**REPORT**

# DRAFT Remedy Selection Report

*Plant McDonough-Atkinson Ash Pond 2 and 3/4*

Submitted to:

**Georgia Power Company**


Submitted by:

**WSP USA, Inc.**

5170 Peachtree Road Building 100 Suite 300, Atlanta, Georgia, USA 30341

+1 770 496 1893


August 31, 2023

# Certification

This *Draft Remedy Selection Report, Georgia Power Company - Plant McDonough-Atkinson Ash Pond 2 and 3/4* has been prepared in to meet the requirements of the United States Environmental Protection Agency coal combustion residual rule [40 Code of Federal Regulations (CFR) 257 Subpart D] and the Georgia Environmental Protection Division Rules for Solid Waste Management 391-3-4-.10(6)(a-c).

I, Todd H Rees, 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 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 that individual 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 (CFR) 257 Subpart D] and the Georgia Environmental Protection Division Rules for Solid Waste Management 391-3-4-.10.

**WSP USA Inc.**


Todd H Rees, PE
*Georgia Registered Professional Engineer No. PE047845*

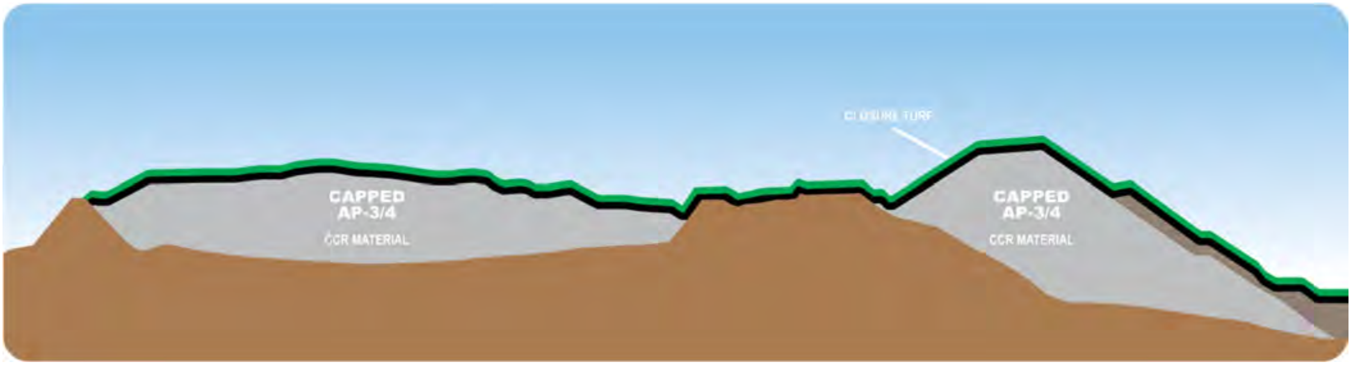
# Executive Summary


Plant McDonough-Atkinson (Plant McDonough, the Site), located in Atlanta, Georgia, was formerly a coal-fire powered generating facility. It was converted to a natural gas combined-cycle power generating facility in 2011. Coal combustion residuals (CCR), commonly referred to as “coal ash”, a non-hazardous material generated from burning coal to generate electricity, were stored at the site in Ash Pond 2 and Ash Pond 3/4 (AP-2 and AP-3/4). Ash ponds were designed, installed, and operated to function as a treatment system for power plant wastewaters, and they have effectively served in this capacity for decades in compliance with the National Pollutant Discharge Elimination System (“NPDES”) permits under which they were regulated. Georgia Power has undertaken actions to close the AP-2 and AP-3/4 in accordance with federal and state regulations. Ash pond consolidation and closure activities began in 2015 and are expected to conclude in 2024. As part of a comprehensive approach to managing CCR, Georgia Power completed a detailed evaluation of corrective measures to remove arsenic, beryllium, lithium, and cobalt in groundwater above the Groundwater Protection Standard (GWPS) at AP-2 and AP-3/4 at Plant McDonough.

## CLOSURE OF THE CCR UNITS

Source control by closure of the CCR unit provides considerable benefits to groundwater and is an important step in managing impacts to groundwater. Source control benefits are being achieved at Plant McDonough through several steps in accordance with the performance standards applicable to CCR unit closures:

- **CCR consolidation:** AP-2 was closed by removal. The CCR material from AP-2, along with CCR removed from portions of AP-3 and AP-4 are being consolidated into a unit called AP-3/4.
- **Capping:** AP-3/4 is being closed in place by capping with a final cover system.
- **Dewatering:** Dewatering during closure is designed to lower the groundwater elevation relative to the elevation of the CCR closed in place.



# Executive Summary

## GROUNDWATER MONITORING AND ASSESSMENT

Georgia Power has performed routine CCR groundwater monitoring at AP-2 and AP-3/4 since background groundwater conditions were initiated in 2016 following commencement of the Federal CCR Rule. Over the period of Georgia Power's monitoring, concentrations of arsenic, beryllium, cobalt, and lithium were identified above GWPS requiring corrective action. Extended groundwater monitoring indicates the constituents above the GWPS are horizontally delineated.

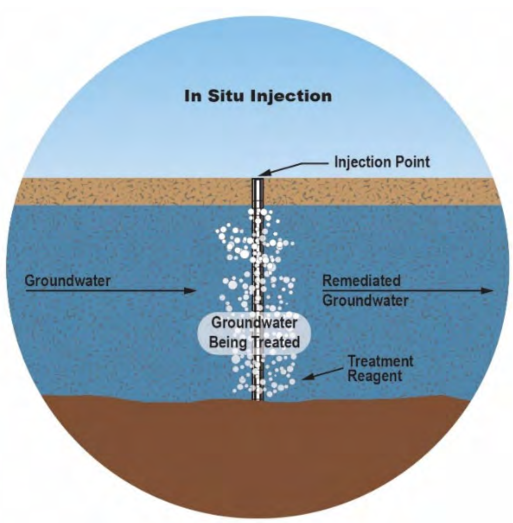
## RISK EVALUATION FOR HUMAN HEALTH AND ENVIRONMENT

Georgia Power completed a risk evaluation on arsenic, beryllium, cobalt, and lithium in groundwater at the site. As documented in the Risk Evaluation Report, these constituents in groundwater at the site are not expected to pose a risk to human health or the environment.

## PROPOSED CORRECTIVE ACTION FOR GROUNDWATER: MONITORED NATURAL ATTENUATION AND IN SITU INJECTION

Georgia Power submitted an assessment of corrective measures (ACM) report for AP-2 and AP-3/4 in July 2020. 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 constituents with concentrations above GWPS in groundwater.

In light of the expected source control benefits, for arsenic, beryllium and lithium in groundwater, Monitored Natural Attenuation (MNA) was selected as the proposed remedy for these constituents using the criteria described in the CCR Rule, 40 Code of Federal Regulations (CFR) Parts 257.97. MNA is the proposed remedy based on the site-specific demonstration following the EPA 2015 guidance of natural attenuation mechanisms, capacity, stability, and favorable protectiveness, effectiveness, and ease of implementation.  The source control provided by the closure and MNA actions are anticipated to decrease arsenic, beryllium and lithium concentrations to less than the GWPS at the waste boundary within 10 years.




In Situ Injection was selected as the proposed remedial approach for cobalt at the site. In Situ Injection is anticipated to create conditions in the subsurface to effectively remove cobalt from groundwater.  Results of laboratory testing with site soil and groundwater demonstrated removal of cobalt from groundwater with this approach.

## ADAPTIVE SITE MANAGEMENT

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

## LONG-TERM GROUNDWATER MONITORING

*Georgia Power will continue to perform groundwater monitoring and reporting at the AP-2 and AP-3/4 for at least 30-years after the units are closed.*

# Table of Contents

**CERTIFICATION** .......... i

**EXECUTIVE SUMMARY** .......... ii

**1.0 INTRODUCTION** .......... 1

**2.0 BACKGROUND** .......... 1

2.1 REMEDY SELECTION PROCESS .......... 1

2.2 UNIT LOCATION AND DESCRIPTION .......... 3

2.3 UNIT CLOSURE .......... 3

2.4 GROUNDWATER MONITORING .......... 4

**3.0 GROUNDWATER CONCEPTUAL SITE MODEL** .......... 6

3.1 SITE GEOLOGY .......... 6

3.2 SITE HYDROGEOLOGY .......... 6

3.3 UPPERMOST AQUIFER AND GROUNDWATER FLOW .......... 7

3.4 GEOCHEMICAL CSM .......... 8

3.5 NATURE AND EXTENT OF GROUNDWATER ABOVE THE GWPS .......... 8

**4.0 ASSESSMENT OF CORRECTIVE MEASURES SUMMARY** .......... 10

**5.0 CORRECTIVE MEASURES EVALUATION** .......... 11

5.1 REQUIRED CRITERIA (§257.97(b)) .......... 11

5.1.1 Protective of Human Health and the Environment (§257.97(b)(1)) .......... 12

5.1.2 Attain the Groundwater Protection Standards (§257.97(b)(2)) .......... 12

5.1.3 Control the Source of Release (§257.97(b)(3)) .......... 13

5.1.4 Removal of Contaminated Material from the Environment (§257.97(b)(4)) .......... 13

5.1.5 Comply with Waste Management Standards (§257.97(b)(5)) .......... 13

5.2 COMPARATIVE CRITERIA (§257.97(c)) .......... 14

5.2.1 Category 1: Long- and Short-Term Effectiveness and Protectiveness .......... 14

5.2.2 Category 2: Source Control Effectiveness .......... 17

5.2.3 Category 3: Ease of Implementation .......... 18

5.2.4 Evaluation of Comparison Criteria ..... 20
5.3 PUBLIC MEETING AND COMMUNITY ENGAGEMENT ..... 20
**6.0 PROPOSED REMEDY SELECTION ..... 20**
6.1 Summary of Proposed Remedy ..... 21
6.2 SCHEDULE ..... 21
6.2.1 Planning and Design ..... 22
6.2.2 Construction and Implementation ..... 23
6.2.3 Operation ..... 23
6.3 REPORTING ..... 23
**7.0 REFERENCES ..... 24**

# Table of Contents - continued

## Tables

Table 1 Summary of Monitoring Well, Assessment Well and Piezometer Construction Data

Table 2 Summary of Corrective Measures Screening

## Figures

Figure 1 Site Location Map

Figure 2 Site Plan, Monitoring Well, Assessment Well, Piezometer, and Surface Water Location Map

Figure 3 Geologic Cross Section Schematic A-A’

Figure 4 Site Potentiometric Map – January 31, 2023

Figure 5 Arsenic Isoconcentration Contour Map – January 2023

Figure 6 Beryllium Isoconcentration Contour Map – January 2023

Figure 7 Cobalt Isoconcentration Contour Map – January 2023

Figure 8 Lithium Isoconcentration Contour Map – January 2023

Figure 9 Corrective Measure Alternative 1: MNA

Figure 10 Corrective Measure Alternative 2: ISI

## Appendices

Appendix A Geochemical Conceptual Site Model

Appendix B Geochemical Model Report

Appendix C Risk Evaluation Report

Appendix D Site Specific Demonstration of Natural Attenuation (MNA Feasibility)

No table of contents entries found.

# 1.0 INTRODUCTION

On behalf of Georgia Power Company (Georgia Power), WSP prepared this *Draft Remedy Selection Report* (RSR) for Plant McDonough-Atkinson Ash Pond AP-2 and 3/4. As documented here, Georgia Power has completed a detailed evaluation of corrective measures to address one or more parameters 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) 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.

This *Draft RSR* 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 a proposed groundwater remedy for preliminary review by GA EPD consisting of geochemical approaches (in-situ injections) for some SSLs and monitored natural attenuation (MNA) for others. At GA EPD's request, following their preliminary review, a public meeting will be held to discuss the assessment of corrective measures and proposed remedy, after which a remedy will be selected, and the final RSR will then be submitted to GA EPD. Once an approved remedy is selected and implemented, the remediation will be monitored routinely and 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 alternatives. Following initiation of the *Assessment of Corrective Measures* (Golder 2020), an evaluation of groundwater corrective action alternatives has been performed and results of this on-going assessment have been documented as required by 40 CFR § 257.96 in the *Semi-annual Remedy Selection and Design Progress Report*s (Golder 2021a, 2021b, 2022a, 2022b; WSP 2023a).

The remedy selected for the 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 (Golder 2020) and subsequent updates to identify an appropriate groundwater remedy for the unit. Selection of an appropriate groundwater remedy is significantly influenced by CCR constituent chemistry and characteristics of Appendix IV parameters, which are inorganic trace elements – metals and metalloids that have attenuation and remediation characteristics markedly different than organic constituents. 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 40 CFR § 257.97(b) and the effectiveness 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 RSR*. A discussion of this criterion will be substantially informed by a forthcoming public meeting following GA EPD preliminary review and comment on this *Draft RSR*. Following GA EPD's review of the draft RSR and preliminary corrective action design information, Georgia Power anticipates GA EPD will provide written concurrence with the plan prior to a public meeting. Following the public meeting, the final RSR 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 McDonough is a power generating facility owned and operated by Georgia Power. The plant is located approximately 7 miles northwest of Atlanta, GA in southeast Cobb County (5551 South Cobb Dr SE, Smyrna, GA 30080). The property occupies approximately 390 acres and is bounded on the southeast by the Chattahoochee River. A Site location map is included as Figure 1.

Plant McDonough historically operated as a coal fired facility, and four on-site CCR surface impoundments were utilized for CCR material over the duration of Plant McDonough’s coal fired operations: Ash Pond 1 (AP-1), Ash Pond 2 (AP-2), Ash Pond 3 (AP-3) and Ash Pond 4 (AP-4). Construction of AP-1 and AP-2 was completed in 1964 and 1968, respectively. Construction of AP-3 and AP-4 was completed in 1969 and 1974, respectively, and the units operated concurrently. In 2011, Plant McDonough ceased coal-fired electric generating activities, and subsequently ceased placing CCR in the units.

Each of these units is in the process of being closed in accordance with federal and state regulations. AP-2 was certified closed by removal in 2016. AP-3 and AP-4 were historically operated together and are being closed as Combined Unit AP-3/4. AP-3/4 was closed in place and is undergoing final closure permitting and certification.

## 2.3 UNIT CLOSURE

Closure activities in accordance with Federal Regulation 40 CFR 257.100 were completed in 2016 for AP-2 and initiated in January 2016 for Combined Unit AP-3/4, before Georgia promulgated its state CCR program. Closure construction activities include the removal of AP-2, liquid removal, consolidation of CCR into a reduced footprint, and after the consolidated closure of AP-3 and AP-4 in place, lowering of the eastern dam containment structure. As described below, closure construction activities for Combined Unit AP-3/4 are currently close to completion.

AP-2 closure by removal of ash was completed in September 2016. Closure procedures included excavating all visible CCR, over excavating into the subgrade soils, and placement of topsoil and seeding for vegetative cover. A closure certification report was submitted to GA EPD on March 30, 2020, and receipt acknowledged on October 14, 2020.

AP-3/4 closure is nearly complete. CCR in the eastern portion of AP-4 has been relocated to the western portion of AP-4 or dry stacked on AP-3. During closure, dewatering of AP-3 and AP-4 has facilitated consolidation and closure in place. CCR has been graded within the footprint of the impoundment to create a subgrade for the final cover system. The closure system employed at Combined Unit AP-3/4 includes compacted subgrade material, 60-mil low-density polyethylene (LLDPE) flexible geomembrane liner, and combined geotextile and engineered turf layer (i.e., ClosureTurf™) cover system. The permeability of the designed AP-3/4 cap is in the order of $10^{-13}$ cm/sec, several orders of magnitude less than the permeability of, for example, a hazardous waste landfill cap (i.e., $10^{-7}$ cm/sec).

The closure is expected to result in groundwater flow returning to its original, pre-construction flow direction to the south. AP-3 and adjacent AP-4 are currently being consolidated and closed in place as combined CCR Unit AP-3/4 in accordance with 40 CFR § 257.102(d), no longer receive CCR, and are in the process of obtaining a solid waste permit under the GA EPD Rules for Solid Waste Management 391-3-4-.10(6). In addition to the engineered cover system, the AP-3/4 closure includes an under-slope drainage system and additional temporary advanced engineering wells to accelerate the pace at which the groundwater table will be lower to the expected long-term post-closure level below the base of AP-3/4 (WSP, 2023b). Based on both empirical data analyses and groundwater modeling, Site water levels are predicted to drop below the bottom of CCR material over time, which is anticipated to support a decline in Appendix III and IV constituent concentrations in groundwater downgradient of AP-3/4 (WSP, 2023e). Following closure completion, a minimum post-closure care period of thirty (30) years will apply. Post-closure care is detailed in the Permit Application, Part A, Section 8.

## 2.4 GROUNDWATER MONITORING

The current groundwater monitoring network for the CCR unit includes the background/upgradient and downgradient monitoring wells, as summarized in Table 1 and shown on Figure 2.

The July through December 2022 assessment monitoring groundwater data show SSLs at concentrations that exceed the state and/or federal Groundwater Protection Standards (GWPS) as presented in the table below. Details are provided in the *2022 Semi-Annual Groundwater Monitoring and Corrective Action Report* (WSP 2023a). The January-February 2023 AP-2 and 3/4 assessment monitoring groundwater data exhibit the same SSLs as the September 2022 groundwater data, as listed in the table below. The following Appendix IV SSL parameters and monitoring wells are the subject of this report:

| AP-2 and 3/4 Statistically Significant Level Exceedances | |
|---|---|
| **Appendix IV Parameter** | **AP-2 and 3/4 Monitoring Well** |
| Arsenic | DGWC-9 |
| Beryllium | DGWC-5, DGWC-9, DGWC-10, DGWC-47, DGWC-48, B-92, B-93 |

| AP-2 and 3/4 Statistically Significant Level Exceedances | |
|---|---|
| **Appendix IV Parameter** | **AP-2 and 3/4 Monitoring Well** |
| Cobalt | DGWC-8, DGWC-9, DGWC-10, DGWC-19, DGWC-20, DGWC-47, DGWC-48, B-56, B-63, B-92, B-93, B-104D |
| Lithium | DGWC-47, DGWC-48, B-120D |
| Combined Radium[3] | B-104D, B-109D |

Notes:

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

[2] The SSLs presented in this summary are reflective of the September 2022 and January-February 2023 monitoring results.

[3] Combined radium is not addressed in this remedy selection report. An Alternate Source Demonstration (ASD) for combined radium at Plant McDonough (WSP 2023f) has been approved by GA EPD.

An SSL of selenium was previously noted for AP-2 and 3/4. Current concentrations of selenium at DGWC-9 are below the GWPS. As such, the previous SSL of selenium at DGWC-9 is not addressed in the RSR, however monitoring will continue. Monitoring well B-115 is no longer part of the monitoring well network because it was a delineation well and B-122D is now providing the relevant delineation. However, SSLs previously noted at well B-115D are addressed in this RSR as part of the Site remediation strategy by the selected corrective measures to address concentrations of beryllium and cobalt in the vicinity of B-115D.

The SSLs of combined radium are not addressed by this RSR. Based on Site data, the combined radium SSL originates from radionuclide sources in bedrock and not a release from the Site. In accordance with 257.95(g)(3), an Alternate Source Demonstration (ASD) for combined radium was approved by the GA EPD on June 15, 2023 (Golder 2021; Golder 2022, WSP 2023f).

Potential trends in SSL constituent concentrations were further evaluated by Groundwater Stats Consulting (GSC) using the Sen's Slope/Mann Kendall trend test. The full report generated from the analyses is provided in the *2023 Annual Groundwater Monitoring and Corrective Action Report* (WSP 2023e). With the exception of a slight increasing trend in cobalt at DGWC-9 (slope = +0.01916), the lack of increasing trends at wells where SSLs have been identified supports that the groundwater appears to be chemically stable. The following statistically significant trends were identified for the noted well/constituent pairs following the January 2023 monitoring event:

- Increasing trends: Cobalt at DGWC-9
- Decreasing trends: Beryllium at DGWA-70A (upgradient), DGWC-47 and DGWC-48

  Cobalt at DGWA-53 (upgradient), DGWC-8, DGWC-10, DGWC-47, and DGWC-48

  Lithium at DGWC-47 and DGWC-48

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

# 3.0 GROUNDWATER CONCEPTUAL SITE MODEL

A conceptual site model (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 parameters) travel in a geologic setting. A CSM is not static and may evolve as data are collected and more is known about the setting. A CSM was initially developed for the site, and as data were gathered during the ACM process, the CSM was refined and used to pre-screen corrective measure technologies, retaining technologies that were suitable for consideration as corrective measure alternatives for groundwater or adaptive management based on site-specific conditions. Since the ACM (Golder 2020), additional investigation activities of Site soils and groundwater have further refined the CSM for use in this RSR.

## 3.1 SITE GEOLOGY

Geologic conditions for this Site are described in detail in the *Hydrogeological Assessment Report* (HAR) prepared by WSP USA Inc. (WSP 2023b). Key elements of the HAR are summarized herein. The Piedmont/Blue Ridge geologic province contains some of the oldest rock formations in the southeastern United States. These late Precambrian to late Paleozoic rocks have undergone repeated cycles of igneous intrusions and extrusions, metamorphism, folding, faulting, shearing, and silicification. Rock outcrops near the Site consist of biotite gneiss, porphyritic gneiss, mica schist, and quartzite.

A geologic cross-section, in the direction of groundwater flow, through the area of interest is presented as Figure 3. A layer of sand and silt with trace organic material approximately 1 foot to 10 feet thick overlies a thick layer of saprolite. The saprolite extends to typical depths of 20 to 40 feet below ground surface and was formed in place by the physical and chemical weathering of the underlying metamorphic rocks. The saprolite typically consists of clay- and silt-rich soils that grade to sandier soils with depth. Given its mineralogical composition, weathering has produced horizontal layering with differing hydraulic conductivity. A zone of variable thickness (approximately 5 to 20 feet) of transitionally weathered rock (TWR) typically exists between the saprolite and competent bedrock. The lithology of the transition zone is highly variable and ranges from medium to coarse unconsolidated material to highly fractured and weathered rock fragments. Localized alluvial soils consisting of generally coarser material (silty sand, clayey silt, and silty clay with well-rounded gravel and cobbles) that have been observed in saprolite may be related to historical river channel migration.

Bedrock types present at the Site include granitic and migmatitic gneiss, biotite gneiss, and amphibolite, all of which have highly variable mineralogy and texture. Detailed geologic mapping of the Site indicates that the Site is bisected by the Brevard fault zone (HAR; WSP, 2023b). Bedrock beneath the overburden north of the faulted intrusive contact is primarily characterized by Ordovician-age felsic sphene-epidote-biotite-quartz-feldspar gneiss with well-developed foliation and an augen texture reflecting historical movement/deformation near fault and shear zones of the inactive Brevard fault zone. Bedrock beneath the overburden south of the faulted intrusive contact is primarily characterized by interlayered Ordovician age phyllonite, button schist with well-developed shear foliation, fine-grained mylonite with poorly developed foliation, and very fine-grained mylonitic biotite gneiss with well-developed shear foliation. The contact has had substantial movement as indicated by porphyroclastic-feldspars with sigmoidal-tails.

## 3.2 SITE HYDROGEOLOGY

Several references to published work within the HAR, were reviewed and confirm that limited fractures within the bedrock at depth are observed on Site and documented within the Piedmont geology. An unconfined aquifer (also known as a phreatic or surficial aquifer) is present at the Site within the soil, saprolite, TWR, and/or shallow bedrock, depending on location. This unconfined, surficial aquifer system is recharged primarily through precipitation and subsequent infiltration; however, flow is generally controlled by topography and surface water drainage and occurs mainly horizontally through intergranular pore spaces. Porosity generally ranges from about 20 to 30% and hydraulic conductivity ranges from 1 to 10-feet per day (ft/day). Groundwater is stored in pore spaces in the saprolite and does percolate downward to the weathered zone between soil and bedrock and into interconnected bedrock discontinuities, but to a much lesser degree compared to horizontal flow through the weathered layering.

Bedrock groundwater occurs in a fracture network that is largely dependent on rock type, degree of differential weathering, topography, and area of catchment. Groundwater flow in the underlying bedrock occurs primarily along discontinuities such as compositional layering, foliation, joints, and fractures. Bedrock fracture porosity is minimal compared to the regolith, and thus, groundwater flow is determined by how well the fractures are inter-connected. The bedrock fractures are not well connected and the predominant groundwater flow at the Site occurs in the overburden and upper bedrock. Based on Site-specific examples and supporting data, as presented in the HAR, fractures within the bedrock are limited and decrease in number and groundwater production with depth. Groundwater monitoring wells were screened across available fractures and did not produce sufficient water for proper development or sampling. Site geophysical logs and groundwater monitoring data at B-123D confirm that the deeper fractures produce less than 0.025 milliliters per minute using a heat pulse flow meter. This flow rate does not constitute “groundwater in an aquifer” but rather “limited” groundwater movement within the deeper bedrock unit.

At the Site, the water table aquifer and the upper bedrock aquifer together constitute an unconfined system. Available groundwater level data indicate a high of 836 feet referenced to North American Vertical Datum (NAVD) near the northern area and about 732 feet NAVD near the Chattahoochee River. Groundwater flows toward the on-site streams and the Chattahoochee River. Figure 4 presents the potentiometric surface contours depicting groundwater flow across the Site based on water levels from January 31, 2023.

## 3.3 UPPERMOST AQUIFER AND GROUNDWATER FLOW

The uppermost aquifer occurs within the overburden and upper bedrock at the Site. Groundwater is typically encountered slightly above the saprolite/weathered rock interface. Groundwater flow in the saprolite zone is through interconnected pores and relict textures and fractures. As the rock becomes increasingly competent with depth, groundwater flow occurs mainly through joints and fractures (i.e., secondary porosity). Recharge to the water-bearing zones in fractured bedrock takes place by seepage through the overlying saprolite or by direct entrance through openings in outcrops and varies with topography. The water table occurs in the saprolite and in the transitionally weathered zone, at least several feet above the top of rock.

Site borings completed deeper in the bedrock aquifer (i.e., greater than 30 feet into the bedrock unit) exhibit minimal and likely isolated fractures. Data from several borings drilled into deeper bedrock during delineation activities at AP-2 and 3/4 confirm that fractures within the bedrock are limited, decrease in number, and that groundwater production decreases with depth as is typical of Piedmont hydrogeologic settings. Therefore, it is anticipated that there is minimal connectivity between the overburden and the deeper bedrock hydrogeologic unit.

Groundwater monitoring wells were screened across available fractures and do not produce sufficient water for proper development or sampling. Site geophysical logs and groundwater monitoring data at B-123D confirm that the deeper fractures produce less than 0.025 milliliters per minute. This flow rate does not constitute groundwater in an "aquifer" but rather limited groundwater movement within the deeper bedrock unit.

Based on review of the potentiometric contours (Figure 4), the horizontal hydraulic gradient is also variable and reflects topography at the Site. The horizontal gradient appears steeper around the downgradient perimeter of the ash ponds, particularly along embankments where groundwater flow lines are influenced by the constructed slopes for the impoundment dams. Hydraulic gradient is calculated as the difference in groundwater elevation (in feet) divided by the distance between two piezometers or wells (in feet).

Groundwater flow velocities were calculated for AP-2 and 3/4 using January 2023 groundwater elevation data. Calculated horizontal flow velocities in the overburden ranged from approximately 105 to 114 feet per year (ft/yr). The estimated flow velocities are generally consistent with other published velocities for regolith-upper bedrock aquifers of the Piedmont (Heath, R.C., 1982).

## 3.4 GEOCHEMICAL CSM

Arsenic, beryllium, cobalt, and lithium are present in groundwater at SSLs above the GWPS at the AP-2 and 3/4 wells, as noted in the table in Section 3.5. As detailed in the *Geochemical Conceptual Site Model* (Appendix A), historical literature and site-specific data indicate arsenic, beryllium, cobalt, and lithium, are naturally occurring in the geologic formations at the Site. Data presented in the *Geochemical Conceptual Site Model* (GCSM) were used in Geochemical Modeling (Appendix B) and provided the basis for evaluating remedy alternatives.

The concentrations of arsenic, beryllium, and cobalt in groundwater are related to groundwater pH, and localized decreases in pH are likely the primary driver for constituent mobilization from the aquifer matrix to groundwater. Lithium in groundwater at AP-2 and 3/4 is likely unaffected by the low pH in groundwater. Several mechanisms may explain the localized acidity observed in the vicinity of wells with a pH <6.0. Pyrite and sulfide minerals, which have been identified in background and downgradient soils, may represent a natural source of localized acidity, arsenic, and cobalt. Other mechanisms may contribute to acidity, including microbially mediated dissolution of sulfides or cation exchange.

As presented in the Geochemical CSM, based on the identified geochemical process described for the Site, WSP, in collaboration with Terra Systems Inc (TSI), conducted laboratory testing to evaluate the potential for using in-situ corrective measure technologies at the Site. The treatability study indicates that in-situ pH and redox adjustments have potential applicability as treatment options for arsenic, beryllium, and cobalt in AP-2 and 3/4 groundwater. Lithium results in the treatability study were not informative as lithium was not present in the raw (or baseline) groundwater samples used in the study. Though not tested as a reactant, activated carbons are known to adsorb lithium (Ahmad 2022). Additional treatability testing will be conducted as a component of the pre-design investigation to further evaluate treatment alternatives.

## 3.5 NATURE AND EXTENT OF GROUNDWATER ABOVE THE GWPS

To characterize the nature and extent of arsenic, beryllium, cobalt, and lithium SSLs, multiple wells have been installed and sampled at the Site (WSP 2023a); refer to the table below for delineation status. In addition, surface water has been sampled at multiple locations to demonstrate horizontal delineation in surface water bodies where proximity to surface water prevented installation of additional wells. Concentrations of arsenic, beryllium, cobalt, and lithium are below reporting limits in surface water samples analyzed for delineation. Figures 5 through 8 present isoconcentration contours for of each of the constituents with an SSL: arsenic, beryllium, cobalt, and lithium, respectively.

| Detection/Assessment Monitoring Well with SSL | Constituent of Concern | Vertical Delineation Well | Horizontal Delineation Well / Surface Water Monitoring Location |
|---|---|---|---|
| DGWC-5 | Beryllium | B-111D | B-98, Flow is toward AP-4[2] |
| DGWC-8 | Cobalt | B-106D | B-88, Flow is toward AP-4[2] |
| DGWC-9 | Arsenic | B-101D | DGWC-10, Flow is toward AP-4[2] |
| | Beryllium | B-101D | DGWC-11, Flow is toward AP-4[2] |
| | Cobalt | B-101D | DGWC-11, Flow is toward AP-4[2] |
| | Selenium[3] | B-101D | DGWC-10, Flow is toward AP-4[2] |
| DGWC-10 | Beryllium | B-102D | DGWC-11, Flow is toward AP-4[2] |
| | Cobalt | B-102D | DGWC-11, Flow is toward AP-4[2] |
| DGWC-19 | Cobalt | B-107D | B-77 |
| DGWC-20 | Arsenic | B-108 | B-83 |
| | Cobalt | B-108D | B-83 |
| DGWC-47 | Beryllium | B-122D | B-77 |
| | Cobalt | B-122D | B-77 |
| | Lithium | B-122D | B-77 |
| DGWC-48 | Beryllium | B-104D / B-122D | B-83 |
| | Cobalt | B-122D | B-83 |
| | Lithium | B-104D / B-122D | B-83 |
| B-56 | Cobalt | B-101D | B-66, Flow is toward AP-4[2] |
| B-63 | Cobalt | B-122D | DW_US |
| B-92 | Beryllium | B-111D | B-97, Flow is toward AP-4[2] |
| B-92 | Cobalt | B-111D | B-97, Flow is toward AP-4[2] |
| B-93 | Beryllium | B-111D | B-98, Flow is toward AP-4[2] |
| | Cobalt | B-111D | B-98, Flow is toward AP-4[2] |
| B-104D | Cobalt | B-122D | B-122D |
| | Combined Radium[4] | NA[4] | NA[4] |
| B-109D | Combined Radium[4] | NA[4] | NA[4] |
| B-120D | Lithium[1] | B-125D | DGWC-4, Flow is toward AP-4[2] |

Notes:

[1] Delineation details are based on January 2023 monitoring results and statistical analyses. The recent (January 2023) SSL of lithium at B-120D is not included in the appended GCSM or Geochemical model reports. This SSL will be accommodated during the pre-design phase of the remedy selection process.

[2] Groundwater flow is currently inward toward the Site. Horizontal delineation is complete.

[3] Selenium at DGWC-9 is no longer an SSL. Selenium was first identified as an SSL in September 2020 but current sample results are below the GWPS. The Site will continue to evaluate the occurrence of selenium at DGWC-9 until the upper confidence interval is below the GWPS.

[4] An ASD for combined radium for Plant McDonough (WSP 2023f) has been approved by GA EPD.

Horizontal delineation of the SSL constituents is complete based on review of the analytical results, statistical analyses, and the isoconcentration contours. Vertical delineation of SSL constituents is complete based on analytical results, isoconcentration contour as well as documentation of a basement depth of migration due to limited fractures (flow paths) within the deep bedrock. Details regarding the specific well pairs used for delineation are described in detail in the *2023 Annual Groundwater Monitoring and Corrective Action Report* (WSP 2023g).

# 4.0 ASSESSMENT OF CORRECTIVE MEASURES SUMMARY

An ACM Report was completed in December 2020 (Golder 2020) in accordance with 40 CFR § 257.96 and identified the following corrective measures as potentially applicable to remediate groundwater at the Site:

- Geochemical Approaches [In-Situ Injection (ISI)]
- Hydraulic Containment (Pump and Treat)
- In-Situ Solidification/Stabilization
- Monitored Natural Attenuation (MNA)
- Permeable Reactive Barrier (PRB)
- Phytoremediation
- Subsurface Vertical Barrier Walls

Georgia Power also plans to 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 remedy will be installed or implemented to address current conditions; (2) the performance of the remedy will be monitored, evaluated, and reported semi-annually; (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 achieve Site objectives. Table 2 presents a summary of the corrective measures and the screening that has occurred since December 2020 when the ACM was published.

Further evaluation and refinement of the corrective measures since completion of the *ACM Report* has been presented in Semi-annual and Annual Remedy Selection Progress Reports submitted in 2021, 2022, and 2023 (Golder, 2021a, Golder 2021b, Golder 2022a, Golder 2022b, WSP 2023a). The corrective measures identified for the AP-2 and 3/4 CCR unit in the *ACM Report* were further evaluated using the criteria outlined in 40 CFR § 257.96(c) and GA EPD Rule 391-3-4.10(6)(a). Throughout the assessment process, phytoremediation, permeable reactive barriers, and subsurface vertical barrier walls were screened out due to limits on implementability, performance, and effectiveness in the site-specific hydrogeology. In-situ stabilization/solidification is impractical to implement at the scale of the Site and was also screened out. Hydraulic containment was screened out because it would provide little incremental reduction of the current extent of arsenic, beryllium, cobalt, or lithium above GWPS, particularly since delineation for SSLs is completed on site. However, pump and treat may be considered during adaptive management over the course of remedy implementation.

The two retained corrective measure alternatives (MNA and ISI) are discussed in further detail below for evaluation against the remedy selection criteria specified in 40 CFR § 257.97(b, c).

**Alternative 1 - MNA:** Alternative 1 relies on stabilizing arsenic, beryllium, cobalt, and lithium using the aquifer's own natural ability/capacity to attenuate (i.e., reduce concentrations of) and achieve the GWPS at the CCR boundary within a time frame that is reasonable compared to that offered by other more active methods. At AP-2 and 3/4, natural attenuation processes, including sorption, dilution, and dispersion, are sufficient to reduce concentrations of arsenic, beryllium, cobalt, and lithium below the GWPS. Following closure, MNA, without enhancements, can achieve concentrations below the GWPS. This natural capacity to attenuate arsenic, beryllium, cobalt, and lithium was demonstrated in the geochemical CSM and site-specific demonstration of natural attenuation (Appendices A and D). The conceptual remedy design for Alternative 1 is shown on Figure 9.

**Alternative 2 - ISI:** Arsenic, beryllium, cobalt, and lithium can be immobilized under different combinations of redox and pH conditions, and potentially with the addition of surface reactive compounds such as iron sulfide or activated carbon(s). ISI would create an in-situ reactive zone in the groundwater plume, creating conditions for reduction-oxidation and adsorption reactions resulting in the chemical attenuation of constituents in groundwater. For evaluating ISI against the remedy selection criteria, a conceptual design was considered using injections of sodium or potassium bicarbonate with iron sulfide and/or activated carbon injected in transmissive intervals located within the saturated saprolite and/or partially weathered rock units. The conceptual remedy design for Alternative 2 is shown on Figure 10. Because this layout is considered conceptual, the configuration of the implemented remedy may be adjusted during the detailed design process.

# 5.0 CORRECTIVE MEASURES EVALUATION

The purpose of this section is to evaluate the corrective measures alternatives using the required criteria described in 40 CFR § 257.97(b) and the comparative criteria described in 40 CFR § 257.97(c).

## 5.1 REQUIRED CRITERIA (§257.97(b))

As described in 40 CFR § 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 40 CFR § 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 40 CFR § 257.98(d).

The corrective measures alternatives are evaluated against the required criteria in the following subsections. As shown below, both alternatives evaluated meet or exceed the required criteria.

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

CCR is classified as a non-hazardous RCRA solid waste, a determination confirmed in 40 CFR § 257 Preamble part III.A. Nevertheless, Georgia Power conducted a risk evaluation for the Site and potential receptors. A Risk Evaluation Report (Wood 2020) was prepared for Plant McDonough and was submitted with the *Assessment of Corrective Measures Report* (Golder 2020). An updated Risk Evaluation Report (WSP 2023d; Appendix C) provides an evaluation of the current SSLs at AP-2 and 3/4. The evaluation was factored into the remedy selection process. The risk evaluation for the SSL-related constituents in groundwater at Plant McDonough was conducted using methods consistent with GA EPD and USEPA guidance and included multiple conservative assumptions. A conceptual exposure model was developed, initial groundwater risk screening was conducted, and a refined risk evaluation was performed for retained constituents of potential interest for hypothetical off-site receptors. Arsenic, beryllium, cobalt, and lithium have been delineated to concentrations not exceeding health-protective screening criteria on Site. Based on the evaluation, arsenic, beryllium, cobalt, and lithium observed in groundwater at the Site 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. Because no adverse human health or environmental risk currently exists, human health and the environment will be protected through closure and implementation of either of the remedies being evaluated. Consequently, each of the remedies being evaluated would meet this criterion.

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

Both proposed remedies can attain the GWPS at the compliance network and throughout the area of SSL exceedances. For each of the remedies retained, attainment of the GWPS is expected based on constituent transport evaluations included in Appendix B.

**Alternative 1**- MNA was evaluated for ability to reach groundwater protection standards following USEPA-issued MNA technical guidance specific to inorganic constituents (USEPA 2007) that contained four “tiers,” which were later described as “phases” (USEPA 2015). Under this guidance, each successive phase of the MNA evaluation is designed to progressively consider existing and long-term attenuation characteristics of the aquifer and incrementally reduce uncertainty at each decision-making screening step. Additional statistical trend evaluation for Alternative 1 (MNA) corroborates this timeframe estimate (see Appendix D).

**Alternative 2**- ISI would also support the attainment of GWPS. Site-specific laboratory testing confirms that arsenic, beryllium, and cobalt can be removed from groundwater using bicarbonates and iron sulfide. Geochemical modeling supports these findings. In addition, lithium is known to adsorb to activated carbon(s), which could be applied, if necessary, to attain GWPS.

The groundwater flow and constituent transport evaluations, and associated input parameters described in detail in Appendices A and B show that the GWPS can be met. However, the predicted time to achieve the GWPS is currently greater than 10 years for MNA only. Consequently, the use of ISI will be implemented to reduce the time to achieve the GWPS to less than 8 years following completion of source control and after groundwater reaches its predicted long-term level. In summary, each of the remedies being evaluated would meet this criterion, with ISI only needing to be applied in the SSL areas to decrease the time to final attainment in these locations.

### 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 each evaluated alternative.

Georgia Power is closing AP-2 by removal and 3/4 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 construction is near final at the AP-2 and 3/4. Closure of the AP-2 and 3/4 CCR units will contribute to a reduction in concentrations of Appendix IV constituents in downgradient groundwater and overall attenuation of groundwater concentrations, as is already being demonstrated by Site groundwater concentration trends (Appendix D). AP-2 and 3/4 closure provides effective source control, as described in section 2.3 above. The control provided by the closures ensures that, for the purpose of remedy selection, the control requirement is met for any of the corrective measure alternatives being evaluated. Neither of the alternatives (MNA or ISI) will interfere with the control provided by the closures. Consequently, each of the remedies being evaluated would meet this criterion.

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

The corrective measure alternatives retained for further consideration would be effective at removing arsenic, beryllium, cobalt, and lithium constituents from groundwater, either through processes of immobilization or chemical attenuation in groundwater. The remedies considered herein remove contaminated material from the environment as follows:

**Alternative 1: MNA** – The natural attenuation processes that are at work in such a remedial approach include a variety of physical, chemical, or biological processes that, under favorable conditions, act without human intervention to reduce the mass, toxicity, mobility, volume, or concentration of contaminants in soil or groundwater. Sorption and redox reactions are the dominant mechanisms responsible for the reduction of mobility, toxicity, or bioavailability of inorganic contaminants by reducing their presence in groundwater.

**Alternative 2: ISI** – Arsenic, beryllium, cobalt, and lithium can be immobilized under different combinations of redox and pH conditions and potentially with the addition of surface reactive compounds such as iron sulfide or activated carbon(s). ISI would create an in-situ reactive zone in the groundwater plume, creating conditions for reduction-oxidation and adsorption reactions resulting in the chemical attenuation of constituents in groundwater.

Each of the corrective measures being evaluated would meet this criterion.

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

In accordance with 40 CFR § 257.98(d), any waste generated during the implementation of any of the remedies under consideration would be managed in a manner that complies with applicable requirements of the Resource Conservation and Recovery Act and the Georgia Comprehensive Solid Waste Management Act. Consequently, each of the remedies being evaluated would meet this criterion.

**Summary of Required Criteria**

| Required Criteria | Alternative 1 (MNA) | Alternative 2 (ISI) |
|---|---|---|
| Be protective human health and the environment | ✓ | ✓ |
| Attain the groundwater protection standards | ✓ | ✓ |
| Control the sources of releases so as to reduce or eliminate, to the maximum extent feasible, further releases of Appendix IV constituents to the environment | ✓ | ✓ |
| Remove from the environment as much of the contaminated material that was released from the CCR unit as a 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 alternatives using the comparative criteria listed in 40 CFR § 257.97(c). Each of the comparative criteria consist of several sub-criteria listed in the CCR Rule that are considered below. The goal of this analysis is to further evaluate the alternatives that meet the required criteria to support remedy selection. Consistent with 40 CFR § 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 alternative, where dark green represents that the “option’s performance under this criterion is highly favorable”, medium green represents that the “option performs favorably under this criterion,” and light green represents that the “option performs less favorably under this criterion.”

**Color Legend:**

| | |
|---|---|
| | Option’s performance under this criterion is *highly favorable* |
| | Option performs *favorably* under this criterion |
| | Option performs *less favorably* under this criterion |

### 5.2.1 Category 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 alternative. Long-term effectiveness and protectiveness mean that the remedy will protect 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 degree of protection and the time period to achieve remedial action objectives are also considered.

### Sub Criterion 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 (Appendix C), Appendix IV constituents in groundwater from AP-2 and 3/4 are not expected to pose a risk to human health or the environment. Therefore, this criterion is considered favorable for both corrective measure alternatives. In addition, each groundwater remedy retained for this comparative analysis will be effective at reducing concentrations to levels below the GWPS, as described in Section 2.5 above.

### Sub Criterion 2: Magnitude of Residual Risks in Terms of Likelihood of Further Releases Due to CCR Remaining Following Implementation of a Remedy

Unit closure through closure in place provides effective source control, as described in Section 2.3 above. As noted in the groundwater modeling report (Appendix B), each of the groundwater remedies retained for comparison will be effective at reducing the concentration of Appendix IV constituents in groundwater beyond the unit boundary to levels below the GWPS. Consequently, each of the remedies being evaluated performs similarly and favorably for purposes of this criterion.

### Sub Criterion 3: The Type and Degree of Long-Term Management Required, Including Monitoring, Operations, and Maintenance

In accordance with 40 CFR § 257.97(c)(1)(iii), this sub-criterion considers the long-term management of each groundwater remedy.

Both Alternative 1 - MNA and Alternative 2 - ISI will require monitoring during the corrective action period and during subsequent long-term performance monitoring to confirm that GWPS are met. MNA is a relatively low operations, maintenance, and monitoring (OMM) corrective action and is considered favorable for OMM. Similarly, the duration of groundwater monitoring is anticipated to be only slightly shorter for Alternative 2 (Appendix B) and is therefore considered equally favorable. Beyond monitoring required to verify performance of the groundwater remedy, per CCR rule requirements, post closure care monitoring, including groundwater sampling and reporting, will continue for no less than 30 years following closure.

### Sub Criterion 4: Short-term risks that might be posed to the community or the environment during implementation of such a remedy

In accordance with 40 CFR § 257.97(c)(1)(iv), this sub-criterion relates to the potential for threats to human health (including without limitation worker safety and the community) and the environment associated with remedy implementation.

Community impacts include increased truck traffic on public roads during construction of the remedies, as well as increased vehicle emissions, resource consumption, and noise. Although Alternative 2 (ISI) will require active injection implementation beyond what is anticipated for Alternative 1 (MNA), the impact to the community will be minimal for both alternatives. For both alternatives, remedial activities will take place on Georgia Power property. Based on these considerations, both alternatives are rated favorable for this criterion.

### Sub Criterion 5: Time until full protection is achieved

Timeframes to achieve GWPS at AP-2 and 3/4 were evaluated using a predictive 1-D reactive transport model (Appendix B). Each of the SSL constituents are predicted to meet GWPS. For areas north and east of AP-2 and 3/4 MNA can achieve the GWPS and is considered favorable. However, for areas south of AP-2 and 3/4, without ISI, MNA is predicted to achieve the GWPS in greater than 10 years following completion of source control and is therefore considered less favorable overall. With implementation of ISI, the time to achievement of GWPS would be less than 10 years, due to the in-situ treatment aspects, and is therefore considered highly favorable.

Additional monitoring will be conducted to evaluate the lithium SSL at B-120D, however preliminary results and trends suggest that MNA may be appropriate.

### *Sub Criterion 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 40 CFR § 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. Alternative 1 (MNA) and Alternative 2 (ISI) are considered favorable since potential exposure through contact with CCR or groundwater is minimal.

### *Sub Criterion 7: Long-term reliability of the engineering and institutional controls*

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

Alternative 1 (MNA) is expected to have high long-term reliability and is considered favorable with respect to this criterion. Alternative 2 (ISI), when needed, is also considered favorable because it reduces the long-term OMM and the need for institutional controls.

### *Sub Criterion 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 Site goals. In accordance with 40 CFR § 257.98(b), adaptive site management practices will be used to modify or replace the remedy if the requirements of 40 CFR § 257.97(b) are not being achieved.

Alternative 1 (MNA) is considered the corrective measure with the lowest likelihood of requiring replacement because natural processes will reduce the concentration of Appendix IV constituents in groundwater over time and therefore is a highly favorable technology. Alternative 2, which relies on in-situ treatment to address arsenic, beryllium, cobalt, and lithium SSLs is considered favorable since the treatment efficacy is relatively certain. ISI is dependent upon the uniform distribution of in-situ reagents within targeted area of interest, and additional ISI applications may be required to avoid geochemical conditions that promote the mobilization or remobilization of Appendix IV constituents.

### *Category 1 Summary: Long- and Short-Term Effectiveness*

Overall, Alternative 1 - MNA is less favorable relative to Alternative 2 - ISI which is considered favorable with respect to long- and short- term effectiveness and protectiveness. While Alternative 2 - ISI is projected to reach GWPS at the waste boundary more quickly than Alternative 1 - MNA, both achieve GWPS within a reasonable timeframe. Alternative 2 - ISI requires post-application monitoring data to evaluate short and long-term effectiveness and reliability and could result in a greater degree of long-term management if re-injections are required. ISI is considered favorable because it rapidly reduces constituent concentrations.

| **Category 1 – Long and Short-Term Effectiveness, Protectiveness, and Certainty of Success Summary** | **Alternative 1: MNA** | **Alternative 2: ISI** |
|---|---|---|
| *Sub-criterion 1*<br>Magnitude of reduction of existing risks | Favorable | Favorable |
| *Sub-criterion 2*<br>Magnitude of residual risk in terms of likelihood of further release | Favorable | Favorable |
| *Sub-criterion 3*<br>Type and degree of long-term management required | Favorable | Favorable |
| *Sub-criterion 4*<br>Short-term risk to community or environment during implementation | Favorable | Favorable |
| *Sub-criterion 5*<br>Time until full protection is achieved | Less Favorable | Highly Favorable |
| *Sub-criterion 6*<br>Potential for exposure of humans and environmental receptors to remaining wastes | Favorable | Favorable |
| *Sub-criterion 7*<br>Long-term reliability of engineering and institutional controls | Favorable | Favorable |
| *Sub-criterion 8*<br>Potential need for replacement of the remedy | Highly Favorable | Favorable |
| **Category 1 Summary:** | Less Favorable | Favorable |

Note: Refer to Section 5.2 for Color Legend

### 5.2.2 Category 2: Source Control Effectiveness

As described in Section 5.1.3 above, the source control required criterion is satisfied in connection with both of the corrective measure alternatives being evaluated. Specifically, in connection with closure, CCR material will be controlled through advanced engineering methods including dewatering, consolidation, and closure. Based on both empirical data and groundwater modeling, future water levels are anticipated to be below the bottom of CCR material, which, over time, would be supportive of declining Appendix IV constituents in groundwater downgradient of AP-3 and AP-4 (WSP, 2023e).

The final cover system is designed to exceed the requirements for CCR capping as described in 40 CFR § 102(d)(3) and will effectively eliminate infiltration to the through the CCR and control releases to the maximum extent feasible. A Georgia-registered professional engineer certified that the closure design meets the requirements of the CCR Rule.

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. Neither of the corrective measures under consideration would interfere with or diminish the anticipated benefits of the closure method.

#### *Sub-Criterion 1: The extent to which containment practices will reduce further releases*

Unit closure through closure in place provides effective source control, as described in Section 2.3, and the potential for releases from AP-2 and 3/4 are substantially reduced. Appendix IV constituents that are present in groundwater at or currently beyond the unit boundary will be controlled by the selected corrective measure. Therefore, all groundwater remedy alternatives are considered favorable for this sub-criterion.

### *Sub-Criterion 2: The extent to which treatment technologies may be used*

This section evaluates 40 CFR § 257.97(c)(2)(ii) regarding the extent to which treatment technologies may be used. Alternatives that include more limited treatment approaches may be considered less favorable. Alternatives that rely on more extensive treatment approaches may be considered more favorable.

Alternative 2 - ISI relies on in-situ treatment with active injections to reduce concentrations of arsenic, beryllium, cobalt, and lithium to GWPS at the unit boundary and prevent further releases downgradient of the unit boundary. Alternative 1 - MNA, relies on natural attenuation as the treatment mechanism and, while predicted to be effective at reducing arsenic, beryllium, cobalt, and lithium concentrations at the unit boundary, would be considered less favorable with respect to this criterion. Because Alternative 2 adds a treatment technology, it is considered more favorable than Alternative 1.

### *Source control effectiveness summary*

Given that source control measures will be used and are the main driver to control additional releases overall both alternatives are favorable for the category of source control. However, Alternative 1 is less favorable because it does not include an active treatment technology.

| **Category 2 – Source Control Effectiveness Summary** | **Alternative 1: MNA** | **Alternative 2: ISI** |
|---|---|---|
| Sub-criterion 1<br>Extend to which containment practices will reduce further releases | Favorable | Favorable |
| Sub-criterion 2<br>Extent to which treatment technologies may be used | Less Favorable | Favorable |
| **Category 2 Summary:** | Less Favorable | Favorable |

Note: Refer to Section 5.2 for Color Legend

## 5.2.3 Category 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.

### *Sub-Criterion 1: Degree of difficulty associated with constructing the technology*

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

Alternative 1 (MNA) is considered favorable since implementation of a long-term monitoring program to confirm attenuation is straightforward. Alternative 2 (ISI) is considered less favorable as there is a construction component. However, ISI technology is well established and relatively easy to implement.

### *Sub-Criterion 2: Expected operational reliability of the technologies*

This section compares the operational reliability of each of the proposed remedies in accordance with 40 CFR § 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 OMM; however, more complex remedies that rely on groundwater flow or geochemical manipulation or mechanical systems would be considered less favorable.

Alternative 1 (MNA) is considered favorable from an operational perspective because MNA has a proven track record and only requires long-term monitoring following implementation. Alternative 2 (ISI) will include the short-term OMM of an in-situ treatment system and is, therefore, considered less favorable.

### Sub-Criterion 3: Need to coordinate with and obtain necessary approvals and permits from other agencies

Section 40 CFR § 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 remedial alternative that could require several permits (for example, a pump and treat system) would be considered less favorable when compared to a remedial alternative that would require fewer permits (for example, MNA).

Alternative 1 (MNA) is considered favorable since the implementation of the MNA remedy for groundwater requires minimal startup and infrastructure is already in place with existing monitoring wells. Alternative 2 (ISI) requires additional permitting (e.g., permit for pilot testing; and full-scale underground injection (UIC) permit), and is therefore considered less favorable than MNA which does not.

### Sub-Criterion 4: Availability of necessary equipment and specialists

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.

Alternative 1 (MNA) and Alternative 2 (ISI) are both considered favorable since the equipment, supplies, technical specialists, contractors, etc. for conducting either corrective measure are common in the remediation industry.

### Sub-Criterion 5: Available capacity and location of needed treatment, storage, and disposal services

This sub criterion (40 CFR § 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. Alternative 1 (MNA) is expected to be performed with existing wells and would not produce waste necessitating treatment-storage-disposal (TSD) services and is considered favorable. Alternative 2 (ISI) would produce relatively small quantities of soil cuttings and ancillary wastes/debris from well installation and chemical injection activities that are negligible, and is also considered favorable.

### Ease of implementation summary

The various sub-criteria were evaluated, and relative comparisons were made between the corrective measure alternatives to determine which remedy or remedies would be expected to be the most and least favorable regarding the certainty of success. The results of this comparison are included in the following table for each of the Comparison Criteria.

| **Category 3 – Ease of Implementation Summary** | **Alternative 1: MNA** | **Alternative 2: ISI** |
|---|---|---|
| *Sub-criterion 1*<br>Degree of difficulty associated with constructing the technology | Favorable | Less Favorable |
| *Sub-criterion 2*<br>Expected operational reliability of the technologies | Favorable | Less Favorable |
| *Sub-criterion 3*<br>Need to coordinate with and obtain necessary approvals and permits from other agencies | Favorable | Less Favorable |

| Category 3 – Ease of Implementation Summary | Alternative 1: MNA | Alternative 2: ISI |
|---|---|---|
| *Sub-criterion 4*<br>Availability of necessary equipment and specialists | Favorable | Favorable |
| *Sub-criterion 5*<br>Available capacity and location of needed treatment, storage, and disposal services | Favorable | Favorable |
| **Category 3 Summary:** | Favorable | Less Favorable |

Note: Refer to Section 5.2 for Color Legend

### 5.2.4 Evaluation of Comparison Criteria

The various sub-criteria were evaluated, and relative comparisons were made between the remedial alternatives to determine which remedy or remedies would be expected to be the most and least favorable regarding the certainty of success. The results of this comparison are summarized in the table below.

| Summary of Comparison Criteria | Alternative 1: MNA | Alternative 2: ISI |
|---|---|---|
| Category 1<br>Long- and Short-Term Effectiveness, Protectiveness, and Certainty of Success | Less Favorable | Favorable |
| Category 2<br>Effectiveness in Controlling the Source to Reduce Further Releases | Less Favorable | Favorable |
| Category 3<br>Ease of Implementation | Favorable | Less Favorable |

Note: Refer to Section 5.2 for Color Legend

## 5.3 PUBLIC MEETING AND COMMUNITY ENGAGEMENT

As noted in Section 2.1 above, this criterion will be addressed in the final RSR ultimately 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 40 CFR § 257.97(d). Georgia Power also plans to 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 assure that performance criteria and Site remedial objectives are met.

## 6.1 Summary of Proposed Remedy

Based on current Site groundwater conditions, the evaluations performed in support of this report (geochemical modeling, lab testing) and the assessments made in Section 5.0, for the areas of SSL exceedances located north and east of AP-3/4 (B-109D, B-120D, DGWC-5, DGWC-8, DGWC-9, and DGWC-10), Alternative 1 (MNA) is the proposed remedy (Figure 9). As described in Appendix D, trends for SSL exceedances are, with few exceptions, stable or decreasing in wells located north and east of AP-3 and AP-4. At these locations, groundwater flow has reversed from the pre-2016 radial flow and currently flows inwards towards AP-2 and 3/4. Based on the groundwater modeling results presented in Appendix B, the influx of background groundwater over time will result in increased pH conditions and concentrations of SSL constituents below GWPS in these locations.

Based on the assessments made in Section 5.0 for the areas of SSL exceedance located south of AP-2 and 3/4 (DGWC-19/20 and DGWC-47/48), Alternative 2 (ISI) is the proposed remedy for arsenic, beryllium, cobalt, and lithium in groundwater above the GWPS (Figure 10). ISI is proposed in these areas due to the favorable results shown in bench scale testing, minimal requirements for Site preparation, ease of implementation and high overall relative performance on the long- and short-term effectiveness, protectiveness, and likelihood of success.

Prior to full-scale implementation, an in-situ pilot test is needed to develop site-specific design parameters such as injection radius of influence and reagent type and concentration. Depending on the final design, reagent delivery would be completed either via injection wells or through direct-push injection technology. A preliminary conceptual layout for injection points is provided in Figure 10. The configuration of the implemented remedy may differ based on final design parameters.

ISI may be completed through multiple rounds of injection, and following injection application, groundwater monitoring at downgradient points would be completed to track performance of the injection remedy.

## 6.2 SCHEDULE

In accordance with 40 CFR § 257.97(d), the following factors were considered when developing the schedule:

- Extent and nature of contamination: The size/area of impacted groundwater is directly related to the time to implement remediation. The horizontal and vertical extent of Appendix IV constituents present in groundwater have been adequately delineated, as described in Section 3.5 of this report. Additional characterization and refinement of the SSL areas is required for design and implementation of the remedy located south of AP-2, AP-3, and AP-4 (DGWC-19/20 and DGWC-47/48) 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 GWPS within 8 years after groundwater reaches its predicted long-term level (estimated at 5 to 10 years following closure; WSP 2023e). As considered in Section 5 of this report, the selected remedy is expected to address Appendix IV constituents in groundwater. In the event that adequate progress is not made towards addressing groundwater and achieving the GWPS, Georgia Power will follow adaptive management strategies to modify the remedial approach, in accordance with 40 CFR § 257.98(b). Site- and remedy-specific performance metrics will be developed and included in the Corrective Action Groundwater Monitoring Plan.

- Availability of treatment or disposal capacity for CCR managed during remedy implementation: Georgia Power has already completed CCR removal at former AP-2. Consolidation and capping at AP-3/4 is substantially complete and certification is anticipated in 2023. No additional CCR material is anticipated to be encountered during remedy implementation.
- Potential risks to human health and the environment from exposure to contamination prior to completion of the remedy: As described in Section 3 of this report, the risk evaluation for the arsenic, beryllium, cobalt, and lithium concentrations in groundwater at AP-2 and 3/4 was conducted using methods consistent with GA EPD and USEPA guidance, included multiple conservative assumptions, and concluded that groundwater conditions at the Site are not expected to pose a risk to human health or the environment. Consequently, 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 40 CFR § 257.97(c)(1).
- Resource value of the aquifer: As summarized in Section 5 of this report and detailed in the Risk Evaluation (Appendix C), no complete pathways for downgradient drinking water receptors were identified. As AP-2 and 3/4 is not expected to pose a risk to human health or the environment, this factor does not have a material impact on the project schedule.

The schedule for implementing and completing the groundwater corrective measure activities is described below. The general approach and implementation schedule will be modified based on new groundwater quality data obtained during the corrective measure implementation process, following adaptive site management practices and in accordance with 40 CFR § 257.98(b).

### 6.2.1 Planning and Design

Subject to the timeline associated with any needed EPD approvals, approximately 36 months will be required to design the proposed remedy and develop a corrective action groundwater monitoring plan. Significant planning and design of Alternative 2 (ISI) may include the following:

- Pre-design investigation (PDI): 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. During the PDI, plume extents will be further refined by collecting groundwater samples, possibly using temporary monitoring wells, which will be assessed for arsenic, beryllium, cobalt, and lithium, at their respective locations. 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. Additional treatability testing will be performed during the PDI to further evaluate treatment alternatives. The field component of the PDI will take approximately 2-4 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 Rep*ort. Following receipt of GA EPD concurrence to proceed, a pilot study workplan will be developed, submitted to EPD, and subsequently implemented for the arsenic, beryllium, cobalt, and lithium 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 constituent 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. This planning and permitting phase is

anticipated to take 6 months total following GA EPD concurrence. 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 groundwater corrective action plan, including detailed remedy design will be developed and submitted to GA EPD as an attachment to the Corrective Action Groundwater Monitoring Plan (CAMP). While design activities will be concurrent with the previously listed activities, the corrective action plan will not be finalized until after the successful completion of the pilot study. Pursuant to 40 CFR § 257.98, a CAMP and monitoring program will be established within 90 days of selection of the groundwater remedy and approval by GA EPD. Following the requirements of the Rule, the Corrective Action Program (CAP; § 257.98(1) must do the following:

    1) At minimum, meet the requirements of an Assessment Monitoring Program under § 257.95.

    2) Document the effectiveness of the Corrective Action Remedy; and

    3) Demonstrate Compliance with the Groundwater Protection Standards

  The Corrective Action Groundwater Monitoring Plan will outline steps to ensure that these key objectives are met. Specifically, the plan will ensure the monitoring well data, Site conditions, and statistical analysis is routinely evaluated. Should these data, as a whole, call the efficacy of the selected remedy (ISI, MNA) into question, Georgia Power will reassess alternative technologies.

### 6.2.2 Construction and Implementation

Injection points are needed to implement ISI. Following the planning and design phase, multiple injection points are likely to be identified. It is expected that up to 6 months may be needed for scheduling and completion of the injection point installation.

The infrastructure of the groundwater MNA remedy is largely in place with the existing monitoring network. In accordance with 40 CFR § 257.98(a), the Corrective Action Groundwater Monitoring Plan and program will be established within 90 days of selection of the groundwater remedy; however, if new monitoring well locations are needed in the approval process of the monitoring plan, additional time for installation may be required.

### 6.2.3 Operation

While the estimated timeframe will be refined during the design process, it is anticipated that the proposed alternative will achieve concentrations of arsenic, beryllium, cobalt, and lithium below the GWPS at the detection monitoring locations within 8 years after groundwater reaches its predicted long-term level. The groundwater remedy will be considered complete when the GWPS is achieved at the Site’s monitoring network for a minimum of 3 years. In accordance with adaptive site management practices and 40 CFR § 257.98(b), the groundwater remedy will be modified if it is determined that the Site goals are not being met or will not be met.

## 6.3 REPORTING

In accordance with 40 CFR § 257.105(h) and § 257.107(h), Georgia Power will place the Final RSR into the Site operating record and posted to Georgia Power’s publicly accessible internet site. Thereafter, Georgia Power will develop a corrective action groundwater monitoring program and implement and report on the proposed remedy in accordance with applicable regulatory requirements.

## 7.0 REFERENCES

Ahmed 2022. Ahmed, et al, "Bioresource Technology Reports." *Bioresource Technology Reports | Journal | ScienceDirect.com by Elsevier*, https://www.sciencedirect.com/journal/bioresource-technology-reports. June 2022.

Electric Power Research Institute (EPRI). 2018. Framework and Demonstration for Monitored Natural Attenuation at Coal Combustion Product Sites. 2018 Technical Report. 3002013616. Palo Alto, California. December.

Golder 2020. Assessment of Corrective Measures, Georgia Power Company Plant McDonough Ash Pond 2 and 3/4, Golder Associates Inc., December 4, 2020.

Golder 2021a. Semi-Annual Remedy Selection and Design Progress Report, Plant McDonogh-Atkinson Ash Pond 2 and 3/4, Golder Associates Inc., February 26, 2021.

Golder 2021b. Semi-Annual Remedy Selection and Design Progress Report, Plant McDonogh-Atkinson Ash Pond 2 and 3/4, Golder Associates Inc., July 30, 2021.

Golder 2022a. Semi-Annual Remedy Selection and Design Progress Report, Plant McDonogh-Atkinson Ash Pond 2 and 3/4, Golder Associates USA Inc., February 28, 2022

Golder 2022b. Semi-Annual Remedy Selection and Design Progress Report, Plant McDonogh-Atkinson Ash Pond 2 and 3/4, Golder Associates USA Inc., July 29, 2022.

Heath, R.C., 1982, Basic Ground-Water Hydrology. Water Supply Paper 2220. U.S. Geological Survey, Federal Center, Box 25425, Denver, Colorado.

USEPA. 2007. Monitored Natural Attenuation of Inorganic Contaminants in Ground Water Volume 1 – Technical Basis for Assessment. U.S. Environmental Protection Agency, Washington, DC, EPA/600/R-07/139, 2008.

USEPA. 2015. Use of Monitored Natural Attenuation for Inorganic Contaminants in Groundwater at Superfund Sites. USEPA Office of Solid Waste and Emergency Response. Directive 9283.1-36. August.

Wood 2020. Risk Evaluation Report, Plant McDonough Ash Pond 2 and 3/4, Cobb County, Georgia, Wood Environment & Infrastructure Solutions, Inc., December 2020.

WSP 2023a. 2022 Semi-Annual Groundwater Monitoring and Corrective Action Report, Plant McDonough-Atkinson Ash Pond 2 and 3/4, WSP USA Inc., February 28, 2023.

WSP 2023b. Hydrogeologic Assessment Report, Plant McDonough-Atkinson Ash Pond 2 and 3/4, WSP USA Inc., May, 2023.

WSP 2023c. 2022 Semi-Annual Remedy Selection and Design Progress Report, Plant McDonogh-Atkinson Ash Pond 1, WSP USA Inc., February 28, 2023.

WSP. 2023d. Risk Evaluation Report, Plant McDonough-Atkinson. Georgia Power Company, Cobb County, Georgia. August, 2023.

WSP 2023e. Advanced Engineering Methods Feasibility Report, Plant McDonough Ash Pond 3, and Ash Pond 4 (AP-3/4), WSP USA Inc., May 2023.

WSP 2023f. Supplemental Radium Source Evaluation, Plant McDonough-Atkinson, WSP USA Inc., May 22, 2023.

WSP 2023g. 2022 Annual Groundwater Monitoring and Corrective Action Report, Plant McDonough-Atkinson Ash Pond 2 and 3/4, WSP USA Inc., July 31, 2023.

