
EPA 6010D	Potassium	0.061J	mg/L	0.20	05/13/20 13:36	B
EPA 6020B	Boron	0.0096J	mg/L	0.10	05/13/20 19:26	
2631748011	**EQBL050820**					
EPA 6010D	Potassium	0.034J	mg/L	0.20	05/13/20 13:40	B
EPA 6020B	Boron	0.0081J	mg/L	0.10	05/13/20 19:31	

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ANALYTICAL RESULTS

Project: PLANT BOWEN
Pace Project No.: 2631748

Sample: SW-1 **Lab ID: 2631748001** Collected: 05/06/20 15:12 Received: 05/08/20 13:52 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
Field Data	Analytical Method: Pace Analytical Services - Atlanta, GA								
Field pH	**6.64**	Std. Units			1		05/13/20 09:07		
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Atlanta, GA								
Calcium	**1120**	mg/L	10.0	1.4	10	05/11/20 18:32	05/14/20 14:35	7440-70-2	
Magnesium	**134**	mg/L	0.50	0.11	10	05/11/20 18:32	05/14/20 14:35	7439-95-4	
Manganese	**0.039J**	mg/L	0.040	0.0061	1	05/11/20 18:32	05/13/20 12:37	7439-96-5	
Potassium	**4.6**	mg/L	0.20	0.026	1	05/11/20 18:32	05/13/20 12:37	7440-09-7	
Sodium	**12.3**	mg/L	1.0	0.19	1	05/11/20 18:32	05/13/20 12:37	7440-23-5	
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3005A Pace Analytical Services - Atlanta, GA								
Boron	**39.3**	mg/L	1.0	0.049	10	05/12/20 14:14	05/15/20 13:34	7440-42-8	
Iron	**0.016J**	mg/L	0.040	0.0097	1	05/12/20 14:14	05/13/20 18:23	7439-89-6	
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**32.3**	mg/L	5.0	5.0	1		05/15/20 23:09		
Alkalinity, Total as CaCO3	**32.3**	mg/L	5.0	5.0	1		05/15/20 23:09		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	ND	mg/L	0.10	0.050	1		05/12/20 20:10	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**1630**	mg/L	25.0	15.0	25		05/15/20 10:50	16887-00-6	
Sulfate	**777**	mg/L	25.0	12.5	25		05/15/20 10:50	14808-79-8	

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ANALYTICAL RESULTS

Project: PLANT BOWEN
Pace Project No.: 2631748

Sample: SW-4 **Lab ID: 2631748002** Collected: 05/06/20 15:40 Received: 05/08/20 13:52 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
Field Data	Analytical Method: Pace Analytical Services - Atlanta, GA								
Field pH	**7.92**	Std. Units			1		05/13/20 09:07		
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Atlanta, GA								
Calcium	**895**	mg/L	10.0	1.4	10	05/11/20 18:32	05/14/20 14:38	7440-70-2	
Magnesium	**70.6**	mg/L	0.50	0.11	10	05/11/20 18:32	05/14/20 14:38	7439-95-4	
Manganese	**0.29**	mg/L	0.040	0.0061	1	05/11/20 18:32	05/13/20 12:41	7439-96-5	
Potassium	**3.8**	mg/L	0.20	0.026	1	05/11/20 18:32	05/13/20 12:41	7440-09-7	
Sodium	**5.7**	mg/L	1.0	0.19	1	05/11/20 18:32	05/13/20 12:41	7440-23-5	
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3005A Pace Analytical Services - Atlanta, GA								
Boron	**18.1**	mg/L	1.0	0.049	10	05/12/20 14:14	05/15/20 13:40	7440-42-8	
Iron	**0.34**	mg/L	0.040	0.0097	1	05/12/20 14:14	05/13/20 18:28	7439-89-6	
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**30.3**	mg/L	5.0	5.0	1		05/15/20 23:16		
Alkalinity, Total as CaCO3	**30.3**	mg/L	5.0	5.0	1		05/15/20 23:16		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	ND	mg/L	0.10	0.050	1		05/12/20 20:11	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**689**	mg/L	25.0	15.0	25		05/14/20 20:11	16887-00-6	
Sulfate	**1100**	mg/L	25.0	12.5	25		05/14/20 20:11	14808-79-8	

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ANALYTICAL RESULTS

Project: PLANT BOWEN
Pace Project No.: 2631748

Sample: APPZ-2S **Lab ID: 2631748003** Collected: 05/07/20 11:58 Received: 05/08/20 13:52 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
Field Data	Analytical Method: Pace Analytical Services - Atlanta, GA								
Field pH	**7.85**	Std. Units			1		05/13/20 09:07		
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Atlanta, GA								
Calcium	**529**	mg/L	10.0	1.4	10	05/11/20 18:32	05/14/20 14:42	7440-70-2	
Magnesium	**68.9**	mg/L	0.50	0.11	10	05/11/20 18:32	05/14/20 14:42	7439-95-4	
Manganese	**0.38**	mg/L	0.040	0.0061	1	05/11/20 18:32	05/13/20 13:04	7439-96-5	
Potassium	**14.7**	mg/L	0.20	0.026	1	05/11/20 18:32	05/13/20 13:04	7440-09-7	
Sodium	**30.6**	mg/L	1.0	0.19	1	05/11/20 18:32	05/13/20 13:04	7440-23-5	
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3005A Pace Analytical Services - Atlanta, GA								
Boron	**17.6**	mg/L	1.0	0.049	10	05/12/20 14:14	05/15/20 13:46	7440-42-8	
Iron	**1.2**	mg/L	0.040	0.0097	1	05/12/20 14:14	05/13/20 18:34	7439-89-6	
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**51.1**	mg/L	5.0	5.0	1		05/19/20 13:50		
Alkalinity, Total as CaCO3	**51.1**	mg/L	5.0	5.0	1		05/19/20 13:50		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	ND	mg/L	0.10	0.050	1		05/12/20 20:45	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**783**	mg/L	20.0	12.0	20		05/14/20 20:31	16887-00-6	
Sulfate	**478**	mg/L	20.0	10.0	20		05/14/20 20:31	14808-79-8	

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ANALYTICAL RESULTS

Project: PLANT BOWEN
Pace Project No.: 2631748

Sample: APPZ-3S **Lab ID: 2631748004** Collected: 05/07/20 11:19 Received: 05/08/20 13:52 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
Field Data	Analytical Method: Pace Analytical Services - Atlanta, GA								
Field pH	**7.09**	Std. Units			1		05/13/20 09:07		
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Atlanta, GA								
Calcium	**743**	mg/L	10.0	1.4	10	05/11/20 18:32	05/14/20 14:46	7440-70-2	
Magnesium	**29.9**	mg/L	0.50	0.11	10	05/11/20 18:32	05/14/20 14:46	7439-95-4	
Manganese	**1.8**	mg/L	0.040	0.0061	1	05/11/20 18:32	05/13/20 13:09	7439-96-5	
Potassium	**28.5**	mg/L	0.20	0.026	1	05/11/20 18:32	05/13/20 13:09	7440-09-7	
Sodium	**12.4**	mg/L	1.0	0.19	1	05/11/20 18:32	05/13/20 13:09	7440-23-5	
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3005A Pace Analytical Services - Atlanta, GA								
Boron	**2.9**	mg/L	0.10	0.0049	1	05/12/20 14:14	05/13/20 18:40	7440-42-8	
Iron	**1.2**	mg/L	0.040	0.0097	1	05/12/20 14:14	05/13/20 18:40	7439-89-6	
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**479**	mg/L	5.0	5.0	1		05/21/20 14:33		
Alkalinity, Total as CaCO3	**479**	mg/L	5.0	5.0	1		05/21/20 14:33		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	ND	mg/L	0.10	0.050	1		05/12/20 20:45	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**34.6**	mg/L	1.0	0.60	1		05/14/20 14:18	16887-00-6	
Sulfate	**1290**	mg/L	25.0	12.5	25		05/14/20 20:52	14808-79-8	

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ANALYTICAL RESULTS

Project: PLANT BOWEN
Pace Project No.: 2631748

Sample: SW-5 **Lab ID: 2631748005** Collected: 05/07/20 09:00 Received: 05/08/20 13:52 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
Field Data	Analytical Method: Pace Analytical Services - Atlanta, GA								
Field pH	**8.20**	Std. Units			1		05/13/20 09:07		
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Atlanta, GA								
Calcium	**165**	mg/L	1.0	0.14	1	05/11/20 18:32	05/13/20 13:13	7440-70-2	
Magnesium	**16.4**	mg/L	0.050	0.011	1	05/11/20 18:32	05/13/20 13:13	7439-95-4	
Manganese	**0.011J**	mg/L	0.040	0.0061	1	05/11/20 18:32	05/13/20 13:13	7439-96-5	
Potassium	**5.3**	mg/L	0.20	0.026	1	05/11/20 18:32	05/13/20 13:13	7440-09-7	
Sodium	**13.9**	mg/L	1.0	0.19	1	05/11/20 18:32	05/13/20 13:13	7440-23-5	
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3005A Pace Analytical Services - Atlanta, GA								
Boron	**2.5**	mg/L	0.10	0.0049	1	05/12/20 14:14	05/13/20 18:46	7440-42-8	
Iron	**0.15**	mg/L	0.040	0.0097	1	05/12/20 14:14	05/13/20 18:46	7439-89-6	
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**65.7**	mg/L	5.0	5.0	1		05/19/20 14:12		
Alkalinity, Total as CaCO3	**65.7**	mg/L	5.0	5.0	1		05/19/20 14:12		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	ND	mg/L	0.10	0.050	1		05/12/20 20:46	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**88.1**	mg/L	1.0	0.60	1		05/14/20 14:33	16887-00-6	
Sulfate	**275**	mg/L	25.0	12.5	25		05/14/20 21:12	14808-79-8	

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ANALYTICAL RESULTS

Project: PLANT BOWEN
Pace Project No.: 2631748

Sample: DUP-1 **Lab ID: 2631748006** Collected: 05/07/20 00:00 Received: 05/08/20 13:52 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Atlanta, GA								
Calcium	**731**	mg/L	10.0	1.4	10	05/11/20 18:32	05/14/20 14:50	7440-70-2	
Magnesium	**29.4**	mg/L	0.50	0.11	10	05/11/20 18:32	05/14/20 14:50	7439-95-4	
Manganese	**1.8**	mg/L	0.040	0.0061	1	05/11/20 18:32	05/13/20 13:17	7439-96-5	
Potassium	**27.5**	mg/L	0.20	0.026	1	05/11/20 18:32	05/13/20 13:17	7440-09-7	
Sodium	**12.2**	mg/L	1.0	0.19	1	05/11/20 18:32	05/13/20 13:17	7440-23-5	
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3005A Pace Analytical Services - Atlanta, GA								
Boron	**2.7**	mg/L	0.10	0.0049	1	05/12/20 14:14	05/13/20 18:51	7440-42-8	
Iron	**1.2**	mg/L	0.040	0.0097	1	05/12/20 14:14	05/13/20 18:51	7439-89-6	
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**517**	mg/L	5.0	5.0	1		05/19/20 16:52		
Alkalinity, Total as CaCO3	**517**	mg/L	5.0	5.0	1		05/19/20 16:52		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	ND	mg/L	0.10	0.050	1		05/12/20 20:46	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**34.9**	mg/L	1.0	0.60	1		05/14/20 14:48	16887-00-6	
Sulfate	**1270**	mg/L	26.0	13.0	26		05/14/20 21:36	14808-79-8	

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ANALYTICAL RESULTS

Project: PLANT BOWEN
Pace Project No.: 2631748

Sample: FBL050720 **Lab ID: 2631748007** Collected: 05/07/20 16:03 Received: 05/08/20 13:52 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Atlanta, GA								
Calcium	**0.30J**	mg/L	1.0	0.14	1	05/11/20 18:32	05/13/20 13:21	7440-70-2	
Magnesium	**0.011J**	mg/L	0.050	0.011	1	05/11/20 18:32	05/13/20 13:21	7439-95-4	
Manganese	ND	mg/L	0.040	0.0061	1	05/11/20 18:32	05/13/20 13:21	7439-96-5	
Potassium	**0.080J**	mg/L	0.20	0.026	1	05/11/20 18:32	05/13/20 13:21	7440-09-7	B
Sodium	ND	mg/L	1.0	0.19	1	05/11/20 18:32	05/13/20 13:21	7440-23-5	
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3005A Pace Analytical Services - Atlanta, GA								
Boron	**0.037J**	mg/L	0.10	0.0049	1	05/12/20 14:14	05/13/20 18:57	7440-42-8	
Iron	ND	mg/L	0.040	0.0097	1	05/12/20 14:14	05/13/20 18:57	7439-89-6	
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	ND	mg/L	5.0	5.0	1		05/19/20 14:26		
Alkalinity, Total as CaCO3	ND	mg/L	5.0	5.0	1		05/19/20 14:26		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	ND	mg/L	0.10	0.050	1		05/12/20 20:46	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	ND	mg/L	1.0	0.60	1		05/14/20 15:02	16887-00-6	
Sulfate	ND	mg/L	1.0	0.50	1		05/14/20 15:02	14808-79-8	

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ANALYTICAL RESULTS

Project: PLANT BOWEN
Pace Project No.: 2631748

Sample: EQBL050720 **Lab ID: 2631748008** Collected: 05/07/20 16:08 Received: 05/08/20 13:52 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Atlanta, GA								
Calcium	ND	mg/L	1.0	0.14	1	05/11/20 18:32	05/13/20 13:25	7440-70-2	
Magnesium	ND	mg/L	0.050	0.011	1	05/11/20 18:32	05/13/20 13:25	7439-95-4	
Manganese	ND	mg/L	0.040	0.0061	1	05/11/20 18:32	05/13/20 13:25	7439-96-5	
Potassium	**0.062J**	mg/L	0.20	0.026	1	05/11/20 18:32	05/13/20 13:25	7440-09-7	B
Sodium	ND	mg/L	1.0	0.19	1	05/11/20 18:32	05/13/20 13:25	7440-23-5	
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3005A Pace Analytical Services - Atlanta, GA								
Boron	**0.023J**	mg/L	0.10	0.0049	1	05/12/20 14:14	05/13/20 19:03	7440-42-8	
Iron	ND	mg/L	0.040	0.0097	1	05/12/20 14:14	05/13/20 19:03	7439-89-6	
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	ND	mg/L	5.0	5.0	1		05/19/20 14:29		
Alkalinity, Total as CaCO3	ND	mg/L	5.0	5.0	1		05/19/20 14:29		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	ND	mg/L	0.10	0.050	1		05/12/20 20:47	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	ND	mg/L	1.0	0.60	1		05/14/20 15:17	16887-00-6	
Sulfate	ND	mg/L	1.0	0.50	1		05/14/20 15:17	14808-79-8	

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ANALYTICAL RESULTS

Project: PLANT BOWEN
Pace Project No.: 2631748

Sample: BGWA-33 **Lab ID: 2631748009** Collected: 05/08/20 09:44 Received: 05/08/20 13:52 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
Field Data	Analytical Method: Pace Analytical Services - Atlanta, GA								
Field pH	**7.35**	Std. Units			1		05/13/20 09:07		
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Atlanta, GA								
Calcium	**47.6**	mg/L	1.0	0.14	1	05/11/20 18:32	05/13/20 13:28	7440-70-2	
Magnesium	**25.3**	mg/L	0.050	0.011	1	05/11/20 18:32	05/13/20 13:28	7439-95-4	
Manganese	**0.0099J**	mg/L	0.040	0.0061	1	05/11/20 18:32	05/13/20 13:28	7439-96-5	
Potassium	**1.3**	mg/L	0.20	0.026	1	05/11/20 18:32	05/13/20 13:28	7440-09-7	
Sodium	**3.3**	mg/L	1.0	0.19	1	05/11/20 18:32	05/13/20 13:28	7440-23-5	
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3005A Pace Analytical Services - Atlanta, GA								
Boron	**0.028J**	mg/L	0.10	0.0049	1	05/12/20 14:14	05/13/20 19:08	7440-42-8	
Iron	**0.081**	mg/L	0.040	0.0097	1	05/12/20 14:14	05/13/20 19:08	7439-89-6	
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**223**	mg/L	5.0	5.0	1		05/19/20 14:31		
Alkalinity, Total as CaCO3	**223**	mg/L	5.0	5.0	1		05/19/20 14:31		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	ND	mg/L	0.10	0.050	1		05/12/20 20:49	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**4.3**	mg/L	1.0	0.60	1		05/14/20 16:02	16887-00-6	
Sulfate	**24.2**	mg/L	1.0	0.50	1		05/14/20 16:02	14808-79-8	

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ANALYTICAL RESULTS

Project: PLANT BOWEN
Pace Project No.: 2631748

Sample: FBL050820 **Lab ID: 2631748010** Collected: 05/08/20 10:52 Received: 05/08/20 13:52 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Atlanta, GA								
Calcium	ND	mg/L	1.0	0.14	1	05/11/20 18:32	05/13/20 13:36	7440-70-2	
Magnesium	ND	mg/L	0.050	0.011	1	05/11/20 18:32	05/13/20 13:36	7439-95-4	
Manganese	ND	mg/L	0.040	0.0061	1	05/11/20 18:32	05/13/20 13:36	7439-96-5	
Potassium	**0.061J**	mg/L	0.20	0.026	1	05/11/20 18:32	05/13/20 13:36	7440-09-7	B
Sodium	ND	mg/L	1.0	0.19	1	05/11/20 18:32	05/13/20 13:36	7440-23-5	
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3005A Pace Analytical Services - Atlanta, GA								
Boron	**0.0096J**	mg/L	0.10	0.0049	1	05/12/20 14:14	05/13/20 19:26	7440-42-8	
Iron	ND	mg/L	0.040	0.0097	1	05/12/20 14:14	05/13/20 19:26	7439-89-6	
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	ND	mg/L	5.0	5.0	1		05/19/20 14:46		
Alkalinity, Total as CaCO3	ND	mg/L	5.0	5.0	1		05/19/20 14:46		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	ND	mg/L	0.10	0.050	1		05/12/20 20:49	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	ND	mg/L	1.0	0.60	1		05/14/20 16:46	16887-00-6	
Sulfate	ND	mg/L	1.0	0.50	1		05/14/20 16:46	14808-79-8	

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ANALYTICAL RESULTS

Project: PLANT BOWEN
Pace Project No.: 2631748

Sample: EQBL050820 **Lab ID: 2631748011** Collected: 05/08/20 10:57 Received: 05/08/20 13:52 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Atlanta, GA								
Calcium	ND	mg/L	1.0	0.14	1	05/11/20 18:32	05/13/20 13:40	7440-70-2	
Magnesium	ND	mg/L	0.050	0.011	1	05/11/20 18:32	05/13/20 13:40	7439-95-4	
Manganese	ND	mg/L	0.040	0.0061	1	05/11/20 18:32	05/13/20 13:40	7439-96-5	
Potassium	**0.034J**	mg/L	0.20	0.026	1	05/11/20 18:32	05/13/20 13:40	7440-09-7	B
Sodium	ND	mg/L	1.0	0.19	1	05/11/20 18:32	05/13/20 13:40	7440-23-5	
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3005A Pace Analytical Services - Atlanta, GA								
Boron	**0.0081J**	mg/L	0.10	0.0049	1	05/12/20 14:14	05/13/20 19:31	7440-42-8	
Iron	ND	mg/L	0.040	0.0097	1	05/12/20 14:14	05/13/20 19:31	7439-89-6	
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	ND	mg/L	5.0	5.0	1		05/19/20 14:49		
Alkalinity, Total as CaCO3	ND	mg/L	5.0	5.0	1		05/19/20 14:49		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	ND	mg/L	0.10	0.050	1		05/14/20 21:51	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	ND	mg/L	1.0	0.60	1		05/14/20 17:01	16887-00-6	
Sulfate	ND	mg/L	1.0	0.50	1		05/14/20 17:01	14808-79-8	

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QUALITY CONTROL DATA

Project: PLANT BOWEN
Pace Project No.: 2631748

QC Batch: 46265
QC Batch Method: EPA 3010A
Analysis Method: EPA 6010D
Analysis Description: 6010D MET
Laboratory: Pace Analytical Services - Atlanta, GA
Associated Lab Samples: 2631748001, 2631748002, 2631748003, 2631748004, 2631748005, 2631748006, 2631748007, 2631748008, 2631748009, 2631748010, 2631748011

METHOD BLANK: 214652 Matrix: Water
Associated Lab Samples: 2631748001, 2631748002, 2631748003, 2631748004, 2631748005, 2631748006, 2631748007, 2631748008, 2631748009, 2631748010, 2631748011

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Calcium	mg/L	ND	1.0	0.14	05/13/20 11:16	
Magnesium	mg/L	ND	0.050	0.011	05/13/20 11:16	
Manganese	mg/L	ND	0.040	0.0061	05/13/20 11:16	
Potassium	mg/L	0.033J	0.20	0.026	05/13/20 11:16	
Sodium	mg/L	ND	1.0	0.19	05/13/20 11:16	

LABORATORY CONTROL SAMPLE: 214653

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium	mg/L	1	0.97J	97	80-120	
Magnesium	mg/L	1	0.96	96	80-120	
Manganese	mg/L	1	0.95	95	80-120	
Potassium	mg/L	1	1.0	102	80-120	
Sodium	mg/L	1	1.0	102	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 214654 214655

Parameter	Units	2631746001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium	mg/L	559	1	1	551	552	-712	-664	75-125	0	20	M6
Magnesium	mg/L	2.4	1	1	3.2	3.1	81	79	75-125	1	20	
Manganese	mg/L	0.055	1	1	0.99	0.99	93	93	75-125	0	20	
Potassium	mg/L	80.3	1	1	80.5	81.1	24	83	75-125	1	20	M1
Sodium	mg/L	801	1	1	798	812	-378	1080	75-125	2	20	M6

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QUALITY CONTROL DATA

Project: PLANT BOWEN
Pace Project No.: 2631748

QC Batch: 46296
QC Batch Method: EPA 3005A
Analysis Method: EPA 6020B
Analysis Description: 6020B MET
Laboratory: Pace Analytical Services - Atlanta, GA
Associated Lab Samples: 2631748001, 2631748002, 2631748003, 2631748004, 2631748005, 2631748006, 2631748007, 2631748008, 2631748009, 2631748010, 2631748011

METHOD BLANK: 214789 Matrix: Water
Associated Lab Samples: 2631748001, 2631748002, 2631748003, 2631748004, 2631748005, 2631748006, 2631748007, 2631748008, 2631748009, 2631748010, 2631748011

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Boron	mg/L	ND	0.10	0.0049	05/13/20 17:08	
Iron	mg/L	ND	0.040	0.0097	05/13/20 17:08	

LABORATORY CONTROL SAMPLE: 214790

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Boron	mg/L	1	1.0	104	80-120	
Iron	mg/L	1	1.0	102	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 214791 214792

Parameter	Units	2631746001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Boron	mg/L	16.9	1	1	18.7	17.9	183	105	75-125	4	20	M6
Iron	mg/L	0.11	1	1	1.0	1.0	92	92	75-125	0	20	

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QUALITY CONTROL DATA

Project: PLANT BOWEN
Pace Project No.: 2631748

QC Batch: 541634
QC Batch Method: SM 2320B-2011
Analysis Method: SM 2320B-2011
Analysis Description: 2320B Alkalinity
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 2631748001, 2631748002

METHOD BLANK: 2886255 Matrix: Water
Associated Lab Samples: 2631748001, 2631748002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	ND	5.0	5.0	05/15/20 20:10	
Alkalinity,Bicarbonate (CaCO3)	mg/L	ND	5.0	5.0	05/15/20 20:10	

LABORATORY CONTROL SAMPLE: 2886256

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	50	53.0	106	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2886257 2886258

Parameter	Units	92476889005 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	29.3	50	50	78.6	78.4	99	98	80-120	0	25	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2886259 2886260

Parameter	Units	92477011007 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	66400	50	50	117	118	101	103	80-120	1	25	

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QUALITY CONTROL DATA

Project: PLANT BOWEN
Pace Project No.: 2631748

QC Batch: 542080
QC Batch Method: SM 2320B-2011
Analysis Method: SM 2320B-2011
Analysis Description: 2320B Alkalinity
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 2631748003, 2631748005, 2631748006, 2631748007, 2631748008, 2631748009, 2631748010, 2631748011

METHOD BLANK: 2888457 Matrix: Water
Associated Lab Samples: 2631748003, 2631748005, 2631748006, 2631748007, 2631748008, 2631748009, 2631748010, 2631748011

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	ND	5.0	5.0	05/19/20 12:58	
Alkalinity,Bicarbonate (CaCO3)	mg/L	ND	5.0	5.0	05/19/20 12:58	

LABORATORY CONTROL SAMPLE: 2888458

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	50	51.2	102	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2888459 2888460

Parameter	Units	92477758001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	81.5	50	50	137	137	110	111	80-120	0	25	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2888461 2888462

Parameter	Units	92477758002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	71.0	50	50	122	121	102	100	80-120	1	25	

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REPORT OF LABORATORY ANALYSIS

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Peachtree Corners, GA 30092
(770)734-4200

QUALITY CONTROL DATA

Project: PLANT BOWEN
Pace Project No.: 2631748

QC Batch: 542833
QC Batch Method: SM 2320B-2011
Analysis Method: SM 2320B-2011
Analysis Description: 2320B Alkalinity
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 2631748004

METHOD BLANK: 2891674 Matrix: Water
Associated Lab Samples: 2631748004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	ND	5.0	5.0	05/21/20 14:05	
Alkalinity,Bicarbonate (CaCO3)	mg/L	ND	5.0	5.0	05/21/20 14:05	

LABORATORY CONTROL SAMPLE: 2891675

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	50	52.0	104	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2891676 2891677

Parameter	Units	92478257001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	15.9	50	50	70.1	70.1	108	108	80-120	0	25	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2891678 2891679

Parameter	Units	92477606021 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	163	50	50	221	221	116	116	80-120	0	25	

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QUALITY CONTROL DATA

Project: PLANT BOWEN
Pace Project No.: 2631748

QC Batch: 541111
QC Batch Method: SM 4500-S2D-2011
Analysis Method: SM 4500-S2D-2011
Analysis Description: 4500S2D Sulfide Water
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 2631748001, 2631748002

METHOD BLANK: 2883751 Matrix: Water
Associated Lab Samples: 2631748001, 2631748002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Sulfide	mg/L	ND	0.10	0.050	05/12/20 20:02	

LABORATORY CONTROL SAMPLE: 2883752

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfide	mg/L	0.5	0.48	97	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2883753 2883754

Parameter	Units	92477011002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfide	mg/L	ND	0.5	0.5	0.46	0.50	89	97	80-120	8	10	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2883755 2883756

Parameter	Units	92477011003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfide	mg/L	ND	0.5	0.5	0.46	0.46	92	91	80-120	0	10	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: PLANT BOWEN
Pace Project No.: 2631748

QC Batch: 541114
QC Batch Method: SM 4500-S2D-2011
Analysis Method: SM 4500-S2D-2011
Analysis Description: 4500S2D Sulfide Water
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 2631748003, 2631748004, 2631748005, 2631748006, 2631748007, 2631748008, 2631748009, 2631748010

METHOD BLANK: 2883784 Matrix: Water
Associated Lab Samples: 2631748003, 2631748004, 2631748005, 2631748006, 2631748007, 2631748008, 2631748009, 2631748010

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Sulfide	mg/L	ND	0.10	0.050	05/12/20 20:40	

LABORATORY CONTROL SAMPLE: 2883785

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfide	mg/L	0.5	0.47	94	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2883788 2883789

Parameter	Units	92476928038 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfide	mg/L	ND	0.5	0.5	0.35	0.35	70	70	80-120	0	10	M1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2883798 2883799

Parameter	Units	92477008003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfide	mg/L	ND	0.5	0.5	0.24	0.26	48	51	80-120	7	10	M1

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: PLANT BOWEN
Pace Project No.: 2631748

QC Batch: 541618
QC Batch Method: SM 4500-S2D-2011
Analysis Method: SM 4500-S2D-2011
Analysis Description: 4500S2D Sulfide Water
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 2631748011

METHOD BLANK: 2886143 Matrix: Water
Associated Lab Samples: 2631748011

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Sulfide	mg/L	ND	0.10	0.050	05/14/20 21:48	

LABORATORY CONTROL SAMPLE: 2886144

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfide	mg/L	0.5	0.51	101	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2886145 2886146

Parameter	Units	2631746001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfide	mg/L	ND	0.5	0.5	0.35	0.35	71	70	80-120	0	10	M1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2886147 2886148

Parameter	Units	2631746002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfide	mg/L	ND	0.5	0.5	0.30	0.30	57	58	80-120	1	10	M1

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QUALITY CONTROL DATA

Project: PLANT BOWEN
Pace Project No.: 2631748

QC Batch: 541454
QC Batch Method: EPA 300.0 Rev 2.1 1993
Analysis Method: EPA 300.0 Rev 2.1 1993
Analysis Description: 300.0 IC Anions
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 2631748001, 2631748002, 2631748003, 2631748004, 2631748005, 2631748006, 2631748007, 2631748008, 2631748009, 2631748010, 2631748011

METHOD BLANK: 2885445 Matrix: Water
Associated Lab Samples: 2631748001, 2631748002, 2631748003, 2631748004, 2631748005, 2631748006, 2631748007, 2631748008, 2631748009, 2631748010, 2631748011

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	ND	1.0	0.60	05/14/20 11:35	
Sulfate	mg/L	ND	1.0	0.50	05/14/20 11:35	

LABORATORY CONTROL SAMPLE: 2885446

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	50	54.0	108	90-110	
Sulfate	mg/L	50	54.5	109	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2885447 2885448

Parameter	Units	92477073004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	8.7	50	50	61.6	61.4	106	105	90-110	0	10	
Sulfate	mg/L	2700	50	50	58.5	57.6	112	110	90-110	2	10	M1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2885449 2885450

Parameter	Units	2631748009 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	4.3	50	50	57.7	58.0	107	107	90-110	0	10	
Sulfate	mg/L	24.2	50	50	77.6	77.9	107	107	90-110	0	10	

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QUALIFIERS

Project: PLANT BOWEN
Pace Project No.: 2631748

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

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: PLANT BOWEN
Pace Project No.: 2631748

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
2631748001	SW-1				
2631748002	SW-4				
2631748003	APPZ-2S				
2631748004	APPZ-3S				
2631748005	SW-5				
2631748009	BGWA-33				
2631748001	SW-1	EPA 3010A	46265	EPA 6010D	46269
2631748002	SW-4	EPA 3010A	46265	EPA 6010D	46269
2631748003	APPZ-2S	EPA 3010A	46265	EPA 6010D	46269
2631748004	APPZ-3S	EPA 3010A	46265	EPA 6010D	46269
2631748005	SW-5	EPA 3010A	46265	EPA 6010D	46269
2631748006	DUP-1	EPA 3010A	46265	EPA 6010D	46269
2631748007	FBL050720	EPA 3010A	46265	EPA 6010D	46269
2631748008	EQBL050720	EPA 3010A	46265	EPA 6010D	46269
2631748009	BGWA-33	EPA 3010A	46265	EPA 6010D	46269
2631748010	FBL050820	EPA 3010A	46265	EPA 6010D	46269
2631748011	EQBL050820	EPA 3010A	46265	EPA 6010D	46269
2631748001	SW-1	EPA 3005A	46296	EPA 6020B	46297
2631748002	SW-4	EPA 3005A	46296	EPA 6020B	46297
2631748003	APPZ-2S	EPA 3005A	46296	EPA 6020B	46297
2631748004	APPZ-3S	EPA 3005A	46296	EPA 6020B	46297
2631748005	SW-5	EPA 3005A	46296	EPA 6020B	46297
2631748006	DUP-1	EPA 3005A	46296	EPA 6020B	46297
2631748007	FBL050720	EPA 3005A	46296	EPA 6020B	46297
2631748008	EQBL050720	EPA 3005A	46296	EPA 6020B	46297
2631748009	BGWA-33	EPA 3005A	46296	EPA 6020B	46297
2631748010	FBL050820	EPA 3005A	46296	EPA 6020B	46297
2631748011	EQBL050820	EPA 3005A	46296	EPA 6020B	46297
2631748001	SW-1	SM 2320B-2011	541634		
2631748002	SW-4	SM 2320B-2011	541634		
2631748003	APPZ-2S	SM 2320B-2011	542080		
2631748004	APPZ-3S	SM 2320B-2011	542833		
2631748005	SW-5	SM 2320B-2011	542080		
2631748006	DUP-1	SM 2320B-2011	542080		
2631748007	FBL050720	SM 2320B-2011	542080		
2631748008	EQBL050720	SM 2320B-2011	542080		
2631748009	BGWA-33	SM 2320B-2011	542080		
2631748010	FBL050820	SM 2320B-2011	542080		
2631748011	EQBL050820	SM 2320B-2011	542080		
2631748001	SW-1	SM 4500-S2D-2011	541111		
2631748002	SW-4	SM 4500-S2D-2011	541111		
2631748003	APPZ-2S	SM 4500-S2D-2011	541114		
2631748004	APPZ-3S	SM 4500-S2D-2011	541114		
2631748005	SW-5	SM 4500-S2D-2011	541114		
2631748006	DUP-1	SM 4500-S2D-2011	541114		

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: PLANT BOWEN
Pace Project No.: 2631748

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
2631748007	**FBL050720**	SM 4500-S2D-2011	541114		
2631748008	**EQBL050720**	SM 4500-S2D-2011	541114		
2631748009	**BGWA-33**	SM 4500-S2D-2011	541114		
2631748010	**FBL050820**	SM 4500-S2D-2011	541114		
2631748011	**EQBL050820**	SM 4500-S2D-2011	541618		
2631748001	**SW-1**	EPA 300.0 Rev 2.1 1993	541454		
2631748002	**SW-4**	EPA 300.0 Rev 2.1 1993	541454		
2631748003	**APPZ-2S**	EPA 300.0 Rev 2.1 1993	541454		
2631748004	**APPZ-3S**	EPA 300.0 Rev 2.1 1993	541454		
2631748005	**SW-5**	EPA 300.0 Rev 2.1 1993	541454		
2631748006	**DUP-1**	EPA 300.0 Rev 2.1 1993	541454		
2631748007	**FBL050720**	EPA 300.0 Rev 2.1 1993	541454		
2631748008	**EQBL050720**	EPA 300.0 Rev 2.1 1993	541454		
2631748009	**BGWA-33**	EPA 300.0 Rev 2.1 1993	541454		
2631748010	**FBL050820**	EPA 300.0 Rev 2.1 1993	541454		
2631748011	**EQBL050820**	EPA 300.0 Rev 2.1 1993	541454		

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: 1 of 1

Section A Required Client Information:	Section B Required Project Information:	Section C Invoice Information:
Company: GA Power	Report To: SCS Contacts	Attention: Southern Co.
Address: Atlanta, GA	Copy To: Geosyntec Contacts	Company Name:
		Address:
Email To: SCS Contacts	Purchase Order No.:	Pace Quote Reference:
Phone: Fax:	Project Name: Plant Bowen	Pace Project Manager: Kevin Herring
Requested Due Date/TAT: 10 Day	Project Number:	Pace Profile #: 2928-9

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER

☐ UST ☐ RCRA ☑ OTHER CCR

Site Location STATE: GA

Requested Analysis Filtered (Y/N)

ITEM #	Section D Required Client Information — SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE	Valid Matrix Codes: MATRIX / CODE — DRINKING WATER DW; WATER WT; WASTE WATER WW; PRODUCT P; SOIL/SOLID SL; OIL OL; WIPE WP; AIR AR; OTHER OT; TISSUE TS	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED DATE	COLLECTED TIME	COMPOSITE DATE	COMPOSITE TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Chloride/Sulfate	Metals 6010/6020	Alkalinity & BiCarb	Sulfide	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	~~APPZ-23~~									4	2		1		1					X	X	X	X			
2	~~APPZ-33~~									4	2		1		1					X	X	X	X			
3	SW-1	WT	G	5/6/20	1512					4	2		1		1					X	X	X	X			Surface Water
4	~~SW-2~~	WT								4	2		1		1					X	X	X	X			
5	~~SW-3~~									4	2		1		1					X	X	X	X			
6	SW-4	WT	G	5/6/20	1540					4	2		1		1					X	X	X	X			Surface Water
7	~~SW-5~~									4	2		1		1					X	X	X	X			
8	~~BGWA-33~~									4	2		1		1					X	X	X	X			
9	~~DUP-1~~									4	2		1		1					X	X	X	X			
10																										
11																										
12																										

2631748

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS: Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
	William Leaker / Resolute	5/8/20	13:52	Pace	5/8/20	1352	2.4	Y	N	Y
*Metals=B,Ca,Mg,Mn,K,Na,Fe										

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Kevin Herring / Will Leaker

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 5/6/20

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: 1 of 1

Section A Required Client Information:

Company:	GA Power
Address:	Atlanta, GA
Email To:	SCS Contacts
Phone:	Fax:
Requested Due Date/TAT:	10 Day

Section B Required Project Information:

Report To:	SCS Contacts
Copy To:	Geosyntec Contacts
Purchase Order No.:	
Project Name:	Plant Bowen
Project Number:	

Section C Invoice Information:

Attention:	Southern Co.
Company Name:	
Address:	
Pace Quote Reference:	
Pace Project Manager:	Kevin Herring
Pace Profile #:	2928-9

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☒ OTHER CCR

Site Location STATE: GA

Section D Required Client Information

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Valid Matrix Codes

MATRIX	CODE
DRINKING WATER	DW
WATER	WT
WASTE WATER	WW
PRODUCT	P
SOIL/SOLID	SL
OIL	OL
WIPE	WP
AIR	AR
OTHER	OT
TISSUE	TS

ITEM #	SAMPLE ID	MATRIX CODE (use valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED DATE	COLLECTED TIME	COMPOSITE DATE	COMPOSITE TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Chloride/Sulfate	Metals 6010/6020	Alkalinity & BiCarb	Sulfide	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	APPZ-2S	WT	G	5/7/20	1158				4	2		1		1					X	X	X	X		7.85
2	APPZ-3S	WT	G	5/7/20	1119				4	2		1		1					X	X	X	X		4.09
3	SW-1								4	2		1		1					X	X	X	X		
4	SW-2								4	2		1		1					X	X	X	X		
5	SW-3								4	2		1		1					X	X	X	X		
6	SW-4								4	2		1		1					X	X	X	X		
7	SW-5	WT	G	5/7/20	0900				4	2		1		1					X	X	X	X		Surface Water 8.25
8	BGWA-33								4	2		1		1					X	X	X	X		
9	DUP-1	WT	G	5/7/20	-				4	2		1		1					X	X	X	X		
10	FBLK050720	WT	G	5/7/20	1603				4	2		1		1					X	X	X	X		
11	EQBLK050720	WT	G	1605	5/7/20				4	2		1		1					X	X	X	X		
12																								

Requested Analysis Filtered (Y/N)

2631748 Pace Project No./ Lab I.D.

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
	William Looker / Resolute	5/8/20	13:57	Pace	5/8/20	1352	2.4	Y	N	Y
*Metals=B,Ca,Mg,Mn,K,Na,Fe							Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Kevin Herring / Will Looker

SIGNATURE of SAMPLER: DATE Signed (MM/DD/YY): 5/7/20

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

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Page: of

Section A Required Client Information:	Section B Required Project Information:	Section C Invoice Information:
Company: GA Power	Report To: SCS Contacts	Attention: Southern Co.
Address: Atlanta, GA	Copy To: Geosyntec Contacts	Company Name:
		Address:
Email To: SCS Contacts	Purchase Order No.:	Pace Quote Reference:
Phone: Fax	Project Name: Plant Bowen	Pace Project Manager: Kevin Herring
Requested Due Date/TAT: 10 Day	Project Number:	Pace Profile #: 2928-9

REGULATORY AGENCY: ☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER ☐ UST ☐ RCRA ☑ OTHER CCR

Site Location STATE: GA

Section D Required Client Information

Valid Matrix Codes

MATRIX	CODE
DRINKING WATER	DW
WATER	WT
WASTE WATER	WW
PRODUCT	P
SOIL/SOLID	SL
OIL	OL
WIPE	WP
AIR	AR
OTHER	OT
TISSUE	TS

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED DATE	COLLECTED TIME	COMPOSITE DATE	COMPOSITE TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Chloride/Sulfate	Metals 6010/6020	Alkalinity & BiCarb	Sulfide	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	APPZ-2S								4	2		1		1					X	X	X	X		
2	APPZ-3S								4	2		1		1					X	X	X	X		
3	SW-1								4	2		1		1					X	X	X	X		
4	SW-2								4	2		1		1					X	X	X	X		
5	SW-3								4	2		1		1					X	X	X	X		
6	SW-4								4	2		1		1					X	X	X	X		
7	SW-5								4	2		1		1					X	X	X	X		
8	BGWA-33	WT	G	5/8/20	9:44				4	2		1		1					X	X	X	X		7.35
9	DUP-1								4	2		1		1					X	X	X	X		
10	FBLO50820	WT	G	5/8/20	10:52				4	2		1		1					X	X	X	X		
11	EQBLO50820	WT	G	5/8/20	10:57				4	2		1		1					X	X	X	X		
12																								

2631748 Pace Project No./ Lab I.D.

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
	William Looker / Resolute	5/8/20	13:52	[signature] / Pace	5/8/20	1352	1.7	Y	N	Y
*Metals=B,Ca,Mg,Mn,K,Na,Fe										

SAMPLER NAME AND SIGNATURE				
PRINT Name of SAMPLER: William Looker				
SIGNATURE of SAMPLER: [signature]	DATE Signed (MM/DD/YY): 5/8/20	Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)

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May 22, 2020

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

RE: Project: PLANT BOWEN
Pace Project No.: 2631749

Dear Joju Abraham:

Enclosed are the analytical results for sample(s) received by the laboratory on May 08, 2020. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

The test results provided in this final report were generated by each of the following laboratories within the Pace Network:
- Pace Analytical Services - Atlanta, GA

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: Kristen Jurinko
Whitney Law, Geosyntec Consultants
Noelia Muskus, Geosyntec Consultants
Lauren Petty, Southern Company Services, Inc.

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CERTIFICATIONS

Project: PLANT BOWEN
Pace Project No.: 2631749

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 BOWEN
Pace Project No.: 2631749

Lab ID	Sample ID	Matrix	Date Collected	Date Received
2631749001	**SW-1**	Water	05/06/20 15:12	05/08/20 13:52
2631749002	**SW-4**	Water	05/06/20 16:40	05/08/20 13:52
2631749003	**APPZ-2S**	Water	05/07/20 11:58	05/08/20 13:52
2631749004	**APPZ-3S**	Water	05/07/20 11:19	05/08/20 13:52
2631749005	**SW-5**	Water	05/07/20 09:00	05/08/20 13:52
2631749006	**DUP-1**	Water	05/07/20 00:00	05/08/20 13:52
2631749007	**FBL050720**	Water	05/07/20 16:03	05/08/20 13:52
2631749008	**EQBL050720**	Water	05/07/20 16:08	05/08/20 13:52
2631749009	**BGWA-33**	Water	05/08/20 09:44	05/08/20 13:52
2631749010	**FBL050820**	Water	05/08/20 10:52	05/08/20 13:52
2631749011	**EQBL050820**	Water	05/08/20 10:57	05/08/20 13:52

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SAMPLE ANALYTE COUNT

Project: PLANT BOWEN
Pace Project No.: 2631749

Lab ID	Sample ID	Method	Analysts	Analytes Reported
2631749001	**SW-1**	EPA 6020B	KLH	1
2631749002	**SW-4**	EPA 6020B	KLH	1
2631749003	**APPZ-2S**	EPA 6020B	KLH	1
2631749004	**APPZ-3S**	EPA 6020B	KLH	1
2631749005	**SW-5**	EPA 6020B	KLH	1
2631749006	**DUP-1**	EPA 6020B	KLH	1
2631749007	**FBL050720**	EPA 6020B	KLH	1
2631749008	**EQBL050720**	EPA 6020B	KLH	1
2631749009	**BGWA-33**	EPA 6020B	KLH	1
2631749010	**FBL050820**	EPA 6020B	KLH	1
2631749011	**EQBL050820**	EPA 6020B	KLH	1

PASI-GA = Pace Analytical Services - Atlanta, GA

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SUMMARY OF DETECTION

Project: PLANT BOWEN
Pace Project No.: 2631749

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
2631749001	**SW-1**					
	Field pH	6.64	Std. Units		05/13/20 09:11	
2631749002	**SW-4**					
	Field pH	7.92	Std. Units		05/13/20 09:11	
EPA 6020B	Cobalt	0.00094J	mg/L	0.0050	05/13/20 18:28	
2631749003	**APPZ-2S**					
	Field pH	7.85	Std. Units		05/13/20 09:11	
EPA 6020B	Cobalt	0.00069J	mg/L	0.0050	05/13/20 18:34	
2631749004	**APPZ-3S**					
	Field pH	7.09	Std. Units		05/13/20 09:11	
EPA 6020B	Cobalt	0.0024J	mg/L	0.0050	05/13/20 18:40	
2631749005	**SW-5**					
	Field pH	8.20	Std. Units		05/13/20 09:11	
2631749006	**DUP-1**					
EPA 6020B	Cobalt	0.0023J	mg/L	0.0050	05/13/20 18:51	
2631749009	**BGWA-33**					
	Field pH	7.35	Std. Units		05/13/20 09:11	

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ANALYTICAL RESULTS

Project: PLANT BOWEN
Pace Project No.: 2631749

Sample: SW-1 **Lab ID: 2631749001** Collected: 05/06/20 15:12 Received: 05/08/20 13:52 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
	Analytical Method: Pace Analytical Services - Atlanta, GA								
Field pH	**6.64**	Std. Units			1		05/13/20 09:11		
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3005A Pace Analytical Services - Atlanta, GA								
Cobalt	ND	mg/L	0.0050	0.00030	1	05/12/20 14:14	05/13/20 18:23	7440-48-4	

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ANALYTICAL RESULTS

Project: PLANT BOWEN
Pace Project No.: 2631749

Sample: SW-4 **Lab ID: 2631749002** Collected: 05/06/20 16:40 Received: 05/08/20 13:52 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
	Analytical Method: Pace Analytical Services - Atlanta, GA								
Field pH	**7.92**	Std. Units			1		05/13/20 09:11		
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3005A Pace Analytical Services - Atlanta, GA								
Cobalt	**0.00094J**	mg/L	0.0050	0.00030	1	05/12/20 14:14	05/13/20 18:28	7440-48-4	

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ANALYTICAL RESULTS

Project: PLANT BOWEN
Pace Project No.: 2631749

Sample: APPZ-2S **Lab ID: 2631749003** Collected: 05/07/20 11:58 Received: 05/08/20 13:52 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
	Analytical Method: Pace Analytical Services - Atlanta, GA								
Field pH	**7.85**	Std. Units			1		05/13/20 09:11		
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3005A Pace Analytical Services - Atlanta, GA								
Cobalt	**0.00069J**	mg/L	0.0050	0.00030	1	05/12/20 14:14	05/13/20 18:34	7440-48-4	

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ANALYTICAL RESULTS

Project: PLANT BOWEN
Pace Project No.: 2631749

Sample: APPZ-3S **Lab ID: 2631749004** Collected: 05/07/20 11:19 Received: 05/08/20 13:52 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
	Analytical Method: Pace Analytical Services - Atlanta, GA								
Field pH	**7.09**	Std. Units			1		05/13/20 09:11		
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3005A Pace Analytical Services - Atlanta, GA								
Cobalt	**0.0024J**	mg/L	0.0050	0.00030	1	05/12/20 14:14	05/13/20 18:40	7440-48-4	

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ANALYTICAL RESULTS

Project: PLANT BOWEN
Pace Project No.: 2631749

Sample: SW-5 **Lab ID: 2631749005** Collected: 05/07/20 09:00 Received: 05/08/20 13:52 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
	Analytical Method: Pace Analytical Services - Atlanta, GA								
Field pH	**8.20**	Std. Units			1		05/13/20 09:11		
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3005A Pace Analytical Services - Atlanta, GA								
Cobalt	ND	mg/L	0.0050	0.00030	1	05/12/20 14:14	05/13/20 18:46	7440-48-4	

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ANALYTICAL RESULTS

Project: PLANT BOWEN
Pace Project No.: 2631749

Sample: DUP-1 **Lab ID: 2631749006** Collected: 05/07/20 00:00 Received: 05/08/20 13:52 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 Pace Analytical Services - Atlanta, GA								
Cobalt	**0.0023J**	mg/L	0.0050	0.00030	1	05/12/20 14:14	05/13/20 18:51	7440-48-4	

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ANALYTICAL RESULTS

Project: PLANT BOWEN
Pace Project No.: 2631749

Sample: FBL050720 **Lab ID: 2631749007** Collected: 05/07/20 16:03 Received: 05/08/20 13:52 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 Pace Analytical Services - Atlanta, GA								
Cobalt	ND	mg/L	0.0050	0.00030	1	05/12/20 14:14	05/13/20 18:57	7440-48-4	

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ANALYTICAL RESULTS

Project: PLANT BOWEN
Pace Project No.: 2631749

Sample: EQBL050720 **Lab ID: 2631749008** Collected: 05/07/20 16:08 Received: 05/08/20 13:52 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 Pace Analytical Services - Atlanta, GA								
Cobalt	ND	mg/L	0.0050	0.00030	1	05/12/20 14:14	05/13/20 19:03	7440-48-4	

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ANALYTICAL RESULTS

Project: PLANT BOWEN
Pace Project No.: 2631749

Sample: BGWA-33 **Lab ID: 2631749009** Collected: 05/08/20 09:44 Received: 05/08/20 13:52 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
	Analytical Method: Pace Analytical Services - Atlanta, GA								
Field pH	**7.35**	Std. Units			1		05/13/20 09:11		
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3005A Pace Analytical Services - Atlanta, GA								
Cobalt	ND	mg/L	0.0050	0.00030	1	05/12/20 14:14	05/13/20 19:08	7440-48-4	

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ANALYTICAL RESULTS

Project: PLANT BOWEN
Pace Project No.: 2631749

Sample: FBL050820 **Lab ID: 2631749010** Collected: 05/08/20 10:52 Received: 05/08/20 13:52 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 Pace Analytical Services - Atlanta, GA								
Cobalt	ND	mg/L	0.0050	0.00030	1	05/12/20 14:14	05/13/20 19:26	7440-48-4	

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ANALYTICAL RESULTS

Project: PLANT BOWEN
Pace Project No.: 2631749

Sample: EQBL050820 **Lab ID: 2631749011** Collected: 05/08/20 10:57 Received: 05/08/20 13:52 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 Pace Analytical Services - Atlanta, GA								
Cobalt	ND	mg/L	0.0050	0.00030	1	05/12/20 14:14	05/13/20 19:31	7440-48-4	

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QUALITY CONTROL DATA

Project: PLANT BOWEN
Pace Project No.: 2631749

QC Batch: 46296
QC Batch Method: EPA 3005A
Analysis Method: EPA 6020B
Analysis Description: 6020B MET
Laboratory: Pace Analytical Services - Atlanta, GA
Associated Lab Samples: 2631749001, 2631749002, 2631749003, 2631749004, 2631749005, 2631749006, 2631749007, 2631749008, 2631749009, 2631749010, 2631749011

METHOD BLANK: 214789 Matrix: Water
Associated Lab Samples: 2631749001, 2631749002, 2631749003, 2631749004, 2631749005, 2631749006, 2631749007, 2631749008, 2631749009, 2631749010, 2631749011

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Cobalt	mg/L	ND	0.0050	0.00030	05/13/20 17:08	

LABORATORY CONTROL SAMPLE: 214790

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Cobalt	mg/L	0.1	0.10	101	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 214791 214792

Parameter	Units	2631746001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Cobalt	mg/L	ND	0.1	0.1	0.092	0.090	92	90	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.

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QUALIFIERS

Project: PLANT BOWEN
Pace Project No.: 2631749

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.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: PLANT BOWEN
Pace Project No.: 2631749

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
2631749001	**SW-1**	EPA 3005A	46296	EPA 6020B	46297
2631749002	**SW-4**	EPA 3005A	46296	EPA 6020B	46297
2631749003	**APPZ-2S**	EPA 3005A	46296	EPA 6020B	46297
2631749004	**APPZ-3S**	EPA 3005A	46296	EPA 6020B	46297
2631749005	**SW-5**	EPA 3005A	46296	EPA 6020B	46297
2631749006	**DUP-1**	EPA 3005A	46296	EPA 6020B	46297
2631749007	**FBL050720**	EPA 3005A	46296	EPA 6020B	46297
2631749008	**EQBL050720**	EPA 3005A	46296	EPA 6020B	46297
2631749009	**BGWA-33**	EPA 3005A	46296	EPA 6020B	46297
2631749010	**FBL050820**	EPA 3005A	46296	EPA 6020B	46297
2631749011	**EQBL050820**	EPA 3005A	46296	EPA 6020B	46297

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Page: 1 of 1

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company:	GA Power	Report To:	SCS Contacts	Attention:	Southern Co.
Address:	Atlanta, GA	Copy To:	Geosyntec Contacts	Company Name:	
				Address:	
Email To:	SCS Contacts	Purchase Order No.:		Pace Quote Reference:	
Phone:	Fax:	Project Name:	Plant Bowen	Pace Project Manager:	Kevin Herring
Requested Due Date/TAT:	10 Day	Project Number:		Pace Profile #:	2828-10

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☑ OTHER CCR

Site Location STATE: GA

Requested Analysis Filtered (Y/N)

ITEM #	Section D Required Client Information: SAMPLE ID (A-Z, 0-9 / , -) Sample IDs MUST BE UNIQUE	Valid Matrix Codes: MATRIX / CODE — DRINKING WATER DW; WATER WT; WASTE WATER WW; PRODUCT P; SOIL/SOLID SL; OIL OL; WIPE WP; AIR AR; OTHER OT; TISSUE TS	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED DATE	COLLECTED TIME	COMPOSITE DATE	COMPOSITE TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Y/N	Analysis Test: Cobalt by 6020	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D. 2631749
1	APPZ-2S									1			1						X		
2	APPZ-3S									1			1						X		
3	SW-1	WT	G	5/6/20	1517					1			1						X		Surface Water
4	SW-2									1			1						X		
5	SW-3									1			1						X		
6	SW-4	WT	G	5/6/20	1540					1			1						X		Surface Water
7	SW-5									1			1						X		
8	BGWA-3S									1			1						X		
9	DUP-1									1			1						X		
10																					
11																					
12																					

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS: Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
	William Lasker	5/8/20	13:52	Pace	5/8/20	1352	2.4	Y	N	Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: William Lasker

SIGNATURE of SAMPLER: [signature]

DATE Signed (MM/DD/YY): 5/6/20

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

F-ALL-Q-020rev.07, 15-Feb-2007

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: 1 of 1

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company:	GA Power	Report To:	SCS Contacts	Attention:	Southern Co.
Address:	Atlanta, GA	Copy To:	Geosyntec Contacts	Company Name:	
				Address:	
Email To:	SCS Contacts	Purchase Order No.:		Pace Quote Reference:	
Phone:	Fax:	Project Name:	Plant Bowen	Pace Project Manager:	Kevin Herring
Requested Due Date/TAT:	10 Day	Project Number:		Pace Profile #:	2928-10

REGULATORY AGENCY: ☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER ☐ UST ☐ RCRA ☒ OTHER CCR

Site Location STATE: GA

Requested Analysis Filtered (Y/N)

ITEM #	Section D Required Client Information: SAMPLE ID (A-Z, 0-9 / ,-) Samples IDs MUST BE UNIQUE	Valid Matrix Codes: MATRIX / CODE — DRINKING WATER DW; WATER WT; WASTE WATER WW; PRODUCT P; SOIL/SOLID SL; OIL OL; WIPE WP; AIR AR; OTHER OT; TISSUE TS	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED DATE	COLLECTED TIME	COMPOSITE DATE	COMPOSITE TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Y/N	Analysis Test: Cobalt by 6020	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	APPZ-2S		WT	G	5/1/20	1158				1			1						X		7.85
2	APPZ-3S		WT	G	5/1/20	1109				1			1						X		7.09
3	SW-1									1			1						X		
4	SW-2									1			1						X		
5	SW-3									1			1						X		
6	SW-4									1			1						X		
7	SW-5		WT	G	5/1/20	0900				1			1						X		Surface Water 8.20
8	BGWA-33									1			1						X		
9	DUP-1		WT	G	5/1/20	—				1			1						X		
10	FBL050120		WT	G	5/1/20	1603				1			1						X		
11	EQBL050120		WT	G	5/1/20	1608				1			1						X		
12																					

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS: Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
	William Lasker / Resolute	5/8/20	13:52	Pace	5/8/20	1352	2.4	Y	N	Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: [illegible] William Lasker

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 5/7/20

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Section A Required Client Information:	Section B Required Project Information:	Section C Invoice Information:	Page: of
Company: GA Power	Report To: SCS Contacts	Attention: Southern Co.	
Address: Atlanta, GA	Copy To: Geosyntec Contacts	Company Name:	REGULATORY AGENCY
		Address:	☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
Email To: SCS Contacts	Purchase Order No.:	Pace Quote Reference:	☐ UST ☐ RCRA ☑ OTHER CCR
Phone: Fax:	Project Name: Plant Bowen	Pace Project Manager: Kevin Herring	Site Location STATE: GA
Requested Due Date/TAT: 10 Day	Project Number:	Pace Profile #: 2928-10	

Section D Required Client Information

SAMPLE ID
(A-Z, 0-9 / ,-)
Sample IDs MUST BE UNIQUE

Valid Matrix Codes

MATRIX	CODE
DRINKING WATER	DW
WATER	WT
WASTE WATER	WW
PRODUCT	P
SOIL/SOLID	SL
OIL	OL
WIPE	WP
AIR	AR
OTHER	OT
TISSUE	TS

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED DATE	COLLECTED TIME	COMPOSITE DATE	COMPOSITE TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Cobalt by 6020	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	~~APPZ-2S~~								1			1							X		
2	~~APPZ-3S~~								1			1							X		
3	~~SW-1~~								1			1							X		
4	~~SW-2~~								1			1							X		
5	~~SW-3~~								1			1							X		
6	~~SW-4~~								1			1							X		
7	~~SW-5~~								1			1							X		
8	BGWA-33	WT	G	5/8/20	9:44				1			1							X		7.35
9	~~DUP-1~~								1			1							X		
10	FBL050820	WT	G	5/8/20	10:52				1			1							X		
11	EQBL050820	WT	G	5/8/20	10:57				1			1							X		
12																					

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
	William Lasker / Resolute	5/8/20	13:52	Pace	5/8/20	1352	

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: William Lasker

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 5/8/20

Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)

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110 Technology Parkway
Peachtree Corners, GA 30092
(770)734-4200

May 22, 2020

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

RE: Project: PLANT BOWEN
Pace Project No.: 2631758

Dear Joju Abraham:

Enclosed are the analytical results for sample(s) received by the laboratory on May 08, 2020. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

The test results provided in this final report were generated by each of the following laboratories within the Pace Network:
- Pace Analytical Services - Atlanta, GA

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: Kristen Jurinko
Whitney Law, Geosyntec Consultants
Noelia Muskus, Geosyntec Consultants
Lauren Petty, Southern Company Services, Inc.

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CERTIFICATIONS

Project: PLANT BOWEN
Pace Project No.: 2631758

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 BOWEN
Pace Project No.: 2631758

Lab ID	Sample ID	Matrix	Date Collected	Date Received
2631758001	**SW-1**	Water	05/06/20 15:12	05/08/20 13:52
2631758002	**SW-4**	Water	05/06/20 15:40	05/08/20 13:52
2631758003	**APPZ-2S**	Water	05/07/20 11:58	05/08/20 13:52
2631758004	**APPZ-3S**	Water	05/07/20 11:19	05/08/20 13:52
2631758005	**SW-5**	Water	05/07/20 09:00	05/08/20 13:52
2631758006	**DUP-1**	Water	05/07/20 00:00	05/08/20 13:52
2631758007	**FBL050720**	Water	05/07/20 16:03	05/08/20 13:52
2631758008	**EQBL050720**	Water	05/07/20 16:08	05/08/20 13:52
2631758009	**BGWA-33**	Water	05/08/20 09:44	05/08/20 13:52
2631758010	**FBL050820**	Water	05/08/20 10:52	05/08/20 13:52
2631758011	**EQBL050820**	Water	05/08/20 10:57	05/08/20 13:52

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SAMPLE ANALYTE COUNT

Project: PLANT BOWEN
Pace Project No.: 2631758

Lab ID	Sample ID	Method	Analysts	Analytes Reported
2631758001	**SW-1**	EPA 6020B	KLH	1
2631758002	**SW-4**	EPA 6020B	KLH	1
2631758003	**APPZ-2S**	EPA 6020B	KLH	1
2631758004	**APPZ-3S**	EPA 6020B	DRB	1
2631758005	**SW-5**	EPA 6020B	KLH	1
2631758006	**DUP-1**	EPA 6020B	DRB	1
2631758007	**FBL050720**	EPA 6020B	KLH	1
2631758008	**EQBL050720**	EPA 6020B	KLH	1
2631758009	**BGWA-33**	EPA 6020B	KLH	1
2631758010	**FBL050820**	EPA 6020B	KLH	1
2631758011	**EQBL050820**	EPA 6020B	KLH	1

PASI-GA = Pace Analytical Services - Atlanta, GA

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SUMMARY OF DETECTION

Project: PLANT BOWEN
Pace Project No.: 2631758

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
2631758001	**SW-1**					
	Field pH	6.64	Std. Units		05/20/20 10:12	
EPA 6020B	Molybdenum	0.017	mg/L	0.010	05/13/20 18:23	
2631758002	**SW-4**					
	Field pH	7.92	Std. Units		05/20/20 10:12	
EPA 6020B	Molybdenum	0.062	mg/L	0.010	05/13/20 18:28	
2631758003	**APPZ-2S**					
	Field pH	7.85	Std. Units		05/20/20 10:12	
EPA 6020B	Molybdenum	0.18	mg/L	0.010	05/13/20 18:34	
2631758004	**APPZ-3S**					
	Field pH	7.09	Std. Units		05/20/20 10:12	
EPA 6020B	Molybdenum	1.0	mg/L	0.050	05/15/20 13:51	
2631758005	**SW-5**					
	Field pH	8.20	Std. Units		05/20/20 10:12	
EPA 6020B	Molybdenum	0.15	mg/L	0.010	05/13/20 18:46	
2631758006	**DUP-1**					
EPA 6020B	Molybdenum	0.97	mg/L	0.050	05/15/20 13:57	
2631758009	**BGWA-33**					
	Field pH	7.35	Std. Units		05/20/20 10:12	
EPA 6020B	Molybdenum	0.037	mg/L	0.010	05/13/20 19:08	

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ANALYTICAL RESULTS

Project: PLANT BOWEN
Pace Project No.: 2631758

Sample: SW-1 **Lab ID: 2631758001** Collected: 05/06/20 15:12 Received: 05/08/20 13:52 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
Field Data	Analytical Method: Pace Analytical Services - Atlanta, GA								
Field pH	**6.64**	Std. Units			1		05/20/20 10:12		
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3005A Pace Analytical Services - Atlanta, GA								
Molybdenum	**0.017**	mg/L	0.010	0.00095	1	05/12/20 14:14	05/13/20 18:23	7439-98-7	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: PLANT BOWEN
Pace Project No.: 2631758

Sample: SW-4 **Lab ID: 2631758002** Collected: 05/06/20 15:40 Received: 05/08/20 13:52 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
Field Data	Analytical Method: Pace Analytical Services - Atlanta, GA								
Field pH	**7.92**	Std. Units			1		05/20/20 10:12		
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3005A Pace Analytical Services - Atlanta, GA								
Molybdenum	**0.062**	mg/L	0.010	0.00095	1	05/12/20 14:14	05/13/20 18:28	7439-98-7	

REPORT OF LABORATORY ANALYSIS

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(770)734-4200

ANALYTICAL RESULTS

Project: PLANT BOWEN
Pace Project No.: 2631758

Sample: APPZ-2S **Lab ID: 2631758003** Collected: 05/07/20 11:58 Received: 05/08/20 13:52 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
Field Data	Analytical Method: Pace Analytical Services - Atlanta, GA								
Field pH	**7.85**	Std. Units			1		05/20/20 10:12		
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3005A Pace Analytical Services - Atlanta, GA								
Molybdenum	**0.18**	mg/L	0.010	0.00095	1	05/12/20 14:14	05/13/20 18:34	7439-98-7	

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ANALYTICAL RESULTS

Project: PLANT BOWEN
Pace Project No.: 2631758

Sample: APPZ-3S **Lab ID: 2631758004** Collected: 05/07/20 11:19 Received: 05/08/20 13:52 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
Field Data	Analytical Method: Pace Analytical Services - Atlanta, GA								
Field pH	**7.09**	Std. Units			1		05/20/20 10:12		
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3005A Pace Analytical Services - Atlanta, GA								
Molybdenum	**1.0**	mg/L	0.050	0.0047	5	05/12/20 14:14	05/15/20 13:51	7439-98-7	

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ANALYTICAL RESULTS

Project: PLANT BOWEN
Pace Project No.: 2631758

Sample: SW-5 **Lab ID: 2631758005** Collected: 05/07/20 09:00 Received: 05/08/20 13:52 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
Field Data	Analytical Method: Pace Analytical Services - Atlanta, GA								
Field pH	**8.20**	Std. Units			1		05/20/20 10:12		
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3005A Pace Analytical Services - Atlanta, GA								
Molybdenum	**0.15**	mg/L	0.010	0.00095	1	05/12/20 14:14	05/13/20 18:46	7439-98-7	

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ANALYTICAL RESULTS

Project: PLANT BOWEN
Pace Project No.: 2631758

Sample: DUP-1 **Lab ID: 2631758006** Collected: 05/07/20 00:00 Received: 05/08/20 13:52 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 Pace Analytical Services - Atlanta, GA								
Molybdenum	**0.97**	mg/L	0.050	0.0047	5	05/12/20 14:14	05/15/20 13:57	7439-98-7	

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Peachtree Corners, GA 30092
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ANALYTICAL RESULTS

Project: PLANT BOWEN
Pace Project No.: 2631758

Sample: FBL050720 **Lab ID: 2631758007** Collected: 05/07/20 16:03 Received: 05/08/20 13:52 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 Pace Analytical Services - Atlanta, GA								
Molybdenum	ND	mg/L	0.010	0.00095	1	05/12/20 14:14	05/13/20 18:57	7439-98-7	

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Peachtree Corners, GA 30092
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ANALYTICAL RESULTS

Project: PLANT BOWEN
Pace Project No.: 2631758

Sample: EQBL050720 **Lab ID: 2631758008** Collected: 05/07/20 16:08 Received: 05/08/20 13:52 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 Pace Analytical Services - Atlanta, GA								
Molybdenum	ND	mg/L	0.010	0.00095	1	05/12/20 14:14	05/13/20 19:03	7439-98-7	

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Peachtree Corners, GA 30092
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ANALYTICAL RESULTS

Project: PLANT BOWEN
Pace Project No.: 2631758

Sample: BGWA-33 **Lab ID: 2631758009** Collected: 05/08/20 09:44 Received: 05/08/20 13:52 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
Field Data	Analytical Method: Pace Analytical Services - Atlanta, GA								
Field pH	**7.35**	Std. Units			1		05/20/20 10:12		
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3005A Pace Analytical Services - Atlanta, GA								
Molybdenum	**0.037**	mg/L	0.010	0.00095	1	05/12/20 14:14	05/13/20 19:08	7439-98-7	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: PLANT BOWEN
Pace Project No.: 2631758

Sample: FBL050820 **Lab ID: 2631758010** Collected: 05/08/20 10:52 Received: 05/08/20 13:52 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 Pace Analytical Services - Atlanta, GA								
Molybdenum	ND	mg/L	0.010	0.00095	1	05/12/20 14:14	05/13/20 19:26	7439-98-7	

REPORT OF LABORATORY ANALYSIS

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Peachtree Corners, GA 30092
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ANALYTICAL RESULTS

Project: PLANT BOWEN
Pace Project No.: 2631758

Sample: EQBL050820 **Lab ID: 2631758011** Collected: 05/08/20 10:57 Received: 05/08/20 13:52 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 Pace Analytical Services - Atlanta, GA								
Molybdenum	ND	mg/L	0.010	0.00095	1	05/12/20 14:14	05/13/20 19:31	7439-98-7	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: PLANT BOWEN
Pace Project No.: 2631758

QC Batch: 46296
QC Batch Method: EPA 3005A
Analysis Method: EPA 6020B
Analysis Description: 6020B MET
Laboratory: Pace Analytical Services - Atlanta, GA
Associated Lab Samples: 2631758001, 2631758002, 2631758003, 2631758004, 2631758005, 2631758006, 2631758007, 2631758008, 2631758009, 2631758010, 2631758011

METHOD BLANK: 214789 Matrix: Water
Associated Lab Samples: 2631758001, 2631758002, 2631758003, 2631758004, 2631758005, 2631758006, 2631758007, 2631758008, 2631758009, 2631758010, 2631758011

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Molybdenum	mg/L	ND	0.010	0.00095	05/13/20 17:08	

LABORATORY CONTROL SAMPLE: 214790

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Molybdenum	mg/L	0.1	0.10	102	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 214791 214792

Parameter	Units	2631746001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Molybdenum	mg/L	10.8	0.1	0.1	11.2	10.8	426	37	75-125	4	20	M6

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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110 Technology Parkway
Peachtree Corners, GA 30092
(770)734-4200

QUALIFIERS

Project: PLANT BOWEN
Pace Project No.: 2631758

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.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: PLANT BOWEN
Pace Project No.: 2631758

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
2631758001	**SW-1**				
2631758002	**SW-4**				
2631758003	**APPZ-2S**				
2631758004	**APPZ-3S**				
2631758005	**SW-5**				
2631758009	**BGWA-33**				
2631758001	**SW-1**	EPA 3005A	46296	EPA 6020B	46297
2631758002	**SW-4**	EPA 3005A	46296	EPA 6020B	46297
2631758003	**APPZ-2S**	EPA 3005A	46296	EPA 6020B	46297
2631758004	**APPZ-3S**	EPA 3005A	46296	EPA 6020B	46297
2631758005	**SW-5**	EPA 3005A	46296	EPA 6020B	46297
2631758006	**DUP-1**	EPA 3005A	46296	EPA 6020B	46297
2631758007	**FBL050720**	EPA 3005A	46296	EPA 6020B	46297
2631758008	**EQBL050720**	EPA 3005A	46296	EPA 6020B	46297
2631758009	**BGWA-33**	EPA 3005A	46296	EPA 6020B	46297
2631758010	**FBL050820**	EPA 3005A	46296	EPA 6020B	46297
2631758011	**EQBL050820**	EPA 3005A	46296	EPA 6020B	46297

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CHAIN-OF-CUSTODY / Analytical Request Document

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Page: 1 of 1

Section A Required Client Information:	Section B Required Project Information:	Section C Invoice Information:
Company: GA Power	Report To: SCS Contacts	Attention: Southern Co.
Address: Atlanta, GA	Copy To: Geosyntec Contacts	Company Name:
		Address:
Email To: SCS Contacts	Purchase Order No.:	Pace Quote Reference:
Phone: Fax:	Project Name: Plant Bowen	Pace Project Manager: Kevin Herring
Requested Due Date/TAT: 10 Day	Project Number:	Pace Profile #: 2928-11

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER

☐ UST ☐ RCRA ☑ OTHER CCR

Site Location STATE: GA

Valid Matrix Codes: DRINKING WATER DW; WATER WT; WASTE WATER WW; PRODUCT P; SOIL/SOLID SL; OIL OL; WIPE WP; AIR AR; OTHER OT; TISSUE TS

ITEM #	Section D Required Client Information: SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE	MATRIX CODE (use valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED DATE	COLLECTED TIME	COMPOSITE DATE	COMPOSITE TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Y/N	Analysis Test: Molybdenum by 6020	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	APPZ-23								1			1							X		
2	APPZ-33								1			1							X		
3	SW-1	WT	G	5/6/20	15:12				1			1							X		Surface Water
4	SW-2								1			1							X		
5	SW-3								1			1							X		
6	SW-4	WT	G	5/6/20	15:40				1			1							X		Surface Water
7	SW-5								1			1							X		
8	BGWA-33								1			1							X		
9	DUP-1								1			1							X		
10																					
11																					
12																					

2631758

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS: Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
	William Baker / Resolute	5/8/20	13:57	[signature] Pace	5/8/20	1352	2.4	Y	N	Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Kevin Herring / Will Baker

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 5/6/20

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

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Page: 1 of 1

Section A Required Client Information:

Company:	GA Power
Address:	Atlanta, GA
Email To:	SCS Contacts
Phone:	Fax:
Requested Due Date/TAT:	10 Day

Section B Required Project Information:

Report To:	SCS Contacts
Copy To:	Geosyntec Contacts
Purchase Order No.:	
Project Name:	Plant Bowen
Project Number:	

Section C Invoice Information:

Attention:	Southern Co.
Company Name:	
Address:	
Pace Quote Reference:	
Pace Project Manager:	Kevin Herring
Pace Profile #:	2928-11

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☑ OTHER CCR

Site Location STATE: GA

Section D Required Client Information

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Valid Matrix Codes

MATRIX	CODE
DRINKING WATER	DW
WATER	WT
WASTE WATER	WW
PRODUCT	P
SOIL/SOLID	SL
OIL	OL
WIPE	WP
AIR	AR
OTHER	OT
TISSUE	TS

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED DATE	COLLECTED TIME	COMPOSITE DATE	COMPOSITE TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Molybdenum by 6020	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	APPZ-2S	WT	G	5/7/20	1158				1			1							X		7.85
2	APPZ-3S	WT	G	5/7/20	1119				1			1							X		7.09
3	SW-1								1			1							X		
4	SW-2								1			1							X		
5	SW-3								1			1							X		
6	SW-4								1			1							X		
7	SW-5	WT	G	5/8/20	0900				1			1							X		Surface Water SW
8	BGWA-33								1			1							X		
9	DUP-1	WT	G	5/7/20	—				1			1							X		
10	FB050720	WT	G	5/7/20	1603				1			1							X		
11	EQBL050720	WT	G	5/7/20	1608				1			1							X		
12																					

Requested Analysis Filtered (Y/N)

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
	William Laaker / Resolute	5/8/20	13:52	Pace	5/8/20	1357	2.4	Y	N	Y
							Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Kevin Herring / Will Laaker

SIGNATURE of SAMPLER: Kevin Herring

DATE Signed (MM/DD/YY): 5/7/20

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

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Page: of

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Address: Atlanta, GA	Copy To: Geosyntec Contacts	Company Name:
		Address:
Email To: SCS Contacts	Purchase Order No.:	Pace Quote Reference:
Phone: Fax:	Project Name: Plant Bowen	Pace Project Manager: Kevin Herring
Requested Due Date/TAT: 10 Day	Project Number:	Pace Profile #: 2928-11

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER

☐ UST ☐ RCRA ☒ OTHER CCR

Site Location STATE: GA

Section D Required Client Information

Valid Matrix Codes

MATRIX	CODE
DRINKING WATER	DW
WATER	WT
WASTE WATER	WW
PRODUCT	P
SOIL/SOLID	SL
OIL	OL
WIPE	WP
AIR	AR
OTHER	OT
TISSUE	TS

SAMPLE ID
(A-Z, 0-9 / ,-)
Sample IDs MUST BE UNIQUE

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED DATE	COLLECTED TIME	COMPOSITE DATE	COMPOSITE TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Molybdenum by 6020	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	~~APPZ-2S~~								1			1							X		
2	~~APPZ-3S~~								1			1							X		
3	~~SW-1~~								1			1							X		
4	~~SW-2~~								1			1							X		
5	~~SW-3~~								1			1							X		
6	~~SW-4~~								1			1							X		
7	~~SW-5~~								1			1							X		
8	BGWA-33	WT	G	5/8/20	9:44				1			1							X		7.35
9	~~DUP-1~~								1			1							X		
10	FBL050820	WT	G	5/8/20	10:52				1			1							X		
11	EQBL050820	WT	G	5/8/20	10:57				1			1							X		
12																					

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
	William Lasker / Resolute	5/8/20	13:52	[signature]	5/8/20	1352	

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: William Lasker

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 5/8/20

Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)

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F-ALL-Q-020rev.07, 15-Feb-2007

Pace Analytical Services, LLC
110 Technology Parkway
Peachtree Corners, GA 30092
(770)734-4200

May 26, 2020

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

RE: Project: PLANT BOWEN
Pace Project No.: 2631746

Dear Joju Abraham:

Enclosed are the analytical results for sample(s) received by the laboratory on May 08, 2020. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

The test results provided in this final report were generated by each of the following laboratories within the Pace Network:

- Pace Analytical Services - Asheville
- Pace Analytical Services - Atlanta, GA

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: Kristen Jurinko
Whitney Law, Geosyntec Consultants
Noelia Muskus, Geosyntec Consultants
Lauren Petty, Southern Company Services, Inc.

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CERTIFICATIONS

Project: PLANT BOWEN
Pace Project No.: 2631746

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

Pace Analytical Services Asheville
2225 Riverside Drive, Asheville, NC 28804
Florida/NELAP Certification #: E87648
Massachusetts Certification #: M-NC030
North Carolina Drinking Water Certification #: 37712
North Carolina Wastewater Certification #: 40
South Carolina Certification #: 99030001
Virginia/VELAP Certification #: 460222

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SAMPLE SUMMARY

Project: PLANT BOWEN
Pace Project No.: 2631746

Lab ID	Sample ID	Matrix	Date Collected	Date Received
2631746001	**GPZ-2**	Water	05/07/20 14:52	05/08/20 13:52
2631746002	**GSB-3PZ**	Water	05/07/20 14:46	05/08/20 13:52
2631746003	**DUP-1**	Water	05/07/20 00:00	05/08/20 13:52
2631746004	**FBL050720**	Water	05/07/20 16:13	05/08/20 13:52
2631746005	**EQBL050720**	Water	05/07/20 16:20	05/08/20 13:52

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SAMPLE ANALYTE COUNT

Project: PLANT BOWEN
Pace Project No.: 2631746

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
2631746001	**GPZ-2**	EPA 6010D	DRB	5	PASI-GA
		EPA 6020B	DRB, KLH	2	PASI-GA
		SM 2320B-2011	ECH	2	PASI-A
		SM 4500-S2D-2011	LMS1	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	2	PASI-A
2631746002	**GSB-3PZ**	EPA 6010D	DRB	5	PASI-GA
		EPA 6020B	KLH	2	PASI-GA
		SM 2320B-2011	ECH	2	PASI-A
		SM 4500-S2D-2011	LMS1	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	2	PASI-A
2631746003	**DUP-1**	EPA 6010D	DRB	5	PASI-GA
		EPA 6020B	DRB, KLH	2	PASI-GA
		SM 2320B-2011	ECH	2	PASI-A
		SM 4500-S2D-2011	LMS1	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	2	PASI-A
2631746004	**FBL050720**	EPA 6010D	DRB	5	PASI-GA
		EPA 6020B	KLH	2	PASI-GA
		SM 2320B-2011	ECH	2	PASI-A
		SM 4500-S2D-2011	LMS1	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	2	PASI-A
2631746005	**EQBL050720**	EPA 6010D	DRB	5	PASI-GA
		EPA 6020B	KLH	2	PASI-GA
		SM 2320B-2011	ECH	2	PASI-A
		SM 4500-S2D-2011	LMS1	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	2	PASI-A

PASI-A = Pace Analytical Services - Asheville
PASI-GA = Pace Analytical Services - Atlanta, GA

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SUMMARY OF DETECTION

Project: PLANT BOWEN
Pace Project No.: 2631746

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
2631746001	**GPZ-2**					
	Field pH	9.61	Std. Units		05/08/20 16:11	
EPA 6010D	Calcium	559	mg/L	10.0	05/14/20 14:01	M6
EPA 6010D	Magnesium	2.4	mg/L	0.50	05/14/20 14:01	
EPA 6010D	Manganese	0.055	mg/L	0.040	05/13/20 12:04	
EPA 6010D	Potassium	80.3	mg/L	0.20	05/13/20 12:04	M1
EPA 6010D	Sodium	801	mg/L	10.0	05/14/20 14:01	M6
EPA 6020B	Boron	16.9	mg/L	1.0	05/15/20 13:11	M6
EPA 6020B	Iron	0.11	mg/L	0.040	05/13/20 17:20	
SM 2320B-2011	Alkalinity, Total as CaCO3	80.2	mg/L	5.0	05/19/20 14:51	
EPA 300.0 Rev 2.1 1993	Chloride	89.8	mg/L	1.0	05/14/20 17:16	
EPA 300.0 Rev 2.1 1993	Sulfate	2810	mg/L	53.0	05/14/20 21:56	
2631746002	**GSB-3PZ**					
	Field pH	8.43	Std. Units		05/08/20 16:11	
EPA 6010D	Calcium	643	mg/L	10.0	05/14/20 14:27	
EPA 6010D	Magnesium	18.9	mg/L	0.50	05/14/20 14:27	
EPA 6010D	Manganese	3.4	mg/L	0.040	05/13/20 12:21	
EPA 6010D	Potassium	36.8	mg/L	0.20	05/13/20 12:21	
EPA 6010D	Sodium	72.2	mg/L	1.0	05/13/20 12:21	
EPA 6020B	Boron	6.6	mg/L	0.10	05/13/20 17:43	
EPA 6020B	Iron	0.13	mg/L	0.040	05/13/20 17:43	
SM 2320B-2011	Alkalinity,Bicarbonate (CaCO3)	40.3	mg/L	5.0	05/19/20 15:07	
SM 2320B-2011	Alkalinity, Total as CaCO3	40.3	mg/L	5.0	05/19/20 15:07	
EPA 300.0 Rev 2.1 1993	Chloride	52.3	mg/L	1.0	05/14/20 17:30	
EPA 300.0 Rev 2.1 1993	Sulfate	1640	mg/L	32.0	05/14/20 22:46	
2631746003	**DUP-1**					
EPA 6010D	Calcium	567	mg/L	10.0	05/14/20 14:31	
EPA 6010D	Magnesium	2.2	mg/L	0.50	05/14/20 14:31	
EPA 6010D	Manganese	0.057	mg/L	0.040	05/13/20 12:25	
EPA 6010D	Potassium	80.4	mg/L	0.20	05/13/20 12:25	
EPA 6010D	Sodium	826	mg/L	10.0	05/14/20 14:31	
EPA 6020B	Boron	16.9	mg/L	1.0	05/15/20 13:28	
EPA 6020B	Iron	0.096	mg/L	0.040	05/13/20 17:48	
SM 2320B-2011	Alkalinity, Total as CaCO3	80.8	mg/L	5.0	05/19/20 15:13	
EPA 300.0 Rev 2.1 1993	Chloride	90.0	mg/L	1.0	05/14/20 17:45	
EPA 300.0 Rev 2.1 1993	Sulfate	2830	mg/L	53.0	05/14/20 23:06	
2631746004	**FBL050720**					
EPA 6010D	Calcium	0.24J	mg/L	1.0	05/13/20 12:29	
EPA 6010D	Potassium	0.42	mg/L	0.20	05/13/20 12:29	
EPA 6010D	Sodium	0.80J	mg/L	1.0	05/13/20 12:29	
EPA 6020B	Boron	0.046J	mg/L	0.10	05/13/20 18:00	
2631746005	**EQBL050720**					
EPA 6010D	Potassium	0.23	mg/L	0.20	05/13/20 12:33	B
EPA 6010D	Sodium	0.46J	mg/L	1.0	05/13/20 12:33	
EPA 6020B	Boron	0.014J	mg/L	0.10	05/13/20 18:17	

REPORT OF LABORATORY ANALYSIS

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110 Technology Parkway
Peachtree Corners, GA 30092
(770)734-4200

ANALYTICAL RESULTS

Project: PLANT BOWEN
Pace Project No.: 2631746

Sample: GPZ-2 **Lab ID: 2631746001** Collected: 05/07/20 14:52 Received: 05/08/20 13:52 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
Field Data	Analytical Method: Pace Analytical Services - Atlanta, GA								
Field pH	**9.61**	Std. Units			1		05/08/20 16:11		
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Atlanta, GA								
Calcium	**559**	mg/L	10.0	1.4	10	05/11/20 18:32	05/14/20 14:01	7440-70-2	M6
Magnesium	**2.4**	mg/L	0.50	0.11	10	05/11/20 18:32	05/14/20 14:01	7439-95-4	
Manganese	**0.055**	mg/L	0.040	0.0061	1	05/11/20 18:32	05/13/20 12:04	7439-96-5	
Potassium	**80.3**	mg/L	0.20	0.026	1	05/11/20 18:32	05/13/20 12:04	7440-09-7	M1
Sodium	**801**	mg/L	10.0	1.9	10	05/11/20 18:32	05/14/20 14:01	7440-23-5	M6
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3005A Pace Analytical Services - Atlanta, GA								
Boron	**16.9**	mg/L	1.0	0.049	10	05/12/20 14:14	05/15/20 13:11	7440-42-8	M6
Iron	**0.11**	mg/L	0.040	0.0097	1	05/12/20 14:14	05/13/20 17:20	7439-89-6	
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	ND	mg/L	5.0	5.0	1		05/19/20 14:51		
Alkalinity, Total as CaCO3	**80.2**	mg/L	5.0	5.0	1		05/19/20 14:51		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	ND	mg/L	0.10	0.050	1		05/14/20 21:48	18496-25-8	M1
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**89.8**	mg/L	1.0	0.60	1		05/14/20 17:16	16887-00-6	
Sulfate	**2810**	mg/L	53.0	26.5	53		05/14/20 21:56	14808-79-8	

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ANALYTICAL RESULTS

Project: PLANT BOWEN
Pace Project No.: 2631746

Sample: GSB-3PZ **Lab ID: 2631746002** Collected: 05/07/20 14:46 Received: 05/08/20 13:52 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
Field Data	Analytical Method: Pace Analytical Services - Atlanta, GA								
Field pH	**8.43**	Std. Units			1		05/08/20 16:11		
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Atlanta, GA								
Calcium	**643**	mg/L	10.0	1.4	10	05/11/20 18:32	05/14/20 14:27	7440-70-2	
Magnesium	**18.9**	mg/L	0.50	0.11	10	05/11/20 18:32	05/14/20 14:27	7439-95-4	
Manganese	**3.4**	mg/L	0.040	0.0061	1	05/11/20 18:32	05/13/20 12:21	7439-96-5	
Potassium	**36.8**	mg/L	0.20	0.026	1	05/11/20 18:32	05/13/20 12:21	7440-09-7	
Sodium	**72.2**	mg/L	1.0	0.19	1	05/11/20 18:32	05/13/20 12:21	7440-23-5	
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3005A Pace Analytical Services - Atlanta, GA								
Boron	**6.6**	mg/L	0.10	0.0049	1	05/12/20 14:14	05/13/20 17:43	7440-42-8	
Iron	**0.13**	mg/L	0.040	0.0097	1	05/12/20 14:14	05/13/20 17:43	7439-89-6	
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**40.3**	mg/L	5.0	5.0	1		05/19/20 15:07		
Alkalinity, Total as CaCO3	**40.3**	mg/L	5.0	5.0	1		05/19/20 15:07		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	ND	mg/L	0.10	0.050	1		05/14/20 21:49	18496-25-8	M1
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**52.3**	mg/L	1.0	0.60	1		05/14/20 17:30	16887-00-6	
Sulfate	**1640**	mg/L	32.0	16.0	32		05/14/20 22:46	14808-79-8	

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ANALYTICAL RESULTS

Project: PLANT BOWEN
Pace Project No.: 2631746

Sample: DUP-1 **Lab ID: 2631746003** Collected: 05/07/20 00:00 Received: 05/08/20 13:52 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Atlanta, GA								
Calcium	**567**	mg/L	10.0	1.4	10	05/11/20 18:32	05/14/20 14:31	7440-70-2	
Magnesium	**2.2**	mg/L	0.50	0.11	10	05/11/20 18:32	05/14/20 14:31	7439-95-4	
Manganese	**0.057**	mg/L	0.040	0.0061	1	05/11/20 18:32	05/13/20 12:25	7439-96-5	
Potassium	**80.4**	mg/L	0.20	0.026	1	05/11/20 18:32	05/13/20 12:25	7440-09-7	
Sodium	**826**	mg/L	10.0	1.9	10	05/11/20 18:32	05/14/20 14:31	7440-23-5	
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3005A Pace Analytical Services - Atlanta, GA								
Boron	**16.9**	mg/L	1.0	0.049	10	05/12/20 14:14	05/15/20 13:28	7440-42-8	
Iron	**0.096**	mg/L	0.040	0.0097	1	05/12/20 14:14	05/13/20 17:48	7439-89-6	
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	ND	mg/L	5.0	5.0	1		05/19/20 15:13		
Alkalinity, Total as CaCO3	**80.8**	mg/L	5.0	5.0	1		05/19/20 15:13		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	ND	mg/L	0.10	0.050	1		05/14/20 21:50	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**90.0**	mg/L	1.0	0.60	1		05/14/20 17:45	16887-00-6	
Sulfate	**2830**	mg/L	53.0	26.5	53		05/14/20 23:06	14808-79-8	

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ANALYTICAL RESULTS

Project: PLANT BOWEN
Pace Project No.: 2631746

Sample: FBL050720 **Lab ID: 2631746004** Collected: 05/07/20 16:13 Received: 05/08/20 13:52 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Atlanta, GA								
Calcium	**0.24J**	mg/L	1.0	0.14	1	05/11/20 18:32	05/13/20 12:29	7440-70-2	
Magnesium	ND	mg/L	0.050	0.011	1	05/11/20 18:32	05/13/20 12:29	7439-95-4	
Manganese	ND	mg/L	0.040	0.0061	1	05/11/20 18:32	05/13/20 12:29	7439-96-5	
Potassium	**0.42**	mg/L	0.20	0.026	1	05/11/20 18:32	05/13/20 12:29	7440-09-7	
Sodium	**0.80J**	mg/L	1.0	0.19	1	05/11/20 18:32	05/13/20 12:29	7440-23-5	
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3005A Pace Analytical Services - Atlanta, GA								
Boron	**0.046J**	mg/L	0.10	0.0049	1	05/12/20 14:14	05/13/20 18:00	7440-42-8	
Iron	ND	mg/L	0.040	0.0097	1	05/12/20 14:14	05/13/20 18:00	7439-89-6	
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	ND	mg/L	5.0	5.0	1		05/19/20 15:34		
Alkalinity, Total as CaCO3	ND	mg/L	5.0	5.0	1		05/19/20 15:34		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	ND	mg/L	0.10	0.050	1		05/14/20 21:50	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	ND	mg/L	1.0	0.60	1		05/14/20 18:00	16887-00-6	
Sulfate	ND	mg/L	1.0	0.50	1		05/14/20 18:00	14808-79-8	

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ANALYTICAL RESULTS

Project: PLANT BOWEN
Pace Project No.: 2631746

Sample: EQBL050720 **Lab ID: 2631746005** Collected: 05/07/20 16:20 Received: 05/08/20 13:52 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Atlanta, GA								
Calcium	ND	mg/L	1.0	0.14	1	05/11/20 18:32	05/13/20 12:33	7440-70-2	
Magnesium	ND	mg/L	0.050	0.011	1	05/11/20 18:32	05/13/20 12:33	7439-95-4	
Manganese	ND	mg/L	0.040	0.0061	1	05/11/20 18:32	05/13/20 12:33	7439-96-5	
Potassium	**0.23**	mg/L	0.20	0.026	1	05/11/20 18:32	05/13/20 12:33	7440-09-7	B
Sodium	**0.46J**	mg/L	1.0	0.19	1	05/11/20 18:32	05/13/20 12:33	7440-23-5	
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3005A Pace Analytical Services - Atlanta, GA								
Boron	**0.014J**	mg/L	0.10	0.0049	1	05/12/20 14:14	05/13/20 18:17	7440-42-8	
Iron	ND	mg/L	0.040	0.0097	1	05/12/20 14:14	05/13/20 18:17	7439-89-6	
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	ND	mg/L	5.0	5.0	1		05/19/20 15:37		
Alkalinity, Total as CaCO3	ND	mg/L	5.0	5.0	1		05/19/20 15:37		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	ND	mg/L	0.10	0.050	1		05/14/20 21:51	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	ND	mg/L	1.0	0.60	1		05/14/20 18:15	16887-00-6	
Sulfate	ND	mg/L	1.0	0.50	1		05/14/20 18:15	14808-79-8	

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QUALITY CONTROL DATA

Project: PLANT BOWEN
Pace Project No.: 2631746

QC Batch: 46265
QC Batch Method: EPA 3010A
Analysis Method: EPA 6010D
Analysis Description: 6010D MET
Laboratory: Pace Analytical Services - Atlanta, GA
Associated Lab Samples: 2631746001, 2631746002, 2631746003, 2631746004, 2631746005

METHOD BLANK: 214652 Matrix: Water
Associated Lab Samples: 2631746001, 2631746002, 2631746003, 2631746004, 2631746005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Calcium	mg/L	ND	1.0	0.14	05/13/20 11:16	
Magnesium	mg/L	ND	0.050	0.011	05/13/20 11:16	
Manganese	mg/L	ND	0.040	0.0061	05/13/20 11:16	
Potassium	mg/L	0.033J	0.20	0.026	05/13/20 11:16	
Sodium	mg/L	ND	1.0	0.19	05/13/20 11:16	

LABORATORY CONTROL SAMPLE: 214653

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium	mg/L	1	0.97J	97	80-120	
Magnesium	mg/L	1	0.96	96	80-120	
Manganese	mg/L	1	0.95	95	80-120	
Potassium	mg/L	1	1.0	102	80-120	
Sodium	mg/L	1	1.0	102	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 214654 214655

Parameter	Units	2631746001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium	mg/L	559	1	1	551	552	-712	-664	75-125	0	20	M6
Magnesium	mg/L	2.4	1	1	3.2	3.1	81	79	75-125	1	20	
Manganese	mg/L	0.055	1	1	0.99	0.99	93	93	75-125	0	20	
Potassium	mg/L	80.3	1	1	80.5	81.1	24	83	75-125	1	20	M1
Sodium	mg/L	801	1	1	798	812	-378	1080	75-125	2	20	M6

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QUALITY CONTROL DATA

Project: PLANT BOWEN
Pace Project No.: 2631746

QC Batch: 46296
QC Batch Method: EPA 3005A
Analysis Method: EPA 6020B
Analysis Description: 6020B MET
Laboratory: Pace Analytical Services - Atlanta, GA
Associated Lab Samples: 2631746001, 2631746002, 2631746003, 2631746004, 2631746005

METHOD BLANK: 214789 Matrix: Water
Associated Lab Samples: 2631746001, 2631746002, 2631746003, 2631746004, 2631746005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Boron	mg/L	ND	0.10	0.0049	05/13/20 17:08	
Iron	mg/L	ND	0.040	0.0097	05/13/20 17:08	

LABORATORY CONTROL SAMPLE: 214790

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Boron	mg/L	1	1.0	104	80-120	
Iron	mg/L	1	1.0	102	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 214791 214792

Parameter	Units	2631746001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Boron	mg/L	16.9	1	1	18.7	17.9	183	105	75-125	4	20	M6
Iron	mg/L	0.11	1	1	1.0	1.0	92	92	75-125	0	20	

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QUALITY CONTROL DATA

Project: PLANT BOWEN
Pace Project No.: 2631746

QC Batch: 542080
QC Batch Method: SM 2320B-2011
Analysis Method: SM 2320B-2011
Analysis Description: 2320B Alkalinity
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 2631746001, 2631746002, 2631746003, 2631746004, 2631746005

METHOD BLANK: 2888457 Matrix: Water
Associated Lab Samples: 2631746001, 2631746002, 2631746003, 2631746004, 2631746005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	ND	5.0	5.0	05/19/20 12:58	
Alkalinity,Bicarbonate (CaCO3)	mg/L	ND	5.0	5.0	05/19/20 12:58	

LABORATORY CONTROL SAMPLE: 2888458

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	50	51.2	102	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2888459 2888460

Parameter	Units	92477758001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	81.5	50	50	137	137	110	111	80-120	0	25	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2888461 2888462

Parameter	Units	92477758002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	71.0	50	50	122	121	102	100	80-120	1	25	

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QUALITY CONTROL DATA

Project: PLANT BOWEN
Pace Project No.: 2631746

QC Batch: 541618
QC Batch Method: SM 4500-S2D-2011
Analysis Method: SM 4500-S2D-2011
Analysis Description: 4500S2D Sulfide Water
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 2631746001, 2631746002, 2631746003, 2631746004, 2631746005

METHOD BLANK: 2886143 Matrix: Water
Associated Lab Samples: 2631746001, 2631746002, 2631746003, 2631746004, 2631746005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Sulfide	mg/L	ND	0.10	0.050	05/14/20 21:48	

LABORATORY CONTROL SAMPLE: 2886144

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfide	mg/L	0.5	0.51	101	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2886145 2886146

Parameter	Units	2631746001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfide	mg/L	ND	0.5	0.5	0.35	0.35	71	70	80-120	0	10	M1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2886147 2886148

Parameter	Units	2631746002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfide	mg/L	ND	0.5	0.5	0.30	0.30	57	58	80-120	1	10	M1

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QUALITY CONTROL DATA

Project: PLANT BOWEN
Pace Project No.: 2631746

QC Batch: 541454
QC Batch Method: EPA 300.0 Rev 2.1 1993
Analysis Method: EPA 300.0 Rev 2.1 1993
Analysis Description: 300.0 IC Anions
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 2631746001, 2631746002, 2631746003, 2631746004, 2631746005

METHOD BLANK: 2885445 Matrix: Water
Associated Lab Samples: 2631746001, 2631746002, 2631746003, 2631746004, 2631746005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	ND	1.0	0.60	05/14/20 11:35	
Sulfate	mg/L	ND	1.0	0.50	05/14/20 11:35	

LABORATORY CONTROL SAMPLE: 2885446

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	50	54.0	108	90-110	
Sulfate	mg/L	50	54.5	109	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2885447 2885448

Parameter	Units	92477073004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	8.7	50	50	61.6	61.4	106	105	90-110	0	10	
Sulfate	mg/L	2700	50	50	58.5	57.6	112	110	90-110	2	10	M1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2885449 2885450

Parameter	Units	2631748009 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	4.3	50	50	57.7	58.0	107	107	90-110	0	10	
Sulfate	mg/L	24.2	50	50	77.6	77.9	107	107	90-110	0	10	

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QUALIFIERS

Project: PLANT BOWEN
Pace Project No.: 2631746

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.

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

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110 Technology Parkway
Peachtree Corners, GA 30092
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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: PLANT BOWEN
Pace Project No.: 2631746

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
2631746001	**GPZ-2**				
2631746002	**GSB-3PZ**				
2631746001	**GPZ-2**	EPA 3010A	46265	EPA 6010D	46269
2631746002	**GSB-3PZ**	EPA 3010A	46265	EPA 6010D	46269
2631746003	**DUP-1**	EPA 3010A	46265	EPA 6010D	46269
2631746004	**FBL050720**	EPA 3010A	46265	EPA 6010D	46269
2631746005	**EQBL050720**	EPA 3010A	46265	EPA 6010D	46269
2631746001	**GPZ-2**	EPA 3005A	46296	EPA 6020B	46297
2631746002	**GSB-3PZ**	EPA 3005A	46296	EPA 6020B	46297
2631746003	**DUP-1**	EPA 3005A	46296	EPA 6020B	46297
2631746004	**FBL050720**	EPA 3005A	46296	EPA 6020B	46297
2631746005	**EQBL050720**	EPA 3005A	46296	EPA 6020B	46297
2631746001	**GPZ-2**	SM 2320B-2011	542080		
2631746002	**GSB-3PZ**	SM 2320B-2011	542080		
2631746003	**DUP-1**	SM 2320B-2011	542080		
2631746004	**FBL050720**	SM 2320B-2011	542080		
2631746005	**EQBL050720**	SM 2320B-2011	542080		
2631746001	**GPZ-2**	SM 4500-S2D-2011	541618		
2631746002	**GSB-3PZ**	SM 4500-S2D-2011	541618		
2631746003	**DUP-1**	SM 4500-S2D-2011	541618		
2631746004	**FBL050720**	SM 4500-S2D-2011	541618		
2631746005	**EQBL050720**	SM 4500-S2D-2011	541618		
2631746001	**GPZ-2**	EPA 300.0 Rev 2.1 1993	541454		
2631746002	**GSB-3PZ**	EPA 300.0 Rev 2.1 1993	541454		
2631746003	**DUP-1**	EPA 300.0 Rev 2.1 1993	541454		
2631746004	**FBL050720**	EPA 300.0 Rev 2.1 1993	541454		
2631746005	**EQBL050720**	EPA 300.0 Rev 2.1 1993	541454		

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: 1 of 1

Section A Required Client Information:

Company:	GA Power
Address:	Atlanta, GA
Email To:	SCS Contacts
Phone:	Fax:
Requested Due Date/TAT:	10 Day

Section B Required Project Information:

Report To:	SCS Contacts
Copy To:	Geosyntec Contacts
Purchase Order No.:	
Project Name:	Plant Bowen
Project Number:	

Section C Invoice Information:

Attention:	Southern Co.
Company Name:	
Address:	
Pace Quote Reference:	
Pace Project Manager:	Kevin Herring
Pace Profile #:	2928-9

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☑ OTHER CCR

Site Location STATE: GA

Section D Required Client Information

Valid Matrix Codes

MATRIX	CODE
DRINKING WATER	DW
WATER	WT
WASTE WATER	WW
PRODUCT	P
SOIL/SOLID	SL
OIL	OL
WIPE	WP
AIR	AR
OTHER	OT
TISSUE	TS

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED DATE	COLLECTED TIME	COMPOSITE DATE	COMPOSITE TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Chloride/Sulfate	Metals 6010/6020	Alkalinity & BiCarb	Sulfide	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	GPZ-2	WT	G	5/7/20	1452				4	2		1					1		X	X	X	X		9.61
2	GSB-3PZ	WT	G	5/7/20	1446				4	2		1					1		X	X	X	X		8.43
3	DUP-1	WT	G	5/7/20	—				4	2		1					1		X	X	X	X		
4	FBL050720	WT	G	5/7/20	1613				4	2		1					1		X	X	X	X		
5	EQBL050720	WT	G	5/7/20	1620				4	2		1					1		X	X	X	X		
6																								
7																								
8																								
9																								
10																								
11																								
12																								

2631746

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
	William Laaker / Resolute	5/8/20	13:52	[signature] / Pace	5/8/20	1352	
*Metals=B,Ca,Mg,Mn,K,Na,Fe							

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Kevin Stephenson / Will Laaker

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 5/7/20

Temp in °C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

F-ALL-Q-020rev.07, 15-Feb-2007

Pace Analytical	Document Name: Bottle Identification Form (BIF)	Document Issued: March 14, 2019 Page 1 of 1
	Document No.: F-CAR-CS-043-Rev.00	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.

Exceptions: VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC, LLHg

**Bottom half of box is to list number of bottle

Project #

Matrix	Item#	BP4U-125 mL Plastic Unpreserved (N/A) (CI-)	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) (CI-)	BP3N-250 mL plastic HNO3 (pH < 2)	BP4Z-125 mL Plastic ZN Acetate & NaOH (>9)	BP4C-125 mL Plastic NaOH (pH > 12) (CI-)	WGFU-Wide-mouthed Glass jar Unpreserved	AG1U-1 liter Amber Unpreserved (N/A) (CI-)	AG1H-1 liter Amber HCl (pH < 2)	AG3U-250 mL Amber Unpreserved (N/A) (CI-)	AG1S-1 liter Amber H2SO4 (pH < 2)	AG3S-250 mL Amber H2SO4 (pH < 2)	AG3A(DG3A)-250 mL Amber NH4Cl (N/A)(CI-)	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)	BP1N	BP3A-250 mL Plastic (NH2)2SO4 (9.3-9.7)	AG0U-100 mL Amber Unpreserved vials (N/A)	VSGU-20 mL Scintillation vials (N/A)
Brad	1		2				1	1																	2			
	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 #
2.						

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. Out of hold, incorrect preservative, out of temp, incorrect containers.

Pace Analytical Services, LLC
110 Technology Parkway
Peachtree Corners, GA 30092
(770)734-4200

September 22, 2020

Joju Abraham
Georgia Power-CCR
2480 Maner Road
Atlanta, GA 30339

RE: Project: BOWEN AP-1 BACKGROUND
Pace Project No.: 92494194

Dear Joju Abraham:

Enclosed are the analytical results for sample(s) received by the laboratory on September 04, 2020. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

The test results provided in this final report were generated by each of the following laboratories within the Pace Network:

- Pace Analytical Services - Asheville
- Pace Analytical Services - Charlotte
- Pace Analytical Services - Peachtree Corners, GA

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

Sincerely,

Kevin Herring
kevin.herring@pacelabs.com
1(704)875-9092
HORIZON Database Administrator

Enclosures

cc: Christine Hug, Geosyntec Consultants, Inc.
Kristen Jurinko
Thomas Kessler, Geosyntec
Whitney Law, Geosyntec Consultants
Noelia Muskus, Geosyntec Consultants
Ms. Lauren Petty, Southern Co. Services
Nardos Tilahun, GeoSyntec
Dawit Yifru, Geosyntec Consultants, Inc.

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CERTIFICATIONS

Project: BOWEN AP-1 BACKGROUND
Pace Project No.: 92494194

Pace Analytical Services Charlotte
9800 Kincey Ave. Ste 100, Huntersville, NC 28078
Louisiana/NELAP Certification # LA170028
North Carolina Drinking Water Certification #: 37706
North Carolina Field Services Certification #: 5342
North Carolina Wastewater Certification #: 12
South Carolina Certification #: 99006001
Florida/NELAP Certification #: E87627
Kentucky UST Certification #: 84
Virginia/VELAP Certification #: 460221

Pace Analytical Services Asheville
2225 Riverside Drive, Asheville, NC 28804
Florida/NELAP Certification #: E87648
Massachusetts Certification #: M-NC030
North Carolina Drinking Water Certification #: 37712
North Carolina Wastewater Certification #: 40
South Carolina Certification #: 99030001
Virginia/VELAP Certification #: 460222

Pace Analytical Services Peachtree Corners
110 Technology Pkwy, 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: BOWEN AP-1 BACKGROUND
Pace Project No.: 92494194

Lab ID	Sample ID	Matrix	Date Collected	Date Received
92494194001	**BGWC-14A**	Water	09/02/20 10:33	09/04/20 11:20
92494194002	**BGWA-47D**	Water	09/02/20 16:01	09/04/20 11:20
92494194003	**FBL090220**	Water	09/02/20 15:58	09/04/20 11:20
92494194004	**EQBL090220**	Water	09/02/20 16:10	09/04/20 11:20
92494194005	**DUP-1**	Water	09/02/20 00:00	09/04/20 11:20
92494194006	**BGWA-48D**	Water	09/03/20 13:38	09/04/20 11:20
92494194007	**FBL090320**	Water	09/03/20 15:50	09/04/20 11:20
92494194008	**EQBL090320**	Water	09/03/20 15:56	09/04/20 11:20

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SAMPLE ANALYTE COUNT

Project: BOWEN AP-1 BACKGROUND
Pace Project No.: 92494194

Lab ID	Sample ID	Method	Analysts	Analytes Reported
92494194001	**BGWC-14A**	EPA 6010D	DRB	1
		EPA 6020B	CW1	13
		EPA 7470A	VB	1
		SM 2450C-2011	JRS	1
		EPA 300.0 Rev 2.1 1993	BRJ	3
92494194002	**BGWA-47D**	EPA 6010D	DRB	1
		EPA 6020B	CW1	13
		EPA 7470A	VB	1
		SM 2450C-2011	JRS	1
		EPA 300.0 Rev 2.1 1993	BRJ	3
92494194003	**FBL090220**	EPA 6010D	DRB	1
		EPA 6020B	CW1	13
		EPA 7470A	VB	1
		SM 2450C-2011	JRS	1
		EPA 300.0 Rev 2.1 1993	BRJ	3
92494194004	**EQBL090220**	EPA 6010D	DRB	1
		EPA 6020B	CW1	13
		EPA 7470A	VB	1
		SM 2450C-2011	JRS	1
		EPA 300.0 Rev 2.1 1993	BRJ	3
92494194005	**DUP-1**	EPA 6010D	DRB	1
		EPA 6020B	CW1	13
		EPA 7470A	VB	1
		SM 2450C-2011	JRS	1
		EPA 300.0 Rev 2.1 1993	BRJ	3
92494194006	**BGWA-48D**	EPA 6010D	DRB	1
		EPA 6020B	CW1	13
		EPA 7470A	VB	1
		SM 2450C-2011	AW1	1
		EPA 300.0 Rev 2.1 1993	BRJ	3
92494194007	**FBL090320**	EPA 6010D	DRB	1
		EPA 6020B	CW1	13
		EPA 7470A	VB	1
		SM 2450C-2011	AW1	1
		EPA 300.0 Rev 2.1 1993	BRJ	3
92494194008	**EQBL090320**	EPA 6010D	DRB	1
		EPA 6020B	CW1	13

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SAMPLE ANALYTE COUNT

Project: BOWEN AP-1 BACKGROUND
Pace Project No.: 92494194

Lab ID	Sample ID	Method	Analysts	Analytes Reported
		EPA 7470A	VB	1
		SM 2450C-2011	AW1	1
		EPA 300.0 Rev 2.1 1993	BRJ	3

PASI-A = Pace Analytical Services - Asheville
PASI-C = Pace Analytical Services - Charlotte
PASI-GA = Pace Analytical Services - Peachtree Corners, GA

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SUMMARY OF DETECTION

Project: BOWEN AP-1 BACKGROUND
Pace Project No.: 92494194

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92494194001	**BGWC-14A**					
	pH	6.97	Std. Units		09/10/20 09:25	
EPA 6010D	Calcium	159	mg/L	1.0	09/08/20 23:19	
EPA 6020B	Barium	0.040	mg/L	0.010	09/09/20 19:56	
EPA 6020B	Boron	1.1	mg/L	0.10	09/09/20 19:56	
EPA 6020B	Cadmium	0.00014J	mg/L	0.0025	09/09/20 19:56	
EPA 6020B	Cobalt	0.0010J	mg/L	0.0050	09/09/20 19:56	
EPA 6020B	Lithium	0.00095J	mg/L	0.030	09/09/20 19:56	
EPA 6020B	Molybdenum	0.0013J	mg/L	0.010	09/09/20 19:56	
EPA 6020B	Thallium	0.00035J	mg/L	0.0010	09/09/20 19:56	
SM 2450C-2011	Total Dissolved Solids	814	mg/L	10.0	09/04/20 17:57	
EPA 300.0 Rev 2.1 1993	Chloride	18.9	mg/L	1.0	09/09/20 06:56	
EPA 300.0 Rev 2.1 1993	Fluoride	0.061J	mg/L	0.10	09/09/20 06:56	
EPA 300.0 Rev 2.1 1993	Sulfate	360	mg/L	7.0	09/09/20 14:15	
92494194002	**BGWA-47D**					
	pH	6.95	Std. Units		09/10/20 09:25	
EPA 6010D	Calcium	109	mg/L	1.0	09/08/20 23:23	
EPA 6020B	Antimony	0.00082J	mg/L	0.0030	09/09/20 20:02	
EPA 6020B	Barium	0.058	mg/L	0.010	09/09/20 20:02	
EPA 6020B	Boron	0.022J	mg/L	0.10	09/09/20 20:02	
EPA 6020B	Lead	0.000074J	mg/L	0.0050	09/09/20 20:02	
SM 2450C-2011	Total Dissolved Solids	389	mg/L	10.0	09/04/20 17:57	
EPA 300.0 Rev 2.1 1993	Chloride	6.0	mg/L	1.0	09/09/20 07:10	
EPA 300.0 Rev 2.1 1993	Sulfate	70.2	mg/L	1.0	09/09/20 07:10	
92494194005	**DUP-1**					
EPA 6010D	Calcium	163	mg/L	1.0	09/08/20 23:44	
EPA 6020B	Barium	0.041	mg/L	0.010	09/09/20 20:30	
EPA 6020B	Boron	1.1	mg/L	0.10	09/09/20 20:30	
EPA 6020B	Cadmium	0.00018J	mg/L	0.0025	09/09/20 20:30	
EPA 6020B	Cobalt	0.0011J	mg/L	0.0050	09/09/20 20:30	
EPA 6020B	Lithium	0.00091J	mg/L	0.030	09/09/20 20:30	
EPA 6020B	Molybdenum	0.0014J	mg/L	0.010	09/09/20 20:30	
EPA 6020B	Thallium	0.00036J	mg/L	0.0010	09/09/20 20:30	
SM 2450C-2011	Total Dissolved Solids	816	mg/L	10.0	09/04/20 17:59	
EPA 300.0 Rev 2.1 1993	Chloride	18.8	mg/L	1.0	09/09/20 07:23	
EPA 300.0 Rev 2.1 1993	Fluoride	0.053J	mg/L	0.10	09/09/20 07:23	
EPA 300.0 Rev 2.1 1993	Sulfate	360	mg/L	7.0	09/09/20 14:30	
92494194006	**BGWA-48D**					
	pH	7.35	Std. Units		09/10/20 09:25	
EPA 6010D	Calcium	51.8	mg/L	1.0	09/09/20 18:23	M1
EPA 6020B	Antimony	0.0023J	mg/L	0.0030	09/09/20 20:36	
EPA 6020B	Arsenic	0.0018J	mg/L	0.0050	09/09/20 20:36	
EPA 6020B	Barium	0.067	mg/L	0.010	09/09/20 20:36	
EPA 6020B	Boron	0.022J	mg/L	0.10	09/09/20 20:36	
EPA 6020B	Lead	0.000038J	mg/L	0.0050	09/09/20 20:36	
EPA 6020B	Lithium	0.0014J	mg/L	0.030	09/09/20 20:36	
EPA 6020B	Molybdenum	0.0074J	mg/L	0.010	09/09/20 20:36	

REPORT OF LABORATORY ANALYSIS

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110 Technology Parkway
Peachtree Corners, GA 30092
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SUMMARY OF DETECTION

Project: BOWEN AP-1 BACKGROUND
Pace Project No.: 92494194

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92494194006	**BGWA-48D**					
SM 2450C-2011	Total Dissolved Solids	303	mg/L	10.0	09/09/20 17:15	
EPA 300.0 Rev 2.1 1993	Chloride	6.3	mg/L	1.0	09/09/20 07:37	
EPA 300.0 Rev 2.1 1993	Fluoride	0.11	mg/L	0.10	09/09/20 07:37	
EPA 300.0 Rev 2.1 1993	Sulfate	24.4	mg/L	1.0	09/09/20 07:37	
92494194008	**EQBL090320**					
EPA 7470A	Mercury	0.00012J	mg/L	0.00050	09/09/20 10:16	

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Peachtree Corners, GA 30092
(770)734-4200

ANALYTICAL RESULTS

Project: BOWEN AP-1 BACKGROUND
Pace Project No.: 92494194

Sample: BGWC-14A **Lab ID: 92494194001** Collected: 09/02/20 10:33 Received: 09/04/20 11:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
Field Data	Analytical Method: Pace Analytical Services - Charlotte								
pH	**6.97**	Std. Units			1		09/10/20 09:25		
6010D ATL ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Peachtree Corners, GA								
Calcium	**159**	mg/L	1.0	0.070	1	09/08/20 13:08	09/08/20 23:19	7440-70-2	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3005A Pace Analytical Services - Peachtree Corners, GA								
Antimony	ND	mg/L	0.0030	0.00028	1	09/08/20 20:13	09/09/20 19:56	7440-36-0	
Arsenic	ND	mg/L	0.0050	0.00078	1	09/08/20 20:13	09/09/20 19:56	7440-38-2	
Barium	**0.040**	mg/L	0.010	0.00071	1	09/08/20 20:13	09/09/20 19:56	7440-39-3	
Beryllium	ND	mg/L	0.0030	0.000046	1	09/08/20 20:13	09/09/20 19:56	7440-41-7	
Boron	**1.1**	mg/L	0.10	0.0052	1	09/08/20 20:13	09/09/20 19:56	7440-42-8	
Cadmium	**0.00014J**	mg/L	0.0025	0.00012	1	09/08/20 20:13	09/09/20 19:56	7440-43-9	
Chromium	ND	mg/L	0.010	0.00055	1	09/08/20 20:13	09/09/20 19:56	7440-47-3	
Cobalt	**0.0010J**	mg/L	0.0050	0.00038	1	09/08/20 20:13	09/09/20 19:56	7440-48-4	
Lead	ND	mg/L	0.0050	0.000036	1	09/08/20 20:13	09/09/20 19:56	7439-92-1	
Lithium	**0.00095J**	mg/L	0.030	0.00081	1	09/08/20 20:13	09/09/20 19:56	7439-93-2	
Molybdenum	**0.0013J**	mg/L	0.010	0.00069	1	09/08/20 20:13	09/09/20 19:56	7439-98-7	
Selenium	ND	mg/L	0.010	0.0016	1	09/08/20 20:13	09/09/20 19:56	7782-49-2	
Thallium	**0.00035J**	mg/L	0.0010	0.00014	1	09/08/20 20:13	09/09/20 19:56	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Peachtree Corners, GA								
Mercury	ND	mg/L	0.00050	0.000078	1	09/08/20 11:15	09/09/20 09:55	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2450C-2011 Pace Analytical Services - Peachtree Corners, GA								
Total Dissolved Solids	**814**	mg/L	10.0	10.0	1		09/04/20 17:57		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**18.9**	mg/L	1.0	0.60	1		09/09/20 06:56	16887-00-6	
Fluoride	**0.061J**	mg/L	0.10	0.050	1		09/09/20 06:56	16984-48-8	
Sulfate	**360**	mg/L	7.0	3.5	7		09/09/20 14:15	14808-79-8	

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Peachtree Corners, GA 30092
(770)734-4200

ANALYTICAL RESULTS

Project: BOWEN AP-1 BACKGROUND
Pace Project No.: 92494194

Sample: BGWA-47D **Lab ID: 92494194002** Collected: 09/02/20 16:01 Received: 09/04/20 11:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
Field Data	Analytical Method: Pace Analytical Services - Charlotte								
pH	**6.95**	Std. Units			1		09/10/20 09:25		
6010D ATL ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Peachtree Corners, GA								
Calcium	**109**	mg/L	1.0	0.070	1	09/08/20 13:08	09/08/20 23:23	7440-70-2	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3005A Pace Analytical Services - Peachtree Corners, GA								
Antimony	**0.00082J**	mg/L	0.0030	0.00028	1	09/08/20 20:13	09/09/20 20:02	7440-36-0	
Arsenic	ND	mg/L	0.0050	0.00078	1	09/08/20 20:13	09/09/20 20:02	7440-38-2	
Barium	**0.058**	mg/L	0.010	0.00071	1	09/08/20 20:13	09/09/20 20:02	7440-39-3	
Beryllium	ND	mg/L	0.0030	0.000046	1	09/08/20 20:13	09/09/20 20:02	7440-41-7	
Boron	**0.022J**	mg/L	0.10	0.0052	1	09/08/20 20:13	09/09/20 20:02	7440-42-8	
Cadmium	ND	mg/L	0.0025	0.00012	1	09/08/20 20:13	09/09/20 20:02	7440-43-9	
Chromium	ND	mg/L	0.010	0.00055	1	09/08/20 20:13	09/09/20 20:02	7440-47-3	
Cobalt	ND	mg/L	0.0050	0.00038	1	09/08/20 20:13	09/09/20 20:02	7440-48-4	
Lead	**0.000074J**	mg/L	0.0050	0.000036	1	09/08/20 20:13	09/09/20 20:02	7439-92-1	
Lithium	ND	mg/L	0.030	0.00081	1	09/08/20 20:13	09/09/20 20:02	7439-93-2	
Molybdenum	ND	mg/L	0.010	0.00069	1	09/08/20 20:13	09/09/20 20:02	7439-98-7	
Selenium	ND	mg/L	0.010	0.0016	1	09/08/20 20:13	09/09/20 20:02	7782-49-2	
Thallium	ND	mg/L	0.0010	0.00014	1	09/08/20 20:13	09/09/20 20:02	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Peachtree Corners, GA								
Mercury	ND	mg/L	0.00050	0.000078	1	09/08/20 11:15	09/09/20 09:57	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2450C-2011 Pace Analytical Services - Peachtree Corners, GA								
Total Dissolved Solids	**389**	mg/L	10.0	10.0	1		09/04/20 17:57		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**6.0**	mg/L	1.0	0.60	1		09/09/20 07:10	16887-00-6	
Fluoride	ND	mg/L	0.10	0.050	1		09/09/20 07:10	16984-48-8	
Sulfate	**70.2**	mg/L	1.0	0.50	1		09/09/20 07:10	14808-79-8	

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ANALYTICAL RESULTS

Project: BOWEN AP-1 BACKGROUND
Pace Project No.: 92494194

Sample: FBL090220 **Lab ID: 92494194003** Collected: 09/02/20 15:58 Received: 09/04/20 11:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010D ATL ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Peachtree Corners, GA								
Calcium	ND	mg/L	1.0	0.070	1	09/08/20 13:08	09/08/20 23:36	7440-70-2	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3005A Pace Analytical Services - Peachtree Corners, GA								
Antimony	ND	mg/L	0.0030	0.00028	1	09/08/20 20:13	09/09/20 20:07	7440-36-0	
Arsenic	ND	mg/L	0.0050	0.00078	1	09/08/20 20:13	09/09/20 20:07	7440-38-2	
Barium	ND	mg/L	0.010	0.00071	1	09/08/20 20:13	09/09/20 20:07	7440-39-3	
Beryllium	ND	mg/L	0.0030	0.000046	1	09/08/20 20:13	09/09/20 20:07	7440-41-7	
Boron	ND	mg/L	0.10	0.0052	1	09/08/20 20:13	09/09/20 20:07	7440-42-8	
Cadmium	ND	mg/L	0.0025	0.00012	1	09/08/20 20:13	09/09/20 20:07	7440-43-9	
Chromium	ND	mg/L	0.010	0.00055	1	09/08/20 20:13	09/09/20 20:07	7440-47-3	
Cobalt	ND	mg/L	0.0050	0.00038	1	09/08/20 20:13	09/09/20 20:07	7440-48-4	
Lead	ND	mg/L	0.0050	0.000036	1	09/08/20 20:13	09/09/20 20:07	7439-92-1	
Lithium	ND	mg/L	0.030	0.00081	1	09/08/20 20:13	09/09/20 20:07	7439-93-2	
Molybdenum	ND	mg/L	0.010	0.00069	1	09/08/20 20:13	09/09/20 20:07	7439-98-7	
Selenium	ND	mg/L	0.010	0.0016	1	09/08/20 20:13	09/09/20 20:07	7782-49-2	
Thallium	ND	mg/L	0.0010	0.00014	1	09/08/20 20:13	09/09/20 20:07	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Peachtree Corners, GA								
Mercury	ND	mg/L	0.00050	0.000078	1	09/08/20 11:15	09/09/20 09:59	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2450C-2011 Pace Analytical Services - Peachtree Corners, GA								
Total Dissolved Solids	ND	mg/L	10.0	10.0	1		09/04/20 17:58		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	ND	mg/L	1.0	0.60	1		09/08/20 23:38	16887-00-6	
Fluoride	ND	mg/L	0.10	0.050	1		09/08/20 23:38	16984-48-8	
Sulfate	ND	mg/L	1.0	0.50	1		09/08/20 23:38	14808-79-8	

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ANALYTICAL RESULTS

Project: BOWEN AP-1 BACKGROUND
Pace Project No.: 92494194

Sample: EQBL090220 **Lab ID: 92494194004** Collected: 09/02/20 16:10 Received: 09/04/20 11:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010D ATL ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Peachtree Corners, GA								
Calcium	ND	mg/L	1.0	0.070	1	09/08/20 13:08	09/08/20 23:40	7440-70-2	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3005A Pace Analytical Services - Peachtree Corners, GA								
Antimony	ND	mg/L	0.0030	0.00028	1	09/08/20 20:13	09/09/20 20:25	7440-36-0	
Arsenic	ND	mg/L	0.0050	0.00078	1	09/08/20 20:13	09/09/20 20:25	7440-38-2	
Barium	ND	mg/L	0.010	0.00071	1	09/08/20 20:13	09/09/20 20:25	7440-39-3	
Beryllium	ND	mg/L	0.0030	0.000046	1	09/08/20 20:13	09/09/20 20:25	7440-41-7	
Boron	ND	mg/L	0.10	0.0052	1	09/08/20 20:13	09/09/20 20:25	7440-42-8	
Cadmium	ND	mg/L	0.0025	0.00012	1	09/08/20 20:13	09/09/20 20:25	7440-43-9	
Chromium	ND	mg/L	0.010	0.00055	1	09/08/20 20:13	09/09/20 20:25	7440-47-3	
Cobalt	ND	mg/L	0.0050	0.00038	1	09/08/20 20:13	09/09/20 20:25	7440-48-4	
Lead	ND	mg/L	0.0050	0.000036	1	09/08/20 20:13	09/09/20 20:25	7439-92-1	
Lithium	ND	mg/L	0.030	0.00081	1	09/08/20 20:13	09/09/20 20:25	7439-93-2	
Molybdenum	ND	mg/L	0.010	0.00069	1	09/08/20 20:13	09/09/20 20:25	7439-98-7	
Selenium	ND	mg/L	0.010	0.0016	1	09/08/20 20:13	09/09/20 20:25	7782-49-2	
Thallium	ND	mg/L	0.0010	0.00014	1	09/08/20 20:13	09/09/20 20:25	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Peachtree Corners, GA								
Mercury	ND	mg/L	0.00050	0.000078	1	09/08/20 11:15	09/09/20 10:06	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2450C-2011 Pace Analytical Services - Peachtree Corners, GA								
Total Dissolved Solids	ND	mg/L	10.0	10.0	1		09/04/20 17:58		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	ND	mg/L	1.0	0.60	1		09/08/20 23:51	16887-00-6	
Fluoride	ND	mg/L	0.10	0.050	1		09/08/20 23:51	16984-48-8	
Sulfate	ND	mg/L	1.0	0.50	1		09/08/20 23:51	14808-79-8	

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ANALYTICAL RESULTS

Project: BOWEN AP-1 BACKGROUND
Pace Project No.: 92494194

Sample: DUP-1 **Lab ID: 92494194005** Collected: 09/02/20 00:00 Received: 09/04/20 11:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010D ATL ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Peachtree Corners, GA								
Calcium	**163**	mg/L	1.0	0.070	1	09/08/20 13:08	09/08/20 23:44	7440-70-2	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3005A Pace Analytical Services - Peachtree Corners, GA								
Antimony	ND	mg/L	0.0030	0.00028	1	09/08/20 20:13	09/09/20 20:30	7440-36-0	
Arsenic	ND	mg/L	0.0050	0.00078	1	09/08/20 20:13	09/09/20 20:30	7440-38-2	
Barium	**0.041**	mg/L	0.010	0.00071	1	09/08/20 20:13	09/09/20 20:30	7440-39-3	
Beryllium	ND	mg/L	0.0030	0.000046	1	09/08/20 20:13	09/09/20 20:30	7440-41-7	
Boron	**1.1**	mg/L	0.10	0.0052	1	09/08/20 20:13	09/09/20 20:30	7440-42-8	
Cadmium	**0.00018J**	mg/L	0.0025	0.00012	1	09/08/20 20:13	09/09/20 20:30	7440-43-9	
Chromium	ND	mg/L	0.010	0.00055	1	09/08/20 20:13	09/09/20 20:30	7440-47-3	
Cobalt	**0.0011J**	mg/L	0.0050	0.00038	1	09/08/20 20:13	09/09/20 20:30	7440-48-4	
Lead	ND	mg/L	0.0050	0.000036	1	09/08/20 20:13	09/09/20 20:30	7439-92-1	
Lithium	**0.00091J**	mg/L	0.030	0.00081	1	09/08/20 20:13	09/09/20 20:30	7439-93-2	
Molybdenum	**0.0014J**	mg/L	0.010	0.00069	1	09/08/20 20:13	09/09/20 20:30	7439-98-7	
Selenium	ND	mg/L	0.010	0.0016	1	09/08/20 20:13	09/09/20 20:30	7782-49-2	
Thallium	**0.00036J**	mg/L	0.0010	0.00014	1	09/08/20 20:13	09/09/20 20:30	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Peachtree Corners, GA								
Mercury	ND	mg/L	0.00050	0.000078	1	09/08/20 11:15	09/09/20 10:09	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2450C-2011 Pace Analytical Services - Peachtree Corners, GA								
Total Dissolved Solids	**816**	mg/L	10.0	10.0	1		09/04/20 17:59		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**18.8**	mg/L	1.0	0.60	1		09/09/20 07:23	16887-00-6	
Fluoride	**0.053J**	mg/L	0.10	0.050	1		09/09/20 07:23	16984-48-8	
Sulfate	**360**	mg/L	7.0	3.5	7		09/09/20 14:30	14808-79-8	

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ANALYTICAL RESULTS

Project: BOWEN AP-1 BACKGROUND
Pace Project No.: 92494194

Sample: BGWA-48D **Lab ID: 92494194006** Collected: 09/03/20 13:38 Received: 09/04/20 11:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
Field Data	Analytical Method: Pace Analytical Services - Charlotte								
pH	**7.35**	Std. Units			1		09/10/20 09:25		
6010D ATL ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Peachtree Corners, GA								
Calcium	**51.8**	mg/L	1.0	0.070	1	09/08/20 20:17	09/09/20 18:23	7440-70-2	M1
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3005A Pace Analytical Services - Peachtree Corners, GA								
Antimony	**0.0023J**	mg/L	0.0030	0.00028	1	09/08/20 20:13	09/09/20 20:36	7440-36-0	
Arsenic	**0.0018J**	mg/L	0.0050	0.00078	1	09/08/20 20:13	09/09/20 20:36	7440-38-2	
Barium	**0.067**	mg/L	0.010	0.00071	1	09/08/20 20:13	09/09/20 20:36	7440-39-3	
Beryllium	ND	mg/L	0.0030	0.000046	1	09/08/20 20:13	09/09/20 20:36	7440-41-7	
Boron	**0.022J**	mg/L	0.10	0.0052	1	09/08/20 20:13	09/09/20 20:36	7440-42-8	
Cadmium	ND	mg/L	0.0025	0.00012	1	09/08/20 20:13	09/09/20 20:36	7440-43-9	
Chromium	ND	mg/L	0.010	0.00055	1	09/08/20 20:13	09/09/20 20:36	7440-47-3	
Cobalt	ND	mg/L	0.0050	0.00038	1	09/08/20 20:13	09/09/20 20:36	7440-48-4	
Lead	**0.000038J**	mg/L	0.0050	0.000036	1	09/08/20 20:13	09/09/20 20:36	7439-92-1	
Lithium	**0.0014J**	mg/L	0.030	0.00081	1	09/08/20 20:13	09/09/20 20:36	7439-93-2	
Molybdenum	**0.0074J**	mg/L	0.010	0.00069	1	09/08/20 20:13	09/09/20 20:36	7439-98-7	
Selenium	ND	mg/L	0.010	0.0016	1	09/08/20 20:13	09/09/20 20:36	7782-49-2	
Thallium	ND	mg/L	0.0010	0.00014	1	09/08/20 20:13	09/09/20 20:36	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Peachtree Corners, GA								
Mercury	ND	mg/L	0.00050	0.000078	1	09/08/20 11:15	09/09/20 10:11	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2450C-2011 Pace Analytical Services - Peachtree Corners, GA								
Total Dissolved Solids	**303**	mg/L	10.0	10.0	1		09/09/20 17:15		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**6.3**	mg/L	1.0	0.60	1		09/09/20 07:37	16887-00-6	
Fluoride	**0.11**	mg/L	0.10	0.050	1		09/09/20 07:37	16984-48-8	
Sulfate	**24.4**	mg/L	1.0	0.50	1		09/09/20 07:37	14808-79-8	

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ANALYTICAL RESULTS

Project: BOWEN AP-1 BACKGROUND
Pace Project No.: 92494194

Sample: FBL090320 **Lab ID: 92494194007** Collected: 09/03/20 15:50 Received: 09/04/20 11:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010D ATL ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Peachtree Corners, GA								
Calcium	ND	mg/L	1.0	0.070	1	09/08/20 20:17	09/09/20 18:40	7440-70-2	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3005A Pace Analytical Services - Peachtree Corners, GA								
Antimony	ND	mg/L	0.0030	0.00028	1	09/08/20 20:13	09/09/20 20:48	7440-36-0	
Arsenic	ND	mg/L	0.0050	0.00078	1	09/08/20 20:13	09/09/20 20:48	7440-38-2	
Barium	ND	mg/L	0.010	0.00071	1	09/08/20 20:13	09/09/20 20:48	7440-39-3	
Beryllium	ND	mg/L	0.0030	0.000046	1	09/08/20 20:13	09/09/20 20:48	7440-41-7	
Boron	ND	mg/L	0.10	0.0052	1	09/08/20 20:13	09/09/20 20:48	7440-42-8	
Cadmium	ND	mg/L	0.0025	0.00012	1	09/08/20 20:13	09/09/20 20:48	7440-43-9	
Chromium	ND	mg/L	0.010	0.00055	1	09/08/20 20:13	09/09/20 20:48	7440-47-3	
Cobalt	ND	mg/L	0.0050	0.00038	1	09/08/20 20:13	09/09/20 20:48	7440-48-4	
Lead	ND	mg/L	0.0050	0.000036	1	09/08/20 20:13	09/09/20 20:48	7439-92-1	
Lithium	ND	mg/L	0.030	0.00081	1	09/08/20 20:13	09/09/20 20:48	7439-93-2	
Molybdenum	ND	mg/L	0.010	0.00069	1	09/08/20 20:13	09/09/20 20:48	7439-98-7	
Selenium	ND	mg/L	0.010	0.0016	1	09/08/20 20:13	09/09/20 20:48	7782-49-2	
Thallium	ND	mg/L	0.0010	0.00014	1	09/08/20 20:13	09/09/20 20:48	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Peachtree Corners, GA								
Mercury	ND	mg/L	0.00050	0.000078	1	09/08/20 11:15	09/09/20 10:14	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2450C-2011 Pace Analytical Services - Peachtree Corners, GA								
Total Dissolved Solids	ND	mg/L	10.0	10.0	1		09/09/20 17:15		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	ND	mg/L	1.0	0.60	1		09/09/20 00:05	16887-00-6	
Fluoride	ND	mg/L	0.10	0.050	1		09/09/20 00:05	16984-48-8	
Sulfate	ND	mg/L	1.0	0.50	1		09/09/20 00:05	14808-79-8	

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ANALYTICAL RESULTS

Project: BOWEN AP-1 BACKGROUND
Pace Project No.: 92494194

Sample: EQBL090320 **Lab ID: 92494194008** Collected: 09/03/20 15:56 Received: 09/04/20 11:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010D ATL ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Peachtree Corners, GA								
Calcium	ND	mg/L	1.0	0.070	1	09/08/20 20:17	09/09/20 18:45	7440-70-2	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3005A Pace Analytical Services - Peachtree Corners, GA								
Antimony	ND	mg/L	0.0030	0.00028	1	09/08/20 20:13	09/09/20 20:53	7440-36-0	
Arsenic	ND	mg/L	0.0050	0.00078	1	09/08/20 20:13	09/09/20 20:53	7440-38-2	
Barium	ND	mg/L	0.010	0.00071	1	09/08/20 20:13	09/09/20 20:53	7440-39-3	
Beryllium	ND	mg/L	0.0030	0.000046	1	09/08/20 20:13	09/09/20 20:53	7440-41-7	
Boron	ND	mg/L	0.10	0.0052	1	09/08/20 20:13	09/09/20 20:53	7440-42-8	
Cadmium	ND	mg/L	0.0025	0.00012	1	09/08/20 20:13	09/09/20 20:53	7440-43-9	
Chromium	ND	mg/L	0.010	0.00055	1	09/08/20 20:13	09/09/20 20:53	7440-47-3	
Cobalt	ND	mg/L	0.0050	0.00038	1	09/08/20 20:13	09/09/20 20:53	7440-48-4	
Lead	ND	mg/L	0.0050	0.000036	1	09/08/20 20:13	09/09/20 20:53	7439-92-1	
Lithium	ND	mg/L	0.030	0.00081	1	09/08/20 20:13	09/09/20 20:53	7439-93-2	
Molybdenum	ND	mg/L	0.010	0.00069	1	09/08/20 20:13	09/09/20 20:53	7439-98-7	
Selenium	ND	mg/L	0.010	0.0016	1	09/08/20 20:13	09/09/20 20:53	7782-49-2	
Thallium	ND	mg/L	0.0010	0.00014	1	09/08/20 20:13	09/09/20 20:53	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Peachtree Corners, GA								
Mercury	**0.00012J**	mg/L	0.00050	0.000078	1	09/08/20 11:15	09/09/20 10:16	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2450C-2011 Pace Analytical Services - Peachtree Corners, GA								
Total Dissolved Solids	ND	mg/L	10.0	10.0	1		09/09/20 17:15		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	ND	mg/L	1.0	0.60	1		09/09/20 00:18	16887-00-6	
Fluoride	ND	mg/L	0.10	0.050	1		09/09/20 00:18	16984-48-8	
Sulfate	ND	mg/L	1.0	0.50	1		09/09/20 00:18	14808-79-8	

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QUALITY CONTROL DATA

Project: BOWEN AP-1 BACKGROUND
Pace Project No.: 92494194

QC Batch: 564973
QC Batch Method: EPA 3010A
Analysis Method: EPA 6010D
Analysis Description: 6010D ATL
Laboratory: Pace Analytical Services - Peachtree Corners, GA
Associated Lab Samples: 92494194001, 92494194002, 92494194003, 92494194004, 92494194005

METHOD BLANK: 2994728 Matrix: Water
Associated Lab Samples: 92494194001, 92494194002, 92494194003, 92494194004, 92494194005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Calcium	mg/L	ND	1.0	0.070	09/08/20 21:36	

LABORATORY CONTROL SAMPLE: 2994729

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium	mg/L	1	0.95J	95	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2994730 2994731

Parameter	Units	92492418004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium	mg/L	186	1	1	180	183	-551	-205	75-125	2	20	M1

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QUALITY CONTROL DATA

Project: BOWEN AP-1 BACKGROUND
Pace Project No.: 92494194

QC Batch: 565095
QC Batch Method: EPA 3010A
Analysis Method: EPA 6010D
Analysis Description: 6010D ATL
Laboratory: Pace Analytical Services - Peachtree Corners, GA
Associated Lab Samples: 92494194006, 92494194007, 92494194008

METHOD BLANK: 2995179 Matrix: Water
Associated Lab Samples: 92494194006, 92494194007, 92494194008

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Calcium	mg/L	ND	1.0	0.070	09/09/20 17:42	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2995181 2995182

Parameter	Units	92494194006 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium	mg/L	51.8	1	1	52.5	52.9	72	108	75-125	1	20	M1

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QUALITY CONTROL DATA

Project: BOWEN AP-1 BACKGROUND
Pace Project No.: 92494194

QC Batch: 565097
QC Batch Method: EPA 3005A
Analysis Method: EPA 6020B
Analysis Description: 6020 MET
Laboratory: Pace Analytical Services - Peachtree Corners, GA
Associated Lab Samples: 92494194001, 92494194002, 92494194003, 92494194004, 92494194005, 92494194006, 92494194007, 92494194008

METHOD BLANK: 2995188 Matrix: Water
Associated Lab Samples: 92494194001, 92494194002, 92494194003, 92494194004, 92494194005, 92494194006, 92494194007, 92494194008

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Antimony	mg/L	ND	0.0030	0.00028	09/09/20 18:07	
Arsenic	mg/L	ND	0.0050	0.00078	09/09/20 18:07	
Barium	mg/L	ND	0.010	0.00071	09/09/20 18:07	
Beryllium	mg/L	ND	0.0030	0.000046	09/09/20 18:07	
Boron	mg/L	ND	0.10	0.0052	09/09/20 18:07	
Cadmium	mg/L	ND	0.0025	0.00012	09/09/20 18:07	
Chromium	mg/L	ND	0.010	0.00055	09/09/20 18:07	
Cobalt	mg/L	ND	0.0050	0.00038	09/09/20 18:07	
Lead	mg/L	ND	0.0050	0.000036	09/09/20 18:07	
Lithium	mg/L	ND	0.030	0.00081	09/09/20 18:07	
Molybdenum	mg/L	ND	0.010	0.00069	09/09/20 18:07	
Selenium	mg/L	ND	0.010	0.0016	09/09/20 18:07	
Thallium	mg/L	ND	0.0010	0.00014	09/09/20 18:07	

LABORATORY CONTROL SAMPLE: 2995189

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	mg/L	0.1	0.10	100	80-120	
Arsenic	mg/L	0.1	0.097	97	80-120	
Barium	mg/L	0.1	0.095	95	80-120	
Beryllium	mg/L	0.1	0.096	96	80-120	
Boron	mg/L	1	0.99	99	80-120	
Cadmium	mg/L	0.1	0.098	98	80-120	
Chromium	mg/L	0.1	0.099	99	80-120	
Cobalt	mg/L	0.1	0.095	95	80-120	
Lead	mg/L	0.1	0.093	93	80-120	
Lithium	mg/L	0.1	0.099	99	80-120	
Molybdenum	mg/L	0.1	0.097	97	80-120	
Selenium	mg/L	0.1	0.097	97	80-120	
Thallium	mg/L	0.1	0.091	91	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2995190 2995191

Parameter	Units	92494171001 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	0.099	101	99	75-125	1	20	

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QUALITY CONTROL DATA

Project: BOWEN AP-1 BACKGROUND
Pace Project No.: 92494194

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2995190 2995191

Parameter	Units	92494171001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	mg/L	ND	0.1	0.1	0.097	0.094	96	94	75-125	2	20	
Barium	mg/L	0.033	0.1	0.1	0.13	0.13	98	100	75-125	2	20	
Beryllium	mg/L	ND	0.1	0.1	0.093	0.093	93	93	75-125	0	20	
Boron	mg/L	ND	1	1	0.97	0.96	96	96	75-125	1	20	
Cadmium	mg/L	ND	0.1	0.1	0.097	0.096	97	96	75-125	1	20	
Chromium	mg/L	0.00078J	0.1	0.1	0.10	0.10	100	100	75-125	0	20	
Cobalt	mg/L	ND	0.1	0.1	0.095	0.092	95	92	75-125	4	20	
Lead	mg/L	ND	0.1	0.1	0.093	0.093	93	93	75-125	0	20	
Lithium	mg/L	ND	0.1	0.1	0.096	0.096	96	95	75-125	1	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	0.096	0.094	96	94	75-125	2	20	
Thallium	mg/L	ND	0.1	0.1	0.092	0.090	92	90	75-125	2	20	

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QUALITY CONTROL DATA

Project: BOWEN AP-1 BACKGROUND
Pace Project No.: 92494194

QC Batch: 564918
QC Batch Method: EPA 7470A
Analysis Method: EPA 7470A
Analysis Description: 7470 Mercury
Laboratory: Pace Analytical Services - Peachtree Corners, GA
Associated Lab Samples: 92494194001, 92494194002, 92494194003, 92494194004, 92494194005, 92494194006, 92494194007, 92494194008

METHOD BLANK: 2994377 Matrix: Water
Associated Lab Samples: 92494194001, 92494194002, 92494194003, 92494194004, 92494194005, 92494194006, 92494194007, 92494194008

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00050	0.000078	09/09/20 09:09	

LABORATORY CONTROL SAMPLE: 2994378

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	0.0025	0.0024	95	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2994379 2994380

Parameter	Units	92494171001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	ND	0.0025	0.0025	0.0024	0.0024	95	94	75-125	1	20	

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QUALITY CONTROL DATA

Project: BOWEN AP-1 BACKGROUND
Pace Project No.: 92494194

QC Batch: 564745
QC Batch Method: SM 2450C-2011
Analysis Method: SM 2450C-2011
Analysis Description: 2540C Total Dissolved Solids
Laboratory: Pace Analytical Services - Peachtree Corners, GA
Associated Lab Samples: 92494194001, 92494194002, 92494194003, 92494194004, 92494194005

METHOD BLANK: 2993711 Matrix: Water
Associated Lab Samples: 92494194001, 92494194002, 92494194003, 92494194004, 92494194005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	ND	10.0	10.0	09/04/20 17:53	

LABORATORY CONTROL SAMPLE: 2993712

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	400	396	99	84-108	

SAMPLE DUPLICATE: 2993713

Parameter	Units	92493532001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	54.0	59.0	9	10	

SAMPLE DUPLICATE: 2993714

Parameter	Units	92493813002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	72.0	78.0	8	10	

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QUALITY CONTROL DATA

Project: BOWEN AP-1 BACKGROUND
Pace Project No.: 92494194

QC Batch: 565351
QC Batch Method: SM 2450C-2011
Analysis Method: SM 2450C-2011
Analysis Description: 2540C Total Dissolved Solids
Laboratory: Pace Analytical Services - Peachtree Corners, GA
Associated Lab Samples: 92494194006, 92494194007, 92494194008

METHOD BLANK: 2996312 Matrix: Water
Associated Lab Samples: 92494194006, 92494194007, 92494194008

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	ND	10.0	10.0	09/09/20 17:13	

LABORATORY CONTROL SAMPLE: 2996313

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	400	401	100	84-108	

SAMPLE DUPLICATE: 2996315

Parameter	Units	92494205003 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	611	621	2	10	

SAMPLE DUPLICATE: 3000170

Parameter	Units	92494171009 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	21.0	22.0	5	10	

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QUALITY CONTROL DATA

Project: BOWEN AP-1 BACKGROUND
Pace Project No.: 92494194

QC Batch: 565115
QC Batch Method: EPA 300.0 Rev 2.1 1993
Analysis Method: EPA 300.0 Rev 2.1 1993
Analysis Description: 300.0 IC Anions
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92494194001, 92494194002, 92494194003, 92494194004, 92494194005, 92494194006, 92494194007

METHOD BLANK: 2995239 Matrix: Water
Associated Lab Samples: 92494194001, 92494194002, 92494194003, 92494194004, 92494194005, 92494194006, 92494194007

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	ND	1.0	0.60	09/08/20 22:17	
Fluoride	mg/L	ND	0.10	0.050	09/08/20 22:17	
Sulfate	mg/L	ND	1.0	0.50	09/08/20 22:17	

LABORATORY CONTROL SAMPLE: 2995240

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	50	49.3	99	90-110	
Fluoride	mg/L	2.5	2.6	102	90-110	
Sulfate	mg/L	50	49.6	99	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2995241 2995242

Parameter	Units	92493493002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	1690	50	50	1670	1640	-39	-108	90-110	2	10	M6
Fluoride	mg/L	ND	2.5	2.5	2.6	2.6	105	104	90-110	1	10	
Sulfate	mg/L	3.4	50	50	50.4	50.1	94	93	90-110	1	10	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2995243 2995244

Parameter	Units	92494171010 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	1.4	50	50	49.4	49.5	96	96	90-110	0	10	
Fluoride	mg/L	ND	2.5	2.5	2.4	2.4	95	97	90-110	2	10	
Sulfate	mg/L	3.5	50	50	51.7	51.9	96	97	90-110	0	10	

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QUALITY CONTROL DATA

Project: BOWEN AP-1 BACKGROUND
Pace Project No.: 92494194

QC Batch: 565117
QC Batch Method: EPA 300.0 Rev 2.1 1993
Analysis Method: EPA 300.0 Rev 2.1 1993
Analysis Description: 300.0 IC Anions
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92494194008

METHOD BLANK: 2995245 Matrix: Water
Associated Lab Samples: 92494194008

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	ND	1.0	0.60	09/08/20 22:30	
Fluoride	mg/L	ND	0.10	0.050	09/08/20 22:30	
Sulfate	mg/L	ND	1.0	0.50	09/08/20 22:30	

LABORATORY CONTROL SAMPLE: 2995246

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	50	50.5	101	90-110	
Fluoride	mg/L	2.5	2.5	99	90-110	
Sulfate	mg/L	50	50.7	101	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2995247 2995248

Parameter	Units	92494194008 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	ND	50	50	47.8	47.9	96	96	90-110	0	10	
Fluoride	mg/L	ND	2.5	2.5	2.3	2.3	94	93	90-110	1	10	
Sulfate	mg/L	ND	50	50	47.6	47.8	95	96	90-110	0	10	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2995249 2995250

Parameter	Units	92494262001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	45.0	50	50	92.6	93.2	95	96	90-110	1	10	
Fluoride	mg/L	0.25	2.5	2.5	2.7	2.8	100	104	90-110	4	10	
Sulfate	mg/L	42.2	50	50	89.6	90.2	95	96	90-110	1	10	

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QUALIFIERS

Project: BOWEN AP-1 BACKGROUND
Pace Project No.: 92494194

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.

TNTC - Too Numerous To Count

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.

Acid preservation may not be appropriate for 2 Chloroethylvinyl ether.

A separate vial preserved to a pH of 4-5 is recommended in SW846 Chapter 4 for the analysis of Acrolein and Acrylonitrile by EPA Method 8260.

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

M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
M6	Matrix spike and Matrix spike duplicate recovery not evaluated against control limits due to sample dilution.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: BOWEN AP-1 BACKGROUND
Pace Project No.: 92494194

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
92494194001	**BGWC-14A**				
92494194002	**BGWA-47D**				
92494194006	**BGWA-48D**				
92494194001	**BGWC-14A**	EPA 3010A	564973	EPA 6010D	565003
92494194002	**BGWA-47D**	EPA 3010A	564973	EPA 6010D	565003
92494194003	**FBL090220**	EPA 3010A	564973	EPA 6010D	565003
92494194004	**EQBL090220**	EPA 3010A	564973	EPA 6010D	565003
92494194005	**DUP-1**	EPA 3010A	564973	EPA 6010D	565003
92494194006	**BGWA-48D**	EPA 3010A	565095	EPA 6010D	565118
92494194007	**FBL090320**	EPA 3010A	565095	EPA 6010D	565118
92494194008	**EQBL090320**	EPA 3010A	565095	EPA 6010D	565118
92494194001	**BGWC-14A**	EPA 3005A	565097	EPA 6020B	565120
92494194002	**BGWA-47D**	EPA 3005A	565097	EPA 6020B	565120
92494194003	**FBL090220**	EPA 3005A	565097	EPA 6020B	565120
92494194004	**EQBL090220**	EPA 3005A	565097	EPA 6020B	565120
92494194005	**DUP-1**	EPA 3005A	565097	EPA 6020B	565120
92494194006	**BGWA-48D**	EPA 3005A	565097	EPA 6020B	565120
92494194007	**FBL090320**	EPA 3005A	565097	EPA 6020B	565120
92494194008	**EQBL090320**	EPA 3005A	565097	EPA 6020B	565120
92494194001	**BGWC-14A**	EPA 7470A	564918	EPA 7470A	564991
92494194002	**BGWA-47D**	EPA 7470A	564918	EPA 7470A	564991
92494194003	**FBL090220**	EPA 7470A	564918	EPA 7470A	564991
92494194004	**EQBL090220**	EPA 7470A	564918	EPA 7470A	564991
92494194005	**DUP-1**	EPA 7470A	564918	EPA 7470A	564991
92494194006	**BGWA-48D**	EPA 7470A	564918	EPA 7470A	564991
92494194007	**FBL090320**	EPA 7470A	564918	EPA 7470A	564991
92494194008	**EQBL090320**	EPA 7470A	564918	EPA 7470A	564991
92494194001	**BGWC-14A**	SM 2450C-2011	564745		
92494194002	**BGWA-47D**	SM 2450C-2011	564745		
92494194003	**FBL090220**	SM 2450C-2011	564745		
92494194004	**EQBL090220**	SM 2450C-2011	564745		
92494194005	**DUP-1**	SM 2450C-2011	564745		
92494194006	**BGWA-48D**	SM 2450C-2011	565351		
92494194007	**FBL090320**	SM 2450C-2011	565351		
92494194008	**EQBL090320**	SM 2450C-2011	565351		
92494194001	**BGWC-14A**	EPA 300.0 Rev 2.1 1993	565115		
92494194002	**BGWA-47D**	EPA 300.0 Rev 2.1 1993	565115		
92494194003	**FBL090220**	EPA 300.0 Rev 2.1 1993	565115		
92494194004	**EQBL090220**	EPA 300.0 Rev 2.1 1993	565115		
92494194005	**DUP-1**	EPA 300.0 Rev 2.1 1993	565115		
92494194006	**BGWA-48D**	EPA 300.0 Rev 2.1 1993	565115		
92494194007	**FBL090320**	EPA 300.0 Rev 2.1 1993	565115		
92494194008	**EQBL090320**	EPA 300.0 Rev 2.1 1993	565117		

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Sample Condition Upon Receipt

Pace Analytical

Client Name: GA Power

WO#: 92494194

92494194

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☐ Client ☑ Commercial ☐ Pace Other

Tracking #: _____

Proj. Name:

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

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☐ None ☑ Other Ziploc

Thermometer Used THR214 Type of Ice: ~~Wet~~ Blue None ☐ Samples on ice, cooling process has begun

Cooler Temperature 1.5 Biological Tissue is Frozen: Yes No

Date and Initials of person examining contents: KRW 9/9/20

Temp should be above freezing to 6°C

Comments:

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

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

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

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)

Pace Analytical	Document Name: Bottle Identification Form (BIF)	Document Issued: March 14, 2019 Page 1 of 1
	Document No.: F-CAR-CS-043-Rev.00	Issuing Authority: Pace Carolinas Quality Office

Project #

WO# : 92494194

PM: KLH1 Due Date: 09/21/20

CLIENT: GA-GA Power

*Check mark top half of box if pH and/or dechlorination is verified and within the acceptance range for preservation samples.

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 (NH2)2SO4 (9.3-9.7)	AG0U-100 mL Amber Unpreserved vials (N/A)	VSGU-20 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	Lo

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 (

Out of hold, incorrect preservative, out of temp, incorrect containers.

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page : 1 Of 1

Section A
Required Client Information:

Company:	Georgia Power
Address:	1003 Weatherstone Parkway
	Woodstock, GA 30188
Email To:	
Phone: (678)548-9415	Fax
Requested Due Date:	Standard

Section B
Required Project Information:

Report To:	SCS Contacts
Copy To:	Geosyntec Contacts
Purchase Order #:	
Project Name:	Plant Bowen AP-1 Background
Project Number:	

Section C
Invoice Information:

Attention:	
Company Name:	
Address:	
Pace Quote:	
Pace Project Manager:	Kevin Herring
Pace Profile #:	10844

Regulatory Agency

State / Location

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID (One Character per box. (A-Z, 0-9 / , -) Sample ids must be unique)	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED START DATE	COLLECTED START TIME	COLLECTED END DATE	COLLECTED END TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H2SO4	HNO3	HCl	NaOH	Na2S2O3	Methanol	Other	Analyses Test: RAD 9315/9320	Metals*	Cl, F, SO4	TDS	Residual Chlorine (Y/N)	
	MATRIX: Drinking Water DW, Water WT, Waste Water WW, Product P, Soil/Solid SL, Oil OL, Wipe WP, Air AR, Other OT, Tissue TS																	Y/N					
1	BGWC-14A	WT	G	9/2/20	1033				5	2		3						X	X	X	X		9249441494
2	BGWA-47D	WT	G	9/2/20	1601				5	2		3						X	X	X	X		6.97
3	BGWA-48D	WT	G															X	X	X	X		6.95
4	FBL090220	WT	G	9/2/20	1558				5	2		3						X	X	X	X		
5	EQBL 090220	WT	G	9/2/20	1610				5	2		3						X	X	X	X		
6	DUP-1	WT	G	9/2/20	—				5	2		3						X	X	X	X		
7																		X	X	X	X		
8																							
9																							
10																							
11																							
12																							

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
* As, B, Ba, Be, Ca, Cd, Cr, Co, Hg, Li, Mo, Pb, Sb, Se, Tl	[signature]	9/2/20	[illegible]	Cindy Mardis	9/2/2020	0648				
	Cindy Mardis	9/4	11:20	[signature] Pace	9/4/20	11:20				
	[signature] Pace	9/4/20	3:46	[signature]	9/4/20	1546	1.5	Y	N	Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: [signature] / Georgia Power W.H. Inspector

SIGNATURE of SAMPLER: [signature] DATE Signed: 9/2/20

TEMP in C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page : 1 Of 1

Section A
Required Client Information:

Company:	Georgia Power
Address:	1003 Weatherstone Parkway Woodstock, GA 30188
Email To:	
Phone:	(678)548-9415 Fax
Requested Due Date:	Standard

Section B
Required Project Information:

Report To:	SCS Contacts
Copy To:	Geosyntec Contacts
Purchase Order #:	
Project Name:	Plant Bowen AP-1 Background
Project Number:	

Section C
Invoice Information:

Attention:	
Company Name:	
Address:	
Pace Quote:	
Pace Project Manager:	Kevin Herring
Pace Profile #:	10844

Regulatory Agency

State / Location

SAMPLE ID
One Character per box.
(A-Z, 0-9 / , -)
Sample Ids must be unique

MATRIX CODE: Drinking Water DW, Water WT, Waste Water WW, Product P, Soil/Solid SL, Oil OL, Wipe WP, Air AR, Other OT, Tissue TS

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED START DATE	COLLECTED START TIME	COLLECTED END DATE	COLLECTED END TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H2SO4	HNO3	HCl	NaOH	Na2S2O3	Methanol	Other	Analyses Test Y/N	RAD 9315/9320	Metals*	Cl, F, SO4	TDS	Residual Chlorine (Y/N)	
1	BGWC-14A	WT	G																X	X	X	X		92494194
2	BGWA-47D	WT	G																X	X	X	X		
3	BGWA-48D	WT	G	9/3/20	1338				5	2		3							X	X	X	X		
4	FBL090320	WT	G	9/3/20	1550				5	2		3							X	X	X	X		pH: 7.35
5	EQBL090320	WT	G	9/3/20	1556				5	2		3							X	X	X	X		
6	BUP-1	WT	G																X	X	X	X		
7																			X	X	X	X		
8																								
9																								
10																								
11																								
12																								

Requested Analysis Filtered (Y/N)

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS: TEMP in C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
* As, B, Ba, Be, Ca, Cd, Cr, Co, Hg, Li, Mo, Pb, Sb, Se, Tl	William Laaker / Resolute	9/3/20	5:00	Cindy Mardis / Resolute	9/3	5:00				
	Cindy Mardis	9/4	11:20	[illegible] / Pace	9/4/20	11:20				
	[illegible] / Pace	9/4/20	3:46	Charles Henle	9/4/20	1546	1.5	Y	N	Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: William Laaker, Kevin Stephenson, Veronica Fay, Joe Booth

SIGNATURE of SAMPLER: [signature]

DATE Signed: 9/3/20

Pace Analytical Services, LLC
110 Technology Parkway
Peachtree Corners, GA 30092
(770)734-4200

September 22, 2020

Joju Abraham
Georgia Power-CCR
2480 Maner Road
Atlanta, GA 30339

RE: Project: BOWEN AP SCAN
Pace Project No.: 92494205

Dear Joju Abraham:

Enclosed are the analytical results for sample(s) received by the laboratory on September 04, 2020. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

The test results provided in this final report were generated by each of the following laboratories within the Pace Network:

- Pace Analytical Services - Asheville
- Pace Analytical Services - Charlotte
- Pace Analytical Services - Peachtree Corners, GA

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

Sincerely,

Kevin Herring
kevin.herring@pacelabs.com
1(704)875-9092
HORIZON Database Administrator

Enclosures

cc: Christine Hug, Geosyntec Consultants, Inc.
Kristen Jurinko
Thomas Kessler, Geosyntec
Whitney Law, Geosyntec Consultants
Noelia Muskus, Geosyntec Consultants
Ms. Lauren Petty, Southern Co. Services
Nardos Tilahun, GeoSyntec
Dawit Yifru, Geosyntec Consultants, Inc.