# Tables

# TABLE 1
## SUMMARY OF MONITORING WELL, ASSESSMENT WELL AND PIEZOMETER CONSTRUCTION DATA
Georgia Power Company - Plant McDonough
Atlanta, Georgia

| Well-ID | Hydraulic Location | Screened Media | NAD 83 Northing | NAD 83 Easting | Top of Casing Elevation (feet NAVD 88) | Ground Surface Elevation (feet NAVD 88) | Total Well Depth (feet bgs) | Top of Screen Elevation (feet NAVD 88) | Bottom of Screen Elevation (feet NAVD 88) | Screen Length (feet) | Date of Installation |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **ASH POND 1 (AP-1) DETECTION MONITORING WELL NETWORK** | | | | | | | | | | | |
| DGWA-53 | Upgradient | Upper Bedrock | 1393472.8 | 2201668.8 | 844.26 | 841.3 | 28.9 | 823.7 | 813.7 | 10 | 9/24/2016 |
| DGWA-70A | Upgradient | Overburden | 1390481.4 | 2200591.6 | 808.52 | 805.8 | 59.3 | 756.9 | 746.9 | 10 | 5/10/2017 |
| DGWA-71 | Upgradient | Overburden | 1393963.3 | 2201714.8 | 863.84 | 861.2 | 43.8 | 827.8 | 817.8 | 10 | 2/28/2017 |
| DGWC-37 | Downgradient | Overburden | 1390482.2 | 2200919.8 | 766.21 | 763.7 | 39.7 | 734.4 | 724.4 | 10 | 11/28/2012 |
| DGWC-38 | Downgradient | Overburden | 1390362.7 | 2201148.6 | 757.43 | 754.7 | 25.0 | 740.0 | 730.0 | 10 | 11/29/2012 |
| DGWC-39 | Downgradient | Overburden | 1390303.6 | 2201540.1 | 759.89 | 757.0 | 21.2 | 746.2 | 736.2 | 10 | 11/6/2012 |
| DGWC-40 | Downgradient | Overburden | 1390625.7 | 2201825.9 | 779.06 | 776.2 | 34.9 | 751.7 | 741.7 | 10 | 11/5/2012 |
| DGWC-67 | Downgradient | Overburden | 1390953.8 | 2200830.7 | 766.70 | 767.0 | 56.3 | 720.7 | 710.7 | 10 | 3/14/2017 |
| DGWC-68A | Downgradient | Overburden | 1391301.2 | 2200734.9 | 765.33 | 765.4 | 29.8 | 746.0 | 736.0 | 10 | 4/20/2017 |
| DGWC-69 | Downgradient | Overburden | 1391585.0 | 2200657.1 | 763.75 | 764.0 | 24.3 | 749.7 | 739.7 | 10 | 3/16/2017 |
| DGWC-121 | Downgradient | Overburden | 1390739.7 | 2200849.4 | 764.16 | 764.5 | 50.0 | 724.8 | 714.8 | 10 | 3/22/2022 |
| **ASH POND 1 (AP-1) ASSESSMENT MONITORING WELL NETWORK** | | | | | | | | | | | |
| B-62 | Downgradient | Upper Bedrock | 1389828.1 | 2201811.2 | 760.08 | 760.4 | 39.9 | 730.7 | 720.7 | 10 | 10/4/2016 |
| B-100 | Downgradient | Overburden | 1390254.8 | 2202242.1 | 777.95 | 775.3 | 44.8 | 740.5 | 730.5 | 10 | 7/8/2020 |
| B-105D | Downgradient | Upper Bedrock | 1390634.5 | 2201831.9 | 779.01 | 776.0 | 70.0 | 716.0 | 706.0 | 10 | 10/19/2020 |
| B-112D | Downgradient | Upper Bedrock | 1391564.2 | 2200664.1 | 765.58 | 766.1 | 55.0 | 721.4 | 711.4 | 10 | 3/22/2021 |
| B-113D | Downgradient | Upper Bedrock | 1391264.6 | 2200719.2 | 758.22 | 758.8 | 85.0 | 684.4 | 674.4 | 10 | 3/30/2021 |

**TABLE 1**
**SUMMARY OF MONITORING WELL, ASSESSMENT WELL AND PIEZOMETER CONSTRUCTION DATA**
Georgia Power Company - Plant McDonough
Atlanta, Georgia

| Well-ID | Hydraulic Location | Screened Media | NAD 83 Northing | NAD 83 Easting | Top of Casing Elevation (feet NAVD 88) | Ground Surface Elevation (feet NAVD 88) | Total Well Depth (feet bgs) | Top of Screen Elevation (feet NAVD 88) | Bottom of Screen Elevation (feet NAVD 88) | Screen Length (feet) | Date of Installation |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **ASH POND 2 and ASH PONDS 3/4 (AP-2, 3/4) DETECTION MONITORING WELL NETWORK** | | | | | | | | | | | |
| DGWA-53 | Upgradient | Upper Bedrock | 1393472.8 | 2201668.8 | 844.26 | 841.3 | 28.9 | 823.7 | 813.7 | 10 | 9/24/2016 |
| DGWA-70A | Upgradient | Overburden | 1390481.4 | 2200591.6 | 808.52 | 805.8 | 59.3 | 756.9 | 746.9 | 10 | 5/10/2017 |
| DGWA-71 | Upgradient | Overburden | 1393963.3 | 2201714.8 | 863.84 | 861.2 | 43.8 | 827.8 | 817.8 | 10 | 2/28/2017 |
| DGWC-2 | Downgradient | Overburden/Upper Bedrock | 1393958.0 | 2202119.5 | 850.88 | 848.3 | 49.0 | 809.6 | 799.6 | 10 | 10/2/2012 |
| DGWC-4 | Downgradient | Overburden | 1394171.5 | 2202662.4 | 814.85 | 812.1 | 45.0 | 777.4 | 767.4 | 10 | 10/3/2012 |
| DGWC-5 | Downgradient | Overburden/Upper Bedrock | 1394306.3 | 2202965.1 | 791.75 | 788.7 | 30.0 | 769.0 | 759.0 | 10 | 10/4/2012 |
| DGWC-8 | Downgradient | Overburden | 1394322.2 | 2203882.1 | 826.38 | 824.1 | 49.1 | 785.4 | 775.4 | 10 | 10/10/2012 |
| DGWC-9 | Downgradient | Overburden | 1394055.9 | 2204170.0 | 824.35 | 821.8 | 30.0 | 802.2 | 792.2 | 10 | 10/10/2012 |
| DGWC-10 | Downgradient | Overburden | 1393818.3 | 2204201.1 | 823.55 | 820.9 | 45.4 | 785.9 | 775.9 | 10 | 10/11/2012 |
| DGWC-11 | Downgradient | Overburden | 1393547.1 | 2204166.2 | 800.57 | 798.1 | 49.1 | 759.3 | 749.3 | 10 | 10/15/2012 |
| DGWC-12 | Downgradient | Overburden | 1393149.4 | 2204128.3 | 773.86 | 771.2 | 25.1 | 756.5 | 746.5 | 10 | 10/15/2012 |
| DGWC-13 | Downgradient | Overburden | 1392881.1 | 2204084.6 | 794.10 | 791.3 | 43.8 | 757.9 | 747.9 | 10 | 11/29/2012 |
| DGWC-14 | Downgradient | Overburden/Upper Bedrock | 1392574.2 | 2204013.3 | 792.40 | 789.8 | 34.3 | 765.9 | 755.9 | 10 | 12/18/2012 |
| DGWC-15 | Downgradient | Overburden | 1392544.1 | 2203679.0 | 824.50 | 821.5 | 67.1 | 764.8 | 754.8 | 10 | 11/29/2012 |
| DGWC-17 | Downgradient | Overburden | 1392645.6 | 2203051.0 | 837.05 | 834.2 | 44.5 | 800.0 | 790.0 | 10 | 1/9/2013 |
| DGWC-19 | Downgradient | Overburden | 1392342.6 | 2202601.0 | 825.46 | 822.9 | 39.8 | 793.5 | 783.5 | 10 | 3/12/2013 |
| DGWC-20 | Downgradient | Overburden | 1392164.5 | 2202315.6 | 822.14 | 819.8 | 39.7 | 790.7 | 780.7 | 10 | 3/5/2013 |
| DGWC-21 | Downgradient | Overburden/Upper Bedrock | 1392067.5 | 2202063.5 | 816.28 | 813.5 | 69.0 | 754.9 | 744.9 | 10 | 10/31/2012 |
| DGWC-22 | Downgradient | Upper Bedrock | 1392126.3 | 2201791.9 | 816.59 | 813.7 | 60.0 | 764.0 | 754.0 | 10 | 10/25/2012 |
| DGWC-23 | Downgradient | Upper Bedrock | 1392239.7 | 2201582.0 | 818.37 | 815.7 | 60.1 | 765.9 | 755.9 | 10 | 10/25/2012 |
| DGWC-42 | Downgradient | Overburden | 1391327.8 | 2201870.2 | 804.68 | 802.0 | 50.4 | 762.1 | 752.1 | 10 | 11/12/2012 |
| DGWC-47 | Downgradient | Overburden/Upper Bedrock | 1391553.8 | 2202610.5 | 797.45 | 794.3 | 28.8 | 775.9 | 765.9 | 10 | 6/23/2016 |
| DGWC-48 | Downgradient | Overburden/Upper Bedrock | 1391314.6 | 2202290.2 | 788.33 | 785.2 | 30.0 | 765.6 | 755.6 | 10 | 6/22/2016 |

## TABLE 1
## SUMMARY OF MONITORING WELL, ASSESSMENT WELL AND PIEZOMETER CONSTRUCTION DATA
Georgia Power Company - Plant McDonough
Atlanta, Georgia

| Well-ID | Hydraulic Location | Screened Media | NAD 83 Northing | NAD 83 Easting | Top of Casing Elevation (feet NAVD 88) | Ground Surface Elevation (feet NAVD 88) | Total Well Depth (feet bgs) | Top of Screen Elevation (feet NAVD 88) | Bottom of Screen Elevation (feet NAVD 88) | Screen Length (feet) | Date of Installation |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **ASH POND 2 and ASH PONDS 3/4 (AP-2, 3/4) ASSESSMENT MONITORING WELL NETWORK** | | | | | | | | | | | |
| B-56 | Downgradient | Overburden | 1393957.9 | 2204187.8 | 823.59 | 821.0 | 45.0 | 786.4 | 776.4 | 10 | 10/3/2016 |
| B-62 | Downgradient | Upper Bedrock | 1389828.1 | 2201811.2 | 760.08 | 760.4 | 39.9 | 730.7 | 720.7 | 10 | 10/4/2016 |
| B-63 | Downgradient | Overburden | 1390999.1 | 2202978.1 | 777.10 | 777.3 | 46.0 | 741.8 | 731.8 | 10 | 10/6/2016 |
| B-66 | Downgradient | Overburden | 1393858.2 | 2204277.5 | 815.90 | 813.3 | 55.3 | 768.3 | 758.3 | 10 | 11/16/2016 |
| B-77 | Downgradient | Overburden | 1390948.7 | 2202942.0 | 776.86 | 777.1 | 42.0 | 745.1 | 735.1 | 10 | 9/17/2019 |
| B-82 | Downgradient | Overburden | 1393750.0 | 2204258.1 | 810.07 | 807.5 | 45.0 | 773.0 | 763.0 | 10 | 9/21/2019 |
| B-83 | Downgradient | Overburden | 1390735.5 | 2202695.6 | 776.98 | 777.1 | 48.6 | 738.5 | 728.5 | 10 | 9/30/2019 |
| B-88 | Downgradient | Overburden | 1394401.1 | 2203738.3 | 820.07 | 817.0 | 72.0 | 755.0 | 745.0 | 10 | 11/15/2019 |
| B-92 | Downgradient | Overburden | 1394392.7 | 2203026.7 | 785.08 | 785.3 | 24.6 | 770.7 | 760.7 | 10 | 12/11/2019 |
| B-93 | Downgradient | Overburden | 1394348.7 | 2202946.7 | 789.07 | 789.2 | 28.9 | 770.3 | 760.3 | 10 | 12/12/2019 |
| B-97 | Downgradient | Overburden/Upper Bedrock | 1394430.0 | 2203008.3 | 786.29 | 786.6 | 31.0 | 765.3 | 755.3 | 10 | 2/11/2020 |
| B-98 | Downgradient | Overburden | 1394392.5 | 2202934.0 | 789.67 | 789.8 | 19.4 | 780.8 | 770.8 | 10 | 2/10/2020 |
| B-100 | Downgradient | Overburden | 1390254.8 | 2202242.1 | 777.95 | 775.3 | 44.8 | 740.5 | 730.5 | 10 | 7/8/2020 |
| B-101D | Downgradient | Overburden/Upper Bedrock | 1394063.6 | 2204168.2 | 824.29 | 821.2 | 75.0 | 756.3 | 746.3 | 10 | 11/12/2020 |
| B-102D | Downgradient | Upper Bedrock | 1393828.4 | 2204200.4 | 823.42 | 820.6 | 85.0 | 746.2 | 736.2 | 10 | 11/10/2020 |
| B-104D | Downgradient | Upper Bedrock | 1391318.3 | 2202298.5 | 787.90 | 785.3 | 60.0 | 735.3 | 725.3 | 10 | 10/20/2020 |
| B-106D | Downgradient | Upper Bedrock | 1394327.1 | 2203869.2 | 826.21 | 823.5 | 80.0 | 754.1 | 744.1 | 10 | 11/13/2020 |
| B-107D | Downgradient | Upper Bedrock | 1392334.5 | 2202596.4 | 823.38 | 820.6 | 85.8 | 745.5 | 735.5 | 10 | 10/28/2020 |
| B-108D | Downgradient | Upper Bedrock | 1392156.1 | 2202312.5 | 821.13 | 818.4 | 80.0 | 749.4 | 739.4 | 10 | 10/27/2020 |
| B-109D | Downgradient | Upper Bedrock | 1393957.5 | 2202127.0 | 850.73 | 847.8 | 100.0 | 758.4 | 748.4 | 10 | 10/31/2020 |
| B-111D | Downgradient | Upper Bedrock | 1394303.4 | 2202956.4 | 791.87 | 789.1 | 85.0 | 714.9 | 704.9 | 10 | 11/3/2020 |
| B-120D | Downgradient | Upper Bedrock | 1394047.2 | 2202436.4 | 836.42 | 834.0 | 70.0 | 775.0 | 765.0 | 10 | 3/6/2021 |
| B-122D | Downgradient | Bedrock | 1390992.8 | 2202975.4 | 777.03 | 777.3 | 85.0 | 707.5 | 697.5 | 10 | 3/24/2022 |
| B-125D | Downgradient | Bedrock | 1394111.1 | 2202580.9 | 821.70 | 819.1 | 145.1 | 684.0 | 674.0 | 10 | 3/31/2023 |

**TABLE 1**
**SUMMARY OF MONITORING WELL, ASSESSMENT WELL AND PIEZOMETER CONSTRUCTION DATA**
Georgia Power Company - Plant McDonough
Atlanta, Georgia

| Well-ID | Hydraulic Location | Screened Media | NAD 83 Northing | NAD 83 Easting | Top of Casing Elevation (feet NAVD 88) | Ground Surface Elevation (feet NAVD 88) | Total Well Depth (feet bgs) | Top of Screen Elevation (feet NAVD 88) | Bottom of Screen Elevation (feet NAVD 88) | Screen Length (feet) | Date of Installation |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **PIEZOMETERS** | | | | | | | | | | | |
| B-3 | Downgradient | Overburden/Upper Bedrock | 1394045.1 | 2202411.5 | 837.78 | 835.0 | 37.0 | 808.3 | 798.3 | 10 | 10/3/2012 |
| B-6 | Downgradient | Overburden | 1394419.5 | 2203266.5 | 789.47 | 786.5 | 35.4 | 761.5 | 751.5 | 10 | 10/9/2012 |
| B-7 | Downgradient | Overburden | 1394374.6 | 2203596.1 | 809.16 | 806.1 | 25.2 | 791.3 | 781.3 | 10 | 10/9/2012 |
| B-16 | Downgradient | Overburden | 1392595.1 | 2203315.4 | 826.47 | 823.6 | 43.7 | 790.2 | 780.2 | 10 | 12/19/2012 |
| B-18 | Downgradient | Overburden | 1392521.0 | 2202875.5 | 826.56 | 823.9 | 32.6 | 801.5 | 791.5 | 10 | 1/10/2013 |
| B-24 | Downgradient | Upper Bedrock | 1392479.9 | 2201450.0 | 822.11 | 819.3 | 79.1 | 751.0 | 741.0 | 10 | 10/24/2012 |
| B-25 | Downgradient | Upper Bedrock | 1392813.3 | 2201502.7 | 836.54 | 833.5 | 54.8 | 789.1 | 779.1 | 10 | 10/24/2012 |
| B-26 | Downgradient | Upper Bedrock | 1393105.6 | 2201550.4 | 853.60 | 850.6 | 49.3 | 811.7 | 801.7 | 10 | 10/23/2012 |
| B-28 | Downgradient | Overburden/Upper Bedrock | 1391967.4 | 2201679.2 | 816.08 | 813.3 | 69.4 | 754.3 | 744.3 | 10 | 10/31/2012 |
| B-29 | Downgradient | Overburden | 1391890.0 | 2201422.0 | 816.43 | 813.5 | 54.4 | 769.4 | 759.4 | 10 | 1/11/2013 |
| B-31 | Downgradient | Upper Bedrock | 1392034.3 | 2200928.5 | 797.47 | 794.9 | 45.1 | 760.2 | 750.2 | 10 | 1/22/2013 |
| B-41 | Downgradient | Overburden | 1390920.8 | 2201751.9 | 795.20 | 792.4 | 60.0 | 743.0 | 733.0 | 10 | 11/14/2012 |
| B-50 | Downgradient | Overburden | 1391657.1 | 2201841.0 | 809.67 | 809.2 | 36.0 | 784.4 | 774.4 | 10 | 6/24/2016 |
| B-51 | Downgradient | Overburden | 1390501.2 | 2200906.5 | 765.92 | 763.3 | 65.0 | 708.3 | 698.3 | 10 | 6/27/2016 |
| B-52 | Downgradient | Overburden | 1392308.3 | 2201314.8 | 822.89 | 820.3 | 50.0 | 781.4 | 771.4 | 10 | 9/28/2016 |
| B-54 | Downgradient | Overburden/Upper Bedrock | 1394423.5 | 2203140.7 | 785.46 | 782.6 | 34.2 | 758.8 | 748.8 | 10 | 9/26/2016 |
| B-55 | Downgradient | Overburden | 1394142.6 | 2204147.9 | 825.12 | 822.9 | 52.0 | 781.9 | 771.9 | 10 | 9/22/2016 |
| B-57 | Downgradient | Upper Bedrock | 1391396.3 | 2202736.9 | 789.04 | 786.0 | 50.5 | 746.0 | 736.0 | 10 | 9/24/2016 |
| B-58 | Downgradient | Overburden | 1391125.7 | 2202426.5 | 788.17 | 785.2 | 45.0 | 750.7 | 740.7 | 10 | 9/23/2016 |
| B-59 | Downgradient | Overburden/Upper Bedrock | 1394349.1 | 2203001.1 | 788.00 | 785.5 | 30.3 | 765.3 | 755.3 | 10 | 9/23/2016 |
| B-60 | Downgradient | Overburden | 1391100.7 | 2202881.6 | 782.13 | 779.2 | 49.8 | 739.9 | 729.9 | 10 | 9/29/2016 |
| B-61 | Downgradient | Overburden | 1390957.8 | 2202505.8 | 782.09 | 779.0 | 51.9 | 737.5 | 727.5 | 10 | 9/29/2016 |
| B-64 | Downgradient | Overburden | 1394381.9 | 2203031.3 | 785.83 | 786.1 | 30.4 | 766.1 | 756.1 | 10 | 11/2/2016 |
| B-65 | Downgradient | Overburden/Upper Bedrock | 1394381.2 | 2204050.8 | 821.95 | 822.3 | 45.4 | 787.9 | 777.9 | 10 | 11/15/2016 |

**TABLE 1**
**SUMMARY OF MONITORING WELL, ASSESSMENT WELL AND PIEZOMETER CONSTRUCTION DATA**
Georgia Power Company - Plant McDonough
Atlanta, Georgia

| Well-ID | Hydraulic Location | Screened Media | NAD 83 Northing | NAD 83 Easting | Top of Casing Elevation (feet NAVD 88) | Ground Surface Elevation (feet NAVD 88) | Total Well Depth (feet bgs) | Top of Screen Elevation (feet NAVD 88) | Bottom of Screen Elevation (feet NAVD 88) | Screen Length (feet) | Date of Installation |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **PIEZOMETERS** | | | | | | | | | | | |
| B-68 | Downgradient | Overburden | 1391298.2 | 2200714.2 | 758.68 | 759.0 | 18.0 | 751.0 | 741.0 | 10 | 3/16/2017 |
| B-72 | Downgradient | Overburden | 1391242.2 | 2200723.9 | 758.85 | 758.09 | 21.9 | 746.6 | 736.6 | 10 | 4/19/2017 |
| B-73 | Downgradient | Overburden | 1391352.4 | 2200697.5 | 759.46 | 758.85 | 15.8 | 753.5 | 743.5 | 10 | 4/19/2017 |
| B-74 | Downgradient | Overburden | 1391279.8 | 2200665.3 | 759.44 | 758.96 | 16.5 | 748.2 | 743.2 | 5 | 4/25/2017 |
| B-76 | Downgradient | Overburden | 1390716.9 | 2202756.0 | 760.31 | 760.54 | 38.5 | 732.0 | 722.0 | 10 | 9/18/2019 |
| B-78 | Downgradient | Overburden/Upper Bedrock | 1394328.2 | 2202958.2 | 790.75 | 788.0 | 30.0 | 768.0 | 758.5 | 10 | 9/22/2019 |
| B-79 | Downgradient | Overburden | 1394458.6 | 2203223.0 | 788.66 | 785.9 | 34.9 | 761.0 | 751.5 | 10 | 9/21/2019 |
| B-80 | Downgradient | Overburden | 1394372.6 | 2203533.9 | 804.47 | 801.8 | 30.0 | 782.0 | 772.5 | 10 | 9/20/2019 |
| B-81 | Downgradient | Overburden | 1394364.9 | 2203741.1 | 820.56 | 817.7 | 50.0 | 778.5 | 768.5 | 10 | 9/22/2019 |
| B-84 | Downgradient | Overburden | 1390411.9 | 2202241.9 | 776.24 | 776.3 | 49.1 | 737.5 | 727.5 | 10 | 10/1/2019 |
| B-85 | Downgradient | Overburden/Upper Bedrock | 1394433.4 | 2203134.5 | 782.54 | 782.7 | 34.5 | 758.5 | 748.5 | 10 | 11/18/2019 |
| B-86 | Downgradient | Overburden/Upper Bedrock | 1394480.0 | 2203206.6 | 784.29 | 784.6 | 34.1 | 760.5 | 750.5 | 10 | 11/18/2019 |
| B-87 | Downgradient | Overburden | 1394401.9 | 2203531.3 | 803.37 | 800.4 | 42.0 | 768.7 | 758.7 | 10 | 11/17/2019 |
| B-89 | Downgradient | Upper Bedrock | 1394398.4 | 2204049.4 | 822.36 | 822.6 | 49.5 | 783.1 | 773.1 | 10 | 11/19/2019 |
| B-90 | Downgradient | Overburden | 1394501.0 | 2203212.6 | 784.00 | 784.2 | 33.4 | 760.8 | 750.8 | 10 | 12/10/2019 |
| B-91 | Downgradient | Overburden | 1394447.1 | 2203123.9 | 782.98 | 783.1 | 34.6 | 758.5 | 748.5 | 10 | 12/11/2019 |
| B-94 | Downgradient | Overburden | 1394402.0 | 2203513.7 | 801.74 | 799.2 | 45.2 | 764.6 | 754.6 | 10 | 1/23/2020 |
| B-95 | Downgradient | Overburden | 1394518.6 | 2203167.7 | 784.00 | 784.3 | 33.3 | 761.3 | 751.3 | 10 | 2/11/2020 |
| B-96 | Downgradient | Overburden | 1394478.7 | 2203099.3 | 784.92 | 785.3 | 33.1 | 762.2 | 752.2 | 10 | 2/10/2020 |
| B-99 | Downgradient | Overburden | 1394524.2 | 2203084.5 | 782.39 | 782.6 | 12.3 | 775.3 | 770.3 | 5 | 7/7/2020 |

**TABLE 1**
**SUMMARY OF MONITORING WELL, ASSESSMENT WELL AND PIEZOMETER CONSTRUCTION DATA**
Georgia Power Company - Plant McDonough
Atlanta, Georgia

| Well-ID | Hydraulic Location | Screened Media | NAD 83 Northing | NAD 83 Easting | Top of Casing Elevation (feet NAVD 88) | Ground Surface Elevation (feet NAVD 88) | Total Well Depth (feet bgs) | Top of Screen Elevation (feet NAVD 88) | Bottom of Screen Elevation (feet NAVD 88) | Screen Length (feet) | Date of Installation |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **PIEZOMETERS** | | | | | | | | | | | |
| B-103D | Downgradient | Upper Bedrock | 1391543.5 | 2202614.4 | 795.96 | 793.8 | 70.0 | 733.8 | 723.8 | 10 | 10/15/2020 |
| B-110D | Downgradient | Upper Bedrock | 1391294.4 | 2200736.0 | 764.61 | 764.7 | 65.0 | 711.7 | 701.7 | 10 | 11/17/2020 |
| B-115D | Downgradient | Upper Bedrock | 1391265.3 | 2202580.7 | 789.17 | 786.4 | 80.0 | 717.2 | 707.2 | 10 | 3/20/2021 |
| B-116D | Upgradient | Upper Bedrock | 1390483.7 | 2200611.0 | 807.82 | 805.3 | 90.0 | 726.1 | 716.1 | 10 | 3/8/2021 |
| B-117D | Upgradient | Upper Bedrock | 1393963.8 | 2201727.3 | 863.82 | 861.2 | 75.0 | 796.5 | 786.5 | 10 | 3/17/2021 |
| B-118 | Upgradient | Upper Bedrock | 1391219.3 | 2200449.7 | 807.70 | 805.0 | 75.0 | 740.2 | 730.2 | 10 | 3/9/2021 |
| B-119D | Upgradient | Upper Bedrock | 1391236.4 | 2200446.6 | 807.15 | 804.5 | 105 | 709.8 | 699.8 | 10 | 3/16/2021 |
| B-123D | Downgradient | Bedrock | 1391234.4 | 2202608.4 | 781.80 | 778.9 | 160.0 | 668.9 | 618.9 | 50 | 4/4/2022 |

**Notes:**

1. Coordinate System: NAD 1983 State Plane Georgia West (U.S. feet)
2. bgs - Below Ground Surface; NAD - North American Datum; NAVD - North American Vertical Datum

**TABLE 2**
**SUMMARY OF CORRECTIVE MEASURES SCREENING**
Georgia Power – Plant McDonough-Atkinson Ash Pond 2 and 3/4
Smyrna, Georgia

| Corrective Measure | REGULATORY CITATION FOR CRITERIA: 40 CFR 257.96(C)(1) | | |
|---|---|---|---|
| | **Description** | **Performance** | **Reliability** |
| **Geochemical Approaches (in situ injection)** | Use of an injection well network, or other means of introducing reagents or air into the subsurface, to provide suitable reagents for either anaerobic or aerobic attenuation of arsenic (As), beryllium (Be), cobalt (Co), lithium (Li) and selenium (Se). Under anaerobic conditions, As would be attenuated within sparingly soluble sulfide minerals. Under aerobic conditions, soluble iron or manganese and oxygen (either via air sparging or through a chemical oxidant) would be injected to promote the formation of iron or manganese (oxy-) hydroxides for subsequent sorption of As, Be, Co, Se and to a lesser degree Li onto these mineral phases. If sufficient iron is present in groundwater, the use of air sparging alone may be considered to precipitate iron (oxy-) hydroxides for sorption. In-situ chemical oxidation (ISCO) or in-situ chemical reduction (ISCR) can be used to chemically alter the redox environment in the subsurface to affect the mobility of certain inorganic compounds, including As. | The effective immobilization of As, Be, Co, Li and Se has been shown under aerobic and anaerobic conditions; however, the anaerobic approach (involving the injection of an electron donor together with iron or manganese and sulfur) requires careful study and testing. While aerobic approaches are somewhat less complex, additional aquifer characterization is needed to further evaluate these options. | Reliability dependent on permeability of the subsurface and the amount and distribution of secondary iron or manganese (oxy-) hydroxides (for aerobic approach), or electron donors and soluble iron or manganese and sulfur that can be consistently distributed (for anaerobic approach). Reliable technology if injected materials can be distributed throughout the impacted aquifer. Bench- and/or pilot-scale treatability testing programs are needed to understand the biogeochemical processes that would effectively reduce migration of As, Be, Co, Li and Se in groundwater. |
| **Hydraulic Containment (pump- and-treat)** | Hydraulic containment refers to the use of groundwater extraction to induce a hydraulic gradient for hydraulic capture or 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, CCR conditioning, etc.). It is applicable to a variable mix of inorganic constituents, including dissolved As, Be, Co, Li and Se. | Pump and treat (P&T) is effective at providing hydraulic control, but it is unclear whether full groundwater remediation can be achieved without further understanding attenuation mechanisms at the Site. At AP-2 & 3/4, implementation of the corrective measure is contingent on completing additional assessment activities (i.e., high-resolution site characterization, additional pump tests, flow modeling, and capture zone analysis). This is needed to refine the constituent distribution in the subsurface to target specific zones for pumping for improved mass recovery efficiency/ effectiveness and to further evaluate the potential remedy performance. | Generally reliable for hydraulic containment, but uncertainty exists whether groundwater remediation goals can be achieved within a reasonable time frame without further understanding attenuation mechanisms. |
| **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. Attenuation mechanisms for inorganic constituents at CCR sites, including As, Be, Co, Li and Se at AP-2 & 3/4, are either physical (e.g., dilution, dispersion, flushing, and related processes) or chemical (sorption or oxidation reduction reactions). Chemical attenuation processes include precipitation, and sorption reactions such as adsorption on the surfaces of soil minerals, absorption into the matrix of soil minerals, or partitioning into organic matter. Further, oxidation-reduction (redox) reactions, via abiotic or biotic processes, can transform the valence states of some inorganic constituents to less soluble and thus less mobile forms. For Be and Li, the main attenuation processes include sorption to iron and manganese oxides. | Physical and chemical MNA mechanisms for As, Be, Co, Li and Se, including dilution, dispersion, sorption, and oxidation reduction reactions can be effective at achieving groundwater protection standards (GWPS) within a reasonable time frame. Attenuation processes for As, Be, Co, Li and Se are already occurring at the site as evidenced by groundwater data from the delineation wells. Source control will improve the mass balance such that the buffer capacity of the aquifer is unlikely to be exhausted, and the attenuation processes already at work for As, Be, Co, Li and Se at AP-2 & 3/4 will further enhance ongoing MNA. | Reliable as long as sufficient attenuation capacity is present. MNA is reliable and can either be used as a stand-alone corrective measure for groundwater impacted by dissolved As, Be, Co, Li and Se, or in combination with a second technology. |

**TABLE 2**
**SUMMARY OF CORRECTIVE MEASURES SCREENING**
Georgia Power – Plant McDonough-Atkinson Ash Pond 2 and 3/4
Smyrna, Georgia

| Corrective Measure | REGULATORY CITATION FOR CRITERIA: 40 CFR 257.96(C)(1) | | |
|---|---|---|---|
| | **Description** | **Performance** | **Reliability** |
| **In-Situ Solidification / Stabilization (ISS)** | In-situ stabilization (ISS) is a technique that uses mixing of the CCR with additives to solidify the material in place and reduce future dissolution of CCR compounds from the stabilized material. Additives typically include Portland cement, and the solidification is completed in-situ using large diameter augers. | Medium to high, groundwater impacts would be addressed through the processes of natural attenuation. | In-situ stabilization can be a reliable corrective measure for As, Be, Co, Li and Se in groundwater. Reliability is dependent on the permeability of the subsurface and mechanics of injection. |
| **Permeable Reactive Barrier (PRB)** | Permeable reactive barrier (PRB) technology typically involves the installation of a permeable subsurface wall constructed with reactive media for the removal of constituents as groundwater passes through. Either ZVI-Carbon matrix or solid carbon (bio-barrier) are currently proposed for the concurrent removal of As, Be, Co, Li and Se. The carbon could be composed of peat moss, mulch or another carbon source. Exact placement of the PRB is contingent on finalization of the nature and extent characterization. PRBs can be constructed as “funnel and gate” systems, where a barrier wall directs groundwater to a smaller “treatment gate” filled with reactive media. | PRBs have been shown to effectively address As, Be, Co, Li and Se in groundwater, but additional testing is required for Be and Li to select the appropriate reactive media. The approach is expected to achieve GWPS for both constituents as impacted groundwater passes through the reactive barrier. Certain redox kinetics may be slow and hence a thicker wall might be needed. Furthermore, additional testing is required to select the appropriate sorptive media mix, especially related to Be and Li. | Reliable groundwater corrective measure technology, but loss of reactivity over time may require re-installation depending on the duration of the remedy. Additional data collection, including conducting a bench and/or pilot study, is needed to better characterize current attenuation mechanisms and/or select the appropriate reactive media mix for a PRB wall. |
| **Phyto Remediation (Phyto)** | Phytoremediation uses trees and other plants to degrade or immobilize constituents or achieve hydraulic control without the need for an above-ground water treatment system and infrastructure. Within the context of AP-2 & 3/4, this corrective measure would likely be applied along the point of compliance or downgradient edge of the impacted groundwater for hydraulic control. The system promotes root development to the targeted groundwater zone (depth), allowing for hydraulic control of impacted groundwater. In addition, immobilization of As, Be, Co, LI and Se within the root zone as well as incidental uptake of dissolved As, Be, Co, Li and Se with groundwater is expected to occur concurrent with hydraulic control. | Once established (typically at the end of the third growing season), a phytoremediation ‘system’ is effective for providing hydraulic containment of groundwater, and potential reduction of As, Be, Co, Li and Se concentrations through immobilization and/or uptake and sequestration in the tree biomass; however, the main purpose is to provide hydraulic control. However, changing site conditions may make the corrective measure viable for the area downgradient of AP-2 & 3/4. Additional aquifer testing and/or groundwater flow modeling may be needed to confirm the suitability at that time. | Engineered phytoremediation is a proven technology where hydrogeologic factors are taken into account (e.g., hydraulic conductivity, flow velocity, depth to impacted groundwater zone, etc.). This is considered an active remedial approach through the use of trees as the "pumps" driving the system. Careful design will be needed to select the proper species, which will include consideration of groundwater chemistry, plant uptake of constituents, and groundwater flow. |
| **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. In general, barrier walls are designed to provide containment; localized treatment achieved through the sorption or chemical precipitation reactions from construction of the walls are incidental to the design objective. Barrier walls can also be used in downgradient applications to limit discharge to a surface water feature or to reduce aquifer recharge from an adjacent surface water feature when groundwater extraction wells are placed near one. A variety of barrier materials can be used, including cement and/or bentonite slurries, geomembrane composite materials, or driven materials such as steel or vinyl sheet pile. | Barrier walls are a proven technology for seepage control and/or groundwater cutoff at impoundments. Slurry walls are limited by the depth of installation, which is approximately 90 ft below ground surface. However, site-specific geologic and technology-specific considerations may limit this depth to shallower installations. Additional subsurface investigations, aquifer testing, and compatibility testing with site-specific groundwater will be needed. | Generally reliable as a barrier to groundwater flow; however, treatment of downgradient groundwater is incidental and not the primary objective. |

**TABLE 2**
**SUMMARY OF CORRECTIVE MEASURES SCREENING**
Georgia Power – Plant McDonough-Atkinson Ash Pond 2 and 3/4
Smyrna, Georgia

| Corrective Measure | REGULATORY CITATION FOR CRITERIA: 40 CFR 257.96(C)(1) | | |
|---|---|---|---|
| | **Ease of Implementation** | **Potential Impacts** | **Time Requirement to Begin/Complete** |
| **Geochemical Approaches (in situ injection)** | Moderate. Installation of injection well network or other injection infrastructure would be required. Alternative installation approaches may be considered, such as along the downgradient edge of impacted groundwater, which would function similar to a PRB application. Potential for clogging of aquifer matrix and/or injection well infrastructure. Chemical distribution during injections (i.e., radius of influence) needs to be evaluated. | Minimal impacts are expected if remedy works as designed, based on a thorough pre-design investigation, geochemical modeling, and bench/pilot study results. Redox-altering processes have the potential to mobilize naturally-occurring constituents as an unintended consequence if not properly studied and implemented. | Installation of the injection network can be accomplished relatively quickly (1 to 2 months). However, a thorough pre-design investigation, geochemical modeling, and/or bench- and/or pilot-testing will be required to obtain design parameters prior to design and construction of the corrective measure, which may take up to 24 months. Once installed, the time required to achieve GWPS within the treatment area may be relatively quick but depends on the attenuation process kinetics of each targeted constituent. The time for complete distribution of the injected materials throughout the treatment area is also variable. |
| **Hydraulic Containment (pump- and-treat)** | Moderate. Proven approach, and supplemental installation of extraction wells/trenches is fairly straightforward. The extracted groundwater may potentially require an above-ground treatment system. A variety of sorption and precipitation approaches exist for ex-situ treatment of As, Be, Co, Li and Se. Operation and maintenance (O&M) requirements are expected to include upkeep of infrastructure components (pumps, pipes, tanks, instrumentation and controls, above-ground treatment system) and handling of treatment residuals. | Moderate. The main potential impacts are related to the presence and operation of an on-site above-ground water treatment facility and related infrastructure to convey and treat extracted groundwater. Pumping activity may unintentionally alter the geochemistry within the hydraulic capture zone. | Installation of extraction wells and/or trenches can be accomplished relatively quickly (1 to 2 months). However, additional aquifer testing, system design and installation, and permit approval may be required, which may take up to 24 months. The initiation of the approach would be contingent on the start-up of the wastewater treatment infrastructure. Hydraulic containment can be achieved relatively quickly after startup of the extraction system, but uncertainty exists with respect to the time to achieve GWPS without additional data collection to better understand attenuation mechanisms for As, Be, Co, Li and Se. |
| **Monitored Natural Attenuation (MNA)** | Reasonably implementable with respect to infrastructure, but moderate to complex with respect to documentation. Proven approach, but additional data are needed to show that the existing attenuation capacity is sufficient to meet site objectives within a reasonable timeframe. A monitoring well network already exists to implement future groundwater monitoring efforts. | None. MNA relies on the natural processes active in the aquifer matrix to reduce constituent concentrations without disturbing the surface or the subsurface. | The infrastructure to initiate MNA is already in place. Demonstrating attenuation mechanisms and capacity can be time-consuming and can take up to 24 months. MNA is expected to be successful within a reasonable time frame following pond closure. Engineering measures will be implemented during closure of AP-2 & 3/4 to minimize potential impacts to the subsurface during closure activities and routine groundwater monitoring will be used to verify that groundwater impacts remain stable or decrease over time. |

**TABLE 2**
**SUMMARY OF CORRECTIVE MEASURES SCREENING**
Georgia Power – Plant McDonough-Atkinson Ash Pond 2 and 3/4
Smyrna, Georgia

| Corrective Measure | REGULATORY CITATION FOR CRITERIA: 40 CFR 257.96(C)(1) | | |
|---|---|---|---|
| | **Ease of Implementation** | **Potential Impacts** | **Time Requirement to Begin/Complete** |
| **In-Situ Solidification / Stabilization (ISS)** | Easy to moderate, implementation of ISS will require a detailed design effort with bench scale testing to determine the appropriate amendment mix for a variety of overburden geologic materials. Pilot testing will also be needed to verify the ability of equipment to solidify material at depth. | Potential impacts of the remedy will be negligible. | In-situ stabilization of AP-2 & 3/4 is predicted to take a number of years to complete, depending on the availability of specialized contractors and equipment. |
| **Permeable Reactive Barrier (PRB)** | Moderate to difficult. Trenching would be required to install a mix of reactive materials in the subsurface. Continuous trenching may be the most feasible construction method. Installation methods and materials are readily available. Once installed, treatment will be passive and O&M requirements are minimal if replacement of the PRB is not necessary. | Minimal impacts are expected following the construction of the remedy. However, ZVI has the potential to create anaerobic conditions downgradient of the PRB wall that may mobilize redox-sensitive naturally-occurring constituents. These conditions need to be carefully monitored. Short-term impacts during the construction of the remedy can be mitigated through appropriate planning and health and safety measures. | Installation of a PRB can be accomplished relatively quickly (6 to 12 months), depending on the final location and configuration. However, bench- and/or pilot-testing would be required to obtain design parameters prior to design and construction of the remedy, which may take up to 24 months. Once installed, the time to achieve GWPS downgradient of the PRB is anticipated to be relatively quick. |
| **Phyto Remediation (Phyto)** | Reasonably implementable to moderate. Engineered approach has been proven effective, and specific depth zones can be targeted. Trees are installed to get the roots deep enough to intercept impacted groundwater flow paths. Area must be clear of above and below-ground structures (e.g., power lines). The system, once established (approximately three growing seasons), is a self-maintaining, sustainable remedial system that has no external energy requirements and little maintenance (i.e., efforts normally associated with landscaping). | Minimal impacts are expected. In fact, there are several positive impacts expected, including enhanced aesthetics, wildlife habitat, and limited energy consumption. | The design phase will require some groundwater modeling, which may take up to 6 months. Depending on the number of required units, the installation effort is expected to last several weeks. Hydraulic capture/control is expected approximately three years after planting and system performance is expected to further improve over time. |
| **Subsurface Vertical Barrier Walls** | Moderate to difficult. Trenching will be required to fill in the various slurry mixes; alternatively, sheet pile installations can be accomplished without excavation of trenches. The application of barrier walls is limited by the depth of installation. Installation methods and materials are readily available. Once installed, above-ground infrastructure to pump and treat groundwater will be required. O&M requirements are expected to include upkeep of infrastructure components (pumps, pipes, tanks, instrumentation and controls, above-ground treatment system) and handling of treatment residuals. | Minimal impacts are expected following the construction of the remedy. Short-term impacts during the construction of the remedy can be mitigated through appropriate planning and health and safety measures. Changes to groundwater flow patterns due to installation of the barrier wall are expected, which can affect other aspects of groundwater corrective action. Pumping activity may unintentionally alter the geochemistry within the hydraulic capture zone that may result in the mobilization of other constituents that may require treatment. | Installation of a barrier wall can be accomplished relatively quickly (6 to 12 months), depending on the final location and configuration. However, some design phase and additional aquifer and compatibility testing will be required, which may take up to 24 months. Once installed, preventing migration of constituents dissolved in groundwater is anticipated to be relatively quick. Since this approach does not treat the downgradient area of impacted groundwater but prevents migration from a source area, it will likely have to be maintained long-term and coupled with other approaches. |

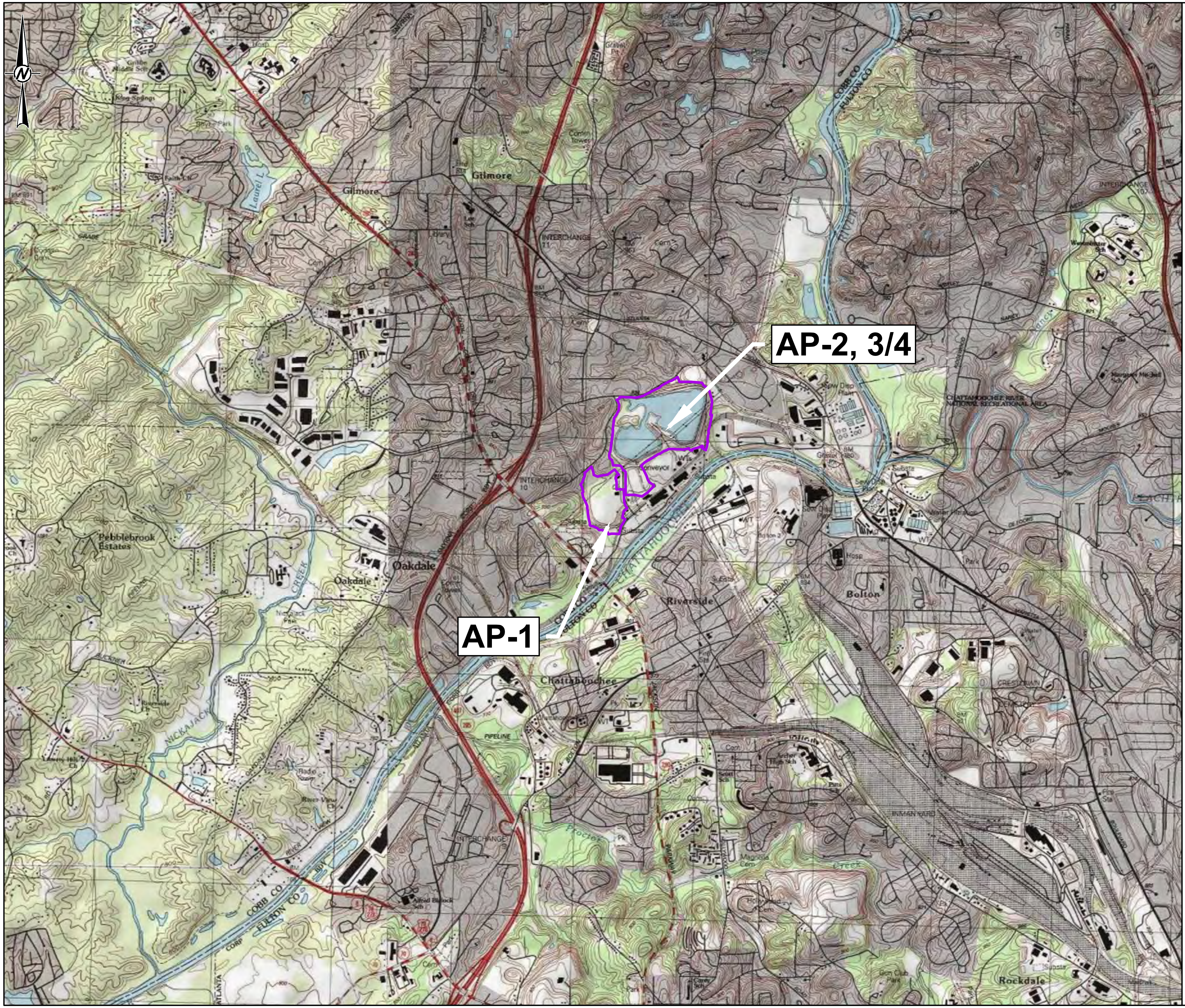
**TABLE 2**
**SUMMARY OF CORRECTIVE MEASURES SCREENING**
Georgia Power – Plant McDonough-Atkinson Ash Pond 2 and 3/4
Smyrna, Georgia

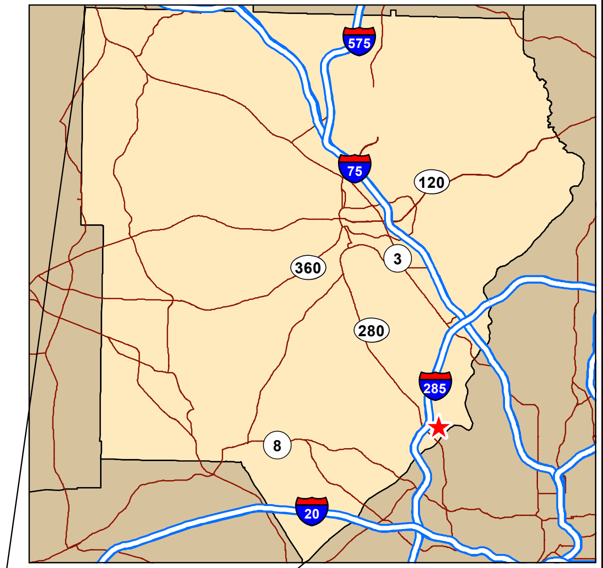
| Corrective Measure | REGULATORY CITATION FOR CRITERIA: 40 CFR 257.96(C)(1) | | | Corrective Measure Screening |
|---|---|---|---|---|
| | Institutional Requirements | Other Env. Or Public Health Requirements | Relative Costs | |
| **Geochemical Approaches (in situ injection)** | Deed restrictions may be necessary until in-situ treatment has achieved GWPS. A new underground injection control (UIC) permit (for in-situ injections) would be required to implement this corrective measure. No other institutional requirements are expected at this time. | None expected at this point. Potential for mobilization of redox-sensitive constituents exists during implementation of an anerobic attenuation approach. Following installation, the remedy is passive. | Medium (depending on expanse of injection network required and injectate volume required per derived design parameters) | ISI is a suitable option for the site. ISI can be applied to As, Be, Co, and Se as a sparingly-soluble mineral, or could be applied to raise the groundwater pH to promote immobilization through sorption mechanisms. Additional evaluation required to determine likelihood to treat Li. |
| **Hydraulic Containment (pump- and-treat)** | Depending on the effluent management strategy, modifications to the existing NPDES permit may be required, or obtaining a new underground injection control (UIC) permit may be needed if groundwater reinjection is chosen. In addition, deed restrictions may be required as long as groundwater conditions are above regulatory standards for unrestricted use. | Above-ground treatment components may need to be present for an extended period of time, generating residuals requiring management and disposal. | Medium to high (depending on remedy duration, complexity of above-ground treatment system, and volume of water processed) | Not retained for further analysis. Hydraulic containment was screened out because it would provide little incremental reduction of the extent of arsenic, barium, cobalt and lithium above the GWPS, particularly since delineation for SSLs is completed on Site. However, pump and treat may be considered during adaptive management over the course of remedy implementation. |
| **Monitored Natural Attenuation (MNA)** | MNA may require the implementation of institutional controls, such as deed restrictions, to preclude potential exposure to groundwater within the footprint of impacted groundwater until GWPS are achieved. | Little to no physical disruption to remediation areas and no adverse construction-related impacts are expected on the surrounding community. | Low to medium | MNA is a suitable option at the Site for the following reasons: Concentrations of the target constituents showing SSLs are stable, decreasing, or are not increasing over time based on several years of monitoring data; Iso-concentration maps show the SSL constituents are well-defined and limited in extent; and dewatering and installation of closure-cover at the Site favors restoration of natural (pre-impoundment) groundwater flow. |
| **In-Situ Solidification / Stabilization (ISS)** | Deed restrictions may be necessary until groundwater concentrations are below GWPS. No other institutional requirements that may limit application of this technology are expected at this time. | Changes to groundwater chemistry relative to the mobility of Appendix IV constituents following completion of ISS, where large volumes of amendments (typically Portland cement) are added to the subsurface, are unknown and would require pilot testing. | Medium, depending on permeability of aquifer | Not retained for further analysis. AP-2 and 3/4 is currently undergoing a closure process that includes dewatering and consolidation of ash. Other retained options are more effective in addressing groundwater corrective action. |

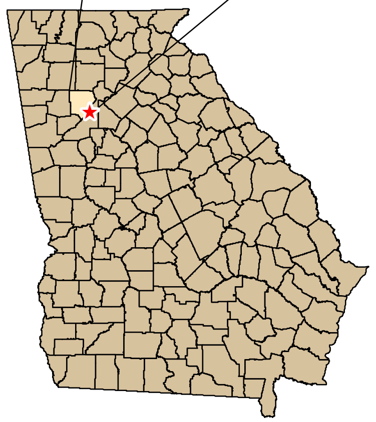
**TABLE 2**
**SUMMARY OF CORRECTIVE MEASURES SCREENING**
Georgia Power – Plant McDonough-Atkinson Ash Pond 2 and 3/4
Smyrna, Georgia

| Corrective Measure | REGULATORY CITATION FOR CRITERIA: 40 CFR 257.96(C)(1) | | | Corrective Measure Screening |
|---|---|---|---|---|
| | Institutional Requirements | Other Env. Or Public Health Requirements | Relative Costs | |
| **Permeable Reactive Barrier (PRB)** | Deed restrictions may be necessary for groundwater areas upgradient of the PRB (if not installed along the waste boundary). No other institutional requirements are expected at this time. | None expected at this point. Following installation, the remedy is passive. However, certain treatment media (such as ZVI) have the potential to mobilize naturally-occurring constituents downgradient of the PRB. | Medium to high (for installation) - minimal O&M requirements if replacement is not necessary | Not retained for further analysis; a PRB cannot treat groundwater downgradient of the constructable alignment; there is minimal space available downgradient of the impacted wells; potential for increased maintenance due to potential biofouling and mineral precipitation. Further, construction of a PRB is likely to impede or restrict restoration of natural groundwater flow across AP-3/4. |
| **Phyto Remediation (Phyto)** | No institutional requirements are expected at this time. | None expected at this point. Following installation, the remedy is passive and does not require external energy. | Medium (for installation) - minimal O&M requirements | Not retained for further analysis; In areas north and northeast of AP-3/4 limited space is available between the CCR unit boundary and the property boundary and combined with the presence of site utilities makes this alternative unfeasible in this area. For areas south of AP-3, pH is the driver for the elevated cobalt concentrations. Phytoremediation is not a feasible alternative to address low pH conditions. |
| **Subsurface Vertical Barrier Walls** | Deed restrictions may be necessary for groundwater areas downgradient of the barrier wall until remedial goals are met. No other institutional requirements are expected at this time. | Due to the need for groundwater extraction associated with barrier walls, above-ground treatment components may need to be present for an extended period of time, generating residuals requiring management and disposal. | Medium to high (depending on length and depth of wall, remedy duration and complexity of above-ground treatment system) | Not retained for further analysis. A SVBW cannot treat groundwater downgradient of the constructable alignment; there is minimal space available downgradient of the impacted wells. |

# Figures



REFERENCE

SERVICE LAYER CREDITS: COPYRIGHT:© 2013 NATIONAL GEOGRAPHIC SOCIETY, I-CUBED

0 0.5 1

1 INCH=0.5 MILES

CLIENT
GEORGIA POWER COMPANY
PLANT MCDONOUGH-ATKINSON

PROJECT
DRAFT REMEDY SELECTION REPORT
PLANT MCDONOUGH-ATKINSON ASH POND 2 AND 3/4

TITLE
SITE LOCATION MAP

| CONSULTANT | | |
|---|---|---|
| | YYYY-MM-DD | 2019-1-31 |
| | PREPARED | SEB |
| | DESIGN | SEB |
| | CHECKED | DP |
| | REVIEWED/APPROVED | RNQ |

| PROJECT No. | Rev. | FIGURE |
|---|---|---|
| 166849618 | 0 | 1 |

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


## LEGEND

- EXISTING CONTOURS (SEE REFERENCE 2)
- PROPERTY BOUNDARY (SEE REFERENCE 1)
- APPROXIMATE PRE-CLOSURE CCR LIMITS
- FINAL CLOSURE CCR LIMITS
- FINAL COVER SYSTEM LIMITS
- PERMIT BOUNDARY
- FUTURE BARRIER WALL OPTION A
- FUTURE BARRIER WALL OPTION B
- CROSS-SECTION LINES
- UPGRADIENT WELL (SEE REFERENCE 5)
- AP-1 MONITORING WELL (SEE REFERENCE 5)
- AP-2, 3/4 MONITORING WELL (SEE REFERENCE 5)
- ASSESSMENT WELLS (SEE REFERENCE 5 AND 7)
- PIEZOMETERS (SEE REFERENCE 5 AND 7)
- GOLDER BORINGS (SEE REFERENCE 6)
- P-1 P & W 1977 PIEZOMETERS (SEE REFERENCE 3)
- AP-1 AT&E 1981 BORINGS (SEE REFERENCE 4)
- SURFACE WATER MONITORING

## REFERENCES

1. APPROXIMATE PROPERTY BOUNDARY PROVIDED BY SOUTHERN COMPANY SERVICES (2017).
2. THE EXISTING TOPOGRAPHY, CONTOUR ELEVATIONS AND PHOTOGRAPHY FOR THE ASH PONDS 1 THROUGH 4 AREAS WERE PROVIDED BY GEORGIA POWER. THE DATE OF THE SURVEY PROVIDED AND SHOWN ON THIS SET OF PLANS, ON THE AP- 1 THROUGH 4, IS AUGUST 31, 2022. - DATE OF PHOTOGRAPHY AUGUST 31, 2022. THE TOPOGRAPHIC CONTOUR INTERVALS IS 1 FOOT.
THE EXISTING TOPOGRAPHY AND CONTOUR ELEVATIONS FOR THE SURROUNDING AREAS OF ASH PONDS 1 THROUGH 4 WERE PROVIDED BY GEORGIA LAND DEPARTMENT AND METRO ENGINEERING AND SURVEYING CO, INC. THE DATE OF THE SURVEY PROVIDED AND SHOWN ON THIS SET OF PLANS, AT THE SURROUNDING AREAS, IS 03-18-2018. REFER TO THE SURVEY DRAWING TITLED "TOPOGRAPHIC MAP PREPARED FOR GEORGIA POWER COMPANY PLANT MCDONOUGH - GEORGIA STATE PLANE WEST SURVEY FEET - DATE OF PHOTOGRAPHY 09-07-2018 FOR SURROUNDING AREAS OF ASH PONDS 1 THROUGH 4.
3. PATTERSON & DEWAR ENGINEERS, PIEZOMETER INSTALLATION REPORT (P&W, 1977).
4. ATLANTA TESTING AND ENGINEERING, GEOTECHNICAL REPORT (AT&E, 1981).
5. SCS PLANT MCDONOUGH HYDROGEOLOGICAL INVESTIGATION (2012 TO 2020).
6. GOLDER ASSOCIATES, PLANT MCDONOUGH SUPPLEMENTAL INVESTIGATION (2017-2021).
7. SELECT BORING/PIEZOMETER LOCATIONS AND ELEVATIONS RESURVEYED BY METRO ENGINEERING & SURVEYING CO., INC., 2020-2021.
8. COORDINATES SYSTEM: NAD 1983 STATE PLANE GEORGIA WEST (U.S. FEET); ELEVATIONS DISPLAY IN FEET REFERENCED TO NORTH AMERICAN VERTICAL DATUM 1988 ( FEET NAVD88).

0 300 600
1" = 300' FEET

CLIENT
GEORGIA POWER COMPANY
PLANT MCDONOUGH

Georgia Power

PROJECT
DRAFT REMEDY SELECTION REPORT
PLANT MCDONOUGH-ATKINSON ASH POND 2 AND 3/4

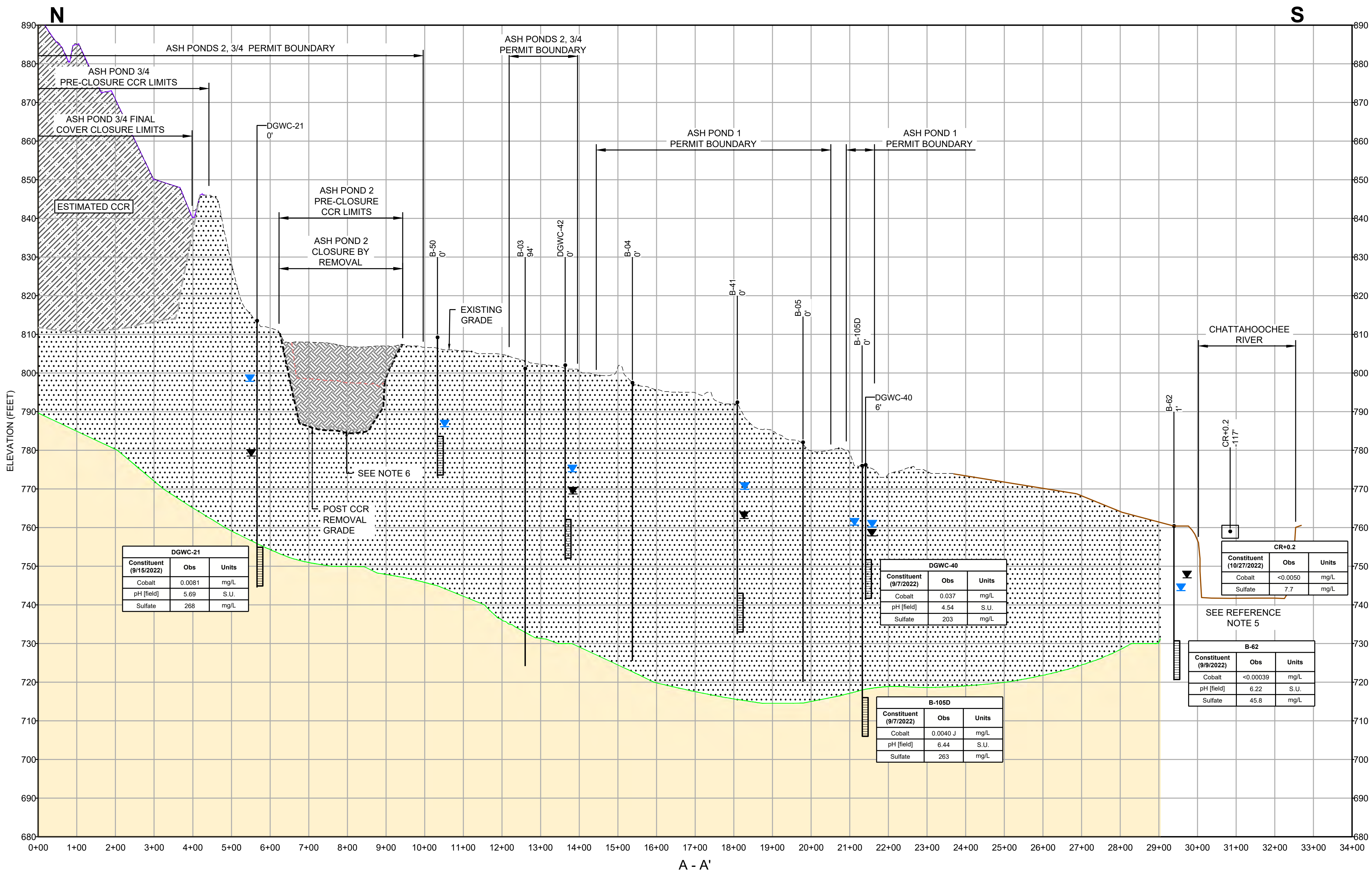
TITLE
**SITE PLAN, MONITORING WELL, ASSESSMENT WELL, PIEZOMETER, AND SURFACE WATER LOCATION MAP**

CONSULTANT
wsp

| | |
|---|---|
| YYYY-MM-DD | 2023-05-05 |
| DESIGNED | SEB |
| PREPARED | CRP |
| CHECKED | CAT |
| REVIEWED / APPROVED | GLH |

| PROJECT NO. | REV. | FIGURE |
|---|---|---|
| 1668499622 | - | 2 |

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI D



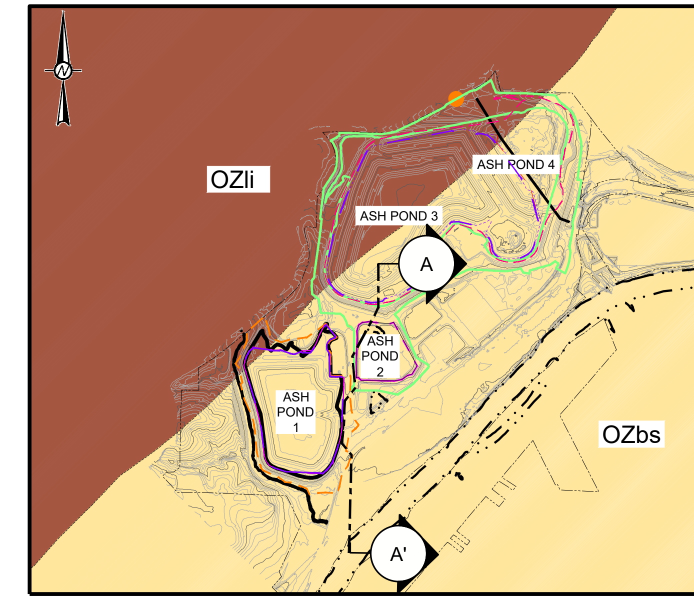

| DGWC-21 | | |
|---|---|---|
| Constituent (9/15/2022) | Obs | Units |
| Cobalt | 0.0081 | mg/L |
| pH [field] | 5.69 | S.U. |
| Sulfate | 268 | mg/L |

| DGWC-40 | | |
|---|---|---|
| Constituent (9/7/2022) | Obs | Units |
| Cobalt | 0.037 | mg/L |
| pH [field] | 4.54 | S.U. |
| Sulfate | 203 | mg/L |

| B-105D | | |
|---|---|---|
| Constituent (9/7/2022) | Obs | Units |
| Cobalt | 0.0040 J | mg/L |
| pH [field] | 6.44 | S.U. |
| Sulfate | 263 | mg/L |

| CR+0.2 | | |
|---|---|---|
| Constituent (10/27/2022) | Obs | Units |
| Cobalt | <0.0050 | mg/L |
| Sulfate | 7.7 | mg/L |

| B-62 | | |
|---|---|---|
| Constituent (9/9/2022) | Obs | Units |
| Cobalt | <0.00039 | mg/L |
| pH [field] | 6.22 | S.U. |
| Sulfate | 45.8 | mg/L |




KEY MAP

## LEGEND

- EXISTING GRADE (SEE REFERENCE 1)
- ESTIMATED TOP OF ROCK SURFACE
- PROPOSED FINAL GRADE
- ESTIMATED PRE-CLOSURE BOTTOM OF CCR LIMITS
- FINAL COVER SYSTEM
- ESTIMATED CCR TO REMAIN IN PLACE
- OVERBURDEN (COMPRISED OF RESIDUAL SOILS, TRANSITIONALLY WEATHERED ROCK, AND FILL)
- PHYLLONITE, BUTTON SCHIST, MYLONITE, AND MYLONITIC BIOTITE GNEISS (OZbs)
- BIOTITE GNEISS, LONG ISLAND CREEK GNEISS (OZli)
- ESTIMATED GROUNDWATER SURFACE (9/06/2022)
- PREDICTED POST-CLOSURE GROUNDWATER SURFACE

B-29
-144'
- BORING ID
- DISTANCE FROM CROSS-SECTION (FEET) (- REPRESENTS LEFT OF ALIGNMENT)
- GROUND SURFACE ELEVATION
- SCREEN INTERNAL

0 150 300
1" = 150' FEET
10X VERTICALLY EXAGGERATED

## NOTES

1. B-122D IS COMPLETED OUTSIDE THE FIGURE VIEW. B-122D IS COMPLETYED IN BIOTITE GNEISS WITH A SCREEN ELEVATION OF 707.52 - 697.52 FEET BGS.

## REFERENCES

1. THE EXISTING TOPOGRAPHY AND CONTOUR ELEVATIONS WERE PROVIDED BY GEORGIA POWER. THE DATE OF THE SURVEY PROVIDED AND SHOWN ON THIS SET OF PLANS IS AUGUST 31, 2022. GEORGIA STATE PLANE WEST SURVEY FEET.
2. BORING/WELL/PIEZOMETER LOCATIONS AND ELEVATIONS PROVIDED BY SOUTHERN COMPANY SERVICES, INC. AND 1968 LAW ENGINEERING GEOTECHNICAL INVESTIGATION REPORT.
3. GEOLOGIC UNITS TAKEN FROM PETROLOGIC SOLUTIONS GEOLOGIC MAPPING, OCTOBER 2016.
4. SELECT BORING/PIEZOMETER LOCATIONS AND ELEVATIONS SURVEYED AND/OR RESURVEYED BY METRO ENGINEERING & SURVEYING CO., INC., 2020 / 2021.
5. NO AVAILABLE SUBSURFACE GEOLOGIC DATA.
6. ESTIMATED PRE-CLOSURE BOTTOM OF CCR LIMITS FOR AP-2 GENERALLY FOLLOW 1 OR MORE FEET ABOVE POST REMOVAL GRADES.

CLIENT
GEORGIA POWER COMPANY
PLANT MCDONOUGH

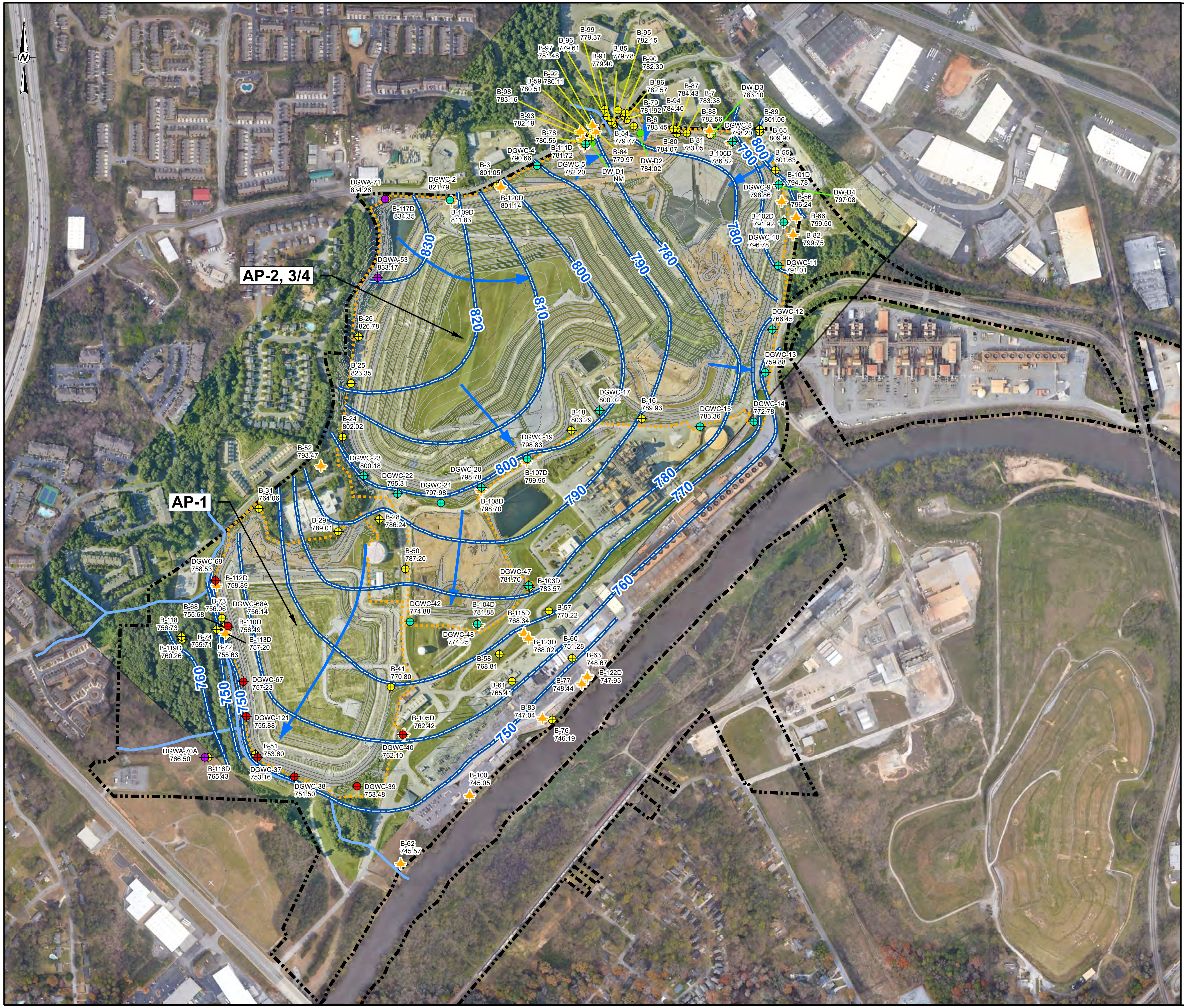
PROJECT
DRAFT REMEDY SELECTION REPORT
PLANT MCDONOUGH-ATKINSON ASH POND 2 AND 3/4

TITLE
GEOLOGIC CROSS SECTION SCHEMATIC A-A'

CONSULTANT

| | |
|---|---|
| YYYY-MM-DD | 2023-02-08 |
| DESIGNED | DLP |
| PREPARED | CRP |
| CHECKED | BAS |
| REVIEWED / APPROVED | DLP |

PROJECT NO. 1668499622
REV. -
SHEET 3




LEGEND

- AP-1 MONITORING WELL
- AP-2,3/4 MONITORING WELL
- UPGRADIENT WELL
- ASSESSMENT MONITORING WELLS
- PIEZOMETER
- AEM WELL
- GROUNDWATER SURFACE CONTOUR (FT-NAVD88)
- APPROXIMATE GROUNDWATER FLOW DIRECTION
- SURFACE WATER STREAM
- PERMIT BOUNDARY
- PROPERTY BOUNDARY
- EXISTING TOPOGRAPHY 10-FOOT CONTOUR
- EXISTING TOPOGRAPHY 2-FOOT CONTOUR

NOTES

1. ALL LOCATIONS AND BOUNDARIES ARE APPROXIMATE.
2. GROUNDWATER ELEVATION MEAUSREMENTS OBTAINED JANUARY 31, 2023 BY WSP.
3. GROUNDWATER ELEVATIONS DISPLAYED IN FEET REFERENCED TO NORTH AMERICAN VERTICAL DATUM (FT NAVD88).
4. WELLS AND PIEZOMETERS THAT CONTAIN A "D" DESIGNATION FOLLOWING THE NUMBER ARE DEEP WELLS AND ELEVATIONS ARE NOT USED FOR CONTOURING.
5. NM = NOT MEASURED.

REFERENCE

1. AERIAL IMAGE DATED NOVEMBER 2019 FROM GOOGLE EARTH AND AUGUST 31, 2022 PROVIDED BY GPC.
2. COORDINATE SYSTEM: NAD 1983 STATE PLANE GEORGIA WEST (U.S. FEET).
3. MONITORING WELL/PIEZOMETER LOCATIONS AND ELEVATIONS SURVEYED BY METRO ENGINEERING AND SURVEYING COMPANY IN AUGUST 2020 WITH ADDITIONAL SURVEY PROVIDED IN JANUARY 2021 AND MAY 2021.

0 600 1,200

1 IN= 600 FT

CLIENT
GEORGIA POWER COMPANY
PLANT MCDONOUGH-ATKINSON

Georgia Power

PROJECT
DRAFT REMEDY SELECTION REPORT
PLANT MCDONOUGH-ATKINSON ASH POND 2 AND 3/4

TITLE
SITE POTENTIOMETRIC MAP – JANUARY 31, 2023

CONSULTANT

wsp

| | |
|---|---|
| YYYY-MM-DD | 2023-02-20 |
| PREPARED | SEB |
| DESIGN | SEB |
| CHECKED | DLP |
| REVIEWED/APPROVED | RNQ |

PROJECT No. 166849622 Rev. 0 FIGURE 4


LEGEND

- AP-1 MONITORING WELL
- AP-2,3/4 MONITORING WELL
- UPGRADIENT WELL
- ASSESSMENT MONITORING WELLS
- PIEZOMETER
- SURFACE WATER MONITORING LOCATION
- TEMPORARY AEM WELL
- 0.01 ARSENIC GWPS ISOCONCENTRATION CONTOUR
- INFERRED POTENTIOMETRIC SURFACE CONTOUR (JAN 2023)
- PROPERTY BOUNDARY
- PERMIT BOUNDARY

NOTES

1. ALL LOCATIONS AND BOUNDARIES ARE APPROXIMATE
2. GROUNDWATER CONCENTRATIONS IN MILLIGRAMS PER LITER (MG/L). GWPS = GROUNDWATER PROTECTION STANDARD.
3. DATA SHOWN REPRESENT THE JANUARY 2023 SEMI-ANNUAL MONITORING EVENT RESULTS AS WELL AS APPLICABLE DELINEATION WELL DATA.
4. DEEP WELL ANALYTICAL RESULTS NOT USED FOR ISOCONCENTRATION CONTOURING.
5. POTENTIOMETRIC SURFACE DETERMINED USING JANUARY 2023 WATER LEVELS.

| Analyte | Units | GWPS |
|---|---|---|
| Arsenic | mg/L | 0.01 |

REFERENCE

1. AERIAL IMAGE DATED NOVEMBER 2019 FROM GOOGLE EARTH AND AUGUST 31, 2022 PROVIDED BY GPC.
2. COORDINATE SYSTEM: NAD 1983 STATE PLANE GEORGIA WEST (U.S. FEET).
3. MONITORING WELL/PIEZOMETER LOCATIONS AND ELEVATIONS SURVEYED BY METRO ENGINEERING AND SURVEYING COMPANY IN AUGUST 2020 WITH ADDITIONAL SURVEY PROVIDED IN JANUARY 2021 AND MAY 2021.

0 400 800

1 IN= 400 FT

CLIENT
GEORGIA POWER COMPANY
PLANT MCDONOUGH-ATKINSON

Georgia Power

PROJECT
DRAFT REMEDY SELECTION REPORT
PLANT MCDONOUGH ASH POND 2 AND 3/4

TITLE
ARSENIC ISOCONCENTRATION CONTOUR MAP - JANUARY 2023

CONSULTANT

wsp

| | |
|---|---|
| YYYY-MM-DD | 2023-04-04 |
| PREPARED | DJC |
| DESIGN | DLP |
| CHECKED | RNQ |
| REVIEWED/APPROVED | |

PROJECT No. 166849622 Rev. 0 FIGURE 5

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


LEGEND

- AP-1 MONITORING WELL
- AP-2,3/4 MONITORING WELL
- UPGRADIENT WELL
- ASSESSMENT MONITORING WELLS
- PIEZOMETER
- SURFACE WATER MONITORING LOCATION
- TEMPORARY AEM WELL
- 0.004 BERYLLIUM GWPS ISOCONCENTRATION CONTOUR
- INFERRED POTENTIOMETRIC SURFACE CONTOUR (JAN 2023)
- PROPERTY BOUNDARY
- PERMIT BOUNDARY

NOTES

1. ALL LOCATIONS AND BOUNDARIES ARE APPROXIMATE
2. GOUNDWATER CONCENTRATIONS IN MILLIGRAMS PER LITER (MG/L). GWPS = GROUNDWATER PROTECTION STANDARD.
3. DATA SHOWN REPRESENT THE JANUARY 2023 SEMI-ANNUAL MONITORING EVENT RESULTS AS WELL AS APPLICABLE DELINEATION WELL DATA.
4. DEEP WELL ANALYTICAL RESULTS NOT USED FOR ISOCONCENTRATION CONTOURING.
5. POTENTIOMETRIC SURFACE DETERMINED USING JANUARY 2023 WATER LEVELS.

| Analyte | Units | GWPS |
|---|---|---|
| Beryllium | mg/L | 0.004 |

REFERENCE

1. AERIAL IMAGE DATED NOVEMBER 2019 FROM GOOGLE EARTH AND AUGUST 31, 2022 PROVIDED BY GPC.
2. COORDINATE SYSTEM: NAD 1983 STATE PLANE GEORGIA WEST (U.S. FEET).
3. MONITORING WELL/PIEZOMETER LOCATIONS AND ELEVATIONS SURVEYED BY METRO ENGINEERING AND SURVEYING COMPANY IN AUGUST 2020 WITH ADDITIONAL SURVEY PROVIDED IN JANUARY 2021 AND MAY 2021.