REPORT OF LABORATORY ANALYSIS

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Pace Analytical Services, LLC
110 Technology Parkway
Peachtree Corners, GA 30092
(770)734-4200

CERTIFICATIONS

Project: BOWEN AP SCAN
Pace Project No.: 92494205

Pace Analytical Services Charlotte
9800 Kincey Ave. Ste 100, Huntersville, NC 28078
Louisiana/NELAP Certification # LA170028
North Carolina Drinking Water Certification #: 37706
North Carolina Field Services Certification #: 5342
North Carolina Wastewater Certification #: 12
South Carolina Certification #: 99006001
Florida/NELAP Certification #: E87627
Kentucky UST Certification #: 84
Virginia/VELAP Certification #: 460221

Pace Analytical Services Asheville
2225 Riverside Drive, Asheville, NC 28804
Florida/NELAP Certification #: E87648
Massachusetts Certification #: M-NC030
North Carolina Drinking Water Certification #: 37712
North Carolina Wastewater Certification #: 40
South Carolina Certification #: 99030001
Virginia/VELAP Certification #: 460222

Pace Analytical Services Peachtree Corners
110 Technology Pkwy, 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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110 Technology Parkway
Peachtree Corners, GA 30092
(770)734-4200

SAMPLE SUMMARY

Project: BOWEN AP SCAN
Pace Project No.: 92494205

Lab ID	Sample ID	Matrix	Date Collected	Date Received
92494205001	**BGWC-38D**	Water	09/02/20 15:37	09/04/20 11:20
92494205002	**BGWC-41D**	Water	09/02/20 12:30	09/04/20 11:20
92494205003	**BGWC-42D**	Water	09/03/20 11:44	09/04/20 11:20
92494205004	**BGWC-43D**	Water	09/03/20 10:46	09/04/20 11:20
92494205005	**BGWC-44D**	Water	09/03/20 13:15	09/04/20 11:20

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110 Technology Parkway
Peachtree Corners, GA 30092
(770)734-4200

SAMPLE ANALYTE COUNT

Project: BOWEN AP SCAN
Pace Project No.: 92494205

Lab ID	Sample ID	Method	Analysts	Analytes Reported
92494205001	**BGWC-38D**	EPA 6010D	DRB	6
		EPA 6020B	CW1	13
		EPA 7470A	VB	1
		SM 2450C-2011	AW1	1
		SM 2320B-2011	ECH	3
		SM 4500-S2D-2011	BAS	1
		EPA 300.0 Rev 2.1 1993	BRJ	3
92494205002	**BGWC-41D**	EPA 6010D	DRB	6
		EPA 6020B	CW1	13
		EPA 7470A	VB	1
		SM 2450C-2011	AW1	1
		SM 2320B-2011	ECH	3
		SM 4500-S2D-2011	BAS	1
		EPA 300.0 Rev 2.1 1993	BRJ	3
92494205003	**BGWC-42D**	EPA 6010D	DRB	6
		EPA 6020B	CW1	13
		EPA 7470A	VB	1
		SM 2450C-2011	AW1	1
		SM 2320B-2011	ECH	3
		SM 4500-S2D-2011	BAS	1
		EPA 300.0 Rev 2.1 1993	BRJ	3
92494205004	**BGWC-43D**	EPA 6010D	DRB, KH	6
		EPA 6020B	CW1	13
		EPA 7470A	VB	1
		SM 2450C-2011	AW1	1
		SM 2320B-2011	ECH	3
		SM 4500-S2D-2011	BAS	1
		EPA 300.0 Rev 2.1 1993	BRJ	3
92494205005	**BGWC-44D**	EPA 6010D	DRB	6
		EPA 6020B	CW1	13
		EPA 7470A	VB	1
		SM 2450C-2011	AW1	1
		SM 2320B-2011	ECH	3
		SM 4500-S2D-2011	BAS	1
		EPA 300.0 Rev 2.1 1993	BRJ	3

PASI-A = Pace Analytical Services - Asheville
PASI-C = Pace Analytical Services - Charlotte

REPORT OF LABORATORY ANALYSIS

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Pace Analytical Services, LLC
110 Technology Parkway
Peachtree Corners, GA 30092
(770)734-4200

SAMPLE ANALYTE COUNT

Project: BOWEN AP SCAN
Pace Project No.: 92494205

Lab ID	Sample ID	Method	Analysts	Analytes Reported

PASI-GA = Pace Analytical Services - Peachtree Corners, GA

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Pace Analytical Services, LLC
110 Technology Parkway
Peachtree Corners, GA 30092
(770)734-4200

SUMMARY OF DETECTION

Project: BOWEN AP SCAN
Pace Project No.: 92494205

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92494205001	**BGWC-38D**					
	pH	6.49	Std. Units		09/10/20 09:15	
EPA 6010D	Calcium	228	mg/L	1.0	09/09/20 18:49	
EPA 6010D	Iron	0.75	mg/L	0.040	09/09/20 18:49	
EPA 6010D	Magnesium	53.8	mg/L	0.050	09/09/20 18:49	
EPA 6010D	Manganese	1.3	mg/L	0.040	09/09/20 18:49	
EPA 6010D	Potassium	3.2	mg/L	0.20	09/09/20 18:49	
EPA 6010D	Sodium	14.6	mg/L	1.0	09/09/20 18:49	
EPA 6020B	Antimony	0.0016J	mg/L	0.0030	09/10/20 12:13	
EPA 6020B	Arsenic	0.0012J	mg/L	0.0050	09/10/20 12:13	
EPA 6020B	Barium	0.19	mg/L	0.010	09/10/20 12:13	
EPA 6020B	Beryllium	0.000060J	mg/L	0.0030	09/10/20 12:13	
EPA 6020B	Boron	7.8	mg/L	0.10	09/10/20 12:13	M1
EPA 6020B	Cadmium	0.00032J	mg/L	0.0025	09/10/20 12:13	
EPA 6020B	Cobalt	0.0043J	mg/L	0.0050	09/10/20 12:13	
EPA 6020B	Lead	0.00022J	mg/L	0.0050	09/10/20 12:13	
EPA 6020B	Lithium	0.0096J	mg/L	0.030	09/10/20 12:13	
EPA 6020B	Molybdenum	0.10	mg/L	0.010	09/10/20 12:13	
EPA 6020B	Selenium	0.0030J	mg/L	0.010	09/10/20 12:13	
EPA 6020B	Thallium	0.00042J	mg/L	0.0010	09/10/20 12:13	
EPA 7470A	Mercury	0.00010J	mg/L	0.00050	09/11/20 11:41	
SM 2450C-2011	Total Dissolved Solids	982	mg/L	10.0	09/08/20 13:11	
SM 2320B-2011	Alkalinity,Bicarbonate (CaCO3)	92.8	mg/L	5.0	09/09/20 18:32	
SM 2320B-2011	Alkalinity, Total as CaCO3	92.8	mg/L	5.0	09/09/20 18:32	
EPA 300.0 Rev 2.1 1993	Chloride	309	mg/L	7.0	09/09/20 15:27	
EPA 300.0 Rev 2.1 1993	Fluoride	0.47	mg/L	0.10	09/09/20 08:04	
EPA 300.0 Rev 2.1 1993	Sulfate	188	mg/L	7.0	09/09/20 15:27	
92494205002	**BGWC-41D**					
	pH	7.45	Std. Units		09/10/20 09:15	
EPA 6010D	Calcium	159	mg/L	1.0	09/09/20 18:53	
EPA 6010D	Iron	0.055	mg/L	0.040	09/09/20 18:53	
EPA 6010D	Magnesium	75.0	mg/L	0.050	09/09/20 18:53	
EPA 6010D	Manganese	0.048	mg/L	0.040	09/09/20 18:53	
EPA 6010D	Potassium	1.4	mg/L	0.20	09/09/20 18:53	
EPA 6010D	Sodium	19.5	mg/L	1.0	09/09/20 18:53	
EPA 6020B	Antimony	0.0014J	mg/L	0.0030	09/10/20 12:36	
EPA 6020B	Arsenic	0.00092J	mg/L	0.0050	09/10/20 12:36	
EPA 6020B	Barium	0.046	mg/L	0.010	09/10/20 12:36	
EPA 6020B	Boron	0.91	mg/L	0.10	09/10/20 12:36	
EPA 6020B	Cobalt	0.00075J	mg/L	0.0050	09/10/20 12:36	
EPA 6020B	Lithium	0.00092J	mg/L	0.030	09/10/20 12:36	
EPA 6020B	Molybdenum	0.015	mg/L	0.010	09/10/20 12:36	
EPA 6020B	Selenium	0.0016J	mg/L	0.010	09/10/20 12:36	
SM 2450C-2011	Total Dissolved Solids	829	mg/L	10.0	09/08/20 13:11	
SM 2320B-2011	Alkalinity,Bicarbonate (CaCO3)	138	mg/L	5.0	09/09/20 18:40	
SM 2320B-2011	Alkalinity, Total as CaCO3	138	mg/L	5.0	09/09/20 18:40	
EPA 300.0 Rev 2.1 1993	Chloride	210	mg/L	5.0	09/09/20 15:42	
EPA 300.0 Rev 2.1 1993	Fluoride	0.088J	mg/L	0.10	09/09/20 08:17	

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110 Technology Parkway
Peachtree Corners, GA 30092
(770)734-4200

SUMMARY OF DETECTION

Project: BOWEN AP SCAN
Pace Project No.: 92494205

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92494205002	**BGWC-41D**					
EPA 300.0 Rev 2.1 1993	Sulfate	224	mg/L	5.0	09/09/20 15:42	
92494205003	**BGWC-42D**					
	pH	7.37	Std. Units		09/10/20 09:15	
EPA 6010D	Calcium	100	mg/L	1.0	09/09/20 19:06	
EPA 6010D	Iron	0.98	mg/L	0.040	09/09/20 19:06	
EPA 6010D	Magnesium	37.2	mg/L	0.050	09/09/20 19:06	
EPA 6010D	Manganese	0.092	mg/L	0.040	09/09/20 19:06	
EPA 6010D	Potassium	2.0	mg/L	0.20	09/09/20 19:06	
EPA 6010D	Sodium	38.1	mg/L	1.0	09/09/20 19:06	
EPA 6020B	Antimony	0.00072J	mg/L	0.0030	09/10/20 12:42	
EPA 6020B	Arsenic	0.0023J	mg/L	0.0050	09/10/20 12:42	
EPA 6020B	Barium	0.087	mg/L	0.010	09/10/20 12:42	
EPA 6020B	Boron	1.6	mg/L	0.10	09/10/20 12:42	
EPA 6020B	Lithium	0.0014J	mg/L	0.030	09/10/20 12:42	
EPA 6020B	Molybdenum	0.018	mg/L	0.010	09/10/20 12:42	
EPA 6020B	Selenium	0.0022J	mg/L	0.010	09/10/20 12:42	
SM 2450C-2011	Total Dissolved Solids	611	mg/L	10.0	09/09/20 17:15	
SM 2320B-2011	Alkalinity,Bicarbonate (CaCO3)	158	mg/L	5.0	09/09/20 18:49	
SM 2320B-2011	Alkalinity, Total as CaCO3	158	mg/L	5.0	09/09/20 18:49	
SM 4500-S2D-2011	Sulfide	0.12	mg/L	0.10	09/08/20 19:49	
EPA 300.0 Rev 2.1 1993	Chloride	115	mg/L	3.0	09/09/20 15:58	
EPA 300.0 Rev 2.1 1993	Fluoride	0.50	mg/L	0.10	09/09/20 08:31	
EPA 300.0 Rev 2.1 1993	Sulfate	141	mg/L	3.0	09/09/20 15:58	
92494205004	**BGWC-43D**					
	pH	7.21	Std. Units		09/10/20 09:15	
EPA 6010D	Calcium	383	mg/L	10.0	09/10/20 15:46	
EPA 6010D	Iron	0.71	mg/L	0.040	09/09/20 19:10	
EPA 6010D	Magnesium	81.8	mg/L	0.050	09/09/20 19:10	
EPA 6010D	Manganese	1.2	mg/L	0.040	09/09/20 19:10	
EPA 6010D	Potassium	6.4	mg/L	0.20	09/09/20 19:10	
EPA 6010D	Sodium	29.0	mg/L	1.0	09/09/20 19:10	
EPA 6020B	Antimony	0.00091J	mg/L	0.0030	09/10/20 12:48	
EPA 6020B	Arsenic	0.00099J	mg/L	0.0050	09/10/20 12:48	
EPA 6020B	Barium	0.083	mg/L	0.010	09/10/20 12:48	
EPA 6020B	Boron	14.6	mg/L	1.0	09/14/20 14:04	
EPA 6020B	Cadmium	0.0011J	mg/L	0.0025	09/10/20 12:48	
EPA 6020B	Cobalt	0.0020J	mg/L	0.0050	09/10/20 12:48	
EPA 6020B	Lead	0.00012J	mg/L	0.0050	09/10/20 12:48	
EPA 6020B	Lithium	0.023J	mg/L	0.030	09/10/20 12:48	
EPA 6020B	Molybdenum	0.11	mg/L	0.010	09/10/20 12:48	
EPA 6020B	Selenium	0.0028J	mg/L	0.010	09/10/20 12:48	
EPA 6020B	Thallium	0.0024	mg/L	0.0010	09/10/20 12:48	
SM 2450C-2011	Total Dissolved Solids	1980	mg/L	10.0	09/09/20 17:16	MW
SM 2320B-2011	Alkalinity,Bicarbonate (CaCO3)	86.8	mg/L	5.0	09/10/20 15:22	
SM 2320B-2011	Alkalinity, Total as CaCO3	86.8	mg/L	5.0	09/10/20 15:22	
EPA 300.0 Rev 2.1 1993	Chloride	564	mg/L	12.0	09/09/20 16:12	

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(770)734-4200

SUMMARY OF DETECTION

Project: BOWEN AP SCAN
Pace Project No.: 92494205

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92494205004	**BGWC-43D**					
EPA 300.0 Rev 2.1 1993	Fluoride	0.87	mg/L	0.10	09/09/20 08:44	
EPA 300.0 Rev 2.1 1993	Sulfate	358	mg/L	12.0	09/09/20 16:12	
92494205005	**BGWC-44D**					
	pH	7.60	Std. Units		09/10/20 09:15	
EPA 6010D	Calcium	50.2	mg/L	1.0	09/09/20 19:14	
EPA 6010D	Iron	0.37	mg/L	0.040	09/09/20 19:14	
EPA 6010D	Magnesium	27.9	mg/L	0.050	09/09/20 19:14	
EPA 6010D	Manganese	0.14	mg/L	0.040	09/09/20 19:14	
EPA 6010D	Potassium	1.4	mg/L	0.20	09/09/20 19:14	
EPA 6010D	Sodium	34.5	mg/L	1.0	09/09/20 19:14	
EPA 6020B	Antimony	0.0021J	mg/L	0.0030	09/10/20 12:53	
EPA 6020B	Arsenic	0.0033J	mg/L	0.0050	09/10/20 12:53	
EPA 6020B	Barium	0.020	mg/L	0.010	09/10/20 12:53	
EPA 6020B	Boron	0.083J	mg/L	0.10	09/10/20 12:53	
EPA 6020B	Lithium	0.0016J	mg/L	0.030	09/10/20 12:53	
EPA 6020B	Molybdenum	0.0055J	mg/L	0.010	09/10/20 12:53	
SM 2450C-2011	Total Dissolved Solids	312	mg/L	10.0	09/09/20 17:16	
SM 2320B-2011	Alkalinity,Bicarbonate (CaCO3)	247	mg/L	5.0	09/18/20 20:56	H1
SM 2320B-2011	Alkalinity, Total as CaCO3	247	mg/L	5.0	09/18/20 20:56	H1
SM 4500-S2D-2011	Sulfide	0.53	mg/L	0.10	09/08/20 19:56	
EPA 300.0 Rev 2.1 1993	Chloride	18.6	mg/L	1.0	09/09/20 08:58	
EPA 300.0 Rev 2.1 1993	Sulfate	31.0	mg/L	1.0	09/09/20 08:58	

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ANALYTICAL RESULTS

Project: BOWEN AP SCAN
Pace Project No.: 92494205

Sample: BGWC-38D **Lab ID: 92494205001** Collected: 09/02/20 15:37 Received: 09/04/20 11:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
Field Data	Analytical Method: Pace Analytical Services - Charlotte								
pH	**6.49**	Std. Units			1		09/10/20 09:15		
6010D ATL ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Peachtree Corners, GA								
Calcium	**228**	mg/L	1.0	0.070	1	09/08/20 20:17	09/09/20 18:49	7440-70-2	
Iron	**0.75**	mg/L	0.040	0.016	1	09/08/20 20:17	09/09/20 18:49	7439-89-6	
Magnesium	**53.8**	mg/L	0.050	0.0076	1	09/08/20 20:17	09/09/20 18:49	7439-95-4	
Manganese	**1.3**	mg/L	0.040	0.0017	1	09/08/20 20:17	09/09/20 18:49	7439-96-5	
Potassium	**3.2**	mg/L	0.20	0.056	1	09/08/20 20:17	09/09/20 18:49	7440-09-7	
Sodium	**14.6**	mg/L	1.0	0.26	1	09/08/20 20:17	09/09/20 18:49	7440-23-5	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3005A Pace Analytical Services - Peachtree Corners, GA								
Antimony	**0.0016J**	mg/L	0.0030	0.00028	1	09/09/20 19:04	09/10/20 12:13	7440-36-0	
Arsenic	**0.0012J**	mg/L	0.0050	0.00078	1	09/09/20 19:04	09/10/20 12:13	7440-38-2	
Barium	**0.19**	mg/L	0.010	0.00071	1	09/09/20 19:04	09/10/20 12:13	7440-39-3	
Beryllium	**0.000060J**	mg/L	0.0030	0.000046	1	09/09/20 19:04	09/10/20 12:13	7440-41-7	
Boron	**7.8**	mg/L	0.10	0.0052	1	09/09/20 19:04	09/10/20 12:13	7440-42-8	M1
Cadmium	**0.00032J**	mg/L	0.0025	0.00012	1	09/09/20 19:04	09/10/20 12:13	7440-43-9	
Chromium	ND	mg/L	0.010	0.00055	1	09/09/20 19:04	09/10/20 12:13	7440-47-3	
Cobalt	**0.0043J**	mg/L	0.0050	0.00038	1	09/09/20 19:04	09/10/20 12:13	7440-48-4	
Lead	**0.00022J**	mg/L	0.0050	0.000036	1	09/09/20 19:04	09/10/20 12:13	7439-92-1	
Lithium	**0.0096J**	mg/L	0.030	0.00081	1	09/09/20 19:04	09/10/20 12:13	7439-93-2	
Molybdenum	**0.10**	mg/L	0.010	0.00069	1	09/09/20 19:04	09/10/20 12:13	7439-98-7	
Selenium	**0.0030J**	mg/L	0.010	0.0016	1	09/09/20 19:04	09/10/20 12:13	7782-49-2	
Thallium	**0.00042J**	mg/L	0.0010	0.00014	1	09/09/20 19:04	09/10/20 12:13	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Peachtree Corners, GA								
Mercury	**0.00010J**	mg/L	0.00050	0.000078	1	09/10/20 13:00	09/11/20 11:41	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2450C-2011 Pace Analytical Services - Peachtree Corners, GA								
Total Dissolved Solids	**982**	mg/L	10.0	10.0	1		09/08/20 13:11		
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**92.8**	mg/L	5.0	5.0	1		09/09/20 18:32		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		09/09/20 18:32		
Alkalinity, Total as CaCO3	**92.8**	mg/L	5.0	5.0	1		09/09/20 18:32		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	ND	mg/L	0.10	0.050	1		09/08/20 19:41	18496-25-8	

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ANALYTICAL RESULTS

Project: BOWEN AP SCAN
Pace Project No.: 92494205

Sample: BGWC-38D **Lab ID: 92494205001** Collected: 09/02/20 15:37 Received: 09/04/20 11:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**309**	mg/L	7.0	4.2	7		09/09/20 15:27	16887-00-6	
Fluoride	**0.47**	mg/L	0.10	0.050	1		09/09/20 08:04	16984-48-8	
Sulfate	**188**	mg/L	7.0	3.5	7		09/09/20 15:27	14808-79-8	

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ANALYTICAL RESULTS

Project: BOWEN AP SCAN
Pace Project No.: 92494205

Sample: BGWC-41D **Lab ID: 92494205002** Collected: 09/02/20 12:30 Received: 09/04/20 11:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
Field Data	Analytical Method: Pace Analytical Services - Charlotte								
pH	**7.45**	Std. Units			1		09/10/20 09:15		
6010D ATL ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Peachtree Corners, GA								
Calcium	**159**	mg/L	1.0	0.070	1	09/08/20 20:17	09/09/20 18:53	7440-70-2	
Iron	**0.055**	mg/L	0.040	0.016	1	09/08/20 20:17	09/09/20 18:53	7439-89-6	
Magnesium	**75.0**	mg/L	0.050	0.0076	1	09/08/20 20:17	09/09/20 18:53	7439-95-4	
Manganese	**0.048**	mg/L	0.040	0.0017	1	09/08/20 20:17	09/09/20 18:53	7439-96-5	
Potassium	**1.4**	mg/L	0.20	0.056	1	09/08/20 20:17	09/09/20 18:53	7440-09-7	
Sodium	**19.5**	mg/L	1.0	0.26	1	09/08/20 20:17	09/09/20 18:53	7440-23-5	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3005A Pace Analytical Services - Peachtree Corners, GA								
Antimony	**0.0014J**	mg/L	0.0030	0.00028	1	09/09/20 19:04	09/10/20 12:36	7440-36-0	
Arsenic	**0.00092J**	mg/L	0.0050	0.00078	1	09/09/20 19:04	09/10/20 12:36	7440-38-2	
Barium	**0.046**	mg/L	0.010	0.00071	1	09/09/20 19:04	09/10/20 12:36	7440-39-3	
Beryllium	ND	mg/L	0.0030	0.000046	1	09/09/20 19:04	09/10/20 12:36	7440-41-7	
Boron	**0.91**	mg/L	0.10	0.0052	1	09/09/20 19:04	09/10/20 12:36	7440-42-8	
Cadmium	ND	mg/L	0.0025	0.00012	1	09/09/20 19:04	09/10/20 12:36	7440-43-9	
Chromium	ND	mg/L	0.010	0.00055	1	09/09/20 19:04	09/10/20 12:36	7440-47-3	
Cobalt	**0.00075J**	mg/L	0.0050	0.00038	1	09/09/20 19:04	09/10/20 12:36	7440-48-4	
Lead	ND	mg/L	0.0050	0.000036	1	09/09/20 19:04	09/10/20 12:36	7439-92-1	
Lithium	**0.00092J**	mg/L	0.030	0.00081	1	09/09/20 19:04	09/10/20 12:36	7439-93-2	
Molybdenum	**0.015**	mg/L	0.010	0.00069	1	09/09/20 19:04	09/10/20 12:36	7439-98-7	
Selenium	**0.0016J**	mg/L	0.010	0.0016	1	09/09/20 19:04	09/10/20 12:36	7782-49-2	
Thallium	ND	mg/L	0.0010	0.00014	1	09/09/20 19:04	09/10/20 12:36	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Peachtree Corners, GA								
Mercury	ND	mg/L	0.00050	0.000078	1	09/10/20 13:00	09/11/20 11:44	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2450C-2011 Pace Analytical Services - Peachtree Corners, GA								
Total Dissolved Solids	**829**	mg/L	10.0	10.0	1		09/08/20 13:11		
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**138**	mg/L	5.0	5.0	1		09/09/20 18:40		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		09/09/20 18:40		
Alkalinity, Total as CaCO3	**138**	mg/L	5.0	5.0	1		09/09/20 18:40		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	ND	mg/L	0.10	0.050	1		09/08/20 19:42	18496-25-8	

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ANALYTICAL RESULTS

Project: BOWEN AP SCAN
Pace Project No.: 92494205

Sample: BGWC-41D **Lab ID: 92494205002** Collected: 09/02/20 12:30 Received: 09/04/20 11:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**210**	mg/L	5.0	3.0	5		09/09/20 15:42	16887-00-6	
Fluoride	**0.088J**	mg/L	0.10	0.050	1		09/09/20 08:17	16984-48-8	
Sulfate	**224**	mg/L	5.0	2.5	5		09/09/20 15:42	14808-79-8	

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ANALYTICAL RESULTS

Project: BOWEN AP SCAN
Pace Project No.: 92494205

Sample: BGWC-42D **Lab ID: 92494205003** Collected: 09/03/20 11:44 Received: 09/04/20 11:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
Field Data	Analytical Method: Pace Analytical Services - Charlotte								
pH	**7.37**	Std. Units			1		09/10/20 09:15		
6010D ATL ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Peachtree Corners, GA								
Calcium	**100**	mg/L	1.0	0.070	1	09/08/20 20:17	09/09/20 19:06	7440-70-2	
Iron	**0.98**	mg/L	0.040	0.016	1	09/08/20 20:17	09/09/20 19:06	7439-89-6	
Magnesium	**37.2**	mg/L	0.050	0.0076	1	09/08/20 20:17	09/09/20 19:06	7439-95-4	
Manganese	**0.092**	mg/L	0.040	0.0017	1	09/08/20 20:17	09/09/20 19:06	7439-96-5	
Potassium	**2.0**	mg/L	0.20	0.056	1	09/08/20 20:17	09/09/20 19:06	7440-09-7	
Sodium	**38.1**	mg/L	1.0	0.26	1	09/08/20 20:17	09/09/20 19:06	7440-23-5	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3005A Pace Analytical Services - Peachtree Corners, GA								
Antimony	**0.00072J**	mg/L	0.0030	0.00028	1	09/09/20 19:04	09/10/20 12:42	7440-36-0	
Arsenic	**0.0023J**	mg/L	0.0050	0.00078	1	09/09/20 19:04	09/10/20 12:42	7440-38-2	
Barium	**0.087**	mg/L	0.010	0.00071	1	09/09/20 19:04	09/10/20 12:42	7440-39-3	
Beryllium	ND	mg/L	0.0030	0.000046	1	09/09/20 19:04	09/10/20 12:42	7440-41-7	
Boron	**1.6**	mg/L	0.10	0.0052	1	09/09/20 19:04	09/10/20 12:42	7440-42-8	
Cadmium	ND	mg/L	0.0025	0.00012	1	09/09/20 19:04	09/10/20 12:42	7440-43-9	
Chromium	ND	mg/L	0.010	0.00055	1	09/09/20 19:04	09/10/20 12:42	7440-47-3	
Cobalt	ND	mg/L	0.0050	0.00038	1	09/09/20 19:04	09/10/20 12:42	7440-48-4	
Lead	ND	mg/L	0.0050	0.000036	1	09/09/20 19:04	09/10/20 12:42	7439-92-1	
Lithium	**0.0014J**	mg/L	0.030	0.00081	1	09/09/20 19:04	09/10/20 12:42	7439-93-2	
Molybdenum	**0.018**	mg/L	0.010	0.00069	1	09/09/20 19:04	09/10/20 12:42	7439-98-7	
Selenium	**0.0022J**	mg/L	0.010	0.0016	1	09/09/20 19:04	09/10/20 12:42	7782-49-2	
Thallium	ND	mg/L	0.0010	0.00014	1	09/09/20 19:04	09/10/20 12:42	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Peachtree Corners, GA								
Mercury	ND	mg/L	0.00050	0.000078	1	09/10/20 13:00	09/11/20 11:46	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2450C-2011 Pace Analytical Services - Peachtree Corners, GA								
Total Dissolved Solids	**611**	mg/L	10.0	10.0	1		09/09/20 17:15		
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**158**	mg/L	5.0	5.0	1		09/09/20 18:49		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		09/09/20 18:49		
Alkalinity, Total as CaCO3	**158**	mg/L	5.0	5.0	1		09/09/20 18:49		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	**0.12**	mg/L	0.10	0.050	1		09/08/20 19:49	18496-25-8	

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ANALYTICAL RESULTS

Project: BOWEN AP SCAN
Pace Project No.: 92494205

Sample: BGWC-42D **Lab ID: 92494205003** Collected: 09/03/20 11:44 Received: 09/04/20 11:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**115**	mg/L	3.0	1.8	3		09/09/20 15:58	16887-00-6	
Fluoride	**0.50**	mg/L	0.10	0.050	1		09/09/20 08:31	16984-48-8	
Sulfate	**141**	mg/L	3.0	1.5	3		09/09/20 15:58	14808-79-8	

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ANALYTICAL RESULTS

Project: BOWEN AP SCAN
Pace Project No.: 92494205

Sample: BGWC-43D **Lab ID: 92494205004** Collected: 09/03/20 10:46 Received: 09/04/20 11:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
Field Data	Analytical Method: Pace Analytical Services - Charlotte								
pH	**7.21**	Std. Units			1		09/10/20 09:15		
6010D ATL ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Peachtree Corners, GA								
Calcium	**383**	mg/L	10.0	0.70	10	09/08/20 20:17	09/10/20 15:46	7440-70-2	
Iron	**0.71**	mg/L	0.040	0.016	1	09/08/20 20:17	09/09/20 19:10	7439-89-6	
Magnesium	**81.8**	mg/L	0.050	0.0076	1	09/08/20 20:17	09/09/20 19:10	7439-95-4	
Manganese	**1.2**	mg/L	0.040	0.0017	1	09/08/20 20:17	09/09/20 19:10	7439-96-5	
Potassium	**6.4**	mg/L	0.20	0.056	1	09/08/20 20:17	09/09/20 19:10	7440-09-7	
Sodium	**29.0**	mg/L	1.0	0.26	1	09/08/20 20:17	09/09/20 19:10	7440-23-5	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3005A Pace Analytical Services - Peachtree Corners, GA								
Antimony	**0.00091J**	mg/L	0.0030	0.00028	1	09/09/20 19:04	09/10/20 12:48	7440-36-0	
Arsenic	**0.00099J**	mg/L	0.0050	0.00078	1	09/09/20 19:04	09/10/20 12:48	7440-38-2	
Barium	**0.083**	mg/L	0.010	0.00071	1	09/09/20 19:04	09/10/20 12:48	7440-39-3	
Beryllium	ND	mg/L	0.0030	0.000046	1	09/09/20 19:04	09/10/20 12:48	7440-41-7	
Boron	**14.6**	mg/L	1.0	0.052	10	09/09/20 19:04	09/14/20 14:04	7440-42-8	
Cadmium	**0.0011J**	mg/L	0.0025	0.00012	1	09/09/20 19:04	09/10/20 12:48	7440-43-9	
Chromium	ND	mg/L	0.010	0.00055	1	09/09/20 19:04	09/10/20 12:48	7440-47-3	
Cobalt	**0.0020J**	mg/L	0.0050	0.00038	1	09/09/20 19:04	09/10/20 12:48	7440-48-4	
Lead	**0.00012J**	mg/L	0.0050	0.000036	1	09/09/20 19:04	09/10/20 12:48	7439-92-1	
Lithium	**0.023J**	mg/L	0.030	0.00081	1	09/09/20 19:04	09/10/20 12:48	7439-93-2	
Molybdenum	**0.11**	mg/L	0.010	0.00069	1	09/09/20 19:04	09/10/20 12:48	7439-98-7	
Selenium	**0.0028J**	mg/L	0.010	0.0016	1	09/09/20 19:04	09/10/20 12:48	7782-49-2	
Thallium	**0.0024**	mg/L	0.0010	0.00014	1	09/09/20 19:04	09/10/20 12:48	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Peachtree Corners, GA								
Mercury	ND	mg/L	0.00050	0.000078	1	09/10/20 13:00	09/11/20 11:48	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2450C-2011 Pace Analytical Services - Peachtree Corners, GA								
Total Dissolved Solids	**1980**	mg/L	10.0	10.0	1		09/09/20 17:16		MW
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**86.8**	mg/L	5.0	5.0	1		09/10/20 15:22		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		09/10/20 15:22		
Alkalinity, Total as CaCO3	**86.8**	mg/L	5.0	5.0	1		09/10/20 15:22		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	ND	mg/L	0.10	0.050	1		09/08/20 19:55	18496-25-8	

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ANALYTICAL RESULTS

Project: BOWEN AP SCAN
Pace Project No.: 92494205

Sample: BGWC-43D **Lab ID: 92494205004** Collected: 09/03/20 10:46 Received: 09/04/20 11:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**564**	mg/L	12.0	7.2	12		09/09/20 16:12	16887-00-6	
Fluoride	**0.87**	mg/L	0.10	0.050	1		09/09/20 08:44	16984-48-8	
Sulfate	**358**	mg/L	12.0	6.0	12		09/09/20 16:12	14808-79-8	

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ANALYTICAL RESULTS

Project: BOWEN AP SCAN
Pace Project No.: 92494205

Sample: BGWC-44D **Lab ID: 92494205005** Collected: 09/03/20 13:15 Received: 09/04/20 11:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
Field Data	Analytical Method: Pace Analytical Services - Charlotte								
pH	**7.60**	Std. Units			1		09/10/20 09:15		
6010D ATL ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Peachtree Corners, GA								
Calcium	**50.2**	mg/L	1.0	0.070	1	09/08/20 20:17	09/09/20 19:14	7440-70-2	
Iron	**0.37**	mg/L	0.040	0.016	1	09/08/20 20:17	09/09/20 19:14	7439-89-6	
Magnesium	**27.9**	mg/L	0.050	0.0076	1	09/08/20 20:17	09/09/20 19:14	7439-95-4	
Manganese	**0.14**	mg/L	0.040	0.0017	1	09/08/20 20:17	09/09/20 19:14	7439-96-5	
Potassium	**1.4**	mg/L	0.20	0.056	1	09/08/20 20:17	09/09/20 19:14	7440-09-7	
Sodium	**34.5**	mg/L	1.0	0.26	1	09/08/20 20:17	09/09/20 19:14	7440-23-5	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3005A Pace Analytical Services - Peachtree Corners, GA								
Antimony	**0.0021J**	mg/L	0.0030	0.00028	1	09/09/20 19:04	09/10/20 12:53	7440-36-0	
Arsenic	**0.0033J**	mg/L	0.0050	0.00078	1	09/09/20 19:04	09/10/20 12:53	7440-38-2	
Barium	**0.020**	mg/L	0.010	0.00071	1	09/09/20 19:04	09/10/20 12:53	7440-39-3	
Beryllium	ND	mg/L	0.0030	0.000046	1	09/09/20 19:04	09/10/20 12:53	7440-41-7	
Boron	**0.083J**	mg/L	0.10	0.0052	1	09/09/20 19:04	09/10/20 12:53	7440-42-8	
Cadmium	ND	mg/L	0.0025	0.00012	1	09/09/20 19:04	09/10/20 12:53	7440-43-9	
Chromium	ND	mg/L	0.010	0.00055	1	09/09/20 19:04	09/10/20 12:53	7440-47-3	
Cobalt	ND	mg/L	0.0050	0.00038	1	09/09/20 19:04	09/10/20 12:53	7440-48-4	
Lead	ND	mg/L	0.0050	0.000036	1	09/09/20 19:04	09/10/20 12:53	7439-92-1	
Lithium	**0.0016J**	mg/L	0.030	0.00081	1	09/09/20 19:04	09/10/20 12:53	7439-93-2	
Molybdenum	**0.0055J**	mg/L	0.010	0.00069	1	09/09/20 19:04	09/10/20 12:53	7439-98-7	
Selenium	ND	mg/L	0.010	0.0016	1	09/09/20 19:04	09/10/20 12:53	7782-49-2	
Thallium	ND	mg/L	0.0010	0.00014	1	09/09/20 19:04	09/10/20 12:53	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Peachtree Corners, GA								
Mercury	ND	mg/L	0.00050	0.000078	1	09/10/20 13:00	09/11/20 11:51	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2450C-2011 Pace Analytical Services - Peachtree Corners, GA								
Total Dissolved Solids	**312**	mg/L	10.0	10.0	1		09/09/20 17:16		
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**247**	mg/L	5.0	5.0	1		09/18/20 20:56		H1
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		09/18/20 20:56		H1
Alkalinity, Total as CaCO3	**247**	mg/L	5.0	5.0	1		09/18/20 20:56		H1
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	**0.53**	mg/L	0.10	0.050	1		09/08/20 19:56	18496-25-8	

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ANALYTICAL RESULTS

Project: BOWEN AP SCAN
Pace Project No.: 92494205

Sample: BGWC-44D **Lab ID: 92494205005** Collected: 09/03/20 13:15 Received: 09/04/20 11:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**18.6**	mg/L	1.0	0.60	1		09/09/20 08:58	16887-00-6	
Fluoride	ND	mg/L	0.10	0.050	1		09/09/20 08:58	16984-48-8	
Sulfate	**31.0**	mg/L	1.0	0.50	1		09/09/20 08:58	14808-79-8	

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QUALITY CONTROL DATA

Project: BOWEN AP SCAN
Pace Project No.: 92494205

QC Batch: 565095
QC Batch Method: EPA 3010A
Analysis Method: EPA 6010D
Analysis Description: 6010D ATL
Laboratory: Pace Analytical Services - Peachtree Corners, GA
Associated Lab Samples: 92494205001, 92494205002, 92494205003, 92494205004, 92494205005

METHOD BLANK: 2995179 Matrix: Water
Associated Lab Samples: 92494205001, 92494205002, 92494205003, 92494205004, 92494205005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Calcium	mg/L	ND	1.0	0.070	09/09/20 17:42	
Iron	mg/L	ND	0.040	0.016	09/09/20 17:42	
Magnesium	mg/L	ND	0.050	0.0076	09/09/20 17:42	
Manganese	mg/L	ND	0.040	0.0017	09/09/20 17:42	
Potassium	mg/L	0.065J	0.20	0.056	09/09/20 17:42	
Sodium	mg/L	ND	1.0	0.26	09/09/20 17:42	

LABORATORY CONTROL SAMPLE: 2995180

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sodium	mg/L	1	1.0	104	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2995181 2995182

Parameter	Units	92494194006 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium	mg/L	51.8	1	1	52.5	52.9	72	108	75-125	1	20	M1
Iron	mg/L	0.36	1	1	1.4	1.4	108	106	75-125	1	20	
Magnesium	mg/L	16.5	1	1	17.4	17.5	88	98	75-125	1	20	
Manganese	mg/L	0.14	1	1	1.2	1.2	102	101	75-125	0	20	
Potassium	mg/L	1.5	1	1	2.5	2.4	100	97	75-125	1	20	
Sodium	mg/L	46.6	1	1	47.2	47.5	57	83	75-125	1	20	M1

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QUALITY CONTROL DATA

Project: BOWEN AP SCAN
Pace Project No.: 92494205

QC Batch: 565403
QC Batch Method: EPA 3005A
Analysis Method: EPA 6020B
Analysis Description: 6020 MET
Laboratory: Pace Analytical Services - Peachtree Corners, GA
Associated Lab Samples: 92494205001, 92494205002, 92494205003, 92494205004, 92494205005

METHOD BLANK: 2996647 Matrix: Water
Associated Lab Samples: 92494205001, 92494205002, 92494205003, 92494205004, 92494205005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Antimony	mg/L	ND	0.0030	0.00028	09/10/20 12:02	
Arsenic	mg/L	ND	0.0050	0.00078	09/10/20 12:02	
Barium	mg/L	ND	0.010	0.00071	09/10/20 12:02	
Beryllium	mg/L	ND	0.0030	0.000046	09/10/20 12:02	
Boron	mg/L	ND	0.10	0.0052	09/10/20 12:02	
Cadmium	mg/L	ND	0.0025	0.00012	09/10/20 12:02	
Chromium	mg/L	ND	0.010	0.00055	09/10/20 12:02	
Cobalt	mg/L	ND	0.0050	0.00038	09/10/20 12:02	
Lead	mg/L	ND	0.0050	0.000036	09/10/20 12:02	
Lithium	mg/L	ND	0.030	0.00081	09/10/20 12:02	
Molybdenum	mg/L	ND	0.010	0.00069	09/10/20 12:02	
Selenium	mg/L	ND	0.010	0.0016	09/10/20 12:02	
Thallium	mg/L	ND	0.0010	0.00014	09/10/20 12:02	

LABORATORY CONTROL SAMPLE: 2996648

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	mg/L	0.1	0.11	113	80-120	
Arsenic	mg/L	0.1	0.10	104	80-120	
Barium	mg/L	0.1	0.10	101	80-120	
Beryllium	mg/L	0.1	0.095	95	80-120	
Boron	mg/L	1	0.94	94	80-120	
Cadmium	mg/L	0.1	0.10	104	80-120	
Chromium	mg/L	0.1	0.098	98	80-120	
Cobalt	mg/L	0.1	0.10	101	80-120	
Lead	mg/L	0.1	0.099	99	80-120	
Lithium	mg/L	0.1	0.094	94	80-120	
Molybdenum	mg/L	0.1	0.10	104	80-120	
Selenium	mg/L	0.1	0.10	102	80-120	
Thallium	mg/L	0.1	0.099	99	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2996649 2996650

Parameter	Units	92494205001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Antimony	mg/L	0.0016J	0.1	0.1	0.11	0.11	109	111	75-125	2	20	
Arsenic	mg/L	0.0012J	0.1	0.1	0.10	0.10	101	104	75-125	3	20	

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QUALITY CONTROL DATA

Project: BOWEN AP SCAN
Pace Project No.: 92494205

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2996649 2996650

Parameter	Units	92494205001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Barium	mg/L	0.19	0.1	0.1	0.28	0.28	90	92	75-125	1	20	
Beryllium	mg/L	0.000060J	0.1	0.1	0.090	0.090	90	90	75-125	0	20	
Boron	mg/L	7.8	1	1	8.1	8.2	35	41	75-125	1	20	M1
Cadmium	mg/L	0.00032J	0.1	0.1	0.098	0.10	97	100	75-125	3	20	
Chromium	mg/L	ND	0.1	0.1	0.095	0.097	95	96	75-125	2	20	
Cobalt	mg/L	0.0043J	0.1	0.1	0.098	0.099	93	95	75-125	1	20	
Lead	mg/L	0.00022J	0.1	0.1	0.093	0.096	93	96	75-125	3	20	
Lithium	mg/L	0.0096J	0.1	0.1	0.099	0.099	89	89	75-125	0	20	
Molybdenum	mg/L	0.10	0.1	0.1	0.20	0.21	99	103	75-125	2	20	
Selenium	mg/L	0.0030J	0.1	0.1	0.095	0.10	92	97	75-125	5	20	
Thallium	mg/L	0.00042J	0.1	0.1	0.094	0.098	93	97	75-125	4	20	

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QUALITY CONTROL DATA

Project: BOWEN AP SCAN
Pace Project No.: 92494205

QC Batch: 565578
QC Batch Method: EPA 7470A
Analysis Method: EPA 7470A
Analysis Description: 7470 Mercury
Laboratory: Pace Analytical Services - Peachtree Corners, GA
Associated Lab Samples: 92494205001, 92494205002, 92494205003, 92494205004, 92494205005

METHOD BLANK: 2997348 Matrix: Water
Associated Lab Samples: 92494205001, 92494205002, 92494205003, 92494205004, 92494205005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00050	0.000078	09/11/20 11:37	

LABORATORY CONTROL SAMPLE: 2997349

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	0.0025	0.0026	102	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2997350 2997351

Parameter	Units	92494171020 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	ND	0.0025	0.0025	0.0024	0.0024	95	98	75-125	3	20	

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QUALITY CONTROL DATA

Project: BOWEN AP SCAN
Pace Project No.: 92494205

QC Batch: 564965
QC Batch Method: SM 2450C-2011
Analysis Method: SM 2450C-2011
Analysis Description: 2540C Total Dissolved Solids
Laboratory: Pace Analytical Services - Peachtree Corners, GA
Associated Lab Samples: 92494205001, 92494205002

METHOD BLANK: 2994687 Matrix: Water
Associated Lab Samples: 92494205001, 92494205002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	ND	10.0	10.0	09/08/20 13:10	

LABORATORY CONTROL SAMPLE: 2994688

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	400	394	98	84-108	

SAMPLE DUPLICATE: 2994689

Parameter	Units	92494205001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	982	976	1	10	

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REPORT OF LABORATORY ANALYSIS

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110 Technology Parkway
Peachtree Corners, GA 30092
(770)734-4200

QUALITY CONTROL DATA

Project: BOWEN AP SCAN
Pace Project No.: 92494205

QC Batch: 565351
QC Batch Method: SM 2450C-2011
Analysis Method: SM 2450C-2011
Analysis Description: 2540C Total Dissolved Solids
Laboratory: Pace Analytical Services - Peachtree Corners, GA
Associated Lab Samples: 92494205003, 92494205004, 92494205005

METHOD BLANK: 2996312 Matrix: Water
Associated Lab Samples: 92494205003, 92494205004, 92494205005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	ND	10.0	10.0	09/09/20 17:13	

LABORATORY CONTROL SAMPLE: 2996313

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	400	401	100	84-108	

SAMPLE DUPLICATE: 2996315

Parameter	Units	92494205003 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	611	621	2	10	

SAMPLE DUPLICATE: 3000170

Parameter	Units	92494171009 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	21.0	22.0	5	10	

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(770)734-4200

QUALITY CONTROL DATA

Project: BOWEN AP SCAN
Pace Project No.: 92494205

QC Batch: 565218
QC Batch Method: SM 2320B-2011
Analysis Method: SM 2320B-2011
Analysis Description: 2320B Alkalinity
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92494205001, 92494205002, 92494205003

METHOD BLANK: 2995440 Matrix: Water
Associated Lab Samples: 92494205001, 92494205002, 92494205003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	ND	5.0	5.0	09/09/20 13:24	
Alkalinity,Bicarbonate (CaCO3)	mg/L	ND	5.0	5.0	09/09/20 13:24	
Alkalinity,Carbonate (CaCO3)	mg/L	ND	5.0	5.0	09/09/20 13:24	

LABORATORY CONTROL SAMPLE: 2995441

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	50	46.7	93	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2995442 2995443

Parameter	Units	92493653001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	21.7	50	50	73.5	73.8	104	104	80-120	0	25	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2995444 2995445

Parameter	Units	92494262001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	137	50	50	185	190	97	105	80-120	2	25	

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QUALITY CONTROL DATA

Project: BOWEN AP SCAN
Pace Project No.: 92494205

QC Batch: 565544
QC Batch Method: SM 2320B-2011
Analysis Method: SM 2320B-2011
Analysis Description: 2320B Alkalinity
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92494205004

METHOD BLANK: 2997173 Matrix: Water
Associated Lab Samples: 92494205004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	ND	5.0	5.0	09/10/20 11:37	
Alkalinity,Bicarbonate (CaCO3)	mg/L	ND	5.0	5.0	09/10/20 11:37	
Alkalinity,Carbonate (CaCO3)	mg/L	ND	5.0	5.0	09/10/20 11:37	

LABORATORY CONTROL SAMPLE: 2997174

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	50	46.8	94	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2997175 2997176

Parameter	Units	92494467001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	93.7	50	50	136	141	84	94	80-120	3	25	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2997177 2997178

Parameter	Units	92494482004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	120	50	50	168	166	95	91	80-120	1	25	

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QUALITY CONTROL DATA

Project: BOWEN AP SCAN
Pace Project No.: 92494205

QC Batch: 567396
QC Batch Method: SM 2320B-2011
Analysis Method: SM 2320B-2011
Analysis Description: 2320B Alkalinity
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92494205005

METHOD BLANK: 3006743 Matrix: Water
Associated Lab Samples: 92494205005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	ND	5.0	5.0	09/18/20 18:18	
Alkalinity,Bicarbonate (CaCO3)	mg/L	ND	5.0	5.0	09/18/20 18:18	
Alkalinity,Carbonate (CaCO3)	mg/L	ND	5.0	5.0	09/18/20 18:18	

LABORATORY CONTROL SAMPLE: 3006744

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	50	49.6	99	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3006871 3006872

Parameter	Units	92494157001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	559	50	50	610	613	103	108	80-120	0	25	

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QUALITY CONTROL DATA

Project: BOWEN AP SCAN
Pace Project No.: 92494205

QC Batch: 565077
QC Batch Method: SM 4500-S2D-2011
Analysis Method: SM 4500-S2D-2011
Analysis Description: 4500S2D Sulfide Water
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92494205001, 92494205002, 92494205003, 92494205004, 92494205005

METHOD BLANK: 2995118 Matrix: Water
Associated Lab Samples: 92494205001, 92494205002, 92494205003, 92494205004, 92494205005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Sulfide	mg/L	ND	0.10	0.050	09/08/20 19:20	

LABORATORY CONTROL SAMPLE: 2995119

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfide	mg/L	0.5	0.53	107	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2995120 2995121

Parameter	Units	92493493001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfide	mg/L	ND	0.5	0.5	ND	ND	2	3	80-120		10	M1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2995122 2995123

Parameter	Units	92493493002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfide	mg/L	ND	0.5	0.5	0.14	0.14	27	28	80-120	3	10	M1

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QUALITY CONTROL DATA

Project: BOWEN AP SCAN
Pace Project No.: 92494205

QC Batch: 565117
QC Batch Method: EPA 300.0 Rev 2.1 1993
Analysis Method: EPA 300.0 Rev 2.1 1993
Analysis Description: 300.0 IC Anions
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92494205001, 92494205002, 92494205003, 92494205004, 92494205005

METHOD BLANK: 2995245 Matrix: Water
Associated Lab Samples: 92494205001, 92494205002, 92494205003, 92494205004, 92494205005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	ND	1.0	0.60	09/08/20 22:30	
Fluoride	mg/L	ND	0.10	0.050	09/08/20 22:30	
Sulfate	mg/L	ND	1.0	0.50	09/08/20 22:30	

LABORATORY CONTROL SAMPLE: 2995246

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	50	50.5	101	90-110	
Fluoride	mg/L	2.5	2.5	99	90-110	
Sulfate	mg/L	50	50.7	101	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2995247 2995248

Parameter	Units	92494194008 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	ND	50	50	47.8	47.9	96	96	90-110	0	10	
Fluoride	mg/L	ND	2.5	2.5	2.3	2.3	94	93	90-110	1	10	
Sulfate	mg/L	ND	50	50	47.6	47.8	95	96	90-110	0	10	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2995249 2995250

Parameter	Units	92494262001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	45.0	50	50	92.6	93.2	95	96	90-110	1	10	
Fluoride	mg/L	0.25	2.5	2.5	2.7	2.8	100	104	90-110	4	10	
Sulfate	mg/L	42.2	50	50	89.6	90.2	95	96	90-110	1	10	

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QUALIFIERS

Project: BOWEN AP SCAN
Pace Project No.: 92494205

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.

TNTC - Too Numerous To Count

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.

Acid preservation may not be appropriate for 2 Chloroethylvinyl ether.

A separate vial preserved to a pH of 4-5 is recommended in SW846 Chapter 4 for the analysis of Acrolein and Acrylonitrile by EPA Method 8260.

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

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.
MW	Due to matrix interference, achieving a constant weight is not possible.

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110 Technology Parkway
Peachtree Corners, GA 30092
(770)734-4200

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: BOWEN AP SCAN
Pace Project No.: 92494205

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
92494205001	**BGWC-38D**				
92494205002	**BGWC-41D**				
92494205003	**BGWC-42D**				
92494205004	**BGWC-43D**				
92494205005	**BGWC-44D**				
92494205001	**BGWC-38D**	EPA 3010A	565095	EPA 6010D	565118
92494205002	**BGWC-41D**	EPA 3010A	565095	EPA 6010D	565118
92494205003	**BGWC-42D**	EPA 3010A	565095	EPA 6010D	565118
92494205004	**BGWC-43D**	EPA 3010A	565095	EPA 6010D	565118
92494205005	**BGWC-44D**	EPA 3010A	565095	EPA 6010D	565118
92494205001	**BGWC-38D**	EPA 3005A	565403	EPA 6020B	565411
92494205002	**BGWC-41D**	EPA 3005A	565403	EPA 6020B	565411
92494205003	**BGWC-42D**	EPA 3005A	565403	EPA 6020B	565411
92494205004	**BGWC-43D**	EPA 3005A	565403	EPA 6020B	565411
92494205005	**BGWC-44D**	EPA 3005A	565403	EPA 6020B	565411
92494205001	**BGWC-38D**	EPA 7470A	565578	EPA 7470A	565644
92494205002	**BGWC-41D**	EPA 7470A	565578	EPA 7470A	565644
92494205003	**BGWC-42D**	EPA 7470A	565578	EPA 7470A	565644
92494205004	**BGWC-43D**	EPA 7470A	565578	EPA 7470A	565644
92494205005	**BGWC-44D**	EPA 7470A	565578	EPA 7470A	565644
92494205001	**BGWC-38D**	SM 2450C-2011	564965		
92494205002	**BGWC-41D**	SM 2450C-2011	564965		
92494205003	**BGWC-42D**	SM 2450C-2011	565351		
92494205004	**BGWC-43D**	SM 2450C-2011	565351		
92494205005	**BGWC-44D**	SM 2450C-2011	565351		
92494205001	**BGWC-38D**	SM 2320B-2011	565218		
92494205002	**BGWC-41D**	SM 2320B-2011	565218		
92494205003	**BGWC-42D**	SM 2320B-2011	565218		
92494205004	**BGWC-43D**	SM 2320B-2011	565544		
92494205005	**BGWC-44D**	SM 2320B-2011	567396		
92494205001	**BGWC-38D**	SM 4500-S2D-2011	565077		
92494205002	**BGWC-41D**	SM 4500-S2D-2011	565077		
92494205003	**BGWC-42D**	SM 4500-S2D-2011	565077		
92494205004	**BGWC-43D**	SM 4500-S2D-2011	565077		
92494205005	**BGWC-44D**	SM 4500-S2D-2011	565077		
92494205001	**BGWC-38D**	EPA 300.0 Rev 2.1 1993	565117		
92494205002	**BGWC-41D**	EPA 300.0 Rev 2.1 1993	565117		
92494205003	**BGWC-42D**	EPA 300.0 Rev 2.1 1993	565117		
92494205004	**BGWC-43D**	EPA 300.0 Rev 2.1 1993	565117		
92494205005	**BGWC-44D**	EPA 300.0 Rev 2.1 1993	565117		

REPORT OF LABORATORY ANALYSIS

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Sample Condition Upon Receipt

Pace Analytical

Client Name: GA Power

WO#: 92494205

92494205

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☐ Client ☑ Commercial ☐ Pace Other

Tracking #: _____

Proj. Name:

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

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☐ None ☑ Other ziploc

Thermometer Used THR214 Type of Ice: ~~Wet~~ Blue None ☐ Samples on ice, cooling process has begun

Cooler Temperature 1.5 Biological Tissue is Frozen: Yes No

Date and initials of person examining contents: KRW 9/4/20

Temp should be above freezing to 6°C

Comments:

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

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

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

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

Pace Analytical	Document Name: Bottle Identification Form (BIF)	Document Issued: March 14, 2019 Page 1 of 1
	Document No.: F-CAR-CS-043-Rev.00	Issuing Authority:

Project #

WO# : 92494205

PM: KLH1 Due Date: 09/21/20

CLIENT: GA-GA Power

*Check mark top half of box if pH and/or dechlorination is verified and within the acceptance range for preservation samples.

Exceptions: VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC, LLHg

**Bottom half of box is to list number of bottle

Matrix	Items#	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-)	AG3U-250 mL Amber H2SO4 (pH < 2)	AG1S-1 liter Amber H2SO4 (pH < 2)	AG3S-250 mL Amber H2SO4 (pH < 2)	AG8A(DG3A)-250 mL Amber NH4Cl (N/A)(Cl-)	AG8A(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)	BP1N	BP3A-250 mL Plastic (NH2)2SO4 (9.3-9.7)	AG0U-100 mL Amber Unpreserved vials (N/A)	VSGU-20 mL Scintillation vials (N/A)
	1		—	—			—	—																				2			
	2		—	—			—	—																				2			
	3		—	—			—	—																				2			
	4		—	—			—	—																				2			
	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 C

Out of hold, incorrect preservative, out of temp, incorrect containers.

Pace Analytical
www.pacelabs.com

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: 1 of 1

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company:	GA Power	Report To:	SCS Contacts	Attention:	Southern Co.
Address:	Atlanta, GA	Copy To:	Geosyntec Contacts	Company Name:	
				Address:	
Email To:	SCS Contacts	Purchase Order No.:		Pace Quote Reference:	
Phone:	Fax:	Project Name:	Plant Bowen AP Scan	Pace Project Manager:	Kevin Herring
Requested Due Date/TAT:		Project Number:		Pace Profile #:	

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☑ OTHER ~~CCR~~

Site Location STATE: GA

Section D Required Client Information

Valid Matrix Codes

MATRIX	CODE
DRINKING WATER	DW
WATER	WT
WASTE WATER	WW
PRODUCT	P
SOIL/SOLID	SL
OIL	OL
WIPE	WP
AIR	AR
OTHER	OT
TISSUE	TS

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED DATE	COLLECTED TIME	COMPOSITE DATE	COMPOSITE TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Chloride/ Flouride/ Sulfate	Metals 6020	Alkalinity & BiCarb	Sulfide	TDS	RAD 9315/9320	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D. 92494205
1	BGWC-38D			9/2/20	1537				6	2		3		1					x	x	x	x	x	x		6.49
2	BGWC-41D			9/2/20	1230				6	2		3		1					x	x	x	x	x	x		7.45
3	BGWC-42D																									
4	BGWC-43D																									
5	BGWC-44D																									
6																										
7																										
8																										
9																										
10																										
11																										
12																										

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS: Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
	Kevin Stephenson	9/3/20	0648	Cindy Mardis	9/3/20	0648				
	Cindy Mardis	9/4	11:20	Ryan Williams / Pace	9/4/20	11:20				
*Metals= App. III and IV + Mg,Mn,K,Na,Fe	Ryan Williams / Pace	9/4/20	3:46	Charles Hawk	9/4/20	1546	1.5	X	N	X

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Kevin Stephenson / Will Laaker / Veronica Fay / Joe Booth

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 9/2/20

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days

F-ALL-Q-020rev.07, 15-Feb-2007

Pace Analytical
www.pacelabs.com

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: 1 of 1

Section A Required Client Information:	Section B Required Project Information:	Section C Invoice Information:
Company: GA Power	Report To: SCS Contacts	Attention: Southern Co.
Address: Atlanta, GA	Copy To: Geosyntec Contacts	Company Name:
		Address:
Email To: SCS Contacts	Purchase Order No.:	Pace Quote Reference:
Phone: Fax:	Project Name: Plant Bowen AP Scan	Pace Project Manager: Kevin Herring
Requested Due Date/TAT: Standard	Project Number:	Pace Profile #:

REGULATORY AGENCY

NPDES ☐ GROUND WATER ☐ DRINKING WATER ☐
UST ☐ RCRA ☐ OTHER ☑ CCR

Site Location STATE: GA

Section D Required Client Information

SAMPLE ID
(A-Z, 0-9 / ,-)
Sample IDs MUST BE UNIQUE

Valid Matrix Codes

MATRIX	CODE
DRINKING WATER	DW
WATER	WT
WASTE WATER	WW
PRODUCT	P
SOIL/SOLID	SL
OIL	OL
WIPE	WP
AIR	AR
OTHER	OT
TISSUE	TS

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED DATE	COLLECTED TIME	COMPOSITE DATE	COMPOSITE TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Chloride/ Flouride/ Sulfate	Metals 6020	Alkalinity & BiCarb	Sulfide	TDS	RAD 9315/9320	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
	Requested Analysis Filtered (Y/N)																									
1	~~BGWC-38D~~																		X	X	X	X	X	X		
2	~~BGWC-41D~~																		X	X	X	X	X	X		
3	BGWC-42D	WT	G	9/3/20	1144				6	2		3		1					X	X	X	X	X	X		pH 7.37
4	BGWC-43D	WT	G	9/3/20	1046				6	2		3		1					X	X	X	X	X	X		pH 7.21
5	BGWC-44D	WT	G	9/3/20	1315				6	2		3		1					X	X	X	X	X	X		pH 7.60
6																										
7																										
8																										
9																										
10																										
11																										
12																										

92492405

Pace Project No./ Lab I.D.

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
	William Laaker / Resolute	9/3/20	5:00	Cindy Mardis / Resolute	9/3	5:00	
	Cindy Mardis	9/4	11:20	Ryan W. Williams / Pace	9/4/20	11:20	
*Metals= App. III and IV + Mg,Mn,K,Na,Fe	Ryan W. Williams / Pace	9/4/20	3:46	[signature]	9/4/20	1546	1.5 Y N Y

SAMPLER NAME AND SIGNATURE	Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
PRINT Name of SAMPLER: Kevin Stephenson / Will Laaker / Veronica Fay / Joe Booth				
SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 9/3/20				

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

Pace Analytical Services, LLC
110 Technology Parkway
Peachtree Corners, GA 30092
(770)734-4200

November 02, 2020

Joju Abraham
Georgia Power-CCR
2480 Maner Road
Atlanta, GA 30339

RE: Project: BOWEN AP
Pace Project No.: 92497532

Dear Joju Abraham:

Enclosed are the analytical results for sample(s) received by the laboratory between September 25, 2020 and September 30, 2020. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

The test results provided in this final report were generated by each of the following laboratories within the Pace Network:

- Pace Analytical Services - Asheville
- Pace Analytical Services - Charlotte
- Pace Analytical Services - Peachtree Corners, GA

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

Sincerely,

Tyler Forney for
Kevin Herring
kevin.herring@pacelabs.com
1(704)875-9092
HORIZON Database Administrator

Enclosures

cc: Christine Hug, Geosyntec Consultants, Inc.
Kristen Jurinko
Thomas Kessler, Geosyntec
Whitney Law, Geosyntec Consultants
Noelia Muskus, Geosyntec Consultants
Ms. Lauren Petty, Southern Co. Services
Nardos Tilahun, GeoSyntec
Dawit Yifru, Geosyntec Consultants, Inc.

REPORT OF LABORATORY ANALYSIS

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Pace Analytical Services, LLC
110 Technology Parkway
Peachtree Corners, GA 30092
(770)734-4200

CERTIFICATIONS

Project: BOWEN AP
Pace Project No.: 92497532

Pace Analytical Services Charlotte
9800 Kincey Ave. Ste 100, Huntersville, NC 28078
Louisiana/NELAP Certification # LA170028
North Carolina Drinking Water Certification #: 37706
North Carolina Field Services Certification #: 5342
North Carolina Wastewater Certification #: 12
South Carolina Certification #: 99006001
Florida/NELAP Certification #: E87627
Kentucky UST Certification #: 84
Virginia/VELAP Certification #: 460221

Pace Analytical Services Asheville
2225 Riverside Drive, Asheville, NC 28804
Florida/NELAP Certification #: E87648
Massachusetts Certification #: M-NC030
North Carolina Drinking Water Certification #: 37712
North Carolina Wastewater Certification #: 40
South Carolina Certification #: 99030001
Virginia/VELAP Certification #: 460222

Pace Analytical Services Peachtree Corners
110 Technology Pkwy, 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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(770)734-4200

SAMPLE SUMMARY

Project: BOWEN AP
Pace Project No.: 92497532

Lab ID	Sample ID	Matrix	Date Collected	Date Received
92497532001	BGWA-2	Water	09/23/20 13:26	09/25/20 09:20
92497532002	BGWA-29	Water	09/23/20 12:04	09/25/20 09:20
92497532003	BGWC-8	Water	09/23/20 16:00	09/25/20 09:20
92497532004	BGWA-6	Water	09/23/20 16:34	09/25/20 09:20
92497532005	FBL092320	Water	09/23/20 16:50	09/25/20 09:20
92497532006	BGWC-9	Water	09/24/20 10:28	09/25/20 09:20
92497532007	BGWC-10	Water	09/24/20 16:04	09/25/20 09:20
92497532008	BGWC-16	Water	09/24/20 11:35	09/25/20 09:20
92497532009	BGWC-17	Water	09/24/20 12:45	09/25/20 09:20
92497532010	BGWC-18	Water	09/24/20 11:18	09/25/20 09:20
92497532011	BGWC-21	Water	09/24/20 15:41	09/25/20 09:20
92497532012	BGWC-22	Water	09/24/20 14:12	09/25/20 09:20
92497532013	BGWC-23	Water	09/24/20 12:37	09/25/20 09:20
92497532014	DUP-1	Water	09/24/20 00:00	09/25/20 09:20
92497532015	FBL092420	Water	09/24/20 16:05	09/25/20 09:20
92497532016	BGWA-33	Water	09/25/20 09:44	09/25/20 16:42
92497532017	BGWC-7	Water	09/25/20 11:22	09/25/20 16:42
92497532018	BGWC-12	Water	09/25/20 10:25	09/25/20 16:42
92497532019	BGWC-24	Water	09/25/20 13:25	09/25/20 16:42
92497532020	BGWC-30	Water	09/25/20 13:10	09/25/20 16:42
92497532021	BGWC-32	Water	09/25/20 12:46	09/25/20 16:42
92497532022	BGWC-35D	Water	09/25/20 10:21	09/25/20 16:42
92497532023	BGWC-37D	Water	09/25/20 12:05	09/25/20 16:42
92497532024	DUP-2	Water	09/25/20 00:00	09/25/20 16:42
92497532025	FBL092520	Water	09/25/20 13:46	09/25/20 16:42
92497532026	EQBL092520	Water	09/25/20 13:52	09/25/20 16:42
92497532027	BGWC-19	Water	09/28/20 10:15	09/29/20 11:30
92497532028	BGWC-20	Water	09/28/20 13:59	09/29/20 11:30
92497532029	BGWC-25	Water	09/28/20 15:05	09/29/20 11:30
92497532030	BGWC-31	Water	09/28/20 16:08	09/29/20 11:30
92497532031	BGWC-34D	Water	09/28/20 12:48	09/29/20 11:30
92497532032	BGWC-36D	Water	09/28/20 11:12	09/29/20 11:30
92497532033	DUP-3	Water	09/28/20 00:00	09/29/20 11:30
92497532034	FBL092820	Water	09/28/20 15:14	09/29/20 11:30
92497532035	EQBL092820	Water	09/28/20 15:20	09/29/20 11:30
92497532036	BGWC-39	Water	09/29/20 10:17	09/30/20 10:23
92497532037	BGWC-40	Water	09/29/20 11:14	09/30/20 10:23

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110 Technology Parkway
Peachtree Corners, GA 30092
(770)734-4200

SAMPLE SUMMARY

Project: BOWEN AP
Pace Project No.: 92497532

Lab ID	Sample ID	Matrix	Date Collected	Date Received
92497532038	**FBL092920**	Water	09/29/20 12:00	09/30/20 10:23
92497532039	**EQBL092920**	Water	09/29/20 12:08	09/30/20 10:23

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SAMPLE ANALYTE COUNT

Project: BOWEN AP
Pace Project No.: 92497532

Lab ID	Sample ID	Method	Analysts	Analytes Reported
92497532001	**BGWA-2**	EPA 6010D	DRB	6
		EPA 6020B	KH	13
		EPA 7470A	VB	1
		SM 2450C-2011	JRS	1
		SM 2320B-2011	ECH	3
		SM 4500-S2D-2011	NAL	1
		EPA 300.0 Rev 2.1 1993	BRJ	3
92497532002	**BGWA-29**	EPA 6010D	DRB	6
		EPA 6020B	KH	13
		EPA 7470A	VB	1
		SM 2450C-2011	JRS	1
		SM 2320B-2011	ECH	3
		SM 4500-S2D-2011	NAL	1
		EPA 300.0 Rev 2.1 1993	BRJ	3
92497532003	**BGWC-8**	EPA 6010D	DRB	6
		EPA 6020B	KH	13
		EPA 7470A	VB	1
		SM 2450C-2011	JRS	1
		SM 2320B-2011	ECH	3
		SM 4500-S2D-2011	NAL	1
		EPA 300.0 Rev 2.1 1993	BRJ	3
92497532004	**BGWA-6**	EPA 6010D	DRB	6
		EPA 6020B	CW1	13
		EPA 7470A	VB	1
		SM 2450C-2011	JRS	1
		SM 2320B-2011	ECH	3
		SM 4500-S2D-2011	NAL	1
		EPA 300.0 Rev 2.1 1993	BRJ	3
92497532005	**FBL092320**	EPA 6010D	DRB	6
		EPA 6020B	CW1	13
		EPA 7470A	VB	1
		SM 2450C-2011	AW1	1
		SM 2320B-2011	ECH	3
		SM 4500-S2D-2011	NAL	1
		EPA 300.0 Rev 2.1 1993	BRJ	3
92497532006	**BGWC-9**	EPA 6010D	DRB	6
		EPA 6020B	CW1	13

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SAMPLE ANALYTE COUNT

Project: BOWEN AP
Pace Project No.: 92497532

Lab ID	Sample ID	Method	Analysts	Analytes Reported
		EPA 7470A	VB	1
		SM 2450C-2011	JRS	1
		SM 2320B-2011	ECH	3
		SM 4500-S2D-2011	NAL	1
		EPA 300.0 Rev 2.1 1993	BRJ	3
92497532007	**BGWC-10**	EPA 6010D	DRB	6
		EPA 6020B	CW1	13
		EPA 7470A	VB	1
		SM 2450C-2011	JRS	1
		SM 2320B-2011	ECH	3
		SM 4500-S2D-2011	NAL	1
		EPA 300.0 Rev 2.1 1993	BRJ	3
92497532008	**BGWC-16**	EPA 6010D	DRB	6
		EPA 6020B	CW1	13
		EPA 7470A	VB	1
		SM 2450C-2011	JRS	1
		SM 2320B-2011	ECH	3
		SM 4500-S2D-2011	NAL	1
		EPA 300.0 Rev 2.1 1993	BRJ	3
92497532009	**BGWC-17**	EPA 6010D	DRB	6
		EPA 6020B	CW1	13
		EPA 7470A	VB	1
		SM 2450C-2011	JRS	1
		SM 2320B-2011	ECH	3
		SM 4500-S2D-2011	NAL	1
		EPA 300.0 Rev 2.1 1993	BRJ	3
92497532010	**BGWC-18**	EPA 6010D	DRB	6
		EPA 6020B	CW1	13
		EPA 7470A	VB	1
		SM 2450C-2011	JRS	1
		SM 2320B-2011	ECH	3
		SM 4500-S2D-2011	NAL	1
		EPA 300.0 Rev 2.1 1993	BRJ	3
92497532011	**BGWC-21**	EPA 6010D	DRB	6
		EPA 6020B	CW1	13
		EPA 7470A	VB	1
		SM 2450C-2011	JRS	1

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(770)734-4200

SAMPLE ANALYTE COUNT

Project: BOWEN AP
Pace Project No.: 92497532

Lab ID	Sample ID	Method	Analysts	Analytes Reported
		SM 2320B-2011	ECH	3
		SM 4500-S2D-2011	NAL	1
		EPA 300.0 Rev 2.1 1993	BRJ	3
92497532012	**BGWC-22**	EPA 6010D	DRB	6
		EPA 6020B	CW1	13
		EPA 7470A	VB	1
		SM 2450C-2011	JRS	1
		SM 2320B-2011	ECH	3
		SM 4500-S2D-2011	NAL	1
		EPA 300.0 Rev 2.1 1993	BRJ	3
92497532013	**BGWC-23**	EPA 6010D	DRB	6
		EPA 6020B	CW1	13
		EPA 7470A	VB	1
		SM 2450C-2011	AW1	1
		SM 2320B-2011	ECH	3
		SM 4500-S2D-2011	NAL	1
		EPA 300.0 Rev 2.1 1993	BRJ	3
92497532014	**DUP-1**	EPA 6010D	DRB	6
		EPA 6020B	CW1	13
		EPA 7470A	VB	1
		SM 2450C-2011	AW1	1
		SM 2320B-2011	ECH	3
		SM 4500-S2D-2011	NAL	1
		EPA 300.0 Rev 2.1 1993	BRJ	3
92497532015	**FBL092420**	EPA 6010D	DRB	6
		EPA 6020B	CW1	13
		EPA 7470A	VB	1
		SM 2450C-2011	AW1	1
		SM 2320B-2011	ECH	3
		SM 4500-S2D-2011	NAL	1
		EPA 300.0 Rev 2.1 1993	BRJ	3
92497532016	**BGWA-33**	EPA 6010D	DRB	6
		EPA 6020B	CW1	13
		EPA 7470A	VB	1
		SM 2450C-2011	AW1	1
		SM 2320B-2011	ECH	3
		SM 4500-S2D-2011	NAL	1

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Peachtree Corners, GA 30092
(770)734-4200

SAMPLE ANALYTE COUNT

Project: BOWEN AP
Pace Project No.: 92497532

Lab ID	Sample ID	Method	Analysts	Analytes Reported
		EPA 300.0 Rev 2.1 1993	CDC	3
92497532017	**BGWC-7**	EPA 6010D	DRB	6
		EPA 6020B	CW1	13
		EPA 7470A	VB	1
		SM 2450C-2011	AW1	1
		SM 2320B-2011	ECH	3
		SM 4500-S2D-2011	NAL	1
		EPA 300.0 Rev 2.1 1993	CDC	3
92497532018	**BGWC-12**	EPA 6010D	DRB	6
		EPA 6020B	CW1	13
		EPA 7470A	VB	1
		SM 2450C-2011	AW1	1
		SM 2320B-2011	ECH	3
		SM 4500-S2D-2011	NAL	1
		EPA 300.0 Rev 2.1 1993	CDC	3
92497532019	**BGWC-24**	EPA 6010D	DRB	6
		EPA 6020B	CW1	13
		EPA 7470A	VB	1
		SM 2450C-2011	AW1	1
		SM 2320B-2011	ECH	3
		SM 4500-S2D-2011	NAL	1
		EPA 300.0 Rev 2.1 1993	CDC	3
92497532020	**BGWC-30**	EPA 6010D	DRB	6
		EPA 6020B	CW1	13
		EPA 7470A	VB	1
		SM 2450C-2011	AW1	1
		SM 2320B-2011	ECH	3
		SM 4500-S2D-2011	NAL	1
		EPA 300.0 Rev 2.1 1993	CDC	3
92497532021	**BGWC-32**	EPA 6010D	DRB	6
		EPA 6020B	CW1	13
		EPA 7470A	VB	1
		SM 2450C-2011	AW1	1
		SM 2320B-2011	ECH	3
		SM 4500-S2D-2011	NAL	1
		EPA 300.0 Rev 2.1 1993	CDC	3
92497532022	**BGWC-35D**	EPA 6010D	DRB	6

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Peachtree Corners, GA 30092
(770)734-4200

SAMPLE ANALYTE COUNT

Project: BOWEN AP
Pace Project No.: 92497532

Lab ID	Sample ID	Method	Analysts	Analytes Reported
		EPA 6020B	CW1	13
		EPA 7470A	VB	1
		SM 2450C-2011	AW1	1
		SM 2320B-2011	ECH	3
		SM 4500-S2D-2011	NAL	1
		EPA 300.0 Rev 2.1 1993	CDC	3
92497532023	**BGWC-37D**	EPA 6010D	DRB	6
		EPA 6020B	CW1	13
		EPA 7470A	VB	1
		SM 2450C-2011	AW1	1
		SM 2320B-2011	ECH	3
		SM 4500-S2D-2011	NAL	1
		EPA 300.0 Rev 2.1 1993	CDC	3
92497532024	**DUP-2**	EPA 6010D	DRB	6
		EPA 6020B	CW1	13
		EPA 7470A	VB	1
		SM 2450C-2011	AW1	1
		SM 2320B-2011	ECH	3
		SM 4500-S2D-2011	NAL	1
		EPA 300.0 Rev 2.1 1993	CDC	3
92497532025	**FBL092520**	EPA 6010D	DRB	6
		EPA 6020B	CW1	13
		EPA 7470A	VB	1
		SM 2450C-2011	AW1	1
		SM 2320B-2011	ECH	3
		SM 4500-S2D-2011	NAL	1
		EPA 300.0 Rev 2.1 1993	CDC	3
92497532026	**EQBL092520**	EPA 6010D	DRB	6
		EPA 6020B	CW1	13
		EPA 7470A	VB	1
		SM 2450C-2011	AW1	1
		SM 2320B-2011	ECH	3
		SM 4500-S2D-2011	NAL	1
		EPA 300.0 Rev 2.1 1993	CDC	3
92497532027	**BGWC-19**	EPA 6010D	DRB	6
		EPA 6020B	KH	13
		EPA 7470A	VB	1

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110 Technology Parkway
Peachtree Corners, GA 30092
(770)734-4200

SAMPLE ANALYTE COUNT

Project: BOWEN AP
Pace Project No.: 92497532

Lab ID	Sample ID	Method	Analysts	Analytes Reported
		SM 2450C-2011	AW1	1
		SM 2320B-2011	ECH	3
		SM 4500-S2D-2011	NAL	1
		EPA 300.0 Rev 2.1 1993	BRJ	3
92497532028	**BGWC-20**	EPA 6010D	DRB	6
		EPA 6020B	KH	13
		EPA 7470A	VB	1
		SM 2450C-2011	AW1	1
		SM 2320B-2011	ECH	3
		SM 4500-S2D-2011	NAL	1
		EPA 300.0 Rev 2.1 1993	BRJ	3
92497532029	**BGWC-25**	EPA 6010D	DRB	6
		EPA 6020B	KH	13
		EPA 7470A	VB	1
		SM 2450C-2011	AW1	1
		SM 2320B-2011	ECH	3
		SM 4500-S2D-2011	NAL	1
		EPA 300.0 Rev 2.1 1993	BRJ	3
92497532030	**BGWC-31**	EPA 6010D	DRB	6
		EPA 6020B	KH	13
		EPA 7470A	VB	1
		SM 2450C-2011	AW1	1
		SM 2320B-2011	ECH	3
		SM 4500-S2D-2011	NAL	1
		EPA 300.0 Rev 2.1 1993	BRJ	3
92497532031	**BGWC-34D**	EPA 6010D	DRB	6
		EPA 6020B	KH	13
		EPA 7470A	VB	1
		SM 2450C-2011	AW1	1
		SM 2320B-2011	ECH	3
		SM 4500-S2D-2011	NAL	1
		EPA 300.0 Rev 2.1 1993	BRJ	3
92497532032	**BGWC-36D**	EPA 6010D	DRB	6
		EPA 6020B	KH	13
		EPA 7470A	VB	1
		SM 2450C-2011	AW1	1
		SM 2320B-2011	ECH	3

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SAMPLE ANALYTE COUNT

Project: BOWEN AP
Pace Project No.: 92497532

Lab ID	Sample ID	Method	Analysts	Analytes Reported
		SM 4500-S2D-2011	NAL	1
		EPA 300.0 Rev 2.1 1993	BRJ	3
92497532033	**DUP-3**	EPA 6010D	DRB	6
		EPA 6020B	KH	13
		EPA 7470A	VB	1
		SM 2450C-2011	AW1	1
		SM 2320B-2011	ECH	3
		SM 4500-S2D-2011	NAL	1
		EPA 300.0 Rev 2.1 1993	CDC	3
92497532034	**FBL092820**	EPA 6010D	DRB	6
		EPA 6020B	KH	13
		EPA 7470A	VB	1
		SM 2450C-2011	AW1	1
		SM 2320B-2011	ECH	3
		SM 4500-S2D-2011	NAL	1
		EPA 300.0 Rev 2.1 1993	CDC	3
92497532035	**EQBL092820**	EPA 6010D	DRB	6
		EPA 6020B	KH	13
		EPA 7470A	VB	1
		SM 2450C-2011	AW1	1
		SM 2320B-2011	ECH	3
		SM 4500-S2D-2011	NAL	1
		EPA 300.0 Rev 2.1 1993	CDC	3
92497532036	**BGWC-39**	EPA 6010D	DRB	6
		EPA 6020B	CW1	13
		EPA 7470A	VB	1
		SM 2450C-2011	AW1	1
		SM 2320B-2011	ECH	3
		SM 4500-S2D-2011	NAL	1
		EPA 300.0 Rev 2.1 1993	CDC	3
92497532037	**BGWC-40**	EPA 6010D	DRB	6
		EPA 6020B	CW1	13
		EPA 7470A	VB	1
		SM 2450C-2011	AW1	1
		SM 2320B-2011	ECH	3
		SM 4500-S2D-2011	NAL	1
		EPA 300.0 Rev 2.1 1993	CDC	3

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SAMPLE ANALYTE COUNT

Project: BOWEN AP
Pace Project No.: 92497532

Lab ID	Sample ID	Method	Analysts	Analytes Reported
92497532038	**FBL092920**	EPA 6010D	DRB	6
		EPA 6020B	CW1	13
		EPA 7470A	VB	1
		SM 2450C-2011	AW1	1
		SM 2320B-2011	ECH	3
		SM 4500-S2D-2011	NAL	1
		EPA 300.0 Rev 2.1 1993	CDC	3
92497532039	**EQBL092920**	EPA 6010D	DRB	6
		EPA 6020B	CW1	13
		EPA 7470A	VB	1
		SM 2450C-2011	AW1	1
		SM 2320B-2011	ECH	3
		SM 4500-S2D-2011	NAL	1
		EPA 300.0 Rev 2.1 1993	CDC	3

PASI-A = Pace Analytical Services - Asheville
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SUMMARY OF DETECTION

Project: BOWEN AP
Pace Project No.: 92497532

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92497532001	**BGWA-2**					
	Performed by	CUSTOMER			10/09/20 11:00	
	pH	7.32	Std. Units		10/09/20 11:00	
EPA 6010D	Calcium	45.2	mg/L	1.0	09/30/20 16:28	M1
EPA 6010D	Iron	0.46	mg/L	0.040	09/30/20 16:28	
EPA 6010D	Magnesium	19.8	mg/L	0.050	09/30/20 16:28	M1
EPA 6010D	Manganese	0.078	mg/L	0.040	09/30/20 16:28	
EPA 6010D	Potassium	1.6	mg/L	0.20	09/30/20 16:28	
EPA 6010D	Sodium	2.9	mg/L	1.0	09/30/20 16:28	
EPA 6020B	Barium	0.14	mg/L	0.010	10/01/20 18:08	
EPA 6020B	Boron	0.0086J	mg/L	0.10	10/01/20 18:08	
EPA 6020B	Lead	0.00014J	mg/L	0.0050	10/01/20 18:08	
SM 2450C-2011	Total Dissolved Solids	237	mg/L	10.0	09/28/20 17:29	
SM 2320B-2011	Alkalinity,Bicarbonate (CaCO3)	202	mg/L	5.0	10/02/20 20:09	
SM 2320B-2011	Alkalinity, Total as CaCO3	202	mg/L	5.0	10/02/20 20:09	
EPA 300.0 Rev 2.1 1993	Chloride	4.2	mg/L	1.0	09/29/20 06:14	
EPA 300.0 Rev 2.1 1993	Sulfate	12.9	mg/L	1.0	09/29/20 06:14	
92497532002	**BGWA-29**					
	Performed by	CUSTOMER			10/09/20 11:00	
	pH	8.08	Std. Units		10/09/20 11:00	
EPA 6010D	Calcium	20.1	mg/L	1.0	09/30/20 16:45	
EPA 6010D	Magnesium	10.7	mg/L	0.050	09/30/20 16:45	
EPA 6010D	Potassium	0.61	mg/L	0.20	09/30/20 16:45	
EPA 6010D	Sodium	6.2	mg/L	1.0	09/30/20 16:45	
EPA 6020B	Barium	0.014	mg/L	0.010	10/01/20 18:14	
EPA 6020B	Lithium	0.00085J	mg/L	0.030	10/01/20 18:14	
SM 2450C-2011	Total Dissolved Solids	114	mg/L	10.0	09/28/20 17:30	
SM 2320B-2011	Alkalinity,Bicarbonate (CaCO3)	112	mg/L	5.0	10/02/20 20:22	
SM 2320B-2011	Alkalinity, Total as CaCO3	112	mg/L	5.0	10/02/20 20:22	
EPA 300.0 Rev 2.1 1993	Chloride	1.1	mg/L	1.0	09/29/20 06:28	
EPA 300.0 Rev 2.1 1993	Sulfate	5.3	mg/L	1.0	09/29/20 06:28	
92497532003	**BGWC-8**					
	Performed by	CUSTOMER			10/09/20 11:00	
	pH	7.67	Std. Units		10/09/20 11:00	
EPA 6010D	Calcium	41.6	mg/L	1.0	09/30/20 16:49	
EPA 6010D	Iron	0.034J	mg/L	0.040	09/30/20 16:49	B
EPA 6010D	Magnesium	14.4	mg/L	0.050	09/30/20 16:49	
EPA 6010D	Potassium	2.7	mg/L	0.20	09/30/20 16:49	
EPA 6010D	Sodium	4.9	mg/L	1.0	09/30/20 16:49	
EPA 6020B	Barium	0.029	mg/L	0.010	10/01/20 18:20	
EPA 6020B	Boron	0.054J	mg/L	0.10	10/01/20 18:20	
EPA 6020B	Chromium	0.0013J	mg/L	0.010	10/01/20 18:20	
SM 2450C-2011	Total Dissolved Solids	187	mg/L	10.0	09/28/20 17:30	
SM 2320B-2011	Alkalinity,Bicarbonate (CaCO3)	156	mg/L	5.0	10/06/20 15:17	
SM 2320B-2011	Alkalinity, Total as CaCO3	156	mg/L	5.0	10/06/20 15:17	

REPORT OF LABORATORY ANALYSIS

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SUMMARY OF DETECTION

Project: BOWEN AP
Pace Project No.: 92497532

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92497532003	**BGWC-8**					
EPA 300.0 Rev 2.1 1993	Chloride	1.5	mg/L	1.0	09/29/20 06:43	
EPA 300.0 Rev 2.1 1993	Sulfate	33.5	mg/L	1.0	09/29/20 06:43	
92497532004	**BGWA-6**					
	Performed by	CUSTOMER			10/09/20 11:00	
	pH	7.36	Std. Units		10/09/20 11:00	
EPA 6010D	Calcium	67.3	mg/L	1.0	09/30/20 17:15	
EPA 6010D	Iron	0.090	mg/L	0.040	09/30/20 17:15	B
EPA 6010D	Magnesium	36.4	mg/L	0.050	09/30/20 17:15	
EPA 6010D	Manganese	0.032J	mg/L	0.040	09/30/20 17:15	
EPA 6010D	Potassium	0.45	mg/L	0.20	09/30/20 17:15	
EPA 6010D	Sodium	3.0	mg/L	1.0	09/30/20 17:15	
EPA 6020B	Barium	0.010	mg/L	0.010	10/01/20 19:21	
EPA 6020B	Boron	0.0081J	mg/L	0.10	10/01/20 19:21	
EPA 6020B	Lead	0.000064J	mg/L	0.0050	10/01/20 19:21	
SM 2450C-2011	Total Dissolved Solids	296	mg/L	10.0	09/28/20 17:30	
SM 2320B-2011	Alkalinity,Bicarbonate (CaCO3)	312	mg/L	5.0	10/07/20 10:30	
SM 2320B-2011	Alkalinity, Total as CaCO3	312	mg/L	5.0	10/07/20 10:30	
EPA 300.0 Rev 2.1 1993	Chloride	8.4	mg/L	1.0	09/29/20 07:26	
EPA 300.0 Rev 2.1 1993	Sulfate	24.6	mg/L	1.0	09/29/20 07:26	
92497532005	**FBL092320**					
EPA 6010D	Magnesium	0.016J	mg/L	0.050	09/30/20 17:19	B
EPA 6020B	Chromium	0.0029J	mg/L	0.010	10/01/20 19:27	
EPA 6020B	Lead	0.000063J	mg/L	0.0050	10/01/20 19:27	
SM 2450C-2011	Total Dissolved Solids	1360	mg/L	20.0	10/01/20 15:27	H1,H4
92497532006	**BGWC-9**					
	Performed by	CUSTOMER			10/09/20 11:00	
	pH	7.34	Std. Units		10/09/20 11:00	
EPA 6010D	Calcium	59.0	mg/L	1.0	09/30/20 17:24	
EPA 6010D	Iron	0.49	mg/L	0.040	09/30/20 17:24	
EPA 6010D	Magnesium	24.1	mg/L	0.050	09/30/20 17:24	
EPA 6010D	Manganese	0.088	mg/L	0.040	09/30/20 17:24	
EPA 6010D	Potassium	2.6	mg/L	0.20	09/30/20 17:24	
EPA 6010D	Sodium	19.6	mg/L	1.0	09/30/20 17:24	
EPA 6020B	Arsenic	0.0021J	mg/L	0.0050	10/01/20 19:33	
EPA 6020B	Barium	0.031	mg/L	0.010	10/01/20 19:33	
EPA 6020B	Boron	0.44	mg/L	0.10	10/03/20 11:24	
EPA 6020B	Lithium	0.0011J	mg/L	0.030	10/01/20 19:33	
EPA 6020B	Molybdenum	0.0034J	mg/L	0.010	10/01/20 19:33	
SM 2450C-2011	Total Dissolved Solids	322	mg/L	10.0	09/28/20 17:41	
SM 2320B-2011	Alkalinity,Bicarbonate (CaCO3)	219	mg/L	5.0	10/06/20 16:07	
SM 2320B-2011	Alkalinity, Total as CaCO3	219	mg/L	5.0	10/06/20 16:07	
EPA 300.0 Rev 2.1 1993	Chloride	9.2	mg/L	1.0	09/29/20 08:10	
EPA 300.0 Rev 2.1 1993	Fluoride	0.091J	mg/L	0.10	09/29/20 08:10	
EPA 300.0 Rev 2.1 1993	Sulfate	84.8	mg/L	1.0	09/29/20 08:10	

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SUMMARY OF DETECTION

Project: BOWEN AP
Pace Project No.: 92497532

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92497532007	**BGWC-10**					
	Performed by	CUSTOMER			10/09/20 11:00	
	pH	7.54	Std. Units		10/09/20 11:00	
EPA 6010D	Calcium	58.8	mg/L	1.0	09/30/20 17:28	
EPA 6010D	Iron	0.38	mg/L	0.040	09/30/20 17:28	
EPA 6010D	Magnesium	25.6	mg/L	0.050	09/30/20 17:28	
EPA 6010D	Manganese	0.020J	mg/L	0.040	09/30/20 17:28	
EPA 6010D	Potassium	2.0	mg/L	0.20	09/30/20 17:28	
EPA 6010D	Sodium	18.7	mg/L	1.0	09/30/20 17:28	
EPA 6020B	Arsenic	0.0060	mg/L	0.0050	10/01/20 19:38	
EPA 6020B	Barium	0.041	mg/L	0.010	10/01/20 19:38	
EPA 6020B	Boron	0.47	mg/L	0.10	10/03/20 11:30	
EPA 6020B	Lithium	0.0013J	mg/L	0.030	10/01/20 19:38	
EPA 6020B	Molybdenum	0.0032J	mg/L	0.010	10/01/20 19:38	
SM 2450C-2011	Total Dissolved Solids	356	mg/L	10.0	09/28/20 17:50	
SM 2320B-2011	Alkalinity,Bicarbonate (CaCO3)	175	mg/L	5.0	10/06/20 16:20	
SM 2320B-2011	Alkalinity, Total as CaCO3	175	mg/L	5.0	10/06/20 16:20	
EPA 300.0 Rev 2.1 1993	Chloride	25.4	mg/L	1.0	09/29/20 08:24	
EPA 300.0 Rev 2.1 1993	Sulfate	98.6	mg/L	2.0	09/29/20 17:20	
92497532008	**BGWC-16**					
	Performed by	CUSTOMER			10/09/20 11:00	
	pH	6.66	Std. Units		10/09/20 11:00	
EPA 6010D	Calcium	141	mg/L	1.0	09/30/20 17:32	
EPA 6010D	Iron	0.036J	mg/L	0.040	09/30/20 17:32	B
EPA 6010D	Magnesium	27.4	mg/L	0.050	09/30/20 17:32	
EPA 6010D	Manganese	3.2	mg/L	0.040	09/30/20 17:32	
EPA 6010D	Potassium	4.6	mg/L	0.20	09/30/20 17:32	
EPA 6010D	Sodium	27.5	mg/L	1.0	09/30/20 17:32	
EPA 6020B	Barium	0.028	mg/L	0.010	10/01/20 19:44	
EPA 6020B	Beryllium	0.00011J	mg/L	0.0030	10/01/20 19:44	
EPA 6020B	Boron	1.3	mg/L	0.50	10/03/20 11:36	
EPA 6020B	Cadmium	0.0018J	mg/L	0.0025	10/01/20 19:44	
EPA 6020B	Cobalt	0.0095	mg/L	0.0050	10/01/20 19:44	
EPA 6020B	Lead	0.00021J	mg/L	0.0050	10/01/20 19:44	
EPA 6020B	Selenium	0.0030J	mg/L	0.010	10/01/20 19:44	
EPA 6020B	Thallium	0.00024J	mg/L	0.0010	10/01/20 19:44	
SM 2450C-2011	Total Dissolved Solids	732	mg/L	20.0	09/28/20 17:50	
SM 2320B-2011	Alkalinity,Bicarbonate (CaCO3)	147	mg/L	5.0	10/06/20 16:41	
SM 2320B-2011	Alkalinity, Total as CaCO3	147	mg/L	5.0	10/06/20 16:41	
EPA 300.0 Rev 2.1 1993	Chloride	28.8	mg/L	1.0	09/29/20 08:39	
EPA 300.0 Rev 2.1 1993	Fluoride	0.059J	mg/L	0.10	09/29/20 08:39	
EPA 300.0 Rev 2.1 1993	Sulfate	338	mg/L	7.0	09/29/20 17:34	
92497532009	**BGWC-17**					
	Performed by	CUSTOMER			10/09/20 11:00	
	pH	7.20	Std. Units		10/09/20 11:00	

REPORT OF LABORATORY ANALYSIS

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SUMMARY OF DETECTION

Project: BOWEN AP
Pace Project No.: 92497532

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92497532009	**BGWC-17**					
EPA 6010D	Calcium	84.9	mg/L	1.0	09/30/20 17:36	
EPA 6010D	Magnesium	27.9	mg/L	0.050	09/30/20 17:36	
EPA 6010D	Manganese	0.12	mg/L	0.040	09/30/20 17:36	
EPA 6010D	Potassium	2.7	mg/L	0.20	09/30/20 17:36	
EPA 6010D	Sodium	15.4	mg/L	1.0	09/30/20 17:36	
EPA 6020B	Barium	0.022	mg/L	0.010	10/01/20 19:50	
EPA 6020B	Beryllium	0.000054J	mg/L	0.0030	10/01/20 19:50	
EPA 6020B	Boron	1.5	mg/L	0.50	10/03/20 11:41	
EPA 6020B	Cadmium	0.00024J	mg/L	0.0025	10/01/20 19:50	
EPA 6020B	Thallium	0.00018J	mg/L	0.0010	10/01/20 19:50	
EPA 7470A	Mercury	0.00027J	mg/L	0.00050	09/29/20 13:49	
SM 2450C-2011	Total Dissolved Solids	481	mg/L	10.0	09/28/20 17:51	
SM 2320B-2011	Alkalinity,Bicarbonate (CaCO3)	153	mg/L	5.0	10/06/20 16:53	
SM 2320B-2011	Alkalinity, Total as CaCO3	153	mg/L	5.0	10/06/20 16:53	
EPA 300.0 Rev 2.1 1993	Chloride	50.1	mg/L	1.0	09/29/20 09:22	
EPA 300.0 Rev 2.1 1993	Fluoride	0.12	mg/L	0.10	09/29/20 09:22	
EPA 300.0 Rev 2.1 1993	Sulfate	156	mg/L	3.0	09/29/20 17:49	
92497532010	**BGWC-18**					
	Performed by	CUSTOMER			10/09/20 11:00	
	pH	7.05	Std. Units		10/09/20 11:00	
EPA 6010D	Calcium	68.7	mg/L	1.0	09/30/20 17:40	
EPA 6010D	Iron	0.016J	mg/L	0.040	09/30/20 17:40	B
EPA 6010D	Magnesium	20.5	mg/L	0.050	09/30/20 17:40	
EPA 6010D	Manganese	0.025J	mg/L	0.040	09/30/20 17:40	
EPA 6010D	Potassium	1.8	mg/L	0.20	09/30/20 17:40	
EPA 6010D	Sodium	5.0	mg/L	1.0	09/30/20 17:40	
EPA 6020B	Barium	0.031	mg/L	0.010	10/01/20 19:56	
EPA 6020B	Boron	0.72	mg/L	0.10	10/03/20 11:47	
SM 2450C-2011	Total Dissolved Solids	310	mg/L	10.0	09/28/20 17:51	
SM 2320B-2011	Alkalinity,Bicarbonate (CaCO3)	181	mg/L	5.0	10/06/20 17:04	
SM 2320B-2011	Alkalinity, Total as CaCO3	181	mg/L	5.0	10/06/20 17:04	
EPA 300.0 Rev 2.1 1993	Chloride	30.3	mg/L	1.0	09/29/20 09:36	
EPA 300.0 Rev 2.1 1993	Fluoride	0.058J	mg/L	0.10	09/29/20 09:36	
EPA 300.0 Rev 2.1 1993	Sulfate	69.9	mg/L	1.0	09/29/20 09:36	
92497532011	**BGWC-21**					
	Performed by	CUSTOMER			10/09/20 11:00	
	pH	7.78	Std. Units		10/09/20 11:00	
EPA 6010D	Calcium	42.0	mg/L	1.0	09/30/20 17:45	
EPA 6010D	Iron	0.083	mg/L	0.040	09/30/20 17:45	B
EPA 6010D	Magnesium	24.7	mg/L	0.050	09/30/20 17:45	
EPA 6010D	Manganese	0.046	mg/L	0.040	09/30/20 17:45	
EPA 6010D	Potassium	1.4	mg/L	0.20	09/30/20 17:45	
EPA 6010D	Sodium	2.3	mg/L	1.0	09/30/20 17:45	
EPA 6020B	Barium	0.031	mg/L	0.010	10/01/20 20:01	
EPA 6020B	Boron	0.037J	mg/L	0.10	10/01/20 20:01	

REPORT OF LABORATORY ANALYSIS

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SUMMARY OF DETECTION

Project: BOWEN AP
Pace Project No.: 92497532

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92497532011	**BGWC-21**					
EPA 6020B	Cobalt	0.00098J	mg/L	0.0050	10/01/20 20:01	
EPA 6020B	Lead	0.000050J	mg/L	0.0050	10/01/20 20:01	
EPA 6020B	Molybdenum	0.0036J	mg/L	0.010	10/01/20 20:01	
SM 2450C-2011	Total Dissolved Solids	243	mg/L	10.0	09/28/20 17:51	
SM 2320B-2011	Alkalinity,Bicarbonate (CaCO3)	179	mg/L	5.0	10/06/20 17:15	
SM 2320B-2011	Alkalinity, Total as CaCO3	179	mg/L	5.0	10/06/20 17:15	
EPA 300.0 Rev 2.1 1993	Chloride	4.0	mg/L	1.0	09/29/20 10:20	
EPA 300.0 Rev 2.1 1993	Sulfate	57.8	mg/L	1.0	09/29/20 10:20	
92497532012	**BGWC-22**					
	Performed by	CUSTOMER			10/09/20 11:00	
	pH	6.82	Std. Units		10/09/20 11:00	
EPA 6010D	Calcium	750	mg/L	10.0	10/01/20 13:06	
EPA 6010D	Iron	0.48	mg/L	0.040	09/30/20 17:49	
EPA 6010D	Magnesium	99.4	mg/L	0.050	09/30/20 17:49	
EPA 6010D	Manganese	6.5	mg/L	0.040	09/30/20 17:49	
EPA 6010D	Potassium	16.0	mg/L	0.20	09/30/20 17:49	
EPA 6010D	Sodium	45.7	mg/L	1.0	09/30/20 17:49	
EPA 6020B	Arsenic	0.0019J	mg/L	0.0050	10/01/20 20:07	
EPA 6020B	Barium	0.093	mg/L	0.010	10/01/20 20:07	
EPA 6020B	Beryllium	0.00012J	mg/L	0.0030	10/01/20 20:07	
EPA 6020B	Boron	18.8	mg/L	5.0	10/03/20 11:53	
EPA 6020B	Cadmium	0.00033J	mg/L	0.0025	10/01/20 20:07	
EPA 6020B	Cobalt	0.041	mg/L	0.0050	10/01/20 20:07	
EPA 6020B	Lead	0.00014J	mg/L	0.0050	10/01/20 20:07	
EPA 6020B	Lithium	0.043	mg/L	0.030	10/01/20 20:07	
EPA 6020B	Molybdenum	0.040	mg/L	0.010	10/01/20 20:07	
EPA 6020B	Selenium	0.0026J	mg/L	0.010	10/01/20 20:07	
EPA 6020B	Thallium	0.0010	mg/L	0.0010	10/01/20 20:07	
SM 2450C-2011	Total Dissolved Solids	3490	mg/L	50.0	09/28/20 17:51	
SM 2320B-2011	Alkalinity,Bicarbonate (CaCO3)	77.3	mg/L	5.0	10/06/20 17:27	
SM 2320B-2011	Alkalinity, Total as CaCO3	77.3	mg/L	5.0	10/06/20 17:27	
EPA 300.0 Rev 2.1 1993	Chloride	1050	mg/L	20.0	09/29/20 18:03	
EPA 300.0 Rev 2.1 1993	Fluoride	0.24	mg/L	0.10	09/29/20 10:34	
EPA 300.0 Rev 2.1 1993	Sulfate	864	mg/L	20.0	09/29/20 18:03	
92497532013	**BGWC-23**					
	Performed by	CUSTOMER			10/09/20 11:00	
	pH	7.09	Std. Units		10/09/20 11:00	
EPA 6010D	Calcium	647	mg/L	10.0	10/01/20 13:10	
EPA 6010D	Iron	0.27	mg/L	0.040	09/30/20 17:54	
EPA 6010D	Magnesium	115	mg/L	0.050	09/30/20 17:54	
EPA 6010D	Manganese	0.39	mg/L	0.040	09/30/20 17:54	
EPA 6010D	Potassium	10.7	mg/L	0.20	09/30/20 17:54	
EPA 6010D	Sodium	41.6	mg/L	1.0	09/30/20 17:54	
EPA 6020B	Arsenic	0.0010J	mg/L	0.0050	10/01/20 20:24	
EPA 6020B	Barium	0.12	mg/L	0.010	10/01/20 20:24	

REPORT OF LABORATORY ANALYSIS

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(770)734-4200

SUMMARY OF DETECTION

Project: BOWEN AP
Pace Project No.: 92497532

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92497532013	**BGWC-23**					
EPA 6020B	Beryllium	0.000054J	mg/L	0.0030	10/01/20 20:24	
EPA 6020B	Boron	13.7	mg/L	5.0	10/03/20 11:58	
EPA 6020B	Lead	0.00014J	mg/L	0.0050	10/01/20 20:24	
EPA 6020B	Lithium	0.031	mg/L	0.030	10/01/20 20:24	
EPA 6020B	Molybdenum	0.011	mg/L	0.010	10/01/20 20:24	
EPA 6020B	Thallium	0.00038J	mg/L	0.0010	10/01/20 20:24	
SM 2450C-2011	Total Dissolved Solids	3160	mg/L	50.0	09/30/20 09:27	
SM 2320B-2011	Alkalinity,Bicarbonate (CaCO3)	115	mg/L	5.0	10/06/20 17:46	
SM 2320B-2011	Alkalinity, Total as CaCO3	115	mg/L	5.0	10/06/20 17:46	
EPA 300.0 Rev 2.1 1993	Chloride	988	mg/L	20.0	09/29/20 18:17	
EPA 300.0 Rev 2.1 1993	Fluoride	0.062J	mg/L	0.10	09/29/20 10:49	
EPA 300.0 Rev 2.1 1993	Sulfate	676	mg/L	20.0	09/29/20 18:17	
92497532014	**DUP-1**					
EPA 6010D	Calcium	58.9	mg/L	1.0	09/30/20 18:06	
EPA 6010D	Iron	0.44	mg/L	0.040	09/30/20 18:06	
EPA 6010D	Magnesium	24.2	mg/L	0.050	09/30/20 18:06	
EPA 6010D	Manganese	0.082	mg/L	0.040	09/30/20 18:06	
EPA 6010D	Potassium	2.6	mg/L	0.20	09/30/20 18:06	
EPA 6010D	Sodium	18.4	mg/L	1.0	09/30/20 18:06	
EPA 6020B	Arsenic	0.0019J	mg/L	0.0050	10/01/20 20:30	
EPA 6020B	Barium	0.030	mg/L	0.010	10/01/20 20:30	
EPA 6020B	Boron	0.44	mg/L	0.10	10/03/20 12:04	
EPA 6020B	Lithium	0.0011J	mg/L	0.030	10/01/20 20:30	
EPA 6020B	Molybdenum	0.0033J	mg/L	0.010	10/01/20 20:30	
SM 2450C-2011	Total Dissolved Solids	246	mg/L	20.0	09/30/20 09:27	
SM 2320B-2011	Alkalinity,Bicarbonate (CaCO3)	216	mg/L	5.0	10/06/20 17:56	
SM 2320B-2011	Alkalinity, Total as CaCO3	216	mg/L	5.0	10/06/20 17:56	
EPA 300.0 Rev 2.1 1993	Chloride	9.4	mg/L	1.0	09/29/20 11:03	
EPA 300.0 Rev 2.1 1993	Fluoride	0.091J	mg/L	0.10	09/29/20 11:03	
EPA 300.0 Rev 2.1 1993	Sulfate	84.5	mg/L	1.0	09/29/20 11:03	
92497532015	**FBL092420**					
EPA 6010D	Magnesium	0.017J	mg/L	0.050	09/30/20 18:11	B
EPA 6020B	Boron	0.028J	mg/L	0.10	10/01/20 20:36	
92497532016	**BGWA-33**					
	Performed by	CUSTOMER			10/09/20 11:00	
	pH	7.62	Std. Units		10/09/20 11:00	
EPA 6010D	Calcium	51.8	mg/L	1.0	10/01/20 18:23	
EPA 6010D	Iron	0.13	mg/L	0.040	10/01/20 18:23	
EPA 6010D	Magnesium	27.3	mg/L	0.050	10/01/20 18:23	
EPA 6010D	Manganese	0.014J	mg/L	0.040	10/01/20 18:23	
EPA 6010D	Potassium	1.3	mg/L	0.20	10/01/20 18:23	
EPA 6010D	Sodium	2.6	mg/L	1.0	10/01/20 18:23	
EPA 6020B	Antimony	0.0015J	mg/L	0.0030	10/01/20 22:02	
EPA 6020B	Arsenic	0.0017J	mg/L	0.0050	10/01/20 22:02	
EPA 6020B	Barium	0.028	mg/L	0.010	10/01/20 22:02	

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(770)734-4200

SUMMARY OF DETECTION

Project: BOWEN AP
Pace Project No.: 92497532

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92497532016	**BGWA-33**					
EPA 6020B	Boron	0.020J	mg/L	0.10	10/01/20 22:02	
EPA 6020B	Chromium	0.00083J	mg/L	0.010	10/01/20 22:02	
EPA 6020B	Lead	0.000045J	mg/L	0.0050	10/01/20 22:02	
EPA 6020B	Molybdenum	0.032	mg/L	0.010	10/01/20 22:02	
EPA 7470A	Mercury	0.000087J	mg/L	0.00050	10/01/20 11:31	B
SM 2450C-2011	Total Dissolved Solids	233	mg/L	10.0	09/30/20 14:54	
SM 2320B-2011	Alkalinity,Bicarbonate (CaCO3)	227	mg/L	5.0	10/07/20 10:43	
SM 2320B-2011	Alkalinity, Total as CaCO3	227	mg/L	5.0	10/07/20 10:43	
EPA 300.0 Rev 2.1 1993	Chloride	3.3	mg/L	1.0	09/29/20 21:23	
EPA 300.0 Rev 2.1 1993	Fluoride	0.068J	mg/L	0.10	09/29/20 21:23	
EPA 300.0 Rev 2.1 1993	Sulfate	22.6	mg/L	1.0	09/29/20 21:23	
92497532017	**BGWC-7**					
	Performed by	CUSTOMER			10/09/20 11:00	
	pH	7.01	Std. Units		10/09/20 11:00	
EPA 6010D	Calcium	138	mg/L	1.0	10/01/20 18:27	
EPA 6010D	Iron	1.2	mg/L	0.040	10/01/20 18:27	
EPA 6010D	Magnesium	42.1	mg/L	0.050	10/01/20 18:27	
EPA 6010D	Manganese	0.032J	mg/L	0.040	10/01/20 18:27	
EPA 6010D	Potassium	3.0	mg/L	0.20	10/01/20 18:27	
EPA 6010D	Sodium	23.7	mg/L	1.0	10/01/20 18:27	
EPA 6020B	Arsenic	0.0025J	mg/L	0.0050	10/01/20 22:19	
EPA 6020B	Barium	0.030	mg/L	0.010	10/01/20 22:19	
EPA 6020B	Boron	1.3	mg/L	0.50	10/03/20 12:42	
EPA 6020B	Cobalt	0.00077J	mg/L	0.0050	10/01/20 22:19	
EPA 6020B	Lithium	0.0065J	mg/L	0.030	10/01/20 22:19	
EPA 6020B	Molybdenum	0.0099J	mg/L	0.010	10/01/20 22:19	
SM 2450C-2011	Total Dissolved Solids	726	mg/L	20.0	09/30/20 14:54	
SM 2320B-2011	Alkalinity,Bicarbonate (CaCO3)	300	mg/L	5.0	10/07/20 10:53	
SM 2320B-2011	Alkalinity, Total as CaCO3	300	mg/L	5.0	10/07/20 10:53	
EPA 300.0 Rev 2.1 1993	Chloride	13.1	mg/L	1.0	09/29/20 21:37	
EPA 300.0 Rev 2.1 1993	Fluoride	0.11	mg/L	0.10	09/29/20 21:37	
EPA 300.0 Rev 2.1 1993	Sulfate	298	mg/L	6.0	09/30/20 04:00	
92497532018	**BGWC-12**					
	pH	7.10	Std. Units		10/09/20 11:00	
EPA 6010D	Calcium	135	mg/L	1.0	10/01/20 18:32	
EPA 6010D	Iron	0.017J	mg/L	0.040	10/01/20 18:32	
EPA 6010D	Magnesium	47.2	mg/L	0.050	10/01/20 18:32	
EPA 6010D	Manganese	0.0018J	mg/L	0.040	10/01/20 18:32	
EPA 6010D	Potassium	2.6	mg/L	0.20	10/01/20 18:32	
EPA 6010D	Sodium	24.9	mg/L	1.0	10/01/20 18:32	
EPA 6020B	Barium	0.038	mg/L	0.010	10/01/20 22:25	
EPA 6020B	Boron	1.0	mg/L	0.50	10/03/20 12:48	
EPA 6020B	Chromium	0.00058J	mg/L	0.010	10/01/20 22:25	
EPA 6020B	Cobalt	0.00049J	mg/L	0.0050	10/01/20 22:25	
EPA 6020B	Lithium	0.0010J	mg/L	0.030	10/01/20 22:25	

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SUMMARY OF DETECTION

Project: BOWEN AP
Pace Project No.: 92497532

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92497532018	**BGWC-12**					
SM 2450C-2011	Total Dissolved Solids	740	mg/L	20.0	09/30/20 14:54	
SM 2320B-2011	Alkalinity,Bicarbonate (CaCO3)	272	mg/L	5.0	10/08/20 18:01	
SM 2320B-2011	Alkalinity, Total as CaCO3	272	mg/L	5.0	10/08/20 18:01	
EPA 300.0 Rev 2.1 1993	Chloride	20.2	mg/L	1.0	09/29/20 21:51	
EPA 300.0 Rev 2.1 1993	Sulfate	320	mg/L	6.0	09/30/20 04:21	
92497532019	**BGWC-24**					
	Performed by	CUSTOMER			10/09/20 11:00	
	pH	6.56	Std. Units		10/09/20 11:00	
EPA 6010D	Calcium	998	mg/L	10.0	10/02/20 17:38	
EPA 6010D	Iron	0.053	mg/L	0.040	10/01/20 18:36	
EPA 6010D	Magnesium	125	mg/L	0.050	10/01/20 18:36	
EPA 6010D	Manganese	4.0	mg/L	0.040	10/01/20 18:36	
EPA 6010D	Potassium	9.2	mg/L	0.20	10/01/20 18:36	
EPA 6010D	Sodium	27.9	mg/L	1.0	10/01/20 18:36	
EPA 6020B	Antimony	0.00048J	mg/L	0.0030	10/01/20 22:30	
EPA 6020B	Arsenic	0.0023J	mg/L	0.0050	10/01/20 22:30	
EPA 6020B	Barium	0.088	mg/L	0.010	10/01/20 22:30	
EPA 6020B	Beryllium	0.00013J	mg/L	0.0030	10/01/20 22:30	
EPA 6020B	Boron	30.8	mg/L	5.0	10/03/20 12:54	
EPA 6020B	Cadmium	0.0081	mg/L	0.0025	10/01/20 22:30	
EPA 6020B	Chromium	0.00058J	mg/L	0.010	10/01/20 22:30	
EPA 6020B	Cobalt	0.0038J	mg/L	0.0050	10/01/20 22:30	
EPA 6020B	Lead	0.00010J	mg/L	0.0050	10/01/20 22:30	
EPA 6020B	Lithium	0.0078J	mg/L	0.030	10/01/20 22:30	
EPA 6020B	Molybdenum	0.00081J	mg/L	0.010	10/01/20 22:30	
EPA 6020B	Selenium	0.010	mg/L	0.010	10/01/20 22:30	
EPA 6020B	Thallium	0.00057J	mg/L	0.0010	10/01/20 22:30	
EPA 7470A	Mercury	0.0036	mg/L	0.00050	10/30/20 14:23	H1,H2
SM 2450C-2011	Total Dissolved Solids	5020	mg/L	50.0	09/30/20 14:54	
SM 2320B-2011	Alkalinity,Bicarbonate (CaCO3)	146	mg/L	5.0	10/07/20 09:59	
SM 2320B-2011	Alkalinity, Total as CaCO3	146	mg/L	5.0	10/07/20 09:59	
EPA 300.0 Rev 2.1 1993	Chloride	1640	mg/L	30.0	09/30/20 04:41	
EPA 300.0 Rev 2.1 1993	Fluoride	0.054J	mg/L	0.10	09/29/20 22:06	
EPA 300.0 Rev 2.1 1993	Sulfate	613	mg/L	30.0	09/30/20 04:41	
92497532020	**BGWC-30**					
	Performed by	CUSTOMER			10/09/20 11:00	
	pH	7.34	Std. Units		10/09/20 11:00	
EPA 6010D	Calcium	93.3	mg/L	1.0	10/01/20 18:40	
EPA 6010D	Iron	0.11	mg/L	0.040	10/01/20 18:40	
EPA 6010D	Magnesium	28.6	mg/L	0.050	10/01/20 18:40	
EPA 6010D	Manganese	0.0088J	mg/L	0.040	10/01/20 18:40	
EPA 6010D	Potassium	2.3	mg/L	0.20	10/01/20 18:40	
EPA 6010D	Sodium	6.0	mg/L	1.0	10/01/20 18:40	
EPA 6020B	Barium	0.070	mg/L	0.010	10/01/20 22:36	
EPA 6020B	Boron	2.1	mg/L	0.50	10/03/20 13:00	

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SUMMARY OF DETECTION

Project: BOWEN AP
Pace Project No.: 92497532

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92497532020	**BGWC-30**					
EPA 6020B	Chromium	0.00087J	mg/L	0.010	10/01/20 22:36	
EPA 6020B	Lead	0.00016J	mg/L	0.0050	10/01/20 22:36	
EPA 6020B	Lithium	0.0011J	mg/L	0.030	10/01/20 22:36	
EPA 6020B	Molybdenum	0.0027J	mg/L	0.010	10/01/20 22:36	
EPA 6020B	Selenium	0.0035J	mg/L	0.010	10/01/20 22:36	
SM 2450C-2011	Total Dissolved Solids	482	mg/L	20.0	09/30/20 14:54	
SM 2320B-2011	Alkalinity,Bicarbonate (CaCO3)	183	mg/L	5.0	10/07/20 10:09	
SM 2320B-2011	Alkalinity, Total as CaCO3	183	mg/L	5.0	10/07/20 10:09	
EPA 300.0 Rev 2.1 1993	Chloride	127	mg/L	3.0	09/30/20 05:30	
EPA 300.0 Rev 2.1 1993	Sulfate	53.6	mg/L	1.0	09/29/20 23:03	
92497532021	**BGWC-32**					
	Performed by	CUSTOMER			10/09/20 11:00	
	pH	6.82	Std. Units		10/09/20 11:00	
EPA 6010D	Calcium	338	mg/L	10.0	10/02/20 17:42	
EPA 6010D	Iron	0.13	mg/L	0.040	10/01/20 18:45	
EPA 6010D	Magnesium	61.8	mg/L	0.050	10/01/20 18:45	
EPA 6010D	Manganese	0.21	mg/L	0.040	10/01/20 18:45	
EPA 6010D	Potassium	5.0	mg/L	0.20	10/01/20 18:45	
EPA 6010D	Sodium	20.5	mg/L	1.0	10/01/20 18:45	
EPA 6020B	Antimony	0.00039J	mg/L	0.0030	10/01/20 22:42	
EPA 6020B	Arsenic	0.00093J	mg/L	0.0050	10/01/20 22:42	
EPA 6020B	Barium	0.14	mg/L	0.010	10/01/20 22:42	
EPA 6020B	Boron	5.5	mg/L	0.50	10/03/20 13:05	
EPA 6020B	Chromium	0.00057J	mg/L	0.010	10/01/20 22:42	
EPA 6020B	Cobalt	0.0081	mg/L	0.0050	10/01/20 22:42	
EPA 6020B	Lead	0.00011J	mg/L	0.0050	10/01/20 22:42	
EPA 6020B	Molybdenum	0.0030J	mg/L	0.010	10/01/20 22:42	
EPA 6020B	Thallium	0.00014J	mg/L	0.0010	10/01/20 22:42	
SM 2450C-2011	Total Dissolved Solids	1690	mg/L	50.0	09/30/20 14:54	
SM 2320B-2011	Alkalinity,Bicarbonate (CaCO3)	186	mg/L	5.0	10/07/20 10:19	
SM 2320B-2011	Alkalinity, Total as CaCO3	186	mg/L	5.0	10/07/20 10:19	
EPA 300.0 Rev 2.1 1993	Chloride	449	mg/L	9.0	09/30/20 05:51	M6
EPA 300.0 Rev 2.1 1993	Fluoride	0.097J	mg/L	0.10	09/29/20 23:17	
EPA 300.0 Rev 2.1 1993	Sulfate	393	mg/L	9.0	09/30/20 05:51	
92497532022	**BGWC-35D**					
	Performed by	CUSTOMER			10/09/20 11:00	
	pH	7.03	Std. Units		10/09/20 11:00	
EPA 6010D	Calcium	169	mg/L	1.0	10/01/20 18:49	
EPA 6010D	Iron	0.94	mg/L	0.040	10/01/20 18:49	
EPA 6010D	Magnesium	39.6	mg/L	0.050	10/01/20 18:49	
EPA 6010D	Manganese	0.14	mg/L	0.040	10/01/20 18:49	
EPA 6010D	Potassium	18.9	mg/L	0.20	10/01/20 18:49	
EPA 6010D	Sodium	91.7	mg/L	1.0	10/01/20 18:49	
EPA 6020B	Antimony	0.00064J	mg/L	0.0030	10/01/20 22:47	
EPA 6020B	Arsenic	0.0021J	mg/L	0.0050	10/01/20 22:47	

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SUMMARY OF DETECTION

Project: BOWEN AP
Pace Project No.: 92497532

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92497532022	**BGWC-35D**					
EPA 6020B	Barium	0.11	mg/L	0.010	10/01/20 22:47	
EPA 6020B	Boron	3.2	mg/L	0.50	10/03/20 13:11	
EPA 6020B	Chromium	0.00072J	mg/L	0.010	10/01/20 22:47	
EPA 6020B	Cobalt	0.00082J	mg/L	0.0050	10/01/20 22:47	
EPA 6020B	Lead	0.00037J	mg/L	0.0050	10/01/20 22:47	
EPA 6020B	Lithium	0.0062J	mg/L	0.030	10/01/20 22:47	
EPA 6020B	Molybdenum	0.024	mg/L	0.010	10/01/20 22:47	
SM 2450C-2011	Total Dissolved Solids	880	mg/L	50.0	09/30/20 14:54	
SM 2320B-2011	Alkalinity,Bicarbonate (CaCO3)	231	mg/L	5.0	10/08/20 18:10	
SM 2320B-2011	Alkalinity, Total as CaCO3	231	mg/L	5.0	10/08/20 18:10	
EPA 300.0 Rev 2.1 1993	Chloride	435	mg/L	9.0	09/30/20 06:52	
EPA 300.0 Rev 2.1 1993	Fluoride	0.17	mg/L	0.10	09/30/20 00:00	
EPA 300.0 Rev 2.1 1993	Sulfate	394	mg/L	9.0	09/30/20 06:52	
92497532023	**BGWC-37D**					
	Performed by	CUSTOMER			10/09/20 11:00	
	pH	7.25	Std. Units		10/09/20 11:00	
EPA 6010D	Calcium	99.9	mg/L	1.0	10/01/20 18:53	
EPA 6010D	Iron	1.3	mg/L	0.040	10/01/20 18:53	
EPA 6010D	Magnesium	36.6	mg/L	0.050	10/01/20 18:53	
EPA 6010D	Manganese	0.14	mg/L	0.040	10/01/20 18:53	
EPA 6010D	Potassium	2.3	mg/L	0.20	10/01/20 18:53	
EPA 6010D	Sodium	44.3	mg/L	1.0	10/01/20 18:53	
EPA 6020B	Antimony	0.0022J	mg/L	0.0030	10/01/20 22:53	
EPA 6020B	Arsenic	0.033	mg/L	0.0050	10/01/20 22:53	
EPA 6020B	Barium	0.10	mg/L	0.010	10/01/20 22:53	
EPA 6020B	Boron	1.6	mg/L	0.50	10/03/20 13:17	
EPA 6020B	Chromium	0.00068J	mg/L	0.010	10/01/20 22:53	
EPA 6020B	Cobalt	0.0011J	mg/L	0.0050	10/01/20 22:53	
EPA 6020B	Lead	0.00029J	mg/L	0.0050	10/01/20 22:53	
EPA 6020B	Lithium	0.014J	mg/L	0.030	10/01/20 22:53	
EPA 6020B	Molybdenum	0.0088J	mg/L	0.010	10/01/20 22:53	
SM 2450C-2011	Total Dissolved Solids	594	mg/L	20.0	09/30/20 14:55	
SM 2320B-2011	Alkalinity,Bicarbonate (CaCO3)	200	mg/L	5.0	10/08/20 15:24	
SM 2320B-2011	Alkalinity, Total as CaCO3	200	mg/L	5.0	10/08/20 15:24	
SM 4500-S2D-2011	Sulfide	1.5	mg/L	0.20	09/29/20 14:18	
EPA 300.0 Rev 2.1 1993	Chloride	105	mg/L	3.0	09/30/20 07:12	
EPA 300.0 Rev 2.1 1993	Fluoride	0.34	mg/L	0.10	09/30/20 00:14	
EPA 300.0 Rev 2.1 1993	Sulfate	175	mg/L	3.0	09/30/20 07:12	
92497532024	**DUP-2**					
EPA 6010D	Calcium	170	mg/L	1.0	10/01/20 18:58	
EPA 6010D	Iron	1.2	mg/L	0.040	10/01/20 18:58	
EPA 6010D	Magnesium	39.4	mg/L	0.050	10/01/20 18:58	
EPA 6010D	Manganese	0.14	mg/L	0.040	10/01/20 18:58	
EPA 6010D	Potassium	18.2	mg/L	0.20	10/01/20 18:58	
EPA 6010D	Sodium	89.2	mg/L	1.0	10/01/20 18:58	

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SUMMARY OF DETECTION

Project: BOWEN AP
Pace Project No.: 92497532

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92497532024	**DUP-2**					
EPA 6020B	Antimony	0.00061J	mg/L	0.0030	10/01/20 22:59	
EPA 6020B	Arsenic	0.0024J	mg/L	0.0050	10/01/20 22:59	
EPA 6020B	Barium	0.11	mg/L	0.010	10/01/20 22:59	
EPA 6020B	Boron	3.3	mg/L	0.50	10/03/20 13:22	
EPA 6020B	Chromium	0.00058J	mg/L	0.010	10/01/20 22:59	
EPA 6020B	Cobalt	0.00084J	mg/L	0.0050	10/01/20 22:59	
EPA 6020B	Lead	0.00037J	mg/L	0.0050	10/01/20 22:59	
EPA 6020B	Lithium	0.0060J	mg/L	0.030	10/01/20 22:59	
EPA 6020B	Molybdenum	0.023	mg/L	0.010	10/01/20 22:59	
SM 2450C-2011	Total Dissolved Solids	1300	mg/L	50.0	09/30/20 14:55	
SM 2320B-2011	Alkalinity,Bicarbonate (CaCO3)	214	mg/L	5.0	10/08/20 15:36	
SM 2320B-2011	Alkalinity, Total as CaCO3	214	mg/L	5.0	10/08/20 15:36	
EPA 300.0 Rev 2.1 1993	Chloride	482	mg/L	10.0	09/30/20 07:33	
EPA 300.0 Rev 2.1 1993	Fluoride	0.15	mg/L	0.10	09/30/20 00:29	
EPA 300.0 Rev 2.1 1993	Sulfate	436	mg/L	10.0	09/30/20 07:33	
92497532025	**FBL092520**					
EPA 6020B	Boron	0.021J	mg/L	0.10	10/01/20 23:05	
92497532026	**EQBL092520**					
EPA 6020B	Boron	0.0095J	mg/L	0.10	10/01/20 23:10	
EPA 300.0 Rev 2.1 1993	Sulfate	0.71J	mg/L	1.0	09/30/20 00:57	
92497532027	**BGWC-19**					
	Performed by	CUSTOMER			10/09/20 11:00	
	pH	6.45	Std. Units		10/09/20 11:00	
EPA 6010D	Calcium	50.1	mg/L	1.0	10/05/20 21:00	M1
EPA 6010D	Magnesium	18.7	mg/L	0.050	10/05/20 21:00	
EPA 6010D	Potassium	3.0	mg/L	0.20	10/05/20 21:00	
EPA 6010D	Sodium	2.7	mg/L	1.0	10/05/20 21:00	B
EPA 6020B	Antimony	0.00050J	mg/L	0.0030	10/06/20 18:01	
EPA 6020B	Barium	0.030	mg/L	0.010	10/06/20 18:01	
EPA 6020B	Beryllium	0.000088J	mg/L	0.0030	10/06/20 18:01	
EPA 6020B	Boron	0.40	mg/L	0.10	10/06/20 18:01	
EPA 6020B	Lead	0.000038J	mg/L	0.0050	10/06/20 18:01	
SM 2450C-2011	Total Dissolved Solids	243	mg/L	10.0	10/02/20 17:25	
SM 2320B-2011	Alkalinity,Bicarbonate (CaCO3)	138	mg/L	5.0	10/08/20 16:15	
SM 2320B-2011	Alkalinity, Total as CaCO3	138	mg/L	5.0	10/08/20 16:15	
EPA 300.0 Rev 2.1 1993	Chloride	8.6	mg/L	1.0	10/01/20 15:08	
EPA 300.0 Rev 2.1 1993	Sulfate	70.3	mg/L	1.0	10/01/20 15:08	
92497532028	**BGWC-20**					
	Performed by	CUSTOMER			10/09/20 11:00	
	pH	7.26	Std. Units		10/09/20 11:00	
EPA 6010D	Calcium	273	mg/L	1.0	10/05/20 21:18	
EPA 6010D	Iron	0.43	mg/L	0.040	10/05/20 21:18	
EPA 6010D	Magnesium	41.7	mg/L	0.050	10/05/20 21:18	

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SUMMARY OF DETECTION

Project: BOWEN AP
Pace Project No.: 92497532

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92497532028	**BGWC-20**					
EPA 6010D	Manganese	0.77	mg/L	0.040	10/05/20 21:18	
EPA 6010D	Potassium	6.8	mg/L	0.20	10/05/20 21:18	
EPA 6010D	Sodium	28.9	mg/L	1.0	10/05/20 21:18	
EPA 6020B	Antimony	0.00050J	mg/L	0.0030	10/06/20 18:07	
EPA 6020B	Barium	0.032	mg/L	0.010	10/06/20 18:07	
EPA 6020B	Boron	3.7	mg/L	0.10	10/06/20 18:07	
EPA 6020B	Chromium	0.0028J	mg/L	0.010	10/06/20 18:07	
EPA 6020B	Lead	0.000083J	mg/L	0.0050	10/06/20 18:07	
EPA 6020B	Lithium	0.027J	mg/L	0.030	10/06/20 18:07	
EPA 6020B	Molybdenum	0.018	mg/L	0.010	10/06/20 18:07	
SM 2450C-2011	Total Dissolved Solids	1060	mg/L	50.0	10/02/20 17:25	
SM 2320B-2011	Alkalinity,Bicarbonate (CaCO3)	90.3	mg/L	5.0	10/08/20 16:25	
SM 2320B-2011	Alkalinity, Total as CaCO3	90.3	mg/L	5.0	10/08/20 16:25	
EPA 300.0 Rev 2.1 1993	Chloride	152	mg/L	12.0	10/01/20 20:49	
EPA 300.0 Rev 2.1 1993	Sulfate	578	mg/L	12.0	10/01/20 20:49	
92497532029	**BGWC-25**					
	Performed by	CUSTOMER			10/09/20 11:00	
	pH	7.35	Std. Units		10/09/20 11:00	
EPA 6010D	Calcium	50.7	mg/L	1.0	10/05/20 21:31	
EPA 6010D	Iron	1.5	mg/L	0.040	10/05/20 21:31	
EPA 6010D	Magnesium	22.7	mg/L	0.050	10/05/20 21:31	
EPA 6010D	Manganese	0.36	mg/L	0.040	10/05/20 21:31	
EPA 6010D	Potassium	1.2	mg/L	0.20	10/05/20 21:31	
EPA 6010D	Sodium	1.9	mg/L	1.0	10/05/20 21:31	B
EPA 6020B	Arsenic	0.0028J	mg/L	0.0050	10/06/20 18:13	
EPA 6020B	Barium	0.016	mg/L	0.010	10/06/20 18:13	
EPA 6020B	Boron	0.049J	mg/L	0.10	10/06/20 18:13	
EPA 6020B	Lead	0.000051J	mg/L	0.0050	10/06/20 18:13	
SM 2450C-2011	Total Dissolved Solids	223	mg/L	10.0	10/02/20 17:25	
SM 2320B-2011	Alkalinity,Bicarbonate (CaCO3)	237	mg/L	5.0	10/08/20 22:32	
SM 2320B-2011	Alkalinity, Total as CaCO3	237	mg/L	5.0	10/08/20 22:32	
SM 4500-S2D-2011	Sulfide	0.62	mg/L	0.10	10/01/20 12:58	
EPA 300.0 Rev 2.1 1993	Chloride	5.6	mg/L	1.0	10/01/20 16:23	
EPA 300.0 Rev 2.1 1993	Sulfate	8.8	mg/L	1.0	10/01/20 16:23	
92497532030	**BGWC-31**					
	Performed by	CUSTOMER			10/09/20 11:00	
	pH	7.32	Std. Units		10/09/20 11:00	
EPA 6010D	Calcium	77.8	mg/L	1.0	10/05/20 21:36	
EPA 6010D	Iron	1.8	mg/L	0.040	10/05/20 21:36	
EPA 6010D	Magnesium	34.6	mg/L	0.050	10/05/20 21:36	
EPA 6010D	Manganese	0.23	mg/L	0.040	10/05/20 21:36	
EPA 6010D	Potassium	1.5	mg/L	0.20	10/05/20 21:36	
EPA 6010D	Sodium	8.0	mg/L	1.0	10/05/20 21:36	
EPA 6020B	Antimony	0.00038J	mg/L	0.0030	10/06/20 18:31	
EPA 6020B	Arsenic	0.0044J	mg/L	0.0050	10/06/20 18:31	

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SUMMARY OF DETECTION

Project: BOWEN AP
Pace Project No.: 92497532

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92497532030	**BGWC-31**					
EPA 6020B	Barium	0.038	mg/L	0.010	10/06/20 18:31	
EPA 6020B	Boron	0.66	mg/L	0.10	10/06/20 18:31	
EPA 6020B	Chromium	0.00056J	mg/L	0.010	10/06/20 18:31	
EPA 6020B	Cobalt	0.00046J	mg/L	0.0050	10/06/20 18:31	
EPA 6020B	Lead	0.0013J	mg/L	0.0050	10/06/20 18:31	
SM 2450C-2011	Total Dissolved Solids	405	mg/L	10.0	10/02/20 17:26	
SM 2320B-2011	Alkalinity,Bicarbonate (CaCO3)	195	mg/L	5.0	10/08/20 17:08	
SM 2320B-2011	Alkalinity, Total as CaCO3	195	mg/L	5.0	10/08/20 17:08	
EPA 300.0 Rev 2.1 1993	Chloride	34.5	mg/L	1.0	10/01/20 16:38	
EPA 300.0 Rev 2.1 1993	Sulfate	115	mg/L	2.0	10/01/20 21:05	
92497532031	**BGWC-34D**					
	Performed by	CUSTOMER			10/09/20 11:00	
	pH	7.24	Std. Units		10/09/20 11:00	
EPA 6010D	Calcium	117	mg/L	1.0	10/05/20 21:40	
EPA 6010D	Iron	0.91	mg/L	0.040	10/05/20 21:40	
EPA 6010D	Magnesium	30.4	mg/L	0.050	10/05/20 21:40	
EPA 6010D	Manganese	0.022J	mg/L	0.040	10/05/20 21:40	
EPA 6010D	Potassium	1.9	mg/L	0.20	10/05/20 21:40	
EPA 6010D	Sodium	5.5	mg/L	1.0	10/05/20 21:40	
EPA 6020B	Antimony	0.00049J	mg/L	0.0030	10/06/20 18:36	
EPA 6020B	Arsenic	0.018	mg/L	0.0050	10/06/20 18:36	
EPA 6020B	Barium	0.042	mg/L	0.010	10/06/20 18:36	
EPA 6020B	Boron	0.28	mg/L	0.10	10/06/20 18:36	
EPA 6020B	Cobalt	0.00048J	mg/L	0.0050	10/06/20 18:36	
EPA 6020B	Molybdenum	0.00078J	mg/L	0.010	10/06/20 18:36	
SM 2450C-2011	Total Dissolved Solids	466	mg/L	10.0	10/02/20 17:26	
SM 2320B-2011	Alkalinity,Bicarbonate (CaCO3)	263	mg/L	5.0	10/08/20 22:49	
SM 2320B-2011	Alkalinity, Total as CaCO3	263	mg/L	5.0	10/08/20 22:49	
SM 4500-S2D-2011	Sulfide	0.72	mg/L	0.10	10/01/20 12:59	
EPA 300.0 Rev 2.1 1993	Chloride	36.6	mg/L	1.0	10/01/20 16:53	
EPA 300.0 Rev 2.1 1993	Sulfate	115	mg/L	2.0	10/01/20 21:20	
92497532032	**BGWC-36D**					
	Performed by	CUSTOMER			10/09/20 11:00	
	pH	7.29	Std. Units		10/09/20 11:00	
EPA 6010D	Calcium	165	mg/L	1.0	10/05/20 21:45	
EPA 6010D	Iron	0.11	mg/L	0.040	10/05/20 21:45	
EPA 6010D	Magnesium	49.5	mg/L	0.050	10/05/20 21:45	
EPA 6010D	Manganese	0.12	mg/L	0.040	10/05/20 21:45	
EPA 6010D	Potassium	3.8	mg/L	0.20	10/05/20 21:45	
EPA 6010D	Sodium	15.7	mg/L	1.0	10/05/20 21:45	
EPA 6020B	Barium	0.067	mg/L	0.010	10/06/20 18:42	
EPA 6020B	Boron	4.8	mg/L	0.10	10/06/20 18:42	
EPA 6020B	Cobalt	0.00038J	mg/L	0.0050	10/06/20 18:42	
EPA 6020B	Lead	0.00017J	mg/L	0.0050	10/06/20 18:42	
EPA 6020B	Lithium	0.0011J	mg/L	0.030	10/06/20 18:42	

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SUMMARY OF DETECTION

Project: BOWEN AP
Pace Project No.: 92497532

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92497532032	**BGWC-36D**					
EPA 6020B	Molybdenum	0.0084J	mg/L	0.010	10/06/20 18:42	
EPA 6020B	Selenium	0.0076J	mg/L	0.010	10/06/20 18:42	
EPA 6020B	Thallium	0.00019J	mg/L	0.0010	10/06/20 18:42	
SM 2450C-2011	Total Dissolved Solids	938	mg/L	20.0	10/02/20 17:26	
SM 2320B-2011	Alkalinity,Bicarbonate (CaCO3)	128	mg/L	5.0	10/08/20 17:28	
SM 2320B-2011	Alkalinity, Total as CaCO3	128	mg/L	5.0	10/08/20 17:28	
EPA 300.0 Rev 2.1 1993	Chloride	277	mg/L	6.0	10/01/20 22:04	
EPA 300.0 Rev 2.1 1993	Fluoride	0.10	mg/L	0.10	10/01/20 17:08	
EPA 300.0 Rev 2.1 1993	Sulfate	135	mg/L	6.0	10/01/20 22:04	
92497532033	**DUP-3**					
EPA 6010D	Calcium	51.9	mg/L	1.0	10/05/20 21:49	
EPA 6010D	Magnesium	19.3	mg/L	0.050	10/05/20 21:49	
EPA 6010D	Potassium	3.1	mg/L	0.20	10/05/20 21:49	
EPA 6010D	Sodium	2.7	mg/L	1.0	10/05/20 21:49	B
EPA 6020B	Barium	0.030	mg/L	0.010	10/06/20 18:48	
EPA 6020B	Beryllium	0.000056J	mg/L	0.0030	10/06/20 18:48	
EPA 6020B	Boron	0.41	mg/L	0.10	10/06/20 18:48	
EPA 6020B	Lead	0.00010J	mg/L	0.0050	10/06/20 18:48	
SM 2450C-2011	Total Dissolved Solids	244	mg/L	10.0	10/02/20 17:26	
SM 2320B-2011	Alkalinity,Bicarbonate (CaCO3)	137	mg/L	5.0	10/08/20 17:37	
SM 2320B-2011	Alkalinity, Total as CaCO3	137	mg/L	5.0	10/08/20 17:37	
EPA 300.0 Rev 2.1 1993	Chloride	8.1	mg/L	1.0	10/01/20 20:02	
EPA 300.0 Rev 2.1 1993	Sulfate	66.2	mg/L	1.0	10/01/20 20:02	M1
92497532034	**FBL092820**					
EPA 6010D	Magnesium	0.010J	mg/L	0.050	10/05/20 21:53	
EPA 6020B	Boron	0.0098J	mg/L	0.10	10/06/20 18:53	
92497532036	**BGWC-39**					
	Performed by	CUSTOMER			10/09/20 11:00	
	pH	6.73	Std. Units		10/09/20 11:00	
EPA 6010D	Calcium	576	mg/L	10.0	10/06/20 16:23	
EPA 6010D	Iron	0.076	mg/L	0.040	10/05/20 19:45	
EPA 6010D	Magnesium	82.3	mg/L	0.050	10/05/20 19:45	
EPA 6010D	Manganese	1.3	mg/L	0.040	10/05/20 19:45	
EPA 6010D	Potassium	11.8	mg/L	0.20	10/05/20 19:45	
EPA 6010D	Sodium	34.3	mg/L	1.0	10/05/20 19:45	
EPA 6020B	Barium	0.096	mg/L	0.010	10/05/20 19:20	
EPA 6020B	Boron	11.1	mg/L	1.0	10/07/20 11:00	
EPA 6020B	Cadmium	0.00020J	mg/L	0.0025	10/05/20 19:20	
EPA 6020B	Cobalt	0.00061J	mg/L	0.0050	10/05/20 19:20	
EPA 6020B	Lithium	0.0066J	mg/L	0.030	10/05/20 19:20	
EPA 6020B	Molybdenum	0.010	mg/L	0.010	10/05/20 19:20	
EPA 6020B	Selenium	0.0020J	mg/L	0.010	10/05/20 19:20	
EPA 6020B	Thallium	0.00025J	mg/L	0.0010	10/05/20 19:20	
SM 2450C-2011	Total Dissolved Solids	2520	mg/L	50.0	10/02/20 17:30	
SM 2320B-2011	Alkalinity,Bicarbonate (CaCO3)	141	mg/L	5.0	10/08/20 21:45	

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SUMMARY OF DETECTION

Project: BOWEN AP
Pace Project No.: 92497532

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92497532036	**BGWC-39**					
SM 2320B-2011	Alkalinity, Total as CaCO3	141	mg/L	5.0	10/08/20 21:45	
EPA 300.0 Rev 2.1 1993	Chloride	792	mg/L	17.0	10/02/20 08:49	
EPA 300.0 Rev 2.1 1993	Sulfate	619	mg/L	17.0	10/02/20 08:49	
92497532037	**BGWC-40**					
	Performed by	CUSTOMER			10/09/20 11:00	
	pH	7.15	Std. Units		10/09/20 11:00	
EPA 6010D	Calcium	165	mg/L	1.0	10/05/20 19:49	
EPA 6010D	Iron	0.20	mg/L	0.040	10/05/20 19:49	
EPA 6010D	Magnesium	49.6	mg/L	0.050	10/05/20 19:49	
EPA 6010D	Manganese	0.020J	mg/L	0.040	10/05/20 19:49	
EPA 6010D	Potassium	2.0	mg/L	0.20	10/05/20 19:49	
EPA 6010D	Sodium	19.2	mg/L	1.0	10/05/20 19:49	
EPA 6020B	Barium	0.047	mg/L	0.010	10/05/20 19:37	
EPA 6020B	Boron	2.7	mg/L	0.50	10/07/20 11:06	
EPA 6020B	Chromium	0.00082J	mg/L	0.010	10/05/20 19:37	
EPA 6020B	Cobalt	0.00044J	mg/L	0.0050	10/05/20 19:37	
EPA 6020B	Lead	0.00024J	mg/L	0.0050	10/05/20 19:37	
EPA 6020B	Molybdenum	0.00069J	mg/L	0.010	10/05/20 19:37	
EPA 6020B	Selenium	0.0050J	mg/L	0.010	10/05/20 19:37	
SM 2450C-2011	Total Dissolved Solids	908	mg/L	20.0	10/02/20 17:30	
SM 2320B-2011	Alkalinity,Bicarbonate (CaCO3)	226	mg/L	5.0	10/08/20 21:55	
SM 2320B-2011	Alkalinity, Total as CaCO3	226	mg/L	5.0	10/08/20 21:55	
EPA 300.0 Rev 2.1 1993	Chloride	218	mg/L	5.0	10/02/20 09:04	
EPA 300.0 Rev 2.1 1993	Sulfate	130	mg/L	5.0	10/02/20 09:04	
92497532038	**FBL092920**					
EPA 6010D	Calcium	0.077J	mg/L	1.0	10/05/20 19:54	
EPA 6010D	Magnesium	0.014J	mg/L	0.050	10/05/20 19:54	
EPA 6020B	Boron	0.018J	mg/L	0.10	10/05/20 19:43	
92497532039	**EQBL092920**					
EPA 6020B	Boron	0.0067J	mg/L	0.10	10/05/20 19:49	

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ANALYTICAL RESULTS

Project: BOWEN AP
Pace Project No.: 92497532

Sample: BGWA-2 **Lab ID: 92497532001** Collected: 09/23/20 13:26 Received: 09/25/20 09:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
Field Data	Analytical Method: Pace Analytical Services - Charlotte								
Performed by	**CUSTOMER**				1		10/09/20 11:00		
pH	**7.32**	Std. Units			1		10/09/20 11:00		
6010D ATL ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Peachtree Corners, GA								
Calcium	**45.2**	mg/L	1.0	0.070	1	09/29/20 18:42	09/30/20 16:28	7440-70-2	M1
Iron	**0.46**	mg/L	0.040	0.016	1	09/29/20 18:42	09/30/20 16:28	7439-89-6	
Magnesium	**19.8**	mg/L	0.050	0.0076	1	09/29/20 18:42	09/30/20 16:28	7439-95-4	M1
Manganese	**0.078**	mg/L	0.040	0.0017	1	09/29/20 18:42	09/30/20 16:28	7439-96-5	
Potassium	**1.6**	mg/L	0.20	0.056	1	09/29/20 18:42	09/30/20 16:28	7440-09-7	
Sodium	**2.9**	mg/L	1.0	0.26	1	09/29/20 18:42	09/30/20 16:28	7440-23-5	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3005A Pace Analytical Services - Peachtree Corners, GA								
Antimony	ND	mg/L	0.0030	0.00028	1	09/30/20 14:00	10/01/20 18:08	7440-36-0	
Arsenic	ND	mg/L	0.0050	0.00078	1	09/30/20 14:00	10/01/20 18:08	7440-38-2	
Barium	**0.14**	mg/L	0.010	0.00071	1	09/30/20 14:00	10/01/20 18:08	7440-39-3	
Beryllium	ND	mg/L	0.0030	0.000046	1	09/30/20 14:00	10/01/20 18:08	7440-41-7	
Boron	**0.0086J**	mg/L	0.10	0.0052	1	09/30/20 14:00	10/01/20 18:08	7440-42-8	
Cadmium	ND	mg/L	0.0025	0.00012	1	09/30/20 14:00	10/01/20 18:08	7440-43-9	
Chromium	ND	mg/L	0.010	0.00055	1	09/30/20 14:00	10/01/20 18:08	7440-47-3	
Cobalt	ND	mg/L	0.0050	0.00038	1	09/30/20 14:00	10/01/20 18:08	7440-48-4	
Lead	**0.00014J**	mg/L	0.0050	0.000036	1	09/30/20 14:00	10/01/20 18:08	7439-92-1	
Lithium	ND	mg/L	0.030	0.00081	1	09/30/20 14:00	10/01/20 18:08	7439-93-2	
Molybdenum	ND	mg/L	0.010	0.00069	1	09/30/20 14:00	10/01/20 18:08	7439-98-7	
Selenium	ND	mg/L	0.010	0.0016	1	09/30/20 14:00	10/01/20 18:08	7782-49-2	
Thallium	ND	mg/L	0.0010	0.00014	1	09/30/20 14:00	10/01/20 18:08	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Peachtree Corners, GA								
Mercury	ND	mg/L	0.00050	0.000078	1	09/28/20 12:05	09/29/20 13:18	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2450C-2011 Pace Analytical Services - Peachtree Corners, GA								
Total Dissolved Solids	**237**	mg/L	10.0	10.0	1		09/28/20 17:29		
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**202**	mg/L	5.0	5.0	1		10/02/20 20:09		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		10/02/20 20:09		
Alkalinity, Total as CaCO3	**202**	mg/L	5.0	5.0	1		10/02/20 20:09		

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ANALYTICAL RESULTS

Project: BOWEN AP
Pace Project No.: 92497532

Sample: BGWA-2 **Lab ID: 92497532001** Collected: 09/23/20 13:26 Received: 09/25/20 09:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	ND	mg/L	0.10	0.050	1		09/29/20 13:28	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**4.2**	mg/L	1.0	0.60	1		09/29/20 06:14	16887-00-6	
Fluoride	ND	mg/L	0.10	0.050	1		09/29/20 06:14	16984-48-8	
Sulfate	**12.9**	mg/L	1.0	0.50	1		09/29/20 06:14	14808-79-8	

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ANALYTICAL RESULTS

Project: BOWEN AP
Pace Project No.: 92497532

Sample: BGWA-29 **Lab ID: 92497532002** Collected: 09/23/20 12:04 Received: 09/25/20 09:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
Field Data	Analytical Method: Pace Analytical Services - Charlotte								
Performed by	**CUSTOMER**				1		10/09/20 11:00		
pH	**8.08**	Std. Units			1		10/09/20 11:00		
6010D ATL ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Peachtree Corners, GA								
Calcium	**20.1**	mg/L	1.0	0.070	1	09/29/20 18:42	09/30/20 16:45	7440-70-2	
Iron	ND	mg/L	0.040	0.016	1	09/29/20 18:42	09/30/20 16:45	7439-89-6	
Magnesium	**10.7**	mg/L	0.050	0.0076	1	09/29/20 18:42	09/30/20 16:45	7439-95-4	
Manganese	ND	mg/L	0.040	0.0017	1	09/29/20 18:42	09/30/20 16:45	7439-96-5	
Potassium	**0.61**	mg/L	0.20	0.056	1	09/29/20 18:42	09/30/20 16:45	7440-09-7	
Sodium	**6.2**	mg/L	1.0	0.26	1	09/29/20 18:42	09/30/20 16:45	7440-23-5	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3005A Pace Analytical Services - Peachtree Corners, GA								
Antimony	ND	mg/L	0.0030	0.00028	1	09/30/20 14:00	10/01/20 18:14	7440-36-0	
Arsenic	ND	mg/L	0.0050	0.00078	1	09/30/20 14:00	10/01/20 18:14	7440-38-2	
Barium	**0.014**	mg/L	0.010	0.00071	1	09/30/20 14:00	10/01/20 18:14	7440-39-3	
Beryllium	ND	mg/L	0.0030	0.000046	1	09/30/20 14:00	10/01/20 18:14	7440-41-7	
Boron	ND	mg/L	0.10	0.0052	1	09/30/20 14:00	10/01/20 18:14	7440-42-8	
Cadmium	ND	mg/L	0.0025	0.00012	1	09/30/20 14:00	10/01/20 18:14	7440-43-9	
Chromium	ND	mg/L	0.010	0.00055	1	09/30/20 14:00	10/01/20 18:14	7440-47-3	
Cobalt	ND	mg/L	0.0050	0.00038	1	09/30/20 14:00	10/01/20 18:14	7440-48-4	
Lead	ND	mg/L	0.0050	0.000036	1	09/30/20 14:00	10/01/20 18:14	7439-92-1	
Lithium	**0.00085J**	mg/L	0.030	0.00081	1	09/30/20 14:00	10/01/20 18:14	7439-93-2	
Molybdenum	ND	mg/L	0.010	0.00069	1	09/30/20 14:00	10/01/20 18:14	7439-98-7	
Selenium	ND	mg/L	0.010	0.0016	1	09/30/20 14:00	10/01/20 18:14	7782-49-2	
Thallium	ND	mg/L	0.0010	0.00014	1	09/30/20 14:00	10/01/20 18:14	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Peachtree Corners, GA								
Mercury	ND	mg/L	0.00050	0.000078	1	09/28/20 12:05	09/29/20 13:28	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2450C-2011 Pace Analytical Services - Peachtree Corners, GA								
Total Dissolved Solids	**114**	mg/L	10.0	10.0	1		09/28/20 17:30		
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**112**	mg/L	5.0	5.0	1		10/02/20 20:22		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		10/02/20 20:22		
Alkalinity, Total as CaCO3	**112**	mg/L	5.0	5.0	1		10/02/20 20:22		

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ANALYTICAL RESULTS

Project: BOWEN AP
Pace Project No.: 92497532

Sample: BGWA-29 **Lab ID: 92497532002** Collected: 09/23/20 12:04 Received: 09/25/20 09:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	ND	mg/L	0.10	0.050	1		09/29/20 13:28	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**1.1**	mg/L	1.0	0.60	1		09/29/20 06:28	16887-00-6	
Fluoride	ND	mg/L	0.10	0.050	1		09/29/20 06:28	16984-48-8	
Sulfate	**5.3**	mg/L	1.0	0.50	1		09/29/20 06:28	14808-79-8	

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ANALYTICAL RESULTS

Project: BOWEN AP
Pace Project No.: 92497532

Sample: BGWC-8 **Lab ID: 92497532003** Collected: 09/23/20 16:00 Received: 09/25/20 09:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
Field Data	Analytical Method: Pace Analytical Services - Charlotte								
Performed by	**CUSTOMER**				1		10/09/20 11:00		
pH	**7.67**	Std. Units			1		10/09/20 11:00		
6010D ATL ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Peachtree Corners, GA								
Calcium	**41.6**	mg/L	1.0	0.070	1	09/29/20 18:42	09/30/20 16:49	7440-70-2	
Iron	**0.034J**	mg/L	0.040	0.016	1	09/29/20 18:42	09/30/20 16:49	7439-89-6	B
Magnesium	**14.4**	mg/L	0.050	0.0076	1	09/29/20 18:42	09/30/20 16:49	7439-95-4	
Manganese	ND	mg/L	0.040	0.0017	1	09/29/20 18:42	09/30/20 16:49	7439-96-5	
Potassium	**2.7**	mg/L	0.20	0.056	1	09/29/20 18:42	09/30/20 16:49	7440-09-7	
Sodium	**4.9**	mg/L	1.0	0.26	1	09/29/20 18:42	09/30/20 16:49	7440-23-5	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3005A Pace Analytical Services - Peachtree Corners, GA								
Antimony	ND	mg/L	0.0030	0.00028	1	09/30/20 14:00	10/01/20 18:20	7440-36-0	
Arsenic	ND	mg/L	0.0050	0.00078	1	09/30/20 14:00	10/01/20 18:20	7440-38-2	
Barium	**0.029**	mg/L	0.010	0.00071	1	09/30/20 14:00	10/01/20 18:20	7440-39-3	
Beryllium	ND	mg/L	0.0030	0.000046	1	09/30/20 14:00	10/01/20 18:20	7440-41-7	
Boron	**0.054J**	mg/L	0.10	0.0052	1	09/30/20 14:00	10/01/20 18:20	7440-42-8	
Cadmium	ND	mg/L	0.0025	0.00012	1	09/30/20 14:00	10/01/20 18:20	7440-43-9	
Chromium	**0.0013J**	mg/L	0.010	0.00055	1	09/30/20 14:00	10/01/20 18:20	7440-47-3	
Cobalt	ND	mg/L	0.0050	0.00038	1	09/30/20 14:00	10/01/20 18:20	7440-48-4	
Lead	ND	mg/L	0.0050	0.000036	1	09/30/20 14:00	10/01/20 18:20	7439-92-1	
Lithium	ND	mg/L	0.030	0.00081	1	09/30/20 14:00	10/01/20 18:20	7439-93-2	
Molybdenum	ND	mg/L	0.010	0.00069	1	09/30/20 14:00	10/01/20 18:20	7439-98-7	
Selenium	ND	mg/L	0.010	0.0016	1	09/30/20 14:00	10/01/20 18:20	7782-49-2	
Thallium	ND	mg/L	0.0010	0.00014	1	09/30/20 14:00	10/01/20 18:20	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Peachtree Corners, GA								
Mercury	ND	mg/L	0.00050	0.000078	1	09/28/20 12:05	09/29/20 13:30	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2450C-2011 Pace Analytical Services - Peachtree Corners, GA								
Total Dissolved Solids	**187**	mg/L	10.0	10.0	1		09/28/20 17:30		
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**156**	mg/L	5.0	5.0	1		10/06/20 15:17		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		10/06/20 15:17		
Alkalinity, Total as CaCO3	**156**	mg/L	5.0	5.0	1		10/06/20 15:17		

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ANALYTICAL RESULTS

Project: BOWEN AP
Pace Project No.: 92497532

Sample: BGWC-8 **Lab ID: 92497532003** Collected: 09/23/20 16:00 Received: 09/25/20 09:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	ND	mg/L	0.10	0.050	1		09/29/20 13:29	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**1.5**	mg/L	1.0	0.60	1		09/29/20 06:43	16887-00-6	
Fluoride	ND	mg/L	0.10	0.050	1		09/29/20 06:43	16984-48-8	
Sulfate	**33.5**	mg/L	1.0	0.50	1		09/29/20 06:43	14808-79-8	

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ANALYTICAL RESULTS

Project: BOWEN AP
Pace Project No.: 92497532

Sample: BGWA-6 **Lab ID: 92497532004** Collected: 09/23/20 16:34 Received: 09/25/20 09:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
Field Data	Analytical Method: Pace Analytical Services - Charlotte								
Performed by	**CUSTOMER**				1		10/09/20 11:00		
pH	**7.36**	Std. Units			1		10/09/20 11:00		
6010D ATL ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Peachtree Corners, GA								
Calcium	**67.3**	mg/L	1.0	0.070	1	09/29/20 18:42	09/30/20 17:15	7440-70-2	
Iron	**0.090**	mg/L	0.040	0.016	1	09/29/20 18:42	09/30/20 17:15	7439-89-6	B
Magnesium	**36.4**	mg/L	0.050	0.0076	1	09/29/20 18:42	09/30/20 17:15	7439-95-4	
Manganese	**0.032J**	mg/L	0.040	0.0017	1	09/29/20 18:42	09/30/20 17:15	7439-96-5	
Potassium	**0.45**	mg/L	0.20	0.056	1	09/29/20 18:42	09/30/20 17:15	7440-09-7	
Sodium	**3.0**	mg/L	1.0	0.26	1	09/29/20 18:42	09/30/20 17:15	7440-23-5	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3005A Pace Analytical Services - Peachtree Corners, GA								
Antimony	ND	mg/L	0.0030	0.00028	1	09/30/20 14:00	10/01/20 19:21	7440-36-0	
Arsenic	ND	mg/L	0.0050	0.00078	1	09/30/20 14:00	10/01/20 19:21	7440-38-2	
Barium	**0.010**	mg/L	0.010	0.00071	1	09/30/20 14:00	10/01/20 19:21	7440-39-3	
Beryllium	ND	mg/L	0.0030	0.000046	1	09/30/20 14:00	10/01/20 19:21	7440-41-7	
Boron	**0.0081J**	mg/L	0.10	0.0052	1	09/30/20 14:00	10/01/20 19:21	7440-42-8	
Cadmium	ND	mg/L	0.0025	0.00012	1	09/30/20 14:00	10/01/20 19:21	7440-43-9	
Chromium	ND	mg/L	0.010	0.00055	1	09/30/20 14:00	10/01/20 19:21	7440-47-3	
Cobalt	ND	mg/L	0.0050	0.00038	1	09/30/20 14:00	10/01/20 19:21	7440-48-4	
Lead	**0.000064J**	mg/L	0.0050	0.000036	1	09/30/20 14:00	10/01/20 19:21	7439-92-1	
Lithium	ND	mg/L	0.030	0.00081	1	09/30/20 14:00	10/01/20 19:21	7439-93-2	
Molybdenum	ND	mg/L	0.010	0.00069	1	09/30/20 14:00	10/01/20 19:21	7439-98-7	
Selenium	ND	mg/L	0.010	0.0016	1	09/30/20 14:00	10/01/20 19:21	7782-49-2	
Thallium	ND	mg/L	0.0010	0.00014	1	09/30/20 14:00	10/01/20 19:21	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Peachtree Corners, GA								
Mercury	ND	mg/L	0.00050	0.000078	1	09/28/20 12:05	09/29/20 13:32	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2450C-2011 Pace Analytical Services - Peachtree Corners, GA								
Total Dissolved Solids	**296**	mg/L	10.0	10.0	1		09/28/20 17:30		
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**312**	mg/L	5.0	5.0	1		10/07/20 10:30		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		10/07/20 10:30		
Alkalinity, Total as CaCO3	**312**	mg/L	5.0	5.0	1		10/07/20 10:30		

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(770)734-4200

ANALYTICAL RESULTS

Project: BOWEN AP
Pace Project No.: 92497532

Sample: BGWA-6 **Lab ID: 92497532004** Collected: 09/23/20 16:34 Received: 09/25/20 09:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	ND	mg/L	0.10	0.050	1		09/29/20 13:29	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**8.4**	mg/L	1.0	0.60	1		09/29/20 07:26	16887-00-6	
Fluoride	ND	mg/L	0.10	0.050	1		09/29/20 07:26	16984-48-8	
Sulfate	**24.6**	mg/L	1.0	0.50	1		09/29/20 07:26	14808-79-8	

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ANALYTICAL RESULTS

Project: BOWEN AP
Pace Project No.: 92497532

Sample: FBL092320 **Lab ID: 92497532005** Collected: 09/23/20 16:50 Received: 09/25/20 09:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010D ATL ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Peachtree Corners, GA								
Calcium	ND	mg/L	1.0	0.070	1	09/29/20 18:42	09/30/20 17:19	7440-70-2	
Iron	ND	mg/L	0.040	0.016	1	09/29/20 18:42	09/30/20 17:19	7439-89-6	
Magnesium	**0.016J**	mg/L	0.050	0.0076	1	09/29/20 18:42	09/30/20 17:19	7439-95-4	B
Manganese	ND	mg/L	0.040	0.0017	1	09/29/20 18:42	09/30/20 17:19	7439-96-5	
Potassium	ND	mg/L	0.20	0.056	1	09/29/20 18:42	09/30/20 17:19	7440-09-7	
Sodium	ND	mg/L	1.0	0.26	1	09/29/20 18:42	09/30/20 17:19	7440-23-5	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3005A Pace Analytical Services - Peachtree Corners, GA								
Antimony	ND	mg/L	0.0030	0.00028	1	09/30/20 14:00	10/01/20 19:27	7440-36-0	
Arsenic	ND	mg/L	0.0050	0.00078	1	09/30/20 14:00	10/01/20 19:27	7440-38-2	
Barium	ND	mg/L	0.010	0.00071	1	09/30/20 14:00	10/01/20 19:27	7440-39-3	
Beryllium	ND	mg/L	0.0030	0.000046	1	09/30/20 14:00	10/01/20 19:27	7440-41-7	
Boron	ND	mg/L	0.10	0.0052	1	09/30/20 14:00	10/01/20 19:27	7440-42-8	
Cadmium	ND	mg/L	0.0025	0.00012	1	09/30/20 14:00	10/01/20 19:27	7440-43-9	
Chromium	**0.0029J**	mg/L	0.010	0.00055	1	09/30/20 14:00	10/01/20 19:27	7440-47-3	
Cobalt	ND	mg/L	0.0050	0.00038	1	09/30/20 14:00	10/01/20 19:27	7440-48-4	
Lead	**0.000063J**	mg/L	0.0050	0.000036	1	09/30/20 14:00	10/01/20 19:27	7439-92-1	
Lithium	ND	mg/L	0.030	0.00081	1	09/30/20 14:00	10/01/20 19:27	7439-93-2	
Molybdenum	ND	mg/L	0.010	0.00069	1	09/30/20 14:00	10/01/20 19:27	7439-98-7	
Selenium	ND	mg/L	0.010	0.0016	1	09/30/20 14:00	10/01/20 19:27	7782-49-2	
Thallium	ND	mg/L	0.0010	0.00014	1	09/30/20 14:00	10/01/20 19:27	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Peachtree Corners, GA								
Mercury	ND	mg/L	0.00050	0.000078	1	09/28/20 12:05	09/29/20 13:40	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2450C-2011 Pace Analytical Services - Peachtree Corners, GA								
Total Dissolved Solids	**1360**	mg/L	20.0	20.0	1		10/01/20 15:27		H1,H4
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	ND	mg/L	5.0	5.0	1		10/06/20 16:03		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		10/06/20 16:03		
Alkalinity, Total as CaCO3	ND	mg/L	5.0	5.0	1		10/06/20 16:03		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	ND	mg/L	0.10	0.050	1		09/29/20 13:32	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	ND	mg/L	1.0	0.60	1		09/29/20 07:55	16887-00-6	

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ANALYTICAL RESULTS

Project: BOWEN AP
Pace Project No.: 92497532

Sample: FBL092320 **Lab ID: 92497532005** Collected: 09/23/20 16:50 Received: 09/25/20 09:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Fluoride	ND	mg/L	0.10	0.050	1		09/29/20 07:55	16984-48-8	
Sulfate	ND	mg/L	1.0	0.50	1		09/29/20 07:55	14808-79-8	

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ANALYTICAL RESULTS

Project: BOWEN AP
Pace Project No.: 92497532

Sample: BGWC-9 **Lab ID: 92497532006** Collected: 09/24/20 10:28 Received: 09/25/20 09:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
Field Data	Analytical Method: Pace Analytical Services - Charlotte								
Performed by	**CUSTOMER**				1		10/09/20 11:00		
pH	**7.34**	Std. Units			1		10/09/20 11:00		
6010D ATL ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Peachtree Corners, GA								
Calcium	**59.0**	mg/L	1.0	0.070	1	09/29/20 18:42	09/30/20 17:24	7440-70-2	
Iron	**0.49**	mg/L	0.040	0.016	1	09/29/20 18:42	09/30/20 17:24	7439-89-6	
Magnesium	**24.1**	mg/L	0.050	0.0076	1	09/29/20 18:42	09/30/20 17:24	7439-95-4	
Manganese	**0.088**	mg/L	0.040	0.0017	1	09/29/20 18:42	09/30/20 17:24	7439-96-5	
Potassium	**2.6**	mg/L	0.20	0.056	1	09/29/20 18:42	09/30/20 17:24	7440-09-7	
Sodium	**19.6**	mg/L	1.0	0.26	1	09/29/20 18:42	09/30/20 17:24	7440-23-5	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3005A Pace Analytical Services - Peachtree Corners, GA								
Antimony	ND	mg/L	0.0030	0.00028	1	09/30/20 14:00	10/01/20 19:33	7440-36-0	
Arsenic	**0.0021J**	mg/L	0.0050	0.00078	1	09/30/20 14:00	10/01/20 19:33	7440-38-2	
Barium	**0.031**	mg/L	0.010	0.00071	1	09/30/20 14:00	10/01/20 19:33	7440-39-3	
Beryllium	ND	mg/L	0.0030	0.000046	1	09/30/20 14:00	10/01/20 19:33	7440-41-7	
Boron	**0.44**	mg/L	0.10	0.0052	1	09/30/20 14:00	10/03/20 11:24	7440-42-8	
Cadmium	ND	mg/L	0.0025	0.00012	1	09/30/20 14:00	10/01/20 19:33	7440-43-9	
Chromium	ND	mg/L	0.010	0.00055	1	09/30/20 14:00	10/01/20 19:33	7440-47-3	
Cobalt	ND	mg/L	0.0050	0.00038	1	09/30/20 14:00	10/01/20 19:33	7440-48-4	
Lead	ND	mg/L	0.0050	0.000036	1	09/30/20 14:00	10/01/20 19:33	7439-92-1	
Lithium	**0.0011J**	mg/L	0.030	0.00081	1	09/30/20 14:00	10/01/20 19:33	7439-93-2	
Molybdenum	**0.0034J**	mg/L	0.010	0.00069	1	09/30/20 14:00	10/01/20 19:33	7439-98-7	
Selenium	ND	mg/L	0.010	0.0016	1	09/30/20 14:00	10/01/20 19:33	7782-49-2	
Thallium	ND	mg/L	0.0010	0.00014	1	09/30/20 14:00	10/01/20 19:33	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Peachtree Corners, GA								
Mercury	ND	mg/L	0.00050	0.000078	1	09/28/20 12:05	09/29/20 13:42	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2450C-2011 Pace Analytical Services - Peachtree Corners, GA								
Total Dissolved Solids	**322**	mg/L	10.0	10.0	1		09/28/20 17:41		
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**219**	mg/L	5.0	5.0	1		10/06/20 16:07		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		10/06/20 16:07		
Alkalinity, Total as CaCO3	**219**	mg/L	5.0	5.0	1		10/06/20 16:07		

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ANALYTICAL RESULTS

Project: BOWEN AP
Pace Project No.: 92497532

Sample: BGWC-9 **Lab ID: 92497532006** Collected: 09/24/20 10:28 Received: 09/25/20 09:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	ND	mg/L	0.10	0.050	1		09/29/20 13:34	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**9.2**	mg/L	1.0	0.60	1		09/29/20 08:10	16887-00-6	
Fluoride	**0.091J**	mg/L	0.10	0.050	1		09/29/20 08:10	16984-48-8	
Sulfate	**84.8**	mg/L	1.0	0.50	1		09/29/20 08:10	14808-79-8	