0 600 1,200

1 IN= 600 FT

CLIENT
GEORGIA POWER COMPANY
PLANT MCDONOUGH-ATKINSON

PROJECT
DRAFT REMEDY SELECTION REPORT
PLANT MCDONOUGH-ATKINSON ASH POND 2 AND 3/4

TITLE
**BERYLLIUM ISOCONCENTRATION CONTOUR MAP - JANUARY 2023**

CONSULTANT

| | |
|---|---|
| YYYY-MM-DD | 2023-04-04 |
| PREPARED | DJC |
| DESIGN | BAS |
| CHECKED | DLP |
| REVIEWED/APPROVED | |

PROJECT No. 166849622 Rev. 0 FIGURE 6

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


## LEGEND

- AP-1 MONITORING WELL
- AP-2,3/4 MONITORING WELL
- UPGRADIENT WELL
- ASSESSMENT MONITORING WELLS
- PIEZOMETER
- SURFACE WATER MONITORING LOCATION
- TEMPORARY AEM WELL
- 0.0322 COBALT GWPS ISOCONCENTRATION CONTOUR
- COBALT GWPS ISOCONCENTRATION CONTOUR (INFERRED)
- INFERRED POTENTIOMETRIC SURFACE CONTOUR (JAN 2023)
- PROPERTY BOUNDARY
- PERMIT BOUNDARY

## NOTES

1. ALL LOCATIONS AND BOUNDARIES ARE APPROXIMATE
2. GOUNDWATER CONCENTRATIONS IN MILLIGRAMS PER LITER (MG/L). GWPS = GROUNDWATER PROTECTION STANDARD. RSL = (FEDERAL REGIONAL SCREENING LEVEL)
3. DATA SHOWN REPRESENT THE JANUARY 2023 SEMI-ANNUAL MONITORING EVENT RESULTS AS WELL AS APPLICABLE DELINEATION WELL DATA.
4. GWPS IS EQUAL TO SITE SPECIFIC BACKGROUND CONCENTRATION AS THERE IS NO MCL AND THE RSL IS BELOW SITE SPECIFIC BACKGROUND
5. DEEP WELL ANALYTICAL RESULTS NOT USED FOR ISOCONCENTRATION CONTOURING.
6. POTENTIOMETRIC SURFACE DETERMINED USING JANUARY 2023 WATER LEVELS.

| Analyte | Units | GWPS |
|---|---|---|
| Cobalt | mg/L | 0.0322 |

## REFERENCE

1. AERIAL IMAGE DATED NOVEMBER 2019 FROM GOOGLE EARTH AND AUGUST 31, 2022 PROVIDED BY GPC.
2. COORDINATE SYSTEM: NAD 1983 STATE PLANE GEORGIA WEST (U.S. FEET).
3. MONITORING WELL/PIEZOMETER LOCATIONS AND ELEVATIONS SURVEYED BY METRO ENGINEERING AND SURVEYING COMPANY IN AUGUST 2020 WITH ADDITIONAL SURVEY PROVIDED IN JANUARY 2021 AND MAY 2021.

0 600 1,200

1 IN= 600 FT

CLIENT
GEORGIA POWER COMPANY
PLANT MCDONOUGH-ATKINSON

Georgia Power

PROJECT
DRAFT REMEDY SELECTION REPORT
PLANT MCDONOUGH ASH POND 2 AND 3/4

TITLE
**COBALT ISOCONCENTRATION CONTOUR MAP - JANUARY 2023**

CONSULTANT

wsp

| | |
|---|---|
| YYYY-MM-DD | 2023-04-04 |
| PREPARED | DJC |
| DESIGN | BAS |
| CHECKED | DLP |
| REVIEWED/APPROVED | |

PROJECT No. 166849622 Rev. 0 FIGURE 7

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


## LEGEND

- AP-1 MONITORING WELL
- AP-2,3/4 MONITORING WELL
- UPGRADIENT WELL
- ASSESSMENT MONITORING WELLS
- PIEZOMETER
- SURFACE WATER MONITORING LOCATION
- TEMPORARY AEM WELL
- 0.04 LITHIUM GWPS ISOCONCENTRATION CONTOUR
- INFERRED POTENTIOMETRIC SURFACE CONTOUR (JAN 2023)
- PROPERTY BOUNDARY
- PERMIT BOUNDARY

## NOTES

1. ALL LOCATIONS AND BOUNDARIES ARE APPROXIMATE.
2. GOUNDWATER CONCENTRATIONS IN MILLIGRAMS PER LITER (MG/L). GWPS = GROUNDWATER PROTECTION STANDARD.
3. DATA SHOWN REPRESENT THE JANUARY 2023 SEMI-ANNUAL MONITORING EVENT RESULTS AS WELL AS APPLICABLE DELINEATION WELL DATA.
4. DEEP WELL ANALYTICAL RESULTS NOT USED FOR ISOCONCENTRATION CONTOURING.
5. POTENTIOMETRIC SURFACE DETERMINED USING JANUARY 2023 WATER LEVELS.

| Analyte | Units | GWPS |
|---|---|---|
| Lithium | mg/L | 0.04 |

## REFERENCE

1. AERIAL IMAGE DATED NOVEMBER 2019 FROM GOOGLE EARTH AND AUGUST 31, 2022 PROVIDED BY GPC.
2. COORDINATE SYSTEM: NAD 1983 STATE PLANE GEORGIA WEST (U.S. FEET).
3. MONITORING WELL/PIEZOMETER LOCATIONS AND ELEVATIONS SURVEYED BY METRO ENGINEERING AND SURVEYING COMPANY IN AUGUST 2020 WITH ADDITIONAL SURVEY PROVIDED IN JANUARY 2021 AND MAY 2021.

0 600 1,200

1 IN= 600 FT

CLIENT
GEORGIA POWER COMPANY
PLANT MCDONOUGH-ATKINSON

Georgia Power

PROJECT
DRAFT REMEDY SELECTION REPORT
PLANT MCDONOUGH ASH POND 2 AND 3/4

TITLE
**LITHIUM ISOCONCENTRATION CONTOUR MAP - JANUARY 2023**

CONSULTANT

wsp

| | |
|---|---|
| YYYY-MM-DD | 2023-04-04 |
| PREPARED | DJC |
| DESIGN | BAS |
| CHECKED | DLP |
| REVIEWED/APPROVED | |

PROJECT No. 166849622 Rev. 0 FIGURE 8


| Analyte | Units | GWPS |
|---|---|---|
| Arsenic | mg/L | 0.01 |
| Beryllium | mg/L | 0.004 |
| Cobalt | mg/L | 0.0322 |
| Lithium | mg/L | 0.04 |

**LEGEND**

- AP-1 MONITORING WELL
- AP-2,3/4 MONITORING WELL
- UPGRADIENT WELL
- ASSESSMENT MONITORING WELLS
- PIEZOMETER
- TEMPORARY AEM WELL
- SURFACE WATER MONITORING LOCATION
- STAFF GUAGE
- INFERRED POTENTIOMETRIC SURFACE CONTOUR (JAN 2023)
- PROPERTY BOUNDARY
- PERMIT BOUNDARY

**ISOCONCENTRATION CONTOUR**

- ARSENIC
- BERYLLIUM
- COBALT
- LITHIUM

**NOTES**

1. ALL LOCATIONS AND BOUNDARIES ARE APPROXIMATE.

**REFERENCE**

1. AERIAL IMAGE DATED NOVEMBER 2019 FROM GOOGLE EARTH AND AUGUST 31, 2022 PROVIDED BY GPC.
2. COORDINATE SYSTEM: NAD 1983 STATE PLANE GEORGIA WEST (U.S. FEET).
3. MONITORING WELL/PIEZOMETER LOCATIONS AND ELEVATIONS SURVEYED BY METRO ENGINEERING AND SURVEYING COMPANY IN AUGUST 2020 WITH ADDITIONAL SURVEY PROVIDED IN JANUARY 2021 AND MAY 2021.

0 600 1,200

1 IN= 600 FT

CLIENT
GEORGIA POWER COMPANY
PLANT MCDONOUGH-ATKINSON

Georgia Power

PROJECT
DRAFT REMEDY SELECTION REPORT
PLANT MCDONOUGH ASH POND 2 AND 3/4

TITLE
**CORRECTIVE MEASURE ALTERNATIVE 1: MNA**

CONSULTANT

| | |
|---|---|
| YYYY-MM-DD | 2023-03-31 |
| PREPARED | DJC |
| DESIGN | DLP |
| CHECKED | DLP |
| REVIEWED/APPROVED | RNQ |

PROJECT No. 166849622 Rev. 0 FIGURE 9

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


**LEGEND**

- AP-1 MONITORING WELL
- AP-2,3/4 MONITORING WELL
- UPGRADIENT WELL
- ASSESSMENT MONITORING WELLS
- PIEZOMETER
- DEWATERING WELL
- SURFACE WATER MONITORING LOCATION
- STAFF GUAGE
- PROPERTY BOUNDARY
- PERMIT BOUNDARY
- IN-SITU INJECTION TRANSECT (INJECTION POINTS 25-FOOT SPACING OVER 200 FEET)

**NOTES**

1. ALL LOCATIONS AND BOUNDARIES ARE APPROXIMATE.

**REFERENCE**

1. AERIAL IMAGE DATED NOVEMBER 2019 FROM GOOGLE EARTH AND AUGUST 31, 2022 PROVIDED BY GPC.
2. COORDINATE SYSTEM: NAD 1983 STATE PLANE GEORGIA WEST (U.S. FEET).
3. MONITORING WELL/PIEZOMETER LOCATIONS AND ELEVATIONS SURVEYED BY METRO ENGINEERING AND SURVEYING COMPANY IN AUGUST 2020 WITH ADDITIONAL SURVEY PROVIDED IN JANUARY 2021 AND MAY 2021.

0 600 1,200

1 IN= 600 FT

CLIENT
GEORGIA POWER COMPANY
PLANT MCDONOUGH-ATKINSON

Georgia Power

PROJECT
DRAFT REMEDY SELECTION REPORT
PLANT MCDONOUGH ASH POND 2 AND 3/4

TITLE
**CORRECTIVE MEASURE ALTERNATIVE 2: ISI**

| CONSULTANT | | |
|---|---|---|
| | YYYY-MM-DD | 2023-04-04 |
| | PREPARED | DJC |
| | DESIGN | DLP |
| | CHECKED | DP/RPK |
| | REVIEWED/APPROVED | RPK |

| PROJECT No. | Rev. | FIGURE |
|---|---|---|
| 166849622 | 0 | **10** |

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

**APPENDIX A**

# Geochemical Conceptual Site Model

**APPENDIX A**

# Geochemical Conceptual Site Model

*Plant McDonough-Atkinson Ash Ponds 2 and 3/4 (AP-2 and 3/4)*

Submitted to:

Georgia Power

241 Ralph McGill Boulevard
Atlanta, Georgia 30341

Submitted by:


**Golder Associates USA Inc.**

5170 Peachtree Road Building 100 Suite 300, Atlanta, Georgia, USA 30341

+1 770 496-1893


August 31, 2023

# Signature Page

**WSP USA Inc.**

PJ Nolan, Ph.D.
*Technical Principal- Geochemistry*

Todd Rees, Ph.D., PE (GA, NJ)
*Technical Fellow, Principal Engineer*

Rens Verburg, Ph.D.
*Technical Fellow, Principal Geochemist*

# Table of Contents

**1.0 INTRODUCTION** ..... 6

**2.0 BACKGROUND INFORMATION** ..... 6

2.1 Site Description ..... 6

2.2 Geologic and Hydrogeologic Setting ..... 6

2.3 Summary of SSLs ..... 7

**3.0 GEOCHEMICAL CONCEPTUAL SITE MODEL** ..... 8

3.1 Groundwater Composition ..... 8

3.1.1 pH and Redox ..... 8

3.1.2 Major Ion Chemistry ..... 9

3.1.3 Groundwater Quality Trends ..... 9

3.2 Porewater Composition ..... 10

3.3 Arsenic ..... 10

3.4 Beryllium ..... 11

3.5 Cobalt ..... 11

3.6 Lithium ..... 12

3.7 Selenium ..... 12

3.8 Site Mineralogy ..... 13

3.9 Sequential Extraction ..... 13

3.10 Mineral Stability ..... 17

3.11 Total Organic Carbon ..... 18

3.11.1 Cation Exchange Capacity ..... 18

**4.0 ARSENIC TRANSPORT AT AP-2 AND 3/4** ..... 19

**5.0 BERYLLIUM TRANSPORT AT AP-2 AND 3/4** ..... 19

**6.0 COBALT TRANSPORT AT AP-2 AND 3/4** ..... 20

**7.0 LITHIUM TRANSPORT AT AP-2 AND 3/4** ..... 20

**8.0 SELENIUM TRANSPORT AT AP-2 AND 3/4** ..... 20

**9.0 GCSM SUMMARY** .......... **21**

**10.0 REFERENCES** .......... **22**

# Tables

Table 1 Sequential Extraction Results

Table 2 Saturation Index Calculation Results

# Figures

Figure 1a Monitoring Well, Piezometer and Surface Water Location Map

Figure 1b (Inset) Monitoring Well, Piezometer and Surface Water Location Map

Figure 2 Soil and Porewater Sampling

Figure 3 Geologic Cross Section Schematic A-A’

Figure 4 pH of Groundwater at AP-2 and 3/4 Monitoring Wells

Figure 5 ORP of Groundwater at AP-2 and 3/4 Monitoring Wells

Figure 6 Pourbaix Plot of Wells with SSLs

Figure 7a Dissolved Oxygen in Groundwater at AP-2 and 3/4 Monitoring Wells

Figure 7b Dissolved Oxygen in Groundwater at AP-2 and 3/4 Monitoring Wells

Figure 8 AP-2 and 3/4 Monitoring Network Piper Diagram

Figure 9a Sulfate in Groundwater at AP-2 and 3/4 Monitoring Wells

Figure 9b Sulfate in Groundwater at AP-2 and 3/4 Monitoring Wells

Figure 10 Boron in Groundwater at AP-2 and 3/4 Monitoring Wells

Figure 11 TDS in Groundwater at AP-2 and 3/4 Monitoring Wells

Figure 12 Arsenic in Groundwater at AP-2 and 3/4 at SSL and Background Wells

Figure 13 DGWC-9 Arsenic Pourbaix Diagram

Figure 14 Beryllium in Groundwater at AP-2 and 3/4 at SSL and Background Wells

Figure 15 pH vs Beryllium at AP-2 and 3/4

Figure 16 AP-2 and 3/4 Beryllium Pourbaix Diagram

| | |
|---|---|
| Figure 17 | pH vs. Cobalt at AP-2 and 3/4 |
| Figure 18a | Cobalt in Groundwater at AP-2 and 3/4 at Some SSL Wells |
| Figure 18b | Cobalt in Groundwater at AP-2 and 3/4 at Some SSL and Background Wells |
| Figure 19 | Lithium in Groundwater at AP-2 and 3/4 SSL Wells |
| Figure 20 | Pourbaix Diagram of Wells with a Lithium SSL |
| Figure 21 | Selenium in Groundwater at DGWC-9 and Background Wells |
| Figure 22 | DGWC-9 Selenium Pourbaix Diagram |
| Figure 23a | Mineralogy of Overburden at AP-2 and 3/4 |
| Figure 23b | Mineralogy of Overburden at AP-2 and 3/4 |
| Figure 23c | Mineralogy of Overburden at AP-2 and 3/4 |
| Figure 23d | Mineralogy of Overburden at AP-2 and 3/4 |
| Figure 24 | Mineralogy of Partially Weathered Bedrock at AP-2 and 3/4 |
| Figure 25 | Mineralogy of Bedrock at AP-2 and 3/4 |
| Figure 26 | Arsenic Sequential Extraction at AP-2 and 3/4 |
| Figure 27 | Beryllium Sequential Extraction at AP-2 and 3/4 |
| Figure 28 | Cobalt Sequential Extraction at AP-2 and 3/4 |
| Figure 29 | Lithium Sequential Extraction at AP-2 and 3/4 |
| Figure 30 | Selenium Sequential Extraction at AP-2 and 3/4 |
| Figure 31 | Iron Sequential Extraction at AP-2 and 3/4 |
| Figure 32 | Manganese Sequential Extraction at AP-2 and 3/4 |
| Figure 33 | Aluminium Sequential Extraction at AP-2 and 3/4 |
| Figure 34 | AP-2 and 3/4 Total Arsenic in Overburden, PWR, and Bedrock |
| Figure 35 | AP-2 and 3/4 Total Beryllium in Overburden, PWR, and Bedrock |
| Figure 36 | AP-2 and 3/4 Total Cobalt in Overburden, PWR, and Bedrock |
| Figure 37 | AP-2 and 3/4 Total Lithium in Overburden, PWR, and Bedrock |
| Figure 38 | AP-2 and 3/4 Total Selenium in Overburden, PWR, and Bedrock |
| Figure 39 | Total Organic Carbon in Overburden and Bedrock at AP-2 and 3/4 |
| Figure 40 | Cation Exchange Capacity of Overburden and Bedrock at AP-2 and 3/4 |

# Appendices


Appendix A Historical Groundwater Quality Data

Appendix B Total Metals Laboratory Results

Appendix C XRD Results

Appendix D Sequential Extraction Results

Appendix E Treatability Study Results

Appendix F Multivariate Statistical Analyses

# 1.0 INTRODUCTION

In accordance with the United States Environmental Protection Agency (US EPA) coal combustion residuals (CCR) Rule [40 Code of Federal Regulations (CFR) 257 Subpart D] and the Georgia (GA) Environmental Protection Division (EPD) Rules for Solid Waste Management 391-3-4.10, this *Geochemical Conceptual Site Model* (CSM) was prepared to document groundwater quality at Georgia Power Company (Georgia Power)'s Plant McDonough-Atkinson Ash Pond 2 and AP-3/4 (AP-2 and 3/4). Data summarized in this report are intended to support remedy selection and fate and transport modelling for AP-2 and 3/4. The geochemical data evaluated as part of this effort were obtained as part of the Assessment of Corrective Measures (ACM) for AP-2 and 3/4.

The assessment presented in this report includes:

- An evaluation of general conditions (aquifer matrix composition, pH and redox conditions, major ion chemistry, general mineralogy, and major groundwater constituent trends); and
- Geochemical evaluation of arsenic, beryllium, cobalt, lithium, and selenium (speciation, mineralogy, advanced geochemical interpretation, and sorption).

The data presented in this report were collected from 2016 to September 2022. Activities completed at Plant McDonough's Ash Pond 1 are reported under separate cover. Because of the proximity of AP-2 and 3/4 to AP-1, some of the data and interpretations are reported in both reports to provide a comprehensive, site-wide narrative of groundwater conditions and constituent fate and transport.

# 2.0 BACKGROUND INFORMATION

Plant McDonough-Atkinson (Plant McDonough, Site), formerly a coal-fired power generating facility, was converted to a natural gas combined-cycle power generating facility in 2011. Located approximately seven miles northwest of Atlanta in southeast Cobb County (5551 South Cobb Dr SE, Smyrna, GA 30080), the property comprises approximately 390 acres and is bounded on the southeast by the Chattahoochee River.

## 2.1 Site Description

Four CCR surface impoundments have received CCR at Plant McDonough: Ash Pond 1 (AP-1), Ash Pond 2 (AP-2), Ash Pond 3 (AP-3) and Ash Pond 4 (AP-4). A notification of intent to close AP-1 was certified on December 7, 2015. AP-2 has been certified closed by removal as of March 30, 2020. CCR from AP-2 has been placed within the AP-3 footprint. AP-3 and AP-4 have historically operated together and are being closed as a Combined Unit (AP-3/4). AP-4 has been consolidated within the AP-3 footprint and closed in place. Final closure of AP-3/4 is substantially complete and is anticipated to be certified closed in 2023.

## 2.2 Geologic and Hydrogeologic Setting

Geologic and hydrogeologic conditions for this Site are described in detail in the *Hydrogeological Assessment Report* (HAR; Golder 2022). Key elements of the HAR are summarized on cross sections presented as transects through the SSL well locations. Figures 1 and 2 present a site plan showing well and piezometer locations. Figure 3 presents a subsurface geologic cross section through the relevant transect.

Based on review of site data, residual soils, primarily clayey/sandy silt, sandy silt with clay, and silty sand, occur as a blanket of variable thickness overlying bedrock across most of the Site. Saprolitic soils and/or saprolitic rock also range in thickness across the Site but are generally encountered at or near ground surface. Saprolitic rock is considered to include transitionally weathered rock (TWR) or partially weathered rock (PWR). Material overlying the top of the rock surface, including residual soils, saprolite, and TWR or PWR, is collectively referred to as "overburden."

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

A regional, unconfined aquifer system is present at the Site, consisting of regolith, TWR, and shallow bedrock. Preferential groundwater flow is anticipated to take place along lineaments and discontinuities. This unconfined, surficial aquifer system is recharged primarily through precipitation and subsequent infiltration, and flow is generally controlled by topography and surface water drainage and occurs mainly through intergranular pore spaces. The saturated soils in the regolith function as the principal storage reservoir for groundwater in the bedrock.

Localized groundwater flow directions in the Site aquifer are influenced by topographic and top of rock variations as well as recent closure activities, including localized dewatering. AP-3/4 is on a topographic high, initially creating radial flow around the ponds, with the exception of the one upland high upgradient (northwest) of AP-3/4. Dewatering at AP-4 is creating an inward gradient, restoring the pre-impoundment southward groundwater flow pattern in the northeast portion AP-3/4 that is expected to continue in the future, corresponding to the higher topographic elevations in that area following closure. Groundwater occurs in a fracture network that is largely dependent on rock type, degree of differential weathering, topography, and area of catchment. Groundwater flow in the underlying bedrock takes place primarily along discontinuities such as compositional layering, foliation, joints, and fractures. Fracture porosity is minimum compared to the regolith, and thus, groundwater flow is determined by how well the fractures are inter-connected. Further, fractures within the bedrock at the Site are not well connected and the predominant groundwater flow at the Site occurs in the overburden and upper bedrock at the Site. Based on site-specific examples and supporting data, as presented in the HAR, fractures within the bedrock are limited and decrease in number and groundwater production with depth.

## 2.3 Summary of SSLs

Analytical results from routine monitoring events have been statistically analyzed in accordance with the Site's certified statistical analysis method. Following the February 2023 sampling event, statistical analyses indicate statistically significant levels (SSLs) of Appendix IV constituents above the groundwater protection standards (GWPS) as summarized below.

| Appendix IV Constituent | SSLs[1] |
|---|---|
| Arsenic | DGWC-9 |
| Beryllium | DGWC-5, DGWC-9, DGWC-10, DGWC-47, DGWC-48, B-92, B-93 |
| Cobalt | DGWC-8, DGWC-9, DGWC-10, DGWC-19, DGWC-20, DGWC-47, DGWC-48, B-56, B-63, B-92, B-93, B-104D |
| Lithium | DGWC-47, DGWC-48, B-104D, B-120D |

| Appendix IV Constituent | SSLs[1] |
|---|---|
| Combined Radium[2] | B-104D, B-109D |
| Selenium[3] | DGWC-9 |

Note:

[1] An SSL is determined by comparing the confidence interval to the GWPS. Under current EPD rules, the GWPS is: (i) the MCL or RSL, or (ii) background levels for constituents where the background level is higher than the MCL or RSL.

[2] Combined Radium is not addressed in this remedy selection report; an Alternate Source Demonstration (ASD) for combined radium has been submitted to the GA EPD and approved by GA EPD on June 15, 2023.

[3] Selenium is no longer an SSL. However, because the upper confidence limit remains above the GWPS, Georgia Power will continue to evaluate corrective measures alternatives.

# 3.0 GEOCHEMICAL CONCEPTUAL SITE MODEL

This section summarizes the results from groundwater, porewater, and aquifer solids sampling. In addition, the data evaluations conducted at the Site to develop the current geochemical CSM are described.

Groundwater quality data between 2016 and 2022 as well as porewater samples from AP-2 and 3/4 were evaluated as part of this CSM. In addition, solids samples were evaluated from across the site. The following lithologies were included in the investigation:

- Saprolite/Overburden
- Partially Weathered Rock/Transitionally Weathered Rock (used interchangeably as PWR/TWR)
- Gneiss and Biotite Gneiss (collectively referred to as Bedrock)

Site groundwater quality data collected at the Site since 2016 are summarized in Appendix A. Analytical data reports have been submitted with Annual and Semi-Annual groundwater monitoring reports and are not included in this report. A summary of the overburden, transitional weathered rock (PWR/TWR) and bedrock samples subjected to various analytical techniques is presented on Figure 2. Analytical data for Total Metals Laboratory Results, XRD Results, and Sequential Extraction Results are included as Appendix B, Appendix C and Appendix D, respectively. Appendices E and F contain the results of treatability testing and additional multivariate statistical analyses, respectively.

## 3.1 Groundwater Composition

### 3.1.1 pH and Redox

Since September 2016, the pH and redox of groundwater in background and SSL wells at AP-2 and 3/4 has ranged from 5.4 to 6.7 and 3.6 to 6.6 (as field pH in standard units [SU]; Figure 4), respectively, and -105 to +712 mV and -89 to +372 mV, respectively (reported as field Oxidation Reduction Potential [ORP]; Figure 5), in fifteen wells showing SSLs and three upgradient wells. Over the previous seven years of monitoring, the pH of groundwater in individual wells has remained relatively stable (at the time of sample collection); however, there is considerable variability between sampling events, reflecting variations in groundwater flow due to seasons and closure activities. The variations in ORP are more pronounced, as expected, due to the inherent nature of measurement of redox potential in the field. Wells DGWC-5 and DGWC-19 show a statistically increasing pH.

In terms of pH, except for well B-104D, all monitoring wells showing SSLs, DGWC-5, DGWC-8, DGWC-9, DGWC-10, DGWC-19, DGWC-20, DGWC-47, DGWC-48, B-56, B-63, and B-93 are distinctive from all other monitoring wells at AP-2 and 3/4, with a pH generally less than 5.5 as of the most recent sampling (September 2022; background wells DGWA-53, DGWA-70A, and DGWA-71 are shown on figures for contrast). Generally, this lower pH has led to wells falling on a Pourbaix plot in or close to the zone where ferrous iron would predominate (Figure 6). An exception to this is DGWC-5 and B-93, where ferric iron is expected to be predominant due to more oxidizing conditions (this is in agreement with field sampling for iron (total) which was non-detect on multiple occasions). Notably, the pH of groundwater at DGWC-9 as of the last sampling was 4.0, the lowest observed on site.

Variations in redox conditions between sampling events are attributed to the nature of the ORP field probes and measurements rather than actual major changes in groundwater conditions (as supported by the returns to baseline values between sampling events and lack of change of other indicator parameters such as ferrous iron, which would indicate a reducing condition and cause a metals release). This can also be seen in dissolved oxygen (DO) levels measured across sampling events, where there is high variability in measurements, but no definitive trends emerge (Figure 7a and 7b; *Note: Figures showing DO concentrations from AP-2 and 3/4 for SSL and background wells are separated by general concentration ranges for clarity*). Nonetheless, a couple downgradient wells (DGWC-9 and DGWC-10) ) shown in Figure 7a report DO levels that are indicative of oxidizing conditions, attributed to dewatering and closure activities. In contrast, most of the downgradient wells shown in Figure 7b report DO levels <0.5 mg/L, reflecting reducing conditions. The redox status of groundwater affects the occurrence and remediation of specific constituents in groundwater, similar to groundwater pH.

In conclusion, generally moderately to slightly acidic conditions likely affect the mobility of CCR Rule metal concentrations in groundwater in the AP-2 and 3/4 network, as described in more detail in the remainder of this document.

### 3.1.2 Major Ion Chemistry

Based on major ion abundance, groundwater in the downgradient monitoring well network at AP-2 and 3/4 can be generally characterized as being of the calcium sulfate type, with a few exceptions (Figure 8). Groundwater at background monitoring wells DGWA-53 and DGWA-70A, and DGWA-71 is of the calcium bicarbonate, and sodium bicarbonate type, respectively. Generally, the overall major ion chemistry of wells where arsenic, beryllium, cobalt, lithium, and selenium have been identified at an SSL is consistent historically, with no major changes since October 2019.

### 3.1.3 Groundwater Quality Trends

Overall, the concentrations of non-SSL parameters in groundwater at the AP-2 and 3/4 monitoring well network have demonstrated a generally stable or slightly decreasing trend. Sulfate has shown distinctly decreasing trends in concentrations at all wells in the AP-2 and 3/4 network, with all but one monitoring well exhibiting sulfate levels less than 500 mg/L during the last sampling event (Figure 9a and 9b). Dissolved sulfide was present above detection limits (0.2 mg/L) in groundwater only at DGWC-11 in the AP-2 and 3/4 monitoring network and was measured at 2 mg/L, indicating the potential presence of localized reducing conditions.

Boron concentrations in groundwater at the AP-2 and 3/4 monitoring network have also been relatively stable or decreasing since August 2016 at SSL wells (Figure 10). Relatively stable concentrations are noted in upgradient wells and in wells near the AP-2 area where removal of CCR occurred in 2015. Monitoring well DGWC-8 shows higher variability in boron concentration trends, possibly due to its location, which is near the surface water inflow from offsite and its proximity to active dewatering of AP-4, resulting in a change in gradient east of AP-3/4 where groundwater is flowing towards AP-4.

The total dissolved solids (TDS) content of groundwater in the AP-2 and 3/4 monitoring network has been stable or decreasing in most wells. Background well DGWA-70A reports the lowest TDS concentrations (ranging from 25 to 88 mg/L since May 2017; Figure 11). Generally, all the wells in the network have had a TDS less than 900 mg/L since December 2016, with the exception of DGWC-4. Thus, the TDS values at wells in the monitoring network indicate no substantial changes due to potential new releases from the CCR unit.

## 3.2 Porewater Composition

Porewater at AP-3/4 was sampled in December 2019 at one piezometer, AE-3. Porewater data are presented in Appendix B. Based on the analytical results, the concentration of boron, a CCR indicator parameter, was 2.6 mg/L, calcium was 183 mg/L, and sulfate was 376 mg/L. The pH of porewater was 6.93 and the ORP was measured at +241.5 mV. Dissolved sulfide was present at 0.46 mg/L. Ferrous iron was below detection limits (0.2 mg/L) and total iron was present in the sample (2.2 mg/L). Arsenic was measured at 1.6 mg/L, beryllium was below detection limits (0.000074 mg/L), cobalt was measured at 0.000087 mg/L (J flagged), lithium was present at 0.18 mg/L, and selenium was measured at 0.0021 mg/L (J flagged).

In summary, arsenic was the only constituent that occurred at concentrations exceeding the reporting limits in porewater, compared to constituents showing SSL in downgradient groundwater. Beryllium, cobalt, and selenium concentrations in downgradient groundwater are much higher than their concentrations in AE-3 porewater. Lithium levels in porewater are similar to the range of levels measured in downgradient wells.

## 3.3 Arsenic

In groundwater, arsenic is mostly present in two valence states, as arsenite species with the valence state $As^{+3}$, and as arsenate species with the valence state of $As^{+5}$ (Hem 1985). The arsenite species have a lower affinity for sorption (attenuation) on metal (hydr)oxide surfaces than arsenate and are generally regarded to be more mobile in natural environments (Nordstrom et al. 2014; Smith and Huyck 1999). Arsenic naturally occurs across the US in soils at average concentrations from 1.5 mg/kg to 4.6 mg/kg, but up to 10.6 mg/kg in shales or clays (Li 2000; Taylor and Mclennan 1985). Under oxidizing conditions, arsenic is ten times less mobile at a pH range 5 to 9 than at high (>9) or low (<5) pH due to desorption from metal surfaces because of changes in surface charge or sorbent dissolution (Strenge and Peterson, 1989). At low pH (<5), arsenic will desorb, becoming mobile in groundwater when sorbents such as ferrihydrite are dissolved (Nordstrom et al. 2014). The sorption of arsenic onto ferrihydrite under varying pH and redox conditions (Dzombak and Morel 1990; Schwertmann 1988) and gibbsite (Karamalidis and Dzombak 2010) has been well studied, as well as arsenic adsorption onto clay minerals (Manning and Goldberg 1996). Arsenic precipitation as a sulfide mineral is also a well-established attenuation mechanism but typically requires highly reducing conditions and the presence of sufficient sulfur (Nordstrom and Alpers 1999; Nordstrom et al. 2014). Thus, arsenic geochemistry is controlled by the availability of a natural (or anthropogenic) source and the pH and redox conditions in the aquifer, with increased mobility at alkaline and acidic pH and reducing conditions, and increased attenuation at circum-neutral pH and variable (fluctuating) redox conditions.

Arsenic is an SSL at well DGWC-9 and the levels in groundwater have been highly variable since December 2016, ranging from 0.015 to 0.040 mg/L (Figure 12). The highest arsenic levels were reported during two sampling events in February 2018 and September 2020. These large fluctuations in arsenic do not correspond to an increase in other CCR indicator parameters. Well DGWC-9 is located near the northeast of AP-4, where dewatering of AP-4 since 2019 has decreased groundwater elevations in monitoring wells in that area (Figure 1), and there is a reversal of gradient such that groundwater flow is towards AP-4, in contrast to groundwater flow that was outward during pond operation. Thus, fluctuations of arsenic levels in DGWC-9 since 2019 may be attributed to closure activities in the vicinity. As of the most recent sampling event (September 2022), arsenic at DGWC-9 was just over the GWPS (0.01 mg/L) and was measured at 0.016 mg/L. It is noteworthy that arsenic concentrations in DGWC-9 are 100 times lower than the porewater arsenic concentration. If AP-4 is considered as a possible arsenic source, this represents significant attenuation of arsenic in the aquifer." Based on the pH and ORP of groundwater at well DGWC-9, arsenic is most likely predominantly present in the oxidized form of arsenate and complexed as the $H_2AsO_4^-$ ion and well within the ferrous iron zone (Figure 13). Speciation analysis of arsenic at this well has not been conducted but based on the Pourbaix diagram, increases in pH and/or establishment of more oxidizing conditions should lead to more effective arsenic attenuation. Arsenic is not at an SSL at any other well in the AP-2 and 3/4 monitoring network.

## 3.4 Beryllium

Beryllium is an alkaline earth metal found in soils at an average concentration of 0.55 to 0.68 mg/kg and at higher concentrations in some rock types (up to 5 mg/kg; Smith and Huyck 1999). Beryllium typically occurs in groundwater as the divalent cation $Be^{+2}$ when not complexed with other ligands, such as under low-pH conditions (Hem 1985). Beryllium is ten times less mobile over the pH range of 5 to 9 than at higher or lower pH (Strenge and Peterson 1989). Beryllium is also known to co-precipitate with iron hydroxides [$Fe(OH)_3$] under semi-alkaline conditions. Naturally occurring beryllium is typically strongly adsorbed in soils to the metal hydroxides (Smith 1999). However, as soil acidification occurs, beryllium may be released, similar to other trace elements, from adsorptive surfaces or through the direct dissolution of metal hydroxides. Arguably the most important mechanisms reducing beryllium concentrations in groundwater are co-precipitation with ferrihydrite or iron hydroxides or by adsorption on ferrihydrite or other metal hydroxide surfaces (Smith 1999).

Beryllium is an SSL at multiple wells in the AP-2 and 3/4 monitoring network. At all wells where beryllium has been measured at an SSL, its concentration has been steadily decreasing or remaining steady, with the exception of B-93 (Figure 14). In addition, at all wells, beryllium in groundwater is closely correlated with low-pH groundwater in the well network as the pH in all of these wells as of September 2022 was less than 5.5 (Figure 15). Beryllium in porewater at AP-3/4 is well below the concentrations measured in the wells. As such, the observed beryllium concentrations in the monitoring network may be the result of acidification of groundwater, possibly due to oxidation of sulfide minerals and release of naturally occurring beryllium, as identified by SEP (Section 3.1; Section 3.9, respectively). Based on field Eh-pH data, beryllium is expected to be present in groundwater predominately as the divalent cation $Be^{+2}$ (Figure 16).

## 3.5 Cobalt

Cobalt is typically present in groundwater in the divalent cation form $Co^{2+}$ (Takeno 2005). Naturally occurring cobalt in U.S. soils is present at an average concentration of 6.7 mg/kg (Shacklette and Boerngen 1984). Cobalt may occur in mineral form as carbonates or hydroxides (Hem 1985; Nordstrom and Alpers 1999). During weathering of these minerals (i.e., dissolution and/or oxidation), any cobalt is typically released and redistributed to iron or manganese (hydr)oxides (Butt et al. 2000) or other sorbents (e.g., clays, organic matter; Uddin 2017). The adsorption of cobalt to ferrihydrite, the direct incorporation of cobalt into precipitated iron hydroxides, and the adsorption of cobalt by gibbsite and manganese dioxides are well documented (e.g., Dzombak and Morel 1990, Karamalidis and Dzombak 2010; Smith1999; Tonkin et al. 2004). Cobalt attenuation is greater at a pH range of 5 to 9 than at lower or higher pH (Strenge and Peterson 1989). Cobalt in groundwater above average levels is commonly associated with low pH, where the dissolution of iron oxyhydroxides promotes the release of cobalt (Smith 1999).

Cobalt is an SSL at multiple wells in the AP-2 and 3/4 network and is also closely linked to groundwater pH, similar to beryllium (Figure 17). Figure 17 shows that elevated cobalt concentrations occur at pH < 5.5 in most samples. Cobalt levels at wells with SSLs have been steady or decreasing with the exception of wells DGWC-9 and DGWC-20 (Figure 18a and Figure 18b). The pH of groundwater at wells DGWC-9 and DGWC-20 has ranged from 3.68 to 4.23 and 4.22 to 4.71, respectively, since September 2016. Well DGWC-20 has shown the most variability, with cobalt levels increasing by up to 0.50 mg/L between sampling events. DGWC-8 has shown a steadily decreasing trend in cobalt, with cobalt concentrations in the recent sampling events (three) being below the GWPS. Cobalt in porewater at AP-3/4 is well below the concentrations measured in wells (Section 3.2). Elevated cobalt in wells is likely closely correlated with the relatively low pH of groundwater at multiple wells across the monitoring network (as compared to the non-SSL wells shown in blue; Figure 17). Cobalt concentrations at DGWA-53 (a background well) have also been intermittently elevated historically; however, these excursions are related to ash pond closure activities and ash consolidation when high TDS levels were also measured due to engineering work was being completed adjacent to the well.

## 3.6 Lithium

Lithium occurs naturally in the environment in soils typically at a range of 20 to 30 mg/kg. Lithium-bearing minerals are commonly found in pegmatites and lithium frequently replaces magnesium in some minerals (Hem 1985; Prodromou 2016). In the environment, under most conditions, lithium will be found in groundwater as the monovalent cationic form $Li^+$ (Takeno 2005). The common ion-exchange minerals do not strongly adsorb lithium; thus, lithium in the environment is typically highly mobile and tends to stay dissolved (Hem 1985). However, lithium adsorption on both iron hydroxides (Dzombak and Morel 1990) and on gibbsite (Karamalidis and Dzombak 2011), while minimal under most groundwater conditions, has been well established. Recent studies further suggest that lithium attenuation by amorphous $Al(OH)_3$ is 11 to 45 times more effective than that of the crystalized form of $Al(OH)_3$, gibbsite (Prodromou 2016). Thus, chemical mechanisms exist for attenuation of lithium in groundwater.

The lithium levels in groundwater at wells with SSLs have ranged from 0.036 to 0.144 since September 2016 (Figure 19). Lithium concentrations have shown a steady decreasing trend across the two SSL wells since then. Lithium is expected to be present in groundwater predominately as the divalent cation $Li^+$ (Figure 20). Lithium is commonly considered a conservative tracer of CCR, but only DGWC-47, DGWC-48, B-104D, and B-120D report lithium SSLs. Notably, where concentrations of other CCR tracers such as sulfate (B-93) and boron (DGWC-21) are at their highest levels, lithium is not. Thus, the occurrence of lithium in wells DGWC-47 and DGWC-48 appears to be related to site conditions near these wells at AP-2, including low pH. Lithium levels in AP-3/4 porewater are similar to the range of levels measured in downgradient wells.

## 3.7 Selenium

Selenium is found in soils across the United States at a range of <0.1 to 4.3 mg/kg and in rock at an average concentration of 0.05 mg/kg (Smith and Hyuck 1999). Selenium valence state and complexation are very sensitive to both pH and redox conditions, with selenium commonly found as $SeO_4^{-2}$, as $Se^{+6}$, as $HSeO_3^-$ or $SeO_3^{-2}$ as $Se^{+4}$, or $HSe^-$ as $Se^{-2}$ (Takeno 2005). Selenium can precipitate as selenium metal or, under oxidizing conditions, it can adsorb to iron oxyhydroxides. Attenuation of selenium on gibbsite is generally limited to selenate [$SeO_4^{-2}$], and attenuation of selenium in all redox states decreases rapidly at pH values greater than 9 (Smith 1999).

Selenium was an SSL at one well at AP-2 and 3/4, DGWC-9. The pH of groundwater at DGWC-9 has ranged from 3.68 to 4.23 since December 2016, the lowest in the network. Dissolved oxygen has also been highly variable at this location. The selenium level in groundwater at well DGWC-9 has ranged from 0.0065 to 0.23 in that time (Figure 21). Elevated selenium concentrations at DGWC-9, when present, appear to be related to low-pH conditions. Selenium in porewater at AP-23/4 is well below the concentrations measured at DGWC-9 (Section 3.2). Notably, selenium levels have been highly variable at this well (Figure 21). Selenium is expected to be present in DGWC-9 predominately complexed as a selenite species ($HSeO_3^-$; Figure 22).

## 3.8 Site Mineralogy

The mineralogical compositions of overburden, PWR/TWR, and bedrock samples from twenty-four boreholes/wells located around AP-1 were assessed using quantitative X-ray diffraction (XRD) with Rietveld refinement. The results for the three lithologies are presented in Appendix C and summarized in Figures 23a-d, Figure 24, and Figure 25. Of the locations where current SSLs are present, sample material is available from DGWC-9, DGWC-10, DGWC-19, DGWC-20, DGWC-47, DGWC-48, B-93, and B104D. In cases where mineralogical results are not available for an SSL location, a nearby “B” series well sample was collected (Figure 2). Cores from background borings DGWA-53, DGWA-70A, and DGWA-71 were also included in the mineralogical analysis. The purpose of this assessment was to identify and quantify the crystalline mineral phases in the aquifer solids with detailed characterization of Site mineralogy based on suitable spatial coverage of solid aquifer samples.

The bedrock samples consist predominantly (~80%) of quartz and plagioclase minerals with some mica (biotite and muscovite) and clay minerals. There is a progressive increase in micas and clays from the bedrock, consisting of biotite gneiss, to the PWR and overburden, as noted in the increased amounts of biotite, muscovite, kaolinite, etc., and increased amounts of iron oxide minerals. Overall, the mineralogical compositions in the overburden and PWR reflect weathered biotite gneiss. Pyrite occurs in overburden at trace levels at B-82, DGWC-9, where the lowest on-site groundwater pH was measured, and at DGWC-20 at concentrations up to 0.5% by weight. Pyrite near the screened interval of wells may represent a source of trace elements to groundwater since many trace elements have a tendency to be associated with either the sulfur or the metal component of sulfur-bearing minerals.

The clays present in overburden and to a lesser degree bedrock can represent an important sorptive reservoir for numerous trace metals and metalloids, including the constituents of interest (COI) at this site (Uddin 2017). Some overburden samples reported gibbsite and hematite, which are minerals that are also known to enhance metal attenuation in the soil matrix.

## 3.9 Sequential Extraction

Chemical analysis of overburden and bedrock by the sequential extraction procedure (SEP) was conducted on 19 solid samples [1 upgradient borehole and 17 downgradient boreholes (two depths at one borehole)] surrounding AP-2 and 3/4]. The analytical results are presented in Appendix D. In many cases, SEP results may not be from the exact well in which an SSL was observed, however, the findings from the SEP are considered representative of the site as a whole. Therefore, all relevant SEP samples to AP-2 and 3/4 are included for discussion in this report.

The SEP consists of a seven-step metals extraction from solids to determine the potential environmental stability of those metals. The final step in the SEP uses hydrofluoric acid, so the SEP results cannot be directly compared to those of the common US EPA 3050B extraction as the SEP results in complete dissolution of the sample, including the silicate fraction.  The seven-step SEP is defined by specific extraction steps as follows (based on a modified Tessier et al. 1979 method):

| SEQUENTIAL EXTRACTION PROCEDURE | | | |
|---|---|---|---|
| (Increasing Availability ↑) | (Increasing Extraction Strength ↓) | | |
| ENVIRONMENTALLY AVAILABLE | Step 1 | Exchangeable Fraction: | This extraction includes trace elements that are electrostatically adsorbed to overburden minerals |
| | Step 2 | Carbonate Fraction: | This extraction targets trace elements that are adsorbed or otherwise bound to carbonate minerals |
| | Step 3 | Amorphous Metals: | This extraction targets trace elements that are complexed by amorphous minerals |
| | Step 4 | Metal Hydroxide Fraction: | This extraction targets trace elements bound to hydroxides of iron, manganese, and/or aluminum |
| | Step 5 | Organic Fraction: | This extraction targets trace elements strongly bound via chemisorption to organic material |
| ACID/SULFIDE AND RESIDUAL | Step 6 | Acid/Sulfide Fraction: | The extraction is used to identify trace elements precipitated as sulfide minerals |
| | Step 7 | Residual Fraction: | Trace elements remaining in the overburden after the previous extractions will be distributed between silicates, phosphates, and refractory oxide |

Steps 1 through 7 represent an increasing amounts of target metals that can be removed into solution from the solid phase. For instance, metals bound in the carbonate fraction, or that are exchangeable, are much more likely to become mobile due to changes in groundwater chemistry than metals bound within a sulfide or residual fraction. The total concentration of a metal measured from all seven steps can be compared to the concentration determined from the total metal analysis for compositional accountability. Metals extracted in Steps 1 through 5 are considered environmentally available, whereas metals extracted in Steps 6 and 7 are not environmentally available under typical groundwater conditions (Tessier et al. 1979). In the following discussion, the term environmentally available is used to describe steps 1 through 5 combined and implies the fraction available to participate in environmental reactions such as adsorption, desorption, ion exchange and other reactions that facilitate removal or attenuation of specific constituents. Acid/sulfide and residual fraction combines step 6 and 7, and generally reflect the natural abundance of target constituents in silicates and sulfides, which do not readily interact with groundwater on short time scales.

The SEP results for arsenic (Sum of SEP Steps 1 through 7) in overburden samples ranged from 0.98 to 6.3 mg/kg while the environmentally available fraction ranged from 0.40 mg/kg in B-81 to 1.85 mg/kg at B-122D; (Figure 26). Overall, approximately 67% of arsenic occurs in the acid/sulfide and residual forms, which may reflect the natural abundance of arsenic in the site overburden derived from weathering of underlying bedrock. In Figure 26, samples from B-82 and B-87 represent the closest location to well DGWC-9 that shows SSL for arsenic.

Arsenic in the acid/sulfide and residual fractions was present in all overburden samples and was the most abundant in the sample from well DGWC-19. A large amount of arsenic in the acid/sulfide and residual fraction was also present in the sulfide/acid soluble phase, up to 3 mg/kg at wells DGWC-20, B-84, and B-77. The majority of the arsenic that was present in the environmentally available fraction in these samples was associated with the amorphous metal and metal hydroxide fractions, up to 1.7 mg/kg. The arsenic in these fractions may indicate arsenic associated with the weathered hydroxides but, given the site pH and Eh conditions, it likely indicates attenuation of arsenic from groundwater.

Arsenic was also extracted from four bedrock samples and ranged from 0.61 to 1.2 mg/kg (Figure 26). All arsenic in samples from downgradient bedrock wells was present in the metal hydroxide phase and carbonate phases and is thus considered environmentally available. All arsenic in bedrock at DGWA-53 occurred in the sulfide/acid soluble or residual phases and was not environmentally available. The occurrence and distribution of different arsenic phases in the background and bedrock cores suggest a natural source of arsenic and differential weathering in the bedrock.

Beryllium (Sum of SEP Steps 1 through 7) in overburden varied between 1.61 and 6.44 mg/kg with the environmentally available fraction ranging from 0.2 mg/kg at B-81 to 2.84 mg/kg in B-84, representing from 12% to 44% of total beryllium (Figure 27). Environmentally available beryllium was present in the carbonate, amorphous, and metal hydroxides fractions of overburden samples. The majority of beryllium in overburden samples was present in the acid/sulfide and residual fraction of samples, ranging from, 0.72 to 2.2 mg/kg, indicating a pool of naturally occurring beryllium that would not be released except under atypical groundwater conditions. Total beryllium (Sum of SEP Steps 1 through 7) in bedrock samples ranged from 1.7 to 2.8 mg/kg, with the majority of beryllium present in the sulfide/acid soluble and residual phases, up to 81% of total beryllium (Figure 27).

Cobalt (Sum of SEP Steps 1 through 7) in overburden varied between 0.32 and 55 mg/kg with the environmentally available fraction ranging from 0.26 mg/kg at B-81 to 48.5 mg/kg at B-84, representing from 17% to 89% of total cobalt (Figure 28). Environmentally available cobalt was mostly present in the amorphous and metal hydroxides fractions of overburden samples. With the exception of B-81, the majority of cobalt in overburden samples was present in the sulfide/acid soluble fraction of samples, ranging from 2.0 to 28 mg/kg, indicating a pool of naturally occurring cobalt that can be released due to acidification or oxidation of those mineral phases. Total cobalt (Sum of SEP Steps 1 through 7) in bedrock samples ranged from 1.9 to 12 mg/kg, with the majority of cobalt present in the sulfide/acid soluble phase, up to 62% of total cobalt (Figure 28).

Lithium (Sum of SEP Steps 1 through 7) in overburden varied between 7.9 and 61 mg/kg with the environmentally available fraction ranging from 0.36 mg/kg to 9.7 mg/kg, indicating a large pool of lithium present in the acid/sulfide and residual fraction (Figure 29). Environmentally available lithium was present in the carbonate, amorphous, organic, and metal hydroxides fractions of overburden samples. The majority of lithium in the acid/sulfide and residual fraction was present in the sulfide/acid soluble fraction. Total lithium (Sum of SEP Steps 1 through 7) in bedrock samples ranged from 9.0 to 32 mg/kg, with the majority of lithium present in the sulfide/acid soluble phase, up to 57% of total lithium (Figure 29).

Selenium (Sum of SEP Steps 1 through 7) in overburden varied between 0.62 and 3.9 mg/kg with the environmentally available fraction accounting for 23 to 100% of selenium in samples (Figure 30). Environmentally available selenium was present in the carbonate, amorphous, and metal hydroxides fractions of overburden samples. In six of the nine overburden samples, selenium was also present in the acid/sulfide and residual fraction, most commonly in the sulfide/acid soluble fraction (all six samples). Total selenium (Sum of SEP Steps 1 through 7) in bedrock samples ranged from 0.36 to 2.3 mg/kg, with the majority of selenium present in the metal hydroxide phase, and up to 100% environmentally available (Figure 30).

While not a COI, iron and its minerals commonly represent one of most abundant reservoirs for metal/metalloid attenuation in soils (Dzombak and Morel 1990; Smith 1999). Iron (Sum of SEP Steps 1 through 7) was present in all overburden samples analyzed, ranging from 4,800 to 68,000 mg/kg (Figure 31). The largest proportion of iron in overburden was present in the sulfide/acid soluble and residual fractions. Total iron (Sum of SEP Steps 1 through 7) in bedrock samples ranged from 10,000 to 34,000 mg/kg and was predominantly present in the sulfide/acid soluble and residual fraction (~50% or greater; Figure 31). In both overburden and bedrock, smaller proportions of iron also resided in the metal hydroxide and amorphous fractions. Of these phases, part of the environmentally available fraction in steps 1 through 5 can generally be considered representative of the amount of iron in soil that may be available as a sorbing medium and can, therefore, be important for attenuation of metals. In addition, the presence of a sulfide/acid soluble fraction associated with iron and confirmed by XRD (Section 3.8) indicates a potential for the generation of acidity through sulfide oxidation (Nordstrom and Alpers 1999).

Manganese (Sum of SEP Steps 1 through 7; not a COI) in overburden ranged from 180 to 2,800 mg/kg while the environmentally available fraction ranged from 19.8 mg/kg at B-47 to 2,499 mg/kg at B-84, representing from 11% to 90% of total manganese (Figure 32). Environmentally available manganese was present in every overburden sample, albeit at only trace levels in the exchangeable and carbonate phases in most samples (except B-122D). The majority of manganese in overburden samples was present in amorphous and metal hydroxide fractions, indicating the presence of a sorbent available for attenuating COIs. Total manganese (Sum of SEP Steps 1 through 7) in bedrock samples ranged from 190 to 570 mg/kg (Figure 32). Manganese was predominately present in the sulfide/acid soluble and residual fractions of samples (Figure 32).

Aluminum is also not a COI at the Site, but it has been well studied as a potential sorbing medium in soils (e.g., Karamalidis and Dzombak 2010). Aluminum (Sum of SEP Steps 1 through 7) in overburden ranged from 37,000 to 88,000 mg/kg (Figure 33). Up to 99% of total aluminum resided in the residual or silicate fraction, consistent with the presence of aluminum silicate minerals. Total aluminum in bedrock was slightly lower, ranging from 29,000 to 50,000 mg/kg but generally with a smaller proportion of aluminum in the sulfide/acid soluble fraction in the bedrock samples (Figure 33).

Additional analysis of arsenic and cobalt in overburden, PWR/TWR, and bedrock in borings at the AP-2 and 3/4 was completed using a US EPA 3050B (near total) acid extraction method with analysis by US EPA method 6010/6020. The results are reported in Appendix B. These results cannot be directly compared to results of SEP testing because this method is not as rigorous and, therefore, does not result in complete digestion of the sample (including the silicates).

Arsenic using US EPA method 3050B was present in overburden at multiple locations up to 6 mg/kg at B-84 and also below detection limits (<0.48 mg/kg) at many others (Figure 34). Arsenic was highest in the PWR/TWR (1.2 mg/kg) at background location DGWA-70A and highest in bedrock at B-89 (0.73 mg/kg). Beryllium using US EPA method 3050B was the highest in overburden from samples of PWR/TWR, overburden, and bedrock, up to 2.6 mg/kg at well B-84 (Figure 35). In bedrock, beryllium was present up to 1.1 mg/kg at well B-89. The highest beryllium concentration in PWR/TWR was at well B-88 (0.52 mg/kg).

Cobalt using US EPA method 3050B was present in overburden, PWR/TWR, and bedrock in borings ranging from below detection (0.48 mg/kg) in overburden up to 27 mg/kg at B-82 (overburden; Figure 36). In bedrock, cobalt using US EPA method 3050B was present at a concentration ranging from 2.3 to 12.6 mg/kg. In PWR/TWR, cobalt was the highest at well DGWA-70A, measured at 20 mg/kg.

Lithium using US EPA method 3050B was present in overburden, PWR/TWR, and bedrock in borings ranging from below detection (~3.2 mg/kg) in overburden up to 71.9 mg/kg at B-83 (overburden; Figure 37). In bedrock, lithium using US EPA method 3050B was present at a concentration ranging from 16.7 to 34.9 mg/kg. In PWR/TWR, lithium using US EPA method 3050B was below detection limit.

Selenium using US EPA method 3050B was present in overburden, PWR/TWR, and bedrock in borings ranging from 1.5 to 259 mg/kg at DGWC-10 (overburden; Figure 38). In bedrock, selenium using US EPA method 3050B was present at a concentration ranging from 3.6 to 4.3 mg/kg. In PWR/TWR, selenium using US EPA method 3050B was the highest at well DGWA-70A, measured at 142 mg/kg. Additional CCR Rule Appendix IV metals were analyzed in overburden and bedrock samples. The results are presented in Appendix B but are not discussed in detail here as they were not at SSLs in groundwater.

## 3.10 Mineral Stability

The geochemical computer code PHREEQC, developed by the United States Geological Survey (USGS), was used to calculate mineral saturation indices (Parkhurst and Appelo 2013). PHREEQC version 3.7 is a general-purpose geochemical modeling code used to simulate reactions in water and between water and solid mineral phases (e.g., rocks and sediments). Reactions include aqueous equilibria, mineral dissolution and precipitation, ion exchange, surface complexation, solid solutions, gas-water equilibrium, and kinetic biogeochemical reactions. The widely accepted thermodynamic database Minteq.v4, 2017 edition, was used as a basis for the thermodynamic constants required for modeling.

The potential for mineral precipitation was assessed in PHREEQC using a saturation index (SI) calculated according to the following equation:

$$SI = \log (IAP/Ksp)$$

The saturation index is the ratio of the ion activity product (IAP) of a mineral to the solubility product (Ksp). An SI value greater than zero indicates that the solution is supersaturated with respect to a particular mineral phase and, therefore, precipitation of the mineral may occur. An evaluation of precipitation kinetics is then required to determine whether the supersaturated mineral will indeed form. An SI value less than zero indicates the solution is undersaturated with respect to a particular mineral phase and this mineral may dissolve. An SI value close to zero indicates equilibrium conditions exist between the mineral and the solution. Many geochemical reactive minerals, not sufficiently abundant to be detected by XRD, participate in geochemical reactions. SI calculations are often used to support whether geochemically reactive mineral species are expected to dissolve, precipitate, or remain in equilibrium, potentially controlling the mobility of groundwater constituents.

The results of speciation modeling of groundwater from background and AP-2 and 3/4 monitoring wells are provided in Table 2. Mineral saturation plays an important role in attenuation of metals, either directly by their removal through mineral precipitation, or indirectly by providing a sorptive surface. The modeling results can be summarized as follows:

- **Iron-bearing minerals:** Due to the generally circumneutral and oxidizing condition of unimpacted groundwater at the Site, the modeling indicated a strong potential for ongoing precipitation of solid phase iron hydroxides in the groundwater system. Thus, throughout most of the Ash Pond Area, the occurrence of iron hydroxides is reasonably assumed based on SEP data from a number of wells. Exceptions included the following monitoring wells with SSLs: DGWC-8, DGWC-9, DGWC-10, DGWC-20, DGWC-47, DGWC-48, B-56, B-63. This was mostly due to low pH at these wells, causing dissolution or inhibiting precipitation of solid-phase iron hydroxides.
- **Other minerals:** Groundwater in nearly all downgradient AP-2 and 3/4 monitoring network wells was modeled to be in equilibrium with respect to barite [$BaSO_4$]. Calcite [$CaCO_3$] was in equilibrium with groundwater in well B-111D. Rhodochrosite [$MnCO_3$] was in equilibrium with groundwater in monitoring network well DGWC-4, B-66, B-77, B-97. Gypsum [$CaSO_4$:$2H_2O$] was in equilibrium with groundwater at DGWC-4. Siderite [$FeCO_3$] was in equilibrium with groundwater at well B-77.

In summary, the dissolved concentrations of multiple COIs can be reduced through the ability of ferrihydrite to act as a substrate for adsorption and co-precipitation. Barite acts as a control on dissolved barium concentrations.

## 3.11 Total Organic Carbon

Total organic carbon (TOC) or natural organic matter (NOM) is an important part of the geochemical redox cycle in the subsurface and may exert a significant control on metal mobility and metal stability. For example, reducing conditions generated by TOC will promote the presence of arsenic in trivalent form [$As^{+3}$], which is more mobile than its pentavalent form [$As^{+5}$]. Similarly, reducing conditions promote the dissolution of iron oxyhydroxide minerals such as ferrihydrite, thereby removing this important sorbent and mobilizing species sorbed onto its surface (Hem 1985; Smith 1999). Lastly, TOC or NOM can act as effective sorbents themselves.

The TOC content of overburden and bedrock was measured in select samples to better understand its potential effect on fate and transport of the SSL parameters, in particular their attenuation. In the four overburden samples from the AP-2 and 3/4 monitoring network in which TOC was determined, TOC concentrations ranged from below detection limits (<0.05%) up to 2.13% by weight (B-122D; Figure 39), indicating that organic carbon likely plays only a minor role in terms of metal mobility in the shallow aquifer. In the bedrock samples, TOC was below detection limits.

### 3.11.1 Cation Exchange Capacity

The cation exchange capacity (CEC) represents the total number of negatively charged sites in a given amount of solid at which reversible cation adsorption and desorption can occur (Hem 1985). Cation exchange also commonly refers to the replacement of one cation by another in a selective series or preferred adsorption, which increases with the ionic radius of major ions (Smith 1999).

The CEC of overburden and bedrock was measured in select samples from the AP-2 and 3/4 monitoring network. The CEC of samples from AP-2 and 3/4 borings ranged from 4.59 meq/100g at a depth of 27' to 28' below ground surface (bgs.) at well B-123D (overburden) to 18.74 meq/100g at 145' bgs. in bedrock at the same well (Figure 40). Generally, the CEC measured at AP-2 and 3/4 would be considered low (<10 meq/100g) to moderate, indicating a limited, yet available potential for attenuation through cation exchange.

# 4.0 ARSENIC TRANSPORT AT AP-2 AND 3/4

Aquifer solids data suggest that total arsenic occurs at average concentrations from 1 to 5 mg/kg in the overburden in the vicinity of well DWGC-9 (Table 1). The majority of arsenic is present in the metal hydroxide phase or the acid soluble/sulfide fraction. Porewater data from AP-2 and 3/4 (December 2019) indicate an arsenic concentration of approximately 1.6 mg/L. Pyrite was identified in the overburden sample at DGWC-9, potentially contributing to the acidic groundwater condition at this well. Pyrite is also commonly associated with the presence of naturally occurring arsenic release into groundwater (Nordstrom and Alpers 1999).

Based on extensive data presented in this report, two hypotheses for the occurrence of arsenic in well DGWC-9 are presented here. The primary working hypothesis is that arsenic in well DGWC-9 is derived from AP-2 and 3/4 and the acidic conditions are inhibiting attenuation at DGWC-9 until groundwater becomes more circumneutral downgradient. Boron is also present in groundwater at DGWC-9 (0.54 to 2.0 mg/L). Iron hydroxides are modeled to be undersaturated at DGWC-9. Groundwater is expected to become more circumneutral in the near future after the reversal of groundwater flow (Section 2.2) has established steady state and allowed infiltration of recharge water mimicking historical (pre-pond) groundwater flow conditions.

The second hypothesis is that arsenic can be mobilized from a natural source. Site data present the possibility of a natural source of arsenic, i.e. the bedrock, from which arsenic could be released into the partially weathered rocks and overburden due to the low pH of groundwater at DGWC-9.

Based on the pH and redox of groundwater at DGWC-9 (Figure 13) and the undersaturation of ferrihydrite in groundwater at the well, arsenic attenuation is occurring at DGWC-9. Attenuation of arsenic will become more effective, and may lower arsenic concentrations below the site GWPS, as pH increases. Downgradient of DGWC-9, as groundwater becomes more circumneutral, attenuation of arsenic by ferrihydrite likely occurs (based on SEP results) and as confirmed by the lack of any other arsenic SSL downgradient of DGWC-9 at nature and extent locations.

# 5.0 BERYLLIUM TRANSPORT AT AP-2 AND 3/4

Based on the evaluation of aquifer materials and groundwater at the site, the presence of beryllium at SSL wells can be attributed to the low pH (< 5.5) observed at those wells. However, where pH becomes circumneutral at nature and extent wells adjacent to those locations, beryllium is attenuated, likely due to the presence of ferrihydrite in aquifer solids. The attenuation of beryllium at those wells appears stable based on non-detect beryllium concentrations in groundwater, SEP results, and adequate sorption capacity in the overburden and bedrock materials (Figures 27, 31, 32 and 33, respectively). However, the SEP results also indicate the presence of a natural source of beryllium in the aquifer solids, which can be mobilized when conditions become sufficiently acidic.

Pyrite was identified in the overburden sample at DGWC-9, a possible source of the acidity contributing to the release of beryllium from overburden and bedrock (Figure 23a). Beryllium was not present in the porewater of AP-2 and 3/4 above its detection limit (0.000074 mg/L).

Thus, based on the data collected to date, beryllium in groundwater at SSL wells is mobilized by low-pH conditions.

# 6.0 COBALT TRANSPORT AT AP-2 AND 3/4

Except where pH is low, the attenuation of cobalt across the AP-2 and 3/4 monitoring network appears stable based on non-detect cobalt concentrations, SEP results, and adequate sorption capacity in the overburden and bedrock materials (Figures 28, 31, 32 and 33, respectively). Based on SEP results and the low concentrations of cobalt measured in porewater at AP-2 and 3/4, adequate attenuation capacity for cobalt in the vicinity of AP-2 and 3/4 likely exists where groundwater is circumneutral and at nature and extent locations.

The precipitation of ferrihydrite was indicated at wells where groundwater was not acidic based on saturation index calculations, likely governing dissolved cobalt concentrations in the groundwater. SEP results demonstrate the amorphous metal and metal hydroxide fractions represented the largest cobalt fraction in overburden in several locations (B-84, B-122D, and DGWC-19) while, at other locations, the residual/sulfide fraction appears to be the dominant fraction (Figure 28). Notably, there is significant hydroxide available for attenuation. The presence of pyrite in samples where cobalt is an SSL indicates pyrite likely plays a role in groundwater acidification while the pyrite may also represent a source of cobalt, which commonly substitutes in sulfide minerals.

Thus, based on the data collected to date, cobalt in groundwater at SSL wells is mobilized by low-pH conditions.

# 7.0 LITHIUM TRANSPORT AT AP-2 AND 3/4

Lithium is commonly considered a conservative tracer of CCR, and attenuation typically is assumed to be negligible. However, based on results of SEP testing, the presence of lithium was confirmed in many fractions that are considered to represent attenuation (Figure 29). Additionally, studies suggest that lithium attenuation by amorphous gibbsite is feasible under circumneutral pH while lithium incorporation into clays is considered a viable mechanism for exchange or a natural source (e.g., Prodromou 2016; Uddin 2017). The precipitation of ferrihydrite was not indicated at wells DGWC-47 or DGWC-48, but it was at B-93. DGWC-47 (B-47) also reported a significant muscovite content, further establishing the presence of a potential natural source for lithium. However, lithium levels are below the GWPS at downgradient locations, indicating attenuation through potentially multiple mechanisms.

Although lithium was detected in the porewater from AP-3/4, compliance wells DGWC-47, DGWC-48, and B-104D that show SSLs for lithium are located near AP-2, where the CCR source has been completely removed. Figure 19 shows a significant decline in lithium concentrations at wells DGWC-48 and B-104D to near the GWPS. Indicator parameters also show significant declines in concentrations (Figures 9a, b, 10, and 11) reflecting the removal of the CCR source from AP-2. Thus, the source of lithium at these wells is inconclusive based on current site data.

# 8.0 SELENIUM TRANSPORT AT AP-2 AND 3/4

Selenium concentrations across the AP-2 and 3/4 monitoring network appear stable based on non-detect groundwater concentrations at non-SSL wells, SEP results, and adequate sorption capacity in the overburden and bedrock materials (Figures 30, 31, 32 and 33, respectively), except where pH is low. Based on SEP results and the low concentrations of selenium measured in porewater at AP-2 and 3/4, adequate attenuation capacity for selenium in the vicinity of AP-2 and 3/4 likely exists where groundwater is circumneutral. The precipitation of ferrihydrite was not indicated at well DGWC-9 based on saturation index calculations (Table 2). Pyrite was identified in the overburden sample at DGWC-9, potentially contributing to the acidic groundwater condition at the well. Pyrite can also represent a possible source for selenium as selenium is known to substitute for sulfur in sulfide minerals. The selenium distribution in groundwater suggests adequate attenuation downgradient of selenium GWPS locations.

Thus, based on the data collected to date, selenium in groundwater at SSL wells is mobilized by low-pH conditions.

# 9.0 GCSM SUMMARY

Based on the evaluation of the AP-2 and 3/4 site presented in this document, the geochemical site conceptual model for the SSLs of arsenic, beryllium, cobalt, lithium, and selenium at AP-2 and 3/4 can be summarized as follows:

**Arsenic**

- The arsenic levels at DGWC-9 have been above the GWPS since September 2016 and have been highly variable. The concentration of arsenic at DGWC-9 is much lower than that of porewater, as of last sampling. The SSL of arsenic is closely related to the low pH of groundwater at this well, with the acidic conditions considered the likely cause for the SSL (lack of attenuation).
- Arsenic is attenuating where pH is circumneutral, including at locations downgradient from the acidic conditions.

**Beryllium**

- The beryllium SSLs in the monitoring network at wells DGWC-5, DGWC-9, DGWC-10, DGWC-47, DWC-48, and B-93 are due to low-pH conditions (pH <5.0 as of January 2022) at these wells, leading to the mobilization of beryllium from aquifer solids into groundwater (Figure 15). Based on the circumneutral porewater pH in AP-2 and 3/4, the low beryllium concentration in porewater, and the lack of consistency in CCR indicators in groundwater at these wells.
- Downgradient of the beryllium SSL locations, beryllium is attenuating, as evidenced by the geochemical characteristics of aquifer solids as well as the lack of beryllium at nature and extent wells.

**Cobalt**

- The cobalt SSLs in the monitoring network at wells DGWC-8, DGWC-9, DGWC-10, DGWC-19, DGWC-20, DGWC-47, DGWC-48, B-56, B-63, B-93 are also likely due to low pH conditions of groundwater at these wells, causing a lack of attenuation of cobalt (all wells have a pH <5.0, except B-63 had a pH of 5.46 as of January 2022; Figure 17).
- Downgradient of the cobalt SSL locations, cobalt is attenuating, as evidenced by the geochemical characteristics of aquifer solids as well as the lack of cobalt at nature and extent wells.

**Lithium**

- The lithium SSLs at DGWC-47, DGWC-48, and B-104D are steady or decreasing (Figure 19). SEP testing confirms that there is a potential natural source of lithium and that its attenuation is occurring. Downgradient of the locations with SSLs, lithium attenuates.

**Selenium**

- The selenium level at DGWC-9 has been above its GWPS multiple times since September 2016 and is highly variable (Figure 21). The selenium trends appear to be similar to those of arsenic and are closely related to the low pH of groundwater at this well.
- Downgradient of DGWC-9, selenium attenuates.

# 10.0 REFERENCES

Butt, C., Lintern, M. and Anand, R., 2000. Evolution of regoliths and landscapes in deeply weathered terrain—implications for geochemical exploration. Ore geology reviews, 16(3-4), pp.167-183.

Dzombak, D. and Morel, F., 1990. Surface complexation modeling: hydrous ferric oxide. John Wiley & Sons.

Golder, 2022. Hydrogeological Assessment Report, Plant McDonough Atkinson Ash Pond 1. Golder Associates USA, inc., October 2022.

Hem, J., 1985. Study and interpretation of the chemical characteristics of natural water (Vol. 2254). US Geological Survey.

Karamalidis, A., and Dzombak, D., 2010. Surface Complexation Modeling: Gibbsite. John Wiley and Sons, New Jersey.

Li, Y., 2000. A compendium of geochemistry: from solar nebula to the human brain. Princeton University Press.

Manning, B.A. and Goldberg, S., 1996. Modeling arsenate competitive adsorption on kaolinite, montmorillonite and illite. Clays and clay minerals, 44(5), pp.609-623.

Nordstrom, K., and Alpers, C., 1999. Geochemistry of acid mine waters. The environmental geochemistry of mineral deposits, 6A, pp.133-160.

Nordstrom, K., Majzlan, J. and Königsberger, E., 2014. Thermodynamic properties for arsenic minerals and aqueous species. Reviews in Mineralogy and Geochemistry, 79(1), pp.217-255.

Parkhurst, D. and Appelo, C., 2013. Description of input and examples for PHREEQC version 3: a computer program for speciation, batch-reaction, one-dimensional transport, and inverse geochemical calculations (No. 6-A43). US Geological Survey.

Schwertmann, U. 1988. Occurrence and formation of iron oxides in various pedoenvironments. in Iron in soils and clay minerals (pp. 267-308). Springer, Dordrecht.

Shacklette, H. and Boerngen, J., 1984. Element concentrations in soils and other surficial materials of the conterminous United States.

Smith, K., 1999. Metal sorption on mineral surfaces: an overview with examples relating to mineral deposits.

Smith, K. and Huyck, H., 1999. An overview of the abundance, relative mobility, bioavailability, and human toxicity of metals. The environmental geochemistry of mineral deposits, 6, pp.29-70.

Strenge, D. and Peterson, S. 1989. Chemical Data Bases for the Multimedia Environmental Pollutant Assessment System (MEPAS) (No. PNL-7145). Pacific Northwest Lab., Richland, WA.

Taylor, S. and McLennan, S., 1985. The continental crust: its composition and evolution: An Examination of the Geochemical Record Preserved in Sedimentary Rocks. Oxford: Blackwell Scientific.

Takeno, N., 2005. Atlas of Eh-pH diagrams. Geological survey of Japan open file report, 419, p.102.

Tessier, A., Campbell, P., and Bisson, M., 1979. Sequential extraction procedure for the speciation of particulate trace metals. Analytical chemistry, 51(7), pp.844-851.

Tonkin, J.W., Balistrieri, L.S. and Murray, J.W., 2004. Modeling sorption of divalent metal cations on hydrous manganese oxide using the diffuse double layer model. Applied Geochemistry, 19(1), pp.29-53.

Uddin, M. 2017. A review on the adsorption of heavy metals by clay minerals, with special focus on the past decade. Chemical Engineering Journal, 308, pp.438-462.

# Tables

**TABLE 1**
**SEQUENTIAL EXTRACTION RESULTS**
Plant McDonough-Atkinson Ash Pond 2, 3/4
Atlanta, Georgia

| Analyte | Well | DGWA-53 (25.7-26.9') | DGWC-19 (34-39') | DGWC-20 (34-39') | B-47 (11-12') | B-48 (23-24') | B-77 (32-40') | B-79 (30-35') | B-81 (45.4-47.5') | B-82 (35.5-37.5') |
|---|---|---|---|---|---|---|---|---|---|---|
| | SEP Step | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg |
| Aluminum | SEP Step 1 | < 6.5 U | 48 J | 11 J | 12 J | < 6.4 U | 18 J | < 7.1 U | < 6.7 U | 15 J |
| Aluminum | SEP Step 2 | 8.2 J * | 30 J * | 11 J * | 28 J | 23 J | 86 * | 13 J * | 27 J * | 20 J * |
| Aluminum | SEP Step 3 | 35 | 260 | 160 | 300 | 320 | 730 | 160 | 320 | 180 |
| Aluminum | SEP Step 4 | 620 | 1600 | 1200 | 2000 | 2000 | 4200 | 800 | 970 | 1200 |
| Aluminum | SEP Step 5 | 110 J * | 750 * | 570 * | 190 | 88 J | 390 * | 45 J * | < 25 * U | 76 J * |
| Aluminum | SEP Step 6 | 1900 | 12000 | 8900 | 17000 | 12000 | 18000 | 5000 | 1600 | 10000 |
| Aluminum | SEP Step 7 | 48000 | 61000 | 46000 | 29000 | 23000 | 65000 | 64000 | 56000 | 54000 |
| Aluminum | SEP SUM | 51000 | 76000 | 56000 | 49000 | 37000 | 88000 | 70000 | 59000 | 66000 |
| Aluminum | SEP TOTAL | 56000 | 110000 | 83000 | 63000 | 61000 | 84000 | 81000 | 74000 | 84000 |
| Arsenic | SEP Step 1 | < 0.52 U | 1.1 J | 0.92 J | < 0.52 U | < 0.52 U | < 0.67 U | < 0.58 U | < 0.54 U | < 0.61 U |
| Arsenic | SEP Step 2 | < 0.39 * U | < 0.49 * U | < 0.47 * U | < 0.39 U | < 0.39 U | < 0.50 U | < 0.43 U | < 0.41 U | < 0.46 U |
| Arsenic | SEP Step 3 | < 0.13 U | < 0.16 U | < 0.16 U | 0.21 J | 0.30 J | 0.94 | < 0.14 U | < 0.14 U | 0.15 J |
| Arsenic | SEP Step 4 | < 0.22 U | < 0.28 U | < 0.26 U | 0.58 B | 0.79 B | 0.67 B | 0.53 J B | 0.40 J B | 0.56 J B |
| Arsenic | SEP Step 5 | < 1.9 * U | < 2.4 * U | < 2.3 * U | < 1.9 U | < 1.9 U | < 2.5 U | < 2.1 U | < 2.0 U | < 2.2 U |
| Arsenic | SEP Step 6 | 0.66 | 1.1 | 0.85 | 0.48 J | 2.1 | 2.0 | 0.82 | 0.21 J | 1.1 |
| Arsenic | SEP Step 7 | 0.28 J B | 4.1 B | 2.0 J B | < 0.13 U | < 0.13 U | 1.4 | 0.33 J | 0.37 J | < 1.5 U |
| Arsenic | SEP SUM | 0.94 | 6.3 | 3.7 | 1.3 | 3.2 | 5.0 | 1.7 | 0.98 | 1.8 |
| Arsenic | SEP TOTAL | 1.3 | 11 | 5.8 | < 0.66 U | 2.4 J | 3.1 | 1.1 | 0.82 J | < 1.5 U |
| Beryllium | SEP Step 1 | < 0.31 U | < 0.39 U | < 0.37 U | NA | NA | < 0.40 U | < 0.34 U | < 0.32 U | < 0.36 U |
| Beryllium | SEP Step 2 | < 0.048 * U | < 0.061 * U | < 0.058 * U | NA | NA | 0.066 J * | 0.14 J * | < 0.050 * U | < 0.056 * U |
| Beryllium | SEP Step 3 | < 0.015 U | 0.17 J | 0.098 J | NA | NA | 0.21 J | 0.35 | 0.070 J | 0.23 J |
| Beryllium | SEP Step 4 | 0.025 J | 1.2 | 0.52 | NA | NA | 0.36 | 0.61 | 0.13 J | 0.96 |
| Beryllium | SEP Step 5 | < 0.32 * U | < 0.40 * U | < 0.38 * U | NA | NA | < 0.41 * U | < 0.35 * U | < 0.33 * U | < 0.37 * U |
| Beryllium | SEP Step 6 | 0.024 J | 1.3 | 0.54 | NA | NA | 0.39 | 0.59 | 0.11 J | 0.76 |
| Beryllium | SEP Step 7 | 1.0 | 2.2 | 0.83 | NA | NA | 0.75 | 2.0 | 1.3 | 0.72 |
| Beryllium | SEP SUM | 1.1 | 4.9 | 2.0 | NA | NA | 1.8 | 3.7 | 1.6 | 2.7 |
| Beryllium | SEP TOTAL | 1.1 | 6.1 | 2.1 | NA | NA | 1.8 | 3.5 | 1.7 | 3.0 |
| Cobalt | SEP Step 1 | < 0.18 U | 0.33 J | 0.98 J | < 0.18 U | < 0.18 U | 0.92 J | < 0.20 U | < 0.19 U | < 0.21 U |
| Cobalt | SEP Step 2 | < 0.19 U | < 0.24 U | < 0.23 U | < 0.19 U | 0.28 J | 0.87 J | < 0.21 U | < 0.20 U | < 0.22 U |
| Cobalt | SEP Step 3 | < 0.045 U | 19 | 7.2 | 0.22 J | 0.53 J | 1.5 J | 1.4 J | 0.16 J | 3.5 |
| Cobalt | SEP Step 4 | 0.32 J | 7.9 | 3.0 | 0.91 J | 1.7 J | 3.2 | 0.70 J | 0.096 J | 1.6 J |
| Cobalt | SEP Step 5 | < 0.60 * U | < 0.76 * U | < 0.72 * U | < 0.60 U | < 0.60 U | 1.0 J * | < 0.67 * U | < 0.63 * U | < 0.70 * U |
| Cobalt | SEP Step 6 | 1.1 J | 12 | 9.1 | 4.1 | 2.5 J | 4.8 | 2.3 J | 0.061 J | 11 |
| Cobalt | SEP Step 7 | 0.47 J | 16 J | 8.6 J | 1.4 J | 0.46 J | 4.2 J | 0.98 J | < 0.16 U | 13 J |
| Cobalt | SEP SUM | 1.8 J | 55 | 29 | 6.6 | 5.4 | 17 | 5.3 | 0.32 J | 29 |
| Cobalt | SEP TOTAL | 1.4 J | 36 | 39 | 8.6 J | 5.1 J | 19 J | 5.7 | 0.46 J | 38 |

**TABLE 1**
**SEQUENTIAL EXTRACTION RESULTS**
Plant McDonough-Atkinson Ash Pond 2, 3/4
Atlanta, Georgia

| Analyte | Well | DGWA-53 (25.7-26.9') | DGWC-19 (34-39') | DGWC-20 (34-39') | B-47 (11-12') | B-48 (23-24') | B-77 (32-40') | B-79 (30-35') | B-81 (45.4-47.5') | B-82 (35.5-37.5') |
|---|---|---|---|---|---|---|---|---|---|---|
| | SEP Step | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg |
| Aluminum | SEP Step 1 | < 6.5 U | 48 J | 11 J | 12 J | < 6.4 U | 18 J | < 7.1 U | < 6.7 U | 15 J |
| Aluminum | SEP Step 2 | 8.2 J * | 30 J * | 11 J * | 28 J | 23 J | 86 * | 13 J * | 27 J * | 20 J * |
| Aluminum | SEP Step 3 | 35 | 260 | 160 | 300 | 320 | 730 | 160 | 320 | 180 |
| Aluminum | SEP Step 4 | 620 | 1600 | 1200 | 2000 | 2000 | 4200 | 800 | 970 | 1200 |
| Aluminum | SEP Step 5 | 110 J * | 750 * | 570 * | 190 | 88 J | 390 * | 45 J * | < 25 * U | 76 J * |
| Aluminum | SEP Step 6 | 1900 | 12000 | 8900 | 17000 | 12000 | 18000 | 5000 | 1600 | 10000 |
| Aluminum | SEP Step 7 | 48000 | 61000 | 46000 | 29000 | 23000 | 65000 | 64000 | 56000 | 54000 |
| Aluminum | SEP SUM | 51000 | 76000 | 56000 | 49000 | 37000 | 88000 | 70000 | 59000 | 66000 |
| Aluminum | SEP TOTAL | 56000 | 110000 | 83000 | 63000 | 61000 | 84000 | 81000 | 74000 | 84000 |
| Arsenic | SEP Step 1 | < 0.52 U | 1.1 J | 0.92 J | < 0.52 U | < 0.52 U | < 0.67 U | < 0.58 U | < 0.54 U | < 0.61 U |
| Arsenic | SEP Step 2 | < 0.39 * U | < 0.49 * U | < 0.47 * U | < 0.39 U | < 0.39 U | < 0.50 U | < 0.43 U | < 0.41 U | < 0.46 U |
| Arsenic | SEP Step 3 | < 0.13 U | < 0.16 U | < 0.16 U | 0.21 J | 0.30 J | 0.94 | < 0.14 U | < 0.14 U | 0.15 J |
| Arsenic | SEP Step 4 | < 0.22 U | < 0.28 U | < 0.26 U | 0.58 B | 0.79 B | 0.67 B | 0.53 J B | 0.40 J B | 0.56 J B |
| Arsenic | SEP Step 5 | < 1.9 * U | < 2.4 * U | < 2.3 * U | < 1.9 U | < 1.9 U | < 2.5 U | < 2.1 U | < 2.0 U | < 2.2 U |
| Arsenic | SEP Step 6 | 0.66 | 1.1 | 0.85 | 0.48 J | 2.1 | 2.0 | 0.82 | 0.21 J | 1.1 |
| Arsenic | SEP Step 7 | 0.28 J B | 4.1 B | 2.0 J B | < 0.13 U | < 0.13 U | 1.4 | 0.33 J | 0.37 J | < 1.5 U |
| Arsenic | SEP SUM | 0.94 | 6.3 | 3.7 | 1.3 | 3.2 | 5.0 | 1.7 | 0.98 | 1.8 |
| Arsenic | SEP TOTAL | 1.3 | 11 | 5.8 | < 0.66 U | 2.4 J | 3.1 | 1.1 | 0.82 J | < 1.5 U |
| Beryllium | SEP Step 1 | < 0.31 U | < 0.39 U | < 0.37 U | NA | NA | < 0.40 U | < 0.34 U | < 0.32 U | < 0.36 U |
| Beryllium | SEP Step 2 | < 0.048 * U | < 0.061 * U | < 0.058 * U | NA | NA | 0.066 J * | 0.14 J * | < 0.050 * U | < 0.056 * U |
| Beryllium | SEP Step 3 | < 0.015 U | 0.17 J | 0.098 J | NA | NA | 0.21 J | 0.35 | 0.070 J | 0.23 J |
| Beryllium | SEP Step 4 | 0.025 J | 1.2 | 0.52 | NA | NA | 0.36 | 0.61 | 0.13 J | 0.96 |
| Beryllium | SEP Step 5 | < 0.32 * U | < 0.40 * U | < 0.38 * U | NA | NA | < 0.41 * U | < 0.35 * U | < 0.33 * U | < 0.37 * U |
| Beryllium | SEP Step 6 | 0.024 J | 1.3 | 0.54 | NA | NA | 0.39 | 0.59 | 0.11 J | 0.76 |
| Beryllium | SEP Step 7 | 1.0 | 2.2 | 0.83 | NA | NA | 0.75 | 2.0 | 1.3 | 0.72 |
| Beryllium | SEP SUM | 1.1 | 4.9 | 2.0 | NA | NA | 1.8 | 3.7 | 1.6 | 2.7 |
| Beryllium | SEP TOTAL | 1.1 | 6.1 | 2.1 | NA | NA | 1.8 | 3.5 | 1.7 | 3.0 |
| Cobalt | SEP Step 1 | < 0.18 U | 0.33 J | 0.98 J | < 0.18 U | < 0.18 U | 0.92 J | < 0.20 U | < 0.19 U | < 0.21 U |
| Cobalt | SEP Step 2 | < 0.19 U | < 0.24 U | < 0.23 U | < 0.19 U | 0.28 J | 0.87 J | < 0.21 U | < 0.20 U | < 0.22 U |
| Cobalt | SEP Step 3 | < 0.045 U | 19 | 7.2 | 0.22 J | 0.53 J | 1.5 J | 1.4 J | 0.16 J | 3.5 |
| Cobalt | SEP Step 4 | 0.32 J | 7.9 | 3.0 | 0.91 J | 1.7 J | 3.2 | 0.70 J | 0.096 J | 1.6 J |
| Cobalt | SEP Step 5 | < 0.60 * U | < 0.76 * U | < 0.72 * U | < 0.60 U | < 0.60 U | 1.0 J * | < 0.67 * U | < 0.63 * U | < 0.70 * U |
| Cobalt | SEP Step 6 | 1.1 J | 12 | 9.1 | 4.1 | 2.5 J | 4.8 | 2.3 J | 0.061 J | 11 |
| Cobalt | SEP Step 7 | 0.47 J | 16 J | 8.6 J | 1.4 J | 0.46 J | 4.2 J | 0.98 J | < 0.16 U | 13 J |
| Cobalt | SEP SUM | 1.8 J | 55 | 29 | 6.6 | 5.4 | 17 | 5.3 | 0.32 J | 29 |
| Cobalt | SEP TOTAL | 1.4 J | 36 | 39 | 8.6 J | 5.1 J | 19 J | 5.7 | 0.46 J | 38 |

**TABLE 1**
**SEQUENTIAL EXTRACTION RESULTS**
Plant McDonough-Atkinson Ash Pond 2, 3/4
Atlanta, Georgia

| Analyte | Well | B-84 (43.5-45') | B-85 (23.5-25') | B-87 (33.5-35') | B-92 (6-8') | B-93 (6-8') | B-104D (55-56') | B-115D (75-76') | B-122D (39-40') | B-123D (27-28') |
|---|---|---|---|---|---|---|---|---|---|---|
| | SEP Step | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg |
| Aluminum | SEP Step 1 | 11 J | < 7.7 U | < 7.5 U | < 8.1 U | 10 J | < 6.4 U | < 6.4 U | 15 J | 94 |
| Aluminum | SEP Step 2 | 16 J * | 13 J * | 9.8 J * | 48 * | 16 J * | 18 J | 4.9 J | 77 | 41 |
| Aluminum | SEP Step 3 | 220 | 66 | 80 | 370 | 140 | 60 | 20 | 820 | 180 |
| Aluminum | SEP Step 4 | 1700 | 900 | 1100 | 3300 | 2000 | 800 | 740 | 6600 | 2200 |
| Aluminum | SEP Step 5 | 30 J * | 55 J * | 82 J * | 480 * | 100 J * | 110 J | 120 J | 960 | 560 |
| Aluminum | SEP Step 6 | 11000 | 6000 | 7700 | 11000 | 13000 | 7500 | 6000 | 21000 | 15000 |
| Aluminum | SEP Step 7 | 62000 | 58000 | 57000 | 54000 | 57000 | 23000 | 22000 | 48000 | 31000 |
| Aluminum | SEP SUM | 75000 | 65000 | 66000 | 70000 | 72000 | 31000 | 29000 | 78000 | 49000 |
| Aluminum | SEP TOTAL | 76000 | 68000 | 75000 | 87000 | 80000 | 35000 | 36000 | 80000 | 96000 |
| Arsenic | SEP Step 1 | < 0.63 U | < 0.63 U | < 0.61 U | < 0.66 U | < 0.71 U | < 0.52 U | < 0.52 U | < 0.70 U | < 0.54 U |
| Arsenic | SEP Step 2 | < 0.47 U | < 0.47 U | < 0.46 U | < 0.50 U | < 0.53 U | 0.42 J | < 0.39 U | < 0.53 U | < 0.40 U |
| Arsenic | SEP Step 3 | 0.30 J | < 0.16 U | < 0.15 U | 0.46 J | < 0.18 U | < 0.13 U | < 0.13 U | 0.87 | < 0.13 U |
| Arsenic | SEP Step 4 | 0.80 B | 0.49 J B | 0.65 B | 1.0 B | 0.64 J B | 0.79 B | 0.77 B | 0.98 B | 0.87 B |
| Arsenic | SEP Step 5 | < 2.3 U | < 2.3 U | < 2.2 U | < 2.4 U | < 2.6 U | < 1.9 U | < 1.9 U | < 2.6 U | < 2.0 U |
| Arsenic | SEP Step 6 | 3.0 | 0.55 J | 1.3 | 1.2 | 0.39 J | < 0.15 L U | < 0.15 U | 0.31 J | 0.32 J |
| Arsenic | SEP Step 7 | 1.2 J | 0.38 J | 0.57 J | 0.53 J | 0.78 | < 0.13 L U | < 0.13 L U | 0.88 J B | < 0.27 U |
| Arsenic | SEP SUM | 5.2 | 1.4 | 2.5 | 3.2 | 1.8 | 1.2 | 0.77 | 3.0 | 1.2 |
| Arsenic | SEP TOTAL | 4.8 | 0.75 | 1.5 | 1.6 | 0.88 | < 0.39 U | < 0.65 U | 1.9 | 1.8 J |
| Beryllium | SEP Step 1 | < 0.37 U | < 0.37 U | < 0.36 U | < 0.39 U | < 0.42 U | NA | NA | NA | NA |
| Beryllium | SEP Step 2 | 0.18 J * | < 0.058 * U | < 0.056 * U | < 0.061 * U | 0.17 J * | NA | NA | NA | NA |
| Beryllium | SEP Step 3 | 0.66 | 0.080 J | 0.13 J | 0.096 J | 0.29 J | NA | NA | NA | NA |
| Beryllium | SEP Step 4 | 2.0 | 0.21 J | 0.31 | 0.23 J | 0.34 | NA | NA | NA | NA |
| Beryllium | SEP Step 5 | < 0.38 * U | < 0.38 * U | < 0.37 * U | < 0.40 * U | < 0.43 * U | NA | NA | NA | NA |
| Beryllium | SEP Step 6 | 1.4 | 0.78 | 0.83 | 0.35 | 0.64 | NA | NA | NA | NA |
| Beryllium | SEP Step 7 | 2.2 | 1.6 | 1.6 | 1.0 | 1.4 | NA | NA | NA | NA |
| Beryllium | SEP SUM | 6.5 | 2.7 | 2.9 | 1.7 | 2.8 | NA | NA | NA | NA |
| Beryllium | SEP TOTAL | 5.1 | 2.6 | 3.2 | 1.7 | 3.1 | NA | NA | NA | NA |
| Cobalt | SEP Step 1 | 0.41 J | < 0.22 U | < 0.21 U | < 0.23 U | 0.33 J | < 0.18 U | < 0.18 U | 0.51 J | 0.39 J |
| Cobalt | SEP Step 2 | < 0.23 U | < 0.23 U | < 0.22 U | 0.47 J | < 0.26 U | < 0.19 U | < 0.19 U | 0.88 J | < 0.20 U |
| Cobalt | SEP Step 3 | 40 | 0.19 J | 1.0 J | 0.54 J | 0.48 J | < 0.045 U | 0.091 J | 2.9 J | 0.11 J |
| Cobalt | SEP Step 4 | 8.1 | 0.26 J | 0.48 J | 1.5 J | 0.62 J | 0.30 J | 0.43 J | 5.5 | 1.1 J |
| Cobalt | SEP Step 5 | < 0.73 * U | < 0.72 * U | < 0.70 * U | < 0.76 * U | < 0.82 * U | < 0.60 U | < 0.60 U | 1.1 J | < 0.62 U |
| Cobalt | SEP Step 6 | 3.7 J | 2.0 J | 4.2 | 2.9 J | 2.4 J | 6.9 | 5.9 | 4.3 | 2.6 |
| Cobalt | SEP Step 7 | 2.4 J | 0.18 J | 1.8 J | 4.3 J | < 0.21 U | 4.4 J | 4.3 J | 4.1 J | 2.0 J |
| Cobalt | SEP SUM | 55 | 2.6 | 7.6 | 9.7 | 3.8 | 12 | 11 | 19 | 6.2 |
| Cobalt | SEP TOTAL | 75 | 2.4 J | 8.6 J | 11 J | 4.3 J | 8.5 | 14 | 19 | 7.8 J |

**TABLE 1**
**SEQUENTIAL EXTRACTION RESULTS**
Plant McDonough-Atkinson Ash Pond 2, 3/4
Atlanta, Georgia

| Analyte | Well | B-84 (43.5-45') | B-85 (23.5-25') | B-87 (33.5-35') | B-92 (6-8') | B-93 (6-8') | B-104D (55-56') | B-115D (75-76') | B-122D (39-40') | B-123D (27-28') |
|---|---|---|---|---|---|---|---|---|---|---|
| | SEP Step | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg |
| Aluminum | SEP Step 1 | < 14 * U | < 14 * U | < 14 * U | < 15 * U | < 16 * U | < 12 U | < 12 U | < 16 U | < 12 U |
| Aluminum | SEP Step 2 | < 11 * U | < 10 * U | < 10 * U | 250 * | < 12 * U | 76 | 15 | 360 | < 9.0 U |
| Aluminum | SEP Step 3 | 910 | 110 | 140 | 3800 | 160 | 180 | 51 | 5100 | 300 |
| Aluminum | SEP Step 4 | 9900 | 980 | 1200 | 10000 | 1600 | 1800 | 1600 | 13000 | 7500 |
| Aluminum | SEP Step 5 | < 53 * U | < 53 * U | < 51 * U | < 56 * U | < 60 * U | < 44 U | < 44 U | 120 | < 46 U |
| Aluminum | SEP Step 6 | 19000 | 6700 | 8800 | 14000 | 8000 | 15000 | 12000 | 15000 | 12000 |
| Aluminum | SEP Step 7 | 12000 | 3700 | 8500 | 11000 | 3800 | 17000 | 15000 | 8300 | 4400 |
| Aluminum | SEP SUM | 42000 | 12000 | 19000 | 40000 | 13000 | 34000 | 29000 | 42000 | 24000 |
| Aluminum | SEP TOTAL | 35000 | 10000 | 18000 | 36000 | 14000 | 26000 | 43000 | 44000 | 38000 |
| Arsenic | SEP Step 1 | < 0.73 U | < 0.72 U | < 0.70 U | < 0.76 U | < 0.82 U | < 0.60 U | < 0.60 U | < 0.81 U | < 0.62 U |
| Arsenic | SEP Step 2 | < 0.55 U | < 0.54 U | < 0.53 U | < 0.57 U | < 0.62 U | 0.47 J | < 0.45 U | < 0.61 U | < 0.47 U |
| Arsenic | SEP Step 3 | 0.65 J | < 0.18 U | 0.79 J | < 0.19 U | < 0.21 U | 0.15 J | < 0.15 U | < 0.20 U | < 0.16 U |
| Arsenic | SEP Step 4 | 1.8 J | 0.65 J | 0.85 J | 1.5 J | 2.1 J | 1.8 J | 1.6 J | 2.6 J | 3.2 |
| Arsenic | SEP Step 5 | < 2.7 U | < 2.6 U | < 2.6 U | < 2.8 U | < 3.0 U | < 2.2 U | < 2.2 U | < 3.0 U | < 2.3 U |
| Arsenic | SEP Step 6 | 8.0 | 5.0 | 11 | 6.8 | 6.3 | 16 | 12 | 10 | 14 |
| Arsenic | SEP Step 7 | 17 | 3.0 | 5.7 | 11 | 4.2 | 14 | 10 | 11 | 8.3 |
| Arsenic | SEP SUM | 28 | 8.7 | 18 | 19 | 13 | 33 | 24 | 24 | 25 |
| Arsenic | SEP TOTAL | 27 | 8.4 | 18 | 21 | 14 | 28 | 44 | 25 | 32 |
| Beryllium | SEP Step 1 | 71 | 7.8 | 0.37 J | 75 | 44 | 1.1 J | 0.40 J | 360 | 15 |
| Beryllium | SEP Step 2 | 25 | 2.5 J | 1.1 J | 87 | 5.5 | 6.3 | 1.8 J | 81 | 1.7 J |
| Beryllium | SEP Step 3 | 1900 B | 9.5 B | 140 B | 200 B | 47 B | 2.8 B | 1.3 B | 260 B | 2.5 B |
| Beryllium | SEP Step 4 | 490 | 23 | 47 | 150 | 54 | 14 | 12 | 810 | 25 |
| Beryllium | SEP Step 5 | 13 J * | < 2.2 * U | < 2.2 * U | 12 J * | < 2.5 * U | < 1.9 *1 U | < 1.9 *1 U | 100 *1 | < 1.9 *1 U |
| Beryllium | SEP Step 6 | 110 | 190 | 180 | 85 | 200 | 94 | 67 | 100 | 110 |
| Beryllium | SEP Step 7 | 160 | 78 | 120 | 130 | 62 | 450 | 320 | 120 | 49 |
| Beryllium | SEP SUM | 2800 | 320 | 480 | 740 | 410 | 560 | 410 | 1800 | 200 |
| Beryllium | SEP TOTAL | 3200 | 270 | 400 | 770 | 410 | 360 | 240 | 1100 | 240 |
| Cobalt | SEP Step 1 | < 0.83 U | < 0.82 U | < 0.79 U | < 0.87 U | < 0.93 U | NA | NA | NA | NA |
| Cobalt | SEP Step 2 | < 0.62 U | < 0.61 U | < 0.60 U | < 0.65 U | < 0.70 U | NA | NA | NA | NA |
| Cobalt | SEP Step 3 | < 0.41 U | < 0.20 U | < 0.20 U | 0.28 J | < 0.23 U | NA | NA | NA | NA |
| Cobalt | SEP Step 4 | 1.1 B * | 0.88 B * | 0.86 B * | 1.2 B * | < 0.64 * U | NA | NA | NA | NA |
| Cobalt | SEP Step 5 | < 3.2 U | < 3.1 U | < 3.0 U | < 3.3 U | < 3.6 U | NA | NA | NA | NA |
| Cobalt | SEP Step 6 | 0.85 J | 0.35 J | 0.36 J | 0.86 | 0.36 J | NA | NA | NA | NA |
| Cobalt | SEP Step 7 | < 1.0 U | < 0.20 U | < 0.20 U | < 0.22 U | < 0.23 U | NA | NA | NA | NA |
| Cobalt | SEP SUM | 2.0 | 1.2 | 1.2 | 2.4 | 0.36 J | NA | NA | NA | NA |
| Cobalt | SEP TOTAL | < 1.0 U | < 0.20 U | < 0.20 U | 1.0 | < 0.23 U | NA | NA | NA | NA |

**TABLE 2**
**SATURATION INDEX CALCULATION RESULTS**
**Plant McDonough-Atkinson Ash Pond 2 and 3/4**
**Atlanta, Georgia**

| **MINERAL PHASES - Saturation Indices** | | **B-100** | **DGWA-53** | **DGWA-70A** | **DGWA-71** | **DGWC-2** | **DGWC-4** | **DGWC-5** | **DGWC-8** | **DGWC-9** | **DGWC-10** | **DGWC-11** | **DGWC-12** | **DGWC-13** | **DGWC-14** | **DGWC-15** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ferrihydrite | $Fe(OH)_3$ | | **1.15** | **0.27** | -0.65 | **1.05** | -0.87 | **0.35** | -1.35 | -1.68 | -0.87 | -1.23 | **0.31** | -3.51 | **-0.31** | **-0.45** |
| Siderite | $FeCO_3$ | | -2.36 | -3.62 | -3.63 | -3.24 | -3.02 | -8.51 | -4.49 | -5.87 | -5.05 | -4.11 | -1.42 | -4.53 | -3.67 | -3.28 |
| Rhodochrosite | $MnCO_3$ | | -0.67 | | | -1.76 | **-0.49** | -2.67 | -2.64 | -3.94 | -3.22 | | -1.73 | | | -3.16 |
| Gypsum | $CaSO_4{:}2H_2O$ | -1.31 | -2.82 | -4.32 | -3.52 | -1.69 | **-0.42** | -0.91 | -1.68 | -1.37 | -1.19 | -1.26 | -1.86 | -1.66 | -2.47 | -1.73 |
| Calcite | $CaCO_3$ | -3.20 | -1.83 | -3.63 | -3.67 | -2.24 | -1.37 | -3.95 | -3.79 | -5.00 | -4.00 | -3.12 | -2.16 | -3.77 | -3.44 | -2.62 |
| Barite | $BaSO_4$ | **0.34** | **-0.28** | -1.55 | -0.91 | **-0.05** | **0.78** | **0.40** | **0.03** | **0.26** | **0.24** | **0.60** | **0.37** | **0.15** | **0.19** | **0.32** |
| Carbon Dioxide | $pCO_2$[(a)] | -0.68 | -1.46 | -1.02 | -1.09 | -1.18 | -0.70 | -0.95 | -1.24 | **0.49** | -1.11 | -1.39 | -1.10 | **-0.30** | -1.48 | -1.83 |

**Notes:**

Saturation indices >-0.5 identified by bold type and grey shading

[(a)]pCO2(g) values presented at 10^value atm

# Figures


**LEGEND**

- AP-1 MONITORING WELL
- AP-2,3/4 MONITORING WELL
- UPGRADIENT WELL
- ASSESSMENT MONITORING WELLS
- PIEZOMETER
- TEMPORARY AEM WELL
- SURFACE WATER MONITORING LOCATION
- STAFF GAUGE
- PROPERTY BOUNDARY
- PERMIT BOUNDARY

**NOTES**

1. ALL LOCATIONS AND BOUNDARIES ARE APPROXIMATE.

**REFERENCE**

1. AERIAL IMAGE DATED NOVEMBER 2019 FROM GOOGLE EARTH AND JUNE 23, 2022 FROM COOPER, BARNETTE & PAGE, INC. (CBP).

2. COORDINATE SYSTEM: NAD 1983 STATE PLANE GEORGIA WEST (U.S. FEET).

3. MONITORING WELL/PIEZOMETER LOCATIONS AND ELEVATIONS SURVEYED BY METRO ENGINEERING AND SURVEYING COMPANY IN AUGUST 2020 WITH ADDITIONAL SURVEY PROVIDED IN JANUARY 2021 AND MAY 2021.

0 600 1,200

1 IN= 600 FT

CLIENT
GEORGIA POWER COMPANY
PLANT MCDONOUGH-ATKINSON

Georgia Power

PROJECT
GEOCHEMICAL CONCEPTUAL SITE MODEL
PLANT MCDONOUGH-ATKINSON ASH POND 2 AND 3/4

TITLE
**MONITORING WELL, PIEZOMETER AND SURFACE WATER LOCATION MAP**

CONSULTANT

| | |
|---|---|
| YYYY-MM-DD | 2022-07-11 |
| PREPARED | SEB |
| DESIGN | DLP |
| CHECKED | PJN |
| REVIEWED/APPROVED | TR |

PROJECT No. 166849622 Rev. 0 FIGURE **1a**


LEGEND

- AP-1 MONITORING WELL
- AP-2,3/4 MONITORING WELL
- UPGRADIENT WELL
- ASSESSMENT MONITORING WELLS
- PIEZOMETER
- TEMPORARY AEM WELL
- SURFACE WATER MONITORING LOCATION
- STAFF GAUGE
- PROPERTY BOUNDARY
- PERMIT BOUNDARY

NOTES

1. ALL LOCATIONS AND BOUNDARIES ARE APPROXIMATE.

REFERENCE

1. AERIAL IMAGE DATED NOVEMBER 2019 FROM GOOGLE EARTH AND JUNE 23, 2022 FROM COOPER, BARNETTE & PAGE, INC. (CBP).

2. COORDINATE SYSTEM: NAD 1983 STATE PLANE GEORGIA WEST (U.S. FEET).

3. MONITORING WELL/PIEZOMETER LOCATIONS AND ELEVATIONS SURVEYED BY METRO ENGINEERING AND SURVEYING COMPANY IN AUGUST 2020 WITH ADDITIONAL SURVEY PROVIDED IN JANUARY 2021 AND MAY 2021.

0 140 280

1"=140 FT FEET

CLIENT

GEORGIA POWER COMPANY
PLANT MCDONOUGH-ATKINSON

Georgia Power

PROJECT

GEOCHEMICAL CONCEPTUAL SITE MODEL
PLANT MCDONOUGH-ATKINSON ASH POND 2 AND 3/4

TITLE

**(INSET) MONITORING WELL, PIEZOMETER AND SURFACE WATER LOCATION MAP**

CONSULTANT

wsp

| | |
|---|---|
| YYYY-MM-DD | 7/18/2022 |
| PREPARED | SEB |
| DESIGN | DAH |
| CHECKED | TR |
| REVIEW/APPROVED | RV |

| PROJECT NO. | CONTROL | REV. | FIGURE |
|---|---|---|---|
| 166849622 | | 0 | **1b** |


## LEGEND

- PERMIT BOUNDARY
- RIVER, STREAMS AND OTHER WATER AREAS
- PROPERTY BOUNDARY
- UPGRADIENT WELL (SEE REFERENCE 4)
- AP-1 MONITORING WELL (SEE REFERENCE 4)
- AP-2, 3/4 MONITORING WELL (SEE REFERENCE 4)
- ASSESSMENT WELLS (SEE REFERENCE 4 AND 5)
- PIEZOMETERS (SEE REFERENCE 4 AND 5)
- SURFACE WATER MONITORING

## REFERENCES

1. IMAGE PROVIDED BY COOPER BARNETTE AND PAGE, DATED JUNE 23, 2022.
2. COORDINATE SYSTEM : NAD 1983 STATE PLANE GEORGIA WEST (U.S. FEET)
3. APPROXIMATE PROPERTY BOUNDARY PROVIDED BY SOUTHERN COMPANY (2018)
3. LAW ENGINEERING GEOTECHNICAL INVESTIGATION REPORT (LAW, 1968).
4. GOLDER ASSOCIATES, PLANT MCDONOUGH SUPPLEMENTAL INVESTIGATION (2017-2021).
5. COORDINATES SYSTEM: NAD 1983 STATE PLANE GEORGIA WEST (U.S. FEET); ELEVATIONS DISPLAY IN FEET REFERENCED TO NORTH AMERICAN VERTICAL DATUM 1988 ( FEET NAVD88).

0 200 400

1" = 200' FEET

10X VERTICALLY EXAGGERATED

| REV | | | DES | CADD | CHK | RVW |
|---|---|---|---|---|---|---|

CLIENT

GEORGIA POWER COMPANY
PLANT MCDONOUGH-ATKINSON

Georgia Power

PROJECT

GEOCHEMICAL CONCEPTUAL SITE MODEL
PLANT MCDONOUGH-ATKINSON ASH POND 2 AND 3/4

TITLE

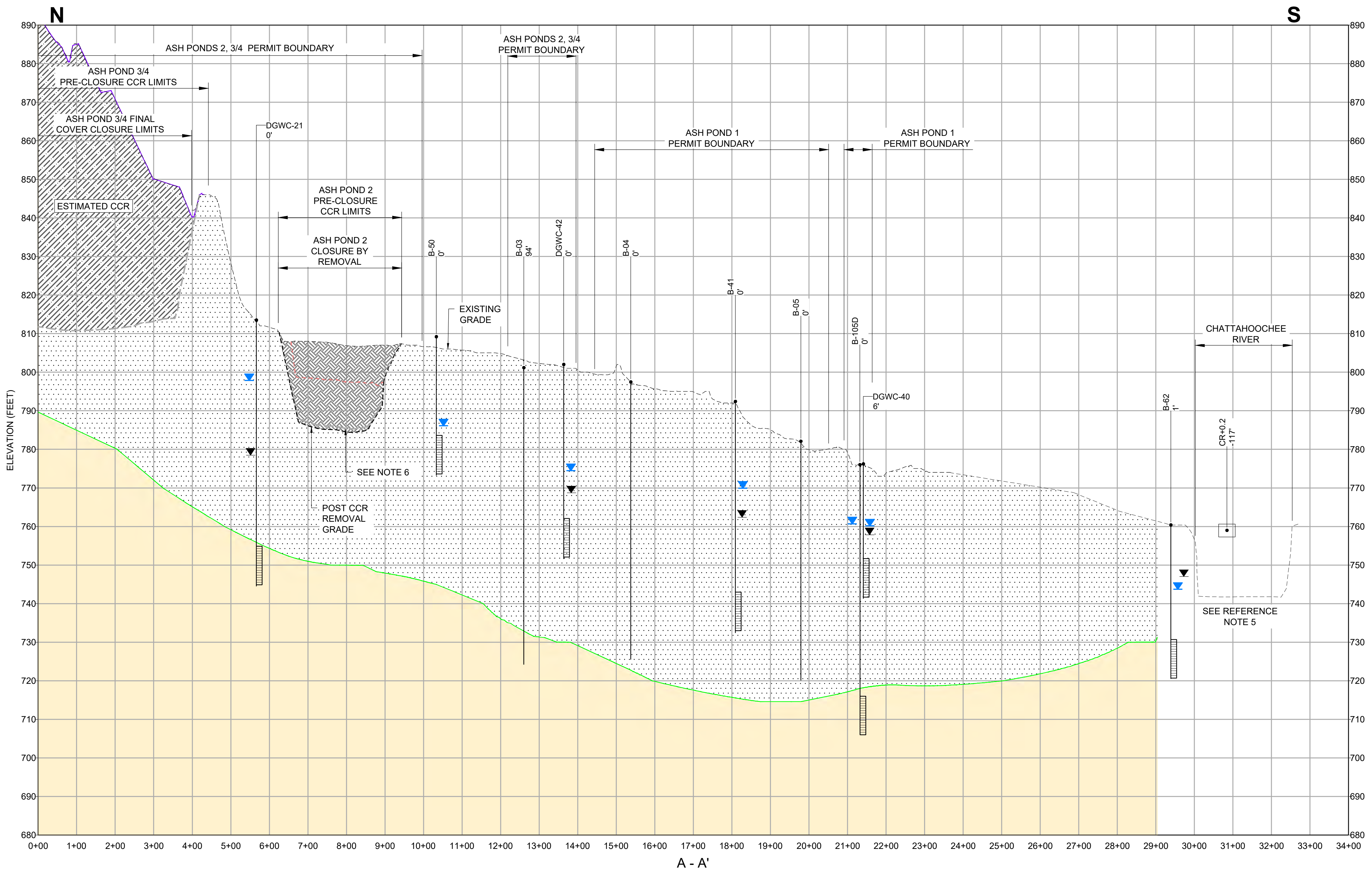
**SOIL AND PORE WATER SAMPLING**

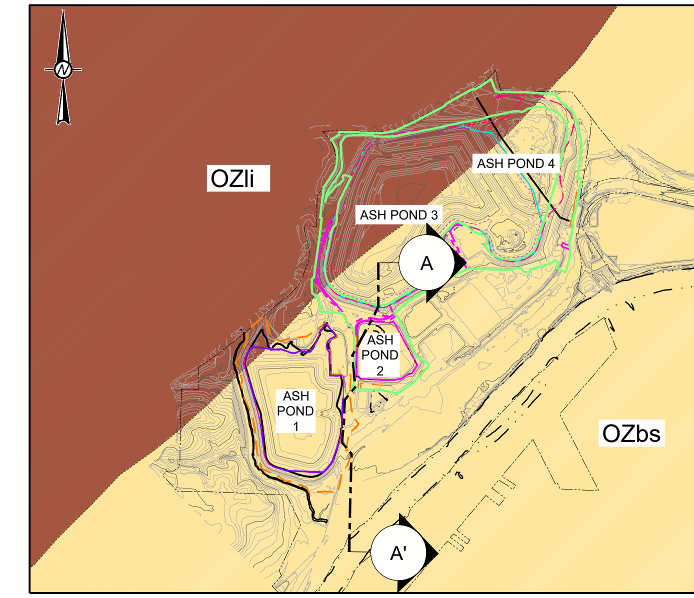
CONSULTANT

wsp

| | |
|---|---|
| YYYY-MM-DD | 2022/09/22 |
| DESIGNED | DLP |
| PREPARED | AVR |
| CHECKED | PJN |
| REVIEWED / APPROVED | TR |

PROJECT NO. 1668499622 | REV. 0 | FIGURE 2




KEY MAP

## NOTES

1. B-122D IS COMPLETED OUTSIDE THE FIGURE VIEW. B-122D IS COMPLETELY IN BIOTITE GNEISS WITH A SCREEN ELEVATION OF 707.52 - 697.52 FEET BGS.

## REFERENCES

1.THE EXISTING TOPOGRAPHY AND CONTOUR ELEVATIONS WERE PROVIDED BY GEORGIA POWER. THE DATE OF THE SURVEY PROVIDED AND SHOWN ON THIS SET OF PLANS IS AUGUST 31, 2022. GEORGIA STATE PLANE WEST SURVEY FEET.

2. BORING/WELL/PIEZOMETER LOCATIONS AND ELEVATIONS PROVIDED BY SOUTHERN COMPANY SERVICES, INC. AND 1968 LAW ENGINEERING GEOTECHNICAL INVESTIGATION REPORT.

3. GEOLOGIC UNITS TAKEN FROM PETROLOGIC SOLUTIONS GEOLOGIC MAPPING, OCTOBER 2016.

4. SELECT BORING/PIEZOMETER LOCATIONS AND ELEVATIONS SURVEYED AND/OR RESURVEYED BY METRO ENGINEERING & SURVEYING CO., INC., 2020 / 2021.

5. NO AVAILABLE SUBSURFACE GEOLOGIC DATA.

6. ESTIMATED PRE-CLOSURE BOTTOM OF CCR LIMITS FOR AP-2 GENERALLY FOLLOW 1 OR MORE FEET ABOVE POST REMOVAL GRADES.

## LEGEND

- EXISTING GRADE (SEE REFERENCE 1)
- ESTIMATED TOP OF ROCK SURFACE
- PROPOSED FINAL GRADE
- ESTIMATED PRE-CLOSURE BOTTOM OF CCR LIMITS
- FINAL COVER SYSTEM
- ESTIMATED CCR TO REMAIN IN PLACE
- OVERBURDEN (COMPRISED OF RESIDUAL SOILS, TRANSITIONALLY WEATHERED ROCK, AND FILL)
- PHYLLONITE, BUTTON SCHIST, MYLONITE, AND MYLONITIC BIOTITE GNEISS (OZbs)
- BIOTITE GNEISS, LONG ISLAND CREEK GNEISS (OZli)
- ESTIMATED GROUNDWATER SURFACE (9/06/2022)
- PREDICTED POST-CLOSURE GROUNDWATER SURFACE

B-29 -144'
- BORING ID
- DISTANCE FROM CROSS-SECTION (FEET) (- REPRESENTS LEFT OF ALIGNMENT)
- GROUND SURFACE ELEVATION
- SCREEN INTERNAL

0 150 300
1" = 150' FEET
10X VERTICALLY EXAGGERATED

CLIENT
GEORGIA POWER COMPANY
PLANT MCDONOUGH-ATKINSON

Georgia Power

PROJECT
GEOCHEMICAL CONCEPTUAL SITE MODEL
PLANT McDONOUGH-ATKINSON ASH POND 2 AND 3/4

TITLE
**GEOLOGIC CROSS SECTION SCHEMATIC A - A'**

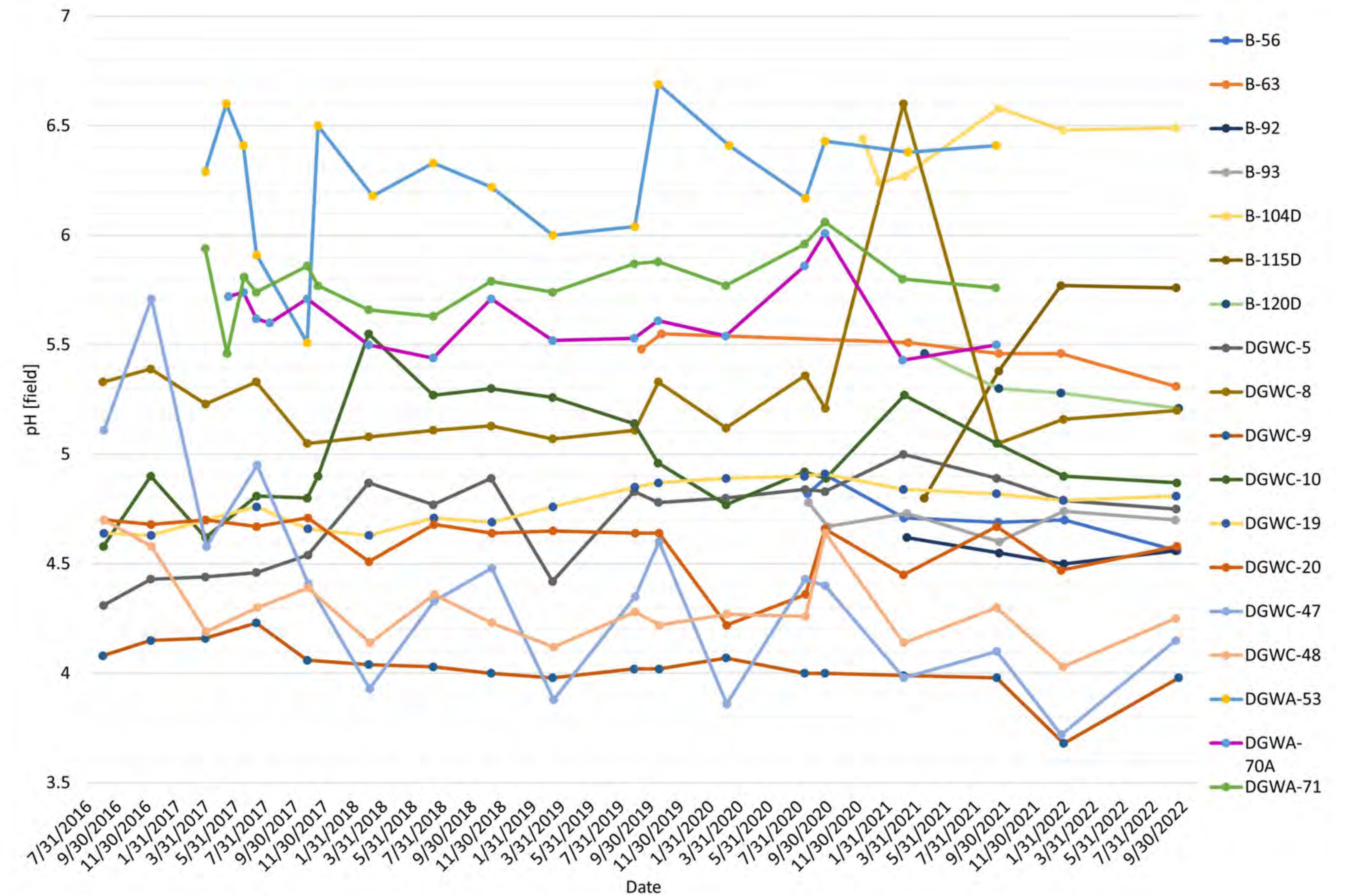
CONSULTANT

wsp

| | |
|---|---|
| YYYY-MM-DD | 2023-02-08 |
| DESIGNED | DLP |
| PREPARED | CRP |
| CHECKED | DLP |
| REVIEWED / APPROVED | RNQ |

| PROJECT NO. | REV. | SHEET |
|---|---|---|
| 1668499622 | - | 3 |

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI D




GEORGIA POWER COMPANY
PLANT MCDONOUGH-ATKINSON

PROJECT
GEOCHEMICAL CONCEPTUAL SITE MODEL

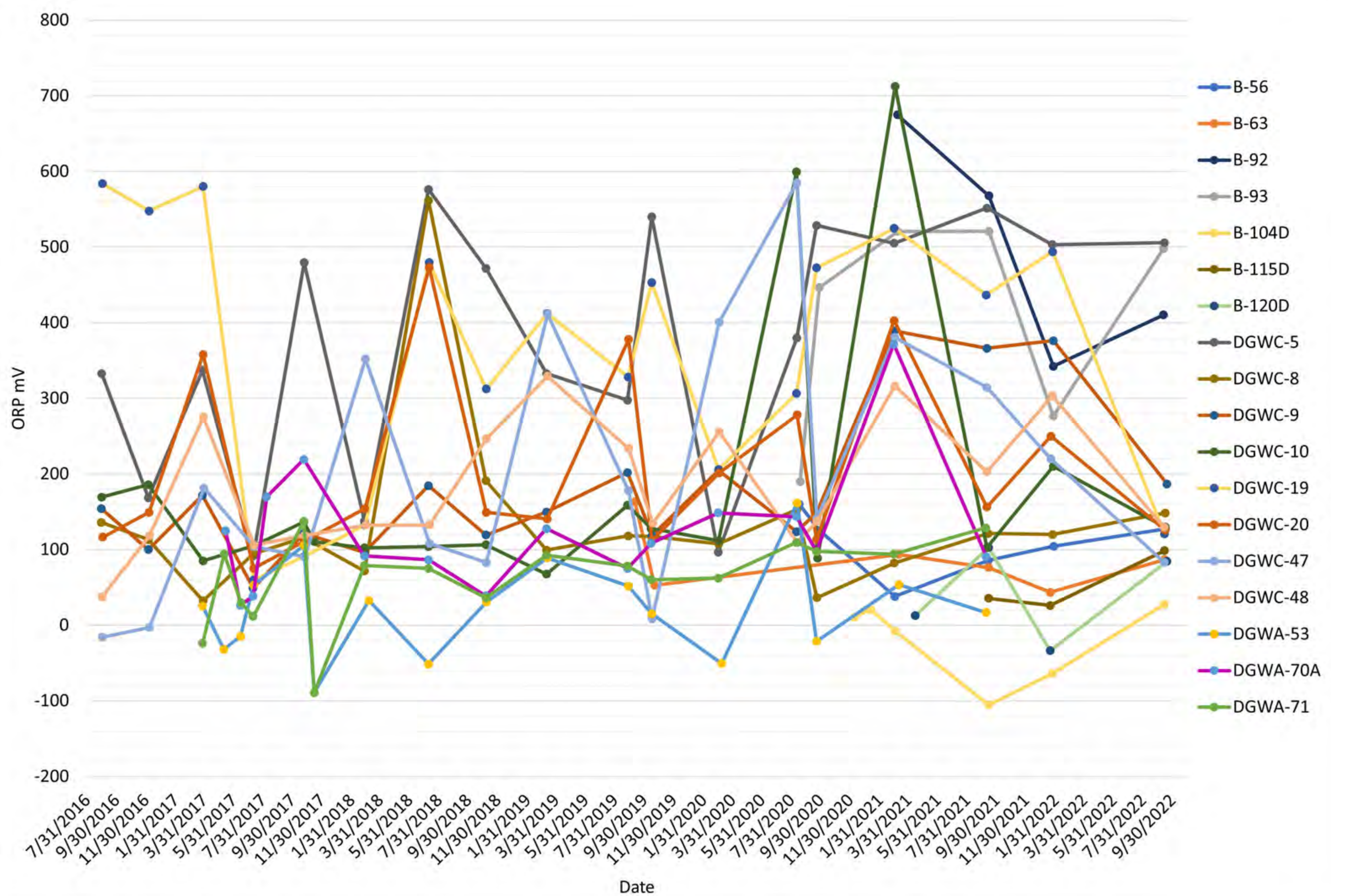
CONSULTANT

| | |
|---|---|
| YYYY-MM-DD | 2023-04-26 |
| DESIGNED | NP |
| PREPARED | NP |
| REVIEWED | PJN |
| APPROVED | TR |

TITLE
**pH OF GROUNDWATER AT AP-2 AND 3/4 MONITORING WELLS**

| PROJECT NO. | CONTROL | REV. | FIGURE |
|---|---|---|---|
| GL166849621 | | 0 | 4 |

PATH: https://golderassociates.sharepoint.com/sites/127388/Project Files/5 Technical Work/2000-Martin Lake Ash Ponds/Tier II Report | FILE NAME: Figure Book.xlsx




GEORGIA POWER COMPANY
PLANT MCDONOUGH-ATKINSON

PROJECT
GEOCHEMICAL CONCEPTUAL SITE MODEL

CONSULTANT

| | |
|---|---|
| YYYY-MM-DD | 2023-04-26 |
| DESIGNED | NP |
| PREPARED | NP |
| REVIEWED | PJN |
| APPROVED | TR |

TITLE
**ORP OF GROUNDWATER AT AP-2 AND 3/4 MONITORING WELLS**

| PROJECT NO. | CONTROL | REV. | FIGURE |
|---|---|---|---|
| GL166849621 | | 0 | 5 |

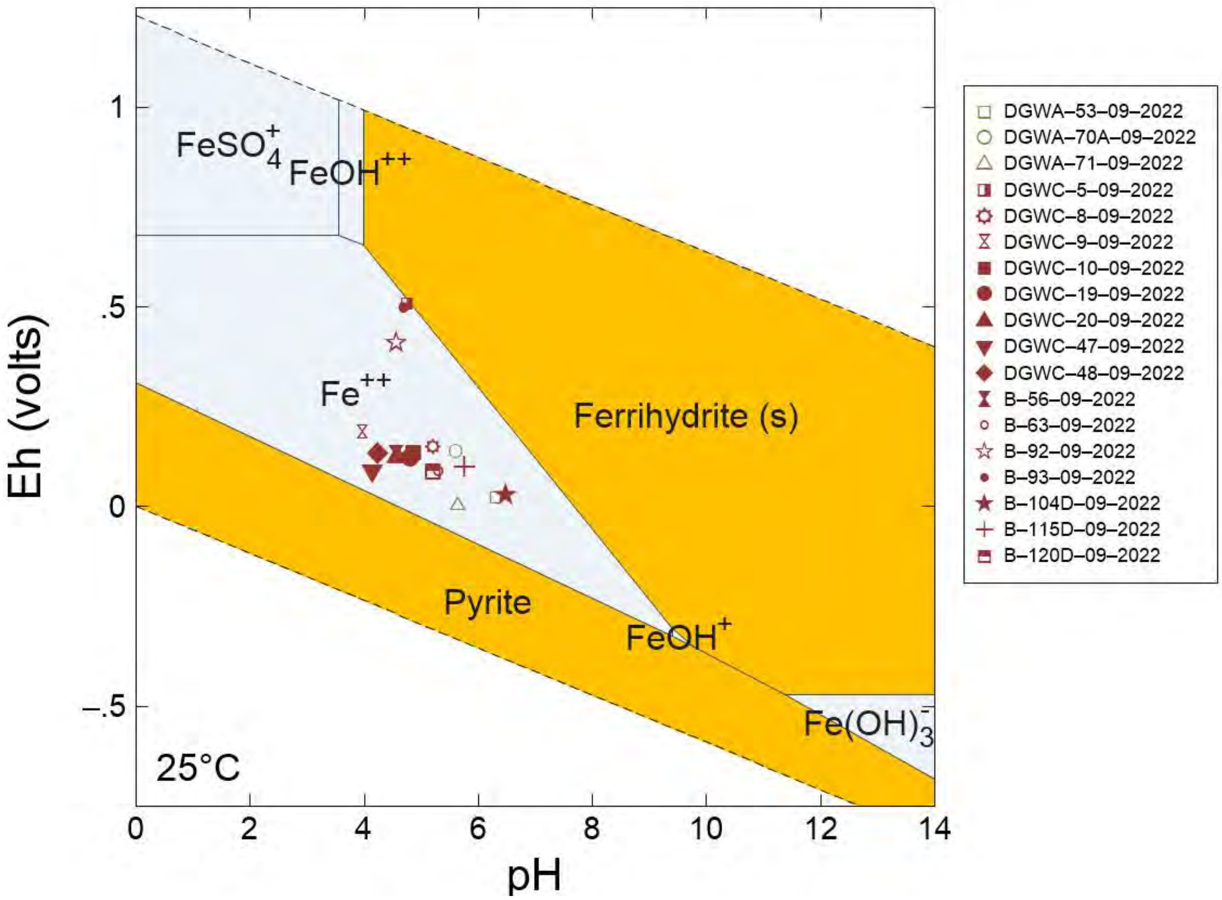



Diagram $Fe^{+++}$, T = 25 °C , P = 1.013 bars, a [main] = $10^{-6}$, a [$H_2O$] = 1, a [$SO_4^{-}$] = $10^{-5}$,

Suppressed: BeS, $Fe(OH)_2$ (am), $Fe(OH)_2$ (c), $Fe_3(OH)_8$, Ferrihydrite (aged), Goethite, Hematite,

Lepidocrocite, Maghemite, Magnetite

Note: ORP converted to SHE

CLIENT
GEORGIA POWER COMPANY
PLANT MCDONOUGH-ATKINSON

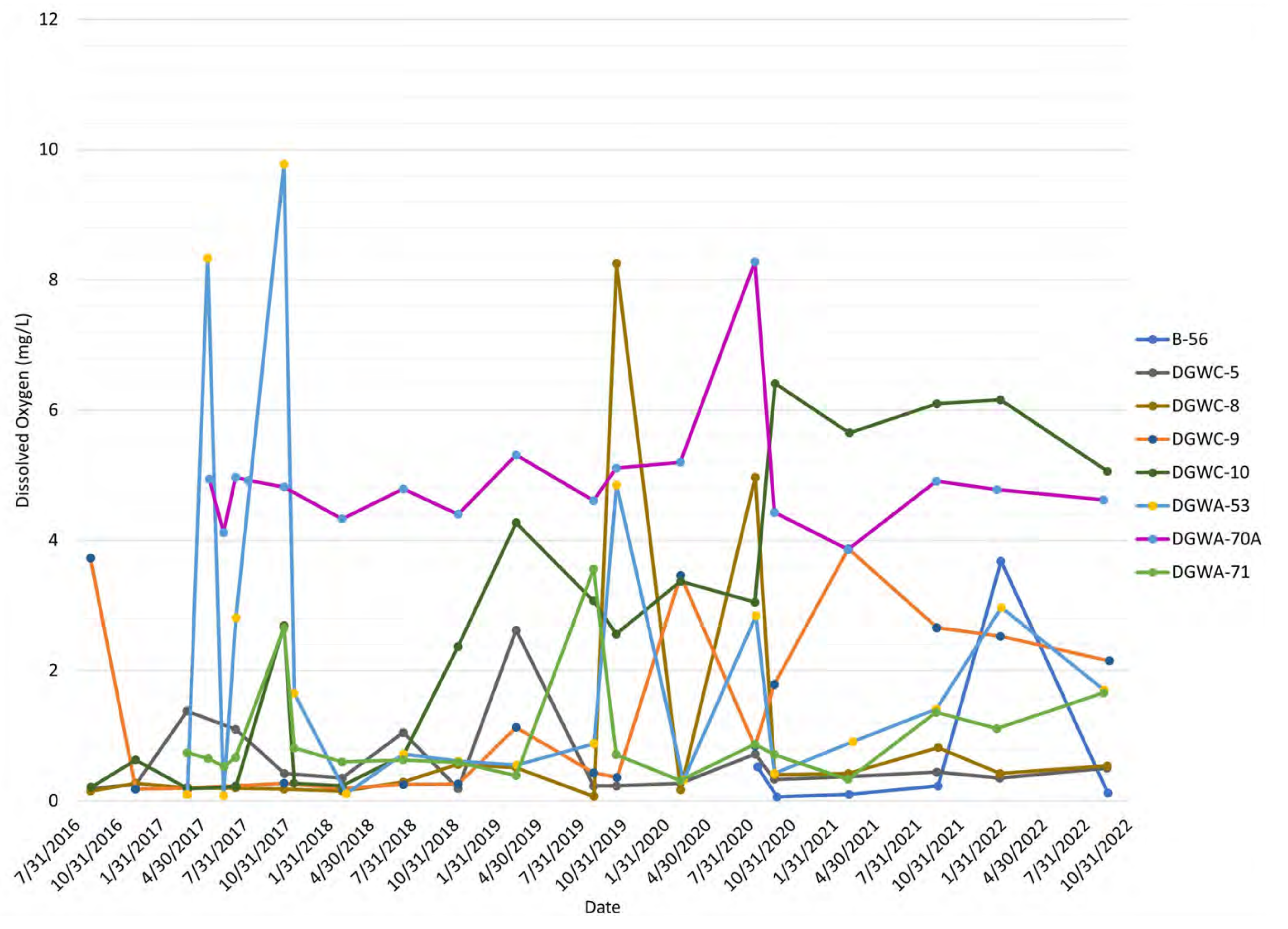
PROJECT
GEOCHEMICAL CONCEPTUAL SITE MODEL

CONSULTANT

| | |
|---|---|
| YYYY-MM-DD | 2023-02-14 |
| DESIGNED | CM |
| PREPARED | NP |
| REVIEWED | PJN |
| APPROVED | TR |

TITLE
**POURBAIX PLOT OF WELLS WITH SSLS**
**(Generalized using 1E-6 for Iron)**

| PROJECT NO. | CONTROL | REV. | FIGURE |
|---|---|---|---|
| GL166849621 | | 0 | 6 |




GEORGIA POWER COMPANY
PLANT MCDONOUGH-ATKINSON

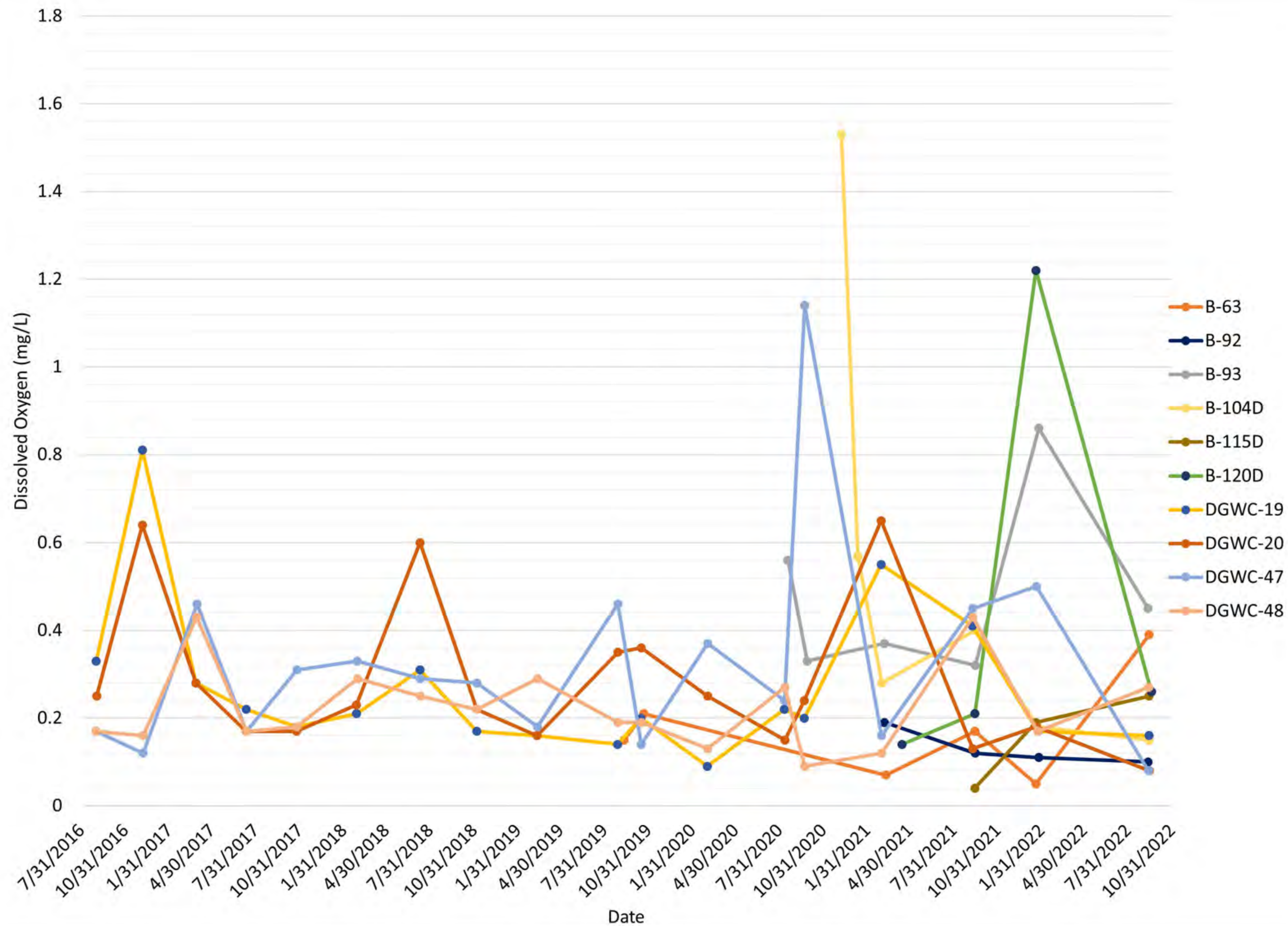
PROJECT
GEOCHEMICAL CONCEPTUAL SITE MODEL

CONSULTANT

| | |
|---|---|
| YYYY-MM-DD | 2023-04-26 |
| DESIGNED | NP |
| PREPARED | NP |
| REVIEWED | PJN |
| APPROVED | TR |

TITLE
**DISSOLVED OXYGEN IN GROUNDWATER AT AP-2 AND 3/4 MONITORING WELLS**

| PROJECT NO. | CONTROL | REV. | FIGURE |
|---|---|---|---|
| GL166849621 | | 0 | 7a |




GEORGIA POWER COMPANY
PLANT MCDONOUGH-ATKINSON

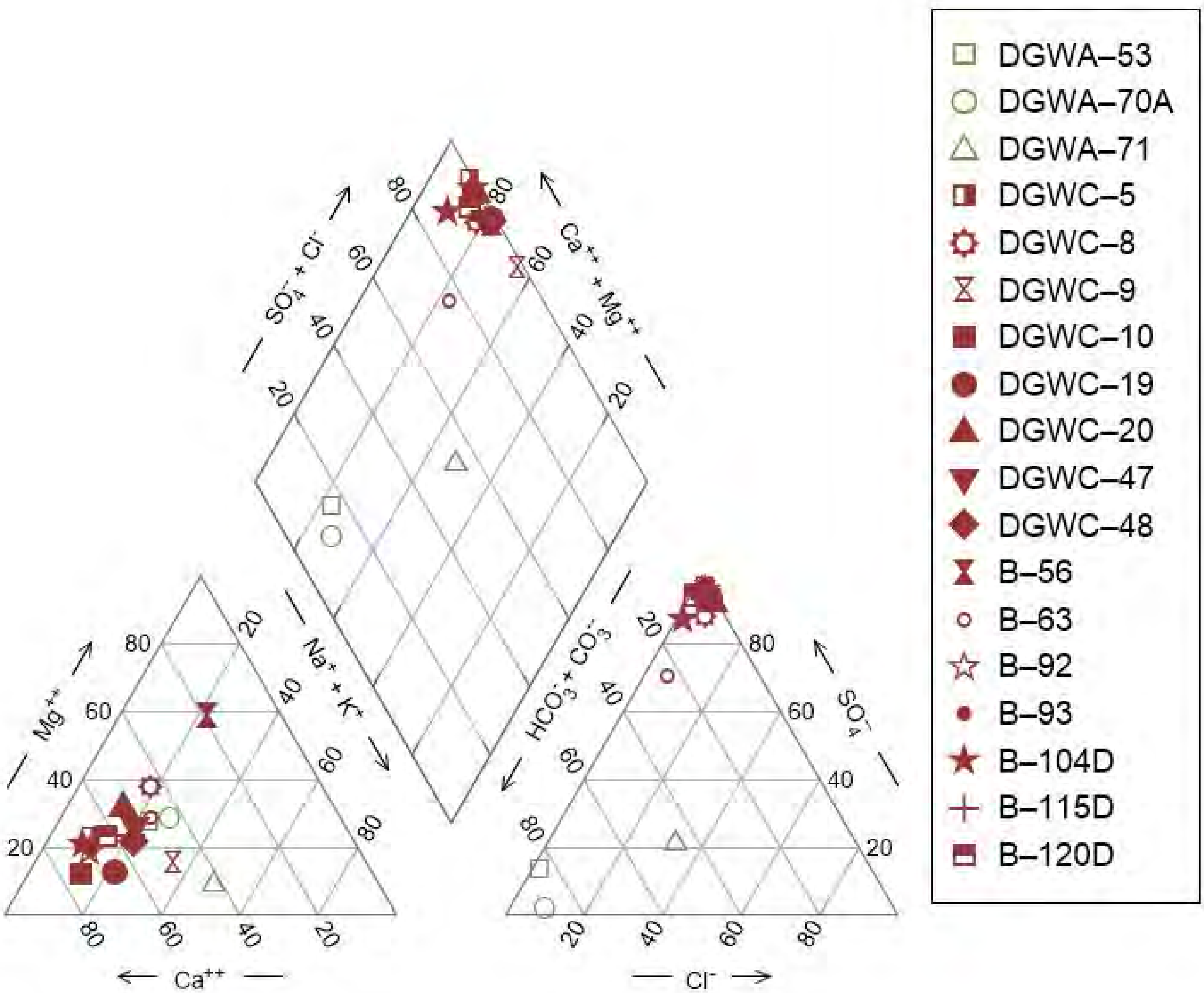
PROJECT
GEOCHEMICAL CONCEPTUAL SITE MODEL