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ANALYTICAL RESULTS

Project: BOWEN AP
Pace Project No.: 92497532

Sample: BGWC-10 **Lab ID: 92497532007** Collected: 09/24/20 16:04 Received: 09/25/20 09:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
Field Data	Analytical Method: Pace Analytical Services - Charlotte								
Performed by	**CUSTOMER**				1		10/09/20 11:00		
pH	**7.54**	Std. Units			1		10/09/20 11:00		
6010D ATL ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Peachtree Corners, GA								
Calcium	**58.8**	mg/L	1.0	0.070	1	09/29/20 18:42	09/30/20 17:28	7440-70-2	
Iron	**0.38**	mg/L	0.040	0.016	1	09/29/20 18:42	09/30/20 17:28	7439-89-6	
Magnesium	**25.6**	mg/L	0.050	0.0076	1	09/29/20 18:42	09/30/20 17:28	7439-95-4	
Manganese	**0.020J**	mg/L	0.040	0.0017	1	09/29/20 18:42	09/30/20 17:28	7439-96-5	
Potassium	**2.0**	mg/L	0.20	0.056	1	09/29/20 18:42	09/30/20 17:28	7440-09-7	
Sodium	**18.7**	mg/L	1.0	0.26	1	09/29/20 18:42	09/30/20 17:28	7440-23-5	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3005A Pace Analytical Services - Peachtree Corners, GA								
Antimony	ND	mg/L	0.0030	0.00028	1	09/30/20 14:00	10/01/20 19:38	7440-36-0	
Arsenic	**0.0060**	mg/L	0.0050	0.00078	1	09/30/20 14:00	10/01/20 19:38	7440-38-2	
Barium	**0.041**	mg/L	0.010	0.00071	1	09/30/20 14:00	10/01/20 19:38	7440-39-3	
Beryllium	ND	mg/L	0.0030	0.000046	1	09/30/20 14:00	10/01/20 19:38	7440-41-7	
Boron	**0.47**	mg/L	0.10	0.0052	1	09/30/20 14:00	10/03/20 11:30	7440-42-8	
Cadmium	ND	mg/L	0.0025	0.00012	1	09/30/20 14:00	10/01/20 19:38	7440-43-9	
Chromium	ND	mg/L	0.010	0.00055	1	09/30/20 14:00	10/01/20 19:38	7440-47-3	
Cobalt	ND	mg/L	0.0050	0.00038	1	09/30/20 14:00	10/01/20 19:38	7440-48-4	
Lead	ND	mg/L	0.0050	0.000036	1	09/30/20 14:00	10/01/20 19:38	7439-92-1	
Lithium	**0.0013J**	mg/L	0.030	0.00081	1	09/30/20 14:00	10/01/20 19:38	7439-93-2	
Molybdenum	**0.0032J**	mg/L	0.010	0.00069	1	09/30/20 14:00	10/01/20 19:38	7439-98-7	
Selenium	ND	mg/L	0.010	0.0016	1	09/30/20 14:00	10/01/20 19:38	7782-49-2	
Thallium	ND	mg/L	0.0010	0.00014	1	09/30/20 14:00	10/01/20 19:38	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Peachtree Corners, GA								
Mercury	ND	mg/L	0.00050	0.000078	1	09/28/20 12:05	09/29/20 13:44	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2450C-2011 Pace Analytical Services - Peachtree Corners, GA								
Total Dissolved Solids	**356**	mg/L	10.0	10.0	1		09/28/20 17:50		
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**175**	mg/L	5.0	5.0	1		10/06/20 16:20		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		10/06/20 16:20		
Alkalinity, Total as CaCO3	**175**	mg/L	5.0	5.0	1		10/06/20 16:20		

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ANALYTICAL RESULTS

Project: BOWEN AP
Pace Project No.: 92497532

Sample: BGWC-10 **Lab ID: 92497532007** Collected: 09/24/20 16:04 Received: 09/25/20 09:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	ND	mg/L	0.10	0.050	1		09/29/20 13:35	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**25.4**	mg/L	1.0	0.60	1		09/29/20 08:24	16887-00-6	
Fluoride	ND	mg/L	0.10	0.050	1		09/29/20 08:24	16984-48-8	
Sulfate	**98.6**	mg/L	2.0	1.0	2		09/29/20 17:20	14808-79-8	

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ANALYTICAL RESULTS

Project: BOWEN AP
Pace Project No.: 92497532

Sample: BGWC-16 **Lab ID: 92497532008** Collected: 09/24/20 11:35 Received: 09/25/20 09:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
Field Data	Analytical Method: Pace Analytical Services - Charlotte								
Performed by	**CUSTOMER**				1		10/09/20 11:00		
pH	**6.66**	Std. Units			1		10/09/20 11:00		
6010D ATL ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Peachtree Corners, GA								
Calcium	**141**	mg/L	1.0	0.070	1	09/29/20 18:42	09/30/20 17:32	7440-70-2	
Iron	**0.036J**	mg/L	0.040	0.016	1	09/29/20 18:42	09/30/20 17:32	7439-89-6	B
Magnesium	**27.4**	mg/L	0.050	0.0076	1	09/29/20 18:42	09/30/20 17:32	7439-95-4	
Manganese	**3.2**	mg/L	0.040	0.0017	1	09/29/20 18:42	09/30/20 17:32	7439-96-5	
Potassium	**4.6**	mg/L	0.20	0.056	1	09/29/20 18:42	09/30/20 17:32	7440-09-7	
Sodium	**27.5**	mg/L	1.0	0.26	1	09/29/20 18:42	09/30/20 17:32	7440-23-5	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3005A Pace Analytical Services - Peachtree Corners, GA								
Antimony	ND	mg/L	0.0030	0.00028	1	09/30/20 14:00	10/01/20 19:44	7440-36-0	
Arsenic	ND	mg/L	0.0050	0.00078	1	09/30/20 14:00	10/01/20 19:44	7440-38-2	
Barium	**0.028**	mg/L	0.010	0.00071	1	09/30/20 14:00	10/01/20 19:44	7440-39-3	
Beryllium	**0.00011J**	mg/L	0.0030	0.000046	1	09/30/20 14:00	10/01/20 19:44	7440-41-7	
Boron	**1.3**	mg/L	0.50	0.026	5	09/30/20 14:00	10/03/20 11:36	7440-42-8	
Cadmium	**0.0018J**	mg/L	0.0025	0.00012	1	09/30/20 14:00	10/01/20 19:44	7440-43-9	
Chromium	ND	mg/L	0.010	0.00055	1	09/30/20 14:00	10/01/20 19:44	7440-47-3	
Cobalt	**0.0095**	mg/L	0.0050	0.00038	1	09/30/20 14:00	10/01/20 19:44	7440-48-4	
Lead	**0.00021J**	mg/L	0.0050	0.000036	1	09/30/20 14:00	10/01/20 19:44	7439-92-1	
Lithium	ND	mg/L	0.030	0.00081	1	09/30/20 14:00	10/01/20 19:44	7439-93-2	
Molybdenum	ND	mg/L	0.010	0.00069	1	09/30/20 14:00	10/01/20 19:44	7439-98-7	
Selenium	**0.0030J**	mg/L	0.010	0.0016	1	09/30/20 14:00	10/01/20 19:44	7782-49-2	
Thallium	**0.00024J**	mg/L	0.0010	0.00014	1	09/30/20 14:00	10/01/20 19:44	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Peachtree Corners, GA								
Mercury	ND	mg/L	0.00050	0.000078	1	09/28/20 12:05	09/29/20 13:47	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2450C-2011 Pace Analytical Services - Peachtree Corners, GA								
Total Dissolved Solids	**732**	mg/L	20.0	20.0	1		09/28/20 17:50		
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**147**	mg/L	5.0	5.0	1		10/06/20 16:41		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		10/06/20 16:41		
Alkalinity, Total as CaCO3	**147**	mg/L	5.0	5.0	1		10/06/20 16:41		

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ANALYTICAL RESULTS

Project: BOWEN AP
Pace Project No.: 92497532

Sample: BGWC-16 **Lab ID: 92497532008** Collected: 09/24/20 11:35 Received: 09/25/20 09:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	ND	mg/L	0.10	0.050	1		09/29/20 13:36	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**28.8**	mg/L	1.0	0.60	1		09/29/20 08:39	16887-00-6	
Fluoride	**0.059J**	mg/L	0.10	0.050	1		09/29/20 08:39	16984-48-8	
Sulfate	**338**	mg/L	7.0	3.5	7		09/29/20 17:34	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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110 Technology Parkway
Peachtree Corners, GA 30092
(770)734-4200

ANALYTICAL RESULTS

Project: BOWEN AP
Pace Project No.: 92497532

Sample: BGWC-17 **Lab ID: 92497532009** Collected: 09/24/20 12:45 Received: 09/25/20 09:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
Field Data	Analytical Method: Pace Analytical Services - Charlotte								
Performed by	**CUSTOMER**				1		10/09/20 11:00		
pH	**7.20**	Std. Units			1		10/09/20 11:00		
6010D ATL ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Peachtree Corners, GA								
Calcium	**84.9**	mg/L	1.0	0.070	1	09/29/20 18:42	09/30/20 17:36	7440-70-2	
Iron	ND	mg/L	0.040	0.016	1	09/29/20 18:42	09/30/20 17:36	7439-89-6	
Magnesium	**27.9**	mg/L	0.050	0.0076	1	09/29/20 18:42	09/30/20 17:36	7439-95-4	
Manganese	**0.12**	mg/L	0.040	0.0017	1	09/29/20 18:42	09/30/20 17:36	7439-96-5	
Potassium	**2.7**	mg/L	0.20	0.056	1	09/29/20 18:42	09/30/20 17:36	7440-09-7	
Sodium	**15.4**	mg/L	1.0	0.26	1	09/29/20 18:42	09/30/20 17:36	7440-23-5	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3005A Pace Analytical Services - Peachtree Corners, GA								
Antimony	ND	mg/L	0.0030	0.00028	1	09/30/20 14:00	10/01/20 19:50	7440-36-0	
Arsenic	ND	mg/L	0.0050	0.00078	1	09/30/20 14:00	10/01/20 19:50	7440-38-2	
Barium	**0.022**	mg/L	0.010	0.00071	1	09/30/20 14:00	10/01/20 19:50	7440-39-3	
Beryllium	**0.000054J**	mg/L	0.0030	0.000046	1	09/30/20 14:00	10/01/20 19:50	7440-41-7	
Boron	**1.5**	mg/L	0.50	0.026	5	09/30/20 14:00	10/03/20 11:41	7440-42-8	
Cadmium	**0.00024J**	mg/L	0.0025	0.00012	1	09/30/20 14:00	10/01/20 19:50	7440-43-9	
Chromium	ND	mg/L	0.010	0.00055	1	09/30/20 14:00	10/01/20 19:50	7440-47-3	
Cobalt	ND	mg/L	0.0050	0.00038	1	09/30/20 14:00	10/01/20 19:50	7440-48-4	
Lead	ND	mg/L	0.0050	0.000036	1	09/30/20 14:00	10/01/20 19:50	7439-92-1	
Lithium	ND	mg/L	0.030	0.00081	1	09/30/20 14:00	10/01/20 19:50	7439-93-2	
Molybdenum	ND	mg/L	0.010	0.00069	1	09/30/20 14:00	10/01/20 19:50	7439-98-7	
Selenium	ND	mg/L	0.010	0.0016	1	09/30/20 14:00	10/01/20 19:50	7782-49-2	
Thallium	**0.00018J**	mg/L	0.0010	0.00014	1	09/30/20 14:00	10/01/20 19:50	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Peachtree Corners, GA								
Mercury	**0.00027J**	mg/L	0.00050	0.000078	1	09/28/20 12:05	09/29/20 13:49	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2450C-2011 Pace Analytical Services - Peachtree Corners, GA								
Total Dissolved Solids	**481**	mg/L	10.0	10.0	1		09/28/20 17:51		
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**153**	mg/L	5.0	5.0	1		10/06/20 16:53		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		10/06/20 16:53		
Alkalinity, Total as CaCO3	**153**	mg/L	5.0	5.0	1		10/06/20 16:53		

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(770)734-4200

ANALYTICAL RESULTS

Project: BOWEN AP
Pace Project No.: 92497532

Sample: BGWC-17 **Lab ID: 92497532009** Collected: 09/24/20 12:45 Received: 09/25/20 09:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	ND	mg/L	0.10	0.050	1		09/29/20 13:37	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**50.1**	mg/L	1.0	0.60	1		09/29/20 09:22	16887-00-6	
Fluoride	**0.12**	mg/L	0.10	0.050	1		09/29/20 09:22	16984-48-8	
Sulfate	**156**	mg/L	3.0	1.5	3		09/29/20 17:49	14808-79-8	

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ANALYTICAL RESULTS

Project: BOWEN AP
Pace Project No.: 92497532

Sample: BGWC-18 **Lab ID: 92497532010** Collected: 09/24/20 11:18 Received: 09/25/20 09:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
Field Data	Analytical Method: Pace Analytical Services - Charlotte								
Performed by	**CUSTOMER**				1		10/09/20 11:00		
pH	**7.05**	Std. Units			1		10/09/20 11:00		
6010D ATL ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Peachtree Corners, GA								
Calcium	**68.7**	mg/L	1.0	0.070	1	09/29/20 18:42	09/30/20 17:40	7440-70-2	
Iron	**0.016J**	mg/L	0.040	0.016	1	09/29/20 18:42	09/30/20 17:40	7439-89-6	B
Magnesium	**20.5**	mg/L	0.050	0.0076	1	09/29/20 18:42	09/30/20 17:40	7439-95-4	
Manganese	**0.025J**	mg/L	0.040	0.0017	1	09/29/20 18:42	09/30/20 17:40	7439-96-5	
Potassium	**1.8**	mg/L	0.20	0.056	1	09/29/20 18:42	09/30/20 17:40	7440-09-7	
Sodium	**5.0**	mg/L	1.0	0.26	1	09/29/20 18:42	09/30/20 17:40	7440-23-5	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3005A Pace Analytical Services - Peachtree Corners, GA								
Antimony	ND	mg/L	0.0030	0.00028	1	09/30/20 14:00	10/01/20 19:56	7440-36-0	
Arsenic	ND	mg/L	0.0050	0.00078	1	09/30/20 14:00	10/01/20 19:56	7440-38-2	
Barium	**0.031**	mg/L	0.010	0.00071	1	09/30/20 14:00	10/01/20 19:56	7440-39-3	
Beryllium	ND	mg/L	0.0030	0.000046	1	09/30/20 14:00	10/01/20 19:56	7440-41-7	
Boron	**0.72**	mg/L	0.10	0.0052	1	09/30/20 14:00	10/03/20 11:47	7440-42-8	
Cadmium	ND	mg/L	0.0025	0.00012	1	09/30/20 14:00	10/01/20 19:56	7440-43-9	
Chromium	ND	mg/L	0.010	0.00055	1	09/30/20 14:00	10/01/20 19:56	7440-47-3	
Cobalt	ND	mg/L	0.0050	0.00038	1	09/30/20 14:00	10/01/20 19:56	7440-48-4	
Lead	ND	mg/L	0.0050	0.000036	1	09/30/20 14:00	10/01/20 19:56	7439-92-1	
Lithium	ND	mg/L	0.030	0.00081	1	09/30/20 14:00	10/01/20 19:56	7439-93-2	
Molybdenum	ND	mg/L	0.010	0.00069	1	09/30/20 14:00	10/01/20 19:56	7439-98-7	
Selenium	ND	mg/L	0.010	0.0016	1	09/30/20 14:00	10/01/20 19:56	7782-49-2	
Thallium	ND	mg/L	0.0010	0.00014	1	09/30/20 14:00	10/01/20 19:56	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Peachtree Corners, GA								
Mercury	ND	mg/L	0.00050	0.000078	1	09/28/20 12:05	09/29/20 13:51	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2450C-2011 Pace Analytical Services - Peachtree Corners, GA								
Total Dissolved Solids	**310**	mg/L	10.0	10.0	1		09/28/20 17:51		
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**181**	mg/L	5.0	5.0	1		10/06/20 17:04		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		10/06/20 17:04		
Alkalinity, Total as CaCO3	**181**	mg/L	5.0	5.0	1		10/06/20 17:04		

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ANALYTICAL RESULTS

Project: BOWEN AP
Pace Project No.: 92497532

Sample: BGWC-18 **Lab ID: 92497532010** Collected: 09/24/20 11:18 Received: 09/25/20 09:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	ND	mg/L	0.10	0.050	1		09/29/20 13:37	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**30.3**	mg/L	1.0	0.60	1		09/29/20 09:36	16887-00-6	
Fluoride	**0.058J**	mg/L	0.10	0.050	1		09/29/20 09:36	16984-48-8	
Sulfate	**69.9**	mg/L	1.0	0.50	1		09/29/20 09:36	14808-79-8	

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ANALYTICAL RESULTS

Project: BOWEN AP
Pace Project No.: 92497532

Sample: BGWC-21 **Lab ID: 92497532011** Collected: 09/24/20 15:41 Received: 09/25/20 09:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
Field Data	Analytical Method: Pace Analytical Services - Charlotte								
Performed by	**CUSTOMER**				1		10/09/20 11:00		
pH	**7.78**	Std. Units			1		10/09/20 11:00		
6010D ATL ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Peachtree Corners, GA								
Calcium	**42.0**	mg/L	1.0	0.070	1	09/29/20 18:42	09/30/20 17:45	7440-70-2	
Iron	**0.083**	mg/L	0.040	0.016	1	09/29/20 18:42	09/30/20 17:45	7439-89-6	B
Magnesium	**24.7**	mg/L	0.050	0.0076	1	09/29/20 18:42	09/30/20 17:45	7439-95-4	
Manganese	**0.046**	mg/L	0.040	0.0017	1	09/29/20 18:42	09/30/20 17:45	7439-96-5	
Potassium	**1.4**	mg/L	0.20	0.056	1	09/29/20 18:42	09/30/20 17:45	7440-09-7	
Sodium	**2.3**	mg/L	1.0	0.26	1	09/29/20 18:42	09/30/20 17:45	7440-23-5	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3005A Pace Analytical Services - Peachtree Corners, GA								
Antimony	ND	mg/L	0.0030	0.00028	1	09/30/20 14:00	10/01/20 20:01	7440-36-0	
Arsenic	ND	mg/L	0.0050	0.00078	1	09/30/20 14:00	10/01/20 20:01	7440-38-2	
Barium	**0.031**	mg/L	0.010	0.00071	1	09/30/20 14:00	10/01/20 20:01	7440-39-3	
Beryllium	ND	mg/L	0.0030	0.000046	1	09/30/20 14:00	10/01/20 20:01	7440-41-7	
Boron	**0.037J**	mg/L	0.10	0.0052	1	09/30/20 14:00	10/01/20 20:01	7440-42-8	
Cadmium	ND	mg/L	0.0025	0.00012	1	09/30/20 14:00	10/01/20 20:01	7440-43-9	
Chromium	ND	mg/L	0.010	0.00055	1	09/30/20 14:00	10/01/20 20:01	7440-47-3	
Cobalt	**0.00098J**	mg/L	0.0050	0.00038	1	09/30/20 14:00	10/01/20 20:01	7440-48-4	
Lead	**0.000050J**	mg/L	0.0050	0.000036	1	09/30/20 14:00	10/01/20 20:01	7439-92-1	
Lithium	ND	mg/L	0.030	0.00081	1	09/30/20 14:00	10/01/20 20:01	7439-93-2	
Molybdenum	**0.0036J**	mg/L	0.010	0.00069	1	09/30/20 14:00	10/01/20 20:01	7439-98-7	
Selenium	ND	mg/L	0.010	0.0016	1	09/30/20 14:00	10/01/20 20:01	7782-49-2	
Thallium	ND	mg/L	0.0010	0.00014	1	09/30/20 14:00	10/01/20 20:01	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Peachtree Corners, GA								
Mercury	ND	mg/L	0.00050	0.000078	1	09/28/20 12:05	09/29/20 13:54	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2450C-2011 Pace Analytical Services - Peachtree Corners, GA								
Total Dissolved Solids	**243**	mg/L	10.0	10.0	1		09/28/20 17:51		
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**179**	mg/L	5.0	5.0	1		10/06/20 17:15		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		10/06/20 17:15		
Alkalinity, Total as CaCO3	**179**	mg/L	5.0	5.0	1		10/06/20 17:15		

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ANALYTICAL RESULTS

Project: BOWEN AP
Pace Project No.: 92497532

Sample: BGWC-21 **Lab ID: 92497532011** Collected: 09/24/20 15:41 Received: 09/25/20 09:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	ND	mg/L	0.10	0.050	1		09/29/20 13:37	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**4.0**	mg/L	1.0	0.60	1		09/29/20 10:20	16887-00-6	
Fluoride	ND	mg/L	0.10	0.050	1		09/29/20 10:20	16984-48-8	
Sulfate	**57.8**	mg/L	1.0	0.50	1		09/29/20 10:20	14808-79-8	

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ANALYTICAL RESULTS

Project: BOWEN AP
Pace Project No.: 92497532

Sample: BGWC-22 **Lab ID: 92497532012** Collected: 09/24/20 14:12 Received: 09/25/20 09:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
Field Data	Analytical Method: Pace Analytical Services - Charlotte								
Performed by	**CUSTOMER**				1		10/09/20 11:00		
pH	**6.82**	Std. Units			1		10/09/20 11:00		
6010D ATL ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Peachtree Corners, GA								
Calcium	**750**	mg/L	10.0	0.70	10	09/29/20 18:42	10/01/20 13:06	7440-70-2	
Iron	**0.48**	mg/L	0.040	0.016	1	09/29/20 18:42	09/30/20 17:49	7439-89-6	
Magnesium	**99.4**	mg/L	0.050	0.0076	1	09/29/20 18:42	09/30/20 17:49	7439-95-4	
Manganese	**6.5**	mg/L	0.040	0.0017	1	09/29/20 18:42	09/30/20 17:49	7439-96-5	
Potassium	**16.0**	mg/L	0.20	0.056	1	09/29/20 18:42	09/30/20 17:49	7440-09-7	
Sodium	**45.7**	mg/L	1.0	0.26	1	09/29/20 18:42	09/30/20 17:49	7440-23-5	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3005A Pace Analytical Services - Peachtree Corners, GA								
Antimony	ND	mg/L	0.0030	0.00028	1	09/30/20 14:00	10/01/20 20:07	7440-36-0	
Arsenic	**0.0019J**	mg/L	0.0050	0.00078	1	09/30/20 14:00	10/01/20 20:07	7440-38-2	
Barium	**0.093**	mg/L	0.010	0.00071	1	09/30/20 14:00	10/01/20 20:07	7440-39-3	
Beryllium	**0.00012J**	mg/L	0.0030	0.000046	1	09/30/20 14:00	10/01/20 20:07	7440-41-7	
Boron	**18.8**	mg/L	5.0	0.26	50	09/30/20 14:00	10/03/20 11:53	7440-42-8	
Cadmium	**0.00033J**	mg/L	0.0025	0.00012	1	09/30/20 14:00	10/01/20 20:07	7440-43-9	
Chromium	ND	mg/L	0.010	0.00055	1	09/30/20 14:00	10/01/20 20:07	7440-47-3	
Cobalt	**0.041**	mg/L	0.0050	0.00038	1	09/30/20 14:00	10/01/20 20:07	7440-48-4	
Lead	**0.00014J**	mg/L	0.0050	0.000036	1	09/30/20 14:00	10/01/20 20:07	7439-92-1	
Lithium	**0.043**	mg/L	0.030	0.00081	1	09/30/20 14:00	10/01/20 20:07	7439-93-2	
Molybdenum	**0.040**	mg/L	0.010	0.00069	1	09/30/20 14:00	10/01/20 20:07	7439-98-7	
Selenium	**0.0026J**	mg/L	0.010	0.0016	1	09/30/20 14:00	10/01/20 20:07	7782-49-2	
Thallium	**0.0010**	mg/L	0.0010	0.00014	1	09/30/20 14:00	10/01/20 20:07	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Peachtree Corners, GA								
Mercury	ND	mg/L	0.00050	0.000078	1	09/28/20 12:05	09/29/20 13:56	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2450C-2011 Pace Analytical Services - Peachtree Corners, GA								
Total Dissolved Solids	**3490**	mg/L	50.0	50.0	1		09/28/20 17:51		
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**77.3**	mg/L	5.0	5.0	1		10/06/20 17:27		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		10/06/20 17:27		
Alkalinity, Total as CaCO3	**77.3**	mg/L	5.0	5.0	1		10/06/20 17:27		

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ANALYTICAL RESULTS

Project: BOWEN AP
Pace Project No.: 92497532

Sample: BGWC-22 **Lab ID: 92497532012** Collected: 09/24/20 14:12 Received: 09/25/20 09:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	ND	mg/L	0.10	0.050	1		09/29/20 13:38	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**1050**	mg/L	20.0	12.0	20		09/29/20 18:03	16887-00-6	
Fluoride	**0.24**	mg/L	0.10	0.050	1		09/29/20 10:34	16984-48-8	
Sulfate	**864**	mg/L	20.0	10.0	20		09/29/20 18:03	14808-79-8	

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ANALYTICAL RESULTS

Project: BOWEN AP
Pace Project No.: 92497532

Sample: BGWC-23 **Lab ID: 92497532013** Collected: 09/24/20 12:37 Received: 09/25/20 09:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
Field Data	Analytical Method: Pace Analytical Services - Charlotte								
Performed by	**CUSTOMER**				1		10/09/20 11:00		
pH	**7.09**	Std. Units			1		10/09/20 11:00		
6010D ATL ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Peachtree Corners, GA								
Calcium	**647**	mg/L	10.0	0.70	10	09/29/20 18:42	10/01/20 13:10	7440-70-2	
Iron	**0.27**	mg/L	0.040	0.016	1	09/29/20 18:42	09/30/20 17:54	7439-89-6	
Magnesium	**115**	mg/L	0.050	0.0076	1	09/29/20 18:42	09/30/20 17:54	7439-95-4	
Manganese	**0.39**	mg/L	0.040	0.0017	1	09/29/20 18:42	09/30/20 17:54	7439-96-5	
Potassium	**10.7**	mg/L	0.20	0.056	1	09/29/20 18:42	09/30/20 17:54	7440-09-7	
Sodium	**41.6**	mg/L	1.0	0.26	1	09/29/20 18:42	09/30/20 17:54	7440-23-5	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3005A Pace Analytical Services - Peachtree Corners, GA								
Antimony	ND	mg/L	0.0030	0.00028	1	09/30/20 14:00	10/01/20 20:24	7440-36-0	
Arsenic	**0.0010J**	mg/L	0.0050	0.00078	1	09/30/20 14:00	10/01/20 20:24	7440-38-2	
Barium	**0.12**	mg/L	0.010	0.00071	1	09/30/20 14:00	10/01/20 20:24	7440-39-3	
Beryllium	**0.000054J**	mg/L	0.0030	0.000046	1	09/30/20 14:00	10/01/20 20:24	7440-41-7	
Boron	**13.7**	mg/L	5.0	0.26	50	09/30/20 14:00	10/03/20 11:58	7440-42-8	
Cadmium	ND	mg/L	0.0025	0.00012	1	09/30/20 14:00	10/01/20 20:24	7440-43-9	
Chromium	ND	mg/L	0.010	0.00055	1	09/30/20 14:00	10/01/20 20:24	7440-47-3	
Cobalt	ND	mg/L	0.0050	0.00038	1	09/30/20 14:00	10/01/20 20:24	7440-48-4	
Lead	**0.00014J**	mg/L	0.0050	0.000036	1	09/30/20 14:00	10/01/20 20:24	7439-92-1	
Lithium	**0.031**	mg/L	0.030	0.00081	1	09/30/20 14:00	10/01/20 20:24	7439-93-2	
Molybdenum	**0.011**	mg/L	0.010	0.00069	1	09/30/20 14:00	10/01/20 20:24	7439-98-7	
Selenium	ND	mg/L	0.010	0.0016	1	09/30/20 14:00	10/01/20 20:24	7782-49-2	
Thallium	**0.00038J**	mg/L	0.0010	0.00014	1	09/30/20 14:00	10/01/20 20:24	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Peachtree Corners, GA								
Mercury	ND	mg/L	0.00050	0.000078	1	09/28/20 12:05	09/29/20 13:59	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2450C-2011 Pace Analytical Services - Peachtree Corners, GA								
Total Dissolved Solids	**3160**	mg/L	50.0	50.0	1		09/30/20 09:27		
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**115**	mg/L	5.0	5.0	1		10/06/20 17:46		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		10/06/20 17:46		
Alkalinity, Total as CaCO3	**115**	mg/L	5.0	5.0	1		10/06/20 17:46		

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(770)734-4200

ANALYTICAL RESULTS

Project: BOWEN AP
Pace Project No.: 92497532

Sample: BGWC-23 **Lab ID: 92497532013** Collected: 09/24/20 12:37 Received: 09/25/20 09:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	ND	mg/L	0.10	0.050	1		09/29/20 13:38	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**988**	mg/L	20.0	12.0	20		09/29/20 18:17	16887-00-6	
Fluoride	**0.062J**	mg/L	0.10	0.050	1		09/29/20 10:49	16984-48-8	
Sulfate	**676**	mg/L	20.0	10.0	20		09/29/20 18:17	14808-79-8	

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ANALYTICAL RESULTS

Project: BOWEN AP
Pace Project No.: 92497532

Sample: DUP-1 **Lab ID: 92497532014** Collected: 09/24/20 00:00 Received: 09/25/20 09:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010D ATL ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Peachtree Corners, GA								
Calcium	**58.9**	mg/L	1.0	0.070	1	09/29/20 18:42	09/30/20 18:06	7440-70-2	
Iron	**0.44**	mg/L	0.040	0.016	1	09/29/20 18:42	09/30/20 18:06	7439-89-6	
Magnesium	**24.2**	mg/L	0.050	0.0076	1	09/29/20 18:42	09/30/20 18:06	7439-95-4	
Manganese	**0.082**	mg/L	0.040	0.0017	1	09/29/20 18:42	09/30/20 18:06	7439-96-5	
Potassium	**2.6**	mg/L	0.20	0.056	1	09/29/20 18:42	09/30/20 18:06	7440-09-7	
Sodium	**18.4**	mg/L	1.0	0.26	1	09/29/20 18:42	09/30/20 18:06	7440-23-5	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3005A Pace Analytical Services - Peachtree Corners, GA								
Antimony	ND	mg/L	0.0030	0.00028	1	09/30/20 14:00	10/01/20 20:30	7440-36-0	
Arsenic	**0.0019J**	mg/L	0.0050	0.00078	1	09/30/20 14:00	10/01/20 20:30	7440-38-2	
Barium	**0.030**	mg/L	0.010	0.00071	1	09/30/20 14:00	10/01/20 20:30	7440-39-3	
Beryllium	ND	mg/L	0.0030	0.000046	1	09/30/20 14:00	10/01/20 20:30	7440-41-7	
Boron	**0.44**	mg/L	0.10	0.0052	1	09/30/20 14:00	10/03/20 12:04	7440-42-8	
Cadmium	ND	mg/L	0.0025	0.00012	1	09/30/20 14:00	10/01/20 20:30	7440-43-9	
Chromium	ND	mg/L	0.010	0.00055	1	09/30/20 14:00	10/01/20 20:30	7440-47-3	
Cobalt	ND	mg/L	0.0050	0.00038	1	09/30/20 14:00	10/01/20 20:30	7440-48-4	
Lead	ND	mg/L	0.0050	0.000036	1	09/30/20 14:00	10/01/20 20:30	7439-92-1	
Lithium	**0.0011J**	mg/L	0.030	0.00081	1	09/30/20 14:00	10/01/20 20:30	7439-93-2	
Molybdenum	**0.0033J**	mg/L	0.010	0.00069	1	09/30/20 14:00	10/01/20 20:30	7439-98-7	
Selenium	ND	mg/L	0.010	0.0016	1	09/30/20 14:00	10/01/20 20:30	7782-49-2	
Thallium	ND	mg/L	0.0010	0.00014	1	09/30/20 14:00	10/01/20 20:30	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Peachtree Corners, GA								
Mercury	ND	mg/L	0.00050	0.000078	1	09/28/20 12:05	09/29/20 14:06	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2450C-2011 Pace Analytical Services - Peachtree Corners, GA								
Total Dissolved Solids	**246**	mg/L	20.0	20.0	1		09/30/20 09:27		
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**216**	mg/L	5.0	5.0	1		10/06/20 17:56		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		10/06/20 17:56		
Alkalinity, Total as CaCO3	**216**	mg/L	5.0	5.0	1		10/06/20 17:56		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	ND	mg/L	0.10	0.050	1		09/29/20 13:39	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**9.4**	mg/L	1.0	0.60	1		09/29/20 11:03	16887-00-6	

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ANALYTICAL RESULTS

Project: BOWEN AP
Pace Project No.: 92497532

Sample: DUP-1 **Lab ID: 92497532014** Collected: 09/24/20 00:00 Received: 09/25/20 09:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Fluoride	**0.091J**	mg/L	0.10	0.050	1		09/29/20 11:03	16984-48-8	
Sulfate	**84.5**	mg/L	1.0	0.50	1		09/29/20 11:03	14808-79-8	

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ANALYTICAL RESULTS

Project: BOWEN AP
Pace Project No.: 92497532

Sample: FBL092420 **Lab ID: 92497532015** Collected: 09/24/20 16:05 Received: 09/25/20 09:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010D ATL ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Peachtree Corners, GA								
Calcium	ND	mg/L	1.0	0.070	1	09/29/20 18:42	09/30/20 18:11	7440-70-2	
Iron	ND	mg/L	0.040	0.016	1	09/29/20 18:42	09/30/20 18:11	7439-89-6	
Magnesium	**0.017J**	mg/L	0.050	0.0076	1	09/29/20 18:42	09/30/20 18:11	7439-95-4	B
Manganese	ND	mg/L	0.040	0.0017	1	09/29/20 18:42	09/30/20 18:11	7439-96-5	
Potassium	ND	mg/L	0.20	0.056	1	09/29/20 18:42	09/30/20 18:11	7440-09-7	
Sodium	ND	mg/L	1.0	0.26	1	09/29/20 18:42	09/30/20 18:11	7440-23-5	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3005A Pace Analytical Services - Peachtree Corners, GA								
Antimony	ND	mg/L	0.0030	0.00028	1	09/30/20 14:00	10/01/20 20:36	7440-36-0	
Arsenic	ND	mg/L	0.0050	0.00078	1	09/30/20 14:00	10/01/20 20:36	7440-38-2	
Barium	ND	mg/L	0.010	0.00071	1	09/30/20 14:00	10/01/20 20:36	7440-39-3	
Beryllium	ND	mg/L	0.0030	0.000046	1	09/30/20 14:00	10/01/20 20:36	7440-41-7	
Boron	**0.028J**	mg/L	0.10	0.0052	1	09/30/20 14:00	10/01/20 20:36	7440-42-8	
Cadmium	ND	mg/L	0.0025	0.00012	1	09/30/20 14:00	10/01/20 20:36	7440-43-9	
Chromium	ND	mg/L	0.010	0.00055	1	09/30/20 14:00	10/01/20 20:36	7440-47-3	
Cobalt	ND	mg/L	0.0050	0.00038	1	09/30/20 14:00	10/01/20 20:36	7440-48-4	
Lead	ND	mg/L	0.0050	0.000036	1	09/30/20 14:00	10/01/20 20:36	7439-92-1	
Lithium	ND	mg/L	0.030	0.00081	1	09/30/20 14:00	10/01/20 20:36	7439-93-2	
Molybdenum	ND	mg/L	0.010	0.00069	1	09/30/20 14:00	10/01/20 20:36	7439-98-7	
Selenium	ND	mg/L	0.010	0.0016	1	09/30/20 14:00	10/01/20 20:36	7782-49-2	
Thallium	ND	mg/L	0.0010	0.00014	1	09/30/20 14:00	10/01/20 20:36	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Peachtree Corners, GA								
Mercury	ND	mg/L	0.00050	0.000078	1	09/28/20 12:05	09/29/20 14:08	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2450C-2011 Pace Analytical Services - Peachtree Corners, GA								
Total Dissolved Solids	ND	mg/L	10.0	10.0	1		09/30/20 09:27		
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	ND	mg/L	5.0	5.0	1		10/07/20 10:39		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		10/07/20 10:39		
Alkalinity, Total as CaCO3	ND	mg/L	5.0	5.0	1		10/07/20 10:39		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	ND	mg/L	0.10	0.050	1		09/29/20 13:40	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	ND	mg/L	1.0	0.60	1		09/29/20 11:18	16887-00-6	

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ANALYTICAL RESULTS

Project: BOWEN AP
Pace Project No.: 92497532

Sample: FBL092420 **Lab ID: 92497532015** Collected: 09/24/20 16:05 Received: 09/25/20 09:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Fluoride	ND	mg/L	0.10	0.050	1		09/29/20 11:18	16984-48-8	
Sulfate	ND	mg/L	1.0	0.50	1		09/29/20 11:18	14808-79-8	

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ANALYTICAL RESULTS

Project: BOWEN AP
Pace Project No.: 92497532

Sample: BGWA-33 **Lab ID: 92497532016** Collected: 09/25/20 09:44 Received: 09/25/20 16:42 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
Field Data	Analytical Method: Pace Analytical Services - Charlotte								
Performed by	**CUSTOMER**				1		10/09/20 11:00		
pH	**7.62**	Std. Units			1		10/09/20 11:00		
6010D ATL ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Peachtree Corners, GA								
Calcium	**51.8**	mg/L	1.0	0.070	1	09/29/20 18:44	10/01/20 18:23	7440-70-2	
Iron	**0.13**	mg/L	0.040	0.016	1	09/29/20 18:44	10/01/20 18:23	7439-89-6	
Magnesium	**27.3**	mg/L	0.050	0.0076	1	09/29/20 18:44	10/01/20 18:23	7439-95-4	
Manganese	**0.014J**	mg/L	0.040	0.0017	1	09/29/20 18:44	10/01/20 18:23	7439-96-5	
Potassium	**1.3**	mg/L	0.20	0.056	1	09/29/20 18:44	10/01/20 18:23	7440-09-7	
Sodium	**2.6**	mg/L	1.0	0.26	1	09/29/20 18:44	10/01/20 18:23	7440-23-5	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3005A Pace Analytical Services - Peachtree Corners, GA								
Antimony	**0.0015J**	mg/L	0.0030	0.00028	1	09/30/20 17:45	10/01/20 22:02	7440-36-0	
Arsenic	**0.0017J**	mg/L	0.0050	0.00078	1	09/30/20 17:45	10/01/20 22:02	7440-38-2	
Barium	**0.028**	mg/L	0.010	0.00071	1	09/30/20 17:45	10/01/20 22:02	7440-39-3	
Beryllium	ND	mg/L	0.0030	0.000046	1	09/30/20 17:45	10/01/20 22:02	7440-41-7	
Boron	**0.020J**	mg/L	0.10	0.0052	1	09/30/20 17:45	10/01/20 22:02	7440-42-8	
Cadmium	ND	mg/L	0.0025	0.00012	1	09/30/20 17:45	10/01/20 22:02	7440-43-9	
Chromium	**0.00083J**	mg/L	0.010	0.00055	1	09/30/20 17:45	10/01/20 22:02	7440-47-3	
Cobalt	ND	mg/L	0.0050	0.00038	1	09/30/20 17:45	10/01/20 22:02	7440-48-4	
Lead	**0.000045J**	mg/L	0.0050	0.000036	1	09/30/20 17:45	10/01/20 22:02	7439-92-1	
Lithium	ND	mg/L	0.030	0.00081	1	09/30/20 17:45	10/01/20 22:02	7439-93-2	
Molybdenum	**0.032**	mg/L	0.010	0.00069	1	09/30/20 17:45	10/01/20 22:02	7439-98-7	
Selenium	ND	mg/L	0.010	0.0016	1	09/30/20 17:45	10/01/20 22:02	7782-49-2	
Thallium	ND	mg/L	0.0010	0.00014	1	09/30/20 17:45	10/01/20 22:02	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Peachtree Corners, GA								
Mercury	**0.000087J**	mg/L	0.00050	0.000078	1	09/30/20 15:00	10/01/20 11:31	7439-97-6	B
2540C Total Dissolved Solids	Analytical Method: SM 2450C-2011 Pace Analytical Services - Peachtree Corners, GA								
Total Dissolved Solids	**233**	mg/L	10.0	10.0	1		09/30/20 14:54		
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**227**	mg/L	5.0	5.0	1		10/07/20 10:43		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		10/07/20 10:43		
Alkalinity, Total as CaCO3	**227**	mg/L	5.0	5.0	1		10/07/20 10:43		

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ANALYTICAL RESULTS

Project: BOWEN AP
Pace Project No.: 92497532

Sample: BGWA-33 **Lab ID: 92497532016** Collected: 09/25/20 09:44 Received: 09/25/20 16:42 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	ND	mg/L	0.10	0.050	1		09/29/20 13:42	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**3.3**	mg/L	1.0	0.60	1		09/29/20 21:23	16887-00-6	
Fluoride	**0.068J**	mg/L	0.10	0.050	1		09/29/20 21:23	16984-48-8	
Sulfate	**22.6**	mg/L	1.0	0.50	1		09/29/20 21:23	14808-79-8	

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ANALYTICAL RESULTS

Project: BOWEN AP
Pace Project No.: 92497532

Sample: BGWC-7 **Lab ID: 92497532017** Collected: 09/25/20 11:22 Received: 09/25/20 16:42 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
Field Data	Analytical Method: Pace Analytical Services - Charlotte								
Performed by	**CUSTOMER**				1		10/09/20 11:00		
pH	**7.01**	Std. Units			1		10/09/20 11:00		
6010D ATL ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Peachtree Corners, GA								
Calcium	**138**	mg/L	1.0	0.070	1	09/29/20 18:44	10/01/20 18:27	7440-70-2	
Iron	**1.2**	mg/L	0.040	0.016	1	09/29/20 18:44	10/01/20 18:27	7439-89-6	
Magnesium	**42.1**	mg/L	0.050	0.0076	1	09/29/20 18:44	10/01/20 18:27	7439-95-4	
Manganese	**0.032J**	mg/L	0.040	0.0017	1	09/29/20 18:44	10/01/20 18:27	7439-96-5	
Potassium	**3.0**	mg/L	0.20	0.056	1	09/29/20 18:44	10/01/20 18:27	7440-09-7	
Sodium	**23.7**	mg/L	1.0	0.26	1	09/29/20 18:44	10/01/20 18:27	7440-23-5	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3005A Pace Analytical Services - Peachtree Corners, GA								
Antimony	ND	mg/L	0.0030	0.00028	1	09/30/20 17:45	10/01/20 22:19	7440-36-0	
Arsenic	**0.0025J**	mg/L	0.0050	0.00078	1	09/30/20 17:45	10/01/20 22:19	7440-38-2	
Barium	**0.030**	mg/L	0.010	0.00071	1	09/30/20 17:45	10/01/20 22:19	7440-39-3	
Beryllium	ND	mg/L	0.0030	0.000046	1	09/30/20 17:45	10/01/20 22:19	7440-41-7	
Boron	**1.3**	mg/L	0.50	0.026	5	09/30/20 17:45	10/03/20 12:42	7440-42-8	
Cadmium	ND	mg/L	0.0025	0.00012	1	09/30/20 17:45	10/01/20 22:19	7440-43-9	
Chromium	ND	mg/L	0.010	0.00055	1	09/30/20 17:45	10/01/20 22:19	7440-47-3	
Cobalt	**0.00077J**	mg/L	0.0050	0.00038	1	09/30/20 17:45	10/01/20 22:19	7440-48-4	
Lead	ND	mg/L	0.0050	0.000036	1	09/30/20 17:45	10/01/20 22:19	7439-92-1	
Lithium	**0.0065J**	mg/L	0.030	0.00081	1	09/30/20 17:45	10/01/20 22:19	7439-93-2	
Molybdenum	**0.0099J**	mg/L	0.010	0.00069	1	09/30/20 17:45	10/01/20 22:19	7439-98-7	
Selenium	ND	mg/L	0.010	0.0016	1	09/30/20 17:45	10/01/20 22:19	7782-49-2	
Thallium	ND	mg/L	0.0010	0.00014	1	09/30/20 17:45	10/01/20 22:19	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Peachtree Corners, GA								
Mercury	ND	mg/L	0.00050	0.000078	1	09/30/20 15:00	10/01/20 11:41	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2450C-2011 Pace Analytical Services - Peachtree Corners, GA								
Total Dissolved Solids	**726**	mg/L	20.0	20.0	1		09/30/20 14:54		
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**300**	mg/L	5.0	5.0	1		10/07/20 10:53		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		10/07/20 10:53		
Alkalinity, Total as CaCO3	**300**	mg/L	5.0	5.0	1		10/07/20 10:53		

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ANALYTICAL RESULTS

Project: BOWEN AP
Pace Project No.: 92497532

Sample: BGWC-7 **Lab ID: 92497532017** Collected: 09/25/20 11:22 Received: 09/25/20 16:42 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	ND	mg/L	0.10	0.050	1		09/29/20 13:43	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**13.1**	mg/L	1.0	0.60	1		09/29/20 21:37	16887-00-6	
Fluoride	**0.11**	mg/L	0.10	0.050	1		09/29/20 21:37	16984-48-8	
Sulfate	**298**	mg/L	6.0	3.0	6		09/30/20 04:00	14808-79-8	

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ANALYTICAL RESULTS

Project: BOWEN AP
Pace Project No.: 92497532

Sample: BGWC-12 **Lab ID: 92497532018** Collected: 09/25/20 10:25 Received: 09/25/20 16:42 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
Field Data	Analytical Method: Pace Analytical Services - Charlotte								
pH	**7.10**	Std. Units			1		10/09/20 11:00		
6010D ATL ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Peachtree Corners, GA								
Calcium	**135**	mg/L	1.0	0.070	1	09/29/20 18:44	10/01/20 18:32	7440-70-2	
Iron	**0.017J**	mg/L	0.040	0.016	1	09/29/20 18:44	10/01/20 18:32	7439-89-6	
Magnesium	**47.2**	mg/L	0.050	0.0076	1	09/29/20 18:44	10/01/20 18:32	7439-95-4	
Manganese	**0.0018J**	mg/L	0.040	0.0017	1	09/29/20 18:44	10/01/20 18:32	7439-96-5	
Potassium	**2.6**	mg/L	0.20	0.056	1	09/29/20 18:44	10/01/20 18:32	7440-09-7	
Sodium	**24.9**	mg/L	1.0	0.26	1	09/29/20 18:44	10/01/20 18:32	7440-23-5	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3005A Pace Analytical Services - Peachtree Corners, GA								
Antimony	ND	mg/L	0.0030	0.00028	1	09/30/20 17:45	10/01/20 22:25	7440-36-0	
Arsenic	ND	mg/L	0.0050	0.00078	1	09/30/20 17:45	10/01/20 22:25	7440-38-2	
Barium	**0.038**	mg/L	0.010	0.00071	1	09/30/20 17:45	10/01/20 22:25	7440-39-3	
Beryllium	ND	mg/L	0.0030	0.000046	1	09/30/20 17:45	10/01/20 22:25	7440-41-7	
Boron	**1.0**	mg/L	0.50	0.026	5	09/30/20 17:45	10/03/20 12:48	7440-42-8	
Cadmium	ND	mg/L	0.0025	0.00012	1	09/30/20 17:45	10/01/20 22:25	7440-43-9	
Chromium	**0.00058J**	mg/L	0.010	0.00055	1	09/30/20 17:45	10/01/20 22:25	7440-47-3	
Cobalt	**0.00049J**	mg/L	0.0050	0.00038	1	09/30/20 17:45	10/01/20 22:25	7440-48-4	
Lead	ND	mg/L	0.0050	0.000036	1	09/30/20 17:45	10/01/20 22:25	7439-92-1	
Lithium	**0.0010J**	mg/L	0.030	0.00081	1	09/30/20 17:45	10/01/20 22:25	7439-93-2	
Molybdenum	ND	mg/L	0.010	0.00069	1	09/30/20 17:45	10/01/20 22:25	7439-98-7	
Selenium	ND	mg/L	0.010	0.0016	1	09/30/20 17:45	10/01/20 22:25	7782-49-2	
Thallium	ND	mg/L	0.0010	0.00014	1	09/30/20 17:45	10/01/20 22:25	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Peachtree Corners, GA								
Mercury	ND	mg/L	0.00050	0.000078	1	09/30/20 15:00	10/01/20 11:43	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2450C-2011 Pace Analytical Services - Peachtree Corners, GA								
Total Dissolved Solids	**740**	mg/L	20.0	20.0	1		09/30/20 14:54		
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**272**	mg/L	5.0	5.0	1		10/08/20 18:01		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		10/08/20 18:01		
Alkalinity, Total as CaCO3	**272**	mg/L	5.0	5.0	1		10/08/20 18:01		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	ND	mg/L	0.10	0.050	1		09/29/20 13:43	18496-25-8	

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ANALYTICAL RESULTS

Project: BOWEN AP
Pace Project No.: 92497532

Sample: BGWC-12 **Lab ID: 92497532018** Collected: 09/25/20 10:25 Received: 09/25/20 16:42 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**20.2**	mg/L	1.0	0.60	1		09/29/20 21:51	16887-00-6	
Fluoride	ND	mg/L	0.10	0.050	1		09/29/20 21:51	16984-48-8	
Sulfate	**320**	mg/L	6.0	3.0	6		09/30/20 04:21	14808-79-8	

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ANALYTICAL RESULTS

Project: BOWEN AP
Pace Project No.: 92497532

Sample: BGWC-24 **Lab ID: 92497532019** Collected: 09/25/20 13:25 Received: 09/25/20 16:42 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
Field Data	Analytical Method: Pace Analytical Services - Charlotte								
Performed by	**CUSTOMER**				1		10/09/20 11:00		
pH	**6.56**	Std. Units			1		10/09/20 11:00		
6010D ATL ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Peachtree Corners, GA								
Calcium	**998**	mg/L	10.0	0.70	10	09/29/20 18:44	10/02/20 17:38	7440-70-2	
Iron	**0.053**	mg/L	0.040	0.016	1	09/29/20 18:44	10/01/20 18:36	7439-89-6	
Magnesium	**125**	mg/L	0.050	0.0076	1	09/29/20 18:44	10/01/20 18:36	7439-95-4	
Manganese	**4.0**	mg/L	0.040	0.0017	1	09/29/20 18:44	10/01/20 18:36	7439-96-5	
Potassium	**9.2**	mg/L	0.20	0.056	1	09/29/20 18:44	10/01/20 18:36	7440-09-7	
Sodium	**27.9**	mg/L	1.0	0.26	1	09/29/20 18:44	10/01/20 18:36	7440-23-5	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3005A Pace Analytical Services - Peachtree Corners, GA								
Antimony	**0.00048J**	mg/L	0.0030	0.00028	1	09/30/20 17:45	10/01/20 22:30	7440-36-0	
Arsenic	**0.0023J**	mg/L	0.0050	0.00078	1	09/30/20 17:45	10/01/20 22:30	7440-38-2	
Barium	**0.088**	mg/L	0.010	0.00071	1	09/30/20 17:45	10/01/20 22:30	7440-39-3	
Beryllium	**0.00013J**	mg/L	0.0030	0.000046	1	09/30/20 17:45	10/01/20 22:30	7440-41-7	
Boron	**30.8**	mg/L	5.0	0.26	50	09/30/20 17:45	10/03/20 12:54	7440-42-8	
Cadmium	**0.0081**	mg/L	0.0025	0.00012	1	09/30/20 17:45	10/01/20 22:30	7440-43-9	
Chromium	**0.00058J**	mg/L	0.010	0.00055	1	09/30/20 17:45	10/01/20 22:30	7440-47-3	
Cobalt	**0.0038J**	mg/L	0.0050	0.00038	1	09/30/20 17:45	10/01/20 22:30	7440-48-4	
Lead	**0.00010J**	mg/L	0.0050	0.000036	1	09/30/20 17:45	10/01/20 22:30	7439-92-1	
Lithium	**0.0078J**	mg/L	0.030	0.00081	1	09/30/20 17:45	10/01/20 22:30	7439-93-2	
Molybdenum	**0.00081J**	mg/L	0.010	0.00069	1	09/30/20 17:45	10/01/20 22:30	7439-98-7	
Selenium	**0.010**	mg/L	0.010	0.0016	1	09/30/20 17:45	10/01/20 22:30	7782-49-2	
Thallium	**0.00057J**	mg/L	0.0010	0.00014	1	09/30/20 17:45	10/01/20 22:30	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Peachtree Corners, GA								
Mercury	**0.0036**	mg/L	0.00050	0.000078	1	10/30/20 12:05	10/30/20 14:23	7439-97-6	H1,H2
2540C Total Dissolved Solids	Analytical Method: SM 2450C-2011 Pace Analytical Services - Peachtree Corners, GA								
Total Dissolved Solids	**5020**	mg/L	50.0	50.0	1		09/30/20 14:54		
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**146**	mg/L	5.0	5.0	1		10/07/20 09:59		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		10/07/20 09:59		
Alkalinity, Total as CaCO3	**146**	mg/L	5.0	5.0	1		10/07/20 09:59		

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ANALYTICAL RESULTS

Project: BOWEN AP
Pace Project No.: 92497532

Sample: BGWC-24 **Lab ID: 92497532019** Collected: 09/25/20 13:25 Received: 09/25/20 16:42 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	ND	mg/L	0.10	0.050	1		09/29/20 13:44	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**1640**	mg/L	30.0	18.0	30		09/30/20 04:41	16887-00-6	
Fluoride	**0.054J**	mg/L	0.10	0.050	1		09/29/20 22:06	16984-48-8	
Sulfate	**613**	mg/L	30.0	15.0	30		09/30/20 04:41	14808-79-8	

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ANALYTICAL RESULTS

Project: BOWEN AP
Pace Project No.: 92497532

Sample: BGWC-30 **Lab ID: 92497532020** Collected: 09/25/20 13:10 Received: 09/25/20 16:42 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
Field Data	Analytical Method: Pace Analytical Services - Charlotte								
Performed by	**CUSTOMER**				1		10/09/20 11:00		
pH	**7.34**	Std. Units			1		10/09/20 11:00		
6010D ATL ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Peachtree Corners, GA								
Calcium	**93.3**	mg/L	1.0	0.070	1	09/29/20 18:44	10/01/20 18:40	7440-70-2	
Iron	**0.11**	mg/L	0.040	0.016	1	09/29/20 18:44	10/01/20 18:40	7439-89-6	
Magnesium	**28.6**	mg/L	0.050	0.0076	1	09/29/20 18:44	10/01/20 18:40	7439-95-4	
Manganese	**0.0088J**	mg/L	0.040	0.0017	1	09/29/20 18:44	10/01/20 18:40	7439-96-5	
Potassium	**2.3**	mg/L	0.20	0.056	1	09/29/20 18:44	10/01/20 18:40	7440-09-7	
Sodium	**6.0**	mg/L	1.0	0.26	1	09/29/20 18:44	10/01/20 18:40	7440-23-5	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3005A Pace Analytical Services - Peachtree Corners, GA								
Antimony	ND	mg/L	0.0030	0.00028	1	09/30/20 17:45	10/01/20 22:36	7440-36-0	
Arsenic	ND	mg/L	0.0050	0.00078	1	09/30/20 17:45	10/01/20 22:36	7440-38-2	
Barium	**0.070**	mg/L	0.010	0.00071	1	09/30/20 17:45	10/01/20 22:36	7440-39-3	
Beryllium	ND	mg/L	0.0030	0.000046	1	09/30/20 17:45	10/01/20 22:36	7440-41-7	
Boron	**2.1**	mg/L	0.50	0.026	5	09/30/20 17:45	10/03/20 13:00	7440-42-8	
Cadmium	ND	mg/L	0.0025	0.00012	1	09/30/20 17:45	10/01/20 22:36	7440-43-9	
Chromium	**0.00087J**	mg/L	0.010	0.00055	1	09/30/20 17:45	10/01/20 22:36	7440-47-3	
Cobalt	ND	mg/L	0.0050	0.00038	1	09/30/20 17:45	10/01/20 22:36	7440-48-4	
Lead	**0.00016J**	mg/L	0.0050	0.000036	1	09/30/20 17:45	10/01/20 22:36	7439-92-1	
Lithium	**0.0011J**	mg/L	0.030	0.00081	1	09/30/20 17:45	10/01/20 22:36	7439-93-2	
Molybdenum	**0.0027J**	mg/L	0.010	0.00069	1	09/30/20 17:45	10/01/20 22:36	7439-98-7	
Selenium	**0.0035J**	mg/L	0.010	0.0016	1	09/30/20 17:45	10/01/20 22:36	7782-49-2	
Thallium	ND	mg/L	0.0010	0.00014	1	09/30/20 17:45	10/01/20 22:36	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Peachtree Corners, GA								
Mercury	ND	mg/L	0.00050	0.000078	1	09/30/20 15:00	10/01/20 11:53	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2450C-2011 Pace Analytical Services - Peachtree Corners, GA								
Total Dissolved Solids	**482**	mg/L	20.0	20.0	1		09/30/20 14:54		
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**183**	mg/L	5.0	5.0	1		10/07/20 10:09		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		10/07/20 10:09		
Alkalinity, Total as CaCO3	**183**	mg/L	5.0	5.0	1		10/07/20 10:09		

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ANALYTICAL RESULTS

Project: BOWEN AP
Pace Project No.: 92497532

Sample: BGWC-30 **Lab ID: 92497532020** Collected: 09/25/20 13:10 Received: 09/25/20 16:42 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	ND	mg/L	0.10	0.050	1		09/29/20 13:45	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**127**	mg/L	3.0	1.8	3		09/30/20 05:30	16887-00-6	
Fluoride	ND	mg/L	0.10	0.050	1		09/29/20 23:03	16984-48-8	
Sulfate	**53.6**	mg/L	1.0	0.50	1		09/29/20 23:03	14808-79-8	

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ANALYTICAL RESULTS

Project: BOWEN AP
Pace Project No.: 92497532

Sample: BGWC-32 **Lab ID: 92497532021** Collected: 09/25/20 12:46 Received: 09/25/20 16:42 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
Field Data	Analytical Method: Pace Analytical Services - Charlotte								
Performed by	**CUSTOMER**				1		10/09/20 11:00		
pH	**6.82**	Std. Units			1		10/09/20 11:00		
6010D ATL ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Peachtree Corners, GA								
Calcium	**338**	mg/L	10.0	0.70	10	09/29/20 18:44	10/02/20 17:42	7440-70-2	
Iron	**0.13**	mg/L	0.040	0.016	1	09/29/20 18:44	10/01/20 18:45	7439-89-6	
Magnesium	**61.8**	mg/L	0.050	0.0076	1	09/29/20 18:44	10/01/20 18:45	7439-95-4	
Manganese	**0.21**	mg/L	0.040	0.0017	1	09/29/20 18:44	10/01/20 18:45	7439-96-5	
Potassium	**5.0**	mg/L	0.20	0.056	1	09/29/20 18:44	10/01/20 18:45	7440-09-7	
Sodium	**20.5**	mg/L	1.0	0.26	1	09/29/20 18:44	10/01/20 18:45	7440-23-5	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3005A Pace Analytical Services - Peachtree Corners, GA								
Antimony	**0.00039J**	mg/L	0.0030	0.00028	1	09/30/20 17:45	10/01/20 22:42	7440-36-0	
Arsenic	**0.00093J**	mg/L	0.0050	0.00078	1	09/30/20 17:45	10/01/20 22:42	7440-38-2	
Barium	**0.14**	mg/L	0.010	0.00071	1	09/30/20 17:45	10/01/20 22:42	7440-39-3	
Beryllium	ND	mg/L	0.0030	0.000046	1	09/30/20 17:45	10/01/20 22:42	7440-41-7	
Boron	**5.5**	mg/L	0.50	0.026	5	09/30/20 17:45	10/03/20 13:05	7440-42-8	
Cadmium	ND	mg/L	0.0025	0.00012	1	09/30/20 17:45	10/01/20 22:42	7440-43-9	
Chromium	**0.00057J**	mg/L	0.010	0.00055	1	09/30/20 17:45	10/01/20 22:42	7440-47-3	
Cobalt	**0.0081**	mg/L	0.0050	0.00038	1	09/30/20 17:45	10/01/20 22:42	7440-48-4	
Lead	**0.00011J**	mg/L	0.0050	0.000036	1	09/30/20 17:45	10/01/20 22:42	7439-92-1	
Lithium	ND	mg/L	0.030	0.00081	1	09/30/20 17:45	10/01/20 22:42	7439-93-2	
Molybdenum	**0.0030J**	mg/L	0.010	0.00069	1	09/30/20 17:45	10/01/20 22:42	7439-98-7	
Selenium	ND	mg/L	0.010	0.0016	1	09/30/20 17:45	10/01/20 22:42	7782-49-2	
Thallium	**0.00014J**	mg/L	0.0010	0.00014	1	09/30/20 17:45	10/01/20 22:42	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Peachtree Corners, GA								
Mercury	ND	mg/L	0.00050	0.000078	1	09/30/20 15:00	10/01/20 11:55	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2450C-2011 Pace Analytical Services - Peachtree Corners, GA								
Total Dissolved Solids	**1690**	mg/L	50.0	50.0	1		09/30/20 14:54		
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**186**	mg/L	5.0	5.0	1		10/07/20 10:19		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		10/07/20 10:19		
Alkalinity, Total as CaCO3	**186**	mg/L	5.0	5.0	1		10/07/20 10:19		

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ANALYTICAL RESULTS

Project: BOWEN AP
Pace Project No.: 92497532

Sample: BGWC-32 **Lab ID: 92497532021** Collected: 09/25/20 12:46 Received: 09/25/20 16:42 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	ND	mg/L	0.10	0.050	1		09/29/20 13:45	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**449**	mg/L	9.0	5.4	9		09/30/20 05:51	16887-00-6	M6
Fluoride	**0.097J**	mg/L	0.10	0.050	1		09/29/20 23:17	16984-48-8	
Sulfate	**393**	mg/L	9.0	4.5	9		09/30/20 05:51	14808-79-8	

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ANALYTICAL RESULTS

Project: BOWEN AP
Pace Project No.: 92497532

Sample: BGWC-35D **Lab ID: 92497532022** Collected: 09/25/20 10:21 Received: 09/25/20 16:42 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
Field Data	Analytical Method: Pace Analytical Services - Charlotte								
Performed by	**CUSTOMER**				1		10/09/20 11:00		
pH	**7.03**	Std. Units			1		10/09/20 11:00		
6010D ATL ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Peachtree Corners, GA								
Calcium	**169**	mg/L	1.0	0.070	1	09/29/20 18:44	10/01/20 18:49	7440-70-2	
Iron	**0.94**	mg/L	0.040	0.016	1	09/29/20 18:44	10/01/20 18:49	7439-89-6	
Magnesium	**39.6**	mg/L	0.050	0.0076	1	09/29/20 18:44	10/01/20 18:49	7439-95-4	
Manganese	**0.14**	mg/L	0.040	0.0017	1	09/29/20 18:44	10/01/20 18:49	7439-96-5	
Potassium	**18.9**	mg/L	0.20	0.056	1	09/29/20 18:44	10/01/20 18:49	7440-09-7	
Sodium	**91.7**	mg/L	1.0	0.26	1	09/29/20 18:44	10/01/20 18:49	7440-23-5	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3005A Pace Analytical Services - Peachtree Corners, GA								
Antimony	**0.00064J**	mg/L	0.0030	0.00028	1	09/30/20 17:45	10/01/20 22:47	7440-36-0	
Arsenic	**0.0021J**	mg/L	0.0050	0.00078	1	09/30/20 17:45	10/01/20 22:47	7440-38-2	
Barium	**0.11**	mg/L	0.010	0.00071	1	09/30/20 17:45	10/01/20 22:47	7440-39-3	
Beryllium	ND	mg/L	0.0030	0.000046	1	09/30/20 17:45	10/01/20 22:47	7440-41-7	
Boron	**3.2**	mg/L	0.50	0.026	5	09/30/20 17:45	10/03/20 13:11	7440-42-8	
Cadmium	ND	mg/L	0.0025	0.00012	1	09/30/20 17:45	10/01/20 22:47	7440-43-9	
Chromium	**0.00072J**	mg/L	0.010	0.00055	1	09/30/20 17:45	10/01/20 22:47	7440-47-3	
Cobalt	**0.00082J**	mg/L	0.0050	0.00038	1	09/30/20 17:45	10/01/20 22:47	7440-48-4	
Lead	**0.00037J**	mg/L	0.0050	0.000036	1	09/30/20 17:45	10/01/20 22:47	7439-92-1	
Lithium	**0.0062J**	mg/L	0.030	0.00081	1	09/30/20 17:45	10/01/20 22:47	7439-93-2	
Molybdenum	**0.024**	mg/L	0.010	0.00069	1	09/30/20 17:45	10/01/20 22:47	7439-98-7	
Selenium	ND	mg/L	0.010	0.0016	1	09/30/20 17:45	10/01/20 22:47	7782-49-2	
Thallium	ND	mg/L	0.0010	0.00014	1	09/30/20 17:45	10/01/20 22:47	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Peachtree Corners, GA								
Mercury	ND	mg/L	0.00050	0.000078	1	09/30/20 15:00	10/01/20 11:57	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2450C-2011 Pace Analytical Services - Peachtree Corners, GA								
Total Dissolved Solids	**880**	mg/L	50.0	50.0	1		09/30/20 14:54		
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**231**	mg/L	5.0	5.0	1		10/08/20 18:10		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		10/08/20 18:10		
Alkalinity, Total as CaCO3	**231**	mg/L	5.0	5.0	1		10/08/20 18:10		

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ANALYTICAL RESULTS

Project: BOWEN AP
Pace Project No.: 92497532

Sample: BGWC-35D **Lab ID: 92497532022** Collected: 09/25/20 10:21 Received: 09/25/20 16:42 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	ND	mg/L	0.10	0.050	1		09/29/20 13:48	18496-25-8	M1
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**435**	mg/L	9.0	5.4	9		09/30/20 06:52	16887-00-6	
Fluoride	**0.17**	mg/L	0.10	0.050	1		09/30/20 00:00	16984-48-8	
Sulfate	**394**	mg/L	9.0	4.5	9		09/30/20 06:52	14808-79-8	

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ANALYTICAL RESULTS

Project: BOWEN AP
Pace Project No.: 92497532

Sample: BGWC-37D **Lab ID: 92497532023** Collected: 09/25/20 12:05 Received: 09/25/20 16:42 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
Field Data	Analytical Method: Pace Analytical Services - Charlotte								
Performed by	**CUSTOMER**				1		10/09/20 11:00		
pH	**7.25**	Std. Units			1		10/09/20 11:00		
6010D ATL ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Peachtree Corners, GA								
Calcium	**99.9**	mg/L	1.0	0.070	1	09/29/20 18:44	10/01/20 18:53	7440-70-2	
Iron	**1.3**	mg/L	0.040	0.016	1	09/29/20 18:44	10/01/20 18:53	7439-89-6	
Magnesium	**36.6**	mg/L	0.050	0.0076	1	09/29/20 18:44	10/01/20 18:53	7439-95-4	
Manganese	**0.14**	mg/L	0.040	0.0017	1	09/29/20 18:44	10/01/20 18:53	7439-96-5	
Potassium	**2.3**	mg/L	0.20	0.056	1	09/29/20 18:44	10/01/20 18:53	7440-09-7	
Sodium	**44.3**	mg/L	1.0	0.26	1	09/29/20 18:44	10/01/20 18:53	7440-23-5	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3005A Pace Analytical Services - Peachtree Corners, GA								
Antimony	**0.0022J**	mg/L	0.0030	0.00028	1	09/30/20 17:45	10/01/20 22:53	7440-36-0	
Arsenic	**0.033**	mg/L	0.0050	0.00078	1	09/30/20 17:45	10/01/20 22:53	7440-38-2	
Barium	**0.10**	mg/L	0.010	0.00071	1	09/30/20 17:45	10/01/20 22:53	7440-39-3	
Beryllium	ND	mg/L	0.0030	0.000046	1	09/30/20 17:45	10/01/20 22:53	7440-41-7	
Boron	**1.6**	mg/L	0.50	0.026	5	09/30/20 17:45	10/03/20 13:17	7440-42-8	
Cadmium	ND	mg/L	0.0025	0.00012	1	09/30/20 17:45	10/01/20 22:53	7440-43-9	
Chromium	**0.00068J**	mg/L	0.010	0.00055	1	09/30/20 17:45	10/01/20 22:53	7440-47-3	
Cobalt	**0.0011J**	mg/L	0.0050	0.00038	1	09/30/20 17:45	10/01/20 22:53	7440-48-4	
Lead	**0.00029J**	mg/L	0.0050	0.000036	1	09/30/20 17:45	10/01/20 22:53	7439-92-1	
Lithium	**0.014J**	mg/L	0.030	0.00081	1	09/30/20 17:45	10/01/20 22:53	7439-93-2	
Molybdenum	**0.0088J**	mg/L	0.010	0.00069	1	09/30/20 17:45	10/01/20 22:53	7439-98-7	
Selenium	ND	mg/L	0.010	0.0016	1	09/30/20 17:45	10/01/20 22:53	7782-49-2	
Thallium	ND	mg/L	0.0010	0.00014	1	09/30/20 17:45	10/01/20 22:53	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Peachtree Corners, GA								
Mercury	ND	mg/L	0.00050	0.000078	1	09/30/20 15:00	10/01/20 12:00	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2450C-2011 Pace Analytical Services - Peachtree Corners, GA								
Total Dissolved Solids	**594**	mg/L	20.0	20.0	1		09/30/20 14:55		
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**200**	mg/L	5.0	5.0	1		10/08/20 15:24		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		10/08/20 15:24		
Alkalinity, Total as CaCO3	**200**	mg/L	5.0	5.0	1		10/08/20 15:24		

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ANALYTICAL RESULTS

Project: BOWEN AP
Pace Project No.: 92497532

Sample: BGWC-37D **Lab ID: 92497532023** Collected: 09/25/20 12:05 Received: 09/25/20 16:42 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	**1.5**	mg/L	0.20	0.10	2		09/29/20 14:18	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**105**	mg/L	3.0	1.8	3		09/30/20 07:12	16887-00-6	
Fluoride	**0.34**	mg/L	0.10	0.050	1		09/30/20 00:14	16984-48-8	
Sulfate	**175**	mg/L	3.0	1.5	3		09/30/20 07:12	14808-79-8	

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ANALYTICAL RESULTS

Project: BOWEN AP
Pace Project No.: 92497532

Sample: DUP-2 **Lab ID: 92497532024** Collected: 09/25/20 00:00 Received: 09/25/20 16:42 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010D ATL ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Peachtree Corners, GA								
Calcium	**170**	mg/L	1.0	0.070	1	09/29/20 18:44	10/01/20 18:58	7440-70-2	
Iron	**1.2**	mg/L	0.040	0.016	1	09/29/20 18:44	10/01/20 18:58	7439-89-6	
Magnesium	**39.4**	mg/L	0.050	0.0076	1	09/29/20 18:44	10/01/20 18:58	7439-95-4	
Manganese	**0.14**	mg/L	0.040	0.0017	1	09/29/20 18:44	10/01/20 18:58	7439-96-5	
Potassium	**18.2**	mg/L	0.20	0.056	1	09/29/20 18:44	10/01/20 18:58	7440-09-7	
Sodium	**89.2**	mg/L	1.0	0.26	1	09/29/20 18:44	10/01/20 18:58	7440-23-5	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3005A Pace Analytical Services - Peachtree Corners, GA								
Antimony	**0.00061J**	mg/L	0.0030	0.00028	1	09/30/20 17:45	10/01/20 22:59	7440-36-0	
Arsenic	**0.0024J**	mg/L	0.0050	0.00078	1	09/30/20 17:45	10/01/20 22:59	7440-38-2	
Barium	**0.11**	mg/L	0.010	0.00071	1	09/30/20 17:45	10/01/20 22:59	7440-39-3	
Beryllium	ND	mg/L	0.0030	0.000046	1	09/30/20 17:45	10/01/20 22:59	7440-41-7	
Boron	**3.3**	mg/L	0.50	0.026	5	09/30/20 17:45	10/03/20 13:22	7440-42-8	
Cadmium	ND	mg/L	0.0025	0.00012	1	09/30/20 17:45	10/01/20 22:59	7440-43-9	
Chromium	**0.00058J**	mg/L	0.010	0.00055	1	09/30/20 17:45	10/01/20 22:59	7440-47-3	
Cobalt	**0.00084J**	mg/L	0.0050	0.00038	1	09/30/20 17:45	10/01/20 22:59	7440-48-4	
Lead	**0.00037J**	mg/L	0.0050	0.000036	1	09/30/20 17:45	10/01/20 22:59	7439-92-1	
Lithium	**0.0060J**	mg/L	0.030	0.00081	1	09/30/20 17:45	10/01/20 22:59	7439-93-2	
Molybdenum	**0.023**	mg/L	0.010	0.00069	1	09/30/20 17:45	10/01/20 22:59	7439-98-7	
Selenium	ND	mg/L	0.010	0.0016	1	09/30/20 17:45	10/01/20 22:59	7782-49-2	
Thallium	ND	mg/L	0.0010	0.00014	1	09/30/20 17:45	10/01/20 22:59	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Peachtree Corners, GA								
Mercury	ND	mg/L	0.00050	0.000078	1	09/30/20 15:00	10/01/20 12:02	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2450C-2011 Pace Analytical Services - Peachtree Corners, GA								
Total Dissolved Solids	**1300**	mg/L	50.0	50.0	1		09/30/20 14:55		
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**214**	mg/L	5.0	5.0	1		10/08/20 15:36		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		10/08/20 15:36		
Alkalinity, Total as CaCO3	**214**	mg/L	5.0	5.0	1		10/08/20 15:36		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	ND	mg/L	0.10	0.050	1		09/29/20 13:50	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**482**	mg/L	10.0	6.0	10		09/30/20 07:33	16887-00-6	

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ANALYTICAL RESULTS

Project: BOWEN AP
Pace Project No.: 92497532

Sample: DUP-2 **Lab ID: 92497532024** Collected: 09/25/20 00:00 Received: 09/25/20 16:42 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Fluoride	**0.15**	mg/L	0.10	0.050	1		09/30/20 00:29	16984-48-8	
Sulfate	**436**	mg/L	10.0	5.0	10		09/30/20 07:33	14808-79-8	

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ANALYTICAL RESULTS

Project: BOWEN AP
Pace Project No.: 92497532

Sample: FBL092520 **Lab ID: 92497532025** Collected: 09/25/20 13:46 Received: 09/25/20 16:42 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010D ATL ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Peachtree Corners, GA								
Calcium	ND	mg/L	1.0	0.070	1	09/29/20 18:44	10/01/20 19:15	7440-70-2	
Iron	ND	mg/L	0.040	0.016	1	09/29/20 18:44	10/01/20 19:15	7439-89-6	
Magnesium	ND	mg/L	0.050	0.0076	1	09/29/20 18:44	10/01/20 19:15	7439-95-4	
Manganese	ND	mg/L	0.040	0.0017	1	09/29/20 18:44	10/01/20 19:15	7439-96-5	
Potassium	ND	mg/L	0.20	0.056	1	09/29/20 18:44	10/01/20 19:15	7440-09-7	
Sodium	ND	mg/L	1.0	0.26	1	09/29/20 18:44	10/01/20 19:15	7440-23-5	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3005A Pace Analytical Services - Peachtree Corners, GA								
Antimony	ND	mg/L	0.0030	0.00028	1	09/30/20 17:45	10/01/20 23:05	7440-36-0	
Arsenic	ND	mg/L	0.0050	0.00078	1	09/30/20 17:45	10/01/20 23:05	7440-38-2	
Barium	ND	mg/L	0.010	0.00071	1	09/30/20 17:45	10/01/20 23:05	7440-39-3	
Beryllium	ND	mg/L	0.0030	0.000046	1	09/30/20 17:45	10/01/20 23:05	7440-41-7	
Boron	**0.021J**	mg/L	0.10	0.0052	1	09/30/20 17:45	10/01/20 23:05	7440-42-8	
Cadmium	ND	mg/L	0.0025	0.00012	1	09/30/20 17:45	10/01/20 23:05	7440-43-9	
Chromium	ND	mg/L	0.010	0.00055	1	09/30/20 17:45	10/01/20 23:05	7440-47-3	
Cobalt	ND	mg/L	0.0050	0.00038	1	09/30/20 17:45	10/01/20 23:05	7440-48-4	
Lead	ND	mg/L	0.0050	0.000036	1	09/30/20 17:45	10/01/20 23:05	7439-92-1	
Lithium	ND	mg/L	0.030	0.00081	1	09/30/20 17:45	10/01/20 23:05	7439-93-2	
Molybdenum	ND	mg/L	0.010	0.00069	1	09/30/20 17:45	10/01/20 23:05	7439-98-7	
Selenium	ND	mg/L	0.010	0.0016	1	09/30/20 17:45	10/01/20 23:05	7782-49-2	
Thallium	ND	mg/L	0.0010	0.00014	1	09/30/20 17:45	10/01/20 23:05	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Peachtree Corners, GA								
Mercury	ND	mg/L	0.00050	0.000078	1	09/30/20 15:00	10/01/20 12:05	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2450C-2011 Pace Analytical Services - Peachtree Corners, GA								
Total Dissolved Solids	ND	mg/L	10.0	10.0	1		09/30/20 14:55		
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	ND	mg/L	5.0	5.0	1		10/08/20 15:50		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		10/08/20 15:50		
Alkalinity, Total as CaCO3	ND	mg/L	5.0	5.0	1		10/08/20 15:50		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	ND	mg/L	0.10	0.050	1		09/29/20 13:51	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	ND	mg/L	1.0	0.60	1		09/30/20 00:43	16887-00-6	

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110 Technology Parkway
Peachtree Corners, GA 30092
(770)734-4200

ANALYTICAL RESULTS

Project: BOWEN AP
Pace Project No.: 92497532

Sample: FBL092520 **Lab ID: 92497532025** Collected: 09/25/20 13:46 Received: 09/25/20 16:42 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Fluoride	ND	mg/L	0.10	0.050	1		09/30/20 00:43	16984-48-8	
Sulfate	ND	mg/L	1.0	0.50	1		09/30/20 00:43	14808-79-8	

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ANALYTICAL RESULTS

Project: BOWEN AP
Pace Project No.: 92497532

Sample: EQBL092520 **Lab ID: 92497532026** Collected: 09/25/20 13:52 Received: 09/25/20 16:42 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010D ATL ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Peachtree Corners, GA								
Calcium	ND	mg/L	1.0	0.070	1	09/29/20 18:44	10/01/20 19:19	7440-70-2	
Iron	ND	mg/L	0.040	0.016	1	09/29/20 18:44	10/01/20 19:19	7439-89-6	
Magnesium	ND	mg/L	0.050	0.0076	1	09/29/20 18:44	10/01/20 19:19	7439-95-4	
Manganese	ND	mg/L	0.040	0.0017	1	09/29/20 18:44	10/01/20 19:19	7439-96-5	
Potassium	ND	mg/L	0.20	0.056	1	09/29/20 18:44	10/01/20 19:19	7440-09-7	
Sodium	ND	mg/L	1.0	0.26	1	09/29/20 18:44	10/01/20 19:19	7440-23-5	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3005A Pace Analytical Services - Peachtree Corners, GA								
Antimony	ND	mg/L	0.0030	0.00028	1	09/30/20 17:45	10/01/20 23:10	7440-36-0	
Arsenic	ND	mg/L	0.0050	0.00078	1	09/30/20 17:45	10/01/20 23:10	7440-38-2	
Barium	ND	mg/L	0.010	0.00071	1	09/30/20 17:45	10/01/20 23:10	7440-39-3	
Beryllium	ND	mg/L	0.0030	0.000046	1	09/30/20 17:45	10/01/20 23:10	7440-41-7	
Boron	**0.0095J**	mg/L	0.10	0.0052	1	09/30/20 17:45	10/01/20 23:10	7440-42-8	
Cadmium	ND	mg/L	0.0025	0.00012	1	09/30/20 17:45	10/01/20 23:10	7440-43-9	
Chromium	ND	mg/L	0.010	0.00055	1	09/30/20 17:45	10/01/20 23:10	7440-47-3	
Cobalt	ND	mg/L	0.0050	0.00038	1	09/30/20 17:45	10/01/20 23:10	7440-48-4	
Lead	ND	mg/L	0.0050	0.000036	1	09/30/20 17:45	10/01/20 23:10	7439-92-1	
Lithium	ND	mg/L	0.030	0.00081	1	09/30/20 17:45	10/01/20 23:10	7439-93-2	
Molybdenum	ND	mg/L	0.010	0.00069	1	09/30/20 17:45	10/01/20 23:10	7439-98-7	
Selenium	ND	mg/L	0.010	0.0016	1	09/30/20 17:45	10/01/20 23:10	7782-49-2	
Thallium	ND	mg/L	0.0010	0.00014	1	09/30/20 17:45	10/01/20 23:10	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Peachtree Corners, GA								
Mercury	ND	mg/L	0.00050	0.000078	1	09/30/20 15:00	10/01/20 12:07	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2450C-2011 Pace Analytical Services - Peachtree Corners, GA								
Total Dissolved Solids	ND	mg/L	10.0	10.0	1		09/30/20 14:55		
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	ND	mg/L	5.0	5.0	1		10/08/20 15:53		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		10/08/20 15:53		
Alkalinity, Total as CaCO3	ND	mg/L	5.0	5.0	1		10/08/20 15:53		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	ND	mg/L	0.10	0.050	1		09/29/20 13:52	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	ND	mg/L	1.0	0.60	1		09/30/20 00:57	16887-00-6	

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ANALYTICAL RESULTS

Project: BOWEN AP
Pace Project No.: 92497532

Sample: EQBL092520 **Lab ID: 92497532026** Collected: 09/25/20 13:52 Received: 09/25/20 16:42 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Fluoride	ND	mg/L	0.10	0.050	1		09/30/20 00:57	16984-48-8	
Sulfate	**0.71J**	mg/L	1.0	0.50	1		09/30/20 00:57	14808-79-8	

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ANALYTICAL RESULTS

Project: BOWEN AP
Pace Project No.: 92497532

Sample: BGWC-19 **Lab ID: 92497532027** Collected: 09/28/20 10:15 Received: 09/29/20 11:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
Field Data	Analytical Method: Pace Analytical Services - Charlotte								
Performed by	**CUSTOMER**				1		10/09/20 11:00		
pH	**6.45**	Std. Units			1		10/09/20 11:00		
6010D ATL ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Peachtree Corners, GA								
Calcium	**50.1**	mg/L	1.0	0.070	1	10/01/20 18:53	10/05/20 21:00	7440-70-2	M1
Iron	ND	mg/L	0.040	0.016	1	10/01/20 18:53	10/05/20 21:00	7439-89-6	
Magnesium	**18.7**	mg/L	0.050	0.0076	1	10/01/20 18:53	10/05/20 21:00	7439-95-4	
Manganese	ND	mg/L	0.040	0.0017	1	10/01/20 18:53	10/05/20 21:00	7439-96-5	
Potassium	**3.0**	mg/L	0.20	0.056	1	10/01/20 18:53	10/05/20 21:00	7440-09-7	
Sodium	**2.7**	mg/L	1.0	0.26	1	10/01/20 18:53	10/05/20 21:00	7440-23-5	B
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3005A Pace Analytical Services - Peachtree Corners, GA								
Antimony	**0.00050J**	mg/L	0.0030	0.00028	1	10/02/20 15:00	10/06/20 18:01	7440-36-0	
Arsenic	ND	mg/L	0.0050	0.00078	1	10/02/20 15:00	10/06/20 18:01	7440-38-2	
Barium	**0.030**	mg/L	0.010	0.00071	1	10/02/20 15:00	10/06/20 18:01	7440-39-3	
Beryllium	**0.000088J**	mg/L	0.0030	0.000046	1	10/02/20 15:00	10/06/20 18:01	7440-41-7	
Boron	**0.40**	mg/L	0.10	0.0052	1	10/02/20 15:00	10/06/20 18:01	7440-42-8	
Cadmium	ND	mg/L	0.0025	0.00012	1	10/02/20 15:00	10/06/20 18:01	7440-43-9	
Chromium	ND	mg/L	0.010	0.00055	1	10/02/20 15:00	10/06/20 18:01	7440-47-3	
Cobalt	ND	mg/L	0.0050	0.00038	1	10/02/20 15:00	10/06/20 18:01	7440-48-4	
Lead	**0.000038J**	mg/L	0.0050	0.000036	1	10/02/20 15:00	10/06/20 18:01	7439-92-1	
Lithium	ND	mg/L	0.030	0.00081	1	10/02/20 15:00	10/06/20 18:01	7439-93-2	
Molybdenum	ND	mg/L	0.010	0.00069	1	10/02/20 15:00	10/06/20 18:01	7439-98-7	
Selenium	ND	mg/L	0.010	0.0016	1	10/02/20 15:00	10/06/20 18:01	7782-49-2	
Thallium	ND	mg/L	0.0010	0.00014	1	10/02/20 15:00	10/06/20 18:01	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Peachtree Corners, GA								
Mercury	ND	mg/L	0.00050	0.000078	1	09/30/20 15:00	10/01/20 12:09	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2450C-2011 Pace Analytical Services - Peachtree Corners, GA								
Total Dissolved Solids	**243**	mg/L	10.0	10.0	1		10/02/20 17:25		
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**138**	mg/L	5.0	5.0	1		10/08/20 16:15		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		10/08/20 16:15		
Alkalinity, Total as CaCO3	**138**	mg/L	5.0	5.0	1		10/08/20 16:15		

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(770)734-4200

ANALYTICAL RESULTS

Project: BOWEN AP
Pace Project No.: 92497532

Sample: BGWC-19 **Lab ID: 92497532027** Collected: 09/28/20 10:15 Received: 09/29/20 11:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	ND	mg/L	0.10	0.050	1		10/01/20 12:57	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**8.6**	mg/L	1.0	0.60	1		10/01/20 15:08	16887-00-6	
Fluoride	ND	mg/L	0.10	0.050	1		10/01/20 15:08	16984-48-8	
Sulfate	**70.3**	mg/L	1.0	0.50	1		10/01/20 15:08	14808-79-8	

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ANALYTICAL RESULTS

Project: BOWEN AP
Pace Project No.: 92497532

Sample: BGWC-20 **Lab ID: 92497532028** Collected: 09/28/20 13:59 Received: 09/29/20 11:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
Field Data	Analytical Method: Pace Analytical Services - Charlotte								
Performed by	**CUSTOMER**				1		10/09/20 11:00		
pH	**7.26**	Std. Units			1		10/09/20 11:00		
6010D ATL ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Peachtree Corners, GA								
Calcium	**273**	mg/L	1.0	0.070	1	10/01/20 18:53	10/05/20 21:18	7440-70-2	
Iron	**0.43**	mg/L	0.040	0.016	1	10/01/20 18:53	10/05/20 21:18	7439-89-6	
Magnesium	**41.7**	mg/L	0.050	0.0076	1	10/01/20 18:53	10/05/20 21:18	7439-95-4	
Manganese	**0.77**	mg/L	0.040	0.0017	1	10/01/20 18:53	10/05/20 21:18	7439-96-5	
Potassium	**6.8**	mg/L	0.20	0.056	1	10/01/20 18:53	10/05/20 21:18	7440-09-7	
Sodium	**28.9**	mg/L	1.0	0.26	1	10/01/20 18:53	10/05/20 21:18	7440-23-5	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3005A Pace Analytical Services - Peachtree Corners, GA								
Antimony	**0.00050J**	mg/L	0.0030	0.00028	1	10/02/20 15:00	10/06/20 18:07	7440-36-0	
Arsenic	ND	mg/L	0.0050	0.00078	1	10/02/20 15:00	10/06/20 18:07	7440-38-2	
Barium	**0.032**	mg/L	0.010	0.00071	1	10/02/20 15:00	10/06/20 18:07	7440-39-3	
Beryllium	ND	mg/L	0.0030	0.000046	1	10/02/20 15:00	10/06/20 18:07	7440-41-7	
Boron	**3.7**	mg/L	0.10	0.0052	1	10/02/20 15:00	10/06/20 18:07	7440-42-8	
Cadmium	ND	mg/L	0.0025	0.00012	1	10/02/20 15:00	10/06/20 18:07	7440-43-9	
Chromium	**0.0028J**	mg/L	0.010	0.00055	1	10/02/20 15:00	10/06/20 18:07	7440-47-3	
Cobalt	ND	mg/L	0.0050	0.00038	1	10/02/20 15:00	10/06/20 18:07	7440-48-4	
Lead	**0.000083J**	mg/L	0.0050	0.000036	1	10/02/20 15:00	10/06/20 18:07	7439-92-1	
Lithium	**0.027J**	mg/L	0.030	0.00081	1	10/02/20 15:00	10/06/20 18:07	7439-93-2	
Molybdenum	**0.018**	mg/L	0.010	0.00069	1	10/02/20 15:00	10/06/20 18:07	7439-98-7	
Selenium	ND	mg/L	0.010	0.0016	1	10/02/20 15:00	10/06/20 18:07	7782-49-2	
Thallium	ND	mg/L	0.0010	0.00014	1	10/02/20 15:00	10/06/20 18:07	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Peachtree Corners, GA								
Mercury	ND	mg/L	0.00050	0.000078	1	09/30/20 15:00	10/01/20 12:12	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2450C-2011 Pace Analytical Services - Peachtree Corners, GA								
Total Dissolved Solids	**1060**	mg/L	50.0	50.0	1		10/02/20 17:25		
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**90.3**	mg/L	5.0	5.0	1		10/08/20 16:25		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		10/08/20 16:25		
Alkalinity, Total as CaCO3	**90.3**	mg/L	5.0	5.0	1		10/08/20 16:25		

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ANALYTICAL RESULTS

Project: BOWEN AP
Pace Project No.: 92497532

Sample: BGWC-20 **Lab ID: 92497532028** Collected: 09/28/20 13:59 Received: 09/29/20 11:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	ND	mg/L	0.10	0.050	1		10/01/20 12:57	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**152**	mg/L	12.0	7.2	12		10/01/20 20:49	16887-00-6	
Fluoride	ND	mg/L	0.10	0.050	1		10/01/20 16:08	16984-48-8	
Sulfate	**578**	mg/L	12.0	6.0	12		10/01/20 20:49	14808-79-8	

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ANALYTICAL RESULTS

Project: BOWEN AP
Pace Project No.: 92497532

Sample: BGWC-25 **Lab ID: 92497532029** Collected: 09/28/20 15:05 Received: 09/29/20 11:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
Field Data	Analytical Method: Pace Analytical Services - Charlotte								
Performed by	**CUSTOMER**				1		10/09/20 11:00		
pH	**7.35**	Std. Units			1		10/09/20 11:00		
6010D ATL ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Peachtree Corners, GA								
Calcium	**50.7**	mg/L	1.0	0.070	1	10/01/20 18:53	10/05/20 21:31	7440-70-2	
Iron	**1.5**	mg/L	0.040	0.016	1	10/01/20 18:53	10/05/20 21:31	7439-89-6	
Magnesium	**22.7**	mg/L	0.050	0.0076	1	10/01/20 18:53	10/05/20 21:31	7439-95-4	
Manganese	**0.36**	mg/L	0.040	0.0017	1	10/01/20 18:53	10/05/20 21:31	7439-96-5	
Potassium	**1.2**	mg/L	0.20	0.056	1	10/01/20 18:53	10/05/20 21:31	7440-09-7	
Sodium	**1.9**	mg/L	1.0	0.26	1	10/01/20 18:53	10/05/20 21:31	7440-23-5	B
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3005A Pace Analytical Services - Peachtree Corners, GA								
Antimony	ND	mg/L	0.0030	0.00028	1	10/02/20 15:00	10/06/20 18:13	7440-36-0	
Arsenic	**0.0028J**	mg/L	0.0050	0.00078	1	10/02/20 15:00	10/06/20 18:13	7440-38-2	
Barium	**0.016**	mg/L	0.010	0.00071	1	10/02/20 15:00	10/06/20 18:13	7440-39-3	
Beryllium	ND	mg/L	0.0030	0.000046	1	10/02/20 15:00	10/06/20 18:13	7440-41-7	
Boron	**0.049J**	mg/L	0.10	0.0052	1	10/02/20 15:00	10/06/20 18:13	7440-42-8	
Cadmium	ND	mg/L	0.0025	0.00012	1	10/02/20 15:00	10/06/20 18:13	7440-43-9	
Chromium	ND	mg/L	0.010	0.00055	1	10/02/20 15:00	10/06/20 18:13	7440-47-3	
Cobalt	ND	mg/L	0.0050	0.00038	1	10/02/20 15:00	10/06/20 18:13	7440-48-4	
Lead	**0.000051J**	mg/L	0.0050	0.000036	1	10/02/20 15:00	10/06/20 18:13	7439-92-1	
Lithium	ND	mg/L	0.030	0.00081	1	10/02/20 15:00	10/06/20 18:13	7439-93-2	
Molybdenum	ND	mg/L	0.010	0.00069	1	10/02/20 15:00	10/06/20 18:13	7439-98-7	
Selenium	ND	mg/L	0.010	0.0016	1	10/02/20 15:00	10/06/20 18:13	7782-49-2	
Thallium	ND	mg/L	0.0010	0.00014	1	10/02/20 15:00	10/06/20 18:13	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Peachtree Corners, GA								
Mercury	ND	mg/L	0.00050	0.000078	1	09/30/20 15:00	10/01/20 12:14	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2450C-2011 Pace Analytical Services - Peachtree Corners, GA								
Total Dissolved Solids	**223**	mg/L	10.0	10.0	1		10/02/20 17:25		
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**237**	mg/L	5.0	5.0	1		10/08/20 22:32		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		10/08/20 22:32		
Alkalinity, Total as CaCO3	**237**	mg/L	5.0	5.0	1		10/08/20 22:32		

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ANALYTICAL RESULTS

Project: BOWEN AP
Pace Project No.: 92497532

Sample: BGWC-25 **Lab ID: 92497532029** Collected: 09/28/20 15:05 Received: 09/29/20 11:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	**0.62**	mg/L	0.10	0.050	1		10/01/20 12:58	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**5.6**	mg/L	1.0	0.60	1		10/01/20 16:23	16887-00-6	
Fluoride	ND	mg/L	0.10	0.050	1		10/01/20 16:23	16984-48-8	
Sulfate	**8.8**	mg/L	1.0	0.50	1		10/01/20 16:23	14808-79-8	

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ANALYTICAL RESULTS

Project: BOWEN AP
Pace Project No.: 92497532

Sample: BGWC-31 **Lab ID: 92497532030** Collected: 09/28/20 16:08 Received: 09/29/20 11:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
Field Data	Analytical Method: Pace Analytical Services - Charlotte								
Performed by	**CUSTOMER**				1		10/09/20 11:00		
pH	**7.32**	Std. Units			1		10/09/20 11:00		
6010D ATL ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Peachtree Corners, GA								
Calcium	**77.8**	mg/L	1.0	0.070	1	10/01/20 18:53	10/05/20 21:36	7440-70-2	
Iron	**1.8**	mg/L	0.040	0.016	1	10/01/20 18:53	10/05/20 21:36	7439-89-6	
Magnesium	**34.6**	mg/L	0.050	0.0076	1	10/01/20 18:53	10/05/20 21:36	7439-95-4	
Manganese	**0.23**	mg/L	0.040	0.0017	1	10/01/20 18:53	10/05/20 21:36	7439-96-5	
Potassium	**1.5**	mg/L	0.20	0.056	1	10/01/20 18:53	10/05/20 21:36	7440-09-7	
Sodium	**8.0**	mg/L	1.0	0.26	1	10/01/20 18:53	10/05/20 21:36	7440-23-5	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3005A Pace Analytical Services - Peachtree Corners, GA								
Antimony	**0.00038J**	mg/L	0.0030	0.00028	1	10/02/20 15:00	10/06/20 18:31	7440-36-0	
Arsenic	**0.0044J**	mg/L	0.0050	0.00078	1	10/02/20 15:00	10/06/20 18:31	7440-38-2	
Barium	**0.038**	mg/L	0.010	0.00071	1	10/02/20 15:00	10/06/20 18:31	7440-39-3	
Beryllium	ND	mg/L	0.0030	0.000046	1	10/02/20 15:00	10/06/20 18:31	7440-41-7	
Boron	**0.66**	mg/L	0.10	0.0052	1	10/02/20 15:00	10/06/20 18:31	7440-42-8	
Cadmium	ND	mg/L	0.0025	0.00012	1	10/02/20 15:00	10/06/20 18:31	7440-43-9	
Chromium	**0.00056J**	mg/L	0.010	0.00055	1	10/02/20 15:00	10/06/20 18:31	7440-47-3	
Cobalt	**0.00046J**	mg/L	0.0050	0.00038	1	10/02/20 15:00	10/06/20 18:31	7440-48-4	
Lead	**0.0013J**	mg/L	0.0050	0.000036	1	10/02/20 15:00	10/06/20 18:31	7439-92-1	
Lithium	ND	mg/L	0.030	0.00081	1	10/02/20 15:00	10/06/20 18:31	7439-93-2	
Molybdenum	ND	mg/L	0.010	0.00069	1	10/02/20 15:00	10/06/20 18:31	7439-98-7	
Selenium	ND	mg/L	0.010	0.0016	1	10/02/20 15:00	10/06/20 18:31	7782-49-2	
Thallium	ND	mg/L	0.0010	0.00014	1	10/02/20 15:00	10/06/20 18:31	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Peachtree Corners, GA								
Mercury	ND	mg/L	0.00050	0.000078	1	09/30/20 15:00	10/01/20 12:21	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2450C-2011 Pace Analytical Services - Peachtree Corners, GA								
Total Dissolved Solids	**405**	mg/L	10.0	10.0	1		10/02/20 17:26		
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**195**	mg/L	5.0	5.0	1		10/08/20 17:08		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		10/08/20 17:08		
Alkalinity, Total as CaCO3	**195**	mg/L	5.0	5.0	1		10/08/20 17:08		

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ANALYTICAL RESULTS

Project: BOWEN AP
Pace Project No.: 92497532

Sample: BGWC-31 **Lab ID: 92497532030** Collected: 09/28/20 16:08 Received: 09/29/20 11:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	ND	mg/L	0.10	0.050	1		10/01/20 12:58	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**34.5**	mg/L	1.0	0.60	1		10/01/20 16:38	16887-00-6	
Fluoride	ND	mg/L	0.10	0.050	1		10/01/20 16:38	16984-48-8	
Sulfate	**115**	mg/L	2.0	1.0	2		10/01/20 21:05	14808-79-8	

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ANALYTICAL RESULTS

Project: BOWEN AP
Pace Project No.: 92497532

Sample: BGWC-34D **Lab ID: 92497532031** Collected: 09/28/20 12:48 Received: 09/29/20 11:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
Field Data	Analytical Method: Pace Analytical Services - Charlotte								
Performed by	**CUSTOMER**				1		10/09/20 11:00		
pH	**7.24**	Std. Units			1		10/09/20 11:00		
6010D ATL ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Peachtree Corners, GA								
Calcium	**117**	mg/L	1.0	0.070	1	10/01/20 18:53	10/05/20 21:40	7440-70-2	
Iron	**0.91**	mg/L	0.040	0.016	1	10/01/20 18:53	10/05/20 21:40	7439-89-6	
Magnesium	**30.4**	mg/L	0.050	0.0076	1	10/01/20 18:53	10/05/20 21:40	7439-95-4	
Manganese	**0.022J**	mg/L	0.040	0.0017	1	10/01/20 18:53	10/05/20 21:40	7439-96-5	
Potassium	**1.9**	mg/L	0.20	0.056	1	10/01/20 18:53	10/05/20 21:40	7440-09-7	
Sodium	**5.5**	mg/L	1.0	0.26	1	10/01/20 18:53	10/05/20 21:40	7440-23-5	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3005A Pace Analytical Services - Peachtree Corners, GA								
Antimony	**0.00049J**	mg/L	0.0030	0.00028	1	10/02/20 15:00	10/06/20 18:36	7440-36-0	
Arsenic	**0.018**	mg/L	0.0050	0.00078	1	10/02/20 15:00	10/06/20 18:36	7440-38-2	
Barium	**0.042**	mg/L	0.010	0.00071	1	10/02/20 15:00	10/06/20 18:36	7440-39-3	
Beryllium	ND	mg/L	0.0030	0.000046	1	10/02/20 15:00	10/06/20 18:36	7440-41-7	
Boron	**0.28**	mg/L	0.10	0.0052	1	10/02/20 15:00	10/06/20 18:36	7440-42-8	
Cadmium	ND	mg/L	0.0025	0.00012	1	10/02/20 15:00	10/06/20 18:36	7440-43-9	
Chromium	ND	mg/L	0.010	0.00055	1	10/02/20 15:00	10/06/20 18:36	7440-47-3	
Cobalt	**0.00048J**	mg/L	0.0050	0.00038	1	10/02/20 15:00	10/06/20 18:36	7440-48-4	
Lead	ND	mg/L	0.0050	0.000036	1	10/02/20 15:00	10/06/20 18:36	7439-92-1	
Lithium	ND	mg/L	0.030	0.00081	1	10/02/20 15:00	10/06/20 18:36	7439-93-2	
Molybdenum	**0.00078J**	mg/L	0.010	0.00069	1	10/02/20 15:00	10/06/20 18:36	7439-98-7	
Selenium	ND	mg/L	0.010	0.0016	1	10/02/20 15:00	10/06/20 18:36	7782-49-2	
Thallium	ND	mg/L	0.0010	0.00014	1	10/02/20 15:00	10/06/20 18:36	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Peachtree Corners, GA								
Mercury	ND	mg/L	0.00050	0.000078	1	09/30/20 15:00	10/01/20 12:24	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2450C-2011 Pace Analytical Services - Peachtree Corners, GA								
Total Dissolved Solids	**466**	mg/L	10.0	10.0	1		10/02/20 17:26		
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**263**	mg/L	5.0	5.0	1		10/08/20 22:49		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		10/08/20 22:49		
Alkalinity, Total as CaCO3	**263**	mg/L	5.0	5.0	1		10/08/20 22:49		

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(770)734-4200

ANALYTICAL RESULTS

Project: BOWEN AP
Pace Project No.: 92497532

Sample: BGWC-34D **Lab ID: 92497532031** Collected: 09/28/20 12:48 Received: 09/29/20 11:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	**0.72**	mg/L	0.10	0.050	1		10/01/20 12:59	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**36.6**	mg/L	1.0	0.60	1		10/01/20 16:53	16887-00-6	
Fluoride	ND	mg/L	0.10	0.050	1		10/01/20 16:53	16984-48-8	
Sulfate	**115**	mg/L	2.0	1.0	2		10/01/20 21:20	14808-79-8	

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ANALYTICAL RESULTS

Project: BOWEN AP
Pace Project No.: 92497532

Sample: BGWC-36D **Lab ID: 92497532032** Collected: 09/28/20 11:12 Received: 09/29/20 11:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
Field Data	Analytical Method: Pace Analytical Services - Charlotte								
Performed by	**CUSTOMER**				1		10/09/20 11:00		
pH	**7.29**	Std. Units			1		10/09/20 11:00		
6010D ATL ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Peachtree Corners, GA								
Calcium	**165**	mg/L	1.0	0.070	1	10/01/20 18:53	10/05/20 21:45	7440-70-2	
Iron	**0.11**	mg/L	0.040	0.016	1	10/01/20 18:53	10/05/20 21:45	7439-89-6	
Magnesium	**49.5**	mg/L	0.050	0.0076	1	10/01/20 18:53	10/05/20 21:45	7439-95-4	
Manganese	**0.12**	mg/L	0.040	0.0017	1	10/01/20 18:53	10/05/20 21:45	7439-96-5	
Potassium	**3.8**	mg/L	0.20	0.056	1	10/01/20 18:53	10/05/20 21:45	7440-09-7	
Sodium	**15.7**	mg/L	1.0	0.26	1	10/01/20 18:53	10/05/20 21:45	7440-23-5	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3005A Pace Analytical Services - Peachtree Corners, GA								
Antimony	ND	mg/L	0.0030	0.00028	1	10/02/20 15:00	10/06/20 18:42	7440-36-0	
Arsenic	ND	mg/L	0.0050	0.00078	1	10/02/20 15:00	10/06/20 18:42	7440-38-2	
Barium	**0.067**	mg/L	0.010	0.00071	1	10/02/20 15:00	10/06/20 18:42	7440-39-3	
Beryllium	ND	mg/L	0.0030	0.000046	1	10/02/20 15:00	10/06/20 18:42	7440-41-7	
Boron	**4.8**	mg/L	0.10	0.0052	1	10/02/20 15:00	10/06/20 18:42	7440-42-8	
Cadmium	ND	mg/L	0.0025	0.00012	1	10/02/20 15:00	10/06/20 18:42	7440-43-9	
Chromium	ND	mg/L	0.010	0.00055	1	10/02/20 15:00	10/06/20 18:42	7440-47-3	
Cobalt	**0.00038J**	mg/L	0.0050	0.00038	1	10/02/20 15:00	10/06/20 18:42	7440-48-4	
Lead	**0.00017J**	mg/L	0.0050	0.000036	1	10/02/20 15:00	10/06/20 18:42	7439-92-1	
Lithium	**0.0011J**	mg/L	0.030	0.00081	1	10/02/20 15:00	10/06/20 18:42	7439-93-2	
Molybdenum	**0.0084J**	mg/L	0.010	0.00069	1	10/02/20 15:00	10/06/20 18:42	7439-98-7	
Selenium	**0.0076J**	mg/L	0.010	0.0016	1	10/02/20 15:00	10/06/20 18:42	7782-49-2	
Thallium	**0.00019J**	mg/L	0.0010	0.00014	1	10/02/20 15:00	10/06/20 18:42	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Peachtree Corners, GA								
Mercury	ND	mg/L	0.00050	0.000078	1	09/30/20 15:00	10/01/20 12:26	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2450C-2011 Pace Analytical Services - Peachtree Corners, GA								
Total Dissolved Solids	**938**	mg/L	20.0	20.0	1		10/02/20 17:26		
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**128**	mg/L	5.0	5.0	1		10/08/20 17:28		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		10/08/20 17:28		
Alkalinity, Total as CaCO3	**128**	mg/L	5.0	5.0	1		10/08/20 17:28		

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ANALYTICAL RESULTS

Project: BOWEN AP
Pace Project No.: 92497532

Sample: BGWC-36D **Lab ID: 92497532032** Collected: 09/28/20 11:12 Received: 09/29/20 11:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	ND	mg/L	0.10	0.050	1		10/01/20 13:00	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**277**	mg/L	6.0	3.6	6		10/01/20 22:04	16887-00-6	
Fluoride	**0.10**	mg/L	0.10	0.050	1		10/01/20 17:08	16984-48-8	
Sulfate	**135**	mg/L	6.0	3.0	6		10/01/20 22:04	14808-79-8	

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ANALYTICAL RESULTS

Project: BOWEN AP
Pace Project No.: 92497532

Sample: DUP-3 **Lab ID: 92497532033** Collected: 09/28/20 00:00 Received: 09/29/20 11:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010D ATL ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Peachtree Corners, GA								
Calcium	**51.9**	mg/L	1.0	0.070	1	10/01/20 18:53	10/05/20 21:49	7440-70-2	
Iron	ND	mg/L	0.040	0.016	1	10/01/20 18:53	10/05/20 21:49	7439-89-6	
Magnesium	**19.3**	mg/L	0.050	0.0076	1	10/01/20 18:53	10/05/20 21:49	7439-95-4	
Manganese	ND	mg/L	0.040	0.0017	1	10/01/20 18:53	10/05/20 21:49	7439-96-5	
Potassium	**3.1**	mg/L	0.20	0.056	1	10/01/20 18:53	10/05/20 21:49	7440-09-7	
Sodium	**2.7**	mg/L	1.0	0.26	1	10/01/20 18:53	10/05/20 21:49	7440-23-5	B
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3005A Pace Analytical Services - Peachtree Corners, GA								
Antimony	ND	mg/L	0.0030	0.00028	1	10/02/20 15:00	10/06/20 18:48	7440-36-0	
Arsenic	ND	mg/L	0.0050	0.00078	1	10/02/20 15:00	10/06/20 18:48	7440-38-2	
Barium	**0.030**	mg/L	0.010	0.00071	1	10/02/20 15:00	10/06/20 18:48	7440-39-3	
Beryllium	**0.000056J**	mg/L	0.0030	0.000046	1	10/02/20 15:00	10/06/20 18:48	7440-41-7	
Boron	**0.41**	mg/L	0.10	0.0052	1	10/02/20 15:00	10/06/20 18:48	7440-42-8	
Cadmium	ND	mg/L	0.0025	0.00012	1	10/02/20 15:00	10/06/20 18:48	7440-43-9	
Chromium	ND	mg/L	0.010	0.00055	1	10/02/20 15:00	10/06/20 18:48	7440-47-3	
Cobalt	ND	mg/L	0.0050	0.00038	1	10/02/20 15:00	10/06/20 18:48	7440-48-4	
Lead	**0.00010J**	mg/L	0.0050	0.000036	1	10/02/20 15:00	10/06/20 18:48	7439-92-1	
Lithium	ND	mg/L	0.030	0.00081	1	10/02/20 15:00	10/06/20 18:48	7439-93-2	
Molybdenum	ND	mg/L	0.010	0.00069	1	10/02/20 15:00	10/06/20 18:48	7439-98-7	
Selenium	ND	mg/L	0.010	0.0016	1	10/02/20 15:00	10/06/20 18:48	7782-49-2	
Thallium	ND	mg/L	0.0010	0.00014	1	10/02/20 15:00	10/06/20 18:48	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Peachtree Corners, GA								
Mercury	ND	mg/L	0.00050	0.000078	1	09/30/20 15:00	10/01/20 12:28	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2450C-2011 Pace Analytical Services - Peachtree Corners, GA								
Total Dissolved Solids	**244**	mg/L	10.0	10.0	1		10/02/20 17:26		
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**137**	mg/L	5.0	5.0	1		10/08/20 17:37		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		10/08/20 17:37		
Alkalinity, Total as CaCO3	**137**	mg/L	5.0	5.0	1		10/08/20 17:37		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	ND	mg/L	0.10	0.050	1		10/01/20 13:01	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**8.1**	mg/L	1.0	0.60	1		10/01/20 20:02	16887-00-6	

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Peachtree Corners, GA 30092
(770)734-4200

ANALYTICAL RESULTS

Project: BOWEN AP
Pace Project No.: 92497532

Sample: DUP-3 **Lab ID: 92497532033** Collected: 09/28/20 00:00 Received: 09/29/20 11:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Fluoride	ND	mg/L	0.10	0.050	1		10/01/20 20:02	16984-48-8	
Sulfate	**66.2**	mg/L	1.0	0.50	1		10/01/20 20:02	14808-79-8	M1

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ANALYTICAL RESULTS

Project: BOWEN AP
Pace Project No.: 92497532

Sample: FBL092820 **Lab ID: 92497532034** Collected: 09/28/20 15:14 Received: 09/29/20 11:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010D ATL ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Peachtree Corners, GA								
Calcium	ND	mg/L	1.0	0.070	1	10/01/20 18:53	10/05/20 21:53	7440-70-2	
Iron	ND	mg/L	0.040	0.016	1	10/01/20 18:53	10/05/20 21:53	7439-89-6	
Magnesium	**0.010J**	mg/L	0.050	0.0076	1	10/01/20 18:53	10/05/20 21:53	7439-95-4	
Manganese	ND	mg/L	0.040	0.0017	1	10/01/20 18:53	10/05/20 21:53	7439-96-5	
Potassium	ND	mg/L	0.20	0.056	1	10/01/20 18:53	10/05/20 21:53	7440-09-7	
Sodium	ND	mg/L	1.0	0.26	1	10/01/20 18:53	10/05/20 21:53	7440-23-5	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3005A Pace Analytical Services - Peachtree Corners, GA								
Antimony	ND	mg/L	0.0030	0.00028	1	10/02/20 15:00	10/06/20 18:53	7440-36-0	
Arsenic	ND	mg/L	0.0050	0.00078	1	10/02/20 15:00	10/06/20 18:53	7440-38-2	
Barium	ND	mg/L	0.010	0.00071	1	10/02/20 15:00	10/06/20 18:53	7440-39-3	
Beryllium	ND	mg/L	0.0030	0.000046	1	10/02/20 15:00	10/06/20 18:53	7440-41-7	
Boron	**0.0098J**	mg/L	0.10	0.0052	1	10/02/20 15:00	10/06/20 18:53	7440-42-8	
Cadmium	ND	mg/L	0.0025	0.00012	1	10/02/20 15:00	10/06/20 18:53	7440-43-9	
Chromium	ND	mg/L	0.010	0.00055	1	10/02/20 15:00	10/06/20 18:53	7440-47-3	
Cobalt	ND	mg/L	0.0050	0.00038	1	10/02/20 15:00	10/06/20 18:53	7440-48-4	
Lead	ND	mg/L	0.0050	0.000036	1	10/02/20 15:00	10/06/20 18:53	7439-92-1	
Lithium	ND	mg/L	0.030	0.00081	1	10/02/20 15:00	10/06/20 18:53	7439-93-2	
Molybdenum	ND	mg/L	0.010	0.00069	1	10/02/20 15:00	10/06/20 18:53	7439-98-7	
Selenium	ND	mg/L	0.010	0.0016	1	10/02/20 15:00	10/06/20 18:53	7782-49-2	
Thallium	ND	mg/L	0.0010	0.00014	1	10/02/20 15:00	10/06/20 18:53	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Peachtree Corners, GA								
Mercury	ND	mg/L	0.00050	0.000078	1	10/05/20 14:00	10/06/20 12:07	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2450C-2011 Pace Analytical Services - Peachtree Corners, GA								
Total Dissolved Solids	ND	mg/L	10.0	10.0	1		10/02/20 17:26		
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	ND	mg/L	5.0	5.0	1		10/08/20 17:47		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		10/08/20 17:47		
Alkalinity, Total as CaCO3	ND	mg/L	5.0	5.0	1		10/08/20 17:47		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	ND	mg/L	0.10	0.050	1		10/01/20 13:01	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	ND	mg/L	1.0	0.60	1		10/01/20 21:14	16887-00-6	

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ANALYTICAL RESULTS

Project: BOWEN AP
Pace Project No.: 92497532

Sample: FBL092820 **Lab ID: 92497532034** Collected: 09/28/20 15:14 Received: 09/29/20 11:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Fluoride	ND	mg/L	0.10	0.050	1		10/01/20 21:14	16984-48-8	
Sulfate	ND	mg/L	1.0	0.50	1		10/01/20 21:14	14808-79-8	

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ANALYTICAL RESULTS

Project: BOWEN AP
Pace Project No.: 92497532

Sample: EQBL092820 **Lab ID: 92497532035** Collected: 09/28/20 15:20 Received: 09/29/20 11:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010D ATL ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Peachtree Corners, GA								
Calcium	ND	mg/L	1.0	0.070	1	10/01/20 18:53	10/05/20 21:58	7440-70-2	
Iron	ND	mg/L	0.040	0.016	1	10/01/20 18:53	10/05/20 21:58	7439-89-6	
Magnesium	ND	mg/L	0.050	0.0076	1	10/01/20 18:53	10/05/20 21:58	7439-95-4	
Manganese	ND	mg/L	0.040	0.0017	1	10/01/20 18:53	10/05/20 21:58	7439-96-5	
Potassium	ND	mg/L	0.20	0.056	1	10/01/20 18:53	10/05/20 21:58	7440-09-7	
Sodium	ND	mg/L	1.0	0.26	1	10/01/20 18:53	10/05/20 21:58	7440-23-5	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3005A Pace Analytical Services - Peachtree Corners, GA								
Antimony	ND	mg/L	0.0030	0.00028	1	10/02/20 15:00	10/06/20 18:59	7440-36-0	
Arsenic	ND	mg/L	0.0050	0.00078	1	10/02/20 15:00	10/06/20 18:59	7440-38-2	
Barium	ND	mg/L	0.010	0.00071	1	10/02/20 15:00	10/06/20 18:59	7440-39-3	
Beryllium	ND	mg/L	0.0030	0.000046	1	10/02/20 15:00	10/06/20 18:59	7440-41-7	
Boron	ND	mg/L	0.10	0.0052	1	10/02/20 15:00	10/06/20 18:59	7440-42-8	
Cadmium	ND	mg/L	0.0025	0.00012	1	10/02/20 15:00	10/06/20 18:59	7440-43-9	
Chromium	ND	mg/L	0.010	0.00055	1	10/02/20 15:00	10/06/20 18:59	7440-47-3	
Cobalt	ND	mg/L	0.0050	0.00038	1	10/02/20 15:00	10/06/20 18:59	7440-48-4	
Lead	ND	mg/L	0.0050	0.000036	1	10/02/20 15:00	10/06/20 18:59	7439-92-1	
Lithium	ND	mg/L	0.030	0.00081	1	10/02/20 15:00	10/06/20 18:59	7439-93-2	
Molybdenum	ND	mg/L	0.010	0.00069	1	10/02/20 15:00	10/06/20 18:59	7439-98-7	
Selenium	ND	mg/L	0.010	0.0016	1	10/02/20 15:00	10/06/20 18:59	7782-49-2	
Thallium	ND	mg/L	0.0010	0.00014	1	10/02/20 15:00	10/06/20 18:59	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Peachtree Corners, GA								
Mercury	ND	mg/L	0.00050	0.000078	1	10/05/20 14:00	10/06/20 12:10	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2450C-2011 Pace Analytical Services - Peachtree Corners, GA								
Total Dissolved Solids	ND	mg/L	10.0	10.0	1		10/02/20 17:26		
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	ND	mg/L	5.0	5.0	1		10/08/20 17:50		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		10/08/20 17:50		
Alkalinity, Total as CaCO3	ND	mg/L	5.0	5.0	1		10/08/20 17:50		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	ND	mg/L	0.10	0.050	1		10/01/20 13:02	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	ND	mg/L	1.0	0.60	1		10/01/20 21:29	16887-00-6	

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ANALYTICAL RESULTS

Project: BOWEN AP
Pace Project No.: 92497532

Sample: EQBL092820 **Lab ID: 92497532035** Collected: 09/28/20 15:20 Received: 09/29/20 11:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Fluoride	ND	mg/L	0.10	0.050	1		10/01/20 21:29	16984-48-8	
Sulfate	ND	mg/L	1.0	0.50	1		10/01/20 21:29	14808-79-8	

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ANALYTICAL RESULTS

Project: BOWEN AP
Pace Project No.: 92497532

Sample: BGWC-39 **Lab ID: 92497532036** Collected: 09/29/20 10:17 Received: 09/30/20 10:23 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
Field Data	Analytical Method: Pace Analytical Services - Charlotte								
Performed by	**CUSTOMER**				1		10/09/20 11:00		
pH	**6.73**	Std. Units			1		10/09/20 11:00		
6010D ATL ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Peachtree Corners, GA								
Calcium	**576**	mg/L	10.0	0.70	10	10/01/20 18:49	10/06/20 16:23	7440-70-2	
Iron	**0.076**	mg/L	0.040	0.016	1	10/01/20 18:49	10/05/20 19:45	7439-89-6	
Magnesium	**82.3**	mg/L	0.050	0.0076	1	10/01/20 18:49	10/05/20 19:45	7439-95-4	
Manganese	**1.3**	mg/L	0.040	0.0017	1	10/01/20 18:49	10/05/20 19:45	7439-96-5	
Potassium	**11.8**	mg/L	0.20	0.056	1	10/01/20 18:49	10/05/20 19:45	7440-09-7	
Sodium	**34.3**	mg/L	1.0	0.26	1	10/01/20 18:49	10/05/20 19:45	7440-23-5	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3005A Pace Analytical Services - Peachtree Corners, GA								
Antimony	ND	mg/L	0.0030	0.00028	1	10/02/20 15:00	10/05/20 19:20	7440-36-0	
Arsenic	ND	mg/L	0.0050	0.00078	1	10/02/20 15:00	10/05/20 19:20	7440-38-2	
Barium	**0.096**	mg/L	0.010	0.00071	1	10/02/20 15:00	10/05/20 19:20	7440-39-3	
Beryllium	ND	mg/L	0.0030	0.000046	1	10/02/20 15:00	10/05/20 19:20	7440-41-7	
Boron	**11.1**	mg/L	1.0	0.052	10	10/02/20 15:00	10/07/20 11:00	7440-42-8	
Cadmium	**0.00020J**	mg/L	0.0025	0.00012	1	10/02/20 15:00	10/05/20 19:20	7440-43-9	
Chromium	ND	mg/L	0.010	0.00055	1	10/02/20 15:00	10/05/20 19:20	7440-47-3	
Cobalt	**0.00061J**	mg/L	0.0050	0.00038	1	10/02/20 15:00	10/05/20 19:20	7440-48-4	
Lead	ND	mg/L	0.0050	0.000036	1	10/02/20 15:00	10/05/20 19:20	7439-92-1	
Lithium	**0.0066J**	mg/L	0.030	0.00081	1	10/02/20 15:00	10/05/20 19:20	7439-93-2	
Molybdenum	**0.010**	mg/L	0.010	0.00069	1	10/02/20 15:00	10/05/20 19:20	7439-98-7	
Selenium	**0.0020J**	mg/L	0.010	0.0016	1	10/02/20 15:00	10/05/20 19:20	7782-49-2	
Thallium	**0.00025J**	mg/L	0.0010	0.00014	1	10/02/20 15:00	10/05/20 19:20	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Peachtree Corners, GA								
Mercury	ND	mg/L	0.00050	0.000078	1	10/05/20 14:00	10/06/20 12:17	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2450C-2011 Pace Analytical Services - Peachtree Corners, GA								
Total Dissolved Solids	**2520**	mg/L	50.0	50.0	1		10/02/20 17:30		
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**141**	mg/L	5.0	5.0	1		10/08/20 21:45		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		10/08/20 21:45		
Alkalinity, Total as CaCO3	**141**	mg/L	5.0	5.0	1		10/08/20 21:45		

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ANALYTICAL RESULTS

Project: BOWEN AP
Pace Project No.: 92497532

Sample: BGWC-39 **Lab ID: 92497532036** Collected: 09/29/20 10:17 Received: 09/30/20 10:23 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	ND	mg/L	0.10	0.050	1		10/01/20 13:14	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**792**	mg/L	17.0	10.2	17		10/02/20 08:49	16887-00-6	
Fluoride	ND	mg/L	0.10	0.050	1		10/02/20 01:20	16984-48-8	
Sulfate	**619**	mg/L	17.0	8.5	17		10/02/20 08:49	14808-79-8	

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ANALYTICAL RESULTS

Project: BOWEN AP
Pace Project No.: 92497532

Sample: BGWC-40 **Lab ID: 92497532037** Collected: 09/29/20 11:14 Received: 09/30/20 10:23 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
Field Data	Analytical Method: Pace Analytical Services - Charlotte								
Performed by	**CUSTOMER**				1		10/09/20 11:00		
pH	**7.15**	Std. Units			1		10/09/20 11:00		
6010D ATL ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Peachtree Corners, GA								
Calcium	**165**	mg/L	1.0	0.070	1	10/01/20 18:49	10/05/20 19:49	7440-70-2	
Iron	**0.20**	mg/L	0.040	0.016	1	10/01/20 18:49	10/05/20 19:49	7439-89-6	
Magnesium	**49.6**	mg/L	0.050	0.0076	1	10/01/20 18:49	10/05/20 19:49	7439-95-4	
Manganese	**0.020J**	mg/L	0.040	0.0017	1	10/01/20 18:49	10/05/20 19:49	7439-96-5	
Potassium	**2.0**	mg/L	0.20	0.056	1	10/01/20 18:49	10/05/20 19:49	7440-09-7	
Sodium	**19.2**	mg/L	1.0	0.26	1	10/01/20 18:49	10/05/20 19:49	7440-23-5	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3005A Pace Analytical Services - Peachtree Corners, GA								
Antimony	ND	mg/L	0.0030	0.00028	1	10/02/20 15:00	10/05/20 19:37	7440-36-0	
Arsenic	ND	mg/L	0.0050	0.00078	1	10/02/20 15:00	10/05/20 19:37	7440-38-2	
Barium	**0.047**	mg/L	0.010	0.00071	1	10/02/20 15:00	10/05/20 19:37	7440-39-3	
Beryllium	ND	mg/L	0.0030	0.000046	1	10/02/20 15:00	10/05/20 19:37	7440-41-7	
Boron	**2.7**	mg/L	0.50	0.026	5	10/02/20 15:00	10/07/20 11:06	7440-42-8	
Cadmium	ND	mg/L	0.0025	0.00012	1	10/02/20 15:00	10/05/20 19:37	7440-43-9	
Chromium	**0.00082J**	mg/L	0.010	0.00055	1	10/02/20 15:00	10/05/20 19:37	7440-47-3	
Cobalt	**0.00044J**	mg/L	0.0050	0.00038	1	10/02/20 15:00	10/05/20 19:37	7440-48-4	
Lead	**0.00024J**	mg/L	0.0050	0.000036	1	10/02/20 15:00	10/05/20 19:37	7439-92-1	
Lithium	ND	mg/L	0.030	0.00081	1	10/02/20 15:00	10/05/20 19:37	7439-93-2	
Molybdenum	**0.00069J**	mg/L	0.010	0.00069	1	10/02/20 15:00	10/05/20 19:37	7439-98-7	
Selenium	**0.0050J**	mg/L	0.010	0.0016	1	10/02/20 15:00	10/05/20 19:37	7782-49-2	
Thallium	ND	mg/L	0.0010	0.00014	1	10/02/20 15:00	10/05/20 19:37	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Peachtree Corners, GA								
Mercury	ND	mg/L	0.00050	0.000078	1	10/05/20 14:00	10/06/20 12:19	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2450C-2011 Pace Analytical Services - Peachtree Corners, GA								
Total Dissolved Solids	**908**	mg/L	20.0	20.0	1		10/02/20 17:30		
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**226**	mg/L	5.0	5.0	1		10/08/20 21:55		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		10/08/20 21:55		
Alkalinity, Total as CaCO3	**226**	mg/L	5.0	5.0	1		10/08/20 21:55		

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(770)734-4200

ANALYTICAL RESULTS

Project: BOWEN AP
Pace Project No.: 92497532

Sample: BGWC-40 **Lab ID: 92497532037** Collected: 09/29/20 11:14 Received: 09/30/20 10:23 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	ND	mg/L	0.10	0.050	1		10/01/20 13:15	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**218**	mg/L	5.0	3.0	5		10/02/20 09:04	16887-00-6	
Fluoride	ND	mg/L	0.10	0.050	1		10/02/20 01:35	16984-48-8	
Sulfate	**130**	mg/L	5.0	2.5	5		10/02/20 09:04	14808-79-8	

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ANALYTICAL RESULTS

Project: BOWEN AP
Pace Project No.: 92497532

Sample: FBL092920 **Lab ID: 92497532038** Collected: 09/29/20 12:00 Received: 09/30/20 10:23 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010D ATL ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Peachtree Corners, GA								
Calcium	**0.077J**	mg/L	1.0	0.070	1	10/01/20 18:49	10/05/20 19:54	7440-70-2	
Iron	ND	mg/L	0.040	0.016	1	10/01/20 18:49	10/05/20 19:54	7439-89-6	
Magnesium	**0.014J**	mg/L	0.050	0.0076	1	10/01/20 18:49	10/05/20 19:54	7439-95-4	
Manganese	ND	mg/L	0.040	0.0017	1	10/01/20 18:49	10/05/20 19:54	7439-96-5	
Potassium	ND	mg/L	0.20	0.056	1	10/01/20 18:49	10/05/20 19:54	7440-09-7	
Sodium	ND	mg/L	1.0	0.26	1	10/01/20 18:49	10/05/20 19:54	7440-23-5	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3005A Pace Analytical Services - Peachtree Corners, GA								
Antimony	ND	mg/L	0.0030	0.00028	1	10/02/20 15:00	10/05/20 19:43	7440-36-0	
Arsenic	ND	mg/L	0.0050	0.00078	1	10/02/20 15:00	10/05/20 19:43	7440-38-2	
Barium	ND	mg/L	0.010	0.00071	1	10/02/20 15:00	10/05/20 19:43	7440-39-3	
Beryllium	ND	mg/L	0.0030	0.000046	1	10/02/20 15:00	10/05/20 19:43	7440-41-7	
Boron	**0.018J**	mg/L	0.10	0.0052	1	10/02/20 15:00	10/05/20 19:43	7440-42-8	
Cadmium	ND	mg/L	0.0025	0.00012	1	10/02/20 15:00	10/05/20 19:43	7440-43-9	
Chromium	ND	mg/L	0.010	0.00055	1	10/02/20 15:00	10/05/20 19:43	7440-47-3	
Cobalt	ND	mg/L	0.0050	0.00038	1	10/02/20 15:00	10/05/20 19:43	7440-48-4	
Lead	ND	mg/L	0.0050	0.000036	1	10/02/20 15:00	10/05/20 19:43	7439-92-1	
Lithium	ND	mg/L	0.030	0.00081	1	10/02/20 15:00	10/05/20 19:43	7439-93-2	
Molybdenum	ND	mg/L	0.010	0.00069	1	10/02/20 15:00	10/05/20 19:43	7439-98-7	
Selenium	ND	mg/L	0.010	0.0016	1	10/02/20 15:00	10/05/20 19:43	7782-49-2	
Thallium	ND	mg/L	0.0010	0.00014	1	10/02/20 15:00	10/05/20 19:43	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Peachtree Corners, GA								
Mercury	ND	mg/L	0.00050	0.000078	1	10/05/20 14:00	10/06/20 12:21	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2450C-2011 Pace Analytical Services - Peachtree Corners, GA								
Total Dissolved Solids	ND	mg/L	10.0	10.0	1		10/02/20 17:30		
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	ND	mg/L	5.0	5.0	1		10/08/20 22:08		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		10/08/20 22:08		
Alkalinity, Total as CaCO3	ND	mg/L	5.0	5.0	1		10/08/20 22:08		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	ND	mg/L	0.10	0.050	1		10/01/20 13:15	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	ND	mg/L	1.0	0.60	1		10/02/20 01:49	16887-00-6	

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ANALYTICAL RESULTS

Project: BOWEN AP
Pace Project No.: 92497532

Sample: FBL092920 **Lab ID: 92497532038** Collected: 09/29/20 12:00 Received: 09/30/20 10:23 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Fluoride	ND	mg/L	0.10	0.050	1		10/02/20 01:49	16984-48-8	
Sulfate	ND	mg/L	1.0	0.50	1		10/02/20 01:49	14808-79-8	

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ANALYTICAL RESULTS

Project: BOWEN AP
Pace Project No.: 92497532

Sample: EQBL092920 **Lab ID: 92497532039** Collected: 09/29/20 12:08 Received: 09/30/20 10:23 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010D ATL ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Peachtree Corners, GA								
Calcium	ND	mg/L	1.0	0.070	1	10/01/20 18:49	10/05/20 19:58	7440-70-2	
Iron	ND	mg/L	0.040	0.016	1	10/01/20 18:49	10/05/20 19:58	7439-89-6	
Magnesium	ND	mg/L	0.050	0.0076	1	10/01/20 18:49	10/05/20 19:58	7439-95-4	
Manganese	ND	mg/L	0.040	0.0017	1	10/01/20 18:49	10/05/20 19:58	7439-96-5	
Potassium	ND	mg/L	0.20	0.056	1	10/01/20 18:49	10/05/20 19:58	7440-09-7	
Sodium	ND	mg/L	1.0	0.26	1	10/01/20 18:49	10/05/20 19:58	7440-23-5	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3005A Pace Analytical Services - Peachtree Corners, GA								
Antimony	ND	mg/L	0.0030	0.00028	1	10/02/20 15:00	10/05/20 19:49	7440-36-0	
Arsenic	ND	mg/L	0.0050	0.00078	1	10/02/20 15:00	10/05/20 19:49	7440-38-2	
Barium	ND	mg/L	0.010	0.00071	1	10/02/20 15:00	10/05/20 19:49	7440-39-3	
Beryllium	ND	mg/L	0.0030	0.000046	1	10/02/20 15:00	10/05/20 19:49	7440-41-7	
Boron	**0.0067J**	mg/L	0.10	0.0052	1	10/02/20 15:00	10/05/20 19:49	7440-42-8	
Cadmium	ND	mg/L	0.0025	0.00012	1	10/02/20 15:00	10/05/20 19:49	7440-43-9	
Chromium	ND	mg/L	0.010	0.00055	1	10/02/20 15:00	10/05/20 19:49	7440-47-3	
Cobalt	ND	mg/L	0.0050	0.00038	1	10/02/20 15:00	10/05/20 19:49	7440-48-4	
Lead	ND	mg/L	0.0050	0.000036	1	10/02/20 15:00	10/05/20 19:49	7439-92-1	
Lithium	ND	mg/L	0.030	0.00081	1	10/02/20 15:00	10/05/20 19:49	7439-93-2	
Molybdenum	ND	mg/L	0.010	0.00069	1	10/02/20 15:00	10/05/20 19:49	7439-98-7	
Selenium	ND	mg/L	0.010	0.0016	1	10/02/20 15:00	10/05/20 19:49	7782-49-2	
Thallium	ND	mg/L	0.0010	0.00014	1	10/02/20 15:00	10/05/20 19:49	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Peachtree Corners, GA								
Mercury	ND	mg/L	0.00050	0.000078	1	10/05/20 14:00	10/06/20 12:24	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2450C-2011 Pace Analytical Services - Peachtree Corners, GA								
Total Dissolved Solids	ND	mg/L	10.0	10.0	1		10/02/20 17:30		
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	ND	mg/L	5.0	5.0	1		10/08/20 22:11		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		10/08/20 22:11		
Alkalinity, Total as CaCO3	ND	mg/L	5.0	5.0	1		10/08/20 22:11		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	ND	mg/L	0.10	0.050	1		10/01/20 13:16	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	ND	mg/L	1.0	0.60	1		10/02/20 02:04	16887-00-6	

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ANALYTICAL RESULTS

Project: BOWEN AP
Pace Project No.: 92497532

Sample: EQBL092920 **Lab ID: 92497532039** Collected: 09/29/20 12:08 Received: 09/30/20 10:23 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Fluoride	ND	mg/L	0.10	0.050	1		10/02/20 02:04	16984-48-8	
Sulfate	ND	mg/L	1.0	0.50	1		10/02/20 02:04	14808-79-8	

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QUALITY CONTROL DATA

Project: BOWEN AP
Pace Project No.: 92497532

QC Batch: 569776
QC Batch Method: EPA 3010A
Analysis Method: EPA 6010D
Analysis Description: 6010D ATL
Laboratory: Pace Analytical Services - Peachtree Corners, GA
Associated Lab Samples: 92497532001, 92497532002, 92497532003, 92497532004, 92497532005, 92497532006, 92497532007, 92497532008, 92497532009, 92497532010, 92497532011, 92497532012, 92497532013, 92497532014, 92497532015

METHOD BLANK: 3018383 Matrix: Water
Associated Lab Samples: 92497532001, 92497532002, 92497532003, 92497532004, 92497532005, 92497532006, 92497532007, 92497532008, 92497532009, 92497532010, 92497532011, 92497532012, 92497532013, 92497532014, 92497532015

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Calcium	mg/L	ND	1.0	0.070	09/30/20 16:15	
Iron	mg/L	0.026J	0.040	0.016	09/30/20 16:15	
Magnesium	mg/L	0.0092J	0.050	0.0076	09/30/20 16:15	
Manganese	mg/L	ND	0.040	0.0017	09/30/20 16:15	
Potassium	mg/L	ND	0.20	0.056	09/30/20 16:15	
Sodium	mg/L	ND	1.0	0.26	09/30/20 16:15	

LABORATORY CONTROL SAMPLE: 3018384

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium	mg/L	1	1.0	104	80-120	
Iron	mg/L	1	1.0	100	80-120	
Magnesium	mg/L	1	1.0	101	80-120	
Manganese	mg/L	1	0.97	97	80-120	
Potassium	mg/L	1	0.89	89	80-120	
Sodium	mg/L	1	1.1	112	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3018385 3018386

Parameter	Units	92497532001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium	mg/L	45.2	1	1	47.0	47.9	181	276	75-125	2	20	M1
Iron	mg/L	0.46	1	1	1.5	1.5	102	102	75-125	0	20	
Magnesium	mg/L	19.8	1	1	21.3	21.7	144	193	75-125	2	20	M1
Manganese	mg/L	0.078	1	1	1.0	1.0	96	96	75-125	1	20	
Potassium	mg/L	1.6	1	1	2.7	2.7	108	111	75-125	1	20	
Sodium	mg/L	2.9	1	1	4.0	4.1	111	120	75-125	2	20	

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QUALITY CONTROL DATA

Project: BOWEN AP
Pace Project No.: 92497532

QC Batch: 569777
QC Batch Method: EPA 3010A
Analysis Method: EPA 6010D
Analysis Description: 6010D ATL
Laboratory: Pace Analytical Services - Peachtree Corners, GA
Associated Lab Samples: 92497532016, 92497532017, 92497532018, 92497532019, 92497532020, 92497532021, 92497532022, 92497532023, 92497532024, 92497532025, 92497532026

METHOD BLANK: 3018389 Matrix: Water
Associated Lab Samples: 92497532016, 92497532017, 92497532018, 92497532019, 92497532020, 92497532021, 92497532022, 92497532023, 92497532024, 92497532025, 92497532026

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Calcium	mg/L	ND	1.0	0.070	10/01/20 16:18	
Iron	mg/L	ND	0.040	0.016	10/01/20 16:18	
Magnesium	mg/L	ND	0.050	0.0076	10/01/20 16:18	
Manganese	mg/L	ND	0.040	0.0017	10/01/20 16:18	
Potassium	mg/L	ND	0.20	0.056	10/01/20 16:18	
Sodium	mg/L	ND	1.0	0.26	10/01/20 16:18	

LABORATORY CONTROL SAMPLE: 3018390

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium	mg/L	1	0.99J	99	80-120	
Iron	mg/L	1	0.95	95	80-120	
Magnesium	mg/L	1	0.98	98	80-120	
Manganese	mg/L	1	0.93	93	80-120	
Potassium	mg/L	1	1.0	101	80-120	
Sodium	mg/L	1	1.1	112	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3018391 3018392

Parameter	Units	92496914014 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium	mg/L	36.9	1	1	39.2	39.8	237	295	75-125	1	20	M1
Iron	mg/L	ND	1	1	0.97	0.96	96	95	75-125	1	20	
Magnesium	mg/L	12.1	1	1	13.6	13.7	145	155	75-125	1	20	M1
Manganese	mg/L	0.010J	1	1	0.93	0.94	92	93	75-125	2	20	
Potassium	mg/L	0.59	1	1	1.5	1.5	93	95	75-125	1	20	
Sodium	mg/L	10.7	1	1	12.0	11.9	138	126	75-125	1	20	M1

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QUALITY CONTROL DATA

Project: BOWEN AP
Pace Project No.: 92497532

QC Batch: 570380
QC Batch Method: EPA 3010A
Analysis Method: EPA 6010D
Analysis Description: 6010D ATL
Laboratory: Pace Analytical Services - Peachtree Corners, GA
Associated Lab Samples: 92497532027, 92497532028, 92497532029, 92497532030, 92497532031, 92497532032, 92497532033, 92497532034, 92497532035

METHOD BLANK: 3021700 Matrix: Water
Associated Lab Samples: 92497532027, 92497532028, 92497532029, 92497532030, 92497532031, 92497532032, 92497532033, 92497532034, 92497532035

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Calcium	mg/L	ND	1.0	0.070	10/05/20 20:52	
Iron	mg/L	ND	0.040	0.016	10/05/20 20:52	
Magnesium	mg/L	ND	0.050	0.0076	10/05/20 20:52	
Manganese	mg/L	ND	0.040	0.0017	10/05/20 20:52	
Potassium	mg/L	ND	0.20	0.056	10/05/20 20:52	
Sodium	mg/L	0.31J	1.0	0.26	10/05/20 20:52	

LABORATORY CONTROL SAMPLE: 3021701

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium	mg/L	1	1.0	103	80-120	
Iron	mg/L	1	0.95	95	80-120	
Magnesium	mg/L	1	0.98	98	80-120	
Manganese	mg/L	1	0.95	95	80-120	
Potassium	mg/L	1	0.97	97	80-120	
Sodium	mg/L	1	1.2	117	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3021764 3021765

Parameter	Units	92497532027 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium	mg/L	50.1	1	1	52.4	50.7	224	54	75-125	3	20	M1
Iron	mg/L	ND	1	1	1.0	0.99	99	97	75-125	2	20	
Magnesium	mg/L	18.7	1	1	20.0	19.6	123	90	75-125	2	20	
Manganese	mg/L	ND	1	1	1.0	0.97	99	97	75-125	2	20	
Potassium	mg/L	3.0	1	1	4.2	4.1	118	102	75-125	4	20	
Sodium	mg/L	2.7	1	1	3.7	3.6	98	92	75-125	2	20	

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QUALITY CONTROL DATA

Project: BOWEN AP
Pace Project No.: 92497532

QC Batch: 570395
QC Batch Method: EPA 3010A
Analysis Method: EPA 6010D
Analysis Description: 6010D ATL
Laboratory: Pace Analytical Services - Peachtree Corners, GA
Associated Lab Samples: 92497532036, 92497532037, 92497532038, 92497532039

METHOD BLANK: 3021771 Matrix: Water
Associated Lab Samples: 92497532036, 92497532037, 92497532038, 92497532039

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Calcium	mg/L	ND	1.0	0.070	10/05/20 18:52	
Iron	mg/L	ND	0.040	0.016	10/05/20 18:52	
Magnesium	mg/L	ND	0.050	0.0076	10/05/20 18:52	
Manganese	mg/L	ND	0.040	0.0017	10/05/20 18:52	
Potassium	mg/L	ND	0.20	0.056	10/05/20 18:52	
Sodium	mg/L	ND	1.0	0.26	10/05/20 18:52	

LABORATORY CONTROL SAMPLE: 3021772

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium	mg/L	1	1.0	102	80-120	
Iron	mg/L	1	0.99	99	80-120	
Magnesium	mg/L	1	1.0	101	80-120	
Manganese	mg/L	1	0.99	99	80-120	
Potassium	mg/L	1	1.0	104	80-120	
Sodium	mg/L	1	1.1	110	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3021773 3021774

Parameter	Units	92496524015 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium	mg/L	72.8	1	1	73.5	75.1	70	232	75-125	2	20	M1
Iron	mg/L	0.39	1	1	1.4	1.5	103	107	75-125	3	20	
Magnesium	mg/L	12.8	1	1	13.8	14.1	96	132	75-125	3	20	M1
Manganese	mg/L	8.6	1	1	9.5	9.7	86	110	75-125	2	20	
Potassium	mg/L	0.72	1	1	1.8	1.8	110	108	75-125	1	20	
Sodium	mg/L	8.1	1	1	9.1	9.3	95	124	75-125	3	20	

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(770)734-4200

QUALITY CONTROL DATA

Project: BOWEN AP
Pace Project No.: 92497532

QC Batch: 570000
QC Batch Method: EPA 3005A
Analysis Method: EPA 6020B
Analysis Description: 6020 MET
Laboratory: Pace Analytical Services - Peachtree Corners, GA
Associated Lab Samples: 92497532001, 92497532002, 92497532003

METHOD BLANK: 3019421 Matrix: Water
Associated Lab Samples: 92497532001, 92497532002, 92497532003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Antimony	mg/L	ND	0.0030	0.00028	10/01/20 14:21	
Arsenic	mg/L	ND	0.0050	0.00078	10/01/20 14:21	
Barium	mg/L	ND	0.010	0.00071	10/01/20 14:21	
Beryllium	mg/L	ND	0.0030	0.000046	10/01/20 14:21	
Boron	mg/L	ND	0.10	0.0052	10/01/20 14:21	
Cadmium	mg/L	ND	0.0025	0.00012	10/01/20 14:21	
Chromium	mg/L	ND	0.010	0.00055	10/01/20 14:21	
Cobalt	mg/L	ND	0.0050	0.00038	10/01/20 14:21	
Lead	mg/L	ND	0.0050	0.000036	10/01/20 14:21	
Lithium	mg/L	ND	0.030	0.00081	10/01/20 14:21	
Molybdenum	mg/L	ND	0.010	0.00069	10/01/20 14:21	
Selenium	mg/L	ND	0.010	0.0016	10/01/20 14:21	
Thallium	mg/L	ND	0.0010	0.00014	10/01/20 14:21	

LABORATORY CONTROL SAMPLE: 3019422

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	mg/L	0.1	0.10	101	80-120	
Arsenic	mg/L	0.1	0.098	98	80-120	
Barium	mg/L	0.1	0.10	100	80-120	
Beryllium	mg/L	0.1	0.098	98	80-120	
Boron	mg/L	1	0.97	97	80-120	
Cadmium	mg/L	0.1	0.098	98	80-120	
Chromium	mg/L	0.1	0.10	102	80-120	
Cobalt	mg/L	0.1	0.099	99	80-120	
Lead	mg/L	0.1	0.098	98	80-120	
Lithium	mg/L	0.1	0.10	103	80-120	
Molybdenum	mg/L	0.1	0.10	102	80-120	
Selenium	mg/L	0.1	0.099	99	80-120	
Thallium	mg/L	0.1	0.097	97	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3019423 3019424

Parameter	Units	92496941015 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	101	101	75-125	0	20	
Arsenic	mg/L	ND	0.1	0.1	0.098	0.10	98	99	75-125	1	20	

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QUALITY CONTROL DATA

Project: BOWEN AP
Pace Project No.: 92497532

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3019423 3019424

Parameter	Units	92496941015 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Barium	mg/L	0.043	0.1	0.1	0.15	0.15	102	102	75-125	0	20	
Beryllium	mg/L	0.000058J	0.1	0.1	0.098	0.099	98	99	75-125	1	20	
Boron	mg/L	1.6	1	1	2.6	2.7	98	111	75-125	5	20	
Cadmium	mg/L	ND	0.1	0.1	0.099	0.098	99	98	75-125	1	20	
Chromium	mg/L	ND	0.1	0.1	0.10	0.10	102	102	75-125	1	20	
Cobalt	mg/L	0.0018J	0.1	0.1	0.10	0.10	99	101	75-125	2	20	
Lead	mg/L	0.000082J	0.1	0.1	0.097	0.10	97	100	75-125	3	20	
Lithium	mg/L	0.0060J	0.1	0.1	0.11	0.11	101	101	75-125	1	20	
Molybdenum	mg/L	ND	0.1	0.1	0.10	0.10	101	101	75-125	0	20	
Selenium	mg/L	ND	0.1	0.1	0.096	0.098	96	98	75-125	2	20	
Thallium	mg/L	ND	0.1	0.1	0.095	0.097	95	97	75-125	2	20	

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QUALITY CONTROL DATA

Project: BOWEN AP
Pace Project No.: 92497532

QC Batch: 570006
QC Batch Method: EPA 3005A
Analysis Method: EPA 6020B
Analysis Description: 6020 MET
Laboratory: Pace Analytical Services - Peachtree Corners, GA
Associated Lab Samples: 92497532004, 92497532005, 92497532006, 92497532007, 92497532008, 92497532009, 92497532010, 92497532011, 92497532012, 92497532013, 92497532014, 92497532015

METHOD BLANK: 3019444 Matrix: Water
Associated Lab Samples: 92497532004, 92497532005, 92497532006, 92497532007, 92497532008, 92497532009, 92497532010, 92497532011, 92497532012, 92497532013, 92497532014, 92497532015

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Antimony	mg/L	ND	0.0030	0.00028	10/01/20 18:07	
Arsenic	mg/L	ND	0.0050	0.00078	10/01/20 18:07	
Barium	mg/L	ND	0.010	0.00071	10/01/20 18:07	
Beryllium	mg/L	ND	0.0030	0.000046	10/01/20 18:07	
Boron	mg/L	ND	0.10	0.0052	10/01/20 18:07	
Cadmium	mg/L	ND	0.0025	0.00012	10/01/20 18:07	
Chromium	mg/L	ND	0.010	0.00055	10/01/20 18:07	
Cobalt	mg/L	ND	0.0050	0.00038	10/01/20 18:07	
Lead	mg/L	ND	0.0050	0.000036	10/01/20 18:07	
Lithium	mg/L	ND	0.030	0.00081	10/01/20 18:07	
Molybdenum	mg/L	ND	0.010	0.00069	10/01/20 18:07	
Selenium	mg/L	ND	0.010	0.0016	10/01/20 18:07	
Thallium	mg/L	ND	0.0010	0.00014	10/01/20 18:07	

LABORATORY CONTROL SAMPLE: 3019445

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	mg/L	0.1	0.092	92	80-120	
Arsenic	mg/L	0.1	0.097	97	80-120	
Barium	mg/L	0.1	0.095	95	80-120	
Beryllium	mg/L	0.1	0.099	99	80-120	
Boron	mg/L	1	0.95	95	80-120	
Cadmium	mg/L	0.1	0.098	98	80-120	
Chromium	mg/L	0.1	0.095	95	80-120	
Cobalt	mg/L	0.1	0.094	94	80-120	
Lead	mg/L	0.1	0.094	94	80-120	
Lithium	mg/L	0.1	0.094	94	80-120	
Molybdenum	mg/L	0.1	0.093	93	80-120	
Selenium	mg/L	0.1	0.10	105	80-120	
Thallium	mg/L	0.1	0.096	96	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3019446 3019447

Parameter	Units	92496914011 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Antimony	mg/L	0.00080J	0.1	0.1	0.096	0.098	95	97	75-125	2	20	

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QUALITY CONTROL DATA

Project: BOWEN AP
Pace Project No.: 92497532

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3019446 3019447

Parameter	Units	92496914011 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	mg/L	0.0064	0.1	0.1	0.10	0.11	98	101	75-125	3	20	
Barium	mg/L	0.11	0.1	0.1	0.20	0.21	97	99	75-125	1	20	
Beryllium	mg/L	0.000050J	0.1	0.1	0.095	0.095	95	95	75-125	1	20	
Boron	mg/L	0.045J	1	1	0.96	0.95	92	91	75-125	1	20	
Cadmium	mg/L	ND	0.1	0.1	0.098	0.10	98	101	75-125	3	20	
Chromium	mg/L	ND	0.1	0.1	0.095	0.096	95	95	75-125	0	20	
Cobalt	mg/L	0.010	0.1	0.1	0.11	0.11	95	97	75-125	2	20	
Lead	mg/L	0.000060J	0.1	0.1	0.094	0.095	94	95	75-125	1	20	
Lithium	mg/L	0.025J	0.1	0.1	0.12	0.12	91	92	75-125	1	20	
Molybdenum	mg/L	ND	0.1	0.1	0.094	0.096	94	95	75-125	2	20	
Selenium	mg/L	ND	0.1	0.1	0.10	0.10	102	104	75-125	2	20	
Thallium	mg/L	ND	0.1	0.1	0.097	0.097	97	97	75-125	1	20	

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QUALITY CONTROL DATA

Project: BOWEN AP
Pace Project No.: 92497532

QC Batch: 570088
QC Batch Method: EPA 3005A
Analysis Method: EPA 6020B
Analysis Description: 6020 MET
Laboratory: Pace Analytical Services - Peachtree Corners, GA
Associated Lab Samples: 92497532016, 92497532017, 92497532018, 92497532019, 92497532020, 92497532021, 92497532022, 92497532023, 92497532024, 92497532025, 92497532026

METHOD BLANK: 3020035 Matrix: Water
Associated Lab Samples: 92497532016, 92497532017, 92497532018, 92497532019, 92497532020, 92497532021, 92497532022, 92497532023, 92497532024, 92497532025, 92497532026

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Antimony	mg/L	ND	0.0030	0.00028	10/01/20 21:10	
Arsenic	mg/L	ND	0.0050	0.00078	10/01/20 21:10	
Barium	mg/L	ND	0.010	0.00071	10/01/20 21:10	
Beryllium	mg/L	ND	0.0030	0.000046	10/01/20 21:10	
Boron	mg/L	ND	0.10	0.0052	10/01/20 21:10	
Cadmium	mg/L	ND	0.0025	0.00012	10/01/20 21:10	
Chromium	mg/L	ND	0.010	0.00055	10/01/20 21:10	
Cobalt	mg/L	ND	0.0050	0.00038	10/01/20 21:10	
Lead	mg/L	ND	0.0050	0.000036	10/01/20 21:10	
Lithium	mg/L	ND	0.030	0.00081	10/01/20 21:10	
Molybdenum	mg/L	ND	0.010	0.00069	10/01/20 21:10	
Selenium	mg/L	ND	0.010	0.0016	10/01/20 21:10	
Thallium	mg/L	ND	0.0010	0.00014	10/01/20 21:10	

LABORATORY CONTROL SAMPLE: 3020036

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	mg/L	0.1	0.11	105	80-120	
Arsenic	mg/L	0.1	0.099	99	80-120	
Barium	mg/L	0.1	0.10	104	80-120	
Beryllium	mg/L	0.1	0.099	99	80-120	
Boron	mg/L	1	0.97	97	80-120	
Cadmium	mg/L	0.1	0.098	98	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	104	80-120	
Lithium	mg/L	0.1	0.097	97	80-120	
Molybdenum	mg/L	0.1	0.098	98	80-120	
Selenium	mg/L	0.1	0.10	104	80-120	
Thallium	mg/L	0.1	0.10	103	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3020037 3020038

Parameter	Units	92496524010 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	0.10	98	102	75-125	4	20	

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QUALITY CONTROL DATA

Project: BOWEN AP
Pace Project No.: 92497532

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3020037 3020038

Parameter	Units	92496524010 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	mg/L	ND	0.1	0.1	0.098	0.099	97	99	75-125	1	20	
Barium	mg/L	0.036	0.1	0.1	0.14	0.14	102	104	75-125	2	20	
Beryllium	mg/L	0.000088J	0.1	0.1	0.093	0.094	93	94	75-125	1	20	
Boron	mg/L	2.2	1	1	3.3	3.3	108	107	75-125	0	20	
Cadmium	mg/L	0.00076J	0.1	0.1	0.094	0.096	93	95	75-125	2	20	
Chromium	mg/L	0.00081J	0.1	0.1	0.096	0.099	96	98	75-125	3	20	
Cobalt	mg/L	0.0019J	0.1	0.1	0.096	0.099	94	97	75-125	3	20	
Lead	mg/L	0.00028J	0.1	0.1	0.095	0.098	95	97	75-125	2	20	
Lithium	mg/L	0.0017J	0.1	0.1	0.093	0.095	92	93	75-125	2	20	
Molybdenum	mg/L	ND	0.1	0.1	0.094	0.097	94	96	75-125	3	20	
Selenium	mg/L	ND	0.1	0.1	0.096	0.10	95	102	75-125	7	20	
Thallium	mg/L	ND	0.1	0.1	0.099	0.10	98	100	75-125	1	20	

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QUALITY CONTROL DATA

Project: BOWEN AP
Pace Project No.: 92497532

QC Batch: 570626
QC Batch Method: EPA 3005A
Analysis Method: EPA 6020B
Analysis Description: 6020 MET
Laboratory: Pace Analytical Services - Peachtree Corners, GA
Associated Lab Samples: 92497532027, 92497532028, 92497532029, 92497532030, 92497532031, 92497532032, 92497532033, 92497532034, 92497532035

METHOD BLANK: 3022872 Matrix: Water
Associated Lab Samples: 92497532027, 92497532028, 92497532029, 92497532030, 92497532031, 92497532032, 92497532033, 92497532034, 92497532035

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Antimony	mg/L	ND	0.0030	0.00028	10/06/20 17:21	
Arsenic	mg/L	ND	0.0050	0.00078	10/06/20 17:21	
Barium	mg/L	ND	0.010	0.00071	10/06/20 17:21	
Beryllium	mg/L	ND	0.0030	0.000046	10/06/20 17:21	
Boron	mg/L	ND	0.10	0.0052	10/06/20 17:21	
Cadmium	mg/L	ND	0.0025	0.00012	10/06/20 17:21	
Chromium	mg/L	ND	0.010	0.00055	10/06/20 17:21	
Cobalt	mg/L	ND	0.0050	0.00038	10/06/20 17:21	
Lead	mg/L	ND	0.0050	0.000036	10/06/20 17:21	
Lithium	mg/L	ND	0.030	0.00081	10/06/20 17:21	
Molybdenum	mg/L	ND	0.010	0.00069	10/06/20 17:21	
Selenium	mg/L	ND	0.010	0.0016	10/06/20 17:21	
Thallium	mg/L	ND	0.0010	0.00014	10/06/20 17:21	

LABORATORY CONTROL SAMPLE: 3022873

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	mg/L	0.1	0.12	116	80-120	
Arsenic	mg/L	0.1	0.097	97	80-120	
Barium	mg/L	0.1	0.10	101	80-120	
Beryllium	mg/L	0.1	0.10	100	80-120	
Boron	mg/L	1	0.99	99	80-120	
Cadmium	mg/L	0.1	0.096	96	80-120	
Chromium	mg/L	0.1	0.10	100	80-120	
Cobalt	mg/L	0.1	0.098	98	80-120	
Lead	mg/L	0.1	0.099	99	80-120	
Lithium	mg/L	0.1	0.10	100	80-120	
Molybdenum	mg/L	0.1	0.10	100	80-120	
Selenium	mg/L	0.1	0.094	94	80-120	
Thallium	mg/L	0.1	0.098	98	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3022874 3022875

Parameter	Units	92496914020 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	0.12	0.12	115	116	75-125	0	20	

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QUALITY CONTROL DATA

Project: BOWEN AP
Pace Project No.: 92497532

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3022874 3022875

Parameter	Units	92496914020 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	mg/L	ND	0.1	0.1	0.097	0.098	97	98	75-125	2	20	
Barium	mg/L	0.15	0.1	0.1	0.25	0.25	102	99	75-125	1	20	
Beryllium	mg/L	0.00010J	0.1	0.1	0.095	0.096	95	96	75-125	1	20	
Boron	mg/L	0.17	1	1	1.1	1.1	94	95	75-125	1	20	
Cadmium	mg/L	ND	0.1	0.1	0.095	0.097	95	97	75-125	2	20	
Chromium	mg/L	0.00063J	0.1	0.1	0.10	0.10	100	100	75-125	0	20	
Cobalt	mg/L	ND	0.1	0.1	0.097	0.099	97	98	75-125	1	20	
Lead	mg/L	0.00014J	0.1	0.1	0.094	0.096	94	96	75-125	2	20	
Lithium	mg/L	0.019J	0.1	0.1	0.11	0.11	92	96	75-125	3	20	
Molybdenum	mg/L	ND	0.1	0.1	0.10	0.10	99	100	75-125	1	20	
Selenium	mg/L	ND	0.1	0.1	0.093	0.095	93	95	75-125	3	20	
Thallium	mg/L	ND	0.1	0.1	0.096	0.097	96	97	75-125	1	20	

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QUALITY CONTROL DATA

Project: BOWEN AP
Pace Project No.: 92497532

QC Batch: 570627
QC Batch Method: EPA 3005A
Analysis Method: EPA 6020B
Analysis Description: 6020 MET
Laboratory: Pace Analytical Services - Peachtree Corners, GA
Associated Lab Samples: 92497532036, 92497532037, 92497532038, 92497532039

METHOD BLANK: 3022878 Matrix: Water
Associated Lab Samples: 92497532036, 92497532037, 92497532038, 92497532039

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Antimony	mg/L	ND	0.0030	0.00028	10/05/20 18:29	
Arsenic	mg/L	ND	0.0050	0.00078	10/05/20 18:29	
Barium	mg/L	ND	0.010	0.00071	10/05/20 18:29	
Beryllium	mg/L	ND	0.0030	0.000046	10/05/20 18:29	
Boron	mg/L	ND	0.10	0.0052	10/05/20 18:29	
Cadmium	mg/L	ND	0.0025	0.00012	10/05/20 18:29	
Chromium	mg/L	ND	0.010	0.00055	10/05/20 18:29	
Cobalt	mg/L	ND	0.0050	0.00038	10/05/20 18:29	
Lead	mg/L	ND	0.0050	0.000036	10/05/20 18:29	
Lithium	mg/L	ND	0.030	0.00081	10/05/20 18:29	
Molybdenum	mg/L	ND	0.010	0.00069	10/05/20 18:29	
Selenium	mg/L	ND	0.010	0.0016	10/05/20 18:29	
Thallium	mg/L	ND	0.0010	0.00014	10/05/20 18:29	

LABORATORY CONTROL SAMPLE: 3022879

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	mg/L	0.1	0.10	100	80-120	
Arsenic	mg/L	0.1	0.096	96	80-120	
Barium	mg/L	0.1	0.096	96	80-120	
Beryllium	mg/L	0.1	0.10	100	80-120	
Boron	mg/L	1	1.0	101	80-120	
Cadmium	mg/L	0.1	0.096	96	80-120	
Chromium	mg/L	0.1	0.10	100	80-120	
Cobalt	mg/L	0.1	0.097	97	80-120	
Lead	mg/L	0.1	0.097	97	80-120	
Lithium	mg/L	0.1	0.10	102	80-120	
Molybdenum	mg/L	0.1	0.10	100	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: 3022880 3022881

Parameter	Units	92498084008 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	0.095	102	95	75-125	7	20	
Arsenic	mg/L	ND	0.1	0.1	0.10	0.095	100	95	75-125	6	20	

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QUALITY CONTROL DATA

Project: BOWEN AP
Pace Project No.: 92497532

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3022880 3022881

Parameter	Units	92498084008 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Barium	mg/L	0.026	0.1	0.1	0.13	0.12	101	91	75-125	9	20	
Beryllium	mg/L	ND	0.1	0.1	0.099	0.096	99	96	75-125	4	20	
Boron	mg/L	0.053	1	1	1.1	1.1	105	103	75-125	2	20	
Cadmium	mg/L	0.00012J	0.1	0.1	0.10	0.094	99	94	75-125	6	20	
Chromium	mg/L	ND	0.1	0.1	0.10	0.096	103	95	75-125	8	20	
Cobalt	mg/L	ND	0.1	0.1	0.10	0.093	100	93	75-125	7	20	
Lead	mg/L	ND	0.1	0.1	0.099	0.094	99	94	75-125	5	20	
Lithium	mg/L	ND	0.1	0.1	0.10	0.096	100	96	75-125	4	20	
Molybdenum	mg/L	0.0089J	0.1	0.1	0.11	0.10	100	93	75-125	7	20	
Selenium	mg/L	0.0051J	0.1	0.1	0.11	0.099	101	94	75-125	6	20	
Thallium	mg/L	ND	0.1	0.1	0.10	0.094	100	93	75-125	6	20	

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QUALITY CONTROL DATA

Project: BOWEN AP
Pace Project No.: 92497532

QC Batch: 569307
QC Batch Method: EPA 7470A
Analysis Method: EPA 7470A
Analysis Description: 7470 Mercury
Laboratory: Pace Analytical Services - Peachtree Corners, GA
Associated Lab Samples: 92497532001, 92497532002, 92497532003, 92497532004, 92497532005, 92497532006, 92497532007, 92497532008, 92497532009, 92497532010, 92497532011, 92497532012, 92497532013, 92497532014, 92497532015

METHOD BLANK: 3016316 Matrix: Water
Associated Lab Samples: 92497532001, 92497532002, 92497532003, 92497532004, 92497532005, 92497532006, 92497532007, 92497532008, 92497532009, 92497532010, 92497532011, 92497532012, 92497532013, 92497532014, 92497532015

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00050	0.000078	09/29/20 13:13	

LABORATORY CONTROL SAMPLE: 3016317

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	0.0025	0.0025	100	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3016318 3016319

Parameter	Units	92497532001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	ND	0.0025	0.0025	0.0025	0.0025	101	99	75-125	1	20	

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QUALITY CONTROL DATA

Project: BOWEN AP
Pace Project No.: 92497532

QC Batch: 570056
QC Batch Method: EPA 7470A
Analysis Method: EPA 7470A
Analysis Description: 7470 Mercury
Laboratory: Pace Analytical Services - Peachtree Corners, GA
Associated Lab Samples: 92497532016, 92497532017, 92497532018, 92497532020, 92497532021, 92497532022, 92497532023, 92497532024, 92497532025, 92497532026, 92497532027, 92497532028, 92497532029, 92497532030, 92497532031, 92497532032, 92497532033

METHOD BLANK: 3019720 Matrix: Water
Associated Lab Samples: 92497532016, 92497532017, 92497532018, 92497532020, 92497532021, 92497532022, 92497532023, 92497532024, 92497532025, 92497532026, 92497532027, 92497532028, 92497532029, 92497532030, 92497532031, 92497532032, 92497532033

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	mg/L	0.00011J	0.00050	0.000078	10/01/20 11:24	

LABORATORY CONTROL SAMPLE: 3019721

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	0.0025	0.0024	96	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3019722 3019723

Parameter	Units	92497532016 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	0.000087J	0.0025	0.0025	0.0025	0.0024	97	93	75-125	5	20	

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QUALITY CONTROL DATA

Project: BOWEN AP
Pace Project No.: 92497532

QC Batch: 570591
QC Batch Method: EPA 7470A
Analysis Method: EPA 7470A
Analysis Description: 7470 Mercury
Laboratory: Pace Analytical Services - Peachtree Corners, GA
Associated Lab Samples: 92497532034, 92497532035, 92497532036, 92497532037, 92497532038, 92497532039