CONSULTANT

| | |
|---|---|
| YYYY-MM-DD | 2023-04-26 |
| DESIGNED | NP |
| PREPARED | NP |
| REVIEWED | PJN |
| APPROVED | TR |

TITLE
**DISSOLVED OXYGEN IN GROUNDWATER AT AP-2 AND 3/4 MONITORING WELLS**

| PROJECT NO. | CONTROL | REV. | FIGURE |
|---|---|---|---|
| GL166849621 | | 0 | 7b |




CLIENT
GEORGIA POWER COMPANY
PLANT MCDONOUGH-ATKINSON

PROJECT
GEOCHEMICAL CONCEPTUAL SITE MODEL

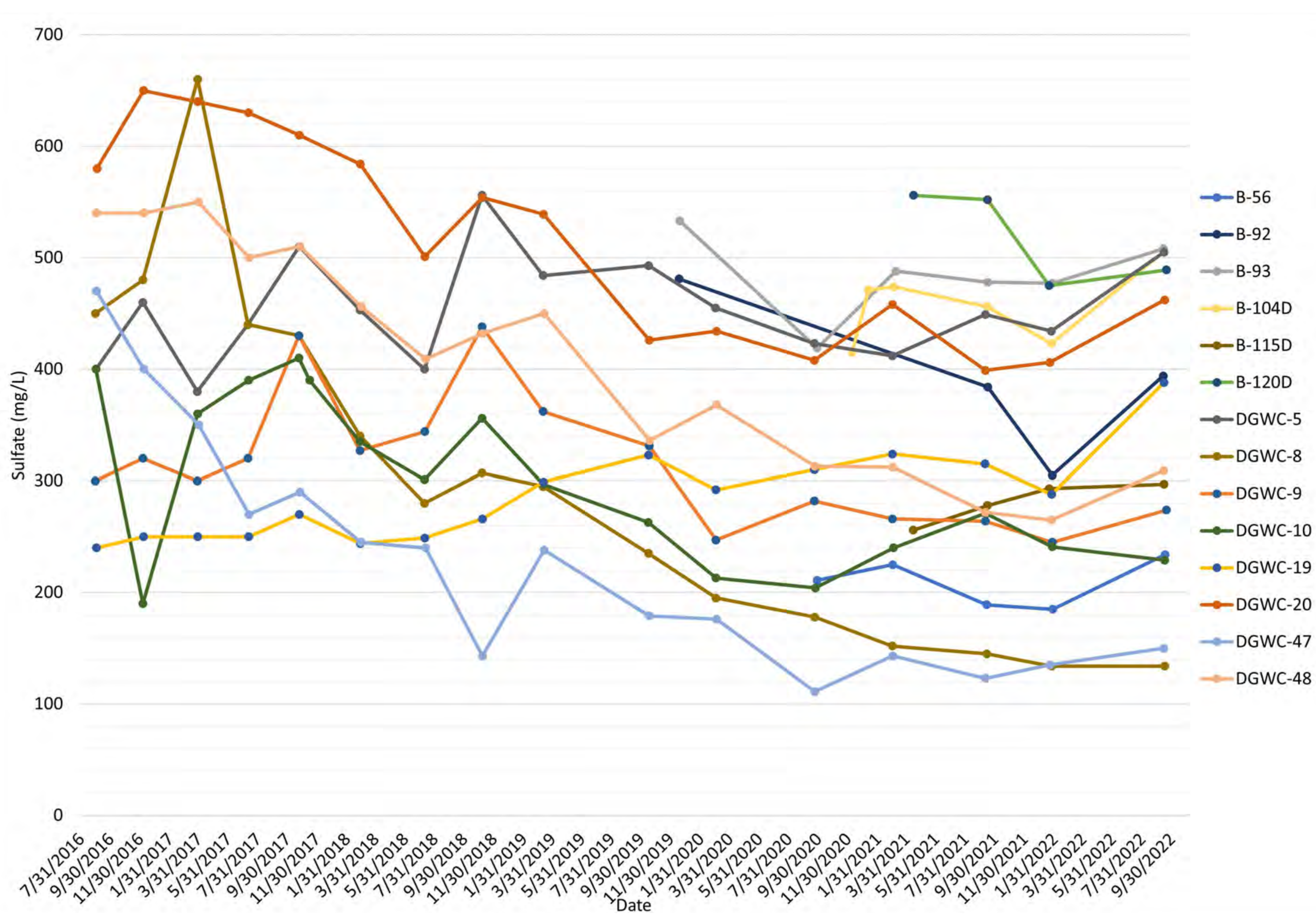
CONSULTANT

| | |
|---|---|
| YYYY-MM-DD | 2023-04-26 |
| DESIGNED | CM |
| PREPARED | NP |
| REVIEWED | PJN |
| APPROVED | TR |

TITLE
**AP-2 AND 3/4 MONITORING NETWORK PIPER DIAGRAM**

| PROJECT NO. | CONTROL | REV. | FIGURE |
|---|---|---|---|
| GL166849621 | | 0 | 8 |

PATH: https://golderassociates.sharepoint.com/sites/127388/Project Files/5 Technical Work/2000-Martin Lake Ash Ponds/Tier II Report | FILE NAME: Figure Book.xlsx




GEORGIA POWER COMPANY
PLANT MCDONOUGH-ATKINSON

PROJECT
GEOCHEMICAL CONCEPTUAL SITE MODEL

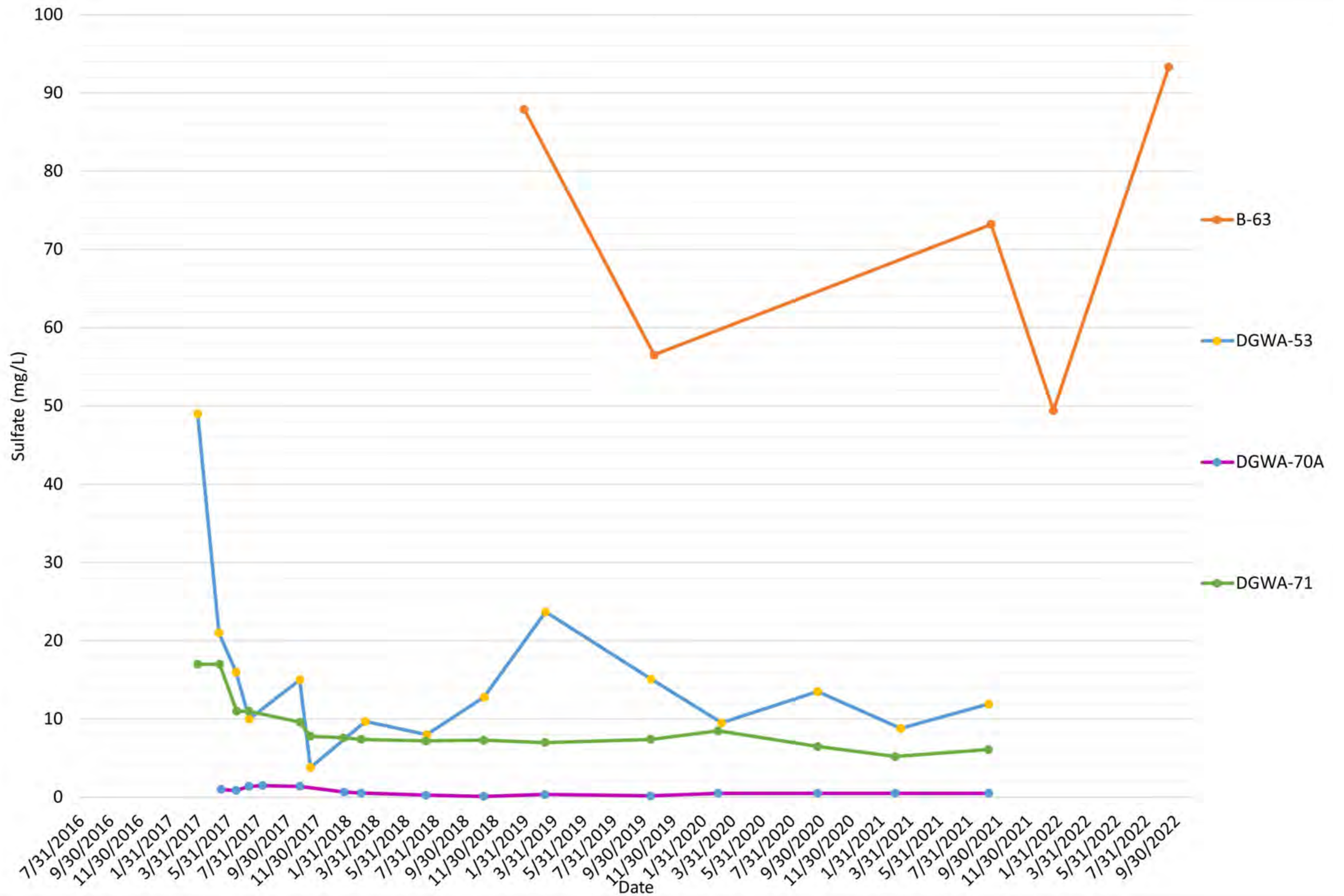
CONSULTANT

| | |
|---|---|
| YYYY-MM-DD | 2023-04-26 |
| DESIGNED | NP |
| PREPARED | NP |
| REVIEWED | PJN |
| APPROVED | TR |

TITLE
**SULFATE IN GROUNDWATER AT AP-2 AND 3/4 MONITORING WELLS**

| PROJECT NO. | CONTROL | REV. | FIGURE |
|---|---|---|---|
| GL166849621 | | 0 | 9a |

PATH: https://golderassociates.sharepoint.com/sites/127388/Project Files/5 Technical Work/2000-Martin Lake Ash Ponds/Tier II Report | FILE NAME: Figure Book.xlsx




GEORGIA POWER COMPANY
PLANT MCDONOUGH-ATKINSON

PROJECT
GEOCHEMICAL CONCEPTUAL SITE MODEL

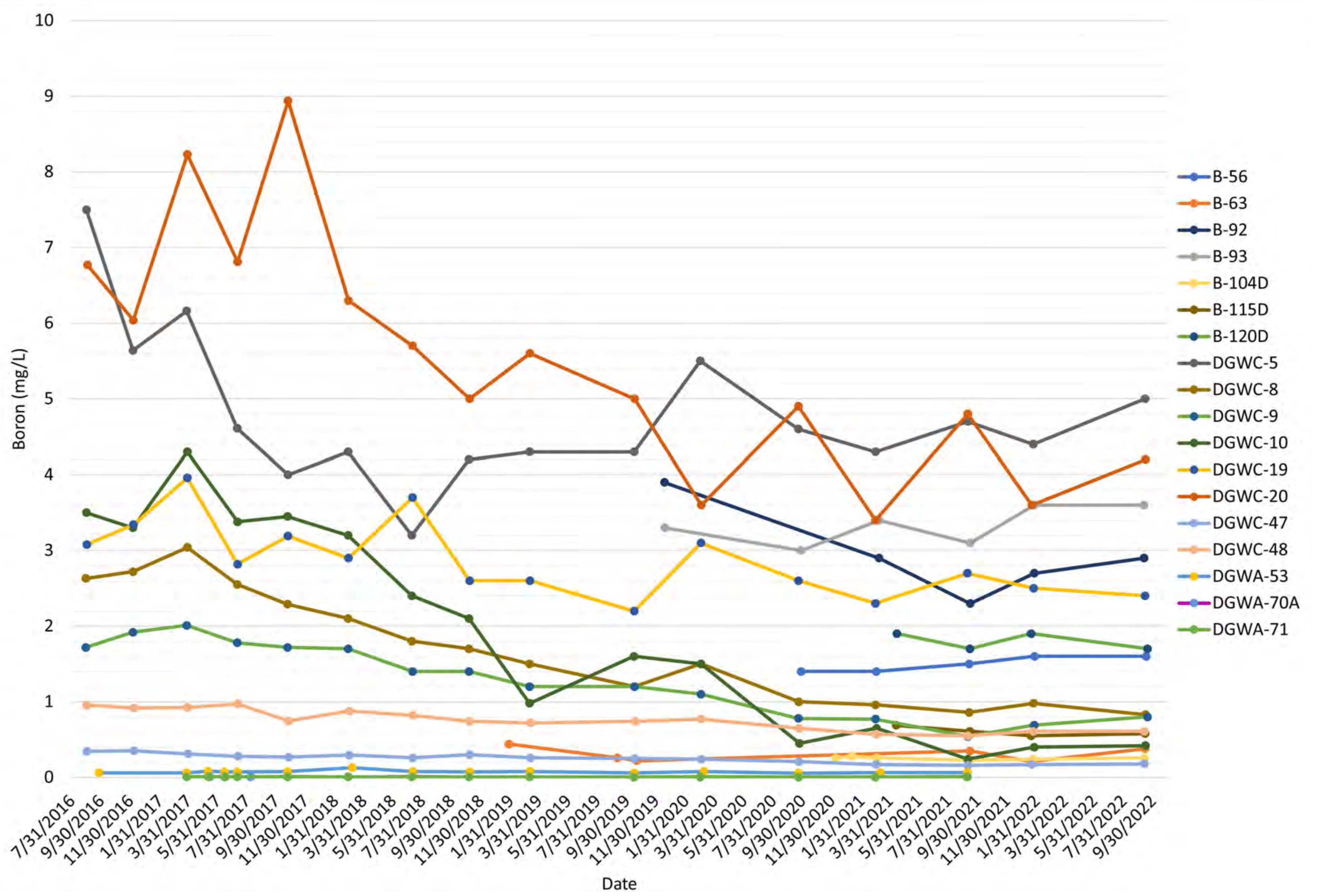
CONSULTANT

| | |
|---|---|
| YYYY-MM-DD | 2023-04-26 |
| DESIGNED | NP |
| PREPARED | NP |
| REVIEWED | PJN |
| APPROVED | TR |

TITLE
**SULFATE IN GROUNDWATER AT AP-2 AND 3/4 MONITORING WELLS**

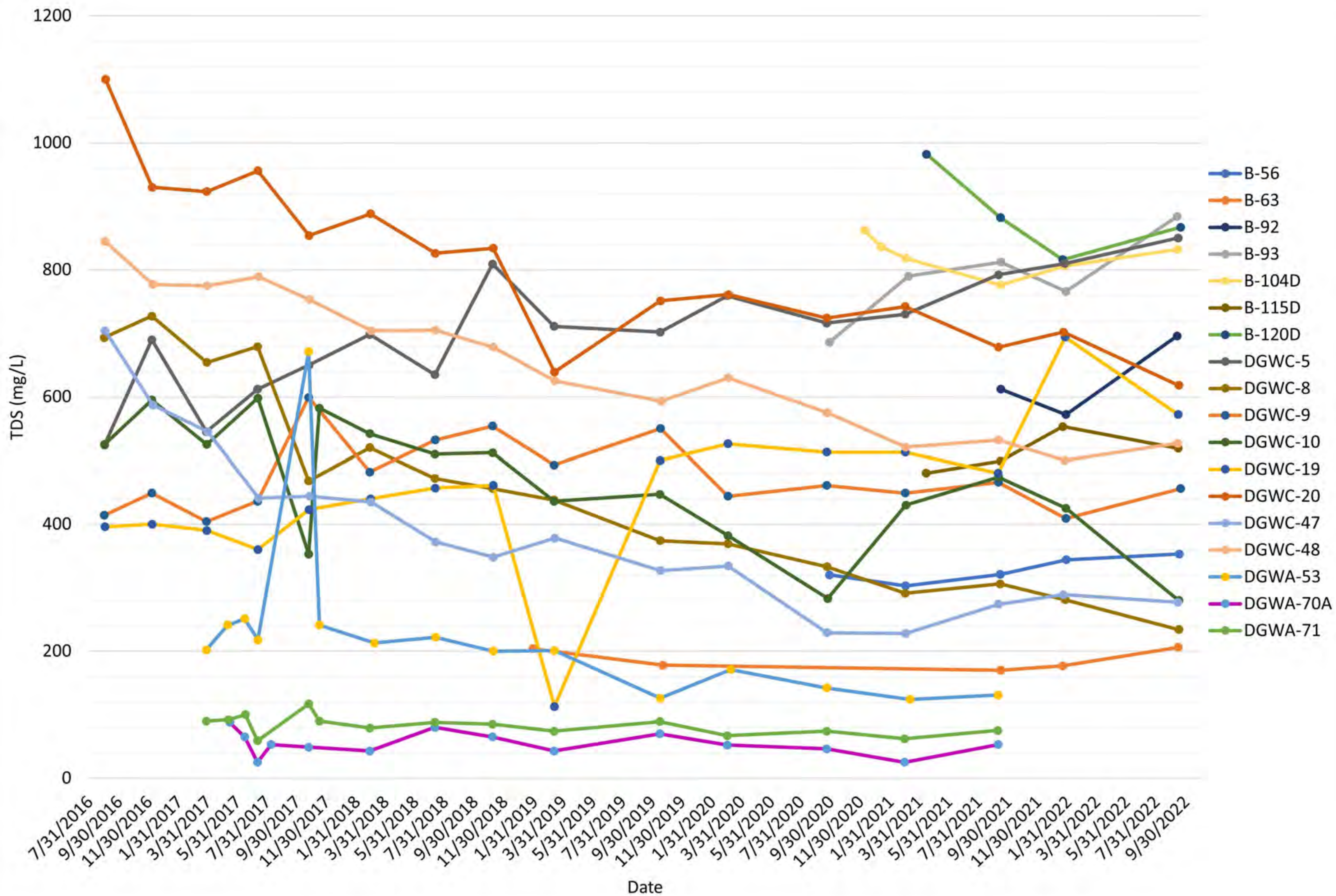
| PROJECT NO. | CONTROL | REV. | FIGURE |
|---|---|---|---|
| GL166849621 | | 0 | 9b |

PATH: https://golderassociates.sharepoint.com/sites/127388/Project Files/5 Technical Work/2000-Martin Lake Ash Ponds/Tier II Report | FILE NAME: Figure Book.xlsx




| | | | |
|---|---|---|---|
| GEORGIA POWER COMPANY<br>PLANT MCDONOUGH-ATKINSON | | PROJECT<br>GEOCHEMICAL CONCEPTUAL SITE MODEL | |
| CONSULTANT | YYYY-MM-DD 2023-04-26<br>DESIGNED NP<br>PREPARED NP<br>REVIEWED PJN<br>APPROVED TR | TITLE<br>**BORON IN GROUNDWATER AT AP-2 AND 3/4 MONITORING WELLS** | |
| | | PROJECT NO. GL166849621 | CONTROL / REV. 0 / FIGURE 10 |

PATH: https://golderassociates.sharepoint.com/sites/127388/Project Files/5 Technical Work/2000-Martin Lake Ash Ponds/Tier II Report | FILE NAME: Figure Book.xlsx




GEORGIA POWER COMPANY
PLANT MCDONOUGH-ATKINSON

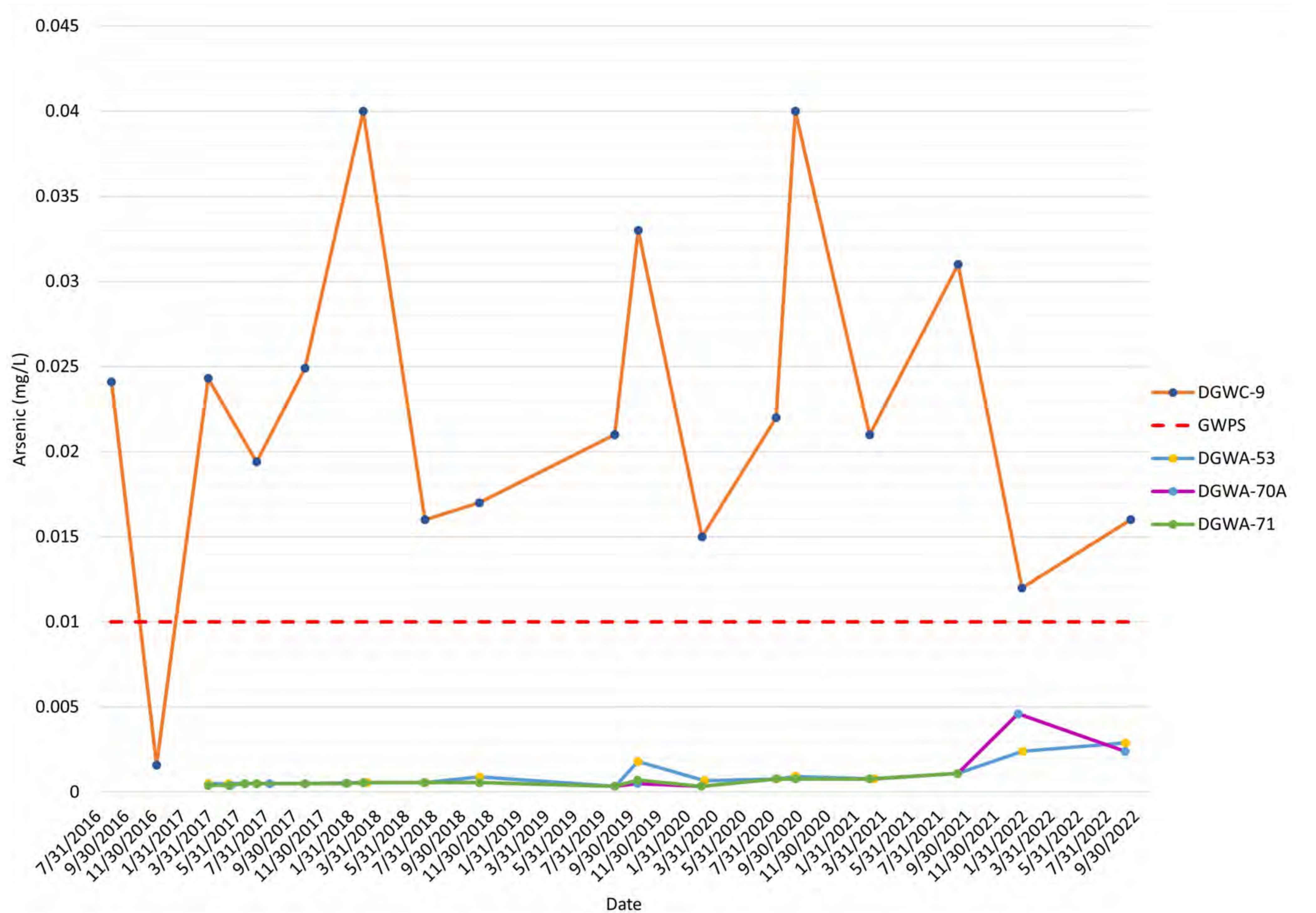
PROJECT
GEOCHEMICAL CONCEPTUAL SITE MODEL

CONSULTANT

| | |
|---|---|
| YYYY-MM-DD | 2023-04-26 |
| DESIGNED | NP |
| PREPARED | NP |
| REVIEWED | PJN |
| APPROVED | TR |

TITLE
**TDS IN GROUNDWATER AT AP-2 AND 3/4 MONITORING WELLS**

| PROJECT NO. | CONTROL | REV. | FIGURE |
|---|---|---|---|
| GL166849621 | | 0 | 11 |




| | |
|---|---|
| GEORGIA POWER COMPANY<br>PLANT MCDONOUGH-ATKINSON | PROJECT<br>GEOCHEMICAL CONCEPTUAL SITE MODEL |
| CONSULTANT | TITLE<br>**ARSENIC IN GROUNDWATER AT AP-2 AND 3/4 SSL AND BACKGROUND WELLS** |

| | |
|---|---|
| YYYY-MM-DD | 2023-04-26 |
| DESIGNED | NP |
| PREPARED | NP |
| REVIEWED | PJN |
| APPROVED | TR |

| PROJECT NO. | CONTROL | REV. | FIGURE |
|---|---|---|---|
| GL166849621 | | 0 | 12 |

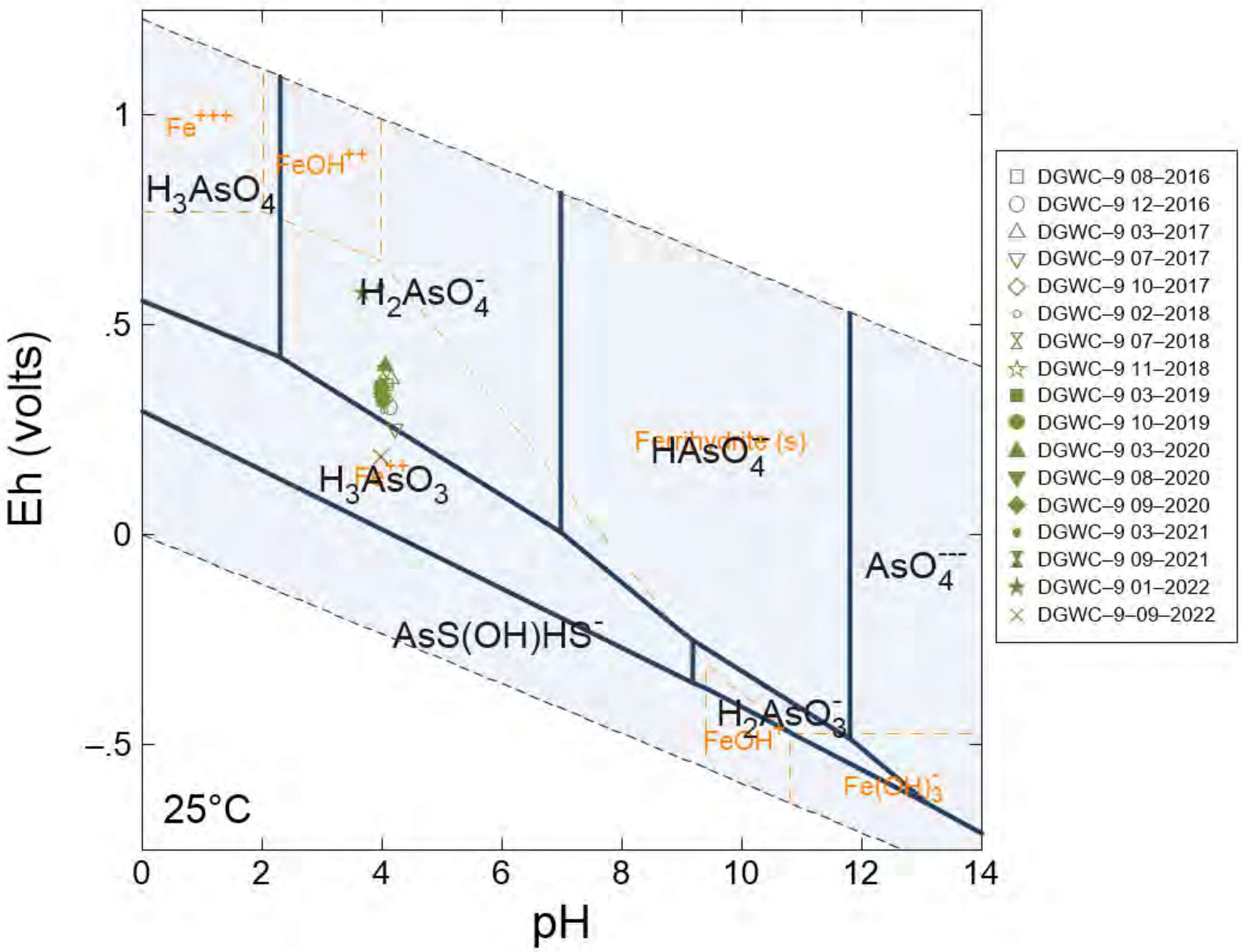



Diagram $AsO_4^{---}$, T = 25 °C , P = 1.013 bars, a [main] = $10^{-18.18}$, a [$H_2O$] = 1, a [$SO_4^{--}$] = $10^{-2.712}$, a [$Fe^{+++}$] = $10^{-6.783}$ (speciates; Suppressed: $Fe(OH)_2$ (c), $Fe(OH)_2^+$, $Fe(OH)_4^-$, Ferrihydrite (aged), Goethite, Hematite, Lepidocrocite, Maghemite, Magnetite

Note: ORP converted to SHE

CLIENT
GEORGIA POWER COMPANY
PLANT MCDONOUGH-ATKINSON

PROJECT
GEOCHEMICAL CONCEPTUAL SITE MODEL

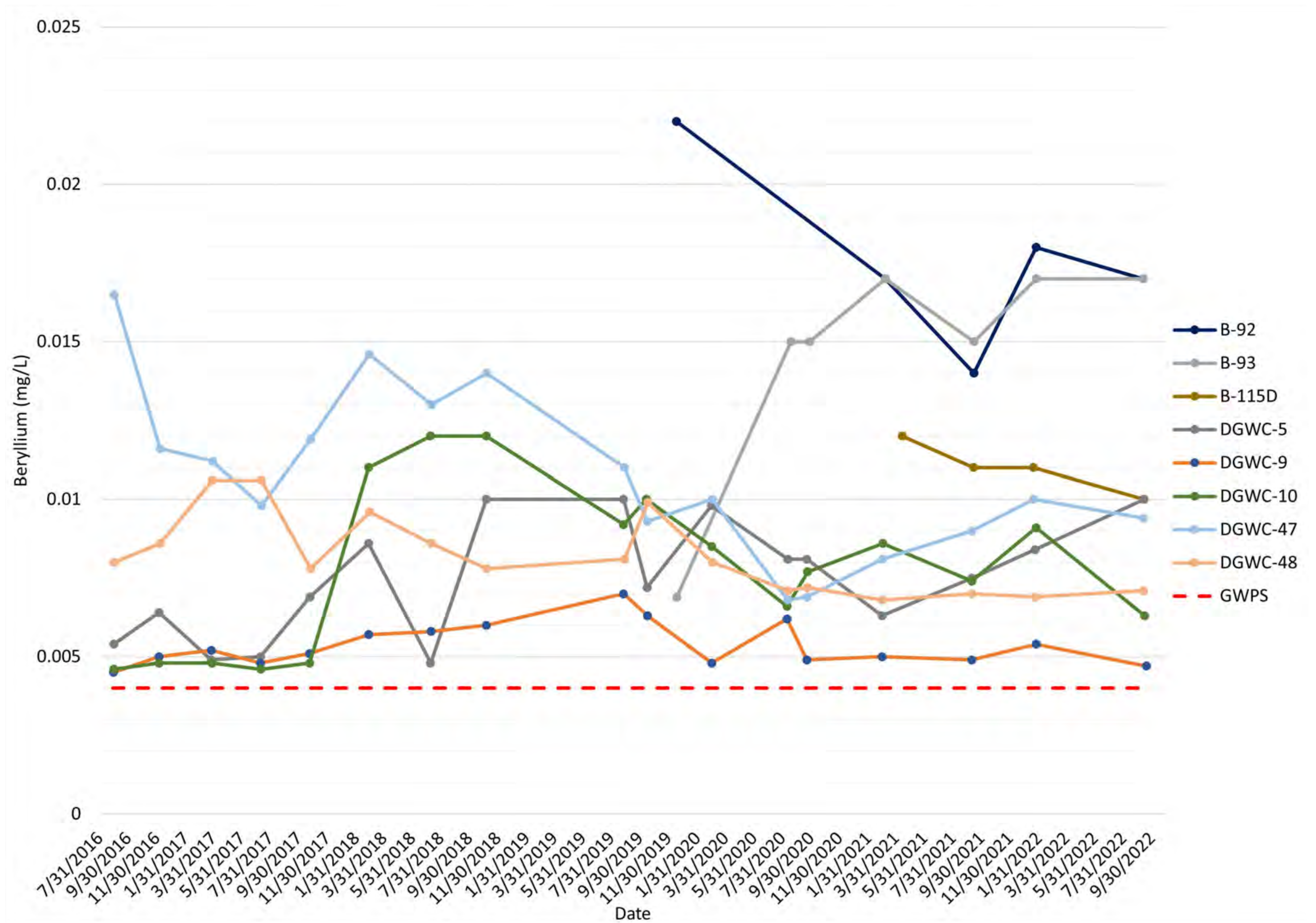
CONSULTANT

| | |
|---|---|
| YYYY-MM-DD | 2023-02-14 |
| DESIGNED | CM |
| PREPARED | NP |
| REVIEWED | PJN |
| APPROVED | TR |

TITLE
**DGWC-9 ARSENIC POURBAIX DIAGRAM**
**(Generalized using 1E-6 for activity of Arsenic)**

| PROJECT NO. | CONTROL | REV. | FIGURE |
|---|---|---|---|
| GL166849621 | | 0 | 13 |

PATH: https://golderassociates.sharepoint.com/sites/127388/Project Files/5 Technical Work/2000-Martin Lake Ash Ponds/Tier II Report | FILE NAME: Figure Book.xlsx




GEORGIA POWER COMPANY
PLANT MCDONOUGH-ATKINSON

PROJECT
GEOCHEMICAL CONCEPTUAL SITE MODEL

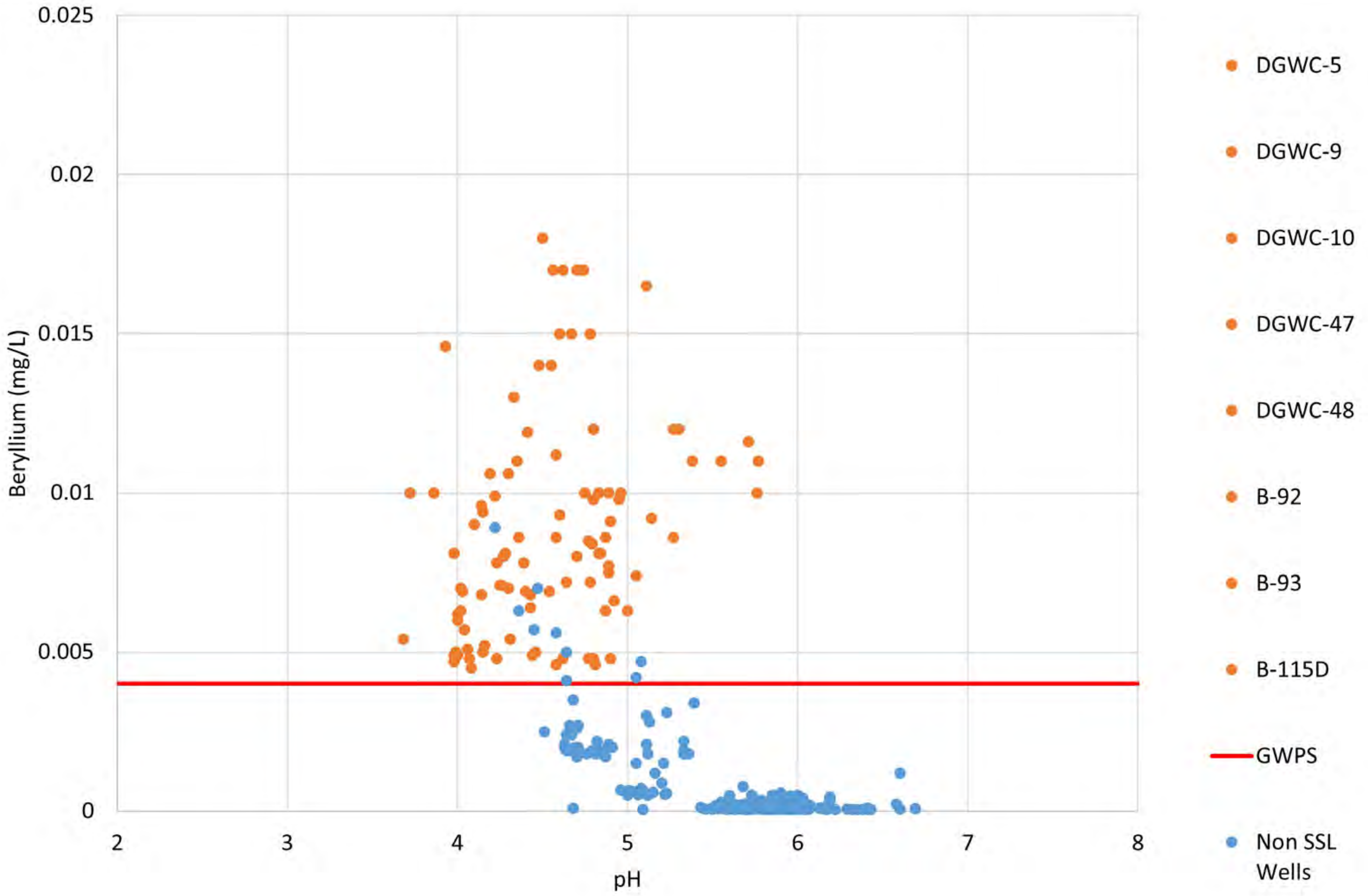
CONSULTANT

| | |
|---|---|
| YYYY-MM-DD | 2023-04-27 |
| DESIGNED | NP |
| PREPARED | NP |
| REVIEWED | PJN |
| APPROVED | TR |

TITLE
**BERYLLIUM IN GROUNDWATER AT AP-2 AND 3/4 SSL AND BACKGROUND WELLS**

| PROJECT NO. | CONTROL | REV. | FIGURE |
|---|---|---|---|
| GL166849621 | | 0 | 14 |

PATH: https://golderassociates.sharepoint.com/sites/127388/Project Files/5 Technical Work/2000-Martin Lake Ash Ponds/Tier II Report | FILE NAME: Figure Book.xlsx




Note: all other data from AP-2,3/4 monitoring wells other than exceedance are shown in blue for contrasting beryllium and pH range

GEORGIA POWER COMPANY
PLANT MCDONOUGH-ATKINSON

PROJECT
GEOCHEMICAL CONCEPTUAL SITE MODEL

CONSULTANT

| | |
|---|---|
| YYYY-MM-DD | 2023-02-14 |
| DESIGNED | NP |
| PREPARED | NP |
| REVIEWED | PJN |
| APPROVED | TR |

TITLE
**pH VS BERYLLIUM AT AP-2 AND 3/4**

| PROJECT NO. | CONTROL | REV. | FIGURE |
|---|---|---|---|
| GL166849621 | | 0 | 15 |

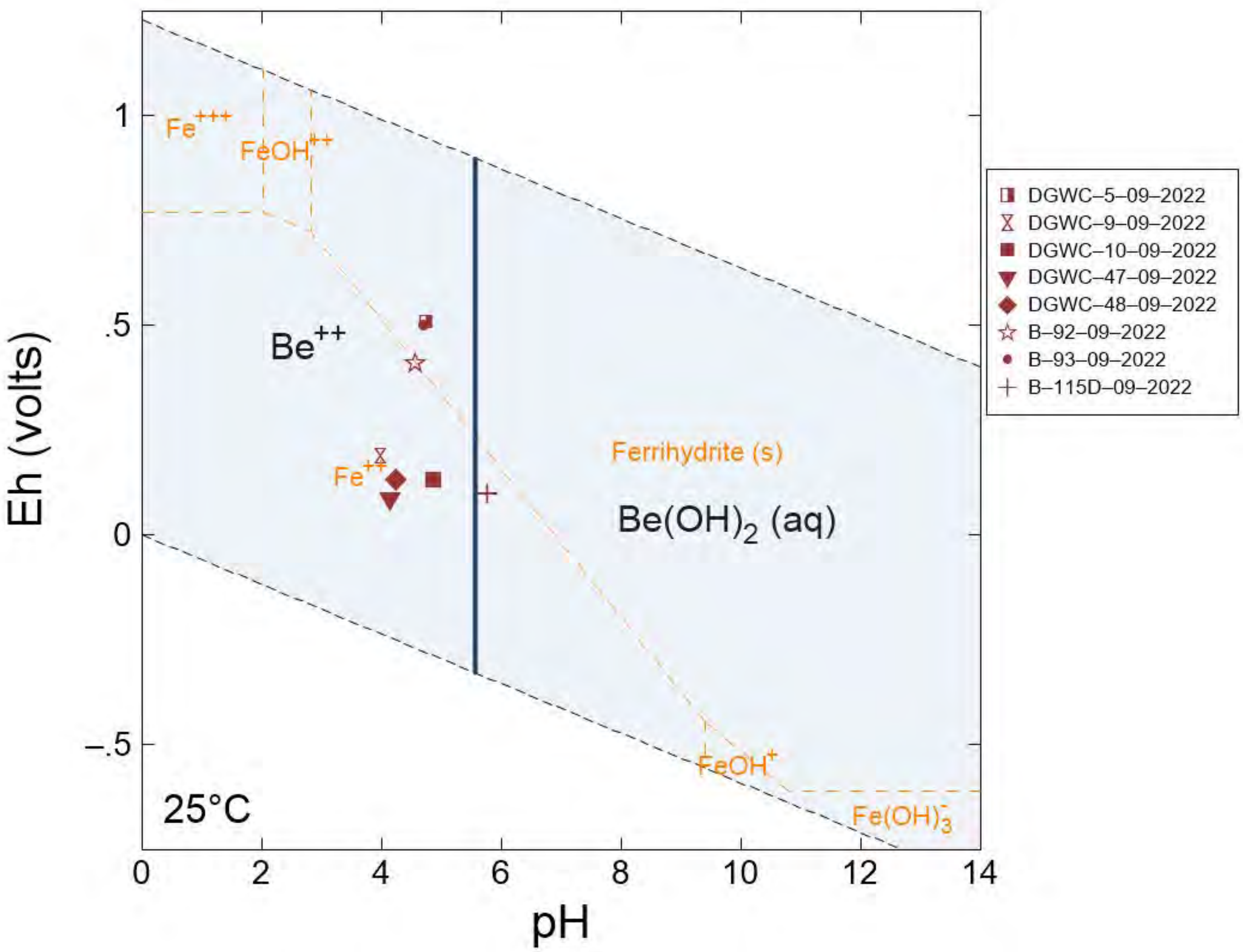



Diagram $Be^{++}$, T = 25 °C , P = 1.013 bars, a [main] = $10^{-6.23}$, a [$H_2O$] = 1, a [$Fe^{+++}$] = $10^{-4.444}$ (speciates, a [$SO_4^{-}$] = $10^{-2.777}$; Suppressed: BeS, $Fe(OH)_2$ (am), $Fe(OH)_2$ (c), $Fe_3(OH)_8$, Ferrihydrite (aged), Goethite, Hematite, Lepidocrocite, Maghemite, Magnetite

Note: ORP converted to SHE

CLIENT
GEORGIA POWER COMPANY
PLANT MCDONOUGH-ATKINSON

PROJECT
GEOCHEMICAL CONCEPTUAL SITE MODEL

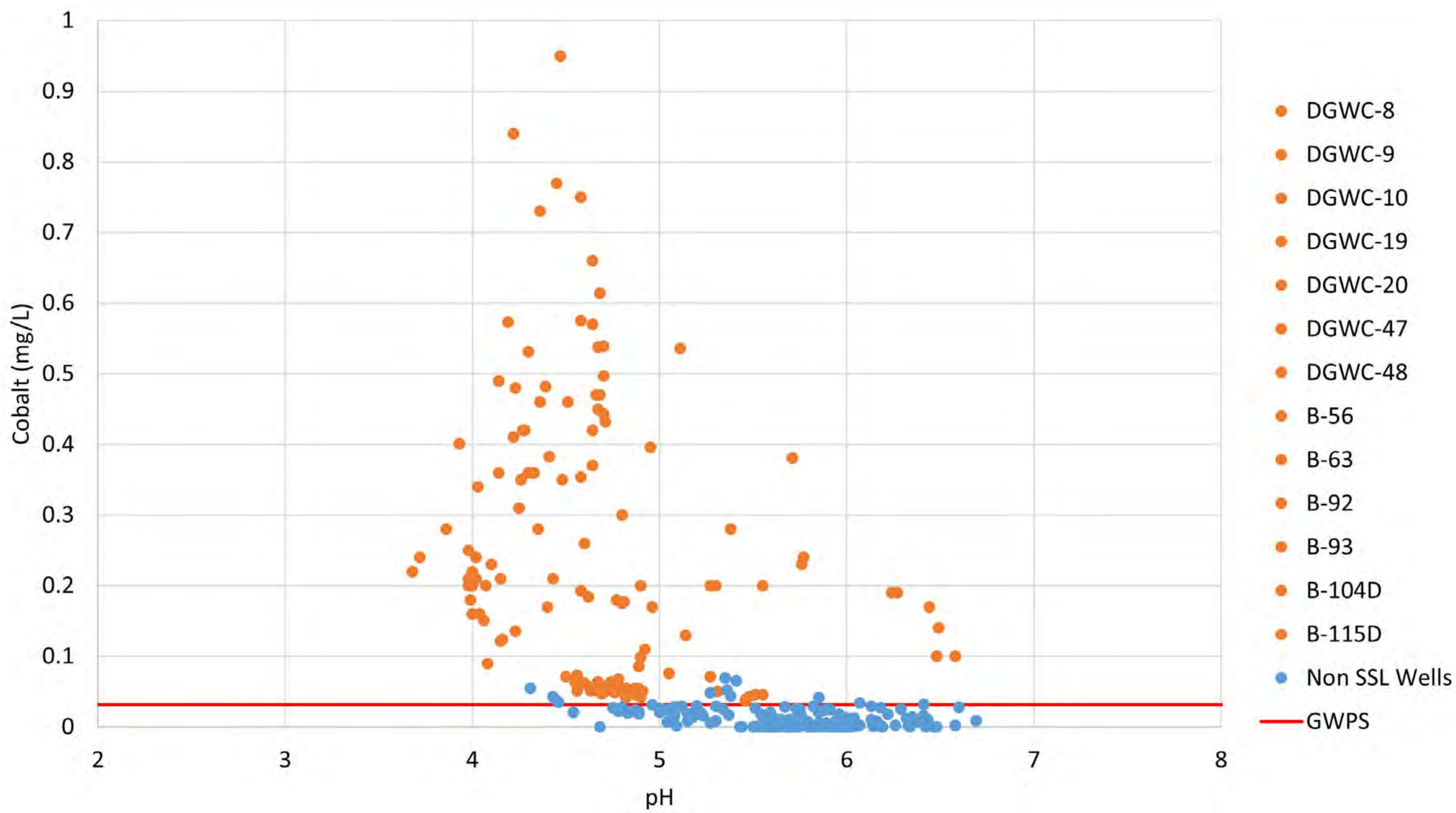
CONSULTANT

| | |
|---|---|
| YYYY-MM-DD | 2023-02-14 |
| DESIGNED | CM |
| PREPARED | NP |
| REVIEWED | PJN |
| APPROVED | TR |

TITLE
**AP-2 AND 3/4 BERYLLIUM POURBAIX DIAGRAM**
**(Generalized using 1E-6 for activity of Beryllium)**

| PROJECT NO. | CONTROL | REV. | FIGURE |
|---|---|---|---|
| GL166849621 | | 0 | 16 |

PATH: https://golderassociates.sharepoint.com/sites/127388/Project Files/5 Technical Work/2000-Martin Lake Ash Ponds/Tier II Report | FILE NAME: Figure Book.xlsx




Note: all other data from AP-2,3/4 monitoring wells other than exceedance are shown in blue for contrasting cobalt and pH range

GEORGIA POWER COMPANY
PLANT MCDONOUGH-ATKINSON

PROJECT
GEOCHEMICAL CONCEPTUAL SITE MODEL

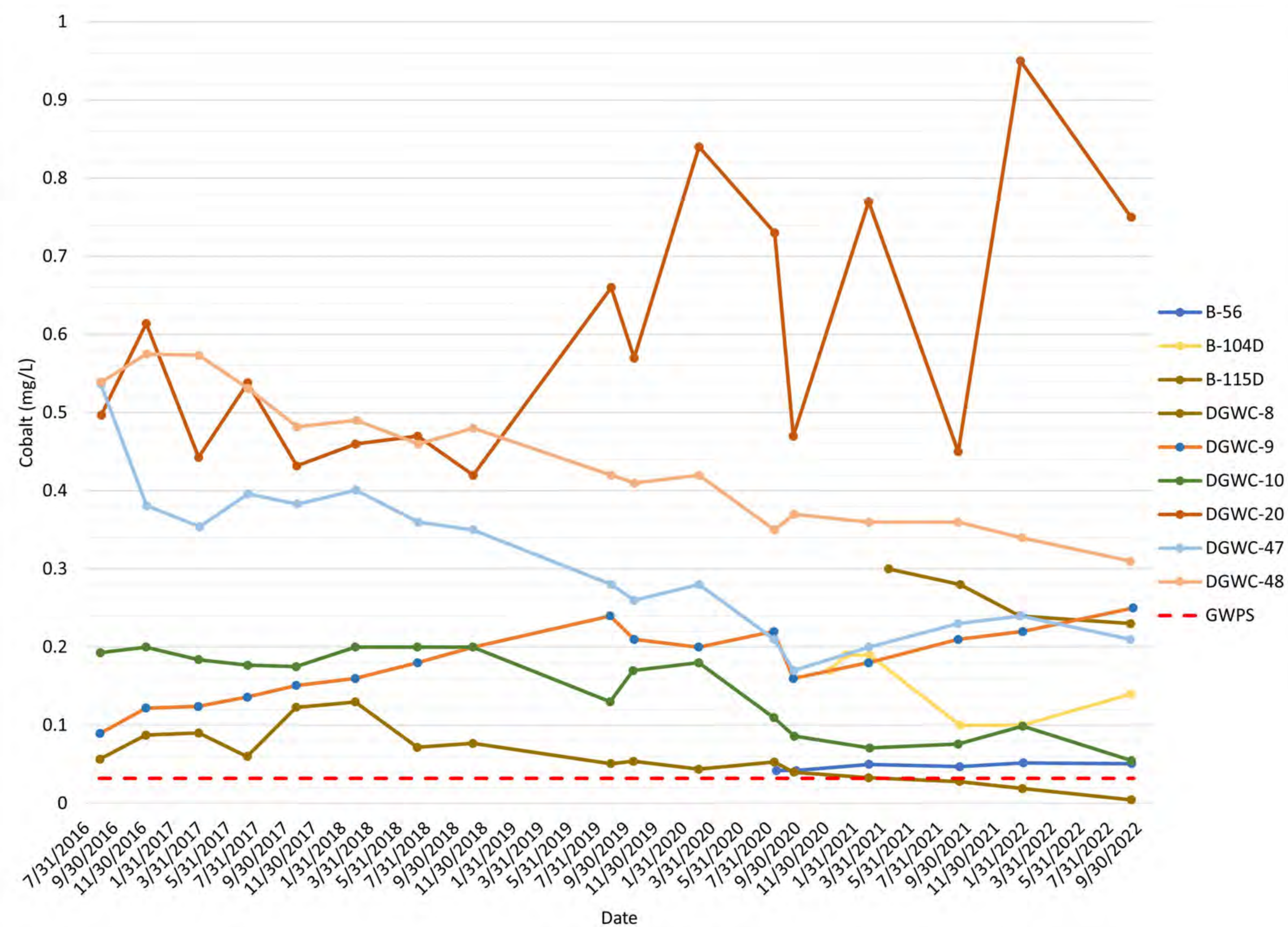
CONSULTANT

| | |
|---|---|
| YYYY-MM-DD | 2023-02-14 |
| DESIGNED | NP |
| PREPARED | NP |
| REVIEWED | PJN |
| APPROVED | TR |

TITLE
PH VS COBALT AT AP-2 AND 3/4

| PROJECT NO. | CONTROL | REV. | FIGURE |
|---|---|---|---|
| GL166849621 | | 0 | 17 |

PATH: https://golderassociates.sharepoint.com/sites/127388/Project Files/5 Technical Work/2000-Martin Lake Ash Ponds/Tier II Report | FILE NAME: Figure Book.xlsx




GEORGIA POWER COMPANY
PLANT MCDONOUGH-ATKINSON

PROJECT
GEOCHEMICAL CONCEPTUAL SITE MODEL

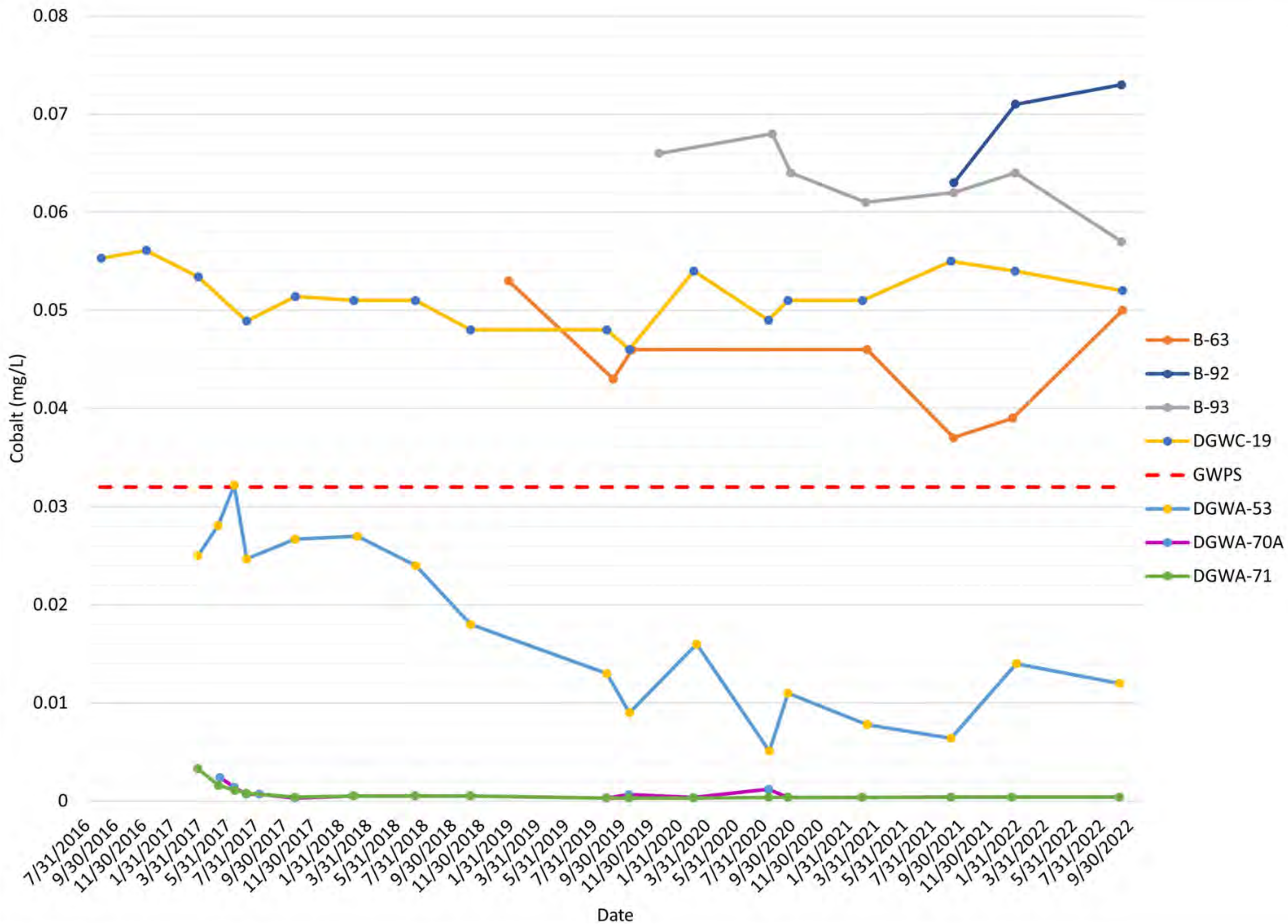
CONSULTANT

wsp

| | |
|---|---|
| YYYY-MM-DD | 2023-04-26 |
| DESIGNED | NP |
| PREPARED | NP |
| REVIEWED | PJN |
| APPROVED | TR |

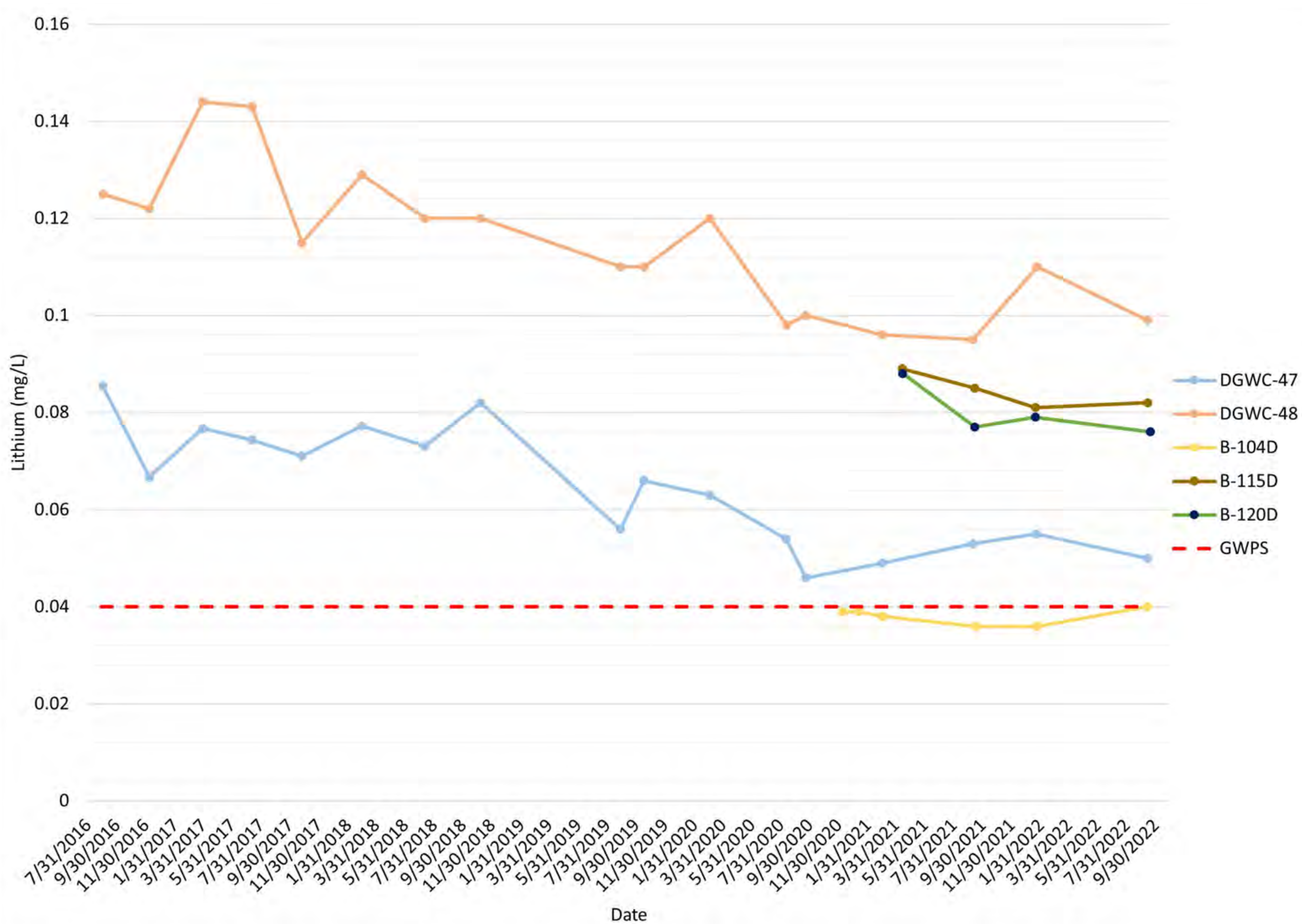
TITLE
**COBALT IN GROUNDWATER AT AP-2 AND 3/4 AT SOME SSL WELLS**

| PROJECT NO. | CONTROL | REV. | FIGURE |
|---|---|---|---|
| GL166849621 | | 0 | 18a |




| | | | |
|---|---|---|---|
| GEORGIA POWER COMPANY<br>PLANT MCDONOUGH-ATKINSON | | PROJECT<br>GEOCHEMICAL CONCEPTUAL SITE MODEL | |
| CONSULTANT | YYYY-MM-DD | 2023-04-26 | TITLE<br>**COBALT IN GROUNDWATER AT AP-2 AND 3/4 AT SOME SSL AND BACKGROUND WELLS** |
| | DESIGNED | NP | |
| | PREPARED | NP | |
| | REVIEWED | PJN | PROJECT NO. GL166849621 · CONTROL · REV. 0 · FIGURE 18b |
| | APPROVED | TR | |

PATH: https://golderassociates.sharepoint.com/sites/127388/Project Files/5 Technical Work/2000-Martin Lake Ash Ponds/Tier II Report | FILE NAME: Figure Book.xlsx




GEORGIA POWER COMPANY
PLANT MCDONOUGH-ATKINSON

PROJECT
GEOCHEMICAL CONCEPTUAL SITE MODEL

CONSULTANT

| | |
|---|---|
| YYYY-MM-DD | 2023-04-26 |
| DESIGNED | NP |
| PREPARED | NP |
| REVIEWED | PJN |
| APPROVED | TR |

TITLE
**LITHIUM IN GROUNDWATER AT AP-2 AND 3/4 SSL WELLS**

| PROJECT NO. | CONTROL | REV. | FIGURE |
|---|---|---|---|
| GL166849621 | | 0 | 19 |

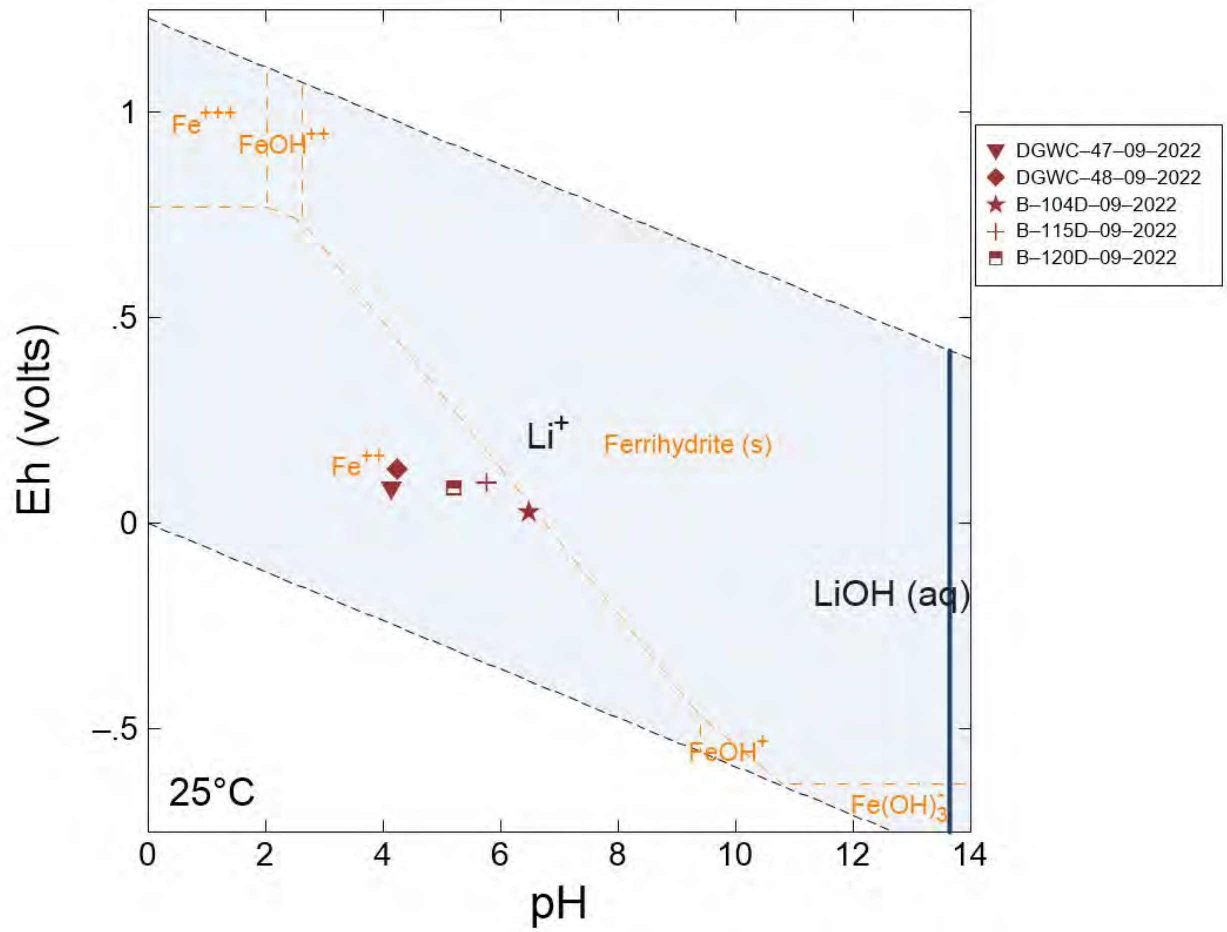



Diagram $Li^{+}$, T = 25 °C , P = 1.013 bars, a [main] = $10^{-5.057}$, a [$H_2O$] = 1, a [$Fe^{+++}$] = $10^{-4.047}$ (speciates, a [$SO_4^{-}$] = $10^{-2.827}$; Suppressed: $Fe(OH)_2$ (am), $Fe(OH)_2$ (aq), $Fe(OH)_2$ (c), $Fe_3(OH)_8$, Ferrihydrite (aged), Goethite, Hematite, Lepidocrocite, Maghemite, Magnetite

| | |
|---|---|
| CLIENT<br>GEORGIA POWER COMPANY<br>PLANT MCDONOUGH-ATKINSON | PROJECT<br>GEOCHEMICAL CONCEPTUAL SITE MODEL |

CONSULTANT

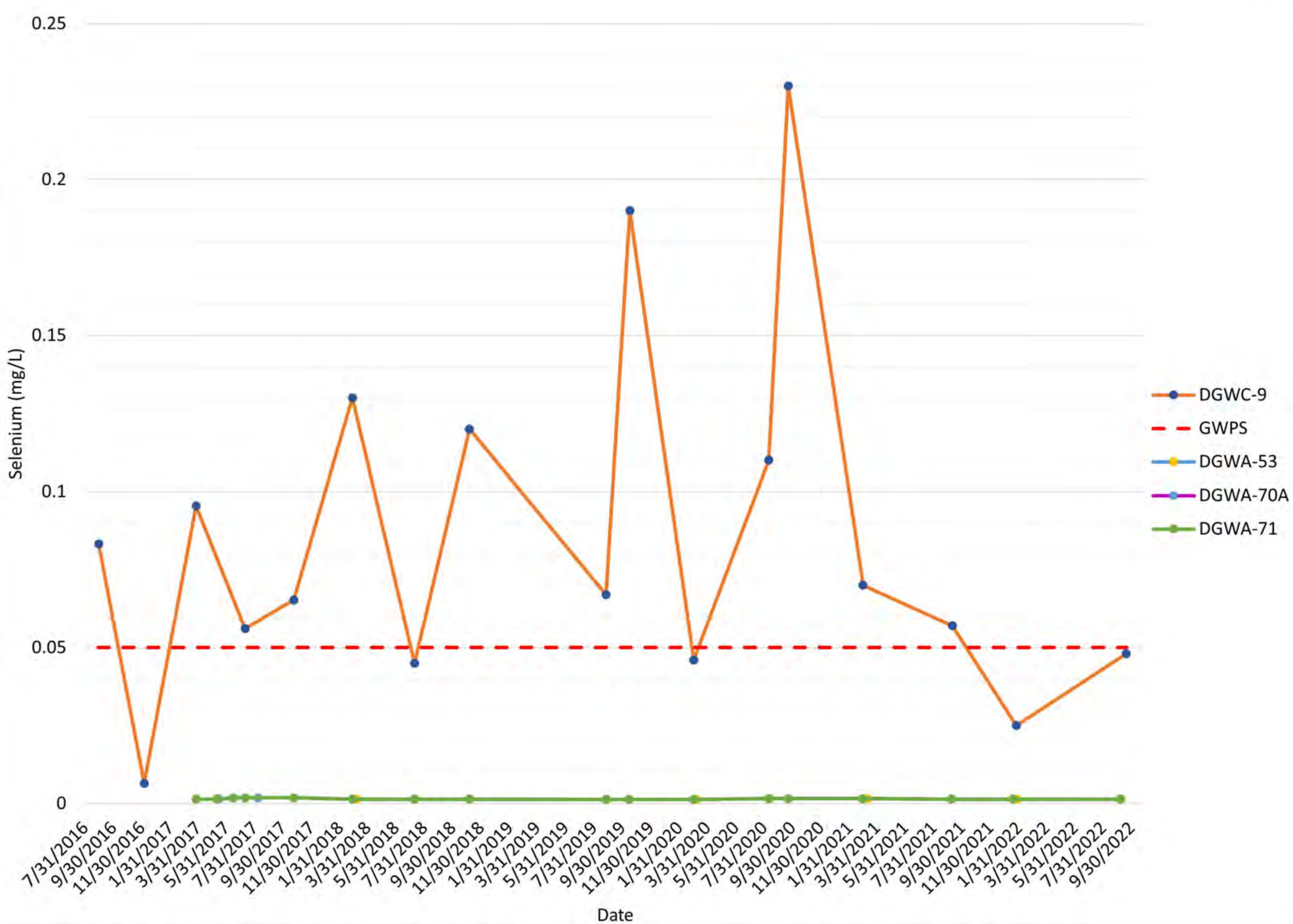
| | |
|---|---|
| YYYY-MM-DD | 2023-02-14 |
| DESIGNED | CM |
| PREPARED | NP |
| REVIEWED | PJN |
| APPROVED | TR |

TITLE

**POURBAIX DIAGRAM OF WELLS WITH A LITHIUM SSL (Generalized using 1E-6 for activity of Lithium)**

| PROJECT NO. | CONTROL | REV. | FIGURE |
|---|---|---|---|
| GL166849621 | | 0 | 20 |

PATH: https://golderassociates.sharepoint.com/sites/127388/Project Files/5 Technical Work/2000-Martin Lake Ash Ponds/Tier II Report | FILE NAME: Figure Book.xlsx




GEORGIA POWER COMPANY
PLANT MCDONOUGH-ATKINSON

PROJECT
GEOCHEMICAL CONCEPTUAL SITE MODEL

CONSULTANT

| | |
|---|---|
| YYYY-MM-DD | 2023-04-26 |
| DESIGNED | NP |
| PREPARED | NP |
| REVIEWED | PJN |
| APPROVED | TR |

TITLE
**SELENIUM IN GROUNDWATER AT DGWC-9 AND BACKGROUND WELLS**

| PROJECT NO. | CONTROL | REV. | FIGURE |
|---|---|---|---|
| GL166849621 | | 0 | 21 |

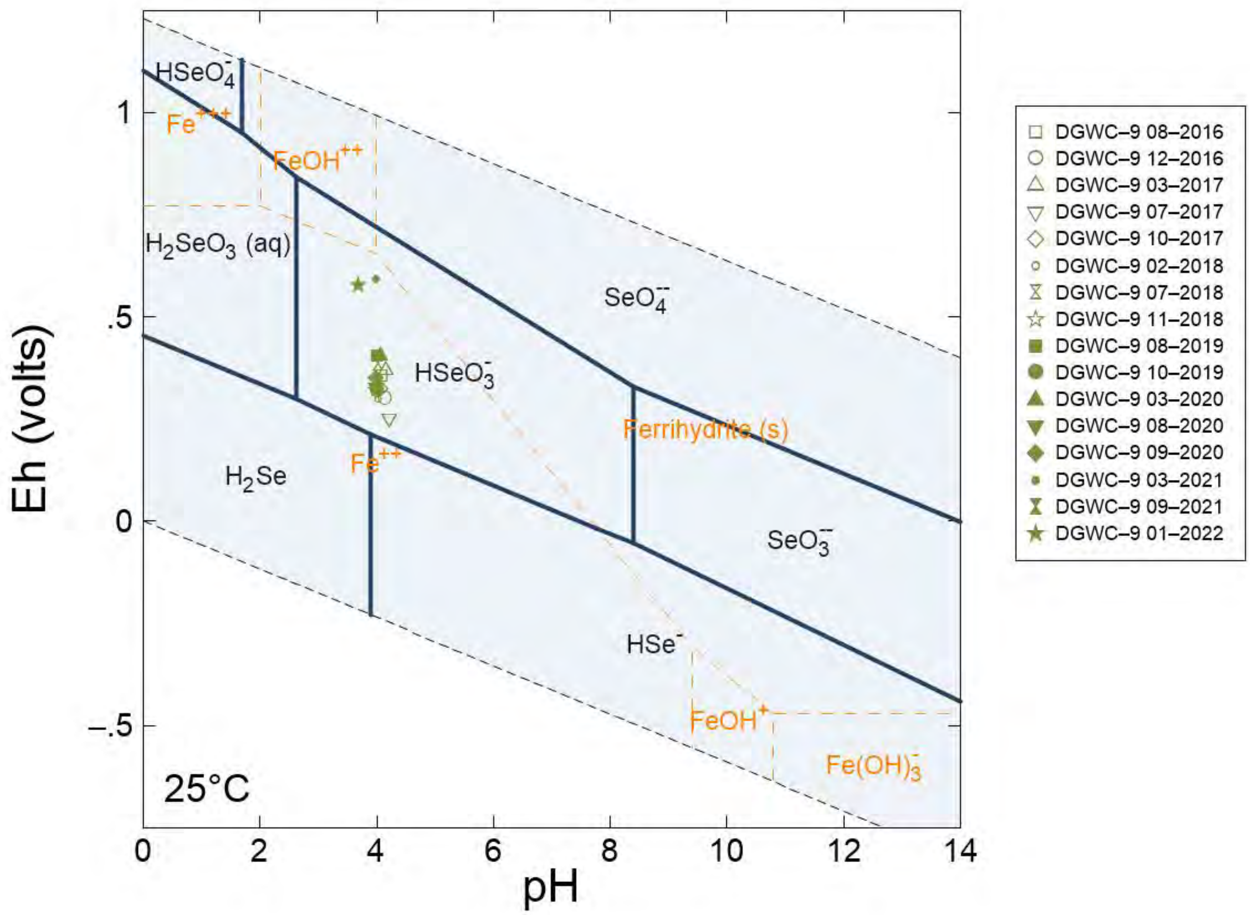


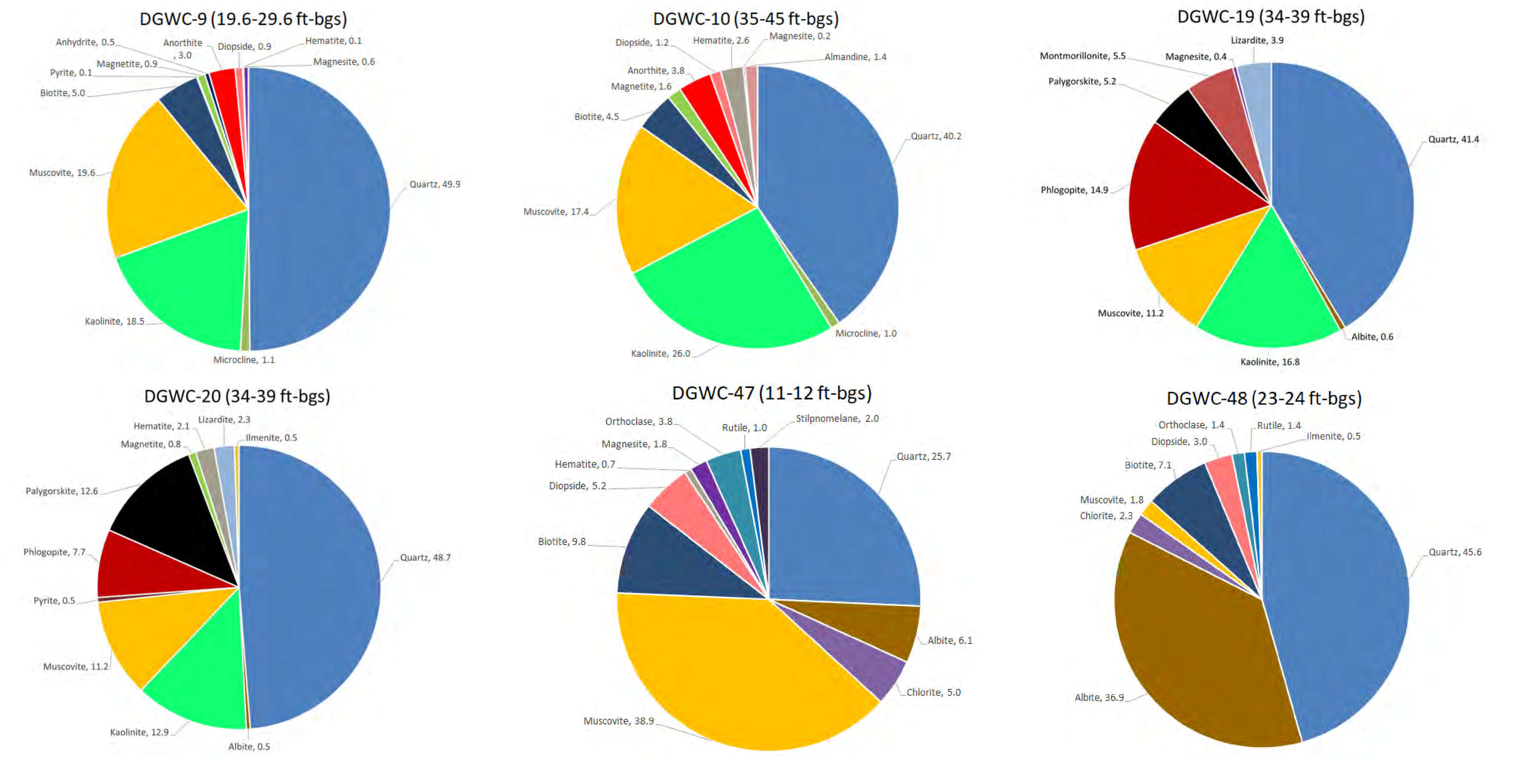

Diagram $Se^{--}$, T = 25 °C , P = 1.013 bars, a [main] = $10^{-23.92}$, a [$H_2O$] = 1, a [$Fe^{+++}$] = $10^{-6.783}$ (speciates, a [$SO_4^{--}$] = $10^{-2.714}$; Suppressed: $Fe(OH)_2$ (c), $Fe(OH)_2^+$, $Fe(OH)_4^-$, Ferrihydrite (aged), Goethite, Hematite, Lepidocrocite, Maghemite, Magnetite

| | |
|---|---|
| CLIENT<br>GEORGIA POWER COMPANY<br>PLANT MCDONOUGH-ATKINSON | PROJECT<br>GEOCHEMICAL CONCEPTUAL SITE MODEL |
| CONSULTANT | TITLE<br>**DGWC-9 SELENIUM POURBAIX DIAGRAM**<br>**(Generalized using 1E-6 for activity of Selenium)** |

| | |
|---|---|
| YYYY-MM-DD | 2023-02-14 |
| DESIGNED | CM |
| PREPARED | NP |
| REVIEWED | PJN |
| APPROVED | TR |

| PROJECT NO. | CONTROL | REV. | FIGURE |
|---|---|---|---|
| GL166849621 | | 0 | 22 |

PATH: https://golderassociates.sharepoint.com/sites/127388/Project Files/5 Technical Work/2000-Martin Lake Ash Ponds/Tier II Report | FILE NAME: Figure Book.xlsx