METHOD BLANK: 3022691 Matrix: Water
Associated Lab Samples: 92497532034, 92497532035, 92497532036, 92497532037, 92497532038, 92497532039

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00050	0.000078	10/06/20 11:48	

LABORATORY CONTROL SAMPLE: 3022692

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	0.0025	0.0027	108	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3022693 3022694

Parameter	Units	92497982002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	ND	0.0025	0.0025	0.0026	0.0026	101	105	75-125	3	20	

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QUALITY CONTROL DATA

Project: BOWEN AP
Pace Project No.: 92497532

QC Batch: 577002
QC Batch Method: EPA 7470A
Analysis Method: EPA 7470A
Analysis Description: 7470 Mercury
Laboratory: Pace Analytical Services - Peachtree Corners, GA
Associated Lab Samples: 92497532019

METHOD BLANK: 3053331 Matrix: Water
Associated Lab Samples: 92497532019

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00050	0.000078	10/30/20 14:18	

LABORATORY CONTROL SAMPLE: 3053332

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	0.0025	0.0026	102	80-120	

SAMPLE DUPLICATE: 3053333

Parameter	Units	92497532019 Result	Dup Result	RPD	Max RPD	Qualifiers
Mercury	mg/L	0.0036	0.0036	1	20	H1

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QUALITY CONTROL DATA

Project: BOWEN AP
Pace Project No.: 92497532

QC Batch: 569431
QC Batch Method: SM 2450C-2011
Analysis Method: SM 2450C-2011
Analysis Description: 2540C Total Dissolved Solids
Laboratory: Pace Analytical Services - Peachtree Corners, GA
Associated Lab Samples: 92497532001, 92497532002, 92497532003, 92497532004, 92497532006, 92497532007, 92497532008, 92497532009, 92497532010, 92497532011, 92497532012

METHOD BLANK: 3017032 Matrix: Water
Associated Lab Samples: 92497532001, 92497532002, 92497532003, 92497532004, 92497532006, 92497532007, 92497532008, 92497532009, 92497532010, 92497532011, 92497532012

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	10.0	10.0	10.0	09/28/20 17:06	

LABORATORY CONTROL SAMPLE: 3017033

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	400	427	107	84-108	

SAMPLE DUPLICATE: 3017034

Parameter	Units	92497149002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	108	116	7	10	

SAMPLE DUPLICATE: 3017035

Parameter	Units	92497149005 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	157	163	4	10	

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QUALITY CONTROL DATA

Project: BOWEN AP
Pace Project No.: 92497532

QC Batch: 569874
QC Batch Method: SM 2450C-2011
Analysis Method: SM 2450C-2011
Analysis Description: 2540C Total Dissolved Solids
Laboratory: Pace Analytical Services - Peachtree Corners, GA
Associated Lab Samples: 92497532013, 92497532014, 92497532015

METHOD BLANK: 3018862 Matrix: Water
Associated Lab Samples: 92497532013, 92497532014, 92497532015

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	ND	10.0	10.0	09/30/20 09:26	

LABORATORY CONTROL SAMPLE: 3018863

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	400	389	97	84-108	

SAMPLE DUPLICATE: 3018864

Parameter	Units	92497404001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	130	150	14	10	D6

SAMPLE DUPLICATE: 3018865

Parameter	Units	92495894026 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	790	774	2	10	

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QUALITY CONTROL DATA

Project: BOWEN AP
Pace Project No.: 92497532

QC Batch: 570011
QC Batch Method: SM 2450C-2011
Analysis Method: SM 2450C-2011
Analysis Description: 2540C Total Dissolved Solids
Laboratory: Pace Analytical Services - Peachtree Corners, GA
Associated Lab Samples: 92497532016, 92497532017, 92497532018, 92497532019, 92497532020, 92497532021, 92497532022, 92497532023, 92497532024, 92497532025, 92497532026

METHOD BLANK: 3019473 Matrix: Water
Associated Lab Samples: 92497532016, 92497532017, 92497532018, 92497532019, 92497532020, 92497532021, 92497532022, 92497532023, 92497532024, 92497532025, 92497532026

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	ND	10.0	10.0	09/30/20 14:53	

LABORATORY CONTROL SAMPLE: 3019474

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	400	417	104	84-108	

SAMPLE DUPLICATE: 3019475

Parameter	Units	92497346001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	174	183	5	10	

SAMPLE DUPLICATE: 3019476

Parameter	Units	92497532025 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	ND	ND		10	

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QUALITY CONTROL DATA

Project: BOWEN AP
Pace Project No.: 92497532

QC Batch: 570220
QC Batch Method: SM 2450C-2011
Analysis Method: SM 2450C-2011
Analysis Description: 2540C Total Dissolved Solids
Laboratory: Pace Analytical Services - Peachtree Corners, GA
Associated Lab Samples: 92497532005

METHOD BLANK: 3020462 Matrix: Water
Associated Lab Samples: 92497532005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	ND	10.0	10.0	10/01/20 15:26	

LABORATORY CONTROL SAMPLE: 3020463

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	400	411	103	84-108	

SAMPLE DUPLICATE: 3020464

Parameter	Units	92496524014 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	188	205	9	10	

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QUALITY CONTROL DATA

Project: BOWEN AP
Pace Project No.: 92497532

QC Batch: 570638
QC Batch Method: SM 2450C-2011
Analysis Method: SM 2450C-2011
Analysis Description: 2540C Total Dissolved Solids
Laboratory: Pace Analytical Services - Peachtree Corners, GA
Associated Lab Samples: 92497532027, 92497532028, 92497532029, 92497532030, 92497532031, 92497532032, 92497532033, 92497532034, 92497532035

METHOD BLANK: 3022933 Matrix: Water
Associated Lab Samples: 92497532027, 92497532028, 92497532029, 92497532030, 92497532031, 92497532032, 92497532033, 92497532034, 92497532035

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	ND	10.0	10.0	10/02/20 17:24	

LABORATORY CONTROL SAMPLE: 3022934

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	400	419	105	84-108	

SAMPLE DUPLICATE: 3022936

Parameter	Units	92497532034 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	ND	ND		10	

SAMPLE DUPLICATE: 3023295

Parameter	Units	92497532027 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	243	245	1	10	

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QUALITY CONTROL DATA

Project: BOWEN AP
Pace Project No.: 92497532

QC Batch: 570640
QC Batch Method: SM 2450C-2011
Analysis Method: SM 2450C-2011
Analysis Description: 2540C Total Dissolved Solids
Laboratory: Pace Analytical Services - Peachtree Corners, GA
Associated Lab Samples: 92497532036, 92497532037, 92497532038, 92497532039

METHOD BLANK: 3022941 Matrix: Water
Associated Lab Samples: 92497532036, 92497532037, 92497532038, 92497532039

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	ND	10.0	10.0	10/02/20 17:27	

LABORATORY CONTROL SAMPLE: 3022942

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	400	430	108	84-108	

SAMPLE DUPLICATE: 3022943

Parameter	Units	92498367001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	65.0	71.0	9	10	

SAMPLE DUPLICATE: 3022944

Parameter	Units	92497532037 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	908	862	5	10	

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QUALITY CONTROL DATA

Project: BOWEN AP
Pace Project No.: 92497532

QC Batch: 570520
QC Batch Method: SM 2320B-2011
Analysis Method: SM 2320B-2011
Analysis Description: 2320B Alkalinity
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92497532001, 92497532002

METHOD BLANK: 3022216 Matrix: Water
Associated Lab Samples: 92497532001, 92497532002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	ND	5.0	5.0	10/02/20 16:32	
Alkalinity,Bicarbonate (CaCO3)	mg/L	ND	5.0	5.0	10/02/20 16:32	
Alkalinity,Carbonate (CaCO3)	mg/L	ND	5.0	5.0	10/02/20 16:32	

LABORATORY CONTROL SAMPLE: 3022217

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	50	50.9	102	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3022218 3022219

Parameter	Units	92497530009 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	22.8	50	50	72.9	73.8	100	102	80-120	1	25	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3022220 3022221

Parameter	Units	92497916010 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	15.2	50	50	69.2	69.6	108	109	80-120	1	25	

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QUALITY CONTROL DATA

Project: BOWEN AP
Pace Project No.: 92497532

QC Batch: 571141
QC Batch Method: SM 2320B-2011
Analysis Method: SM 2320B-2011
Analysis Description: 2320B Alkalinity
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92497532003, 92497532004, 92497532005, 92497532006, 92497532007, 92497532008, 92497532009, 92497532010, 92497532011, 92497532012, 92497532013, 92497532014, 92497532015, 92497532016, 92497532017, 92497532019, 92497532020, 92497532021

METHOD BLANK: 3024975 Matrix: Water
Associated Lab Samples: 92497532003, 92497532004, 92497532005, 92497532006, 92497532007, 92497532008, 92497532009, 92497532010, 92497532011, 92497532012, 92497532013, 92497532014, 92497532015, 92497532016, 92497532017, 92497532019, 92497532020, 92497532021

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	ND	5.0	5.0	10/06/20 15:06	
Alkalinity,Bicarbonate (CaCO3)	mg/L	ND	5.0	5.0	10/06/20 15:06	
Alkalinity,Carbonate (CaCO3)	mg/L	ND	5.0	5.0	10/06/20 15:06	

LABORATORY CONTROL SAMPLE: 3024976

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	50	50.5	101	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3024977 3024978

Parameter	Units	92497532003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	156	50	50	210	211	108	112	80-120	1	25	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3024979 3024980

Parameter	Units	92497532012 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	77.3	50	50	128	128	102	101	80-120	1	25	

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QUALITY CONTROL DATA

Project: BOWEN AP
Pace Project No.: 92497532

QC Batch: 571506
QC Batch Method: SM 2320B-2011
Analysis Method: SM 2320B-2011
Analysis Description: 2320B Alkalinity
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92497532018, 92497532022, 92497532023, 92497532024, 92497532025, 92497532026, 92497532027, 92497532028, 92497532029, 92497532030, 92497532031, 92497532032, 92497532033, 92497532034, 92497532035

METHOD BLANK: 3026929 Matrix: Water
Associated Lab Samples: 92497532018, 92497532022, 92497532023, 92497532024, 92497532025, 92497532026, 92497532027, 92497532028, 92497532029, 92497532030, 92497532031, 92497532032, 92497532033, 92497532034, 92497532035

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	ND	5.0	5.0	10/08/20 14:21	
Alkalinity,Bicarbonate (CaCO3)	mg/L	ND	5.0	5.0	10/08/20 14:21	
Alkalinity,Carbonate (CaCO3)	mg/L	ND	5.0	5.0	10/08/20 14:21	

LABORATORY CONTROL SAMPLE: 3026930

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	50	50.1	100	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3026931 3026932

Parameter	Units	92497532022 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	231	50	50	288	286	114	110	80-120	1	25	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3026933 3026934

Parameter	Units	92497532028 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	90.3	50	50	141	143	101	104	80-120	1	25	

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QUALITY CONTROL DATA

Project: BOWEN AP
Pace Project No.: 92497532

QC Batch: 571655
QC Batch Method: SM 2320B-2011
Analysis Method: SM 2320B-2011
Analysis Description: 2320B Alkalinity
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92497532036, 92497532037, 92497532038, 92497532039

METHOD BLANK: 3027877 Matrix: Water
Associated Lab Samples: 92497532036, 92497532037, 92497532038, 92497532039

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	ND	5.0	5.0	10/08/20 18:28	
Alkalinity,Bicarbonate (CaCO3)	mg/L	ND	5.0	5.0	10/08/20 18:28	
Alkalinity,Carbonate (CaCO3)	mg/L	ND	5.0	5.0	10/08/20 18:28	

LABORATORY CONTROL SAMPLE: 3027878

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	50	50.0	100	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3027879 3027880

Parameter	Units	92497913003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	57.8	50	50	108	109	100	103	80-120	1	25	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3029635 3029636

Parameter	Units	92495904018 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	313	50	50	353	358	79	90	80-120	2	25	M1

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QUALITY CONTROL DATA

Project: BOWEN AP
Pace Project No.: 92497532

QC Batch: 569576
QC Batch Method: SM 4500-S2D-2011
Analysis Method: SM 4500-S2D-2011
Analysis Description: 4500S2D Sulfide Water
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92497532001, 92497532002, 92497532003, 92497532004

METHOD BLANK: 3017560 Matrix: Water
Associated Lab Samples: 92497532001, 92497532002, 92497532003, 92497532004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Sulfide	mg/L	ND	0.10	0.050	09/29/20 13:11	

LABORATORY CONTROL SAMPLE: 3017561

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfide	mg/L	0.5	0.51	103	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3017562 3017563

Parameter	Units	92497358001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfide	mg/L	ND	0.5	0.5	0.53	0.53	104	104	80-120	0	10	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3017564 3017565

Parameter	Units	92497241004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfide	mg/L	ND	0.5	0.5	0.37	0.37	74	75	80-120	0	10	M1

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QUALITY CONTROL DATA

Project: BOWEN AP
Pace Project No.: 92497532

QC Batch: 569578
QC Batch Method: SM 4500-S2D-2011
Analysis Method: SM 4500-S2D-2011
Analysis Description: 4500S2D Sulfide Water
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92497532005, 92497532006, 92497532007, 92497532008, 92497532009, 92497532010, 92497532011, 92497532012, 92497532013, 92497532014, 92497532015, 92497532016, 92497532017, 92497532018, 92497532019, 92497532020, 92497532021

METHOD BLANK: 3017573 Matrix: Water
Associated Lab Samples: 92497532005, 92497532006, 92497532007, 92497532008, 92497532009, 92497532010, 92497532011, 92497532012, 92497532013, 92497532014, 92497532015, 92497532016, 92497532017, 92497532018, 92497532019, 92497532020, 92497532021

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Sulfide	mg/L	ND	0.10	0.050	09/29/20 13:31	

LABORATORY CONTROL SAMPLE: 3017574

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfide	mg/L	0.5	0.53	107	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3017575 3017576

Parameter	Units	92497532005 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfide	mg/L	ND	0.5	0.5	0.55	0.54	108	108	80-120	0	10	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3017577 3017578

Parameter	Units	92497358003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfide	mg/L	ND	0.5	0.5	0.54	0.55	107	108	80-120	0	10	

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QUALITY CONTROL DATA

Project: BOWEN AP
Pace Project No.: 92497532

QC Batch: 569580
QC Batch Method: SM 4500-S2D-2011
Analysis Method: SM 4500-S2D-2011
Analysis Description: 4500S2D Sulfide Water
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92497532022, 92497532023, 92497532024, 92497532025, 92497532026

METHOD BLANK: 3017581 Matrix: Water
Associated Lab Samples: 92497532022, 92497532023, 92497532024, 92497532025, 92497532026

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Sulfide	mg/L	ND	0.10	0.050	09/29/20 13:47	

LABORATORY CONTROL SAMPLE: 3017582

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfide	mg/L	0.5	0.53	106	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3017583 3017584

Parameter	Units	92497532022 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfide	mg/L	ND	0.5	0.5	0.18	0.19	31	32	80-120	2	10	M1

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QUALITY CONTROL DATA

Project: BOWEN AP
Pace Project No.: 92497532

QC Batch: 570214
QC Batch Method: SM 4500-S2D-2011
Analysis Method: SM 4500-S2D-2011
Analysis Description: 4500S2D Sulfide Water
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92497532027, 92497532028, 92497532029, 92497532030, 92497532031, 92497532032, 92497532033, 92497532034, 92497532035

METHOD BLANK: 3020426 Matrix: Water
Associated Lab Samples: 92497532027, 92497532028, 92497532029, 92497532030, 92497532031, 92497532032, 92497532033, 92497532034, 92497532035

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Sulfide	mg/L	ND	0.10	0.050	10/01/20 12:47	

LABORATORY CONTROL SAMPLE: 3020427

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfide	mg/L	0.5	0.55	109	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3020428 3020429

Parameter	Units	92497738004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfide	mg/L	ND	0.5	0.5	0.55	0.55	108	108	80-120	0	10	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3020430 3020431

Parameter	Units	92497738003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfide	mg/L	ND	0.5	0.5	0.56	0.56	109	109	80-120	0	10	

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QUALITY CONTROL DATA

Project: BOWEN AP
Pace Project No.: 92497532

QC Batch: 570216
QC Batch Method: SM 4500-S2D-2011
Analysis Method: SM 4500-S2D-2011
Analysis Description: 4500S2D Sulfide Water
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92497532036, 92497532037, 92497532038, 92497532039

METHOD BLANK: 3020440 Matrix: Water
Associated Lab Samples: 92497532036, 92497532037, 92497532038, 92497532039

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Sulfide	mg/L	ND	0.10	0.050	10/01/20 13:05	

LABORATORY CONTROL SAMPLE: 3020441

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfide	mg/L	0.5	0.53	107	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3020442 3020443

Parameter	Units	92497916007 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfide	mg/L	ND	0.5	0.5	0.24	0.23	49	47	80-120	4	10	M1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3020444 3020445

Parameter	Units	92497916008 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfide	mg/L	ND	0.5	0.5	ND	ND	6	6	80-120		10	M1

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QUALITY CONTROL DATA

Project: BOWEN AP
Pace Project No.: 92497532

QC Batch: 569515
QC Batch Method: EPA 300.0 Rev 2.1 1993
Analysis Method: EPA 300.0 Rev 2.1 1993
Analysis Description: 300.0 IC Anions
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92497532001, 92497532002, 92497532003, 92497532004, 92497532005, 92497532006, 92497532007, 92497532008

METHOD BLANK: 3017404 Matrix: Water
Associated Lab Samples: 92497532001, 92497532002, 92497532003, 92497532004, 92497532005, 92497532006, 92497532007, 92497532008

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	ND	1.0	0.60	09/29/20 01:40	
Fluoride	mg/L	ND	0.10	0.050	09/29/20 01:40	
Sulfate	mg/L	ND	1.0	0.50	09/29/20 01:40	

LABORATORY CONTROL SAMPLE: 3017405

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	50	54.1	108	90-110	
Fluoride	mg/L	2.5	2.7	109	90-110	
Sulfate	mg/L	50	54.2	108	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3017406 3017407

Parameter	Units	92496914009 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	ND	50	50	52.3	52.6	105	105	90-110	1	10	
Fluoride	mg/L	ND	2.5	2.5	2.6	2.6	104	106	90-110	1	10	
Sulfate	mg/L	ND	50	50	51.9	52.3	104	105	90-110	1	10	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3017408 3017409

Parameter	Units	92496914010 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	ND	50	50	51.9	52.4	104	105	90-110	1	10	
Fluoride	mg/L	ND	2.5	2.5	2.6	2.6	104	105	90-110	1	10	
Sulfate	mg/L	ND	50	50	51.6	52.0	103	104	90-110	1	10	

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QUALITY CONTROL DATA

Project: BOWEN AP
Pace Project No.: 92497532

QC Batch: 569516
QC Batch Method: EPA 300.0 Rev 2.1 1993
Analysis Method: EPA 300.0 Rev 2.1 1993
Analysis Description: 300.0 IC Anions
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92497532009, 92497532010, 92497532011, 92497532012, 92497532013, 92497532014, 92497532015

METHOD BLANK: 3017410 Matrix: Water
Associated Lab Samples: 92497532009, 92497532010, 92497532011, 92497532012, 92497532013, 92497532014, 92497532015

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	ND	1.0	0.60	09/29/20 08:53	
Fluoride	mg/L	ND	0.10	0.050	09/29/20 08:53	
Sulfate	mg/L	ND	1.0	0.50	09/29/20 08:53	

LABORATORY CONTROL SAMPLE: 3017411

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	50	54.8	110	90-110	
Fluoride	mg/L	2.5	2.7	109	90-110	
Sulfate	mg/L	50	54.9	110	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3017412 3017413

Parameter	Units	92497532015 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	ND	50	50	52.8	52.1	106	104	90-110	1	10	
Fluoride	mg/L	ND	2.5	2.5	2.6	2.6	106	104	90-110	1	10	
Sulfate	mg/L	ND	50	50	52.5	52.0	105	104	90-110	1	10	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3017414 3017415

Parameter	Units	92495894027 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	ND	50	50	52.5	52.9	105	105	90-110	1	10	
Fluoride	mg/L	ND	2.5	2.5	2.6	2.6	105	104	90-110	1	10	
Sulfate	mg/L	ND	50	50	52.1	52.0	104	104	90-110	0	10	

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QUALITY CONTROL DATA

Project: BOWEN AP
Pace Project No.: 92497532

QC Batch: 569577
QC Batch Method: EPA 300.0 Rev 2.1 1993
Analysis Method: EPA 300.0 Rev 2.1 1993
Analysis Description: 300.0 IC Anions
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92497532016, 92497532017, 92497532018, 92497532019, 92497532020, 92497532021, 92497532022, 92497532023, 92497532024, 92497532025, 92497532026

METHOD BLANK: 3017567 Matrix: Water
Associated Lab Samples: 92497532016, 92497532017, 92497532018, 92497532019, 92497532020, 92497532021, 92497532022, 92497532023, 92497532024, 92497532025, 92497532026

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	ND	1.0	0.60	09/29/20 17:37	
Fluoride	mg/L	ND	0.10	0.050	09/29/20 17:37	
Sulfate	mg/L	ND	1.0	0.50	09/29/20 17:37	

LABORATORY CONTROL SAMPLE: 3017568

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	50	50.9	102	90-110	
Fluoride	mg/L	2.5	2.7	109	90-110	
Sulfate	mg/L	50	50.7	101	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3017569 3017570

Parameter	Units	92496524012 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	8.9	50	50	59.8	60.2	102	103	90-110	1	10	
Fluoride	mg/L	ND	2.5	2.5	2.2	2.5	89	99	90-110	10	10	M1
Sulfate	mg/L	298	50	50	347	351	98	106	90-110	1	10	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3017571 3017572

Parameter	Units	92497532021 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	449	50	50	491	491	85	84	90-110	0	10	M6
Fluoride	mg/L	0.097J	2.5	2.5	2.6	2.6	100	101	90-110	2	10	
Sulfate	mg/L	393	50	50	441	441	97	98	90-110	0	10	

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REPORT OF LABORATORY ANALYSIS

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(770)734-4200

QUALITY CONTROL DATA

Project: BOWEN AP
Pace Project No.: 92497532

QC Batch: 570137
QC Batch Method: EPA 300.0 Rev 2.1 1993
Analysis Method: EPA 300.0 Rev 2.1 1993
Analysis Description: 300.0 IC Anions
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92497532027, 92497532028, 92497532029, 92497532030, 92497532031, 92497532032

METHOD BLANK: 3020267 Matrix: Water
Associated Lab Samples: 92497532027, 92497532028, 92497532029, 92497532030, 92497532031, 92497532032

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	ND	1.0	0.60	10/01/20 07:56	
Fluoride	mg/L	ND	0.10	0.050	10/01/20 07:56	
Sulfate	mg/L	ND	1.0	0.50	10/01/20 07:56	

LABORATORY CONTROL SAMPLE: 3020268

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	50	53.3	107	90-110	
Fluoride	mg/L	2.5	2.7	109	90-110	
Sulfate	mg/L	50	53.4	107	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3020269 3020270

Parameter	Units	92495894028 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	542	50	50	583	587	82	89	90-110	1	10	M6
Fluoride	mg/L	0.41	2.5	2.5	3.2	3.1	110	109	90-110	1	10	
Sulfate	mg/L	3480	50	50	3520	3530	86	111	90-110	0	10	M6

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3020271 3020272

Parameter	Units	92496914018 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	1.6	50	50	56.0	56.5	109	110	90-110	1	10	
Fluoride	mg/L	0.063J	2.5	2.5	2.8	2.8	109	111	90-110	2	10	M1
Sulfate	mg/L	110	50	50	160	161	101	103	90-110	1	10	

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QUALITY CONTROL DATA

Project: BOWEN AP
Pace Project No.: 92497532

QC Batch: 570217
QC Batch Method: EPA 300.0 Rev 2.1 1993
Analysis Method: EPA 300.0 Rev 2.1 1993
Analysis Description: 300.0 IC Anions
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92497532033, 92497532034, 92497532035, 92497532036, 92497532037, 92497532038, 92497532039

METHOD BLANK: 3020447 Matrix: Water
Associated Lab Samples: 92497532033, 92497532034, 92497532035, 92497532036, 92497532037, 92497532038, 92497532039

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	ND	1.0	0.60	10/01/20 19:33	
Fluoride	mg/L	ND	0.10	0.050	10/01/20 19:33	
Sulfate	mg/L	ND	1.0	0.50	10/01/20 19:33	

LABORATORY CONTROL SAMPLE: 3020448

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	50	51.6	103	90-110	
Fluoride	mg/L	2.5	2.7	110	90-110	
Sulfate	mg/L	50	50.5	101	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3020449 3020450

Parameter	Units	92497532033 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	8.1	50	50	62.3	61.6	108	107	90-110	1	10	
Fluoride	mg/L	ND	2.5	2.5	2.7	2.7	107	106	90-110	1	10	
Sulfate	mg/L	66.2	50	50	111	110	89	88	90-110	0	10	M1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3020451 3020452

Parameter	Units	92498084008 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	10.6	50	50	64.0	64.3	107	107	90-110	0	10	
Fluoride	mg/L	ND	2.5	2.5	2.3	2.3	91	93	90-110	3	10	
Sulfate	mg/L	93.5	50	50	134	134	82	81	90-110	0	10	M1

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QUALIFIERS

Project: BOWEN AP
Pace Project No.: 92497532

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.

TNTC - Too Numerous To Count

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.

Acid preservation may not be appropriate for 2 Chloroethylvinyl ether.

A separate vial preserved to a pH of 4-5 is recommended in SW846 Chapter 4 for the analysis of Acrolein and Acrylonitrile by EPA Method 8260.

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.
D6	The precision between the sample and sample duplicate exceeded laboratory control limits.
H1	Analysis conducted outside the EPA method holding time.
H2	Extraction or preparation conducted outside EPA method holding time.
H4	Sample re-extracted and analyzed outside of EPA method holding time.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
M6	Matrix spike and Matrix spike duplicate recovery not evaluated against control limits due to sample dilution.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: BOWEN AP
Pace Project No.: 92497532

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
92497532001	**BGWA-2**				
92497532002	**BGWA-29**				
92497532003	**BGWC-8**				
92497532004	**BGWA-6**				
92497532006	**BGWC-9**				
92497532007	**BGWC-10**				
92497532008	**BGWC-16**				
92497532009	**BGWC-17**				
92497532010	**BGWC-18**				
92497532011	**BGWC-21**				
92497532012	**BGWC-22**				
92497532013	**BGWC-23**				
92497532016	**BGWA-33**				
92497532017	**BGWC-7**				
92497532018	**BGWC-12**				
92497532019	**BGWC-24**				
92497532020	**BGWC-30**				
92497532021	**BGWC-32**				
92497532022	**BGWC-35D**				
92497532023	**BGWC-37D**				
92497532027	**BGWC-19**				
92497532028	**BGWC-20**				
92497532029	**BGWC-25**				
92497532030	**BGWC-31**				
92497532031	**BGWC-34D**				
92497532032	**BGWC-36D**				
92497532036	**BGWC-39**				
92497532037	**BGWC-40**				
92497532001	**BGWA-2**	EPA 3010A	569776	EPA 6010D	569815
92497532002	**BGWA-29**	EPA 3010A	569776	EPA 6010D	569815
92497532003	**BGWC-8**	EPA 3010A	569776	EPA 6010D	569815
92497532004	**BGWA-6**	EPA 3010A	569776	EPA 6010D	569815
92497532005	**FBL092320**	EPA 3010A	569776	EPA 6010D	569815
92497532006	**BGWC-9**	EPA 3010A	569776	EPA 6010D	569815
92497532007	**BGWC-10**	EPA 3010A	569776	EPA 6010D	569815
92497532008	**BGWC-16**	EPA 3010A	569776	EPA 6010D	569815
92497532009	**BGWC-17**	EPA 3010A	569776	EPA 6010D	569815
92497532010	**BGWC-18**	EPA 3010A	569776	EPA 6010D	569815
92497532011	**BGWC-21**	EPA 3010A	569776	EPA 6010D	569815
92497532012	**BGWC-22**	EPA 3010A	569776	EPA 6010D	569815
92497532013	**BGWC-23**	EPA 3010A	569776	EPA 6010D	569815
92497532014	**DUP-1**	EPA 3010A	569776	EPA 6010D	569815
92497532015	**FBL092420**	EPA 3010A	569776	EPA 6010D	569815
92497532016	**BGWA-33**	EPA 3010A	569777	EPA 6010D	569816
92497532017	**BGWC-7**	EPA 3010A	569777	EPA 6010D	569816
92497532018	**BGWC-12**	EPA 3010A	569777	EPA 6010D	569816
92497532019	**BGWC-24**	EPA 3010A	569777	EPA 6010D	569816
92497532020	**BGWC-30**	EPA 3010A	569777	EPA 6010D	569816

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: BOWEN AP
Pace Project No.: 92497532

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
92497532021	**BGWC-32**	EPA 3010A	569777	EPA 6010D	569816
92497532022	**BGWC-35D**	EPA 3010A	569777	EPA 6010D	569816
92497532023	**BGWC-37D**	EPA 3010A	569777	EPA 6010D	569816
92497532024	**DUP-2**	EPA 3010A	569777	EPA 6010D	569816
92497532025	**FBL092520**	EPA 3010A	569777	EPA 6010D	569816
92497532026	**EQBL092520**	EPA 3010A	569777	EPA 6010D	569816
92497532027	**BGWC-19**	EPA 3010A	570380	EPA 6010D	570413
92497532028	**BGWC-20**	EPA 3010A	570380	EPA 6010D	570413
92497532029	**BGWC-25**	EPA 3010A	570380	EPA 6010D	570413
92497532030	**BGWC-31**	EPA 3010A	570380	EPA 6010D	570413
92497532031	**BGWC-34D**	EPA 3010A	570380	EPA 6010D	570413
92497532032	**BGWC-36D**	EPA 3010A	570380	EPA 6010D	570413
92497532033	**DUP-3**	EPA 3010A	570380	EPA 6010D	570413
92497532034	**FBL092820**	EPA 3010A	570380	EPA 6010D	570413
92497532035	**EQBL092820**	EPA 3010A	570380	EPA 6010D	570413
92497532036	**BGWC-39**	EPA 3010A	570395	EPA 6010D	570414
92497532037	**BGWC-40**	EPA 3010A	570395	EPA 6010D	570414
92497532038	**FBL092920**	EPA 3010A	570395	EPA 6010D	570414
92497532039	**EQBL092920**	EPA 3010A	570395	EPA 6010D	570414
92497532001	**BGWA-2**	EPA 3005A	570000	EPA 6020B	570049
92497532002	**BGWA-29**	EPA 3005A	570000	EPA 6020B	570049
92497532003	**BGWC-8**	EPA 3005A	570000	EPA 6020B	570049
92497532004	**BGWA-6**	EPA 3005A	570006	EPA 6020B	570052
92497532005	**FBL092320**	EPA 3005A	570006	EPA 6020B	570052
92497532006	**BGWC-9**	EPA 3005A	570006	EPA 6020B	570052
92497532007	**BGWC-10**	EPA 3005A	570006	EPA 6020B	570052
92497532008	**BGWC-16**	EPA 3005A	570006	EPA 6020B	570052
92497532009	**BGWC-17**	EPA 3005A	570006	EPA 6020B	570052
92497532010	**BGWC-18**	EPA 3005A	570006	EPA 6020B	570052
92497532011	**BGWC-21**	EPA 3005A	570006	EPA 6020B	570052
92497532012	**BGWC-22**	EPA 3005A	570006	EPA 6020B	570052
92497532013	**BGWC-23**	EPA 3005A	570006	EPA 6020B	570052
92497532014	**DUP-1**	EPA 3005A	570006	EPA 6020B	570052
92497532015	**FBL092420**	EPA 3005A	570006	EPA 6020B	570052
92497532016	**BGWA-33**	EPA 3005A	570088	EPA 6020B	570109
92497532017	**BGWC-7**	EPA 3005A	570088	EPA 6020B	570109
92497532018	**BGWC-12**	EPA 3005A	570088	EPA 6020B	570109
92497532019	**BGWC-24**	EPA 3005A	570088	EPA 6020B	570109
92497532020	**BGWC-30**	EPA 3005A	570088	EPA 6020B	570109
92497532021	**BGWC-32**	EPA 3005A	570088	EPA 6020B	570109
92497532022	**BGWC-35D**	EPA 3005A	570088	EPA 6020B	570109
92497532023	**BGWC-37D**	EPA 3005A	570088	EPA 6020B	570109
92497532024	**DUP-2**	EPA 3005A	570088	EPA 6020B	570109
92497532025	**FBL092520**	EPA 3005A	570088	EPA 6020B	570109
92497532026	**EQBL092520**	EPA 3005A	570088	EPA 6020B	570109
92497532027	**BGWC-19**	EPA 3005A	570626	EPA 6020B	570683

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: BOWEN AP
Pace Project No.: 92497532

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
92497532028	BGWC-20	EPA 3005A	570626	EPA 6020B	570683
92497532029	BGWC-25	EPA 3005A	570626	EPA 6020B	570683
92497532030	BGWC-31	EPA 3005A	570626	EPA 6020B	570683
92497532031	BGWC-34D	EPA 3005A	570626	EPA 6020B	570683
92497532032	BGWC-36D	EPA 3005A	570626	EPA 6020B	570683
92497532033	DUP-3	EPA 3005A	570626	EPA 6020B	570683
92497532034	FBL092820	EPA 3005A	570626	EPA 6020B	570683
92497532035	EQBL092820	EPA 3005A	570626	EPA 6020B	570683
92497532036	BGWC-39	EPA 3005A	570627	EPA 6020B	570682
92497532037	BGWC-40	EPA 3005A	570627	EPA 6020B	570682
92497532038	FBL092920	EPA 3005A	570627	EPA 6020B	570682
92497532039	EQBL092920	EPA 3005A	570627	EPA 6020B	570682
92497532001	BGWA-2	EPA 7470A	569307	EPA 7470A	569460
92497532002	BGWA-29	EPA 7470A	569307	EPA 7470A	569460
92497532003	BGWC-8	EPA 7470A	569307	EPA 7470A	569460
92497532004	BGWA-6	EPA 7470A	569307	EPA 7470A	569460
92497532005	FBL092320	EPA 7470A	569307	EPA 7470A	569460
92497532006	BGWC-9	EPA 7470A	569307	EPA 7470A	569460
92497532007	BGWC-10	EPA 7470A	569307	EPA 7470A	569460
92497532008	BGWC-16	EPA 7470A	569307	EPA 7470A	569460
92497532009	BGWC-17	EPA 7470A	569307	EPA 7470A	569460
92497532010	BGWC-18	EPA 7470A	569307	EPA 7470A	569460
92497532011	BGWC-21	EPA 7470A	569307	EPA 7470A	569460
92497532012	BGWC-22	EPA 7470A	569307	EPA 7470A	569460
92497532013	BGWC-23	EPA 7470A	569307	EPA 7470A	569460
92497532014	DUP-1	EPA 7470A	569307	EPA 7470A	569460
92497532015	FBL092420	EPA 7470A	569307	EPA 7470A	569460
92497532016	BGWA-33	EPA 7470A	570056	EPA 7470A	570241
92497532017	BGWC-7	EPA 7470A	570056	EPA 7470A	570241
92497532018	BGWC-12	EPA 7470A	570056	EPA 7470A	570241
92497532019	BGWC-24	EPA 7470A	577002	EPA 7470A	577039
92497532020	BGWC-30	EPA 7470A	570056	EPA 7470A	570241
92497532021	BGWC-32	EPA 7470A	570056	EPA 7470A	570241
92497532022	BGWC-35D	EPA 7470A	570056	EPA 7470A	570241
92497532023	BGWC-37D	EPA 7470A	570056	EPA 7470A	570241
92497532024	DUP-2	EPA 7470A	570056	EPA 7470A	570241
92497532025	FBL092520	EPA 7470A	570056	EPA 7470A	570241
92497532026	EQBL092520	EPA 7470A	570056	EPA 7470A	570241
92497532027	BGWC-19	EPA 7470A	570056	EPA 7470A	570241
92497532028	BGWC-20	EPA 7470A	570056	EPA 7470A	570241
92497532029	BGWC-25	EPA 7470A	570056	EPA 7470A	570241
92497532030	BGWC-31	EPA 7470A	570056	EPA 7470A	570241
92497532031	BGWC-34D	EPA 7470A	570056	EPA 7470A	570241
92497532032	BGWC-36D	EPA 7470A	570056	EPA 7470A	570241
92497532033	DUP-3	EPA 7470A	570056	EPA 7470A	570241
92497532034	FBL092820	EPA 7470A	570591	EPA 7470A	571021

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: BOWEN AP
Pace Project No.: 92497532

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
92497532035	**EQBL092820**	EPA 7470A	570591	EPA 7470A	571021
92497532036	**BGWC-39**	EPA 7470A	570591	EPA 7470A	571021
92497532037	**BGWC-40**	EPA 7470A	570591	EPA 7470A	571021
92497532038	**FBL092920**	EPA 7470A	570591	EPA 7470A	571021
92497532039	**EQBL092920**	EPA 7470A	570591	EPA 7470A	571021
92497532001	**BGWA-2**	SM 2450C-2011	569431		
92497532002	**BGWA-29**	SM 2450C-2011	569431		
92497532003	**BGWC-8**	SM 2450C-2011	569431		
92497532004	**BGWA-6**	SM 2450C-2011	569431		
92497532005	**FBL092320**	SM 2450C-2011	570220		
92497532006	**BGWC-9**	SM 2450C-2011	569431		
92497532007	**BGWC-10**	SM 2450C-2011	569431		
92497532008	**BGWC-16**	SM 2450C-2011	569431		
92497532009	**BGWC-17**	SM 2450C-2011	569431		
92497532010	**BGWC-18**	SM 2450C-2011	569431		
92497532011	**BGWC-21**	SM 2450C-2011	569431		
92497532012	**BGWC-22**	SM 2450C-2011	569431		
92497532013	**BGWC-23**	SM 2450C-2011	569874		
92497532014	**DUP-1**	SM 2450C-2011	569874		
92497532015	**FBL092420**	SM 2450C-2011	569874		
92497532016	**BGWA-33**	SM 2450C-2011	570011		
92497532017	**BGWC-7**	SM 2450C-2011	570011		
92497532018	**BGWC-12**	SM 2450C-2011	570011		
92497532019	**BGWC-24**	SM 2450C-2011	570011		
92497532020	**BGWC-30**	SM 2450C-2011	570011		
92497532021	**BGWC-32**	SM 2450C-2011	570011		
92497532022	**BGWC-35D**	SM 2450C-2011	570011		
92497532023	**BGWC-37D**	SM 2450C-2011	570011		
92497532024	**DUP-2**	SM 2450C-2011	570011		
92497532025	**FBL092520**	SM 2450C-2011	570011		
92497532026	**EQBL092520**	SM 2450C-2011	570011		
92497532027	**BGWC-19**	SM 2450C-2011	570638		
92497532028	**BGWC-20**	SM 2450C-2011	570638		
92497532029	**BGWC-25**	SM 2450C-2011	570638		
92497532030	**BGWC-31**	SM 2450C-2011	570638		
92497532031	**BGWC-34D**	SM 2450C-2011	570638		
92497532032	**BGWC-36D**	SM 2450C-2011	570638		
92497532033	**DUP-3**	SM 2450C-2011	570638		
92497532034	**FBL092820**	SM 2450C-2011	570638		
92497532035	**EQBL092820**	SM 2450C-2011	570638		
92497532036	**BGWC-39**	SM 2450C-2011	570640		
92497532037	**BGWC-40**	SM 2450C-2011	570640		
92497532038	**FBL092920**	SM 2450C-2011	570640		
92497532039	**EQBL092920**	SM 2450C-2011	570640		
92497532001	**BGWA-2**	SM 2320B-2011	570520		

REPORT OF LABORATORY ANALYSIS

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Pace Analytical Services, LLC
110 Technology Parkway
Peachtree Corners, GA 30092
(770)734-4200

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: BOWEN AP
Pace Project No.: 92497532

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
92497532002	BGWA-29	SM 2320B-2011	570520		
92497532003	BGWC-8	SM 2320B-2011	571141		
92497532004	BGWA-6	SM 2320B-2011	571141		
92497532005	FBL092320	SM 2320B-2011	571141		
92497532006	BGWC-9	SM 2320B-2011	571141		
92497532007	BGWC-10	SM 2320B-2011	571141		
92497532008	BGWC-16	SM 2320B-2011	571141		
92497532009	BGWC-17	SM 2320B-2011	571141		
92497532010	BGWC-18	SM 2320B-2011	571141		
92497532011	BGWC-21	SM 2320B-2011	571141		
92497532012	BGWC-22	SM 2320B-2011	571141		
92497532013	BGWC-23	SM 2320B-2011	571141		
92497532014	DUP-1	SM 2320B-2011	571141		
92497532015	FBL092420	SM 2320B-2011	571141		
92497532016	BGWA-33	SM 2320B-2011	571141		
92497532017	BGWC-7	SM 2320B-2011	571141		
92497532018	BGWC-12	SM 2320B-2011	571506		
92497532019	BGWC-24	SM 2320B-2011	571141		
92497532020	BGWC-30	SM 2320B-2011	571141		
92497532021	BGWC-32	SM 2320B-2011	571141		
92497532022	BGWC-35D	SM 2320B-2011	571506		
92497532023	BGWC-37D	SM 2320B-2011	571506		
92497532024	DUP-2	SM 2320B-2011	571506		
92497532025	FBL092520	SM 2320B-2011	571506		
92497532026	EQBL092520	SM 2320B-2011	571506		
92497532027	BGWC-19	SM 2320B-2011	571506		
92497532028	BGWC-20	SM 2320B-2011	571506		
92497532029	BGWC-25	SM 2320B-2011	571506		
92497532030	BGWC-31	SM 2320B-2011	571506		
92497532031	BGWC-34D	SM 2320B-2011	571506		
92497532032	BGWC-36D	SM 2320B-2011	571506		
92497532033	DUP-3	SM 2320B-2011	571506		
92497532034	FBL092820	SM 2320B-2011	571506		
92497532035	EQBL092820	SM 2320B-2011	571506		
92497532036	BGWC-39	SM 2320B-2011	571655		
92497532037	BGWC-40	SM 2320B-2011	571655		
92497532038	FBL092920	SM 2320B-2011	571655		
92497532039	EQBL092920	SM 2320B-2011	571655		
92497532001	BGWA-2	SM 4500-S2D-2011	569576		
92497532002	BGWA-29	SM 4500-S2D-2011	569576		
92497532003	BGWC-8	SM 4500-S2D-2011	569576		
92497532004	BGWA-6	SM 4500-S2D-2011	569576		
92497532005	FBL092320	SM 4500-S2D-2011	569578		
92497532006	BGWC-9	SM 4500-S2D-2011	569578		
92497532007	BGWC-10	SM 4500-S2D-2011	569578		

REPORT OF LABORATORY ANALYSIS

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110 Technology Parkway
Peachtree Corners, GA 30092
(770)734-4200

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: BOWEN AP
Pace Project No.: 92497532

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
92497532008	**BGWC-16**	SM 4500-S2D-2011	569578		
92497532009	**BGWC-17**	SM 4500-S2D-2011	569578		
92497532010	**BGWC-18**	SM 4500-S2D-2011	569578		
92497532011	**BGWC-21**	SM 4500-S2D-2011	569578		
92497532012	**BGWC-22**	SM 4500-S2D-2011	569578		
92497532013	**BGWC-23**	SM 4500-S2D-2011	569578		
92497532014	**DUP-1**	SM 4500-S2D-2011	569578		
92497532015	**FBL092420**	SM 4500-S2D-2011	569578		
92497532016	**BGWA-33**	SM 4500-S2D-2011	569578		
92497532017	**BGWC-7**	SM 4500-S2D-2011	569578		
92497532018	**BGWC-12**	SM 4500-S2D-2011	569578		
92497532019	**BGWC-24**	SM 4500-S2D-2011	569578		
92497532020	**BGWC-30**	SM 4500-S2D-2011	569578		
92497532021	**BGWC-32**	SM 4500-S2D-2011	569578		
92497532022	**BGWC-35D**	SM 4500-S2D-2011	569580		
92497532023	**BGWC-37D**	SM 4500-S2D-2011	569580		
92497532024	**DUP-2**	SM 4500-S2D-2011	569580		
92497532025	**FBL092520**	SM 4500-S2D-2011	569580		
92497532026	**EQBL092520**	SM 4500-S2D-2011	569580		
92497532027	**BGWC-19**	SM 4500-S2D-2011	570214		
92497532028	**BGWC-20**	SM 4500-S2D-2011	570214		
92497532029	**BGWC-25**	SM 4500-S2D-2011	570214		
92497532030	**BGWC-31**	SM 4500-S2D-2011	570214		
92497532031	**BGWC-34D**	SM 4500-S2D-2011	570214		
92497532032	**BGWC-36D**	SM 4500-S2D-2011	570214		
92497532033	**DUP-3**	SM 4500-S2D-2011	570214		
92497532034	**FBL092820**	SM 4500-S2D-2011	570214		
92497532035	**EQBL092820**	SM 4500-S2D-2011	570214		
92497532036	**BGWC-39**	SM 4500-S2D-2011	570216		
92497532037	**BGWC-40**	SM 4500-S2D-2011	570216		
92497532038	**FBL092920**	SM 4500-S2D-2011	570216		
92497532039	**EQBL092920**	SM 4500-S2D-2011	570216		
92497532001	**BGWA-2**	EPA 300.0 Rev 2.1 1993	569515		
92497532002	**BGWA-29**	EPA 300.0 Rev 2.1 1993	569515		
92497532003	**BGWC-8**	EPA 300.0 Rev 2.1 1993	569515		
92497532004	**BGWA-6**	EPA 300.0 Rev 2.1 1993	569515		
92497532005	**FBL092320**	EPA 300.0 Rev 2.1 1993	569515		
92497532006	**BGWC-9**	EPA 300.0 Rev 2.1 1993	569515		
92497532007	**BGWC-10**	EPA 300.0 Rev 2.1 1993	569515		
92497532008	**BGWC-16**	EPA 300.0 Rev 2.1 1993	569515		
92497532009	**BGWC-17**	EPA 300.0 Rev 2.1 1993	569516		
92497532010	**BGWC-18**	EPA 300.0 Rev 2.1 1993	569516		
92497532011	**BGWC-21**	EPA 300.0 Rev 2.1 1993	569516		
92497532012	**BGWC-22**	EPA 300.0 Rev 2.1 1993	569516		
92497532013	**BGWC-23**	EPA 300.0 Rev 2.1 1993	569516		
92497532014	**DUP-1**	EPA 300.0 Rev 2.1 1993	569516		

REPORT OF LABORATORY ANALYSIS

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Pace Analytical Services, LLC
110 Technology Parkway
Peachtree Corners, GA 30092
(770)734-4200

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: BOWEN AP
Pace Project No.: 92497532

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
92497532015	**FBL092420**	EPA 300.0 Rev 2.1 1993	569516		
92497532016	**BGWA-33**	EPA 300.0 Rev 2.1 1993	569577		
92497532017	**BGWC-7**	EPA 300.0 Rev 2.1 1993	569577		
92497532018	**BGWC-12**	EPA 300.0 Rev 2.1 1993	569577		
92497532019	**BGWC-24**	EPA 300.0 Rev 2.1 1993	569577		
92497532020	**BGWC-30**	EPA 300.0 Rev 2.1 1993	569577		
92497532021	**BGWC-32**	EPA 300.0 Rev 2.1 1993	569577		
92497532022	**BGWC-35D**	EPA 300.0 Rev 2.1 1993	569577		
92497532023	**BGWC-37D**	EPA 300.0 Rev 2.1 1993	569577		
92497532024	**DUP-2**	EPA 300.0 Rev 2.1 1993	569577		
92497532025	**FBL092520**	EPA 300.0 Rev 2.1 1993	569577		
92497532026	**EQBL092520**	EPA 300.0 Rev 2.1 1993	569577		
92497532027	**BGWC-19**	EPA 300.0 Rev 2.1 1993	570137		
92497532028	**BGWC-20**	EPA 300.0 Rev 2.1 1993	570137		
92497532029	**BGWC-25**	EPA 300.0 Rev 2.1 1993	570137		
92497532030	**BGWC-31**	EPA 300.0 Rev 2.1 1993	570137		
92497532031	**BGWC-34D**	EPA 300.0 Rev 2.1 1993	570137		
92497532032	**BGWC-36D**	EPA 300.0 Rev 2.1 1993	570137		
92497532033	**DUP-3**	EPA 300.0 Rev 2.1 1993	570217		
92497532034	**FBL092820**	EPA 300.0 Rev 2.1 1993	570217		
92497532035	**EQBL092820**	EPA 300.0 Rev 2.1 1993	570217		
92497532036	**BGWC-39**	EPA 300.0 Rev 2.1 1993	570217		
92497532037	**BGWC-40**	EPA 300.0 Rev 2.1 1993	570217		
92497532038	**FBL092920**	EPA 300.0 Rev 2.1 1993	570217		
92497532039	**EQBL092920**	EPA 300.0 Rev 2.1 1993	570217		

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Sample Condition Upon Receipt

Pace Analytical

Client Name: GA Power

WO#: 92497532

92497532

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☑ Pace Oth

Tracking #: _____

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

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☐ None ☑ Other ziploc

Thermometer Used THR230 Type of Ice: ~~Wet~~ Blue None ☐ Samples on ice, cooling process has begun

Cooler Temperature 2.2 Biological Tissue is Frozen: Yes No

Temp should be above freezing to 6°C

Date and Initials of person examining contents: KDW 9/25/20

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

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

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

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

Pace Analytical

Document Name: Bottle Identification Form (BIF)	Document Issued: March 14, 2019 Page 1 of 1
Document No.: F-CAR-CS-043-Rev.00	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.
Exceptions: VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC, LLHg
**Bottom half of box is to list number of bottle

Project # **WO# : 92497532**

PM: KLH1 Due Date: 10/09/20

CLIENT: GA-GA Power

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)	BPIN - Radium	BP3A-250 mL Plastic (NH2)2SO4 (pH 3-9.7)	AG0U-100 mL Amber Unpreserved vials (N/A)	VSGU-20 mL Scintillation vials (N/A)
	1		2	—			—	—																	2		
	2		2	—			—	—																	2		
	3		2	—			—	—																	2		
	4		2	—																					2		
	5		2	1																							
	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

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certificatio
Out of hold, incorrect preservative, out of temp, incorrect containers.

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: 1 of 3

Section A — Required Client Information:

Company:	GA Power
Address:	Atlanta, GA
Email To:	SCS Contacts
Phone:	Fax:
Requested Due Date/TAT:	

Section B — Required Project Information:

Report To:	SCS Contacts
Copy To:	Geosyntec Contacts
Purchase Order No.:	
Project Name:	Plant Bowen AP
Project Number:	

Section C — Invoice Information:

Attention:	Southern Co.
Company Name:	
Address:	
Pace Quote Reference:	
Pace Project Manager:	Kevin Herring
Pace Profile #:	

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☑ OTHER CCR

Site Location STATE: GA

Section D — Required Client Information

Valid Matrix Codes

MATRIX	CODE
DRINKING WATER	DW
WATER	WT
WASTE WATER	WW
PRODUCT	P
SOIL/SOLID	SL
OIL	OL
WIPE	WP
AIR	AR
OTHER	OT
TISSUE	TS

ITEM #	SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED DATE	COLLECTED TIME	COMPOSITE DATE	COMPOSITE TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Requested Analysis Filtered (Y/N) Y/N	Analysis Test: Chloride/ Flouride/ Sulfate	Metals 6020	Alkalinity & BiCarb	Sulfide	TDS	RAD 93159320	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D. 92492532
1	BGWA-2			9/22/20	1326				4	3		3		1					X	X	X	X	X	X		7.32
2	BGWA-29			9/22/20	1204				4	3		3		1					X	X	X	X	X	X		8.08
3	~~BGWA-39~~																		X	X	X	X	X	X		
4	~~BGWC-7~~																		X	X	X	X	X	X		
5	BGWC-8			9/23/20	1600				4	3		3		1					X	X	X	X	X	X		7.67
6	~~BGWC-9~~																		X	X	X	X	X	X		
7	~~BGWC-10~~																		X	X	X	X	X	X		
8	~~BGWC-12~~																		X	X	X	X	X	X		
9	~~BGWC-16~~																		X	X	X	X	X	X		
10	~~BGWC-17~~																		X	X	X	X	X	X		
11	~~BGWC-18~~																		X	X	X	X	X	X		
12	~~BGWC-19~~																		X	X	X	X	X	X		

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
	[signature]			[signature] Pace	9/25/20	920
*Metals= App. III and IV + Mg,Mn,K,Na,Fe				[signature]	9/25/20	1233

SAMPLE CONDITIONS			
Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
2.2	Y	N	Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Kevin Stephenson / Will Laaker / Veronica Fay / Joe Booth

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 9/23/20

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: 2 of 3

Section A Required Client Information:

Company:	GA Power
Address:	Atlanta, GA
Email To:	SCS Contacts
Phone:	Fax:
Requested Due Date/TAT:	

Section B Required Project Information:

Report To:	SCS Contacts
Copy To:	Geosyntec Contacts
Purchase Order No.:	
Project Name:	Plant Bowen AP
Project Number:	

Section C Invoice Information:

Attention:	Southern Co.
Company Name:	
Address:	
Pace Quote Reference:	
Pace Project Manager:	Kevin Herring
Pace Profile #:	

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☑ OTHER CCR

Site Location STATE: GA

Section D Required Client Information

Valid Matrix Codes

MATRIX	CODE
DRINKING WATER	DW
WATER	WT
WASTE WATER	WW
PRODUCT	P
SOIL	SL
OIL	OL
WIPE	WP
AIR	AR
OTHER	OT
TISSUE	TS

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED DATE	COLLECTED TIME	COMPOSITE DATE	COMPOSITE TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Chloride/ Flouride/ Sulfate	Metals 6020	Alkalinity & BiCarb	Sulfide	TDS	RAD 9315/9320	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	BGWC-20																		X	X	X	X	X	X		
2	BGWC-21																		X	X	X	X	X	X		
3	BGWC-22																		X	X	X	X	X	X		
4	BGWC-23																		X	X	X	X	X	X		
5	BGWC-24																		X	X	X	X	X	X		
6	BGWC-25																		X	X	X	X	X	X		
7	BGWC-30																		X	X	X	X	X	X		
8	BGWA-6			9/23/20	1634				7	3		3		1					X	X	X	X	X	X		7.36
9	BGWC-31																		X	X	X	X	X	X		
10	BGWC-32																		X	X	X	X	X	X		
11	BGWC-34D																		X	X	X	X	X	X		
12	BGWC-35D																		X	X	X	X	X	X		

G2047532

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
	Kevin Stephenson			Ryan Mix / Pace	9/25/20	920				
				L. Wellington/Pace	9/25/20	1233	22	Y	N	Y
*Metals= App. III and IV + Mg,Mn,K,Na,Fe										

SAMPLER NAME AND SIGNATURE					
PRINT Name of SAMPLER:	Kevin Stephenson / Will Laaker / Veronica Fay / Joe Booth		Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
SIGNATURE of SAMPLER:	DATE Signed (MM/DD/YY): 9/23/20					

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: 3 of 3

Section A Required Client Information:

Company:	GA Power
Address:	Atlanta, GA
Email To:	SCS Contacts
Phone:	Fax:
Requested Due Date/TAT:	

Section B Required Project Information:

Report To:	SCS Contacts
Copy To:	Geosyntec Contacts
Purchase Order No.:	
Project Name:	Plant Bowen AP
Project Number:	

Section C Invoice Information:

Attention:	Southern Co.
Company Name:	
Address:	
Pace Quote Reference:	
Pace Project Manager:	Kevin Herring
Pace Profile #:	

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☑ OTHER CCR

Site Location STATE: GA

Section D Required Client Information

Valid Matrix Codes

MATRIX	CODE
DRINKING WATER	DW
WATER	WT
WASTE WATER	WW
PRODUCT	P
SOIL/SOLID	SL
OIL	OL
WIPE	WP
AIR	AR
OTHER	OT
TISSUE	TS

ITEM #	SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED DATE	COLLECTED TIME	COMPOSITE DATE	COMPOSITE TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Requested Analysis Filtered (Y/N) Y/N	Analysis Test: Chloride/ Flouride/ Sulfate	Metals 6020	Alkalinity & BiCarb	Sulfide	TDS	RAD 9315/9320	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	BGWC-36D																		X	X	X	X	X	X		
2	BGWC-37D																		X	X	X	X	X	X		
3	BGWC-39																		X	X	X	X	X	X		
4	BGWC-40																		X	X	X	X	X	X		
5	-DUP-																		X	X	X	X	X	X		
6	FBL092320			9/23/20	1650				7	3		3		1					X	X	X	X	X	X		42447532
7	FBL																		X	X	X	X	X	X		
8	EQBL																		X	X	X	X	X	X		
9																			X	X	X	X	X	X		
10																			X	X	X	X	X	X		
11																			X	X	X	X	X	X		
12																			X	X	X	X	X	X		

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
	Kevin Stephenson			F. Will Laaker / Pace	9/25/20	1283	22	Y	N	Y
*Metals= App. III and IV + Mg,Mn,K,Na,Fe							Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Kevin Stephenson / Will Laaker / Veronica Fay / Joe Booth

SIGNATURE of SAMPLER: DATE Signed (MM/DD/YY): 9/23/20

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Phone:	Fax:
Requested Due Date/TAT:	

Section B Required Project Information:

Report To:	SCS Contacts
Copy To:	Geosyntec Contacts
Purchase Order No.:	
Project Name:	Plant Bowen AP
Project Number:	

Section C Invoice Information:

Attention:	Southern Co.
Company Name:	
Address:	
Pace Quote Reference:	
Pace Project Manager:	Kevin Herring
Pace Profile #:	

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☑ OTHER CCR

Site Location STATE: GA

Section D Required Client Information

SAMPLE ID
(A-Z, 0-9 / ,-)
Sample IDs MUST BE UNIQUE

Valid Matrix Codes

MATRIX	CODE
DRINKING WATER	DW
WATER	WT
WASTE WATER	WW
PRODUCT	P
SOIL/SOLID	SL
OIL	OL
WIPE	WP
AIR	AR
OTHER	OT
TISSUE	TS

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED DATE	COLLECTED TIME	COMPOSITE DATE	COMPOSITE TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Chloride/ Fluoride/ Sulfate	Metals 6020	Alkalinity & BiCarb	Sulfide	TDS	RAD 9315/9320	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	BGWA-2																									
2	BGWA-29																									
3	BGWA-33																									
4	BGWC-7																									
5	BGWC-8																									
6	BGWC-9	WT	G	9/24/20	1028				7	3		3		1					X	X	X	X	X	X		pH 7.54
7	BGWC-10	WT	G	9/24/20	1604				7	3		3		1					X	X	X	X	X	X		pH 7.54
8	BGWC-12																		X	X	X	X	X	X		
9	BGWC-16	WT	G	9/24/20	1435				7	3		3		1					X	X	X	X	X	X		pH 6.66
10	BGWC-17	WT	G	9/24/20	1245				7	3		3		1					X	X	X	X	X	X		pH 7.20
11	BGWC-18	WT	G	9/24/20	1118				7	3		3		1					X	X	X	X	X	X		pH 7.05
12	BGWC-19																		X	X	X	X	X	X		

Residual Chlorine (Y/N): 4247532 — Pace Project No./ Lab I.D.

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
	Veronica Fay / Resolute			[illegible] / Pace	9/25/20	930				
				K. Williams / PACE	9/25/20	1233	2.9	Y	N	Y
*Metals= App. III and IV + Mg,Mn,K,Na,Fe										

SAMPLER NAME AND SIGNATURE				
PRINT Name of SAMPLER:	Kevin Stephenson / Will Lasker / Veronica Fay / Joe Booth			
SIGNATURE of SAMPLER:	[signature]	DATE Signed (MM/DD/YY):	9/24/20	

Temp in °C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

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Phone:	Fax:
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Report To:	SCS Contacts
Copy To:	Geosyntec Contacts
Purchase Order No.:	
Project Name:	Plant Bowen AP
Project Number:	

Section C Invoice Information:

Attention:	Southern Co.
Company Name:	
Address:	
Pace Quote Reference:	
Pace Project Manager:	Kevin Herring
Pace Profile #:	

REGULATORY AGENCY: ☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER ☐ UST ☐ RCRA ☑ OTHER CCR

Site Location STATE: GA

Section D Required Client Information

SAMPLE ID (A-Z, 0-9 / , -) Sample IDs MUST BE UNIQUE

Valid Matrix Codes

MATRIX	CODE
DRINKING WATER	DW
WATER	WT
WASTE WATER	WW
PRODUCT	P
SOIL/SOLID	SL
OIL	OL
WIPE	WP
AIR	AR
OTHER	OT
TISSUE	TS

Requested Analysis Filtered (Y/N)

Pace Project No./ Lab I.D. 92467532

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED DATE	COLLECTED TIME	COMPOSITE DATE	COMPOSITE TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Chloride/ Flouride/ Sulfate	Metals 6020	Alkalinity & BiCarb	Sulfide	TDS	RAD 9315/9320	Residual Chlorine (Y/N)	
1	~~BGWC-20~~																									
2	BGWC-21	WT	G	9/24/20	1541				7	3		3		1				X	X	X	X	X	X		pH 7.78
3	BGWC-22	WT	G	9/24/20	1412				7	3		3		1				X	X	X	X	X	X		pH 6.82
4	BGWC-23	WT	G	9/24/20	1237				7	3		3		1				X	X	X	X	X	X		pH 7.09
5	~~BGWC-24~~																	X	X	X	X	X	X		
6	~~BGWC-25~~																	X	X	X	X	X	X		
7	~~BGWC-30~~																	X	X	X	X	X	X		
8	~~BGWA-6~~																	X	X	X	X	X	X		
9	~~BGWC-31~~																	X	X	X	X	X	X		
10	~~BGWC-32~~	WT	G	9/24/20														X	X	X	X	X	X		
11	~~BGWC-34D~~																	X	X	X	X	X	X		
12	~~BGWC-35D~~																	X	X	X	X	X	X		

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS: Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
	Veronica Fay / Resolute			By Will / Pace	9/25/20	920				
				K. Wellington / Pace	9/25/20	1233	2.9	Y	N	Y
*Metals= App. III and IV + Mg,Mn,K,Na,Fe										

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Kevin Stephenson / Will Laaker / Veronica Fay / Joe Booth

SIGNATURE of SAMPLER: Veronica Fay DATE Signed (MM/DD/YY): 9124120

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

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Page: 3 of 3

Section A Required Client Information:

Company:	GA Power
Address:	Atlanta, GA
Email To:	SCS Contacts
Phone:	Fax:
Requested Due Date/TAT:	

Section B Required Project Information:

Report To:	SCS Contacts
Copy To:	Geosyntec Contacts
Purchase Order No.:	
Project Name:	Plant Bowen AP
Project Number:	

Section C Invoice Information:

Attention:	Southern Co.
Company Name:	
Address:	
Pace Quote Reference:	
Pace Project Manager:	Kevin Herring
Pace Profile #:	

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☑ OTHER CCR

Site Location STATE: GA

Section D Required Client Information

SAMPLE ID
(A-Z, 0-9 / ,-)
Sample IDs MUST BE UNIQUE

Valid Matrix Codes

MATRIX	CODE
DRINKING WATER	DW
WATER	WT
WASTE WATER	WW
PRODUCT	P
SOIL/SOLID	SL
OIL	OL
WIPE	WP
AIR	AR
OTHER	OT
TISSUE	TS

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED DATE	COLLECTED TIME	COMPOSITE DATE	COMPOSITE TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Chloride/ Flouride/ Sulfate	Metals 6020	Alkalinity & BiCarb	Sulfide	TDS	RAD 9315/9320	Residual Chlorine (Y/N)
1	~~BGWC-36D~~																		X	X	X	X	X	X	
2	~~BGWC-37D~~																		X	X	X	X	X	X	
3	~~BGWC-39~~																		X	X	X	X	X	X	
4	~~BGWC-40~~																		X	X	X	X	X	X	
5	DUP- 1	WT	G	9/24/20	—				7	3		3		1					X	X	X	X	X	X	
6	FBL 09242020	WT	G	9/24/20	1405				7	3		3		1					X	X	X	X	X	X	
7	FBL																		X	X	X	X	X	X	
8	EQBL																		X	X	X	X	X	X	
9																			X	X	X	X	X	X	
10																			X	X	X	X	X	X	
11																			X	X	X	X	X	X	
12																			X	X	X	X	X	X	

Requested Analysis Filtered (Y/N)

Pace Project No./ Lab I.D. 92467532

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
	Veronica Fay / Resolute			[illegible] / Pace	9/25/20	920				
*Metals= App. III and IV + Mg,Mn,K,Na,Fe				K. Wellington / Pace	9/25/20	1753	2.9	Y	N	Y

SAMPLER NAME AND SIGNATURE				
PRINT Name of SAMPLER:	Kevin Stephenson / Will Laaker / Veronica Fay / Joe Booth			
SIGNATURE of SAMPLER:	Veronica Fay	DATE Signed (MM/DD/YY):	9/24/20	

Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)

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Page: 1 of 3

Section A Required Client Information:

Company:	GA Power
Address:	Atlanta, GA
Email To:	SCS Contacts
Phone:	Fax:
Requested Due Date/TAT:	

Section B Required Project Information:

Report To:	SCS Contacts
Copy To:	Geosyntec Contacts
Purchase Order No.:	
Project Name:	Plant Bowen AP
Project Number:	

Section C Invoice Information:

Attention:	Southern Co.
Company Name:	
Address:	
Pace Quote Reference:	
Pace Project Manager:	Kevin Herring
Pace Profile #:	

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☑ OTHER CCR

Site Location STATE: GA

Section D Required Client Information

Valid Matrix Codes

MATRIX	CODE
DRINKING WATER	DW
WATER	WT
WASTE WATER	WW
PRODUCT	P
SOIL/SOLID	SL
OIL	OL
WIPE	WP
AIR	AR
OTHER	OT
TISSUE	TS

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED DATE	COLLECTED TIME	COMPOSITE DATE	COMPOSITE TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Chloride/ Flouride/ Sulfate	Metals 6020	Alkalinity & BiCarb	Sulfide	TDS	RAD 9315/9320	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D. 92497532
1	~~BGWA-2~~																		x	x	x	x	x	x		
2	~~BGWA-29~~								5			1							x	x	x	x	x	x		
3	BGWA-33			9/25/20	0844				~~7~~	3		~~3~~		1					x	x	x	x	x	x		7.62 016
4	BGWC-7			9/25/20	1122				7	3		3		1					x	x	x	x	x	x		7.01 017
5	~~BGWC-8~~																		x	x	x	x	x	x		
6	~~BGWC-9~~																		x	x	x	x	x	x		
7	~~BGWC-10~~																		x	x	x	x	x	x		
8	BGWC-12			9/25/20	1033				7	3		3		1					x	x	x	x	x	x		7.10 018
9	~~BGWC-16~~																		x	x	x	x	x	x		
10	~~BGWC-17~~																		x	x	x	x	x	x		
11	~~BGWC-18~~																		x	x	x	x	x	x		
12	~~BGWC-19~~																		x	x	x	x	x	x		

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS: Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
	Kevin Stephenson	9/25/20	1642	Charly Henry	9/25/20	1642				
				CA Pace	~~9/28/20~~ 9/25/20	1642	4.0	Y	N	Y
*Metals= App. III and IV + Mg,Mn,K,Na,Fe										

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Kevin Stephenson / Will Laaker / Veronica Fay / Joe Booth

SIGNATURE of SAMPLER: DATE Signed (MM/DD/YY):

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F-ALL-Q-020rev.07, 15-Feb-2007

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Copy To:	Geosyntec Contacts
Purchase Order No.:	
Project Name:	Plant Bowen AP
Project Number:	

Section C Invoice Information:

Attention:	Southern Co.
Company Name:	
Address:	
Pace Quote Reference:	
Pace Project Manager:	Kevin Herring
Pace Profile #:	

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☑ OTHER CCR

Site Location STATE: GA

Section D Required Client Information

SAMPLE ID
(A-Z, 0-9 / ,-)
Sample IDs MUST BE UNIQUE

Valid Matrix Codes

MATRIX	CODE
DRINKING WATER	DW
WATER	WT
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PRODUCT	P
SOIL/SOLID	SL
OIL	OL
WIPE	WP
AIR	AR
OTHER	OT
TISSUE	TS

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED DATE	COLLECTED TIME	COMPOSITE DATE	COMPOSITE TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Chloride/ Flouride/ Sulfate	Metals 6020	Alkalinity & BiCarb	Sulfide	TDS	RAD 9315/9320	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	~~BGWC-20~~																		X	X	X	X	X	X		
2	~~BGWC-21~~																		X	X	X	X	X	X		
3	~~BGWC-22~~																		X	X	X	X	X	X		
4	~~BGWC-23~~																		X	X	X	X	X	X		
5	BGWC-24			9/25/20	1325				7	3		3		1					X	X	X	X	X	X		6.56 016
6	~~BGWC-25~~																		X	X	X	X	X	X		
7	BGWC-30			9/24/20	1310				7	3		3		1					X	X	X	X	X	X		7.34 020
8	~~BGWA-6~~																		X	X	X	X	X	X		
9	~~BGWC-34~~																		X	X	X	X	X	X		
10	BGWC-32			9/24/20	1246				7	3		3		1					X	X	X	X	X	X		6.82 021
11	~~BGWC-34D~~																		X	X	X	X	X	X		
12	BGWC-35D			9/24/20	1021				7	3		3		1					X	X	X	X	X	X		7.03 022

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
	Kevin Stephenson	9/24/20	1642	Charles Hunter	9/25/20	1642				
*Metals= App. III and IV + Mg,Mn,K,Na,Fe				Pace	9/25/20	1642	4.0	Y	N	Y
							Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Kevin Stephenson / Will Laaker / Veronica Fay / Joe Booth

SIGNATURE of SAMPLER: DATE Signed (MM/DD/YY):

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F-ALL-Q-020rev.07, 15-Feb-2007

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Report To:	SCS Contacts
Copy To:	Geosyntec Contacts
Purchase Order No.:	
Project Name:	Plant Bowen AP
Project Number:	

Section C Invoice Information:

Attention:	Southern Co.
Company Name:	
Address:	
Pace Quote Reference:	
Pace Project Manager:	Kevin Herring
Pace Profile #:	

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☑ OTHER CCR

Site Location STATE: GA

Section D Required Client Information

Valid Matrix Codes

MATRIX	CODE
DRINKING WATER	DW
WATER	WT
WASTE WATER	WW
PRODUCT	P
SOIL/SOLID	SL
OIL	OL
WIPE	WP
AIR	AR
OTHER	OT
TISSUE	TS

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED DATE	COLLECTED TIME	COMPOSITE DATE	COMPOSITE TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test (Y/N)	Chloride/ Flouride/ Sulfate	Metals 6020	Alkalinity & BiCarb	Sulfide	TDS	RAD 9315/9320	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	~~BGWC-36D~~																		X	X	X	X	X	X		
2	~~BGWC-37D~~			9/25/20	1205				7	3		3		1					X	X	X	X	X	X		7.25 023
3	~~BGWC-38~~																		X	X	X	X	X	X		
4	~~BGWC-40~~																		X	X	X	X	X	X		
5	DUP-2			9/25/20	—				7	3		3		1					X	X	X	X	X	X		024
6	FBL092520			9/25/20	1346				7	3		3		1					X	X	X	X	X	X		025
7	~~FBL~~																		X	X	X	X	X	X		
8	EQBL092520			9/25/20	1352				7	3		3		1					X	X	X	X	X	X		026
9																			X	X	X	X	X	X		
10																			X	X	X	X	X	X		
11																			X	X	X	X	X	X		
12																			X	X	X	X	X	X		

92497532

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS: Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
	Kevin Stephenson	9/25/20	1642	Charles Hawk	9/25/20	1642				
*Metals= App. III and IV + Mg,Mn,K,Na,Fe				[illegible]	9/25/20	1642	4.0	Y	N	Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Kevin Stephenson / Will Laaker / Veronica Fay / Joe Booth

SIGNATURE of SAMPLER: DATE Signed (MM/DD/YY):

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F-ALL-Q-020rev.07, 15-Feb-2007

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Page: 1 of 3

Section A Required Client Information:	Section B Required Project Information:	Section C Invoice Information:
Company: GA Power	Report To: SCS Contacts	Attention: Southern Co.
Address: Atlanta, GA	Copy To: Geosyntec Contacts	Company Name:
		Address:
Email To: SCS Contacts	Purchase Order No.:	Pace Quote Reference:
Phone: Fax:	Project Name: Plant Bowen AP	Pace Project Manager: Kevin Herring
Requested Due Date/TAT:	Project Number:	Pace Profile #:

REGULATORY AGENCY: ☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER ☐ UST ☐ RCRA ☑ OTHER CCR

Site Location STATE: GA

Section D Required Client Information

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Valid Matrix Codes: MATRIX / CODE — DRINKING WATER DW; WATER WT; WASTE WATER WW; PRODUCT P; SOIL/SOLID SL; OIL OL; WIPE WP; AIR AR; OTHER OT; TISSUE TS

ITEM #	SAMPLE ID	MATRIX CODE (use valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED DATE	COLLECTED TIME	COMPOSITE DATE	COMPOSITE TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Y/N	Analysis Test: Chloride/ Flouride/ Sulfate	Metals 6020	Alkalinity & BiCarb	Sulfide	TDS	RAD 9315/9320	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	BGWA-2																		x	x	x	x	x	x		
2	BGWA-29																		x	x	x	x	x	x		
3	BGWA-33	WT	G	9/28/20	1402				2			2							X	X	X	X	X	X		7.02
4	BGWC-7																		x	x	x	x	x	x		
5	BGWC-8																		x	x	x	x	x	x		
6	BGWC-9																		x	x	x	x	x	x		
7	BGWC-10																		x	x	x	x	x	x		
8	BGWC-12																		x	x	x	x	x	x		
9	BGWC-16																		x	x	x	x	x	x		
10	BGWC-17																		x	x	x	x	x	x		
11	BGWC-18							C											x	x	x	x	x	x		
12	BGWC-19	WT	G	9/28/20	1015				7	3		3		1					x	x	x	x	x	x		6.45 027

92467532 Pace Project No./ Lab I.D.

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
	Kevin Stephenson	9/28	5:00	Cindy Mardis	9/28	5:00				
	Cindy Mardis	9/29	10:35	Lynn Williams	9/29/20	10:35				
*Metals= App. III and IV + Mg,Mn,K,Na,Fe	Lynn Williams / Pace	9/29/20	11:30	Pace	9/29/20	1130	4.9	Y	N	X
							Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Kevin Stephenson / Will Laaker / Veronica Fay / Joe Booth

SIGNATURE of SAMPLER: DATE Signed (MM/DD/YY):

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Page: 2 of 3

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Company: GA Power	Report To: SCS Contacts	Attention: Southern Co.
Address: Atlanta, GA	Copy To: Geosyntec Contacts	Company Name:
		Address:
Email To: SCS Contacts	Purchase Order No.:	Pace Quote Reference:
Phone: Fax	Project Name: Plant Bowen AP	Pace Project Manager: Kevin Herring
Requested Due Date/TAT:	Project Number:	Pace Profile #:

REGULATORY AGENCY: ☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER ☐ UST ☐ RCRA ☑ OTHER CCR

Site Location STATE: GA

Section D Required Client Information

Valid Matrix Codes

MATRIX	CODE
DRINKING WATER	DW
WATER	WT
WASTE WATER	WW
PRODUCT	P
SOIL/SOLID	SL
OIL	OL
WIPE	WP
AIR	AR
OTHER	OT
TISSUE	TS

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED DATE	COLLECTED TIME	COMPOSITE DATE	COMPOSITE TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Chloride/ Flouride/ Sulfate	Metals 6020	Alkalinity & BiCarb	Sulfide	TDS	RAD 9315/9320	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	BGWC-20	WT	G	9/26/12	1359				7	3		3		1					X	X	X	X	X	X		7.26 628
2	BGWC-21																		X	X	X	X	X	X		
3	BGWC-22																		X	X	X	X	X	X		
4	BGWC-23																		X	X	X	X	X	X		
5	BGWC-24																		X	X	X	X	X	X		
6	BGWC-25	WT	G	9/26/12	1505				7	3		3		1					X	X	X	X	X	X		7.55 025
7	BGWC-30																		X	X	X	X	X	X		
8	BGWA-6																		X	X	X	X	X	X		
9	BGWC-31	WT	G	9/26/12	1445				7	3		3		1					X	X	X	X	X	X		7.32 030
10	BGWC-32																		X	X	X	X	X	X		
11	BGWC-34D	WT	G	9/26/12	1345				7	3		3		1					X	X	X	X	X	X		7.24 031
12	BGWC-35D																		X	X	X	X	X	X		

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
	Kevin Stephenson	9/28	5:00	Cindy Mardis	9/28	5:00				
	Cindy Mardis	9/29	10:35	Ryan Williams	9/29/12	1035				
*Metals= App. III and IV + Mg,Mn,K,Na,Fe	Ryan Williams / Pace	9/29/12	11:30	Pace	9/29/12	1130	4.9	Y	N	Y
							Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Kevin Stephenson / Will Laaker / Veronica Fay / Joe Booth

SIGNATURE of SAMPLER: DATE Signed (MM/DD/YY):

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

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Page: 3 of 3

Section A Required Client Information:

Company:	GA Power
Address:	Atlanta, GA
Email To:	SCS Contacts
Phone:	Fax:
Requested Due Date/TAT:	

Section B Required Project Information:

Report To:	SCS Contacts
Copy To:	Geosyntec Contacts
Purchase Order No.:	
Project Name:	Plant Bowen AP
Project Number:	

Section C Invoice Information:

Attention:	Southern Co.
Company Name:	
Address:	
Pace Quote Reference:	
Pace Project Manager:	Kevin Herring
Pace Profile #:	

REGULATORY AGENCY: ☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER ☐ UST ☐ RCRA ☑ OTHER CCR

Site Location STATE: GA

Section D Required Client Information

SAMPLE ID (A-Z, 0-9 / , -) Sample IDs MUST BE UNIQUE

Valid Matrix Codes: DRINKING WATER DW; WATER WT; WASTE WATER WW; PRODUCT P; SOIL/SOLID SL; OIL OL; WIPE WP; AIR AR; OTHER OT; TISSUE TS

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED DATE	COLLECTED TIME	COMPOSITE DATE	COMPOSITE TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Chloride/ Flouride/ Sulfate	Metals 6020	Alkalinity & BiCarb	Sulfide	TDS	RAD 9315/9320	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	BGWC-36D	WT	G	9/28/20	1112				7	3		3		1					X	X	X	X	X	X		92447532
2	~~BGWC-37D~~																									032
3	~~BGWC-39~~																									
4	~~BGWC-40~~																									
5	DUP- 3	WT	G	9/28/20	—				7	3		3		1					X	X	X	X	X	X		033
6	FBLC92820	WT	G	9/28/20	1514				7	3		3		1					X	X	X	X	X	X		034
7	~~FBL~~																									
8	EQBLC92820	WT	G	9/28/20	1520				7	3		3		1					X	X	X	X	X	X		035
9																										
10																										
11																			X	X	X	X	X	X		
12																			X	X	X	X	X	X		

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
	Kevin Stephenson	9/28	5:00	Cindy Mardis	9/28	5:00				
	Cindy Mardis	9/29	10:55	Ryan Williams	9/29/20	10:35				
*Metals= App. III and IV + Mg,Mn,K,Na,Fe	Ryan Williams/Pace	9/29/20	11:30	Pace	9/30/20	1130	4.9	Y	N	Y
							Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Kevin Stephenson / Will Laaker / Veronica Fay / Joe Booth

SIGNATURE of SAMPLER: DATE Signed (MM/DD/YY):

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

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Page: 3 of 3

Section A Required Client Information:
Company: GA Power
Address: Atlanta, GA
Email To: SCS Contacts
Phone: Fax:
Requested Due Date/TAT:

Section B Required Project Information:
Report To: SCS Contacts
Copy To: Geosyntec Contacts
Purchase Order No.:
Project Name: Plant Bowen AP
Project Number:

Section C Invoice Information:
Attention: Southern Co.
Company Name:
Address:
Pace Quote Reference:
Pace Project Manager: Kevin Herring
Pace Profile #:

REGULATORY AGENCY
☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☑ OTHER CCR
Site Location STATE: GA

Requested Analysis Filtered (Y/N)

ITEM #	Section D Required Client Information — SAMPLE ID (A-Z, 0-9 / , -) Sample IDs MUST BE UNIQUE	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED DATE	COLLECTED TIME	COMPOSITE DATE	COMPOSITE TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N: Chloride/ Fluoride/ Sulfate	Metals 6020	Alkalinity & BiCarb	Sulfide	TDS	RAD 9315/9320	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
	Valid Matrix Codes: MATRIX / CODE — DRINKING WATER DW; WATER WT; WASTE WATER WW; PRODUCT P; SOIL/SOLID SL; OIL OL; WIPE WP; AIR AR; OTHER OT; TISSUE TS																								92467532
1	~~BGWC-36D~~																	x	x	x	x	x	x		
2	~~BGWC-37D~~																	x	x	x	x	x	x		
3	BGWC-39	WT	G	9/29/20	1017				7	3		3	1					x	x	x	x	x	x		pH: 6.73 026
4	BGWC-40	WT	G	9/29/20	1114				7	3		3	1					x	x	x	x	x	x		pH: 7.15 027
5	~~DUP~~																	x	x	x	x	x	x		
6	FBL092920	WT	G	9/29/20	1200				7	3		3	1					x	x	x	x	x	x		028
7	~~FBL~~																	x	x	x	x	x	x		
8	EQBL 092920	WT	G	9/29/20	1208				7	3		3	1					x	x	x	x	x	x		029
9																		x	x	x	x	x	x		
10																		x	x	x	x	x	x		
11																		x	x	x	x	x	x		
12																		x	x	x	x	x	x		

ADDITIONAL COMMENTS

= App. III and IV + Mg,Mn,K,Na,Fe

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
Will Laaker / Resolute	9/29	5:00	Cindy Mardis	9/29	5:00	
Cindy Mardis	9/30	10:23	Pace	9130	1023	

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Kevin Stephenson / Will Laaker / Veronica Fay / Joe Booth

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 9/29/20

Temp in °C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

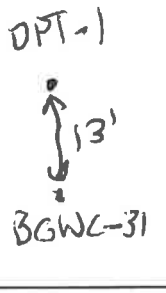
APPENDIX C

DPT Boring Logs

Geosyntec consultants

BORING LOG

BOREHOLE LOCATION MAP



BORING NO.: 1 PROJECT NO.: GW6581C PAGE 1 OF 1

SITE: Plant Bowen DATE: 8/13/2020

TOOLS AND METHOD: DPT BIT DIA: 2

TOTAL DEPTH: 15 GROUNDWATER DEPTH: N/A

DRILLING COMPANY: Cascade RIG: Geoprobe 7822DT

DRILLERS: David Ferrell, Jason Esquire LOGGERS: Chad Bush

LITHOLOGY LOG	GRAPHIC LOG	SAMPLE ID AND DEPTH	SPT BLOW COUNT	DRILLING LOG
0'-9' no sample				
12 ~~9~~'-15' CLAY with ~~coo~~ sand reddish yellow [7.5 YR 6/6]				run 12 ~~9~~'-15' refusal at 15'
				end of hole

DPT-1; 12'-15'; 1410

DPT-1A; 10'-15'; 1425

DPT-1B; 5'-10'; 1435

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BORING LOG

BORING NO.: 2 PROJECT NO: 6065IC PAGE 1 OF 1

SITE: Plant Bowen DATE: 8/13/2020

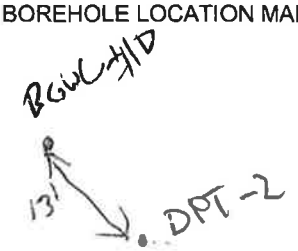
TOOLS AND METHOD: DPT BIT DIA: 2"

TOTAL DEPTH: 17 GROUNDWATER DEPTH: N/A

DRILLING COMPANY: Cascade RIG: geoprobe 7822DT

DRILLERS: David Ferrel, Juan Esquive LOGGERS: Chad Russo

BOREHOLE LOCATION MAP



LITHOLOGY LOG	GRAPHIC LOG	SAMPLE ID AND DEPTH	SPT BLOW COUNT	DRILLING LOG
NO SAMPLE				run ~~0' - 15'~~
10'-15' CLAY reddish yellow [7.5YR 7/8] L				run 10'-15' ~4' recovery
				run 15'-17' sample stretched to 4'
DPT-2; 10'-17'; 1120; 1 bag				End of hole
DPT-2A; 10'-15'; 1128				
DPT-2A; 15'-17'; 1130				
DPT-3B; 10'-15'; 1139				
DPT-3B; 16'-17'; 1140				

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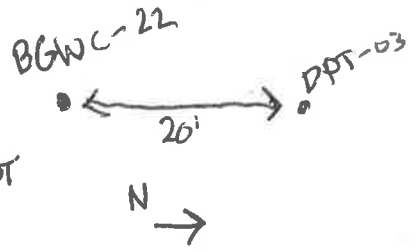
BORING LOG

BOREHOLE LOCATION MAP



BORING NO.: 3 PROJECT NO.: GW6581C PAGE 1 OF 1

SITE: Plant Bowen DATE: 8/13/2020

TOOLS AND METHOD: DPT BIT DIA: 2"

TOTAL DEPTH: 22' GROUNDWATER DEPTH: N/A

DRILLING COMPANY: Cascade RIG: geoprobe 7822DT

DRILLERS: ~~Cascade Daniel~~ David Ferrel Johnesquire LOGGERS: Chad Russo

LITHOLOGY LOG	GRAPHIC LOG	SAMPLE ID AND DEPTH	SPT BLOW COUNT	DRILLING LOG
0'-12' no sample				
12'-15' CLAY reddish yellow [7.5YR 6/8]				run 12'-15' Sample stretched to 5'
				run 15'-19'
				run 19'-22'
				22' end of hole

DPT-03 1000
12'-22'
2 bags

DPT-03A 1005
12'-15'

DPT-03A 1008
15'-19'

DPT-03A 1012
19'-22'

DPT-03B 1025
12'-15'

DPT-03B 1026
15'-19'

DPT-03B 1028
19'-22'

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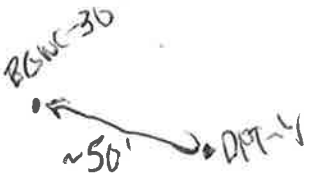
BORING LOG

BOREHOLE LOCATION MAP



BORING NO.: 4 PROJECT NO.: GW6581C PAGE 1 OF 1

SITE: Plant Bowen DATE: 8/13/2020 - 8/14/2020

TOOLS AND METHOD: DPT BIT DIA: 2

TOTAL DEPTH: 35' GROUNDWATER DEPTH: ~~2022, 15'~~ N/A

DRILLING COMPANY: Cascade RIG: geoprobe 2022DT

DRILLERS: ~~David Parrett~~ David Ferrel, John Esquire LOGGERS: Chad Russo

LITHOLOGY LOG	GRAPHIC LOG	SAMPLE ID AND DEPTH	SPT BLOW COUNT	DRILLING LOG
0'-25' no sample				
25'-35' CLAY reddish yellow [7.5YR 7/8]				run 25'-30' run 30'-35' end of hole

DPT-4; 25'-35'; 1650; 8/13/2020
3 bags

DPT-4A; 25'-30'; 0855; 8/14/2020
DPT-4A; 30'-33'; 0859; 8/14/2020
~~DPT-4A; 33'- ; ; 8/14/2020~~
DPT-4B; 25'-30'; 0922; 8/14/2020
DPT-4B; 30'-34.5'; 0928; 8/14/2020

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BORING LOG

BORING NO.: 5 PROJECT NO.: GW0038L PAGE 1 OF 1

SITE: Plant Bowen DATE: 8/14/2020

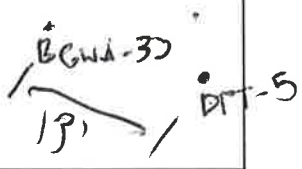
TOOLS AND METHOD: DPT BIT DIA: 2

TOTAL DEPTH: 52' GROUNDWATER DEPTH:

DRILLING COMPANY: Cascade RIG: Geoprobe 7822DT

DRILLERS: David Fagel, Juan Esquivel LOGGERS: Chad Russo

BOREHOLE LOCATION MAP



LITHOLOGY LOG	GRAPHIC LOG	SAMPLE ID AND DEPTH	SPT BLOW COUNT	DRILLING LOG
0'-42' no sample				
42'-52' CLAY reddish yellow [7.5YR 7/8]				run 42'-47' run ~~42'~~ 47'-52'
				end of hole

DPT-5; 42'-52'; 1130

DPT-5A; 42'-47'; 1242

DPT-5A; 47'-52'; 1247

DPT-5B; 42'-47'; 1415

DPT-5B; 47'-52'; 1422

APPENDIX D

SiREM Laboratory Sorption and Desorption and Site Material Characterization Report

Prepared for:

Geosyntec Consultants, Inc.
1255 Roberts Blvd, Suite 200
Kennesaw, Georgia 30144

FINAL

Laboratory Sorption and Desorption Treatability Study and Site Material Characterization

Bowen Ash Pond-1, Bartow County, Georgia

Prepared by:

130 Stone Rd W
Guelph, Ontario N1G 3Z2

SiREM Ref: GW6581C

27 January 2022

siremlab.com

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1. INTRODUCTION 1

2. MATERIALS AND METHODS 1

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2.2 Desorption Test Reactor Construction and Incubation 3

2.3 Sampling and Analysis 3

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2.3.2 Analysis of pH 3

2.3.3 Analysis of ORP 4

2.3.4 Analysis of Dissolved Metals at SGS Environmental 4

3. RESULTS 4

LIST OF TABLES

Table 1A: Summary of Sorption Test Reactors, Controls, Treatments, and Amendments
Table 1B: Summary of Desorption Test Reactors, Controls, Treatments, and Amendments

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Appendix A: Chain of Custody Documentation
Appendix B: Baseline Chemical Characterization Results
Appendix C: Baseline Mineralogical Results
Appendix D: Sequential Extraction Procedure Results
Appendix E: Summary of Sorption Test Dissolved Metals, ORP and pH Results
Appendix F: Summary of Desorption Test Dissolved Metals, ORP and pH Results
Appendix G: External Laboratory Reports

LIST OF ABBREVIATIONS

%	percent
°C	degrees Celsius
µg/g	micrograms per gram
µm	micrometers
AEC	anion exchange capacity
AP	Ash Pond
As	arsenic
CEC	cation exchange capacity
Co	cobalt
EDXA	energy dispersive X-ray analysis
g	grams
g/L	grams per liter
g/mL	grams per milliliter
Geosyntec	Geosyntec Consultants, Inc.
H_2	hydrogen
HDPE	high density polyethylene
ICP-MS	inductively coupled plasma-mass spectrometry
meq/100g	milliequivalents per 100 grams
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
min	minutes
mL	milliliter
Mo	molybdenum
mV	millivolts
ORP	oxidation-reduction potential
RPM	revolutions per minute
SEM	scanning electron microscopy
SEP	sequential extraction procedure
SGS	SGS Environmental
SiREM	SiREM Laboratory
TOC	total organic carbon
XRD	X-ray diffraction

1. INTRODUCTION

Geosyntec Consultants, Inc. (Geosyntec) retained SiREM Laboratory (SiREM) to perform a laboratory treatability study to assess the sorption and desorption behaviour of arsenic (As), cobalt (Co) and molybdenum (Mo) in groundwater and geologic materials from the Bowen Ash Pond (AP)-1 site in Bartow County, GA (the Site).

The geologic materials were collected by Geosyntec personnel on 13 and 14 August 2020 and were received by SiREM on 21 September 2020 and 1 June 2021. The groundwater labelled BGWA-2, which is groundwater from a background well, was collected by Geosyntec personnel on 26 May 2021 and was received by SiREM on 2 June 2021. Upon arrival at SiREM, geological material and groundwater were stored at 4 degrees Celsius (°C) until required for reactor construction. Geological material samples were submitted for baseline characterization prior to the sorption and desorption tests and locations for testing were selected based on the baseline characterization results. The chain of custodies received with these samples are provided in Appendix A.

The remainder of this report is divided into two sections. Section 2 presents the experimental materials and methods and Section 3 presents the results.

2. MATERIALS AND METHODS

The following sections describe the materials and methods used for geologic material baseline characterization (Section 2.1), sorption test reactor construction and incubation (Section 2.2), desorption test reactor construction and incubation (Section 2.3), and sorption and desorption test sampling and analysis (Section 2.4).

2.1 Site Geologic Material Baseline Characterization

Geologic material baseline characterization was completed through SiREMNA™ testing and included anion exchange capacity (AEC), cation exchange capacity (CEC), total sulfur, total sulfide, total organic carbon (TOC) content, total metals, X-ray diffraction (XRD), scanning electron microscopy (SEM) with energy dispersive X-ray analysis (EDXA) and a follow up sequential extraction procedure (SEP) on select aquifer solid samples.

On 24 September 2020 geologic material samples were individually homogenized and subsampled in a chemical fume hood. The samples were shipped to external laboratories for analysis as outlined in the summary table below. Prior to performing the XRD analysis, SGS Environmental (SGS) in Lakefield, ON performed whole rock analysis on the samples to have as a reference for the mineral identification by XRD.

On 15 and 18 June 2021 Geologic material samples received on 1 June 2021 were homogenized with the respective samples received on 21 September 2020. After homogenization, samples from the locations labelled DPT02_BAP1_081320_10-17 and DPT05_BAP_081420_42-52 were shipped to Test America for SEP analysis.

Parameter	Method	Laboratory
Total sulfur, total sulfide and TOC content	ASTM E1915-13	SGS, Lakefield, Ontario
Total metals	EPA 200.8	
Whole Rock Analysis	Borate Fusion and Xray Fluorescence Spectrometry	
XRD	Rietveld refinement method	
SEM and EDXA	SGS Internal method	
CEC	EPA method SW9081	SGS, Guelph, Ontario
AEC	Modified EPA method SW9081	Specialty Analytical, Clackamas, Oregon
Sequential extraction procedure	Methods SW846, 6010B and 3010A for SEP Steps 1-7	Eurofins TestAmerica, Knoxville, Tennessee

2.2 Sorption Test Reactor Construction and Incubation

One sample location of geological material was selected from the Bowen AP-1 Site to be tested for the sorption test. On 15 June 2021 the material from the DPT05 (42-52) location received on 21 September 2020 was homogenized by manually mixing with additional material received on 1 June 2021 for reproducibility between replicates. Reactors were constructed on 15 July 2021 by filling 250 milliliter (mL) (nominal volume) high density polyethylene (HDPE) Nalgene® bottles (Systems Plus, New Hamburg, ON) with 100 grams (g) of homogenized geologic material. Reactors were constructed in duplicate with an additional set of duplicate reactors constructed to be used for sampling at Time 0.

After adding geologic material to enough reactors to represent six testing concentration conditions on 15 July 2021, six separate volumes of BGWA-2 Site groundwater were spiked with As, Co and Mo to target the concentration levels for the sorption test as listed in Table 1A. For each concentration level, 700 mL of Site groundwater was spiked with As as a 3 gram per liter (g/L) sodium arsenate heptahydrate (Sigma-Aldrich, Oakville, ON) stock solution, Co as a 3 g/L cobalt chloride hexahydrate (Sigma-Aldrich, Oakville, ON) stock solution and Mo as a 2 g/L sodium molybdate dihydrate (Sigma-Aldrich, Oakville, ON) stock solution. Once the groundwater for each concentration level was spiked, the reactors containing geologic material were each amended with 150 mL of the appropriately spiked groundwater. Note that “target” spiked concentrations and “actual concentrations” (as determined by subsequent laboratory analyses) may not be exactly the same. However, the sorption calculations used the measured spiked concentrations and not the target concentrations.

After construction on 22 July 2021, 29 July 2021, 30 July 2021 and 3 August 2021, the reactors were placed on an end-over-end tumbler at room temperature and mixed for a period of 7 days. Table 1A summarizes the details of reactor construction, incubation, amendments, sampling schedule and parameters of the sorption test reactors.

2.3 Desorption Test Reactor Construction and Incubation

One sample location from Bowen AP-1 was selected to be tested for the desorption test. On 18 June 2021 the materials from the DPT02 (10-17) location received on 21 September 2020 were homogenized by manually mixing with additional materials received on 1 June 2021 for reproducibility between replicates. These materials were used to evaluate desorption of As, Co and Mo from aquifer materials collected in the vicinity of a As, Co and Mo-impacted well. Reactors were constructed by filling 250 mL (nominal volume) HDPE Nalgene® bottles (Systems Plus, New Hamburg, ON) with 100 g of geologic material and 150 mL of BGWA-2 Site groundwater.

Reactors were constructed in duplicate with an additional set of duplicate reactors constructed to be used for sampling at Time 0. One set of reactors were incubated at ambient conditions to evaluate desorption of As, Co and Mo. After construction on 8 September 2021 reactors were placed on an end-over-end tumbler at room temperature and continually mixed for 7 days.

Table 1B summarizes the reactor construction, incubation, amendments, sampling schedule and parameters of the desorption test reactors.

2.4 Sorption and Desorption Test Sampling and Analysis

2.4.1 Reactor Sampling

Aqueous samples were collected from the sorption test reactors at Time 0 and after 7 days of incubation. Aqueous samples from the spiked Site groundwater from each concentration level which had not been combined with Site geological material was also sampled at Time 0. Aqueous samples were collected from the desorption test reactors at time 0 and after 7 days of incubation. Both sorption and desorption test reactors and the groundwater sampled at baseline were sampled for analysis of pH, oxidation-reduction potential (ORP), and dissolved metals.

Prior to sampling, contents of the reactors were transferred to 250 mL centrifuge bottles and centrifuged for 5 minutes (min) at 5,000 revolutions per minute (RPM) to separate the solid and aqueous phases. Once separated, the supernatant was sampled using 30 mL HDPE plastic syringes (Fisher Scientific, Whitby, ON).

The sampling and analytical methods employed by SiREM and SGS are described in Sections 2.3.2 to 2.3.4.

2.4.2 Analysis of pH

The pH measurements were performed using an Oakton pH spear with a combination pH electrode (Oakton, Vernon Hills, IL). A 0.5 mL sample was collected and placed into a 1.5 mL micro-centrifuge tube. The pH was measured on the lab bench. The pH spear was calibrated at

each sampling event according to the manufacturer's instructions using pH 4.0, 7.0 and 10 standards.

2.4.3 Analysis of ORP

The ORP measurements performed using an Omega PHH-127 Multi-Parameter Water Quality Monitor with ORP Probe (Omega, Laval, QC). A 1.2 mL sample was collected and placed in a 5 mL Thermo-Fisher vial. The ORP was measured on the lab bench immediately after sampling. The ORP probe was tested at each sampling event according to the manufacturer's instructions using Zobell's solution.

2.4.4 Analysis of Dissolved Metals at SGS Environmental

Analysis of dissolved metals was completed at SGS Environmental (SGS) in Lakefield, ON using an inductively coupled plasma-mass spectrometer (ICP-MS) based on Standard Method 3030B, EPA Method 200.8 and NIOSH 7300 Issue 2.

A 30 mL sample was collected and filtered through a 0.45 micrometer (µm) nylon syringe filter (Mandel Scientific, Guelph, ON) into a 30 mL HDPE bottle with a nitric acid preservative. Once collected, the samples were packaged on ice in a cooler and shipped overnight to SGS.

3. RESULTS

Appendix B presents the results of the baseline chemical characterization, Appendix C presents the baseline mineralogical results and Appendix D present the SEP results. Appendices E and F present the results of the sorption and desorption tests respectively. The tables in Appendices E and F present results for dissolved metals, pH and ORP as well as the recorded masses of Site geological materials and Site groundwater amended to each respective reactor. AEC and CEC are presented in units of milliequivalents per 100 grams (meq/100g). Total sulfur, total sulfide, TOC, whole rock analysis, XRD are presented as a percentage of the total weight of the geologic material. Bulk metals results are presented in units of micrograms per gram (µg/g). SEP results are presented in milligrams per kilogram (mg/kg). Concentrations of dissolved metals are provided in milligrams per liter (mg/L), ORP results are provided in millivolts (mV) and reactor weights are provided in g. The volume of Site groundwater amended to each reactor was calculated from the measured mass of water added to the reactor using a density of 1 gram per milliliter (g/mL). The external laboratory reports are presented in Appendix G.

TABLES

TABLE 1A: SUMMARY OF SORPTION TEST REACTORS, CONTROLS, TREATMENTS, AND AMENDMENTS
Bowen Ash Plant-1, Bartow County, Georgia

Groundwater Sample ID	Geologic Material Sample ID	Treatment	Number of Reactors	Number of Sacrificial Reactors	Bottle Numbers	Incubation Period and Sampling Frequency	Reactor Contents		Amendments			Analyses	
							Groundwater (L)	Geologic Material (kg)	Arsenic	Cobalt	Molybdenum	Dissolved As, Co and Mo Samping Events	pH/ORP Sampling Events
BGWA-2 Batch	DPT05(42-52)	Concentration Level 1	2	2	43 & 44	7 Days (Sampled at Time 0 and on Day 7)	0.150	0.10	Spiked to target 0.01 mg/L of As.	Spiked to target 0.01 mg/L of Co.	Spiked to target 0.1 mg/L of Mo.	4	4
		Concentration Level 2	2	2	45 & 46		0.150	0.10	Spiked to target 0.02 mg/L of As.	Spiked to target 0.02 mg/L of Co.	Spiked to target 0.25 mg/L of Mo.	4	4
		Concentration Level 3	2	2	47 & 48		0.150	0.10	Spiked to target 0.04 mg/L of As.	Spiked to target 0.04 mg/L of Co.	Spiked to target 0.5 mg/L of Mo.	4	4
		Concentration Level 4	2	2	49 & 50		0.150	0.10	Spiked to target 0.06 mg/L of As.	Spiked to target 0.06 mg/L of Co.	Spiked to target 0.75 mg/L of Mo.	4	4
		Concentration Level 5	2	2	51 & 52		0.150	0.10	Spiked to target 0.08 mg/L of As.	Spiked to target 0.08 mg/L of Co.	Spiked to target 1.25 mg/L of Mo.	4	4
		Concentration Level 6	2	2	53 & 54		0.150	0.10	Spiked to target 0.1 mg/L of As.	Spiked to target 0.1 mg/L of Co.	Spiked to target 2 mg/L of Mo.	4	4

Notes:

-- - not applicable
As - arsenic
Co - cobalt
ID - identification
kg - kilogram
L - liter
mg/L - milligrams per liter
Mo - molybdenum
ORP - oxidation-reduction potential

TABLE 1B: SUMMARY OF DESORPTION TEST REACTORS, CONTROLS, TREATMENTS, AND AMENDMENTS
Bowen Ash Pond-1, Bartow County, Georgia

Location	Groundwater Sample ID	Geologic Material Sample ID	Treatment	Number of Reactors	Number of Sacrificial Reactors	Reactor Numbers	Incubation Period and Sampling Frequency	Reactor Contents		Analyses		
								Groundwater (L)	Geologic Material (kg)	Dissolved As, Co and Mo Sampling Events	Target Constituents	pH/ORP Sampling Events
Bowen AP-1	BGWA-2 Batch	DPT02 (10-17)	Ambient Conditions	2	2	11 & 12	7 Days (Sampled at Time 0 and on Day 7)	0.150	0.100	4	As, Co, Mo	4

Notes:

-- - not applicable
As - arsenic
Co - cobalt
ID - identification
kg - kilogram
L - liter
Mo - molybdenum
ORP - oxidation-reduction potential

APPENDIX A:
Chain of Custody Documentation

SiREM

Chain-of-Custody Form

siremlab.com

130 Stone Road West
Guelph ON, Canada N1G 3Z2
(519) 822-2265

Lab # S-6196

*Project Name: Bowen ACM Evaluation	*Project #: GW6581C/15
*Project Manager: Whitney Law	*Company: Geosyntec Consultants
*Email Address: wlaw@geosyntec.com	
Address (Street): 1255 Roberts Blvd, NW, Suite 200	
City: Kennesaw / State/Province: GA (30144) / Country: USA	
*Phone #: 678-202-9573	
*Sampler's Signature	*Sampler's Printed Name

Analysis

Preservative Key
0. None
1. HCL
2. Other
3. Other
4. Other
5. Other
6. Other

Client Sample ID	Sampling Date	Sampling Time	Matrix	# of Containers	Anion Exch Capacity (AEC)	Caton Exch Capacity (CEC)	Total Sulfur	Total Sulfide	Organic Carbon Content	Total Metal Conc (See Note #1 for COCs)	X Ray Diffraction, EDXA	Other Information
DPT01(12-15)	8/13/20	14:10	S	1	X	X	X	X	X	X	X	NOTE#1: Total metals to be reported
DPT02(10-17)	8/13/20	11:20	S	1	X	X	X	X	X	X	X	Mo, Co, Fe, Al, Mn
DPT03(12-22)	8/13/20	10:00	S	1	X	X	X	X	X	X	X	
DPT04(25-35)	8/13/20	16:50	S	1	X	X	X	X	X	X	X	
DPT05(42-52)	8/14/20	11:30	S	1	X	X	X	X	X	X	X	

Billing Information
P.O. #: Quote#: Si-4745-091420
*Bill To: GW6581C/15/01

Turnaround Time Requested
Normal [X]
Rush [ ]

For Lab Use Only
Cooler Condition: HB 09/22/20 15°C Good
Cooler Temperature: 15°C
Custody Seals: Yes [✓] No [ ]

For Lab Use Only
Proposal #:

Relinquished By:	Received By:	Relinquished By:	Received By:	Relinquished By:	Received By:
Signature: WBLaw	Signature: NBrent	Signature:	Signature:	Signature:	Signature:
Printed Name: Whitney B. Law	Printed Name: Natasha Brent	Printed Name:	Printed Name:	Printed Name:	Printed Name:
Firm: Geosyntec Consultants	Firm: ~~FedEx~~ SiREM	Firm:	Firm:	Firm:	Firm:
Date/Time: 9/17/20 14:32	Date/Time: 21 Sept 20 13:20	Date/Time:	Date/Time:	Date/Time:	Date/Time:

Distribution: White - return to Originator; Yellow - Lab Copy; Pink - Retained by Client

** Mandatory Fields*

Chain-of-Custody Form

SiREM
siremlab.com

130 Stone Road West
Guelph ON, Canada N1G 3Z2
(519) 822-2265

Lab # 3-8072

*Project Name: Bowen ACM Evaluation	*Project #: GW6581C/15
*Project Manager: Whitney Law	*Company: Geosyntec Consultants
*Email Address: wlaw@geosyntec.com	
Address (Street): 1255 Roberts Blvd, NW, Suite 200	
City: Kennesaw	State/Province: GA (30144)
Country: USA	
*Phone #: 678-202-9573	
*Sampler's Signature	*Sampler's Printed Name

Client Sample ID	Sampling Date	Sampling Time	Matrix	# of Containers	Gene-Trac DHC	Gene-Trac VC	Gene-Trac DHB	Gene-Trac DHG	Treatability Study	Other Information
DPT01_BAP1_081320_12-15	8/13/20		S	2						to be homogenized with existing sample at lab
DPT02_BAP1_081320_10-17	8/13/20		S	1						to be homogenized with existing sample at lab
DPT03_BAP1_081320_12-22	8/13/20		S	3						to be homogenized with existing sample at lab
DPT04_BAP1_081320_25-35	8/13/20		S	2						to be homogenized with existing sample at lab
DPT05_BAP1_081420_42-52	8/14/20		S	2					X	to be homogenized with existing material at lab and used for batch sorption study for As, Mo, Co

Analysis

Preservative Key
0. None
1. HCL
2. Other
3. Other
4. Other
5. Other
6. Other

WL 5/27/21

WL 5/27/21 (See Notes →)

WL 5/27/21

Billing Information
P.O. #:
*Bill To: GW6581C/15/01

Turnaround Time Requested
Normal: X
Rush:

For Lab Use Only
Cooler Condition: good
Cooler Temperature: 18°C
Custody Seals: Yes ☑ No ☐

For Lab Use Only
Proposal #:

Relinquished By:	Received By:	Relinquished By:	Received By:	Relinquished By:	Received By:
Signature: Whitney B Law	Signature:	Signature:	Signature:	Signature:	Signature:
Printed Name: Whitney B Law	Printed Name:	Printed Name:	Printed Name:	Printed Name:	Printed Name:
Firm: Geosyntec	Firm:	Firm:	Firm:	Firm:	Firm:
Date/Time: 5/27/21 11:30	Date/Time:	Date/Time:	Date/Time:	Date/Time:	Date/Time:

Distribution: White - return to Originator; Yellow - Lab Copy; Pink - Retained by Client

* Mandatory Fields

SiREM

Chain-of-Custody Form

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130 Stone Rd. W
Guelph, ON N1G 3Z2
(519) 822-2265

Lab # S-8082

*Project Name: BOWEN ACM EVALUATION
*Project #: GW6581C/15
*Project Manager: Whitney Law
*Company: Geosyntec Consultants
*Email Address: wlaw@geosyntec.com
Address (Street): 1255 Roberts Blvd, NW Suite 200
City: Kennesaw
State/Province: GA 30144
Country: USA
*Phone #: 678 202 9573
*Sampler's Signature:
*Sampler's Printed Name: William Laker

Client Sample ID	Sampling Date	Sampling Time	Matrix	# of Containers
BGWA-2 BATCH	5/26/21	0947	GW	2

Analysis

Gene-Trac DHC	Gene-Trac FGA	Gene-Trac DHB	Gene-Trac DHG	Gene-Trac NGS	Volatile Fatty Acids	Dissolved hydrocarbon gases	Treatability Study				
							X				

Preservative Key
0. None
1. HCL
2. Other
3. Other
4. Other
5. Other
6. Other

Other Information

P.O. #
Billing Information
*Bill To: GW6581C/15/01

Turnaround Time Requested
Normal ☐
Rush ☐

For Lab Use Only
Cooler Condition: Good
Cooler Temperature: 18°C
Custody Seals: Yes ☑ No ☐

For Lab Use Only
Proposal #:

Relinquished By:	Received By:	Relinquished By:	Received By:	Relinquished By:	Received By:
Signature	Signature	Signature	Signature	Signature	Signature
Printed Name: William Laker	Printed Name: Noelia Muskus	Printed Name: Noelia Muskus	Printed Name: Thomas Kessler	Printed Name: Thomas Kessler	Printed Name: Jordan Linkletter
Firm: Resolute	Firm: Geosyntec	Firm: Geosyntec	Firm: Geosyntec	Firm: Geosyntec	Firm: SiREM
Date/Time: 5/26/21 12:58	Date/Time: 5/26/2021 12:58	Date/Time: 5/26/2021 18:30	Date/Time: 5/27/2021 1830	Date/Time: 5/27/2021 1200	Date/Time: 6/2/21

Distribution: White - return to Originator Yellow Lab Copy: Pink Retained by Client

* Mandatory Fields

APPENDIX B:
Baseline Chemical Characterization Results

SiREM
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130 Stone Rd. W
Guelph, ON N1G 3Z2
(519) 822-2265

Analytical Results

SiREM File Reference: S-6196

Client: Geosyntec Consultants Inc.
Client Project Number: GW6581C/15
Date Samples Received: September 21, 2020
Date Samples Analyzed: October 5, 2020 to October 16, 2020

Client Sample ID	Laboratory Sample ID	Client Sample Date	Anion Exchange Capacity	Cation Exchange Capcity	Total Sulfur	Total Sulfide	Total Organic Carbon
			meq/100g	meq/100g	%	%	%
DPT01(12-15)	S-6196-1	13-Aug-20	5.50	6.70	< 0.005	< 0.04	0.05
DPT02(10-17)	S-6196-2	13-Aug-20	6.79	28.00	< 0.005	< 0.04	0.10
DPT03(12-22)	S-6196-3	13-Aug-20	7.52	27.70	< 0.005	< 0.04	0.05
DPT04(25-35)	S-6196-4	13-Aug-20	8.13	4.90	< 0.005	< 0.04	0.03
DPT05(42-52)	S-6196-5	14-Aug-20	7.79	17.50	< 0.005	< 0.04	< 0.025
		QL	0.0002	0.0002	0.005	0.04	0.025

Comments:
% - percent
< - compound not detected, the associated value is the detection limit
meq/100g - milliequivalents per 100 grams
NA - not applicable
QL - quantitation limit

Analyst:

Kela Ashworth, B.Sc.
Senior Laboratory Technician

Results approved:

Jeff Roberts, M.Sc.
Operations Manager

Date:

11-Nov-20

SiREM
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130 Stone Rd. W
Guelph, ON N1G 3Z2
(519) 822-2265

Analytical Results - Total Metals

SiREM File Reference: S-6196

Client: Geosyntec Consultants Inc.
Client Project Number: GW6581C/15
Date Samples Received: September 21, 2020
Date Samples Analyzed: October 13, 2020

Client Sample ID	Laboratory Sample ID	Client Sample Date	Molybdenum	Lithium	Cobalt	Arsenic	Iron	Aluminum	Manganese
			µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g
DPT01(12-15)	S-6196-1	13-Aug-20	8.8	23	13	6.8	28,000	39,000	960
DPT02(10-17)	S-6196-2	13-Aug-20	7.6	56	19	30	40,000	72,000	550
DPT03(12-22)	S-6196-3	13-Aug-20	4.1	43	14	11	38,000	77,000	210
DPT04(25-35)	S-6196-4	13-Aug-20	4.4	69	29	20	40,000	93,000	250
DPT05(42-52)	S-6196-5	14-Aug-20	2.2	39	12	22	17,000	37,000	700
		QL	0.1	2	0.01	0.5	3	1.00	0.1

Comments:
< - compound not detected, the associated value is the detection limit
µg/g - microgram per gram
NA - not applicable
QL - quantitation limit

Analyst:

Kela Ashworth, B.Sc.
Senior Laboratory Technician

Results approved:

Jeff Roberts, M.Sc.
Operations Manager

Date:

11-Nov-20

SiREM
Leading Science · Lasting Solutions

130 Stone Rd. W
Guelph, ON N1G 3Z2
(519) 822-2265

Analytical Results - Whole Rock Analysis

SiREM File Reference: S-6196

Client: Geosyntec Consultants Inc.
Client Project Number: GW6581C/15
Date Samples Received: September 21, 2020
Date Samples Analyzed: October 28, 2020

Client Sample ID	Laboratory Sample ID	Client Sample Date	Quartz (SiO2)	Aluminum Oxide (Al2O3)	Ferric Oxide (Fe2O3)	Magnesium Oxide (MgO)	Calcium Oxide (CaO)	Sodium Oxide (Na2O)	Potassium Oxide (K2O)	Titanium Dioxide (TiO2)	Phosphorous Pentoxide (P2O5)	Manganese Oxide (MnO)	Chromium (III) Oxide (Cr2O3)	Vanadium Oxide (V2O5)	Loss on Ignition
			%	%	%	%	%	%	%	%	%	%	%	%	%
DPT01(12-15)	S-6196-1	13-Aug-20	82.4	7.32	3.87	0.62	0.19	0.06	1.39	0.63	0.04	0.12	< 0.01	< 0.01	3.56
DPT02(10-17)	S-6196-2	13-Aug-20	65.3	16.1	5.69	0.85	0.17	0.05	3.42	0.75	0.07	0.07	0.01	0.02	7.18
DPT03(12-22)	S-6196-3	13-Aug-20	66.2	17.3	5.61	0.71	0.05	0.05	1.22	0.66	0.06	0.03	< 0.01	0.02	8.39
DPT04(25-35)	S-6196-4	13-Aug-20	64.6	17.1	5.61	1.16	0.07	0.04	2.38	0.52	0.10	0.02	0.01	0.01	7.94
DPT05(42-52)	S-6196-5	14-Aug-20	74.8	11.9	3.59	1.34	0.02	0.06	2.72	0.43	0.07	0.14	< 0.01	0.01	4.77
		QL	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01

Comments:
% - percent
< - compound not detected, the associated value is the detection limit
NA - not applicable
QL - quantitation limit

Analyst:

Kela Ashworth, B.Sc.
Senior Laboratory Technician

Results approved:

Jeff Roberts, M.Sc.
Operations Manager

Date:

11-Nov-20

APPENDIX C:
Baseline Mineralogical Results

SiREM
Leading Science · Lasting Solutions

130 Stone Rd. W
Guelph, ON N1G 3Z2
(519) 822-2265

Analytical Results - Rietveld Quantitative X-Ray Diffraction

SiREM File Reference: S-6196

Client: Geosyntec Consultants Inc.
Client Project Number: GW6581C/15
Date Samples Received: September 21, 2020
Date Samples Analyzed: October 6, 2020

Client Sample ID	Laboratory Sample ID	Client Sample Date	Quartz	Albite	Microcline	Muscovite	Kaolinite	Goethite	Orthoclase	Magnetite	Rutile
			wt %	wt %	wt %	wt %	wt %	wt %	wt %	wt %	wt %
DPT01(12-15)	S-6196-1	13-Aug-20	79.2	0.8	2.3	11.1	6.6	-	-	-	-
DPT02(10-17)	S-6196-2	13-Aug-20	43.6	1.1	-	14.0	17.2	10.4	13.7	-	-
DPT03(12-22)	S-6196-3	13-Aug-20	39.9	2.2	-	13.7	24.5	17.5	1.4	0.2	0.6
DPT04(25-35)	S-6196-4	13-Aug-20	42.6	2.3	-	20.1	16.2	14.8	3.6	0.1	0.4
DPT05(42-52)	S-6196-5	14-Aug-20	66.7	1.5	-	21.6	9.2	-	0.3	-	0.7
		QL	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01

Comments:
% - percent
< - compound not detected, the associated value is the detection limit
-- not identified by analyst
wt % - weight percent
NA - not applicable
QL - quantitation limit

Analyst:
Kela Ashworth
Kela Ashworth, B.Sc.
Senior Laboratory Technician

Results approved:
Jeff Roberts
Jeff Roberts, M.Sc.
Operations Manager

Date:
11-Nov-20

APPENDIX D:
Sequential Extraction Procedure Results

SiREM
Leading Science-Lasting Solutions

130 Stone Rd. W
Guelph, ON N1G 3Z2
(519) 822-2265

Analytical Results - Sequential Extraction Procedure

SiREM File Reference: S-6196 & S-8072

Client: Geosyntec Consultants Inc.
Client Project Number: GW6581C/15
Date Samples Received: September 21, 2020 and June 2, 2021
Date Samples Analyzed: November 2, 2021

Client Sample ID	Laboratory Sample ID	Client Sample Date	SEP Step 1			SEP Step 2			SEP Step 3			SEP Step 4			SEP Step 5			SEP Step 6			SEP Step 7			SEP Sum of Steps 1-7			Total		
			Arsenic	Cobalt	Molybdenum	Arsenic	Cobalt	Molybdenum	Arsenic	Cobalt	Molybdenum	Arsenic	Cobalt	Molybdenum	Arsenic	Cobalt	Molybdenum	Arsenic	Cobalt	Molybdenum	Arsenic	Cobalt	Molybdenum	Arsenic	Cobalt	Molybdenum	Arsenic	Cobalt	Molybdenum
			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
DPT02 (10-17)	S-6196-2 & S-8072-2	13-Aug-20	0.89 J	<0.21	<0.39	<0.46	<0.22	<0.29	0.78	8.0	0.36 J	8.9	4.2	1.6 J	6.1 J	<0.71	<1.5	6.5	1.4 J	0.70 J	2.7	0.73 J	0.23 J	26	14	2.9	24	12	2.8
DPT05 (42-52)	S-6196-5 & S-8072-5	14-Aug-20	1.0 J	<0.23	<0.42	<0.50	<0.24	<0.32	1.1	4.1	0.42 J	15	5.9	1.3 J	4.4 J	<0.77	<1.6	6.2	1.0 J	0.22 J	1.6	<0.033	<0.11	30	11	1.9 J	26	9.0	1.6 J

Comments:
< - compound not detected, the associated value is the method detection limit.
J - result is less than the reporting limit, but greater than or equal to the method detection limit and the concentration is an approximate value.
mg/kg - milligram per kilogram

Analyst:

Kela Ashworth, B.Sc.
Senior Laboratory Technician

Results approved:

Michael Healey, B.Sc.
Laboratory Supervisor I

Date:

19-Nov-21

APPENDIX E:
Summary of Sorption Test Dissolved Metals, ORP and pH Results

APPENDIX E: SUMMARY OF SORPTION TEST DISSOLVED METALS, ORP AND pH RESULTS
Bowen Ash Pond-1, Bartow County, Georgia

Groundwater Sample ID	Site Material	Treatment	Date	Day	Replicate	Dissolved Arsenic	Dissolved Cobalt	Dissolved Molybdenum	Reactor Weight	Reactor + Soil Weight	Mass Soil	Reactor, Soil + Water Weight	Mass Water	pH	ORP
						mg/L	mg/L	mg/L	g	g	g	g	g		
BGWA-2 Batch	DPT05(42-52)	Concentration Level 1	22-Jul-21	0	***Spiked Aqueous Concentration***	***0.0111***	***0.0102***	***0.113***	--	--	--	--	--	--	--
					BAP1DPT05_43a	0.0006	0.00527	0.0286	36.38	135	98.97	287	152.10	6.86	182
					BAP1DPT05_44a	0.0006	0.00540	0.0346	36.35	138	101.82	288	149.99	6.92	182
					Average	**0.0006**	**0.00534**	**0.0316**	**36.37**	**137**	**100.40**	**288**	**151.05**	**6.89**	**182**
			29-Jul-21	7	BAP1DPT05_43b	<0.0002	0.000516	0.00027	36.32	137	100.24	285	148.50	5.33	149
					BAP1DPT05_44b	<0.0002	0.000283	<0.00004	36.32	135	98.95	285	150.00	5.25	146
					Average	**ND**	**0.000400**	**0.00014**	**36.32**	**136**	**99.60**	**285**	**149.25**	**5.29**	**148**
		Concentration Level 2	29-Jul-21	0	***Spiked Aqueous Concentration***	***0.0218***	***0.0194***	***0.276***	--	--	--	--	--	--	--
					BAP1DPT05_45a	0.0010	0.0090	0.042	36.29	136	99.58	284	148.19	6.68	181
					BAP1DPT05_46a	0.0009	0.0090	0.057	36.41	136	99.82	284	148.23	6.77	190
					Average	**0.0010**	**0.0090**	**0.050**	**36.35**	**136**	**99.70**	**284**	**148.21**	**6.73**	**186**
			5-Aug-21	7	BAP1DPT05_45b	<0.0002	0.000669	<0.00004	36.37	137	100.66	284	146.82	5.51	136
					BAP1DPT05_46b	<0.0002	0.000754	<0.00004	36.29	137	100.31	284	147.66	5.42	126
					Average	**ND**	**0.000712**	**ND**	**36.33**	**137**	**100.49**	**284**	**147.24**	**5.47**	**131**
		Concentration Level 3	29-Jul-21	0	***Spiked Aqueous Concentration***	***0.0433***	***0.0384***	***0.566***	--	--	--	--	--	--	--
					BAP1DPT05_47a	0.002	0.016	0.200	36.30	135	99.02	284	148.67	6.82	224
					BAP1DPT05_48a	0.002	0.016	0.157	36.35	136	99.28	281	144.96	6.66	238
					Average	**0.002**	**0.016**	**0.179**	**36.33**	**135**	**99.15**	**282**	**146.82**	**6.74**	**231**
			5-Aug-21	7	BAP1DPT05_47b	<0.0002	0.000998	<0.00004	36.31	137	100.66	284	147.03	5.32	132
					BAP1DPT05_48b	<0.0002	0.000715	<0.00004	36.38	135	98.61	283	148.02	5.30	139
					Average	**ND**	**0.000857**	**ND**	**36.35**	**136**	**99.64**	**284**	**147.53**	**5.31**	**136**
		Concentration Level 4	30-Jul-21	0	***Spiked Aqueous Concentration***	***0.066***	***0.059***	***0.860***	--	--	--	--	--	--	--
					BAP1DPT05_49a	0.004	0.028	0.378	36.29	135	98.38	281	146.56	6.96	194
					BAP1DPT05_50a	0.007	0.030	0.510	36.49	138	101.22	284	146.31	7.11	223
					Average	**0.005**	**0.029**	**0.444**	**36.39**	**136**	**99.80**	**283**	**146.44**	**7.04**	**209**
			6-Aug-21	7	BAP1DPT05_49b	<0.0002	0.000723	<0.00004	36.35	136	99.46	280	144.50	5.45	133
					BAP1DPT05_50b	<0.0002	0.00121	<0.00004	36.31	136	99.29	282	146.31	5.33	125
					Average	**ND**	**0.000967**	**ND**	**36.33**	**136**	**99.38**	**281**	**145.41**	**5.39**	**129**
		Concentration Level 5	30-Jul-21	0	***Spiked Aqueous Concentration***	***0.0861***	***0.0761***	***1.39***	--	--	--	--	--	--	--
					BAP1DPT05_51a	0.004	0.035	0.599	36.34	137	100.36	286	149.03	6.82	211
					BAP1DPT05_52a	0.005	0.036	0.635	36.37	137	100.66	285	147.65	6.86	209
					Average	**0.004**	**0.035**	**0.617**	**36.36**	**137**	**100.51**	**285**	**148.34**	**6.84**	**210**
			6-Aug-21	7	BAP1DPT05_51b	<0.0002	0.00149	0.00004	36.33	136	99.81	282	145.36	5.32	128
					BAP1DPT05_52b	<0.0002	0.00121	0.00006	36.36	137	100.34	284	147.67	5.30	136
					Average	**ND**	**0.00135**	**0.00005**	**36.35**	**136**	**100.08**	**283**	**146.52**	**5.31**	**132**
		Concentration Level 6	3-Aug-21	0	***Spiked Aqueous Concentration***	***0.106***	***0.0950***	***2.18***	--	--	--	--	--	--	--
					BAP1DPT05_53a	0.005	0.042	0.940	36.39	135	98.71	284	148.94	6.84	169
					BAP1DPT05_54a	0.007	0.046	1.120	36.40	136	100.05	288	151.83	6.94	163
					Average	**0.006**	**0.044**	**1.030**	**36.40**	**136**	**99.38**	**286**	**150.39**	**6.89**	**166**
			10-Aug-21	7	BAP1DPT05_53b	<0.0002	0.00140	0.00007	36.34	136	99.43	287	150.79	5.42	158
					BAP1DPT05_54b	<0.0002	0.00122	0.00006	36.33	136	99.71	279	142.95	5.29	130
					Average	**ND**	**0.00131**	**0.00007**	**36.34**	**136**	**99.57**	**283**	**146.87**	**5.36**	**144**

Notes:

-- - not applicable
< - compound not detected, the associated value is the detection limit
g - gram
mg/L - milligrams per liter
ND - not detected
ORP - oxidation reduction potential

APPENDIX F:
Summary of Desorption Test Dissolved Metals, ORP and pH Results

APPENDIX F: SUMMARY OF DESORPTION TEST DISSOLVED METALS, ORP AND pH RESULTS
Bowen Ash Pond-1, Bartow County, Georgia

Groundwater Sample ID	Site Material	Chemical Characteristics (Baseline Characterization)	Treatment	Date	Day	Replicate	Dissolved Arsenic	Dissolved Cobalt	Dissolved Molybdenum	Reactor Weight	Reactor + Soil Weight	Mass Soil	Reactor, Soil + Water Weight	Mass Water	pH	ORP
							mg/L	mg/L	mg/L	g	g	g	g	g		
BGWA-2	DPT02 (10-17)	Arsenic: 30 µg/g Cobalt: 19 µg/g Molybdenum: 7.6 µg/g	Ambient Conditions	31-Aug-21	0	BAP1DPT02_11a	< 0.0002	0.00014	0.00026	36.35	140.97	104.62	290.96	149.99	7.10	230
						BAP1DPT02_12a	< 0.0002	0.00016	0.00029	36.35	135.83	99.48	287.24	151.41	7.09	231
						Average	**ND**	**0.00015**	**0.00028**	**36.35**	**138.40**	**102.05**	**289.10**	**150.70**	**7.10**	**231**
				15-Sep-21	7*	BAP1DPT02_11b	< 0.0002	0.000005	0.000050	36.34	136.51	100.17	287.33	150.82	5.79	146
						BAP1DPT02_12b	< 0.0002	0.000012	0.00010	36.39	138.38	101.99	287.68	149.30	5.82	156
						Average	**ND**	**0.000009**	**0.000075**	**36.37**	**137.45**	**101.08**	**287.51**	**150.06**	**5.81**	**151**

Notes:
* Samples for Day 7 sampling were prepared on 8 September 2021
< - compound not detected, the associated value is the detection limit
µg/g - micrograms per gram
g - grams
mg/L - milligrams per liter
ND - not detected
ORP - oxidation reduction potential

APPENDIX G:
External Laboratory Reports

SGS Canada Inc.
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

SiREM Laboratory
Attn : Kela Ashworth

130 Stone Rd. W
Guelph, ON
N1G 3Z2, Canada

Phone: 519-822-2265
Fax:519-822-3151

Project : S-6196

14-October-2020

Date Rec. : 25 September 2020
LR Report: **CA15482-SEP20**

Copy: #1

CERTIFICATE OF ANALYSIS
Final Report

Analysis	1: Analysis Start Date	2: Analysis Start Time	3: Analysis Completed Date	4: Analysis Completed Time	5: S-6196-1	6: S-6196-2	7: S-6196-3	8: S-6196-4	9: S-6196-5
Sample Date & Time					24-Sep-20	24-Sep-20	24-Sep-20	24-Sep-20	24-Sep-20
Ag [µg/g]	07-Oct-20	15:21	13-Oct-20	14:29	< 1	< 1	< 1	< 1	< 1
Al [µg/g]	07-Oct-20	15:21	13-Oct-20	14:29	39000	72000	77000	93000	37000
As [µg/g]	07-Oct-20	15:21	13-Oct-20	14:29	6.8	30	11	20	22
Ba [µg/g]	07-Oct-20	15:21	13-Oct-20	14:29	210	180	85	210	96
Be [µg/g]	07-Oct-20	15:21	13-Oct-20	14:29	1.3	2.8	1.2	2.7	0.89
Bi [µg/g]	07-Oct-20	15:21	13-Oct-20	14:29	0.34	0.58	0.59	0.47	0.23
Ca [µg/g]	07-Oct-20	15:21	13-Oct-20	14:29	1300	1200	310	590	87
Cd [µg/g]	07-Oct-20	15:21	13-Oct-20	14:29	0.24	0.22	0.06	0.11	0.04
Co [µg/g]	07-Oct-20	15:21	13-Oct-20	14:29	13	19	14	29	12
Cr [µg/g]	07-Oct-20	15:21	13-Oct-20	14:29	21	83	74	47	36
Cu [µg/g]	07-Oct-20	15:21	13-Oct-20	14:29	37	44	32	41	18
Fe [µg/g]	07-Oct-20	15:21	13-Oct-20	14:29	28000	40000	38000	40000	17000
K [µg/g]	07-Oct-20	15:21	13-Oct-20	14:29	12000	25000	8900	20000	13000
Li [µg/g]	07-Oct-20	15:21	13-Oct-20	14:29	23	56	43	69	39
Mg [µg/g]	07-Oct-20	15:21	13-Oct-20	14:29	4000	4700	3900	7200	5000
Mn [µg/g]	07-Oct-20	15:21	13-Oct-20	14:29	960	550	210	250	700

OnLine LIMS

00022855O8

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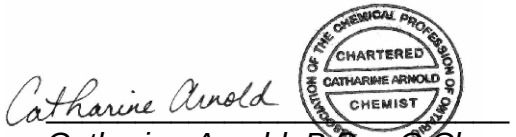
SGS Canada Inc.
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

Project : S-6196
LR Report : **CA15482-SEP20**

Analysis	1: Analysis Start Date	2: Analysis Start Time	3: Analysis Completed Date	4: Analysis Completed Time	5: S-6196-1	6: S-6196-2	7: S-6196-3	8: S-6196-4	9: S-6196-5
Mo [µg/g]	07-Oct-20	15:21	13-Oct-20	14:29	8.8	7.6	4.1	4.4	2.2
Ni [µg/g]	07-Oct-20	15:21	13-Oct-20	14:29	20	49	37	54	30
Pb [µg/g]	07-Oct-20	15:21	13-Oct-20	14:29	17	33	37	43	20
Sb [µg/g]	07-Oct-20	15:21	13-Oct-20	14:29	< 0.8	< 0.8	0.9	< 0.8	< 0.8
Se [µg/g]	07-Oct-20	15:21	13-Oct-20	14:29	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7
Sn [µg/g]	07-Oct-20	15:21	13-Oct-20	14:29	< 6	< 6	< 6	< 6	< 6
Sr [µg/g]	07-Oct-20	15:21	13-Oct-20	14:29	13	22	11	13	6.03
Ti [µg/g]	07-Oct-20	15:21	13-Oct-20	14:29	1300	2800	2700	2800	1300
Tl [µg/g]	07-Oct-20	15:21	13-Oct-20	14:29	0.43	1.1	1.0	0.70	0.57
U [µg/g]	07-Oct-20	15:21	13-Oct-20	14:29	2.0	4.9	5.8	5.1	6.7
V [µg/g]	07-Oct-20	15:21	13-Oct-20	14:29	54	113	113	91	47
Y [µg/g]	07-Oct-20	15:21	13-Oct-20	14:29	15	24	13	38	12
Zn [µg/g]	07-Oct-20	15:21	13-Oct-20	14:29	68	96	90	110	45
S [%]	09-Oct-20	10:54	09-Oct-20	11:22	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
C [%]	09-Oct-20	10:54	09-Oct-20	11:22	0.074	0.111	0.060	0.044	0.021
Sulphide [%]	09-Oct-20	15:49	09-Oct-20	16:46	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04
TOC [%]	09-Oct-20	10:44	09-Oct-20	11:22	0.050	0.100	0.050	0.030	< 0.025



Catharine Arnold, B.Sc., C.Chem
Project Specialist,
Environment, Health & Safety

OnLine LIMS

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SGS Canada Inc.
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

Project : S-6196

28-October-2020

SiREM Laboratory
Attn : Kela Ashworth

130 Stone Rd. W
Guelph, ON
N1G 3Z2, Canada

Phone: 519-822-2265
Fax:519-822-3151

Date Rec. : 25 September 2020
LR Report: **CA15483-SEP20**

Copy: #1

CERTIFICATE OF ANALYSIS

Final Report

Analysis	**5: S-6196-1**	**6: S-6196-2**	**7: S-6196-3**	**8: S-6196-4**	**9: S-6196-5**
Sample Date & Time	24-Sep-20	24-Sep-20	24-Sep-20	24-Sep-20	24-Sep-20
SiO2 [%]	82.4	65.3	66.2	64.6	74.8
Al2O3 [%]	7.32	16.1	17.3	17.1	11.9
Fe2O3 [%]	3.87	5.69	5.61	5.61	3.59
MgO [%]	0.62	0.85	0.71	1.16	1.34
CaO [%]	0.19	0.17	0.05	0.07	0.02
Na2O [%]	0.06	0.05	0.05	0.04	0.06
K2O [%]	1.39	3.42	1.22	2.38	2.72
TiO2 [%]	0.63	0.75	0.66	0.52	0.43
P2O5 [%]	0.04	0.07	0.06	0.10	0.07
MnO [%]	0.12	0.07	0.03	0.02	0.14
Cr2O3 [%]	< 0.01	0.01	< 0.01	0.01	< 0.01
V2O5 [%]	< 0.01	0.02	0.02	0.01	0.01
LOI [%]	3.56	7.18	8.39	7.94	4.77
Sum [%]	100.2	99.7	100.3	99.6	99.8

Catharine Arnold

CHARTERED CHEMIST CATHARINE ARNOLD

Catharine Arnold, B.Sc., C.Chem
Project Specialist,
Environment, Health & Safety

OnLine LIMS

0002303171

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1-503 Imperial Road North Guelph, ON, N1H 6T9 t: 519-837-1600 1-800-265-7175 f: 519-837-1242 ca.agri.guelph.lab@sgs.com

Report # 565003

Analytical Report

Email

SGS LAKEFIELD - Catharine Arnold - S6196 Pulp
CEC
185 Concession St.
Lakefield, ON K0L 2H0

Fax: 705-652-6365
Email: catharine.arnold@sgs.com; lisa.thompson@sgs.com

Date Received: Sep-29-2020
Date Reported: Oct-16-2020

Laboratory Number:	32182108	32182109	32182110	32182111
Sample ID:	S-6196-1	S-6196-2	S-6196-3	S-6196-4
Sample Description:	Pulp			
CEC - Actual (MEQ/100g)	6.70	28.00	27.70	4.90

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Authorized By: *Jack Legg*
CCA-ON, 4R NMS

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1-503 Imperial Road North Guelph, ON, N1H 6T9 t: 519-837-1600 1-800-265-7175 f: 519-837-1242 ca.agri.guelph.lab@sgs.com

Analytical Report

Email

SGS LAKEFIELD - Catharine Arnold - S6196 Pulp
CEC
185 Concession St.
Lakefield, ON K0L 2H0

Fax: 705-652-6365
Email: catharine.arnold@sgs.com; lisa.thompson@sgs.com

Date Received: Sep-29-2020
Date Reported: Oct-16-2020

Laboratory Number:	32182112
Sample ID:	S-6196-5
Sample Description:	

CEC - Actual (MEQ/100g)	17.50

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Authorized By: *Jack Legg*
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Specialty Analytical

9011 SE Jannsen Rd
Clackamas, Oregon 97015
TEL: 503-607-1331 FAX: 503-607-1336
Website: www.specialtyanalytical.com

October 12, 2020

Kela Ashworth
SiREM Lab
130 Stone Road West
Guelph, Ontario N1G3Z2

TEL: (519) 822-2265
FAX
RE: S-6196

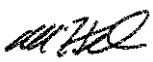
Dear Kela Ashworth: Order No.: 2009183

Specialty Analytical received 5 sample(s) on 9/25/2020 for the analyses presented in the following report.

There were no problems with the analysis and all data for associated QC met EPA or laboratory specifications, except where noted in the Case Narrative, or as qualified with flags. Results apply only to the samples analyzed. Without approval of the laboratory, the reproduction of this report is only permitted in its entirety.

If you have any questions regarding these tests, please feel free to call.

Sincerely,



Marty French
Lab Director

Specialty Analytical

Date Reported: 12-Oct-20

CLIENT: SiREM Lab
Project: S-6196

Lab Order: 2009183

Lab ID: 2009183-001 **Collection Date:** 9/24/2020
Client Sample ID: S-6196-1 **Matrix:** SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
ANION EXCHANGE CAPACITY		**SW9081**				Analyst: **SH**
Anion Exchange Capacity	5.50	0.000200		meq/100g	1	10/5/2020

Lab ID: 2009183-002 **Collection Date:** 9/24/2020
Client Sample ID: S-6196-2 **Matrix:** SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
ANION EXCHANGE CAPACITY		**SW9081**				Analyst: **SH**
Anion Exchange Capacity	6.79	0.000200		meq/100g	1	10/5/2020 12:02:00 AM

Lab ID: 2009183-003 **Collection Date:** 9/24/2020
Client Sample ID: S-6196-3 **Matrix:** SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
ANION EXCHANGE CAPACITY		**SW9081**				Analyst: **SH**
Anion Exchange Capacity	7.52	0.000200		meq/100g	1	10/5/2020 12:04:00 AM

Lab ID: 2009183-004 **Collection Date:** 9/24/2020
Client Sample ID: S-6196-4 **Matrix:** SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
ANION EXCHANGE CAPACITY		**SW9081**				Analyst: **SH**
Anion Exchange Capacity	8.13	0.000200		meq/100g	1	10/5/2020 12:06:00 AM

Lab ID: 2009183-005 **Collection Date:** 9/24/2020
Client Sample ID: S-6196-5 **Matrix:** SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
ANION EXCHANGE CAPACITY		**SW9081**				Analyst: **SH**
Anion Exchange Capacity	7.79	0.000200		meq/100g	1	10/5/2020 12:08:00 AM

KEY TO FLAGS

Rev. May 12, 2010

A	This sample contains a Gasoline Range Organic not identified as a specific hydrocarbon product. The result was quantified against gasoline calibration standards
A1	This sample contains a Diesel Range Organic not identified as a specific hydrocarbon product. The result was quantified against diesel calibration standards.
A2	This sample contains a Lube Oil Range Organic not identified as a specific hydrocarbon product. The result was quantified against a lube oil calibration standard.
A3	The result was determined to be Non-Detect based on hydrocarbon pattern recognition. The product was carry-over from another hydrocarbon type.
A4	The product appears to be aged or degraded diesel.
B	The blank exhibited a positive result great than the reporting limit for this compound.
CN	See Case Narrative.
D	Result is based from a dilution.
E	Result exceeds the calibration range for this compound. The result should be considered as estimate.
F	The positive result for this hydrocarbon is due to single component contamination. The product does not match any hydrocarbon in the fuels library.
G	Result may be biased high due to biogenic interferences. Clean up is recommended.
H	Sample was analyzed outside recommended holding time.
HT	At clients request, samples was analyzed outside of recommended holding time.
J	The result for this analyte is between the MDL and the PQL and should be considered as estimated concentration.
K	Diesel result is biased high due to amount of Oil contained in the sample.
L	Diesel result is biased high due to amount of Gasoline contained in the sample.
M	Oil result is biased high due to amount of Diesel contained in the sample.
MC	Sample concentration is greater than 4x the spiked value, the spiked value is considered insignificant.
MI	Result is outside control limits due to matrix interference.
MSA	Value determined by Method of Standard Addition.
O	Laboratory Control Standard (LCS) exceeded laboratory control limits, but meets CCV criteria. Data meets EPA requirements.
Q	Detection levels elevated due to sample matrix.
R	RPD control limits were exceeded.
RF	Duplicate failed due to result being at or near the method-reporting limit.
RP	Matrix spike values exceed established QC limits; post digestion spike is in control.
S	Recovery is outside control limits.
SC	Closing CCV or LCS exceeded high recovery control limits, but associated samples are non-detect. Data meets EPA requirements.
*	The result for this parameter was greater that the maximum contaminant level of the TCLP regulatory limit.

www.specialtyanalytical.com

Chain of Custody Record

Specialty Analytical
9011 SE Jannsen Rd
Clackamas, OR 97015
Phone: 503-607-1331
Fax: 503-607-1336

Date: | Page: 1 of: 1

Project Name:

Client: SiREM Lab

Project No: S-6196 PO No:

Address: 130 Stone Road West

Collected by: Kela Ashworth

City, State, Zip: Guelph, Ontario, N1G 3Z2

State Collected: OR [ ] WA [ ] OTHER

Telephone: 519-822-2265

Report To (PM): Kela Ashworth

AP Email: accountspayablecan@siremlab.com

PM Email: kashworth@siremlab.com

Laboratory Project No (internal): 2009183

Temperature on Receipt: 5.8 °C on ice

Cooling: Yes, on ice Shipped Via: Fedex

Custody Seal: Y / N Intact / Broken Cooler / Bottle

MDL [ ] TIER IV [ ] EDD [ ]

Sample Disposal: [ ] Return to client [ ] Disposal by lab (after 60 days)

Sample Name	Sample Date	Sample Time	Sample Matrix*	# of Containers	Anion Exchange Capacity										Anion Exchange Capacity		Comments
									Requested Tests								
1 S-6196-1	24-Sep-20		S	1	✓												
2 S-6196-2	24-Sep-20		S	1	✓												
3 S-6196-3	24-Sep-20		S	1	✓												
4 S-6196-4	24-Sep-20		S	1	✓												
5 S-6196-5	24-Sep-20		S	1	✓												
6																	
7																	
8																	
9																	
10																	

*Matrix: A = Air, AQ = Aqueous, L=Liquid, O = Oil, P = Product, S = Soil, SD = Sediment, SL = Solid, W = Water, DW = Drinking Water, GW = Ground Water, SW = Storm Water, WW = Waste Water, M = Miscellaneous

Turn-around Time: Standard (5-7 Business): ✓ 3 Day: [ ] 2 Day: [ ] Next Day: [ ] Same Day: [ ]

Expedited turn-around requests should be coordinated in advance

Relinquished	Date/Time	Received	Date/Time
x Kela Ashworth	24 Sept 2020 / 4:30pm	x	9/25/2020 9:30
Relinquished x	Date/Time	Received x	Date/Time
Relinquished x	Date/Time	Received x	Date/Time

Quantitative X-Ray Diffraction by Rietveld Refinement

Report Prepared for:	*Environmental Services*
Project Number/ LIMS No.	*Custom XRD/MI4504-OCT20*
Sample Receipt:	*October 6, 2020*
Sample Analysis:	*October 6, 2020*
Reporting Date:	*October 26, 2020*

Instrument:	BRUKER AXS D8 Advance Diffractometer
Test Conditions:	Co radiation, 35 kV, 40 mA Regular Scanning: Step: 0.02°, Step time: 1s, 2θ range: 3-80°
Interpretations :	PDF2/PDF4 powder diffraction databases issued by the International Center for Diffraction Data (ICDD). DiffracPlus Eva and Topas software.
Detection Limit :	0.5-2%. Strongly dependent on crystallinity.

Contents:

1) Method Summary
2) Quantitative XRD Results
3) XRD Pattern(s)

Kim Gibbs, H.B.Sc., P.Geo.
Senior Mineralogist

Huyun Zhou, Ph.D., P.Geo.
Senior Mineralogist

ACCREDITATION: SGS Minerals Services Lakefield is accredited to the requirements of ISO/IEC 17025 for specific tests as listed on our scope of accreditation, including geochemical, mineralogical and trade mineral tests. To view a list of the accredited methods, please visit the following website and search SGS Canada - Minerals Services - Lakefield: http://palcan.scc.ca/SpecsSearch/GLSearchForm.do.

Method Summary

The Rietveld Method of Mineral Identification by XRD (ME-LR-MIN-MET-MN-D05) method used by SGS Minerals Services is accredited to the requirements of ISO/IEC 17025.

Mineral Identification and Interpretation:

Mineral identification and interpretation involves matching the diffraction pattern of an unknown material to patterns of single-phase reference materials. The reference patterns are compiled by the Joint Committee on Powder Diffraction Standards - International Center for Diffraction Data (JCPDS-ICDD) database and released on software as Powder Diffraction Files (PDF).

Interpretations do not reflect the presence of non-crystalline and/or amorphous compounds, except when internal standards have been added by request. Mineral proportions may be strongly influenced by crystallinity, crystal structure and preferred orientations. Mineral or compound identification and quantitative analysis results should be accompanied by supporting chemical assay data or other additional tests.

Quantitative Rietveld Analysis:

Quantitative Rietveld Analysis is performed by using Topas 4.2 (Bruker AXS), a graphics based profile analysis program built around a non-linear least squares fitting system, to determine the amount of different phases present in a multicomponent sample. Whole pattern analyses are predicated by the fact that the X-ray diffraction pattern is a total sum of both instrumental and specimen factors. Unlike other peak intensity-based methods, the Rietveld method uses a least squares approach to refine a theoretical line profile until it matches the obtained experimental patterns.

Rietveld refinement is completed with a set of minerals specifically identified for the sample. Zero values indicate that the mineral was included in the refinement calculations, but the calculated concentration was less than 0.05wt%. Minerals not identified by the analyst are not included in refinement calculations for specific samples and are indicated with a dash.

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WARNING: The sample(s) to which the findings recorded herein (the "Findings") relate was(were) drawn and / or provided by the Client or by a third party acting at the Client's direction. The Findings constitute no warranty of the sample's representativeness of any goods and strictly relate to the sample(s). The Company accepts no liability with regard to the origin or source from which the sample(s) is/are said to be extracted.

Summary of Rietveld Quantitative Analysis X-Ray Diffraction Results

Mineral/Compound	S-6196-1 OCT4504-01 (wt %)	S-6196-2 OCT4504-02 (wt %)	S-6196-3 OCT4504-03 (wt %)	S-6196-4 OCT4504-04 (wt %)	S-6196-5 OCT4504-05 (wt %)
Quartz	79.2	43.6	39.9	42.6	66.7
Albite	0.8	1.1	2.2	2.3	1.5
Microcline	2.3	-	-	-	-
Muscovite	11.1	14.0	13.7	20.1	21.6
Kaolinite	6.6	17.2	24.5	16.2	9.2
Goethite	-	10.4	17.5	14.8	-
Orthoclase	-	13.7	1.4	3.6	0.3
Magnetite	-	-	0.2	0.1	-
Rutile	-	-	0.6	0.4	0.7
TOTAL	100	100	100	100	100

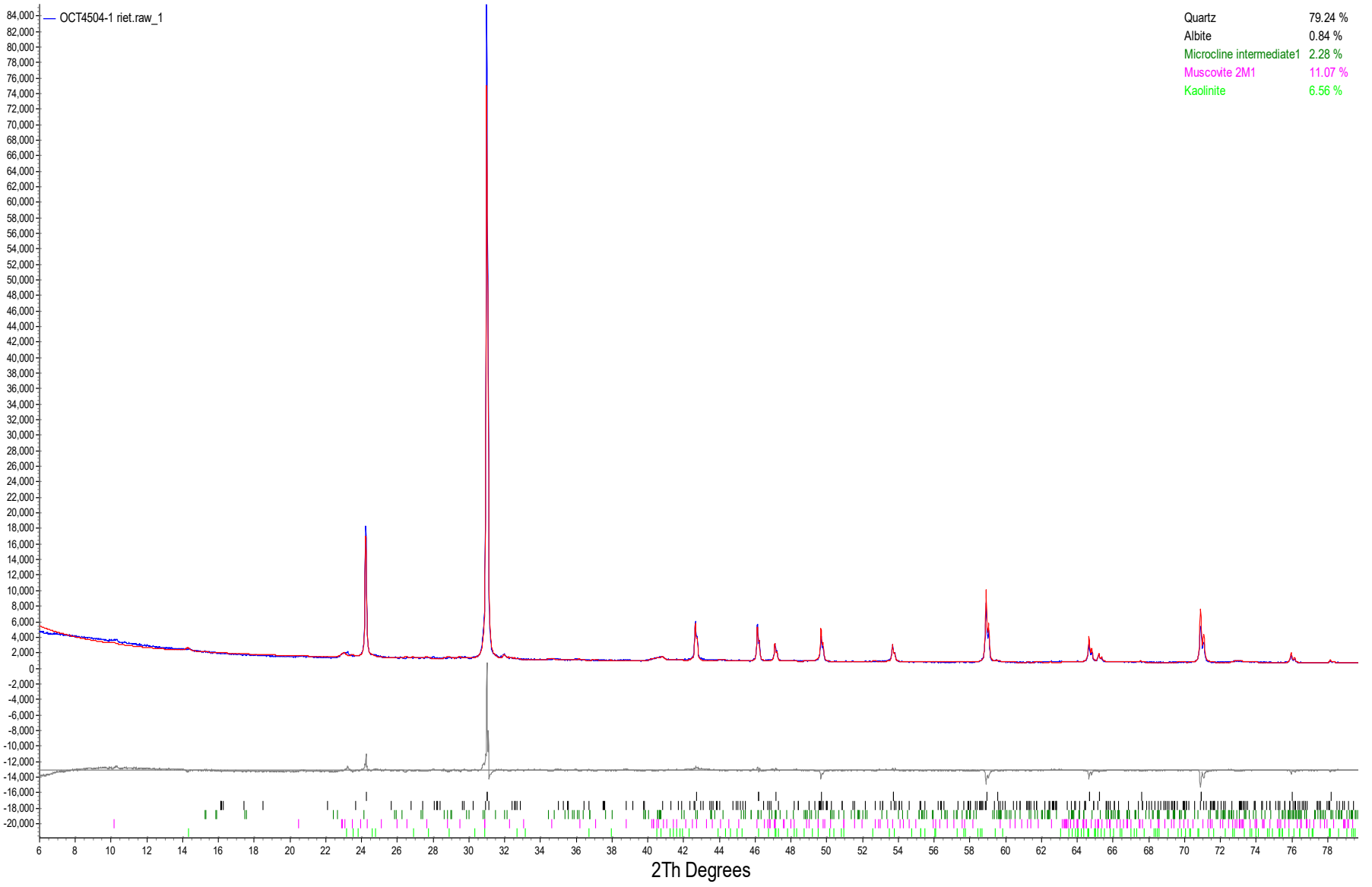
Zero values indicate that the mineral was included in the refinement, but the calculated concentration is below a measurable value.

Dashes indicate that the mineral was not identified by the analyst and not included in the refinement calculation for the sample.

The weight percent quantities indicated have been normalized to a sum of 100%. The quantity of amorphous material has not been determined.