GEORGIA POWER COMPANY
PLANT MCDONOUGH-ATKINSON

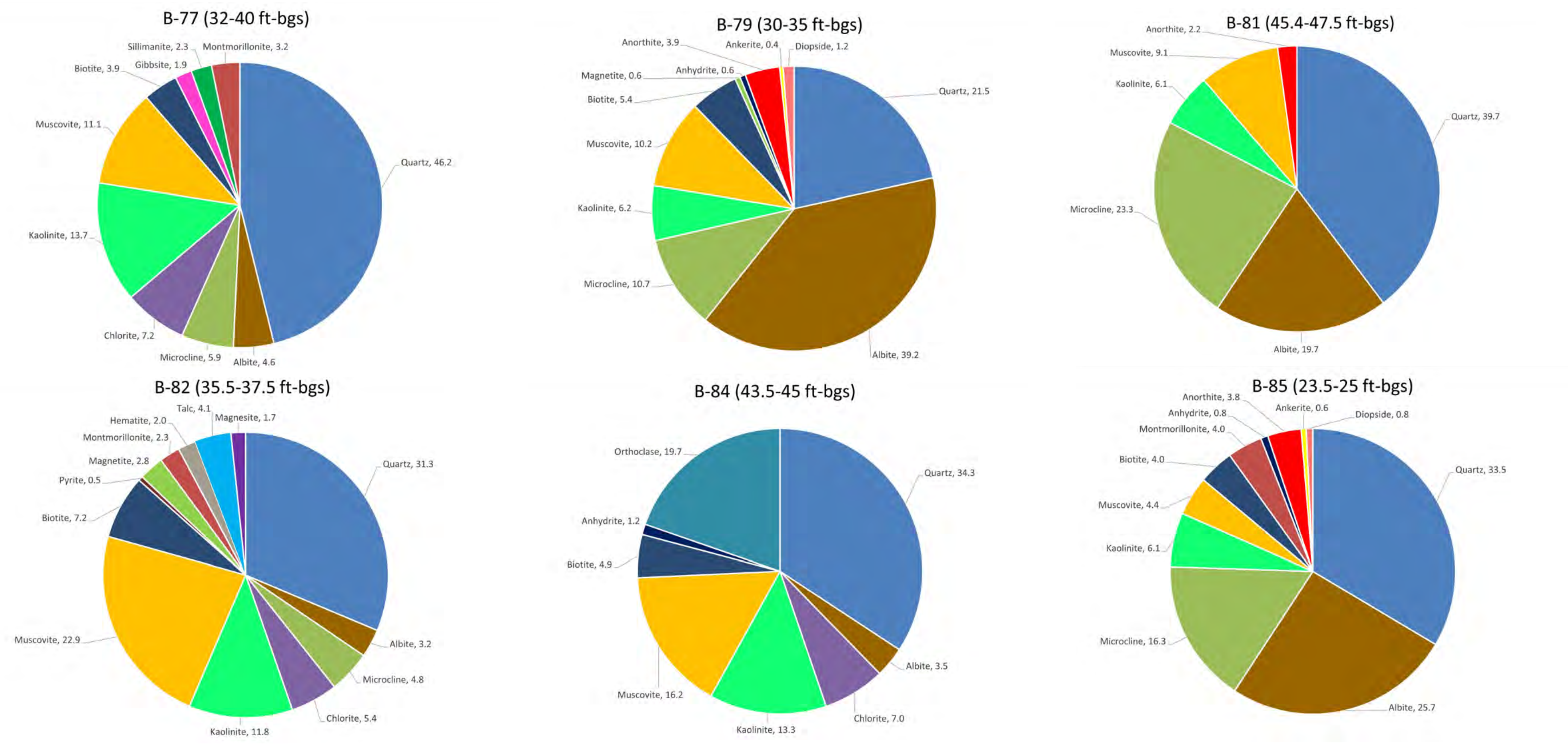
PROJECT
GEOCHEMICAL CONCEPTUAL SITE MODEL

CONSULTANT

| | |
|---|---|
| YYYY-MM-DD | 2022-09-18 |
| DESIGNED | NP |
| PREPARED | NP |
| REVIEWED | PJN |
| APPROVED | TR |

TITLE
**MINERALOGY OF OVERBURDEN AT AP-2 AND 3/4**

| PROJECT NO. | CONTROL | REV. | FIGURE |
|---|---|---|---|
| GL166849621 | | 0 | 23a |




GEORGIA POWER COMPANY
PLANT MCDONOUGH-ATKINSON

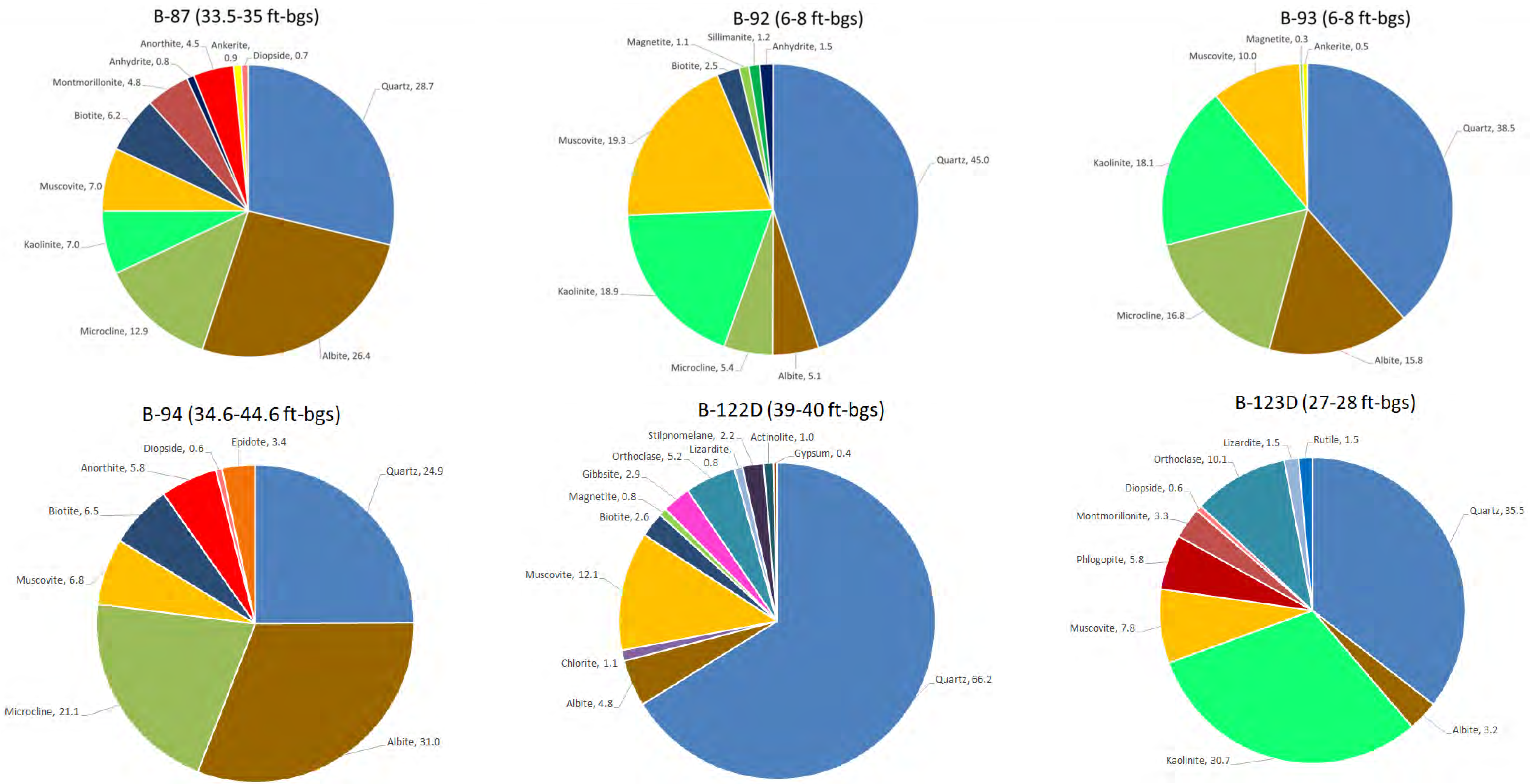
PROJECT
GEOCHEMICAL CONCEPTUAL SITE MODEL

CONSULTANT

| | |
|---|---|
| YYYY-MM-DD | 2022-09-18 |
| DESIGNED | NP |
| PREPARED | NP |
| REVIEWED | PJN |
| APPROVED | TR |

TITLE
**MINERALOGY OF OVERBURDEN AT AP-2 AND 3/4**

| PROJECT NO. | CONTROL | REV. | FIGURE |
|---|---|---|---|
| GL166849621 | | 0 | 23b |




GEORGIA POWER COMPANY
PLANT MCDONOUGH-ATKINSON

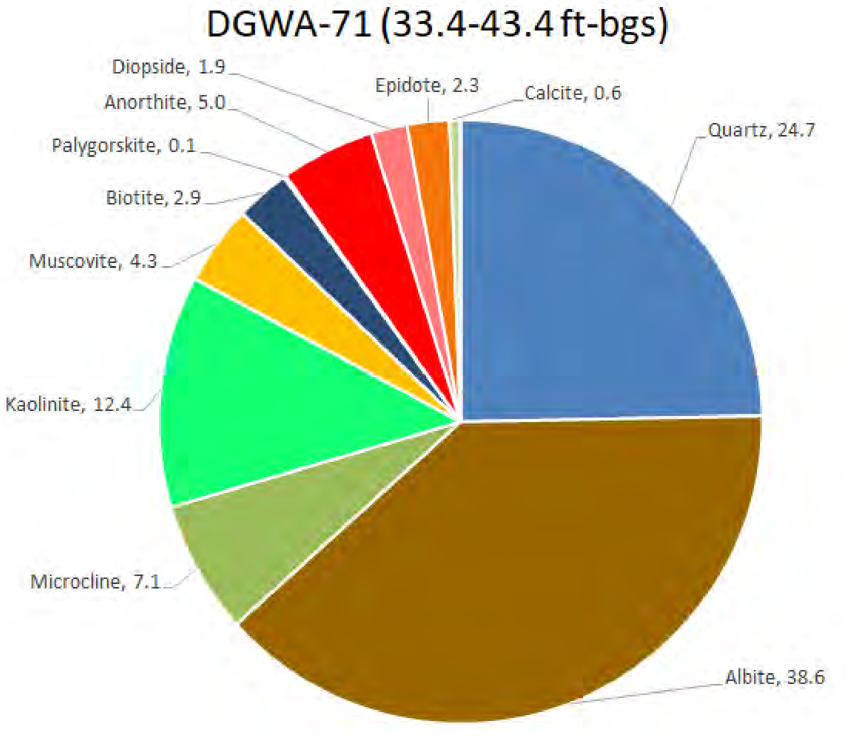
PROJECT
GEOCHEMICAL CONCEPTUAL SITE MODEL

CONSULTANT

| | |
|---|---|
| YYYY-MM-DD | 2023-04-24 |
| DESIGNED | NP |
| PREPARED | NP |
| REVIEWED | PJN |
| APPROVED | TR |

TITLE
**MINERALOGY OF OVERBURDEN AT AP-2 AND 3/4**

| PROJECT NO. | CONTROL | REV. | FIGURE |
|---|---|---|---|
| GL166849621 | | 0 | 23c |




GEORGIA POWER COMPANY
PLANT MCDONOUGH-ATKINSON

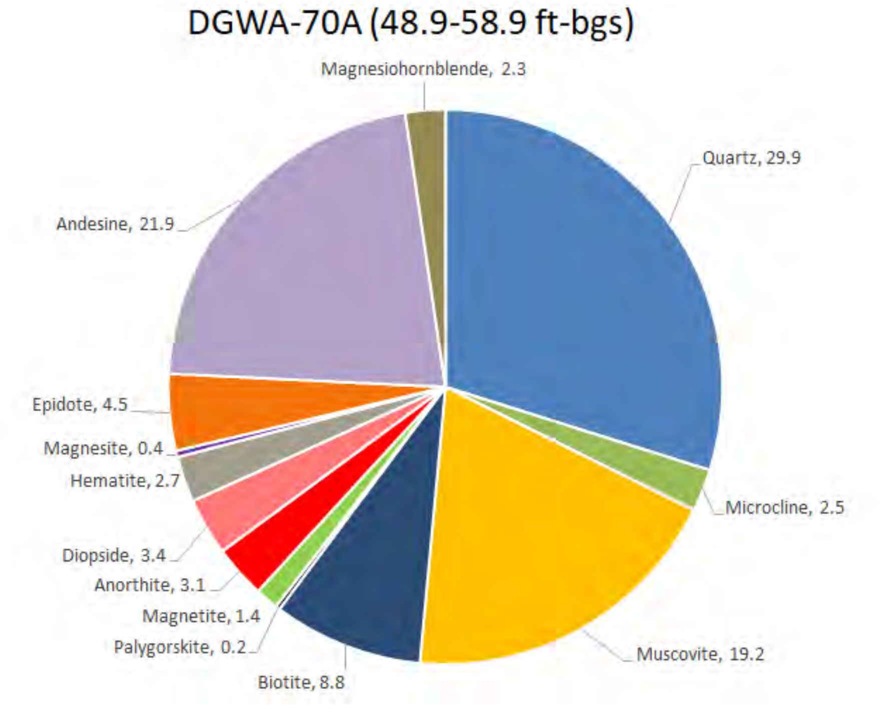
PROJECT
GEOCHEMICAL CONCEPTUAL SITE MODEL

CONSULTANT

| | |
|---|---|
| YYYY-MM-DD | 2023-04-24 |
| DESIGNED | NP |
| PREPARED | NP |
| REVIEWED | PJN |
| APPROVED | TR |

TITLE
**MINERALOGY OF OVERBURDEN AT AP-2 AND 3/4**

| PROJECT NO. | CONTROL | REV. | FIGURE |
|---|---|---|---|
| GL166849621 | | 0 | 23d |




GEORGIA POWER COMPANY
PLANT MCDONOUGH-ATKINSON

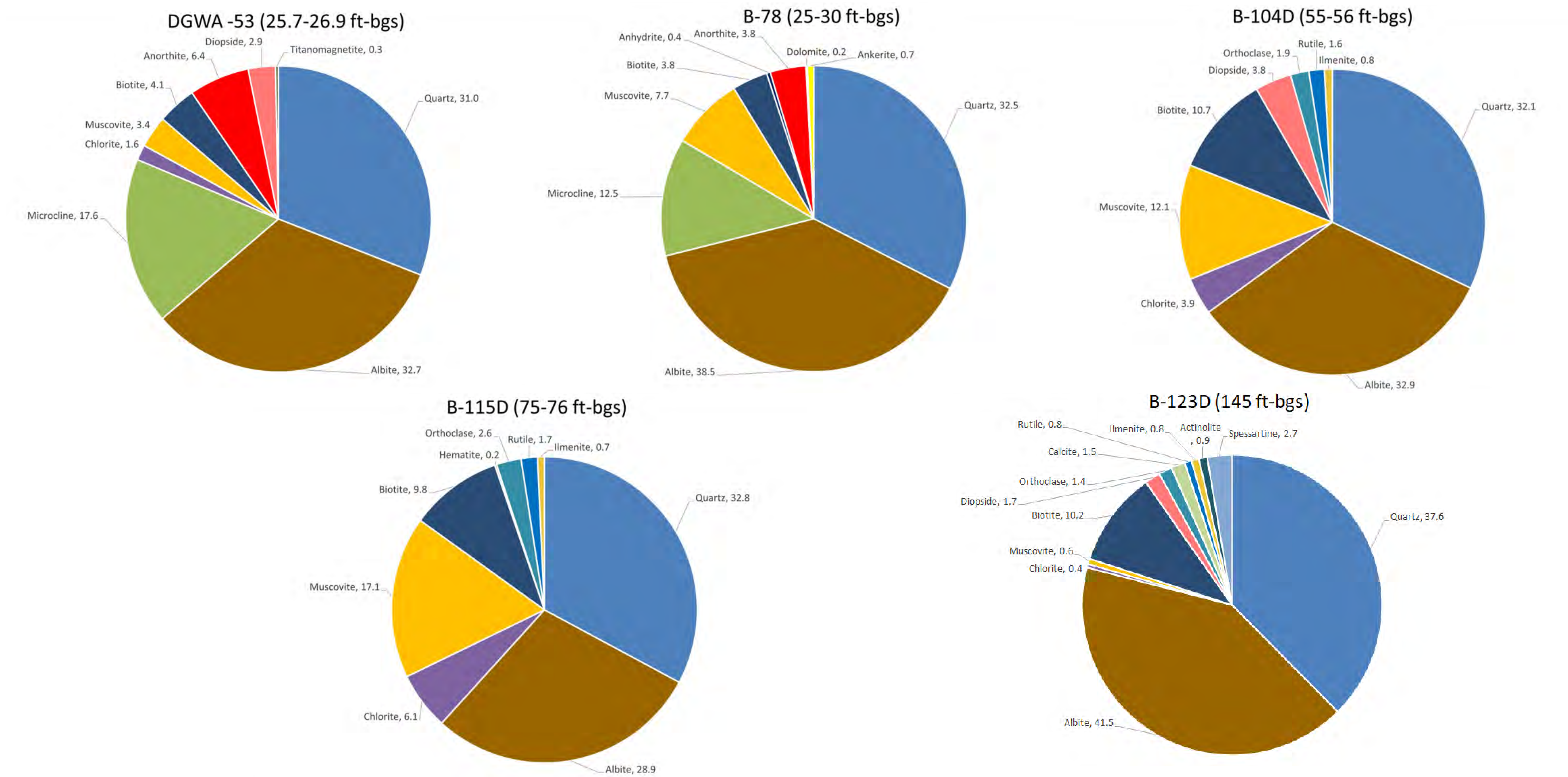
PROJECT
GEOCHEMICAL CONCEPTUAL SITE MODEL

CONSULTANT

| | |
|---|---|
| YYYY-MM-DD | 2023-04-24 |
| DESIGNED | NP |
| PREPARED | NP |
| REVIEWED | PJN |
| APPROVED | TR |

TITLE
**MINERALOGY OF PARTIALLY WEATHERED BEDROCK AT AP-2 AND 3/4**

| PROJECT NO. | CONTROL | REV. | FIGURE |
|---|---|---|---|
| GL166849621 | | 0 | 24 |




GEORGIA POWER COMPANY
PLANT MCDONOUGH-ATKINSON

PROJECT
GEOCHEMICAL CONCEPTUAL SITE MODEL

CONSULTANT

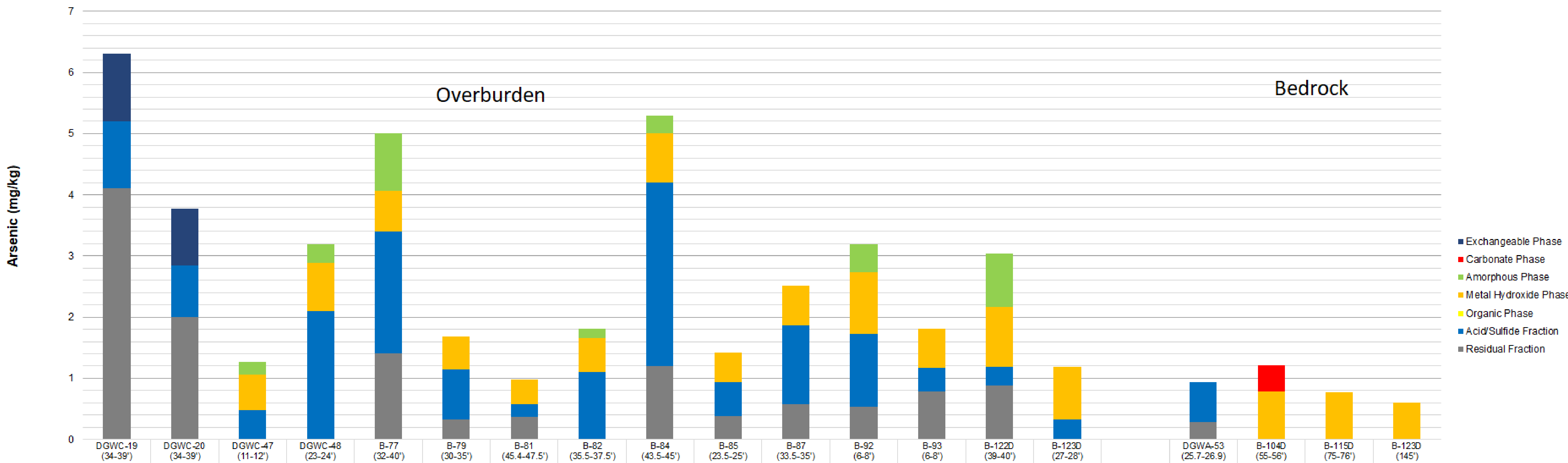
wsp

| | |
|---|---|
| YYYY-MM-DD | 2023-04-24 |
| DESIGNED | NP |
| PREPARED | NP |
| REVIEWED | PJN |
| APPROVED | TR |

TITLE
**MINERALOGY OF BEDROCK AT AP-2 AND 3/4**

| PROJECT NO. | CONTROL | REV. | FIGURE |
|---|---|---|---|
| GL166849621 | | 0 | 25 |

PATH: https://golderassociates.sharepoint.com/sites/127388/Project Files/5 Technical Work/2000-Martin Lake Ash Ponds/Tier II Report | FILE NAME: Figure Book.xlsx




| | DGWC-19 (34-39') | DGWC-20 (34-39') | DGWC-47 (11-12') | DGWC-48 (23-24') | B-77 (32-40') | B-79 (30-35') | B-81 (45.4-47.5') | B-82 (35.5-37.5') | B-84 (43.5-45') | B-85 (23.5-25') | B-87 (33.5-35') | B-92 (6-8') | B-93 (6-8') | B-122D (39-40') | B-123D (27-28') | DGWA-53 (25.7-26.9) | B-104D (55-56') | B-115D (75-76') | B-123D (145') |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Exchangeable Phase | 1.1 | 0.92 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Carbonate Phase | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.42 | 0 | 0 |
| Amorphous Phase | 0 | 0 | 0.21 | 0.3 | 0.94 | 0 | 0 | 0.15 | 0.3 | 0 | 0 | 0.46 | 0 | 0.87 | 0 | 0 | 0 | 0 | 0 |
| Metal Hydroxide Phase | 0 | 0 | 0.58 | 0.79 | 0.67 | 0.53 | 0.4 | 0.56 | 0.8 | 0.49 | 0.65 | 1 | 0.64 | 0.98 | 0.87 | 0 | 0.79 | 0.77 | 0.61 |
| Organic Phase | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Acid/Sulfide Fraction | 1.1 | 0.85 | 0.48 | 2.1 | 2 | 0.82 | 0.21 | 1.1 | 3 | 0.55 | 1.3 | 1.2 | 0.39 | 0.31 | 0.32 | 0.66 | 0 | 0 | 0 |
| Residual Fraction | 4.1 | 2 | 0 | 0 | 1.4 | 0.33 | 0.37 | 0 | 1.2 | 0.38 | 0.57 | 0.53 | 0.78 | 0.88 | 0 | 0.28 | 0 | 0 | 0 |

**Borehole and depth below ground surface (Arsenic mg/kg)**

GEORGIA POWER COMPANY
PLANT MCDONOUGH-ATKINSON

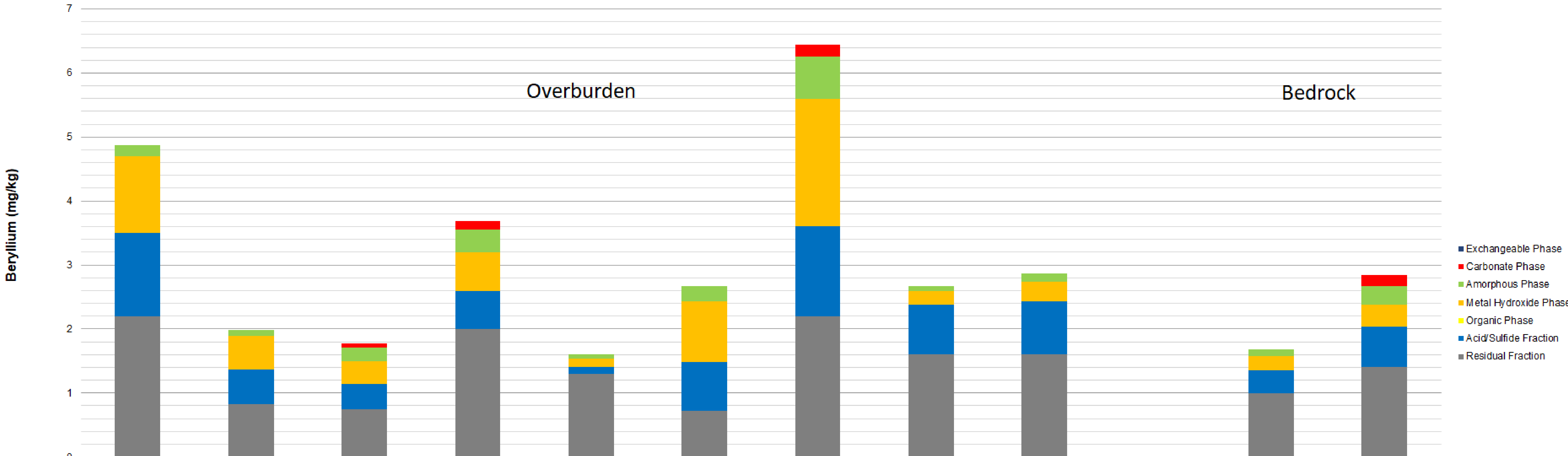
PROJECT
GEOCHEMICAL CONCEPTUAL SITE MODEL

CONSULTANT

| | |
|---|---|
| YYYY-MM-DD | 2023-04-24 |
| DESIGNED | NP |
| PREPARED | NP |
| REVIEWED | PJN |
| APPROVED | TR |

TITLE
**ARSENIC SEQUENTIAL EXTRACTION AT AP-2 AND 3/4**

| PROJECT NO. | CONTROL | REV. | FIGURE |
|---|---|---|---|
| GL166849621 | | 0 | 26 |




| | DGWC-19 (34-39') | DGWC-20 (34-39') | B-77 (32-40') | B-79 (30-35') | B-81 (45.4-47.5') | B-82 (35.5-37.5') | B-84 (43.5-45') | B-85 (23.5-25') | B-87 (33.5-35') | | B-92 (6-8') | B-93 (6-8') |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Exchangeable Phase | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 |
| Carbonate Phase | 0 | 0 | 0.066 | 0.14 | 0 | 0 | 0.18 | 0 | 0 | | 0 | 0.17 |
| Amorphous Phase | 0.17 | 0.098 | 0.21 | 0.35 | 0.07 | 0.23 | 0.66 | 0.08 | 0.13 | | 0.096 | 0.29 |
| Metal Hydroxide Phase | 1.2 | 0.52 | 0.36 | 0.61 | 0.13 | 0.96 | 2 | 0.21 | 0.31 | | 0.23 | 0.34 |
| Organic Phase | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 |
| Acid/Sulfide Fraction | 1.3 | 0.54 | 0.39 | 0.59 | 0.11 | 0.76 | 1.4 | 0.78 | 0.83 | | 0.35 | 0.64 |
| Residual Fraction | 2.2 | 0.83 | 0.75 | 2 | 1.3 | 0.72 | 2.2 | 1.6 | 1.6 | | 1 | 1.4 |

**Borehole and depth below ground surface (Beryllium mg/kg)**

GEORGIA POWER COMPANY
PLANT MCDONOUGH-ATKINSON

PROJECT
GEOCHEMICAL CONCEPTUAL SITE MODEL

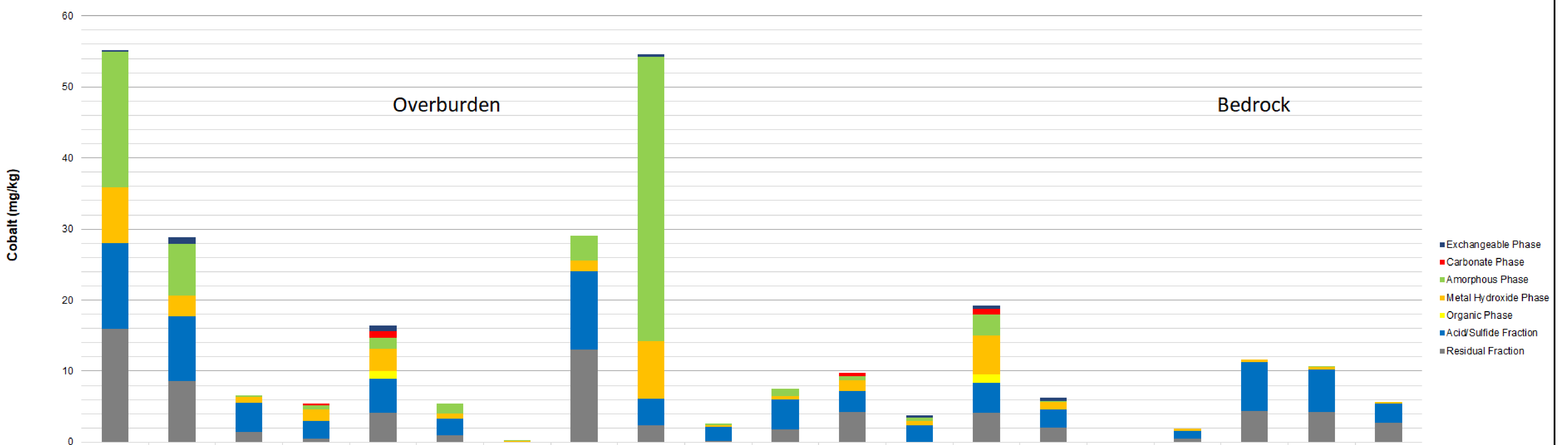
CONSULTANT

wsp

| | |
|---|---|
| YYYY-MM-DD | 2023-04-24 |
| DESIGNED | NP |
| PREPARED | NP |
| REVIEWED | PJN |
| APPROVED | TR |

TITLE
**BERYLLIUM SEQUENTIAL EXTRACTION AT AP-2 AND 3/4**

| PROJECT NO. | CONTROL | REV. | FIGURE |
|---|---|---|---|
| GL166849621 | | 0 | 27 |

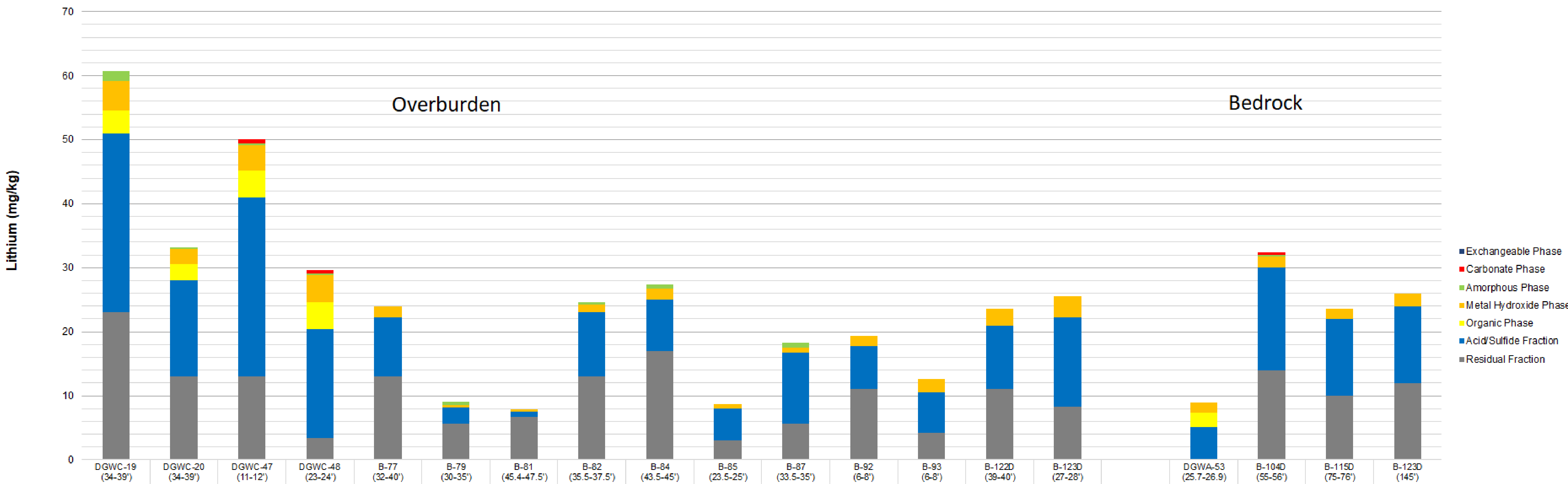



| | DGWC-19 (34-39') | DGWC-20 (34-39') | DGWC-47 (11-12') | DGWC-48 (23-24') | B-77 (32-40') | B-79 (30-35') | B-81 (45.4-47.5') | B-82 (35.5-37.5') | B-84 (43.5-45') | B-85 (23.5-25') | B-87 (33.5-35') |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Exchangeable Phase | 0.33 | 0.98 | 0 | 0 | 0.92 | 0 | 0 | 0 | 0.41 | 0 | 0 |
| Carbonate Phase | 0 | 0 | 0 | 0.28 | 0.87 | 0 | 0 | 0 | 0 | 0 | 0 |
| Amorphous Phase | 19 | 7.2 | 0.22 | 0.53 | 1.5 | 1.4 | 0.16 | 3.5 | 40 | 0.19 | 1 |
| Metal Hydroxide Phase | 7.9 | 3 | 0.91 | 1.7 | 3.2 | 0.7 | 0.096 | 1.6 | 8.1 | 0.26 | 0.48 |
| Organic Phase | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Acid/Sulfide Fraction | 12 | 9.1 | 4.1 | 2.5 | 4.8 | 2.3 | 0.061 | 11 | 3.7 | 2 | 4.2 |
| Residual Fraction | 16 | 8.6 | 1.4 | 0.46 | 4.2 | 0.98 | 0 | 13 | 2.4 | 0.18 | 1.8 |

| | B-92 (6-8') | B-93 (6-8') | B-122D (39-40') | B-123D (27-28') | DGWA-53 (25.7-26.9) | B-104D (55-56') | B-115D (75-76') | B-123D (145') |
|---|---|---|---|---|---|---|---|---|
| Exchangeable Phase | 0 | 0.33 | 0.51 | 0.39 | 0 | 0 | 0 | 0 |
| Carbonate Phase | 0.47 | 0 | 0.88 | 0 | 0 | 0 | 0 | 0 |
| Amorphous Phase | 0.54 | 0.48 | 2.9 | 0.11 | 0 | 0 | 0.091 | 0 |
| Metal Hydroxide Phase | 1.5 | 0.62 | 5.5 | 1.1 | 0.32 | 0.3 | 0.43 | 0.22 |
| Organic Phase | 0 | 0 | 1.1 | 0 | 0 | 0 | 0 | 0 |
| Acid/Sulfide Fraction | 2.9 | 2.4 | 4.3 | 2.6 | 1.1 | 6.9 | 5.9 | 2.7 |
| Residual Fraction | 4.3 | 0 | 4.1 | 2 | 0.47 | 4.4 | 4.3 | 2.7 |

**Borehole and depth below ground surface (Cobalt mg/kg)**

| | | | |
|---|---|---|---|
| GEORGIA POWER COMPANY<br>PLANT MCDONOUGH-ATKINSON | | PROJECT<br>GEOCHEMICAL CONCEPTUAL SITE MODEL | |
| CONSULTANT | YYYY-MM-DD: 2023-04-24<br>DESIGNED: NP<br>PREPARED: NP<br>REVIEWED: PJN<br>APPROVED: TR | TITLE<br>**COBALT SEQUENTIAL EXTRACTION AT AP-2 AND 3/4** | |
| | | PROJECT NO. GL166849621 CONTROL | REV. 0 FIGURE 28 |




| | DGWC-19 (34-39') | DGWC-20 (34-39') | DGWC-47 (11-12') | DGWC-48 (23-24') | B-77 (32-40') | B-79 (30-35') | B-81 (45.4-47.5') | B-82 (35.5-37.5') | B-84 (43.5-45') | B-85 (23.5-25') | B-87 (33.5-35') | B-92 (6-8') | B-93 (6-8') | B-122D (39-40') | B-123D (27-28') | DGWA-53 (25.7-26.9) | B-104D (55-56') | B-115D (75-76') | B-123D (145') |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Exchangeable Phase | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Carbonate Phase | 0 | 0 | 0.69 | 0.52 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.47 | 0 | 0 |
| Amorphous Phase | 1.5 | 0.24 | 0.33 | 0.32 | 0 | 0.5 | 0 | 0.32 | 0.65 | 0 | 0.79 | 0 | 0 | 0 | 0 | 0 | 0.15 | 0 | 0 |
| Metal Hydroxide Phase | 4.7 | 2.3 | 3.9 | 4.2 | 1.7 | 0.38 | 0.36 | 1.3 | 1.8 | 0.65 | 0.85 | 1.5 | 2.1 | 2.6 | 3.2 | 1.6 | 1.8 | 1.6 | 2 |
| Organic Phase | 3.5 | 2.6 | 4.2 | 4.2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2.3 | 0 | 0 | 0 |
| Acid/Sulfide Fraction | 28 | 15 | 28 | 17 | 9.3 | 2.6 | 0.81 | 10 | 8 | 5 | 11 | 6.8 | 6.3 | 10 | 14 | 5.1 | 16 | 12 | 12 |
| Residual Fraction | 23 | 13 | 13 | 3.4 | 13 | 5.6 | 6.7 | 13 | 17 | 3 | 5.7 | 11 | 4.2 | 11 | 8.3 | | 14 | 10 | 12 |

**Borehole and depth below ground surface (Lithium mg/kg)**

GEORGIA POWER COMPANY
PLANT MCDONOUGH-ATKINSON

PROJECT
GEOCHEMICAL CONCEPTUAL SITE MODEL

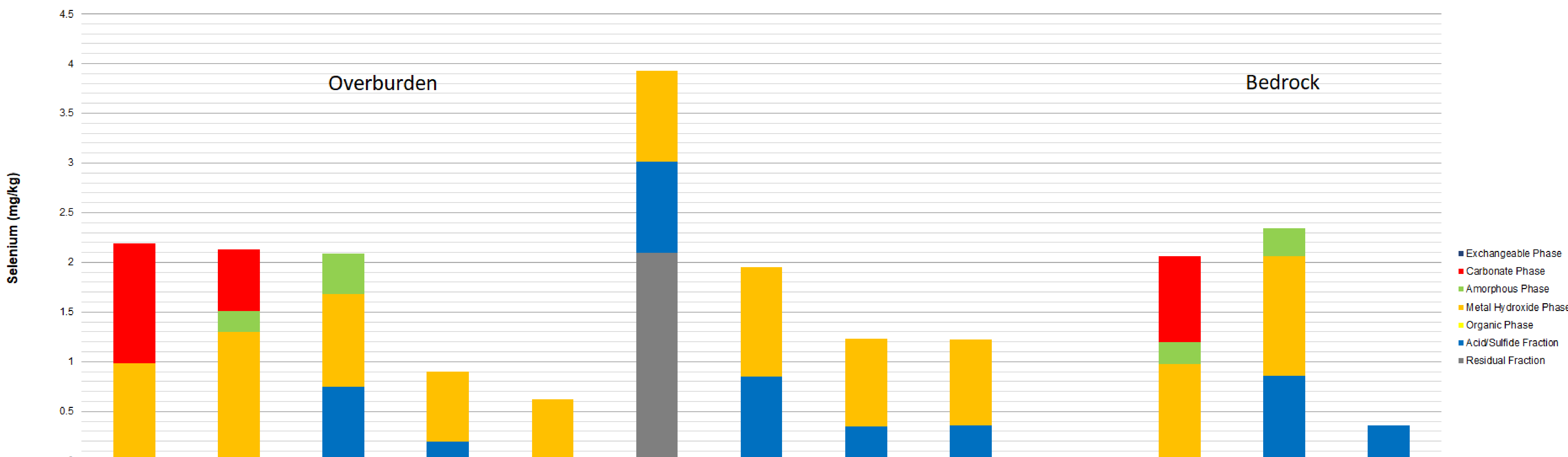
CONSULTANT

| | |
|---|---|
| YYYY-MM-DD | 2023-04-24 |
| DESIGNED | NP |
| PREPARED | NP |
| REVIEWED | PJN |
| APPROVED | TR |

TITLE
**LITHIUM SEQUENTIAL EXTRACTION AT AP-2 AND 3/4**

| PROJECT NO. | CONTROL | REV. | FIGURE |
|---|---|---|---|
| GL166849621 | | 0 | 29 |

PATH: https://golderassociates.sharepoint.com/sites/127388/Project Files/5 Technical Work/2000-Martin Lake Ash Ponds/Tier II Report | FILE NAME: Figure Book.xlsx




| | DGWC-19 (34-39') | DGWC-20 (34-39') | B-77 (32-40') | B-79 (30-35') | B-81 (45.4-47.5') | B-82 (35.5-37.5') | B-84 (43.5-45') | B-85 (23.5-25') | B-87 (33.5-35') | | DGWA-53 (25.7-26.9) | B-92 (6-8') | B-93 (6-8') |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Exchangeable Phase | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 |
| Carbonate Phase | 1.2 | 0.62 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 0.86 | 0 | 0 |
| Amorphous Phase | 0 | 0.21 | 0.41 | 0 | 0 | 0 | 0 | 0 | 0 | | 0.22 | 0.28 | 0 |
| Metal Hydroxide Phase | 0.99 | 1.3 | 0.93 | 0.7 | 0.62 | 0.92 | 1.1 | 0.88 | 0.86 | | 0.98 | 1.2 | 0 |
| Organic Phase | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 |
| Acid/Sulfide Fraction | 0 | 0 | 0.75 | 0.2 | 0 | 0.91 | 0.85 | 0.35 | 0.36 | | 0 | 0.86 | 0.36 |
| Residual Fraction | 0 | 0 | 0 | 0 | 0 | 2.1 | 0 | 0 | 0 | | 0 | 0 | 0 |

**Borehole and depth below ground surface (Selenium mg/kg)**

GEORGIA POWER COMPANY
PLANT MCDONOUGH-ATKINSON

PROJECT
GEOCHEMICAL CONCEPTUAL SITE MODEL

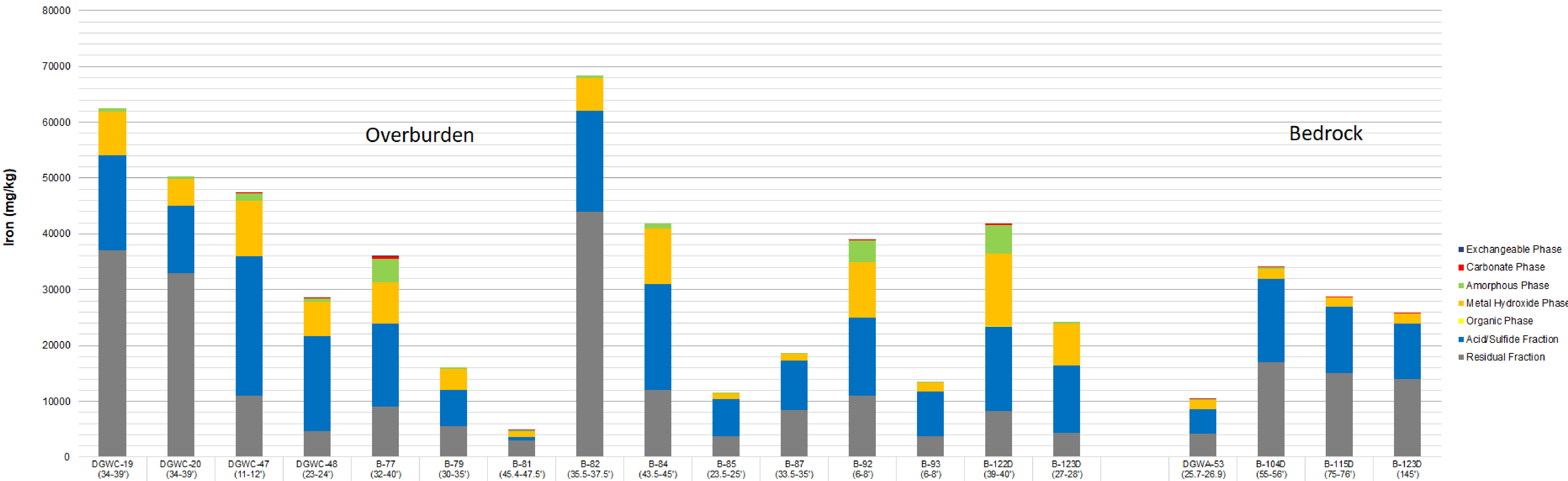
CONSULTANT

| | |
|---|---|
| YYYY-MM-DD | 2023-04-24 |
| DESIGNED | NP |
| PREPARED | NP |
| REVIEWED | PJN |
| APPROVED | TR |

TITLE
**SELENIUM SEQUENTIAL EXTRACTION AT AP-2 AND 3/4**

| PROJECT NO. | CONTROL | REV. | FIGURE |
|---|---|---|---|
| GL166849621 | | 0 | 30 |

PATH: https://golderassociates.sharepoint.com/sites/127388/Project Files/5 Technical Work/2000-Martin Lake Ash Ponds/Tier II Report | FILE NAME: Figure Book.xlsx




| | DGWC-19 (34-39') | DGWC-20 (34-39') | DGWC-47 (11-12') | DGWC-48 (23-24') | B-77 (32-40') | B-79 (30-35') | B-81 (45.4-47.5') | B-82 (35.5-37.5') | B-84 (43.5-45') | B-85 (23.5-25') |
|---|---|---|---|---|---|---|---|---|---|---|
| Exchangeable Phase | 0 | 0 | 0 | 0 | 130 | 0 | 0 | 0 | 0 | 0 |
| Carbonate Phase | 0 | 0 | 21 | 22 | 360 | 0 | 9.7 | 0 | 0 | 0 |
| Amorphous Phase | 490 | 380 | 1300 | 590 | 4300 | 350 | 240 | 440 | 910 | 110 |
| Metal Hydroxide Phase | 7900 | 4900 | 10000 | 6200 | 7300 | 3700 | 850 | 5900 | 9900 | 980 |
| Organic Phase | 56 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Acid/Sulfide Fraction | 17000 | 12000 | 25000 | 17000 | 15000 | 6600 | 680 | 18000 | 19000 | 6700 |
| Residual Fraction | 37000 | 33000 | 11000 | 4700 | 9000 | 5500 | 3000 | 44000 | 12000 | 3700 |

| | B-87 (33.5-35') | B-92 (6-8') | B-93 (6-8') | B-122D (39-40') | B-123D (27-28') | DGWA-53 (25.7-26.9) | B-104D (55-56') | B-115D (75-76') | B-123D (145') |
|---|---|---|---|---|---|---|---|---|---|
| Exchangeable Phase | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Carbonate Phase | 0 | 250 | 0 | 360 | 0 | 13 | 76 | 15 | 21 |
| Amorphous Phase | 140 | 3800 | 160 | 5100 | 300 | 130 | 180 | 51 | 42 |
| Metal Hydroxide Phase | 1200 | 10000 | 1600 | 13000 | 7500 | 1700 | 1800 | 1600 | 1700 |
| Organic Phase | 0 | 0 | 0 | 120 | 0 | 0 | 0 | 0 | 0 |
| Acid/Sulfide Fraction | 8800 | 14000 | 8000 | 15000 | 12000 | 4400 | 15000 | 12000 | 10000 |
| Residual Fraction | 8500 | 11000 | 3800 | 8300 | 4400 | 4200 | 17000 | 15000 | 14000 |

**Borehole and depth below ground surface (Iron mg/kg)**

GEORGIA POWER COMPANY
PLANT MCDONOUGH-ATKINSON

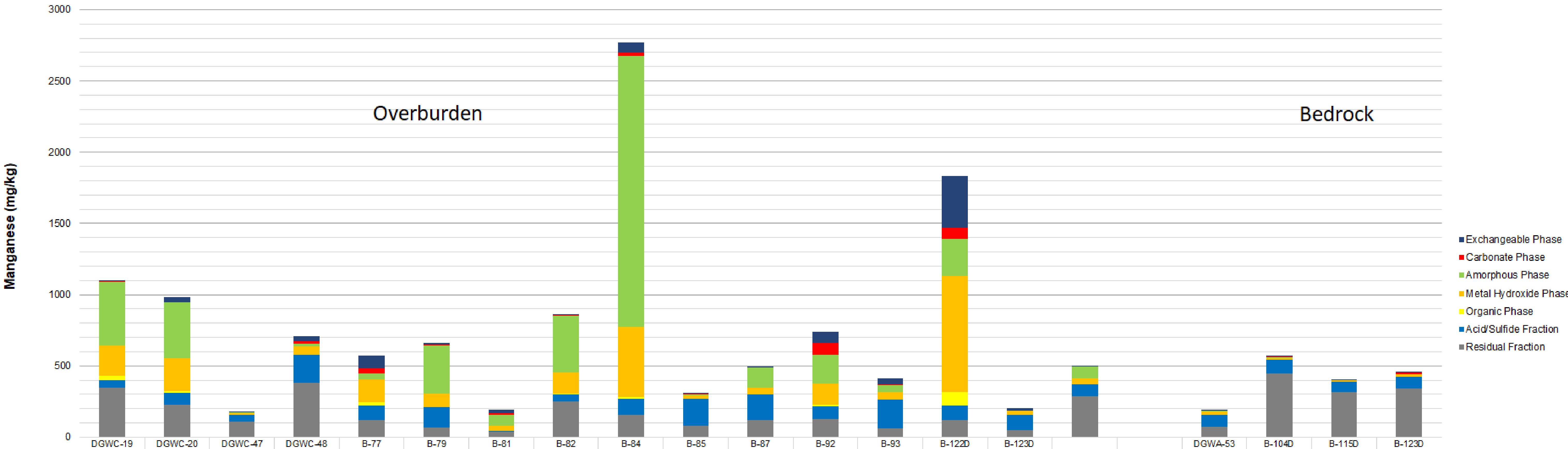
PROJECT
GEOCHEMICAL CONCEPTUAL SITE MODEL

CONSULTANT

| | |
|---|---|
| YYYY-MM-DD | 2023-04-25 |
| DESIGNED | NP |
| PREPARED | NP |
| REVIEWED | PJN |
| APPROVED | TR |

TITLE
**IRON SEQUENTIAL EXTRACTION AT AP-2 AND 3/4**

| PROJECT NO. | CONTROL | REV. | FIGURE |
|---|---|---|---|
| GL166849621 | | 0 | 31 |




| | DGWC-19 (34-39') | DGWC-20 (34-39') | DGWC-47 (11-12') | DGWC-48 (23-24') | B-77 (32-40') | B-79 (30-35') | B-81 (45.4-47.5') | B-82 (35.5-37.5') | B-84 (43.5-45') | B-85 (23.5-25') | B-87 (33.5-35') | B-92 (6-8') | B-93 (6-8') | B-122D (39-40') | B-123D (27-28') | | DGWA-53 (25.7-26.9) | B-104D (55-56') | B-115D (75-76') | B-123D (145') |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Exchangeable Phase | 8.4 | 31 | 2.5 | 39 | 87 | 8.2 | 23 | 4.2 | 71 | 7.8 | 0.37 | 75 | 44 | 360 | 15 | 0.84 | 0.52 | 1.1 | 0.4 | 0.43 |
| Carbonate Phase | 1.6 | 4.3 | 0 | 13 | 35 | 5.7 | 7.8 | 1.5 | 25 | 2.5 | 1.1 | 87 | 5.5 | 81 | 1.7 | 3.6 | 0.94 | 6.3 | 1.8 | 9.2 |
| Amorphous Phase | 450 | 390 | 9.1 | 18 | 45 | 340 | 77 | 400 | 1900 | 9.5 | 140 | 200 | 47 | 260 | 2.5 | 78 | 1.1 | 2.8 | 1.3 | 2.3 |
| Metal Hydroxide Phase | 210 | 230 | 8.2 | 61 | 160 | 97 | 39 | 150 | 490 | 23 | 47 | 150 | 54 | 810 | 25 | 42 | 24 | 14 | 12 | 18 |
| Organic Phase | 31 | 16 | 0 | 0 | 24 | 0 | 0 | 3.9 | 13 | 0 | 0 | 12 | 0 | 100 | 0 | 0 | 0 | 0 | 0 | 0 |
| Acid/Sulfide Fraction | 51 | 79 | 48 | 200 | 100 | 140 | 7.8 | 50 | 110 | 190 | 180 | 85 | 200 | 100 | 110 | 83 | 85 | 94 | 67 | 84 |
| Residual Fraction | 350 | 230 | 110 | 380 | 120 | 70 | 36 | 250 | 160 | 78 | 120 | 130 | 62 | 120 | 49 | 290 | 74 | 450 | 320 | 340 |

**Borehole and depth below ground surface (Manganese mg/kg)**

GEORGIA POWER COMPANY
PLANT MCDONOUGH-ATKINSON

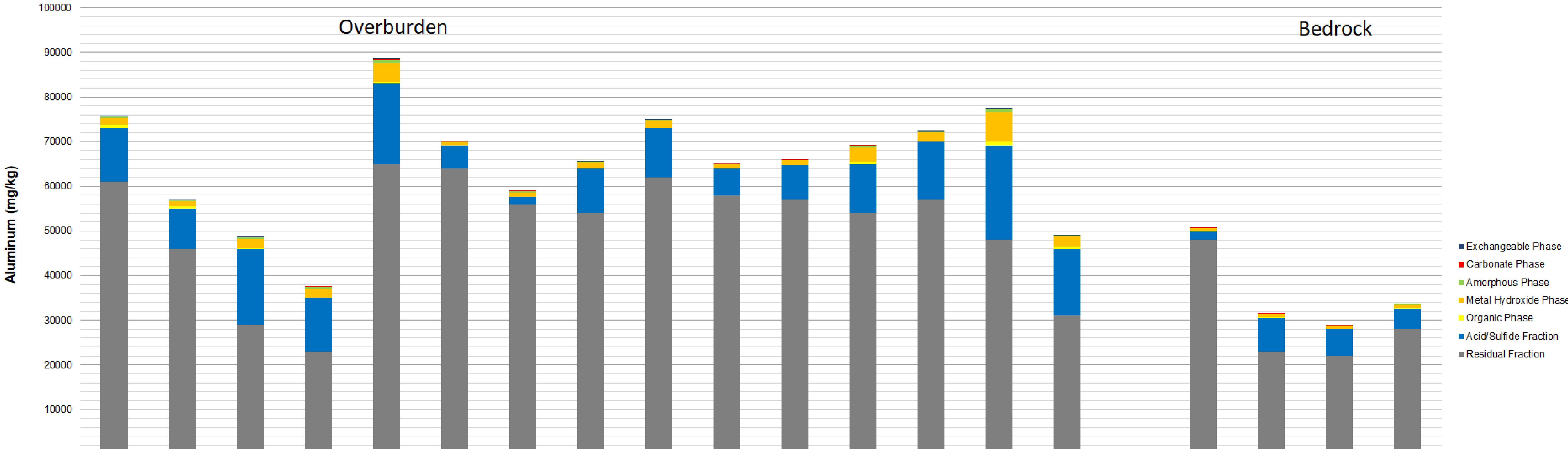
PROJECT
GEOCHEMICAL CONCEPTUAL SITE MODEL

CONSULTANT

| | |
|---|---|
| YYYY-MM-DD | 2023-04-25 |
| DESIGNED | NP |
| PREPARED | NP |
| REVIEWED | PJN |
| APPROVED | TR |

TITLE
**MANGANESE SEQUENTIAL EXTRACTION AT AP-2 AND 3/4**

| PROJECT NO. | CONTROL | REV. | FIGURE |
|---|---|---|---|
| GL166849621 | | 0 | 32 |




| | DGWC-19 (34-39') | DGWC-20 (34-39') | DGWC-47 (11-12') | DGWC-48 (23-24') | B-77 (32-40') | B-79 (30-35') | B-81 (45.4-47.5') | B-82 (35.5-37.5') | B-84 (43.5-45') | B-85 (23.5-25') | B-87 (33.5-35') | B-92 (6-8') | B-93 (6-8') | B-122D (39-40') | B-123D (27-28') | DGWA-53 (25.7-26.9) | B-104D (55-56') | B-115D (75-76') | B-123D (145') |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Exchangeable Phase | 48 | 11 | 12 | 0 | 18 | 0 | 0 | 15 | 11 | 0 | 0 | 0 | 10 | 15 | 94 | 0 | 0 | 0 | 0 |
| Carbonate Phase | 30 | 11 | 28 | 23 | 86 | 13 | 27 | 20 | 16 | 13 | 9.8 | 48 | 16 | 77 | 41 | 8.2 | 18 | 4.9 | 0 |
| Amorphous Phase | 260 | 160 | 300 | 320 | 730 | 160 | 320 | 180 | 220 | 66 | 80 | 370 | 140 | 820 | 180 | 35 | 60 | 20 | 16 |
| Metal Hydroxide Phase | 1600 | 1200 | 2000 | 2000 | 4200 | 800 | 970 | 1200 | 1700 | 900 | 1100 | 3300 | 2000 | 6600 | 2200 | 620 | 800 | 740 | 760 |
| Organic Phase | 750 | 570 | 190 | 88 | 390 | 45 | 0 | 76 | 30 | 55 | 82 | 480 | 100 | 960 | 560 | 110 | 110 | 120 | 120 |
| Acid/Sulfide Fraction | 12000 | 8900 | 17000 | 12000 | 18000 | 5000 | 1600 | 10000 | 11000 | 6000 | 7700 | 11000 | 13000 | 21000 | 15000 | 1900 | 7500 | 6000 | 4600 |
| Residual Fraction | 61000 | 46000 | 29000 | 23000 | 65000 | 64000 | 56000 | 54000 | 62000 | 58000 | 57000 | 54000 | 57000 | 48000 | 31000 | 48000 | 23000 | 22000 | 28000 |

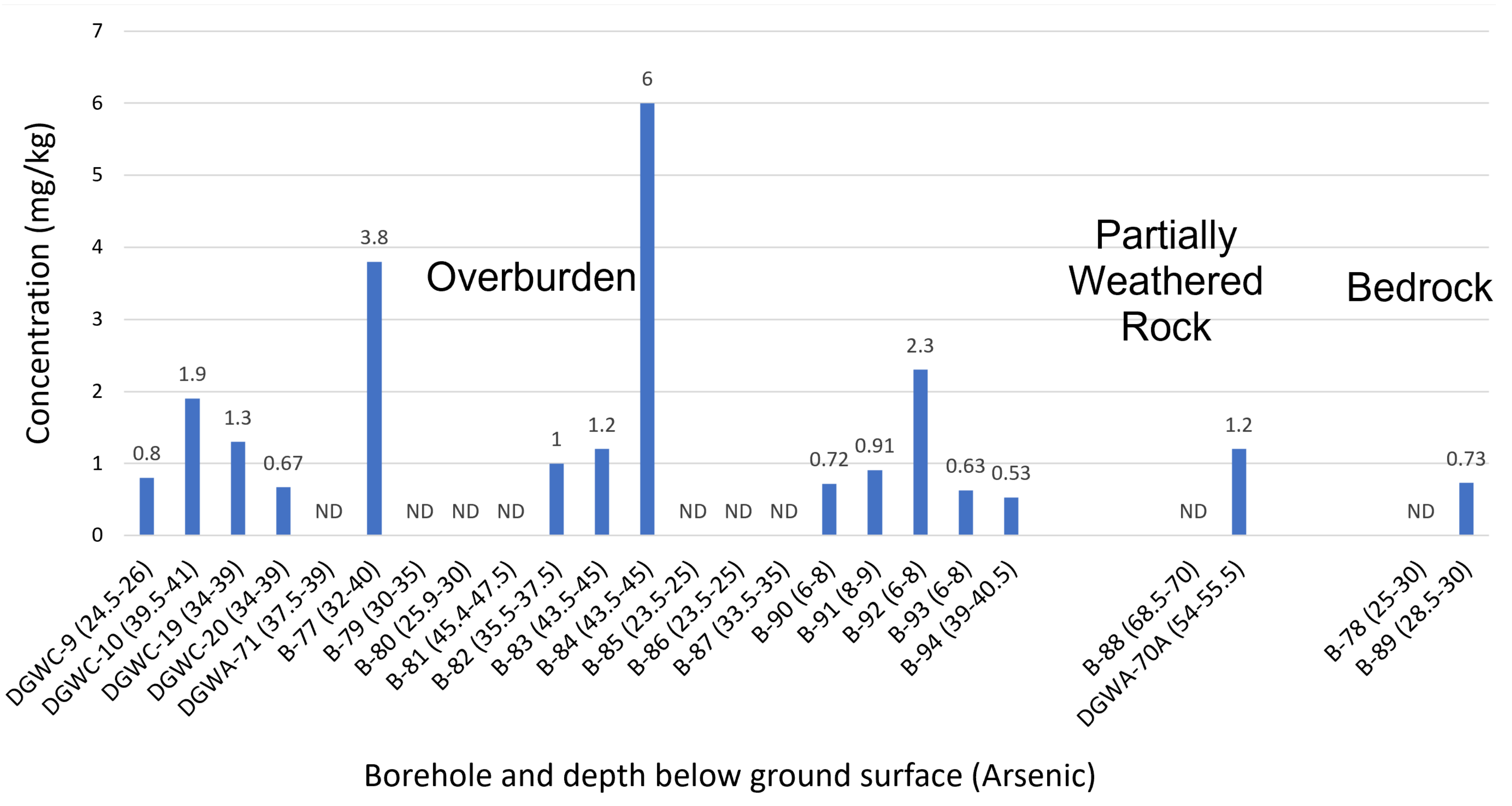
**Borehole and depth below ground surface (Aluminum mg/kg)**

| | |
|---|---|
| GEORGIA POWER COMPANY<br>PLANT MCDONOUGH-ATKINSON | PROJECT<br>GEOCHEMICAL CONCEPTUAL SITE MODEL |
| CONSULTANT: wsp | TITLE<br>**ALUMINIUM SEQUENTIAL EXTRACTION AT AP-2 AND 3/4** |

| | |
|---|---|
| YYYY-MM-DD | 2023-04-25 |
| DESIGNED | NP |
| PREPARED | NP |
| REVIEWED | PJN |
| APPROVED | TR |

| PROJECT NO. | CONTROL | REV. | FIGURE |
|---|---|---|---|
| GL166849621 | | 0 | 33 |

PATH: https://golderassociates.sharepoint.com/sites/127388/Project Files/5 Technical Work/2000-Martin Lake Ash Ponds/Tier II Report | FILE NAME: Figure Book.xlsx