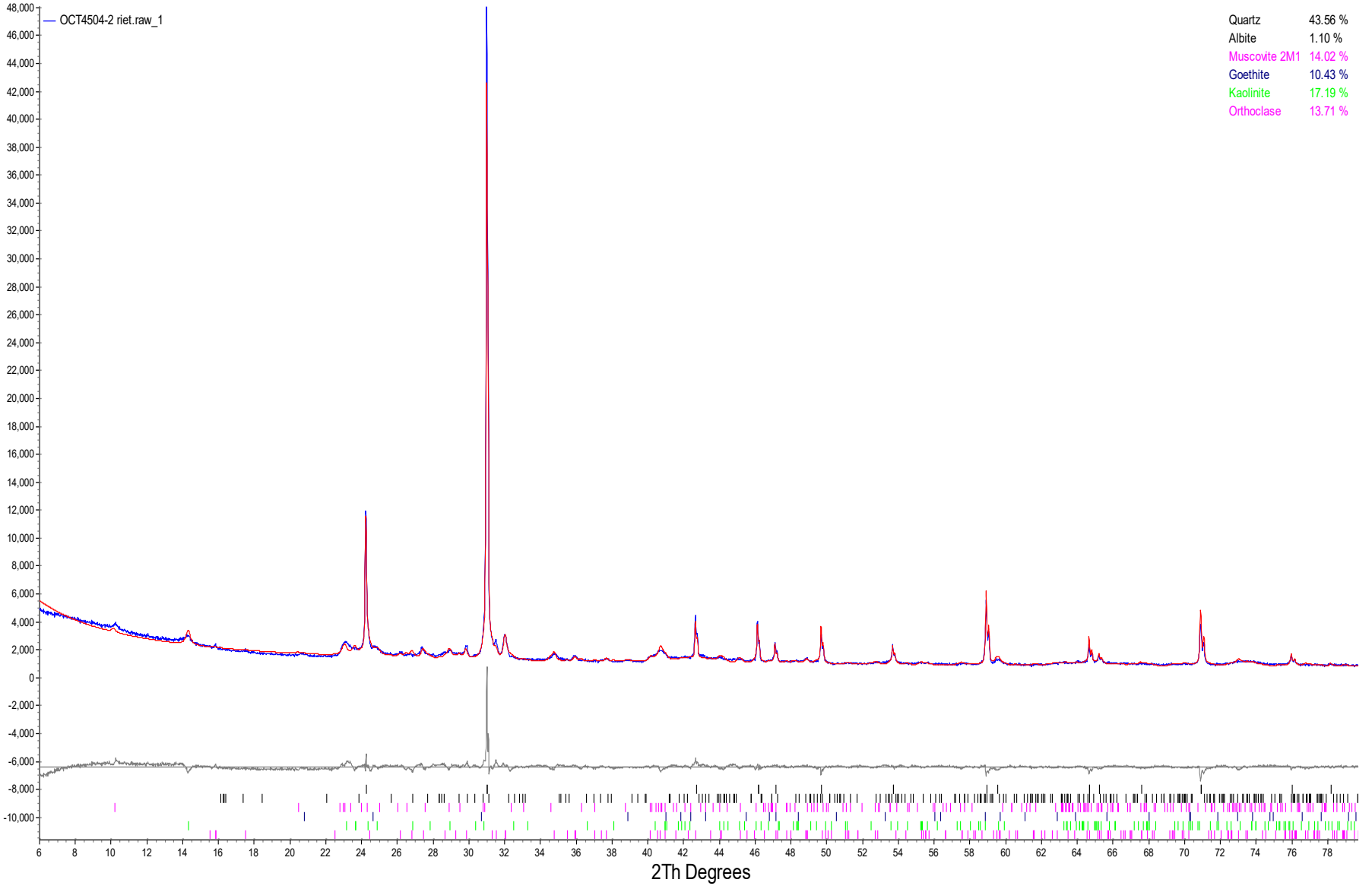
Mineral/Compound	Formula
Quartz	SiO_2
Albite	$NaAlSi_3O_8$
Microcline	$KAlSi_3O_8$
Muscovite	$KAl_2(AlSi_3O_{10})(OH)_2$
Kaolinite	$Al_2Si_2O_5(OH)_4$
Goethite	$\alpha FeO{\cdot}OH$
Orthoclase	$KAlSi_3O_8$
Magnetite	Fe_3O_4
Rutile	TiO_2

S-6196-1



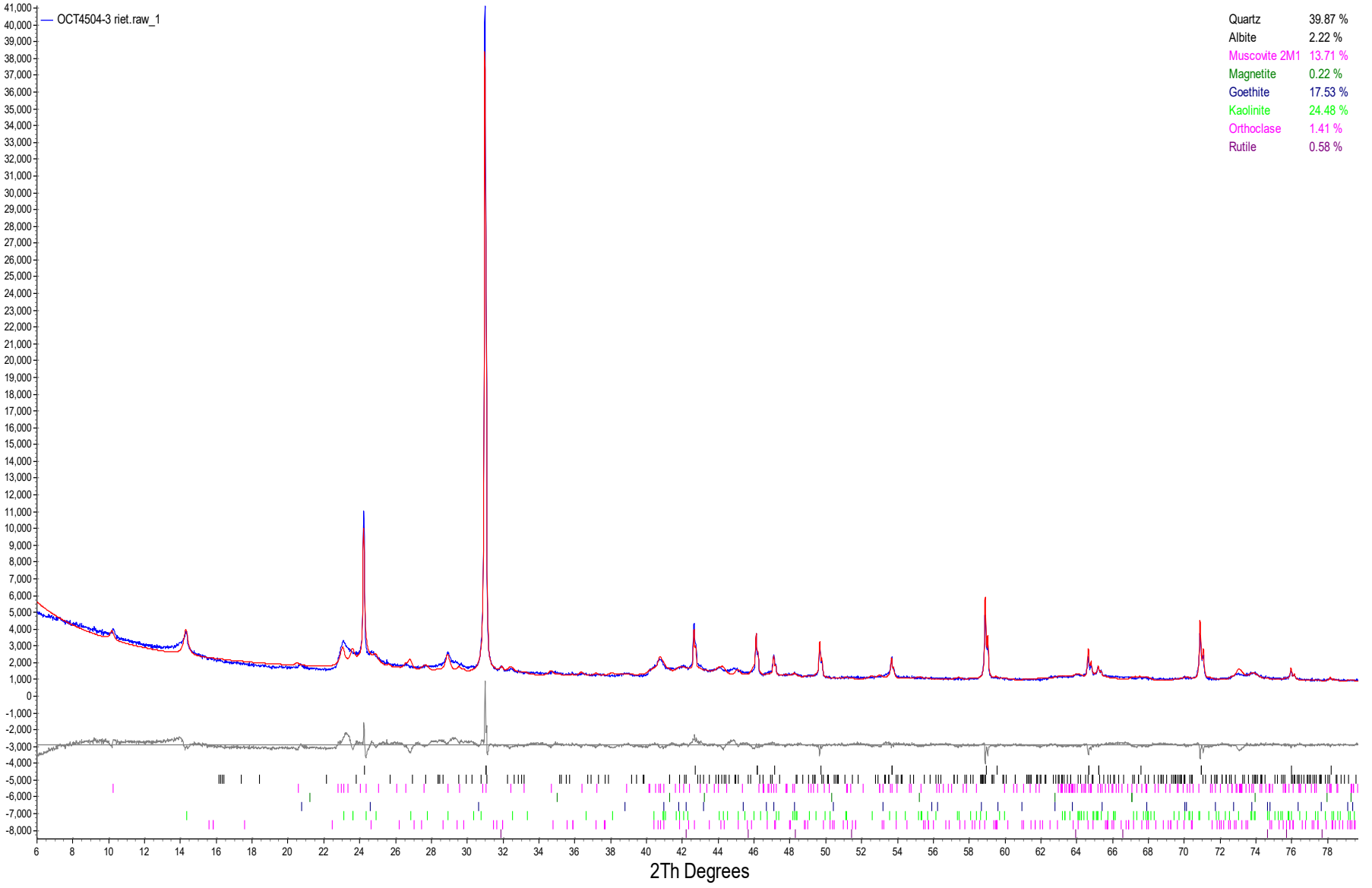
Quartz	79.24 %
Albite	0.84 %
Microcline intermediate1	2.28 %
Muscovite 2M1	11.07 %
Kaolinite	6.56 %

S-6196-2



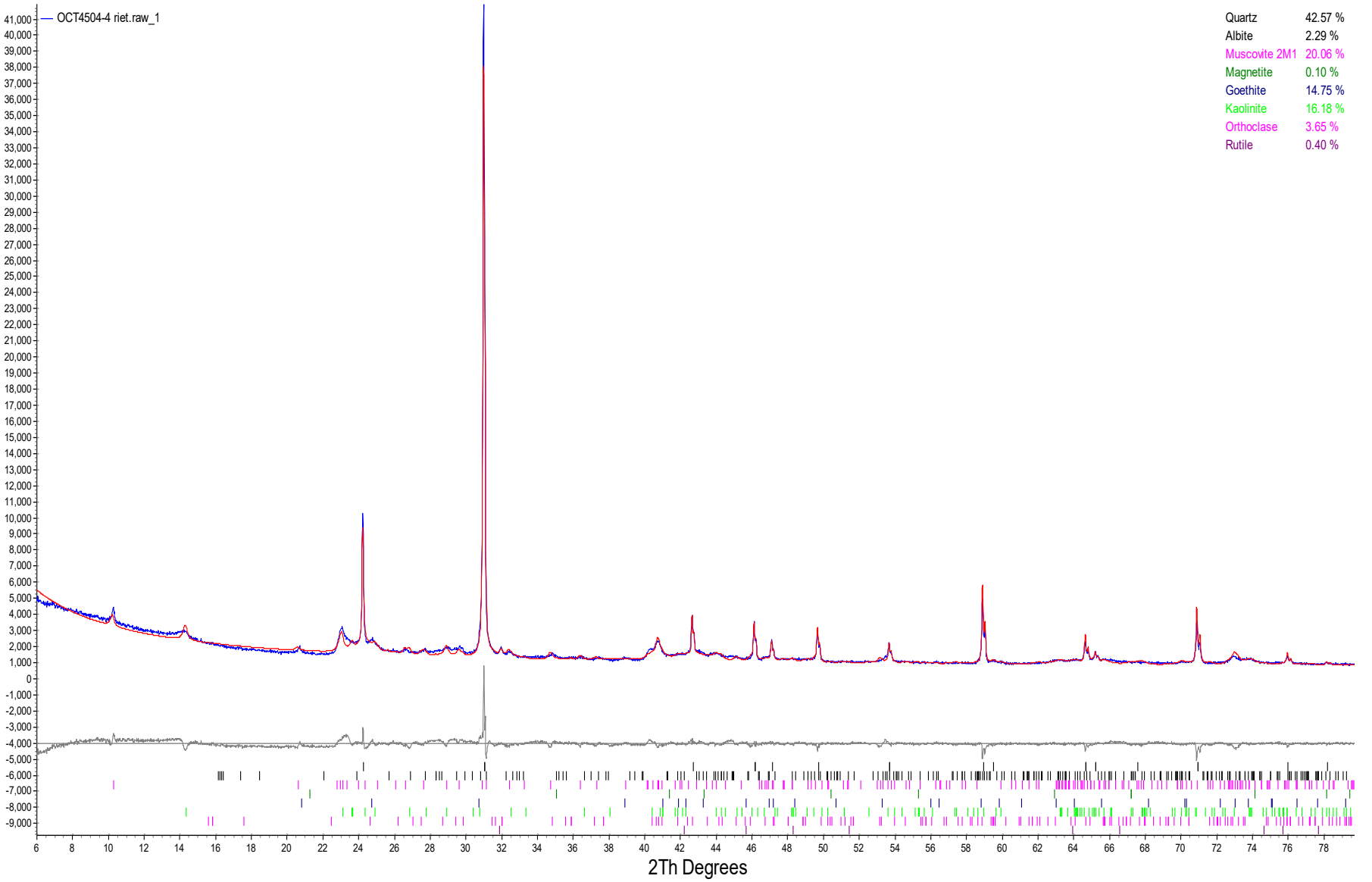
Quartz	43.56 %
Albite	1.10 %
Muscovite 2M1	14.02 %
Goethite	10.43 %
Kaolinite	17.19 %
Orthoclase	13.71 %

S-6196-3



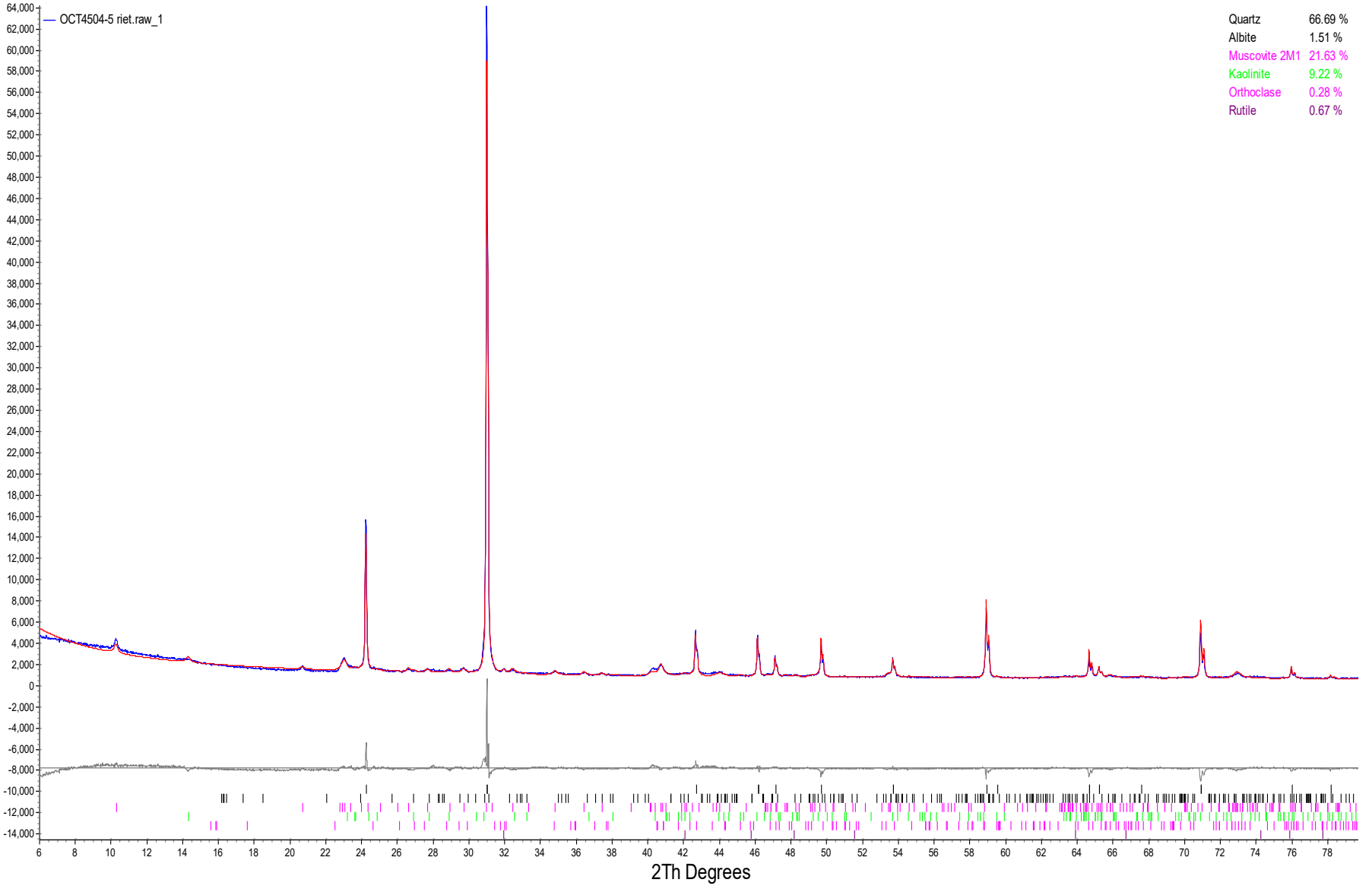
Quartz	39.87 %
Albite	2.22 %
Muscovite 2M1	13.71 %
Magnetite	0.22 %
Goethite	17.53 %
Kaolinite	24.48 %
Orthoclase	1.41 %
Rutile	0.58 %

S-6196-4



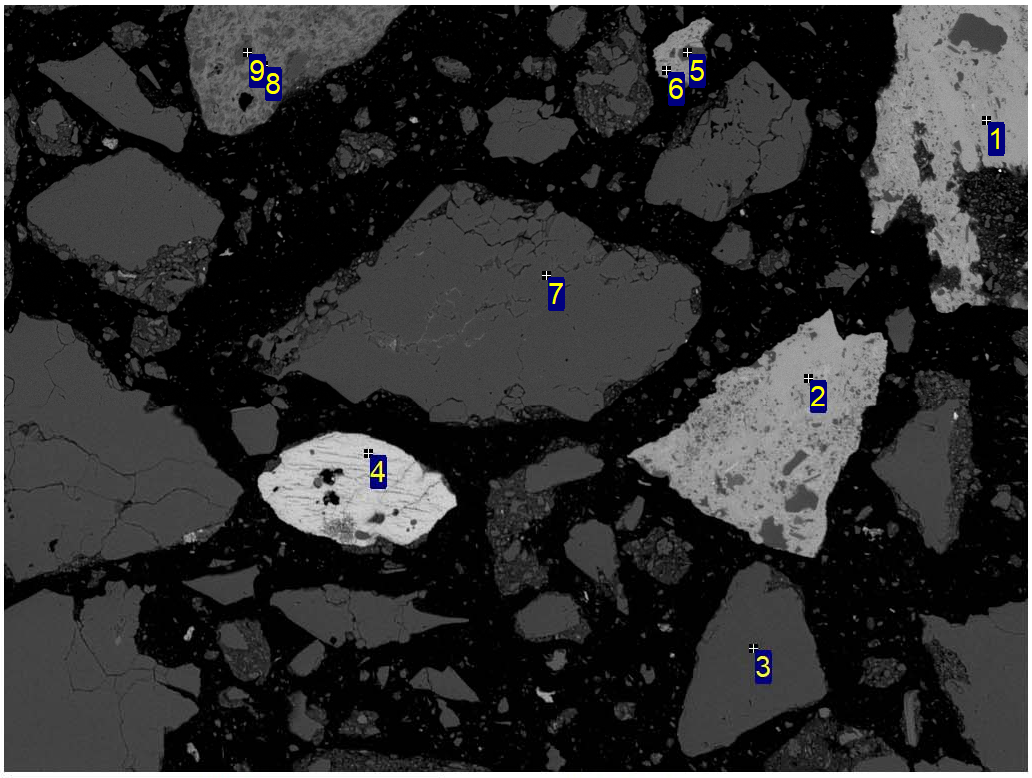
Quartz	42.57 %
Albite	2.29 %
Muscovite 2M1	20.06 %
Magnetite	0.10 %
Goethite	14.75 %
Kaolinite	16.18 %
Orthoclase	3.65 %
Rutile	0.40 %

S-6196-5



Quartz	66.69 %
Albite	1.51 %
Muscovite 2M1	21.63 %
Kaolinite	9.22 %
Orthoclase	0.28 %
Rutile	0.67 %

Sample Notes:
S-6196-1

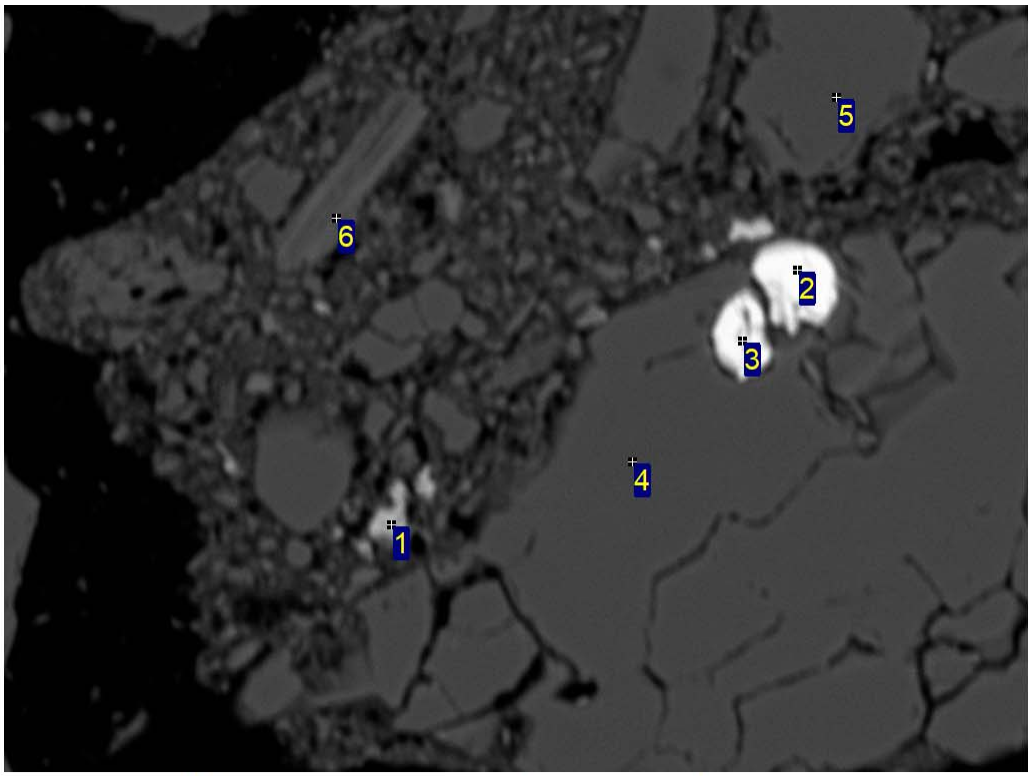


Processing option : All elements analysed (Normalised)

Spectrum	O	Mg	Al	Si	K	Ti	Mn	Fe	Total	Mineral ID
1	43.9	0.7	4.6	10.5	0.9		0.3	39.1	100.0	FeOx/Mica
2	42.6	0.3	4.7	7.2	0.4		0.3	44.5	100.0	FeOx/Mica
3	51.7			48.3					100.0	Quartz
4	34.6					29.1	2.5	33.8	100.0	Ilmenite
5	53.2			46.1				0.7	100.0	Quartz
6	45.3	1.1	7.5	13.2	2.8			30.0	100.0	FeOx/Mica
7	51.0			49.0					100.0	Quartz
8	39.0	1.3	6.8	13.4	2.2			37.3	100.0	FeOx/Mica
9	52.1			47.2				0.7	100.0	Quartz

All results in weight%

Sample Notes:
S-6196-1

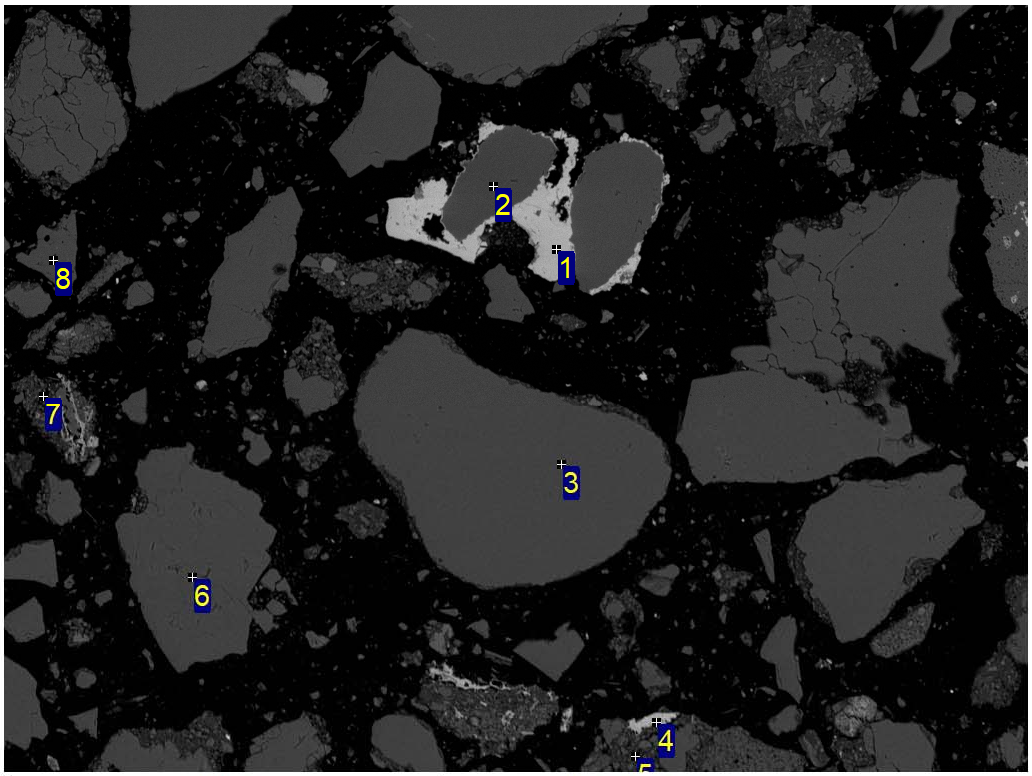


Processing option : All elements analysed (Normalised)

Spectrum	O	Mg	Al	Si	P	K	Ti	Mn	Fe	Zr	Hf	Total	Mineral ID
1	41.6	0.7	1.4	2.8	0.3			0.9	52.3			100.0	FeOx
2	35.0			15.7						49.3		100.0	Zircon
3	33.6			15.9						48.8	1.6	100.0	Zircon
4	51.9			48.1								100.0	Quartz
5	51.4			48.6								100.0	Quartz
6	47.7	1.1	16.7	23.8		8.2	0.4		2.2			100.0	Mica

All results in weight%

Sample Notes:
S-6196-1

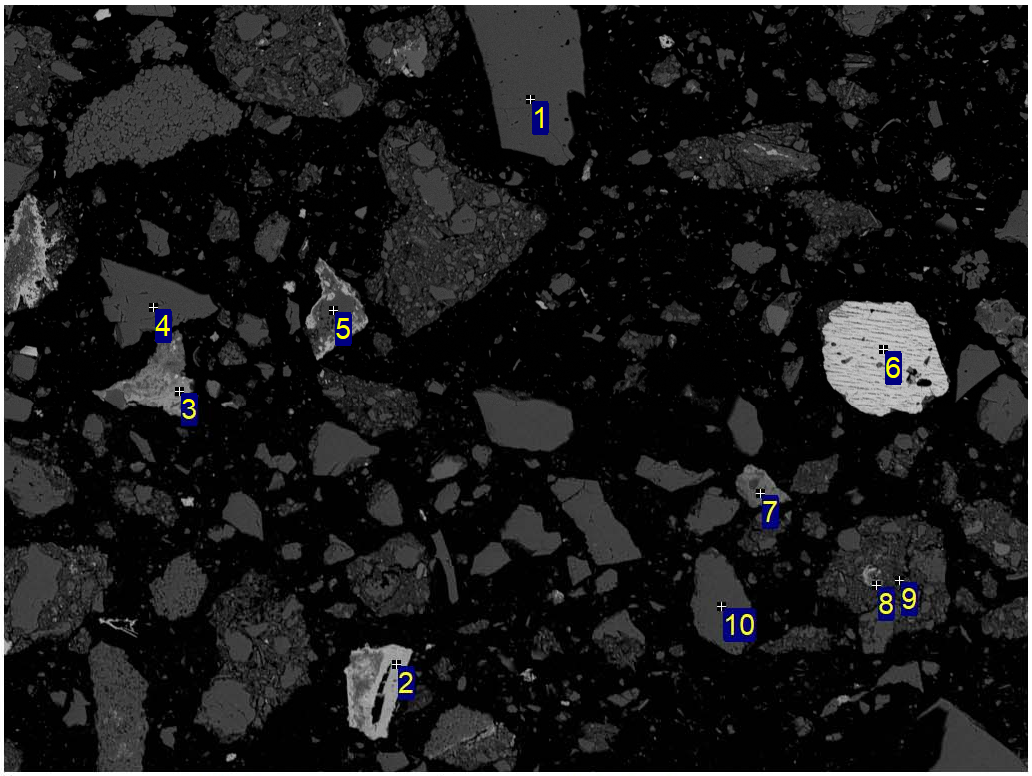


Processing option : All elements analysed (Normalised)

Spectrum	O	Mg	Al	Si	S	K	Ti	Mn	Fe	Total	Mineral ID
1	39.8			2.4				0.5	57.3	100.0	FeOx
2	51.7			47.9					0.4	100.0	Quartz
3	51.7			48.3						100.0	Quartz
4	40.5	1.1	0.9	2.4					55.1	100.0	FeOx
5	43.7	0.7	14.9	25.2	0.5	2.2	0.3		12.5	100.0	Silicates
6	52.7			47.3						100.0	Quartz
7	45.3	0.8	11.1	21.4		1.7	8.8		10.9	100.0	Silicates
8	52.1		0.4	47.1		0.1			0.2	100.0	Quartz

All results in weight%

Sample Notes:
S-6196-1



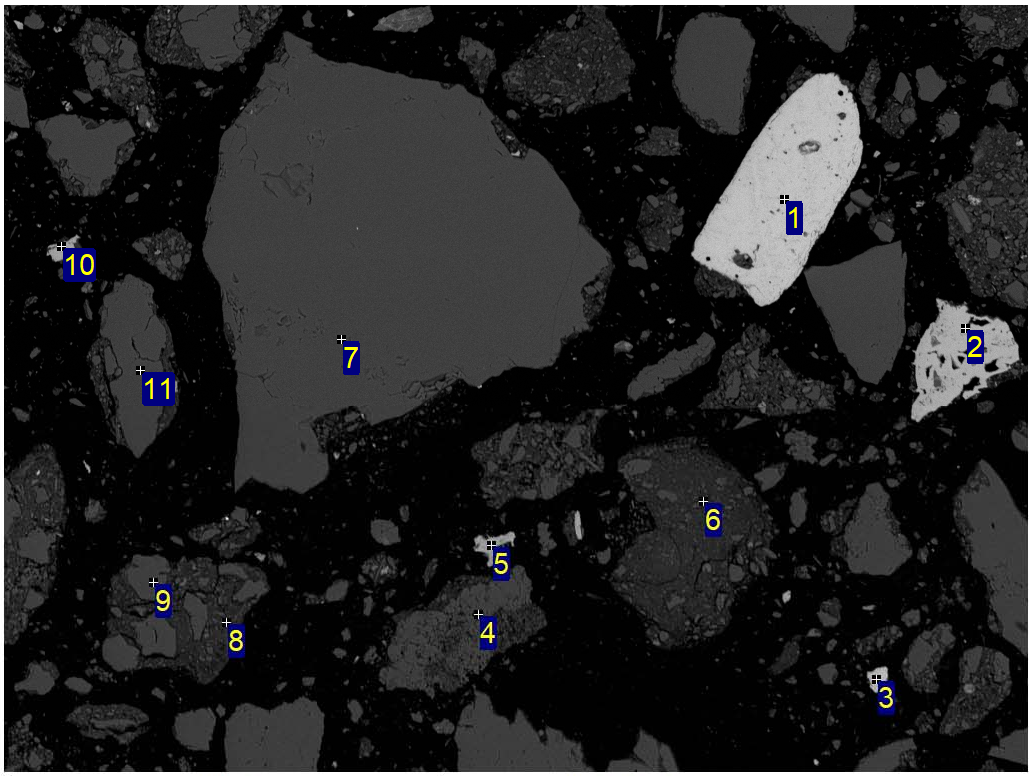
Electron Image 1

Processing option : All elements analysed (Normalised)

Spectrum	O	Mg	Al	Si	S	Cl	K	Ca	Ti	Mn	Fe	Ba	Total	Mineral ID
1	51.8			48.2									100.0	Quartz
2	37.1	0.7	1.3	1.8						0.6	58.4		100.0	FeOx
3	42.0	0.3	6.3	19.6			1.3				30.5		100.0	Amphibole
4	50.9			49.1									100.0	Quartz
5	51.1			48.6							0.4		100.0	Quartz
6	37.2		0.4						30.3	4.9	27.2		100.0	Ilmenite
7	43.3	0.4	7.3	22.5			1.0		0.3		25.2		100.0	Amphibole
8	35.8	1.7	5.9	9.1		0.5	1.3	2.0		38.1	3.3	2.4	100.0	MnOx
9	47.0	1.5	14.9	29.0	0.3		3.2		0.4		3.7		100.0	Feldspar
10	51.6			48.4									100.0	Quartz

All results in weight%

Sample Notes:
S-6196-1



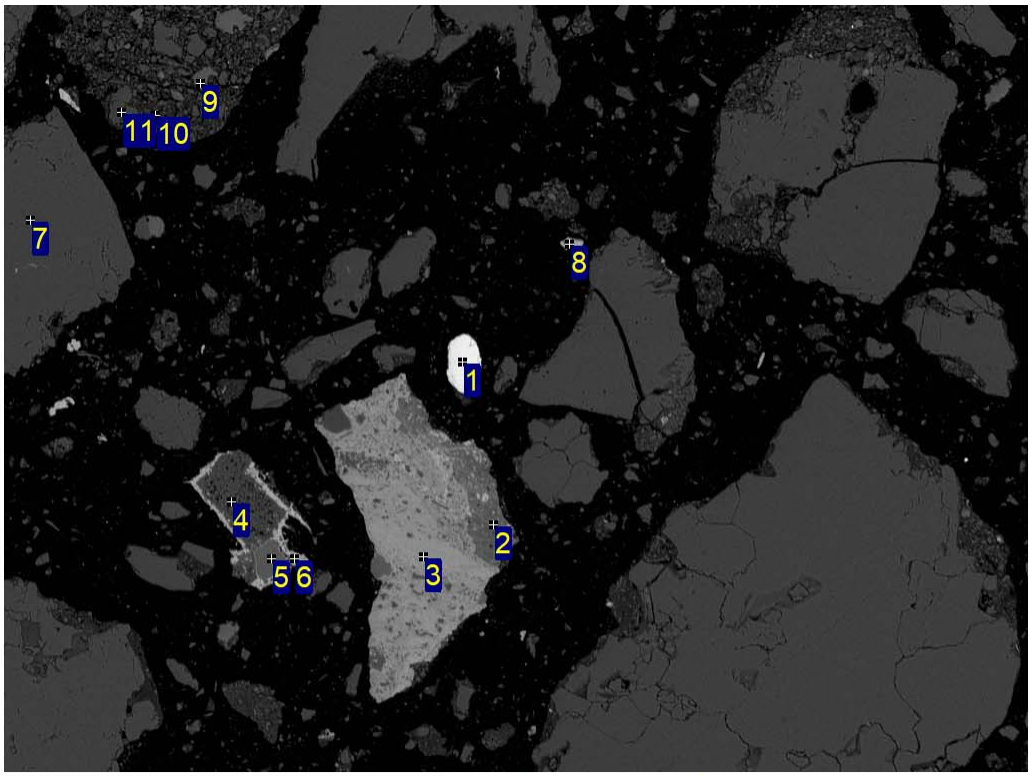
Electron Image 1

Processing option : All elements analysed (Normalised)

Spectrum	O	Mg	Al	Si	P	Cl	K	Ca	Ti	Mn	Fe	Total	Mineral ID
1	38.3								29.7	1.8	30.1	100.0	Ilmenite
2	40.2			2.2						0.4	57.2	100.0	FeOx
3	35.4								31.0	1.4	32.1	100.0	Ilmenite
4	52.7			47.3								100.0	Quartz
5	38.6	0.5	0.6	1.7	0.3					1.6	56.7	100.0	FeOx
6	48.4	0.8	11.9	32.7		0.4	1.7		0.5		3.6	100.0	Feldspar
7	51.5			48.5								100.0	Quartz
8	45.9	0.4	7.4	42.8			1.4	0.2	0.3		1.6	100.0	Quartz/Feldpsar
9	52.3			47.7								100.0	Quartz
10	38.7	0.4	0.9	1.9						1.5	56.6	100.0	FeOx
11	52.0			48.0								100.0	Quartz

All results in weight%

Sample Notes:
S-6196-1 Rep



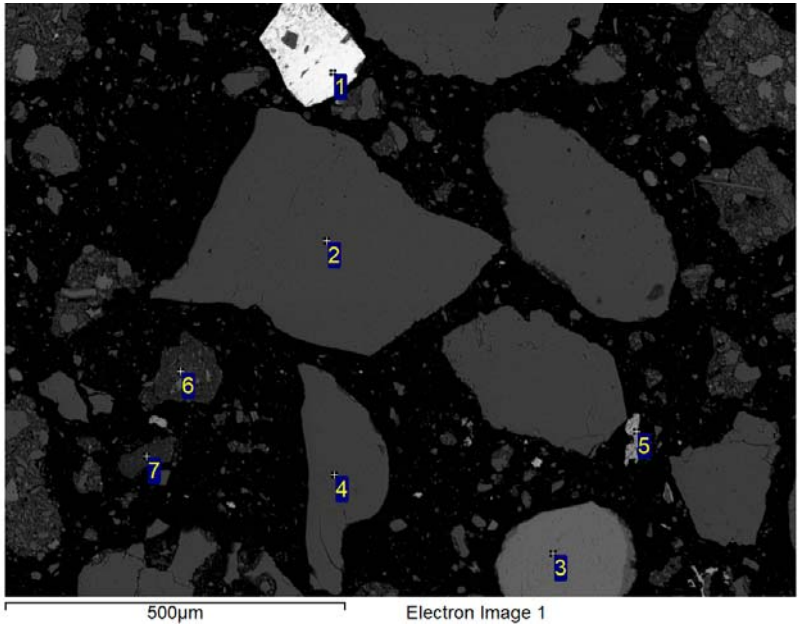
Electron Image 1

Processing option : All elements analysed (Normalised)

Spectrum	O	Mg	Al	Si	S	K	Ti	Mn	Fe	Zr	Ba	Hf	Total	Mineral ID
1	32.9			15.9						49.7		1.5	100.0	Zircon
2	46.5	2.3	6.4	31.3		4.2			9.4				100.0	Feldspar
3	42.8	0.4	5.0	7.3		0.5		0.3	43.7				100.0	FeOx
4	48.0	0.4	3.0	46.2		1.7			0.7				100.0	Quartz
5	45.0		9.2	30.2	0.4	13.0			0.4		1.8		100.0	Feldspar
6	46.4		0.3	21.8		0.1			31.4				100.0	FeOx/Quartz
7	51.8			48.2									100.0	Quartz
8	41.0	0.3	0.5	2.2					56.0				100.0	FeOx
9	32.2		11.3	37.5		17.1	0.4		1.5				100.0	Feldspar
10	49.0	1.1	10.1	34.4	0.3	2.6	0.3		2.1				100.0	Feldspar
11	51.8			48.2									100.0	Quartz

All results in weight%

Sample Notes:
S-6196-1 Rep

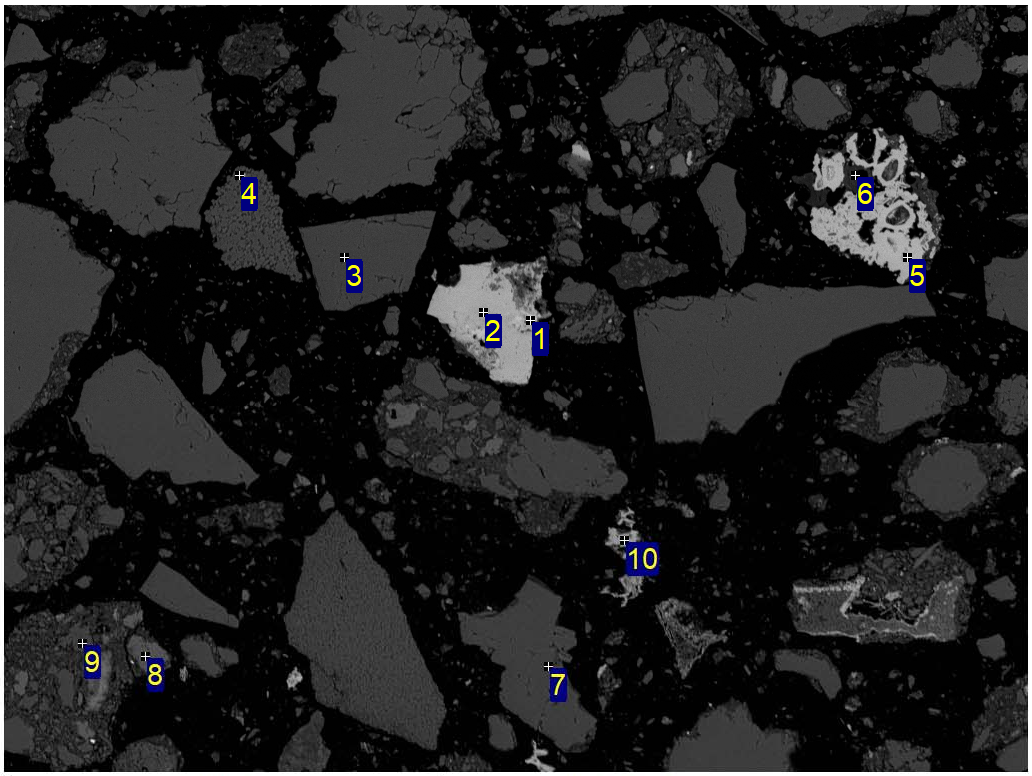


Processing option : All elements analysed (Normalised)

Spectrum	O	Na	Mg	Al	Si	S	K	Ca	Ti	Mn	Fe	Zr	Hf	Total	Mineral ID
1	33.5				15.8							49.1	1.6	100.0	Zircon
2	51.2				48.8									100.0	Quartz
3	46.7	1.5	0.5	12.8	17.2			1.1	0.5		19.6			100.0	Amphibole
4	51.8				48.2									100.0	Quartz
5	34.2		0.5	0.3	2.3					1.2	61.4			100.0	FeOx
6	46.0		1.1	15.1	30.1		2.7		0.4		4.6			100.0	Feldspar
7	45.8		1.1	17.9	27.8	0.9	2.8	0.2	0.6		2.9			100.0	Feldpsar

All results in weight%

Sample Notes:
S-6196-1 Rep

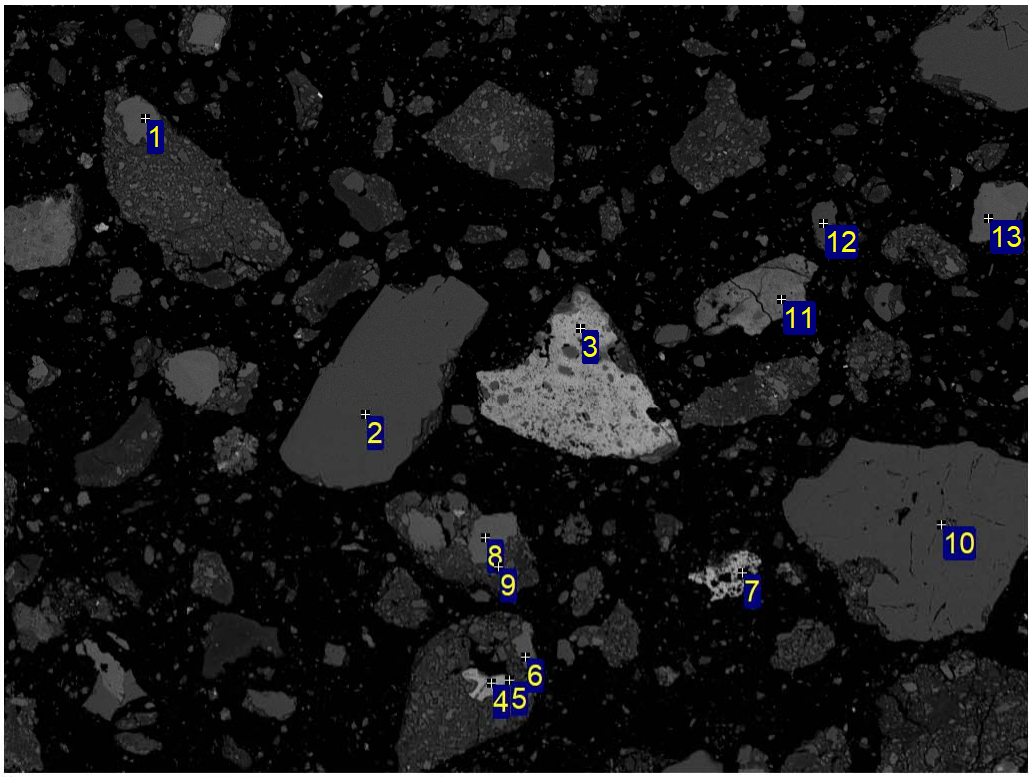


Processing option : All elements analysed (Normalised)

Spectrum	O	Mg	Al	Si	S	K	Ca	Ti	Mn	Fe	Ba	Total	Mineral ID
1	41.5		0.6	16.1			0.2		8.1	32.0	1.5	100.0	FeOx/Feldspar
2	38.1		0.6	2.1			0.2		3.7	55.2		100.0	FeOx
3	51.7			48.3								100.0	Quartz
4	51.8			47.9						0.3		100.0	Quartz
5	33.7			1.4					1.0	63.9		100.0	FeOx
6	48.8	0.9	15.9	23.9	1.5	2.9		0.4		5.8		100.0	Mica
7	51.4			48.6								100.0	Quartz
8	47.9	0.6	12.0	29.0		10.3				0.2		100.0	Feldspar
9	52.3			47.7								100.0	Quartz
10	39.6	0.6	1.4	2.4			0.2		0.4	55.4		100.0	FeOx

All results in weight%

Sample Notes:
S-6196-2

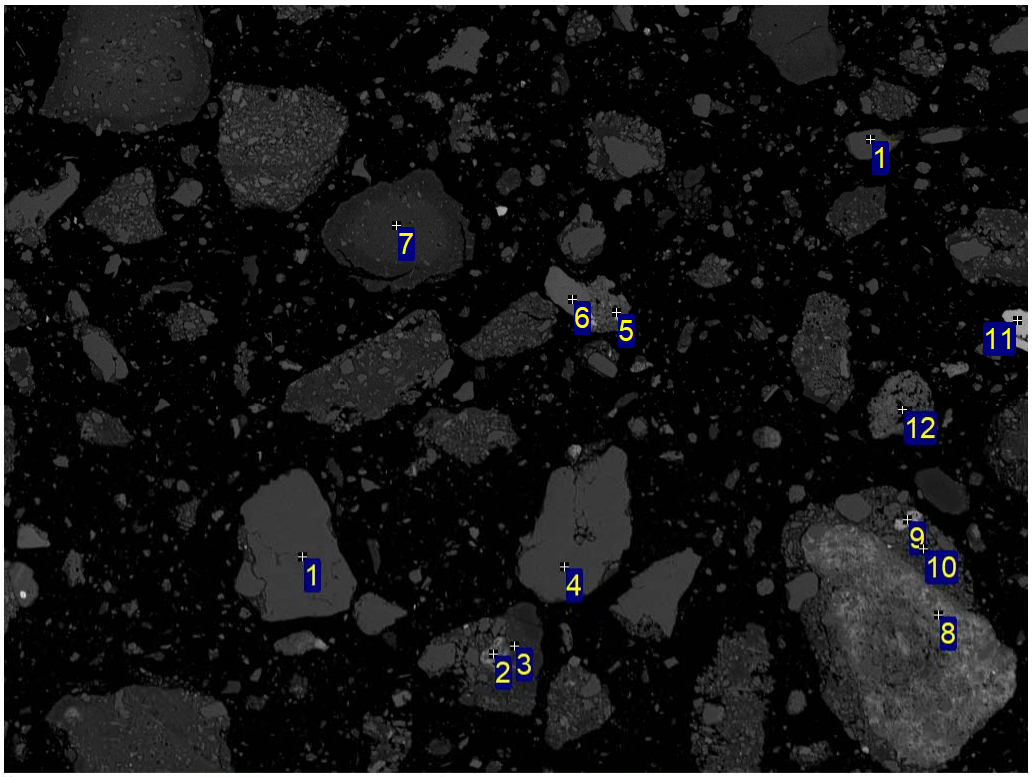


Processing option : All elements analysed (Normalised)

Spectrum	O	Mg	Al	Si	P	Cl	K	Ti	Mn	Fe	Ba	Total	Mineral ID
1	45.5		9.4	31.7			13.5					100.0	Feldspar
2	51.8			48.2								100.0	Quartz
3	37.7		2.2	1.9					0.8	57.4		100.0	FeOx
4	34.5		1.1	0.8		0.4			0.8	62.3		100.0	FeOx
5	33.2		1.5	1.2	0.4				0.9	62.8		100.0	FeOx
6	46.2		9.6	31.2			12.3			0.7		100.0	Feldspar
7	35.8		2.2	11.1	0.5	0.5				49.9		100.0	FeOx
8	45.8		8.7	32.8			12.6					100.0	Feldspar
9	50.2	0.8	8.7	35.7			2.0	0.6		2.0		100.0	Silicates
10	50.5			49.5								100.0	Quartz
11	43.3	0.4	10.8	13.5			1.0	0.4		30.7		100.0	Amphibole
12	52.3			47.5						0.2		100.0	Quartz
13	45.5		9.3	31.2			13.0				0.9	100.0	Feldspar

All results in weight%

Sample Notes:
S-6196-2

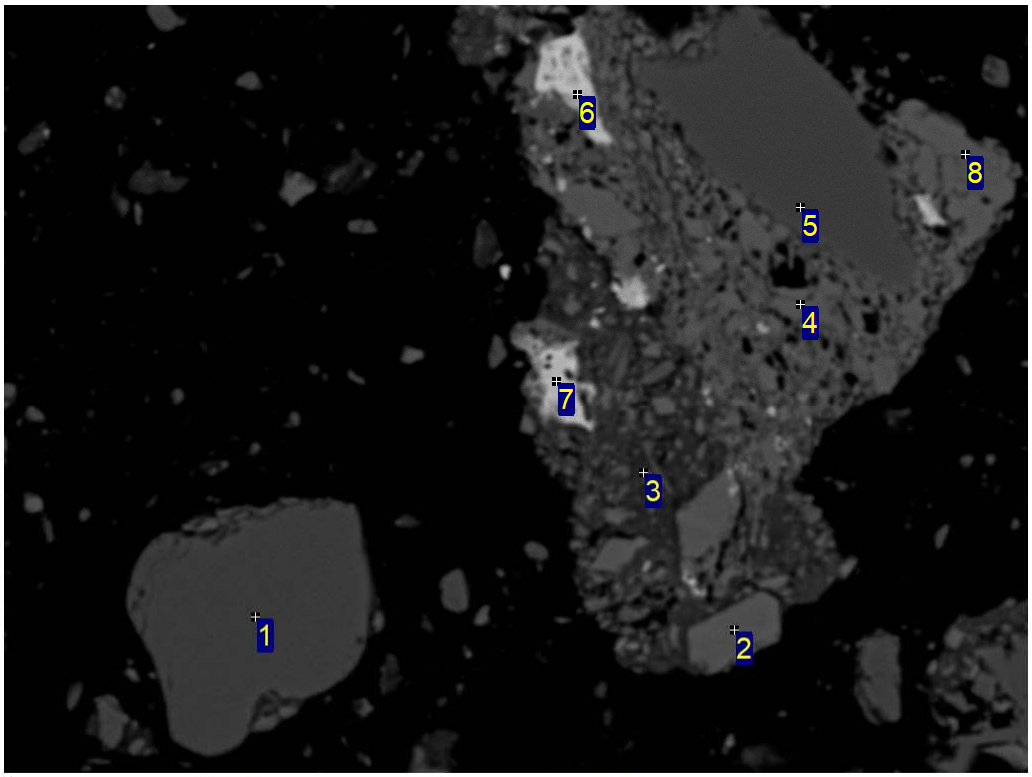


Processing option : All elements analysed (Normalised)

Spectrum	O	Mg	Al	Si	P	Cl	K	Ca	Ti	Fe	Total	Mineral ID
1	52.4			47.6							100.0	Quartz
2	36.4		5.7	8.0		0.4	0.7			48.8	100.0	FeOx
3	45.1	0.7	18.6	25.8		0.3	1.7		0.4	7.4	100.0	Mica
4	51.9			48.1							100.0	Quartz
5	40.1	0.9	9.1	36.2			12.1		0.6	0.9	100.0	Feldspar
6	45.6		9.5	31.5			13.4				100.0	Feldspar
7	48.3	1.0	16.6	25.9		0.5	2.2	0.4	0.4	4.7	100.0	Feldpsar
8	42.8	0.6	6.0	19.6			1.6			29.4	100.0	FeOx/Silicates
9	41.3		5.4	6.4	0.3		0.3			46.4	100.0	FeOx/Silicates
10	46.7	0.6	6.2	42.5			1.7		0.3	2.1	100.0	Silicates
11	41.4		0.9	1.0	1.3					55.3	100.0	FeOx
12	42.2	0.4	4.4	47.5			5.1			0.4	100.0	Quartz/Mica
1	52.8			47.2							100.0	Quartz

All results in weight%

Sample Notes:
S-6196-2

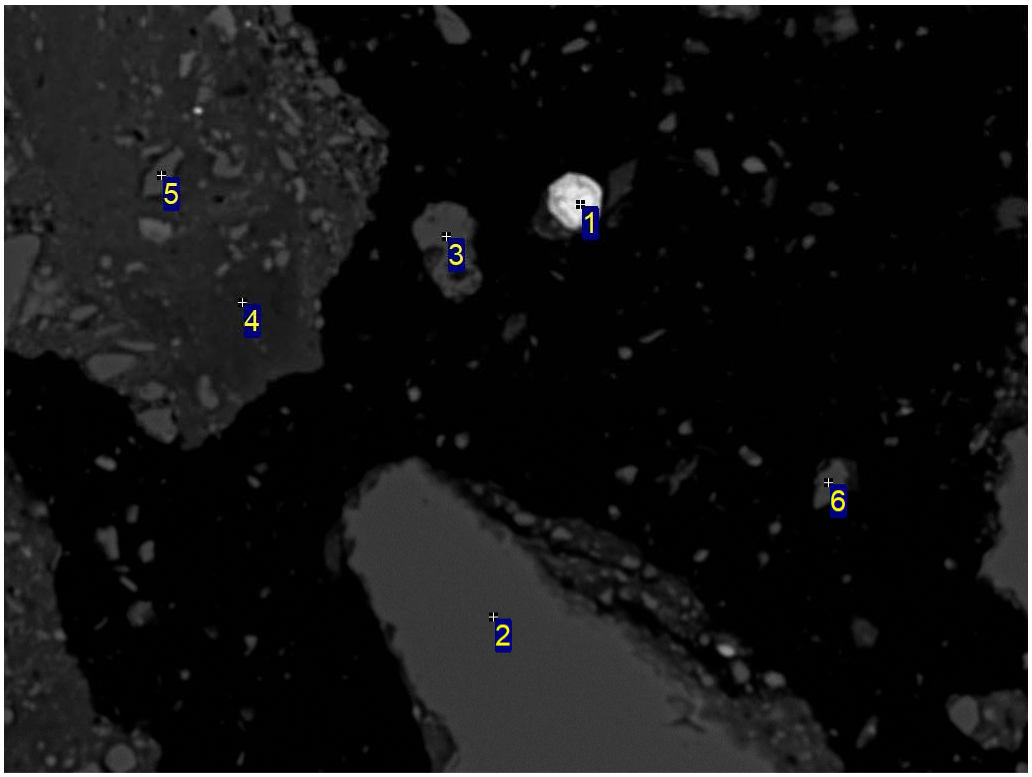


Processing option : All elements analysed (Normalised)

Spectrum	O	Mg	Al	Si	S	Cl	K	Ti	Fe	Total	Mineral ID
1	51.6			48.4						100.0	Quartz
2	45.8		9.1	32.2			12.8			100.0	Feldspar
3	42.9	0.6	12.6	28.0	1.8	0.5	4.5	0.2	8.9	100.0	Silicates
4	45.5		9.4	32.0			13.0			100.0	Feldspar
5	51.1			48.9						100.0	Quartz
6	32.8		1.1	4.9			0.7		60.5	100.0	FeOx
7	37.3		0.4	1.9					60.4	100.0	FeOx
8	43.6		9.5	32.8			14.0			100.0	Feldsparo

All results in weight%

Sample Notes:
S-6196-2

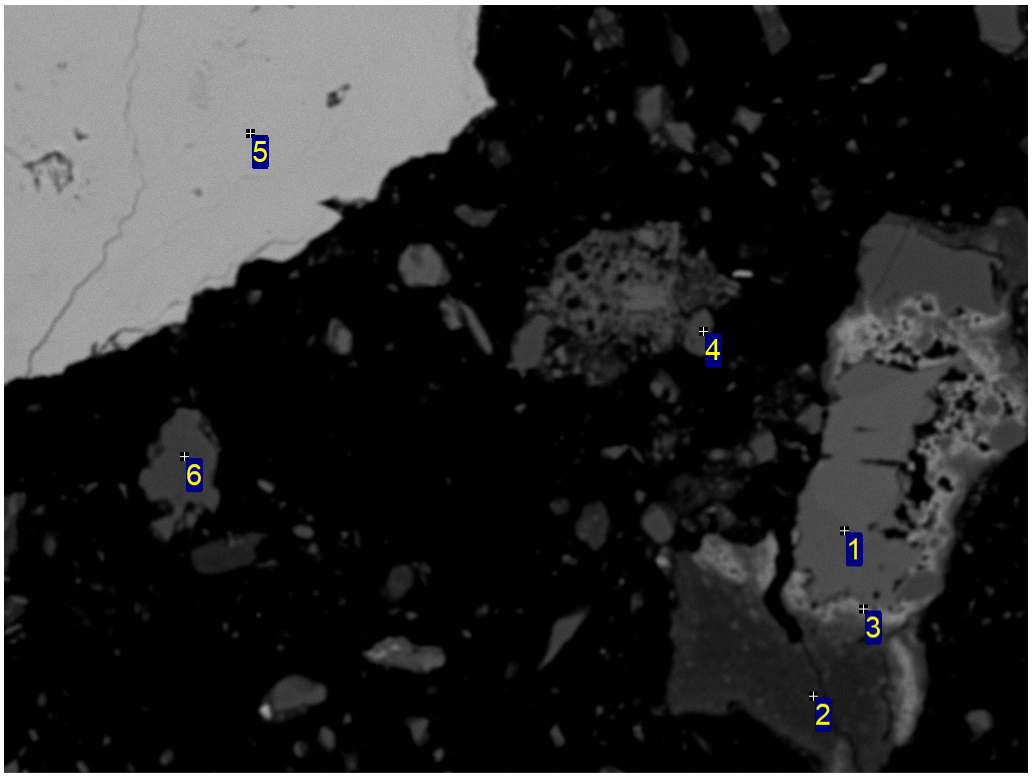


Processing option : All elements analysed (Normalised)

Spectrum	O	Mg	Al	Si	S	Cl	K	Ca	Ti	Fe	Zr	Total	Mineral ID
1	35.5			15.3						0.4	48.8	100.0	Zircon
2	51.8			48.2								100.0	Quartz
3	51.9			48.1								100.0	Quartz
4	45.4	0.6	15.9	27.3	2.4	0.3	1.2		0.6	6.3		100.0	Feldspar
5	53.4		0.4	46.1				0.2				100.0	Quartz
6	53.1	0.2	1.4	44.4			0.6			0.2		100.0	Quartz

All results in weight%

Sample Notes:
S-6196-2 Rep

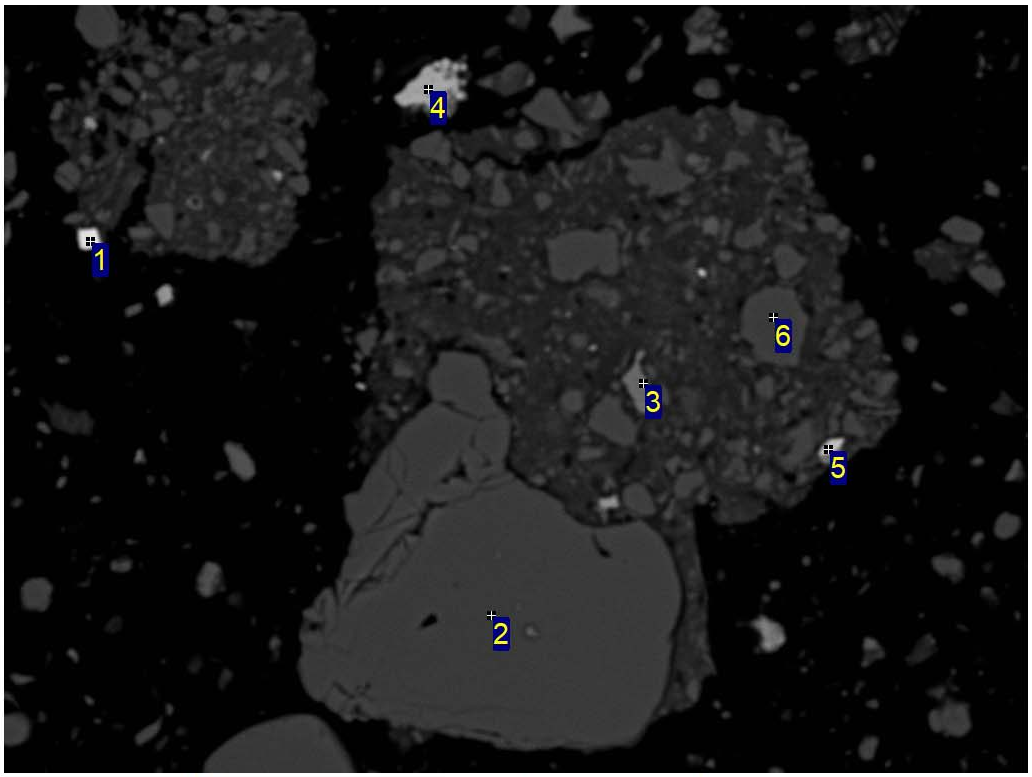


Processing option : All elements analysed (Normalised)

Spectrum	O	Mg	Al	Si	P	S	Cl	K	Ti	Fe	Ba	Total	Mineral ID
1	44.3		9.5	32.2				13.1		0.3	0.6	100.0	Feldspar
2	42.0	0.7	19.1	26.9		1.7	0.3	2.0	0.3	7.0		100.0	Mica
3	30.1		8.1	20.2			0.3	7.0		34.4		100.0	FeOx/Feldspar
4	55.9		3.6	34.1			3.6	0.9		1.9		100.0	Quartz/Felspar
5	39.0		0.4	0.9	1.5					58.2		100.0	FeOx
6	50.3			49.4						0.3		100.0	Quartz

All results in weight%

Sample Notes:
S-6196-2 Rep

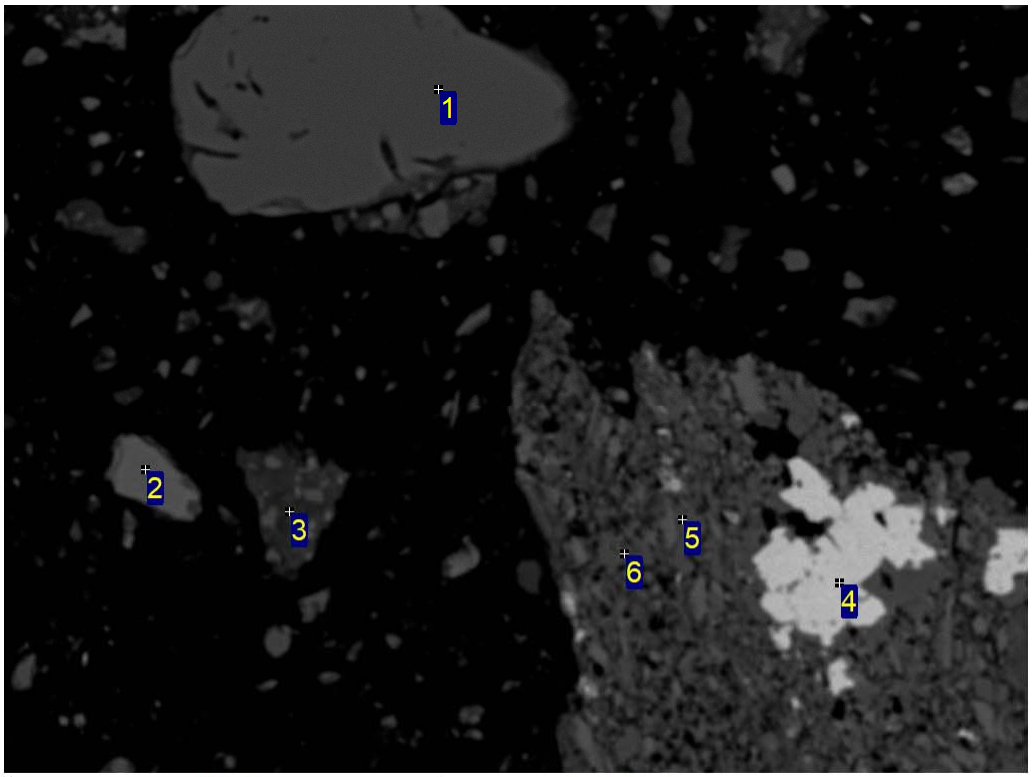


Processing option : All elements analysed (Normalised)

Spectrum	O	Mg	Al	Si	K	Ca	Ti	Mn	Fe	Zr	Total	Mineral ID
1	34.1			16.0						49.9	100.0	Zircon
2	50.9			49.1							100.0	Quartz
3	43.4		11.7	19.1		16.0			9.8		100.0	Mica
4	39.1		0.4	2.7				0.4	57.5		100.0	FeOx
5	39.6	0.9	3.7	12.8	0.3		7.7		35.0		100.0	FeOx/Mica
6	51.5			48.5							100.0	Quartz

All results in weight%

Sample Notes:
S-6196-2 Rep

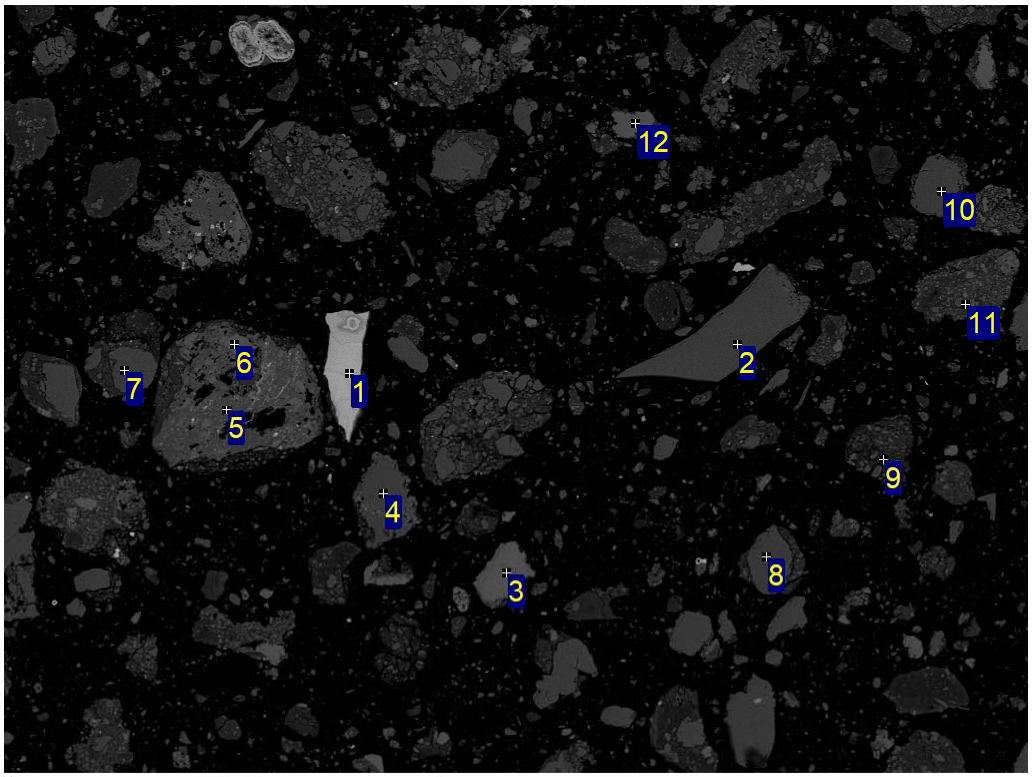


Processing option : All elements analysed (Normalised)

Spectrum	O	Mg	Al	Si	S	K	Ti	Fe	Total	Mineral ID
1	51.0			49.0					100.0	Quartz
2	45.2		9.2	32.5		13.1			100.0	Feldspar
3	43.6	0.6	17.1	28.8	1.0	1.5	0.5	7.0	100.0	Mica/Feldpsar
4	35.3		0.4	1.6				62.7	100.0	FeOx
5	46.3	0.4	10.4	31.0		11.3		0.5	100.0	Feldspar
6	49.5	0.2	3.0	43.7		3.5			100.0	Quartz/Feldspar

All results in weight%

Sample Notes:
S-6196-2 Rep

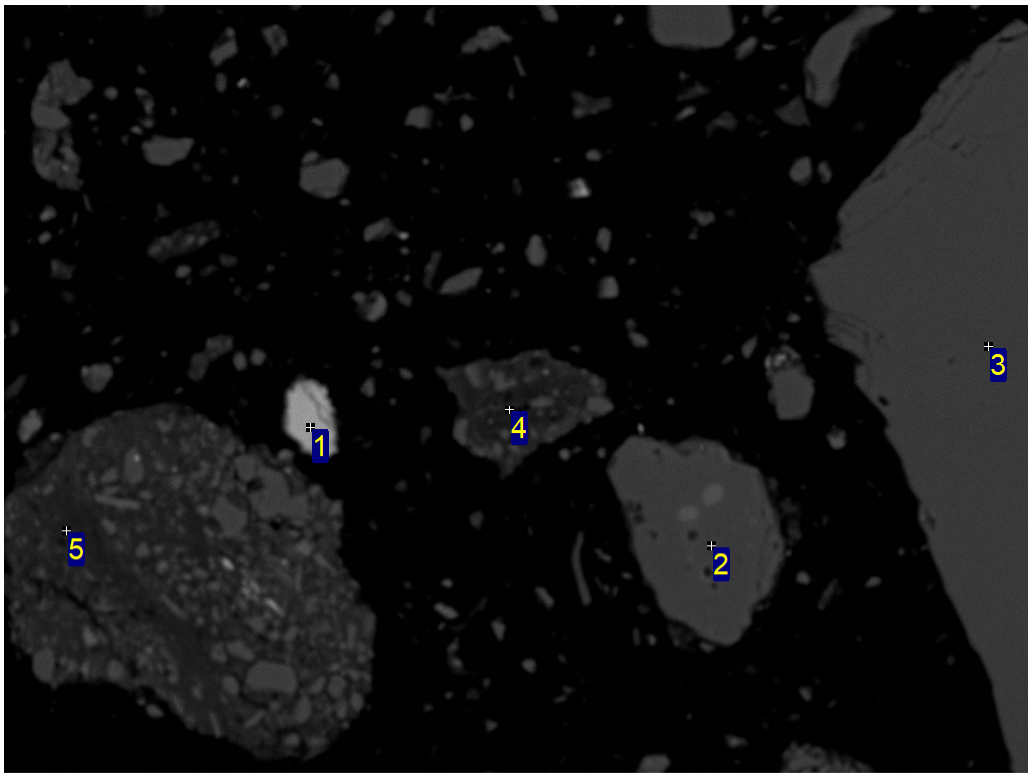


Processing option : All elements analysed (Normalised)

Spectrum	O	Mg	Al	Si	P	S	Cl	K	Ti	Fe	Ba	Total	Mineral ID
1	40.1			1.0	1.4					57.6		100.0	FeOx
2	50.7			49.3								100.0	Quartz
3	45.1		9.6	31.9				13.4				100.0	Feldspar
4	50.6			49.1						0.3		100.0	Quartz
5	45.4	1.9	8.5	34.6				8.8	0.3	0.7		100.0	Feldspar/Quartz
6	44.6		9.3	32.1				12.9		0.2	1.0	100.0	Feldspar
7	51.2			48.8								100.0	Quartz
8	50.9			49.1								100.0	Quartz
9	42.1	0.6	16.1	34.1		0.3	0.4	1.5	1.9	3.0		100.0	Feldspar/Quartz
10	51.1			48.9								100.0	Quartz
11	37.0	0.5	8.7	44.3		0.6		4.4		4.4		100.0	Feldspar/Quartz
12	46.7		9.2	31.3				12.8				100.0	Feldspar

All results in weight%

Sample Notes:
S-6196-2 Rep

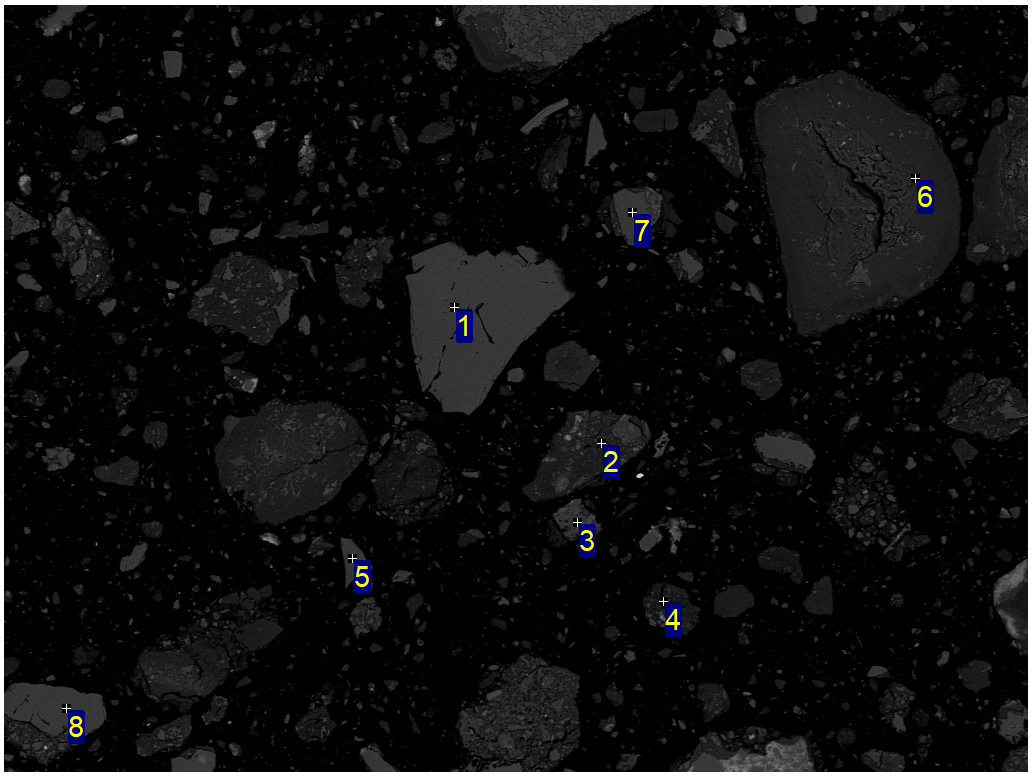


Processing option : All elements analysed (Normalised)

Spectrum	O	Mg	Al	Si	P	S	Cl	K	Ti	Fe	Total	Mineral ID
1	38.3		0.6	1.0	1.4					58.7	100.0	FeOx
2	51.2		0.3	48.3				0.2			100.0	Quartz
3	50.9			49.1							100.0	Quartz
4	42.2	0.6	14.1	34.5		2.3	0.4	1.3	0.4	4.1	100.0	Feldspar
5	43.5	0.6	16.9	28.2		1.3	0.4	1.3	0.5	7.2	100.0	Feldspar

All results in weight%

Sample Notes:
S-6196-3



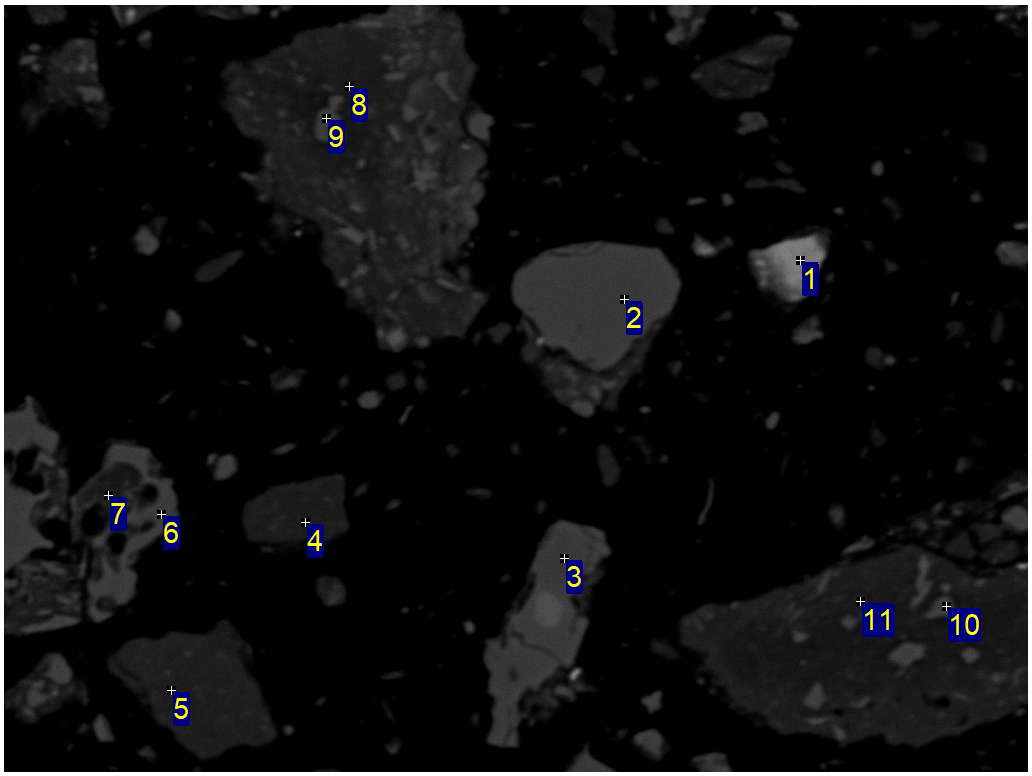
Electron Image 1

Processing option : All elements analysed (Normalised)

Spectrum	O	Mg	Al	Si	S	Cl	K	Ca	Ti	Fe	Total	Mineral ID
1	51.9			48.1							100.0	Quartz
2	48.3	0.7	17.2	26.5	0.8	0.3	1.7		0.5	4.0	100.0	Mica
3	48.2		1.3	41.8			0.1			8.6	100.0	Quartz
4	35.2	0.5	21.8	36.3		0.9	2.2		1.0	2.1	100.0	Silicates
5	52.4			47.6							100.0	Quartz
6	49.6	0.6	17.8	25.7		0.3	1.0	0.3	0.4	4.3	100.0	Mica
7	52.0			48.0							100.0	Quartz
8	52.8			47.2							100.0	Quartz

All results in weight%

Sample Notes:
S-6196-3

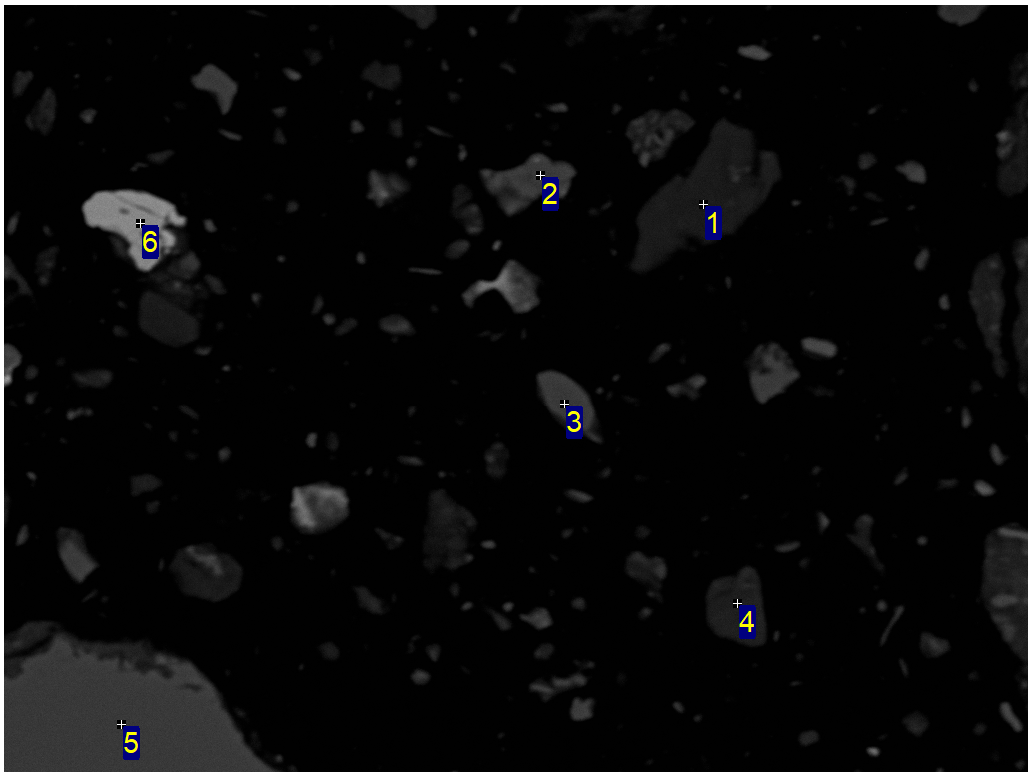


Processing option : All elements analysed (Normalised)

Spectrum	O	Mg	Al	Si	P	S	Cl	K	Ti	Fe	Total	Mineral ID
1	43.7	0.3	6.9	8.2	0.8			0.3		39.8	100.0	FeOx
2	51.3			48.7							100.0	Quartz
3	52.1			47.9							100.0	Quartz
4	46.4	0.6	19.6	27.7				1.3	0.5	3.9	100.0	Mica
5	45.2	0.7	19.4	26.5				1.5	0.6	6.1	100.0	Mica
6	53.0		0.6	46.5							100.0	Quartz
7	46.3	0.8	16.5	30.4		1.0	0.3	2.0	0.3	2.4	100.0	Feldspar
8	44.7	0.5	20.0	28.1		1.0	0.4	1.1	0.4	3.8	100.0	Feldspar/Mica
9	52.8		2.2	44.5				0.2		0.3	100.0	Quartz
10	52.6		0.5	46.7						0.2	100.0	Quartz
11	43.9	0.7	17.8	30.8		0.8	0.4	1.6	0.5	3.5	100.0	Feldspar

All results in weight%

Sample Notes:
S-6196-3

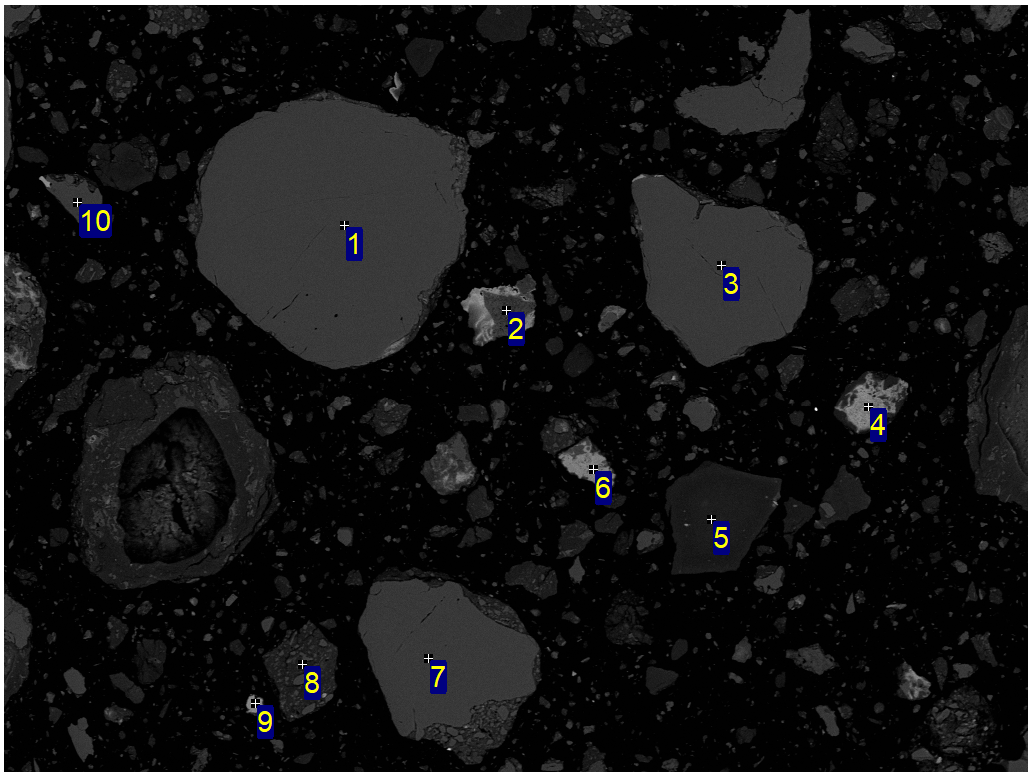


Processing option : All elements analysed (Normalised)

Spectrum	O	Mg	Al	Si	S	Cl	K	Ti	Fe	Total	Mineral ID
1	47.6	0.8	20.1	27.7	0.4		1.5	0.4	1.4	100.0	Feldspar
2	52.4			47.6						100.0	Quartz
3	51.8			48.2						100.0	Quartz
4	43.9	0.5	18.6	24.1		0.4	1.0	0.5	11.0	100.0	Feldspar
5	52.8			47.2						100.0	Quartz
6	40.6		0.3	0.4				58.0	0.7	100.0	Rutile

All results in weight%

Sample Notes:
S-6196-3

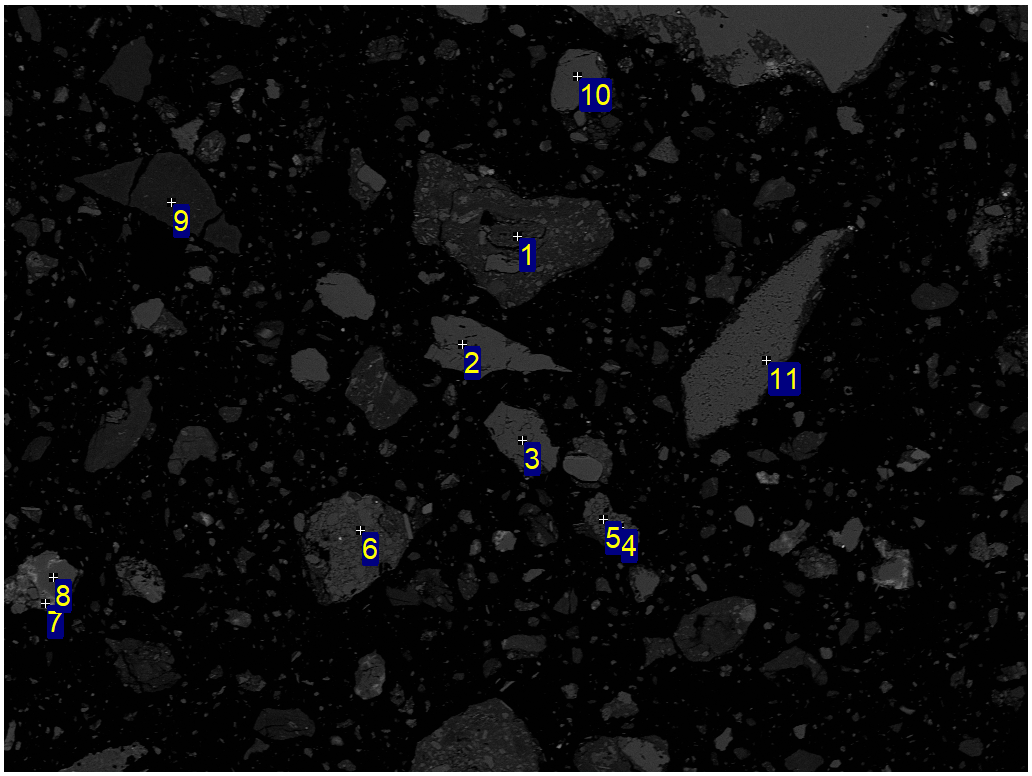


Processing option : All elements analysed (Normalised)

Spectrum	O	Mg	Al	Si	P	S	Cl	K	Ca	Ti	Fe	Total	Mineral ID
1	51.3			48.7								100.0	Quartz
2	50.6		0.6	48.3				0.1			0.5	100.0	Quartz
3	51.9			48.1								100.0	Quartz
4	37.2		4.3	5.2							53.4	100.0	FeOx
5	44.5	0.7	19.0	26.5		0.9	0.5	0.9	0.2	0.4	6.5	100.0	Mica
6	39.5		3.6	11.5	0.4					0.3	44.7	100.0	FeOx/Silicates
7	51.9			48.1								100.0	Quartz
8	46.6	0.6	17.1	26.7		0.4		1.5		1.0	6.1	100.0	Mica
9	42.6		0.4							57.0		100.0	Rutile
10	52.1			47.9								100.0	Quartz

All results in weight%

Sample Notes:
S-6196-3 Rep

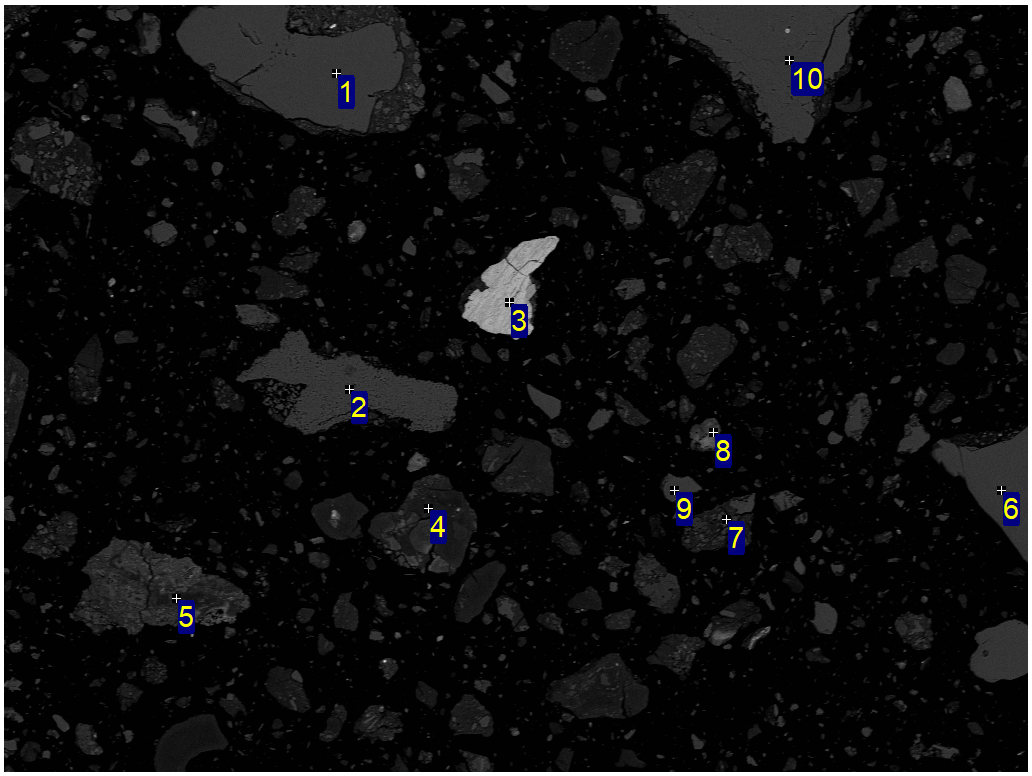


Processing option : All elements analysed (Normalised)

Spectrum	O	Mg	Al	Si	S	Cl	K	Ca	Ti	Fe	Total	Mineral ID
1	41.7	0.7	18.4	32.4	0.3	0.3	1.5	0.3	0.8	3.7	100.0	Feldspar
2	49.9		1.2	48.9							100.0	Quartz
3	52.1			47.9							100.0	Quartz
4	46.0			5.3					48.5	0.3	100.0	Rutile
5	53.9		1.5	44.6							100.0	Quartz
6	55.0	0.3	16.1	26.5			1.4		0.6		100.0	Mica
7	40.9	0.5	9.5	15.4			0.9		0.4	32.4	100.0	FeOx/Mica
8	52.7			47.1						0.2	100.0	Quartz
9	47.8	0.6	20.1	27.6	0.6	0.4	1.1		0.3	1.4	100.0	Mica
10	52.6			47.4							100.0	Quartz
11	47.6			52.4							100.0	Si-O

All results in weight%

Sample Notes:
S-6196-3 Rep

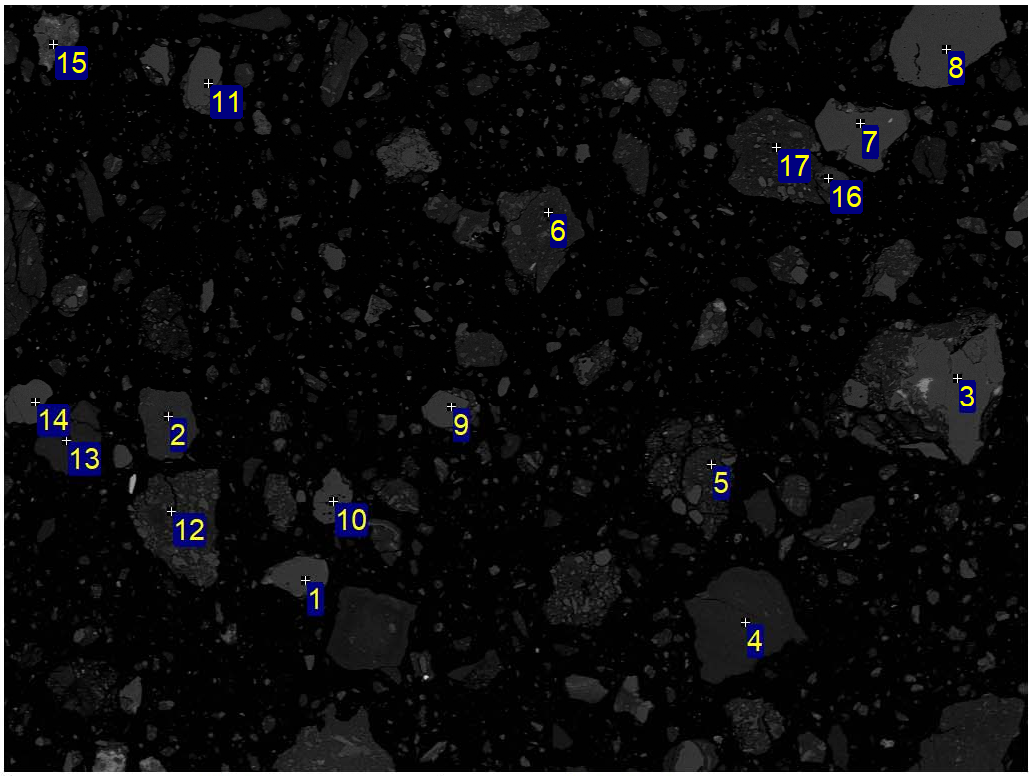


Processing option : All elements analysed (Normalised)

Spectrum	O	F	Mg	Al	Si	S	Cl	K	Ti	Mn	Fe	Total	Mineral ID
1	52.0				48.0							100.0	Quartz
2	52.3			0.4	46.8			0.2			0.3	100.0	Quartz
3	36.3								33.3	1.8	28.6	100.0	Ilmenite
4	45.4		0.6	17.9	23.5	2.0	0.3	1.2	0.4		8.5	100.0	Mica
5	44.7			18.6	24.6	2.0	0.4	0.8	0.8		8.0	100.0	Mica
6	52.4				47.6							100.0	Quartz
7	50.2		0.2	0.9	47.8	0.2		0.1	0.6			100.0	Quartz
8	44.9	2.1	2.6	9.1	23.6			3.8		9.8	4.1	100.0	Mica
9	52.0				48.0							100.0	Quartz
10	52.1				47.9							100.0	Quartz

All results in weight%

Sample Notes:
S-6196-3 Rep

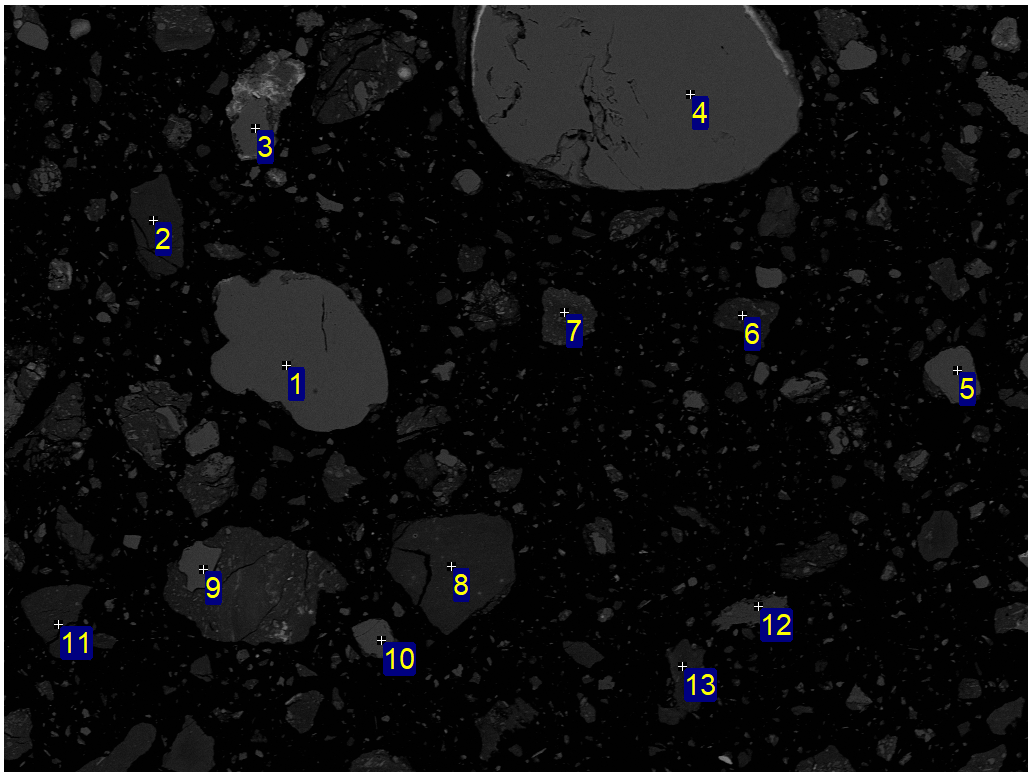


Processing option : All elements analysed (Normalised)

Spectrum	O	Mg	Al	Si	S	Cl	K	Ca	Ti	Fe	Total	Mineral ID
1	52.2			47.8							100.0	Quartz
2	43.0	0.7	15.1	20.4		0.3	1.2		0.5	18.9	100.0	FeOx/Mica
3	52.5			47.5							100.0	Quartz
4	45.9	0.6	19.3	26.8			1.1		0.3	5.8	100.0	Mica
5	45.5	1.5	16.1	26.2			4.8		3.1	2.7	100.0	Mica
6	43.7	0.6	16.5	28.0	1.7	0.3	1.5		0.6	7.1	100.0	Mica
7	52.9			47.1							100.0	Quartz
8	52.5			43.7				3.8			100.0	Quartz
9	52.4			47.6							100.0	Quartz
10	52.0			48.0							100.0	Quartz
11	51.6			48.2						0.2	100.0	Quartz
12	48.2	1.0	17.8	26.3		0.2	2.5		0.4	3.6	100.0	Mica
13	46.0	0.7	18.0	23.8			1.3		0.5	9.7	100.0	Mica
14	51.8			48.2							100.0	Quartz
15	39.2	1.3	6.7	27.7			2.2			22.9	100.0	FeOx/Feldspar
16	44.1		23.5	29.6	1.0		0.3			1.5	100.0	Silicates
17	42.9	0.4	13.3	36.5	1.5	0.3	0.9		0.5	3.8	100.0	Feldspar/Quartz

All results in weight%

Sample Notes:
S-6196-3 Rep

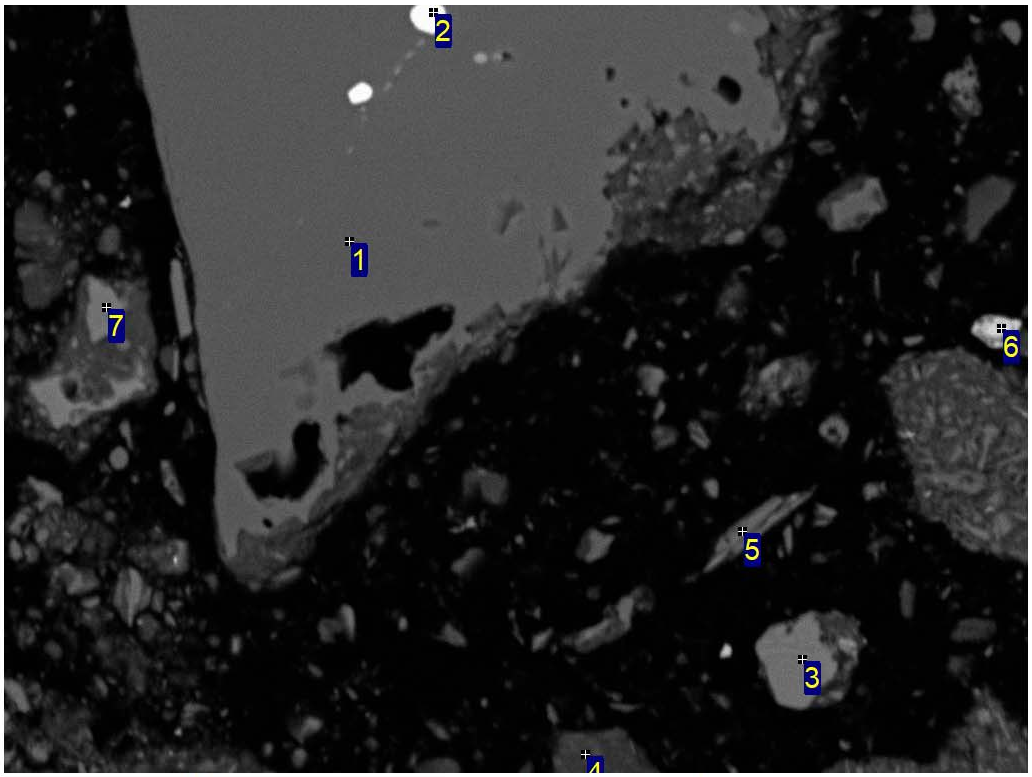


Processing option : All elements analysed (Normalised)

Spectrum	O	Mg	Al	Si	S	Cl	K	Ti	Fe	Total	Mineral ID
1	52.3			47.7						100.0	Quartz
2	46.5	0.6	19.0	26.0	0.5	0.3	1.1	0.3	5.7	100.0	Mica
3	52.3			47.7						100.0	Quartz
4	52.8			47.2						100.0	Quartz
5	52.6			47.4						100.0	Quartz
6	48.5	2.3	16.3	26.2			5.6	0.2	0.9	100.0	Mica
7	46.8	0.5	13.8	31.4	0.6	0.2	1.4	0.7	4.5	100.0	Feldspar
8	47.0	0.5	19.7	26.4		0.3	1.0	0.4	4.7	100.0	Mica
9	52.3			47.7						100.0	Quartz
10	52.3			47.7						100.0	Quartz
11	49.5	0.7	19.1	26.3			1.2	0.5	2.7	100.0	Mica
12	55.9		20.8	23.3						100.0	Mica
13	45.9	0.7	18.3	25.8	0.4		1.0	0.7	7.3	100.0	Mica

All results in weight%

Sample Notes:
S-6196-4

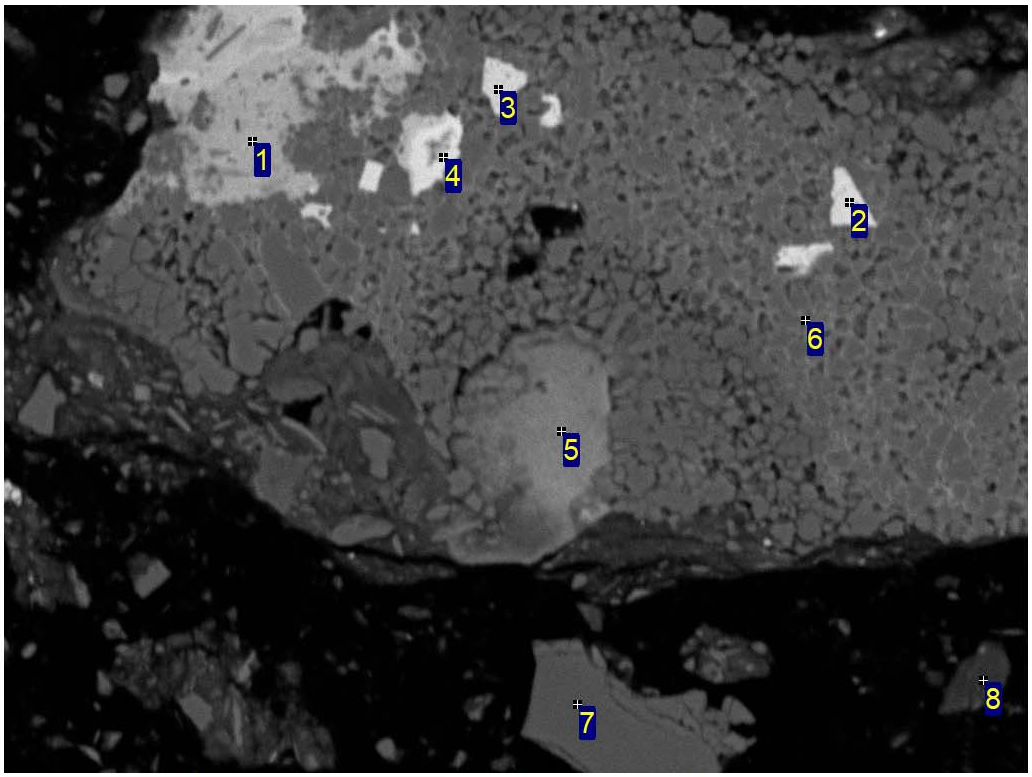


Processing option : All elements analysed (Normalised)

Spectrum	O	F	Mg	Al	Si	P	S	K	Ti	Fe	Total	Mineral ID
1	51.6				48.4						100.0	Quartz
2							55.5			44.5	100.0	Pyrite
3	45.7			9.4	31.4			13.5			100.0	Feldspar
4	47.1		0.7	18.3	25.2			1.5	0.8	6.5	100.0	Mica
5	47.3	1.6	2.5	9.5	33.1			5.7		0.4	100.0	Feldspar
6	40.0		0.6	2.7	2.3	0.4				54.0	100.0	FeOx
7	45.6			9.4	31.6			13.4			100.0	Feldspar

All results in weight%

Sample Notes:
S-6196-4

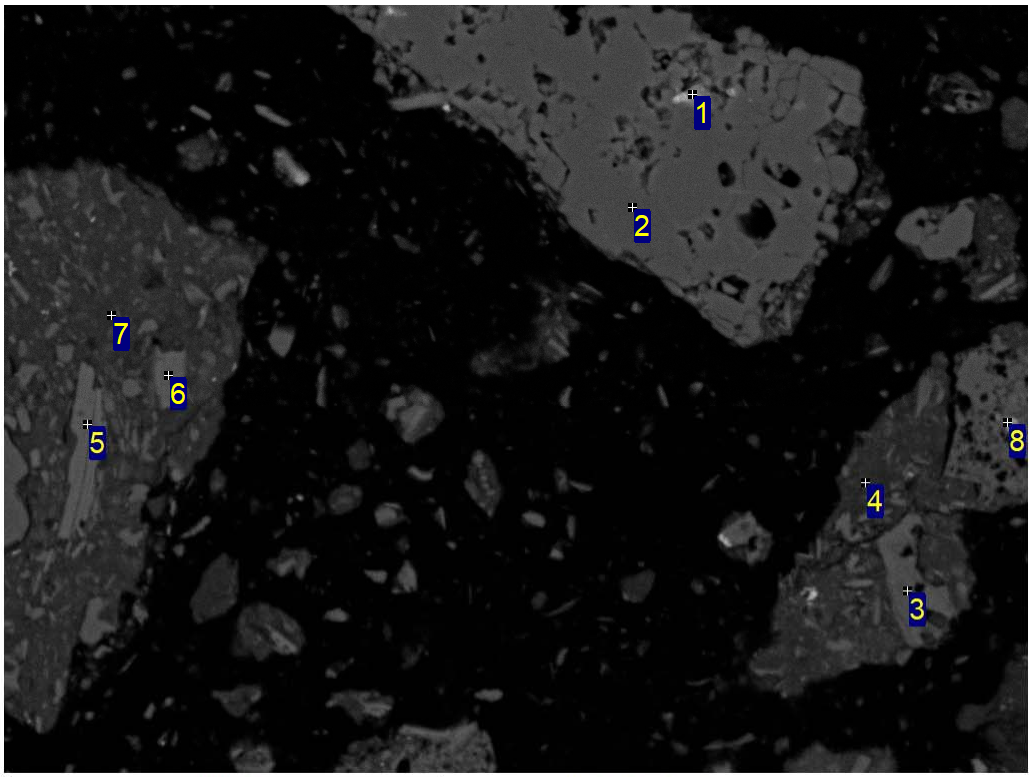


Processing option : All elements analysed (Normalised)

Spectrum	O	Mg	Al	Si	P	S	Cl	K	Ti	Mn	Fe	Total	Mineral ID
1	45.5		7.0	8.9				0.7			37.9	100.0	FeOx/Feldspar
2	40.8		0.6	1.4						0.6	56.7	100.0	FeOx
3	43.2		0.6	19.6						0.4	36.2	100.0	FeOx/Quartz
4	44.2			1.9						0.7	53.1	100.0	FeOx
5	38.9		10.9	4.5	0.7	0.4	0.4				44.1	100.0	Fe-Al-O
6	46.7		1.5	43.1				1.1			7.6	100.0	Quartz/FeOx
7	51.8			48.2								100.0	FeOx
8	44.8	0.8	18.0	25.6				2.2	0.5		8.1	100.0	Mica

All results in weight%

Sample Notes:
S-6196-4

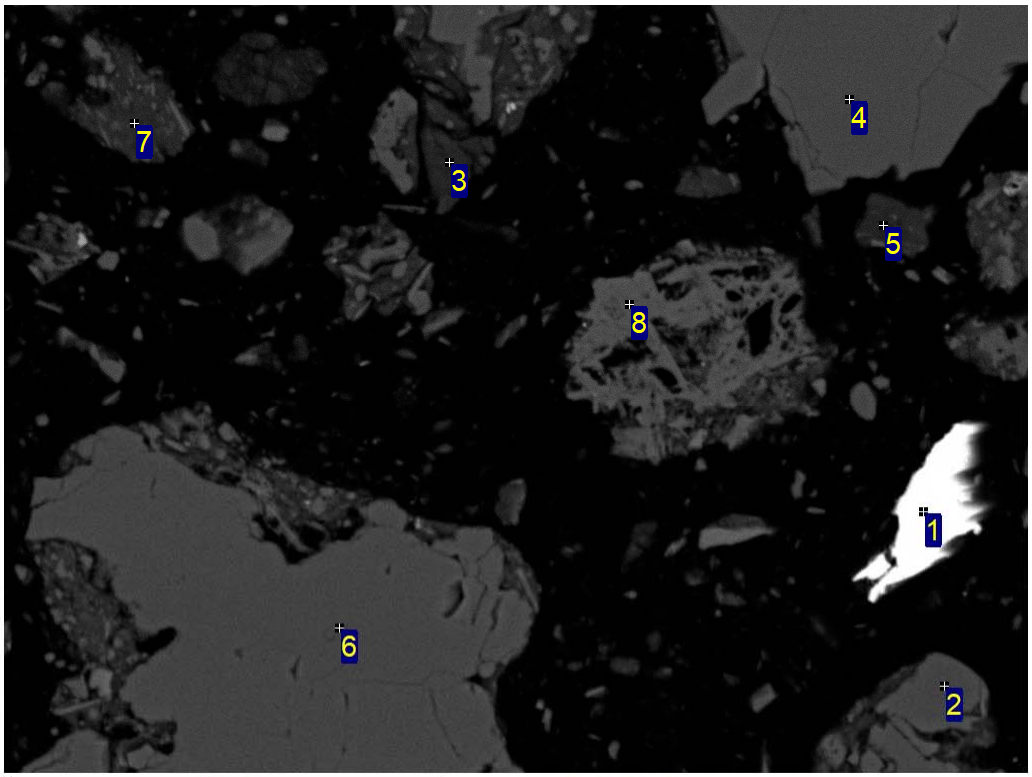


Processing option : All elements analysed (Normalised)

Spectrum	O	F	Mg	Al	Si	K	Ti	Fe	Total	Mineral ID
1	43.7			0.7	28.1			27.5	100.0	FeOx/Quartz
2	51.6				48.4				100.0	Quartz
3	46.5		3.0	14.3	27.7	7.9		0.6	100.0	Mica
4	44.7		0.8	15.3	30.8	1.5	0.8	6.2	100.0	Feldspar/Mica
5	46.9	1.7	2.9	12.8	27.1	7.7		0.9	100.0	Mica
6	44.0		1.2	16.9	27.3	7.4		3.2	100.0	Mica
7	45.4		0.7	16.0	29.4	1.7	0.8	6.1	100.0	Mica
8	46.0		0.9	3.0	46.8	2.5		0.9	100.0	Quartz

All results in weight%

Sample Notes:
S-6196-4

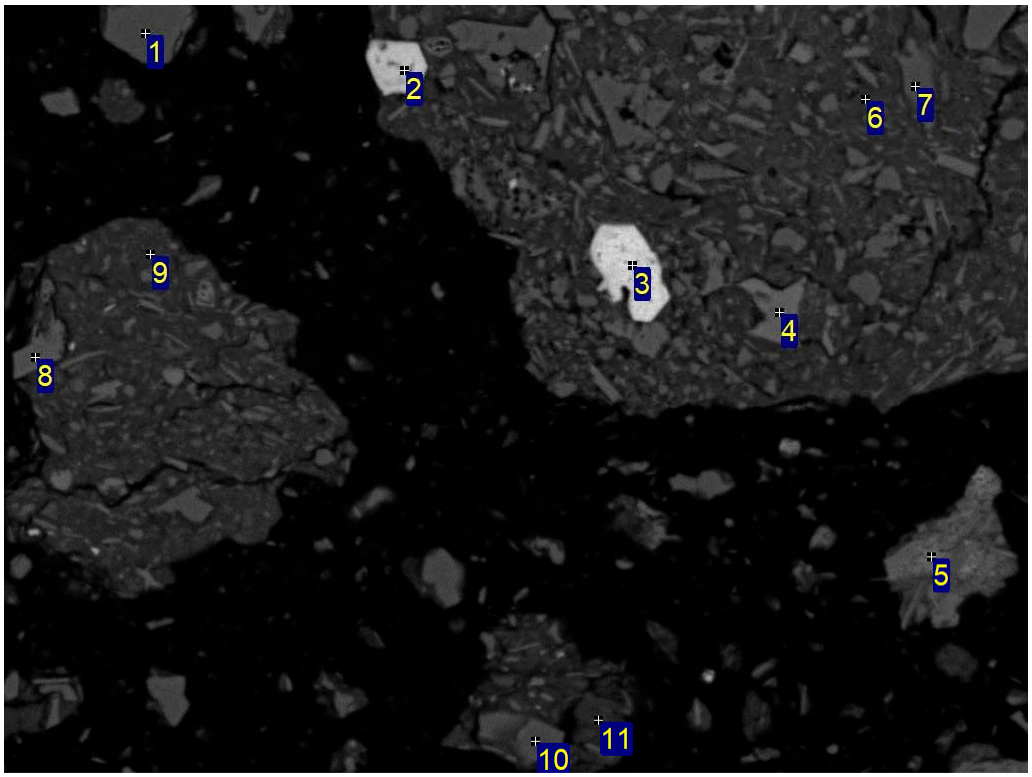


Processing option : All elements analysed (Normalised)

Spectrum	O	Mg	Al	Si	Cl	K	Ti	Cr	Mn	Fe	Total	Mineral ID
1				1.6				10.8	0.9	86.8	100.0	Fe-Cr
2	52.1			47.9							100.0	Quartz
3	47.0	0.9	18.4	26.7		2.0	0.5			4.6	100.0	Mica
4	51.9			48.1							100.0	Quartz
5	44.7	0.8	19.1	27.7		1.4				6.3	100.0	Mica
6	51.9			48.1							100.0	Quartz
7	46.5	0.8	17.1	26.4	0.3	2.1	0.5			6.2	100.0	Mica
8	48.3	2.9	12.9	27.3		8.6					100.0	Feldspar

All results in weight%

Sample Notes:
S-6196-4 Rep

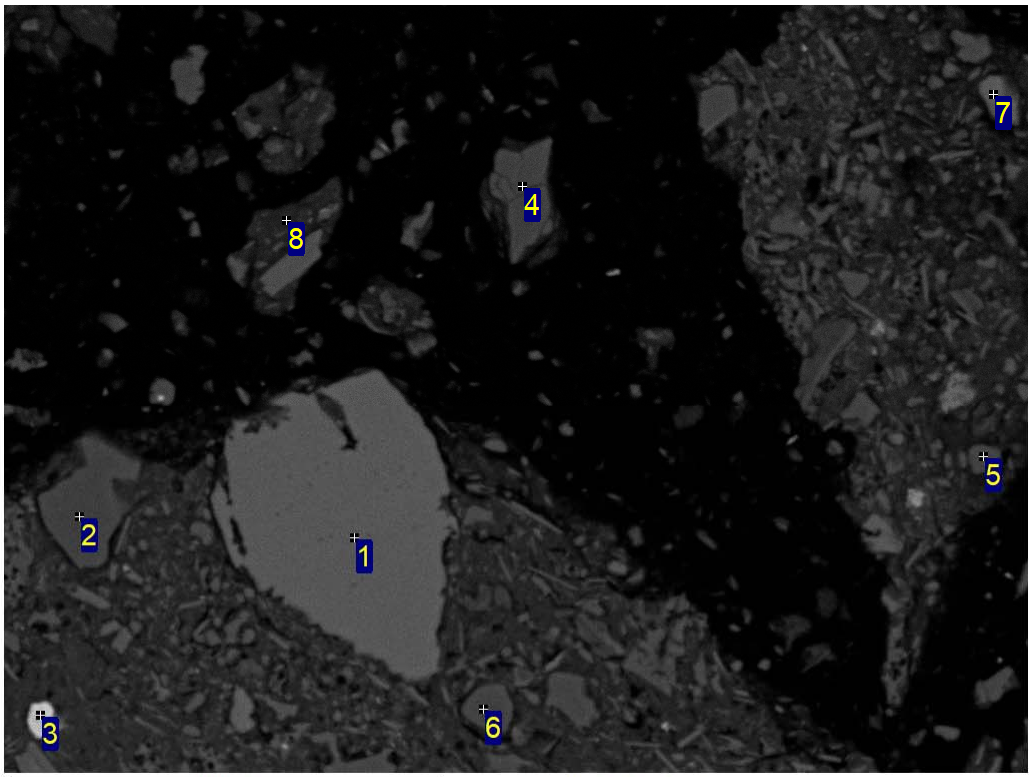


Processing option : All elements analysed (Normalised)

Spectrum	O	Mg	Al	Si	P	Cl	K	Ti	Fe	Total	Mineral ID
1	52.3			47.7						100.0	Quartz
2	40.2		1.5	2.1	0.4				55.8	100.0	FeOx
3	34.8			1.3					64.0	100.0	FeOx
4	48.0		9.1	30.3			12.1		0.5	100.0	Feldspar
5	38.2	0.7	5.4	17.6			1.0		37.1	100.0	FeOx/Feldspar
6	45.1	0.9	17.8	26.2		0.4	2.4		7.3	100.0	Mica
7	54.4		3.8	40.3			0.4		1.1	100.0	Quartz
8	48.7	2.6	14.0	25.1			9.3	0.3		100.0	Mica
9	42.8	1.0	18.1	28.2			2.5		7.4	100.0	Mica
10	53.7		0.5	45.6			0.2			100.0	Quartz
11	44.1	0.7	18.1	27.3			2.2		7.7	100.0	Mica

All results in weight%

Sample Notes:
S-6196-4 Rep

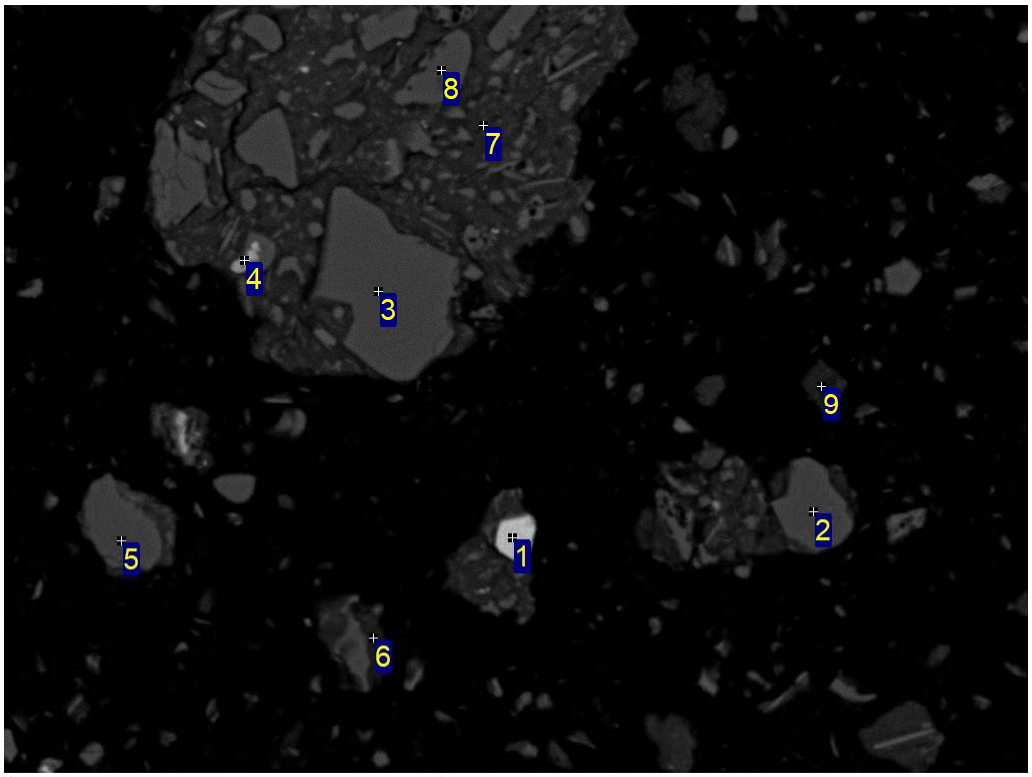


Processing option : All elements analysed (Normalised)

Spectrum	O	Mg	Al	Si	P	K	Ti	Fe	Total	Mineral ID
1	45.6		9.5	31.5		13.4			100.0	Feldspar
2	52.4			47.6					100.0	Quartz
3	36.9		0.5	1.4	0.4			60.8	100.0	FeOx
4	52.5		0.8	46.3		0.4			100.0	Quartz
5	53.7		0.8	45.5					100.0	Quartz
6	52.7			47.3					100.0	Quartz
7	47.6		10.0	30.6		10.7		1.0	100.0	Feldspar
8	45.6	0.5	15.6	30.8		1.6	0.4	5.4	100.0	Feldspar

All results in weight%

Sample Notes:
S-6196-4 Rep

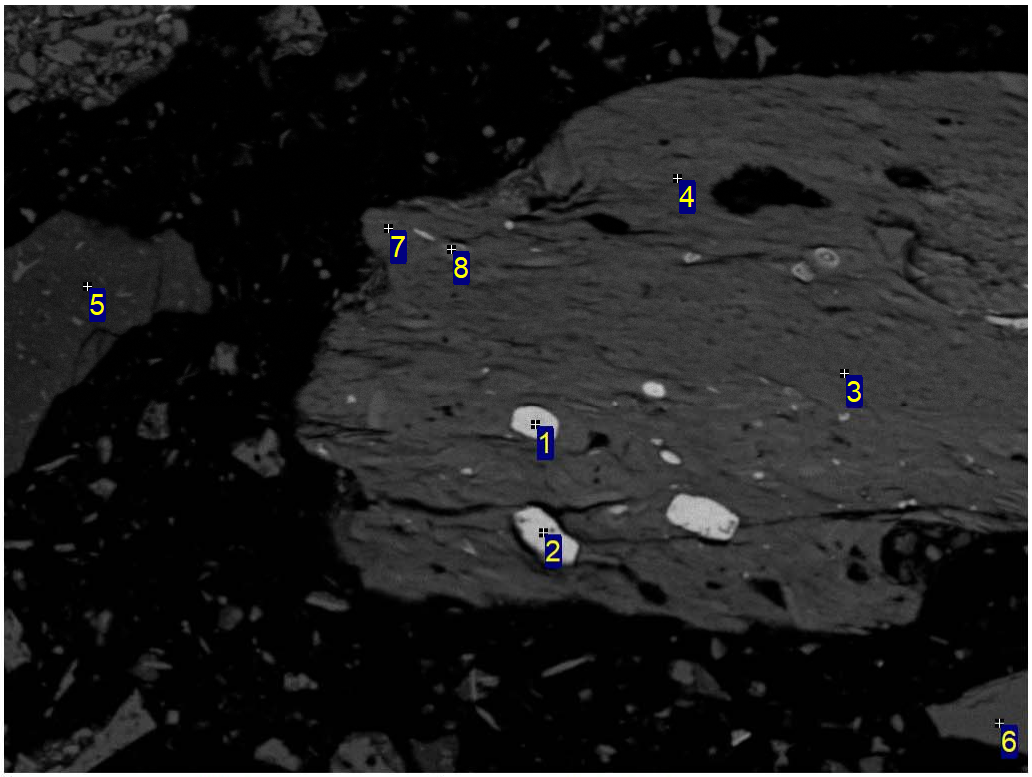


Processing option : All elements analysed (Normalised)

Spectrum	O	Mg	Al	Si	Cl	K	Ti	Fe	Total	Mineral ID
1	38.5			1.3				60.3	100.0	FeOx
2	52.3			47.7					100.0	Quartz
3	52.1			47.9					100.0	Quartz
4	38.0		3.4	14.0				44.5	100.0	Amphibole
5	52.0			47.8		0.2			100.0	Quartz
6	45.1	0.9	13.7	31.7		3.1		5.4	100.0	Feldspar
7	45.0	0.8	16.4	29.9		1.7	0.5	5.8	100.0	Feldspar
8	53.4		0.3	46.3					100.0	Quartz
9	47.1	0.7	18.3	27.2	0.4	1.4		4.9	100.0	Mica

All results in weight%

Sample Notes:
S-6196-5

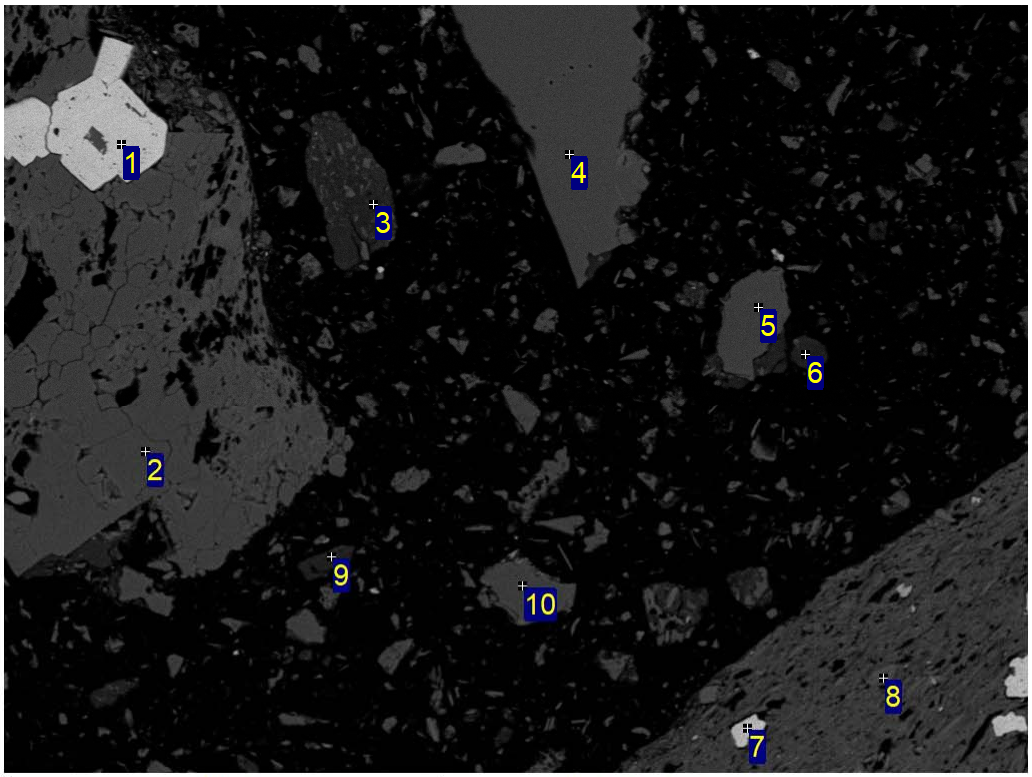


Processing option : All elements analysed (Normalised)

Spectrum	O	Mg	Al	Si	S	Cl	K	Ti	Fe	Total	Mineral ID
1	39.5		0.5	2.1	0.5				57.2	100.0	FeOx
2	39.6		1.1	1.8					57.4	100.0	FeOx
3	48.9	3.0	14.6	25.8			7.4		0.4	100.0	Mica
4	47.3	3.2	14.3	27.0			8.2			100.0	Mica
5	44.4	0.8	16.8	26.2	1.2	0.4	1.6	0.9	7.6	100.0	Mica
6	52.1			47.9						100.0	Quartz
7	48.1	2.3	14.3	27.1		0.7	6.7		0.9	100.0	Mica
8	46.4	2.1	10.5	33.6			5.2		2.1	100.0	Feldspar

All results in weight%

Sample Notes:
S-6196-5

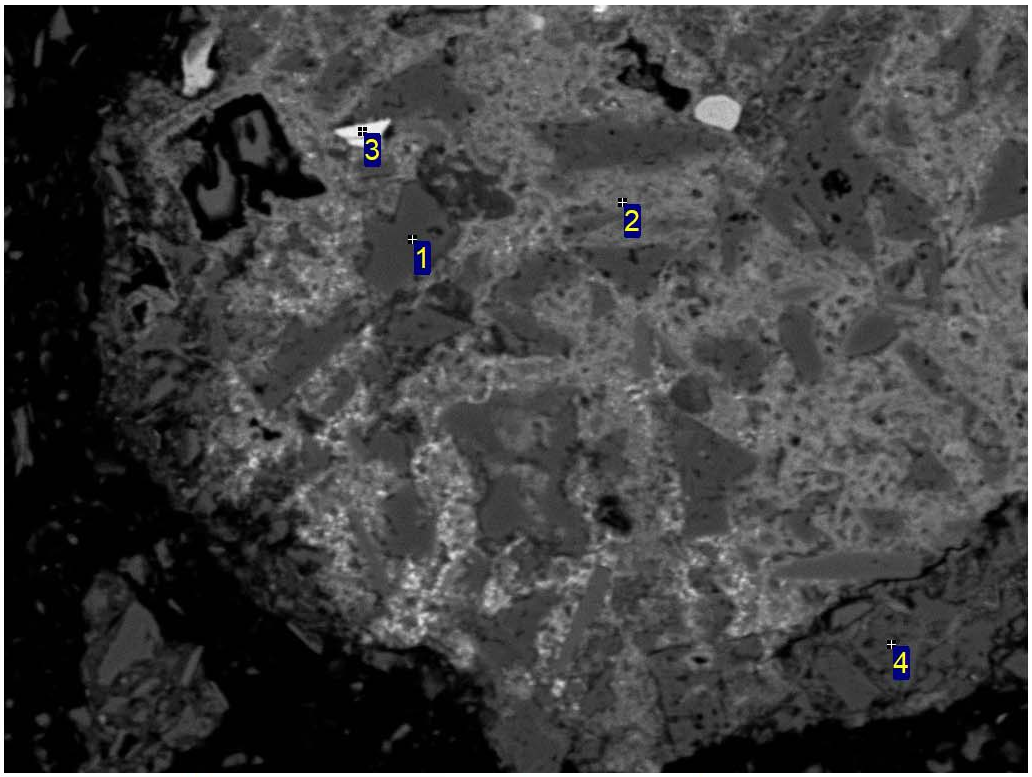


Processing option : All elements analysed (Normalised)

Spectrum	O	Na	Mg	Al	Si	S	K	Ti	Fe	Total	Mineral ID
1	38.3			0.5	1.4				59.8	100.0	FeOx
2	52.3				47.7					100.0	Quartz
3	43.8		0.7	17.5	28.6	1.0	2.2		6.2	100.0	Feldspar
4	52.1				47.9					100.0	Quartz
5	52.4				47.6					100.0	Quartz
6	46.2			19.2	26.1		0.8	0.6	7.2	100.0	Mica
7	37.7			0.8	1.3				60.3	100.0	FeOx
8	47.4	0.5	0.9	16.7	23.8		8.8		1.9	100.0	Mica
9	46.6		0.5	16.4	29.8		1.1	0.4	5.2	100.0	Mica
10	52.3				47.7					100.0	Quartz

All results in weight%

Sample Notes:
S-6196-5

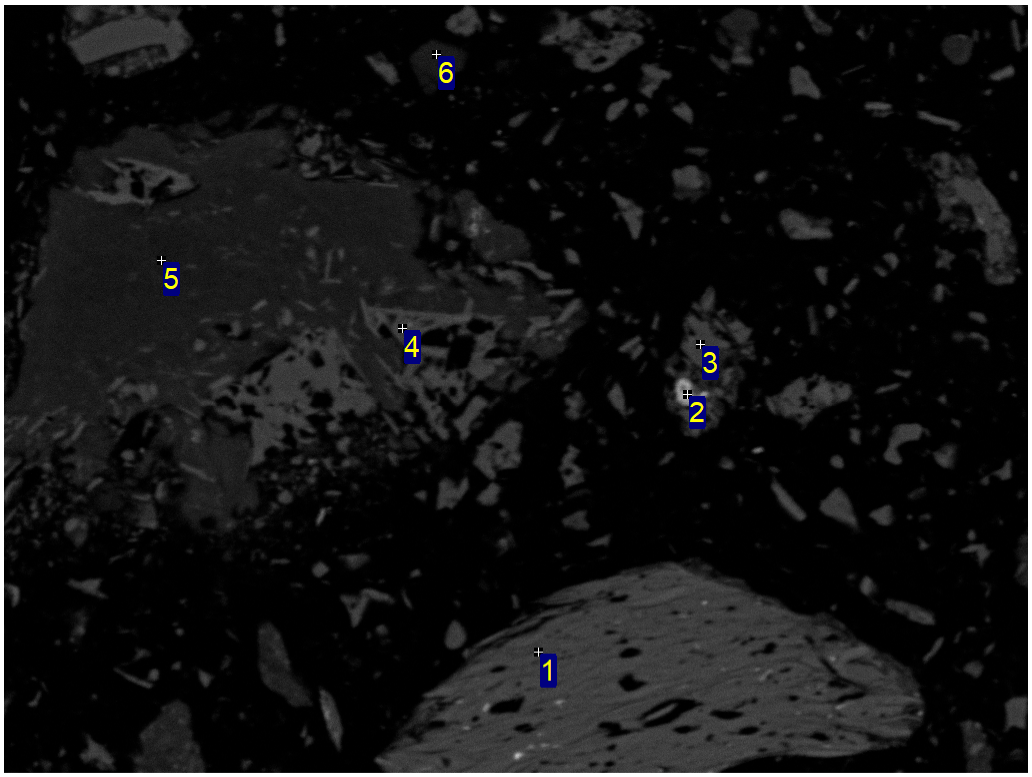


Processing option : All elements analysed (Normalised)

Spectrum	O	Mg	Al	Si	K	Mn	Fe	Co	Zr	Total	Mineral ID
1	51.5			48.2		0.3				100.0	Quartz
2	46.7	0.5	12.2	4.2	0.8	32.7	1.7	1.1		100.0	Mn-Al-O
3	35.1			15.4		0.7			48.8	100.0	Zircon
4	52.1	0.4	1.9	44.0	1.3	0.3				100.0	Quartz

All results in weight%

Sample Notes:
S-6196-5

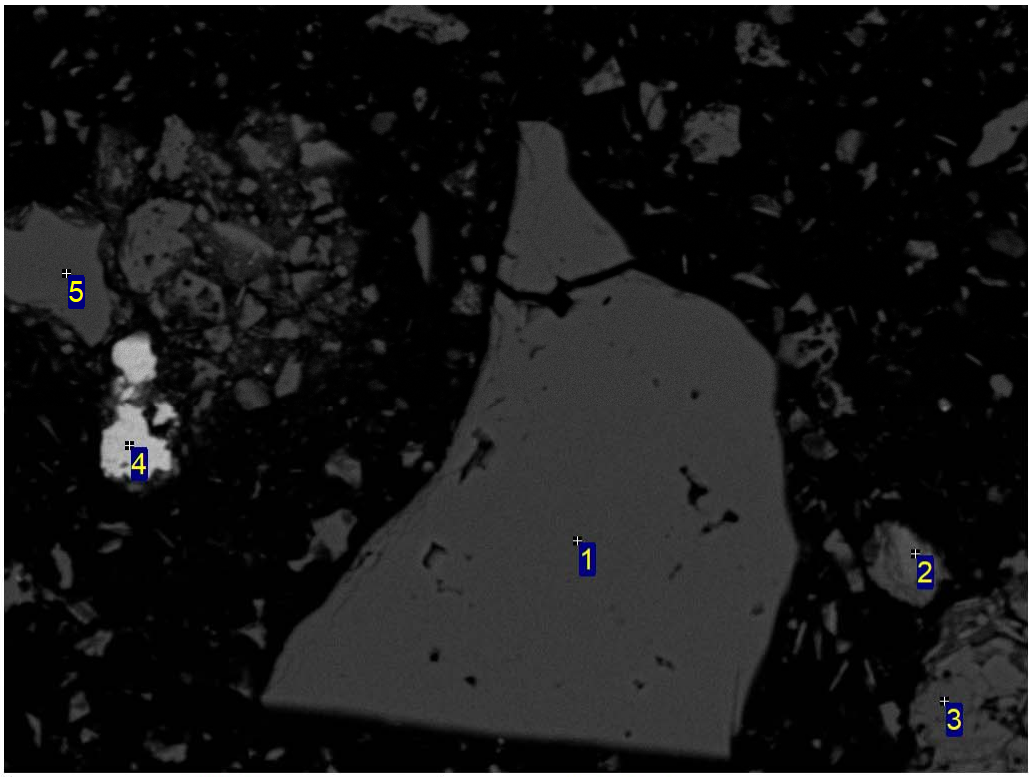


Processing option : All elements analysed (Normalised)

Spectrum	O	Mg	Al	Si	P	S	Cl	K	Ti	Fe	Total	Mineral ID
1	46.5	3.3	13.5	27.0				9.2		0.5	100.0	Feldspar
2	40.6	0.4	2.8	3.3	0.5					52.4	100.0	FeOx
3	52.1	0.5	1.3	45.0				1.1			100.0	Quartz
4	50.5	1.3	4.7	40.2				3.3			100.0	Quartz
5	43.5	0.7	19.9	27.4		1.6	0.7	1.1		5.1	100.0	Feldspar
6	44.4		20.4	27.4			0.4	0.9	0.6	5.8	100.0	Feldspar

All results in weight%

Sample Notes:
S-6196-5 Rep

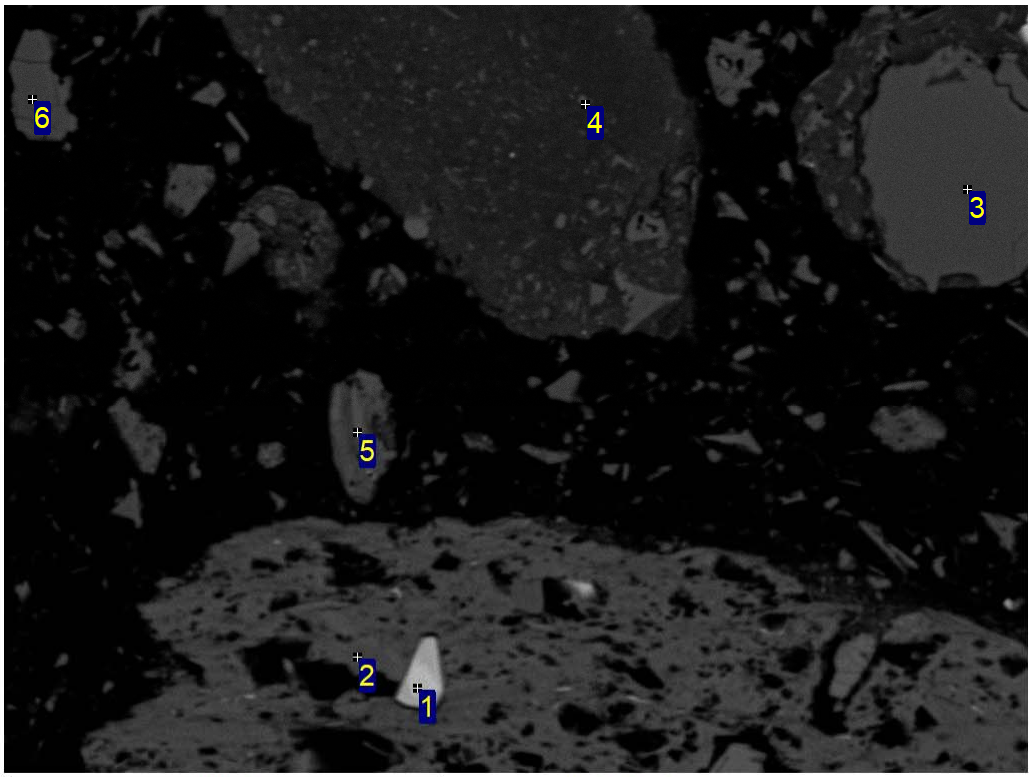


Processing option : All elements analysed (Normalised)

Spectrum	O	Mg	Al	Si	K	Ti	Fe	Total	Mineral ID
1	51.9			48.1				100.0	Quartz
2	47.7	1.1	15.7	22.7	9.3	0.3	3.2	100.0	Mica
3	52.7			47.1	0.2			100.0	Quartz
4	36.6		0.6	1.5			61.2	100.0	FeOx
5	51.7			48.3				100.0	Quartz

All results in weight%

Sample Notes:
S-6196-5 Rep



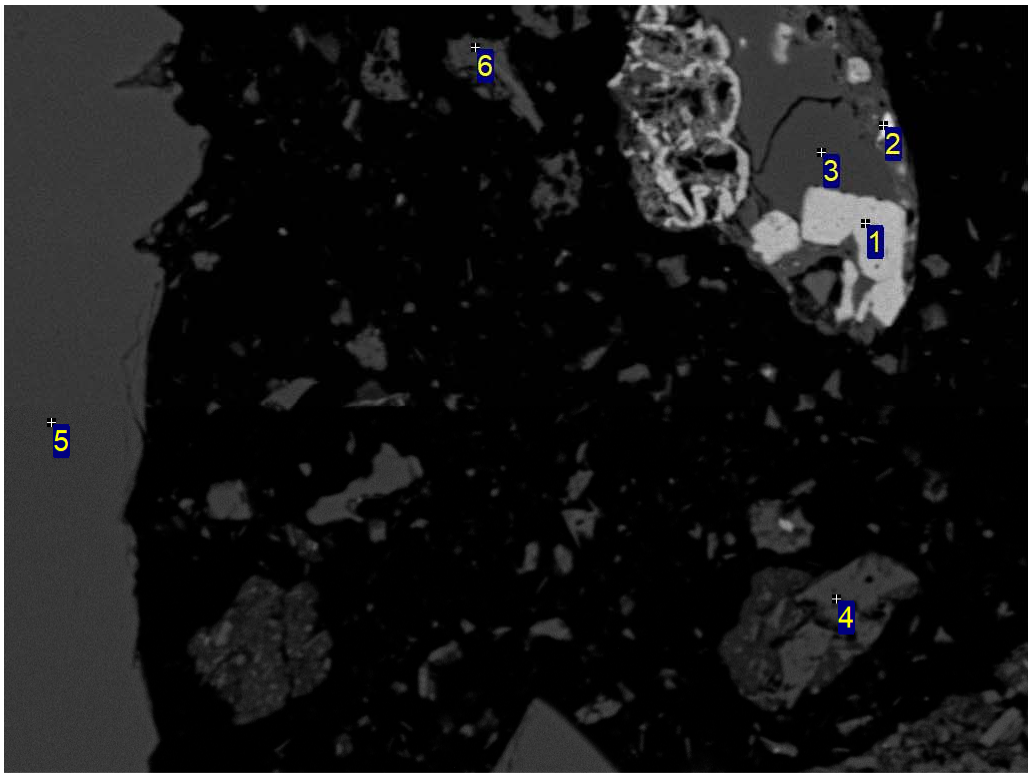
Electron Image 1

Processing option : All elements analysed (Normalised)

Spectrum	O	Mg	Al	Si	S	K	Ti	Fe	Total	Mineral ID
1	37.9		2.8	3.7		0.9		54.7	100.0	FeOx
2	46.8	3.5	14.5	25.8		9.5			100.0	Mica
3	51.8			48.2					100.0	Quartz
4	47.2	0.6	12.2	33.3	0.9	1.5	0.6	3.7	100.0	Feldspar
5	47.6	1.4	16.5	24.4		8.9		1.1	100.0	Mica
6	52.0			48.0					100.0	Quartz

All results in weight%

Sample Notes:
S-6196-5 Rep

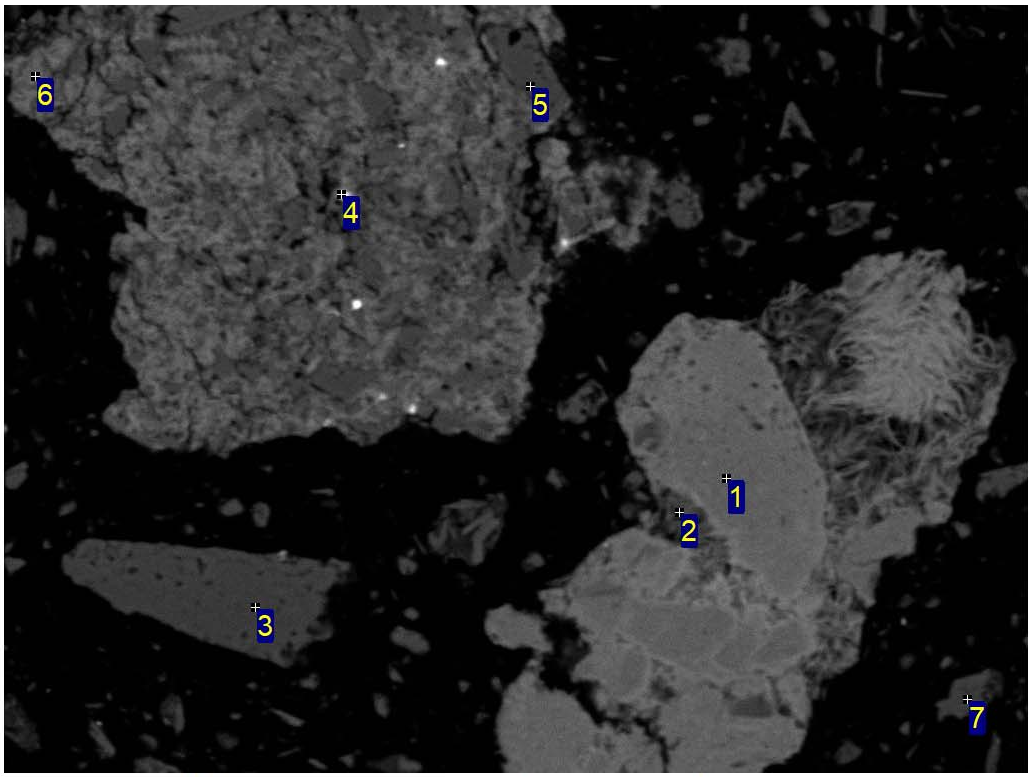


Processing option : All elements analysed (Normalised)

Spectrum	O	Mg	Al	Si	K	Ti	Fe	Zr	Total	Mineral ID
1	38.0		0.5	1.3			60.2		100.0	FeOx
2	47.4	2.5	12.8	23.8	7.7	1.7	2.3	1.9	100.0	Mica
3	51.6			48.4					100.0	Quartz
4	51.9		0.7	46.9	0.5				100.0	Quartz
5	51.9			48.1					100.0	Quartz
6	51.8	0.3	1.2	45.6	0.6		0.6		100.0	Quartz

All results in weight%

Sample Notes:
S-6196-5 Rep



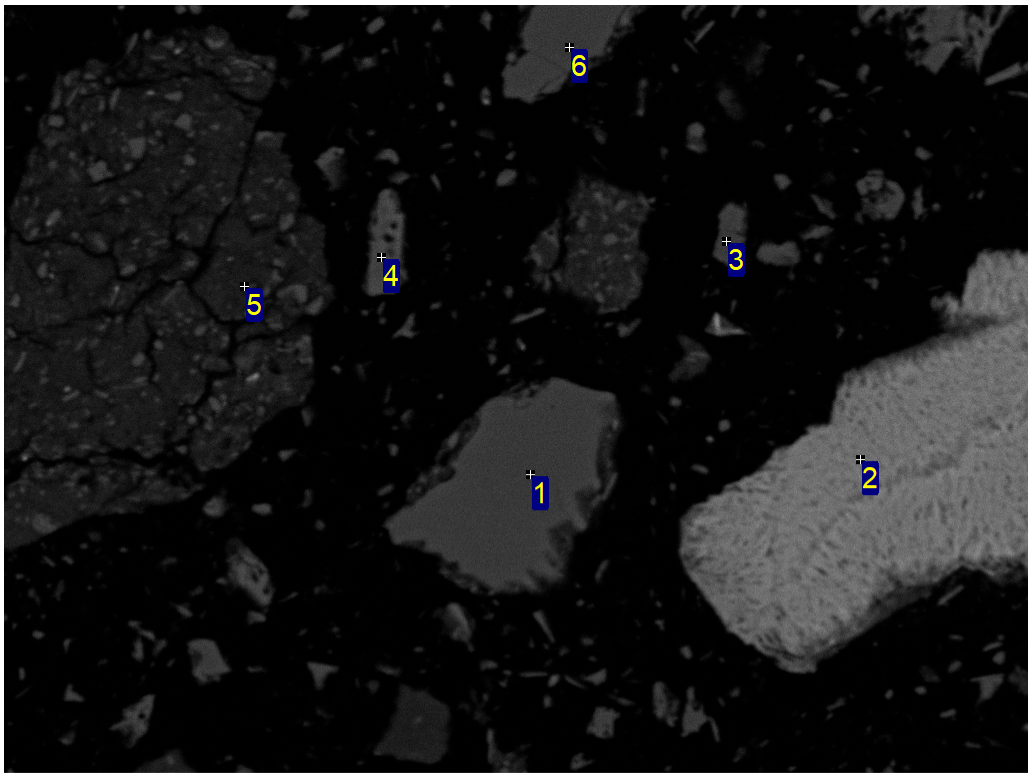
Electron Image 1

Processing option : All elements analysed (Normalised)

Spectrum	O	Mg	Al	Si	K	Ti	Mn	Fe	Ce	Total	Mineral ID
1	49.7		13.7	6.3	0.4	0.8	27.7	1.5		100.0	Mn-Al-O
2	42.1		14.8	4.6	0.3		38.2			100.0	Mn-Al-O
3	52.3		1.0	46.1	0.7					100.0	Quartz
4	32.9	2.0	11.2	28.7	4.4		15.1	1.8	4.1	100.0	MnOx/Feldspar
5	44.1	2.5	11.4	27.1	6.4		7.8	0.8		100.0	Feldspar
6	45.1		15.1				39.8			100.0	Mn-Al-O
7	52.4		0.7	46.5	0.3					100.0	Quartz

All results in weight%

Sample Notes:
S-6196-5 Rep

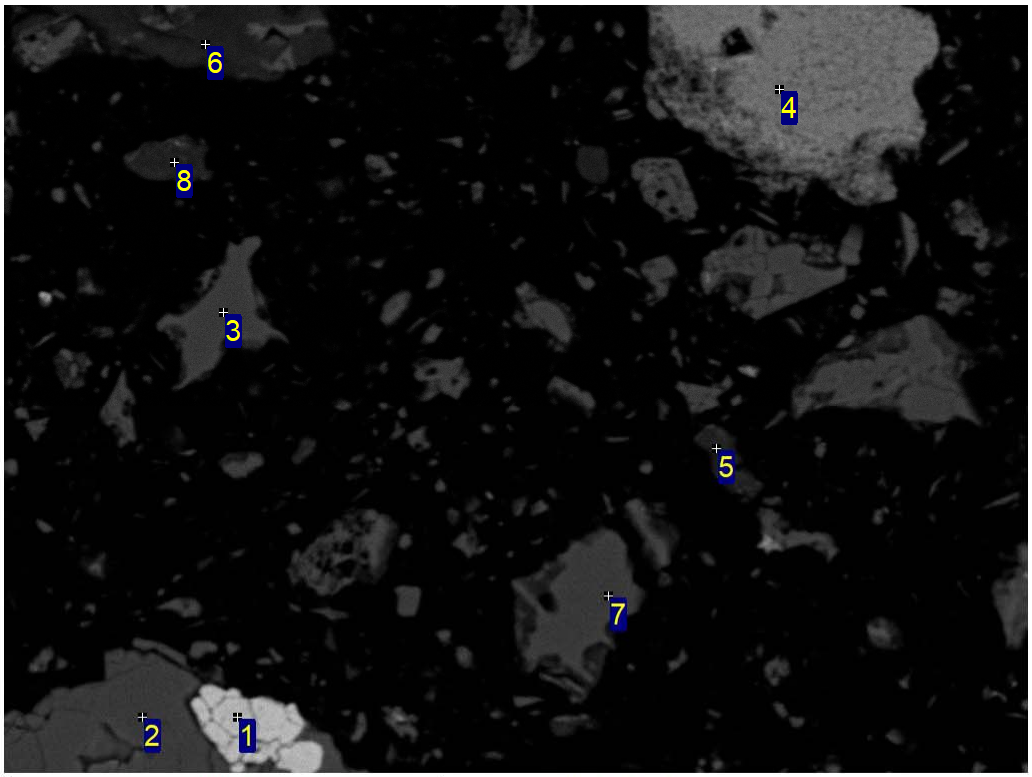


Processing option : All elements analysed (Normalised)

Spectrum	O	Mg	Al	Si	S	K	Mn	Fe	Total	Mineral ID
1	51.8			48.2					100.0	Quartz
2	46.0		12.6				41.3		100.0	Mn-Al-O
3	52.6			47.4					100.0	Quartz
4	48.5	3.0	14.3	24.9		8.7		0.6	100.0	Mica
5	43.3	0.8	19.0	27.4	0.8	1.3		7.4	100.0	Feldspar
6	51.0			49.0					100.0	Quartz

All results in weight%

Sample Notes:
S-6196-5 Rep



Processing option : All elements analysed (Normalised)

Spectrum	O	Mg	Al	Si	S	Cl	K	Ti	Mn	Fe	Ni	Total	Mineral ID
1	37.2		0.6	1.5						60.7		100.0	FeOx
2	52.0			48.0								100.0	Quartz
3	51.9			48.1								100.0	Quartz
4	48.5		13.6						37.0		1.0	100.0	Mn-Al-O
5	47.5	0.5	16.4	27.5		0.5	1.8			5.8		100.0	Feldspar
6	45.7		19.9	25.8	0.5		1.0	0.7		6.4		100.0	Feldspar
7	52.0			48.0								100.0	Quartz
8	44.5	0.6	16.9	27.9			1.6	0.7		7.8		100.0	Feldspar

All results in weight%

eurofins | Environment Testing America



ANALYTICAL REPORT

Eurofins TestAmerica, Knoxville
5815 Middlebrook Pike
Knoxville, TN 37921
Tel: (865)291-3000

Laboratory Job ID: 140-24429-2
Client Project/Site: S-7677 SiREMNA

For:
Sirem, div of Geosyntec Consultants
130 Stone Rd West
Guelph, Ontario N1G 3Z2

Attn: Kela Ashworth

Ryan Henry

Authorized for release by:
12/10/2021 4:05:54 PM

Ryan Henry, Project Manager I
(865)291-3000
williamr.henry@eurofinset.com

LINKS

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Definitions/Glossary

Client: Sirem, div of Geosyntec Consultants
Job ID: 140-24429-2
Project/Site: S-7677 SiREMNA

Qualifiers

Metals

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Job ID: 140-24429-2

Laboratory: Eurofins TestAmerica, Knoxville

Narrative

Job Narrative
140-24429-2

Receipt
The samples were received on 8/31/2021 at 10:10am and arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 5.4º C.

Metals
7 Step Sequential Extraction Procedure

These soil samples were prepared and analyzed using Eurofins TestAmerica Knoxville standard operating procedure KNOX-MT-0008, "7 Step Sequential Extraction Procedure". SW-846 Method 6010B as incorporated in Eurofins TestAmerica Knoxville standard operating procedure KNOX-MT-0007 was used to perform the final instrument analyses.

An aliquot of each sample was sequentially extracted using the steps listed below:

· Step 1 - Exchangeable Fraction: A 5 gram aliquot of sample was extracted with 25 mL of 1M magnesium sulfate (MgSO4), centrifuged and filtered. 5 mL of the resulting leachate was digested using method 3010A and analyzed by method 6010B. Results are reported in mg/kg on a dry weight basis.
· Step 2 - Carbonate Fraction: The sample residue from step 1 was extracted with 25 mL of 1M sodium acetate/acetic acid (NaOAc/HOAc) at pH 5, centrifuged and filtered. 5 mL of the resulting leachate was digested using method 3010A and analyzed by method 6010B. Results are reported in mg/kg on a dry weight basis.
· Step 3 - Non-crystalline Materials Fraction: The sample residue from step 2 was extracted with 25 mL of 0.2M ammonium oxalate (pH 3), centrifuged and filtered. 5 mL of the resulting leachate was digested using method 3010A and analyzed by method 6010B. Results are reported in mg/kg on a dry weight basis.
· Step 4 - Metal Hydroxide Fraction: The sample residue from step 3 was extracted with 25 mL of 1M hydroxylamine hydrochloride solution in 25% v/v acetic acid, centrifuged and filtered. 5 mL of the resulting leachate was digested using method 3010A and analyzed by method 6010B. Results are reported in mg/kg on a dry weight basis.
· Step 5 - Organic-bound Fraction: The sample residue from step 4 was extracted three times with 25 mL of 5% sodium hypochlorite (NaClO) at pH 9.5, centrifuged and filtered. The resulting leachates were combined and 5 mL were digested using method 3010A and analyzed by method 6010B. Results are reported in mg/kg on a dry weight basis.
· Step 6 - Acid/Sulfide Fraction: The sample residue from step 5 was extracted with 25 mL of a 3:1:2 v/v solution of HCl-HNO3-H2O, centrifuged and filtered. 5 mL of the resulting leachate was diluted to 50 mL with reagent water and analyzed by method 6010B. Results are reported in mg/kg on a dry weight basis.
· Step 7 - Residual Fraction: A 1.0 g aliquot of the sample residue from step 6 was digested using HF, HNO3, HCl and H3BO3. The digestate was analyzed by ICP using method 6010B. Results are reported in mg/kg on a dry weight basis.

In addition, a 1.0 g aliquot of the original sample was digested using HF, HNO3, HCl and H3BO3. The digestate was analyzed by ICP using method 6010B. Total metal results are reported in mg/kg on a dry weight basis.

Results were calculated using the following equation:

Result, µg/g or mg/Kg, dry weight = (C × V × V1 × D) / (W × S × V2)

Where:
C = Concentration from instrument readout, µg/mL
V = Final volume of digestate, mL
D = Instrument dilution factor
V1 = Total volume of leachate, mL
V2 = Volume of leachate digested, mL
W = Wet weight of sample, g
S = Percent solids/100

A method blank, laboratory control sample and laboratory control sample duplicate were prepared and analyzed with each SEP step in

Job ID: 140-24429-2 (Continued)

Laboratory: Eurofins TestAmerica, Knoxville (Continued)

order to provide information about both the presence of elements of interest in the extraction solutions, and the recovery of elements of interest from the extraction solutions. Results outside of laboratory QC limits do not reflect out of control performance, but rather the effect of the extraction solution upon the analyte.

A laboratory sample duplicate was prepared and analyzed with each batch of samples in order to provide information regarding the reproducibility of the procedure.

SEP Report Notes:

The final report lists the results for each step, the result for the total digestion of the sample, and a sum of the results of steps 1 through 7 by element.

Magnesium was not reported for step 1 because the extraction solution for this step (magnesium sulfate) contains high levels of magnesium. Sodium was not reported for steps 2 and 5 since the extraction solutions for these steps contain high levels of sodium. The sum of steps 1 through 7 is much higher than the total result for sodium and magnesium due to the magnesium and sodium introduced by the extraction solutions.

The digestates for steps 1, 2 and 5 were analyzed at a dilution due to instrument problems caused by the high solids content of the digestates. The reporting limits were adjusted accordingly.

Method 6010B: The following sample was diluted due to the presence of titanium which interferes with Cobalt: S-8072_DPT02BAP1 (140-24429-4). Elevated reporting limits (RLs) are provided.

Method 6010B: The following sample was diluted due to the presence of iron which interferes with Arsenic: S-8072_DPT02BAP1 (140-24429-4). Elevated reporting limits (RLs) are provided.

Method 6010B SEP: The laboratory control sample (LCS) and laboratory control sample duplicate (LCSD) for preparation batch 140-54486 and 140-54566 and analytical batch 140-55146 recovered outside control limits for the following analyte: Lithium. This analyte was biased high in the LCS/LCSD and was detected in the associated samples as an estimated value; therefore, the data have been reported.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

General Chemistry
% Moisture: The samples were analyzed for percent moisture using SOP number KNOX-WC-0012 (based on Modified MCAWW 160.3 and SM2540B and on the percent moisture determinations described in methods 3540C and 3550B).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Sample Summary

Client: Sirem, div of Geosyntec Consultants
Project/Site: S-7677 SiREMNA

Job ID: 140-24429-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
140-24429-4	S-8072_DPT02BAP1	Solid	08/30/21 00:00	08/31/21 10:10
140-24429-5	S-8072_DPT05BAP1	Solid	08/30/21 00:00	08/31/21 10:10

Client Sample ID: S-8072_DPT02BAP1
Lab Sample ID: 140-24429-4
Date Collected: 08/30/21 00:00
Matrix: Solid
Date Received: 08/31/21 10:10
Percent Solids: 84.0

Method: 6010B SEP - SEP Metals (ICP) - Step 1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**0.89**	**J**	2.4	0.62	mg/Kg	☼	09/30/21 08:00	10/22/21 13:05	4
Cobalt	ND		12	0.21	mg/Kg	☼	09/30/21 08:00	10/22/21 13:05	4
Molybdenum	ND		9.5	0.39	mg/Kg	☼	09/30/21 08:00	10/22/21 13:05	4

Method: 6010B SEP - SEP Metals (ICP) - Step 2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		1.8	0.46	mg/Kg	☼	10/01/21 08:00	10/22/21 15:03	3
Cobalt	ND		8.9	0.22	mg/Kg	☼	10/01/21 08:00	10/22/21 15:03	3
Molybdenum	ND		7.1	0.29	mg/Kg	☼	10/01/21 08:00	10/22/21 15:03	3

Method: 6010B SEP - SEP Metals (ICP) - Step 3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**0.78**		0.59	0.15	mg/Kg	☼	10/04/21 08:00	10/22/21 17:01	1
Cobalt	**8.0**		3.0	0.054	mg/Kg	☼	10/04/21 08:00	10/22/21 17:01	1
Molybdenum	**0.36**	**J**	2.4	0.098	mg/Kg	☼	10/04/21 08:00	10/22/21 17:01	1

Method: 6010B SEP - SEP Metals (ICP) - Step 4

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**8.9**		0.59	0.26	mg/Kg	☼	10/05/21 08:00	10/25/21 13:18	1
Cobalt	**4.2**		3.0	0.063	mg/Kg	☼	10/05/21 08:00	10/25/21 13:18	1
Molybdenum	**1.6**	**J**	2.4	0.098	mg/Kg	☼	10/05/21 08:00	10/25/21 13:18	1

Method: 6010B SEP - SEP Metals (ICP) - Step 5

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**6.1**	**J**	8.9	2.3	mg/Kg	☼	10/07/21 08:00	10/25/21 15:17	5
Cobalt	ND		45	0.71	mg/Kg	☼	10/07/21 08:00	10/25/21 15:17	5
Molybdenum	ND		36	1.5	mg/Kg	☼	10/07/21 08:00	10/25/21 15:17	5

Method: 6010B SEP - SEP Metals (ICP) - Step 6

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**6.5**		0.59	0.18	mg/Kg	☼	10/07/21 08:00	10/25/21 17:16	1
Cobalt	**1.4**	**J**	3.0	0.055	mg/Kg	☼	10/07/21 08:00	10/25/21 17:16	1
Molybdenum	**0.70**	**J**	2.4	0.12	mg/Kg	☼	10/07/21 08:00	10/25/21 17:16	1

Method: 6010B SEP - SEP Metals (ICP) - Step 7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**2.7**		0.59	0.15	mg/Kg	☼	10/08/21 08:00	10/26/21 14:25	1
Cobalt	**0.73**	**J**	5.9	0.062	mg/Kg	☼	10/08/21 08:00	10/26/21 15:48	2
Molybdenum	**0.23**	**J**	2.4	0.098	mg/Kg	☼	10/08/21 08:00	10/26/21 14:25	1

Method: 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**26**		0.50	0.13	mg/Kg			11/02/21 16:06	1
Cobalt	**14**		2.5	0.023	mg/Kg			11/02/21 16:06	1
Molybdenum	**2.9**		2.0	0.082	mg/Kg			11/02/21 16:06	1

Method: 6010B - SEP Metals (ICP) - Total

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**24**		1.2	0.31	mg/Kg	☼	09/29/21 08:00	10/27/21 16:49	2
Cobalt	**12**		5.9	0.062	mg/Kg	☼	09/29/21 08:00	10/27/21 16:49	2
Molybdenum	**2.8**		2.4	0.098	mg/Kg	☼	09/29/21 08:00	10/27/21 14:53	1

Client Sample ID: S-8072_DPT05BAP1
Lab Sample ID: 140-24429-5

Date Collected: 08/30/21 00:00
Matrix: Solid

Date Received: 08/31/21 10:10
Percent Solids: 78.0

Method: 6010B SEP - SEP Metals (ICP) - Step 1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**1.0**	**J**	2.6	0.67	mg/Kg	☼	09/30/21 08:00	10/22/21 13:09	4
Cobalt	ND		13	0.23	mg/Kg	☼	09/30/21 08:00	10/22/21 13:09	4
Molybdenum	ND		10	0.42	mg/Kg	☼	09/30/21 08:00	10/22/21 13:09	4

Method: 6010B SEP - SEP Metals (ICP) - Step 2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		1.9	0.50	mg/Kg	☼	10/01/21 08:00	10/22/21 15:08	3
Cobalt	ND		9.6	0.24	mg/Kg	☼	10/01/21 08:00	10/22/21 15:08	3
Molybdenum	ND		7.7	0.32	mg/Kg	☼	10/01/21 08:00	10/22/21 15:08	3

Method: 6010B SEP - SEP Metals (ICP) - Step 3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**1.1**		0.64	0.17	mg/Kg	☼	10/04/21 08:00	10/22/21 17:06	1
Cobalt	**4.1**		3.2	0.058	mg/Kg	☼	10/04/21 08:00	10/22/21 17:06	1
Molybdenum	**0.42**	**J**	2.6	0.11	mg/Kg	☼	10/04/21 08:00	10/22/21 17:06	1

Method: 6010B SEP - SEP Metals (ICP) - Step 4

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**15**		0.64	0.28	mg/Kg	☼	10/05/21 08:00	10/25/21 13:32	1
Cobalt	**5.9**		3.2	0.068	mg/Kg	☼	10/05/21 08:00	10/25/21 13:32	1
Molybdenum	**1.3**	**J**	2.6	0.11	mg/Kg	☼	10/05/21 08:00	10/25/21 13:32	1

Method: 6010B SEP - SEP Metals (ICP) - Step 5

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**4.4**	**J**	9.6	2.4	mg/Kg	☼	10/07/21 08:00	10/25/21 15:32	5
Cobalt	ND		48	0.77	mg/Kg	☼	10/07/21 08:00	10/25/21 15:32	5
Molybdenum	ND		38	1.6	mg/Kg	☼	10/07/21 08:00	10/25/21 15:32	5

Method: 6010B SEP - SEP Metals (ICP) - Step 6

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**6.2**		0.64	0.19	mg/Kg	☼	10/07/21 08:00	10/25/21 17:30	1
Cobalt	**1.0**	**J**	3.2	0.059	mg/Kg	☼	10/07/21 08:00	10/25/21 17:30	1
Molybdenum	**0.22**	**J**	2.6	0.13	mg/Kg	☼	10/07/21 08:00	10/25/21 17:30	1

Method: 6010B SEP - SEP Metals (ICP) - Step 7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**1.6**		0.64	0.17	mg/Kg	☼	10/08/21 08:00	10/26/21 14:30	1
Cobalt	ND		3.2	0.033	mg/Kg	☼	10/08/21 08:00	10/26/21 14:30	1
Molybdenum	ND		2.6	0.11	mg/Kg	☼	10/08/21 08:00	10/26/21 14:30	1

Method: 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**30**		0.50	0.13	mg/Kg			11/02/21 16:06	1
Cobalt	**11**		2.5	0.023	mg/Kg			11/02/21 16:06	1
Molybdenum	**1.9**	**J**	2.0	0.082	mg/Kg			11/02/21 16:06	1

Method: 6010B - SEP Metals (ICP) - Total

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**26**		0.64	0.17	mg/Kg	☼	09/29/21 08:00	10/27/21 14:59	1
Cobalt	**9.0**		3.2	0.033	mg/Kg	☼	09/29/21 08:00	10/27/21 14:59	1
Molybdenum	**1.6**	**J**	2.6	0.11	mg/Kg	☼	09/29/21 08:00	10/27/21 14:59	1

Default Detection Limits

Client: Sirem, div of Geosyntec Consultants
Job ID: 140-24429-2
Project/Site: S-7677 SiREMNA

Method: 6010B SEP - SEP Metals (ICP) - Step 1
Prep: 3010A
SEP: Exchangeable

Analyte	RL	MDL	Units
Arsenic	0.50	0.13	mg/Kg
Cobalt	2.5	0.045	mg/Kg
Molybdenum	2.0	0.082	mg/Kg

Method: 6010B SEP - SEP Metals (ICP) - Step 2
Prep: 3010A
SEP: Carbonate

Analyte	RL	MDL	Units
Arsenic	0.50	0.13	mg/Kg
Cobalt	2.5	0.063	mg/Kg
Molybdenum	2.0	0.082	mg/Kg

Method: 6010B SEP - SEP Metals (ICP) - Step 3
Prep: 3010A
SEP: Non-Crystalline

Analyte	RL	MDL	Units
Arsenic	0.50	0.13	mg/Kg
Cobalt	2.5	0.045	mg/Kg
Molybdenum	2.0	0.082	mg/Kg

Method: 6010B SEP - SEP Metals (ICP) - Step 4
Prep: 3010A
SEP: Metal Hydroxide

Analyte	RL	MDL	Units
Arsenic	0.50	0.22	mg/Kg
Cobalt	2.5	0.053	mg/Kg
Molybdenum	2.0	0.082	mg/Kg

Method: 6010B SEP - SEP Metals (ICP) - Step 5
Prep: 3010A
SEP: Organic-Bound

Analyte	RL	MDL	Units
Arsenic	1.5	0.38	mg/Kg
Cobalt	7.5	0.12	mg/Kg
Molybdenum	6.0	0.25	mg/Kg

Method: 6010B SEP - SEP Metals (ICP) - Step 6
SEP: Acid/Sulfide

Analyte	RL	MDL	Units
Arsenic	0.50	0.15	mg/Kg
Cobalt	2.5	0.046	mg/Kg
Molybdenum	2.0	0.099	mg/Kg

Method: 6010B SEP - SEP Metals (ICP) - Step 7
Prep: Residual

Analyte	RL	MDL	Units
Arsenic	0.50	0.13	mg/Kg
Cobalt	2.5	0.026	mg/Kg
Molybdenum	2.0	0.082	mg/Kg

Default Detection Limits

Client: Sirem, div of Geosyntec Consultants
Job ID: 140-24429-2
Project/Site: S-7677 SiREMNA

Method: 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7

Analyte	RL	MDL	Units
Arsenic	0.50	0.13	mg/Kg
Cobalt	2.5	0.023	mg/Kg
Molybdenum	2.0	0.082	mg/Kg

Method: 6010B - SEP Metals (ICP) - Total

Prep: Total

Analyte	RL	MDL	Units
Arsenic	0.50	0.13	mg/Kg
Cobalt	2.5	0.026	mg/Kg
Molybdenum	2.0	0.082	mg/Kg

Method: 6010B - SEP Metals (ICP) - Total

Lab Sample ID: MB 140-54251/17-A
Matrix: Solid
Analysis Batch: 55243

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 54251

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.50	0.13	mg/Kg		09/29/21 08:00	10/27/21 10:49	1
Cobalt	ND		2.5	0.026	mg/Kg		09/29/21 08:00	10/27/21 10:49	1
Molybdenum	ND		2.0	0.082	mg/Kg		09/29/21 08:00	10/27/21 10:49	1

Lab Sample ID: LCS 140-54251/18-A
Matrix: Solid
Analysis Batch: 55243

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 54251

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	5.00	5.06		mg/Kg		101	80 - 120
Cobalt	5.00	5.19		mg/Kg		104	80 - 125
Molybdenum	25.0	26.0		mg/Kg		104	80 - 125

Lab Sample ID: LCSD 140-54251/19-A
Matrix: Solid
Analysis Batch: 55243

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 54251

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Arsenic	5.00	4.94		mg/Kg		99	80 - 120	2	30
Cobalt	5.00	5.05		mg/Kg		101	80 - 125	3	30
Molybdenum	25.0	25.4		mg/Kg		102	80 - 125	3	30

Method: 6010B SEP - SEP Metals (ICP)

Lab Sample ID: MB 140-54252/17-B ^4
Matrix: Solid
Analysis Batch: 55087

Client Sample ID: Method Blank
Prep Type: Step 1
Prep Batch: 54333

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		2.0	0.52	mg/Kg		09/30/21 08:00	10/22/21 11:17	4
Cobalt	ND		10	0.18	mg/Kg		09/30/21 08:00	10/22/21 11:17	4
Molybdenum	ND		8.0	0.33	mg/Kg		09/30/21 08:00	10/22/21 11:17	4

Lab Sample ID: LCS 140-54252/18-B ^5
Matrix: Solid
Analysis Batch: 55087

Client Sample ID: Lab Control Sample
Prep Type: Step 1
Prep Batch: 54333

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	5.00	5.07		mg/Kg		101	80 - 120
Cobalt	5.00	4.98	J	mg/Kg		100	80 - 120
Molybdenum	25.0	25.2		mg/Kg		101	80 - 120

Lab Sample ID: LCSD 140-54252/19-B ^5
Matrix: Solid
Analysis Batch: 55087

Client Sample ID: Lab Control Sample Dup
Prep Type: Step 1
Prep Batch: 54333

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Arsenic	5.00	4.84		mg/Kg		97	80 - 120	4	30
Cobalt	5.00	4.92	J	mg/Kg		98	80 - 120	1	30
Molybdenum	25.0	25.0		mg/Kg		100	80 - 120	1	30

Method: 6010B SEP - SEP Metals (ICP)

Lab Sample ID: MB 140-54334/17-B ^3
Matrix: Solid
Analysis Batch: 55087

Client Sample ID: Method Blank
Prep Type: Step 2
Prep Batch: 54370

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		1.5	0.39	mg/Kg		10/01/21 08:00	10/22/21 13:24	3
Cobalt	ND		7.5	0.19	mg/Kg		10/01/21 08:00	10/22/21 13:24	3
Molybdenum	ND		6.0	0.25	mg/Kg		10/01/21 08:00	10/22/21 13:24	3

Lab Sample ID: LCS 140-54334/18-B ^5
Matrix: Solid
Analysis Batch: 55087

Client Sample ID: Lab Control Sample
Prep Type: Step 2
Prep Batch: 54370

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	5.00	3.62		mg/Kg		72	60 - 120
Cobalt	5.00	4.63	J	mg/Kg		93	80 - 120
Molybdenum	25.0	20.4		mg/Kg		82	70 - 120

Lab Sample ID: LCSD 140-54334/19-B ^5
Matrix: Solid
Analysis Batch: 55087

Client Sample ID: Lab Control Sample Dup
Prep Type: Step 2
Prep Batch: 54370

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Arsenic	5.00	3.80		mg/Kg		76	60 - 120	5	30
Cobalt	5.00	4.60	J	mg/Kg		92	80 - 120	1	30
Molybdenum	25.0	20.3		mg/Kg		81	70 - 120	0	30

Lab Sample ID: MB 140-54371/17-B
Matrix: Solid
Analysis Batch: 55087

Client Sample ID: Method Blank
Prep Type: Step 3
Prep Batch: 54400

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.50	0.13	mg/Kg		10/04/21 08:00	10/22/21 15:23	1
Cobalt	ND		2.5	0.045	mg/Kg		10/04/21 08:00	10/22/21 15:23	1
Molybdenum	ND		2.0	0.082	mg/Kg		10/04/21 08:00	10/22/21 15:23	1

Lab Sample ID: LCS 140-54371/18-B
Matrix: Solid
Analysis Batch: 55087

Client Sample ID: Lab Control Sample
Prep Type: Step 3
Prep Batch: 54400

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	5.00	4.81		mg/Kg		96	80 - 120
Cobalt	5.00	5.01		mg/Kg		100	80 - 120
Molybdenum	25.0	24.5		mg/Kg		98	80 - 120

Lab Sample ID: LCSD 140-54371/19-B
Matrix: Solid
Analysis Batch: 55087

Client Sample ID: Lab Control Sample Dup
Prep Type: Step 3
Prep Batch: 54400

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Arsenic	5.00	4.76		mg/Kg		95	80 - 120	1	30
Cobalt	5.00	4.97		mg/Kg		99	80 - 120	1	30
Molybdenum	25.0	24.2		mg/Kg		97	80 - 120	1	30

Method: 6010B SEP - SEP Metals (ICP) (Continued)

Lab Sample ID: MB 140-54401/17-B
Matrix: Solid
Analysis Batch: 55146

Client Sample ID: Method Blank
Prep Type: Step 4
Prep Batch: 54485

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.50	0.22	mg/Kg		10/05/21 08:00	10/25/21 11:34	1
Cobalt	ND		2.5	0.053	mg/Kg		10/05/21 08:00	10/25/21 11:34	1
Molybdenum	ND		2.0	0.082	mg/Kg		10/05/21 08:00	10/25/21 11:34	1

Lab Sample ID: LCS 140-54401/18-B
Matrix: Solid
Analysis Batch: 55146

Client Sample ID: Lab Control Sample
Prep Type: Step 4
Prep Batch: 54485

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	5.00	4.99		mg/Kg		100	80 - 130
Cobalt	5.00	5.10		mg/Kg		102	80 - 120
Molybdenum	25.0	25.9		mg/Kg		104	80 - 120

Lab Sample ID: LCSD 140-54401/19-B
Matrix: Solid
Analysis Batch: 55146

Client Sample ID: Lab Control Sample Dup
Prep Type: Step 4
Prep Batch: 54485

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Arsenic	5.00	4.96		mg/Kg		99	80 - 130	1	30
Cobalt	5.00	5.07		mg/Kg		101	80 - 120	1	30
Molybdenum	25.0	25.7		mg/Kg		103	80 - 120	1	30

Lab Sample ID: MB 140-54486/17-B ^5
Matrix: Solid
Analysis Batch: 55146

Client Sample ID: Method Blank
Prep Type: Step 5
Prep Batch: 54566

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		7.5	1.9	mg/Kg		10/07/21 08:00	10/25/21 13:37	5
Cobalt	ND		38	0.60	mg/Kg		10/07/21 08:00	10/25/21 13:37	5
Molybdenum	ND		30	1.3	mg/Kg		10/07/21 08:00	10/25/21 13:37	5

Lab Sample ID: LCS 140-54486/18-B ^5
Matrix: Solid
Analysis Batch: 55146

Client Sample ID: Lab Control Sample
Prep Type: Step 5
Prep Batch: 54566

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	15.0	9.89		mg/Kg		66	60 - 100
Cobalt	15.0	0.863	J	mg/Kg		6	1 - 60
Molybdenum	75.0	53.6		mg/Kg		72	60 - 100

Lab Sample ID: LCSD 140-54486/19-B ^5
Matrix: Solid
Analysis Batch: 55146

Client Sample ID: Lab Control Sample Dup
Prep Type: Step 5
Prep Batch: 54566

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Arsenic	15.0	10.3		mg/Kg		68	60 - 100	4	30
Cobalt	15.0	0.840	J	mg/Kg		6	1 - 60	3	30
Molybdenum	75.0	53.4		mg/Kg		71	60 - 100	0	30

Method: 6010B SEP - SEP Metals (ICP) (Continued)

Lab Sample ID: MB 140-54567/17-A
Matrix: Solid
Analysis Batch: 55146

Client Sample ID: Method Blank
Prep Type: Step 6
Prep Batch: 54567

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.50	0.15	mg/Kg		10/07/21 08:00	10/25/21 15:37	1
Cobalt	ND		2.5	0.046	mg/Kg		10/07/21 08:00	10/25/21 15:37	1
Molybdenum	ND		2.0	0.099	mg/Kg		10/07/21 08:00	10/25/21 15:37	1

Lab Sample ID: LCS 140-54567/18-A
Matrix: Solid
Analysis Batch: 55146

Client Sample ID: Lab Control Sample
Prep Type: Step 6
Prep Batch: 54567

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	5.00	5.01		mg/Kg		100	80 - 120
Cobalt	5.00	5.00		mg/Kg		100	80 - 120
Molybdenum	25.0	25.1		mg/Kg		100	80 - 120

Lab Sample ID: LCSD 140-54567/19-A
Matrix: Solid
Analysis Batch: 55146

Client Sample ID: Lab Control Sample Dup
Prep Type: Step 6
Prep Batch: 54567

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Arsenic	5.00	5.07		mg/Kg		101	80 - 120	1	30
Cobalt	5.00	5.10		mg/Kg		102	80 - 120	2	30
Molybdenum	25.0	25.8		mg/Kg		103	80 - 120	3	30

Lab Sample ID: MB 140-54607/17-A
Matrix: Solid
Analysis Batch: 55197

Client Sample ID: Method Blank
Prep Type: Step 7
Prep Batch: 54607

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.50	0.13	mg/Kg		10/08/21 08:00	10/26/21 11:23	1
Cobalt	ND		2.5	0.026	mg/Kg		10/08/21 08:00	10/26/21 11:23	1
Molybdenum	ND		2.0	0.082	mg/Kg		10/08/21 08:00	10/26/21 11:23	1

Lab Sample ID: LCS 140-54607/18-A
Matrix: Solid
Analysis Batch: 55197

Client Sample ID: Lab Control Sample
Prep Type: Step 7
Prep Batch: 54607

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	5.00	4.99		mg/Kg		100	80 - 120
Cobalt	5.00	5.09		mg/Kg		102	80 - 125
Molybdenum	25.0	25.7		mg/Kg		103	80 - 125

Lab Sample ID: LCSD 140-54607/19-A
Matrix: Solid
Analysis Batch: 55197

Client Sample ID: Lab Control Sample Dup
Prep Type: Step 7
Prep Batch: 54607

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Arsenic	5.00	5.04		mg/Kg		101	80 - 120	1	30
Cobalt	5.00	5.16		mg/Kg		103	80 - 125	1	30
Molybdenum	25.0	26.1		mg/Kg		104	80 - 125	2	30

Metals

Prep Batch: 54251

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-24429-4	S-8072_DPT02BAP1	Total/NA	Solid	Total	
140-24429-5	S-8072_DPT05BAP1	Total/NA	Solid	Total	
MB 140-54251/17-A	Method Blank	Total/NA	Solid	Total	
LCS 140-54251/18-A	Lab Control Sample	Total/NA	Solid	Total	
LCSD 140-54251/19-A	Lab Control Sample Dup	Total/NA	Solid	Total	

SEP Batch: 54252

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-24429-4	S-8072_DPT02BAP1	Step 1	Solid	Exchangeable	
140-24429-5	S-8072_DPT05BAP1	Step 1	Solid	Exchangeable	
MB 140-54252/17-B ^4	Method Blank	Step 1	Solid	Exchangeable	
LCS 140-54252/18-B ^5	Lab Control Sample	Step 1	Solid	Exchangeable	
LCSD 140-54252/19-B ^5	Lab Control Sample Dup	Step 1	Solid	Exchangeable	

Prep Batch: 54333

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-24429-4	S-8072_DPT02BAP1	Step 1	Solid	3010A	54252
140-24429-5	S-8072_DPT05BAP1	Step 1	Solid	3010A	54252
MB 140-54252/17-B ^4	Method Blank	Step 1	Solid	3010A	54252
LCS 140-54252/18-B ^5	Lab Control Sample	Step 1	Solid	3010A	54252
LCSD 140-54252/19-B ^5	Lab Control Sample Dup	Step 1	Solid	3010A	54252

SEP Batch: 54334

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-24429-4	S-8072_DPT02BAP1	Step 2	Solid	Carbonate	
140-24429-5	S-8072_DPT05BAP1	Step 2	Solid	Carbonate	
MB 140-54334/17-B ^3	Method Blank	Step 2	Solid	Carbonate	
LCS 140-54334/18-B ^5	Lab Control Sample	Step 2	Solid	Carbonate	
LCSD 140-54334/19-B ^5	Lab Control Sample Dup	Step 2	Solid	Carbonate	

Prep Batch: 54370

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-24429-4	S-8072_DPT02BAP1	Step 2	Solid	3010A	54334
140-24429-5	S-8072_DPT05BAP1	Step 2	Solid	3010A	54334
MB 140-54334/17-B ^3	Method Blank	Step 2	Solid	3010A	54334
LCS 140-54334/18-B ^5	Lab Control Sample	Step 2	Solid	3010A	54334
LCSD 140-54334/19-B ^5	Lab Control Sample Dup	Step 2	Solid	3010A	54334

SEP Batch: 54371

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-24429-4	S-8072_DPT02BAP1	Step 3	Solid	Non-Crystalline	
140-24429-5	S-8072_DPT05BAP1	Step 3	Solid	Non-Crystalline	
MB 140-54371/17-B	Method Blank	Step 3	Solid	Non-Crystalline	
LCS 140-54371/18-B	Lab Control Sample	Step 3	Solid	Non-Crystalline	
LCSD 140-54371/19-B	Lab Control Sample Dup	Step 3	Solid	Non-Crystalline	

Prep Batch: 54400

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-24429-4	S-8072_DPT02BAP1	Step 3	Solid	3010A	54371
140-24429-5	S-8072_DPT05BAP1	Step 3	Solid	3010A	54371
MB 140-54371/17-B	Method Blank	Step 3	Solid	3010A	54371

Metals (Continued)

Prep Batch: 54400 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 140-54371/18-B	Lab Control Sample	Step 3	Solid	3010A	54371
LCSD 140-54371/19-B	Lab Control Sample Dup	Step 3	Solid	3010A	54371

SEP Batch: 54401

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-24429-4	S-8072_DPT02BAP1	Step 4	Solid	Metal Hydroxide	
140-24429-5	S-8072_DPT05BAP1	Step 4	Solid	Metal Hydroxide	
MB 140-54401/17-B	Method Blank	Step 4	Solid	Metal Hydroxide	
LCS 140-54401/18-B	Lab Control Sample	Step 4	Solid	Metal Hydroxide	
LCSD 140-54401/19-B	Lab Control Sample Dup	Step 4	Solid	Metal Hydroxide	

Prep Batch: 54485

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-24429-4	S-8072_DPT02BAP1	Step 4	Solid	3010A	54401
140-24429-5	S-8072_DPT05BAP1	Step 4	Solid	3010A	54401
MB 140-54401/17-B	Method Blank	Step 4	Solid	3010A	54401
LCS 140-54401/18-B	Lab Control Sample	Step 4	Solid	3010A	54401
LCSD 140-54401/19-B	Lab Control Sample Dup	Step 4	Solid	3010A	54401

SEP Batch: 54486

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-24429-4	S-8072_DPT02BAP1	Step 5	Solid	Organic-Bound	
140-24429-5	S-8072_DPT05BAP1	Step 5	Solid	Organic-Bound	
MB 140-54486/17-B ^5	Method Blank	Step 5	Solid	Organic-Bound	
LCS 140-54486/18-B ^5	Lab Control Sample	Step 5	Solid	Organic-Bound	
LCSD 140-54486/19-B ^5	Lab Control Sample Dup	Step 5	Solid	Organic-Bound	

Prep Batch: 54566

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-24429-4	S-8072_DPT02BAP1	Step 5	Solid	3010A	54486
140-24429-5	S-8072_DPT05BAP1	Step 5	Solid	3010A	54486
MB 140-54486/17-B ^5	Method Blank	Step 5	Solid	3010A	54486
LCS 140-54486/18-B ^5	Lab Control Sample	Step 5	Solid	3010A	54486
LCSD 140-54486/19-B ^5	Lab Control Sample Dup	Step 5	Solid	3010A	54486

SEP Batch: 54567

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-24429-4	S-8072_DPT02BAP1	Step 6	Solid	Acid/Sulfide	
140-24429-5	S-8072_DPT05BAP1	Step 6	Solid	Acid/Sulfide	
MB 140-54567/17-A	Method Blank	Step 6	Solid	Acid/Sulfide	
LCS 140-54567/18-A	Lab Control Sample	Step 6	Solid	Acid/Sulfide	
LCSD 140-54567/19-A	Lab Control Sample Dup	Step 6	Solid	Acid/Sulfide	

Prep Batch: 54607

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-24429-4	S-8072_DPT02BAP1	Step 7	Solid	Residual	
140-24429-5	S-8072_DPT05BAP1	Step 7	Solid	Residual	
MB 140-54607/17-A	Method Blank	Step 7	Solid	Residual	
LCS 140-54607/18-A	Lab Control Sample	Step 7	Solid	Residual	
LCSD 140-54607/19-A	Lab Control Sample Dup	Step 7	Solid	Residual	

Metals

Analysis Batch: 55087

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-24429-4	S-8072_DPT02BAP1	Step 1	Solid	6010B SEP	54333
140-24429-4	S-8072_DPT02BAP1	Step 2	Solid	6010B SEP	54370
140-24429-4	S-8072_DPT02BAP1	Step 3	Solid	6010B SEP	54400
140-24429-5	S-8072_DPT05BAP1	Step 1	Solid	6010B SEP	54333
140-24429-5	S-8072_DPT05BAP1	Step 2	Solid	6010B SEP	54370
140-24429-5	S-8072_DPT05BAP1	Step 3	Solid	6010B SEP	54400
MB 140-54252/17-B ^4	Method Blank	Step 1	Solid	6010B SEP	54333
MB 140-54334/17-B ^3	Method Blank	Step 2	Solid	6010B SEP	54370
MB 140-54371/17-B	Method Blank	Step 3	Solid	6010B SEP	54400
LCS 140-54252/18-B ^5	Lab Control Sample	Step 1	Solid	6010B SEP	54333
LCS 140-54334/18-B ^5	Lab Control Sample	Step 2	Solid	6010B SEP	54370
LCS 140-54371/18-B	Lab Control Sample	Step 3	Solid	6010B SEP	54400
LCSD 140-54252/19-B ^5	Lab Control Sample Dup	Step 1	Solid	6010B SEP	54333
LCSD 140-54334/19-B ^5	Lab Control Sample Dup	Step 2	Solid	6010B SEP	54370
LCSD 140-54371/19-B	Lab Control Sample Dup	Step 3	Solid	6010B SEP	54400

Analysis Batch: 55146

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-24429-4	S-8072_DPT02BAP1	Step 4	Solid	6010B SEP	54485
140-24429-4	S-8072_DPT02BAP1	Step 5	Solid	6010B SEP	54566
140-24429-4	S-8072_DPT02BAP1	Step 6	Solid	6010B SEP	54567
140-24429-5	S-8072_DPT05BAP1	Step 4	Solid	6010B SEP	54485
140-24429-5	S-8072_DPT05BAP1	Step 5	Solid	6010B SEP	54566
140-24429-5	S-8072_DPT05BAP1	Step 6	Solid	6010B SEP	54567
MB 140-54401/17-B	Method Blank	Step 4	Solid	6010B SEP	54485
MB 140-54486/17-B ^5	Method Blank	Step 5	Solid	6010B SEP	54566
MB 140-54567/17-A	Method Blank	Step 6	Solid	6010B SEP	54567
LCS 140-54401/18-B	Lab Control Sample	Step 4	Solid	6010B SEP	54485
LCS 140-54486/18-B ^5	Lab Control Sample	Step 5	Solid	6010B SEP	54566
LCS 140-54567/18-A	Lab Control Sample	Step 6	Solid	6010B SEP	54567
LCSD 140-54401/19-B	Lab Control Sample Dup	Step 4	Solid	6010B SEP	54485
LCSD 140-54486/19-B ^5	Lab Control Sample Dup	Step 5	Solid	6010B SEP	54566
LCSD 140-54567/19-A	Lab Control Sample Dup	Step 6	Solid	6010B SEP	54567

Analysis Batch: 55197

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-24429-4	S-8072_DPT02BAP1	Step 7	Solid	6010B SEP	54607
140-24429-4	S-8072_DPT02BAP1	Step 7	Solid	6010B SEP	54607
140-24429-5	S-8072_DPT05BAP1	Step 7	Solid	6010B SEP	54607
MB 140-54607/17-A	Method Blank	Step 7	Solid	6010B SEP	54607
LCS 140-54607/18-A	Lab Control Sample	Step 7	Solid	6010B SEP	54607
LCSD 140-54607/19-A	Lab Control Sample Dup	Step 7	Solid	6010B SEP	54607

Analysis Batch: 55243

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-24429-4	S-8072_DPT02BAP1	Total/NA	Solid	6010B	54251
140-24429-4	S-8072_DPT02BAP1	Total/NA	Solid	6010B	54251
140-24429-5	S-8072_DPT05BAP1	Total/NA	Solid	6010B	54251
MB 140-54251/17-A	Method Blank	Total/NA	Solid	6010B	54251
LCS 140-54251/18-A	Lab Control Sample	Total/NA	Solid	6010B	54251
LCSD 140-54251/19-A	Lab Control Sample Dup	Total/NA	Solid	6010B	54251

QC Association Summary

Client: Sirem, div of Geosyntec Consultants
Job ID: 140-24429-2
Project/Site: S-7677 SiREMNA

Metals

Analysis Batch: 55440

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-24429-4	S-8072_DPT02BAP1	Sum of Steps 1-7	Solid	6010B SEP	
140-24429-5	S-8072_DPT05BAP1	Sum of Steps 1-7	Solid	6010B SEP	

General Chemistry

Analysis Batch: 53487

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-24429-5	S-8072_DPT05BAP1	Total/NA	Solid	Moisture	

Analysis Batch: 53579

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-24429-4	S-8072_DPT02BAP1	Total/NA	Solid	Moisture	

Lab Chronicle

Client: Sirem, div of Geosyntec Consultants
Project/Site: S-7677 SiREMNA

Job ID: 140-24429-2

Client Sample ID: S-8072_DPT02BAP1

Lab Sample ID: 140-24429-4
Date Collected: 08/30/21 00:00
Matrix: Solid
Date Received: 08/31/21 10:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Sum of Steps 1-7	Analysis	6010B SEP		1			55440	11/02/21 16:06	DKW	TAL KNX
	Instrument ID: NOEQUIP									
Total/NA	Analysis	Moisture		1			53579	09/09/21 10:14	LDP	TAL KNX
	Instrument ID: NOEQUIP									

Client Sample ID: S-8072_DPT02BAP1

Lab Sample ID: 140-24429-4
Date Collected: 08/30/21 00:00
Matrix: Solid
Date Received: 08/31/21 10:10
Percent Solids: 84.0

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Total			1.000 g	50 mL	54251	09/29/21 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			55243	10/27/21 14:53	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.000 g	50 mL	54251	09/29/21 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		2			55243	10/27/21 16:49	KNC	TAL KNX
	Instrument ID: DUO									
Step 1	SEP	Exchangeable			5.000 g	25 mL	54252	09/29/21 08:00	KNC	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	54333	09/30/21 08:00	KNC	TAL KNX
Step 1	Analysis	6010B SEP		4			55087	10/22/21 13:05	KNC	TAL KNX
	Instrument ID: DUO									
Step 2	SEP	Carbonate			5.000 g	25 mL	54334	09/30/21 08:00	KNC	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	54370	10/01/21 08:00	KNC	TAL KNX
Step 2	Analysis	6010B SEP		3			55087	10/22/21 15:03	KNC	TAL KNX
	Instrument ID: DUO									
Step 3	SEP	Non-Crystalline			5.000 g	25 mL	54371	10/01/21 08:00	KNC	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	54400	10/04/21 08:00	KNC	TAL KNX
Step 3	Analysis	6010B SEP		1			55087	10/22/21 17:01	KNC	TAL KNX
	Instrument ID: DUO									
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	54401	10/04/21 08:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	54485	10/05/21 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			55146	10/25/21 13:18	KNC	TAL KNX
	Instrument ID: DUO									
Step 5	SEP	Organic-Bound			5.000 g	75 mL	54486	10/05/21 08:00	KNC	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	54566	10/07/21 08:00	KNC	TAL KNX
Step 5	Analysis	6010B SEP		5			55146	10/25/21 15:17	KNC	TAL KNX
	Instrument ID: DUO									
Step 6	SEP	Acid/Sulfide			5.000 g	250 mL	54567	10/07/21 08:00	KNC	TAL KNX
Step 6	Analysis	6010B SEP		1			55146	10/25/21 17:16	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	54607	10/08/21 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		1			55197	10/26/21 14:25	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	54607	10/08/21 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		2			55197	10/26/21 15:48	KNC	TAL KNX
	Instrument ID: DUO									

Lab Chronicle

Client: Sirem, div of Geosyntec Consultants
Project/Site: S-7677 SiREMNA

Job ID: 140-24429-2

Client Sample ID: S-8072_DPT05BAP1

Lab Sample ID: 140-24429-5
Date Collected: 08/30/21 00:00
Matrix: Solid
Date Received: 08/31/21 10:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Sum of Steps 1-7	Analysis	6010B SEP		1			55440	11/02/21 16:06	DKW	TAL KNX
	Instrument ID: NOEQUIP									
Total/NA	Analysis	Moisture		1			53487	09/07/21 10:52	LDP	TAL KNX
	Instrument ID: NOEQUIP									

Client Sample ID: S-8072_DPT05BAP1

Lab Sample ID: 140-24429-5
Date Collected: 08/30/21 00:00
Matrix: Solid
Date Received: 08/31/21 10:10
Percent Solids: 78.0

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Total			1.000 g	50 mL	54251	09/29/21 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			55243	10/27/21 14:59	KNC	TAL KNX
	Instrument ID: DUO									
Step 1	SEP	Exchangeable			5.000 g	25 mL	54252	09/29/21 08:00	KNC	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	54333	09/30/21 08:00	KNC	TAL KNX
Step 1	Analysis	6010B SEP		4			55087	10/22/21 13:09	KNC	TAL KNX
	Instrument ID: DUO									
Step 2	SEP	Carbonate			5.000 g	25 mL	54334	09/30/21 08:00	KNC	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	54370	10/01/21 08:00	KNC	TAL KNX
Step 2	Analysis	6010B SEP		3			55087	10/22/21 15:08	KNC	TAL KNX
	Instrument ID: DUO									
Step 3	SEP	Non-Crystalline			5.000 g	25 mL	54371	10/01/21 08:00	KNC	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	54400	10/04/21 08:00	KNC	TAL KNX
Step 3	Analysis	6010B SEP		1			55087	10/22/21 17:06	KNC	TAL KNX
	Instrument ID: DUO									
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	54401	10/04/21 08:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	54485	10/05/21 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			55146	10/25/21 13:32	KNC	TAL KNX
	Instrument ID: DUO									
Step 5	SEP	Organic-Bound			5.000 g	75 mL	54486	10/05/21 08:00	KNC	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	54566	10/07/21 08:00	KNC	TAL KNX
Step 5	Analysis	6010B SEP		5			55146	10/25/21 15:32	KNC	TAL KNX
	Instrument ID: DUO									
Step 6	SEP	Acid/Sulfide			5.000 g	250 mL	54567	10/07/21 08:00	KNC	TAL KNX
Step 6	Analysis	6010B SEP		1			55146	10/25/21 17:30	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	54607	10/08/21 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		1			55197	10/26/21 14:30	KNC	TAL KNX
	Instrument ID: DUO									

Lab Chronicle

Client: Sirem, div of Geosyntec Consultants
Project/Site: S-7677 SiREMNA

Job ID: 140-24429-2

Client Sample ID: Method Blank
Lab Sample ID: MB 140-54251/17-A
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Total			1.000 g	50 mL	54251	09/29/21 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			55243	10/27/21 10:49	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Method Blank
Lab Sample ID: MB 140-54252/17-B ^4
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 1	SEP	Exchangeable			5.000 g	25 mL	54252	09/29/21 08:00	KNC	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	54333	09/30/21 08:00	KNC	TAL KNX
Step 1	Analysis	6010B SEP		4			55087	10/22/21 11:17	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Method Blank
Lab Sample ID: MB 140-54334/17-B ^3
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 2	SEP	Carbonate			5.000 g	25 mL	54334	09/30/21 08:00	KNC	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	54370	10/01/21 08:00	KNC	TAL KNX
Step 2	Analysis	6010B SEP		3			55087	10/22/21 13:24	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Method Blank
Lab Sample ID: MB 140-54371/17-B
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 3	SEP	Non-Crystalline			5.000 g	25 mL	54371	10/01/21 08:00	KNC	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	54400	10/04/21 08:00	KNC	TAL KNX
Step 3	Analysis	6010B SEP		1			55087	10/22/21 15:23	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Method Blank
Lab Sample ID: MB 140-54401/17-B
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	54401	10/04/21 08:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	54485	10/05/21 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			55146	10/25/21 11:34	KNC	TAL KNX
	Instrument ID: DUO									

Lab Chronicle

Client: Sirem, div of Geosyntec Consultants
Project/Site: S-7677 SiREMNA

Job ID: 140-24429-2

Client Sample ID: Method Blank
Lab Sample ID: MB 140-54486/17-B ^5
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 5	SEP	Organic-Bound			5.000 g	75 mL	54486	10/05/21 08:00	KNC	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	54566	10/07/21 08:00	KNC	TAL KNX
Step 5	Analysis	6010B SEP		5			55146	10/25/21 13:37	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Method Blank
Lab Sample ID: MB 140-54567/17-A
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 6	SEP	Acid/Sulfide			5.000 g	250 mL	54567	10/07/21 08:00	KNC	TAL KNX
Step 6	Analysis	6010B SEP		1			55146	10/25/21 15:37	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Method Blank
Lab Sample ID: MB 140-54607/17-A
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 7	Prep	Residual			1.000 g	50 mL	54607	10/08/21 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		1			55197	10/26/21 11:23	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample
Lab Sample ID: LCS 140-54251/18-A
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Total			1.000 g	50 mL	54251	09/29/21 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			55243	10/27/21 10:54	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample
Lab Sample ID: LCS 140-54252/18-B ^5
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 1	SEP	Exchangeable			5.000 g	25 mL	54252	09/29/21 08:00	KNC	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	54333	09/30/21 08:00	KNC	TAL KNX
Step 1	Analysis	6010B SEP		5			55087	10/22/21 11:22	KNC	TAL KNX
	Instrument ID: DUO									

Lab Chronicle

Client: Sirem, div of Geosyntec Consultants
Project/Site: S-7677 SiREMNA

Job ID: 140-24429-2

Client Sample ID: Lab Control Sample
Lab Sample ID: LCS 140-54334/18-B ^5
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 2	SEP	Carbonate			5.000 g	25 mL	54334	09/30/21 08:00	KNC	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	54370	10/01/21 08:00	KNC	TAL KNX
Step 2	Analysis	6010B SEP		5			55087	10/22/21 13:29	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample
Lab Sample ID: LCS 140-54371/18-B
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 3	SEP	Non-Crystalline			5.000 g	25 mL	54371	10/01/21 08:00	KNC	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	54400	10/04/21 08:00	KNC	TAL KNX
Step 3	Analysis	6010B SEP		1			55087	10/22/21 15:28	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample
Lab Sample ID: LCS 140-54401/18-B
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	54401	10/04/21 08:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	54485	10/05/21 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			55146	10/25/21 11:39	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample
Lab Sample ID: LCS 140-54486/18-B ^5
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 5	SEP	Organic-Bound			5.000 g	75 mL	54486	10/05/21 08:00	KNC	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	54566	10/07/21 08:00	KNC	TAL KNX
Step 5	Analysis	6010B SEP		5			55146	10/25/21 13:42	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample
Lab Sample ID: LCS 140-54567/18-A
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 6	SEP	Acid/Sulfide			5.000 g	250 mL	54567	10/07/21 08:00	KNC	TAL KNX
Step 6	Analysis	6010B SEP		1			55146	10/25/21 15:42	KNC	TAL KNX
	Instrument ID: DUO									

Lab Chronicle

Client: Sirem, div of Geosyntec Consultants
Project/Site: S-7677 SiREMNA

Job ID: 140-24429-2

Client Sample ID: Lab Control Sample
Lab Sample ID: LCS 140-54607/18-A
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 7	Prep	Residual			1.000 g	50 mL	54607	10/08/21 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		1			55197	10/26/21 11:28	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample Dup
Lab Sample ID: LCSD 140-54251/19-A
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Total			1.000 g	50 mL	54251	09/29/21 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			55243	10/27/21 10:59	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample Dup
Lab Sample ID: LCSD 140-54252/19-B ^5
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 1	SEP	Exchangeable			5.000 g	25 mL	54252	09/29/21 08:00	KNC	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	54333	09/30/21 08:00	KNC	TAL KNX
Step 1	Analysis	6010B SEP		5			55087	10/22/21 11:27	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample Dup
Lab Sample ID: LCSD 140-54334/19-B ^5
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 2	SEP	Carbonate			5.000 g	25 mL	54334	09/30/21 08:00	KNC	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	54370	10/01/21 08:00	KNC	TAL KNX
Step 2	Analysis	6010B SEP		5			55087	10/22/21 13:34	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample Dup
Lab Sample ID: LCSD 140-54371/19-B
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 3	SEP	Non-Crystalline			5.000 g	25 mL	54371	10/01/21 08:00	KNC	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	54400	10/04/21 08:00	KNC	TAL KNX
Step 3	Analysis	6010B SEP		1			55087	10/22/21 15:32	KNC	TAL KNX
	Instrument ID: DUO									

Lab Chronicle

Client: Sirem, div of Geosyntec Consultants
Project/Site: S-7677 SiREMNA

Job ID: 140-24429-2

Client Sample ID: Lab Control Sample Dup
Lab Sample ID: LCSD 140-54401/19-B
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	54401	10/04/21 08:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	54485	10/05/21 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			55146	10/25/21 11:44	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample Dup
Lab Sample ID: LCSD 140-54486/19-B ^5
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 5	SEP	Organic-Bound			5.000 g	75 mL	54486	10/05/21 08:00	KNC	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	54566	10/07/21 08:00	KNC	TAL KNX
Step 5	Analysis	6010B SEP		5			55146	10/25/21 13:47	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample Dup
Lab Sample ID: LCSD 140-54567/19-A
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 6	SEP	Acid/Sulfide			5.000 g	250 mL	54567	10/07/21 08:00	KNC	TAL KNX
Step 6	Analysis	6010B SEP		1			55146	10/25/21 15:47	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample Dup
Lab Sample ID: LCSD 140-54607/19-A
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 7	Prep	Residual			1.000 g	50 mL	54607	10/08/21 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		1			55197	10/26/21 11:33	KNC	TAL KNX
	Instrument ID: DUO									

Laboratory References:
TAL KNX = Eurofins TestAmerica, Knoxville, 5815 Middlebrook Pike, Knoxville, TN 37921, TEL (865)291-3000

Accreditation/Certification Summary

Client: Sirem, div of Geosyntec Consultants
Job ID: 140-24429-2
Project/Site: S-7677 SiREMNA

Laboratory: Eurofins TestAmerica, Knoxville

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
	AFCEE	N/A	
ANAB	Dept. of Defense ELAP	L2311	02-13-22
ANAB	Dept. of Energy	L2311.01	02-13-22
ANAB	ISO/IEC 17025	L2311	02-13-22
Arkansas DEQ	State	88-0688	06-17-22
California	State	2423	06-30-22
Colorado	State	TN00009	02-28-22
Connecticut	State	PH-0223	02-28-22
Florida	NELAP	E87177	06-30-22
Georgia (DW)	State	906	12-11-22
Hawaii	State	NA	12-11-21
Kansas	NELAP	E-10349	10-31-22
Kentucky (DW)	State	90101	12-31-21
Louisiana	NELAP	83979	06-30-22
Louisiana (DW)	State	LA019	12-31-21
Maryland	State	277	03-31-22
Michigan	State	9933	12-11-22
Nevada	State	TN00009	07-31-22
New Hampshire	NELAP	299919	01-17-22
New Jersey	NELAP	TN001	06-30-22
New York	NELAP	10781	03-31-22
North Carolina (DW)	State	21705	07-31-22
North Carolina (WW/SW)	State	64	12-31-21
Ohio VAP	State	CL0059	06-02-23
Oklahoma	State	9415	08-31-22
Oregon	NELAP	TNI0189	12-31-21
Pennsylvania	NELAP	68-00576	12-31-21
Tennessee	State	02014	12-11-22
Texas	NELAP	T104704380-18-12	08-31-22
US Fish & Wildlife	US Federal Programs	058448	07-31-22
USDA	US Federal Programs	P330-19-00236	08-20-22
Utah	NELAP	TN00009	07-31-22
Virginia	NELAP	460176	09-14-22
Washington	State	C593	01-19-22
West Virginia (DW)	State	9955C	01-02-22
West Virginia DEP	State	345	04-30-22
Wisconsin	State	998044300	08-31-22

Method Summary

Client: Sirem, div of Geosyntec Consultants
Project/Site: S-7677 SiREMNA

Job ID: 140-24429-2

Method	Method Description	Protocol	Laboratory
6010B	SEP Metals (ICP) - Total	SW846	TAL KNX
6010B SEP	SEP Metals (ICP)	SW846	TAL KNX
Moisture	Percent Moisture	EPA	TAL KNX
3010A	Preparation, Total Metals	SW846	TAL KNX
Acid/Sulfide	Sequential Extraction Procedure, Acid/Sulfide Fraction	TAL-KNOX	TAL KNX
Carbonate	Sequential Extraction Procedure, Carbonate Fraction	TAL-KNOX	TAL KNX
Exchangeable	Sequential Extraction Procedure, Exchangeable Fraction	TAL-KNOX	TAL KNX
Metal Hydroxide	Sequential Extraction Procedure, Metal Hydroxide Fraction	TAL-KNOX	TAL KNX
Non-Crystalline	Sequential Extraction Procedure, Non-crystalline Materials	TAL-KNOX	TAL KNX
Organic-Bound	Sequential Extraction Procedure, Organic Bound Fraction	TAL-KNOX	TAL KNX
Residual	Sequential Extraction Procedure, Residual Fraction	TAL-KNOX	TAL KNX
Total	Preparation, Total Material	TAL-KNOX	TAL KNX

Protocol References:

EPA = US Environmental Protection Agency

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

TAL-KNOX = TestAmerica Laboratories, Knoxville, Facility Standard Operating Procedure.

Laboratory References:

TAL KNX = Eurofins TestAmerica, Knoxville, 5815 Middlebrook Pike, Knoxville, TN 37921, TEL (865)291-3000

Eurofins TestAmerica, Knoxville
5815 Middlebrook Pike

Knoxville, TN 37921-5947
phone 865.291.3000 fax 865.584.4315

Chain of Custody Record

eurofins Environment Testing America

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

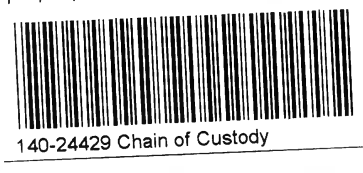
TestAmerica Laboratories, Inc. d/b/a Eurofins TestAmerica

Client Contact	Project Manager: Kela Ashworth	Site Contact:	Date:	COC No:
SiREM	Email: kashworth@siremlab.com	Lab Contact:	Carrier:	1 of 1 COCs
130 Stone Road West	Tel/Fax:			TALS Project #:
Guelph, Ontario, N1G 2Z3	**Analysis Turnaround Time**			Sampler:
519-822-2265	☐ CALENDAR DAYS ☐ WORKING DAYS			**For Lab Use Only:**
(xxx) xxx-xxxx FAX	TAT if different from Below _____			Walk-in Client:
Project Name: S-7677 SiREMNA	☐ 2 weeks			Lab Sampling:
Site:	☐ 1 week			
P O # 800003206	☐ 2 days			Job / SDG No.:
	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	Sequential Extraction Procedure	Sample Specific Notes:
S-8083_DPT02AP1	30Aug21			S	1			X	SEP for As, Li & Mo
S-8083_DPT06AP1	30Aug21			S	1			X	SEP for As, Li & Mo
S-8083_DPT04XRFAP1	30Aug21			S	1			X	SEP for As, Li & Mo
S-8072_DPT02BAP1	30Aug21			S	1			X	SEP for As, Co & Mo
S-8072_DPT05BAP1	30Aug21			S	1			X	SEP for As, Co & Mo

NO CUSTODY SEALS
RECEIVED AT RT 5.3/CT 5.4°C
BKD 8-31-21
1 COOLER FEDX# 7746 7126 4636 INT PO

140-24429 Chain of Custody



Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return to Client ☐ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd:_____ Corr'd:_____ Therm ID No.:_____

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Kela Ashworth	SiREM	30Aug21/16:30	[signature]	ETA KNX	8-31-21 10:10
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

Form No. CA-C-WI-002, Rev. 4.35, dated 10/6/2020

Loc: 140
24429

EUROFINS/TESTAMERICA KNOXVILLE SAMPLE RECEIPT/CONDITION UPON RECEIPT ANOMALY CHECKLIST **Log In Number:**

Review Items	Yes	No	NA	If No, what was the problem?
1. Are the shipping containers intact?	✓		✓	☐ **Containers, Broken**
2. Were ambient air containers received intact?			✓	☐ Checked in lab
3. The coolers/containers custody seal if present, is it intact?			✓	☐ Yes ☐ NA
4. Is the cooler temperature within limits? (> freezing temp. of water to 6 °C, VOST: 10°C) Thermometer ID : 5071 Correction factor: +0.1°C	✓			☐ **Cooler Out of Temp, Client Contacted, Proceed/Cancel** ☐ **Cooler Out of Temp, Same Day Receipt**
5. Were all of the sample containers received intact?	✓			☐ **Containers, Broken**
6. Were samples received in appropriate containers?	✓			☐ **Containers, Improper; Client Contacted; Proceed/Cancel**
7. Do sample container labels match COC? (IDs, Dates, Times)	✓			☐ **COC & Samples Do Not Match** ☐ **COC Incorrect/Incomplete** ☐ **COC Not Received**
8. Were all of the samples listed on the COC received?	✓			☐ **Sample Received, Not on COC** ☐ **Sample on COC, Not Received**
9. Is the date/time of sample collection noted?	✓			☐ **COC; No Date/Time; Client Contacted**
10. Was the sampler identified on the COC?		✓		☑ **Sampler Not Listed on COC**
11. Is the client and project name/# identified?	✓			☐ **COC Incorrect/Incomplete**
12. Are tests/parameters listed for each sample?	✓			☐ **COC No tests on COC**
13. Is the matrix of the samples noted?	✓			☐ **COC Incorrect/Incomplete**
14. Was COC relinquished? (Signed/Dated/Timed)	✓			☐ **COC Incorrect/Incomplete**
15. Were samples received within holding time?	✓			☐ **Holding Time - Receipt**
16. Were samples received with correct chemical preservative (excluding Encore)?			✓	☐ **pH Adjusted, pH Included (See box 16A)** ☐ **Incorrect Preservative**
17. Were VOA samples received without headspace?			✓	☐ **Headspace (VOA only)**
18. Did you check for residual chlorine, if necessary? (e.g. 1613B, 1668) Chlorine test strip lot number:			✓	☐ **Residual Chlorine**
19. For 1613B water samples is pH<9?			✓	☐ If no, notify lab to adjust
20. For rad samples was sample activity info. Provided?			✓	☐ Project missing info

Comments/Actions Taken

16

Labeling Verified by: **Date:**

pH test strip lot number:

	Box 16A: pH Preservation	Box 18A: Residual Chlorine
Preservative:		
Lot Number:		
Exp Date:		
Analyst:		
Date:		
Time:		

Project #: _____ PM Instructions: _____

Sample Receiving Associate: [signature] Date: 8-31-21

QA026R32.doc, 062719

SGS Canada Inc.
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

16-August-2021

SiREM Laboratory
Attn : Kela Ashworth

130 Stone Rd. W
Guelph, ON
N1G 3Z2, Canada

Phone: 519-822-2265
Fax:519-822-3151

Date Rec. : 05 August 2021
LR Report: **CA13193-AUG21**
Reference: 800003210A Bowen AP1

Copy: #1

CERTIFICATE OF ANALYSIS
Final Report

Analysis	1: Analysis Start Date	2: Analysis Start Time	3: Analysis Completed Date	4: Analysis Completed Time	5: BAP1DPT05_45a	6: BAP1DPT05_46a	7: BAP1DPT05_47a
Sample Date & Time					29-Jul-21	29-Jul-21	29-Jul-21
Temp Upon Receipt [°C]	---	---	---	---	4.0	4.0	4.0
Ag (diss) [mg/L]	12-Aug-21	19:43	16-Aug-21	14:04	< 0.00005	< 0.00005	< 0.00005
Al (diss) [mg/L]	12-Aug-21	19:43	16-Aug-21	14:04	0.004	0.004	0.004
As (diss) [mg/L]	12-Aug-21	19:43	16-Aug-21	14:04	0.0010	0.0009	0.0020
Ba (diss) [mg/L]	12-Aug-21	19:43	16-Aug-21	14:04	0.0408	0.0431	0.0521
Be (diss) [mg/L]	12-Aug-21	19:43	16-Aug-21	14:04	< 0.000007	< 0.000007	< 0.000007
B (diss) [mg/L]	12-Aug-21	19:43	16-Aug-21	14:04	0.008	0.008	0.008
Bi (diss) [mg/L]	12-Aug-21	19:43	16-Aug-21	14:04	< 0.00001	< 0.00001	< 0.00001
Ca (diss) [mg/L]	12-Aug-21	19:43	16-Aug-21	14:04	25.2	26.2	28.2
Cd (diss) [mg/L]	12-Aug-21	19:43	16-Aug-21	14:04	0.000023	0.000018	0.000051
Co (diss) [mg/L]	12-Aug-21	19:43	16-Aug-21	14:04	0.00898	0.00904	0.0161
Cr (diss) [mg/L]	12-Aug-21	19:43	16-Aug-21	14:04	0.00123	0.00141	0.00110
Cu (diss) [mg/L]	12-Aug-21	19:43	16-Aug-21	14:04	< 0.0002	< 0.0002	< 0.0002
Fe (diss) [mg/L]	12-Aug-21	19:43	16-Aug-21	14:04	< 0.007	< 0.007	< 0.007
K (diss) [mg/L]	12-Aug-21	19:43	16-Aug-21	14:04	1.21	1.22	1.30
Li (diss) [mg/L]	12-Aug-21	19:43	16-Aug-21	14:04	0.0001	0.0001	0.0001
Mg (diss) [mg/L]	12-Aug-21	19:43	16-Aug-21	14:04	12.8	13.2	13.7
Mn (diss) [mg/L]	12-Aug-21	19:43	16-Aug-21	14:04	0.185	0.170	0.118
Mo (diss) [mg/L]	12-Aug-21	19:43	16-Aug-21	14:04	0.0422	0.0568	0.200
Na (diss) [mg/L]	12-Aug-21	19:43	16-Aug-21	14:04	3.18	3.08	3.17
Ni (diss) [mg/L]	12-Aug-21	19:43	16-Aug-21	14:04	0.0032	0.0028	0.0021
Pb (diss) [mg/L]	12-Aug-21	19:43	16-Aug-21	14:04	< 0.00009	< 0.00009	< 0.00009
Sb (diss) [mg/L]	12-Aug-21	19:43	16-Aug-21	14:04	< 0.0009	< 0.0009	< 0.0009
Se (diss) [mg/L]	12-Aug-21	19:43	16-Aug-21	14:04	0.00046	0.00047	0.00037
Sn (diss) [mg/L]	12-Aug-21	19:43	16-Aug-21	14:04	< 0.00006	< 0.00006	< 0.00006
Sr (diss) [mg/L]	12-Aug-21	19:43	16-Aug-21	14:04	0.0426	0.0427	0.0432

OnLine LIMS

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SGS Canada Inc.
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

LR Report : **CA13193-AUG21**

Analysis	1: Analysis Start Date	2: Analysis Start Time	3: Analysis Completed Date	4: Analysis Completed Time	5: BAP1DPT05_ 45a	6: BAP1DPT05_ 46a	7: BAP1DPT05_ 47a
Ti (diss) [mg/L]	12-Aug-21	19:43	16-Aug-21	14:04	< 0.00005	0.00012	0.00016
Tl (diss) [mg/L]	12-Aug-21	19:43	16-Aug-21	14:04	0.000032	0.000035	0.000044
U (diss) [mg/L]	12-Aug-21	19:43	16-Aug-21	14:04	0.000026	0.000028	0.000059
V (diss) [mg/L]	12-Aug-21	19:43	16-Aug-21	14:04	0.00008	0.00008	0.00012
W (diss) [mg/L]	12-Aug-21	19:43	16-Aug-21	14:04	< 0.00002	< 0.00002	0.00003
Y (diss) [mg/L]	12-Aug-21	19:43	16-Aug-21	14:04	0.00562	0.00496	0.00343
Zn (diss) [mg/L]	12-Aug-21	19:43	16-Aug-21	14:04	0.004	< 0.002	0.003

Analysis	8: BAP1DPT05_ 48a	9: BAP1DPT05_ 49a	10: BAP1DPT05_ 50a	11: BAP1DPT05_ 51a	12: BAP1DPT05_ 52a	13: BAP1DPT05_ 53a	14: BAP1DPT05_ 54a
Sample Date & Time	29-Jul-21	30-Jul-21	30-Jul-21	30-Jul-21	30-Jul-21	03-Aug-21	03-Aug-21
Temp Upon Receipt [°C]	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Ag (diss) [mg/L]	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Al (diss) [mg/L]	0.004	0.005	0.005	0.004	0.005	0.008	0.008
As (diss) [mg/L]	0.0015	0.0035	0.0068	0.0041	0.0046	0.0046	0.0070
Ba (diss) [mg/L]	0.0452	0.0593	0.0730	0.0534	0.0566	0.0510	0.0576
Be (diss) [mg/L]	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007
B (diss) [mg/L]	0.007	0.008	0.008	0.008	0.008	0.008	0.008
Bi (diss) [mg/L]	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Ca (diss) [mg/L]	25.1	31.0	35.5	29.3	29.4	28.0	30.1
Cd (diss) [mg/L]	0.000056	0.000088	0.000128	0.000147	0.000142	0.000211	0.000257
Co (diss) [mg/L]	0.0159	0.0282	0.0302	0.0353	0.0356	0.0415	0.0455
Cr (diss) [mg/L]	0.00116	0.00122	0.00096	0.00098	0.00187	0.00109	0.00084
Cu (diss) [mg/L]	< 0.0002	< 0.0002	< 0.0002	0.0002	< 0.0002	< 0.0002	< 0.0002
Fe (diss) [mg/L]	< 0.007	< 0.007	< 0.007	< 0.007	0.011	< 0.007	0.007
K (diss) [mg/L]	1.28	1.31	1.39	1.30	1.30	1.27	1.31
Li (diss) [mg/L]	0.0002	0.0001	0.0001	0.0001	0.0002	0.0001	0.0001
Mg (diss) [mg/L]	12.8	15.1	16.6	13.9	14.1	13.7	14.5
Mn (diss) [mg/L]	0.159	0.144	0.100	0.148	0.140	0.151	0.129
Mo (diss) [mg/L]	0.157	0.378	0.510	0.599	0.635	0.940	1.12
Na (diss) [mg/L]	3.21	3.41	3.40	3.57	3.55	4.03	4.05
Ni (diss) [mg/L]	0.0024	0.0024	0.0018	0.0024	0.0024	0.0025	0.0021
Pb (diss) [mg/L]	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009
Sb (diss) [mg/L]	< 0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009
Se (diss) [mg/L]	0.00042	0.00043	0.00040	0.00039	0.00041	0.00043	0.00040
Sn (diss) [mg/L]	< 0.00006	< 0.00006	< 0.00006	< 0.00006	< 0.00006	< 0.00006	< 0.00006
Sr (diss) [mg/L]	0.0396	0.0460	0.0490	0.0452	0.0459	0.0442	0.0467
Ti (diss) [mg/L]	0.00016	0.00022	0.00022	0.00028	0.00030	0.00037	0.00047
Tl (diss) [mg/L]	0.000039	0.000042	0.000050	0.000040	0.000042	0.000043	0.000044
U (diss) [mg/L]	0.000037	0.000046	0.000094	0.000036	0.000047	0.000041	0.000055

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P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

LR Report : **CA13193-AUG21**

Analysis	8: BAP1DPT05_ 48a	9: BAP1DPT05_ 49a	10: BAP1DPT05_ 50a	11: BAP1DPT05_ 51a	12: BAP1DPT05_ 52a	13: BAP1DPT05_ 53a	14: BAP1DPT05_ 54a
V (diss) [mg/L]	0.00012	0.00008	0.00010	0.00011	0.00011	0.00011	0.00012
W (diss) [mg/L]	< 0.00002	0.00003	0.00009	0.00004	0.00006	0.00005	0.00009
Y (diss) [mg/L]	0.00415	0.00425	0.00279	0.00447	0.00422	0.00452	0.00377
Zn (diss) [mg/L]	0.003	< 0.002	< 0.002	0.003	0.004	0.002	0.003

Catharine Arnold

Catharine Arnold, B.Sc., C.Chem
Project Specialist,
Environment, Health & Safety

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P.O. Box 4300 - 185 Concession St.
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10-August-2021

SiREM Laboratory
Attn : Kela Ashworth

130 Stone Rd. W
Guelph, ON
N1G 3Z2, Canada

Phone: 519-822-2265
Fax:519-822-3151

Date Rec. : 30 July 2021
LR Report: **CA19540-JUL21**
Reference: 800003210A Bowen AP1

Copy: #1

CERTIFICATE OF ANALYSIS
Final Report

Analysis	1: Analysis Start Date	2: Analysis Start Time	3: Analysis Completed Date	4: Analysis Completed Time	5: BAP1DPT05_43a	6: BAP1DPT05_44a	7: BAP1DPT05_43b	8: BAP1DPT05_44b
Sample Date & Time					22-Jul-21	22-Jul-21	22-Jul-21	22-Jul-21
Temp Upon Receipt [°C]	---	---	---	---	9.0	9.0	9.0	9.0
Ag (diss) [mg/L]	07-Aug-21	01:00	10-Aug-21	20:09	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Al (diss) [mg/L]	07-Aug-21	01:00	10-Aug-21	20:09	0.007	0.008	0.017	0.017
As (diss) [mg/L]	07-Aug-21	01:00	10-Aug-21	20:09	0.0006	0.0006	< 0.0002	< 0.0002
Ba (diss) [mg/L]	07-Aug-21	01:00	10-Aug-21	20:09	0.0538	0.0593	0.0126	0.0133
Be (diss) [mg/L]	07-Aug-21	01:00	10-Aug-21	20:09	0.000020	0.000018	0.000043	0.000047
B (diss) [mg/L]	07-Aug-21	01:00	10-Aug-21	20:09	0.021	0.017	0.017	0.016
Bi (diss) [mg/L]	07-Aug-21	01:00	10-Aug-21	20:09	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Ca (diss) [mg/L]	07-Aug-21	01:00	10-Aug-21	20:09	35.1	37.1	1.59	1.70
Cd (diss) [mg/L]	07-Aug-21	01:00	10-Aug-21	20:09	0.000013	0.000016	0.000011	0.000016
Co (diss) [mg/L]	07-Aug-21	01:00	10-Aug-21	20:09	0.00527	0.00540	0.000516	0.000283
Cr (diss) [mg/L]	07-Aug-21	01:00	10-Aug-21	20:09	0.00135	0.00098	0.00087	0.00103
Cu (diss) [mg/L]	07-Aug-21	01:00	10-Aug-21	20:09	0.0004	0.0003	0.0005	0.0005
Fe (diss) [mg/L]	07-Aug-21	01:00	10-Aug-21	20:09	0.025	< 0.007	< 0.007	< 0.007
K (diss) [mg/L]	07-Aug-21	01:00	10-Aug-21	20:09	2.07	1.92	1.46	1.53
Li (diss) [mg/L]	07-Aug-21	01:00	10-Aug-21	20:09	0.0018	0.0018	0.0024	0.0025

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LR Report : **CA19540-JUL21**

Analysis	1: Analysis Start Date	2: Analysis Start Time	3: Analysis Completed Date	4: Analysis Completed Time	5: BAP1DPT05_43a	6: BAP1DPT05_44a	7: BAP1DPT05_43b	8: BAP1DPT05_44b
Mg (diss) [mg/L]	07-Aug-21	01:00	10-Aug-21	20:09	17.4	18.1	0.973	1.04
Mn (diss) [mg/L]	07-Aug-21	01:00	10-Aug-21	20:09	0.148	0.138	0.0870	0.0922
Mo (diss) [mg/L]	07-Aug-21	01:00	10-Aug-21	20:09	0.0286	0.0346	0.00027	0.00013
Na (diss) [mg/L]	07-Aug-21	01:00	10-Aug-21	20:09	3.82	3.68	2.97	2.96
Ni (diss) [mg/L]	07-Aug-21	01:00	10-Aug-21	20:09	0.0020	0.0018	0.0009	0.0010
Pb (diss) [mg/L]	07-Aug-21	01:00	10-Aug-21	20:09	< 0.00009	< 0.00009	< 0.00009	< 0.00009
Sb (diss) [mg/L]	07-Aug-21	01:00	10-Aug-21	20:09	< 0.0009	< 0.0009	< 0.0009	< 0.0009
Se (diss) [mg/L]	07-Aug-21	01:00	10-Aug-21	20:09	0.00043	0.00048	0.00014	0.00014
Sn (diss) [mg/L]	07-Aug-21	01:00	10-Aug-21	20:09	0.00024	0.00012	0.00016	0.00013
Sr (diss) [mg/L]	07-Aug-21	01:00	10-Aug-21	20:09	0.0425	0.0442	0.00548	0.00582
Ti (diss) [mg/L]	07-Aug-21	01:00	10-Aug-21	20:09	< 0.00005	0.00020	< 0.00005	< 0.00005
Tl (diss) [mg/L]	07-Aug-21	01:00	10-Aug-21	20:09	0.000034	0.000037	0.000026	0.000028
U (diss) [mg/L]	07-Aug-21	01:00	10-Aug-21	20:09	0.000086	0.000061	0.000062	0.000061
V (diss) [mg/L]	07-Aug-21	01:00	10-Aug-21	20:09	0.00008	0.00008	0.00004	0.00005
W (diss) [mg/L]	07-Aug-21	01:00	10-Aug-21	20:09	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Y (diss) [mg/L]	07-Aug-21	01:00	10-Aug-21	20:09	0.00532	0.00473	0.00021	0.00022
Zn (diss) [mg/L]	07-Aug-21	01:00	10-Aug-21	20:09	< 0.002	0.003	0.006	0.007

Catharine Arnold

CHARTERED CATHARINE ARNOLD CHEMIST — ASSOCIATION OF THE CHEMICAL PROFESSION OF ONTARIO

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08-September-2021

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Phone: 519-822-2265
Fax:519-822-3151

Date Rec. : 30 August 2021
LR Report: **CA15595-AUG21**
Reference: 800003210A Bowen AP1

Copy: #1

CERTIFICATE OF ANALYSIS
Final Report

Sample ID	Sample Date & Time	Mo (diss) mg/L
1: Analysis Start Date		02-Sep-21
2: Analysis Start Time		20:27
3: Analysis Completed Date		07-Sep-21
4: Analysis Completed Time		13:58
5: BAP1DPT05_43b	22-Jul-21	0.00027
6: BAP1DPT05_44b	22-Jul-21	< 0.00004

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Project : Bowen AP1

24-August-2021

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Fax:519-822-3151

Date Rec. : 11 August 2021
LR Report: **CA12371-AUG21**
Reference: P.O# 800003210A

Copy: #1

CERTIFICATE OF ANALYSIS
Final Report

Analysis	1: Analysis Start Date	2: Analysis Start Time	3: Analysis Completed Date	4: Analysis Completed Time	5: BAP1DPT05_4 5b	6: BAP1DPT05_4 6b	7: BAP1DPT05_4 7b	8: BAP1DPT05_4 8b	9: BAP1DPT05_4 9b
Sample Date & Time					05-Aug-21	05-Aug-21	05-Aug-21	05-Aug-21	06-Aug-21
Temp Upon Receipt [°C]	---	---	---	---	12.0	12.0	12.0	12.0	12.0
Ag (diss) [mg/L]	17-Aug-21	12:55	18-Aug-21	16:19	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Al (diss) [mg/L]	17-Aug-21	12:55	18-Aug-21	16:19	0.014	0.010	0.012	0.011	0.013
As (diss) [mg/L]	17-Aug-21	12:55	18-Aug-21	16:19	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Ba (diss) [mg/L]	17-Aug-21	12:55	18-Aug-21	16:19	0.0117	0.0114	0.0111	0.0116	0.0119
Be (diss) [mg/L]	17-Aug-21	12:55	18-Aug-21	16:19	0.000019	0.000018	0.000020	0.000019	0.000018
B (diss) [mg/L]	17-Aug-21	12:55	18-Aug-21	16:19	0.009	0.008	0.008	0.009	0.009
Bi (diss) [mg/L]	17-Aug-21	12:55	18-Aug-21	16:19	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Ca (diss) [mg/L]	17-Aug-21	12:55	18-Aug-21	16:19	1.35	1.40	1.43	1.31	1.23
Cd (diss) [mg/L]	17-Aug-21	12:55	18-Aug-21	16:19	0.000008	0.000015	0.000021	0.000013	0.000012
Co (diss) [mg/L]	17-Aug-21	12:55	18-Aug-21	16:19	0.000669	0.000754	0.000998	0.000715	0.000723
Cr (diss) [mg/L]	17-Aug-21	12:55	18-Aug-21	16:19	0.00117	0.00105	0.00107	0.00097	0.00099
Cu (diss) [mg/L]	17-Aug-21	12:55	18-Aug-21	16:19	< 0.0002	< 0.0002	0.0002	< 0.0002	< 0.0002
Fe (diss) [mg/L]	17-Aug-21	12:55	18-Aug-21	16:19	< 0.007	< 0.007	< 0.007	< 0.007	< 0.007
K (diss) [mg/L]	17-Aug-21	12:55	18-Aug-21	16:19	1.06	1.15	1.22	1.24	1.10
Li (diss) [mg/L]	17-Aug-21	12:55	18-Aug-21	16:19	0.0005	0.0006	0.0006	0.0006	0.0006
Mg (diss) [mg/L]	17-Aug-21	12:55	18-Aug-21	16:19	0.833	0.827	0.842	0.785	0.741
Mn (diss) [mg/L]	17-Aug-21	12:55	18-Aug-21	16:19	0.0854	0.0842	0.0847	0.0766	0.0780
Mo (diss) [mg/L]	17-Aug-21	12:55	18-Aug-21	16:19	< 0.00004	< 0.00004	< 0.00004	< 0.00004	< 0.00004
Na (diss) [mg/L]	17-Aug-21	12:55	18-Aug-21	16:19	2.62	2.70	2.87	2.72	3.58
Ni (diss) [mg/L]	17-Aug-21	12:55	18-Aug-21	16:19	0.0010	0.0010	0.0010	0.0010	0.0009
Pb (diss) [mg/L]	17-Aug-21	12:55	18-Aug-21	16:19	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009
Sb (diss) [mg/L]	17-Aug-21	12:55	18-Aug-21	16:19	< 0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009
Se (diss) [mg/L]	17-Aug-21	12:55	18-Aug-21	16:19	0.00014	0.00010	0.00013	0.00012	0.00012
Sn (diss) [mg/L]	17-Aug-21	12:55	18-Aug-21	16:20	< 0.00006	0.00007	0.00008	0.00007	0.00007
Sr (diss) [mg/L]	17-Aug-21	12:55	18-Aug-21	16:20	0.00539	0.00538	0.00563	0.00516	0.00515
Ti (diss) [mg/L]	17-Aug-21	12:55	18-Aug-21	16:20	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Tl (diss) [mg/L]	17-Aug-21	12:55	18-Aug-21	16:20	0.000029	0.000032	0.000031	0.000035	0.000031
U (diss) [mg/L]	17-Aug-21	12:55	18-Aug-21	16:20	0.000056	0.000050	0.000049	0.000052	0.000054
V (diss) [mg/L]	17-Aug-21	12:55	18-Aug-21	16:20	0.00005	0.00005	0.00005	0.00006	0.00005
W (diss) [mg/L]	17-Aug-21	12:55	18-Aug-21	16:20	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Y (diss) [mg/L]	17-Aug-21	12:55	18-Aug-21	16:20	0.00019	0.00017	0.00019	0.00018	0.00016
Zn (diss) [mg/L]	17-Aug-21	12:55	18-Aug-21	16:20	0.008	0.008	0.006	0.009	0.010

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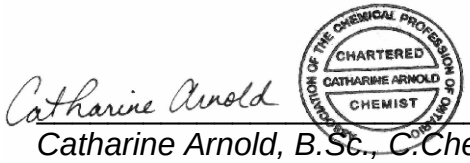
Project : Bowen AP1

LR Report : CA12371-AUG21

Analysis	10: BAP1DPT05_50b	11: BAP1DPT05_51b	12: BAP1DPT05_52b	13: BAP1DPT05_53b	14: BAP1DPT05_54b
Sample Date & Time	06-Aug-21	06-Aug-21	06-Aug-21	10-Aug-21	10-Aug-21
Temp Upon Receipt [°C]	12.0	12.0	12.0	12.0	12.0
Ag (diss) [mg/L]	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Al (diss) [mg/L]	0.013	0.013	0.016	0.011	0.011
As (diss) [mg/L]	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Ba (diss) [mg/L]	0.0124	0.0118	0.0119	0.0106	0.0110
Be (diss) [mg/L]	0.000020	0.000017	0.000018	0.000018	0.000020
B (diss) [mg/L]	0.009	0.009	0.009	0.008	0.008
Bi (diss) [mg/L]	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Ca (diss) [mg/L]	1.25	1.31	1.29	1.09	1.14
Cd (diss) [mg/L]	0.000013	0.000014	0.000016	0.000013	0.000018
Co (diss) [mg/L]	0.00121	0.00149	0.00121	0.00140	0.00122
Cr (diss) [mg/L]	0.00092	0.00136	0.00090	0.00085	0.00114
Cu (diss) [mg/L]	< 0.0002	0.0003	0.0002	0.0003	0.0004
Fe (diss) [mg/L]	< 0.007	< 0.007	< 0.007	< 0.007	0.013
K (diss) [mg/L]	1.11	1.08	1.10	1.05	1.13
Li (diss) [mg/L]	0.0005	0.0005	0.0005	0.0005	0.0005
Mg (diss) [mg/L]	0.771	0.764	0.755	0.671	0.685
Mn (diss) [mg/L]	0.0783	0.0866	0.0762	0.0673	0.0766
Mo (diss) [mg/L]	< 0.00004	0.00004	0.00006	0.00007	0.00006
Na (diss) [mg/L]	3.78	3.20	3.56	3.73	3.43
Ni (diss) [mg/L]	0.0009	0.0010	0.0010	0.0008	0.0009
Pb (diss) [mg/L]	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009
Sb (diss) [mg/L]	< 0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009
Se (diss) [mg/L]	0.00017	0.00014	0.00015	0.00013	0.00013
Sn (diss) [mg/L]	0.00007	< 0.00006	0.00007	0.00007	0.00007
Sr (diss) [mg/L]	0.00506	0.00514	0.00519	0.00447	0.00467
Ti (diss) [mg/L]	0.00007	< 0.00005	0.00010	< 0.00005	0.00005
Tl (diss) [mg/L]	0.000032	0.000035	0.000031	0.000034	0.000031
U (diss) [mg/L]	0.000051	0.000053	0.000053	0.000051	0.000052
V (diss) [mg/L]	0.00006	0.00007	0.00010	0.00006	0.00005
W (diss) [mg/L]	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Y (diss) [mg/L]	0.00017	0.00017	0.00016	0.00015	0.00015
Zn (diss) [mg/L]	0.009	0.007	0.007	0.007	0.008



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Project : Bowen AP1

24-August-2021

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Date Rec. : 12 August 2021
LR Report: **CA15238-AUG21**
Reference: P.O# 800003210A

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CERTIFICATE OF ANALYSIS
Final Report

Analysis	1: Analysis Start Date	2: Analysis Start Time	3: Analysis Completed Date	4: Analysis Completed Time	5: HAP1DPT06_[1]	6: HAP1DPT06_[2]	7: HAP1DPT06_[3]	8: HAP1DPT06_[4]	9: HAP1DPT06_[5]	10: HAP1DPT06_[6]
Sample Date & Time					29-Jun-21	29-Jun-21	30-Jun-21	30-Jun-21	30-Jun-21	30-Jun-21
Temp Upon Receipt [°C]	---	---	---	---	13.0	13.0	13.0	13.0	13.0	13.0
Ag (diss) [mg/L]	17-Aug-21	12:55	18-Aug-21	16:51	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Al (diss) [mg/L]	17-Aug-21	12:55	18-Aug-21	16:51	0.004	0.004	< 0.001	< 0.001	< 0.001	< 0.001
As (diss) [mg/L]	17-Aug-21	12:55	18-Aug-21	16:51	0.0631	0.112	0.280	0.560	1.12	1.70
Ba (diss) [mg/L]	17-Aug-21	12:55	18-Aug-21	16:51	0.0435	0.0430	0.0411	0.0419	0.0427	0.0419
Be (diss) [mg/L]	17-Aug-21	12:55	18-Aug-21	16:51	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007
B (diss) [mg/L]	17-Aug-21	12:55	18-Aug-21	16:51	0.018	0.018	0.017	0.016	0.017	0.017
Bi (diss) [mg/L]	17-Aug-21	12:55	18-Aug-21	16:51	0.00060	0.00050	0.00032	0.00031	0.00025	0.00020
Ca (diss) [mg/L]	17-Aug-21	12:55	18-Aug-21	16:51	129	125	129	128	127	125
Cd (diss) [mg/L]	17-Aug-21	12:55	18-Aug-21	16:51	0.000013	0.000015	0.000032	0.000088	0.000157	0.000357
Co (diss) [mg/L]	17-Aug-21	12:55	18-Aug-21	16:51	0.000051	0.000059	0.000052	0.000078	0.000058	0.000046
Cr (diss) [mg/L]	17-Aug-21	12:55	18-Aug-21	16:51	< 0.00008	0.00012	< 0.00008	< 0.00008	< 0.00008	< 0.00008
Cu (diss) [mg/L]	17-Aug-21	12:55	18-Aug-21	16:52	0.0003	0.0003	0.0002	< 0.0002	< 0.0002	< 0.0002
Fe (diss) [mg/L]	17-Aug-21	12:55	18-Aug-21	16:52	< 0.007	< 0.007	< 0.007	< 0.007	< 0.007	< 0.007
K (diss) [mg/L]	17-Aug-21	12:55	18-Aug-21	16:52	0.305	0.292	0.298	0.291	0.293	0.294
Li (diss) [mg/L]	17-Aug-21	12:55	18-Aug-21	16:52	0.0074	0.0131	0.0283	0.0412	0.0569	0.0709

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Project : Bowen AP1
LR Report : CA15238-AUG21

Analysis	1: Analysis Start Date	2: Analysis Start Time	3: Analysis Completed Date	4: Analysis Completed Time	5: HAP1DPT06_[1]	6: HAP1DPT06_[2]	7: HAP1DPT06_[3]	8: HAP1DPT06_[4]	9: HAP1DPT06_[5]	10: HAP1DPT06_[6]
Mg (diss) [mg/L]	17-Aug-21	12:55	18-Aug-21	16:52	4.31	4.12	4.24	4.16	4.12	3.97
Mn (diss) [mg/L]	17-Aug-21	12:55	18-Aug-21	16:52	0.0242	0.0235	0.0235	0.0230	0.0205	0.0106
Mo (diss) [mg/L]	17-Aug-21	12:55	18-Aug-21	16:52	0.0142	0.0522	0.105	0.261	0.587	1.20
Na (diss) [mg/L]	17-Aug-21	12:55	18-Aug-21	16:52	56.6	55.4	56.2	56.5	56.0	60.9
Ni (diss) [mg/L]	17-Aug-21	12:55	18-Aug-21	16:52	0.0002	0.0003	0.0003	0.0002	0.0002	0.0002
Pb (diss) [mg/L]	17-Aug-21	12:55	18-Aug-21	16:52	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009
Sb (diss) [mg/L]	17-Aug-21	12:55	18-Aug-21	16:58	< 0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009
Se (diss) [mg/L]	17-Aug-21	12:55	18-Aug-21	16:58	0.00010	0.00010	0.00008	0.00011	0.00011	0.00012
Sn (diss) [mg/L]	17-Aug-21	12:55	18-Aug-21	16:58	< 0.00006	< 0.00006	< 0.00006	< 0.00006	< 0.00006	< 0.00006
Sr (diss) [mg/L]	17-Aug-21	12:55	18-Aug-21	16:58	0.390	0.389	0.389	0.425	0.402	0.387
Ti (diss) [mg/L]	17-Aug-21	12:55	18-Aug-21	16:58	< 0.00005	0.00010	< 0.00005	0.00011	0.00020	0.00026
Tl (diss) [mg/L]	17-Aug-21	12:55	18-Aug-21	16:58	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005
U (diss) [mg/L]	17-Aug-21	12:55	18-Aug-21	16:58	0.000743	0.000734	0.000705	0.000677	0.000740	0.000730
V (diss) [mg/L]	17-Aug-21	12:55	18-Aug-21	16:58	0.00021	0.00018	0.00019	0.00018	0.00021	0.00018
W (diss) [mg/L]	17-Aug-21	12:55	18-Aug-21	16:58	0.00007	0.00007	0.00008	0.00010	0.00014	0.00018
Y (diss) [mg/L]	17-Aug-21	12:55	18-Aug-21	16:58	0.00007	0.00007	0.00006	0.00007	0.00007	0.00006
Zn (diss) [mg/L]	17-Aug-21	12:55	18-Aug-21	16:58	0.003	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002

Analysis	11: HAP2DPT07&8_[1]	12: HAP2DPT07&8_[2]	13: HAP2DPT07&8_[3]	14: HAP2DPT07&8_[4]	15: HAP2DPT07&8_[5]	16: HAP3DPT01_[1]	17: HAP3DPT01_[2]	18: HAP3DPT01_[3]	19: HAP3DPT01_[4]	20: HAP3DPT01_[5]
Sample Date & Time	05-Jul-12	05-Jul-12	06-Jul-12	07-Jul-12	08-Jul-12	13-Jul-12	13-Jul-12	14-Jul-12	14-Jul-12	14-Jul-12
Temp Upon Receipt [°C]	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0
Ag (diss) [mg/L]	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Al (diss) [mg/L]	0.003	0.003	0.002	0.007	0.003	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
As (diss) [mg/L]	0.0008	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	0.0002	< 0.0002	< 0.0002
Ba (diss) [mg/L]	0.0397	0.0412	0.0410	0.0413	0.0403	0.0424	0.0414	0.0415	0.0413	0.0407
Be (diss) [mg/L]	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007
B (diss) [mg/L]	0.006	0.006	0.006	0.006	0.006	0.005	0.005	0.005	0.004	0.005
Bi (diss) [mg/L]	0.00001	< 0.00001	< 0.00001	0.00007	0.00001	0.00002	0.00001	0.00002	< 0.00001	< 0.00001

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Project : Bowen AP1
LR Report : CA15238-AUG21

Analysis	11: HAP2DPT07&8_[1]	12: HAP2DPT07&8_[2]	13: HAP2DPT07&8_[3]	14: HAP2DPT07&8_[4]	15: HAP2DPT07&8_[5]	16: HAP3DPT01_[1]	17: HAP3DPT01_[2]	18: HAP3DPT01_[3]	19: HAP3DPT01_[4]	20: HAP3DPT01_[5]
Ca (diss) [mg/L]	31.6	32.7	31.9	31.0	31.6	30.6	30.8	31.0	30.8	30.9
Cd (diss) [mg/L]	0.000010	0.000003	0.000003	0.000005	0.000007	0.000015	0.000013	0.000039	0.000031	0.000057
Co (diss) [mg/L]	0.0970	0.227	0.332	0.441	0.552	0.000643	0.000626	0.000627	0.000656	0.000659
Cr (diss) [mg/L]	< 0.00008	< 0.00008	< 0.00008	0.00011	< 0.00008	< 0.00008	< 0.00008	< 0.00008	< 0.00008	< 0.00008
Cu (diss) [mg/L]	0.0027	0.0013	0.0010	0.0011	0.0005	< 0.0002	0.0040	< 0.0002	< 0.0002	< 0.0002
Fe (diss) [mg/L]	< 0.007	< 0.007	< 0.007	< 0.007	< 0.007	< 0.007	< 0.007	< 0.007	< 0.007	< 0.007
K (diss) [mg/L]	0.693	0.702	0.713	0.710	0.729	0.752	0.753	0.770	0.757	0.747
Li (diss) [mg/L]	0.0021	0.0021	0.0019	0.0019	0.0019	0.0149	0.0306	0.0430	0.0558	0.0705
Mg (diss) [mg/L]	6.29	6.24	6.16	6.04	6.14	6.06	5.91	6.26	6.04	5.97
Mn (diss) [mg/L]	0.0844	0.0863	0.0851	0.0858	0.0868	0.0852	0.0851	0.0865	0.0854	0.0856
Mo (diss) [mg/L]	0.0109	0.00017	0.00010	0.00011	0.00010	0.0330	0.0501	0.0886	0.103	0.165
Na (diss) [mg/L]	8.02	7.86	7.87	7.72	8.05	7.84	7.86	8.01	7.95	7.89
Ni (diss) [mg/L]	0.0004	0.0004	0.0004	0.0004	0.0003	0.0003	0.0013	0.0004	0.0003	0.0004
Pb (diss) [mg/L]	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009
Sb (diss) [mg/L]	< 0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009
Se (diss) [mg/L]	< 0.00004	< 0.00004	< 0.00004	< 0.00004	< 0.00004	< 0.00004	< 0.00004	< 0.00004	< 0.00004	< 0.00004
Sn (diss) [mg/L]	< 0.00006	< 0.00006	< 0.00006	< 0.00006	< 0.00006	< 0.00006	< 0.00006	< 0.00006	< 0.00006	< 0.00006
Sr (diss) [mg/L]	0.0764	0.0773	0.0753	0.0734	0.0746	0.0738	0.0739	0.0747	0.0734	0.0740
Ti (diss) [mg/L]	< 0.00005	0.00008	0.00008	< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.00007	< 0.00005	0.00008
Tl (diss) [mg/L]	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005	< 0.000005
U (diss) [mg/L]	0.000043	0.000024	0.000012	0.000012	0.000011	0.000035	0.000010	0.000032	0.000010	0.000030
V (diss) [mg/L]	0.00002	< 0.00001	0.00001	0.00002	0.00001	0.00002	0.00001	0.00002	< 0.00001	0.00001
W (diss) [mg/L]	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Y (diss) [mg/L]	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Zn (diss) [mg/L]	0.012	0.006	0.005	0.005	0.004	0.002	< 0.002	< 0.002	< 0.002	< 0.002

Analysis	21: BAP1DPT0543&44_[1]	22: BAP1DPT0545&46_[2]	23: BAP1DPT0547&43_[3]	24: BAP1DPT0549&50_[4]	25: BAP1DPT0551&52_[5]	26: BAP1DT05_[6]
Sample Date & Time	22-Jul-12	29-Jul-12	29-Jul-12	30-Jul-12	30-Jul-12	03-Aug-21

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Project : Bowen AP1
LR Report : **CA15238-AUG21**

Analysis	21: BAP1DPT0543& 44_[1]	22: BAP1DPT0545& 46_[2]	23: BAP1DPT0547& 43_[3]	24: BAP1DPT0549& 50_[4]	25: BAP1DPT0551& 52_[5]	26: BAP1DT05_[6]
Temp Upon Receipt [°C]	13.0	13.0	13.0	13.0	13.0	13.0
Ag (diss) [mg/L]	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Al (diss) [mg/L]	0.001	< 0.001	< 0.001	0.001	0.001	0.002
As (diss) [mg/L]	0.0111	0.0218	0.0433	0.0659	0.0861	0.106
Ba (diss) [mg/L]	0.140	0.140	0.143	0.139	0.142	0.143
Be (diss) [mg/L]	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007	< 0.000007
B (diss) [mg/L]	0.008	0.008	0.008	0.007	0.007	0.007
Bi (diss) [mg/L]	0.00015	0.00011	0.00015	0.00008	0.00010	0.00011
Ca (diss) [mg/L]	47.3	48.0	46.6	48.0	46.4	45.9
Cd (diss) [mg/L]	0.000050	0.000080	0.000175	0.000248	0.000446	0.000679
Co (diss) [mg/L]	0.0102	0.0194	0.0384	0.0586	0.0761	0.0950
Cr (diss) [mg/L]	0.00032	0.00024	0.00029	0.00027	0.00026	0.00022
Cu (diss) [mg/L]	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	0.0006
Fe (diss) [mg/L]	< 0.007	< 0.007	< 0.007	< 0.007	< 0.007	< 0.007
K (diss) [mg/L]	1.79	1.77	1.80	1.77	1.77	1.78
Li (diss) [mg/L]	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Mg (diss) [mg/L]	21.7	21.5	22.0	21.6	21.3	21.5
Mn (diss) [mg/L]	0.00035	0.00020	0.00019	0.00023	0.00026	0.00018
Mo (diss) [mg/L]	0.113	0.276	0.566	0.860	1.39	2.18
Na (diss) [mg/L]	3.50	3.50	3.71	3.86	4.03	4.59
Ni (diss) [mg/L]	< 0.0001	< 0.0001	0.0001	0.0001	< 0.0001	0.0002
Pb (diss) [mg/L]	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009
Sb (diss) [mg/L]	< 0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009
Se (diss) [mg/L]	0.00040	0.00043	0.00043	0.00037	0.00044	0.00039
Sn (diss) [mg/L]	< 0.00006	< 0.00006	< 0.00006	< 0.00006	< 0.00006	< 0.00006
Sr (diss) [mg/L]	0.0546	0.0545	0.0528	0.0546	0.0534	0.0534
Ti (diss) [mg/L]	0.00006	0.00010	0.00021	0.00023	0.00036	0.00055
Tl (diss) [mg/L]	0.000157	0.000166	0.000154	0.000161	0.000164	0.000167
U (diss) [mg/L]	0.000670	0.000678	0.000662	0.000614	0.000643	0.000640
V (diss) [mg/L]	0.00060	0.00058	0.00059	0.00060	0.00058	0.00056
W (diss) [mg/L]	0.00005	0.00008	0.00010	0.00013	0.00020	0.00030

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Project : Bowen AP1
LR Report : **CA15238-AUG21**

Analysis	21: BAP1DPT0543& 44_[1]	22: BAP1DPT0545& 46_[2]	23: BAP1DPT0547& 43_[3]	24: BAP1DPT0549& 50_[4]	25: BAP1DPT0551& 52_[5]	26: BAP1DT05_[6]
Y (diss) [mg/L]	0.00008	0.00008	0.00009	0.00009	0.00009	0.00009
Zn (diss) [mg/L]	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002

Catharine Arnold

Catharine Arnold, B.Sc., C.Chem
Project Specialist,
Environment, Health & Safety

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Project : Bowen AP1

14-September-2021

SiREM Laboratory
Attn : Kela Ashworth

130 Stone Rd. W
Guelph, ON
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Phone: 519-822-2265
Fax:519-822-3151

Date Rec. : 03 September 2021
LR Report: **CA12171-SEP21**
Reference: P.O# 800003210A

Copy: #1

CERTIFICATE OF ANALYSIS
Final Report

Analysis	1: Analysis Start Date	2: Analysis Start Time	3: Analysis Completed Date	4: Analysis Completed Time	5: HAP1DPT02_1a	6: HAP1DPT02_2a	7: HAP1DPT04XRF_3/5a	8: HAP1DPT04XRF_4/6a	9: HAP2DPT08_7a
Sample Date & Time					31-Aug-21	31-Aug-21	31-Aug-21	31-Aug-21	31-Aug-21
Temp Upon Receipt [°C]	---	---	---	---	11.0	11.0	11.0	11.0	11.0
Ag (diss) [mg/L]	10-Sep-21	15:00	14-Sep-21	11:43	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Al (diss) [mg/L]	10-Sep-21	15:00	14-Sep-21	11:43	0.003	0.002	0.003	0.003	0.002
As (diss) [mg/L]	10-Sep-21	15:00	14-Sep-21	11:43	< 0.0002	< 0.0002	0.0007	0.0007	< 0.0002
Ba (diss) [mg/L]	10-Sep-21	15:00	14-Sep-21	11:43	0.0421	0.0420	0.0403	0.0405	0.00396
Be (diss) [mg/L]	10-Sep-21	15:00	14-Sep-21	11:43	< 0.000007	< 0.000007	0.000008	0.000016	0.000007
B (diss) [mg/L]	10-Sep-21	15:00	14-Sep-21	11:43	0.165	0.148	0.106	0.113	0.293
Bi (diss) [mg/L]	10-Sep-21	15:00	14-Sep-21	11:43	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Ca (diss) [mg/L]	10-Sep-21	15:00	14-Sep-21	11:43	124	122	110	112	40.0
Cd (diss) [mg/L]	10-Sep-21	15:00	14-Sep-21	11:43	0.000003	0.000003	< 0.000003	< 0.000003	0.00176
Co (diss) [mg/L]	10-Sep-21	15:00	14-Sep-21	11:43	0.000053	0.000053	0.000084	0.000095	0.0571
Cr (diss) [mg/L]	10-Sep-21	15:00	14-Sep-21	11:43	0.00055	0.00049	0.00059	0.00045	0.00048
Cu (diss) [mg/L]	10-Sep-21	15:00	14-Sep-21	11:48	< 0.0002	< 0.0002	< 0.0002	< 0.0002	0.0002
Fe (diss) [mg/L]	10-Sep-21	15:00	14-Sep-21	11:48	< 0.007	< 0.007	0.008	0.008	< 0.007
K (diss) [mg/L]	10-Sep-21	15:00	14-Sep-21	11:48	1.91	1.88	2.38	2.36	2.16
Li (diss) [mg/L]	10-Sep-21	15:00	14-Sep-21	11:48	0.0012	0.0013	0.0043	0.0046	0.0078
Mg (diss) [mg/L]	10-Sep-21	15:00	14-Sep-21	11:48	6.74	6.69	5.94	5.77	8.23
Mn (diss) [mg/L]	10-Sep-21	15:00	14-Sep-21	11:48	0.00316	0.00232	0.0182	0.0196	0.997
Mo (diss) [mg/L]	10-Sep-21	15:00	14-Sep-21	11:48	0.00725	0.00752	0.00658	0.00656	0.00011
Na (diss) [mg/L]	10-Sep-21	15:00	14-Sep-21	11:48	46.4	47.1	54.7	54.6	7.41
Ni (diss) [mg/L]	10-Sep-21	15:00	14-Sep-21	11:48	0.0003	0.0003	0.0009	0.0010	0.0667
Pb (diss) [mg/L]	10-Sep-21	15:00	14-Sep-21	11:48	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009
Sb (diss) [mg/L]	10-Sep-21	15:00	14-Sep-21	11:48	< 0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009
Se (diss) [mg/L]	10-Sep-21	15:00	14-Sep-21	11:48	0.00010	0.00010	0.00097	0.00084	0.00709
Sn (diss) [mg/L]	10-Sep-21	15:00	14-Sep-21	11:48	< 0.00006	< 0.00006	0.00081	0.00080	0.00006
Sr (diss) [mg/L]	10-Sep-21	15:00	14-Sep-21	11:48	0.771	0.755	0.573	0.568	0.0992
Ti (diss) [mg/L]	10-Sep-21	15:00	14-Sep-21	11:48	0.00013	0.00007	0.00015	0.00015	0.00011
Tl (diss) [mg/L]	10-Sep-21	15:00	14-Sep-21	11:48	< 0.000005	< 0.000005	0.000012	0.000013	0.000008
U (diss) [mg/L]	10-Sep-21	15:00	14-Sep-21	11:48	0.000540	0.000567	0.000739	0.000738	0.000015
V (diss) [mg/L]	10-Sep-21	15:00	14-Sep-21	11:48	0.00007	0.00007	0.00030	0.00029	0.00004
W (diss) [mg/L]	10-Sep-21	15:00	14-Sep-21	11:48	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Y (diss) [mg/L]	10-Sep-21	15:00	14-Sep-21	11:48	0.00029	0.00026	0.00080	0.00079	0.00062
Zn (diss) [mg/L]	10-Sep-21	15:00	14-Sep-21	11:48	< 0.002	0.003	< 0.002	< 0.002	0.049

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Project : Bowen AP1

LR Report : CA12171-SEP21

Analysis	10: HAP2DPT08_8a	11: HAP3DPT02_9a	12: HAP3DPT02_10a	13: BAP1DPT02_11a	14: BAP1DPT02_12a
Sample Date & Time	31-Aug-21	31-Aug-21	31-Aug-21	31-Aug-21	31-Aug-21
Temp Upon Receipt [°C]	11.0	11.0	11.0	11.0	11.0
Ag (diss) [mg/L]	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Al (diss) [mg/L]	0.001	0.001	0.002	0.005	0.005
As (diss) [mg/L]	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Ba (diss) [mg/L]	0.00396	0.0270	0.0276	0.0373	0.0382
Be (diss) [mg/L]	0.000009	< 0.000007	< 0.000007	0.000009	0.000009
B (diss) [mg/L]	0.324	0.227	0.230	0.108	0.110
Bi (diss) [mg/L]	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Ca (diss) [mg/L]	40.0	66.7	69.0	42.3	42.2
Cd (diss) [mg/L]	0.00200	< 0.000003	< 0.000003	0.000011	0.000014
Co (diss) [mg/L]	0.0605	0.000027	0.000032	0.000142	0.000164
Cr (diss) [mg/L]	0.00039	0.00098	0.00088	0.00125	0.00108
Cu (diss) [mg/L]	0.0003	0.0004	< 0.0002	< 0.0002	< 0.0002
Fe (diss) [mg/L]	< 0.007	< 0.007	< 0.007	< 0.007	< 0.007
K (diss) [mg/L]	2.22	1.86	2.03	1.58	1.59
Li (diss) [mg/L]	0.0083	0.0057	0.0065	0.0005	0.0005
Mg (diss) [mg/L]	8.59	5.48	5.91	13.6	13.7
Mn (diss) [mg/L]	1.02	0.00050	0.00042	0.0137	0.0131
Mo (diss) [mg/L]	0.00022	0.0112	0.0139	0.00026	0.00029
Na (diss) [mg/L]	7.57	5.22	5.13	3.97	4.07
Ni (diss) [mg/L]	0.0714	0.0002	0.0002	0.0014	0.0013
Pb (diss) [mg/L]	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009
Sb (diss) [mg/L]	< 0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009
Se (diss) [mg/L]	0.00767	0.00074	0.00073	0.00041	0.00048
Sn (diss) [mg/L]	0.00006	< 0.00006	< 0.00006	< 0.00006	< 0.00006
Sr (diss) [mg/L]	0.103	0.427	0.454	0.0861	0.0866
Ti (diss) [mg/L]	0.00006	0.00012	0.00013	0.00018	0.00019
Tl (diss) [mg/L]	0.000006	0.000007	< 0.000005	0.000021	0.000030
U (diss) [mg/L]	0.000016	0.000472	0.000485	0.000081	0.000089
V (diss) [mg/L]	0.00002	0.00028	0.00029	0.00006	0.00007
W (diss) [mg/L]	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Y (diss) [mg/L]	0.00071	0.00007	0.00008	0.00143	0.00142
Zn (diss) [mg/L]	0.056	< 0.002	< 0.002	< 0.002	< 0.002

Catharine Arnold

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Project : Bowen AP1

22-September-2021

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Date Rec. : 16 September 2021
LR Report: **CA15375-SEP21**
Reference: P.O# 800003210A

Copy: #1

CERTIFICATE OF ANALYSIS
Final Report

Analysis	1: Analysis Start Date	2: Analysis Start Time	3: Analysis Completed Date	4: Analysis Completed Time	5: HAP1DPT02_1b	6: HAP1DPT02_2b	7: HAP1DPT04XRF_3b	8: HAP1DPT04XRF_4b	9: HAP1DPT04XRF_5b
Sample Date & Time					15-Sep-21	15-Sep-21	15-Sep-21	15-Sep-21	15-Sep-21
Temp Upon Receipt [°C]	---	---	---	---	9.0	9.0	9.0	9.0	9.0
Ag (diss) [mg/L]	21-Sep-21	15:10	22-Sep-21	14:19	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Al (diss) [mg/L]	21-Sep-21	15:10	22-Sep-21	14:19	0.002	0.002	0.006	0.004	0.003
As (diss) [mg/L]	21-Sep-21	15:10	22-Sep-21	14:19	< 0.0002	< 0.0002	0.0031	0.0030	0.0012
Ba (diss) [mg/L]	21-Sep-21	15:10	22-Sep-21	14:19	0.0382	0.0399	0.0462	0.0433	0.0496
Be (diss) [mg/L]	21-Sep-21	15:10	22-Sep-21	14:19	< 0.000007	0.000009	0.000034	0.000025	0.000022
B (diss) [mg/L]	21-Sep-21	15:10	22-Sep-21	14:19	0.651	0.602	0.281	0.312	0.281
Bi (diss) [mg/L]	21-Sep-21	15:10	22-Sep-21	14:19	0.00002	0.00001	0.00001	0.00001	0.00002
Ca (diss) [mg/L]	21-Sep-21	15:10	22-Sep-21	14:19	89.2	89.4	74.2	80.1	83.1
Cd (diss) [mg/L]	21-Sep-21	15:10	22-Sep-21	14:19	0.000013	< 0.000003	0.000004	0.000006	0.000009
Co (diss) [mg/L]	21-Sep-21	15:10	22-Sep-21	14:19	0.000077	0.000074	0.000122	0.000165	0.000617
Cr (diss) [mg/L]	21-Sep-21	15:10	22-Sep-21	14:19	0.00174	0.00214	0.00108	0.00095	0.00053
Cu (diss) [mg/L]	21-Sep-21	15:10	22-Sep-21	14:19	< 0.0002	< 0.0002	0.0005	0.0005	0.0005
Fe (diss) [mg/L]	21-Sep-21	15:10	22-Sep-21	14:19	< 0.007	< 0.007	0.016	0.016	0.010
K (diss) [mg/L]	21-Sep-21	15:10	22-Sep-21	14:19	3.44	3.42	4.56	4.46	2.89
Li (diss) [mg/L]	21-Sep-21	15:10	22-Sep-21	14:19	0.0005	0.0007	0.0048	0.0040	0.0015
Mg (diss) [mg/L]	21-Sep-21	15:10	22-Sep-21	14:19	9.55	8.93	5.41	5.76	6.11
Mn (diss) [mg/L]	21-Sep-21	15:10	22-Sep-21	14:19	0.00296	0.00213	0.0339	0.0324	0.231
Mo (diss) [mg/L]	21-Sep-21	15:10	22-Sep-21	14:19	0.00956	0.00967	0.0124	0.0113	0.00896
Na (diss) [mg/L]	21-Sep-21	15:10	22-Sep-21	14:19	38.6	36.9	58.6	63.7	61.3
Ni (diss) [mg/L]	21-Sep-21	15:10	22-Sep-21	14:19	0.0005	0.0005	0.0016	0.0015	0.0011
Pb (diss) [mg/L]	21-Sep-21	15:10	22-Sep-21	14:19	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009
Sb (diss) [mg/L]	21-Sep-21	15:10	22-Sep-21	14:19	< 0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009
Se (diss) [mg/L]	21-Sep-21	15:10	22-Sep-21	14:19	0.00020	0.00022	0.00134	0.00115	0.00070
Sn (diss) [mg/L]	21-Sep-21	15:10	22-Sep-21	14:19	0.00013	0.00012	0.00121	0.00118	0.00135
Sr (diss) [mg/L]	21-Sep-21	15:10	22-Sep-21	14:19	0.727	0.720	0.392	0.413	0.441
Ti (diss) [mg/L]	21-Sep-21	15:10	22-Sep-21	14:19	< 0.00005	0.00022	0.00021	0.00023	0.00017
Tl (diss) [mg/L]	21-Sep-21	15:10	22-Sep-21	14:19	< 0.000005	< 0.000005	0.000016	0.000015	0.000013
U (diss) [mg/L]	21-Sep-21	15:10	22-Sep-21	14:19	0.000173	0.000190	0.00285	0.00240	0.00104
V (diss) [mg/L]	21-Sep-21	15:10	22-Sep-21	14:19	0.00013	0.00010	0.00065	0.00075	0.00066
W (diss) [mg/L]	21-Sep-21	15:10	22-Sep-21	14:19	< 0.00002	< 0.00002	0.00004	0.00004	< 0.00002
Y (diss) [mg/L]	21-Sep-21	15:10	22-Sep-21	14:19	0.00013	0.00009	0.00046	0.00047	0.00043
Zn (diss) [mg/L]	21-Sep-21	15:10	22-Sep-21	14:19	< 0.002	0.003	0.002	0.003	0.002

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Project : Bowen AP1

LR Report : CA15375-SEP21

Analysis	10: HAP1DPT04XRF_6b	11: HAP2DPT08_7b	12: HAP2DPT08_8b	13: HAP2DPT02_9b	14: HAP2DPT02_10b	15: BAP1DPT02_11b	16: BAP1DPT02_12b
Sample Date & Time	15-Sep-21	15-Sep-21	15-Sep-21	15-Sep-21	15-Sep-21	15-Sep-21	15-Sep-21
Temp Upon Receipt [°C]	9.0	9.0	9.0	9.0	9.0	9.0	9.0
Ag (diss) [mg/L]	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Al (diss) [mg/L]	0.002	0.007	0.014	0.007	0.003	0.005	0.003
As (diss) [mg/L]	0.0012	0.0016	0.0028	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Ba (diss) [mg/L]	0.0430	0.0280	0.0306	0.0291	0.0302	0.0112	0.0113
Be (diss) [mg/L]	0.000018	0.000039	0.000068	< 0.000007	< 0.000007	0.000099	0.000086
B (diss) [mg/L]	0.309	0.872	0.836	0.285	0.290	0.498	0.547
Bi (diss) [mg/L]	0.00001	0.00001	< 0.00001	0.00001	0.00001	0.00002	< 0.00001
Ca (diss) [mg/L]	69.6	48.4	51.6	63.9	67.5	11.8	12.5
Cd (diss) [mg/L]	0.000016	0.00420	0.0120	0.000007	0.000005	0.000041	0.000035
Co (diss) [mg/L]	0.000911	0.114	0.167	0.000085	0.000076	0.000005	0.000012
Cr (diss) [mg/L]	0.00051	0.00045	0.00049	0.00215	0.00246	0.00136	0.00150
Cu (diss) [mg/L]	0.0006	0.0009	0.0028	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Fe (diss) [mg/L]	0.009	< 0.007	< 0.007	0.010	< 0.007	< 0.007	< 0.007
K (diss) [mg/L]	2.53	5.54	5.93	3.90	3.98	1.24	1.37
Li (diss) [mg/L]	0.0008	0.0172	0.0243	0.0077	0.0077	0.0005	0.0005
Mg (diss) [mg/L]	5.64	12.5	13.7	7.25	7.80	3.28	3.49
Mn (diss) [mg/L]	0.381	3.60	5.05	0.00059	0.00051	0.0120	0.0126
Mo (diss) [mg/L]	0.00414	0.00017	0.00047	0.0534	0.0542	0.00005	0.00010
Na (diss) [mg/L]	60.3	10.4	10.1	5.57	5.65	4.85	4.90
Ni (diss) [mg/L]	0.0015	0.117	0.151	0.0003	0.0003	0.0014	0.0016
Pb (diss) [mg/L]	< 0.00009	0.00011	0.00058	< 0.00009	< 0.00009	< 0.00009	< 0.00009
Sb (diss) [mg/L]	< 0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009
Se (diss) [mg/L]	0.00050	0.0148	0.0159	0.00047	0.00066	0.00050	0.00043
Sn (diss) [mg/L]	0.00125	0.00014	0.00014	0.00011	0.00012	< 0.00006	< 0.00006
Sr (diss) [mg/L]	0.366	0.147	0.152	0.539	0.572	0.0297	0.0306
Ti (diss) [mg/L]	0.00017	0.00011	0.00007	0.00030	0.00010	0.00011	0.00010
Tl (diss) [mg/L]	0.000009	0.000014	0.000020	0.000006	0.000008	0.000020	0.000016
U (diss) [mg/L]	0.000268	0.000018	0.000027	0.00143	0.00171	0.000011	0.000025
V (diss) [mg/L]	0.00045	0.00007	0.00005	0.00041	0.00044	0.00008	0.00008
W (diss) [mg/L]	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Y (diss) [mg/L]	0.00047	0.00100	0.00157	0.00016	0.00012	0.00048	0.00034
Zn (diss) [mg/L]	0.004	0.087	0.127	< 0.002	< 0.002	0.008	0.004

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APPENDIX C

Risk Evaluation Report

RISK EVALUATION REPORT
PLANT BOWEN
ASH POND 1
CARTERSVILLE, GEORGIA

Prepared for

Georgia Power
241 Ralph McGill Boulevard
Atlanta, Georgia 30308

Prepared by

Geosyntec Consultants, Inc.
1255 Roberts Blvd. Suite 200
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July 2024

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LIST OF ACRONYMS AND ABBREVIATIONS

Amsl	Above mean sea level
AP	Ash Pond
ASD	Alternative Source Determination
CCR	Coal Combustion Residual
CEM	Conceptual Exposure Model
CFR	Code of Federal Regulations
COI	Constituent of Interest
COPI	Constituent of Potential Interest
EPC	Exposure Point Concentration
EPD	[Georgia] Environmental Protection Division
ft	feet
GWPS	Groundwater Protection Standard
HAR	Hydrogeologic Assessment Report
HSRA	Hazardous Site Response Act
MCL	Maximum Contaminant Level
mg/L	Milligrams per liter
ProUCL	ProUCL software version 5.1
RAGS	Risk Assessment Guidance for Superfund
RME	Reasonable Maximum Exposure
RRS	Risk Reduction Standards
RSL	Regional Screening Level
SSL	Statistically Significant Level
UCL	95 Percent Upper Confidence Limit of the Arithmetic Mean
USEPA	United States Environmental Protection Agency
VRP	Voluntary Remediation Program

EXECUTIVE SUMMARY

Georgia Power's Plant Bowen (site) is a four-unit, coal-fired electric generating facility that commenced operations in the 1970s and is located approximately nine miles southwest of Cartersville in Bartow County, Georgia. Coal combustion residual (CCR) material resulting from power generation has historically been transferred and stored in the 254-acre Ash Pond 1 (AP-1), which is located adjacent to and west of the electric-generating facility. In preparation for the closure of AP-1, the conversion of the plant to dry handling was completed in 2020, and AP-1 no longer receives CCR materials pursuant to the Federal CCR Rule, 40 C.F.R. § 257, Subpart D (USEPA, 2020) and the State CCR Rule, Ga. Comp. R. & Regs. 391-3-4-.10 (EPD, 2022). Georgia Power will close AP-1 by excavation and consolidation of CCR material into an approximately 144-acre lined, multi-cell storage facility situated within the current footprint of AP-1. Georgia Power submitted a permit application for the closure of AP-1 to the Georgia Environmental Protection Division (EPD) on November 20, 2018. On February 17, 2022, Georgia EPD issued CCR Permit 008- 021D(CCR) for the closure of Plant Bowen AP-1. The final closure permit will require post-closure care including semiannual groundwater monitoring and reporting for at least 30 years following CCR removal.

This report presents the results of a risk evaluation for CCR constituents[1] exhibiting statistically significant levels (SSLs) in groundwater at AP-1 from samples collected by Georgia Power in compliance with the Federal and State CCR Rules between 2016 and August 2022. The risk evaluation was performed in support of the *Draft Remedy Selection Report*. A conservative, health-protective approach was used that is consistent with United States Environmental Protection Agency (USEPA) risk assessment guidance, Georgia EPD regulations and guidance, and standard practice for risk assessment in the State of Georgia. Arsenic, cobalt, and molybdenum have been identified as SSL-related constituents using the groundwater protection standard (GWPS) established for AP-1 in accordance with the Federal and State CCR Rules (Geosyntec, 2022a).

Consistent with USEPA guidance, this risk evaluation used a tiered approach to evaluate potential risks, which included the following steps:

1. Development of a conceptual exposure model (CEM) for AP-1.
2. Initial groundwater risk screening: Compare groundwater concentrations of SSL-related constituents to conservative, health-protective criteria and/or background concentrations to assess whether they pose a risk to human health.

[1] The constituents included in the risk evaluation also occur naturally in the site geologic setting. An alternative source demonstration (ASD) was prepared for arsenic, one of the SSL-related constituents identified at AP-1, in accordance with accordance with 40 CFR §257.95 and approved by Georgia EPD. The ASD demonstrates that concentrations of arsenic in BGWC-34D are naturally occurring. Therefore, arsenic was not included in the risk evaluation.

3. Refined groundwater risk evaluation: Perform a more refined analysis of any Constituents of Potential Interest (COPIs) that were not screened out in the initial risk screening to assess whether they pose a potential risk to human health.
4. Development of risk conclusions and identification of associated uncertainties.

Using this approach that includes multiple conservative assumptions, SSL-related constituents, cobalt and molybdenum, identified at AP-1 are not expected to pose a risk to human health or the environment; therefore, no further risk evaluation for groundwater or surface water is warranted. Compliance monitoring for AP-1 will continue pursuant to the requirements of the Federal and State CCR Rules. Georgia Power will proactively evaluate the data and update this evaluation, if necessary.

1 INTRODUCTION

This report summarizes a risk evaluation of AP-1 at Plant Bowen (site) located approximately nine miles southwest of Cartersville in Bartow County, Georgia (**Figure 1**). The risk evaluation was performed in support of the *Draft Remedy Selection Report* and is used to ensure that the proposed remedy will protect human health and the environment. Georgia Power will close AP--1 by excavation and consolidation of CCR material into an approximately 144-acre lined, multi-cell storage facility situated within the current footprint of AP-1. Georgia Power submitted a permit application for the closure of AP-1 to Georgia EPD on November 20, 2018. On February 17, 2022, Georgia EPD issued CCR Permit 008- 021D(CCR) for the closure of Plant Bowen AP-1. The final closure permit will require post-closure care including semiannual groundwater monitoring and reporting for at least 30 years following CCR removal.

This risk evaluation provides additional technical review of the human health and environmental protectiveness associated with the closure of AP-1 with respect to constituent concentrations in groundwater identified at SSLs above GWPS. USEPA revised the Federal CCR Rule on July 30, 2018, updating the GWPS for cobalt, lead, lithium, and molybdenum values. On February 22, 2022, EPD adopted the federal GWPS for cobalt, lead, lithium, and molybdenum under 40 CFR §257.95(h) (EPD, 2022), which established the GWPS for these constituents as the higher of background concentrations or 0.006 milligrams per liter (mg/L), 0.015 mg/L, 0.040 mg/L, and 0.100 mg/L, respectively.

The risk evaluation relies on a conservative, health-protective approach that is consistent with the risk approaches outlined in Voluntary Remediation Program (VRP) (Georgia Voluntary Remediation Act, O.C.G.A. § 12-8-100; EPD, 2009) and components of the Risk Assessment Guidance for Superfund (RAGS) as included in the USEPA Regional Screening Level (RSL) User's Guide (USEPA, 2022a). This evaluation also incorporates principles and assumptions consistent with the Federal and State CCR Rules.

The risk evaluation includes the development of a site-specific CEM and a stepwise risk screening process for identified SSL-related constituents for AP-1. Cobalt and molybdenum were identified as SSL-related constituents under the Federal and State CCR Rules in the following wells (Geosyntec, 2022a).

- Cobalt: BGWC-22
- Molybdenum: BGWC-43D

Arsenic was also identified as an SSL-related constituent in monitoring well BGWC-34D. However, an alternative source demonstration (ASD) for arsenic in this monitoring well was prepared in accordance with 40 CFR §257.95 (Geosyntec, 2021b) and approved by Georgia EPD on August 18, 2021. The ASD demonstrates that concentrations of arsenic detected in

BGWC-34D are not associated with a release from AP-1 but are instead caused by a natural source of arsenic in the site-specific rock formation. Accordingly, arsenic was not included in the risk evaluation described herein.

The remainder of the report is organized as follows:

- ***Section 2, Basis and Background for the Development of the Conceptual Exposure Model*** – Presents site-specific information related to the site history, monitoring network, topography and surface hydrology, geology and hydrogeology, potential transport pathways, and receptors that could potentially be exposed to SSL-related constituents.

- ***Section 3, Groundwater Risk Evaluation Screening*** – Describes the process for the initial risk-based screening of SSL-related constituents to identify COPIs in groundwater.

- ***Section 4, Refined Risk Evaluation*** – Describes the process for refined evaluation of groundwater COPIs, including calculation of exposure point concentrations (EPCs) and analysis of concentration trends over time.

- ***Section 5, Uncertainty Assessment*** – Describes the uncertainties associated with the risk screening process.

- ***Section 6, Conclusions*** – Presents the conclusions of the risk evaluation.

- ***Section 7, References*** – Provides reference information for the sources cited in this document.

2 BASIS AND BACKGROUND FOR THE DEVELOPMENT OF THE CONCEPTUAL EXPOSURE MODEL

This section provides a brief overview of the site location and operational history, site regulatory status, and geology/hydrogeology. A CEM representing the site-specific processes and conditions that are relevant to the potential migration of groundwater and potential exposure to SSL-related constituents has been developed based on a review and compilation of information previously presented in AP-1 documents, including the *Hydrogeologic Assessment Report (HAR) (Revision 03) for Ash Pond 1* (Geosyntec, 2021a), *2022 Semiannual Groundwater Monitoring & Corrective Action Report – Plant Bowen - Ash Pond 1* (Geosyntec, 2022a), and the *2021 Annual Groundwater Monitoring & Corrective Action Report – Plant Bowen - Ash Pond 1* (Geosyntec, 2022b). The CEM includes a conservative evaluation of assumed potential transport pathways, potential exposure pathways, and potential human and ecological receptors.

2.1 Site Description

The site is located in Bartow County, Georgia, approximately nine miles southwest of the city of Cartersville. AP-1 historically occupied 254 acres and is bordered by Euharlee Creek to the west and northwest, and the Etowah River is located to the northeast (**Figure 1**).

Operation of AP-1 commenced in 1971 with receipt of sluiced CCR material from the plant. In 2008, Georgia Power began operation of a new CCR monofill at Plant Bowen, which substantially decreased the volume of CCR processing at AP-1. In preparation for AP-1 closure, the plant completed the conversion to dry ash handling in early 2019, after which AP-1 no longer received ash. Georgia Power has begun closure of AP-1 by excavation and consolidation of CCR material into an approximately 144-acre lined, multi-cell storage facility situated within the current footprint of AP-1. Closure activities are being conducted in accordance with 40 C.F.R. § 257.102 and corresponding Georgia EPD Rule 391-3-4-.10(7)(b).

The monitoring well network for AP-1 is shown on **Figure 2**. Based on the conceptual site model and the observed hydrogeologic conditions at the site, downgradient well locations are distributed along the northern, western, and southern perimeter of the site, in the direction of groundwater flow. Both background and downgradient wells are screened in the same water-bearing horizon along the zone of primary groundwater transport within the highly weathered bedrock and upper portion of the competent bedrock.

2.1.1 Topography and Surface Hydrology

AP-1 is located in the western portion of the Plant Bowen property. The topography of the AP-1 north stack forms a concave downward mound that slopes from the center of the stack to the perimeter, with a peak elevation of about 780 feet mean sea level (MSL). The southern half of

AP-1 has a peak elevation of 760 feet above MSL at its center. The topography surrounding AP-1 slopes toward Euharlee Creek to the west and the Etowah River to the north. Topographic relief south of AP-1 appears to slope toward the west to Euharlee Creek (Geosyntec, 2021a).

2.1.2 Geology and Hydrogeology

The following information is provided in the *2022 Semiannual Groundwater Monitoring & Corrective Action Report – Plant Bowen - Ash Pond 1 (AP-1)* (Geosyntec, 2022a).

> *The Site is located within the Great Valley District of the Valley and Ridge Physiographic Province (Valley and Ridge) in northwest Georgia. The Valley and Ridge is characterized by Paleozoic sedimentary rocks that have been folded and faulted into the ridges and valleys that gave this region its name. The floor of the valley is underlain by shales, dolomites, and limestones of Cambrian and Ordovician age. Geologic mapping performed by Lawton et al. (1976) indicates that the Site is underlain by the Ordovician-Cambrian age Knox Dolomite and the Ordovician age Newala Limestone. Based on review of subsurface investigations at the Site, the bedrock is described as predominantly dolomite. The overall Site is underlain primarily by residuum and competent dolomite/limestone bedrock. AP-1 is underlain primarily by three units: (i) fill material consisting of earthen embankments and CCR material; (ii) residuum; and (iii) competent dolomite/limestone bedrock.*
>
> . . . .
>
> *The uppermost aquifer at the Site occurs near the interface of the residuum and the fractured and solutioned bedrock. Groundwater recharge is by precipitation infiltrating through the residuum to bedrock, or in bedrock outcrop areas, direct infiltration into the bedrock. Groundwater flow in bedrock is under unconfined to semi-confined conditions from the mantle of overlying lower-permeability residuum and is controlled by secondary porosity along fractures and solution-enhanced features that are typically filled with residuum. Based on observations of residuum soil types and horizontal hydraulic conductivity values, the movement of groundwater in the clay-rich residuum and upper weathered bedrock zone is slow and likely behaves as flow through low-permeability porous media.*

The potentiometric surface contours based on July 2022 groundwater level measurements are provided on **Figure 3.**

The AP-1 HAR (Geosyntec, 2021a) includes a discussion of a numerical groundwater model that was developed for AP-1 to simulate groundwater flow and constituent transport under final closure conditions. The results of that modeling effort indicate that the post-closure groundwater flow is simulated to be to the north, towards the Etowah River.

2.2 Potential Transport Pathways

A variety of geologic, hydrogeologic, and geochemical mechanisms can occur in the subsurface and serve to attenuate constituent concentrations in groundwater such as soil or rock characteristics, the local geology and hydrogeology, and the distance the groundwater must travel before reaching a potential receptor. A summary of the potential transport pathways is shown on the CEM in **Figure 4**.

Euharlee Creek and the Etowah River are located to the west/northwest and northeast of AP-1, respectively. The surface water flow direction for Euharlee Creek is north where it enters the Etowah River which flows from east to west. A conservative assumption for this assessment was made that groundwater from the site flows to either Euharlee Creek or the Etowah River. In addition, for the purposes of this evaluation, both Euharlee Creek and the Etowah River were assumed to represent a hydraulic discharge boundary for groundwater flow in the upper aquifer from the nearby region.

Concentrations of the SSL-related constituents were below their health-protective screening levels in wells on-site and upgradient of surface water bodies, as shown by the findings of the risk evaluation in Section 4.1.4. Therefore, evaluation of surface water was not recommended.

2.3 Potential Exposure Pathways and Receptors

The exposure pathways for groundwater assumed to be complete for purposes of this risk evaluation were used to identify potential receptors and estimate potential risk. The CEM (**Figure 4**) depicts the conservative potential exposure pathways and receptors included in the risk evaluation.

The following potential exposure pathways and receptors were considered:

- On-site industrial worker: The groundwater exposure pathway for the on-site industrial worker was considered incomplete because there are no wells on-site that are classified for use as potable wells.

- On-site construction worker: While there is a potential for limited exposure to groundwater by a future construction worker through dermal contact with on-site shallow groundwater during subsurface activities, future construction workers would be expected to have little to no direct contact with on-site groundwater due to safety procedures outlined in their site-specific health and safety plans.

- On-site resident: The groundwater exposure pathway for on-site residents was considered incomplete because the site is zoned industrial and there is no residential use on-site under current site conditions and future residential use of the site is considered unlikely (Bartow County, 2022).

- Off-site industrial/construction worker: The potential for off-site worker exposure through direct contact with groundwater was addressed qualitatively through the evaluation of hypothetical off-site residential receptors. Health-protective screening levels for residential receptors would be more conservative than industrial and construction worker screening levels.

- Off-site resident: The groundwater exposure pathway for hypothetical off-site residential receptors was conservatively assumed to be potentially complete. Nearby zoning is a combination of either general industrial or zoned as a special district (Bartow County, 2022). An off-site well survey of potential groundwater wells within a three-mile radius of the site was conducted and consisted of reviewing federal, state, and county records and online sources, in addition to conducting a windshield survey of the area (Newfields, 2020). The off-site well survey is included as **Appendix A**. A desktop review was performed in January 2022 to search for additional wells added since 2020. Results of the survey and the January 2022 update are presented on **Figure 5**. Off-site residential receptors in the downgradient groundwater flow direction identified in the well survey are located on the opposite side of Euharlee Creek which for the purpose of this risk evaluation was assumed to represent hydraulic discharge boundary for groundwater downgradient of AP-1.

  Concentrations of the SSL-related constituents cobalt and molybdenum have been delineated to below health-protective screening levels in groundwater monitoring wells and piezometers on-site. As a conservative measure, hypothetical off-site residential exposure to cobalt and molybdenum was evaluated using data collected from on-site groundwater wells between 2016 and August 2022 downgradient of AP-1. This comparison makes the conservative assumption that on-site groundwater may potentially migrate to off-site drinking water wells through advective transport in groundwater without any attenuation within the aquifer media through factors such as dilution, dispersion, or adsorption, and disregards the presence of Euharlee Creek which represents an assumed hydraulic discharge boundary for groundwater downgradient of AP-1. Accordingly, the risk evaluation screening assumed the hypothetical off-site residential receptor could be exposed by ingestion and dermal contact with SSL-related constituents in groundwater through its use as a future potable water source.

- Recreational surface water receptor: The surface water exposure pathway for hypothetical recreational receptors was addressed qualitatively through the evaluation of on-site groundwater data. SSL-related constituent concentrations are below the health-protective screening criteria in on-site groundwater. Therefore, evaluation of the surface water pathway was not necessary.

- Ecological surface water receptors: The surface water exposure pathway for off-site ecological receptors was addressed qualitatively through the evaluation of on-site groundwater data. SSL-related constituent concentrations are below health-protective screening criteria in on-site groundwater. Therefore, evaluation of the surface water pathway was not necessary.

3 RISK EVALUATION SCREENING

The CEM developed in Section 2 was used to identify the potential exposure pathways to human receptors that should be considered in the risk evaluation. The initial step in the risk evaluation is the comparison of SSL-related constituent concentrations from groundwater samples collected between 2016 and August 2022 to relevant, health-protective levels or background. The approach used is consistent with the Georgia EPD regulations and guidance, USEPA guidance, and standard practice for risk assessment in the State of Georgia. The EPD allows for the evaluation of risk to support site-specific remedial approaches in programs such as the Voluntary Remediation Program (VRP) (EPD, 2009).

The initial risk evaluation screening was performed for the potential groundwater exposure pathway by comparing the concentrations of SSL-related constituents in groundwater samples from wells determined to have SSL-related constituents to appropriate health-protective screening criteria and/or background. These criteria included the risk reduction standards (RRS)[2] established under the Hazardous Site Response Act (HSRA) for drinking water and the site-specific background levels for the protection of human health. If the maximum concentration of an SSL-related constituent exceeded the screening criterion, the constituent was identified as a COPI for further evaluation in the refined risk evaluation. The methodology and screening criteria used were identified in accordance with regulatory guidance and standard risk assessment practices using an approach designed to conservatively overestimate possible exposures and risks, providing an additional level of confidence in the conclusions. The methodology is summarized on **Figure 6** and discussed in more detail below.

3.1 Data Used in Risk Evaluation Screening

This section provides information on the groundwater dataset used in the risk evaluation screening.

3.1.1 Groundwater Data

For the initial risk screening evaluation, groundwater data from samples collected between 2016 and August 2022 from the on-site wells that were identified to have SSL-related constituents were used in the risk screening evaluation for hypothetical off-site residential exposure.

The list of wells identified in the *2022 Semiannual Groundwater Monitoring & Corrective Action Report – Plant Bowen – Ash Pond 1 (AP-1)* (Geosyntec, 2022a) with the SSL-related constituents cobalt and molybdenum identified under the Federal and State CCR Rules is shown below.

[2] HSRA was amended in 2018 to make the methods used for calculating RRSs consistent with USEPA's RAGS for the calculation of RSLs.

- Cobalt: BGWC-22
- Molybdenum: BGWC-43D

The data for these wells were screened against the relevant health-protective screening criteria and/or background. The location of the wells with SSL-related constituents included in the risk screen are provided on **Figure 7**.

Groundwater data used in the risk evaluation screening were collected from the uppermost aquifer and are considered to be representative of groundwater conditions at the site. The groundwater dataset used in the risk evaluation is presented in **Appendix B-1.** Method detection limits for the groundwater datasets used in the risk evaluation were reviewed and confirmed to be less than the screening levels.

3.1.2 Background Groundwater Quality

Statistical analysis of groundwater monitoring data are performed at the site pursuant to §257.93-95 following the professional engineer certified Statistical Analysis Method Certification (October, 2017, revised January 2020) (Geosyntec, 2020) and the Unified Guidance (USEPA, 2009) for AP-1; background values are routinely updated under the program. Five monitoring wells in the certified monitoring well network are designated as upgradient (background) locations for AP-1, including BGWA-2, BGWA-29, BGWA-33, BGWA-47D, and BGWA-48D. The statistical analyses performed on the groundwater data were described in the *2022 Semiannual Groundwater Monitoring & Corrective Action Report – Plant Bowen Ash Pond 1 (AP-1)* (Geosyntec, 2022a); and is presented below.

> *The Sanitas groundwater statistical software was used to perform the 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 document Statistical Analysis of Groundwater Data at RCRA Facilities Unified Guidance (Unified Guidance) (USEPA, 2009). Time series plots generated by Sanitas are used to identify suspected outliers, or extreme values that would result in limits that are not representative of the current background data population. Suspected outliers at all wells are formally tested using Tukey's box plot method and, when identified, flagged in the computer database with "o" and deselected prior to construction of statistical limits. Background well data were updated following the Unified Guidance recommendation, evaluating recent background data using Tukey's box plot method for outliers and Sen's Slope/Mann-Kendall methods for potential trends.*

3.2 Groundwater Screening Evaluation

The process of screening constituents detected in groundwater against human health screening levels for groundwater is discussed below and presented in **Figure 6**. The HSRA RRS under the VRP approach presented herein include site-specific screening levels equivalent to Type 2 RRS (cobalt and molybdenum) for off-site residential receptors. The Hazardous Site Response Act, Rule 391-3-19.07(1) notes that *"[a]ll risk reduction standards will, when implemented, provide adequate protection of human health and the environment.*" In addition, Rule 391-3-19-.07(3) notes a corrective action, if needed, may be considered complete when "*a site meets any or a combination of the applicable risk reduction standards described in Rule 391-3-19-.07.*"

In accordance with industry standards and methodologies approved by the Georgia EPD, the screening level hierarchy for the SSL-related constituents is as follows:

- The higher of the Type 1 or Type 2 RRS for hypothetical off-site residential exposure, which are considered protective of human health for those constituents regulated under HSRA. Georgia EPD has not established a Type 1 RRS for molybdenum and cobalt is not a HSRA-regulated substance. Therefore, site-specific screening values were calculated for both constituents as described in the following bullet.

- In accordance with standard methodologies approved by the Georgia EPD, site-specific risk-based screening values were calculated for cobalt and molybdenum using the default exposure factors for residential receptors and the methodology found in Appendix III of the HSRA rule (EPD, 2018). The calculated screening values are equivalent to Type 2 groundwater RRSs protective of residential exposures. Toxicity values for cobalt and molybdenum used in the calculations were the USEPA-preferred values contained in the USEPA's RSL Calculator (USEPA, 2022b). The risk-based screening values were calculated using RSL Calculator assuming a target hazard quotient of 1, consistent with Georgia EPD guidance applicable in other contexts (EPD, 2018). The calculation of the risk-based screening values for cobalt and molybdenum are presented in **Appendix C**. Based on the foregoing, the site-specific screening level was used for cobalt and molybdenum.

- If the site-specific background concentrations are greater than the criterion described above, then the site-specific background concentration is used as the screening level in accordance with the CCR methodology for development of groundwater protection standards (USEPA, 2020). Background was not used as a screening level in this evaluation.

In summation, based on the hierarchy above, groundwater data collected from the wells identified to have SSL-related constituents were compared to residential screening criteria for groundwater or the relevant background concentration.

Table 1 presents the maximum detected concentration of cobalt (0.041 mg/L) and molybdenum (0.24 mg/L) which were used to represent potential off-site groundwater quality for comparison to the selected screening levels for cobalt (0.006 mg/L) and molybdenum, (0.1 mg/L), for hypothetical off-site residential receptors. As noted in **Table 1**, cobalt and molybdenum were detected at a concentration that exceeded their screening levels and were retained as COPIs for further evaluation in the refined risk evaluation.

4 REFINED RISK EVALUATION

A refined risk evaluation was conducted for the groundwater COPIs (cobalt and molybdenum) that were detected at concentrations that exceeded the health-protective screening criteria. The refined risk evaluation identified EPCs for cobalt and molybdenum in groundwater for the purposes of characterizing potential risk to human receptors.

4.1 Refined Groundwater Risk Evaluation

Potential risk associated with exposure to cobalt and molybdenum by hypothetical off-site residential receptors was refined using the methodology described in HSRA and VRP and other supporting guidance (EPD, 2018; EPD, 2009; EPD, 2015) and is presented in the following section and on **Figure 8**.

For the refined risk evaluation, groundwater data from samples collected between 2016 and August 2022 from the on-site wells that were identified to have an SSL-related constituent and downgradient monitoring wells/piezometers that represent groundwater flow in the same hydraulically downgradient direction were used to evaluate hypothetical off-site residential exposure.

As noted above, groundwater data used in the risk screening level evaluation were collected from the uppermost aquifer and are considered to be representative of groundwater conditions at the site. The groundwater dataset used in the refined risk evaluation is presented in **Appendix B-1.**

4.1.1 Groundwater Exposure Point Calculation

The refined risk evaluation for cobalt and molybdenum included the development of an EPC. The EPC is a conservative estimate of potential exposure that is selected to address uncertainty and variability in the dataset (USEPA, 2002). Consistent with guidance for developing groundwater EPCs (USEPA, 2014), 95 percent upper confidence limits of the arithmetic mean (UCLs) were calculated using USEPA ProUCL 5.2 software (ProUCL) (USEPA, 2022c) and ProUCL User's Guide (USEPA, 2022d).

For the refined risk evaluation, UCLs for the COPIs in groundwater were calculated for datasets with the following characteristics:

- UCL for the individual well with an SSL-related constituent;
- UCL based on combined data from the well(s) with an SSL-related constituent and other well(s)/piezometer(s) in the general vicinity to include additional downgradient monitoring well(s)/piezometer(s) that represent groundwater flow in the same hydraulically downgradient direction; and

- UCL based on the combined data from the farthest downgradient well(s)/piezometers(s) that are hydraulically downgradient of the well(s) with an SSL-related constituent.

Other assumptions made in the calculations of the UCLs include:

- Primary samples (no duplicates) were used to calculate EPCs as duplicate samples were analyzed for quality assurance purposes.

- If the calculated UCL exceeded the maximum detected concentration, then the maximum detected concentration was used as the EPC.

ProUCL software calculates multiple UCLs and provides a recommended UCL which was selected as the EPC. If there were multiple UCLs recommended by ProUCL, the maximum UCL value was selected as a conservative assumption. **Appendix D-1** provides a detailed summary of the UCLs calculated using the methods described above, and **Appendix D-2** presents figures showing the wells used in the calculation of the EPCs for the groundwater COPIs. **Appendix D-3** provides the input and output files associated with the ProUCL software.

Table 2 summarizes the Step 3 groundwater EPCs selected for cobalt and molybdenum. This table shows the number of samples, the maximum detected concentrations, the UCLs recommended by ProUCL software, and the selected EPCs.

4.1.2 COPI Concentration Trend Analysis

Concentration trends over time were evaluated as one line of evidence in the refined risk evaluation for cobalt and molybdenum. The Mann-Kendall trend test with an alpha value equal to 0.05 and the Theil-Sen line test were conducted on the data from BGWC-22, BGWC-32, BGWC-35D, BGWC-37D, BGWC-39, and BGWC-41D for cobalt and BGWC-30, BGWC-36D, BGWC-38D, BGWC-43D, BGWC-44D, BGWC-49D, and BGWC-50D for molybdenum to evaluate the trends in concentrations over time. The tests were conducted using the USEPA ProUCL 5.2 software (USEPA, 2022c).

The Mann-Kendall results are presented on time series graphs in **Appendix D-4** and indicated:

- There are no statistical trends in cobalt concentrations over time in BGWC-35D, BGWC-39, and BGWC-41D.

- There is a statistically decreasing trend in cobalt concentrations over time in BGWC-32 and BGWC-37D.

- There is a statistically increasing trend in cobalt concentrations over time in BGWC-22. However, as noted in the preceding bullet, there is a statistically decreasing trend in

cobalt concentration in BGWC-32 and the concentrations of cobalt in furthest downgradient wells from BGWC-22, BGWC-39 and BGWC-41D, are below cobalt's screening level.

- There are no statistical trends in molybdenum concentrations over time in BGWC-36D, BGWC-38D, BGWC-43D, BGWC-44D, BGWC-49D, and BGWC-50D.

- There is a statistically significant decreasing trend in molybdenum concentrations over time in BGWC-30.

Mann Kendall trend analysis requires four data points with at least three detections. Trends may be evaluated at the farthest downgradient piezometers from the well(s) with SSL-related constituents, if necessary, after additional sampling events are conducted at downgradient locations.

4.1.3 Refined Groundwater Risk Evaluation Results

Cobalt and molybdenum were identified as groundwater COPIs in the initial risk screening. In the refined risk evaluation, comparison of the calculated EPC to the screening level was used to identify COIs that may pose a potential risk to hypothetical off-site residential receptors exposed through the potential use of groundwater as potable water. If the EPC from the farthest downgradient well(s) in an exposure unit is greater than the respective screening level, then the constituent is identified as having the potential for risk that warrants additional evaluation (e.g., performing a surface water evaluation).

4.1.3.1 Cobalt

Cobalt was detected in 24 out of 24 groundwater samples in monitoring well BGWC-22 at concentrations that exceeded the groundwater screening level for hypothetical off-site residential receptors. For the refined risk evaluation, the following EPCs were calculated for cobalt using the monitoring wells shown in **Appendices D-1** and **D-2b**:

- Data from BGWC-22 were used to determine if the UCL is less than the screening level (EPC Step 1 in **Appendix D-1**).

- Data from BGWC-22 and the downgradient monitoring wells BGWC-32, BGWC-35D, BGWC-37D, BGWC-39, BGWC-41D, and BGWC-42D were combined to represent groundwater exposure in the same hydraulically downgradient direction (EPC Step 2 in **Appendix D-1**).

- Data from BGWC-39 and BGWC-41D were used to represent groundwater exposure using the wells that are the farthest hydraulically downgradient of well BGWC-22 (EPC Step 3 in **Appendix D-1**).

The Step 1 (0.024 mg/L) and Step 2 (0.01 mg/L) EPCs for cobalt exceeded the applicable screening level. However, and Step 3 (0.001 mg/L) EPC was below the applicable screening level of 0.006 mg/L.

Table 3 presents the results of the refined screening comparing the farthest hydraulically downgradient EPC to the screening level. As cobalt was not detected above the applicable screening level in the farthest hydraulically downgradient wells on the site, cobalt was not identified as a COI in groundwater for hypothetical off-site residential receptors and is not expected to pose a risk to human health through potable water use.

4.1.3.2 Molybdenum

Molybdenum was detected in 9 out of 9 groundwater samples in monitoring well BGWC-43D at concentrations that exceeded the groundwater screening level for hypothetical off-site residential receptors. For the refined risk evaluation, the following EPCs were calculated for molybdenum using the monitoring wells shown in **Appendices D-1** and **D-2c**:

- Data from BGWC-43D were used to determine if the UCL is less than the screening level (EPC Step 1 in **Appendix D-1**).
- Data from BGWC-43D, the adjacent/nearby wells BGWC-30, BGWC-36D, BGWC-38D, BGWC-43D, and BGWC-49D, and the downgradient monitoring wells BGWA-6, BGWC-44D, and BGWC-50D were combined to represent groundwater exposure in the same hydraulically downgradient direction (EPC Step 2 in **Appendix D-1**).
- Data from BGWA-6, BGWC-44D, and BGWC-50D were used to represent groundwater exposure using the wells that are the farthest hydraulically downgradient of well BGWC-22 (EPC Step 3 in **Appendix D-1**).

The Step 1 (0.2 mg/L) EPC for molybdenum exceeded the applicable screening level. However, the EPC Step 2 (0.045 mg/L) and EPC Step 3 (0.0035 mg/L) were below the applicable screening level of 0.1 mg/L.

Table 3 presents the results of the refined screening comparing the farthest hydraulically downgradient EPC to the screening level. As molybdenum was not detected above the applicable screening level in the farthest hydraulically downgradient wells on the site, molybdenum was not identified as a COI in groundwater for hypothetical off-site residential receptors and is not expected to pose a risk to human health through potable water use.

4.1.4 Refined Risk Evaluation Summary and Conclusions

Detections of cobalt and molybdenum were reported at concentrations above the corresponding groundwater screening value. However, the results of the refined groundwater risk evaluation indicate the following:

- Cobalt and molybdenum are not expected to pose a risk to hypothetical off-site residential receptors.

- The individual data points used to calculate the cobalt and molybdenum EPCs to represent potential groundwater exposure for hypothetical off-site residential receptors based on the farthest hydrologically downgradient monitoring wells were below the health-protective screening level.

Accordingly, based on the multiple lines of evidence and various conservative assumptions, further risk evaluation for groundwater is not warranted. The simulated changes in the groundwater flow direction under post-closure conditions (described in Section 2.1.2) are unlikely to change the risk evaluation conclusions. Georgia Power will continue to sample compliance and delineation monitoring wells as part of the ongoing assessment monitoring program. The monitoring program will also serve to identify any new exceedances of GWPSs that might be associated with changes to the groundwater flow regime under post-closure conditions. Georgia Power will proactively evaluate new data and update this risk evaluation, if necessary.

5 UNCERTAINTY ASSESSMENT

USEPA guidance stresses the importance of providing an analysis of uncertainties so that risk managers are better informed when evaluating risk assessment conclusions (USEPA, 1989). The uncertainty assessment provides a better understanding of the key uncertainties that are most likely to affect the risk assessment results and conclusions.

The potential uncertainties associated with the risk evaluation are as follows:

Health-Protective Screening Criteria Uncertainties

- In accordance with standard methodologies approved by the Georgia EPD, a value equivalent to a Type 2 RRS was considered as a screening criterion for cobalt and molybdenum. Selection of the screening criteria is considered appropriate for risk quantification for AP-1. Georgia EPD Rule 391-3-19.07(1) notes that "*[a]ll risk reduction standards will, when implemented, provide adequate protection of human health and the environment*".

- Screening criteria based on RRSs represent the reasonable maximum exposure (RME), which are the highest exposures that are reasonably expected to occur at a site. The USEPA risk assessment guidance defines the RME as "*the highest exposure that is reasonably expected to occur at a site but that is still within the range of possible exposures*" (USEPA, 1989). The same guidance document states that the "*intent of the RME is to estimate a conservative exposure case (i.e., well above the average case) that is still within the range of possible exposures*". Potential receptors will likely have lower exposures than those presented in this risk evaluation (i.e., a majority of the site concentrations will be less than the UCL), which overestimates potential exposure.

Exposure Uncertainties

- The maximum detected concentrations of cobalt and molybdenum were compared to screening criteria to identify the COPIs. Use of the maximum detected concentration is consistent with standard practice; however, use of the maximum detected concentration for exposure likely overestimates potential risk.

- The constituents included in the risk evaluation may occur naturally in the site geologic setting. Although background concentrations were evaluated, contributions to exposure and risk were assumed to be entirely CCR-related and natural background sources were not quantified. Thus, SSL concentration-related exposures were likely overestimated.

- Hypothetical off-site residential exposure was evaluated using on-site groundwater data from wells around the perimeter and downgradient of AP-1. This comparison makes the

conservative assumption that on-site groundwater may potentially migrate to off-site drinking water wells through advective transport in groundwater, but without any attenuation within the aquifer media through factors such as dilution, dispersion, or adsorption. This assumption may overestimate potential exposure and risk to hypothetical off-site receptors.

- EPCs for metals in groundwater were assumed to be 100 percent bioavailable by ingestion and dermal contact. This assumption may tend to overestimate risk.

- An off-site well survey of potential groundwater wells within a three-mile radius of the site was conducted by NewFields in 2020 and updated in January of 2022 which consisted of reviewing publicly available federal, state, and county records as well as a windshield survey of the area (**Appendix A**). Geosyntec relied on the data collected by NewFields.

- The evaluation used on-site groundwater data to represent hypothetical off-site exposure, which is a conservative approach that likely results in overestimation of assumed exposure and assumed potential risk. Although off-site potable wells identified in the well survey were not included in the risk evaluation, the presence of these wells do not appear to impact the conclusions of the risk evaluation because concentrations of COPIs are delineated in on-site groundwater.

Toxicity Uncertainties

- Toxicity factors used to calculate health-protective criteria are established at conservative levels to account for uncertainties and often result in criteria that are many times lower than the levels observed to cause effects in human or animal studies. For metals, humans, other animals, and plants have evolved in the presence of metals and are adapted to various levels of exposure (EPA, 2007). Therefore, a screening level exceedance does not necessarily equate to an adverse effect.

6 CONCLUSIONS

This risk evaluation for the SSL-related constituents in groundwater at AP-1 was conducted using methods consistent with Georgia EPD and USEPA guidance and included multiple conservative assumptions. Based on this evaluation, the SSL-related constituents cobalt and molybdenum are not expected to pose a risk to human health or the environment.

Accordingly, no further risk evaluation of groundwater or surface water is warranted. Compliance monitoring for AP-1 under the Federal and State CCR Rules will continue. Georgia Power will proactively evaluate the data and update this risk evaluation, if necessary

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USEPA, 2022d. *ProUCL Version 5.2 User Guide. Statistical Software for Environmental Applications for Data Sets with and without Nondetect Observations*, Office of Research and Development. June 14, 2022.

TABLES

Table 1
SSL-Related Constituents Groundwater Screening
Plant Bowen AP-1 Risk Evaluation Report[1]
Plant Bowen, Cartersville, GA

CCR Rule Designation	Constituent	CAS No.	Detection Frequency	Exceedance Frequency[2]	Maximum Concentration (mg/L)	Screening Level (mg/L)	Source[3]	Site-Specific Background (mg/L)	COPI? (Y/N)	Rationale[4]
Appendix IV	Cobalt	7440-48-4	24 / 24	24 / 24	0.041	0.006	Site-Specific	0.005	Y	ASL
	Molybdenum	7439-98-7	9 / 9	9 / 9	0.24	0.1	Site-Specific	0.034	Y	ASL

Notes:

[1] Evaluation includes 2016 to August 2022 groundwater analytical data from wells BGWC-22 (cobalt) and BGWC-43D (molybdenum).

[2] The exceedance frequency is based on the number of samples with detected concentrations that exceed the identified screening level.

[3] The screening values are the maximum value from the following sources:

- Type 1 RRSs listed in HSRA Appendix III, Table 1 (HSRA-regulated substances only).
- Type 2 RRSs calculated using the USEPA RSL calculator with default residential exposure factor listed in the RSL Users Guide (HSRA-regulated substances only).
- Site-Specific values calculated using the USEPA RSL calculator with default residential exposure factor listed in the RSL Users Guide.
- EPA Maximum Contaminant Levels (MCLs).
- Site-specific background levels for each constituent were calculated as described in the document "*Statistical Analysis Method Certification, 40 CFR §257.93(f), Plant Bowen - Ash Pond 1 (AP-1)* " (Geosyntec, 2020).

[4] Rationale for classification of constituent as a COPI or exclusion as a COPI:

- ASL = Above respective screening level
- BSL = Below respective screening level

Definitions:

CAS = Chemical Abstract Service
CCR = Coal Combustion Residuals
COPI = Constituent of Potential Interest
EPA = United States Environmental Protection Agency
GA EPD= Georgia Environmental Protection Division
HSRA = [GA EPD] Hazardous Site Response Act
mg/L = milligram(s) per liter
RRS = [GA EPD] Risk Reduction Standard
RSL = [EPA] Regional Screening Level

Table 2
Groundwater Exposure Point Concentration Summary
Plant Bowen AP-1 Risk Evaluation Report
Plant Bowen, Cartersville, GA

CCR Rule Designation	Constituent	CAS No.	Detection Frequency	Maximum Concentration (mg/L)	Wells Included in 95% UCL Calculation	95% UCL[1] (mg/L)	Recommended UCL Method	Selected EPC[1] (mg/L)
Appendix IV	Cobalt	7440-48-4	7 / 15	0.0033	BGWC-39 & BGWC-41D	0.0010	95% KM (t) UCL	0.0010
	Molybdenum	7439-98-7	12 / 30	0.012	BGWA-6, BGWC-44D, & BGWC-50D	0.0035	95% KM (t) UCL	0.0035

Notes:

[1] Groundwater exposure point concentrations (EPCs) calculated in accordance with EPA, 2014. Memorandum for Determining Groundwater Exposure Point Concentrations, Supplemental Guidance. OSWER Directive 9283.1-42, February 2014. Located at: https://cfpub.epa.gov/ncea/risk/recordisplay.cfm?deid=236917.

Table 3
Downgradient Groundwater Refined Evaluation
Plant Bowen AP-1 Risk Evaluation Report
Plant Bowen, Cartersville, GA

CCR Rule Designation	Constituent	CAS No.	Detection Frequency	Exceedance Frequency[1]	Selected EPC (mg/L)	Screening Level (mg/L)	Source[2]	Site-Specific Background (mg/L)	COI? (Y/N)	Rationale[3]
Appendix IV	Cobalt	7440-48-4	7 / 15	0 / 15	0.0010	0.006	Site-Specific	0.005	N	BSL
	Molybdenum	7439-98-7	12 / 30	0 / 30	0.0035	0.1	Site-Specific	0.034	N	BSL

Notes:

[1] The exceedance frequency is based on the number of samples with detected concentrations that exceed the identified screening level.

[2] The screening values are the maximum value from the following sources:

- Type 2 RRSs calculated using the USEPA RSL calculator with default residential exposure factor listed in the RSL Users Guide (HSRA-regulated substances only).
- Site-Specific values calculated using the USEPA RSL calculator with default residential exposure factor listed in the RSL Users Guide.
- Site-specific background levels for each constituent were calculated as described in the document "*Statistical Analysis Method Certification, 40 CFR §257.93(f), Plant Bowen - Ash Pond 1 (AP-1)*" (Geosyntec, 2020).

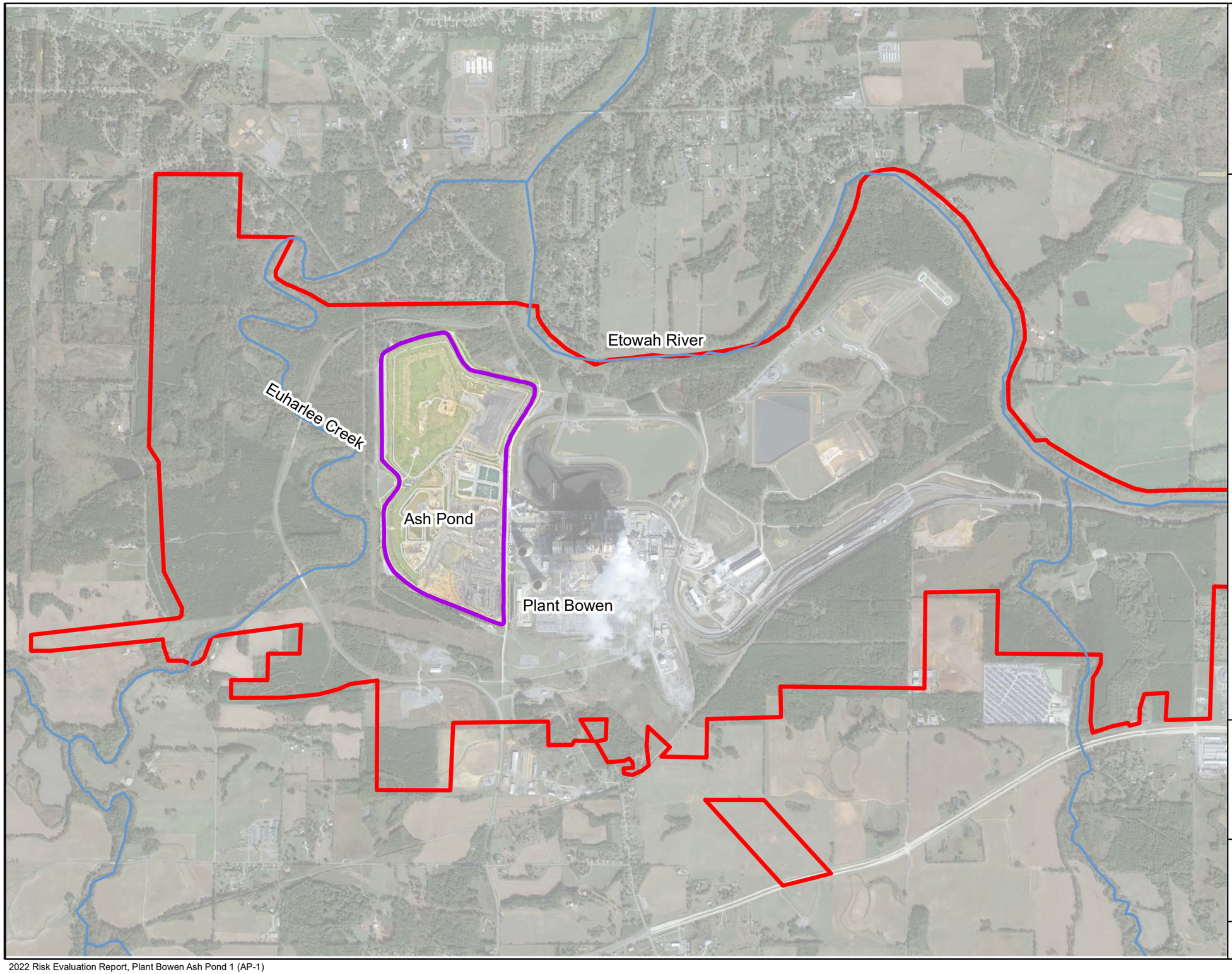
[3] Rationale for classification of constituent as a COPI or exclusion as a COPI:

- ASL = Above respective screening level
- BSL = Below respective screening level

Definitions:

CAS = Chemical Abstract Service
CCR = Coal Combustion Residuals
COPI = Constituent of Potential Concern
EPA = United States Environmental Protection Agency
RRS = Risk Reduction Standard

FIGURES



N

LEGEND

- Approximate Site Boundary
- Approximate AP-1
- River or Stream



Note:
1. Aerial photograph source: Google Earth Pro, November 2019 and Georgia Power Company, September 2022.

0 900 1,800 3,600 Feet

SITE LOCATION MAP

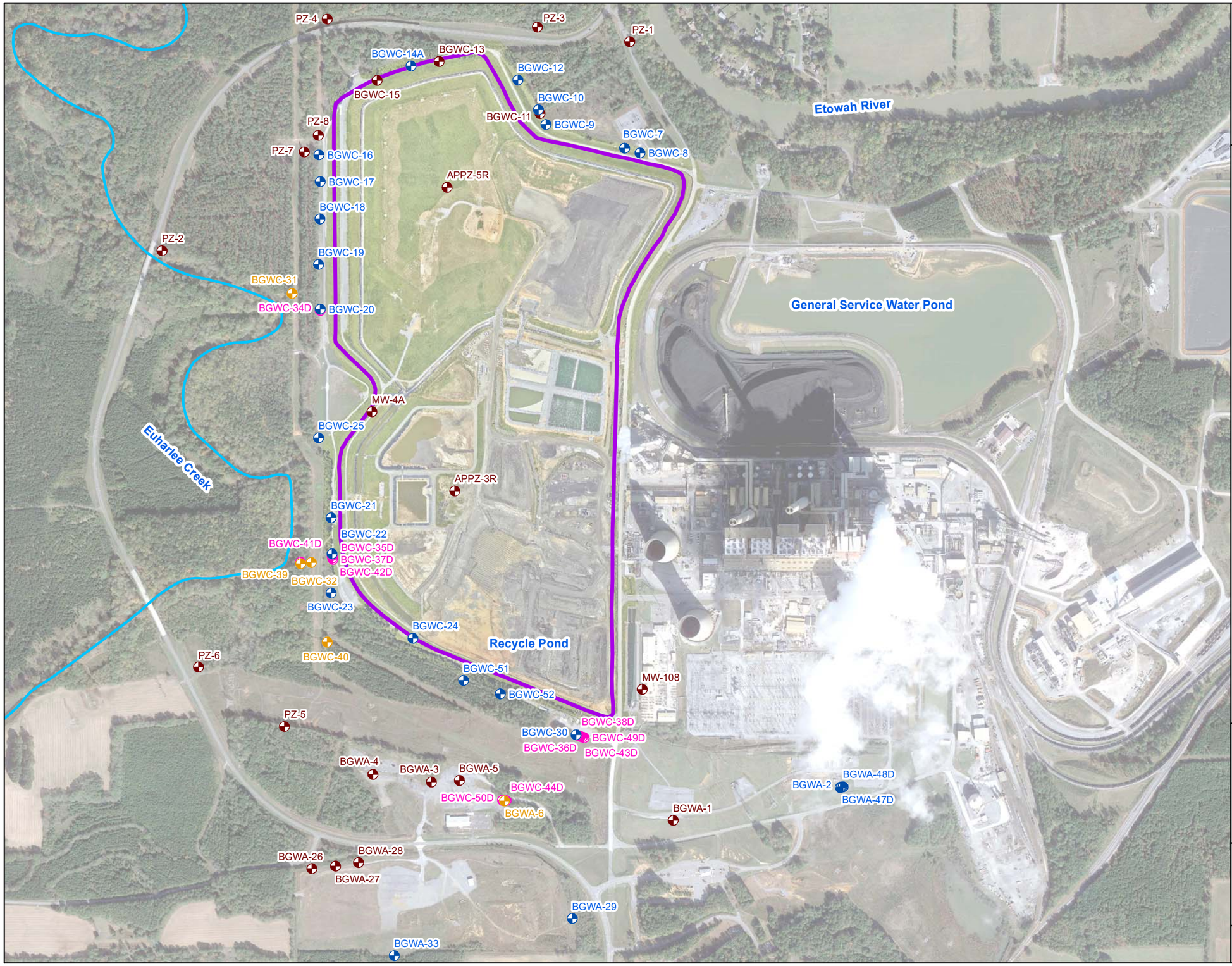
GEORGIA POWER
PLANT BOWEN AP-1
BARTOW COUNTY, GEORGIA

Prepared For: Georgia Power

Prepared By: Geosyntec consultants

KENNESAW, GA | JULY 2024

FIGURE 1



N

LEGEND

- Compliance Monitoring
- Horizontal Delineation Monitoring
- Vertical Delineation Monitoring
- Piezometer
- Euharlee Creek
- Approximate AP-1

Notes:
1. All wells and piezometers presented are screened within the weathered fractured bedrock.
2. Aerial photograph source: Google Earth Pro, November 2019 and Georgia Power Company, September 2022.

0 400 800 1,600
Feet

MONITORING WELL NETWORK MAP

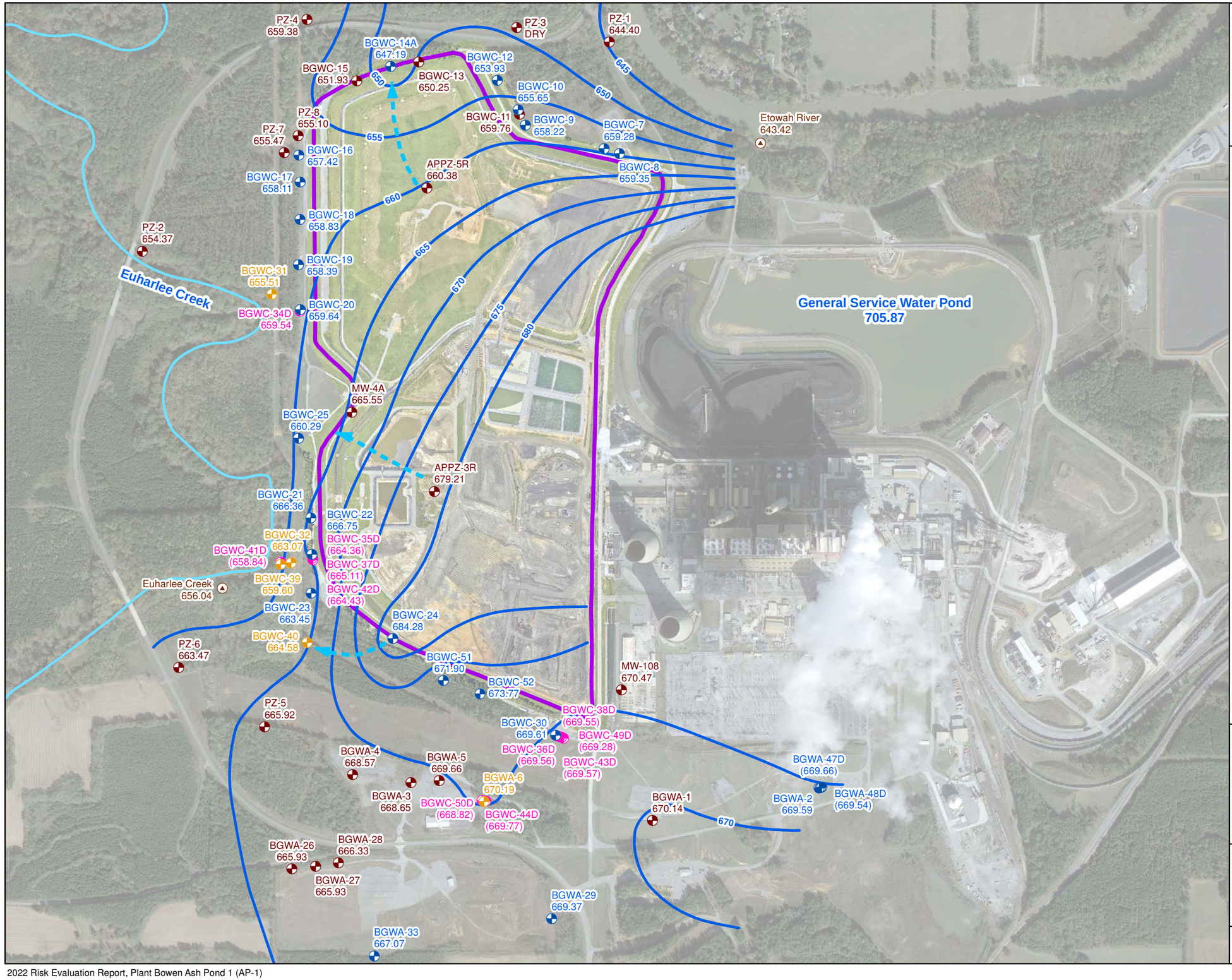
GEORGIA POWER
PLANT BOWEN AP-1
BARTOW COUNTY, GEORGIA

Prepared For: Georgia Power

Prepared By: Geosyntec consultants

KENNESAW, GA | JULY 2024

FIGURE 2



N

LEGEND

- Compliance Monitoring Well
- Horizontal Delineation Monitoring Well
- Vertical Delineation Monitoring Well
- Piezometer
- Surface Water Transducer
- Groundwater Elevation Contour
- Approximate Groundwater Flow Direction
- Euharlee Creek
- Approximate AP-1 Boundary

Notes:
1. Water level elevations recorded on July 25, 2022. Elevation provided in feet referenced to the North American Vertical Datum (NAVD) 88. The Recycle Pond is currently dry.
2. Surface water elevations of Etowah River, Euharlee Creek, and General Service Water Pond are recorded using In-Situ® Instruments, Inc.'s Win-Situ® reporting software, and Level Troll 500® pressure transducers.
3. The map shows only the wells/piezometers currently installed at the time of the gauging event.
4. Groundwater elevations in parentheses were not used in development of groundwater contours due to well being screened at a different elevation in the formation/aquifer.
5. Aerial photograph source: Google Earth Pro, November 2019 and Georgia Power Company, September 2022.

0 400 800 1,600
Feet

POTENTIOMETRIC SURFACE CONTOUR MAP - JULY 2022

GEORGIA POWER
PLANT BOWEN AP-1
BARTOW COUNTY, GEORGIA

Prepared For: Georgia Power

Prepared By: Geosyntec consultants

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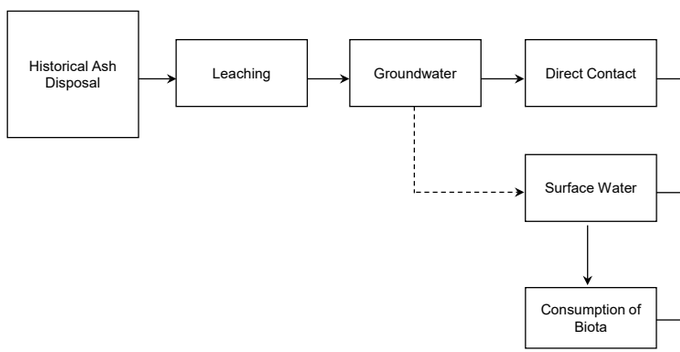
FIGURE 3



	HUMAN HEALTH AND ECOLOGICAL RISK EVALUATION RECEPTORS									
	HUMAN									ECOLOGICAL
	Current				Future					Current / Future
	On-Site	Off-Site		On- / Off-Site	On-Site		Off-Site		On- / Off-Site	On- / Off-Site
EXPOSURE ROUTE	Worker[1]	Worker[2]	Child and Adult Resident	Child and Adult Recreator[3]	Worker[1]	Child and Adult Resident	Worker[2]	Child and Adult Resident	Child and Adult Recreator	Aquatic Receptors[3]
Ingestion		○	●				○	●		
Dermal Contact		○	●				○	●		
Ingestion				○					○	○
Dermal Contact				○					○	○
Ingestion				○					○	

Legend

⇢ A conservative assumption for this assessment was made that groundwater from the site flows to the downgradient surface water.

● Indicates potentially complete pathway to receptors, which are evaluated quantitatively.

○ Indicates potentially complete pathway to receptors, which are evaluated qualitatively.

Footnotes

1. Industrial worker was considered to have no complete pathways because there are no wells on-site that are classified for use as potable wells. On-site construction workers would be expected to have little to no direct contact with on-site groundwater due to safety procedures outlined in their site-specific health and safety plans.
2. Off-site industrial/construction worker addressed through the evaluation of hypothetical off-site residential receptors as health-protective screening levels for residential receptors would be more conservative than industrial and construction worker screening levels.
3. Generalized receptor for ecological health risk evaluation.

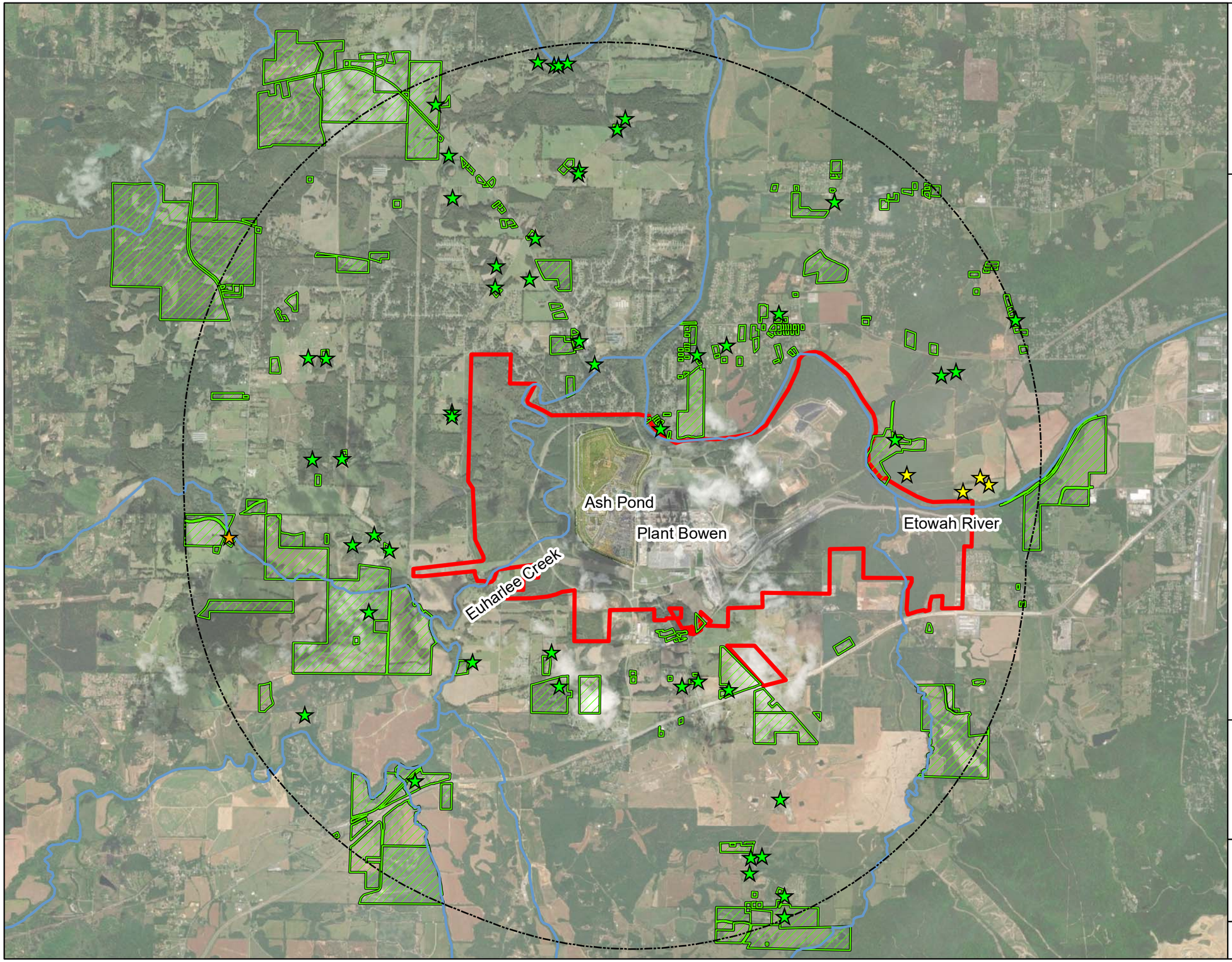
Conceptual Exposure Model

Georgia Power
Plant Bowen AP-1

Geosyntec consultants

Kennesaw, GA | JULY 2024

Figure 4



N

LEGEND

Off Site Wells

- Private Drinking Well
- Private Irrigation Well
- Spring
- River or Stream
- 3-Mile Radius
- Parcel Identified as Likely Having Well
- Approximate Site Boundary



Notes:
1. Aerial photograph source: Google Earth Pro, November 2019 and Georgia Power Company, September 2022.

0 0.5 1 2 Miles

OFF-SITE WELL SURVEY RESULTS

GEORGIA POWER
PLANT BOWEN AP-1
BARTOW COUNTY, GEORGIA

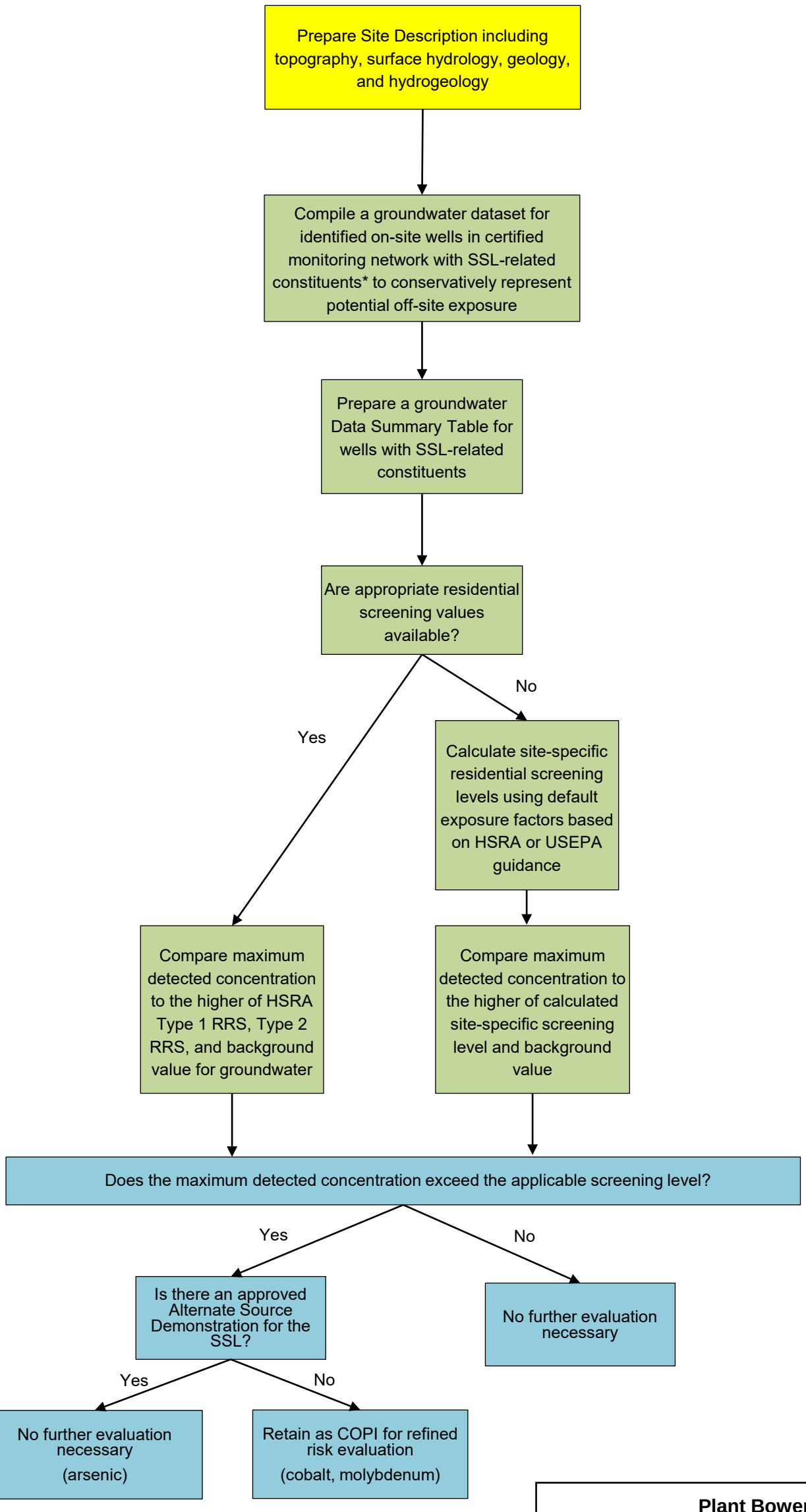
Prepared For: Georgia Power

Prepared By: Geosyntec consultants

KENNESAW, GA | JULY 2024

FIGURE 5

Initial Risk Screening Approach (Groundwater) for AP-1

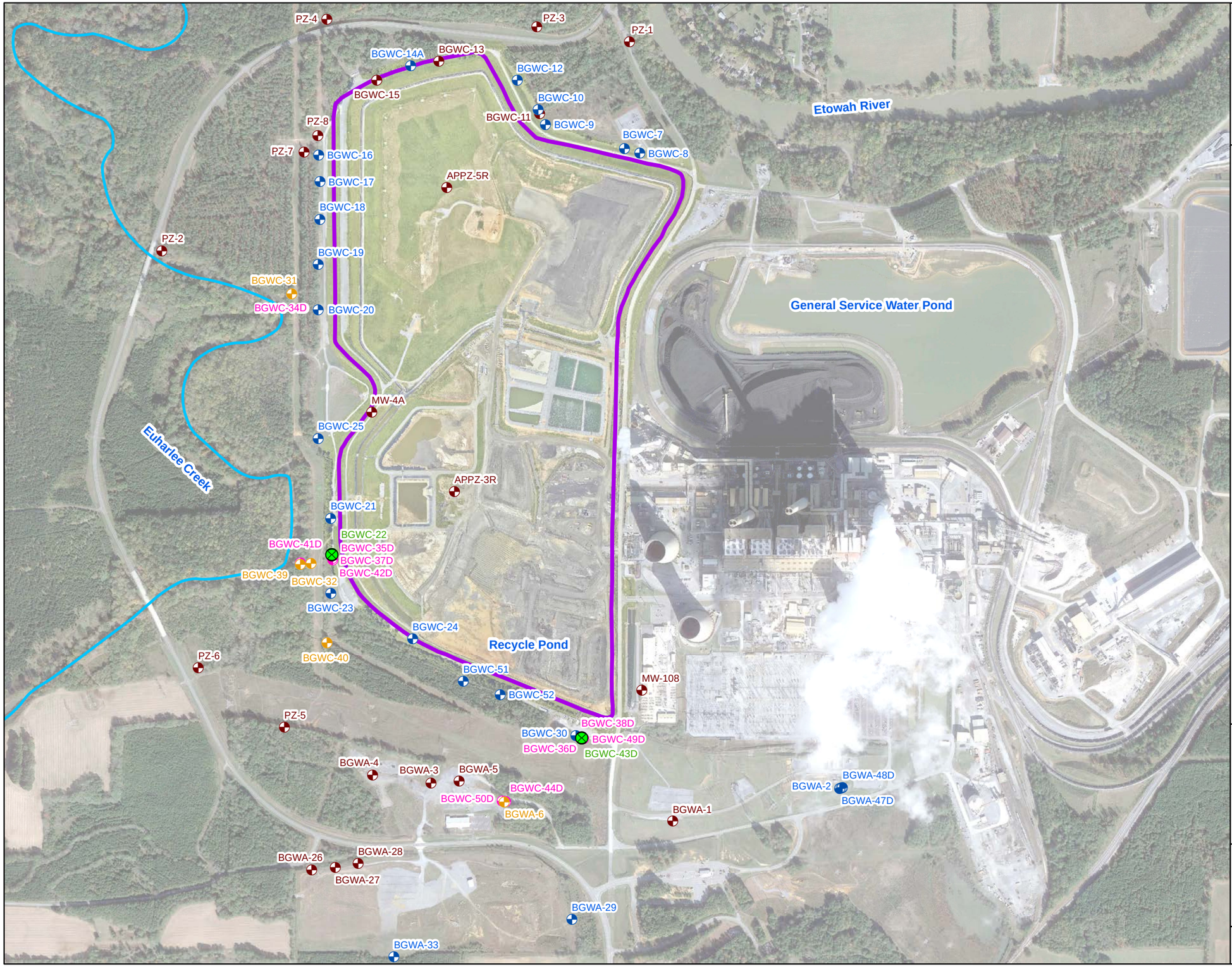


Notes:
* Initial screen evaluates wells at AP-1 with SSL-related constituents arsenic, cobalt, and molybdenum
SSL = Statistically Significant Level
COPI = Constituent of Potential Interest
HSRA = Hazardous Site Response Act
RRS = Risk Reduction Standard
USEPA = United States Environmental Protection Agency

Plant Bowen AP-1
Initial Groundwater Risk Screening Approach

Figure 6

JULY 2024



N

LEGEND

- Wells with SSL Related Constituents
- Compliance Monitoring Well
- Horizontal Delineation Monitoring Well
- Vertical Delineation Monitoring Well
- Piezometer
- Euharlee Creek
- Approximate AP-1 Boundary

Notes:
1. Cobalt Federal and State CCR Rules SSL-Related Constituent: BGWC-22.
2. Molybdenum Federal and State CCR Rules SSL-Related Constituent: BGWC-43D.
3. All wells and piezometers presented are screened within the weathered fractured bedrock.
4. Aerial photograph source: Google Earth Pro, November 2019 and Georgia Power Company, September 2022.

0 400 800 1,600 Feet

MONITORING WELLS INCLUDED IN RISK SCREEN

GEORGIA POWER
PLANT BOWEN AP-1
BARTOW COUNTY, GEORGIA

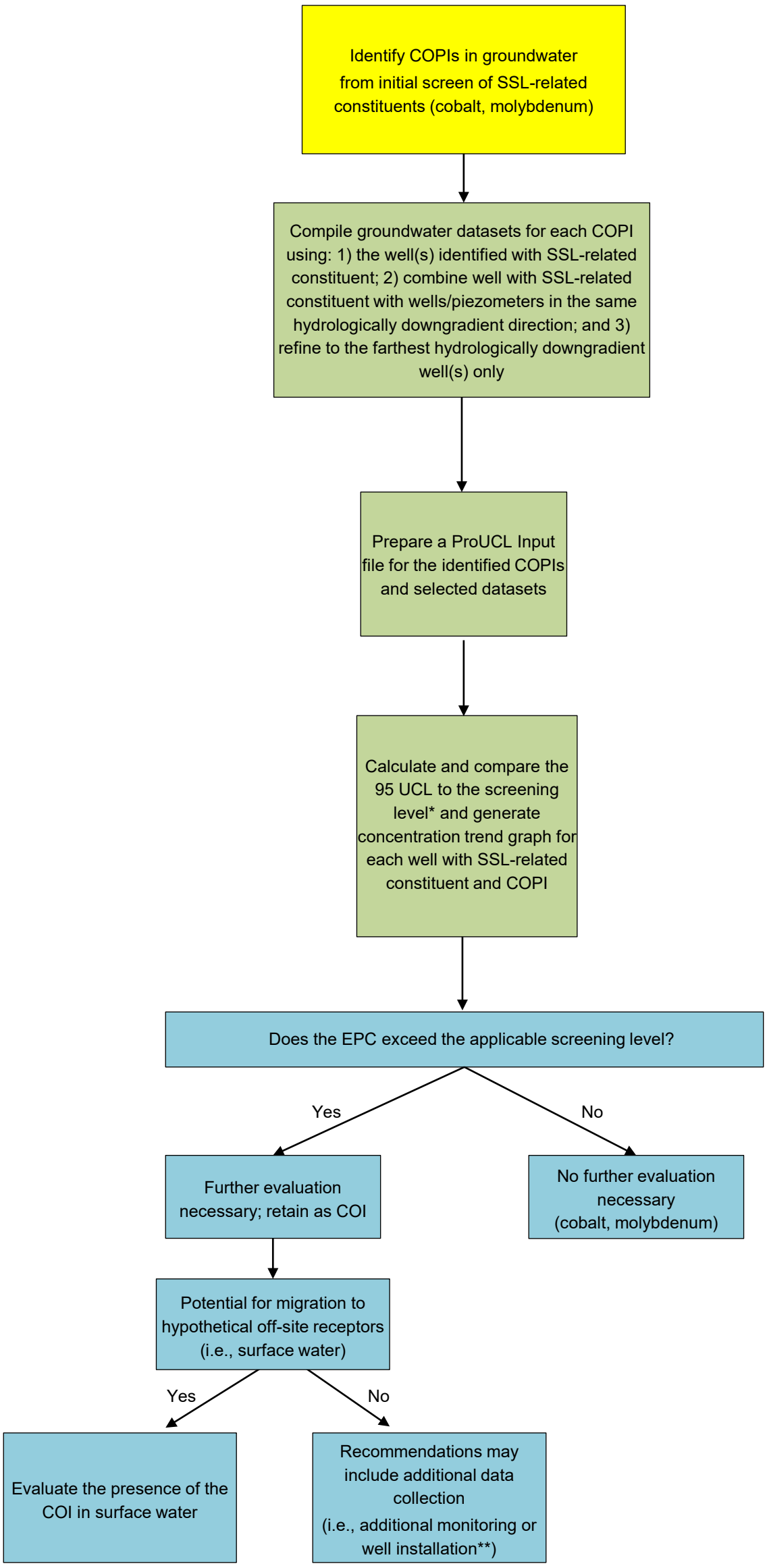
Prepared For: Georgia Power

Prepared By: Geosyntec consultants

KENNESAW, GA | JULY 2024

FIGURE 7

Approach for Refined Risk Evaluation (Groundwater) for AP-1



Notes:
*If the 95 UCL exceeds the maximum concentration, use the maximum as the EPC.
**This step is not necessary for AP-1
SSL = Statistically Significant Level
COPI = Constituent of Potential Interest
EPC = Exposure Point Concentration
UCL = Upper Confidence Limit
COI = Constituent of Interest

Plant Bowen AP-1
Refined Groundwater Risk Evaluation Approach

Figure 8

JULY 2024

APPENDIX A

Plant Bowen Well Survey (Off-Site)

Well Survey

Plant Bowen

Ash Pond (AP-1)

Euharlee, GA

Prepared for

Georgia Power Company

241 Ralph McGill Blvd., Atlanta, GA 30308

Prepared by

NewFields

1349 W. Peachtree Street, Suite 2000

Atlanta, GA 30309

March 5, 2020

Introduction

Plant Bowen is located at 317 Covered Bridge Rd, Euharlee, GA 30120. Plant Bowen operates a Coal Combustion Residual (CCR) Ash Pond (AP-1) located to the west of the plant. Newfields conducted a well survey of potential drinking water wells within a three-mile radius of the AP-1 ("Investigated Area"). The Investigated Area is shown on Figure 1.

As part of this survey, NewFields reviewed information from a number of Federal, State, and County records and online sources, as well as two windshield surveys of the Investigated Area. Information from each identified well was then compiled into a geographic information system (GIS) database.

Information Collection

This section summarizes the sources utilized to identify potential drinking water wells within the Investigated Area.

1. Federal Sources
    a. **United States Geological Survey (USGS).** USGS maintains an inventory database of wells sampled by a USGS-affiliated program for groundwater levels and/or water quality parameters at any time in the past.[1] Well information and coordinates were downloaded for the state of Georgia and compiled into the GIS database. Wells in this database in the Investigated Area are labelled 'human drinking water wells' or 'monitoring wells'. Many of the monitoring wells appear to be co-located with drinking water wells and may in fact be private drinking water wells utilized for monitoring purposes by USGS, and so were assumed to be likely drinking water wells in this survey. Some of these USGS monitoring wells may in fact be private drinking water wells utilized for monitoring purposes by USGS.
    b. **Safe Drinking Water Information System (SDWIS)**. This EPA database has listings of public water systems but does not have well location information. SDWIS information was used to help identify the suppliers of public water in the vicinity of the facility. The primary supplier of water in the vicinity is the Bartow County Water Department.

2. State Sources

    Georgia Environmental Protection Division (EPD)

    a. **Drinking Water Branch.** EPD Drinking Water Branch maintains records about municipal and industrial wells, whose presence or absence within a radius of a site can be ascertained by contacting the agency. An email was sent to Michael Gillis of EPD on October 23rd, 2019. Mr. Gillis confirmed there are no wells within the Investigated Area.
    b. Georgia Geologic Survey Hydrologic Study. In 1979, the Georgia Geologic Survey conducted a hydrologic study of Bartow, Cherokee, and Forsyth county to provide information to industries, counties, and land developers needed to develop new groundwater supplies as the counties grew. The survey located a representative sample of residential and farms wells to determine their depth and construction type. That survey identified several residential wells in the investigated area.

[1] http://waterdata.usgs.gov/ga/nwis/inventory?introduction

c. **Hazardous Site Inventory (HSI) files.** EPD maintains files for Hazardous Site Inventory files for site which are undergoing state-led corrective action. These files usually contain groundwater data and well surveys. There are no HSI sites within the Investigated Area.
d. **Hazardous Site Response Act (HSRA) Notifications.** EPD maintains non-HSI HSRA notification reports (i.e., notifications submitted after releases of reportable substances). NewFields reviewed reports associated with sites in Bartow County and scanned well surveys done for sites within a 5-mile radius of Plant Bowen. No wells were identified in the Investigated Area.

3. County Sources
    a. **Bartow County Health Department.** The Health Department maintains records of the permits for "on-site sewage management systems" (septic tanks). However, Bartow County does not maintain these records in a manner that is geographically searchable and so no wells could be identified using this source.
    b. **Bartow County Water Department.** The Water Department provided NewFields with a shapefile showing the waterlines in southwest Bartow County, including the dates of construction. Public water is available throughout the Investigated Area. Earliest lines in the area were built in 1972, and most later lines were built coinciding with new construction.
    c. **Bartow County Tax Assessor.** Bartow County GIS Analyst Melissa McClain-Lasebikan provided parcel shapefiles, which were joined to WinGAP parcel data supplied by Carolyn E. Dew with the Bartow County Tax Assessor's office. The tax assessor's data included improvement values for parcels (indicating the presence of a structure) and the year of construction. Parcels with structures built prior to 1972 were identified as potentially containing active or abandoned drinking water wells.

4. Windshield Surveys
    a. A windshield survey of the Investigated Area was conducted on October 9th, 2019. During the survey wells were visually identified and compiled into the GIS database. The majority of wells identified during the survey were near residences and are most likely drinking water wells. Some apparent wells were observed in close proximity to agricultural irrigation and were assumed to be irrigation wells.

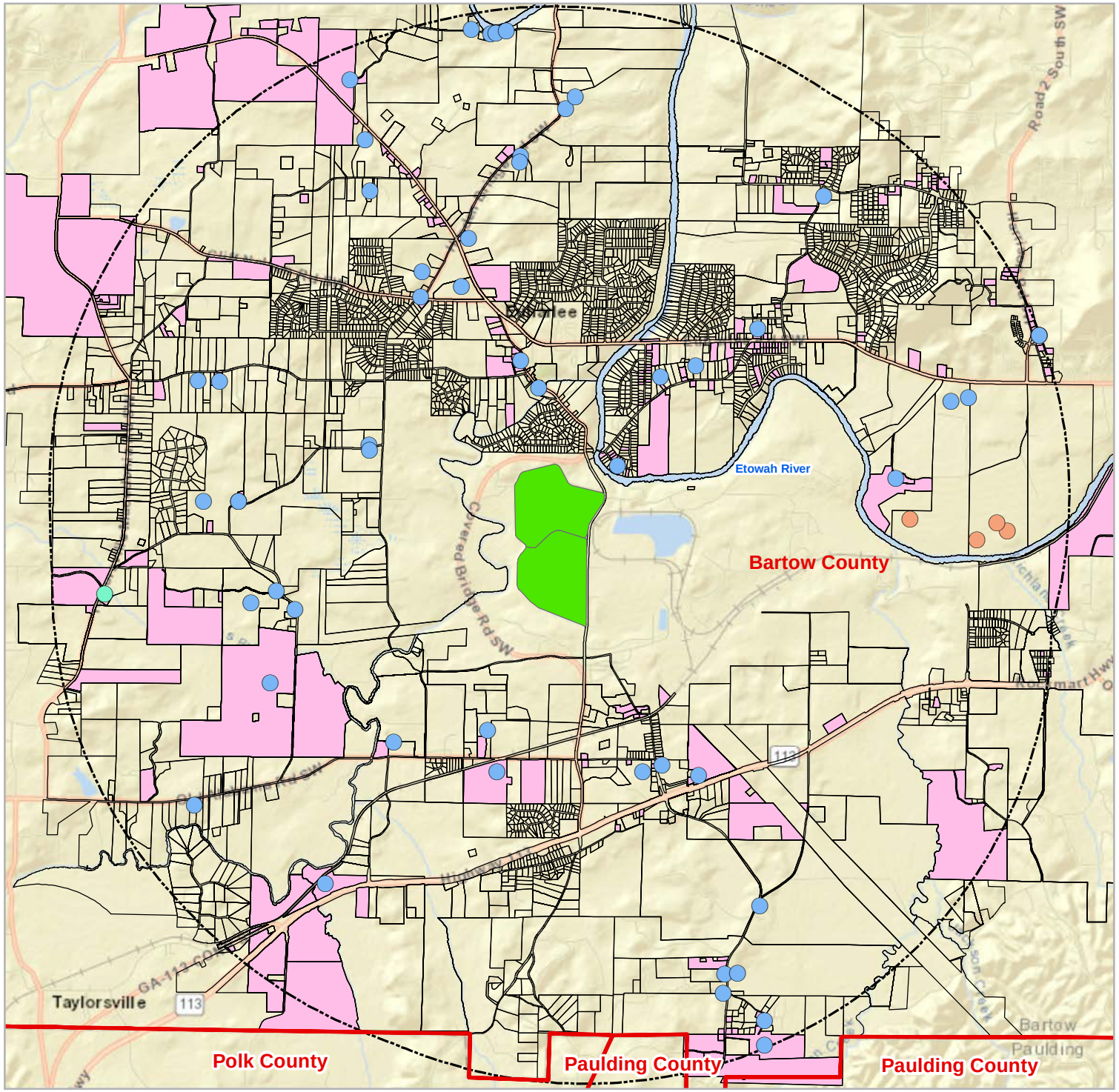
Summary

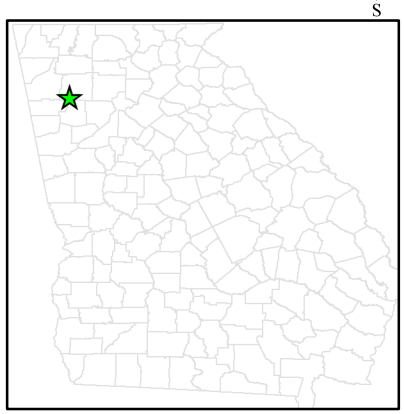
In addition to identifying specific wells from the above listed sources, NewFields used a combination of parcel data and information about the presence and age of public water infrastructure to identify parcels that most likely are using well water as their drinking water source or had drinking water wells at one time. Public water is available throughout the area. Parcels with structures older than the water lines were assumed to have a well. These wells may or may not be active for drinking water and/or irrigation. Parcels may be (or have been) sharing wells, so a well might not exist for each identified parcel.

Combining well data from all sources with parcel data, NewFields identified 218 parcels likely to be associated with an active or inactive well within the Investigated Area, and one parcel with a spring. The majority of these wells likely are likely private drinking water wells, but there are also some irrigation wells. There were no public drinking water wells with the Investigated Area.

Parcel data was used to identify 184 potential wells. Windshield surveys identified 27 potential wells. Sixteen (16) wells were identified using the GA DNR Hydrological Study. The USGS was used to identify eight wells and one spring. Many wells were identified by multiple sources.

Figure 1 shows points for identified wells. The shaded parcels on Figure 1 are parcels that were identified from parcel data as likely to contain wells. When viewed as a PDF file, the figure is interactive, and wells identified using different sources can be turned on and off.





N
W E
S

- Private Drinking Well
- Irrigation Well
- Spring
- County Line
- 3-Mile Radius
- Ash Pond 1
- Parcel
- Parcel identified as likely having a well

0 2,250 4,500 9,000 Feet

Title	Plant Bowen - Ash Pond - 1
Project	GPC Plants Georgia
NewFields	Two Midtown Plaza 1349 W. Peachtree St, #2000 Atlanta, Georgia 30309 Tel: 404-347-9050
Date	02/13/2020
Rev. No.	2
MXD	gpc_ccr_2019/agis
Figure No.	1

APPENDIX B
Data Used in Risk Evaluation

Appendix B
Groundwater Data
Plant Bowen AP-1 Risk Evaluation Report
Plant Bowen, Cartersville, GA

	Constituents	Cobalt	Molybdenum
	Units	mg/L	mg/L
Well/Peizometer	Sample Date		
BGWA-6	6/6/2016	<0.0025 ND	<0.015 ND
BGWA-6	8/10/2016	**0.0006 J**	<0.01 ND
BGWA-6	10/4/2016	<0.01 ND	<0.01 ND
BGWA-6	12/1/2016	<0.01 ND	<0.01 ND
BGWA-6	2/14/2017	<0.01 ND	<0.01 ND
BGWA-6	4/13/2017	<0.01 ND	<0.01 ND
BGWA-6	5/25/2017	<0.01 ND	<0.01 ND
BGWA-6	7/7/2017	<0.01 ND	<0.01 ND
BGWA-6	10/16/2018	**0.00094 J**	<0.01 ND
BGWA-6	4/2/2019	**0.00016 J**	**0.00026 J**
BGWA-6	9/23/2019	**0.00042 J**	<0.01 ND
BGWA-6	2/18/2020	**0.00032 J**	<0.01 ND
BGWA-6	3/19/2020	<0.005 ND	<0.01 ND
BGWA-6	9/23/2020	<0.00038 ND	<0.00069 ND
BGWA-6	2/18/2021	<0.00038 ND	<0.00069 ND
BGWA-6	3/31/2021	**0.00094 J**	**0.001 J**
BGWA-6	8/16/2021	**0.00052 J**	<0.00074 ND
BGWA-6	2/9/2022	**0.0005 J**	<0.00074 ND
BGWA-6	7/26/2022	<0.00039 ND	<0.00074 ND
BGWC-22	6/8/2016	**0.0079**	**0.07**
BGWC-22	8/18/2016	**0.0109**	**0.0758**
BGWC-22	10/10/2016	**0.011**	**0.0712**
BGWC-22	12/8/2016	**0.013**	**0.0682**
BGWC-22	2/17/2017	**0.0122**	**0.066**
BGWC-22	4/20/2017	**0.0116**	**0.0662**
BGWC-22	6/5/2017	**0.0112**	**0.071**
BGWC-22	7/19/2017	**0.0131**	**0.0703**
BGWC-22	3/29/2018	**0.016**	**0.056**
BGWC-22	6/14/2018	**0.017**	**0.059**
BGWC-22	10/22/2018	**0.021**	**0.055**
BGWC-22	3/1/2019	**0.017**	**0.039**
BGWC-22	4/3/2019	**0.019**	**0.039**
BGWC-22	5/2/2019	**0.023 J**	**0.043**
BGWC-22	9/27/2019	**0.027**	**0.045**
BGWC-22	2/25/2020	**0.017**	**0.039**
BGWC-22	3/20/2020	**0.02**	**0.039**
BGWC-22	9/24/2020	**0.041**	**0.04**
BGWC-22	2/19/2021	**0.032**	**0.046**
BGWC-22	3/29/2021	**0.029 J**	**0.045**
BGWC-22	7/19/2021	**0.039**	**0.044**

Appendix B
Groundwater Data
Plant Bowen AP-1 Risk Evaluation Report
Plant Bowen, Cartersville, GA

	Constituents	Cobalt	Molybdenum
	Units	mg/L	mg/L
Well/Peizometer	Sample Date		
BGWC-22	8/23/2021	**0.029**	**0.041**
BGWC-22	2/15/2022	**0.03**	**0.039**
BGWC-22	8/2/2022	**0.034**	**0.04**
BGWC-30	1/23/2017	**0.0012 J**	**0.0125**
BGWC-30	2/7/2017	**0.0008 J**	**0.0163**
BGWC-30	3/27/2017	**0.001 J**	**0.0157**
BGWC-30	4/17/2017	**0.0009 J**	**0.0178**
BGWC-30	5/22/2017	**0.0008 J**	**0.0208**
BGWC-30	6/5/2017	**0.0008 J**	**0.0191**
BGWC-30	7/11/2017	**0.0008 J**	**0.0218**
BGWC-30	8/23/2017	**0.0006 J**	**0.0218**
BGWC-30	3/26/2018	<0.01 ND	**0.014**
BGWC-30	6/15/2018	<0.01 ND	**0.012**
BGWC-30	10/22/2018	<0.01 ND	**0.01**
BGWC-30	3/1/2019	<0.01 ND	**0.011**
BGWC-30	4/2/2019	**0.00022 J**	**0.01**
BGWC-30	9/27/2019	<0.0025 ND	**0.0036 J**
BGWC-30	2/26/2020	<0.005 ND	**0.0023 J**
BGWC-30	3/23/2020	<0.005 ND	**0.0037 J**
BGWC-30	9/25/2020	<0.00038 ND	**0.0027 J**
BGWC-30	3/8/2021	<0.00038 ND	**0.0031 J**
BGWC-30	3/25/2021	<0.00038 ND	**0.0017 J**
BGWC-30	7/20/2021	<0.00038 ND	**0.0018 J**
BGWC-30	8/19/2021	**0.002 J**	**0.0032 J**
BGWC-30	2/14/2022	<0.00039 ND	**0.0048 J**
BGWC-30	8/1/2022	<0.00039 ND	**0.0047 J**
BGWC-32	10/22/2018	**0.0037 J**	**0.0038 J**
BGWC-32	4/5/2019	**0.011**	**0.0035 J**
BGWC-32	5/3/2019	**0.0078 J**	**0.0048 J**
BGWC-32	9/26/2019	**0.01**	**0.003 J**
BGWC-32	11/15/2019	**0.0077**	-
BGWC-32	2/27/2020	**0.00095 J**	**0.0032 J**
BGWC-32	3/24/2020	**0.0037 J**	**0.0031 J**
BGWC-32	9/25/2020	**0.0081**	**0.003 J**
BGWC-32	2/23/2021	**0.0062**	**0.0032 J**
BGWC-32	3/30/2021	**0.0014 J**	**0.0037 J**
BGWC-32	8/25/2021	**0.0018 J**	**0.0038 J**
BGWC-32	2/16/2022	<0.00039 ND	**0.0038 J**
BGWC-32	7/29/2022	**0.0022 J**	**0.0036 J**
BGWC-35D	10/22/2018	<0.01 ND	**0.033**

Appendix B
Groundwater Data
Plant Bowen AP-1 Risk Evaluation Report
Plant Bowen, Cartersville, GA

	Constituents	Cobalt	Molybdenum
	Units	mg/L	mg/L
Well/Peizometer	Sample Date		
BGWC-35D	11/29/2018	-	**0.03**
BGWC-35D	4/4/2019	**0.0011 J**	**0.03**
BGWC-35D	9/26/2019	**0.0019 J**	**0.033**
BGWC-35D	2/25/2020	**0.0011 J**	**0.026**
BGWC-35D	3/25/2020	**0.00046 J**	**0.022**
BGWC-35D	9/25/2020	**0.00082 J**	**0.024**
BGWC-35D	2/22/2021	**0.0011 J**	**0.035**
BGWC-35D	3/26/2021	**0.0015 J**	**0.036**
BGWC-35D	8/20/2021	**0.0018 J**	**0.04**
BGWC-35D	2/17/2022	**0.0024 J**	**0.039**
BGWC-35D	7/28/2022	**0.0038 J**	**0.036**
BGWC-36D	10/17/2018	**0.00057 J**	**0.017**
BGWC-36D	1/14/2019	-	**0.013**
BGWC-36D	4/2/2019	**0.0011 J**	**0.011**
BGWC-36D	9/27/2019	**0.0009 J**	**0.013**
BGWC-36D	2/26/2020	**0.00058 J**	**0.0032 J**
BGWC-36D	3/23/2020	**0.00049 J**	**0.0058 J**
BGWC-36D	9/28/2020	**0.00038 J**	**0.0084 J**
BGWC-36D	3/8/2021	<0.00038 ND	**0.0083 J**
BGWC-36D	3/25/2021	<0.00038 ND	**0.013**
BGWC-36D	8/23/2021	<0.00039 ND	**0.014**
BGWC-36D	2/14/2022	<0.00039 ND	**0.012**
BGWC-36D	7/29/2022	<0.00039 ND	**0.0095 J**
BGWC-37D	5/3/2019	-	**0.04**
BGWC-37D	2/25/2020	**0.0015 J**	**0.012**
BGWC-37D	3/24/2020	**0.0019 J**	**0.01**
BGWC-37D	9/25/2020	**0.0011 J**	**0.0088 J**
BGWC-37D	2/22/2021	**0.0007 J**	**0.012**
BGWC-37D	3/26/2021	**0.0011 J**	**0.017**
BGWC-37D	8/20/2021	**0.00088 J**	**0.016**
BGWC-37D	2/17/2022	**0.00056 J**	**0.016**
BGWC-37D	7/28/2022	<0.00039 ND	**0.0082 J**
BGWC-38D	5/2/2019	-	**0.11**
BGWC-38D	2/27/2020	**0.014**	**0.11**
BGWC-38D	3/24/2020	**0.0065**	**0.12**
BGWC-38D	9/2/2020	**0.0043 J**	**0.1**
BGWC-38D	3/9/2021	**0.0014 J**	**0.13**
BGWC-38D	3/29/2021	**0.0015 J**	**0.13**
BGWC-38D	8/19/2021	**0.004 J**	**0.076**
BGWC-38D	2/14/2022	**0.0019 J**	**0.097**

Appendix B
Groundwater Data
Plant Bowen AP-1 Risk Evaluation Report
Plant Bowen, Cartersville, GA

	Constituents	Cobalt	Molybdenum
	Units	mg/L	mg/L
Well/Peizometer	Sample Date		
BGWC-38D	8/2/2022	**0.0019 J**	**0.093**
BGWC-39	12/13/2019	**0.0033 J**	-
BGWC-39	2/27/2020	**0.00047 J**	**0.0039 J**
BGWC-39	3/24/2020	<0.005 ND	**0.0026 J**
BGWC-39	9/29/2020	**0.00061 J**	**0.01**
BGWC-39	2/22/2021	<0.00038 ND	**0.0076 J**
BGWC-39	3/31/2021	<0.00038 ND	**0.0062 J**
BGWC-39	8/24/2021	<0.00039 ND	**0.0076 J**
BGWC-39	2/16/2022	<0.00039 ND	**0.0052 J**
BGWC-39	8/2/2022	<0.00039 ND	**0.0062 J**
BGWC-41D	5/4/2020	-	<0.01 ND
BGWC-41D	9/2/2020	**0.00075 J**	**0.015**
BGWC-41D	2/22/2021	**0.00053 J**	**0.013**
BGWC-41D	3/31/2021	<0.00038 ND	**0.011**
BGWC-41D	8/24/2021	**0.00044 J**	**0.011**
BGWC-41D	2/15/2022	<0.00039 ND	**0.0087 J**
BGWC-41D	7/29/2022	**0.0004 J**	**0.008 J**
BGWC-42D	5/11/2020	-	**0.02**
BGWC-42D	5/20/2020	-	**0.021**
BGWC-42D	9/3/2020	<0.00038 ND	**0.018**
BGWC-42D	2/22/2021	<0.00038 ND	**0.0052 J**
BGWC-42D	4/1/2021	<0.00038 ND	**0.0059 J**
BGWC-42D	8/20/2021	<0.00039 ND	**0.013**
BGWC-42D	2/17/2022	<0.00039 ND	**0.0055 J**
BGWC-42D	7/28/2022	<0.00039 ND	**0.0092 J**
BGWC-43D	5/4/2020	-	**0.14**
BGWC-43D	5/20/2020	-	**0.16**
BGWC-43D	9/3/2020	**0.002 J**	**0.11**
BGWC-43D	3/8/2021	**0.0043 J**	**0.2**
BGWC-43D	3/29/2021	**0.0057**	**0.21**
BGWC-43D	7/20/2021	**0.0057**	**0.24**
BGWC-43D	8/23/2021	**0.0051**	**0.21**
BGWC-43D	2/15/2022	**0.0038 J**	**0.15**
BGWC-43D	8/1/2022	**0.0024 J**	**0.16**
BGWC-44D	5/4/2020	-	<0.01 ND
BGWC-44D	9/3/2020	<0.00038 ND	**0.0055 J**
BGWC-44D	2/18/2021	<0.00038 ND	**0.0062 J**
BGWC-44D	3/31/2021	<0.00038 ND	**0.0023 J**
BGWC-44D	8/18/2021	<0.00039 ND	**0.0041 J**
BGWC-44D	2/9/2022	<0.00039 ND	**0.0011 J**

Appendix B
Groundwater Data
Plant Bowen AP-1 Risk Evaluation Report
Plant Bowen, Cartersville, GA

	Constituents	Cobalt	Molybdenum
	Units	mg/L	mg/L
Well/Peizometer	Sample Date		
BGWC-44D	7/26/2022	<0.00039 ND	**0.012**
BGWC-49D	4/19/2021	**0.00079 J**	**0.0067 J**
BGWC-49D	8/24/2021	**0.001 J**	**0.0049 J**
BGWC-49D	2/17/2022	**0.00088 J**	**0.0056 J**
BGWC-49D	8/1/2022	**0.00065 J**	**0.0066 J**
BGWC-50D	4/19/2021	**0.0013 J**	**0.0043 J**
BGWC-50D	8/18/2021	**0.0016 J**	**0.0021 J**
BGWC-50D	2/9/2022	**0.00079 J**	**0.0032 J**
BGWC-50D	7/26/2022	**0.00072 J**	**0.0029 J**

Notes:
Bold = the constituent was detected in the sample.
< = Non-detect result; the reporting limit is presented
J = Estimated value; the presented value is below the reporting limit but above the method detection limit.
ND = Non-detect result; the reporting limit is presented
"-" = No analysis conducted.
mg/L milligrams(s) per liter

APPENDIX C

USEPA RSL Calculator Generated Residential Screening Levels

Appendix C
USEPA RSL Calculator Generated Residential Screening Levels
Plan Bowen AP-1 Risk Evaluation Report
Plant Bowen, Cartersville, GA

Variable	Value
THQ (target hazard quotient) unitless	1
TR (target risk) unitless	0.00001
LT (lifetime) years	70
K (volatilization factor of Andelman) L/m^3	0.5
I_{sc} (apparent thickness of stratum corneum) cm	0.001
ED_{res} (exposure duration - resident) years	26
ED_{res-c} (exposure duration - child) years	6
ED_{res-a} (exposure duration - adult) years	20
ED_{0-2} (mutagenic exposure duration first phase) years	2
ED_{2-6} (mutagenic exposure duration second phase) years	4
ED_{6-16} (mutagenic exposure duration third phase) years	10
ED_{16-26} (mutagenic exposure duration fourth phase) years	10
EF_{res} (exposure frequency) days/year	350
EF_{res-c} (exposure frequency - child) days/year	350
EF_{res-a} (exposure frequency - adult) days/year	350
EF_{0-2} (mutagenic exposure frequency first phase) days/year	350
EF_{2-6} (mutagenic exposure frequency second phase) days/year	350
EF_{6-16} (mutagenic exposure frequency third phase) days/year	350
EF_{16-26} (mutagenic exposure frequency fourth phase) days/year	350
$ET_{event-res-adj}$ (age-adjusted exposure time) hours/event	0.67077
$ET_{event-res-madj}$ (mutagenic age-adjusted exposure time) hours/event	0.67077
ET_{res} (exposure time) hours/day	24
ET_{res-c} (dermal exposure time - child) hours/event	0.54
ET_{res-a} (dermal exposure time - adult) hours/event	0.71
ET_{res-c} (inhalation exposure time - child) hours/day	24
ET_{res-a} (inhalation exposure time - adult) hours/day	24
ET_{0-2} (mutagenic inhalation exposure time first phase) hours/day	24
ET_{2-6} (mutagenic inhalation exposure time second phase) hours/day	24
ET_{6-16} (mutagenic inhalation exposure time third phase) hours/day	24
ET_{16-26} (mutagenic inhalation exposure time fourth phase) hours/day	24
ET_{0-2} (mutagenic dermal exposure time first phase) hours/event	0.54
ET_{2-6} (mutagenic dermal exposure time second phase) hours/event	0.54
ET_{6-16} (mutagenic dermal exposure time third phase) hours/event	0.71
ET_{16-26} (mutagenic dermal exposure time fourth phase) hours/event	0.71
BW_{res-a} (body weight - adult) kg	80
BW_{res-c} (body weight - child) kg	15
BW_{0-2} (mutagenic body weight) kg	15
BW_{2-6} (mutagenic body weight) kg	15
BW_{6-16} (mutagenic body weight) kg	80
BW_{16-26} (mutagenic body weight) kg	80
$IFW_{res-adj}$ (adjusted intake factor) L/kg	327.95
$IFW_{res-adj}$ (adjusted intake factor) L/kg	327.95
$IFWM_{res-adj}$ (mutagenic adjusted intake factor) L/kg	1019.9
$IFWM_{res-adj}$ (mutagenic adjusted intake factor) L/kg	1019.9
IRW_{res-c} (water intake rate - child) L/day	0.78
IRW_{res-a} (water intake rate - adult) L/day	2.5
IRW_{0-2} (mutagenic water intake rate) L/day	0.78
IRW_{2-6} (mutagenic water intake rate) L/day	0.78
IRW_{6-16} (mutagenic water intake rate) L/day	2.5
IRW_{16-26} (mutagenic water intake rate) L/day	2.5
EV_{res-a} (events - adult) per day	1
EV_{res-c} (events - child) per day	1
EV_{0-2} (mutagenic events) per day	1
EV_{2-6} (mutagenic events) per day	1
EV_{6-16} (mutagenic events) per day	1
EV_{16-26} (mutagenic events) per day	1
$DFW_{res-adj}$ (age-adjusted dermal factor) cm^2-event/kg	2610650
$DFWM_{res-adj}$ (mutagenic age-adjusted dermal factor) cm^2-event/kg	8191633
SA_{res-c} (skin surface area - child) cm^2	6365
SA_{res-a} (skin surface area - adult) cm^2	19652
SA_{0-2} (mutagenic skin surface area) cm^2	6365
SA_{2-6} (mutagenic skin surface area) cm^2	6365
SA_{6-16} (mutagenic skin surface area) cm^2	19652
SA_{16-26} (mutagenic skin surface area) cm^2	19652

Output generated 26OCT2022:10:53:41

Appendix C
USEPA RSL Calculator Generated Residential Screening Levels
Plant Bowen AP-1 Risk Evaluation Report
Plant Bowen, Cartersville, GA

Chemical	Cobalt	Molybdenum
CAS Number	7440-48-4	7439-98-7
Mutagen?	No	No
Volatile?	No	No
Chemical Type	Inorganics	Inorganics
SF_o(mg/kg-day) $^{-1}$	-	-
SF_oRef		
IUR(ug/m ^{3})$^{-1}$	0.009	-
IURRef	P	
RfD(mg/kg-day)	0.0003	0.005
RfDRef	PPRTV Current	IRIS
RfC(mg/m ^{3})	0.000006	0.002
RfCRef	PPRTV Current	ATSDR Final
GIABS	1	1
K_p (cm/hr)	0.0004	0.001
MW	58.93	95.94
B(unitless)	0.00118	0.00377
t^*(hr)	0.54	0.87
τ_{event}(hr/event)	0.225	0.362
FA(unitless)	1	1
In EPD?	Yes	Yes
$DA_{event\ (ca)}$	-	-
$DA_{event\ (nc\ child)}$	0.00737	0.147
$DA_{event\ (nc\ adult)}$	0.0127	0.0212
MCL(ug/L)	-	-
Ingestion SLTR=1E-05(ug/L)	-	-
Dermal SLTR=1E-05(ug/L)	-	-
Inhalation SLTR=1E-05(ug/L)	-	-
Carcinogenic SLTR=1E-05(ug/L)	-	-
Ingestion SLChildTHQ=1(ug/L)	6.02	100
Dermal SLChildTHQ=1(ug/L)	3410	22800
Inhalation SLChildTHQ=1(ug/L)	-	-
Noncarcinogenic SLChildTHI=1(ug/L)	6.01	99.8
Ingestion SLAdultTHQ=1(ug/L)	10	167
Dermal SLAdultTHQ=1(ug/L)	4480	29900
Inhalation SLAdultTHQ=1(ug/L)	-	-
Noncarcinogenic SLAdultTHI=1(ug/L)	9.99	166
ScreeningLevel(ug/L)	6.01E+00 nc	9.98E+01 nc

Notes

I = IRIS; P = PPRTV; O = OPP; A = ATSDR; C = Cal EPA; X = PPRTV Screening Level; H = HEAST; D = DWSHA; W = TEF applied; E = RPF applied; G = see user's guide; U = user provided; ca = cancer; nc = noncancer; * = where: nc SL < 100X ca SL; ** = where nc SL < 10X ca SL; SSL values are based on DAF=1; max = ceiling limit exceeded; sat = Csat exceeded.

APPENDIX D

Support for Refined Risk Evaluation

Appendix D-1

Exposure Point Concentration Calculation Results

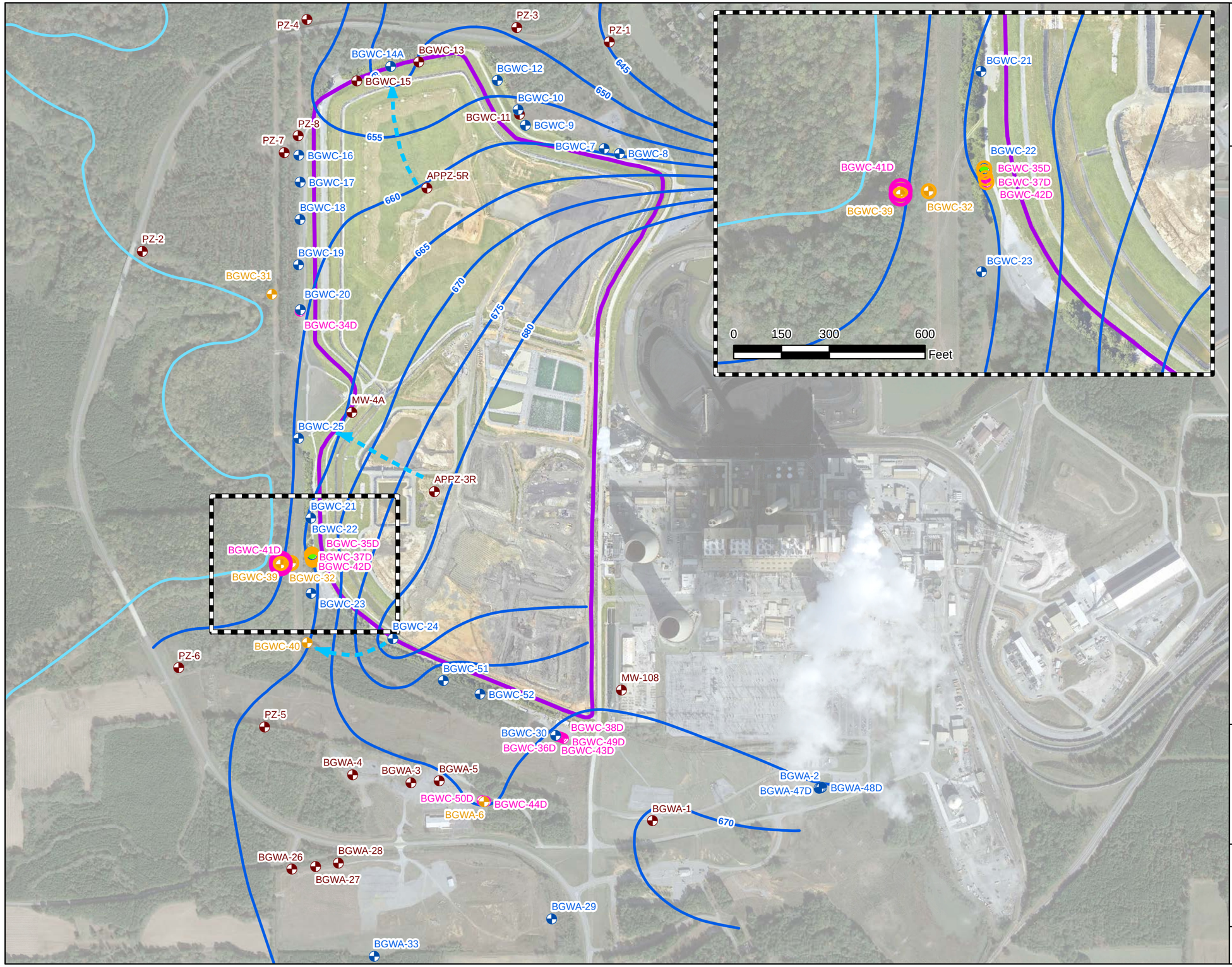
Appendix D
Appendix D-1
Groundwater Exposure Point Concentrations Summary
Plant Bowen AP-1 Risk Evaluation Report
Plant Bowen, Cartersville, GA

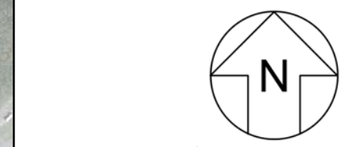
Constituent	Well IDs Included	Maximum Concentration (mg/L)	Detection Frequency	Exceedance Frequency	EPC Step 1 Individual Target Well(s) 2016-2022 (mg/L)	EPC Step 2 Target Well(s) & Downgradient Well(s) 2016-2022 (mg/L)	EPC Step 3 Farthest Downgradient Well(s) 2016-2022 (mg/L)
Cobalt	BGWC-22	0.041	24 / 24	23 / 24	0.024		
	BGWC-22 BGWC-32 BGWC-35D BGWC-37D BGWC-39 BGWC-41D BGWC-42D	0.041	60 / 77	24 / 77		0.010	
	BGWC-39 BGWC-41D	0.0033	7 / 15	0 / 15			0.0010
Molybdenum	BGWC-43D	0.24	9 / 9	9 / 9	0.20		
	BGWA-6 BGWC-30 BGWC-36D BGWC-38D BGWC-43D BGWC-44D BGWC-49D BGWC-50D	0.24	69 / 87	37 / 87		0.045	
	BGWA-6 BGWC-44D BGWC-50D	0.012	12 / 30	1 / 30			0.0035

Notes
Highlighted cells indicate the EPCs selected in the refined risk evaluation.
[1] EPCs calculated in accordance with USEPA, 2014. Memorandum for Determining Groundwater Exposure Point Concentrations, Supplemental Guidance. OSWER Directive 9283.1-42, February 2014. Located at https://cfpub.epa.gov/ncea/risk/recordisplay.cfm?deid=236917

Appendix D-2

Exposure Point Concentration Figures





LEGEND

- Compliance Monitoring Well
- Horizontal Delineation Monitoring Well
- Vertical Delineation Monitoring Well
- Piezometer
- Groundwater Elevation Contour
- Approximate Groundwater Flow Direction
- Euharlee Creek
- Approximate AP-1

Exposure Point Concentration Wells

- Step 1 Well
- Step 2 Well
- Step 3 Well

Notes:
1. Exposure Point Concentration (EPC).
2. EPC Step 1 - Individual Target Well(s) 2016-2022.
3. EPC Step 2 - Target Well(s) & Adjacent Well(s) & Downgradient Well(s) 2016-2022.
4. EPC Step 3 - Farthest Downgradient Well(s) 2016-2022.
5. Water elevation contours are based on measurements shown on Figure 3. Elevation provided in feet referenced to the North American Vertical Datum (NAVD) 88.
6. Aerial photograph source: Google Earth Pro, November 2019 and Georgia Power Company, September 2022.

0 400 800 1,600 Feet

EXPOSURE POINT CONCENTRATION MAP COBALT

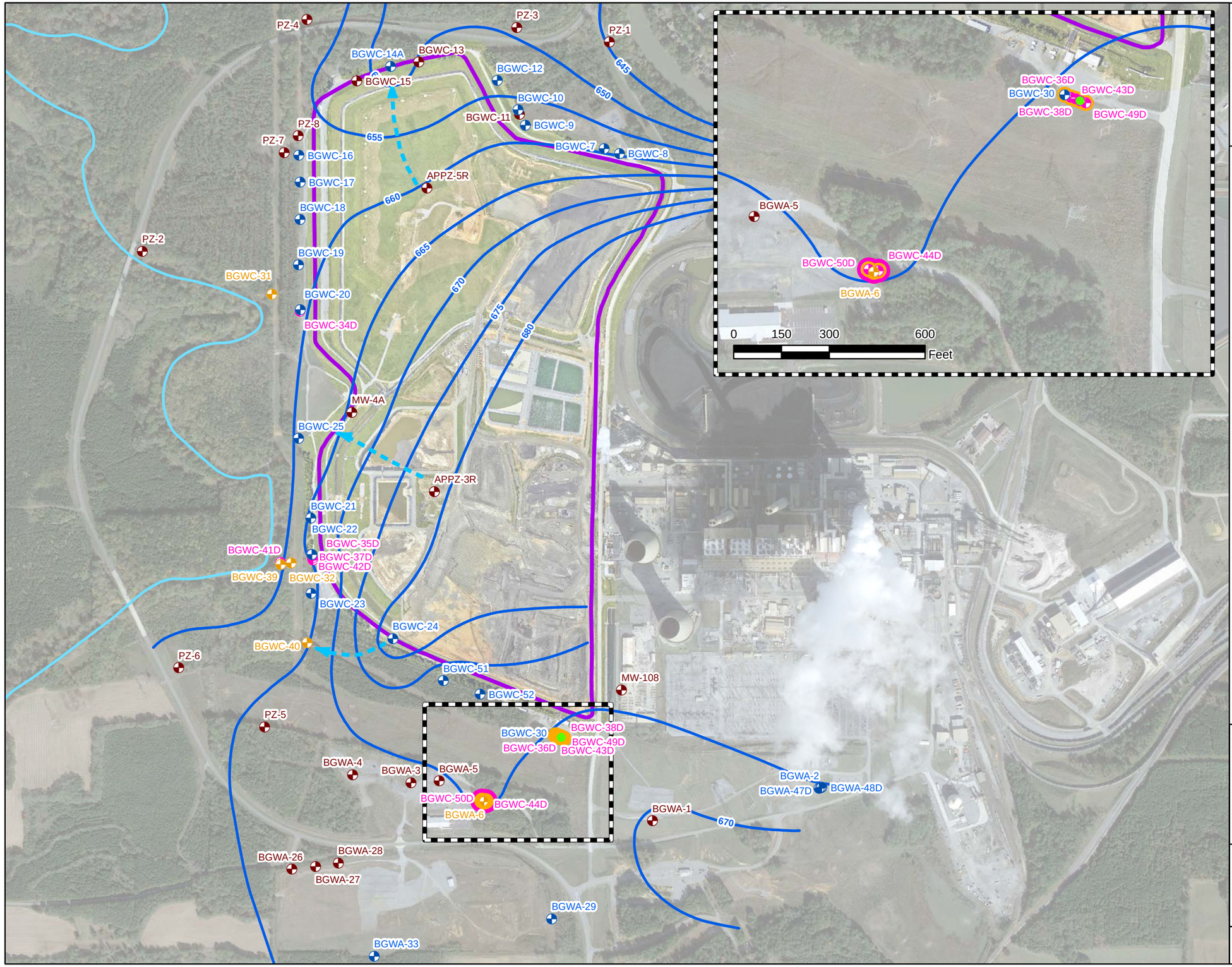
GEORGIA POWER
PLANT BOWEN AP-1
BARTOW COUNTY, GEORGIA

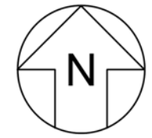
Prepared For: Georgia Power

Prepared By: Geosyntec consultants

KENNESAW, GA | JULY 2024

FIGURE D-2a





LEGEND

- Compliance Monitoring Well
- Horizontal Delineation Monitoring Well
- Vertical Delineation Monitoring Well
- Piezometer
- Groundwater Elevation Contour
- Approximate Groundwater Flow Direction
- Euharlee Creek
- Approximate AP-1

Exposure Point Concentration Wells

- Step 1 Well
- Step 2 Well
- Step 3 Well

Notes:
1. Exposure Point Concentration (EPC).
2. EPC Step 1 - Individual Target Well(s) 2016-2022.
3. EPC Step 2 - Target Well(s) & Adjacent Well(s) & Downgradient Well(s) 2016-2022.
4. EPC Step 3 - Farthest Downgradient Well(s) 2016-2022.
5. Water elevation contours are based on measurements shown on Figure 3. Elevation provided in feet referenced to the North American Vertical Datum (NAVD) 88.
6. Aerial photograph source: Google Earth Pro, November 2019 and Georgia Power Company, September 2022.

0 400 800 1,600 Feet

EXPOSURE POINT CONCENTRATION MAP MOLYBDENUM

GEORGIA POWER
PLANT BOWEN AP-1
BARTOW COUNTY, GEORGIA

Prepared For: Georgia Power

Prepared By: Geosyntec consultants

KENNESAW, GA | JULY 2024

FIGURE D-2b

Appendix D-3

ProUCL Input / Output Files

Appendix D
Appendix D-3
ProUCL Input
Plant Bowen AP-1 Risk Evaluation Report
Plant Bowen, Cartersville, GA

Step 1 EPC Inputs				Step 2 EPC Inputs				Step 3 EPC Inputs			
Step1_Cobalt	D_Step1_Cobalt	Step1_Molybdenum	D_Step1_Molybdenum	Step2_Cobalt	D_Step2_Cobalt	Step2_Molybdenum	D_Step2_Molybdenum	Step3_Cobalt	D_Step3_Cobalt	Step3_Molybdenum	D_Step3_Molybdenum
0.0079	1	0.14	1	0.0079	1	0.015	0	0.0033	1	0.015	0
0.0109	1	0.16	1	0.0109	1	0.01	0	0.00047	1	0.01	0
0.011	1	0.11	1	0.011	1	0.01	0	0.005	0	0.01	0
0.013	1	0.2	1	0.013	1	0.01	0	0.00061	1	0.01	0
0.0122	1	0.21	1	0.0122	1	0.01	0	0.00038	0	0.01	0
0.0116	1	0.24	1	0.0116	1	0.01	0	0.00038	0	0.01	0
0.0112	1	0.21	1	0.0112	1	0.01	0	0.00039	0	0.01	0
0.0131	1	0.15	1	0.0131	1	0.01	0	0.00039	0	0.01	0
0.016	1	0.16	1	0.016	1	0.01	0	0.00039	0	0.01	0
0.017	1			0.017	1	0.00026	1	0.00075	1	0.00026	1
0.021	1			0.021	1	0.01	0	0.00053	1	0.01	0
0.017	1			0.017	1	0.01	0	0.00038	0	0.01	0
0.019	1			0.019	1	0.01	0	0.00044	1	0.01	0
0.023	1			0.023	1	0.00069	0	0.00039	0	0.00069	0
0.027	1			0.027	1	0.00069	0	0.0004	1	0.00069	0
0.017	1			0.017	1	0.001	1			0.001	1
0.02	1			0.02	1	0.00074	0			0.00074	0
0.041	1			0.041	1	0.00074	0			0.00074	0
0.032	1			0.032	1	0.00074	0			0.00074	0
0.029	1			0.029	1	0.0125	1			0.01	0
0.039	1			0.039	1	0.0163	1			0.0055	1
0.029	1			0.029	1	0.0157	1			0.0062	1
0.03	1			0.03	1	0.0178	1			0.0023	1
0.034	1			0.034	1	0.0208	1			0.0041	1
				0.0037	1	0.0191	1			0.0011	1
				0.011	1	0.0218	1			0.012	1
				0.0078	1	0.0218	1			0.0043	1
				0.01	1	0.014	1			0.0021	1
				0.0077	1	0.012	1			0.0032	1
				0.00095	1	0.01	1			0.0029	1
				0.0037	1	0.011	1				
				0.0081	1	0.01	1				
				0.0062	1	0.0036	1				
				0.0014	1	0.0023	1				
				0.0018	1	0.0037	1				
				0.00039	0	0.0027	1				
				0.0022	1	0.0031	1				
				0.01	0	0.0017	1				
				0.0011	1	0.0018	1				
				0.0019	1	0.0032	1				
				0.0011	1	0.0048	1				
				0.00046	1	0.0047	1				
				0.00082	1	0.017	1				
				0.0011	1	0.013	1				
				0.0015	1	0.011	1				
				0.0018	1	0.013	1				
				0.0024	1	0.0032	1				
				0.0038	1	0.0058	1				
				0.0015	1	0.0084	1				
				0.0019	1	0.0083	1				
				0.0011	1	0.013	1				
				0.0007	1	0.014	1				
				0.0011	1	0.012	1				
				0.00088	1	0.0095	1				
				0.00056	1	0.11	1				

Appendix D
Appendix D-3
ProUCL Input
Plant Bowen AP-1 Risk Evaluation Report
Plant Bowen, Cartersville, GA

Step 1 EPC Inputs				Step 2 EPC Inputs				Step 3 EPC Inputs			
Step1_Cobalt	D_Step1_Cobalt	Step1_Molybdenum	D_Step1_Molybdenum	Step2_Cobalt	D_Step2_Cobalt	Step2_Molybdenum	D_Step2_Molybdenum	Step3_Cobalt	D_Step3_Cobalt	Step3_Molybdenum	D_Step3_Molybdenum
				0.00039	0	0.11	1				
				0.0033	1	0.12	1				
				0.00047	1	0.1	1				
				0.005	0	0.13	1				
				0.00061	1	0.13	1				
				0.00038	0	0.076	1				
				0.00038	0	0.097	1				
				0.00039	0	0.093	1				
				0.00039	0	0.14	1				
				0.00039	0	0.16	1				
				0.00075	1	0.11	1				
				0.00053	1	0.2	1				
				0.00038	0	0.21	1				
				0.00044	1	0.24	1				
				0.00039	0	0.21	1				
				0.0004	1	0.15	1				
				0.00038	0	0.16	1				
				0.00038	0	0.01	0				
				0.00038	0	0.0055	1				
				0.00039	0	0.0062	1				
				0.00039	0	0.0023	1				
				0.00039	0	0.0041	1				
						0.0011	1				
						0.012	1				
						0.0067	1				
						0.0049	1				
						0.0056	1				
						0.0066	1				
						0.0043	1				
						0.0021	1				
						0.0032	1				
						0.0029	1				

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.2 10/24/2022 12:44:39 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Step1_Cobalt

General Statistics

Total Number of Observations	24	Number of Distinct Observations	21
		Number of Missing Observations	0
Minimum	0.0079	Mean	0.0209
Maximum	0.041	Median	0.018
SD	0.00956	Std. Error of Mean	0.00195
Coefficient of Variation	0.457	Skewness	0.642

Normal GOF Test

Shapiro Wilk Test Statistic	0.922	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.884	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.159	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.205	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.0243	95% Adjusted-CLT UCL (Chen-1995)	0.0244
		95% Modified-t UCL (Johnson-1978)	0.0243

Gamma GOF Test

A-D Test Statistic	0.446	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.746	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.13	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.178	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	5.129	k star (bias corrected MLE)	4.515
Theta hat (MLE)	0.00408	Theta star (bias corrected MLE)	0.00463
nu hat (MLE)	246.2	nu star (bias corrected)	216.7
MLE Mean (bias corrected)	0.0209	MLE Sd (bias corrected)	0.00984
		Approximate Chi Square Value (0.05)	183.7
Adjusted Level of Significance	0.0392	Adjusted Chi Square Value	181.5

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.0247	95% Adjusted Gamma UCL	0.025

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.959	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.93	Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.12	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.162	Data appear Lognormal at 10% Significance Level	

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	-4.841	Mean of logged Data	-3.968
Maximum of Logged Data	-3.194	SD of logged Data	0.462

Assuming Lognormal Distribution

95% H-UCL	0.0254	90% Chebyshev (MVUE) UCL	0.0271
95% Chebyshev (MVUE) UCL	0.0298	97.5% Chebyshev (MVUE) UCL	0.0337
99% Chebyshev (MVUE) UCL	0.0412		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.0241	95% BCA Bootstrap UCL	0.0244
95% Standard Bootstrap UCL	0.0241	95% Bootstrap-t UCL	0.0247
95% Hall's Bootstrap UCL	0.0244	95% Percentile Bootstrap UCL	0.0242
90% Chebyshev(Mean, Sd) UCL	0.0268	95% Chebyshev(Mean, Sd) UCL	0.0294
97.5% Chebyshev(Mean, Sd) UCL	0.0331	99% Chebyshev(Mean, Sd) UCL	0.0403

Suggested UCL to Use

95% Student's-t UCL	0.0243

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Step1_Molybdenum

General Statistics

Total Number of Observations	9	Number of Distinct Observations	7
		Number of Missing Observations	0
Minimum	0.11	Mean	0.176
Maximum	0.24	Median	0.16
SD	0.0416	Std. Error of Mean	0.0139
Coefficient of Variation	0.237	Skewness	0.0293

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,
refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,
but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).
The Chebyshev UCL often results in gross overestimates of the mean.
Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test

Shapiro Wilk Test Statistic	0.955	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.764	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.201	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.316	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.201	95% Adjusted-CLT UCL (Chen-1995)	0.198
		95% Modified-t UCL (Johnson-1978)	0.201

Gamma GOF Test

A-D Test Statistic	0.306	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.721	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.19	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.279	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics

k hat (MLE)	19.29	k star (bias corrected MLE)	12.93
Theta hat (MLE)	0.0091	Theta star (bias corrected MLE)	0.0136
nu hat (MLE)	347.2	nu star (bias corrected)	232.8
MLE Mean (bias corrected)	0.176	MLE Sd (bias corrected)	0.0488
		Approximate Chi Square Value (0.05)	198.5
Adjusted Level of Significance	0.0231	Adjusted Chi Square Value	191.8

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.206	95% Adjusted Gamma UCL	0.213

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.95	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk Critical Value	0.859	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.182	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.252	Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal Statistics

Minimum of Logged Data	-2.207	Mean of logged Data	-1.766
Maximum of Logged Data	-1.427	SD of logged Data	0.246

Assuming Lognormal Distribution

95% H-UCL	0.209	90% Chebyshev (MVUE) UCL	0.219
95% Chebyshev (MVUE) UCL	0.239	97.5% Chebyshev (MVUE) UCL	0.266
99% Chebyshev (MVUE) UCL	0.32		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.198	95% BCA Bootstrap UCL	0.198
95% Standard Bootstrap UCL	0.197	95% Bootstrap-t UCL	0.203
95% Hall's Bootstrap UCL	0.199	95% Percentile Bootstrap UCL	0.198
90% Chebyshev(Mean, Sd) UCL	0.217	95% Chebyshev(Mean, Sd) UCL	0.236
97.5% Chebyshev(Mean, Sd) UCL	0.262	99% Chebyshev(Mean, Sd) UCL	0.313

Suggested UCL to Use

95% Student's-t UCL	0.201

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Step2_Cobalt

General Statistics

Total Number of Observations	77	Number of Distinct Observations	51
Number of Detects	60	Number of Non-Detects	17
Number of Distinct Detects	48	Number of Distinct Non-Detects	4
Minimum Detect	4.0000E-4	Minimum Non-Detect	3.8000E-4
Maximum Detect	0.041	Maximum Non-Detect	0.01
Variance Detects	1.2212E-4	Percent Non-Detects	22.08%
Mean Detects	0.00994	SD Detects	0.0111
Median Detects	0.005	CV Detects	1.111
Skewness Detects	1.216	Kurtosis Detects	0.568
Mean of Logged Detects	-5.438	SD of Logged Detects	1.449

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.808	**Normal GOF Test on Detected Observations Only**
1% Shapiro Wilk P Value	2.672E-10	Detected Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.211	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.132	Detected Data Not Normal at 1% Significance Level

Detected Data Not Normal at 1% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.00786	KM Standard Error of Mean	0.0012
90KM SD	0.0104	95% KM (BCA) UCL	0.00988
95% KM (t) UCL	0.00986	95% KM (Percentile Bootstrap) UCL	0.00985
95% KM (z) UCL	0.00983	95% KM Bootstrap t UCL	0.0102
90% KM Chebyshev UCL	0.0115	95% KM Chebyshev UCL	0.0131
97.5% KM Chebyshev UCL	0.0154	99% KM Chebyshev UCL	0.0198

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.513	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.794	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.154	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.119	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.726	k star (bias corrected MLE)	0.701
Theta hat (MLE)	0.0137	Theta star (bias corrected MLE)	0.0142
nu hat (MLE)	87.17	nu star (bias corrected)	84.14
Mean (detects)	0.00994		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	4.0000E-4	Mean	0.00996
Maximum	0.041	Median	0.01
SD	0.00974	CV	0.978
k hat (MLE)	0.906	k star (bias corrected MLE)	0.879
Theta hat (MLE)	0.011	Theta star (bias corrected MLE)	0.0113
nu hat (MLE)	139.5	nu star (bias corrected)	135.4
Adjusted Level of Significance (β)	0.0469		
Approximate Chi Square Value (135.38, α)	109.5	Adjusted Chi Square Value (135.38, β)	109.1
95% Gamma Approximate UCL	0.0123	95% Gamma Adjusted UCL	0.0124

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.00786	SD (KM)	0.0104
Variance (KM)	1.0901E-4	SE of Mean (KM)	0.0012
k hat (KM)	0.567	k star (KM)	0.553
nu hat (KM)	87.28	nu star (KM)	85.21
theta hat (KM)	0.0139	theta star (KM)	0.0142
80% gamma percentile (KM)	0.0129	90% gamma percentile (KM)	0.0208
95% gamma percentile (KM)	0.0291	99% gamma percentile (KM)	0.0494

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (85.21, α)	64.93	Adjusted Chi Square Value (85.21, β)	64.6
95% KM Approximate Gamma UCL	0.0103	95% KM Adjusted Gamma UCL	0.0104

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Approximate Test Statistic	0.907	**Shapiro Wilk GOF Test**
10% Shapiro Wilk P Value	1.0074E-4	Detected Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.137	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.104	Detected Data Not Lognormal at 10% Significance Level

Detected Data Not Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.00781	Mean in Log Scale	-6.105
SD in Original Scale	0.0105	SD in Log Scale	1.835
95% t UCL (assumes normality of ROS data)	0.00981	95% Percentile Bootstrap UCL	0.00976
95% BCA Bootstrap UCL	0.00985	95% Bootstrap t UCL	0.01
95% H-UCL (Log ROS)	0.0237		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-5.954	KM Geo Mean	0.0026
KM SD (logged)	1.608	95% Critical H Value (KM-Log)	2.936
KM Standard Error of Mean (logged)	0.185	95% H-UCL (KM -Log)	0.0162
KM SD (logged)	1.608	95% Critical H Value (KM-Log)	2.936
KM Standard Error of Mean (logged)	0.185		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.00788	Mean in Log Scale	-6.051
SD in Original Scale	0.0105	SD in Log Scale	1.78
95% t UCL (Assumes normality)	0.00988	95% H-Stat UCL	0.0219

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Suggested UCL to Use

95% KM (t) UCL	0.00986

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.

Please verify the data were collected from random locations.

If the data were collected using judgmental or other non-random methods,

then contact a statistician to correctly calculate UCLs.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Step2_Molybdenum

General Statistics

Total Number of Observations	87	Number of Distinct Observations	56
Number of Detects	69	Number of Non-Detects	18
Number of Distinct Detects	53	Number of Distinct Non-Detects	4
Minimum Detect	2.6000E-4	Minimum Non-Detect	6.9000E-4
Maximum Detect	0.24	Maximum Non-Detect	0.015
Variance Detects	0.00404	Percent Non-Detects	20.69%
Mean Detects	0.0432	SD Detects	0.0635
Median Detects	0.012	CV Detects	1.472
Skewness Detects	1.592	Kurtosis Detects	1.369
Mean of Logged Detects	-4.293	SD of Logged Detects	1.591

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.67	**Normal GOF Test on Detected Observations Only**	
1% Shapiro Wilk P Value	0	Detected Data Not Normal at 1% Significance Level	
Lilliefors Test Statistic	0.371	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.123	Detected Data Not Normal at 1% Significance Level	

Detected Data Not Normal at 1% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.0348	KM Standard Error of Mean	0.00632
90KM SD	0.0585	95% KM (BCA) UCL	0.0465
95% KM (t) UCL	0.0453	95% KM (Percentile Bootstrap) UCL	0.0454
95% KM (z) UCL	0.0452	95% KM Bootstrap t UCL	0.048
90% KM Chebyshev UCL	0.0538	95% KM Chebyshev UCL	0.0623
97.5% KM Chebyshev UCL	0.0743	99% KM Chebyshev UCL	0.0977

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	4.047	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.812	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.232	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.113	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.545	k star (bias corrected MLE)	0.531
Theta hat (MLE)	0.0792	Theta star (bias corrected MLE)	0.0813
nu hat (MLE)	75.22	nu star (bias corrected)	73.28
Mean (detects)	0.0432		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	2.6000E-4	Mean	0.0363
Maximum	0.24	Median	0.01
SD	0.0581	CV	1.6
k hat (MLE)	0.595	k star (bias corrected MLE)	0.582
Theta hat (MLE)	0.0611	Theta star (bias corrected MLE)	0.0624
nu hat (MLE)	103.5	nu star (bias corrected)	101.2
Adjusted Level of Significance (β)	0.0472		
Approximate Chi Square Value (101.23, α)	79.01	Adjusted Chi Square Value (101.23, β)	78.69
95% Gamma Approximate UCL	0.0465	95% Gamma Adjusted UCL	0.0467

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0348	SD (KM)	0.0585
Variance (KM)	0.00342	SE of Mean (KM)	0.00632
k hat (KM)	0.354	k star (KM)	0.349
nu hat (KM)	61.52	nu star (KM)	60.73
theta hat (KM)	0.0984	theta star (KM)	0.0997
80% gamma percentile (KM)	0.0551	90% gamma percentile (KM)	0.101
95% gamma percentile (KM)	0.151	99% gamma percentile (KM)	0.281

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (60.73, α)	43.81	Adjusted Chi Square Value (60.73, β)	43.57
95% KM Approximate Gamma UCL	0.0482	95% KM Adjusted Gamma UCL	0.0485

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Approximate Test Statistic	0.932	**Shapiro Wilk GOF Test**
10% Shapiro Wilk P Value	0.00114	Detected Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.132	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.0975	Detected Data Not Lognormal at 10% Significance Level

Detected Data Not Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0348	Mean in Log Scale	-4.743
SD in Original Scale	0.0589	SD in Log Scale	1.751
95% t UCL (assumes normality of ROS data)	0.0453	95% Percentile Bootstrap UCL	0.0459
95% BCA Bootstrap UCL	0.0468	95% Bootstrap t UCL	0.047
95% H-UCL (Log ROS)	0.0721		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-4.781	KM Geo Mean	0.00839
KM SD (logged)	1.813	95% Critical H Value (KM-Log)	3.145
KM Standard Error of Mean (logged)	0.203	95% H-UCL (KM -Log)	0.0803
KM SD (logged)	1.813	95% Critical H Value (KM-Log)	3.145
KM Standard Error of Mean (logged)	0.203		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.035	Mean in Log Scale	-4.648
SD in Original Scale	0.0587	SD in Log Scale	1.67
95% t UCL (Assumes normality)	0.0455	95% H-Stat UCL	0.066

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Suggested UCL to Use

95% KM (t) UCL	0.0453

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.
Please verify the data were collected from random locations.
If the data were collected using judgmental or other non-random methods,
then contact a statistician to correctly calculate UCLs.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Step3_Cobalt

General Statistics

Total Number of Observations	15	Number of Distinct Observations	10
Number of Detects	7	Number of Non-Detects	8
Number of Distinct Detects	7	Number of Distinct Non-Detects	3
Minimum Detect	4.0000E-4	Minimum Non-Detect	3.8000E-4
Maximum Detect	0.0033	Maximum Non-Detect	0.005
Variance Detects	1.1074E-6	Percent Non-Detects	53.33%
Mean Detects	9.2857E-4	SD Detects	0.00105
Median Detects	5.3000E-4	CV Detects	1.133
Skewness Detects	2.578	Kurtosis Detects	6.717
Mean of Logged Detects	-7.296	SD of Logged Detects	0.729

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.555	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.73	Detected Data Not Normal at 1% Significance Level	
Lilliefors Test Statistic	0.425	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.35	Detected Data Not Normal at 1% Significance Level	

Detected Data Not Normal at 1% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	6.5429E-4	KM Standard Error of Mean	2.1405E-4
90KM SD	7.4150E-4	95% KM (BCA) UCL	0.00105
95% KM (t) UCL	0.00103	95% KM (Percentile Bootstrap) UCL	0.00103
95% KM (z) UCL	0.00101	95% KM Bootstrap t UCL	0.00306
90% KM Chebyshev UCL	0.0013	95% KM Chebyshev UCL	0.00159
97.5% KM Chebyshev UCL	0.00199	99% KM Chebyshev UCL	0.00278

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.21	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.718	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.362	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.316	Detected Data Not Gamma Distributed at 5% Significance Level	

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.742	k star (bias corrected MLE)	1.09
Theta hat (MLE)	5.3319E-4	Theta star (bias corrected MLE)	8.5158E-4
nu hat (MLE)	24.38	nu star (bias corrected)	15.27
Mean (detects)	9.2857E-4		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	4.0000E-4	Mean	0.00577
Maximum	0.01	Median	0.01
SD	0.00473	CV	0.821
k hat (MLE)	0.837	k star (bias corrected MLE)	0.714
Theta hat (MLE)	0.00689	Theta star (bias corrected MLE)	0.00808
nu hat (MLE)	25.1	nu star (bias corrected)	21.42
Adjusted Level of Significance (β)	0.0324		
Approximate Chi Square Value (21.42, α)	11.9	Adjusted Chi Square Value (21.42, β)	11.04
95% Gamma Approximate UCL	0.0104	95% Gamma Adjusted UCL	0.0112

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	6.5429E-4	SD (KM)	7.4150E-4
Variance (KM)	5.4982E-7	SE of Mean (KM)	2.1405E-4
k hat (KM)	0.779	k star (KM)	0.667
nu hat (KM)	23.36	nu star (KM)	20.02
theta hat (KM)	8.4034E-4	theta star (KM)	9.8047E-4
80% gamma percentile (KM)	0.00108	90% gamma percentile (KM)	0.00166
95% gamma percentile (KM)	0.00227	99% gamma percentile (KM)	0.00372

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (20.02, α)	10.87	Adjusted Chi Square Value (20.02, β)	10.04
95% KM Approximate Gamma UCL	0.00121	95% KM Adjusted Gamma UCL	0.0013

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.719	**Shapiro Wilk GOF Test**	
10% Shapiro Wilk Critical Value	0.838	Detected Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.302	**Lilliefors GOF Test**	
10% Lilliefors Critical Value	0.28	Detected Data Not Lognormal at 10% Significance Level	

Detected Data Not Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	4.9989E-4	Mean in Log Scale	-8.277
SD in Original Scale	8.0579E-4	SD in Log Scale	1.144
95% t UCL (assumes normality of ROS data)	8.6634E-4	95% Percentile Bootstrap UCL	8.9380E-4
95% BCA Bootstrap UCL	0.00111	95% Bootstrap t UCL	0.00155
95% H-UCL (Log ROS)	0.00122		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-7.585	KM Geo Mean	5.0776E-4
KM SD (logged)	0.558	95% Critical H Value (KM-Log)	2.132
KM Standard Error of Mean (logged)	0.161	95% H-UCL (KM -Log)	8.1558E-4
KM SD (logged)	0.558	95% Critical H Value (KM-Log)	2.132
KM Standard Error of Mean (logged)	0.161		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	6.9000E-4	Mean in Log Scale	-7.796
SD in Original Scale	9.2770E-4	SD in Log Scale	0.934
95% t UCL (Assumes normality)	0.00111	95% H-Stat UCL	0.00123

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Suggested UCL to Use

95% KM (t) UCL	0.00103

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.

Please verify the data were collected from random locations.

If the data were collected using judgmental or other non-random methods,

then contact a statistician to correctly calculate UCLs.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Step3_Molybdenum

General Statistics

Total Number of Observations	30	Number of Distinct Observations	16
Number of Detects	12	Number of Non-Detects	18
Number of Distinct Detects	12	Number of Distinct Non-Detects	4
Minimum Detect	2.6000E-4	Minimum Non-Detect	6.9000E-4
Maximum Detect	0.012	Maximum Non-Detect	0.015
Variance Detects	1.0015E-5	Percent Non-Detects	60%
Mean Detects	0.00375	SD Detects	0.00316
Median Detects	0.00305	CV Detects	0.845
Skewness Detects	1.696	Kurtosis Detects	3.746
Mean of Logged Detects	-5.955	SD of Logged Detects	1.008

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.856	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.805	Detected Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.181	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.281	Detected Data appear Normal at 1% Significance Level	

Detected Data appear Normal at 1% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.00248	KM Standard Error of Mean	6.0533E-4
90KM SD	0.00264	95% KM (BCA) UCL	0.00362
95% KM (t) UCL	0.00351	95% KM (Percentile Bootstrap) UCL	0.00352
95% KM (z) UCL	0.00348	95% KM Bootstrap t UCL	0.00364
90% KM Chebyshev UCL	0.0043	95% KM Chebyshev UCL	0.00512
97.5% KM Chebyshev UCL	0.00626	99% KM Chebyshev UCL	0.0085

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.162	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.745	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.109	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.25	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.504	k star (bias corrected MLE)	1.183
Theta hat (MLE)	0.00249	Theta star (bias corrected MLE)	0.00317
nu hat (MLE)	36.09	nu star (bias corrected)	28.4
Mean (detects)	0.00375		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	2.6000E-4	Mean	0.0075
Maximum	0.012	Median	0.01
SD	0.00368	CV	0.49
k hat (MLE)	2.136	k star (bias corrected MLE)	1.944
Theta hat (MLE)	0.00351	Theta star (bias corrected MLE)	0.00386
nu hat (MLE)	128.1	nu star (bias corrected)	116.7
Adjusted Level of Significance (β)	0.041		
Approximate Chi Square Value (116.66, α)	92.72	Adjusted Chi Square Value (116.66, β)	91.5
95% Gamma Approximate UCL	0.00943	95% Gamma Adjusted UCL	0.00956

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.00248	SD (KM)	0.00264
Variance (KM)	6.9530E-6	SE of Mean (KM)	6.0533E-4
k hat (KM)	0.885	k star (KM)	0.819
nu hat (KM)	53.13	nu star (KM)	49.15
theta hat (KM)	0.0028	theta star (KM)	0.00303
80% gamma percentile (KM)	0.00405	90% gamma percentile (KM)	0.006
95% gamma percentile (KM)	0.00798	99% gamma percentile (KM)	0.0127

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (49.15, α)	34.05	Adjusted Chi Square Value (49.15, β)	33.33
95% KM Approximate Gamma UCL	0.00358	95% KM Adjusted Gamma UCL	0.00366

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.946	**Shapiro Wilk GOF Test**
10% Shapiro Wilk Critical Value	0.883	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.167	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.223	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.00241	Mean in Log Scale	-6.539
SD in Original Scale	0.00256	SD in Log Scale	1.073
95% t UCL (assumes normality of ROS data)	0.00321	95% Percentile Bootstrap UCL	0.00319
95% BCA Bootstrap UCL	0.00344	95% Bootstrap t UCL	0.00359
95% H-UCL (Log ROS)	0.00429		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-6.688	KM Geo Mean	0.00125
KM SD (logged)	1.293	95% Critical H Value (KM-Log)	2.867
KM Standard Error of Mean (logged)	0.324	95% H-UCL (KM -Log)	0.00572
KM SD (logged)	1.293	95% Critical H Value (KM-Log)	2.867
KM Standard Error of Mean (logged)	0.324		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.00381	Mean in Log Scale	-5.986
SD in Original Scale	0.00263	SD in Log Scale	1.129
95% t UCL (Assumes normality)	0.00462	95% H-Stat UCL	0.00828

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

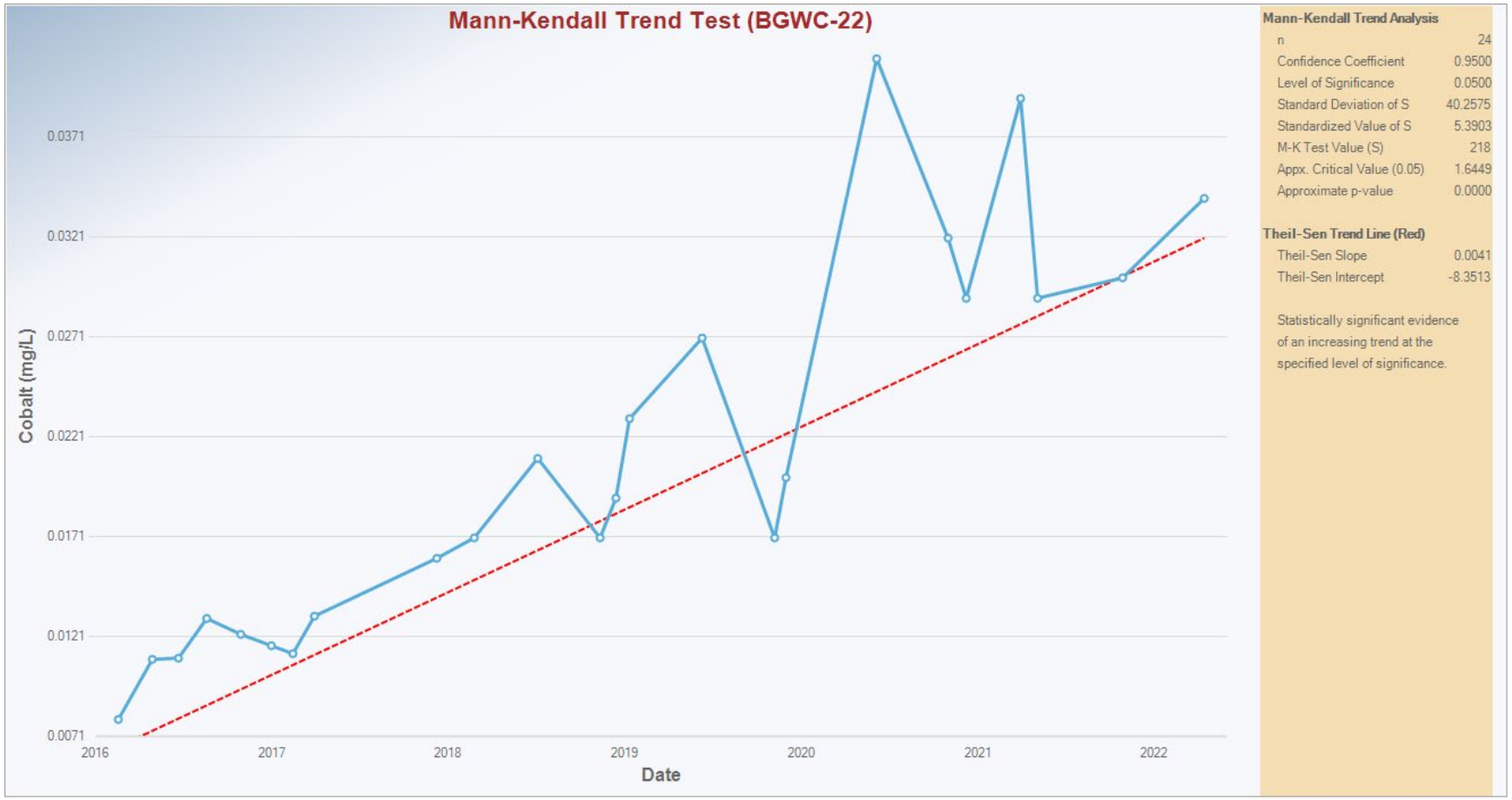
95% KM (t) UCL	0.00351

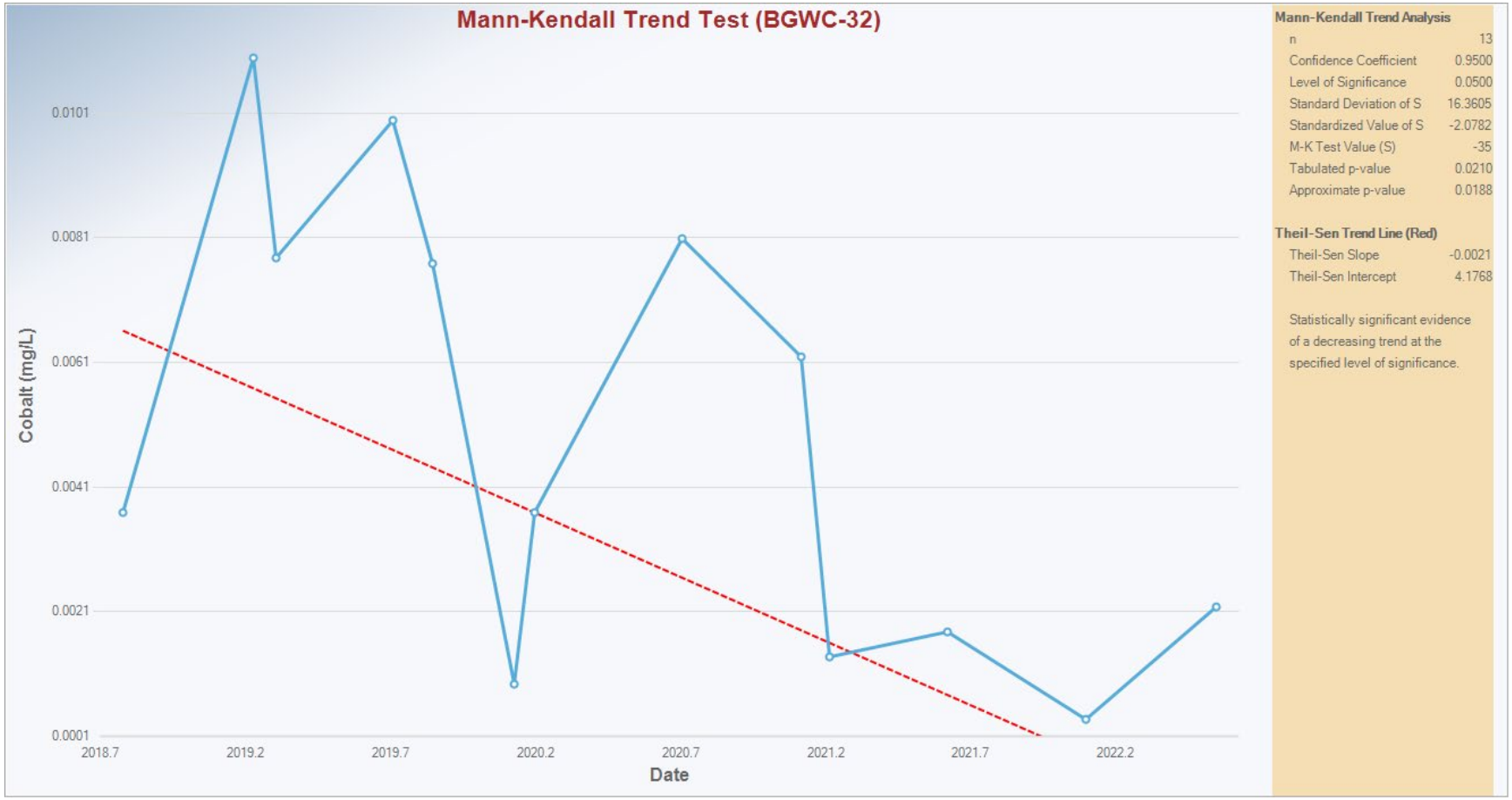
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

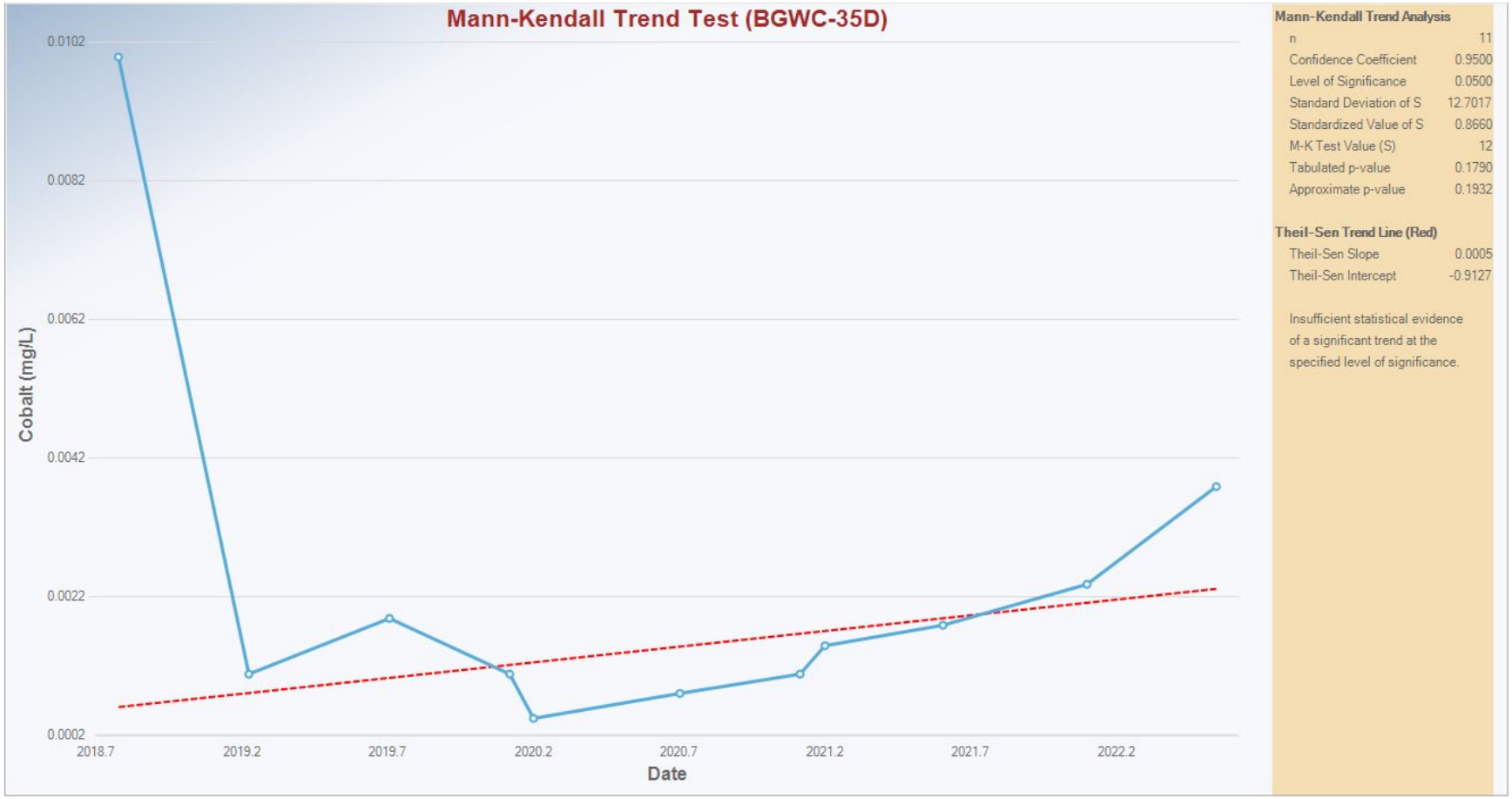
Appendix D-4

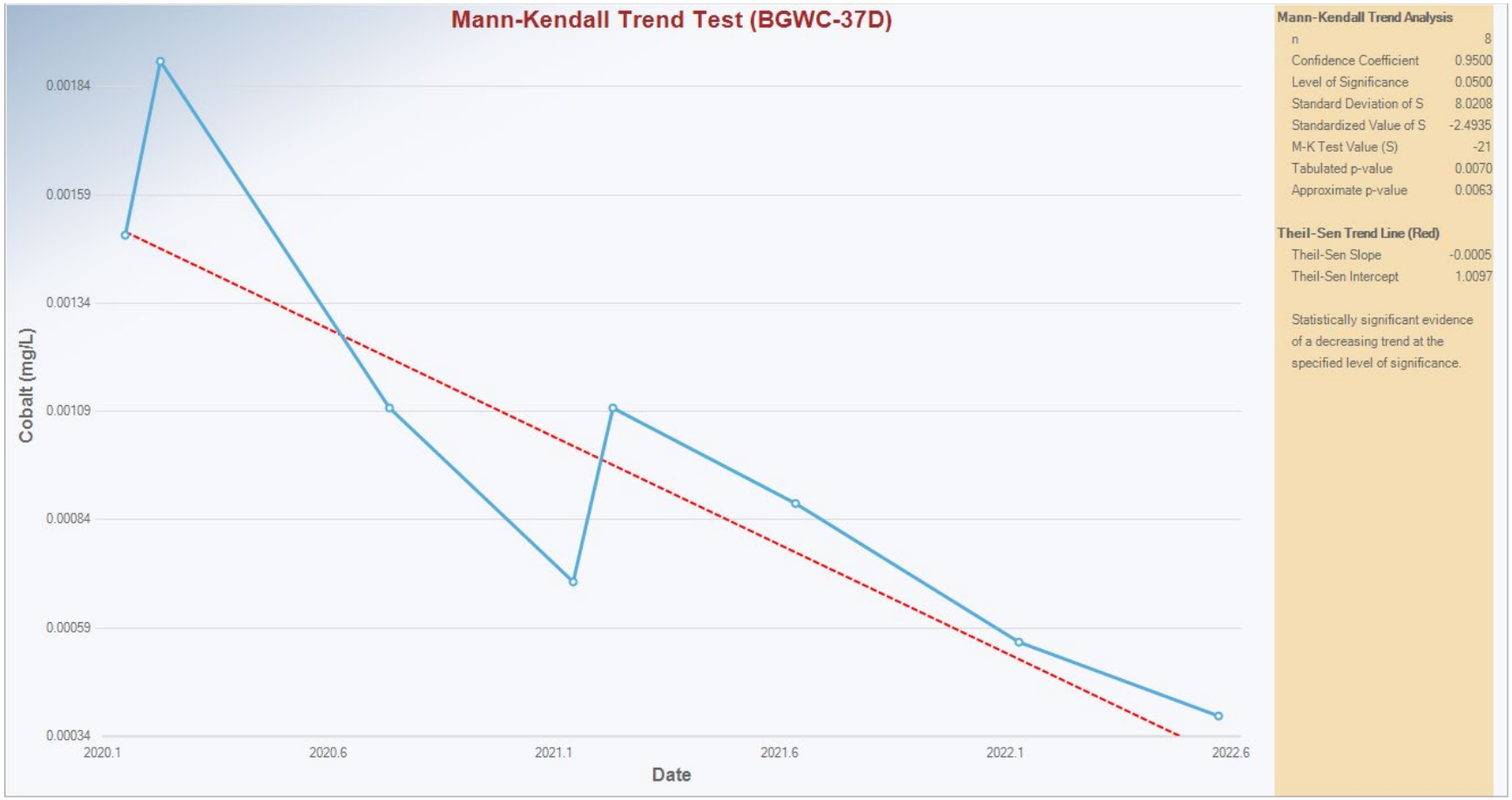
Groundwater Trend Graphs

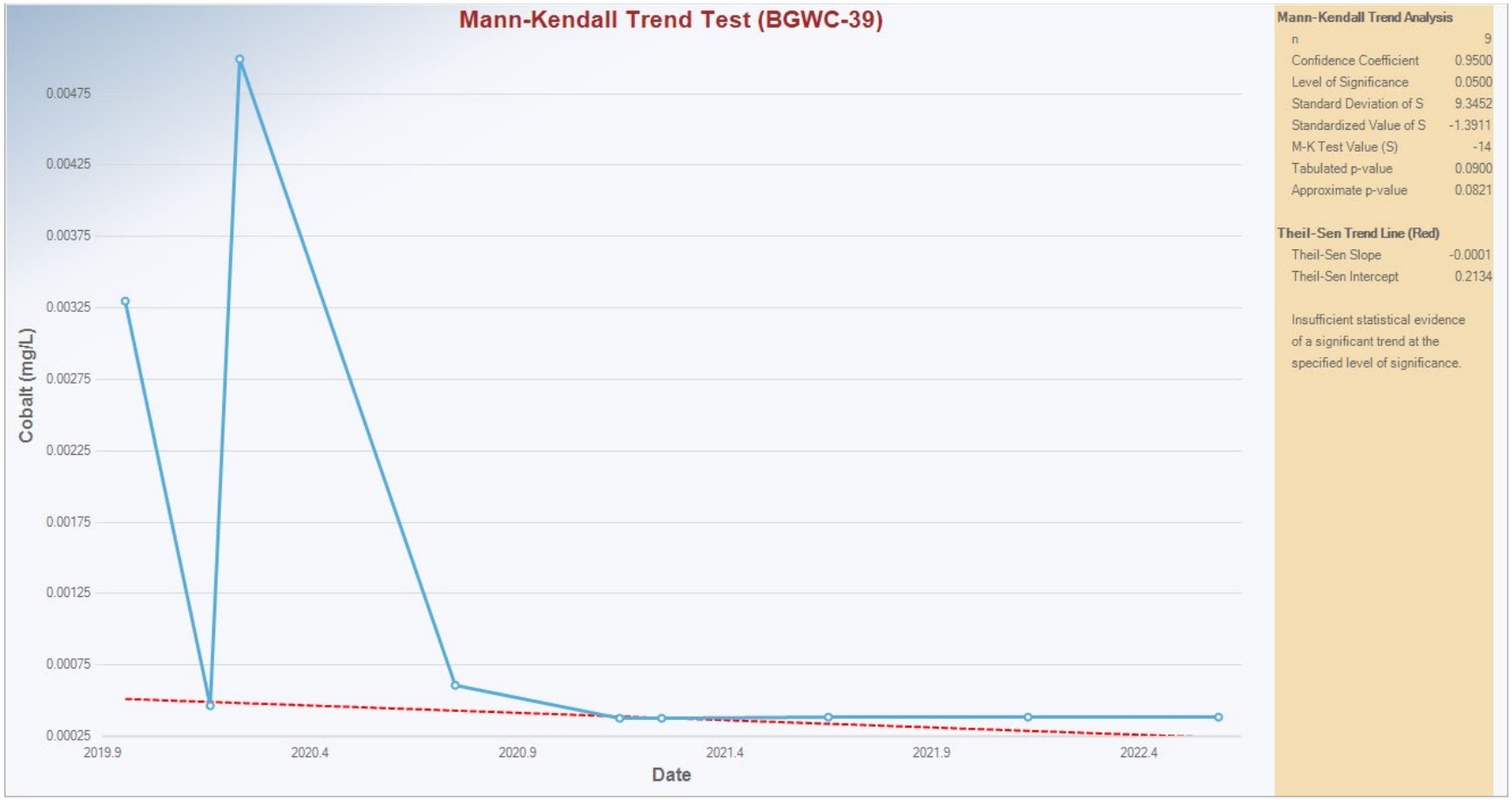
Appendix D
Appendix D-4
Groundwater Trend Graphs
Plant Bowen AP-1 Risk Evaluation Report
Plant Bowen, Cartersville, GA

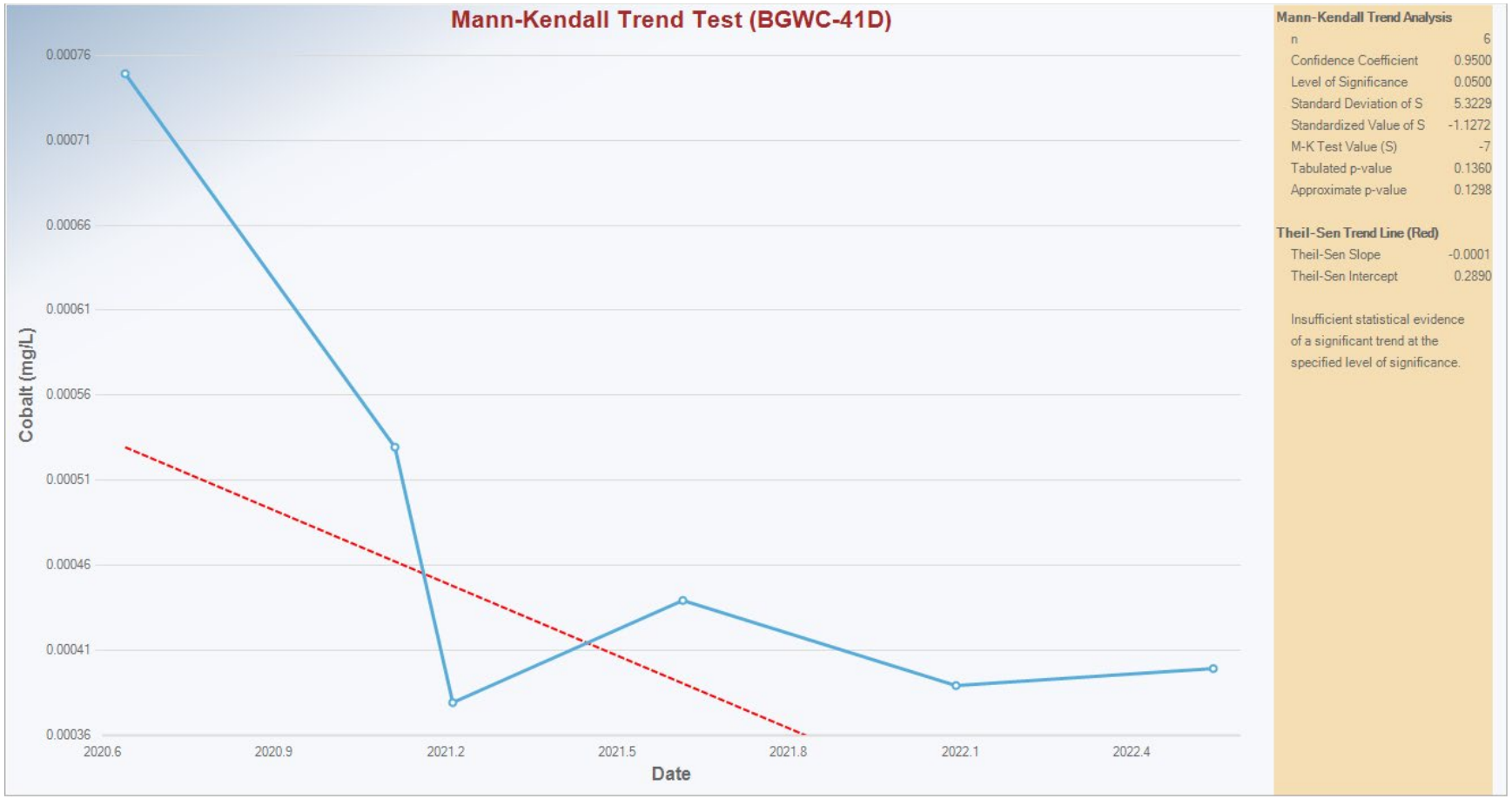


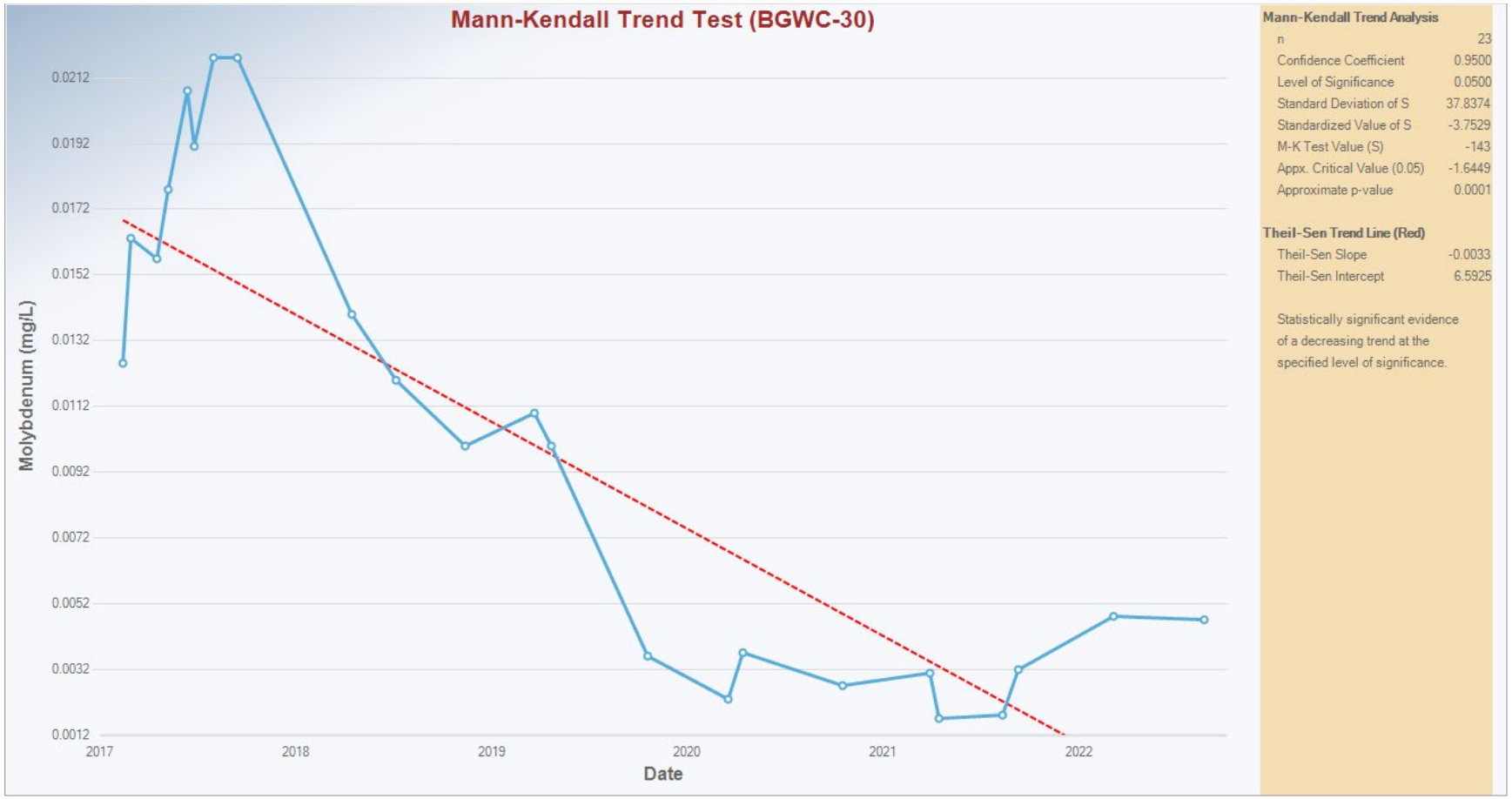

Mann-Kendall Trend Test (BGWC-32)
Cobalt (mg/L)
0.0101
0.0081
0.0061
0.0041
0.0021
0.0001
2018.7
2019.2
2019.7
2020.2
2020.7
2021.2
2021.7
2022.2
Date
Mann-Kendall Trend Analysis
n 13
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 16.3605
Standardized Value of S -2.0782
M-K Test Value (S) -35
Tabulated p-value 0.0210
Approximate p-value 0.0188
Theil-Sen Trend Line (Red)
Theil-Sen Slope -0.0021
Theil-Sen Intercept 4.1768
Statistically significant evidence of a decreasing trend at the specified level of significance.

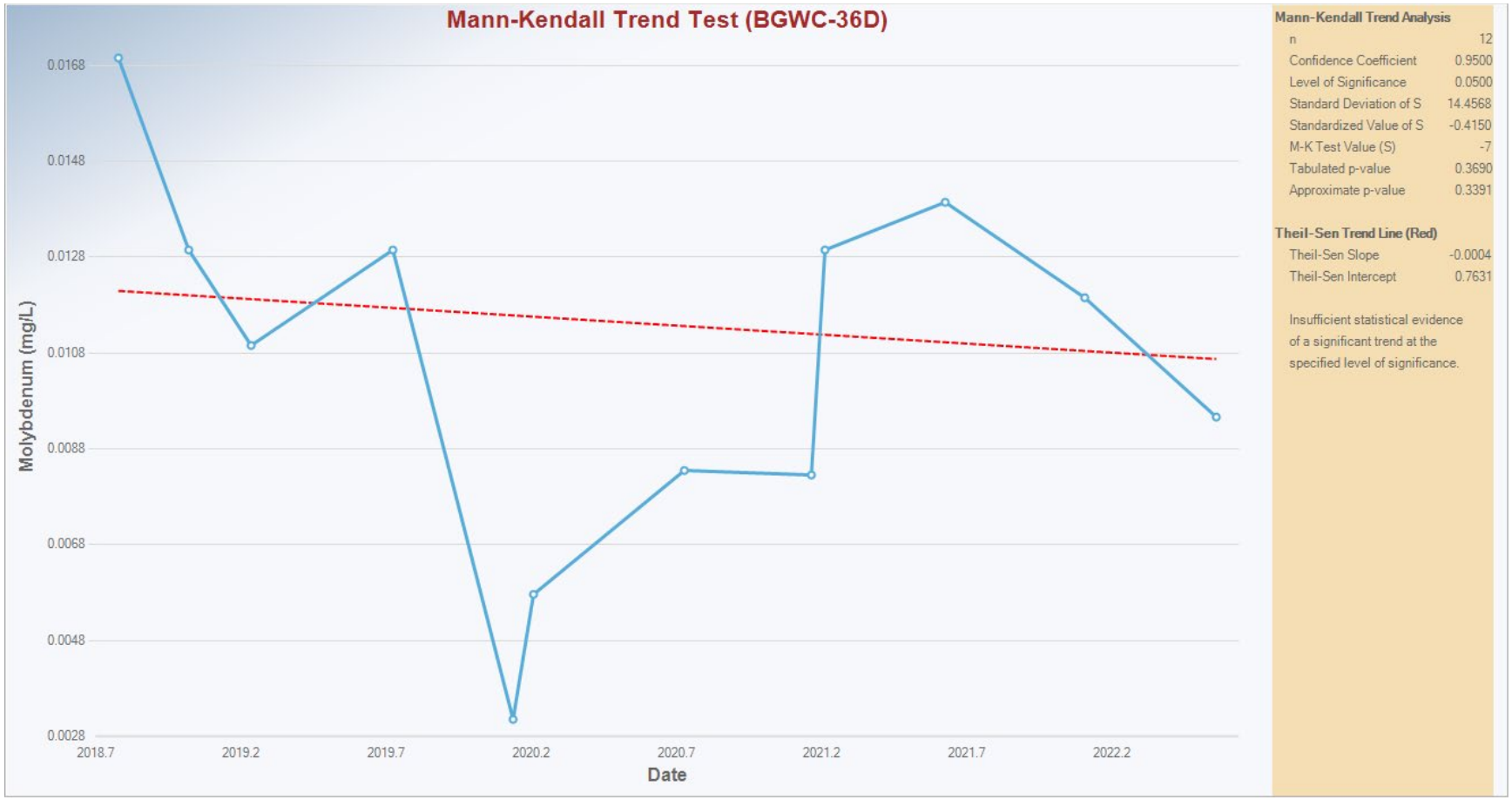

Mann-Kendall Trend Test (BGWC-35D)
0.0102
0.0082
0.0062
0.0042
0.0022
0.0002
Cobalt (mg/L)
2018.7
2019.2
2019.7
2020.2
2020.7
2021.2
2021.7
2022.2
Date
Mann-Kendall Trend Analysis
n 11
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 12.7017
Standardized Value of S 0.8660
M-K Test Value (S) 12
Tabulated p-value 0.1790
Approximate p-value 0.1932
Theil-Sen Trend Line (Red)
Theil-Sen Slope 0.0005
Theil-Sen Intercept -0.9127
Insufficient statistical evidence of a significant trend at the specified level of significance.

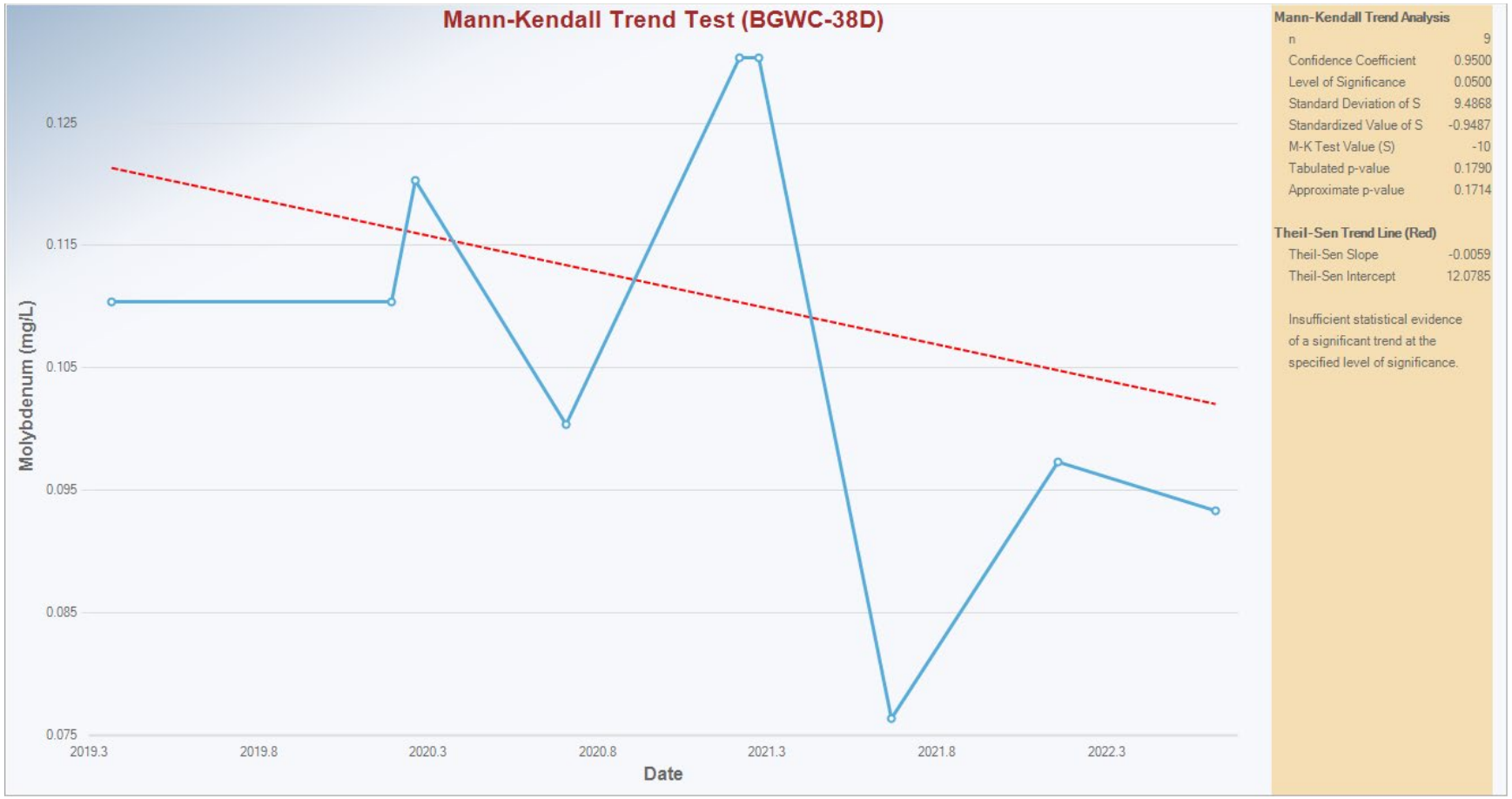

Mann-Kendall Trend Test (BGWC-37D)
Cobalt (mg/L)
0.00184
0.00159
0.00134
0.00109
0.00084
0.00059
0.00034
2020.1
2020.6
2021.1
2021.6
2022.1
2022.6
Date
Mann-Kendall Trend Analysis
n 8
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 8.0208
Standardized Value of S -2.4935
M-K Test Value (S) -21
Tabulated p-value 0.0070
Approximate p-value 0.0063
Theil-Sen Trend Line (Red)
Theil-Sen Slope -0.0005
Theil-Sen Intercept 1.0097
Statistically significant evidence of a decreasing trend at the specified level of significance.

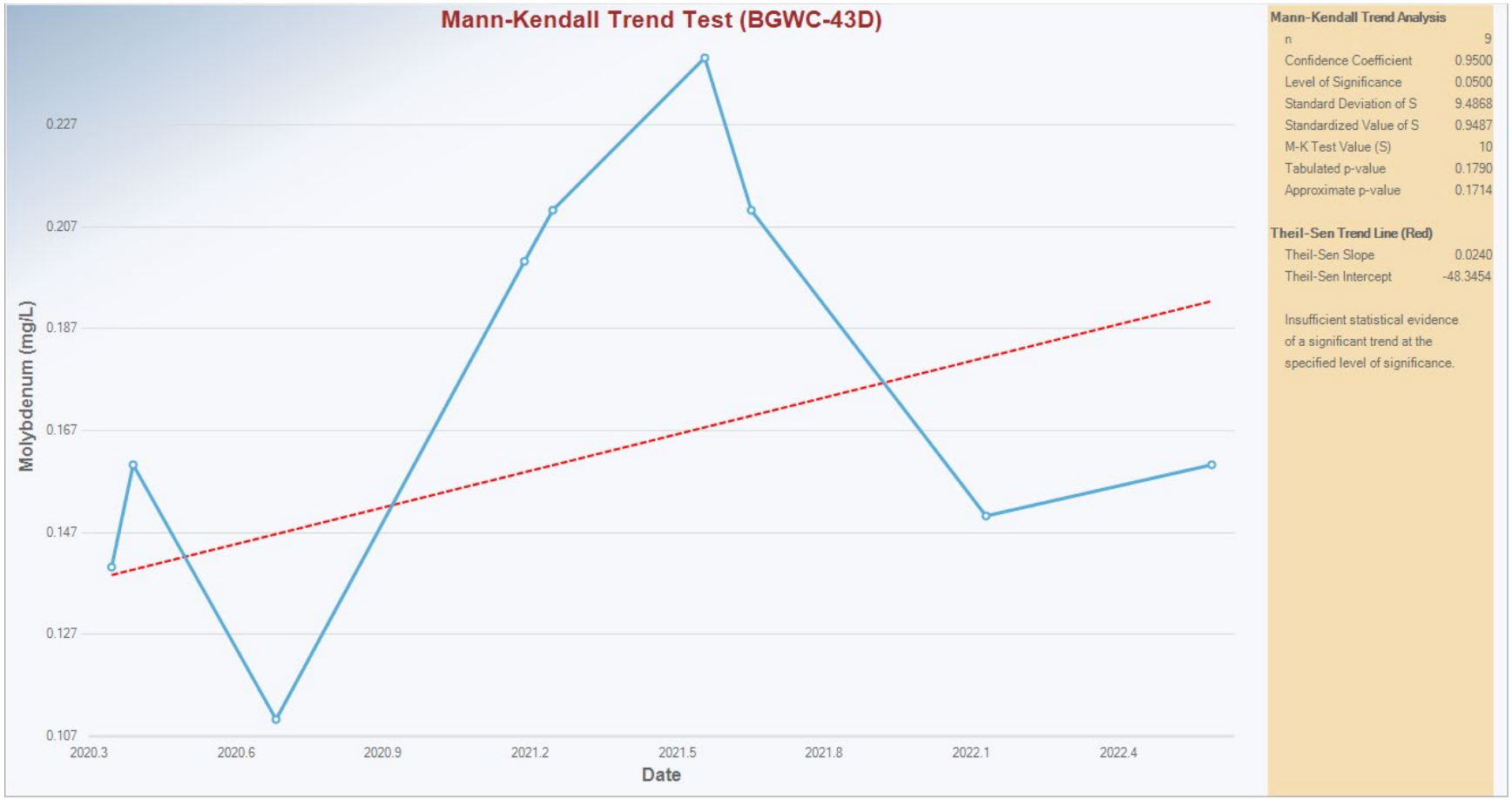

Mann-Kendall Trend Test (BGWC-39)
Cobalt (mg/L)
0.00475
0.00425
0.00375
0.00325
0.00275
0.00225
0.00175
0.00125
0.00075
0.00025
2019.9
2020.4
2020.9
2021.4
2021.9
2022.4
Date
Mann-Kendall Trend Analysis
n 9
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 9.3452
Standardized Value of S -1.3911
M-K Test Value (S) -14
Tabulated p-value 0.0900
Approximate p-value 0.0821
Theil-Sen Trend Line (Red)
Theil-Sen Slope -0.0001
Theil-Sen Intercept 0.2134
Insufficient statistical evidence of a significant trend at the specified level of significance.

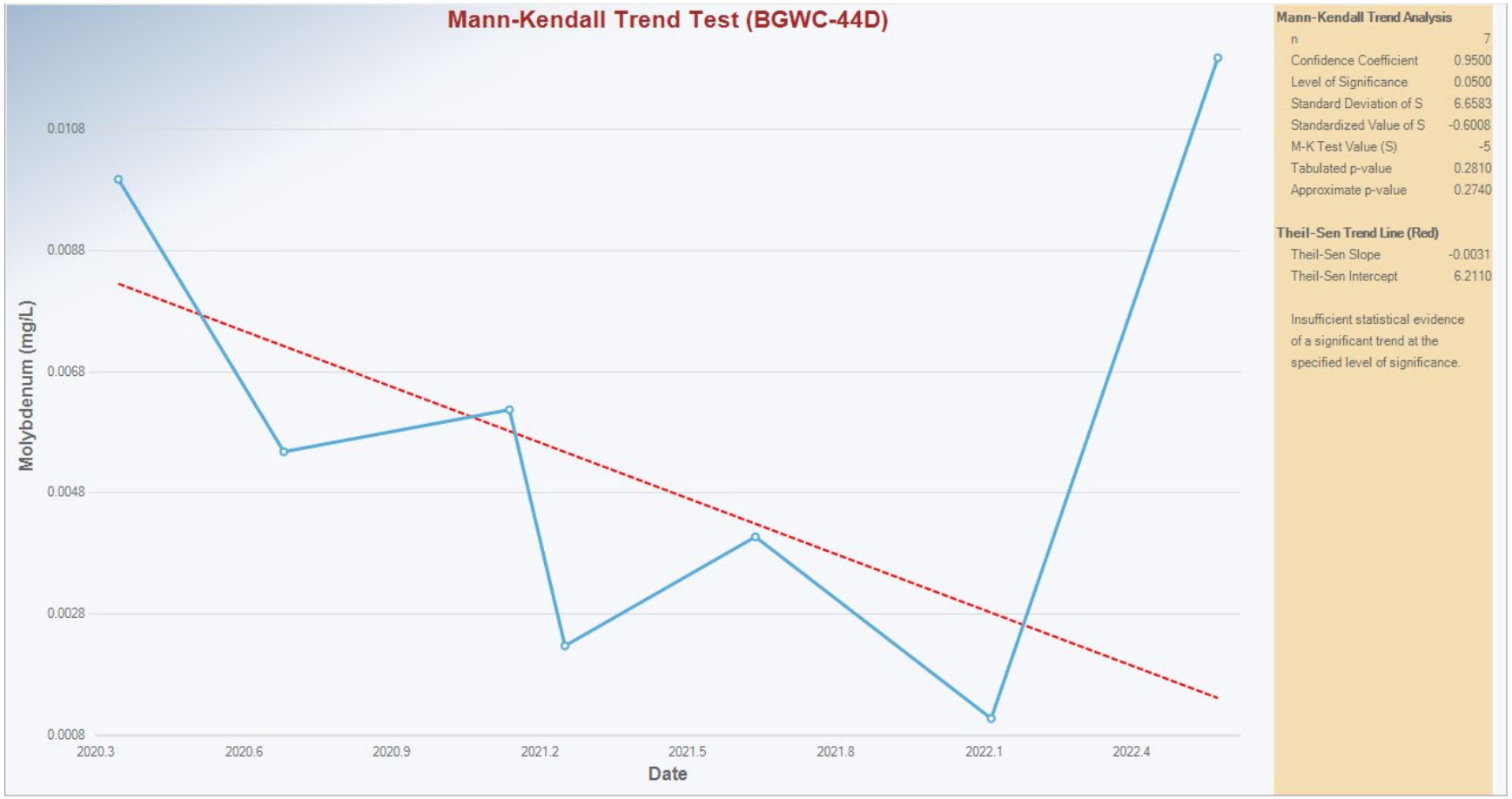

Mann-Kendall Trend Test (BGWC-41D)
Cobalt (mg/L)
0.00076
0.00071
0.00066
0.00061
0.00056
0.00051
0.00046
0.00041
0.00036
2020.6
2020.9
2021.2
2021.5
2021.8
2022.1
2022.4
Date
Mann-Kendall Trend Analysis
n 6
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 5.3229
Standardized Value of S -1.1272
M-K Test Value (S) -7
Tabulated p-value 0.1360
Approximate p-value 0.1298
Theil-Sen Trend Line (Red)
Theil-Sen Slope -0.0001
Theil-Sen Intercept 0.2890
Insufficient statistical evidence of a significant trend at the specified level of significance.

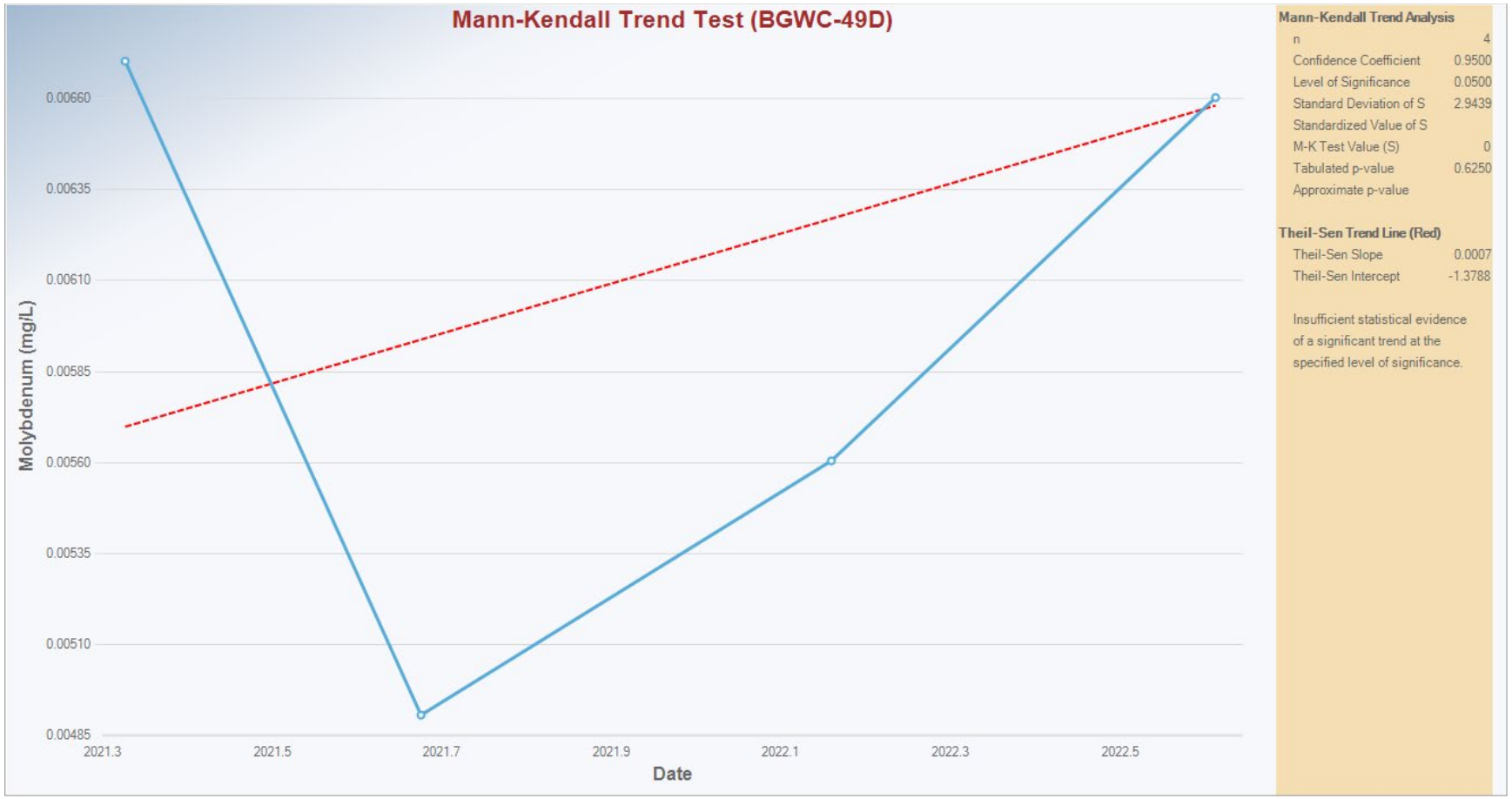

Mann-Kendall Trend Test (BGWC-30)
Molybdenum (mg/L)
0.0212
0.0192
0.0172
0.0152
0.0132
0.0112
0.0092
0.0072
0.0052
0.0032
0.0012
2017
2018
2019
2020
2021
2022
Date
Mann-Kendall Trend Analysis
n 23
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 37.8374
Standardized Value of S -3.7529
M-K Test Value (S) -143
Appx. Critical Value (0.05) -1.6449
Approximate p-value 0.0001
Theil-Sen Trend Line (Red)
Theil-Sen Slope -0.0033
Theil-Sen Intercept 6.5925
Statistically significant evidence of a decreasing trend at the specified level of significance.

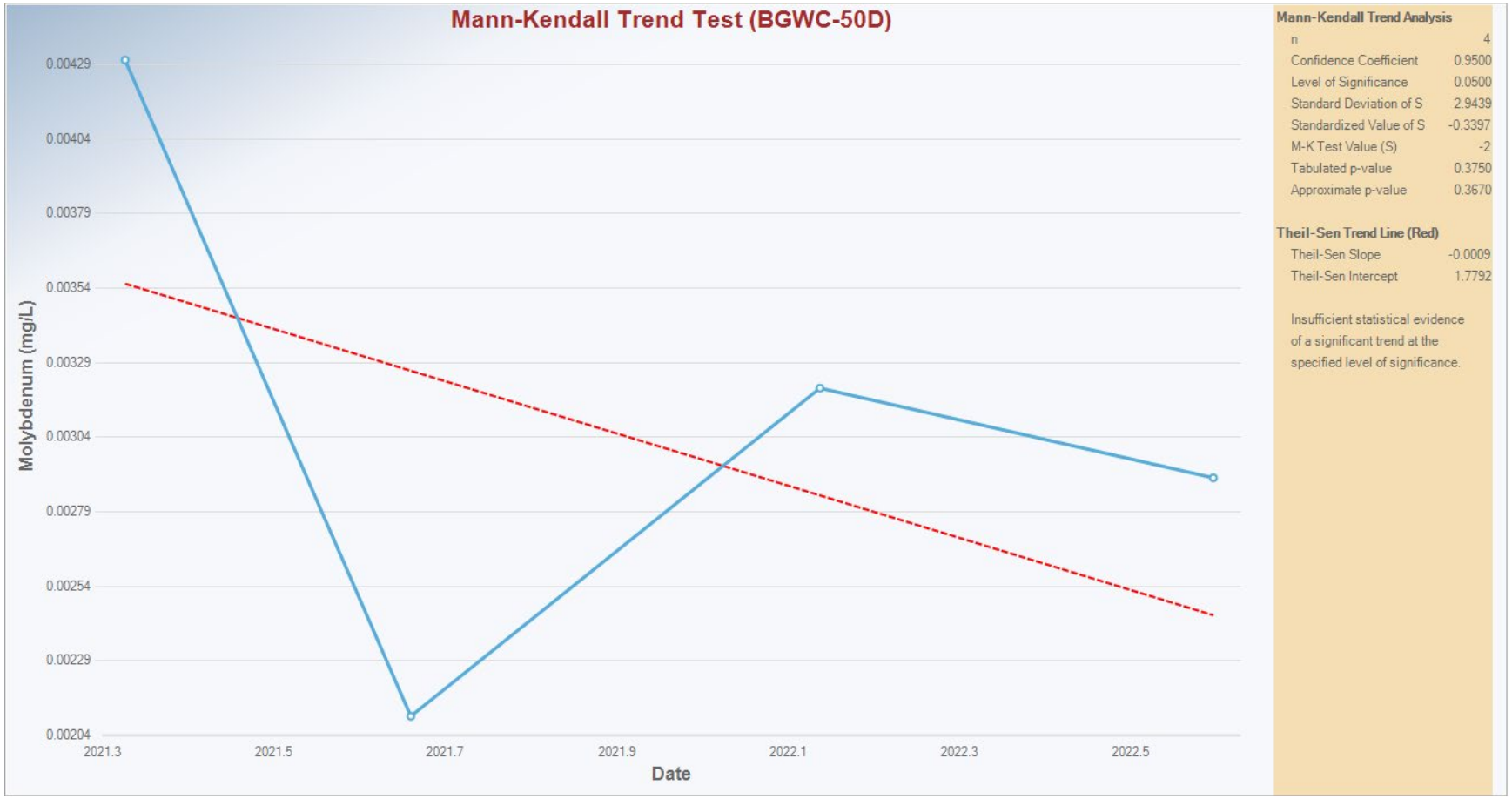

Mann-Kendall Trend Test (BGWC-36D)
Molybdenum (mg/L)
0.0168
0.0148
0.0128
0.0108
0.0088
0.0068
0.0048
0.0028
2018.7
2019.2
2019.7
2020.2
2020.7
2021.2
2021.7
2022.2
Date
Mann-Kendall Trend Analysis
n 12
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 14.4568
Standardized Value of S -0.4150
M-K Test Value (S) -7
Tabulated p-value 0.3690
Approximate p-value 0.3391
Theil-Sen Trend Line (Red)
Theil-Sen Slope -0.0004
Theil-Sen Intercept 0.7631
Insufficient statistical evidence of a significant trend at the specified level of significance.


Mann-Kendall Trend Test (BGWC-38D)
Molybdenum (mg/L)
0.125
0.115
0.105
0.095
0.085
0.075
2019.3
2019.8
2020.3
2020.8
2021.3
2021.8
2022.3
Date
Mann-Kendall Trend Analysis
n 9
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 9.4868
Standardized Value of S -0.9487
M-K Test Value (S) -10
Tabulated p-value 0.1790
Approximate p-value 0.1714
Theil-Sen Trend Line (Red)
Theil-Sen Slope -0.0059
Theil-Sen Intercept 12.0785
Insufficient statistical evidence of a significant trend at the specified level of significance.


Mann-Kendall Trend Test (BGWC-43D)
Molybdenum (mg/L)
0.227
0.207
0.187
0.167
0.147
0.127
0.107
2020.3
2020.6
2020.9
2021.2
2021.5
2021.8
2022.1
2022.4
Date
Mann-Kendall Trend Analysis
n 9
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 9.4868
Standardized Value of S 0.9487
M-K Test Value (S) 10
Tabulated p-value 0.1790
Approximate p-value 0.1714
Theil-Sen Trend Line (Red)
Theil-Sen Slope 0.0240
Theil-Sen Intercept -48.3454
Insufficient statistical evidence of a significant trend at the specified level of significance.


Mann-Kendall Trend Test (BGWC-44D)
Molybdenum (mg/L)
0.0108
0.0088
0.0068
0.0048
0.0028
0.0008
2020.3
2020.6
2020.9
2021.2
2021.5
2021.8
2022.1
2022.4
Date
Mann-Kendall Trend Analysis
n 7
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 6.6583
Standardized Value of S -0.6008
M-K Test Value (S) -5
Tabulated p-value 0.2810
Approximate p-value 0.2740
Theil-Sen Trend Line (Red)
Theil-Sen Slope -0.0031
Theil-Sen Intercept 6.2110
Insufficient statistical evidence of a significant trend at the specified level of significance.


Mann-Kendall Trend Test (BGWC-49D)
Molybdenum (mg/L)
0.00660
0.00635
0.00610
0.00585
0.00560
0.00535
0.00510
0.00485
2021.3
2021.5
2021.7
2021.9
2022.1
2022.3
2022.5
Date
Mann-Kendall Trend Analysis
n 4
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 2.9439
Standardized Value of S
M-K Test Value (S) 0
Tabulated p-value 0.6250
Approximate p-value
Theil-Sen Trend Line (Red)
Theil-Sen Slope 0.0007
Theil-Sen Intercept -1.3788
Insufficient statistical evidence of a significant trend at the specified level of significance.


Mann-Kendall Trend Test (BGWC-50D)
Molybdenum (mg/L)
0.00429
0.00404
0.00379
0.00354
0.00329
0.00304
0.00279
0.00254
0.00229
0.00204
2021.3
2021.5
2021.7
2021.9
2022.1
2022.3
2022.5
Date
Mann-Kendall Trend Analysis
n 4
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 2.9439
Standardized Value of S -0.3397
M-K Test Value (S) -2
Tabulated p-value 0.3750
Approximate p-value 0.3670
Theil-Sen Trend Line (Red)
Theil-Sen Slope -0.0009
Theil-Sen Intercept 1.7792
Insufficient statistical evidence of a significant trend at the specified level of significance.

APPENDIX D

Monitored Natural Attenuation Evaluation

Prepared for

Georgia Power Company
241 Ralph McGill Blvd NE
Atlanta, Georgia 30308

MONITORED NATURAL ATTENUATION EVALUATION

PLANT BOWEN ASH POND 1 (AP-1)

Prepared by

Geosyntec consultants

engineers | scientists | innovators

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Project Number GW6581C

July 2024

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Figure 2 Linear Regression for Molybdenum in BGWC-43D Since Closure Activities Began

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Appendix A ProUCL Input Data and Output Results

LIST OF ACRONYMS AND ABBREVIATIONS

ACM	Assessment of Corrective Measures
CCR	Coal Combustion Residual
EPRI	Electric Power Research Institute
GA EPD	Georgia Environmental Protection Division
GWPS	Groundwater Protection Standard
ITRC	Interstate Technology and Regulatory Council
MNA	Monitored Natural Attenuation
Mo	Molybdenum
ORP	Oxidation-Reduction Potential
SEP	Sequential Extraction Procedure
SSI	Statistically Significant Increases
SSL	Statistically Significant Levels
USEPA	United States Environmental Protection Agency
XRD	X-Ray Diffraction

1 INTRODUCTION

1.1 Purpose and Scope

On behalf of Georgia Power Company (Georgia Power), Geosyntec Consultants, Inc. (Geosyntec) prepared this *Monitored Natural Attenuation (MNA) Evaluation Report* (Report) for Georgia Power's Plant Bowen Ash Pond 1 (AP-1 or Site), a coal combustion residuals (CCR) unit. This Report is included as an Appendix to the *Draft Remedy Selection Report – Plant Bowen AP-1* (Remedy Selection Report) (Geosyntec 2023a).

The purpose of this Report is to assess the applicability of MNA as a corrective measure for statistically significant levels (SSL) of molybdenum (Mo) in groundwater at BGWC-43D well downgradient of AP-1. An assessment of corrective measures identified MNA as a potential corrective measure to remediate groundwater at the Site. MNA relies on natural attenuation processes (*e.g.,* mineral precipitation, sorption, dilution, dispersion, *etc.*) to reduce dissolved concentrations of inorganic constituents in groundwater to below groundwater protection standards (GWPS) within a reasonable timeframe. Attenuation mechanisms are constituent- and site-specific.

The MNA evaluation was completed using a phased approach, consistent with guidance documents for inorganic constituents published by the United States Environmental Protection Agency (USEPA, 2015), the Interstate Technology and Regulatory Council (ITRC, 2010), and the Electric Power Research Institute (EPRI, 2018). A range of field characterizations, laboratory and desktop evaluations have been conducted to develop a conceptual site model (CSM) and assess attenuation mechanisms at the Site. The progressive, phased evaluation is aimed at assessing the existing and long-term effectiveness of attenuation processes and reduce uncertainty for decision-making at each screening step. In this evaluation, multiple lines of evidence were considered to demonstrate the applicability of MNA for groundwater corrective action in the following four phases in accordance with USEPA guidance:

- Phase I: Demonstrating that the groundwater plume is *not expanding*.
- Phase II: Identifying *attenuation mechanisms* and demonstrating that *the attenuation rates* are sufficient.
- Phase III: Demonstrating that that the *attenuation capacity* of the aquifer is sufficient to attenuate the mass of contaminant(s) within the plume and the *stability* of the immobilized contaminant(s) is sufficient to resist re-mobilization.
- Phase IV: Design of a *performance monitoring program* based on an understanding of the mechanism of the attenuation process, and establishment of contingency remedies tailored to site-specific characteristics.

1.2 Site Overview and Closure Activities

Plant Bowen is a four-unit, coal-fired, electric-generating facility that commenced operations in the 1970s. The plant is located nine miles southwest of Cartersville in Bartow County, Georgia.

CCR placement in AP-1 ceased in 2020, with closure activities subsequently beginning in early 2021. Details of the closure approach have been summarized in the Amended Written Closure Plan and published in 2018 to Georgia Power's CCR compliance website. Georgia EPD approved the closure permit (008-021D(CCR)) on February 17, 2022. Following closure completion, AP-1 will enter into post-closure care for a minimum period of thirty (30) years. Post-closure care is detailed in the closure permit. Georgia Power will retain ownership of the Site following closure.

2 MNA DEMONSTRATION – MOLYBDENUM

The results of the phased MNA evaluation for Mo are summarized below.

2.1 Phase I Analysis

Two objectives were identified for Phase I of the MNA evaluation:

- Assess the source control measures and other key initial considerations; and
- Evaluate if the Mo plume is stable.

Each objective for Phase I analysis of Mo is discussed in the following subsections.

2.1.1 Source Control and Key Considerations

The first aspect of the Phase I analysis was to assess source control measures and key initial considerations. This step serves as an initial screening approach before moving to subsequent steps.

Closure of AP-1 will provide substantial source control and includes excavation and consolidation of CCR material into a fully-contained multi-cell storage facility situated within the current footprint of AP-1. An engineered cover system will be installed over the consolidated CCR material to substantially eliminate infiltration from surface water or rainwater, resist erosion, contain CCR materials, and provide source control. Any infiltration through the cover system will be captured by an engineered liner system, including leachate collection system, which will also physically contain CCR materials and provide source control. Physical containment and control of the CCR within an engineered storage facility will over time, be supportive of declining concentrations of Appendix IV constituents in groundwater.

Pre-closure activities upgradient of BGWC-43D commenced in 2017 with the decommissioning of the Recycle Pond, with active dewatering of the CCR material within the former Recycle Pond area beginning in early 2021. Removal of CCR from areas directly upgradient of BGWC-43D is anticipated to be completed in the first quarter of 2023. The shallow groundwater monitoring well BGWC-30, which is part of the monitoring well cluster together with well BGWC-43D, has experienced a decrease in water levels as a consequence of these pre-closure activities. This drop in water levels has also been accompanied by a drop in boron and Mo concentrations, indicating that closure activities are expected to have a positive effect on groundwater quality.

2.1.2 Plume Stability

The second aspect of the Phase I analysis was to evaluate if the Mo plume is stable or receding. Mo is horizontally and vertically delineated by wells BGWC-50D and BGWC-44D and is spatially

limited (localized). Evaluation of plume stability considered spatial extent, delineation results, and concentration trends.

Linear regression of Mo concentrations in BGWC-43D were conducted for the full data set (May 2020 to January 2024) and for the period since closure construction activities began (approximately May 2021). Best-fit lines for full data for both timeframes are shown on **Figure 1** and **Figure 2**, respectively.

To evaluate statistical trends for Mo, the software package ProUCL version. 5.1 (USEPA, 2016) was used according to the software's user guide (USEPA, 2015a). The results of the statistical analyses are provided in **Appendix A**.

BGWC-43D was installed as a vertical delineation well for wells BGWC-30 and BGWC-38D. Groundwater data for the period of 2017-2022 are available for well BGWC-30, which indicate significant reductions in concentrations of boron (86%), sulfate (85%), and Mo (70%) (Mann-Kendall trend test analysis, p-value $<10^{-3}$), likely related to the commencement of closure activities. Boron and sulfate are conservative primary indicators of CCR constituents, and the reductions indicate that source control measures potentially limited the migration of CCR constituents to groundwater with subsequent declines of constituent concentrations in groundwater.

For the Mo SSL identified in well BGWC-43D, wells BGWC-49D and BGWC-50D vertically and horizontally delineate the extent of the Mo plume, respectively, to concentrations below the GWPS (0.10 milligrams per liter (mg/L)).

Linear regression indicates a negative slope of the best fit lines since the initiation of sampling at BGWC-43D in 2020 (-1.58×10^{-5} mg/L per day) and since the initiation of closure construction activities in May 2021 (-8.87×10^{-5} mg/L per day). The slope of the line increases following the initiation of closure activities, suggesting a more rapid decrease in concentrations.

No statistically significant increasing trend of the groundwater Mo concentrations was identified in BGWC-43D since 2020, when the well was installed (Mann-Kendall trend analysis, P-value = 0.17).

The plume stability and trend analyses will be revisited as additional monitoring data become available as part of the corrective action (long-term monitoring) program during and following the completion of other ongoing measures (*e.g.,* closure) at the Site.

In summary, further evaluation of MNA for Mo under Phase 2 criteria is warranted:

- Source control is ongoing at the Site, limiting the potential release of constituents; MNA is most appropriate as a groundwater corrective measure when coupled with source control.

- The Mo plume is spatially limited (localized) and remains onsite.

- Mo concentrations appear stable at well BGWC-43D.

2.2 Phase II – Mechanism and Rate of Attenuation

Since the Phase I analysis indicated site conditions are conducive to the natural attenuation of Mo, a Phase II analysis was initiated to document the predominant attenuation mechanism(s) of Mo. This evaluation consisted of (i) evaluation of geochemical equilibria (ii) characterization of groundwater and aquifer materials; and (iii) batch sorption/desorption testing, which are all detailed in the *Geochemical Conceptual Site Model Report* (GCSM Report; Geosyntec 2023a). As demonstrated in the *Reactive Transport Model Report* (Geosyntec, 2023c), the predicted post-closure attenuation rates are sufficient to achieve GWPS. As data is collected during implementation of MNA and once a decreasing trend of Mo at BGWC-43D is established, a site-specific first-order attenuation rate constant will be calculated using an exponential data fit to temporal Mo data from BGWC-43D according to the method outlined by USEPA (2002).

2.2.1 Geochemical Equilibria

Molybdenum in groundwater under oxidizing conditions is present as the molybdate oxyanion (MoO_4^{2-}) (Smedley and Kinniburgh, 2017). Under site-specific Eh-pH conditions at AP-1, Mo has also been shown to be thermodynamically stable as MoO_4^{2-} in well BGWC-43D (Geosyntec, 2023b). Molybdenum tends to be more mobile under alkaline conditions with increasing sorption under neutral to acidic conditions (due to the formation of positively charged surface sites in lower pH conditions). Molybdenum strongly binds to organic matter and readily sorbs to oxyhydroxide minerals (Goldberg et. al., 1996; ATSDR, 2020).

Based on site-specific Eh-pH conditions, iron is likely to be present as iron oxides and oxyhydroxides (Geosyntec, 2023b). Therefore, geochemical evidence suggests that attenuation of Mo is likely to occur under site conditions through sorption to iron oxyhydroxides. Further evidence of this mechanism is discussed below via characterization of aquifer materials and site-specific sorption and desorption studies.

2.2.2 Groundwater and Aquifer Material Collection and Baseline Data

Field investigations were completed in August 2020 to collect site materials for chemical and mineralogical characterization that were used for the Phase II MNA evaluation. These materials were analyzed to evaluate groundwater corrective measures and to potentially support evaluation of attenuation mechanism(s) for an MNA demonstration.

Geologic material was collected via direct push technology (DPT) from multiple locations (adjacent to compliance wells) to represent downgradient and background aquifer solids. (Figure 5 in the GCSM Report [Geosyntec, 2023b]). The samples were sent to SiREM laboratory (Guelph, Ontario) for a baseline chemical and mineralogical characterization including X-ray diffraction

(XRD), sequential extraction procedure (SEP), and batch sorption and desorption tests. The findings are briefly summarized below, and details are provided and the GCSM Report (Geosyntec, 2023b).

The quantitative -XRD- data indicated that the residuum is mainly made up of quartz, muscovite, a hydrous silicate of aluminum and potassium mica, kaolinite, an aluminosilicate clay mineral and goethite (Geosyntec, 2023b). The predominant bedrock formations underlaying AP-1, the Knox Dolomite and Newala Limestone, both produce a cherty, silty and/or clayey residuum upon weathering. These XRD data of the residuum are consistent with weathering of the highly siliceous Knox dolomite and suggest that the parent carbonate bedrock is the source of mineral phases, including silicates, clay minerals, and Fe- and Mn-oxides observed in the residuum samples. Further, the XRD confirmed the presence of attenuation phases in residuum that is typically present as infill in secondary porosity features of the bedrock.

A seven-step SEP analysis was performed to evaluate which solid phases the constituents of interest are associated with. This allows an assessment of the mobility and/or attenuation of these constituents of interest. SEP data indicated that Mo was not extracted in the first two steps (labile exchangeable and carbonate phase) or the organic phase (Step 5). The bulk of total detectable Mo was extracted in Step 4 indicating Mo is mainly bound to crystalline metal oxides and oxyhydroxides in the residuum (Geosyntec, 2023b).

The results of the aquifer solids characterization identified multiple lines of evidence suggesting interactions with iron and potentially aluminum and manganese oxyhydroxides as the primary driver of Mo attenuation.

2.2.3 Batch Sorption/Desorption Testing

Batch sorption and desorption testing was performed to evaluate both the sorption behavior of Mo and whether sorbed Mo is available for desorption under the conditions tested. As part of the sorption testing, a site-specific partition coefficient (Kd) was calculated for Mo. The Kd represents the relative propensity for a constituent to be associated with the solid versus the aqueous phase. Therefore, understanding the magnitude of Kd is essential for estimating the chemical attenuation of Mo.

The materials and methods for the sorption and desorption batch studies are detailed in the GCSM Report (Geosyntec, 2023b). Briefly, the sorption experiments were conducted with background groundwater spiked with six concentration levels of Mo and aquifer solids that served to provide sorption sites. Desorption experiments were conducted with background water, and aquifer solids from a boring downgradient of BGWC-22 which had the second highest concentrations of Mo amongst the collected borings.

The site-specific Kd was calculated based on the sorption of Mo using six concentration steps with the highest concentration being twice as high as the highest Mo concentration observed at the Site.

The Kd value, assuming linear sorption, was calculated as 45,523 liters per kilogram (L/kg) which is outside the range of values reported by USEPA (2005) for Mo[1].

Desorption batch tests were conducted using DPT cores collected from downgradient locations around AP-1. Since this testing speaks to the stability of Mo attenuation, it is further described in the Phase III evaluation below.

2.3 Phase III – Attenuation Capacity and Stability

The applicability of MNA and attenuation mechanisms were evaluated in Phase I and Phase II assessments. Phase III assesses the site-specific capacity for natural attenuation and the stability of the attenuation processes.

2.3.1 Aquifer Attenuation Capacity

A review of aquifer attenuation capacity was completed in accordance with USEPA (USEPA, 2007; USEPA 2015) to understand if sufficient capacity is available in the aquifer downgradient of BGWC-43D to attenuate Mo. These calculations are inherently conservative as they assume a constant mass flux and exclude mechanisms which dilute the Mo in groundwater and exclude the effect of source control. This includes the following assumptions:

- A groundwater Mo concentration of 0.24 mg/L as measured at BGWC-43D in July 2021 (highest Mo groundwater concentration reported for the available data);
- An equivalent porous medium with an effective porosity of 0.3 (Geosyntec, 2021)[2];
- An aquifer solids density of 2.6 grams per cubic centimeter;
- An aquifer thickness of 50 ft;
- An aquifer width of 300 ft around BGWC-43D;
- An aquifer length of 850 ft based on the approximate distance between BGWC-43D to the downgradient delineation well BGWC-50D;
- A groundwater velocity of 0.12 ft/day in the vicinity of BGWC-43D, calculated using March 2021 groundwater level data and the geometric mean horizontal hydraulic conductivity (Kh) value (Geosyntec, 2021); and

[1] As described in the GCSM Report, Mo sorption was also observed during Day 0, indicating Mo sorption to aquifer solids.

[2] This assumption is consistent with the conceptual site model that flow occurs in residuum and sediment filed secondary porosity features.

- An aquifer solids attenuation capacity of 1.74 mg of Mo per kg of aquifer material was assumed based on the results of the Day (0) sorption testing (Section 2.2.3) using the highest Mo spike level of 2.16 mg/L (Geosyntec, 2023)[3].

Based on these assumptions, the mass flux of Mo into the system dimensions outlined above was calculated as 1,339 g/year in the absence of source control. However, the attenuation capacity downgradient of BGWC-43D will support a stable, non-expanding plume footprint for >100 years in the absence of source control. However, closure of AP-1 is predicted to result in declining concentrations of Appendix IV constituents (Geosyntec, 2023c). This evaluation further confirms the suitability of MNA as a corrective measure for Mo downgradient of BGWC-43D.

2.3.2 Batch Desorption Tests

Batch desorption testing was completed to evaluate the stability of the chemical attenuation mechanisms. A detailed account of the study and the associated laboratory report are provided in the GCSM Report (Geosyntec, 2023b). Aquifer solids sampled from downgradient of well BGWC-22, was used to assess the leaching/desorption behavior of Mo, as described in Section 3). The results of the desorption study indicated stable aqueous phase concentrations of Mo ($<10^{-4}$ mg/L) after 7 days of incubation under ambient conditions, suggesting that Mo is not available for desorption under the conditions tested. Desorption data support the suitability of MNA as a remedial component for Mo.

[3] Day 7 results suggest a higher attenuation capacity.

3 Phase IV – Performance Monitoring Program

In conjunction with source control (*i.e.,* pond closure), MNA is an appropriate corrective measure. A plan outlining the associated performance monitoring program and contingency measures will be developed as part of Phase IV of MNA evaluation, if MNA is selected as a component of the groundwater remedy at the Site. The plan is required to provide data to evaluate the performance of the MNA component of the remedy and the progress of the natural attenuation processes at the Site, particularly following the completion of ongoing closure activities (*i.e.,* post-closure care (PCC) period).

Reevaluation of site conditions will assess whether there are changes that can affect the chemical or physical attenuation mechanisms and the anticipated long-term success of MNA. The reevaluation, for example, may include one or both of the following:

- Additional data collection to evaluate geochemical conditions (e.g., major ions, pH, ORP) and updating the geochemical and/or transport models.

- A review and potentially a field assessment of post-closure hydraulic (i.e., groundwater flow) conditions.

If these evaluations indicate that conditions promoting natural attenuation, together with source control, are insufficient to meet remedial objectives, alternative remedial approaches may need to be considered. If an alternative corrective measure is selected, MNA is appropriate as a component of the selected remedy.

4 CONCLUSIONS

A tiered MNA evaluation was completed, consistent with USEPA, ITRC, and EPRI guidance documents, to assess if site conditions are favorable for implementing MNA as a corrective measure to address Mo SSL in groundwater downgradient of AP-1. The evaluation indicates MNA is an appropriate corrective measure for Mo coupled with source control, based on multiple line of evidence.

The Mo plume has been delineated and appears stable based on statistical analysis of currently available groundwater data. This MNA evaluation is supported by geochemical characterization and sorption/desorption tests indicating the significant capacity of site aquifer solids to attenuate Mo through sorption. Stable, non-expanding plume footprints downgradient of BGWC-43D for an extended time are anticipated based on conservative estimate of attenuation capacity under current conditions, even in the absence of source control.

An MNA performance monitoring program, and contingency remedies tailored to site-specific characteristics will be established if MNA is selected as a corrective measure.

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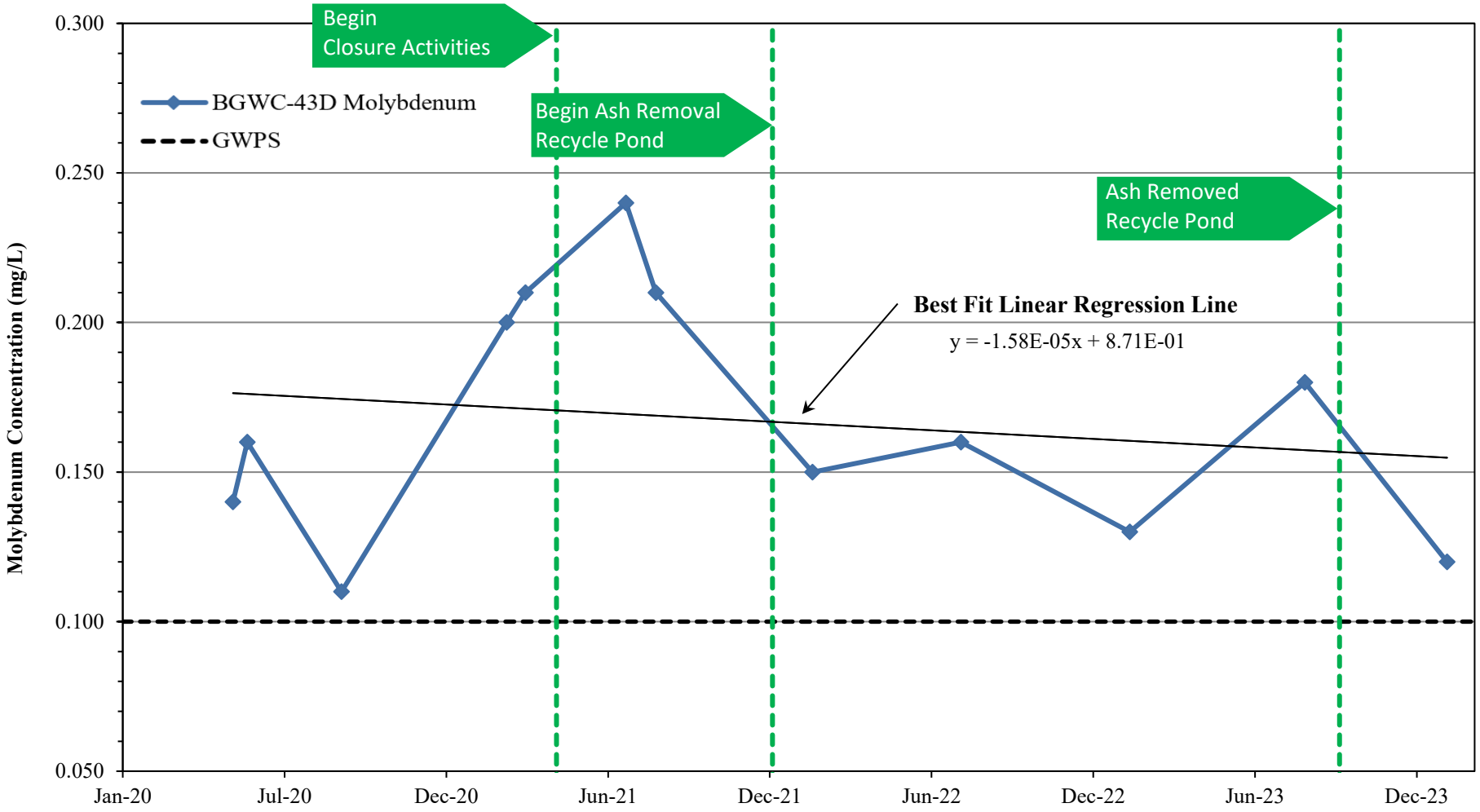
FIGURES



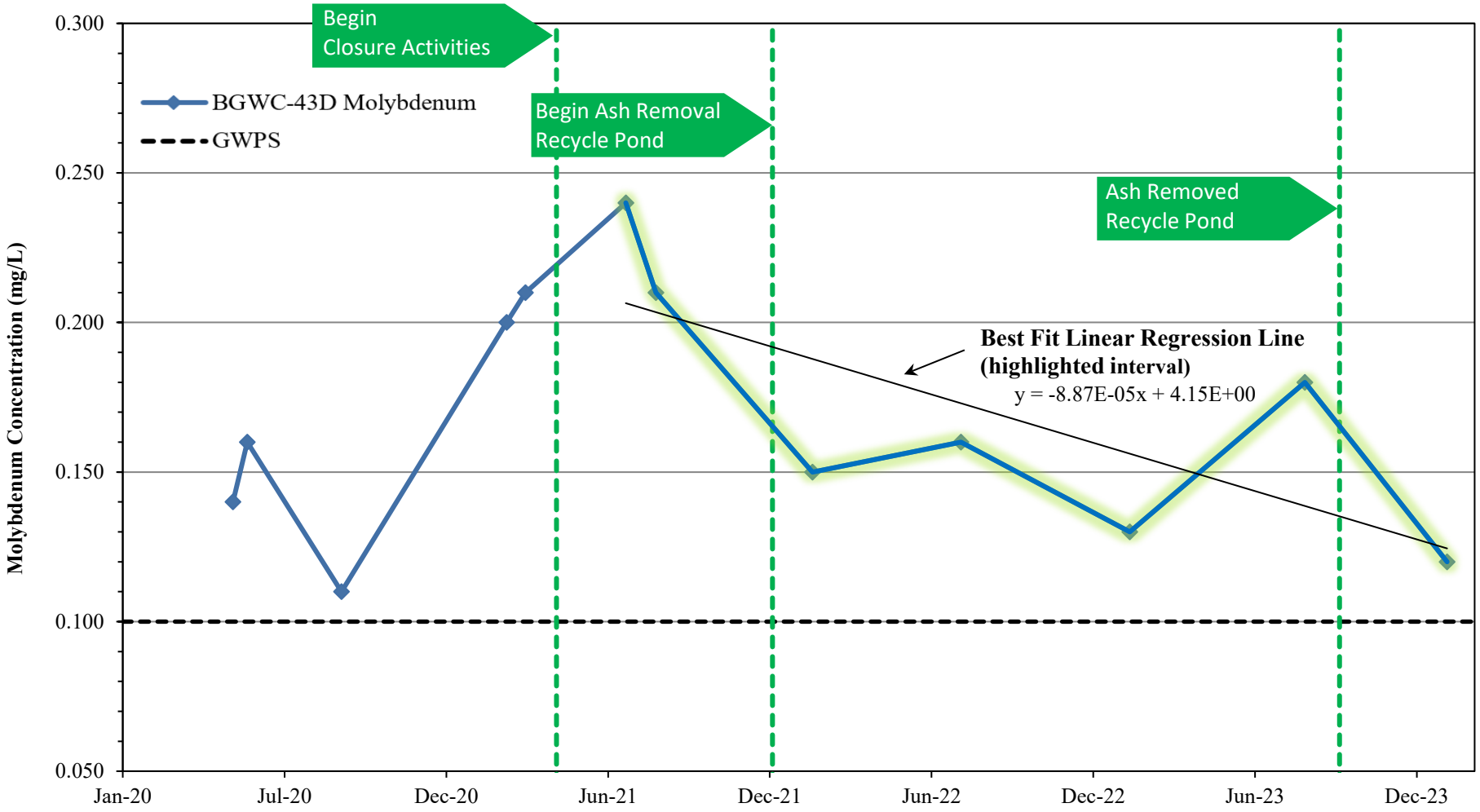
Note:
1. The Groundwater Protection Standard (GWPS) for molybdenum is 0.1 mg/L.
2. Milestone dates are approximated from observed construction activities.

LINEAR REGRESSION FOR MOLYBDENUM IN BGWC-43D
GEORGIA POWER COMPANY
PLANT BOWEN AP-1
BARTOW COUNTY, GEORGIA

Geosyntec consultants

KENNESAW, GA | JULY 2024

FIGURE 1



Note:
1. The Groundwater Protection Standard (GWPS) for molybdenum is 0.1 mg/L.
2. Milestone dates are approximated from observed construction activities.

LINEAR REGRESSION FOR MOLYBDENUM IN BGWC-43D SINCE CLOSURE ACTIVITIES BEGAN

GEORGIA POWER COMPANY
PLANT BOWEN AP-1
BARTOW COUNTY, GEORGIA

Geosyntec consultants

KENNESAW, GA | JULY 2024

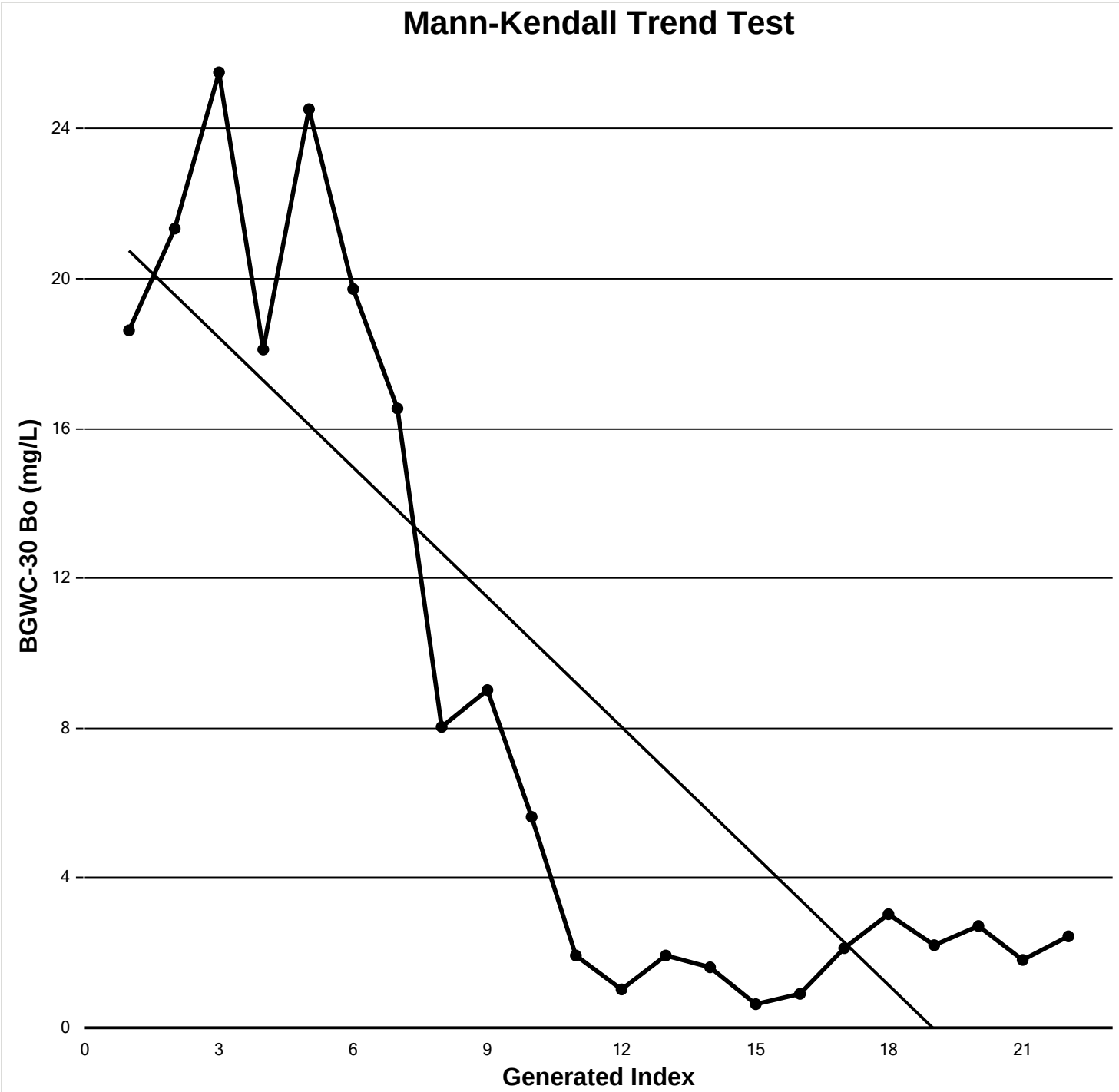
FIGURE 2

APPENDIX A

ProUCL Input Data and Output Results

Well	Date	Constituent	BGWC-30 Bo (mg/L)	Units
Boron	BGWC-30	2017-03-27	19.1	mg/L
Boron	BGWC-30	2017-04-17	21.8	mg/L
Boron	BGWC-30	2017-05-22	26	mg/L
Boron	BGWC-30	2017-06-05	18.6	mg/L
Boron	BGWC-30	2017-07-11	25	mg/L
Boron	BGWC-30	2017-08-23	20.2	mg/L
Boron	BGWC-30	2017-10-10	17	mg/L
Boron	BGWC-30	2018-06-15	8.5	mg/L
Boron	BGWC-30	2018-10-22	9.5	mg/L
Boron	BGWC-30	2019-04-02	6.1	mg/L
Boron	BGWC-30	2019-09-27	2.4	mg/L
Boron	BGWC-30	2020-02-26	1.5	mg/L
Boron	BGWC-30	2020-03-23	2.4	mg/L
Boron	BGWC-30	2020-09-25	2.1	mg/L
Boron	BGWC-30	2021-03-25	1.1	mg/L
Boron	BGWC-30	2021-07-20	1.4	mg/L
Boron	BGWC-30	2021-08-19	2.6	mg/L
Boron	BGWC-30	2022-02-14	3.5	mg/L
Boron	BGWC-30	2022-08-01	2.7	mg/L
Boron	BGWC-30	2023-02-01	3.2	mg/L
Boron	BGWC-30	2023-08-21	2.3	mg/L
Boron	BGWC-30	2024-02-06	2.9	mg/L

	A	B	C	D	E	F	G	H	I	J	K	L
1				**Mann-Kendall Trend Test Analysis**								
2			User Selected Options									
3			Date/Time of Computation	ProUCL 5.2 6/12/2024 10:18:36 AM								
4			From File	Updated ProUCL Input.xls								
5			Full Precision	OFF								
6			Confidence Coefficient	0.95								
7			Level of Significance	0.05								
8												
9			**BGWC-30 Bo (mg/L)**									
10												
11			**General Statistics**									
12			Number or Reported Events Not Used	0								
13			Number of Generated Events	22								
14			Number Values Reported (n)	22								
15			Minimum	1.1								
16			Maximum	26								
17			Mean	9.086								
18			Geometric Mean	5.391								
19			Median	3.35								
20			Standard Deviation	8.834								
21			Coefficient of Variation	0.972								
22												
23			**Mann-Kendall Test**									
24			M-K Test Value (S)	-124								
25			Tabulated p-value	0								
26			Standard Deviation of S	35.45								
27			Standardized Value of S	-3.47								
28			Approximate p-value	2.6050E-4								
29												
30	**Statistically significant evidence of a decreasing**											
31	**trend at the specified level of significance.**											



Mann-Kendall Trend Analysis	
n	22
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	35.4495
Standardized Value of S	-3.4697
M-K Test Value (S)	-124
Tabulated p-value	0.0000
Approximate p-value	0.0003

OLS Regression Line (Blue)	
OLS Regression Slope	-1.1582
OLS Regression Intercept	22.4052

Statistically significant evidence of a decreasing trend at the specified level of significance.

Well	Date	Constituent	BGWC-30 SO4 (mg/L)	Units
BGWC-30	2017-03-27	Sulphate	410	mg/L
BGWC-30	2017-04-17	Sulphate	400	mg/L
BGWC-30	2017-05-22	Sulphate	460	mg/L
BGWC-30	2017-06-05	Sulphate	440	mg/L
BGWC-30	2017-07-11	Sulphate	420	mg/L
BGWC-30	2017-08-23	Sulphate	390	mg/L
BGWC-30	2017-10-10	Sulphate	420	mg/L
BGWC-30	2018-06-15	Sulphate	174	mg/L
BGWC-30	2018-10-22	Sulphate	204	mg/L
BGWC-30	2019-04-02	Sulphate	153	mg/L
BGWC-30	2019-09-27	Sulphate	51.7	mg/L
BGWC-30	2020-02-26	Sulphate	42.6	mg/L
BGWC-30	2020-03-23	Sulphate	55.7	mg/L
BGWC-30	2020-09-25	Sulphate	53.6	mg/L
BGWC-30	2021-03-25	Sulphate	28.1	mg/L
BGWC-30	2021-07-20	Sulphate	37.2	mg/L
BGWC-30	2021-08-19	Sulphate	58.2	mg/L
BGWC-30	2022-02-14	Sulphate	74.4	mg/L
BGWC-30	2022-08-01	Sulphate	63.3	mg/L
BGWC-30	2023-02-01	Sulphate	75.5	mg/L
BGWC-30	2023-08-21	Sulphate	54.0	mg/L
BGWC-30	2024-02-06	Sulphate	64.2	mg/L

	A	B	C	D	E	F	G	H	I	J	K	L
1				**Mann-Kendall Trend Test Analysis**								
2		User Selected Options										
3		Date/Time of Computation		ProUCL 5.2 6/12/2024 10:20:30 AM								
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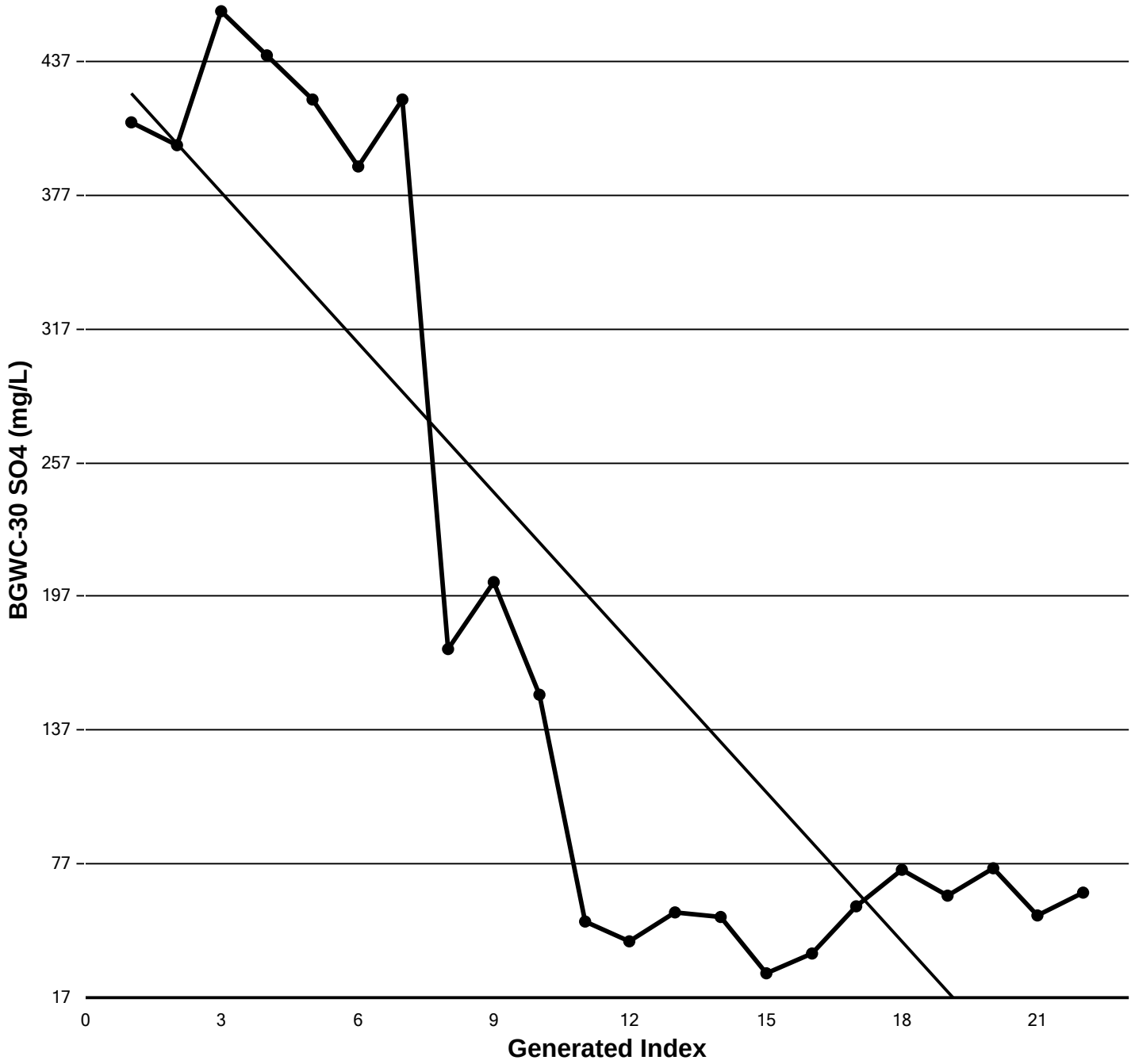
5		Full Precision		OFF								
6		Confidence Coefficient		0.95								
7		Level of Significance		0.05								
8												
9		**BGWC-30 SO4 (mg/L)**										
10												
11		**General Statistics**										
12		Number or Reported Events Not Used		0								
13		Number of Generated Events		22								
14		Number Values Reported (n)		22								
15		Minimum		28.1								
16		Maximum		460								
17		Mean		187.7								
18		Geometric Mean		120.6								
19		Median		74.95								
20		Standard Deviation		168.6								
21		Coefficient of Variation		0.898								
22												
23		**Mann-Kendall Test**										
24		M-K Test Value (S)		-114								
25		Tabulated p-value		0								
26		Standard Deviation of S		35.45								
27		Standardized Value of S		-3.188								
28		Approximate p-value		7.1721E-4								
29												
30	**Statistically significant evidence of a decreasing**											
31	**trend at the specified level of significance.**											

Mann-Kendall Trend Test



Mann-Kendall Trend Analysis	
n	22
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	35.4495
Standardized Value of S	-3.1876
M-K Test Value (S)	-114
Tabulated p-value	0.0000
Approximate p-value	0.0007

OLS Regression Line (Blue)	
OLS Regression Slope	-22.4082
OLS Regression Intercept	445.3987

Statistically significant evidence of a decreasing trend at the specified level of significance.

Well	Date	Constituent	BGWC-30 Mo (mg/L)	Units
BGWC-30	2017-03-27	Molybdenum	0.0157	mg/L
BGWC-30	2017-04-17	Molybdenum	0.0178	mg/L
BGWC-30	2017-05-22	Molybdenum	0.0208	mg/L
BGWC-30	2017-06-05	Molybdenum	0.0191	mg/L
BGWC-30	2017-07-11	Molybdenum	0.0218	mg/L
BGWC-30	2017-08-23	Molybdenum	0.0218	mg/L
BGWC-30	2018-03-26	Molybdenum	0.014	mg/L
BGWC-30	2018-06-15	Molybdenum	0.012	mg/L
BGWC-30	2018-10-22	Molybdenum	0.01	mg/L
BGWC-30	2019-03-01	Molybdenum	0.011	mg/L
BGWC-30	2019-04-02	Molybdenum	0.01	mg/L
BGWC-30	2019-09-27	Molybdenum	0.0036	mg/L
BGWC-30	2020-02-26	Molybdenum	0.0023	mg/L
BGWC-30	2020-03-23	Molybdenum	0.0037	mg/L
BGWC-30	2020-09-25	Molybdenum	0.0027	mg/L
BGWC-30	2021-03-08	Molybdenum	0.0031	mg/L
BGWC-30	2021-03-25	Molybdenum	0.0017	mg/L
BGWC-30	2021-07-20	Molybdenum	0.0018	mg/L
BGWC-30	2021-08-19	Molybdenum	0.0032	mg/L
BGWC-30	2022-02-14	Molybdenum	0.0048	mg/L
BGWC-30	2022-08-01	Molybdenum	0.0047	mg/L
BGWC-30	2023-02-01	Molybdenum	0.0058	mg/L
BGWC-30	2023-08-21	Molybdenum	0.0048	mg/L
BGWC-30	2024-02-06	Molybdenum	0.0049	mg/L

	A	B	C	D	E	F	G	H	I	J	K	L
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2		User Selected Options										
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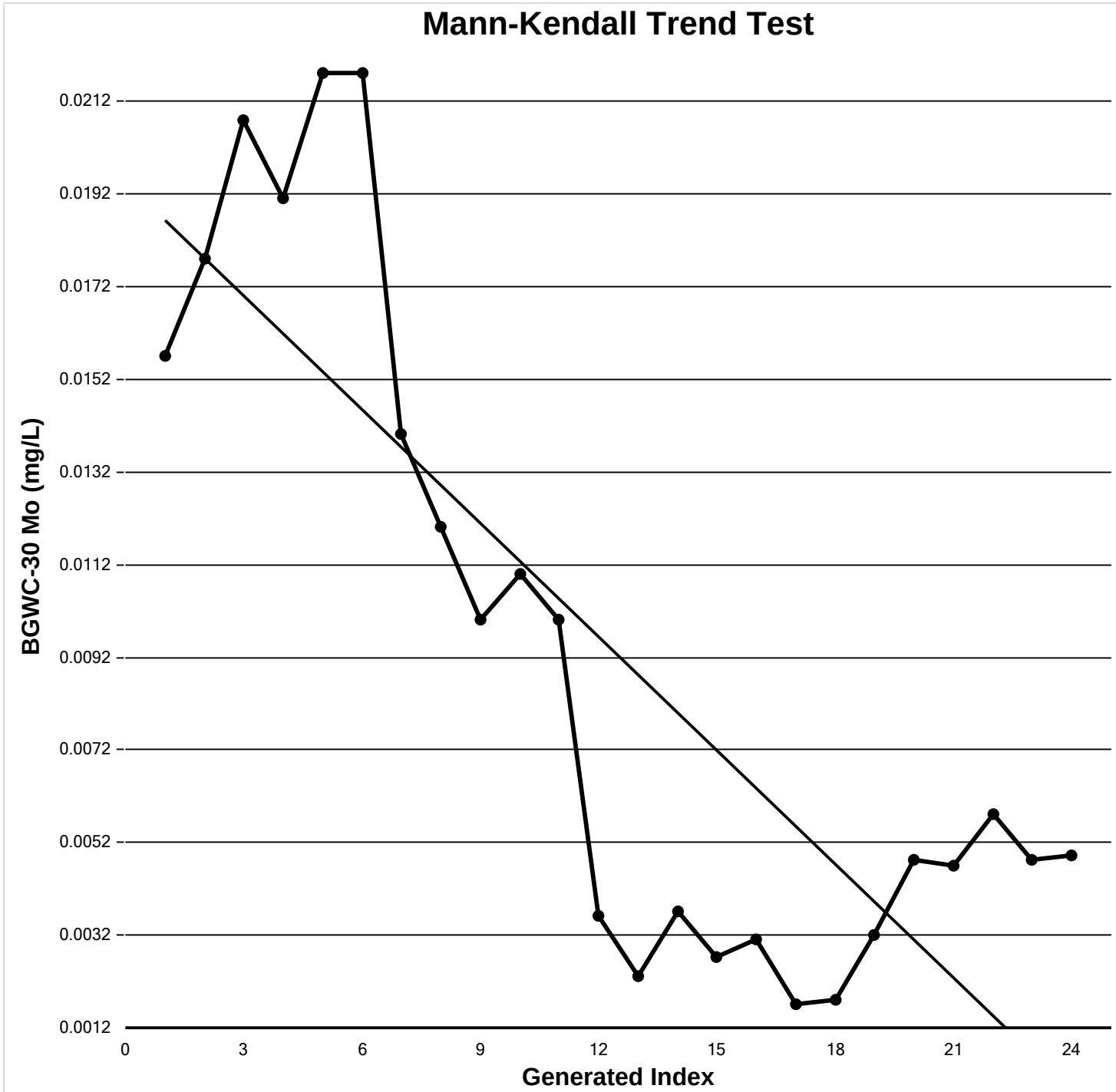
6		Confidence Coefficient		0.95								
7		Level of Significance		0.05								
8												
9		**BGWC-30 Mo (mg/L)**										
10												
11		**General Statistics**										
12		Number or Reported Events Not Used		0								
13		Number of Generated Events		24								
14		Number Values Reported (n)		24								
15		Minimum		0.0017								
16		Maximum		0.0218								
17		Mean		0.00921								
18		Geometric Mean		0.00673								
19		Median		0.00535								
20		Standard Deviation		0.007								
21		Coefficient of Variation		0.76								
22												
23		**Mann-Kendall Test**										
24		M-K Test Value (S)		-131								
25		Critical Value (0.05)		-1.645								
26		Standard Deviation of S		40.28								
27		Standardized Value of S		-3.228								
28		Approximate p-value		6.2427E-4								
29												
30	**Statistically significant evidence of a decreasing**											
31	**trend at the specified level of significance.**											



Mann-Kendall Trend Analysis	
n	24
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	40.2782
Standardized Value of S	-3.2276
M-K Test Value (S)	-131
Appx. Critical Value (0.05)	-1.6449
Approximate p-value	0.0006

OLS Regression Line (Blue)	
OLS Regression Slope	-0.0008
OLS Regression Intercept	0.0195

Statistically significant evidence of a decreasing trend at the specified level of significance.

Well	Date	Constituent	BGWC-43D Mo (mg/L)	Units
BGWC-43D	2020-05-04	Molybdenum	0.14	mg/L
BGWC-43D	2020-05-20	Molybdenum	0.16	mg/L
BGWC-43D	2020-09-03	Molybdenum	0.11	mg/L
BGWC-43D	2021-03-08	Molybdenum	0.2	mg/L
BGWC-43D	2021-03-29	Molybdenum	0.21	mg/L
BGWC-43D	2021-07-20	Molybdenum	0.24	mg/L
BGWC-43D	2021-08-23	Molybdenum	0.21	mg/L
BGWC-43D	2022-02-15	Molybdenum	0.15	mg/L
BGWC-43D	2022-08-01	Molybdenum	0.16	mg/L
BGWC-43D	2023-02-07	Molybdenum	0.13	mg/L
BGWC-43D	2023-08-23	Molybdenum	0.18	mg/L
BGWC-43D	2024-01-30	Molybdenum	0.12	mg/L

	A	B	C	D	E	F	G	H	I	J	K	L
1				**Mann-Kendall Trend Test Analysis**								
2		User Selected Options										
3		Date/Time of Computation		ProUCL 5.2 6/12/2024 10:23:08 AM								
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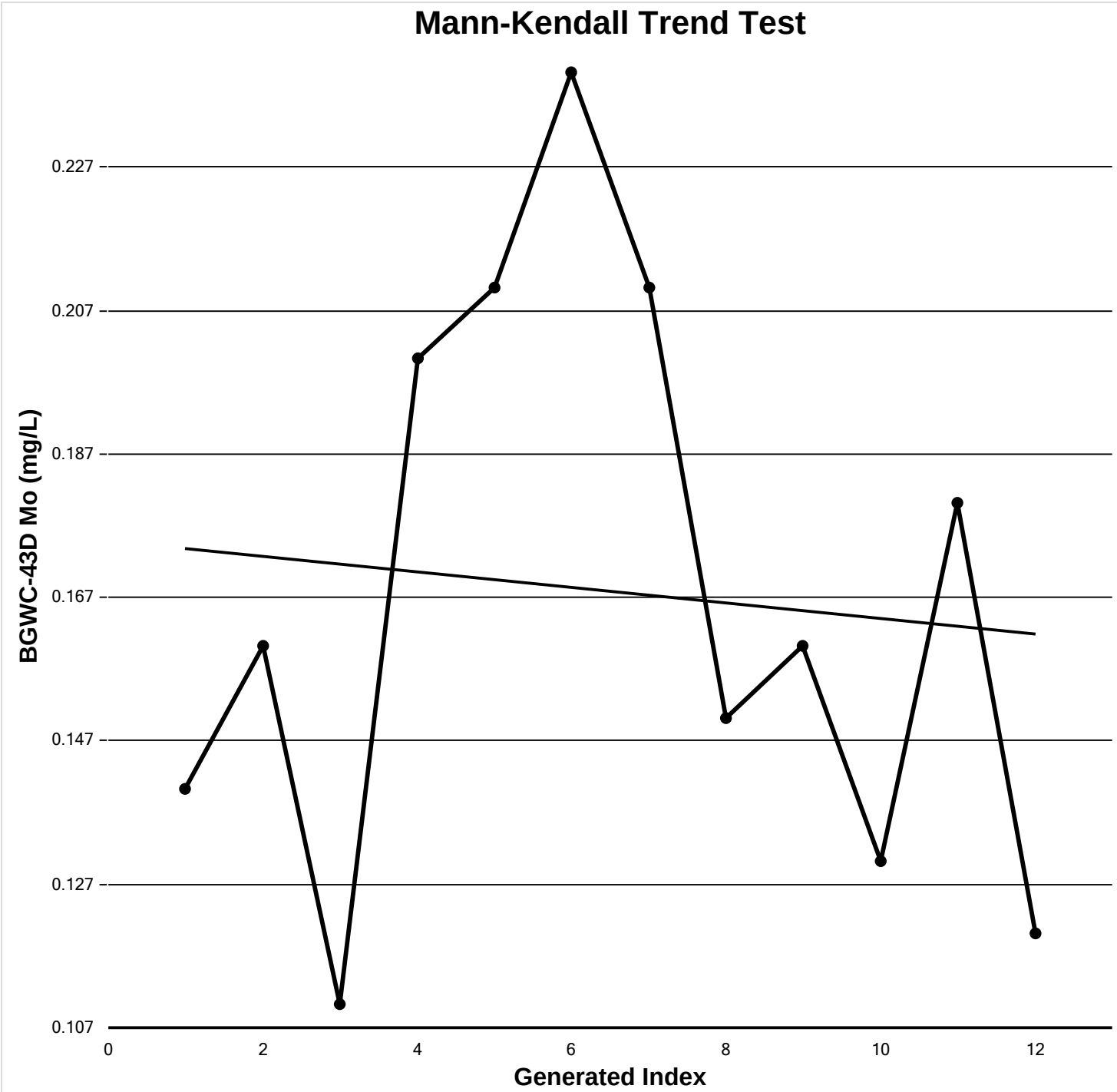
5		Full Precision		OFF								
6		Confidence Coefficient		0.95								
7		Level of Significance		0.05								
8												
9		**BGWC-43D Mo (mg/L)**										
10												
11		**General Statistics**										
12		Number or Reported Events Not Used		0								
13		Number of Generated Events		12								
14		Number Values Reported (n)		12								
15		Minimum		0.11								
16		Maximum		0.24								
17		Mean		0.168								
18		Geometric Mean		0.163								
19		Median		0.16								
20		Standard Deviation		0.0407								
21		Coefficient of Variation		0.243								
22												
23		**Mann-Kendall Test**										
24		M-K Test Value (S)		-4								
25		Tabulated p-value		0.42								
26		Standard Deviation of S		14.51								
27		Standardized Value of S		-0.207								
28		Approximate p-value		0.418								
29												
30	**Insufficient evidence to identify a significant**											
31	**trend at the specified level of significance.**											



Mann-Kendall Trend Analysis	
n	12
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	14.5144
Standardized Value of S	-0.2067
M-K Test Value (S)	-4
Tabulated p-value	0.4200
Approximate p-value	0.4181

OLS Regression Line (Blue)	
OLS Regression Slope	-0.0011
OLS Regression Intercept	0.1745

Insufficient statistical evidence of a significant trend at the specified level of significance.

APPENDIX E

Reactive Transport Model Report

Prepared for



Georgia Power Company
241 Ralph McGill Blvd NE
Atlanta, Georgia 30308

REACTIVE TRANSPORT MODEL REPORT

PLANT BOWEN ASH POND 1 (AP-1)

Prepared by



engineers | scientists | innovators

1255 Roberts Boulevard, Suite 200
Kennesaw, Georgia 30144

Project Number GW7629

July 2024

Geosyntec consultants

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LIST OF ACRONYMS AND ABBREVIATIONS

AP-1	Ash Pond 1
CCR	Coal Combustion Residual
CFR	Code of Federal Regulations
Co	Cobalt
CSM	Conceptual Site Model
GA EPD	Georgia Environmental Protection Division
GCSM	Geochemical Conceptual Site Model
gpm	gallons per minute
GWPS	Groundwater Protection Standard
HAR	Hydrogeologic Assessment Report
HELP	Hydrologic Evaluation of Landfill Performance
HFO	Hydrous Ferric Oxide
Mo	Molybdenum
MNA	Monitored Natural Attenuation
NOI	Notice of Intent
SSL	Statistically Significant Level
SEP	Sequential Extraction Procedure
USEPA	United States Environmental Protection Agency
WRA	Whole Rock Analysis
XRD	X-Ray Diffraction

1.0 INTRODUCTION

1.1 Purpose

This reactive transport model report (Report) has been prepared for the Georgia Power Company (Georgia Power) Plant Bowen Ash Pond 1 (AP-1 or Site) and is included as Appendix B to the *Draft Remedy Selection Report – Plant Bowen Ash Pond 1 (AP-1)* (Remedy Selection Report) (Geosyntec, 2023a). The purpose of this report is to document the reactive transport model developed to evaluate potential remediation approaches to address statistically significant levels (SSLs) of cobalt (Co) and molybdenum (Mo) concentrations above groundwater protection standards (GWPS) at BGWC-22 and BGWC-43D in the bedrock beneath AP-1.

1.2 Site Background and Overview of AP-1 Pond Closure

Plant Bowen is located nine miles southwest of Cartersville in Bartow County, Georgia. The Site is bordered by the Etowah River to the north and east, and sparsely populated, forested, rural, and industrial land on the south and west. A Site location map is included in the Remedy Selection Report (See Figure 1 of the Remedy Selection Report, Geosyntec, 2023a).

AP-1 occupies an area of approximately 254 acres. In preparation for AP-1 closure, Plant Bowen converted to dry ash handling in early 2019, and AP-1 no longer receives ash. Georgia Power submitted a notice of intent (NOI) to the Georgia Environmental Protection Division (GA EPD) stating that waste stream flows are no longer directed to AP-1, effective December 31, 2020. Georgia Power will close AP-1 by excavation and consolidation of Coal Combustion Residual (CCR) material into an approximately 144-acre fully-contained (including engineered composite-liner and final cover systems), multi-cell storage facility situated within the current footprint of AP-1. Removal of CCR in the vicinity of BGWC-43D is ongoing and is anticipated to be completed in early 2023. Removal of CCR in the vicinity of BGWC-22 is scheduled to be completed in 2024-2025. Closure of AP-1 is anticipated to be completed in 2035

1.3 Site Geology and Hydrogeologic Setting

The following section summarizes the geologic and hydrogeologic conditions at AP-1 as described in the *Hydrogeologic Assessment Report (Revision 3) – AP-1* (Hydrogeologic Assessment Report (HAR) Rev 3) (Geosyntec, 2021) prepared in support of the AP-1 solid waste handling permit.

1.3.1 Site Geology

The Site is located within the Great Valley District of the Valley and Ridge Physiographic Province (Valley and Ridge) in northwest Georgia. The Valley and Ridge is characterized by Paleozoic sedimentary rocks that have been folded and faulted into ridges and valleys that gave this region its name. The floor of the valley is underlain by shales, dolomites, and limestones of Cambrian and Ordovician age. Geologic mapping performed by Lawton et al. (1976) indicates that the Site is underlain by the Ordovician-Cambrian age Knox Dolomite and the Ordovician age Newala Limestone. The composition and weathering of the Knox Dolomite and the Newala Limestone are discussed in detail in the *Geochemical Conceptual Site Model Report Plant Bowen Ash Pond 1* (GCSM Report; Geosyntec, 2023b), included as Appendix A of the Remedy Selection Report (Geosyntec 2023a). The Site is underlain primarily by three units: (i) fill material consisting of earthen embankments and CCR material; (ii) residuum; and (iii) dolomite/limestone bedrock. Based on review of subsurface investigations at the Site, the bedrock is described as predominantly Knox Dolomite, with the smaller area in the south-southwest corner of AP-1 underlain by the Newala Limestone.

1.3.2 Hydrogeology and Groundwater Flow

The uppermost aquifer at the Site occurs near the interface of the residuum and the fractured and solutioned bedrock. Groundwater recharge is by precipitation infiltrating through the residuum to bedrock, or in bedrock outcrop areas through direct infiltration. Groundwater flow in bedrock is under unconfined to semi-confined conditions from the mantle of overlying lower-permeability residuum and is controlled by secondary porosity along fractures and solution-enhanced features that are typically filled with residuum (Geosyntec, 2023c). Based on observations of residuum soil types, horizontal hydraulic conductivity values, and boring logs and geophysical evaluations, the movement of groundwater in the clay-rich residuum and weathered bedrock zone is slow and likely behaves as flow through low-permeability porous media. Groundwater flow in the dolomite/limestone bedrock is likely controlled by secondary porosity features that are typically filled with residuum (Geosyntec, 2023c).

Groundwater elevation data and potentiometric surface contours that depict groundwater flow direction are provided in the Draft Remedy Selection Report (See Figure 5 of the Remedy Selection Report, Geosyntec, 2023a). Interpretation of the potentiometric surface contours indicates that groundwater generally flows to the north, northwest, and west, towards Euharlee Creek. A component of flow in the southernmost portion of AP-1 is to the south and west, likely due to groundwater mounding related to historical free water storage at the recycle pond at the southern end of AP-1 (now decommissioned).

1.4 Groundwater Exceedances

Georgia Power has performed CCR groundwater monitoring-related activities at AP-1 since June 2016[1]. As discussed in the Remedy Selection Report (Geosyntec, 2023a), the concentration of Co and Mo in groundwater at BGWC-22 and BGWC-43D, respectively, exceeds the GWPS. Cobalt and Mo in groundwater has been horizontally and vertically delineated, as shown in the Remedy Selection Report (See Figure 6 and Figure 7 of the Remedy Selection Report, Geosyntec, 2023a). Groundwater monitoring data confirm that Co and Mo are not migrating offsite, and impacts are likely limited in extent due to natural attenuation processes in the aquifer.

1.5 Model Approach & Objectives

Geosyntec has developed reactive transport models for Co and Mo to support the remedy selection process for AP-1. The GA EPD Groundwater Contaminant Fate and Transport Modeling Guidance (GA EPD, 2016) was used as a guide for developing both models, where appropriate.

As noted above in **Section 1.2**, Georgia Power will close AP-1 by excavation and consolidation of CCR material into an approximately 144-acre fully-contained, multi-cell engineered storage facility situated within the current footprint of AP-1. CCR near BGWC-43D is currently being removed and CCR near BGWC-22 is scheduled to be removed in 2024-2025. Closure of AP-1 is anticipated to be completed in 2035.

Several factors including, but not limited to, construction activities and weather are anticipated to affect groundwater flow conditions during the interim closure construction period. During the construction time period groundwater flow velocity and direction in the vicinity of the ash pond is anticipated to change and reach a post-closure new steady-state groundwater flow condition. Based on the above and for the purpose of evaluating remedial alternatives, the transport models described below assume that remedial approaches will be implemented under steady state post-closure conditions.

[1] Monitoring activities have been performed in accordance with the United States Environmental Protection Agency's (USEPA's) Coal Combustion Residuals (CCR) Rule, 40 Code of Federal Regulations (CFR) Parts 257 effective October 19, 2015 (CCR Rule) including subsequent revisions and Georgia Environmental Protection Division's (GA EPD's) Rule for Solid Waste Management Rule 391-3-4-10 for CCR.

Three objectives were developed to guide the modeling effort:

- Develop a predictive reactive transport model for Mo and Co in the vicinity of BGWC-43D and BGWC-22 (respectively) under post-closure conditions.

- Assess the feasibility of monitored natural attenuation (MNA) processes to achieve the Co and Mo GWPS at or beyond the compliance boundary under model predicted post-closure conditions.

- Evaluate the feasibility of geochemical injections to achieve the Co and Mo GWPS at or beyond the compliance boundary under predicted post-closure conditions.

The geochemical conceptual site model (CSM), groundwater flow models, and transport models used to meet the above objectives are described in detail in the sections below.

2.0 GEOCHEMICAL CONCEPTUAL SITE MODEL

The following section summarizes the geochemical CSM for AP-1, as described in the GCSM Report (Geosyntec 2023b).

2.1 Cobalt Geochemistry and Fate and Transport Properties

Cobalt in groundwater under site-specific geochemical conditions at BGWC-22 is predominantly present as Co^{2+} while iron (Fe) associated with solid phases in the well screen interval is predicted to be present as iron oxides and oxyhydroxides. Therefore, Co in Site groundwater is predicted to be present as either dissolved Co^{2+} or adsorbed (complexed) with oxide phases of Fe, consistent with the literature (ATSDR, 2004; Krupke and Serne, 2002).

Results from the site-specific geochemical characterization presented in the GCSM Report (Geosyntec 2023b) indicate that the primary mechanisms governing Co attenuation at Bowen AP-1 include the following: (i) complexation of Co to surface species of aquifer matrix materials; and (ii) Co-precipitation – entrainment of Co initially bound to mineral surfaces in the crystal structure as the mineral continues to grow. The groundwater monitoring data suggests that any Co migration at the Site is likely limited to the vicinity of BGWC-22. Sorption and desorption experiments confirmed significant attenuation capacity of residuum material limiting the migration of Co through residuum-filled secondary porosity in the bedrock.

2.2 Molybdenum Geochemistry and Fate and Transport Properties

Molybdenum in groundwater under oxidizing conditions is present as the molybdate oxyanion ($MoO4^{2-}$) (Smedley and Kinniburgh, 2017). While Mo can also form Mo(V) and Mo (IV) species, $Mo(VI)O_4^{2-}$ is predicted to be the predominant species at the Site, including at BGWC-43D, based on groundwater geochemical conditions. Iron associated with the solid phases in the well screen interval is likely to be present as iron oxides and oxyhydroxides.

Mo tends to be more mobile under alkaline conditions with increasing sorption under neutral to acidic conditions (due to the formation of positively charged surface sites in lower pH conditions). Molybdenum strongly binds to organic matter and readily sorbs to oxyhydroxide minerals (Goldberg et. al., 1996; ATSDR, 2020). Therefore, Mo in Site groundwater is predicted to be present as dissolved $Mo(VI)O_4^{2-}$ or adsorbed (complexed) with oxide phases of Fe, consistent with the literature.

Results from the site-specific geochemical characterization presented in the GCSM Report (Geosyntec 2023b) indicate that the primary mechanisms governing Mo attenuation at Bowen AP-1 include the following: (i) complexation of $Mo(VI)O_4^{2-}$ to surface species of aquifer matrix materials; and (ii) Co-precipitation – entrainment of Mo initially bound to mineral surfaces in the crystal structure as the mineral continues to grow. Groundwater monitoring data suggests that any Mo migration at the Site is limited to the vicinity of BGWC-43D. Sorption and desorption experiments confirmed significant attenuation capacity of residuum material limiting the migration of Mo through residuum-filled secondary porosity in the bedrock.

2.3 Summary of Geochemical CSM

Under current Site conditions, Co and Mo are likely to be attenuated by residuum associated with secondary porosity features in the bedrock. Key details to support the geochemical CSM include:

- The wells of interest (BGWC-22 and BGWC-43D) are screened in bedrock and groundwater flow in bedrock is anticipated to be controlled by secondary porosity features typically filled with residuum.

- The in-place weathering of siliceous carbonate bedrock underlying AP-1 results in the formation of residuum enriched in silicate and aluminosilicate minerals.

- The interaction of residuum associated with secondary porosity features in bedrock with groundwater is likely to dominate attenuation of site-specific constituents.

- The composition of residuum in the vicinity of AP-1 indicates the presence of mineral phases that provide substantial attenuation capacity (i.e., iron oxyhydroxides and clay minerals).

- Sequential Extraction Procedure (SEP) conducted for select residuum samples representative of conditions at AP-1 suggests that Co and Mo are associated with amorphous and crystalline metal oxides and oxyhydroxides under Site conditions.

- The sorption and desorption studies confirm that Co and Mo are sorbed, with Co and Mo unavailable for desorption under experimental conditions. The measured partition coefficient for Co (i.e., 82 L/kg) was within the range of values reported in the literature and indicative of aquifer attenuation capacity for Co (Geosyntec, 2023b). The early (Day 0) results of the Mo sorption test indicates that Mo is

sorbed to the residuum. As such, the parent bedrock and the residuum associated with secondary porosity features in bedrock are expected to attenuate Co and Mo downgradient of AP-1.

- The laboratory studies are consistent with groundwater monitoring results that indicate attenuation of Co and Mo is occurring in the bedrock downgradient of AP-1.

It is important to note that the geochemical concepts presented in **Section 2** and utilized in the model (*i.e.,* attenuation to specific surfaces, or the effect of injectate on concentrations of Co and Mo) are applicable to pre- and post-closure conditions, assuming the magnitude and trends in concentration of Co and Mo continue to remain stable. As closure construction progresses, and additional groundwater monitoring data is collected, the assumptions associated with post-closure modeling will be evaluated and refinements made to the model, if necessary. Further, where applicable, the models presented herein have been developed with conservative assumptions on geochemical parameters including the type and mass of adsorption sites in the aquifer, as well as the mass of Co and Mo in groundwater. These conservative assumptions are described in later sections.

3.0 GROUNDWATER FLOW MODEL

Groundwater flow and reactive transport models were developed to evaluate the feasibility of MNA and geochemical injections as potential corrective measures for Mo and Co exceedances of GWPS. The following sections describe the setup, layering, boundaries, and parameterization for the flow models.

3.1 Focused Groundwater Flow Models

Two focused groundwater flow models were created to simulate post-closure groundwater flow. The first focused model simulates post-closure groundwater flow on the southern side of AP-1, in the vicinity of BGWC-43D. The second focused model simulates post-closure groundwater flow on the western side of AP-1, in the vicinity of BGWC-22. Both focused models are based on and informed by an updated version of the site wide groundwater flow model that was developed by Geosyntec (Geosyntec, 2020) to simulate groundwater flow under post-closure conditions. Groundwater flow in both focused models was assumed to approximate flow within an equivalent porous medium, consistent with the conceptual site model and the scale of these models. This approach conservatively excludes Co or Mo attenuation within the primary porosity of the bedrock matrix and assumes that transport of Co and Mo occurs in secondary porosity features that typically exhibit higher hydraulic conductivity than the bedrock matrix. For the purposes of the feasibility level remedy selection, layer elevations, flow parameters, and flow boundaries were adjusted from the site wide model to better reflect local flow conditions. In both focused flow models, flow was simulated under steady state conditions. Both flow models utilize the MODFLOW computer model (Harbaugh, 2005) and were created using the Processing MODFLOW version 8.0.47 (Simcore, 2012) software. A summary of flow model setup and output is provided below.

3.1.1 Flow Model Grid Extent & Layering

Model grid extents and layering for the BGWC-22 focused model and BGWC-43D focused model are shown on **Figures 1A** and **1B**, respectively. Model extents were designed to focus primarily on the portion of AP-1 where groundwater concentrations of Mo (at BGWC-43D) and Co (at BGWC-22) are detected above the GWPS. Both models use a uniform model grid cell size of 10 feet x 10 feet. Layering for both models is summarized below:

Material	Model Layer	Status
CCR & Dike & Residuum	1 to 2	Inactive
Residuum	3	Inactive
Upper Bedrock	4	Active
Intermediate Bedrock	5	Active
Lower Bedrock	6	Active

For both focused models, model layering is consistent with the conceptual site model described in the HAR (Geosyntec, 2021) and based on a 3D site wide geologic model developed for Plant Bowen. Post-closure design grades were not incorporated into model layering since the purpose of the model is to evaluate post-closure groundwater contaminant transport in the underlying bedrock. Similarly, Layers 1 to 3 in both flow models were ultimately inactivated when simulating reactive transport for the following reasons: i) post-closure, CCR will be consolidated and placed in a fully-contained, multi-cell storage facility; and ii) groundwater with observed concentrations of Co and Mo above the GWPS occurs within the underlying bedrock. As such, flow was not simulated in overlying layers. An example cross section of layering for BGWC-22 and BGWC-43D focused models are provided on **Figures 1A** and **1B**, respectively.

3.1.2 Flow Model Boundaries

Model flow boundaries and input parameters for the BGWC-22 focused model and BGWC-43D focused model are shown on **Figures 2A** and **2B**, respectively. Model boundaries representing Euharlee Creek were derived from the updated version of the calibrated site wide model. The general head boundaries were informed by post-closure groundwater elevations contours simulated by the updated version of the site wide model. Recharge rates in the focused models were based on estimated post-closure recharge rates simulated using the updated version of the site wide model. Post-closure recharge values within the footprint of AP-1 were assigned a value of $7x10^{-4}$ inches/year (in/yr) based on a Hydrologic Evaluation of Landfill Performance (HELP) model (Geosyntec, 2018). Recharge in the vicinity of BGWC-22 and BGWC-43D was assumed to be 0.76 in/yr and 0.16 in/yr, respectively.

Simulated groundwater elevation contours representing predicted post-closure flow conditions are shown on **Figures 2A** and 2**B**.

3.1.3 Flow Model Parameters

Model parameters are shown in **Table 1A** and **Table 1B**. In general, hydraulic conductivity is based on manually derived calibrated values from the updated version of the site wide model. Effective porosity and bulk density values were assigned to the models based on literature values (United States Environmental Protection Agency (USEPA), 1998; Kresic, 2006) and professional judgement. Longitudinal dispersivity was selected based on professional judgement and the USEPA On-line Tools for Site Assessment Calculation (USEPA, 2021). Transverse and vertical dispersivity were based on guidance from USEPA (1998) and standard modeling practice where transverse and vertical dispersivity are 10 and 100 times smaller than longitudinal dispersivity, respectively.

4.0 REACTIVE TRANSPORT MODEL – COBALT

A reactive transport model was developed for the area around monitoring well BGWC-22, where groundwater Co concentrations exceed the GWPS. The following sections describe the Co reactive transport model setup, scenarios, results, and sensitivity analysis.

4.1 Model Setup

The reactive transport model utilizes the three-dimensional (3D) reactive multicomponent transport code PHT3D (Prommer and Post, 2010). PHT3D incorporates the programs MT3DMS (Zheng and Wang, 1999) for 3D advective-dispersive multi-species transport modeling and PHREEQC (Parkhust and Appelo, 2000) for geochemical reaction modeling. PHT3D uses MODFLOW (Harbaugh, 2005) to provide the groundwater flow field for transport simulations.

Transport model construction and parameterization was performed in the Processing MODFLOW version 8.0.47 pre- and post-processing software package (Simcore, 2012). Equilibrium constants from the MINTEQ.V4 thermodynamic database (USEPA, 1999) were used for the Co model.

4.1.1 Geochemical Properties

This section describes the key geochemical reactions included in the reactive transport model: aqueous complexation, mineral precipitation/dissolution, and adsorption/desorption to mineral surfaces.

4.1.1.1 Aqueous Complexation- At each time step, PHT3D uses PHREEQC to calculate equilibrium aqueous speciation. The MINTEQ.V4 database of equilibrium constants was used for aqueous speciation calculations. Chloride was defined as the

charge balancing constituent to simulate an electrochemically neutral solution at each time step.

4.1.1.2 Mineral Precipitation/Dissolution- At each time step, minerals specified within the model setup are allowed to precipitate or dissolve to achieve equilibrium with groundwater. While a mixture of different iron oxides and oxyhydroxides are commonly found in aquifers due to variations in crystallinity, crystal size, solid solution, and crystallization kinetics, ferrihydrite was the only iron oxides included in the model.

4.1.1.3 Adsorption/Desorption- Adsorption and desorption of dissolved species to and from the ferrihydrite surface was modeled using the non-electrostatic hydrous ferric oxide (HFO) surface complexation model developed by Dzombak and Morel (1990) and included in the MINTEQ.V4 database. Other mineral surfaces were not included in the model due to the strong affinity of Mo adsorption on iron oxides. The surface complexation model describes adsorption to HFO equilibrated with ferrihydrite using two surface sites (strong and weak). The concentration of surface sites was dynamically linked to the concentration of ferrihydrite using a strong site density of 0.005 moles per mole (mol/mol) iron and 0.2 mol/mol iron, respectively (Dzombak and Morel, 1990). Since the solid phase composition may influence surface complexation and attenuation, model sensitivity analysis was performed by using an alternate Site-specific surface (**Section 4.3.3**).

4.1.2 Initial Geochemical Conditions

This section describes the model parameters for groundwater composition and mineralogy used to define the initial geochemical conditions of the model domain.

4.1.2.1 Groundwater Composition

Groundwater monitoring results from the September 2020 semiannual sampling event (Geosyntec, 2020) were used to define initial groundwater compositions within the model domain. Data from the September 2020 semiannual groundwater sampling event was used because the dataset is more complete than datasets from more recent sampling events; results from the September 2020 sampling event are consistent with the most recent 2022 semiannual sampling results (Geosyntec 2022).

Four areas with distinct initial groundwater compositions were defined: (i) the groundwater plume (i.e., groundwater with Co concentration above the GWPS in the vicinity of BGWC-22) in Layer 4 of the model; (ii) groundwater with Co concentration below GWPS north of BGWC-22 which represents groundwater downgradient of

BGWC-22 post-closure in Layer 4 of the model; (iii) groundwater with Co concentration below GWPS south and upgradient of BGWC-22 post-closure in Layer 4 of the model; and (iv) groundwater with Co concentrations below GWPS in bedrock beneath BGWC-22 consistent with vertical delineation of groundwater by well BGWC-37D in Layers 5 and 6 in the model.

(i) Layer 4 - Composition of Groundwater within Co Plume

The initial groundwater Co plume was defined in Layer 4 (bedrock) of the model around BGWC-22 (**Figure 3**). The concentration of Co was defined based on the highest observed Co concentration at BGWC-22 of 0.04 mg/L. The initial concentration of other constituents within the plume was based on the average of groundwater monitoring results at BGWC-22 and BGWC-23. BGWC-22 and BGWC-23 have similar chemical composition (except Co which is below the GWPS in BGWC-23). As such BGWC-23 was used to select initial concentration of other constituents since it is upgradient of BGWC-22 under post-closure conditions. Monitoring wells BGWC-22, BGWC-23 are screened within Layer 4 of the model.

(ii) Layer 4 - Composition of Groundwater North of BGWC-22

The composition of groundwater in Layer 4 north of BGWC-22 represents downgradient groundwater under post-closure conditions. The initial groundwater composition within this area was defined based on the average of groundwater monitoring results at BGWC-21 and BGWC-25 which are screened within Layer 4 of the model.

(iii) Layer 4 – Upgradient Groundwater Composition

Groundwater in Layer 4 with Co concentrations lower than the GWPS that represents upgradient groundwater under post-closure conditions was defined based on groundwater monitoring results at well BGWC-22 and BGWC-23. The initial Co concentration in this area was defined based on BGWC-23 Co concentrations. As stated earlier, BGWC-22 and BGWC-23 are both screened within Layer 4 of the model.

(iv) Layers 5 and 6 – Vertically Delineated Groundwater

Groundwater in Layer 5 and Layer 6 with Co concentrations lower than the GWPS which represents vertically delineated groundwater were defined based on groundwater monitoring results at well BGWC-37D and post-closure downgradient well BGWC-34D. Both these wells are screened within Layer 5 of the model. Although well BGWC-37D

is deeper than the delineation well BGWC-35D, it was selected for the model since the data would be applicable to both Layers 5 and 6 of the model.

Other Constituents

Values for the following constituents were used to define the initial groundwater and recharge compositions within the model: pH, pe (oxidation reduction potential), and molar concentrations of bicarbonate (represented in PHREEQC as C(4)), dissolved calcium, chloride, iron (II), potassium, magnesium, manganese (II), sodium, sulfate (represented in PHREEQC as S). pe was calculated from measured oxidation-reduction potential values. Bicarbonate was calculated from measured total alkalinity results assuming alkalinity is entirely attributed to bicarbonate at circumneutral pH, consistent with pH measurements of site groundwater. Results for total iron and manganese were used as the initial concentration of iron(II) and manganese(II), respectively, assuming that the concentrations of other insoluble or minor oxidation states (i.e., iron(III), manganese(III,IV)) in groundwater are negligible.

For each of the areas described above, the model conservatively assumes that the entire thickness of the cell in each layer has the same geochemical composition. To balance the electrochemical charge in the initial groundwater, the geochemical composition of each water, along with the mineralogy and adsorption parameters described below, was input into a batch PHREEQC model, and equilibrated using chloride to balance the charge. The charge-balanced solution composition was used as the initial groundwater concentration for the transport model. The initial groundwater composition for each area of the model domain is presented in **Table 2**.

4.1.2.2 Mineralogy

The initial concentration of ferrihydrite was defined based on the results of the SEP and solid phase characterization of residuum samples. A batch PHREEQC equilibrium simulation model (described above) was used to assess the saturation indices of solid phases that are likely to be in equilibrium with groundwater at BGWC-22. The results of the equilibrium model suggest iron oxide and oxyhydroxide phases are supersaturated in groundwater consistent with solid characterization results presented in the GCSM Report. No additional solid phases were included in the model.

The initial concentration of ferrihydrite varied within the model domain. Before initiating the transport model, PHT3D equilibrates the surface sites with groundwater to generate the initial concentrations of adsorbed species. Therefore, the initial concentration of

ferrihydrite affects the initial concentration of solid-phase Mo in the model. Two areas with discrete ferrihydrite concentrations were defined: i) the area within the groundwater Co plume (Layer 4), and ii) the area outside the groundwater Co plume (i.e., Co concentration less than GWPS) (Layer 4). The initial concentration of ferrihydrite assigned to each area was based on results of solid phase analysis performed on site samples and professional judgement.

The initial concentration of ferrihydrite was calibrated based on the mobile fraction of Co determined from SEP experiments performed on soil samples in the vicinity of BGWC-22 (sample DPT-02). SEPs are chemical extractions used to remove metals from specific solid phases using progressively stronger reagents to mobilize metals from increasingly stable phases (Geosyntec 2023b). SEPs are standard practice for evaluation attenuation of inorganic contaminants (USEPA, 2015). Step 1 (exchangeable phase) and Step 2 (carbonate phase) of the procedure represent the fraction of Co that may be reversibly sorbed or desorbed onto the solid phases. This approach assumes that later steps of the SEP represent more recalcitrant solid-phase species (e.g., co precipitated or incorporated) that are unlikely to mobilize to groundwater under anticipated post-closure aquifer conditions (i.e., pH between 6.4 s.u. to 8.1 s.u). The sum of Co associated with Steps 1 and 2 was used as the amount of adsorbed Co used to select the initial concentration of ferrihydrite. Cobalt was not detected above the laboratory detection limits during Steps 1 and 2 of the SEP, and therefore one half of the analytical method detection limit was used to calculate the Co concentration of each step (0.23 mg/Kg), The initial concentration of Co adsorbed to ferrihydrite is a critical component of the total Co mass in the model and is further evaluated in the sensitivity analysis section (**Section 4.3.3**). As additional data are collected as part of the remedy design and implementation process, the mass of solid phase assumed in the model will be revised as appropriate if necessary.

The initial concentration of ferrihydrite within the groundwater Co plume was defined as 0.06 mol/L. This concentration represents the amount of ferrihydrite needed to achieve the measured concentration of adsorbed Co (0.23 mg/Kg) when ferrihydrite is modeled to be in equilibrium with the groundwater with Co concentrations of 0.04 mg/L using PHREEQC.

Although most of the Co measured in the SEP was associated with Step 3 (non-crystalline phase) and Step 4 (metal hydroxide phase), these phases, which are amorphous and crystalline metal oxides and oxyhydroxides, are considered to be relatively stable under the expected post-closure geochemical conditions (i.e., circumneutral pH and slightly positive to slightly negative average ORP values. Cobalt associated with these phases would most likely only be released upon mineral dissolution under low pH and/or

reducing conditions or some other changes in pH/redox conditions. While clay minerals may provide some surface sites for additional attenuation capacity (Geosyntec 2023b), the model takes a conservative approach and only includes adsorption to iron oxides.

The initial concentration of ferrihydrite outside of the Co plume was defined as 0.58 mol/L based on x-ray fluorescence spectroscopy (whole rock analysis) of samples DPT-02 and DPT-03 collected downgradient of BGWC-22. X-ray fluorescence is a standard analytical tool for evaluation mineralogy for evaluating mineralogy for the attenuation of inorganic contaminants (USEPA, 2015). This ferrihydrite concentration assumes that the measured solid-phase iron concentration is entirely represented by ferrihydrite. This concentration represents the upper end of expected ferrihydrite concentrations within the residuum, and the effect of initial ferrihydrite concentration is further evaluated in the sensitivity analysis section (**Section 4.3.3**). As additional data are collected as part of the remedy design and implementation process

4.1.3 Boundary Conditions

Two reactive transport boundary conditions were defined: i) a general constant boundary with specified concentration at boundaries of the model, and ii) a recharge boundary condition with specified concentration representing infiltration from precipitation.

The groundwater composition of the constant boundary was set similar to initial concentrations at the boundaries of the model (*i.e.,* the concentration of Co is below the GWPS). This is a reasonable assumption given that no drastic changes in groundwater chemistry are expected at the model boundaries and that Co is horizontally delineated close to BGWC-22. The geochemical composition of recharge (precipitation) was defined using 2020 precipitation-weighted mean concentrations reported by the National Atmospheric Deposition Program for the monitoring site in Williamson, Georgia (National Atmospheric Deposition Program, 2021). Cobalt model initial parameters, including recharge composition, are included in **Table 2**.

The model assumes that under post-closure conditions, the closure of AP-1 and consolidation of CCR within a fully-contained, multi-cell storage facility will eliminate additional mass loading of Co to the system (i.e., a continuous source of Co will no longer be present under post-closure conditions). As such, the initial total concentration of Co (associated with groundwater and solid phase sorbed Co) represents the entire Co mass in the model. Additional mass of Co in the form of a continuous source was not included in the model and therefore, changes in modeled Co concentrations are the result of sorption/desorption reactions and mass transport as opposed to the introduction or removal of Co through additional boundary conditions.

4.2 Model Scenarios

4.2.1 MNA Scenario

Under the MNA scenario, the reactive transport model was run for 70 years under post-closure conditions. The Co attenuation mechanism is adsorption onto naturally occurring ferrihydrite surfaces as described in **Section 4.1.2**. Additional manipulations of groundwater gradient or geochemistry were not performed under this scenario.

4.2.2 Injection Scenario

Under the injection scenario, cells representing groundwater injection wells were included in the reactive transport model to simulate injection of an iron amendment that would promote attenuation of Co via adsorption to iron oxide mineral surfaces, accelerating ongoing natural attenuation processes through the precipitation of additional reactive sites. For the injection scenario, aqueous ferric iron (Fe(III)) was selected as the injectate to evaluate the feasibility and to provide a "proof of concept" for this remedial approach. Fe(III) was selected because (i) injection of a solid amendment (e.g., ferrihydrite) is not possible using PHT3D; and (ii) it does not require a change in oxidation state to precipitate. Bicarbonate was included in the injectate to provide buffering capacity and limit pH changes due to the injection of Fe^{3+}.

A single round of injection was simulated with a period of follow-up performance monitoring. Time periods for injection and performance monitoring are depicted below.

Event	Duration (days)	Cumulative Days
Injection	90	1-90
Monitoring (no injection)	3650	90-3740

The injectate composition is summarized in **Table 3**. The injection rate was defined as 2 gallon per minute (gpm) per injection well. Twenty-four (24) injection wells were placed within the Co plume and were "screened" in Layer 4. PHT3D simulates injection across the entire layer thickness. All injection wells were simulated to operate simultaneously and continuously for the injection period. The number of injection wells and the injection rate were selected to ensure that water table mounding did not exceed the ground surface (*i.e.,* flooding of injectate did not occur).

Note that the primary purpose of the injection model is to assess the viability and feasibility of geochemical injections for Co remediation. Therefore, the simulated injection wells, the parameters defined in the injection model (*e.g.,* number of wells, flow rate, injection regime, and injectate composition), and the simulated results should be

considered preliminary and "proof of concept". If geochemical injections are selected as a component of the remedy, the results of treatability and pilot testing will be used to evaluate and select the actual injectate, number of injection wells, injection regime and injection rate as part of the remedy design process.

4.3 Model Results

4.3.1 MNA Model Results

Model simulation results indicate that the Co concentration in groundwater steadily decreases over time (**Figure 4**). Co initially adsorbed to aquifer solids serves as a secondary source of Co in groundwater; adsorbed Co is mobilized to groundwater as background groundwater with a lower Co concentration flow through the aquifer within the Co plume area. The groundwater transports the mobilized Co downgradient of the initial area. Note that the desorption studies presented in the GCSM Report (Geosyntec 2023b) indicate limited to no mobilization of previously adsorbed Co. As such, the ferrihydrite based MNA model and associated results represent a conservative scenario of Co mobilization.

The predicted groundwater Co concentration downgradient of the plume at time 0 is not anticipated to exceed the GWPS over time (*i.e.,* Co continues to be horizontally delineated), primarily due to strong sorption/attenuation capacity of downgradient geological material represented by ferrihydrite in the model.

A time series of modeled groundwater Co concentrations at BGWC-22 under the MNA model scenario is shown in **Figure 4**. The groundwater Co concentration at BGWC-22 is predicted to decrease below the GWPS in approximately 36 years.

4.3.2 Injection Model Results

A time series of modeled groundwater Co concentrations at BGWC-22 under the injection model scenario is shown in **Figure 4**. The modeled groundwater Co concentration at BGWC-22 decreases significantly in response to the 90-day injection.

There was a significantly faster reduction in Co concentration at BGWC-22 in the injection scenario as compared to the baseline MNA scenario, with the Co concentration anticipated to be below the GWPS at BGWC-22 after 90 days of injection. This is attributed to the higher attenuation capacity in the area influenced by injectate. The groundwater Co concentration within the entire initial Co plume is also predicted to decrease to below the GWPS after 90 days of injection.

Based on the model results described above, injections combined with MNA is predicted to reduce Co concentrations more quickly than MNA alone.

4.3.3 Model Sensitivity Analysis

A sensitivity analysis was performed on (i) sorption site properties; (ii) initial concentration and mass of Co in aquifer solids within the plume footprint; and (iii) attenuation capacity (i.e., ferrihydrite concentration outside the Co plume downgradient of BGWC-22 under post-closure conditions).

To assess the impact of sorption site properties, a Site-specific surface (consistent with the laboratory sorption experiments on aquifer solids collected at the Site) was simulated. The effect of initial Co in the system was evaluated by selecting alternate values for solid-phase Co. The effect of aquifer attenuation capacity on Co attenuation was evaluated by selecting alternate concentrations of ferrihydrite downgradient of BGWC-22 under post-closure conditions.

4.3.3.1 Surface properties - Site-Specific Surface

As discussed above, the ferrihydrite based MNA model indicates that adsorbed Co is remobilized when background water with low Co concentration flows through the aquifer. However, desorption studied presented in the GCSM Report (Geosyntec, 2023b) indicate limited to no remobilization of adsorbed Co. As such, an alternate Site-specific surface was defined to simulate the sorption, and desorption experiments conducted in the laboratory with Site materials. Details of the experiments and associated analysis are reported in the GCSM Report (Geosyntec 2023b). A PHREEQC model was developed to create a surface that (i) once equilibrated with an aqueous phase with a similar composition to that of BGWC-22 adsorbs the cobalt and results in an equilibrium soil-liquid phase partitioning coefficient (Kd) of 82 L/kg (as reported by the laboratory), and (ii) once the surface with adsorbed Co is equilibrated with background groundwater, the aqueous phase concertation resembles the concentration from desorption tests conducted by the laboratory. The custom Site-specific surface was then incorporated into the PMWIN model. The model with a custom surface was run for a period of 10 years owing to the attenuation capacity and lack of desorption form the Site-specific surface.

A time series of modeled groundwater Co concentration at BGWC-22 under the MNA scenario with the custom Site-specific surface is shown in **Figure 5**. Model results indicate that the groundwater Co concentration at BGWC-22 is predicted to decrease below the GWPS in approximately 3 years. This estimated remedial time frame is significantly lesser than the ferrihydrite surface scenario. The reduction in remedial time

frame can be attributed to the negligible desorption of Co from site materials as evidenced by laboratory experiments, which significantly reduces the effect of the secondary source of Co in the model. Similar to ferrihydrite, the strong attenuation capacity of solid phase, further inhibits the mobilization of Co outside the initial area with Co concentrations above GWPS. These results reflect the sensitivity of the reactive transport model to sorption properties of the site.

4.3.3.2 Initial Concentration of Co in Aquifer Solids

Within the reactive transport model, the initial ferrihydrite equilibrated with groundwater at timestep 0 (before the transport steps commence) sets the total mass of Co in the system. This step 'pre-loads' ferrihydrite surfaces with Co within the plume footprint by equilibration with groundwater. As described in **Section 4.1**, the initial concentration of ferrihydrite within the Co plume footprint was calibrated such that the modeled Co concentrations match the Co concentrations measured in SEP experiments performed on aquifer matrix materials in the vicinity of the BGWC-22. The sorbed Co in SEP was estimated assuming the non-detect results are equivalent to one half (i.e., 50%) of the method reporting limit. If the non-detect data are assumed to be one quarter (i.e., 25%) of reporting limit, the initial ferrihydrite and Co in the system will be proportionally reduced. This scenario demonstrates the sensitivity of the reactive transport model to the initial Co associated with solid surfaces. Similar to the baseline model, this scenario was run for a period of 70 years. A time series of modeled groundwater Co concentrations at BGWC-22 under the MNA scenario with reduced initial Co mass load is shown in **Figure 5**. Under this scenario, the groundwater Co concentration at BGWC-22 is predicted to decrease below the GWPS within approximately 19 years, significantly faster than the 36 years predicted with the baseline scenario.

As expected, the lower the initial mass of Co associated with the solid phase, the faster the Co concentrations decrease to below the GWPS. Similarly, if the initial mass of Co associated with the solid phase is higher, the time to reduce Co concentrations to below GWPS will proportionally increase. These results suggest that the model is sensitive to the initial mass of solid phase Co and emphasizes the importance of further geochemical characterization in the vicinity of BGWC-22 as part of the design and implementation of the groundwater remedy.

4.3.3.3 Attenuation Capacity

The attenuation capacity of the aquifer controls the extent to which dissolved Co in the groundwater can be sequestered via adsorption to mineral surfaces. Higher attenuation

capacities can limit groundwater plume migration because more surface sites are available to adsorb Co from the groundwater. Lower attenuation capacities may result in substantial plume migration because surface sites quickly become saturated with Co, allowing dissolved Co to be transported downgradient.

The attenuation capacity of the aquifer is represented in the model by the concentration of ferrihydrite sites, which is defined as a function of ferrihydrite concentration. In realty, numerous iron oxide phases with a range of attenuation capacities are likely present in site aquifer solids. The concentration of iron from whole rock analysis (WRA) of samples collected from boring DPT-02 and DPT-03, provide data on the iron content of site aquifer solids within the vicinity of exceedance well BGWC-22. However, the precise composition of iron is unknown. Additionally, heterogeneities in aquifer solids iron concentration are likely to exist across the site, and many other aquifer properties affect the degree to which Co adsorbs to naturally occurring iron oxides (e.g., surface area, mineral impurities).

To evaluate the sensitivity of the reactive transport model to the attenuation capacity of the aquifer solids outside the initial groundwater plume footprint, two model scenarios were run. The first model scenario is identical to the one described in **Section 4.2.1** and represents an upper estimate of site attenuation capacity by assuming that the initial ferrihydrite concentration is equal to 100% of iron measured by WRA (0.58 mol/L). The second model scenario is similar to the first, except the initial ferrihydrite concentration outside of the plume area is assumed to be two orders of magnitude lower (0.0058 mol/L). This scenario represents a lower estimate of ferrihydrite aquifer solids concentration.

Time series of modeled groundwater Co concentration at BGWC-22 under the MNA scenario with a high and low aquifer attenuation capacity outside of the larger plume area is shown in **Figure 5**. As shown on **Figure 5**, sensitivity analysis of attenuation capacity was run for a time period of 10 years, as at year 10, the cobalt concentration in groundwater for the low aquifer attenuation capacity scenario reaches the predefined boundary conditions of the model. After 10 years, groundwater Co concentrations have decreased within the plume with the low attenuation scenario. Although the plume remains on-site, the size of the plume increases and the edge of the plume has migrated approximately 270 feet downgradient beyond its initial boundaries. These results demonstrate that the remedial time frame is sensitive to the attenuation capacity outside the plume area, particularly at locations downgradient of BGWC-22, emphasizes the importance of further geochemical characterization in the vicinity of BGWC-22 as part of the design and implementation of the groundwater remedy.

5.0 REACTIVE TRANSPORT MODEL – MOLYBDENUM

A reactive transport model was developed for the area around monitoring well BGWC-43D, where groundwater Mo concentrations exceed the GWPS. The following sections describe the Mo reactive transport model setup, scenarios, results, and sensitivity analysis.

5.1 Model Setup

The reactive transport model utilizes the three-dimensional (3D) reactive multicomponent transport code PHT3D (Prommer and Post, 2010). PHT3D incorporates the programs MT3DMS (Zheng and Wang, 1999) for 3D advective-dispersive multi-species transport modeling and PHREEQC (Parkhust and Appelo, 2000) for geochemical reaction modeling. PHT3D uses MODFLOW (Harbaugh, 2005) to provide the groundwater flow field for transport simulations.

Transport model construction and parameterization was performed in the Processing MODFLOW version 8.0.47 pre- and post-processing software package (Simcore, 2012). Equilibrium constants from the MINTEQ.V4 thermodynamic database (USEPA, 1999) were used for the Mo model.

5.1.1 Geochemical Properties

This section describes the key geochemical reactions included in the reactive transport model: aqueous complexation, mineral precipitation/dissolution, and adsorption/desorption to mineral surfaces.

5.1.1.1 Aqueous Complexation- At each time step, PHT3D uses PHREEQC to calculate equilibrium aqueous speciation. The MINTEQ.V4 database of equilibrium constants was used for aqueous speciation calculations. Chloride was defined as the charge balancing constituent to simulate an electrochemically neutral solution at each time step.

5.1.1.2 Mineral Precipitation/Dissolution- At each time step, minerals specified within the model setup are allowed to precipitate or dissolve to achieve equilibrium with groundwater. While a mixture of different iron oxides and oxyhydroxides are commonly found in aquifers due to variations in crystallinity, crystal size, solid solution, and crystallization kinetics, ferrihydrite was the only iron oxides included in the model.

5.1.1.2 Adsorption/Desorption- Adsorption and desorption of dissolved species to and from the ferrihydrite surface was modeled using the non-electrostatic HFO surface

complexation model developed by Dzombak and Morel (1990) and included in the MINTEQ.V4 database. Other mineral surfaces were not included in the model due to the strong affinity of Mo adsorption on iron oxides. The surface complexation model describes adsorption to HFO equilibrated with ferrihydrite using two surface sites (strong and weak). The concentration of surface sites was dynamically linked to the concentration of ferrihydrite using a strong site density of 0.005 moles per mole (mol/mol) iron and 0.2 mol/mol iron, respectively (Dzombak and Morel, 1990). Since the solid phase composition may influence surface complexation and attenuation, model sensitivity analysis was performed by using an alternate Site-specific surface (**Section 5.3.3**).

5.1.2 Initial Geochemical Conditions

This section describes the model parameters for groundwater composition and mineralogy used to define the initial geochemical conditions of the model domain.

5.1.2.1 Groundwater Composition

Groundwater monitoring results from the September 2020 semiannual sampling event (Geosyntec, 2020) were used to define initial groundwater compositions within the model domain. Data from the September 2020 semiannual groundwater sampling event was used because the dataset is more complete than datasets from more recent sampling events; results from the September 2020 sampling event are consistent with the most recent 2022 semiannual sampling results (Geosyntec 2022).

Three areas with distinct initial groundwater compositions were defined: (i) the groundwater plume (i.e., groundwater with Mo concentration above GWPS in the vicinity of BGWC-43D) in Layers 4 and 5 of the model; (ii) groundwater with Mo concentration below the GWPS in the bedrock in the vicinity of BGWC-43D consistent with horizontal delineation of groundwater in Layer 4 of the model and groundwater upgradient of BGWC-43 under post-closure conditions; and (iii) groundwater with Mo concentrations below GWPS in bedrock below BGWC-43D consistent with vertical delineation of groundwater in Layers 5 and 6 of the model. The composition of these areas is described below:

<u>(i) Layers 4 and 5 – Composition of Groundwater Mo Plume</u>

The initial groundwater Mo plume was defined within Layers 4 and 5 of the model. The initial groundwater composition within this area was based on the average of groundwater monitoring results at BGWC-38D and BGWC-43D. Monitoring wells BGWC-38D, BGWC-43D are screened within layers 4 and 5, respectively.

The initial concentration of Mo in groundwater was highest at BGWC-38D and BGWC-43D at 0.1 and 0.11 mg/L, respectively. The average concentration of these two wells was selected as the initial concentration in the plume within the Layers 4 and 5 at time 0 (**Figure 6**).

(ii) Layer 4 – Horizontally Delineated Groundwater and Groundwater Upgradient of BGWC-43D Composition

Groundwater in Layer 4 with Mo concentrations lower than the GWPS that represents horizontally delineated groundwater was defined based on groundwater monitoring results at downgradient delineation well BGWC-44D which is screened within Layer 4. Under post-closure conditions this area is anticipated to be upgradient of BGWC-43D.

(iii) Layers 5 and 6 – Vertically Delineated Groundwater Composition

Groundwater in Layer 5 and Layer 6 with Mo concentrations lower than the GWPS which represents vertically delineated groundwater were defined based on groundwater monitoring results at downgradient delineation well BGWC-50D which is screened within Layer 5.

Other Constituents

Values for the following constituents were used to define the initial groundwater and recharge compositions within the model: pH, pe (oxidation reduction potential), and molar concentrations of bicarbonate (represented in PHREEQC as C(4)), dissolved calcium, chloride, iron (II), potassium, magnesium, manganese (II), sodium, sulfate (represented in PHREEQC as S). pe was calculated from measured oxidation-reduction potential values. Bicarbonate was calculated from measured total alkalinity results assuming alkalinity is entirely attributed to bicarbonate at circumneutral pH, consistent with pH measurements of site groundwater. Results for total iron and manganese were used as the initial concentration of iron(II) and manganese(II), respectively, assuming that the concentrations of other insoluble or minor oxidation states (i.e., iron(III), manganese(III,IV)) in groundwater are negligible.

For each of the areas described above, the model conservatively assumes that the entire thickness of the cell in each layer has the same geochemical composition. To balance the electrochemical charge in the initial groundwater, the geochemical composition of each water, along with the mineralogy and adsorption parameters described below, was input into a batch PHREEQC model, and equilibrated using chloride to balance the charge. The charge-balanced solution composition was used as the initial groundwater concentration

for the transport model. The initial groundwater composition for each area of the model domain is presented in **Table 4**.

5.1.2.2 Mineralogy

The initial concentration of ferrihydrite was defined based on the results of the SEP and solid phase characterization of residuum samples. A batch PHREEQC equilibrium simulation model (described above) was used to assess the saturation indices of solid phases that are likely to be in equilibrium with groundwater at BGWC-43D. The results of the equilibrium model suggest iron oxide and oxyhydroxide phases are supersaturated in groundwater consistent with solid characterization results presented in the GCSM Report. No additional solid phases were included in the model.

The initial concentration of ferrihydrite varied within the model domain. Before initiating the transport model, PHT3D equilibrates the surface sites with groundwater to generate the initial concentrations of adsorbed species. Therefore, the initial concentration of ferrihydrite affects the initial concentration of solid-phase Mo in the model. Two areas with discrete ferrihydrite concentrations were defined: i) the area within the groundwater Mo plume (Layers 4 and 5), and ii) the area outside the Mo groundwater plume (i.e., Mo concentrations below GWPS) (Layers 4 and 5). The initial concentration of ferrihydrite assigned to each area was based on results of solid phase analysis performed on site samples and professional judgement.

The initial concentration of ferrihydrite was calibrated based on the mobile fraction of Mo determined from SEP experiments performed on residuum samples in the vicinity of BGWC-22 (sample DPT-02). SEPs are chemical extractions used to remove metals from specific solid phases using progressively stronger reagents to mobilize metals from increasingly stable phases (Geosyntec 2023b). SEPs are standard practice for evaluation attenuation of inorganic contaminants (USEPA, 2015). Step 1 (exchangeable phase) and Step 2 (carbonate phase) of the procedure represent the fraction of Mo that may be reversibly sorbed or desorbed onto the solid phases. This approach assumes that later steps of the SEP represent more recalcitrant solid-phase species (e.g., co precipitated or incorporated) that are unlikely to mobilize to groundwater under anticipated post-closure aquifer conditions (i.e., pH between 6.4 s.u. to 8.1 s.u). The sum of Mo associated with Steps 1 and 2 was used as the amount of adsorbed Mo used to select the initial concentration of ferrihydrite. Molybdenum was not detected above the laboratory detection limits during Steps 1 and 2 of the SEP, and therefore one half of the analytical method detection limit was used to calculate the Mo concentration of each step (0.34 mg/Kg). Note that solid phase molybdenum data in the vicinity of BGWC-43D was not

available at the time of model development. As such, as additional data are collected during remedy design and implementation in the vicinity of BGWC-43D, the assumptions used in the model will be revised as appropriate. The initial concentration of Mo adsorbed to ferrihydrite is a critical component of the total Mo mass in the model and is further evaluated in the sensitivity analysis section (**Section 4.3.3**).

The initial concentration of ferrihydrite within the Mo groundwater plume was defined as 0.16 mol/L. This concentration represents the amount of ferrihydrite needed to achieve the measured concentration of adsorbed Mo (0.34 mg/Kg) when ferrihydrite is modeled to be in equilibrium with the groundwater with Mo concentrations of 0.11 mg/L using PHREEQC.

Although most of the Mo measured in the SEP was associated with Step 3 (non-crystalline phase) and Step 4 (metal hydroxide phase), these phases, which are amorphous and crystalline metal oxides and oxyhydroxides, are considered to be relatively stable under the expected post-closure geochemical conditions (i.e., circumneutral pH and slightly positive to slightly negative average ORP values. Molybdenum associated with these phases would most likely only be released upon mineral dissolution under low pH and/or reducing conditions or some other changes in pH/redox conditions. While clay minerals may provide some surface sites for additional attenuation capacity (Geosyntec 2023b), the model takes a conservative approach and only includes adsorption to iron oxides.

The initial concentration of ferrihydrite outside of Mo groundwater plume was defined as 0.58 mol/L based on x-ray fluorescence spectroscopy (whole rock analysis) of samples DPT-02 and DPT-03 collected downgradient of BGWC-22. Note that the iron concentration at DPT-04 in the vicinity of BGWC-43D is consistent with DPT-02 and DPT-03. X-ray fluorescence is a standard analytical tool for evaluation mineralogy for evaluating mineralogy for the attenuation of inorganic contaminants (USEPA, 2015). This ferrihydrite concentration assumes that the measured solid-phase iron concentration is entirely represented by ferrihydrite. This concentration represents the upper end of expected ferrihydrite concentrations within the residuum, and the effect of initial ferrihydrite concentration is further evaluated in the sensitivity analysis section (**Section 4.3.3**). As additional data are collected as part of the remedy design and implementation process

5.1.3 Boundary Conditions

Two reactive transport boundary conditions were defined: i) a general constant boundary with specified concentration at boundaries of the model, and ii) a recharge boundary condition with specified concentration representing infiltration from precipitation.

The groundwater composition of the constant boundary was set similar to initial concentrations at the boundaries of the model (i.e., the concentration of Mo is below the GWPS). This is a reasonable assumption given that no drastic changes in groundwater chemistry are expected at the model boundaries and that Mo is horizontally delineated close to BGWC-43D. The geochemical composition of recharge (precipitation) was defined using 2020 precipitation-weighted mean concentrations reported by the National Atmospheric Deposition Program for the monitoring site in Williamson, Georgia (National Atmospheric Deposition Program, 2021). Molybdenum model initial parameters, including recharge composition, are included in **Table 4**.

The model assumes that under post-closure conditions, the closure of AP-1 and consolidation of CCR within a fully-contained, multi-cell storage facility will eliminate additional mass loading of Mo to the system (i.e., a continuous source of Mo will no longer be present under post-closure conditions). As such, the initial total concentration of Mo (associated with groundwater and solid phase sorbed Mo) represents the entire Mo mass in the model. Additional mass of Mo in the form of a continuous source was not included in the model and therefore, changes in modeled Mo concentrations are the result of sorption/desorption reactions and mass transport as opposed to the introduction or removal of Mo through additional boundary conditions.

5.2 Model Scenarios

5.2.1 MNA Scenario

Under the MNA scenario, the reactive transport model was run for 10 years under post-closure conditions as the initial concentration of Mo at BGWC-43D is only marginally higher than the GWPS. The Mo attenuation mechanism is adsorption onto naturally occurring ferrihydrite surfaces as described in **Section 5.1.2**. Additional manipulations of groundwater gradient or geochemistry were not performed under this scenario.

5.2.2 Injection Scenario

Under the injection scenario, cells representing groundwater injection wells were included in the reactive transport model to simulate injection of an iron amendment that would promote attenuation of Mo via adsorption to iron oxide mineral surfaces, accelerating ongoing natural attenuation processes through the precipitation of additional reactive surface sites. For the injection scenario, aqueous ferric iron (Fe(III)) was selected as the injectate to evaluate the feasibility and to provide a “proof of concept” for this remedial approach. Fe(III) was selected because (i) injection of a solid amendment (*e.g.*, ferrihydrite) is not possible using PHT3D, and (ii) it does not require a change in

oxidation state to precipitate. Bicarbonate was included in the injectate to provide buffering capacity and limit pH changes due to injection of Fe^{3+}.

A single round of injection was simulated with a period of follow-up performance monitoring. Time periods for injection and performance monitoring are depicted below:

Event	Duration (days)	Cumulative Days
Injection	60	1-60
Monitoring (no injection)	3650	60-3410

The injectate composition is summarized in **Table 3**. The injection rate was defined as 0.8 gallon per minute (gpm) per injection well. Forty-four (44) injection cells were placed within the Mo plume and were "screened" in Layer 4 and 5, the layers in which the elevated Mo concentrations were observed in groundwater. PHT3D simulates injection across the entire layer thickness. All injection wells were simulated to operate simultaneously and continuously for the injection period. The number of injection wells and the injection rate were selected to such that water table mounding did not exceed the ground surface (i.e., flooding of injectate did not occur).

Note that the primary purpose of the injection model is to assess the viability and feasibility of geochemical injections for Mo remediation. Therefore, the simulated injection wells, the parameters defined in the injection model (e.g., number of wells, flow rate, injection regime, and injectate composition), and the simulated results should be considered preliminary and "proof of concept". If geochemical injections are selected as a component of the remedy, the results of treatability and pilot testing will be used to evaluate and select the actual injectate, number of injection wells, injection regime and injection rate as part of the remedy design process.

5.3 Model Results

5.3.1 MNA Model Results

Model simulation results indicate that the Mo concentration in groundwater steadily decreases over time (**Figure 7**). Molybdenum initially adsorbed to aquifer solids serves as a secondary source of Mo in groundwater; adsorbed Mo is mobilized to groundwater as background groundwater with a lower Mo concentration flow through the aquifer within the assumed area with elevated initial concentrations of Mo. The groundwater transports the mobilized Mo downgradient of the initial area. Therefore, the higher the groundwater velocity, the more reduction in Mo in the secondary source area can be anticipated. This is reflected in faster clean-up in Layer 4 as compared to Layer 5. Note

that the desorption studies presented in the GCSM Report (Geosyntec 2023b) indicate limited to no mobilization of previously adsorbed Mo. As such, the ferrihydrite based MNA model and associated results represent a conservative scenario of Mo mobilization.

The predicted groundwater Mo concentration downgradient of the plume at time 0 is not anticipated to exceed GWPS over time (*i.e.*, Mo continues to be horizontally delineated), primarily due to strong sorption and attenuation capacity of downgradient geological material represented by ferrihydrite in the model.

A time series of modeled groundwater Mo concentrations at BGWC-43D under the MNA model scenario is shown in **Figure 7**. The groundwater Mo concentration in BGWC-43D is predicted to decrease below the GWPS within the first year (approximately 4 months). Under the MNA scenario, the groundwater Mo concentration within the entire Mo plume is predicted to decrease to below the GWPS in approximately 5 years.

5.3.2 Injection Model Results

A time series of modeled groundwater Mo concentrations at BGWC-43D under the injection model scenario is shown in **Figure 7**. The modeled groundwater Mo concentration decreases significantly in response to the 60-day injection period.

There was a significantly faster reduction in Mo concentration at BGWC-43D in the injection scenario as compared to baseline MNA scenario with the Mo concentration anticipated to be below GWPS after 10 days of injection. This is attributed to higher attenuation capacity at the area influenced by injectate. The attenuation capacity is enhanced via enhanced sorption activity and higher concentration of sorption sites (ferrihydrite) from iron injection. As illustrated in **Figure 7**, a slight increase was detected within 2-6 months following the injection, however, the Mo concentration continues to be below the GWPS and continued to decrease afterwards (no further increase in the next 10 years of the monitoring period). The groundwater Mo concentration within the entire Mo plume is predicted to decrease to below the GWPS in approximately 6 months after injection is completed.

Based on the model results described above, injection combined with MNA is predicted to reduce Mo concentrations more quickly than MNA alone.

5.3.3 Model Sensitivity Analysis

A sensitivity analysis was performed on (i) sorption site properties; (ii) initial concentration of Mo in aquifer solids within the plume footprint; and (iii) attenuation

capacity (i.e., ferrihydrite concentration outside the area with Mo exceedance downgradient of BGWC-43D under post-closure conditions).

To assess the impact of sorption site properties a Site-specific surface (consistent with the laboratory sorption experiments on aquifer solids collected at the Site) was also simulated. The effect of initial Mo in the system was tested by selecting alternate values for solid-phase Mo. The effect of aquifer attenuation capacity on Mo attenuation was evaluated by selecting alternate concentrations of ferrihydrite downgradient of BGWC-43D under post-closure conditions.

5.3.3.1 Surface properties - Site-Specific Surface

As discussed above, the ferrihydrite based MNA model indicates that adsorbed Mo is remobilized when background water with low Mo concentration flows through the aquifer. However, desorption studied presented in the GCSM Report (Geosyntec, 2023b) indicate limited to no remobilization of adsorbed Mo. As such, an alternate Site-specific surface was defined to simulate the sorption, and desorption experiments conducted in the laboratory with Site materials. Details of the experiments and associated analysis are reported in the GCSM Report (Geosyntec 2023b). As a conservative estimate, a Kd was assumed based on values reported in the literature since Kd values reported by the laboratory were significantly higher than literature values (Geosyntec 2023b). A PHREEQC model was developed to simulate a surface that (i) once equilibrated with an aqueous phase with a similar composition to that of groundwater at BGWC-43D adsorbs molybdenum and results in a Kd of 20 L/Kg (USEPA, 2005), and (ii) once the surface with adsorbed Mo is equilibrated with background groundwater, the aqueous phase concentration resembles the concentration from desorption tests conducted by the laboratory. The custom Site-specific surface was then incorporated into the PMWIN model. . Similar to the baseline scenario the custom Site-specific surface model was run for a period of 10 years.

A time series of modeled groundwater Mo concentration at BGWC-43D with the custom Site-specific surface is shown in **Figure 8**. Model results indicate that the groundwater Mo concentration is predicted to decrease below the GWPS within 2 months at BGWC-43D. This estimated remedial time frame is less than ferrihydrite surface. The reduced remedial time frame is mainly attributed to the negligible desorption, as evidenced by laboratory experiments, which significantly reduces the effect of a secondary source of Mo in the model. Similar to ferrihydrite, strong sorption and attenuation capacity of the solid phase further inhibits the mobilization of Mo outside the initial area with elevated Mo concentrations above GWPS (*i.e.,* Mo continues to be delineated).

These results demonstrate the impact of surface properties on the performance of MNA at the Site. Additional geochemical characterization of aquifer materials as part of the remedy design and implementation process will provide greater certainty on the performance of the selected remedy.

5.3.3.2 Initial Concentration of Mo in Aquifer Solids

Within the reactive transport model, the initial ferrihydrite equilibrated with groundwater at timestep 0 (before transport steps commence) sets the total mass of Mo in the system. This step 'pre-loads' ferrihydrite surfaces with Mo by equilibration with groundwater. As described in **Section 5.1**, the initial concentration of ferrihydrite within the initial area with Mo concentration above GWPS was calibrated such that the modeled Mo concentrations match the Mo concentrations measured in SEP experiments performed on aquifer matrix materials in the vicinity of BGWC-43D. The sorbed Mo in SEP was estimated assuming the non-detect results are equivalent to one half of method reporting limit. If the non-detect data are assumed at one quarter of the method reporting limit, the initial ferrihydrite in the system and Mo in the system will be proportionally reduced. This scenario demonstrates the sensitivity of the reactive transport model to the initial Mo associated with solid surfaces. Similar to the baseline scenario the low initial concentration scenario surface model was run for a period of 10 years. A time series of modeled groundwater Mo concentrations at BGWC-43D under the MNA scenario with reduced initial Mo solid phase concentration is shown in **Figure 8**. Under this scenario, the groundwater Mo concentration at BGWC-43D is predicted to decrease below the GWPS within approximately 3 months, marginally faster than the 4 months predicted with the baseline scenario.

As expected, the lower the initial mass of Mo associated with the solid phase, the faster the Mo concentrations decrease to below the GWPS. Similarly, if the initial mass of Mo associated with the solid phase is higher, the time to reduce Mo concentrations to below GWPS will proportionally increase. These results suggest that the model is sensitive to the initial mass of solid phase Mo and emphasizes the importance of further geochemical characterization in the vicinity of BGWC-43D as part of the design and implementation of the groundwater remedy.

5.3.3.3 Attenuation Capacity

The attenuation capacity of the aquifer controls the extent to which dissolved Mo in the groundwater can be sequestered via adsorption to mineral surfaces. Higher attenuation capacities can limit groundwater plume migration because more surface sites are

available to adsorb Mo from the groundwater. Lower attenuation capacities may result in substantial plume migration because surface sites quickly become saturated with Mo, allowing dissolved Mo to be transported downgradient.

The attenuation capacity of the aquifer is represented in the model by the concentration of ferrihydrite sites, which is defined as a function of ferrihydrite concentration. In realty, numerous iron oxide phases with a range of attenuation capacities are likely present in site aquifer solids. The concentration of iron from whole rock analysis (WRA) of samples collected from boring DPT-02 and DPT-03 provide data on the iron content of site aquifer solids within the vicinity of exceedance well BGWC-43D. However, the precise composition of iron is unknown. Additionally, heterogeneities in aquifer solids iron concentration are likely to exist across the site, and many other aquifer properties affect the degree to which Mo adsorbs to naturally occurring iron oxides (e.g., surface area, mineral impurities).

To evaluate the sensitivity of the reactive transport model to the attenuation capacity of the aquifer solids outside the initial groundwater plume footprint, two model scenarios were run. The first model scenario is identical to the one described in **Section 4.2.1** and represents an upper estimate of site attenuation capacity by assuming that the initial ferrihydrite concentration is equal to 100% of iron measured by WRA (0.58 mol/L). The second model scenario is similar to the first, except the initial ferrihydrite concentration outside of the plume area is assumed to be two orders of magnitude lower (0.0058 mol/L). This scenario represents a lower estimate of ferrihydrite aquifer solids concentration. . Similar to the baseline scenario the low attenuation capacity model was run for a period of 10 years.

Time series of modeled groundwater Mo concentration at BGWC-43D under the MNA scenario with a high and low aquifer attenuation capacity outside of the larger plume area is shown in **Figure 8**. Groundwater Mo concentrations at BGWC-43D are predicted to decrease below the GWPS within approximately 4 months, consistent the higher attenuation capacity scenario. Similarly, the concentration of Mo within the plume decreases to below GWPS in approximately five years and the plume remains stable. The extent of the plume with concentrations of Mo greater than the GWPS are not predicted to change and the plume continues to be on-site. These results suggest that the remedial time frame is not as sensitive to the attenuation capacity outside the plume area, in the vicinity of BGWC-43D. This lack of sensitivity can be attributed to the low concentration of Mo at BGWC-43D (0.11 mg/L) which is marginally above the GWPS. The sensitivity analysis further reinforces the viability of MNA as a remedial alternative for Mo at the Site.

6.0 MODEL UNCERTAINTY & LIMITATIONS

The reactive transport model was constructed in accordance with standard industry practices, using the best information available at the time of model development, and widely accepted and publicly available numerical modeling software. However, reactive transport models are necessarily simplified mathematical representations of complex natural systems. Therefore, all models have associated uncertainties in model predictions and limits to their accuracy. Some of the primary limitations and sources of uncertainty in this model are:

- The transport models were developed for post-closure conditions. Post-closure, the flow velocity, and direction are anticipated to be significantly different from current conditions. As such, the transport model could not be calibrated aside from comparing modeled concentrations to measured concentrations of Co and Mo under pre-closure conditions.

- In general, both the Co and Mo in groundwater are horizontally and vertically delineated. However, a more refined delineation that provides a better understanding of concentration extents and mass was not available at the time of model development, adding uncertainty to model results. Higher resolution characterization of groundwater in the vicinity of BGWC-22 and BGWC-43D as part of the design and implementation of the selected groundwater remedy will help further refine model assumptions.

- Although aquifer characterization data indicates the presence of iron oxides which suggests significant attenuation capacity, the attenuation capacity of the aquifer including the distribution and concentration of iron-bearing minerals represents another source of uncertainty. Higher resolution site characterization near BGWC-22 and BGWC-43D as part of the design and implementation of the selected groundwater remedy will help further refine model assumptions.

- Reactions rates have not been included in the models due to both uncertainty and for simplicity; the model assumes instantaneous equilibrium conditions. The sorption and desorption studies with AP-1 aquifer materials suggest fast kinetics for both Co and Mo sorption and desorption (*i.e.*, on the order of days) (Geosyntec, 2023b); however, the reaction rate uncertainty associated with the injection scenarios may affect predicted remedial time frames. Additional data collected during the design of the remedy will help inform these data gaps.

- Injection parameters were assumed to serve as a proof of concept. In practice, the number of injection wells, locations of wells, injectate composition, and injection regime will be evaluated in the design phase and selected to accelerate remediation goals.

- Remedial time frames predicted in this model are based on assumptions developed using available data. As such, refinements to the geochemical CSM may affect predicted time frames to achieve Mo and Co concentration below GWPS.

- The model and associated geochemical CSM assumes that closure activities do not significantly change the geochemistry of groundwater at the Site. As closure progresses, groundwater monitoring data will be evaluated to assess geochemical changes to groundwater composition.

- The objective of the reactive transport modeling is to assess potential remediation approaches to Co and Mo exceedances at AP-1. These models were not calibrated to existing conditions and are intended as a feasibility-level tool to compare and forecast the relative differences between post-closure remediation scenarios.

7.0 FINDINGS & CONCLUSIONS

Conclusions drawn from the results of the Co and Mo reactive transport models are summarized below.

7.1 Model Findings – Cobalt

The reactive transport model described in **Section 4** was used to estimate the remedial feasibility for groundwater Co concentrations to decrease below the GWPS under two scenarios: i) MNA, and ii) in-situ injections followed by performance monitoring.

Under the MNA scenario described in **Section 4.2.1**, the groundwater Co concentration at BGWC-22 is predicted to decrease to below the GWPS in approximately 36 years (**Figure 4**). Further, during the MNA period, the model predicts that Co will continue to be delineated and the extent of groundwater with cobalt concentration above GWPS will remain stable owing to the high attenuation capacity of the aquifer.

Injection of an iron-based amendment followed by MNA is predicted to decrease the time to achieve GWPS compared to MNA alone. Under the injection scenario described in **Section 4.2.2,** the concentration of Co in well BGWC-22 and the entire initial Co plume is predicted to decrease to below the GWPS after 90 days of continuous injection. No significant rebound in Co concentrations were observed during the 10-year performance monitoring period post injection. Injection reduced the clean-up time by increasing attenuation capacity via enhanced sorption activity and higher concentration of sorption sites. These results represent a proof-of-concept evaluation of injection as a remedial technology for the Site. If geochemical injections are selected as a part of the remedy, the time to achieve groundwater Co concentrations below the GWPS will depend on the amendment.

Note that the primary purpose of the injection model is to assess the viability and feasibility of geochemical injections for Co remediation. Therefore, the simulated injection wells, the parameters defined in the injection model (e.g., number of wells, flow rate, injection regime, and injectate composition), and the simulated results should be considered preliminary and "proof of concept". If geochemical injections are selected as a component of the remedy, the results of treatability and pilot testing will be used to evaluate and select the actual injectate, number of injection wells, injection regime and injection rate as part of the remedy design process.

A sensitivity analysis was performed to assess the effect of assumed sorption site properties, initial concentration of Co associated with solid phases, and initial ferrihydrite

concentration (i.e., attenuation capacity) as described in **Section 4.3.3**. The results of the sensitivity analysis indicate that the Co remedial time frame is sensitive to sorption characteristics of the solid phase and is directly proportional to the initial solid phase concentration of Co and attenuation capacity.

7.2 Model Findings – Molybdenum

The reactive transport model described in **Section 5** was used to estimate the remedial feasibility for groundwater Mo concentrations to decrease below the GWPS under two scenarios: i) MNA, and ii) in-situ injections followed by performance monitoring.

Under the MNA scenario described in **Section 5.2.1**, the groundwater Mo concentration at BGWC-43D is predicted to decrease below the GWPS in approximately 4 months under post-closure conditions (**Figure 7**). The groundwater Mo concentration within the entire initial Mo plume is predicted to decrease to below the GWPS in approximately 5 years. Further, during the MNA period, the model predicts that Mo will continue to be delineated and the extent of groundwater with Mo concentration above the GWPS will remain stable owing to the high attenuation capacity of the aquifer.

Injection of an iron-based amendment followed by MNA is predicted to decrease the time to achieve GWPS compared to MNA alone. Under the injection scenario described in **Section 5.2.2**, the concentration of Mo in well BGWC-43D is predicted to decrease below the GWPS after 10 days of continuous injection. No significant rebound of Mo concentrations was observed during the performance monitoring period. The concentration of Mo within the entire initial Mo plume is predicted to decrease to below the GWPS in 6 months after injection is completed. These results represent a proof-of-concept evaluation of injection as a remedial technology for the Site. If geochemical injections are selected as a part of the remedy, the time to achieve groundwater Mo concentrations below the GWPS will depend on the amendment selected during the design phase and how the injection remedy is implemented.

Note that the primary purpose of the injection model is to assess the viability and feasibility of geochemical injections for Mo remediation. Therefore, the simulated injection wells, the parameters defined in the injection model (*e.g.,* number of wells, flow rate, injection regime, and injectate composition), and the simulated results should be considered preliminary and "proof of concept". If geochemical injections are selected as a component of the remedy, the results of treatability and pilot testing will be used to evaluate and select the actual injectate, number of injection wells, injection regime and injection rate as part of the remedy design process.

A sensitivity analysis was performed to assess the effect of assumed sorption site properties, initial concentration of Mo associated with solid phases, and initial ferrihydrite concentration (i.e., attenuation capacity) as described in **Section 5.3.3**. The results of the sensitivity analysis indicate that the Mo remedial time frame is sensitive to sorption characteristics of the solid phase and is directly proportional to the initial solid phase concentration of Mo and initial attenuation capacity.

7.3 Conclusions

The reactive transport modeling supports the geochemical CSM and suggests that Co and Mo attenuation in groundwater at AP-1 is likely due to adsorption on naturally occurring iron oxide minerals. Molybdenum and Co are present in both the dissolved phase and associated with the solid phase. The solid phase Co and Mo potentially serve as a secondary source of Co or Mo when background groundwater moves through the system. The modeling study here demonstrates that the Mo concentration at BGWC-43D will likely reach the GWPS in a relatively short period of time (<1 year) under the MNA scenario, likely because the initial concentration is only marginally above GWPS post-closure. Cobalt concentrations below GWPS at BGWC-22 were achieved after 36 years under the MNA scenario.

The reactive transport models show that injection of an Fe(III)-based amendment and bicarbonate buffer would result in a decrease in groundwater Mo and Co concentrations. The injection of iron creates additional sorption sites and attenuation capacity within the aquifer that adsorb dissolved cobalt and molybdenum. The presence of a buffer is anticipated to maintain the neutral pH of groundwater upon addition of Fe(III) and therefore, further enhances sorption activity of iron oxides. The concentration of Co and Mo is anticipated to decrease faster under the simulated injection scenarios than with MNA alone.

Ultimately, the time to achieve Mo and Co concentrations below the GWPS is dependent on the initial load, the density of reactive surfaces available for attenuation, and the pH within the plume footprint. Additional data collected during the design and remedy implementation process will be evaluated to further refine these parameters. Treatability studies and pilot studies will provide vital information on the number of injection wells, optimum well locations, injectate composition, and injection rates required to achieve remediation objectives.

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TABLES

Table 1A
BGWC-22 Focused Groundwater Flow Model Parameters
Plant Bowen, Bartow County, Georgia

Material	Model Layer	Kh (ft/d)	Kv (ft/d)	Effective Porosity	Bulk Density (g/cm^3)	Dispersivity (ft): Longitudinal /Horizontal /Vertical
CCR & Dike (inactive)	1	NA	NA	NA	NA	NA
CCR & Dike (inactive)	2	NA	NA	NA	NA	NA
Residuum (inactive)	3	NA	NA	NA	NA	NA
Bedrock	4	1.088-48.3	0.57-7.4	0.1	2.3	15/1.5/0.15
Bedrock	5	0.513	0.1967	0.05	2.4	15/1.5/0.15
Bedrock	6	0.513	0.1967	0.03	2.5	15/1.5/0.15

Notes:
1. Kh = Horizontal hydraulic conductivity.
2. Kv = Vertical hydraulic conductivity.
3. ft/d = feet per day.
4. g/cm^3 = grams per cubic centimeter.
5. NA = Not applicable as layer is inactivated.

Table 1B
BGWC-43D Focused Groundwater Flow Model Parameters
Plant Bowen, Bartow County, Georgia

Material	Model Layer	Kh (ft/d)	Kv (ft/d)	Effective Porosity	Bulk Density (g/cm^3)	Dispersivity (ft): Longitudinal /Horizontal /Vertical
CCR & Dike (inactive)	1	NA	NA	NA	NA	NA
CCR & Dike (inactive)	2	NA	NA	NA	NA	NA
Residuum (inactive)	3	NA	NA	NA	NA	NA
Bedrock	4	0.513-48.3	0.1967-7.411	0.1	2.3	15/1.5/0.15
Bedrock	5	0.513-20	0.1967-2	0.05	2.4	15/1.5/0.15
Bedrock	6	0.513	0.1967	0.03	2.5	15/1.5/0.15

Notes:
1. Kh = Horizontal hydraulic conductivity.
2. Kv = Vertical hydraulic conductivity.
3. ft/d = feet per day.
4. g/cm^3 = grams per cubic centimeter.
5. NA = Not applicable as layer is inactivated.

Table 2
Cobalt Reactive Transport Model Initial Parameters
Plant Bowen AP-1, Bartow County, Georgia

Model Parameter	Model Area									
	Assumed area with concentration above GWPS (layer 4)		Outside the assumed area with concentration above GWPS (layer 4- Area 1)		Outside the assumed area with concentration above GWPS (layer 4- Area 2)		layer 5 and 6		Recharge (precipitation)	
Units	mol/L	mg/L	mol/L	mg/L	mol/L	mg/L	mol/L	mg/L	mol/L	mg/L
Groundwater and Recharge Composition										
pH	6.9		6.9		7.5		7.2		5.3	
pe	3.74		3.74		2.36		1.93		--	
Calcium	1.75E-02	6.99E+02	1.75E-02	6.99E+02	1.16E-03	4.64E+01	2.71E-03	1.08E+02	1.20E-06	4.80E-02
Chloride	2.91E-02	1.02E+03	2.91E-02	1.02E+03	1.37E-04	4.80E+00	2.02E-03	7.08E+01	5.60E-06	1.96E-01
Cobalt	7.07E-07	4.10E-02	7.07E-07	4.10E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	--	--
Iron	6.82E-06	3.75E-01	6.82E-06	3.75E-01	1.44E-05	7.92E-01	2.01E-05	1.11E+00	--	--
Magnesium	4.47E-03	1.07E+02	4.47E-03	1.07E+02	9.88E-04	2.37E+01	1.40E-03	3.35E+01	8.20E-07	1.97E-02
Manganese	6.38E-05	3.45E+00	6.38E-05	3.45E+00	3.76E-06	2.03E-01	2.59E-06	1.40E-01	--	--
Potassium	3.42E-04	1.34E+01	3.42E-04	1.34E+01	3.33E-05	1.30E+00	5.38E-05	2.10E+00	3.33E-06	1.30E-01
Sodium	1.90E-03	4.37E+01	1.90E-03	4.37E+01	2.45E-04	5.64E+00	1.08E-03	2.49E+01	5.20E-06	1.20E-01
Sulfate	8.02E-03	7.70E+02	8.02E-03	7.70E+02	2.33E-04	2.23E+01	1.51E-03	1.45E+02	3.10E-06	2.98E-01
Total Alkalinity	9.62E-04	9.62E+01	9.62E-04	9.62E+01	2.74E-03	2.74E+02	2.32E-03	2.32E+02	--	--
Source	average of BGWC-22 and BGWC-23, except for cobalt value which is from, BGWC-22, September 2020 groundwater monitoring event (Geosyntec, 2022)		average of BGWC-22 and BGWC-23, except for cobalt value which is from, BGWC-23, September 2020 groundwater monitoring event (Geosyntec, 2022)		average of BGWC-21 and BGWC-25, September 2020 groundwater monitoring event (Geosyntec, 2022)		average of BGWC-34D and BGWC-37D, September 2020 groundwater monitoring event (Geosyntec, 2022)		National Atmospheric Deposition Program, 2021	
Soil Composition										
Units	mol/L	g/L	mol/L	g/L	mol/L	g/L	mol/L	g/L	--	--
Ferrihydrite[1]	6.0E-02	1.0E+01	5.8E-01	9.3E+01	5.8E-01	9.3E+01	5.8E-01	9.3E+01	--	--
Source	Sequential extraction procedure (Geosyntec, 2022)		Iron whole-rock analysis (Geosyntec, 2022)		Iron whole-rock analysis (Geosyntec, 2022)		Iron whole-rock analysis (Geosyntec, 2022)			

Notes:
1. Note that the PMWIN input for initial solid phase concentrations takes into account both the concentration and the effective porosity.

Abbreviations:
-- = not applicable
mol/L = moles per liter
mg/L=milligrams per liter
S.U. = standard unit
GWPS = groundwater protection standard

Table 3
Reactive Transport Model Parameters - Geochemical Composition of Injectate
Plant Bowen AP-1, Bartow County, Georgia

Constituent	Concentration	Units
pH	8.20	s.u
pe	3	--
Bicarbonate	1.00E-01	mol/L
Iron (III)	2.00E-02	mol/L

Notes:

1. mol/L indicates moles per liter, s.u. indicates standard units.
2. Equilibrium composition calculated using a batch PHREEQC model.
3. Chloride calculation calculated to achieve charge balance.

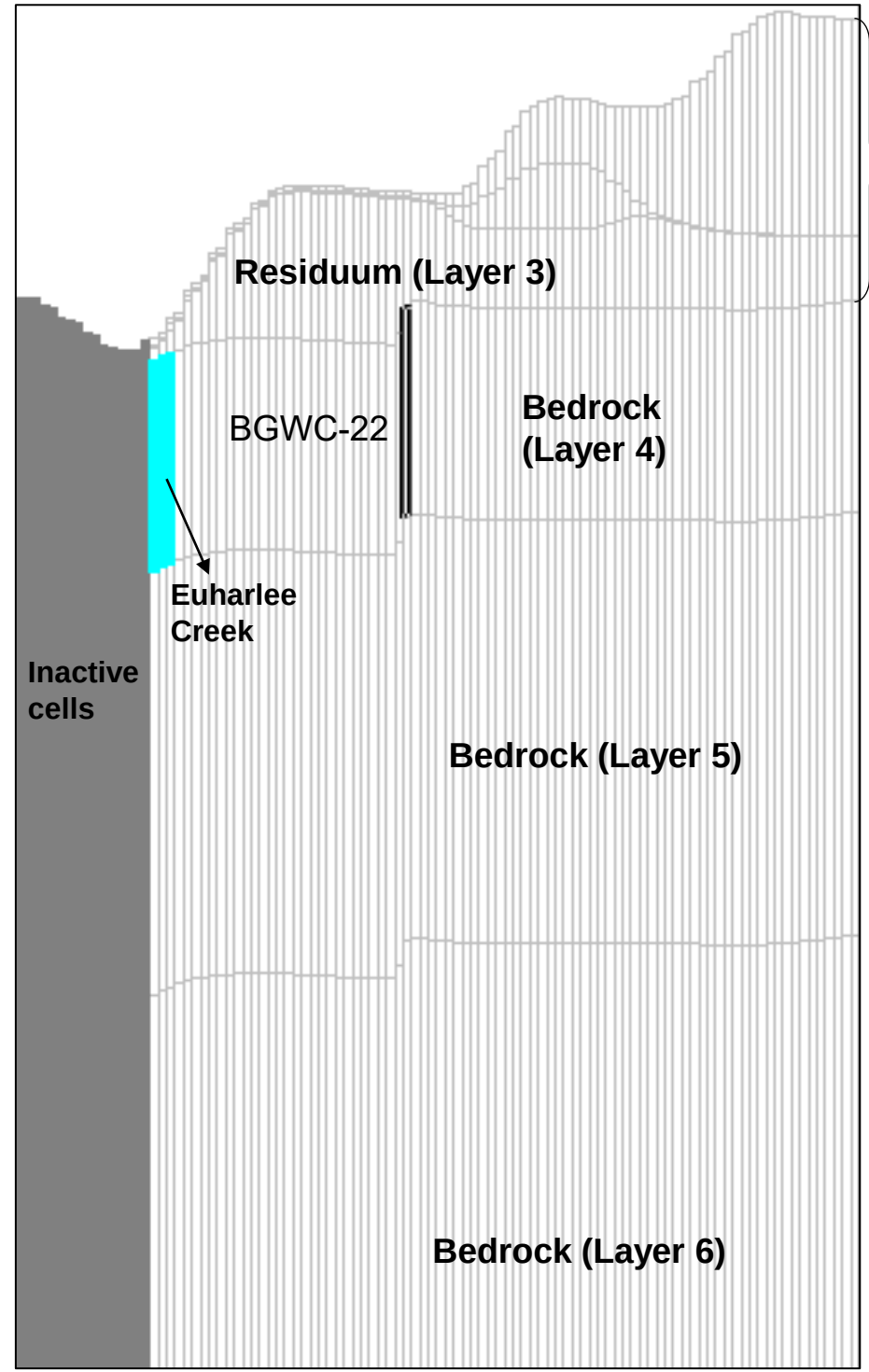
Table 4
Molybdenum Reactive Transport Model Initial Parameters
Plant Bowen AP-1, Bartow County, Georgia

Model Parameter	Model Area							
	Assumed area with concentration above GWPS (layer 4 and 5)		Outside the assumed area with concentration above GWPS (layer 4)		Outside the assumed area with concentration above GWPS (layer 5 & 6)		Recharge (precipitation)	
Units	mol/L	mg/L	mol/L	mg/L	mol/L	mg/L	mol/L	mg/L
Groundwater and Recharge Composition								
pH	6.84		7.6		7.6		5.3	
pe	3.76		2.40		2.40 [1]		--	
Calcium	7.64E-03	3.06E+02	1.26E-03	5.02E+01	1.51E-03	6.03E+01	1.20E-06	4.80E-02
Chloride	1.25E-02	4.37E+02	5.31E-04	1.86E+01	4.37E-04	1.53E+01	5.60E-06	1.96E-01
Iron	1.33E-05	7.30E-01	6.73E-06	3.70E-01	6.73E-06	3.70E-01 [1]	--	--
Magnesium	2.83E-03	6.78E+01	1.16E-03	2.79E+01	1.16E-03	2.79E+01 [1]	8.20E-07	1.97E-02
Manganese	2.31E-05	1.25E+00	2.59E-06	1.40E-01	2.59E-06	1.40E-01 [1]	--	--
Molybdenum	1.11E-06	1.05E-01	0.00E+00	0.00E+00 [2]	0.00E+00	0.00E+00 [1,2]	--	--
Potassium	1.23E-04	4.80E+00	3.59E-05	1.40E+00	3.59E-05	1.40E+00 [1]	3.33E-06	1.30E-01
Sodium	9.48E-04	2.18E+01	1.50E-03	3.45E+01	1.50E-03	3.45E+01 [1]	5.20E-06	1.20E-01
Sulfate	2.84E-03	2.73E+02	3.23E-04	3.10E+01	8.27E-04	7.94E+01	3.10E-06	2.98E-01
Total Alkalinity	8.98E-04	8.98E+01	2.47E-03	2.47E+02	2.47E-03		--	--
Source	average of BGWC-43D and BGWC-38D, September 2020 groundwater monitoring event (Geosyntec, 2022)		BGWC-44D, September 2020 groundwater monitoring event (Geosyntec, 2022)		BGWC-50D, September 2020 groundwater monitoring event (Geosyntec, 2022)		National Atmospheric Deposition Program, 2021	
Soil Composition								
Units	mol/L	g/L	mol/L	g/L	mol/L	g/L	--	--
Ferrihydrite[3]	1.6E-01	2.6E+01	5.8E-01	9.3E+01	5.8E-01	9.3E+01	--	--
Source	Ferrihydrite and Goethite: Sequential extraction procedure (Geosyntec, 2022)		Ferrihydrite: Iron whole-rock analysis (Geosyntec, 2022) Goethite: XRD (Geosyntec, 2022)		Ferrihydrite: Iron whole-rock analysis (Geosyntec, 2022) Goethite: XRD (Geosyntec, 2022)			

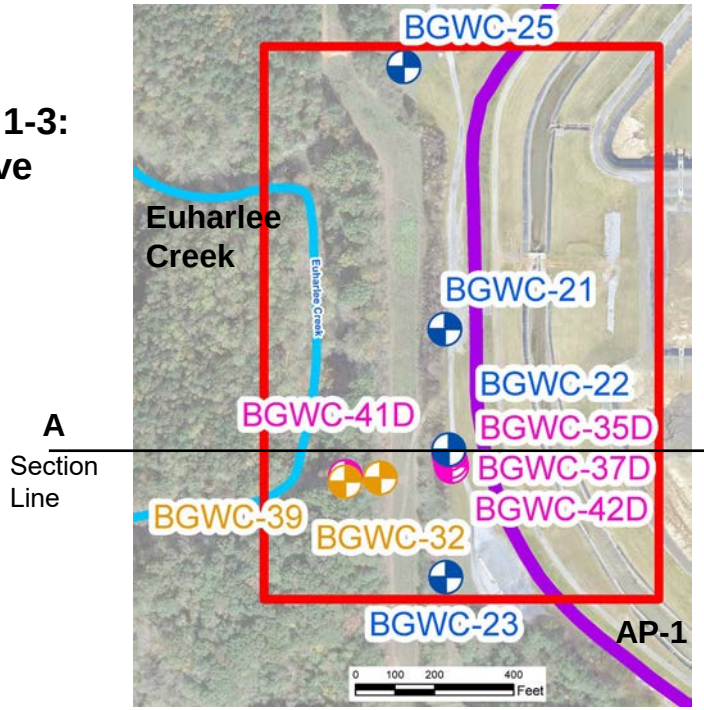
Notes:
1. Data for flagged constituents from BGWC-50 at the specified sampling event was unavailable. Data of layer 4- outside the assumed area with concentration above GWPS- was used as model input.
2. The lab data was qualified as J and the model input assumed as 0.
3. Note that the PMWIN input for initial solid phase concentrations takes into account both the concentration and the effective porosity.

Abbreviations:
-- = not applicable
mol/L = moles per liter
mg/L=milligrams per liter
S.U. = standard unit
GWPS = groundwater protection standard

FIGURES



Model Location Map



Model Layering		
Material	**Model Layer**	**Status**
CCR, Dike, & Residuum	1	Inactive
CCR, Dike, & Residuum	2	Inactive
Residuum	3	Inactive
Bedrock	4	Active
Bedrock	5	Active
Bedrock	6	Active

BGWC-22 FOCUSED GROUNDWATER FLOW MODEL: LAYERING & CROSS SECTION

GEORGIA POWER COMPANY
PLANT BOWEN AP-1
BARTOW COUNTY, GEORGIA

Prepared For: Georgia Power

Prepared By: Geosyntec consultants

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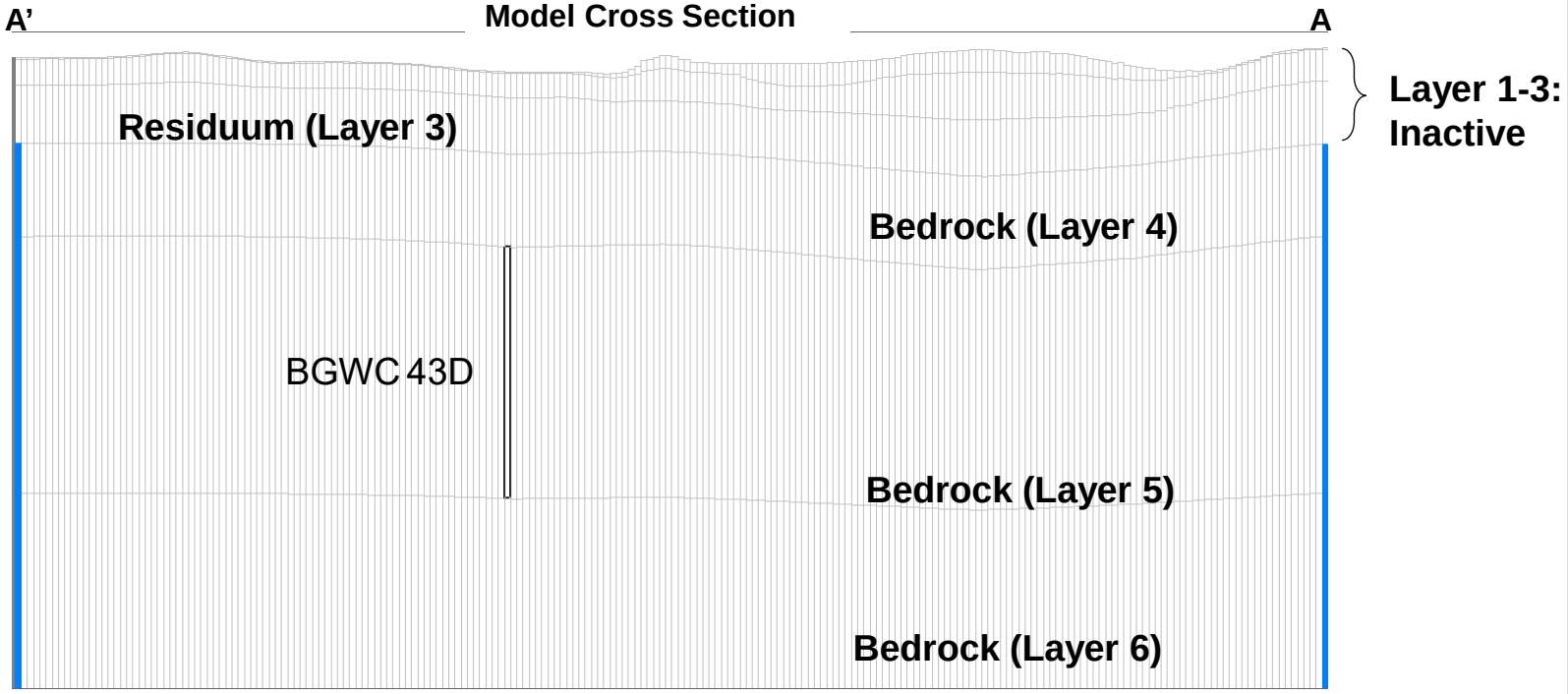
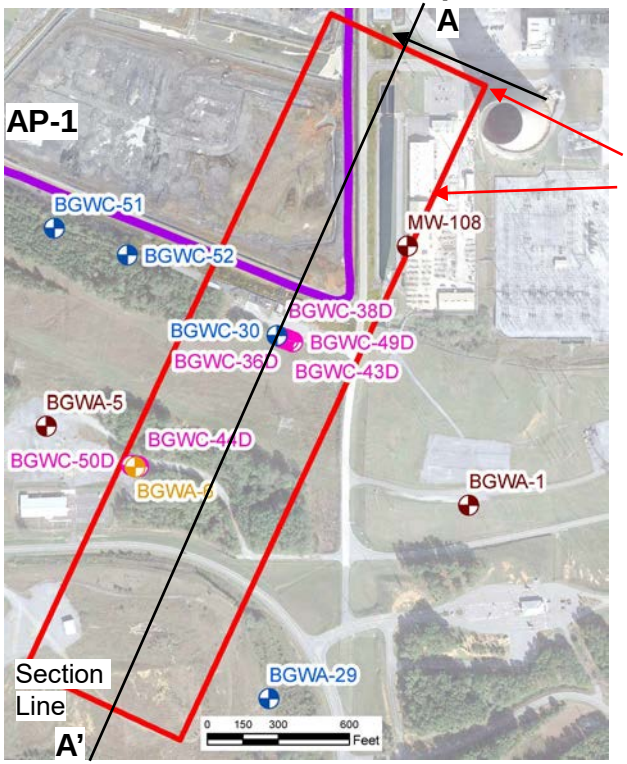
FIGURE 1a

Model Cross Section



Model Location Map



Model Layering		
Material	**Model Layer**	**Status**
CCR, Dike, & Residuum	1	Inactive
CCR, Dike, & Residuum	2	Inactive
Residuum	3	Inactive
Bedrock	4	Active
Bedrock	5	Active
Bedrock	6	Active

BGWC-43D FOCUSED GROUNDWATER FLOW MODEL: LAYERING & CROSS SECTION

GEORGIA POWER COMPANY
PLANT BOWEN AP-1
BARTOW COUNTY, GEORGIA

Prepared For: Georgia Power

Prepared By: Geosyntec consultants

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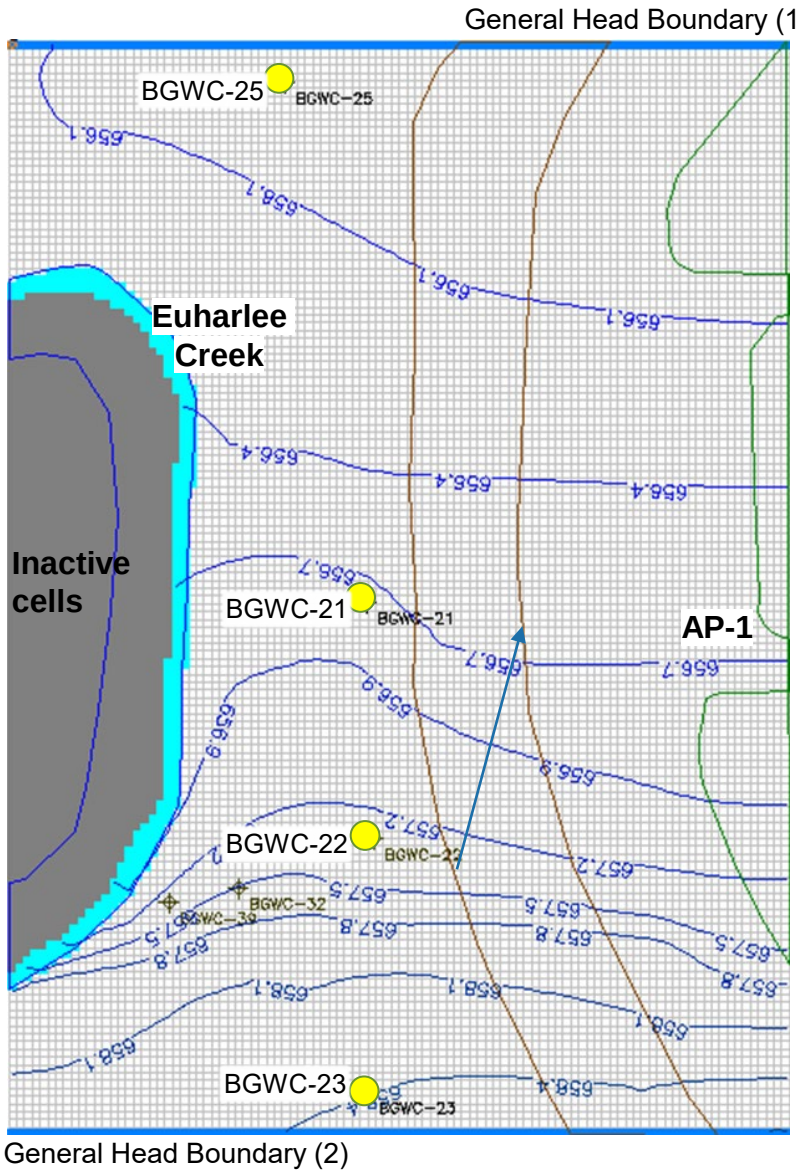
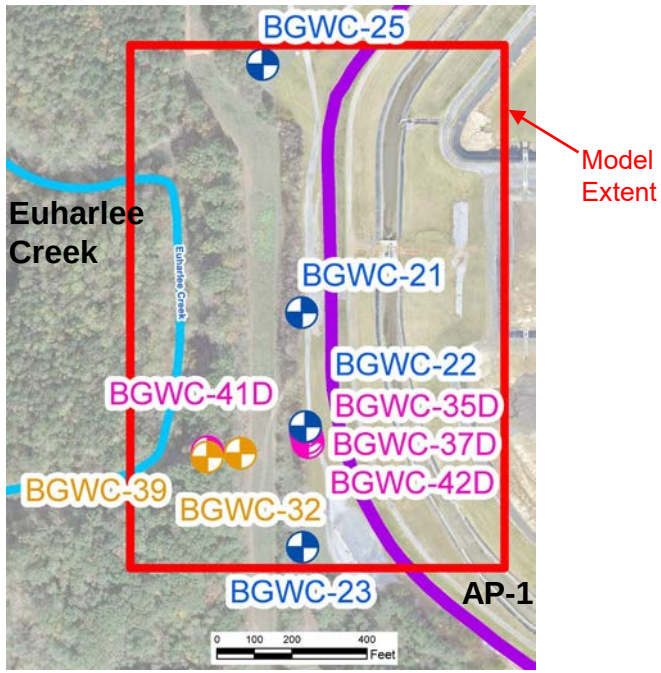
FIGURE 1b



Model Extent Legend

- Modeled Groundwater Contour Elevation (ft)
- Modeled Groundwater Flow Direction
- Inactive Cells
- River Boundary Cells
- General Head Boundary Cells
- Monitoring Well

Model Location Map



Boundary	MODFLOW Package	Groundwater Elevation (ft)	Conductance (ft^2/d)
General Head Boundary (1)	General Head	655.7-656.1	200
General Head Boundary (2)	General Head	658.4-658.7	200
Euharlee Creek (layer 4)	River	565.3-657.1	100-1000

Notes:

1) Model groundwater elevations shown above are from layer 4 and represent post-closure conditions.
2) In MODFLOW, conductance is the product of hydraulic conductivity and cross-sectional area of flow divided by the length of the flow path. For boundary conditions it is often a calibrated parameter.

BGWC-22 FOCUSED GROUNDWATER FLOW MODEL: BOUNDARY CONDITIONS

GEORGIA POWER COMPANY
PLANT BOWEN AP-1
BARTOW COUNTY, GEORGIA

Prepared For: Georgia Power

Prepared By: Geosyntec consultants

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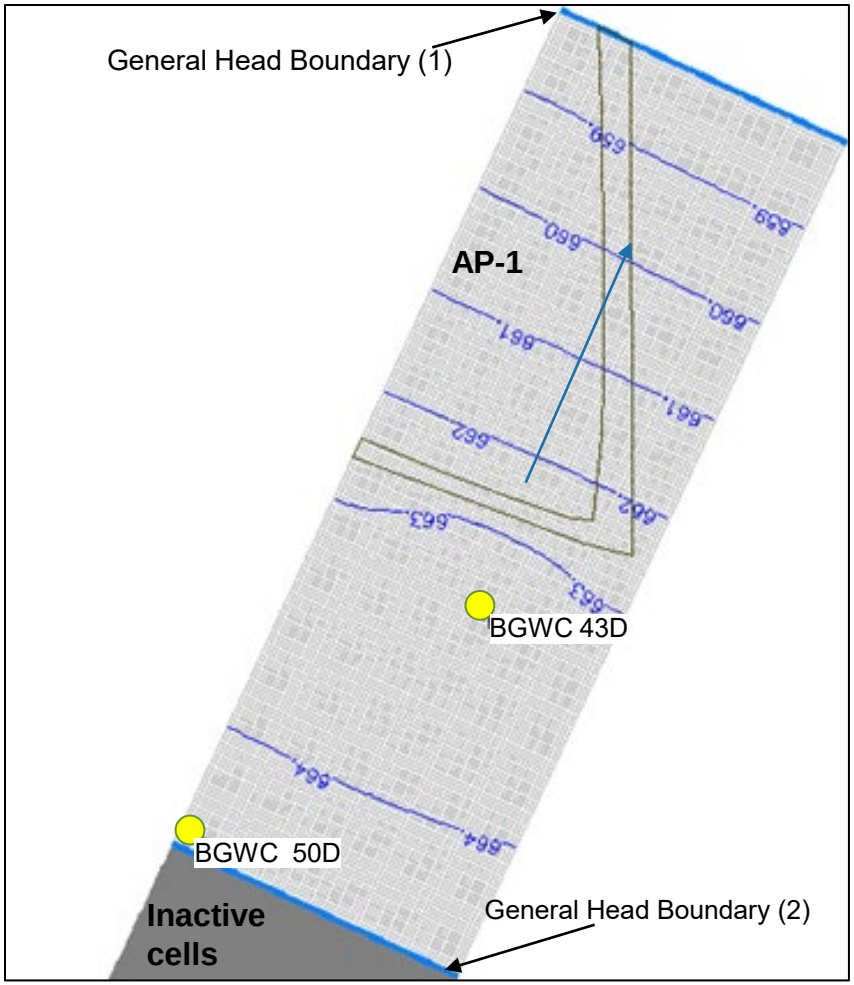
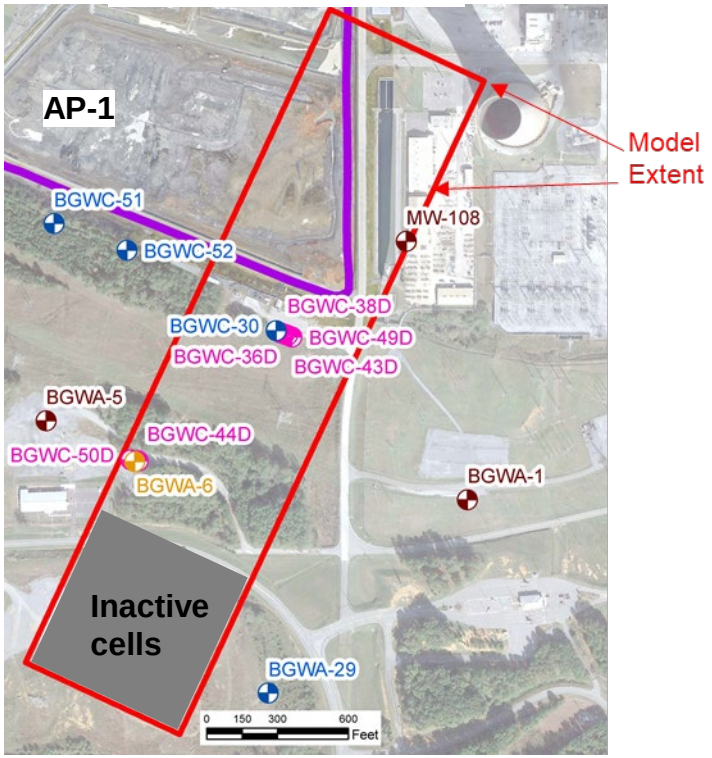
FIGURE 2a



Model Extent Legend

- Modeled Groundwater Contour Elevation (ft)
- Modeled Groundwater Flow Direction
- Inactive Cells
- General Head Boundary Cells
- Monitoring Well

Model Location Map



Boundary	MODFLOW Package	Groundwater Elevation (ft)	Conductance (ft^2/d)
General Head Boundary (1)	General Head	658	100
General Head Boundary (2)	General Head	664.3	100

Notes:

1) Model groundwater elevations shown above are from layer 5 and represent post-closure conditions.
2) In MODFLOW, conductance is the product of hydraulic conductivity and cross-sectional area of flow divided by the length of the flow path. For boundary conditions it is often a calibrated parameter.

BGWC-43D FOCUSED GROUNDWATER FLOW MODEL: BOUNDARY CONDITIONS

GEORGIA POWER COMPANY
PLANT BOWEN AP-1
BARTOW COUNTY, GEORGIA

Prepared For: Georgia Power

Prepared By: Geosyntec consultants

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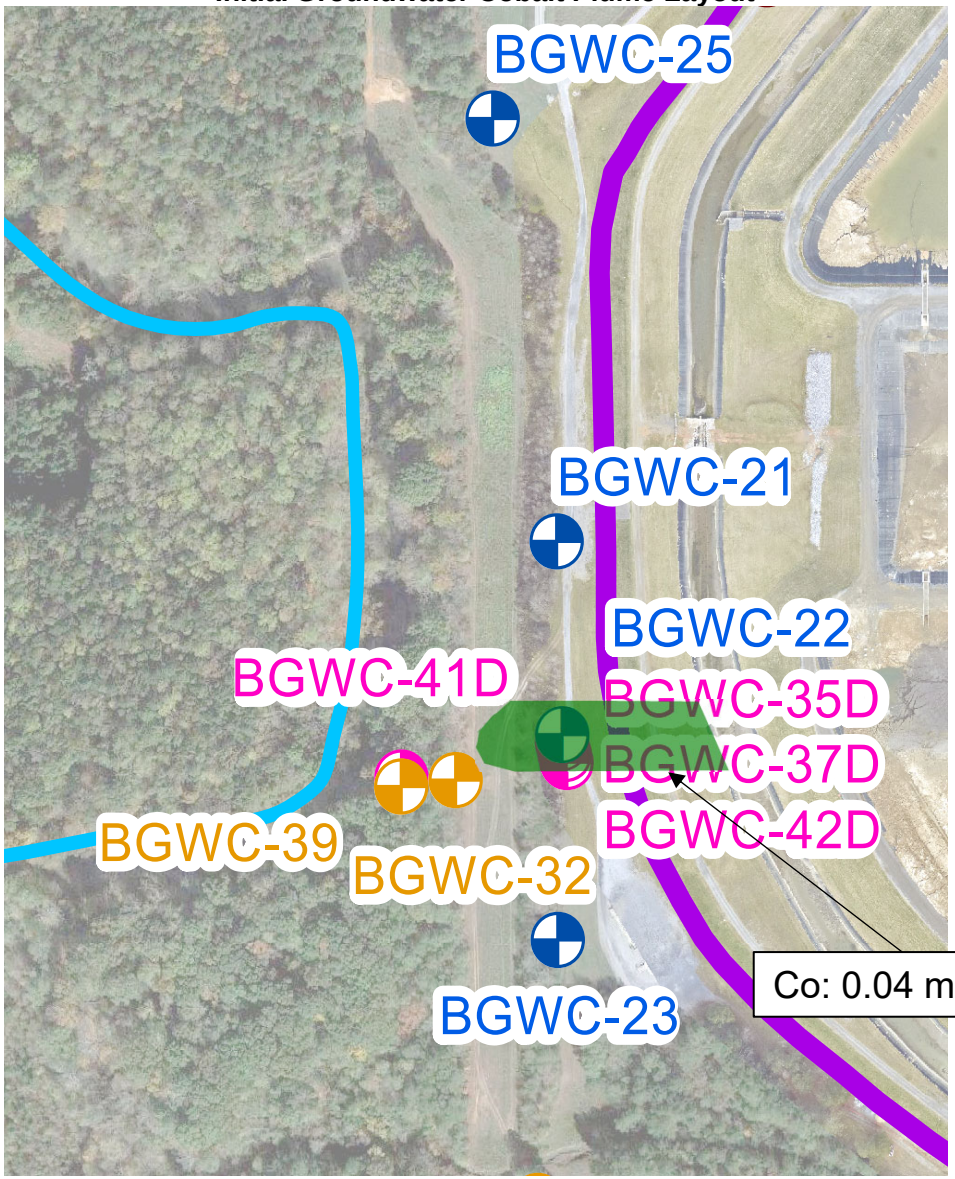
FIGURE 2b

Initial Groundwater Cobalt Plume Layout



Notes:
1. The cobalt GWPS is 0.006 mg/L.
2. Green shaded area represents the assumed area with Co concentration above GWPS.

Abbreviations:
GWPS = groundwater protection standard
Co = cobalt
MNA = monitored natural attenuation
mg/L = milligrams per liter

INITIAL GROUNDWATER PLUME LAYOUT – COBALT MODEL
GEORGIA POWER COMPANY
PLANT BOWEN AP-1
BARTOW COUNTY, GEORGIA

Prepared For: Georgia Power
Prepared By: Geosyntec consultants

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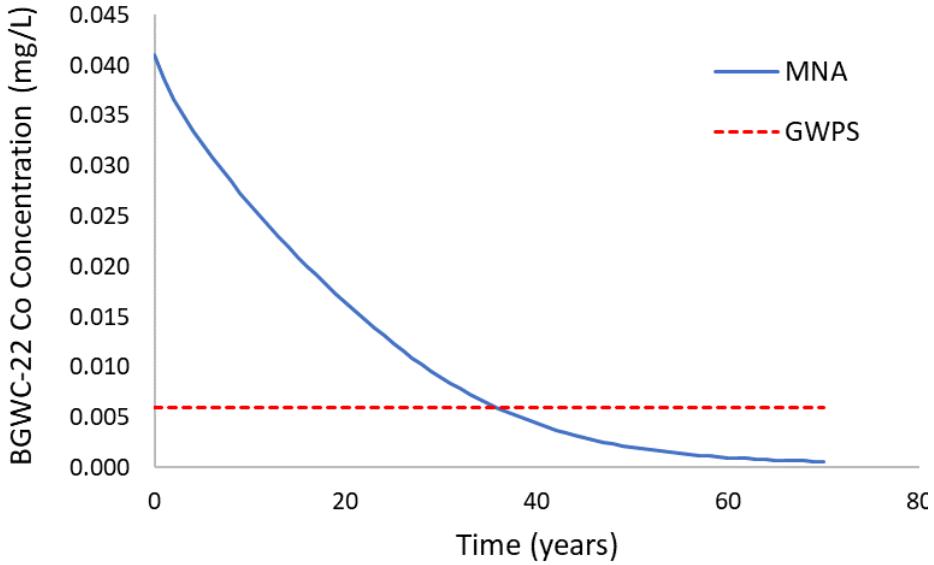
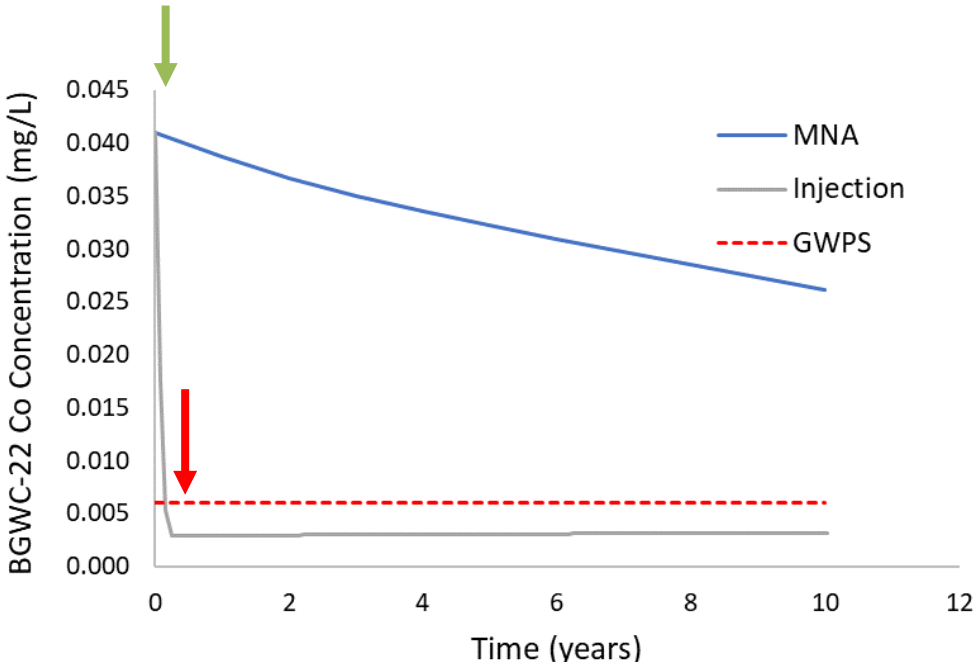
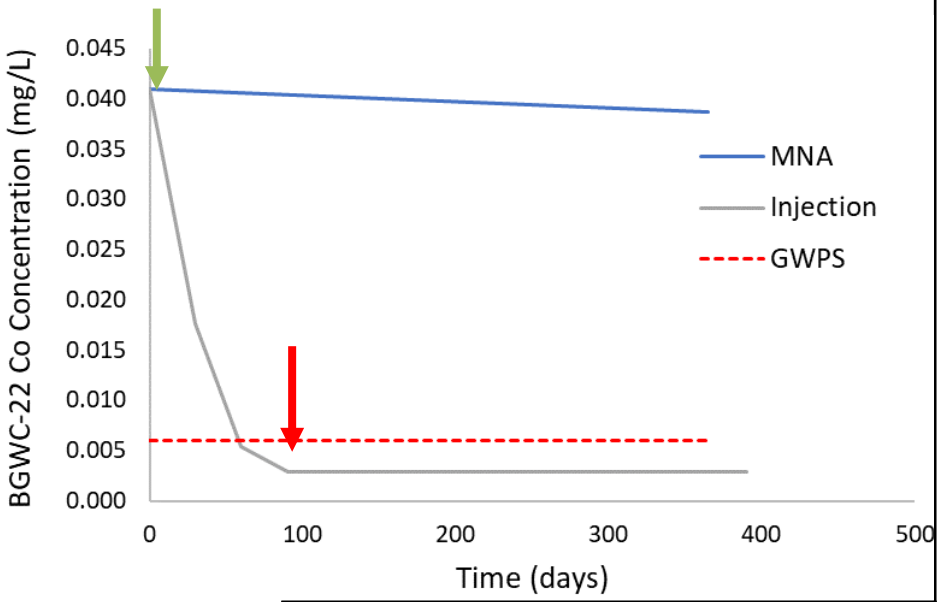
FIGURE 3







Notes:
1. The cobalt GWPS is 0.006 mg/L.
2. Green, and red vertical arrows indicate the initiation and end of injection, respectively.
3. MNA represents the baseline scenario with ferrihydrite.

Abbreviations:
GWPS = groundwater protection standard
Co = cobalt
MNA = monitored natural attenuation
mg/L = milligrams per liter

MODEL RESULTS – PREDICTED COBALT CONCENTRATION TIME SERIES

GEORGIA POWER COMPANY
PLANT BOWEN AP-1
BARTOW COUNTY, GEORGIA

Prepared For:	Prepared By:	FIGURE
Georgia Power	Geosyntec consultants	4
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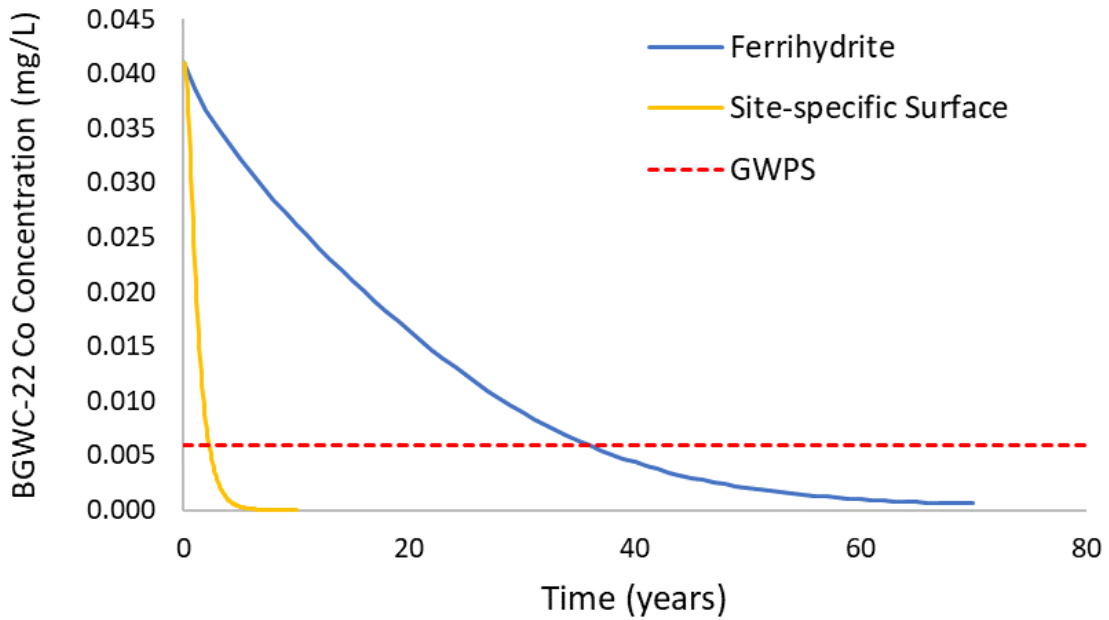
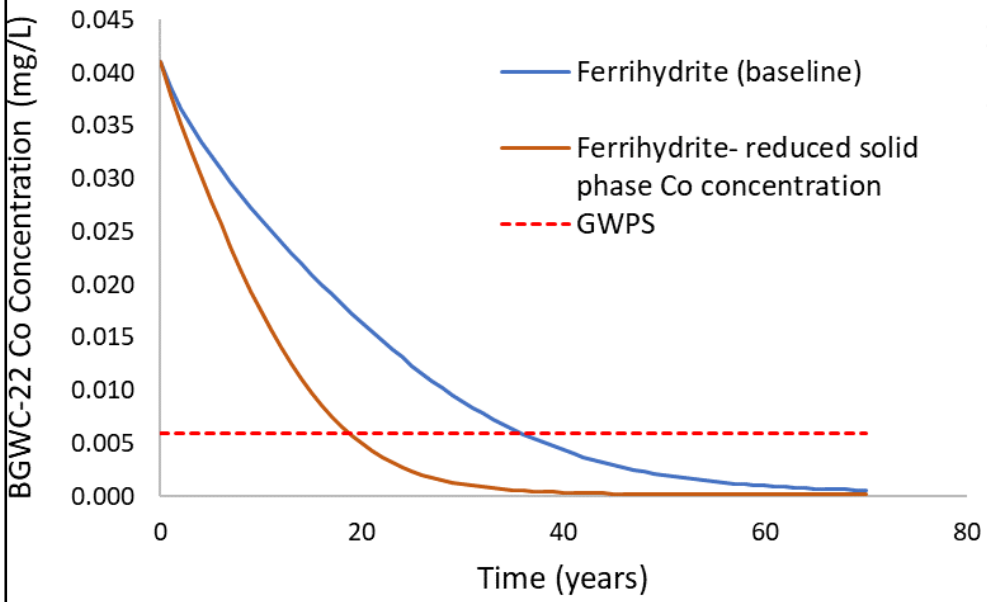
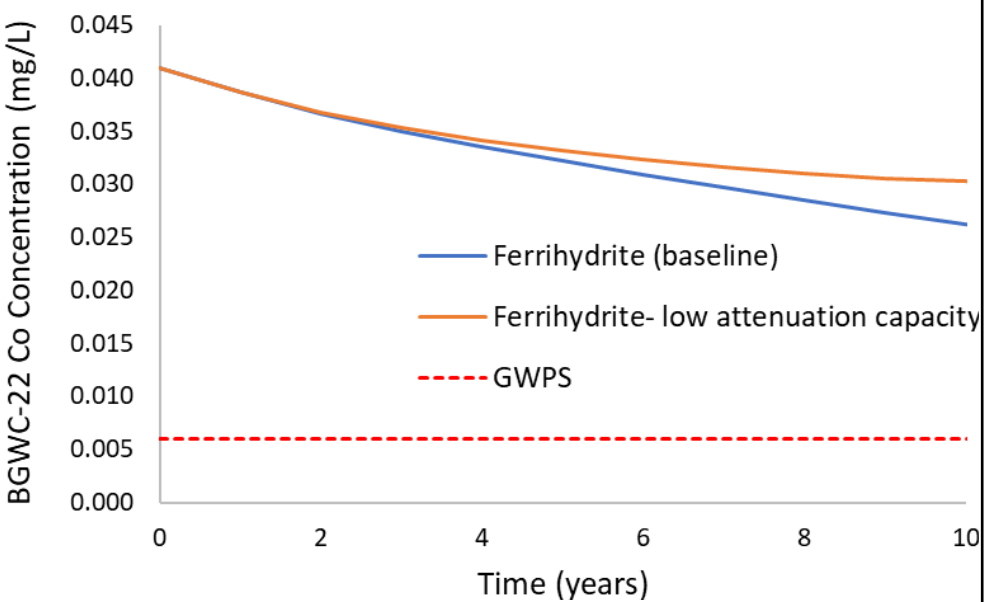






Notes:
1. The cobalt GWPS is 0.006 mg/L.
2. MNA represents the baseline scenario with ferrihydrite.
3. Ferrihydrite and Ferrihydrite (baseline) in graphs refer to baseline MNA scenario in Figure 7.

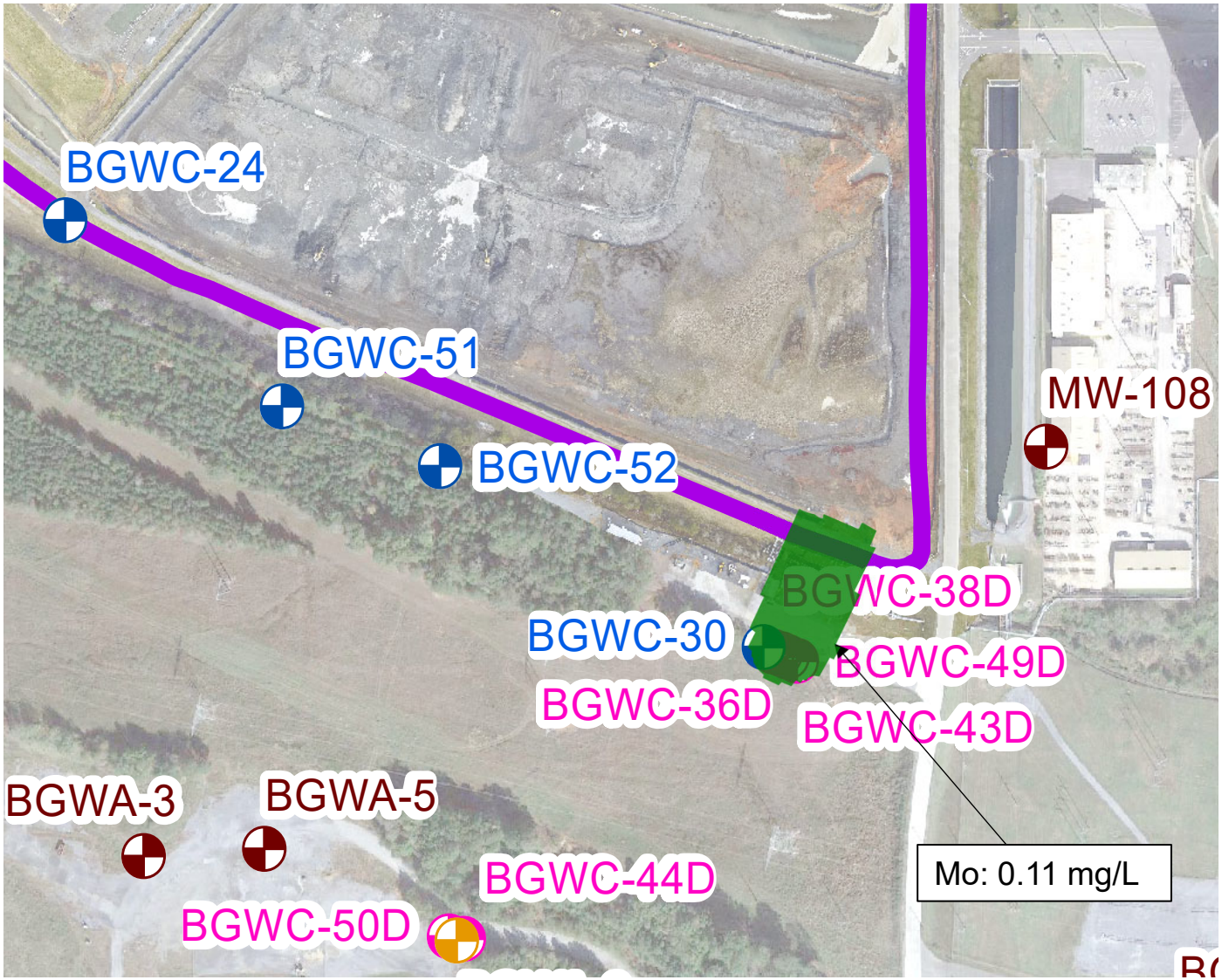
Abbreviations:
GWPS = groundwater protection standard
Co = cobalt
MNA = monitored natural attenuation
mg/L = milligrams per liter

SENSITIVITY ANALYSIS RESULTS – PREDICTED COBALT CONCENTRATION TIME SERIES

GEORGIA POWER COMPANY
PLANT BOWEN AP-1
BARTOW COUNTY, GEORGIA

Prepared For:	Prepared By:	FIGURE
Georgia Power	Geosyntec consultants	5
KENNESAW, GA	JULY 2024	

Initial Groundwater Molybdenum Plume Layout



Notes:
1. The molybdenum GWPS is 0.1 mg/L.
2. Green shaded area represents the assumed area with Mo concentration above GWPS.

Abbreviations:
GWPS = groundwater protection standard
Mo = molybdenum
MNA = monitored natural attenuation
mg/L = milligrams per liter

INITIAL GROUNDWATER PLUME LAYOUT – MOLYBDENUM MODEL

GEORGIA POWER COMPANY
PLANT BOWEN AP-1
BARTOW COUNTY, GEORGIA

Prepared For: Georgia Power

Prepared By: Geosyntec consultants

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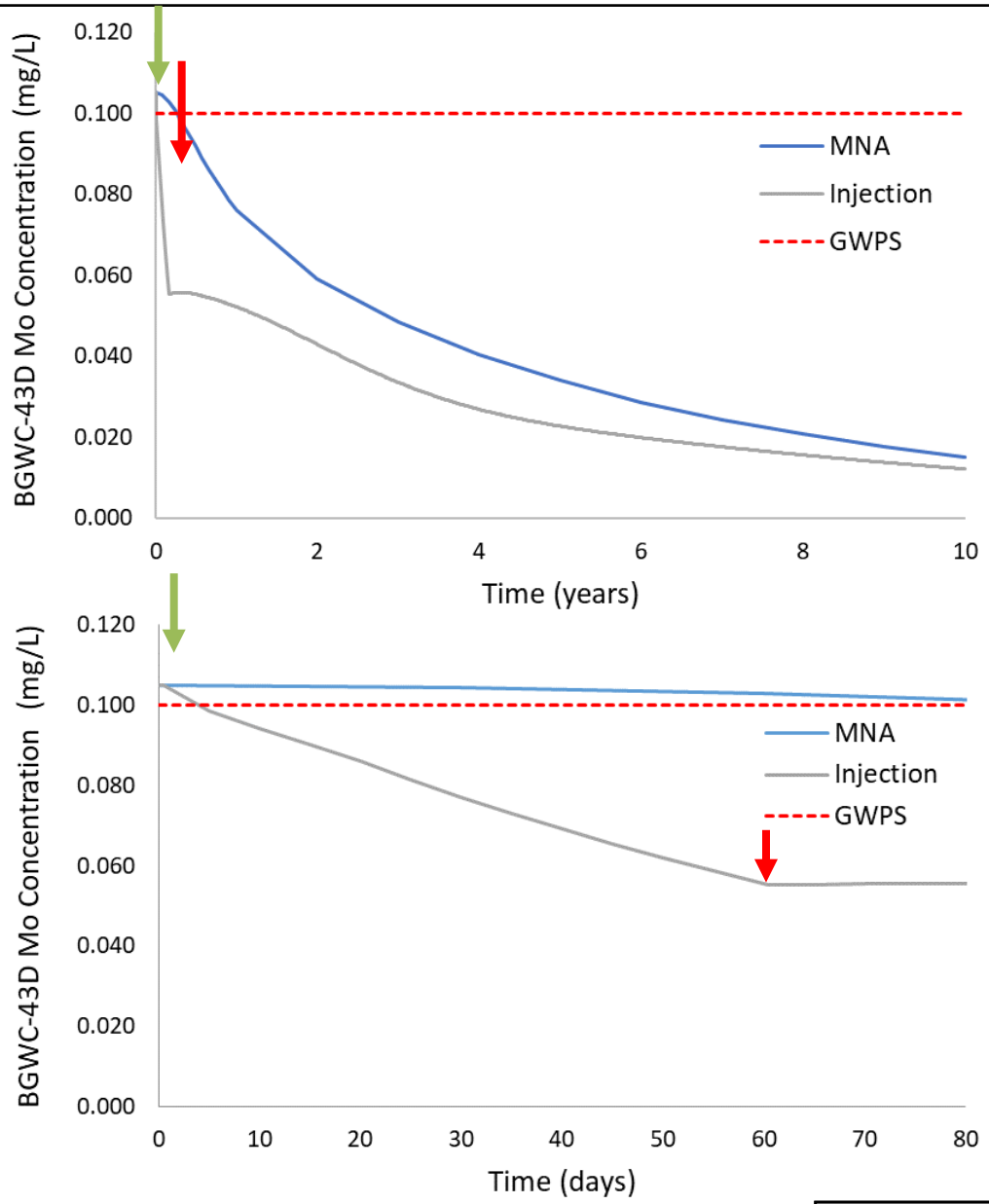
FIGURE 6



Notes:
1. The molybdenum GWPS is 0.1 mg/L.
2. Green, and red vertical arrows indicate the initiation and end of injection.
3. MNA represents the baseline scenario with ferrihydrite.

Abbreviations:
GWPS = groundwater protection standard
Mo = molybdenum
MNA = monitored natural attenuation
mg/L = milligrams per liter

MODEL RESULTS – PREDICTED MOLYBDENUM CONCENTRATION TIME SERIES

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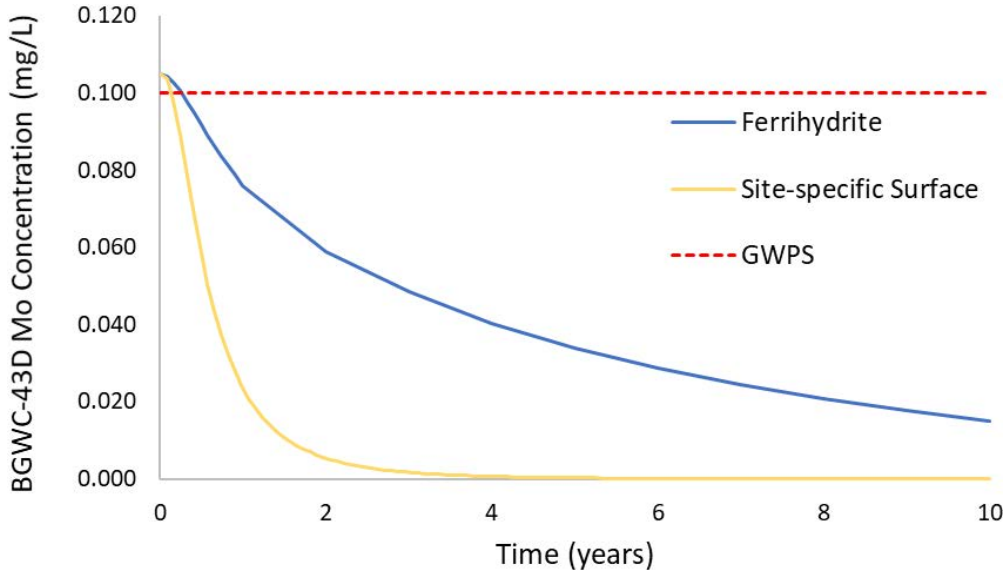

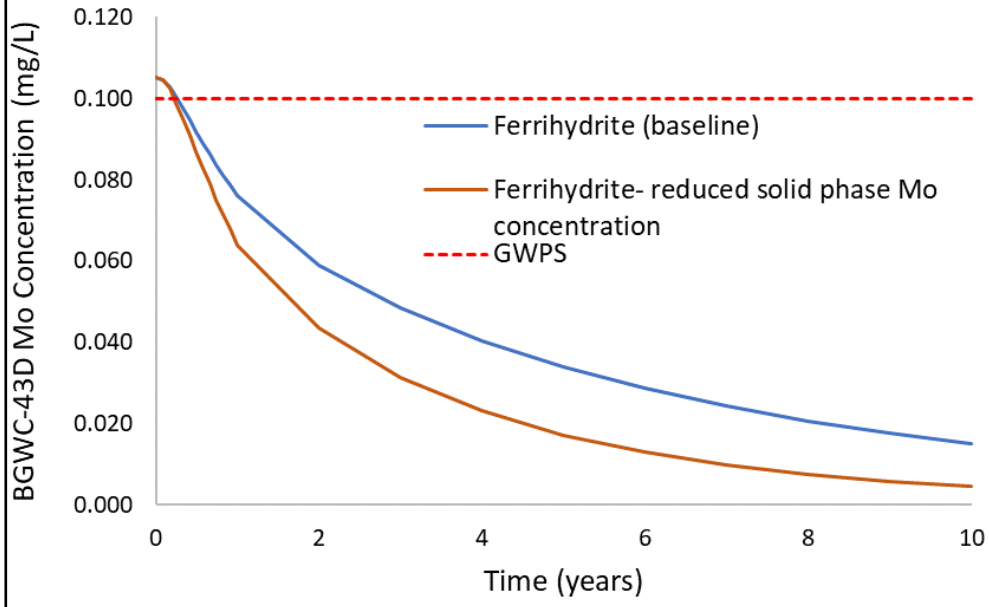

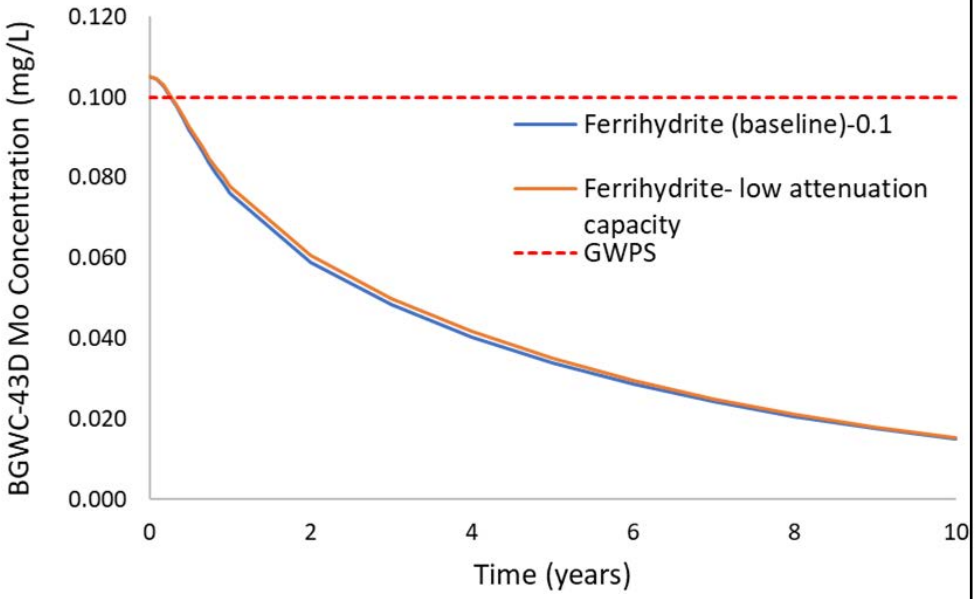

Notes:
1. The molybdenum GWPS is 0.1 mg/L.
2. Ferrihydrite and Ferrihydrite (baseline) in graphs refer to baseline MNA scenario in Figure 7.

Abbreviations:
GWPS = groundwater protection standard
Mo = molybdenum
mg/L = milligrams per liter

SENSITIVITY ANALYSIS RESULTS – PREDICTED MOLYBDENUM CONCENTRATION TIME SERIES

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