GEORGIA POWER COMPANY
PLANT MCDONOUGH-ATKINSON

PROJECT
GEOCHEMICAL CONCEPTUAL SITE MODEL

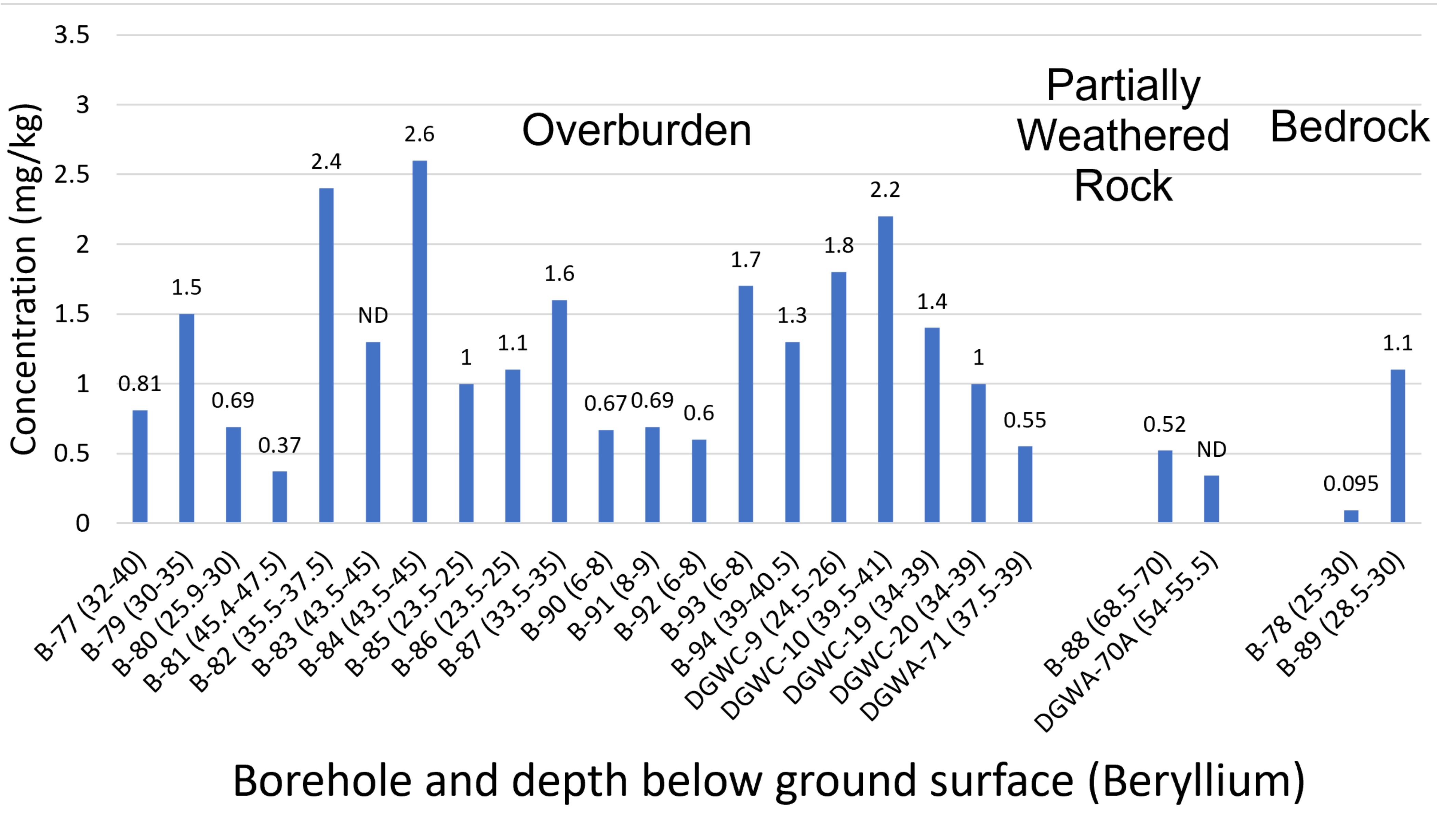
CONSULTANT

wsp

| | |
|---|---|
| YYYY-MM-DD | 2023-04-24 |
| DESIGNED | NP |
| PREPARED | NP |
| REVIEWED | PJN |
| APPROVED | TR |

TITLE
**AP-2 AND 3/4 TOTAL ARSENIC IN OVERBURDEN, PWR, AND BEDROCK**

| PROJECT NO. | CONTROL | REV. | FIGURE |
|---|---|---|---|
| GL166849621 | | 0 | 34 |




GEORGIA POWER COMPANY
PLANT MCDONOUGH-ATKINSON

PROJECT
GEOCHEMICAL CONCEPTUAL SITE MODEL

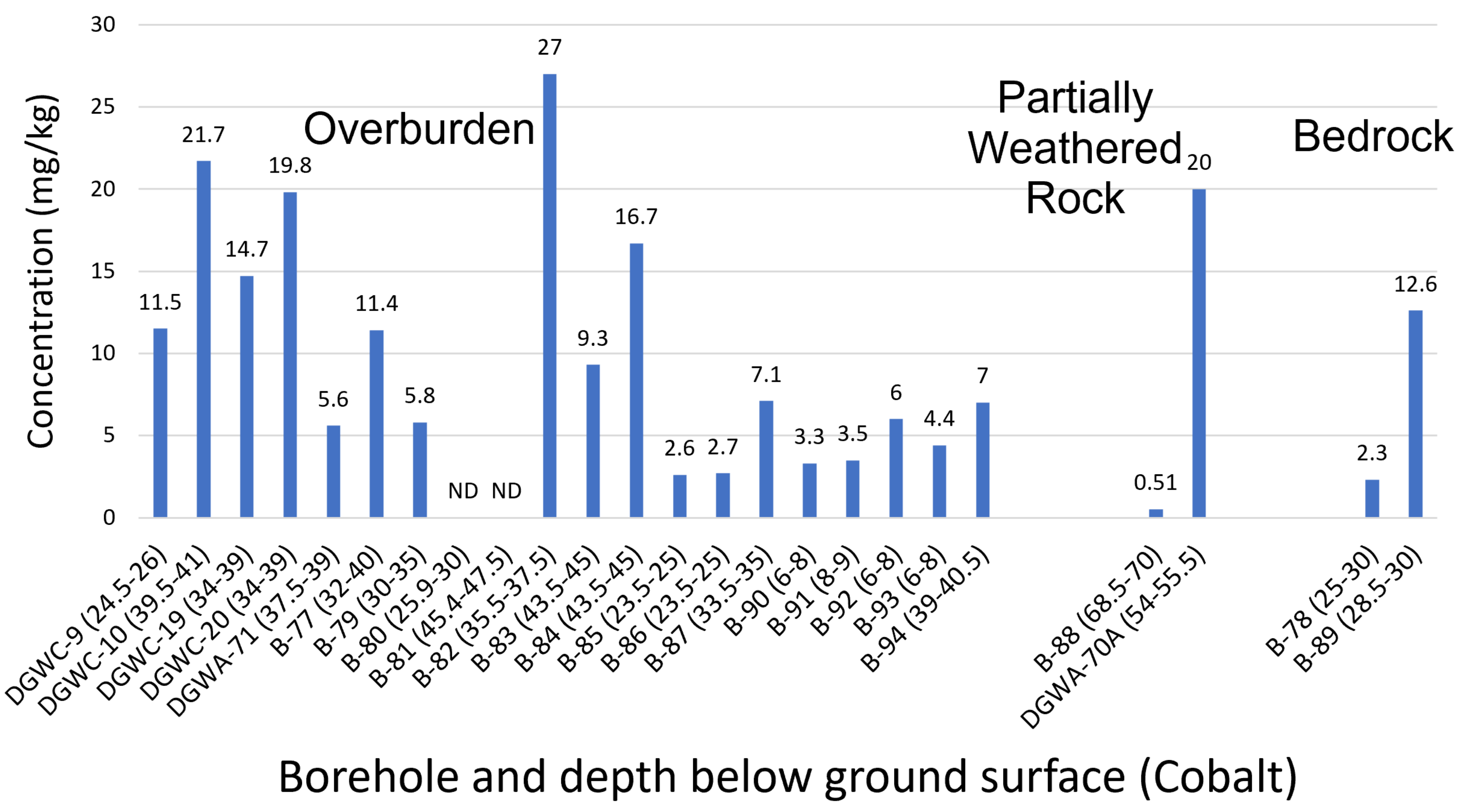
CONSULTANT

wsp

| | |
|---|---|
| YYYY-MM-DD | 2022-09-18 |
| DESIGNED | NP |
| PREPARED | NP |
| REVIEWED | PJN |
| APPROVED | TR |

TITLE
**AP-2 AND 3/4 TOTAL BERYLLIUM IN OVERBURDEN, PWR, AND BEDROCK**

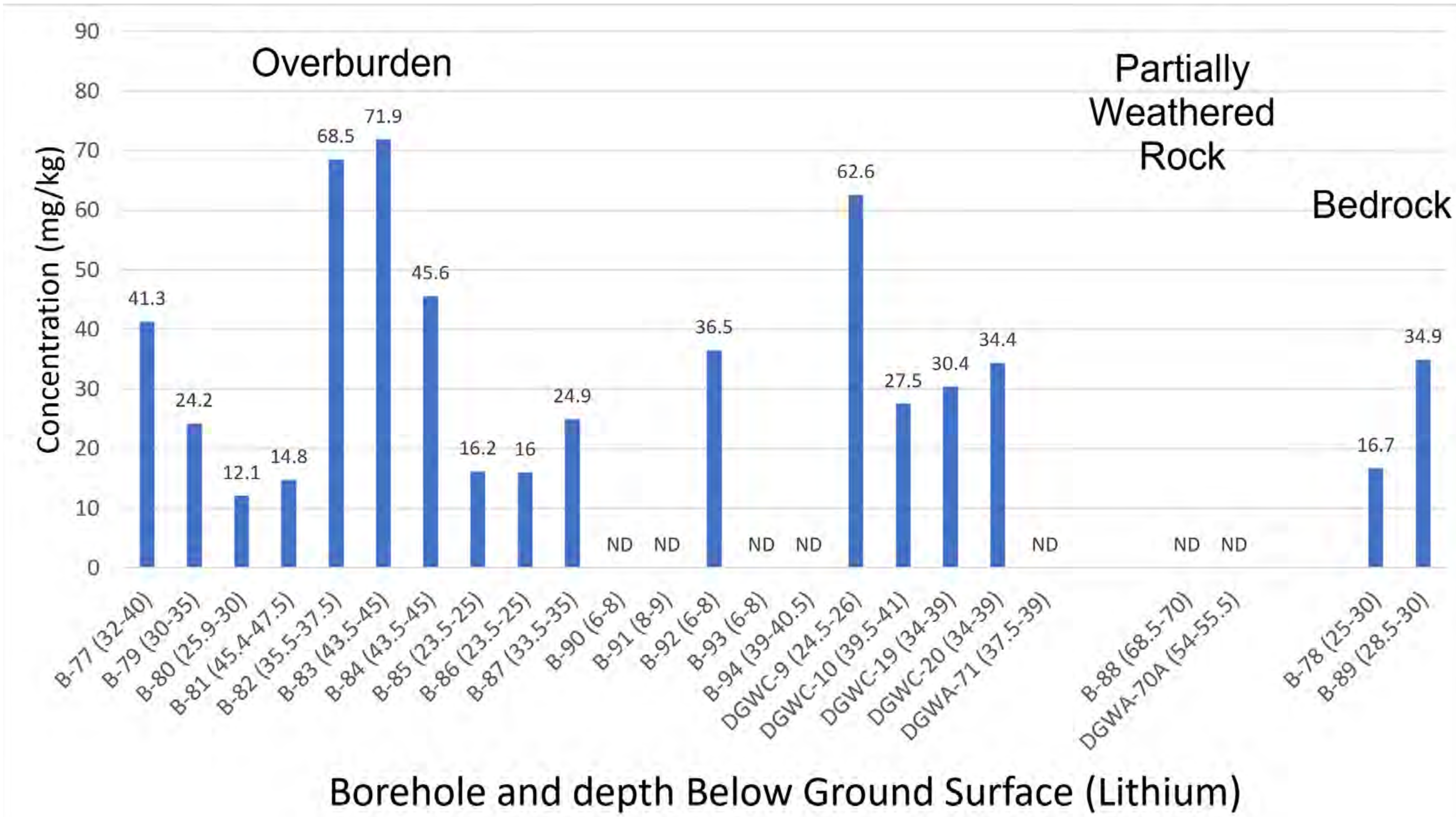
| PROJECT NO. | CONTROL | REV. | FIGURE |
|---|---|---|---|
| GL166849621 | | 0 | 35 |




| | |
|---|---|
| GEORGIA POWER COMPANY<br>PLANT MCDONOUGH-ATKINSON | PROJECT<br>GEOCHEMICAL CONCEPTUAL SITE MODEL |
| CONSULTANT: wsp | TITLE<br>AP-2 AND 3/4 TOTAL COBALT IN OVERBURDEN, PWR, AND BEDROCK |

| | |
|---|---|
| YYYY-MM-DD | 2023-4-25 |
| DESIGNED | NP |
| PREPARED | NP |
| REVIEWED | PJN |
| APPROVED | TR |

| PROJECT NO. | CONTROL | REV. | FIGURE |
|---|---|---|---|
| GL166849621 | | 0 | 36 |




GEORGIA POWER COMPANY
PLANT MCDONOUGH-ATKINSON

PROJECT
GEOCHEMICAL CONCEPTUAL SITE MODEL

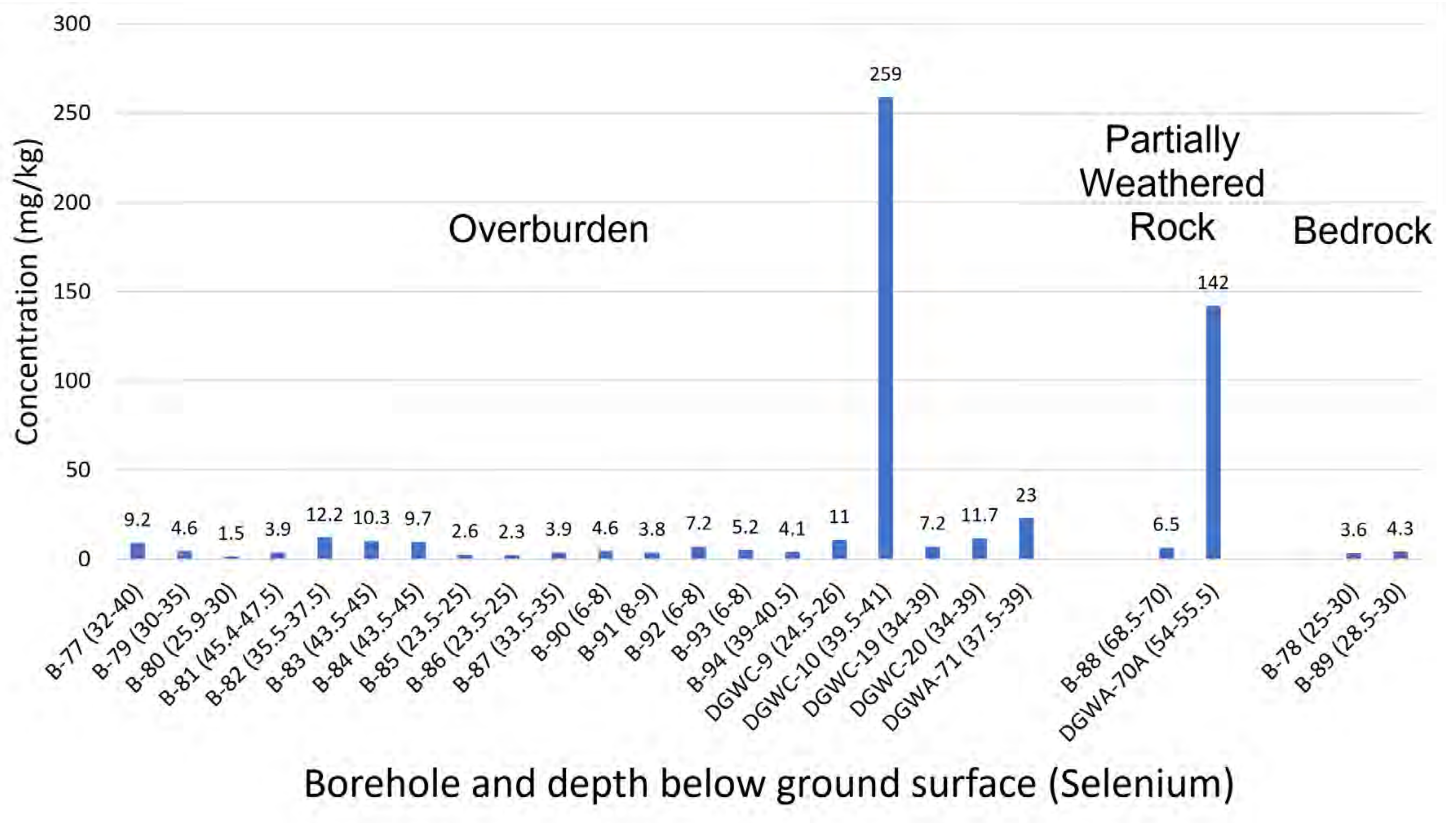
CONSULTANT

| | |
|---|---|
| YYYY-MM-DD | 2023-04-25 |
| DESIGNED | NP |
| PREPARED | NP |
| REVIEWED | PJN |
| APPROVED | TR |

TITLE
**AP-2 AND 3/4 TOTAL LITHIUM IN OVERBURDEN, PWR, AND BEDROCK**

| PROJECT NO. | CONTROL | REV. | FIGURE |
|---|---|---|---|
| GL166849621 | | 0 | 37 |

PATH: https://golderassociates.sharepoint.com/sites/127388/Project Files/5 Technical Work/2000-Martin Lake Ash Ponds/Tier II Report | FILE NAME: Figure Book.xlsx




GEORGIA POWER COMPANY
PLANT MCDONOUGH-ATKINSON

PROJECT
GEOCHEMICAL CONCEPTUAL SITE MODEL

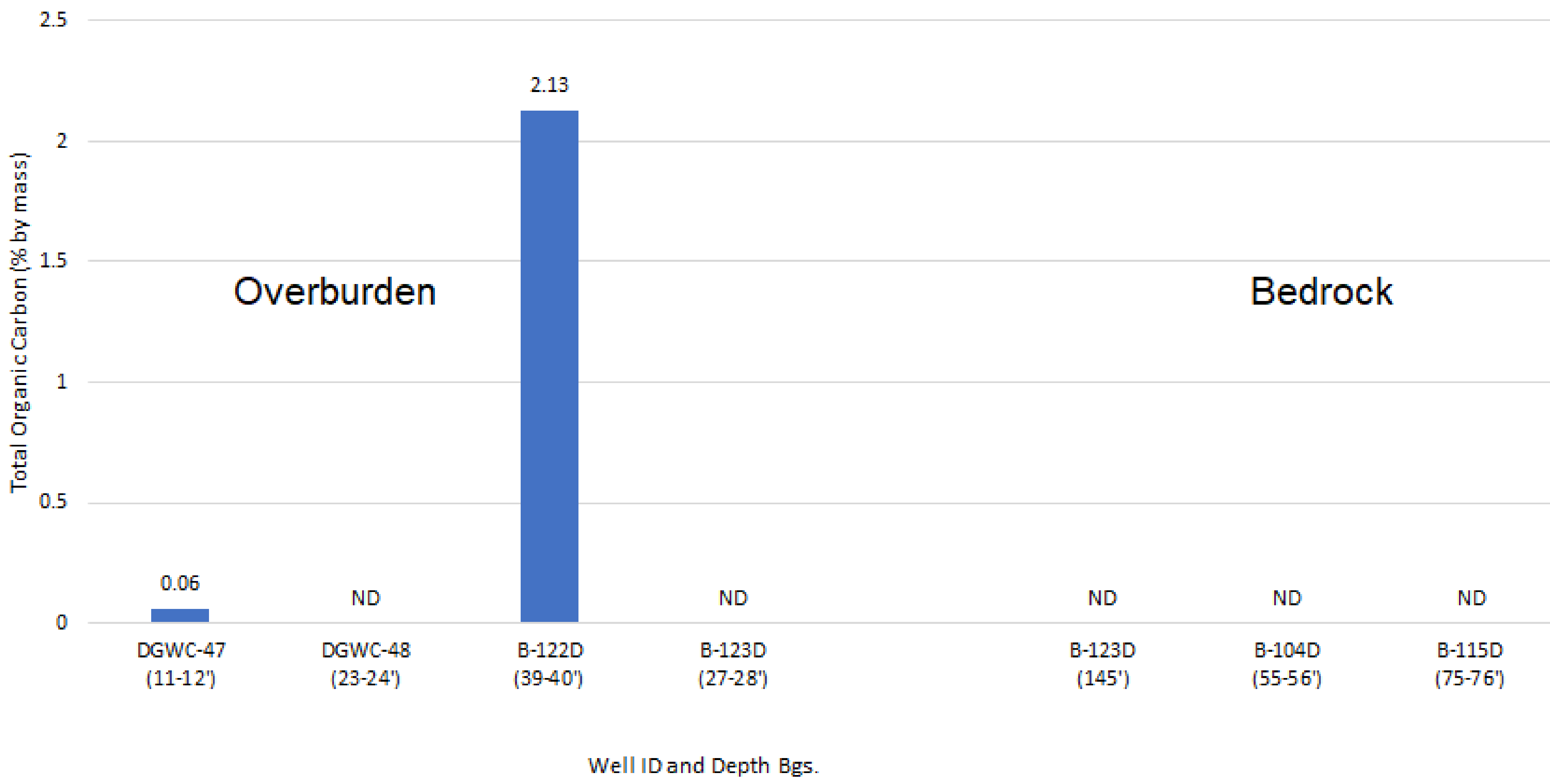
CONSULTANT

| | |
|---|---|
| YYYY-MM-DD | 2023-04-25 |
| DESIGNED | NP |
| PREPARED | NP |
| REVIEWED | PJN |
| APPROVED | TR |

TITLE
**AP-2 AND 3/4 TOTAL SELENIUM IN OVERBURDEN, PWR, AND BEDROCK**

| PROJECT NO. | CONTROL | REV. | FIGURE |
|---|---|---|---|
| GL166849621 | | 0 | 38 |

PATH: https://golderassociates.sharepoint.com/sites/127388/Project Files/5 Technical Work/2000-Martin Lake Ash Ponds/Tier II Report | FILE NAME: Figure Book.xlsx




GEORGIA POWER COMPANY
PLANT MCDONOUGH-ATKINSON

PROJECT
GEOCHEMICAL CONCEPTUAL SITE MODEL

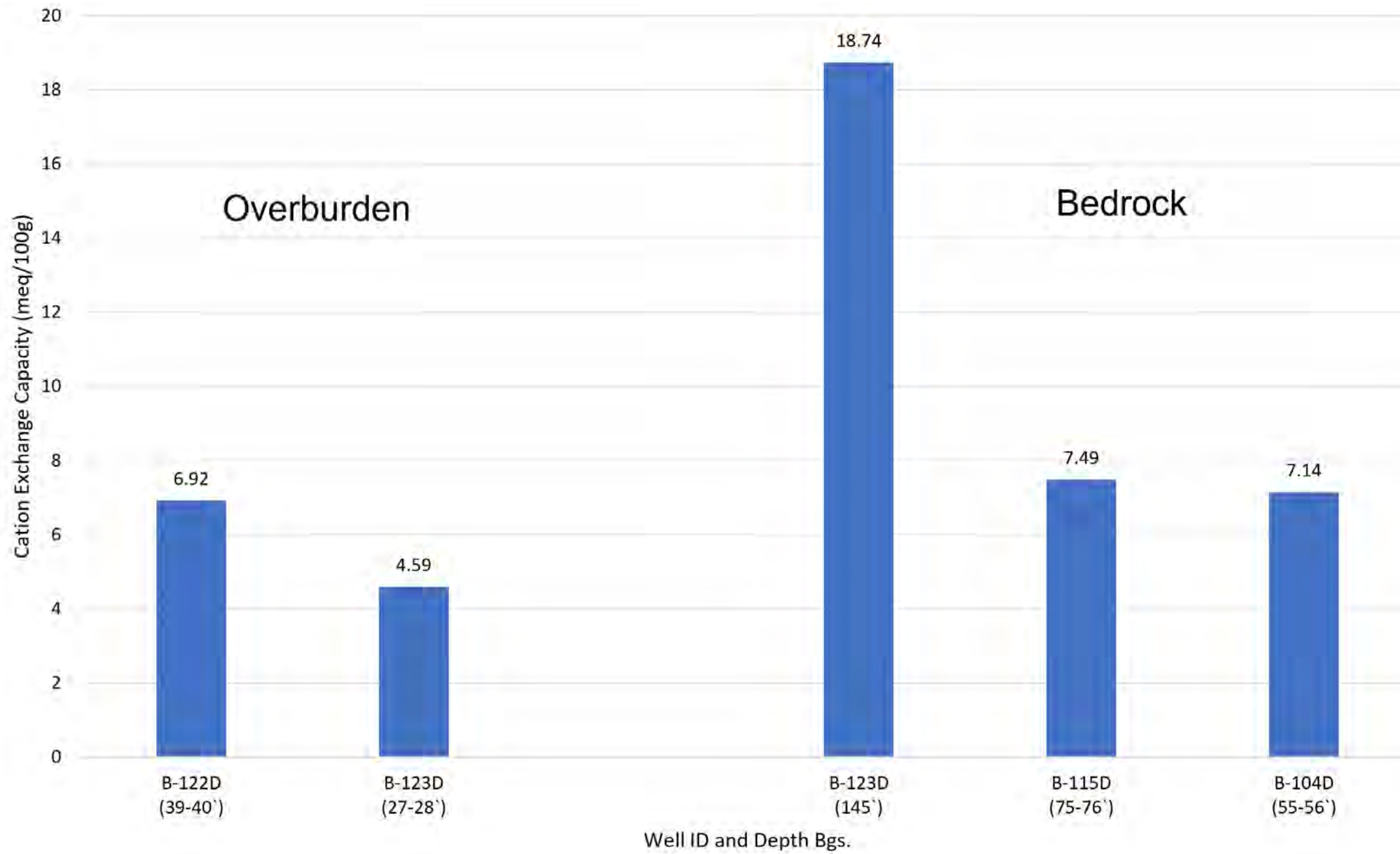
CONSULTANT

| | |
|---|---|
| YYYY-MM-DD | 2023-04-25 |
| DESIGNED | NP |
| PREPARED | NP |
| REVIEWED | PJN |
| APPROVED | TR |

TITLE
**TOTAL ORGANIC CARBON IN OVERBURDEN AND BEDROCK AT AP-2 AND 3/4**

| PROJECT NO. | CONTROL | REV. | FIGURE |
|---|---|---|---|
| GL166849621 | | 0 | 39 |

PATH: https://golderassociates.sharepoint.com/sites/127388/Project Files/5 Technical Work/2000-Martin Lake Ash Ponds/Tier II Report | FILE NAME: Figure Book.xlsx




GEORGIA POWER COMPANY
PLANT MCDONOUGH-ATKINSON

PROJECT
GEOCHEMICAL CONCEPTUAL SITE MODEL

CONSULTANT

| | |
|---|---|
| YYYY-MM-DD | 2023-04-25 |
| DESIGNED | NP |
| PREPARED | NP |
| REVIEWED | PJN |
| APPROVED | TR |

TITLE
**CATION EXCHANGE CAPCITY OF OVERBURDEN AND BEDROCK AT AP-2 AND 3/4**

| PROJECT NO. | CONTROL | REV. | FIGURE |
|---|---|---|---|
| GL166849621 | | 0 | 40 |

**APPENDIX A**

# Historical Groundwater Quality Data

| Analyte | | Units | DGWA-2 | DGWA-2 | DGWA-2 | DGWA-26 | DGWA-26 | DGWA-27 | DGWA-27 | DGWA-53 | DGWA-53 | DGWA-53 | DGWA-53 | DGWA-53 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 3/30/2017 | 7/11/2017 | 10/24/2017 | 8/30/2016 | 12/6/2016 | 8/30/2016 | 12/6/2016 | 3/28/2017 | 7/12/2017 | 10/24/2017 | 11/15/2017 | 3/8/2018 |
| **Appendix III** | Boron | mg/L | 1.56 | 1.39 | 1.18 | 0.854 | 0.552 | 1.13 | 1.36 | 0.0612 | 0.0735 | 0.077 | ------ | 0.13 J |
| | Calcium | mg/L | 103 | 98.4 | 86 | 83.2 | 46.2 | 166 | 163 | 30.8 | 40.3 | 30.3 | ------ | 39.8 |
| | Chloride | mg/L | 4.8 | 4.6 | 4.4 | 4.3 | 2.8 | 6.8 | 6.9 | 3.7 | 2.3 | 2.7 | 2.2 | 2.4 |
| | Fluoride | mg/L | 0.06 J | 0.04 J | 0.43 | 0.2 J | 0.15 J | 1 | 0.81 | 0.12 J | 0.1 J | 0.06 J | 0.05 J | < 0.029 |
| | pH, field measured | S.U. | 5.75 | ------ | ------ | 5.51 | 5.84 | 4.72 | 4.83 | 6.29 | 5.91 | 5.51 | 6.5 | 6.18 |
| | Sulfate | mg/L | 360 | 330 | 260 | 330 | 220 | 860 | 730 | 49 | 10 | 15 | 3.8 | 9.7 |
| | Total Dissolved Solids | mg/L | 580 | 542 | 523 | 566 | 432 | 1270 | 1110 | 202 | 218 | 671 | 241 | 213 |
| **Appendix IV** | Antimony | mg/L | < 0.00030 | < 0.00060 | < 0.00060 | < 0.00080 | < 0.00080 | < 0.00080 | < 0.00080 | < 0.00030 | < 0.00060 | < 0.00060 | ------ | < 0.00078 |
| | Arsenic | mg/L | < 0.00040 | < 0.00050 | < 0.00050 | < 0.0016 | < 0.0016 | 0.007 | < 0.0016 | 0.0005 J | < 0.00050 | < 0.00050 | ------ | < 0.00057 |
| | Barium | mg/L | 0.0232 | 0.0201 | 0.0206 | 0.0377 | 0.0157 | 0.0447 | 0.037 | 0.134 | 0.173 | 0.109 | ------ | 0.19 |
| | Beryllium | mg/L | < 0.000070 | < 0.000090 | < 0.000090 | 0.0009 J | 0.0002 J | 0.0275 | 0.0184 | < 0.000070 | < 0.000090 | < 0.000090 | ------ | < 0.00025 |
| | Cadmium | mg/L | 0.0005 J | 0.0003 J | 0.0003 J | < 0.000070 | < 0.000070 | 0.0054 | 0.0046 | < 0.000060 | < 0.00010 | < 0.00010 | ------ | < 0.000093 |
| | Chromium | mg/L | 0.0005 J | < 0.00050 | < 0.00050 | < 0.00090 | < 0.00090 | < 0.00090 | < 0.00090 | < 0.00030 | < 0.00050 | < 0.00050 | ------ | < 0.0016 |
| | Cobalt | mg/L | 0.0255 | 0.0238 | 0.0292 | < 0.00050 | < 0.00050 | 0.93 | 0.598 | 0.025 | 0.0247 | 0.0267 | ------ | 0.027 |
| | Fluoride | mg/L | 0.06 J | 0.04 J | 0.43 | 0.2 J | 0.15 J | 1 | 0.81 | 0.12 J | 0.1 J | 0.06 J | 0.05 J | < 0.029 |
| | Lead | mg/L | 0.0001 J | < 0.000070 | < 0.000070 | < 0.00010 | < 0.00010 | 0.0005 J | 0.0003 J | < 0.000070 | < 0.000070 | < 0.000070 | ------ | < 0.00027 |
| | Lithium | mg/L | 0.0807 | 0.0731 | 0.0995 | 0.02 J | 0.0212 J | 0.0496 J | 0.0443 J | 0.0108 J | 0.0075 J | 0.0103 J | ------ | 0.011 J |
| | Mercury | mg/L | 0.00007 J | < 0.000041 | < 0.000036 | 0.00008 J | 0.00005 J | 0.00005 J | 0.00007 J | < 0.000041 | < 0.000041 | < 0.000036 | ------ | < 0.000036 |
| | Molybdenum | mg/L | 0.0009 J | < 0.0010 | < 0.0010 | < 0.0017 | < 0.0017 | < 0.0017 | < 0.0017 | 0.0242 | 0.0321 | 0.0227 | ------ | 0.035 |
| | Selenium | mg/L | < 0.0014 | < 0.0018 | < 0.0018 | 0.0092 J | 0.0038 J | 0.0447 | 0.0212 | < 0.0014 | < 0.0018 | < 0.0018 | ------ | < 0.0014 |
| | Thallium | mg/L | < 0.000050 | < 0.000050 | < 0.000050 | < 0.00020 | < 0.00020 | < 0.00020 | < 0.00020 | < 0.000050 | < 0.000050 | < 0.000050 | ------ | < 0.00014 |
| | Radium | pCi/L | 0.737 U | 0.871 U | 1.19 | 8.98 | 4.47 | 0.815 U | 1.24 U | 6.36 | 4.37 | 4.46 | ------ | 2.14 |
| | Radium-226 | pCi/L | ------ | 0.142 U | 0.604 | 1.19 | 0.786 | 0.287 U | 0.942 | ------ | 2.03 | 2.28 | ------ | 0.372 |
| | Radium-228 | pCi/L | ------ | 0.729 | 0.589 U | 7.79 | 3.68 | 0.528 U | 0.296 U | ------ | 2.34 | 2.18 | ------ | 1.77 |
| **Field Measured** | Conductivity | uS/cm | 808.72 | ------ | ------ | 752.2 | 552.32 | 1400.9 | 1343.94 | 331.86 | 416 | 0 | 450.61 | 378.52 |
| | Dissolved Oxygen | mg/L | 1.03 | ------ | ------ | 3.3 | 1.7 | 0.25 | 0.15 | 0.1 | 2.81 | 9.78 | 1.65 | 0.11 |
| | Oxidation Reduction Potential | millivolts | -11.8 | ------ | ------ | 120 | 89.1 | 258.7 | 177.1 | 25.34 | 53.1 | 105.5 | -89.2 | 32.5 |
| | Temperature | Deg C | 19.32 | ------ | ------ | 24.97 | 16.65 | 21.55 | 17.23 | 17.8 | 26.12 | 31.4 | 18.74 | 16.51 |
| | Turbidity | ntu | 4.88 | ------ | ------ | 4.46 | 0.94 | 0.95 | 2.1 | 7.66 | 3.05 | 3.29 | 3.2 | 7.95 |
| | Water level depth | ft | 29.98 | ------ | ------ | 24.56 | 26.4 | 20.17 | 20.9 | 9.42 | 7.01 | 12.44 | 17.17 | 13.66 |
| **Supplemental** | Alkalinity as CaCO3, Total | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Alkalinity, Bicarbonate as CaCO3 | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Alkalinity, Carbonate as CaCO3 | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Aluminum | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Dissolved Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Hardness | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Total | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Ferric (Fe2) | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Ferrous | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Magnesium | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Manganese | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nickel | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nitrate as N | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphorus, Total Orthophosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Potassium | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silica | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silicon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silver | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Sodium | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Sulfide | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Total Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Zinc | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |

**NOTES:**
1. mg/L - milligrams per Liter; pCi/L - picocuries per Liter; S.U. - Standard Units; uS/cm - microSiemens per centimeter; Deg C - Degrees Celsius; ntu - Nephelometric turbidity units; ft - feet.
2. < indicates the substance was not detected above the analytical method detection limit (MDL). The value displayed is the method detection limit.
3. J indicates the substance was detected at such low levels that the precision of the laboratory instruments could not produce a reliable value. Therefore, the value displayed is qualified by the laboratory as an estimated number.
4. Radium data are a combination of radium isotopes 226 and 228. When results are reported below the MDC (Minimum Detectable Concentration), data are displayed with an accompanying U. The MDC varies depending upon the sample amount and elapsed time of the measurement.

| Analyte | | Units | DGWA-53<br>7/12/2018 | DGWA-53<br>7/12/2018 | DGWA-53<br>11/7/2018 | DGWA-53<br>11/7/2018 | DGWA-53<br>3/13/2019 | DGWA-53<br>8/28/2019 | DGWA-53<br>10/16/2019 | DGWA-53<br>3/9/2020 | DGWA-53<br>3/9/2020 | DGWA-53<br>8/13/2020 | DGWA-53<br>9/22/2020 | DGWA-53<br>3/12/2021 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Appendix III** | Boron | mg/L | < 0.076 | 0.082 | 0.073 | 0.085 | 0.08 | ------ | 0.059 | 0.08 J | 0.0824 J | ------ | 0.056 J | 0.064 |
| | Calcium | mg/L | 34.7 | 37.9 | 28.6 | 30.7 | 26.7 | ------ | 17.7 | 23.7 | 23.3 | ------ | 15.5 | 18.4 |
| | Chloride | mg/L | 2.2 | 2.1 | 2.3 | ------ | 3.6 | ------ | 2 | 1.8 | ------ | ------ | 1.6 | 2.0 |
| | Fluoride | mg/L | 0.071 J | 0.067 J | < 0.029 | ------ | 0.13 J | 0.42 | 0.11 J | 0.1 J | ------ | 0.062 J | 0.099 J | 0.076 J |
| | pH, field measured | S.U. | ------ | ------ | 6.22 | ------ | ------ | ------ | ------ | 6.41 | 6.41 | 6.17 | 6.43 | 6.38 |
| | Sulfate | mg/L | 8 | 5.9 | 12.8 | ------ | 23.7 | ------ | 15.1 | 9.5 | ------ | ------ | 13.5 | 8.8 |
| | Total Dissolved Solids | mg/L | 198 | 222 | 200 | ------ | < 201 | ------ | 126 | 171 | ------ | ------ | 142 | 124 |
| **Appendix IV** | Antimony | mg/L | < 0.00078 | < 0.00078 | < 0.00078 | < 0.00078 | ------ | < 0.00027 | < 0.00027 | < 0.00027 | < 0.00027 | 0.0003 J | < 0.00028 | < 0.00028 |
| | Arsenic | mg/L | < 0.00057 | < 0.00057 | 0.0009 J | < 0.00057 | ------ | < 0.00035 | 0.0018 J | 0.00068 J | 0.00073 J | < 0.00078 | 0.00093 J | < 0.00078 |
| | Barium | mg/L | 0.18 | 0.18 | 0.15 | 0.15 | ------ | 0.087 | 0.077 | 0.099 | 0.0965 | 0.046 | 0.07 | 0.076 |
| | Beryllium | mg/L | < 0.000050 | < 0.000050 | < 0.000050 | < 0.000050 | ------ | < 0.000074 | < 0.000074 | < 0.000074 | < 0.000074 | < 0.000046 | < 0.000046 | < 0.000046 |
| | Cadmium | mg/L | < 0.00013 J | 0.0001 J | < 0.000093 | < 0.000093 | ------ | < 0.00011 | < 0.00011 | < 0.00011 | < 0.00011 | < 0.00012 | < 0.00012 | < 0.00012 |
| | Chromium | mg/L | < 0.0016 | < 0.0016 | < 0.0016 | < 0.0016 | ------ | < 0.00039 | < 0.00039 | < 0.00039 | 0.00044 J | < 0.00055 | < 0.00055 | < 0.00055 |
| | Cobalt | mg/L | 0.024 | 0.024 | 0.018 | 0.019 | ------ | 0.013 | 0.009 | 0.016 | 0.0154 | 0.0051 | 0.011 | 0.0078 |
| | Fluoride | mg/L | 0.071 J | 0.067 J | < 0.029 | | 0.13 J | 0.42 | 0.11 J | 0.1 J | ------ | 0.062 J | 0.099 J | 0.076 J |
| | Lead | mg/L | < 0.00027 | < 0.00027 | < 0.00027 | < 0.00027 | ------ | < 0.000046 | < 0.000046 | < 0.000046 | < 0.000046 | < 0.000036 | < 0.000036 | < 0.000036 |
| | Lithium | mg/L | 0.0084 J | 0.0082 J | 0.0077 J | 0.0095 J | ------ | 0.0092 J | 0.0094 J | 0.0077 J | 0.008 J | 0.0085 J | 0.0089 J | 0.0083 J |
| | Mercury | mg/L | < 0.000036 | 0.000038 J | < 0.000036 | < 0.000036 | ------ | < 0.00014 | < 0.00014 | < 0.00014 | < 0.00014 | < 0.000078 | < 0.000078 | < 0.000078 |
| | Molybdenum | mg/L | 0.034 | 0.031 | 0.029 | 0.03 | ------ | 0.031 | 0.037 | 0.026 | 0.0275 | 0.012 | 0.039 | 0.018 |
| | Selenium | mg/L | < 0.0014 | < 0.0014 | < 0.0014 | < 0.0014 | ------ | < 0.0013 | < 0.0013 | < 0.0013 | < 0.0013 | < 0.0016 | < 0.0016 | < 0.0016 |
| | Thallium | mg/L | < 0.00014 | < 0.00014 | < 0.00014 | < 0.00014 | ------ | < 0.000052 | < 0.000052 | < 0.000052 | 0.000099 J | < 0.00014 | < 0.00014 | < 0.00014 |
| | Radium | pCi/L | 4.65 | 2.92 | 3.05 | ------ | ------ | 2.68 | 1.89 | 3.51 | ------ | 1.04 | 2.27 | 1.63 |
| | Radium-226 | pCi/L | 2.18 | 1.97 | 2.23 | ------ | ------ | 1.38 | 1.26 | 2.32 | ------ | 0.706 | 0.95 | 0.844 |
| | Radium-228 | pCi/L | 2.47 | 0.946 U | 0.819 U | ------ | ------ | 1.3 | 0.626 U | 1.19 | ------ | 0.337 U | 1.32 | 0.786 U |
| **Field Measured** | Conductivity | uS/cm | ------ | ------ | 334.2 | ------ | ------ | ------ | ------ | ------ | ------ | 149.9 | 210.82 | 195.64 |
| | Dissolved Oxygen | mg/L | ------ | ------ | 0.6 | ------ | ------ | ------ | ------ | ------ | ------ | 2.84 | 0.42 | 0.91 |
| | Oxidation Reduction Potential | millivolts | ------ | ------ | 30.6 | ------ | ------ | ------ | ------ | ------ | ------ | 161.6 | -21.2 | 53.7 |
| | Temperature | Deg C | ------ | ------ | 17.8 | ------ | ------ | ------ | ------ | ------ | ------ | 24.69 | 20.64 | 25.66 |
| | Turbidity | ntu | ------ | ------ | 17.9 | ------ | ------ | ------ | ------ | ------ | ------ | 4.11 | 4.05 | 8.6 |
| | Water level depth | ft | ------ | ------ | 14.9 | ------ | ------ | ------ | ------ | ------ | ------ | 21.52 | 15.71 | 13.7 |
| **Supplemental** | Alkalinity as CaCO3, Total | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 91.0 |
| | Alkalinity, Bicarbonate as CaCO3 | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | 73 | ------ | ------ | ------ | ------ | 91.0 |
| | Alkalinity, Carbonate as CaCO3 | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | < 20 | ------ | ------ | ------ | ------ | < 5.0 |
| | Aluminum | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | < 0.032 | ------ | ------ | ------ | ------ | ------ |
| | Dissolved Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | 1.4 | ------ | ------ | ------ | ------ | ------ |
| | Hardness | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | | ------ | ------ | ------ | ------ | ------ |
| | Iron, Total | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | < 0.20 | ------ | ------ | ------ | ------ | ------ |
| | Iron, Ferric (Fe2) | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | | ------ | ------ | ------ | ------ | ------ |
| | Iron, Ferrous | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | < 0.20 | ------ | ------ | ------ | ------ | ------ |
| | Magnesium | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | 5.3 | ------ | ------ | ------ | ------ | 6.5 |
| | Manganese | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | 2.9 | ------ | ------ | ------ | ------ | ------ |
| | Nickel | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | 0.005 J | ------ | ------ | ------ | ------ | ------ |
| | Nitrate as N | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | 0.24 | ------ | ------ | ------ | ------ | ------ |
| | Phosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | 0.0 | ------ | ------ | ------ | ------ | ------ |
| | Phosphorus, Total Orthophosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | | ------ | ------ | ------ | ------ | ------ |
| | Potassium | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | 3.6 | ------ | ------ | ------ | ------ | 3.9 |
| | Silica | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | | ------ | ------ | ------ | ------ | ------ |
| | Silicon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | 18.2 | ------ | ------ | ------ | ------ | ------ |
| | Silver | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | < 0.00028 | ------ | ------ | ------ | ------ | ------ |
| | Sodium | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | 6.1 | ------ | ------ | ------ | ------ | 9.0 |
| | Sulfide | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Total Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Zinc | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |

**NOTES:**
1. mg/L - milligrams per Liter; pCi/L - picocuries per Liter; S.U. - Standarc
2. < indicates the substance was not detected above the analytical metho
3. J indicates the substance was detected at such low levels that the pre
4. Radium data are a combination of radium isotopes 226 and 228. Whe

| | Analyte | Units | DGWA-53 | DGWA-53 | DGWA-53 | DGWA-70 | DGWA-70 | DGWA-70A | DGWA-70A | DGWA-70A | DGWA-70A | DGWA-70A | DGWA-70A | DGWA-70A |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 9/9/2021 | 1/28/2022 | 9/8/2022 | 3/28/2017 | 3/28/2017 | 7/11/2017 | 10/24/2017 | 1/23/2018 | 2/27/2018 | 7/10/2018 | 11/6/2018 | 3/12/2019 |
| **Appendix III** | Boron | mg/L | 0.065 | 0.062 | 0.05 | 0.0256 J | 0.0067 J | < 0.0060 | 0.0082 J | ------ | < 0.0062 J | < 0.0077 J | 0.0065 J | 0.0073 J |
| | Calcium | mg/L | 18.3 | 19.5 | 17.2 | 25.4 | 5.14 | 5.96 | 4.93 | 4.95 | 5.6 | 5 | 5.5 | 5.1 |
| | Chloride | mg/L | 1.8 | 1.8 | 1.60 | 7.1 | 3.8 | 2.1 | 2.4 | 2.4 | 2.5 | 1.9 | 2.3 | 2.5 |
| | Fluoride | mg/L | 0.099 J | 0.08 J | 0.11 | 3.4 | 1.2 | 0.06 J | < 0.030 | ------ | < 0.029 | 0.082 J | < 0.029 | 0.039 J |
| | pH, field measured | S.U. | 6.41 | 6.35 | 6.32 | ------ | 5.9 | 5.62 | 5.71 | ------ | ------ | ------ | ------ | ------ |
| | Sulfate | mg/L | 11.9 | 13.1 | 12 | 6.8 | 2.7 | 1.4 | 1.4 | 0.67 J | 0.54 J | 0.25 J | 0.12 J | < 0.35 J |
| | Total Dissolved Solids | mg/L | 131 | 155 | 129 | ------ | 39 | 25 | 49 | ------ | 43 | < 80 | 65 | < 43 |
| **Appendix IV** | Antimony | mg/L | < 0.00078 | < 0.00078 | < 0.00078 | 0.0004 J | < 0.00030 | < 0.00060 | < 0.00060 | ------ | < 0.00078 | < 0.00078 | < 0.00078 | ------ |
| | Arsenic | mg/L | < 0.0011 | 0.0024 J | 0.0029 J | < 0.00040 | < 0.00040 | < 0.00050 | < 0.00050 | < 0.0050 | < 0.00057 | < 0.00057 | < 0.00057 | ------ |
| | Barium | mg/L | 0.099 | 0.068 | 0.077 | 0.0338 | 0.0166 | 0.0306 | 0.0333 | ------ | 0.034 | 0.037 | 0.037 | ------ |
| | Beryllium | mg/L | < 0.000054 | < 0.000054 | < 0.000054 | < 0.000070 | < 0.000070 | < 0.000090 | < 0.000090 | ------ | 0.000063 J | 0.000095 J | 0.00012 J | ------ |
| | Cadmium | mg/L | < 0.00011 | < 0.00011 | < 0.00011 | < 0.000060 | < 0.000060 | < 0.00010 | < 0.00010 | ------ | < 0.000093 | < 0.000093 | < 0.000093 | ------ |
| | Chromium | mg/L | < 0.0011 | < 0.0011 | < 0.0011 | < 0.00030 | 0.0008 J | 0.0005 J | 0.0005 J | ------ | < 0.0016 | < 0.0016 | < 0.0016 | ------ |
| | Cobalt | mg/L | 0.0064 | 0.014 | 0.012 | 0.0052 J | 0.0034 J | 0.0007 J | < 0.00030 | ------ | < 0.00052 | < 0.00052 | < 0.00052 | ------ |
| | Fluoride | mg/L | 0.099 J | 0.08 J | 0.11 | 3.4 | 1.2 | 0.06 J | < 0.030 | ------ | < 0.029 | 0.082 J | < 0.029 | 0.039 J |
| | Lead | mg/L | < 0.00089 | < 0.00089 | < 0.00089 | < 0.000070 | 0.00009 J | < 0.000070 | < 0.000070 | ------ | < 0.00027 | < 0.00027 | < 0.00027 | ------ |
| | Lithium | mg/L | 0.0091 J | 0.0091 J | 0.0083 J | 0.0104 J | 0.0054 J | < 0.0015 | < 0.0015 | ------ | < 0.00097 | < 0.00097 | < 0.00097 | ------ |
| | Mercury | mg/L | < 0.000078 | < 0.00013 | < 0.00013 | < 0.000040 | < 0.000041 | < 0.000041 | < 0.000036 | ------ | < 0.000036 | < 0.000055 J | < 0.000036 | ------ |
| | Molybdenum | mg/L | 0.025 | 0.026 | 0.027 | 0.0032 J | < 0.00060 | < 0.0010 | < 0.0010 | ------ | < 0.0019 | < 0.0019 | < 0.0019 | ------ |
| | Selenium | mg/L | < 0.0014 | < 0.0014 | < 0.0014 | < 0.0014 | < 0.0014 | < 0.0018 | < 0.0018 | ------ | < 0.0014 | < 0.0014 | < 0.0014 | ------ |
| | Thallium | mg/L | < 0.00018 | < 0.00018 | < 0.00018 | < 0.000050 | < 0.000050 | < 0.000050 | < 0.000050 | ------ | < 0.00014 | < 0.00014 | < 0.00014 | ------ |
| | Radium | pCi/L | 2.72 | 2.1 | 1.69 | ------ | 0.866 U | 0.254 U | 0.472 U | ------ | 1.22 | 0.362 U | 0.859 U | ------ |
| | Radium-226 | pCi/L | 1.42 | 0.925 | ------ | ------ | ------ | 0.0557 U | 0.471 | ------ | 0.138 U | 0.362 | 0.328 | ------ |
| | Radium-228 | pCi/L | 1.3 | 1.17 | ------ | ------ | ------ | 0.198 U | 0.00142 U | ------ | 1.08 | -0.0842 U | 0.531 U | ------ |
| **Field Measured** | Conductivity | uS/cm | 198 | 171.6 | ------ | ------ | 81.61 | 68.8 | 72.19 | ------ | ------ | ------ | ------ | ------ |
| | Dissolved Oxygen | mg/L | 1.41 | 2.97 | ------ | ------ | 2.33 | 4.97 | 4.82 | ------ | ------ | ------ | ------ | ------ |
| | Oxidation Reduction Potential | millivolts | 16.7 | 72.3 | ------ | ------ | -56.11 | 38.6 | 219.41 | ------ | ------ | ------ | ------ | ------ |
| | Temperature | Deg C | 23.38 | 14.31 | ------ | ------ | 18.52 | 21.16 | 20.17 | ------ | ------ | ------ | ------ | ------ |
| | Turbidity | ntu | 4.5 | 11.99 | ------ | ------ | 4.11 | 3.55 | 1.29 | ------ | ------ | ------ | ------ | ------ |
| | Water level depth | ft | 14.6 | 19.2 | ------ | ------ | 26.06 | 41.95 | 41.96 | ------ | ------ | ------ | ------ | ------ |
| **Supplemental** | Alkalinity as CaCO3, Total | mg/L | ------ | 82.9 | 78.6 | ------ | ------ | ------ | ------ | 25 | ------ | ------ | ------ | ------ |
| | Alkalinity, Bicarbonate as CaCO3 | mg/L | ------ | 82.9 | 78.6 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Alkalinity, Carbonate as CaCO3 | mg/L | ------ | < 1.8 | < 5.0 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Aluminum | mg/L | ------ | ------ | ------ | < 0.0162 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Dissolved Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Hardness | mg/L | ------ | ------ | ------ | 98.7 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Total | mg/L | ------ | ------ | 5.4 | ------ | ------ | ------ | ------ | 0.0279 J | ------ | ------ | ------ | ------ |
| | Iron, Ferric (Fe2) | mg/L | ------ | ------ | 2.4 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Ferrous | mg/L | ------ | ------ | 3.0 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Magnesium | mg/L | ------ | 6.9 | 5.8 | 8.54 | ------ | ------ | ------ | 2.18 | ------ | ------ | ------ | ------ |
| | Manganese | mg/L | ------ | ------ | ------ | 1.76 | ------ | ------ | ------ | 0.0212 | ------ | ------ | ------ | ------ |
| | Nickel | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nitrate as N | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphorus, Total Orthophosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Potassium | mg/L | ------ | 4.2 | 3.6 | 8.49 | ------ | ------ | ------ | 1.66 | ------ | ------ | ------ | ------ |
| | Silica | mg/L | ------ | ------ | ------ | 26.6 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silicon | mg/L | ------ | ------ | ------ | 12.5 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silver | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Sodium | mg/L | ------ | 8.9 | 7.3 | 15.4 | ------ | ------ | ------ | 3.61 | ------ | ------ | ------ | ------ |
| | Sulfide | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Total Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Zinc | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |

**NOTES:**
1. mg/L - milligrams per Liter; pCi/L - picocuries per Liter; S.U. - Standarc
2. < indicates the substance was not detected above the analytical metho
3. J indicates the substance was detected at such low levels that the pre
4. Radium data are a combination of radium isotopes 226 and 228. Whe

**APPENDIX A**
**ANALYTICAL RESULTS (2016 - 2022)**
Plant McDonough-Atkinson Ash Pond 1 and Ash Pond 2 and 3/4
Atlanta, Georgia

| | Analyte | Units | DGWA-70A | DGWA-70A | DGWA-70A | DGWA-70A | DGWA-70A | DGWA-70A | DGWA-70A | DGWA-70A | DGWA-70A | DGWA-71 | DGWA-71 | DGWA-71 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 8/27/2019 | 10/15/2019 | 3/2/2020 | 8/11/2020 | 9/22/2020 | 3/1/2021 | 9/9/2021 | 1/18/2022 | 9/7/2022 | 3/28/2017 | 3/28/2017 | 7/11/2017 |
| **Appendix III** | Boron | mg/L | ------ | < 0.0049 | 0.0055 J | ------ | < 0.0052 | < 0.0052 | < 0.0086 | 0.024 J | < 0.0086 | 0.0097 J | 0.0122 J | 0.0077 J |
| | Calcium | mg/L | ------ | 5.1 | 5.3 | ------ | 5 | 4.1 | 5.3 | 6.1 | 5.9 | 8.31 | 8.51 | 7.71 |
| | Chloride | mg/L | ------ | 2.2 | 1.9 | ------ | 1.9 | 1.9 | 1.9 | 1.9 | 2.10 | 3.6 | 3.6 | 3.1 |
| | Fluoride | mg/L | < 0.029 | < 0.029 | < 0.050 | < 0.050 | < 0.050 | < 0.050 | < 0.050 | < 0.050 | 0.061 J | 0.06 J | < 0.020 | 0.007 J |
| | pH, field measured | S.U. | ------ | ------ | 5.54 | 5.86 | 6.01 | 5.43 | 5.5 | 5.5 | 5.6 | 5.94 | ------ | 5.74 |
| | Sulfate | mg/L | ------ | 0.16 J | < 0.50 | ------ | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | 17 | 19 | 11 |
| | Total Dissolved Solids | mg/L | ------ | 70 | 52 | ------ | 46 | 25.0 | 53 | 54 | 34 | 90 | ------ | 59 |
| **Appendix IV** | Antimony | mg/L | < 0.00027 | < 0.00027 | < 0.00027 | 0.0013 J | < 0.00028 | < 0.00028 | 0.0015 J | < 0.00078 | < 0.00078 | 0.0007 J | < 0.00030 | < 0.00060 |
| | Arsenic | mg/L | < 0.00035 | 0.00052 J | < 0.00035 | < 0.00078 | < 0.00078 | < 0.00078 | < 0.0011 | 0.0046 J | 0.0024 J | < 0.00040 | < 0.00040 | < 0.00050 |
| | Barium | mg/L | 0.037 | 0.034 | 0.035 | 0.041 | 0.038 | 0.042 | 0.038 | 0.043 | 0.039 | 0.0378 | 0.0376 | 0.0362 |
| | Beryllium | mg/L | 0.000079 J | < 0.000074 | 0.000096 J | 0.00013 J | 0.000068 J | 0.00012 J | 0.000089 J | 0.000092 J | 0.000084 J | 0.00009 J | 0.00008 J | < 0.000090 |
| | Cadmium | mg/L | < 0.00011 | < 0.00011 | 0.00041 J | < 0.00012 | < 0.00012 | < 0.00012 | < 0.00011 | < 0.00011 | < 0.00011 | < 0.000060 | < 0.000060 | < 0.00010 |
| | Chromium | mg/L | 0.00071 J | 0.034 | 0.0013 J | 0.0016 J | 0.00089 J | < 0.00055 | < 0.0011 | < 0.0011 | < 0.0011 | 0.0023 J | < 0.00030 | < 0.00050 |
| | Cobalt | mg/L | < 0.00030 | 0.00064 J | 0.00037 J | 0.0012 J | < 0.00038 | < 0.00038 | < 0.00039 | < 0.00039 | < 0.00039 | 0.0033 J | 0.0035 J | 0.0008 J |
| | Fluoride | mg/L | < 0.029 | < 0.029 | < 0.050 | < 0.050 | < 0.050 | < 0.050 | < 0.050 | < 0.050 | 0.061 J | 0.06 J | < 0.020 | 0.007 J |
| | Lead | mg/L | 0.000078 J | < 0.000046 | 0.000074 J | 0.0003 J | 0.000078 J | < 0.000036 | < 0.00089 | < 0.00089 | < 0.00089 | < 0.000070 | < 0.000070 | < 0.000070 |
| | Lithium | mg/L | < 0.00078 | < 0.00078 | < 0.00078 | 0.0019 J | < 0.00081 | < 0.00081 | < 0.00073 | < 0.00073 | < 0.00073 | 0.0025 J | 0.0025 J | < 0.0015 |
| | Mercury | mg/L | < 0.00014 | < 0.00014 | < 0.00014 | < 0.000078 | < 0.000078 | < 0.000078 | < 0.000078 | < 0.00013 | < 0.00013 | < 0.000041 | < 0.000040 | < 0.000041 |
| | Molybdenum | mg/L | < 0.00095 | < 0.00095 | < 0.00095 | < 0.00069 | < 0.00069 | < 0.00069 | < 0.00074 | < 0.00074 | < 0.00074 | 0.0009 J | 0.0009 J | < 0.0010 |
| | Selenium | mg/L | < 0.0013 | < 0.0013 | < 0.0013 | < 0.0016 | < 0.0016 | < 0.0016 | < 0.0014 | < 0.0014 | < 0.0014 | < 0.0014 | < 0.0014 | < 0.0018 |
| | Thallium | mg/L | < 0.000052 | < 0.000052 | 0.000078 J | < 0.00014 | < 0.00014 | < 0.00014 | < 0.00018 | < 0.00018 | < 0.00018 | 0.00006 J | < 0.000050 | < 0.000050 |
| | Radium | pCi/L | 1.97 | 0.319 U | 0.419 U | 0.812 U | 0.45 U | 0.552 U | 0.779 U | 1.26 | 0.504 U | 0.257 U | ------ | 0.461 U |
| | Radium-226 | pCi/L | 1.11 | 0.2 U | 0.267 U | 0.178 U | 0.178 U | 0.121 U | -0.0648 U | 0.0285 U | ------ | ------ | ------ | 0.0113 U |
| | Radium-228 | pCi/L | 0.863 | 0.119 U | 0.152 U | 0.634 U | 0.272 U | 0.431 U | 0.779 | 1.23 | ------ | ------ | ------ | 0.45 U |
| **Field Measured** | Conductivity | uS/cm | ------ | ------ | ------ | 61.2 | 59.6 | 51.09 | 67.29 | 71.6 | ------ | 134.53 | ------ | 104.8 |
| | Dissolved Oxygen | mg/L | ------ | ------ | ------ | 8.28 | 4.43 | 3.86 | 4.91 | 4.78 | ------ | 0.74 | ------ | 0.67 |
| | Oxidation Reduction Potential | millivolts | ------ | ------ | ------ | 143.5 | 97.5 | 371.8 | 90.7 | 164.6 | ------ | -23.89 | ------ | 11.7 |
| | Temperature | Deg C | ------ | ------ | ------ | 18.32 | 17.36 | 17.41 | 18.3 | 16.15 | ------ | 18.65 | ------ | 21.73 |
| | Turbidity | ntu | ------ | ------ | ------ | 3.94 | 3.67 | 0.75 | 0.65 | 0.44 | ------ | 4.84 | ------ | 1.79 |
| | Water level depth | ft | ------ | ------ | ------ | 39.88 | 41.14 | 39.1 | 41.57 | 41.78 | ------ | 29.13 | ------ | 28.65 |
| **Supplemental** | Alkalinity as CaCO3, Total | mg/L | ------ | ------ | ------ | ------ | ------ | 20.4 | ------ | 27 | 27.6 | ------ | ------ | ------ |
| | Alkalinity, Bicarbonate as CaCO3 | mg/L | ------ | 23 | ------ | ------ | ------ | 20.4 | ------ | 27 | 27.6 | ------ | ------ | ------ |
| | Alkalinity, Carbonate as CaCO3 | mg/L | ------ | < 20 | ------ | ------ | ------ | < 5.0 | ------ | < 1.8 | < 5.0 | ------ | ------ | ------ |
| | Aluminum | mg/L | ------ | < 0.032 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 0.0162 | ------ |
| | Dissolved Organic Carbon | mg/L | ------ | < 0.50 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Hardness | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 26.9 | ------ |
| | Iron, Total | mg/L | ------ | 0.25 | ------ | ------ | ------ | ------ | ------ | ------ | < 0.025 | ------ | ------ | ------ |
| | Iron, Ferric (Fe2) | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 0.025 | ------ | ------ | ------ |
| | Iron, Ferrous | mg/L | ------ | < 0.20 | ------ | ------ | ------ | ------ | ------ | ------ | 0.0 | ------ | ------ | ------ |
| | Magnesium | mg/L | ------ | 2.2 | ------ | ------ | ------ | 2.1 | ------ | 2.4 | 2.3 | ------ | 1.39 | ------ |
| | Manganese | mg/L | ------ | < 0.0061 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 0.343 | ------ |
| | Nickel | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nitrate as N | mg/L | ------ | < 0.0050 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphate | mg/L | ------ | 0.1 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphorus, Total Orthophosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Potassium | mg/L | ------ | 1.6 | ------ | ------ | ------ | 1.6 | ------ | 1.7 | 1.6 | ------ | 1.13 | ------ |
| | Silica | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 34.8 | ------ |
| | Silicon | mg/L | ------ | 8.2 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 16.3 | ------ |
| | Silver | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Sodium | mg/L | ------ | 3.1 | ------ | ------ | ------ | 2.6 | ------ | 3.5 | 3.4 | ------ | 17.9 | ------ |
| | Sulfide | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Total Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Zinc | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |

**NOTES:**
1. mg/L - milligrams per Liter; pCi/L - picocuries per Liter; S.U. - Standard
2. < indicates the substance was not detected above the analytical meth
3. J indicates the substance was detected at such low levels that the pre
4. Radium data are a combination of radium isotopes 226 and 228. Whe

**APPENDIX A**
**ANALYTICAL RESULTS (2016 - 2022)**
Plant McDonough-Atkinson Ash Pond 1 and Ash Pond 2 and 3/4
Atlanta, Georgia

| Analyte | | Units | DGWA-71 10/24/2017 | DGWA-71 11/15/2017 | DGWA-71 1/22/2018 | DGWA-71 2/27/2018 | DGWA-71 7/10/2018 | DGWA-71 11/6/2018 | DGWA-71 3/12/2019 | DGWA-71 8/27/2019 | DGWA-71 10/15/2019 | DGWA-71 3/2/2020 | DGWA-71 8/11/2020 | DGWA-71 9/22/2020 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appendix III | Boron | mg/L | 0.0083 J | ------ | ------ | < 0.0069 J | < 0.0059 J | 0.0067 J | 0.0068 J | ------ | 0.0054 J | 0.01 J | ------ | < 0.0052 |
| | Calcium | mg/L | 6.86 | ------ | 5.8 | 6.1 | 5.7 | 5.7 | 5.5 | ------ | 5.1 | 5.8 | ------ | 5.4 |
| | Chloride | mg/L | 3.2 | 3.1 | 3.8 | 3.2 | 2.5 | 2.6 | 3.3 | ------ | 3.3 | 3 | ------ | 5.2 |
| | Fluoride | mg/L | < 0.030 | < 0.030 | ------ | < 0.029 | < 0.029 | < 0.029 | < 0.029 | < 0.029 | < 0.029 | < 0.050 | < 0.050 | < 0.050 |
| | pH, field measured | S.U. | 5.86 | 5.77 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 5.77 | 5.96 | 6.06 |
| | Sulfate | mg/L | 9.6 | 7.8 | 7.6 | 7.4 | 7.2 | 7.3 | 7 | ------ | 7.4 | 8.5 | ------ | 6.5 |
| | Total Dissolved Solids | mg/L | 117 | 90 | ------ | 79 | < 88 | 85 | < 74 | ------ | 89 | 67 | ------ | 74 |
| Appendix IV | Antimony | mg/L | < 0.00060 | ------ | ------ | < 0.00078 | < 0.00078 | < 0.00078 | ------ | < 0.00027 | < 0.00027 | 0.0018 J | 0.0018 J | < 0.00028 |
| | Arsenic | mg/L | < 0.00050 | ------ | < 0.00052 | < 0.00057 | < 0.00057 | < 0.00057 | ------ | < 0.00035 | 0.00071 J | < 0.00035 | < 0.00078 | < 0.00078 |
| | Barium | mg/L | 0.0313 | ------ | ------ | 0.029 | 0.027 | 0.026 | ------ | 0.027 | 0.024 | 0.026 | 0.026 | 0.024 |
| | Beryllium | mg/L | < 0.000090 | ------ | ------ | 0.000092 J | 0.000091 J | 0.00013 J | ------ | < 0.000074 | 0.000088 J | 0.0001 J | 0.00011 J | 0.000069 J |
| | Cadmium | mg/L | < 0.00010 | ------ | ------ | < 0.000093 | < 0.000093 | < 0.000093 | ------ | < 0.00011 | < 0.00011 | < 0.00011 | < 0.00012 | < 0.00012 |
| | Chromium | mg/L | < 0.00050 | ------ | ------ | < 0.0016 | < 0.0016 | < 0.0016 | ------ | 0.0018 J | 0.0025 J | 0.00045 J | 0.0006 J | < 0.00055 |
| | Cobalt | mg/L | 0.0004 J | ------ | ------ | < 0.00052 | < 0.00052 | < 0.00052 | ------ | < 0.00030 | < 0.00030 | < 0.00030 | < 0.00038 | < 0.00038 |
| | Fluoride | mg/L | < 0.030 | < 0.030 | ------ | < 0.029 | < 0.029 | < 0.029 | < 0.029 | < 0.029 | < 0.029 | < 0.050 | < 0.050 | < 0.050 |
| | Lead | mg/L | < 0.000070 | ------ | ------ | < 0.00027 | < 0.00027 | < 0.00027 | ------ | < 0.000046 | < 0.000046 | < 0.000046 | < 0.000036 | < 0.000036 |
| | Lithium | mg/L | < 0.0015 | ------ | ------ | 0.0013 J | 0.0012 J | 0.0014 J | ------ | 0.0014 J | 0.0012 J | 0.0011 J | 0.0015 J | 0.0012 J |
| | Mercury | mg/L | < 0.000036 | ------ | ------ | < 0.000036 | < 0.00010 J | 0.000041 J | ------ | < 0.00014 | < 0.00014 | < 0.00014 | < 0.000078 | < 0.000078 |
| | Molybdenum | mg/L | < 0.0010 | ------ | ------ | < 0.0019 | < 0.0019 | < 0.0019 | ------ | < 0.00095 | < 0.00095 | < 0.00095 | < 0.00069 | < 0.00069 |
| | Selenium | mg/L | < 0.0018 | ------ | ------ | < 0.0014 | < 0.0014 | < 0.0014 | ------ | < 0.0013 | < 0.0013 | < 0.0013 | < 0.0016 | < 0.0016 |
| | Thallium | mg/L | < 0.000050 | ------ | ------ | < 0.00014 | < 0.00014 | < 0.00014 | ------ | < 0.000052 | < 0.000052 | < 0.000052 | < 0.00014 | < 0.00014 |
| | Radium | pCi/L | 0.724 U | ------ | ------ | 0.714 U | 0.426 U | 0.455 U | ------ | 1.3 U | 1.21 U | 1.3 | 0.965 U | 0.216 U |
| | Radium-226 | pCi/L | 0.278 U | ------ | ------ | 0.132 U | 0.324 | 0.13 U | ------ | 0.435 U | 0.628 | 0.752 | 0.217 U | 0.216 U |
| | Radium-228 | pCi/L | 0.446 U | ------ | ------ | 0.582 U | 0.102 U | 0.325 U | ------ | 0.867 | 0.586 U | 0.545 U | 0.748 U | -0.365 U |
| Field Measured | Conductivity | uS/cm | 96.26 | 95.67 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 78.4 | 72.2 |
| | Dissolved Oxygen | mg/L | 2.66 | 0.81 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 0.87 | 0.71 |
| | Oxidation Reduction Potential | millivolts | 137.13 | 89.5 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 109.5 | 97.7 |
| | Temperature | Deg C | 17.95 | 16.91 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 18.68 | 17.83 |
| | Turbidity | ntu | 1.73 | 4.72 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 2.22 | 1.21 |
| | Water level depth | ft | 28.98 | 29.09 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 29.02 | 29.22 |
| Supplemental | Alkalinity as CaCO3, Total | mg/L | ------ | ------ | 29 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Alkalinity, Bicarbonate as CaCO3 | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 21 | ------ | ------ | ------ |
| | Alkalinity, Carbonate as CaCO3 | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 20 | ------ | ------ | ------ |
| | Aluminum | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 0.07 J | ------ | ------ | ------ |
| | Dissolved Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 0.50 | ------ | ------ | ------ |
| | Hardness | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Total | mg/L | ------ | ------ | 0.273 | ------ | ------ | ------ | ------ | ------ | 0.25 | ------ | ------ | ------ |
| | Iron, Ferric (Fe2) | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Ferrous | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 0.20 | ------ | ------ | ------ |
| | Magnesium | mg/L | ------ | ------ | 0.941 | ------ | ------ | ------ | ------ | ------ | 0.77 | ------ | ------ | ------ |
| | Manganese | mg/L | ------ | ------ | 0.1 | ------ | ------ | ------ | ------ | ------ | 0.043 | ------ | ------ | ------ |
| | Nickel | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nitrate as N | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 0.5 | ------ | ------ | ------ |
| | Phosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 0.1 | ------ | ------ | ------ |
| | Phosphorus, Total Orthophosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Potassium | mg/L | ------ | ------ | 0.745 | ------ | ------ | ------ | ------ | ------ | 0.75 | ------ | ------ | ------ |
| | Silica | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silicon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 15.5 | ------ | ------ | ------ |
| | Silver | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Sodium | mg/L | ------ | ------ | 8.97 | ------ | ------ | ------ | ------ | ------ | 7 | ------ | ------ | ------ |
| | Sulfide | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Total Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Zinc | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |

**NOTES:**
1. mg/L - milligrams per Liter; pCi/L - picocuries per Liter; S.U. - Standard
2. < indicates the substance was not detected above the analytical meth
3. J indicates the substance was detected at such low levels that the pre
4. Radium data are a combination of radium isotopes 226 and 228. Whe

# APPENDIX A
## ANALYTICAL RESULTS (2016 - 2022)
Plant McDonough-Atkinson Ash Pond 1 and Ash Pond 2 and 3/4
Atlanta, Georgia

| | Analyte | Units | DGWA-71 | DGWA-71 | DGWA-71 | DGWA-71 | DGWA-8 | DGWA-8 | DGWA-9 | DGWA-9 | DGWC-10 | DGWC-10 | DGWC-10 | DGWC-10 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 3/1/2021 | 9/8/2021 | 1/18/2022 | 9/7/2022 | 8/30/2016 | 12/6/2016 | 8/30/2016 | 12/6/2016 | 8/31/2016 | 12/6/2016 | 12/6/2016 | 3/29/2017 |
| **Appendix III** | Boron | mg/L | 0.0054 J | < 0.0086 | 0.015 J | < 0.0086 | 2.63 | 2.72 | 1.72 | 1.92 | 3.5 | 3.24 | 3.3 | 4.3 |
| | Calcium | mg/L | 5.9 | 6.1 | 6.6 | 6.4 | 82.7 | 76.8 | 64.9 | 59.3 | 81.7 | 84.4 | 74.2 | 79.5 |
| | Chloride | mg/L | 3.9 | 5.9 | 5.9 | 8.20 | 9.7 | 9.8 | 6 | 6.2 | 11 | 10 | 10 | 11 |
| | Fluoride | mg/L | < 0.050 | < 0.050 | < 0.050 | 0.056 J | 0.39 | 0.47 | 0.78 | 1.1 | 1 | 1.1 | 1.3 | 1.5 |
| | pH, field measured | S.U. | 5.80 | 5.76 | 5.51 | 5.65 | ------ | ------ | ------ | ------ | 4.58 | ------ | 4.9 | 4.62 |
| | Sulfate | mg/L | 5.2 | 6.1 | 6.3 | 7 | 450 | 480 | 300 | 320 | 400 | 360 | 190 | 360 |
| | Total Dissolved Solids | mg/L | 62.0 | 75 | 76 | 82 | 693 | 727 | 414 | 449 | 525 | ------ | 595 | 525 |
| **Appendix IV** | Antimony | mg/L | 0.0019 J | < 0.00078 | < 0.00078 | < 0.00078 | < 0.00080 | < 0.00080 | < 0.00080 | < 0.00080 | < 0.00080 | < 0.00080 | < 0.00080 | < 0.00030 |
| | Arsenic | mg/L | < 0.00078 | < 0.0011 | 0.0054 | < 0.0022 | < 0.0016 | < 0.0016 | 0.0241 | < 0.0016 | 0.0058 | 0.0051 | 0.0017 J | 0.0055 |
| | Barium | mg/L | 0.028 | 0.025 | 0.029 | 0.025 | 0.0435 | 0.0431 | 0.0162 | 0.0138 | 0.0321 | 0.0293 | 0.029 | 0.0335 |
| | Beryllium | mg/L | 0.00011 J | 0.000091 J | 0.00012 J | 0.000075 J | 0.0018 J | 0.0034 | 0.0045 | 0.005 | 0.0046 | 0.0043 | 0.0048 | 0.0048 |
| | Cadmium | mg/L | < 0.00012 | < 0.00011 | < 0.00011 | < 0.00011 | 0.0019 | 0.0025 | 0.0004 J | 0.0005 J | 0.0012 | 0.0011 | 0.0013 | 0.0013 |
| | Chromium | mg/L | < 0.00055 | < 0.0011 | < 0.0011 | < 0.0011 | < 0.00090 | < 0.00090 | < 0.00090 | < 0.00090 | < 0.00090 | < 0.00090 | < 0.00090 | 0.0008 J |
| | Cobalt | mg/L | < 0.00038 | < 0.00039 | < 0.00039 | < 0.00039 | 0.0568 | 0.0873 | 0.0896 | 0.122 | 0.193 | 0.19 | 0.2 | 0.184 |
| | Fluoride | mg/L | < 0.050 | < 0.050 | < 0.050 | 0.056 J | 0.39 | 0.47 | 0.78 | 1.1 | 1 | 1.1 | 1.3 | 1.5 |
| | Lead | mg/L | < 0.000036 | < 0.00089 | < 0.00089 | < 0.00089 | < 0.00010 | < 0.00010 | < 0.00060 | < 0.00010 | < 0.00010 | < 0.00010 | < 0.00010 | < 0.00030 |
| | Lithium | mg/L | 0.0012 J | 0.0013 J | 0.0013 J | 0.0012 J | 0.005 J | 0.0066 J | 0.0212 J | 0.0242 J | 0.0022 J | < 0.0021 | < 0.0021 | 0.002 J |
| | Mercury | mg/L | 0.000090 J | 0.000096 J | 0.00015 J | 0.00013 J | 0.00009 J | 0.0001 J | < 0.000041 | 0.00005 J | 0.00007 J | < 0.000040 | 0.00009 J | 0.00008 J |
| | Molybdenum | mg/L | < 0.00069 | < 0.00074 | < 0.00074 | < 0.00074 | < 0.0017 | < 0.0017 | < 0.0017 | < 0.0017 | < 0.0017 | < 0.0017 | < 0.0017 | < 0.00060 |
| | Selenium | mg/L | < 0.0016 | < 0.0014 | < 0.0014 | < 0.0014 | 0.0032 J | < 0.0010 | 0.0833 | 0.0065 J | 0.0366 | 0.0354 | 0.0026 J | 0.0286 |
| | Thallium | mg/L | < 0.00014 | < 0.00018 | < 0.00018 | < 0.00018 | < 0.00020 | < 0.00020 | < 0.0010 | 0.0006 J | 0.0004 J | 0.0004 J | 0.0004 J | 0.0006 J |
| | Radium | pCi/L | 0.389 U | 0.051 U | 0.729 U | 0.588 U | 0.919 U | 0.407 U | 1.33 | 0.828 U | 1.08 | ------ | 1.31 | 1.24 |
| | Radium-226 | pCi/L | 0.0137 U | 0.051 U | 0.125 U | ------ | 0.084 U | 0.261 | 0.412 | 0.184 U | 0.0836 U | ------ | 0.324 | ------ |
| | Radium-228 | pCi/L | 0.375 U | -0.185 U | 0.604 U | ------ | 0.835 U | 0.146 U | 0.918 | 0.644 U | 1 | ------ | 0.984 | ------ |
| **Field Measured** | Conductivity | uS/cm | 79.57 | 77.38 | 128.78 | ------ | ------ | ------ | ------ | ------ | 621.27 | ------ | 772.9 | 766.86 |
| | Dissolved Oxygen | mg/L | 0.33 | 1.36 | 1.11 | ------ | ------ | ------ | ------ | ------ | 0.21 | ------ | 0.63 | 0.19 |
| | Oxidation Reduction Potential | millivolts | 94.1 | 128.8 | 106.8 | ------ | ------ | ------ | ------ | ------ | 169.5 | ------ | 185.8 | 85.34 |
| | Temperature | Deg C | 17.58 | 20.69 | 16.36 | ------ | ------ | ------ | ------ | ------ | 22.79 | ------ | 15.81 | 19.28 |
| | Turbidity | ntu | 0.28 | 1.88 | 1.67 | ------ | ------ | ------ | ------ | ------ | 3.7 | ------ | 3.94 | 0.25 |
| | Water level depth | ft | 27.57 | 28.22 | 28.57 | ------ | ------ | ------ | ------ | ------ | 20.81 | ------ | 21.07 | 22.8 |
| **Supplemental** | Alkalinity as CaCO3, Total | mg/L | 23.9 | ------ | 22.5 | 16.0 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Alkalinity, Bicarbonate as CaCO3 | mg/L | 23.9 | ------ | 22.5 | 16.0 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Alkalinity, Carbonate as CaCO3 | mg/L | < 5.0 | ------ | < 1.8 | < 5.0 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Aluminum | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 0.943 | ------ | ------ |
| | Dissolved Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Hardness | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 306 | ------ | ------ |
| | Iron, Total | mg/L | ------ | ------ | ------ | < 0.025 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Ferric (Fe2) | mg/L | ------ | ------ | ------ | < 0.025 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Ferrous | mg/L | ------ | ------ | ------ | 0.0 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Magnesium | mg/L | 0.85 | ------ | 0.93 | 0.9 | ------ | ------ | ------ | ------ | ------ | 23 | ------ | ------ |
| | Manganese | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 6.79 | ------ | ------ |
| | Nickel | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nitrate as N | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphorus, Total Orthophosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Potassium | mg/L | 0.76 | ------ | 0.66 | 0.8 | ------ | ------ | ------ | ------ | ------ | 7.31 | ------ | ------ |
| | Silica | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 15.7 | ------ | ------ |
| | Silicon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 7.33 | ------ | ------ |
| | Silver | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Sodium | mg/L | 8.6 | ------ | 9.1 | 8.1 | ------ | ------ | ------ | ------ | ------ | 15.2 | ------ | ------ |
| | Sulfide | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 0.363 | 2 | < 0.363 | < 0.363 | < 0.363 |
| | Total Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 |
| | Zinc | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |

**NOTES:**
1. mg/L - milligrams per Liter; pCi/L - picocuries per Liter; S.U. - Standarc
2. < indicates the substance was not detected above the analytical methc
3. J indicates the substance was detected at such low levels that the pre
4. Radium data are a combination of radium isotopes 226 and 228. Whe

| Analyte | | Units | DGWC-10 7/12/2017 | DGWC-10 10/24/2017 | DGWC-10 11/15/2017 | DGWC-10 2/27/2018 | DGWC-10 7/10/2018 | DGWC-10 11/6/2018 | DGWC-10 3/12/2019 | DGWC-10 8/27/2019 | DGWC-10 10/15/2019 | DGWC-10 3/3/2020 | DGWC-10 8/11/2020 | DGWC-10 9/24/2020 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Appendix III** | Boron | mg/L | 3.38 | 3.45 | ------ | 3.2 | 2.4 | 2.1 | 0.98 | ------ | 1.6 | 1.5 | ------ | 0.45 |
| | Calcium | mg/L | 86.3 | 81.5 | ------ | 96.2 | 95.3 | 94.8 | 83.5 | ------ | 79.1 | 63.6 | ------ | 53.1 |
| | Chloride | mg/L | 11 | 11 | 12 | 10.8 | 11 | 12.3 | 12.1 | ------ | 9.4 | 8.4 | ------ | 5.9 |
| | Fluoride | mg/L | 1.7 | 2.1 | 1.4 | 2.3 | 2 | 2 | 1.7 | 1.4 | 1.4 | 1.5 | 1.4 | 0.97 |
| | pH, field measured | S.U. | 4.81 | 4.8 | 4.9 | 5.55 | ------ | ------ | ------ | ------ | ------ | 4.77 | 4.92 | 4.89 |
| | Sulfate | mg/L | 390 | 410 | 390 | 335 | 301 | 356 | 297 | ------ | 263 | 213 | ------ | 204 |
| | Total Dissolved Solids | mg/L | 598 | 353 | 582 | 542 | 510 | 512 | 436 | ------ | 447 | 382 | ------ | 283 |
| **Appendix IV** | Antimony | mg/L | < 0.00060 | < 0.00060 | ------ | < 0.00078 | < 0.00078 | < 0.00078 | ------ | < 0.00027 | < 0.00027 | < 0.00027 | < 0.00028 | < 0.00028 |
| | Arsenic | mg/L | 0.0042 J | 0.0058 | ------ | 0.011 | 0.0036 J | 0.0044 J | ------ | 0.0024 J | 0.0078 | 0.0025 J | 0.0028 J | 0.0078 |
| | Barium | mg/L | 0.0314 | 0.0317 | ------ | 0.028 | 0.027 | 0.025 | ------ | 0.021 | 0.024 | 0.024 | 0.024 | 0.021 |
| | Beryllium | mg/L | 0.0046 | 0.0048 | ------ | 0.011 | 0.012 | 0.012 | ------ | 0.0092 | 0.01 | 0.0085 | 0.0066 | 0.0077 |
| | Cadmium | mg/L | 0.0013 | 0.0014 | ------ | 0.001 | 0.0016 | 0.0012 | ------ | 0.00077 J | 0.00095 J | 0.00095 J | 0.00071 J | 0.00055 J |
| | Chromium | mg/L | 0.0006 J | 0.0007 J | ------ | < 0.0016 | < 0.0016 | < 0.0016 | ------ | 0.00083 J | 0.00078 J | 0.00092 J | 0.00097 J | 0.001 J |
| | Cobalt | mg/L | 0.177 | 0.175 | ------ | 0.2 | 0.2 | 0.2 | ------ | 0.13 | 0.17 | 0.18 | 0.11 | 0.086 |
| | Fluoride | mg/L | 1.7 | 2.1 | 1.4 | 2.3 | 2 | 2 | 1.7 | 1.4 | 1.4 | 1.5 | 1.4 | 0.97 |
| | Lead | mg/L | < 0.00030 | < 0.00030 | ------ | < 0.0014 | < 0.00027 | < 0.00027 | ------ | 0.00024 J | 0.00014 J | 0.00011 J | 0.00007 J | 0.00013 J |
| | Lithium | mg/L | 0.0019 J | 0.0022 J | ------ | 0.0037 J | 0.0047 J | 0.0049 J | ------ | 0.0053 J | 0.0051 J | 0.0049 J | 0.0033 J | 0.0049 J |
| | Mercury | mg/L | < 0.000041 | < 0.000036 | ------ | < 0.000036 | < 0.000051 J | < 0.00034 J | ------ | < 0.00014 | < 0.00014 | < 0.00014 | < 0.000078 | 0.000081 J |
| | Molybdenum | mg/L | < 0.0010 | < 0.0010 | ------ | < 0.0019 | < 0.0019 | < 0.0019 | ------ | < 0.00095 | < 0.00095 | < 0.00095 | < 0.00069 | < 0.00069 |
| | Selenium | mg/L | 0.0257 | 0.0281 | ------ | 0.067 | 0.023 | 0.049 | ------ | 0.015 | 0.071 | 0.021 | 0.023 | 0.074 |
| | Thallium | mg/L | 0.0005 J | 0.0004 J | ------ | < 0.00071 | 0.00032 J | 0.00039 J | ------ | 0.00036 J | 0.00039 J | 0.00042 J | 0.00037 J | 0.00034 J |
| | Radium | pCi/L | 0.831 | 0.838 U | ------ | 1.55 | 1.65 | 1.46 | ------ | 1.58 | 0.831 U | 1.69 | 1.45 | 1.39 |
| | Radium-226 | pCi/L | 0.253 | 0.542 | ------ | 0.612 | 0.685 | 0.822 | ------ | 0.504 | 0.615 | 1.05 | 0.412 | 0.317 U |
| | Radium-228 | pCi/L | 0.578 | 0.296 U | ------ | 0.942 | 0.96 | 0.641 | ------ | 1.08 | 0.216 U | 0.638 | 1.04 | 1.07 |
| **Field Measured** | Conductivity | uS/cm | 758.63 | 758.1 | 766.7 | 721.5 | ------ | ------ | ------ | ------ | ------ | ------ | 531.2 | 469.6 |
| | Dissolved Oxygen | mg/L | 0.22 | 2.69 | 0.27 | 0.23 | ------ | ------ | ------ | ------ | ------ | ------ | 3.05 | 6.41 |
| | Oxidation Reduction Potential | millivolts | 105.05 | 136.47 | 110.6 | 102.4 | ------ | ------ | ------ | ------ | ------ | ------ | 599.4 | 88.95 |
| | Temperature | Deg C | 21.11 | 20.23 | 18.21 | 19.8 | ------ | ------ | ------ | ------ | ------ | ------ | 21.99 | 18.16 |
| | Turbidity | ntu | 0.88 | 0.98 | 1.88 | 1.67 | ------ | ------ | ------ | ------ | ------ | ------ | 1.25 | 0.97 |
| | Water level depth | ft | 16.53 | 23.07 | 24.77 | 26.09 | ------ | ------ | ------ | ------ | ------ | ------ | 32.95 | 30.11 |
| **Supplemental** | Alkalinity as CaCO3, Total | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Alkalinity, Bicarbonate as CaCO3 | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 1.5 | ------ | ------ | ------ |
| | Alkalinity, Carbonate as CaCO3 | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 1.0 | ------ | ------ | ------ |
| | Aluminum | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 1.8 | ------ | ------ | ------ |
| | Dissolved Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 0.50 | ------ | ------ | ------ |
| | Hardness | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Total | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 0.20 | ------ | ------ | ------ |
| | Iron, Ferric (Fe2) | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Ferrous | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 0.20 | ------ | ------ | ------ |
| | Magnesium | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 8.6 | ------ | ------ | ------ |
| | Manganese | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 4.7 | ------ | ------ | ------ |
| | Nickel | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nitrate as N | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 1.6 | ------ | ------ | ------ |
| | Phosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 0.00321 | ------ | ------ | ------ |
| | Phosphorus, Total Orthophosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Potassium | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 7.5 | ------ | ------ | ------ |
| | Silica | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silicon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 6.9 | ------ | ------ | ------ |
| | Silver | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Sodium | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 11 | ------ | ------ | ------ |
| | Sulfide | mg/L | < 0.363 | ------ | < 0.363 | < 0.363 | ------ | < 0.363 | 1.6 | < 0.363 | < 0.363 | < 0.363 | < 0.20 | < 0.20 |
| | Total Organic Carbon | mg/L | < 0.50 | ------ | 1.9 | < 0.50 | ------ | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 |
| | Zinc | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |

**NOTES:**
1. mg/L - milligrams per Liter; pCi/L - picocuries per Liter; S.U. - Standarc
2. < indicates the substance was not detected above the analytical meth
3. J indicates the substance was detected at such low levels that the pre
4. Radium data are a combination of radium isotopes 226 and 228. Whe

| Analyte | | Units | DGWC-10 | DGWC-10 | DGWC-10 | DGWC-10 | DGWC-11 | DGWC-11 | DGWC-11 | DGWC-11 | DGWC-11 | DGWC-11 | DGWC-11 | DGWC-11 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 3/4/2021 | 9/10/2021 | 1/26/2022 | 9/15/2022 | 8/31/2016 | 12/6/2016 | 12/6/2016 | 3/29/2017 | 7/12/2017 | 10/24/2017 | 2/27/2018 | 7/10/2018 |
| **Appendix III** | Boron | mg/L | 0.65 | 0.24 | 0.4 | 0.42 | 0.914 | 1.15 | 1.11 | 1.07 | 1.14 | 1.18 | 1.2 | 1.1 |
| | Calcium | mg/L | 75.8 | 82.4 | 76.8 | 64.4 | 44.2 | 48.3 | 46.8 | 50.5 | 50.8 | 55 | 51.4 | 56.2 |
| | Chloride | mg/L | 7.2 | 8.2 | 9 | 8.20 | 11 | 11 | 11 | 12 | 11 | 12 | 12.7 | 13.7 |
| | Fluoride | mg/L | 1.8 | 2.2 | 1.8 | 0.84 | 0.06 J | 0.06 J | 0.06 J | 0.04 J | 0.03 J | < 0.030 | < 0.029 | 0.047 J |
| | pH, field measured | S.U. | 5.27 | 5.05 | 4.9 | 4.87 | 5.83 | 5.91 | ------ | 5.74 | 5.82 | 5.79 | 5.94 | ------ |
| | Sulfate | mg/L | 240 | 271 | 241 | 229 | 200 | 190 | 190 | 200 | 210 | 210 | 220 | 240 |
| | Total Dissolved Solids | mg/L | 430 | 474 | 425 | 280 | 307 | 358 | ------ | 300 | 382 | 342 | 393 | 422 |
| **Appendix IV** | Antimony | mg/L | < 0.00028 | < 0.00078 | 0.0021 J | < 0.00078 | < 0.00080 | < 0.00080 | < 0.00080 | < 0.00030 | < 0.00060 | < 0.00060 | < 0.00078 | < 0.00078 |
| | Arsenic | mg/L | 0.0060 | 0.0076 | 0.0043 J | 0.0024 J | < 0.0016 | < 0.0016 | < 0.0016 | < 0.00040 | < 0.00050 | < 0.00050 | < 0.00057 | < 0.00057 |
| | Barium | mg/L | 0.025 | 0.019 | 0.022 | 0.018 | 0.0545 | 0.0564 | 0.0509 | 0.0565 | 0.0572 | 0.0596 | 0.067 | 0.073 |
| | Beryllium | mg/L | 0.0086 | 0.0074 | 0.0091 | 0.0063 | < 0.000080 | < 0.000080 | < 0.00040 R | < 0.000070 | < 0.000090 | < 0.000090 | 0.000058 J | 0.000076 J |
| | Cadmium | mg/L | 0.00088 | 0.00061 | 0.0007 | 0.00047 J | < 0.000070 | < 0.000070 | < 0.000070 | < 0.000060 | < 0.00010 | < 0.00010 | < 0.000093 | < 0.000093 |
| | Chromium | mg/L | 0.00090 J | < 0.0011 | 0.0011 J | < 0.0011 | < 0.00090 | < 0.00090 | < 0.00090 | < 0.00030 | < 0.00050 | < 0.00050 | < 0.0016 | < 0.0016 |
| | Cobalt | mg/L | 0.071 | 0.076 | 0.099 | 0.055 | < 0.00050 | 0.0006 J | < 0.00050 | < 0.00050 | < 0.00030 | < 0.00030 | < 0.00052 | < 0.00052 |
| | Fluoride | mg/L | 1.8 | 2.2 | 1.8 | 0.84 | 0.06 J | 0.06 J | 0.06 J | 0.04 J | 0.03 J | < 0.030 | < 0.029 | 0.047 J |
| | Lead | mg/L | 0.000092 J | < 0.00089 | < 0.00089 | < 0.0044 | < 0.00010 | < 0.00010 | < 0.00010 | < 0.000070 | < 0.000070 | < 0.000070 | < 0.00027 | < 0.00027 |
| | Lithium | mg/L | 0.0042 J | 0.0051 J | 0.0059 J | 0.0053 J | 0.0022 J | 0.0027 J | < 0.0103 R | 0.0021 J | 0.0022 J | 0.0024 J | 0.0022 J | 0.0019 J |
| | Mercury | mg/L | < 0.000078 | < 0.000078 | < 0.00013 | < 0.00013 | 0.00005 J | 0.00008 J | < 0.000040 | 0.00006 J | < 0.000041 | < 0.000036 | < 0.000036 | < 0.000047 J |
| | Molybdenum | mg/L | < 0.00069 | < 0.00074 | < 0.00074 | < 0.00074 | < 0.0017 | < 0.0017 | < 0.0017 | < 0.00060 | < 0.0010 | < 0.0010 | < 0.0019 | < 0.0019 |
| | Selenium | mg/L | 0.050 | 0.034 | 0.015 | 0.02 | < 0.0010 | < 0.0010 | < 0.0010 | < 0.0014 | < 0.0018 | < 0.0018 | < 0.0014 | < 0.0014 |
| | Thallium | mg/L | 0.00042 J | 0.00027 J | 0.00033 J | < 0.00090 | < 0.00020 | < 0.00020 | < 0.00020 | < 0.000050 | < 0.00030 | < 0.000050 | < 0.00014 | < 0.00014 |
| | Radium | pCi/L | 1.48 | 0.882 U | 1.21 | 0.953 | 1.09 | 0.409 U | ------ | 0.727 | 0.85 U | 0.98 U | 1.14 | 0.495 U |
| | Radium-226 | pCi/L | 0.362 U | 0.383 | 0.182 U | ------ | 0.0794 U | 0.132 U | ------ | ------ | 0.101 U | 0.461 | 0.496 | 0.277 U |
| | Radium-228 | pCi/L | 1.12 | 0.499 U | 1.03 | ------ | 1.01 | 0.277 U | ------ | ------ | 0.749 U | 0.519 U | 0.64 U | 0.218 U |
| **Field Measured** | Conductivity | uS/cm | 598.7 | 647.24 | 620.87 | ------ | 442.97 | 483.97 | ------ | 488.79 | 494.12 | 512.31 | 530.41 | ------ |
| | Dissolved Oxygen | mg/L | 5.65 | 6.1 | 6.16 | ------ | 0.18 | 0.18 | ------ | 0.13 | 0.2 | 0.23 | 0.15 | ------ |
| | Oxidation Reduction Potential | millivolts | 712.4 | 102.5 | 210.1 | ------ | 321.6 | 110.34 | ------ | 66.31 | 83.2 | 125.53 | 130.9 | ------ |
| | Temperature | Deg C | 18.5 | 20.23 | 17.68 | ------ | 23.4 | 17.99 | ------ | 21.43 | 22.31 | 20.21 | 18.79 | ------ |
| | Turbidity | ntu | 1.98 | 0.99 | 1.85 | ------ | 3.11 | 3.8 | ------ | 0.58 | 0.65 | 0.45 | 1.19 | ------ |
| | Water level depth | ft | 28 | 26.35 | 27.99 | ------ | 9.33 | 7.69 | ------ | 8.2 | 5.9 | 8.85 | 10.3 | ------ |
| **Supplemental** | Alkalinity as CaCO3, Total | mg/L | 9.0 | ------ | 5.3 | < 5.00 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Alkalinity, Bicarbonate as CaCO3 | mg/L | 9.0 | ------ | 5.3 | < 5.00 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Alkalinity, Carbonate as CaCO3 | mg/L | < 5.0 | ------ | < 1.8 | < 5.00 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Aluminum | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | 0.0305 J | ------ | ------ | ------ | ------ | ------ |
| | Dissolved Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Hardness | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | 175 | ------ | ------ | ------ | ------ | ------ |
| | Iron, Total | mg/L | ------ | ------ | ------ | < 0.025 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Ferric (Fe2) | mg/L | ------ | ------ | ------ | < 0.025 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Ferrous | mg/L | ------ | ------ | ------ | 0.0 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Magnesium | mg/L | 7.3 | ------ | 7.4 | 6.2 | ------ | ------ | 14.1 | ------ | ------ | ------ | ------ | ------ |
| | Manganese | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | 0.052 | ------ | ------ | ------ | ------ | ------ |
| | Nickel | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nitrate as N | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphorus, Total Orthophosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Potassium | mg/L | 7.0 | ------ | 6.9 | 5.7 | ------ | ------ | 3.61 | ------ | ------ | ------ | ------ | ------ |
| | Silica | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | 27.8 | ------ | ------ | ------ | ------ | ------ |
| | Silicon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | 13 | ------ | ------ | ------ | ------ | ------ |
| | Silver | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Sodium | mg/L | 10.9 | ------ | 11.1 | 10.3 | ------ | ------ | 16.5 | ------ | ------ | ------ | ------ | ------ |
| | Sulfide | mg/L | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | ------ | < 0.20 | < 0.20 | < 0.20 |
| | Total Organic Carbon | mg/L | < 0.50 | < 0.50 | 0.7 J | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | ------ | < 0.50 | 0.93 J | < 0.50 |
| | Zinc | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |

**NOTES:**
1. mg/L - milligrams per Liter; pCi/L - picocuries per Liter; S.U. - Standarc
2. < indicates the substance was not detected above the analytical metho
3. J indicates the substance was detected at such low levels that the pre
4. Radium data are a combination of radium isotopes 226 and 228. Whe

| | Analyte | Units | DGWC-11 11/6/2018 | DGWC-11 3/12/2019 | DGWC-11 8/27/2019 | DGWC-11 10/15/2019 | DGWC-11 3/2/2020 | DGWC-11 8/11/2020 | DGWC-11 9/22/2020 | DGWC-11 3/2/2021 | DGWC-11 9/9/2021 | DGWC-11 1/25/2022 | DGWC-11 9/15/2022 | DGWC-12 9/1/2016 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Appendix III** | Boron | mg/L | 1.2 | 1.2 | ------ | 1.2 | 1.6 | ------ | 1.3 | 1.3 | 1.5 | 1.7 | 1.70 | 7.64 |
| | Calcium | mg/L | 62.6 | 61.4 | ------ | 61.2 | 65.8 | ------ | 72.7 | 65.3 | 66.8 | 70.2 | 66.6 | 80.6 |
| | Chloride | mg/L | 15.2 | 14.5 | ------ | 15.6 | 15 | ------ | 16 | 14.4 | 13.6 | 14.1 | 12.10 | 13 |
| | Fluoride | mg/L | < 0.029 | < 0.052 J | < 0.029 | < 0.029 | 0.064 J | < 0.050 | < 0.050 | < 0.050 | < 0.050 | < 0.050 | 0.064 J | 0.02 J |
| | pH, field measured | S.U. | ------ | ------ | ------ | ------ | 5.62 | 5.68 | 5.53 | 5.59 | 5.59 | 5.54 | 5.52 | 5.67 |
| | Sulfate | mg/L | 302 | 275 | ------ | 273 | 264 | ------ | 267 | 250 | 247 | 250 | 287 | 390 |
| | Total Dissolved Solids | mg/L | 412 | 433 | ------ | 461 | 458 | ------ | 481 | 456 | 433 | 465 | 414 | 568 |
| **Appendix IV** | Antimony | mg/L | < 0.00078 | ------ | < 0.00027 | < 0.00027 | < 0.00027 | < 0.00028 | < 0.00028 | < 0.00028 | < 0.00078 | < 0.00078 | < 0.00078 | < 0.00080 |
| | Arsenic | mg/L | < 0.00057 | ------ | < 0.00035 | < 0.00035 | < 0.00035 | < 0.00078 | < 0.00078 | < 0.00078 | < 0.0011 | < 0.0011 | < 0.0022 | < 0.0016 |
| | Barium | mg/L | 0.074 | ------ | 0.071 | 0.064 | 0.071 | 0.064 | 0.058 | 0.052 | 0.054 | 0.047 | 0.047 | 0.0254 |
| | Beryllium | mg/L | < 0.000094 J | ------ | 0.00014 J | 0.00012 J | 0.00016 J | 0.00011 J | 0.00015 J | 0.00014 J | 0.00013 J | 0.00019 J | 0.00018 J | 0.0002 J |
| | Cadmium | mg/L | < 0.000093 | ------ | 0.00012 J | < 0.00011 | < 0.00011 | < 0.00012 | 0.00016 J | 0.00013 J | < 0.00011 | 0.00016 J | < 0.00011 | 0.0004 J |
| | Chromium | mg/L | < 0.0016 | ------ | 0.0006 J | < 0.00039 | 0.0006 J | 0.00061 J | 0.00058 J | < 0.00055 | < 0.0011 | < 0.0011 | < 0.0011 | < 0.00090 |
| | Cobalt | mg/L | < 0.00052 | ------ | 0.00076 J | 0.0006 J | 0.00078 J | 0.00055 J | 0.00098 J | 0.00065 J | 0.00081 J | 0.0015 J | 0.0010 J | 0.0021 J |
| | Fluoride | mg/L | < 0.029 | < 0.052 J | < 0.029 | < 0.029 | 0.064 J | < 0.050 | < 0.050 | < 0.050 | < 0.050 | < 0.050 | 0.064 J | 0.02 J |
| | Lead | mg/L | < 0.00027 | ------ | 0.00012 J | 0.000076 J | 0.00015 J | 0.000053 J | 0.0001 J | < 0.000036 | < 0.00089 | < 0.00089 | < 0.00089 | < 0.00010 |
| | Lithium | mg/L | 0.0022 J | ------ | 0.0023 J | 0.0019 J | 0.0023 J | 0.0028 J | 0.0019 J | 0.0017 J | 0.0029 J | 0.0021 J | 0.0024 J | < 0.0021 |
| | Mercury | mg/L | < 0.00028 J | ------ | < 0.00014 | < 0.00014 | < 0.00014 | < 0.000078 | < 0.000078 | < 0.000078 | < 0.000078 | < 0.00013 | < 0.00013 | 0.00009 J |
| | Molybdenum | mg/L | < 0.0019 | ------ | < 0.00095 | < 0.00095 | < 0.00095 | < 0.00069 | < 0.00069 | < 0.00069 | < 0.00074 | < 0.00074 | < 0.00074 | < 0.0017 |
| | Selenium | mg/L | < 0.0014 | ------ | < 0.0013 | < 0.0013 | < 0.0013 | < 0.0016 | < 0.0016 | < 0.0016 | < 0.0014 | < 0.0014 | < 0.0014 | 0.0017 J |
| | Thallium | mg/L | < 0.00014 | ------ | < 0.000052 | < 0.000052 | < 0.000052 | < 0.00014 | < 0.00014 | < 0.00014 | < 0.00018 | < 0.00018 | < 0.00018 | < 0.00020 |
| | Radium | pCi/L | 1.41 | ------ | 2.13 | 0.622 U | 1.3 | 1.02 | 0.502 U | 0.666 U | 1.2 U | 0.983 U | 1.12 | 1.11 |
| | Radium-226 | pCi/L | 0.425 | ------ | 1.07 | 0.191 U | 0.833 | 0.104 U | 0.145 U | 0.145 U | 0.416 | 0.103 U | ------ | 0.113 U |
| | Radium-228 | pCi/L | 0.98 | ------ | 1.06 | 0.431 U | 0.466 U | 0.915 | 0.357 U | 0.521 U | 0.782 U | 0.88 | ------ | 0.999 |
| **Field Measured** | Conductivity | uS/cm | ------ | ------ | ------ | ------ | ------ | 582.4 | 659.28 | 670.3 | 588.64 | 1481.8 | ------ | 738.83 |
| | Dissolved Oxygen | mg/L | ------ | ------ | ------ | ------ | ------ | 0.11 | 0.22 | 0.21 | 0.16 | 0.23 | ------ | 0.14 |
| | Oxidation Reduction Potential | millivolts | ------ | ------ | ------ | ------ | ------ | 250.7 | 82.7 | 302.9 | 54.4 | 81 | ------ | 464.8 |
| | Temperature | Deg C | ------ | ------ | ------ | ------ | ------ | 23.37 | 19.61 | 14.67 | 20.72 | 18.23 | ------ | 22.17 |
| | Turbidity | ntu | ------ | ------ | ------ | ------ | ------ | 2.79 | 2.48 | 0.26 | 4.59 | 2.71 | ------ | 0.16 |
| | Water level depth | ft | ------ | ------ | ------ | ------ | ------ | 17.34 | 14.34 | 12.44 | 13.4 | 11.49 | ------ | 8.29 |
| **Supplemental** | Alkalinity as CaCO3, Total | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 10.9 | ------ | 11.9 | 12.5 | ------ |
| | Alkalinity, Bicarbonate as CaCO3 | mg/L | ------ | ------ | ------ | 7 | ------ | ------ | ------ | 10.9 | ------ | 11.9 | 12.5 | ------ |
| | Alkalinity, Carbonate as CaCO3 | mg/L | ------ | ------ | ------ | < 1.0 | ------ | ------ | ------ | < 5.0 | ------ | < 1.8 | < 5.00 | ------ |
| | Aluminum | mg/L | ------ | ------ | ------ | < 0.032 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Dissolved Organic Carbon | mg/L | ------ | ------ | ------ | < 0.50 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Hardness | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Total | mg/L | ------ | ------ | ------ | < 0.20 | ------ | ------ | ------ | ------ | ------ | ------ | < 0.025 | ------ |
| | Iron, Ferric (Fe2) | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 0.025 | ------ |
| | Iron, Ferrous | mg/L | ------ | ------ | ------ | < 0.20 | ------ | ------ | ------ | ------ | ------ | ------ | 0.0 | ------ |
| | Magnesium | mg/L | ------ | ------ | ------ | < 0.011 | ------ | ------ | ------ | 26.7 | ------ | 33.6 | 25.8 | ------ |
| | Manganese | mg/L | ------ | ------ | ------ | < 0.0061 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nickel | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nitrate as N | mg/L | ------ | ------ | ------ | 0.009 J | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphate | mg/L | ------ | ------ | ------ | 0.1 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphorus, Total Orthophosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Potassium | mg/L | ------ | ------ | ------ | < 0.026 | ------ | ------ | ------ | 4.7 | ------ | 4.7 | 4.5 | ------ |
| | Silica | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silicon | mg/L | ------ | ------ | ------ | < 0.020 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silver | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Sodium | mg/L | ------ | ------ | ------ | < 0.19 | ------ | ------ | ------ | 20.3 | ------ | 22.8 | 21.0 | ------ |
| | Sulfide | mg/L | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| | Total Organic Carbon | mg/L | < 0.50 | < 0.50 | < 0.50 | 2 | 1.3 | < 0.50 | < 0.50 | 2.2 | < 0.50 | 0.7 J | 0.69 J | ------ |
| | Zinc | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |

**NOTES:**
1. mg/L - milligrams per Liter; pCi/L - picocuries per Liter; S.U. - Standarc
2. < indicates the substance was not detected above the analytical metho
3. J indicates the substance was detected at such low levels that the pre
4. Radium data are a combination of radium isotopes 226 and 228. Whe

**APPENDIX A**
**ANALYTICAL RESULTS (2016 - 2022)**
Plant McDonough-Atkinson Ash Pond 1 and Ash Pond 2 and 3/4
Atlanta, Georgia

| Analyte | | Units | DGWC-12<br>12/7/2016 | DGWC-12<br>12/7/2016 | DGWC-12<br>3/29/2017 | DGWC-12<br>7/12/2017 | DGWC-12<br>10/25/2017 | DGWC-12<br>2/27/2018 | DGWC-12<br>7/11/2018 | DGWC-12<br>11/7/2018 | DGWC-12<br>3/12/2019 | DGWC-12<br>8/27/2019 | DGWC-12<br>9/17/2019 | DGWC-12<br>10/15/2019 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appendix III | Boron | mg/L | 6.37 | 8.07 | 8.46 | 7.55 | 9.97 | 8 | 10.2 | 7.7 | 4.8 | ------ | 6.9 | 5.9 |
| | Calcium | mg/L | 92 | 82.1 | 88.3 | 87 | 92.1 | 85.6 | 93.6 | 73.3 | 62.1 | ------ | ------ | 61.4 |
| | Chloride | mg/L | 13 | 20 | 13 | 12 | 13 | 11.7 | 11.3 | 11.8 | 12.1 | ------ | ------ | 11.6 |
| | Fluoride | mg/L | 0.13 J | 0.16 J | 0.1 J | 0.2 J | 0.6 | 0.34 | < 0.029 | 0.07 J | < 0.065 J | < 0.029 | ------ | < 0.029 |
| | pH, field measured | S.U. | ------ | 5.65 | 5.61 | 5.81 | 6.07 | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Sulfate | mg/L | 350 | 350 | 150 | 350 | 400 | 356 | 344 | 298 | 284 | ------ | ------ | 270 |
| | Total Dissolved Solids | mg/L | ------ | 559 | 550 | 594 | 571 | 582 | 593 | 504 | 465 | ------ | ------ | 472 |
| Appendix IV | Antimony | mg/L | < 0.00080 | < 0.00080 | < 0.00030 | < 0.00060 | < 0.00060 | < 0.00078 | < 0.00078 | < 0.00078 | ------ | < 0.00027 | < 0.00027 | < 0.00027 |
| | Arsenic | mg/L | < 0.0016 | < 0.0016 | < 0.00040 | < 0.00050 | 0.0006 J | < 0.00057 | < 0.00057 | < 0.00057 | ------ | < 0.00035 | < 0.00035 | 0.00063 J |
| | Barium | mg/L | 0.0273 | 0.0241 | 0.0268 | 0.0262 | 0.0268 | 0.025 | 0.026 | 0.028 | ------ | 0.024 | 0.02 | 0.02 |
| | Beryllium | mg/L | 0.0002 J | 0.0002 J | 0.0002 J | 0.0002 J | 0.0002 J | 0.00021 J | 0.0002 J | < 0.00019 J | ------ | 0.00028 J | 0.00049 J | 0.00016 J |
| | Cadmium | mg/L | 0.0003 J | 0.0003 J | 0.0003 J | 0.0004 J | 0.0004 J | 0.00038 J | 0.00033 J | < 0.00031 J | ------ | 0.00037 J | 0.00035 J | 0.00025 J |
| | Chromium | mg/L | < 0.00090 | < 0.00090 | < 0.00030 | < 0.00050 | < 0.00050 | < 0.0016 | < 0.0016 | < 0.0016 | ------ | < 0.00039 | < 0.00039 | < 0.00039 |
| | Cobalt | mg/L | 0.0027 J | 0.0026 J | 0.0026 J | 0.0033 J | 0.0021 J | 0.0021 J | 0.002 J | 0.0057 J | ------ | 0.0021 J | 0.0079 | 0.0058 |
| | Fluoride | mg/L | 0.13 J | 0.16 J | 0.1 J | 0.2 J | 0.6 | 0.34 | < 0.029 | 0.07 J | < 0.065 J | < 0.029 | ------ | < 0.029 |
| | Lead | mg/L | < 0.00010 | < 0.00010 | < 0.000070 | < 0.000070 | < 0.000070 | < 0.00027 | < 0.00027 | < 0.00027 | ------ | 0.0001 J | < 0.000046 | < 0.000046 |
| | Lithium | mg/L | < 0.0021 | < 0.0021 | < 0.0011 | < 0.0015 | < 0.0015 | 0.00097 J | < 0.00097 | < 0.00097 | ------ | 0.0011 J | 0.0011 J | 0.00091 J |
| | Mercury | mg/L | < 0.000040 | < 0.000041 | 0.00014 J | 0.00008 J | 0.00006 J | < 0.000060 J | 0.000036 J | 0.000045 J | ------ | < 0.00014 | < 0.00014 | < 0.00014 |
| | Molybdenum | mg/L | < 0.0017 | < 0.0017 | < 0.00060 | < 0.0010 | < 0.0010 | < 0.0019 | < 0.0019 | < 0.0019 | ------ | < 0.00095 | < 0.00095 | < 0.00095 |
| | Selenium | mg/L | 0.0018 J | < 0.0010 | 0.0017 J | 0.0019 J | 0.0024 J | 0.0024 J | < 0.0014 | 0.0016 J | ------ | < 0.0013 | 0.0014 J | 0.0019 J |
| | Thallium | mg/L | < 0.00020 | < 0.00020 | 0.00008 J | 0.00009 J | 0.00009 J | < 0.00014 | < 0.00014 | < 0.00014 | ------ | 0.000089 J | 0.000097 J | 0.000091 J |
| | Radium | pCi/L | ------ | 2.66 | 0.0726 U | 0.538 U | 0.216 U | 0.83 | 0.728 U | 0.414 U | ------ | 0.434 U | ------ | 0.359 U |
| | Radium-226 | pCi/L | ------ | 0.23 U | ------ | 0.0323 U | 0.216 U | 0.423 | 0.258 | 0.378 | ------ | 0.434 U | ------ | 0.264 U |
| | Radium-228 | pCi/L | ------ | 2.43 | ------ | 0.506 U | -0.000688 U | 0.407 U | 0.47 U | 0.0358 U | ------ | -0.115 U | ------ | 0.0947 U |
| Field Measured | Conductivity | uS/cm | ------ | 795.03 | 773.23 | 741.8 | 847.41 | ------ | ------ | ------ | ------ | ------ | 581.46 | ------ |
| | Dissolved Oxygen | mg/L | ------ | 0.19 | 0.2 | 0.18 | 0.24 | ------ | ------ | ------ | ------ | ------ | 0.02 | ------ |
| | Oxidation Reduction Potential | millivolts | ------ | 182.33 | 175.5 | 95.6 | 63.78 | ------ | ------ | ------ | ------ | ------ | 99.3 | ------ |
| | Temperature | Deg C | ------ | 15.3 | 19.51 | 21.95 | 16.74 | ------ | ------ | ------ | ------ | ------ | 19.19 | ------ |
| | Turbidity | ntu | ------ | 1.09 | 2.61 | 1.58 | 2.4 | ------ | ------ | ------ | ------ | ------ | 2.18 | ------ |
| | Water level depth | ft | ------ | 7.48 | 7.53 | 7 | 8.3 | ------ | ------ | ------ | ------ | ------ | 9.51 | ------ |
| Supplemental | Alkalinity as CaCO3, Total | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Alkalinity, Bicarbonate as CaCO3 | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 32 |
| | Alkalinity, Carbonate as CaCO3 | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 20 |
| | Aluminum | mg/L | < 0.0128 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 0.032 |
| | Dissolved Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 0.50 |
| | Hardness | mg/L | 347 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Total | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 2.2 |
| | Iron, Ferric (Fe2) | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Ferrous | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 4.3 |
| | Magnesium | mg/L | 28.6 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 22.7 |
| | Manganese | mg/L | 0.222 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 0.78 |
| | Nickel | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nitrate as N | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 0.0050 |
| | Phosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 0.0 |
| | Phosphorus, Total Orthophosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Potassium | mg/L | 4.62 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 4.3 |
| | Silica | mg/L | 19.9 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silicon | mg/L | 9.29 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 7.5 |
| | Silver | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Sodium | mg/L | 18.5 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 14.6 |
| | Sulfide | mg/L | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | ------ |
| | Total Organic Carbon | mg/L | < 0.50 | < 0.50 | ------ | 0.55 J | 8.9 | < 0.50 | 1.1 | ------ | 2.3 | < 0.50 | 1.4 | ------ |
| | Zinc | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |

**NOTES:**
1. mg/L - milligrams per Liter; pCi/L - picocuries per Liter; S.U. - Standarc
2. < indicates the substance was not detected above the analytical methc
3. J indicates the substance was detected at such low levels that the pre
4. Radium data are a combination of radium isotopes 226 and 228. Whe

| Analyte | | Units | DGWC-12 | DGWC-12 | DGWC-12 | DGWC-12 | DGWC-12 | DGWC-12 | DGWC-12 | DGWC-121 | DGWC-13 | DGWC-13 | DGWC-13 | DGWC-13 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 3/2/2020 | 8/11/2020 | 9/22/2020 | 3/3/2021 | 9/9/2021 | 1/25/2022 | 9/15/2022 | 9/8/2022 | 12/7/2016 | 12/7/2016 | 3/30/2017 | 7/12/2017 |
| **Appendix III** | Boron | mg/L | 3.3 | ------ | 4.2 | 3.6 | 2 | 0.7 | 3.30 | 2.10 | 0.805 | 0.9 | 0.898 | 0.996 |
| | Calcium | mg/L | 46.5 | ------ | 55.4 | 50.1 | 29.2 | 28.5 | 41.5 | 45.0 | 41.3 | 39.8 | 46.3 | 47.8 |
| | Chloride | mg/L | 8.9 | ------ | 10.8 | 10.3 | 8.5 | 8.1 | 8.20 | 4.50 | 13 | 14 | 16 | 14 |
| | Fluoride | mg/L | 0.071 J | < 0.050 | < 0.050 | 0.085 J | 0.099 J | 0.093 J | 0.078 J | 0.093 J | 0.3 J | 0.3 | 0.12 J | 0.13 J |
| | pH, field measured | S.U. | 6.13 | 5.69 | 6.00 | 6.13 | 6.07 | 5.96 | 5.75 | 6.32 | ------ | 5.96 | 5.94 | 5.84 |
| | Sulfate | mg/L | 181 | ------ | 183 | 203 | 126 | 111 | 191 | 84.8 | 160 | 160 | 180 | 170 |
| | Total Dissolved Solids | mg/L | 338 | ------ | 338 | 325 | 275 | 258 | 377 | 261 | ------ | 270 | 287 | 312 |
| **Appendix IV** | Antimony | mg/L | 0.0003 J | < 0.00028 | < 0.00028 | < 0.00028 | < 0.00078 | < 0.00078 | < 0.00078 | < 0.00078 | < 0.00080 | < 0.00080 | < 0.00030 | < 0.00060 |
| | Arsenic | mg/L | < 0.00035 | < 0.00078 | < 0.00078 | < 0.00078 | < 0.0011 | < 0.0011 | < 0.0022 | < 0.0022 | < 0.0016 | < 0.0016 | < 0.00040 | < 0.00050 |
| | Barium | mg/L | 0.04 | 0.028 | 0.036 | 0.035 | 0.04 | 0.054 | 0.035 | 0.042 | 0.0278 | 0.0266 | 0.0308 | 0.0291 |
| | Beryllium | mg/L | 0.000074 J | 0.00024 J | 0.00017 J | 0.00011 J | 0.000084 J | < 0.000054 | 0.00019 J | < 0.000054 | < 0.000080 | < 0.000080 | 0.00007 J | < 0.000090 |
| | Cadmium | mg/L | < 0.00011 | 0.00038 J | 0.00017 J | 0.00016 J | < 0.00011 | < 0.00011 | 0.00017 J | < 0.00011 | < 0.000070 | 0.0002 J | 0.00008 J | < 0.00010 |
| | Chromium | mg/L | < 0.00039 | 0.00094 J | < 0.00055 | 0.00099 J | < 0.0011 | < 0.0011 | < 0.0011 | < 0.0011 | < 0.00090 | < 0.00090 | 0.0009 J | < 0.00050 |
| | Cobalt | mg/L | 0.029 | 0.006 | 0.013 | 0.010 | 0.034 | 0.018 | 0.025 | 0.0019 J | < 0.00050 | < 0.00050 | 0.0005 J | 0.0004 J |
| | Fluoride | mg/L | 0.071 J | < 0.050 | < 0.050 | 0.085 J | 0.099 J | 0.093 J | 0.078 J | 0.093 J | 0.3 J | 0.3 | 0.12 J | 0.13 J |
| | Lead | mg/L | < 0.000046 | < 0.000036 | 0.00011 J | < 0.000036 | < 0.00089 | < 0.00089 | < 0.00089 | < 0.00089 | < 0.00010 | < 0.00010 | 0.0002 J | < 0.000070 |
| | Lithium | mg/L | < 0.00078 | 0.0011 J | < 0.00081 | < 0.00081 | < 0.00073 | < 0.00073 | 0.00088 J | 0.010 J | 0.0028 J | 0.003 J | 0.0035 J | 0.0028 J |
| | Mercury | mg/L | < 0.00014 | < 0.000078 | < 0.000078 | < 0.000078 | < 0.000078 | < 0.00013 | < 0.00013 | < 0.00013 | < 0.000040 | 0.00009 J | 0.00007 J | < 0.000041 |
| | Molybdenum | mg/L | < 0.00095 | < 0.00069 | < 0.00069 | < 0.00069 | < 0.00074 | < 0.00074 | < 0.00074 | < 0.00074 | 0.0276 | 0.0273 | 0.03 | 0.0323 |
| | Selenium | mg/L | < 0.0013 | 0.0019 J | < 0.0016 | < 0.0016 | < 0.0014 | < 0.0014 | < 0.0014 | < 0.0014 | 0.0022 J | 0.0015 J | 0.0015 J | < 0.0018 |
| | Thallium | mg/L | 0.00013 J | < 0.00014 | < 0.00014 | < 0.00014 | < 0.00018 | < 0.00018 | < 0.00018 | < 0.00018 | < 0.00020 | < 0.00020 | < 0.000050 | < 0.000050 |
| | Radium | pCi/L | 1.2 U | 0.77 U | 0.515 U | 1.85 | 1.78 | 0.739 U | 0.52 U | 2 | ------ | 1.76 | 1.59 | 1.36 |
| | Radium-226 | pCi/L | 0.456 | 0.234 U | -0.0641 U | 0.648 U | 0.23 U | 0.364 | ------ | ------ | ------ | 0.434 | ------ | 0.578 |
| | Radium-228 | pCi/L | 0.746 U | 0.536 U | 0.515 U | 1.20 | 1.55 | 0.375 U | ------ | ------ | ------ | 1.33 | ------ | 0.786 |
| **Field Measured** | Conductivity | uS/cm | ------ | 699.4 | 558.58 | 566 | 447.02 | 958.95 | ------ | ------ | ------ | 443.1 | 480.83 | 461.4 |
| | Dissolved Oxygen | mg/L | ------ | 0.08 | 0.21 | 0.09 | 0.09 | 0.16 | ------ | ------ | ------ | 2.64 | 4.24 | 1.01 |
| | Oxidation Reduction Potential | millivolts | ------ | 220 | 38.1 | 785.2 | 14.8 | 4.1 | ------ | ------ | ------ | 116.59 | -15.7 | 78.4 |
| | Temperature | Deg C | ------ | 21.97 | 21.6 | 16.51 | 20.43 | 17.24 | ------ | ------ | ------ | 16.58 | 21.23 | 20.47 |
| | Turbidity | ntu | ------ | 3.45 | 4.91 | 4.37 | 4.19 | 4.67 | ------ | ------ | ------ | 1.02 | 4.35 | 0.5 |
| | Water level depth | ft | ------ | 10.58 | 9.04 | 9.21 | 9.15 | 8.73 | ------ | ------ | ------ | 33.37 | 33.58 | 32.8 |
| **Supplemental** | Alkalinity as CaCO3, Total | mg/L | ------ | ------ | ------ | 43.5 | ------ | 74.7 | 33.6 | 111.0 | ------ | ------ | ------ | ------ |
| | Alkalinity, Bicarbonate as CaCO3 | mg/L | ------ | ------ | ------ | 43.5 | ------ | 74.7 | 33.6 | 111.0 | ------ | ------ | ------ | ------ |
| | Alkalinity, Carbonate as CaCO3 | mg/L | ------ | ------ | ------ | < 5.0 | ------ | < 1.8 | < 5.00 | < 5.0 | ------ | ------ | ------ | ------ |
| | Aluminum | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 0.0128 | ------ | ------ | ------ |
| | Dissolved Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Hardness | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 131 | ------ | ------ | ------ |
| | Iron, Total | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | 9.9 | 3.3 | ------ | ------ | ------ | ------ |
| | Iron, Ferric (Fe2) | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | 2.9 | 0.6 | ------ | ------ | ------ | ------ |
| | Iron, Ferrous | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | 7.0 | 2.8 | ------ | ------ | ------ | ------ |
| | Magnesium | mg/L | ------ | ------ | ------ | 20.2 | ------ | 16.8 | 19.5 | 12.7 | 6.67 | ------ | ------ | ------ |
| | Manganese | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 0.0342 | ------ | ------ | ------ |
| | Nickel | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nitrate as N | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphorus, Total Orthophosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Potassium | mg/L | ------ | ------ | ------ | 6.2 | ------ | 9 | 5.5 | 3.7 | 5.78 | ------ | ------ | ------ |
| | Silica | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 13.2 | ------ | ------ | ------ |
| | Silicon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 6.16 | ------ | ------ | ------ |
| | Silver | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Sodium | mg/L | ------ | ------ | ------ | 14.8 | ------ | 11.6 | 12.7 | 10.8 | 26.7 | ------ | ------ | ------ |
| | Sulfide | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 0.46 | ------ |
| | Total Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 0.50 | ------ |
| | Zinc | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |

**NOTES:**
1. mg/L - milligrams per Liter; pCi/L - picocuries per Liter; S.U. - Standarc
2. < indicates the substance was not detected above the analytical metho
3. J indicates the substance was detected at such low levels that the pre
4. Radium data are a combination of radium isotopes 226 and 228. Whe

| Analyte | | Units | DGWC-13 11/15/2017 | DGWC-13 2/28/2018 | DGWC-13 7/10/2018 | DGWC-13 11/7/2018 | DGWC-13 3/13/2019 | DGWC-13 8/28/2019 | DGWC-13 10/16/2019 | DGWC-13 3/3/2020 | DGWC-13 8/12/2020 | DGWC-13 9/23/2020 | DGWC-13 3/2/2021 | DGWC-13 9/9/2021 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Appendix III** | Boron | mg/L | 0.795 | < 0.11 | 0.72 | 0.76 | 0.62 | ------ | 0.65 | 0.61 | ------ | 0.57 | 0.58 | 0.62 |
| | Calcium | mg/L | 49.3 | 13.1 | 42.6 | 44.8 | 42.1 | ------ | 43.8 | 49.3 | ------ | 39 | 40.5 | 38.2 |
| | Chloride | mg/L | 16 | 2.7 | 14.8 | 16.7 | 12.4 | ------ | 17.4 | 9.4 | ------ | 12.6 | 13.1 | 12.9 |
| | Fluoride | mg/L | 0.44 | 0.18 J | 0.32 | 0.088 J | 0.13 J | 0.091 J | 0.14 J | 0.078 J | 0.051 J | 0.058 J | 0.084 J | 0.083 J |
| | pH, field measured | S.U. | 5.87 | ------ | ------ | ------ | ------ | ------ | ------ | 5.71 | 5.68 | 5.72 | 5.69 5.68 | 5.69 |
| | Sulfate | mg/L | 180 | 43.5 | 152 | 162 | 179 | ------ | 167 | 157 | ------ | 134 | 131 | 127 |
| | Total Dissolved Solids | mg/L | 325 | 84 | 306 | 314 | 656 | ------ | 296 | 263 | ------ | 278 | 256 | 246 |
| **Appendix IV** | Antimony | mg/L | < 0.00060 | < 0.00078 | 0.0014 J | < 0.00078 | ------ | < 0.00027 | < 0.00027 | < 0.00027 | < 0.00028 | < 0.00028 | < 0.00028 | < 0.00078 |
| | Arsenic | mg/L | < 0.00050 | < 0.00057 | < 0.00057 | < 0.00057 | ------ | < 0.00035 | < 0.00035 | < 0.00035 | < 0.00078 | < 0.00078 | < 0.00078 | < 0.0011 |
| | Barium | mg/L | 0.0309 | 0.0079 J | 0.035 | 0.034 | ------ | 0.033 | 0.034 | 0.035 | 0.032 | 0.03 | 0.030 | 0.027 |
| | Beryllium | mg/L | < 0.000090 | < 0.000050 | 0.00005 J | < 0.000059 J | ------ | < 0.000074 | < 0.000074 | < 0.000074 | 0.000078 J | 0.000068 J | 0.000073 J | 0.00007 J |
| | Cadmium | mg/L | < 0.00010 | < 0.000093 | < 0.000093 | < 0.000093 | ------ | < 0.00011 | < 0.00011 | < 0.00011 | < 0.00012 | < 0.00012 | < 0.00012 | < 0.00011 |
| | Chromium | mg/L | < 0.00050 | 0.0022 J | < 0.0016 | < 0.0016 | ------ | < 0.00039 | < 0.00039 | 0.00066 J | 0.00074 J | 0.00059 J | < 0.00055 | < 0.0011 |
| | Cobalt | mg/L | < 0.00030 | < 0.00052 | < 0.00052 | < 0.00052 | ------ | < 0.00030 | < 0.00030 | < 0.00030 | < 0.00038 | 0.00038 J | < 0.00038 | < 0.00039 |
| | Fluoride | mg/L | 0.44 | 0.18 J | 0.32 | 0.088 J | 0.13 J | 0.091 J | 0.14 J | 0.078 J | 0.051 J | 0.058 J | 0.084 J | 0.083 J |
| | Lead | mg/L | < 0.000070 | < 0.00027 | < 0.00027 | < 0.00027 | ------ | < 0.000046 | < 0.000046 | < 0.000046 | < 0.000036 | 0.000098 J | < 0.000036 | < 0.00089 |
| | Lithium | mg/L | 0.0028 J | < 0.00097 | 0.0028 J | 0.0033 J | ------ | 0.0033 J | 0.0029 J | 0.0035 J | 0.0034 J | 0.0033 J | 0.0033 J | 0.0036 J |
| | Mercury | mg/L | < 0.000036 | < 0.000036 | < 0.000054 J | < 0.000036 | ------ | < 0.00014 | < 0.00014 | < 0.00014 | < 0.000078 | < 0.000078 | < 0.000078 | < 0.000078 |
| | Molybdenum | mg/L | 0.0275 | 0.0093 J | 0.024 | 0.018 | ------ | 0.015 | 0.014 | 0.018 | 0.012 | 0.012 | 0.011 | 0.011 |
| | Selenium | mg/L | 0.0019 J | < 0.0014 | 0.0028 J | 0.0029 J | ------ | 0.0039 J | 0.0031 J | 0.0062 J | 0.0038 J | 0.0053 J | 0.0060 | 0.006 |
| | Thallium | mg/L | < 0.000050 | < 0.00014 | < 0.00014 | < 0.00014 | ------ | < 0.000052 | < 0.000052 | < 0.000052 | < 0.00014 | < 0.00014 | < 0.00014 | < 0.00018 |
| | Radium | pCi/L | 1.08 U | 0.721 U | 0.746 U | 1.22 U | ------ | 1.43 | 1.73 | 1.03 | 1.63 | 0.935 U | 1.12 U | 1.23 U |
| | Radium-226 | pCi/L | ------ | 0.118 U | 0.327 | 0.432 | ------ | 0.916 | 0.997 | 0.608 | 0.703 | 0.207 U | 0.328 U | 0.361 U |
| | Radium-228 | pCi/L | ------ | 0.603 U | 0.419 U | 0.787 U | ------ | 0.517 U | 0.732 U | 0.421 U | 0.926 U | 0.728 U | 0.791 | 0.87 |
| **Field Measured** | Conductivity | uS/cm | 487.7 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 450.2 | 406.7 | 434.51 | 396.69 |
| | Dissolved Oxygen | mg/L | 2.47 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 3.58 | 3.59 | 4.49 | 4.05 |
| | Oxidation Reduction Potential | millivolts | 49 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 137.6 | 56.1 | 126.5 | 133.2 |
| | Temperature | Deg C | 18.73 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 20.01 | 20.67 | 18.56 | 20.93 |
| | Turbidity | ntu | 1.9 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 2.78 | 3.23 | 0.33 | 1 |
| | Water level depth | ft | 34.01 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 34.02 | 32.75 | 34.6 | 32.9 |
| **Supplemental** | Alkalinity as CaCO3, Total | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 23.5 | ------ |
| | Alkalinity, Bicarbonate as CaCO3 | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | 27 | ------ | ------ | ------ | 23.5 | ------ |
| | Alkalinity, Carbonate as CaCO3 | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | < 20 | ------ | ------ | ------ | < 5.0 | ------ |
| | Aluminum | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | 0.049 J | ------ | ------ | ------ | ------ | ------ |
| | Dissolved Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | < 0.50 | ------ | ------ | ------ | ------ | ------ |
| | Hardness | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Total | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | < 0.20 | ------ | ------ | ------ | ------ | ------ |
| | Iron, Ferric (Fe2) | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | < 0.20 | ------ | ------ | ------ | ------ | ------ |
| | Iron, Ferrous | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | < 0.20 | ------ | ------ | ------ | ------ | ------ |
| | Magnesium | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | 8.1 | ------ | ------ | ------ | 8.2 | ------ |
| | Manganese | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | < 0.0061 | ------ | ------ | ------ | ------ | ------ |
| | Nickel | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | 0.0012 J | ------ | ------ | ------ | ------ | ------ |
| | Nitrate as N | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | 0.89 | ------ | ------ | ------ | ------ | ------ |
| | Phosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | 0.0 | ------ | ------ | ------ | ------ | ------ |
| | Phosphorus, Total Orthophosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Potassium | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | 5.9 | ------ | ------ | ------ | 5.6 | ------ |
| | Silica | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silicon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | 8.1 | ------ | ------ | ------ | ------ | ------ |
| | Silver | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | < 0.00028 | ------ | ------ | ------ | ------ | ------ |
| | Sodium | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | 26.2 | ------ | ------ | ------ | 23.7 | ------ |
| | Sulfide | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Total Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | < 0.50 | < 0.50 | < 0.50 | 0.79 J | 1.4 | < 0.50 | 5.6 |
| | Zinc | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |

**NOTES:**
1. mg/L - milligrams per Liter; pCi/L - picocuries per Liter; S.U. - Standarc
2. < indicates the substance was not detected above the analytical methc
3. J indicates the substance was detected at such low levels that the pre
4. Radium data are a combination of radium isotopes 226 and 228. Whe

**APPENDIX A**

**ANALYTICAL RESULTS (2016 - 2022)**

Plant McDonough-Atkinson Ash Pond 1 and Ash Pond 2 and 3/4

Atlanta, Georgia

| Analyte | | Units | DGWC-13<br>1/25/2022 | DGWC-13<br>9/15/2022 | DGWC-14<br>8/31/2016 | DGWC-14<br>12/6/2016 | DGWC-14<br>12/6/2016 | DGWC-14<br>3/29/2017 | DGWC-14<br>7/12/2017 | DGWC-14<br>10/25/2017 | DGWC-14<br>2/27/2018 | DGWC-14<br>7/11/2018 | DGWC-14<br>11/7/2018 | DGWC-14<br>3/13/2019 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Appendix III** | Boron | mg/L | 0.69 | 0.69 | 0.0419 J | 0.0804 | 0.0729 | 0.103 | 0.044 | 0.0565 | < 0.054 | 0.057 | 0.055 | 0.047 |
| | Calcium | mg/L | 43.2 | 36.7 | 9.95 | 10.4 | 10.5 | 14.4 | 10.5 | 9.67 | 10 | 9.9 | 9.7 | 9.7 |
| | Chloride | mg/L | 14.3 | 13.70 | 3.1 | 3.1 | 3.1 | 3.8 | 2.9 | 3.5 | 3.4 | 3.2 | 3.1 | 3.4 |
| | Fluoride | mg/L | 0.063 J | 0.095 J | 0.06 J | 0.1 J | 0.04 J | 0.02 J | < 0.030 | < 0.030 | < 0.029 | < 0.029 | < 0.029 | 0.042 J |
| | pH, field measured | S.U. | 4.68 / 5.64 | 5.56 | 5.68 | 5.63 | ------ | 5.68 | 5.66 | 6.18 | ------ | ------ | ------ | ------ |
| | Sulfate | mg/L | 116 | 133 | 44 | 45 | 45 | 81 | 44 | 42 | 41 | 40.6 | 41.3 | 41.2 |
| | Total Dissolved Solids | mg/L | 256 | 216 | 106 | 138 | ------ | 102 | 118 | 88 | 99 | 119 | 113 | 280 |
| **Appendix IV** | Antimony | mg/L | < 0.00078 | < 0.00078 | < 0.00080 | < 0.00080 | < 0.00080 | < 0.00030 | < 0.00060 | < 0.00060 | < 0.00078 | < 0.00078 | < 0.00078 | ------ |
| | Arsenic | mg/L | < 0.0011 | < 0.0022 | < 0.0016 | < 0.0016 | < 0.0016 | < 0.00040 | < 0.00050 | < 0.00050 | < 0.00057 | < 0.00057 | < 0.00057 | ------ |
| | Barium | mg/L | 0.028 | 0.027 | 0.0576 | 0.0608 | 0.0596 | 0.0693 | 0.0585 | 0.0563 | 0.059 | 0.061 | 0.055 | ------ |
| | Beryllium | mg/L | 0.000091 J | 0.000080 J | < 0.000080 | < 0.000080 | < 0.000080 | < 0.000070 | < 0.000090 | < 0.000090 | < 0.000050 | < 0.000050 | < 0.000050 | ------ |
| | Cadmium | mg/L | < 0.00011 | < 0.00011 | < 0.000070 | < 0.000070 | < 0.000070 | < 0.000060 | < 0.00010 | < 0.00010 | < 0.000093 | < 0.000093 | < 0.000093 | ------ |
| | Chromium | mg/L | < 0.0011 | < 0.0011 | < 0.00090 | < 0.00090 | < 0.00090 | < 0.00030 | < 0.00050 | < 0.00050 | < 0.0016 | < 0.0016 | < 0.0016 | ------ |
| | Cobalt | mg/L | < 0.00039 | < 0.00039 | < 0.00050 | < 0.00050 | < 0.00050 | < 0.00050 | < 0.00030 | < 0.00030 | < 0.00052 | < 0.00052 | < 0.00052 | ------ |
| | Fluoride | mg/L | 0.063 J | 0.095 J | 0.06 J | 0.1 J | 0.04 J | 0.02 J | < 0.030 | < 0.030 | < 0.029 | < 0.029 | < 0.029 | 0.042 J |
| | Lead | mg/L | < 0.00089 | < 0.00089 | < 0.00010 | < 0.00010 | < 0.00010 | < 0.000070 | < 0.000070 | < 0.000070 | < 0.00027 | < 0.00027 | < 0.00027 | ------ |
| | Lithium | mg/L | 0.0037 J | 0.004 J | 0.0031 J | 0.0042 J | 0.0039 J | 0.0041 J | 0.0036 J | 0.0032 J | 0.0035 J | 0.0034 J | 0.0037 J | ------ |
| | Mercury | mg/L | < 0.00013 | < 0.00013 | 0.00005 J | 0.00008 J | < 0.000040 | 0.00006 J | < 0.000041 | < 0.000036 | < 0.000036 | < 0.000036 | < 0.000036 | ------ |
| | Molybdenum | mg/L | 0.0093 J | 0.0094 J | < 0.0017 | < 0.0017 | < 0.0017 | < 0.00060 | < 0.0010 | < 0.0010 | < 0.0019 | < 0.0019 | < 0.0019 | ------ |
| | Selenium | mg/L | 0.006 | 0.0040 J | 0.0016 J | < 0.0010 | 0.0017 J | < 0.0014 | < 0.0018 | < 0.0018 | < 0.0014 | 0.002 J | 0.0016 J | ------ |
| | Thallium | mg/L | < 0.00018 | < 0.00018 | < 0.00020 | < 0.00020 | < 0.00020 | < 0.000050 | < 0.000050 | < 0.000050 | < 0.00014 | < 0.00014 | < 0.00014 | ------ |
| | Radium | pCi/L | 0.254 U | 1.01 | 0.997 U | 0.659 U | ------ | 0.313 U | 1.03 U | 0.607 U | 0.695 U | 1.04 U | 0.593 U | ------ |
| | Radium-226 | pCi/L | 0.254 | ------ | 0.204 U | 0.127 U | ------ | ------ | 0.357 | 0.58 | 0.309 U | 0.414 | 0.293 U | ------ |
| | Radium-228 | pCi/L | -0.0253 U | ------ | 0.793 | 0.532 U | ------ | ------ | 0.674 U | 0.0271 U | 0.386 U | 0.624 U | 0.3 U | ------ |
| **Field Measured** | Conductivity | uS/cm | 410.65 | ------ | 134.33 | 152.32 | ------ | 169.28 | 142.4 | 145.28 | ------ | ------ | ------ | ------ |
| | Dissolved Oxygen | mg/L | 4.68 | ------ | 4.04 | 4.41 | ------ | 4.45 | 4.31 | 4.92 | ------ | ------ | ------ | ------ |
| | Oxidation Reduction Potential | millivolts | 78.3 | ------ | 444.6 | 153.87 | ------ | 247.97 | 59.4 | 31.31 | ------ | ------ | ------ | ------ |
| | Temperature | Deg C | 18.8 | ------ | 27.22 | 16.11 | ------ | 22.17 | 23.24 | 20.26 | ------ | ------ | ------ | ------ |
| | Turbidity | ntu | 0.19 | ------ | 0.33 | 0.15 | ------ | 0.17 | 1.93 | 0.41 | ------ | ------ | ------ | ------ |
| | Water level depth | ft | 35.04 | ------ | 21.96 | 22.62 | ------ | 21.92 | 20.75 | 20.8 | ------ | ------ | ------ | ------ |
| **Supplemental** | Alkalinity as CaCO3, Total | mg/L | 21.9 | 22.1 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Alkalinity, Bicarbonate as CaCO3 | mg/L | 21.9 | 22.1 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Alkalinity, Carbonate as CaCO3 | mg/L | < 1.8 | < 5.00 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Aluminum | mg/L | ------ | ------ | ------ | ------ | < 0.0128 | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Dissolved Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Hardness | mg/L | ------ | ------ | ------ | ------ | 44.6 | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Total | mg/L | ------ | < 0.025 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Ferric (Fe2) | mg/L | ------ | < 0.025 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Ferrous | mg/L | ------ | 0.0 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Magnesium | mg/L | 8.9 | 7.9 | ------ | ------ | 4.45 | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Manganese | mg/L | ------ | ------ | ------ | ------ | 0.003 J | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nickel | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nitrate as N | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphorus, Total Orthophosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Potassium | mg/L | 5.7 | 4.9 | ------ | ------ | 3.14 | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silica | mg/L | ------ | ------ | ------ | ------ | 28.5 | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silicon | mg/L | ------ | ------ | ------ | ------ | 13.3 | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silver | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Sodium | mg/L | 24.7 | 20.7 | ------ | ------ | 6.42 | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Sulfide | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Total Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Zinc | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | 0.03 | < 0.018 | 0.085 | 0.14 | < 0.018 | < 0.018 |

**NOTES:**

1. mg/L - milligrams per Liter; pCi/L - picocuries per Liter; S.U. - Standarc
2. < indicates the substance was not detected above the analytical methc
3. J indicates the substance was detected at such low levels that the pre
4. Radium data are a combination of radium isotopes 226 and 228. Whe

**APPENDIX A**
**ANALYTICAL RESULTS (2016 - 2022)**
Plant McDonough-Atkinson Ash Pond 1 and Ash Pond 2 and 3/4
Atlanta, Georgia

| | Analyte | Units | DGWC-14 8/27/2019 | DGWC-14 10/16/2019 | DGWC-14 3/3/2020 | DGWC-14 8/11/2020 | DGWC-14 9/22/2020 | DGWC-14 3/2/2021 | DGWC-14 9/9/2021 | DGWC-14 1/25/2022 | DGWC-14 9/13/2022 | DGWC-15 12/7/2016 | DGWC-15 12/7/2016 | DGWC-15 3/30/2017 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Appendix III** | Boron | mg/L | ------ | 0.052 | 0.15 | ------ | 0.086 J | 0.089 | 0.08 | 0.097 | 0.09 | 1.56 | 1.26 | 1.5 |
| | Calcium | mg/L | ------ | 9.4 | 14 | ------ | 11.6 | 11.4 | 11.1 | 12.4 | 11.2 | 34.7 | 37.6 | 36.9 |
| | Chloride | mg/L | ------ | 3.5 | 4.1 | ------ | 3.2 | 3.5 | 3.3 | 3.7 | 3.50 | 20 | 20 | 21 |
| | Fluoride | mg/L | < 0.029 | 0.052 J | < 0.050 | < 0.050 | < 0.050 | < 0.050 | < 0.050 | < 0.050 | 0.059 J | 0.11 J | 0.13 J | < 0.0040 |
| | pH, field measured | S.U. | ------ | ------ | 5.73 | 5.73 | 5.7 | 5.81 5.69 | 5.7 | 5.69 | 5.71 | 5.94 | ------ | 5.8 |
| | Sulfate | mg/L | ------ | 42.1 | 45.5 | ------ | 40.2 | 42.6 | 42.3 | 44.4 | 41.2 | 180 | 180 | 210 |
| | Total Dissolved Solids | mg/L | ------ | 104 | 123 | ------ | 105 | 105 | 99 | 120 | 80 | 287 | ------ | 312 |
| **Appendix IV** | Antimony | mg/L | < 0.00027 | < 0.00027 | < 0.00027 | < 0.00028 | 0.0011 J | < 0.00028 | < 0.00078 | < 0.00078 | < 0.00078 | < 0.00080 | < 0.00080 | < 0.00030 |
| | Arsenic | mg/L | < 0.00035 | 0.00039 J | < 0.00035 | < 0.00078 | < 0.00078 | < 0.00078 | < 0.0011 | < 0.0011 | < 0.0022 | < 0.0016 | < 0.0016 | 0.0006 J |
| | Barium | mg/L | 0.059 | 0.059 | 0.064 | 0.061 | 0.06 | 0.064 | 0.059 | 0.064 | 0.063 | 0.0469 | 0.0493 | 0.0495 |
| | Beryllium | mg/L | < 0.000074 | < 0.000074 | < 0.000074 | < 0.000046 | < 0.000046 | < 0.000046 | < 0.000054 | < 0.000054 | < 0.000054 | < 0.000080 | < 0.000080 | < 0.000070 |
| | Cadmium | mg/L | < 0.00011 | < 0.00011 | < 0.00011 | < 0.00012 | < 0.00012 | < 0.00012 | < 0.00011 | < 0.00011 | < 0.00011 | 0.00009 J | < 0.000070 | 0.00009 J |
| | Chromium | mg/L | < 0.00039 | < 0.00039 | < 0.00039 | < 0.00055 | < 0.00055 | < 0.00055 | < 0.0011 | < 0.0011 | < 0.0011 | < 0.00090 | < 0.00090 | 0.0005 J |
| | Cobalt | mg/L | < 0.00030 | < 0.00030 | < 0.00030 | < 0.00038 | < 0.00038 | < 0.00038 | < 0.00039 | < 0.00039 | < 0.00039 | 0.0028 J | 0.0028 J | 0.0024 J |
| | Fluoride | mg/L | < 0.029 | 0.052 J | < 0.050 | < 0.050 | < 0.050 | < 0.050 | < 0.050 | < 0.050 | 0.059 J | 0.11 J | 0.13 J | < 0.0040 |
| | Lead | mg/L | < 0.000046 | < 0.000046 | < 0.000046 | 0.000096 J | 0.000044 J | 0.000083 J | < 0.00089 | < 0.00089 | < 0.00089 | 0.0002 J | < 0.00010 | 0.0001 J |
| | Lithium | mg/L | 0.0038 J | 0.0032 J | 0.008 J | 0.0035 J | 0.0038 J | 0.0040 J | 0.0044 J | 0.0043 J | 0.0043 J | 0.0066 J | 0.0063 J | 0.0061 J |
| | Mercury | mg/L | < 0.00014 | < 0.00014 | < 0.00014 | < 0.000078 | < 0.000078 | < 0.000078 | < 0.000078 | < 0.00013 | < 0.00013 | < 0.000041 | < 0.000040 | 0.00006 J |
| | Molybdenum | mg/L | < 0.00095 | < 0.00095 | < 0.00095 | < 0.00069 | < 0.00069 | < 0.00069 | < 0.00074 | < 0.00074 | < 0.00074 | < 0.0017 | < 0.0017 | < 0.00060 |
| | Selenium | mg/L | < 0.0013 | 0.0017 J | 0.0014 J | < 0.0016 | < 0.0016 | < 0.0016 | 0.0017 J | 0.0016 J | < 0.0014 | < 0.0010 | < 0.0010 | < 0.0014 |
| | Thallium | mg/L | < 0.000052 | < 0.000052 | < 0.000052 | < 0.00014 | < 0.00014 | < 0.00014 | < 0.00018 | < 0.00018 | < 0.00018 | < 0.00020 | < 0.00020 | < 0.000050 |
| | Radium | pCi/L | 1.17 U | 1.04 U | 1.44 | 1.17 U | 1.2 U | 0.861 U | 0.643 U | 0.229 U | 0.538 U | 1.73 | ------ | 0.276 U |
| | Radium-226 | pCi/L | 0.55 | 0.459 U | 0.838 | 0.298 U | 0.283 U | 0.293 U | 0.502 | 0.229 | ------ | 0.0845 U | ------ | ------ |
| | Radium-228 | pCi/L | 0.62 U | 0.578 U | 0.603 U | 0.875 | 0.914 U | 0.568 U | 0.141 U | -0.0763 U | ------ | 1.65 | ------ | ------ |
| **Field Measured** | Conductivity | uS/cm | ------ | ------ | ------ | 137.1 | 146.77 | 157.53 | 149.86 | 162.44 | ------ | 472.69 | ------ | 468 |
| | Dissolved Oxygen | mg/L | ------ | ------ | ------ | 5.99 | 4.61 | 4.41 | 4.93 | 4.61 | ------ | 0.11 | ------ | 0.18 |
| | Oxidation Reduction Potential | millivolts | ------ | ------ | ------ | 102.1 | 87.84 | 144.1 | 94 | 94 | ------ | 109 | ------ | -32.88 |
| | Temperature | Deg C | ------ | ------ | ------ | 19.95 | 19.36 | 16.83 | 20 | 16.42 | ------ | 18.19 | ------ | 24.01 |
| | Turbidity | ntu | ------ | ------ | ------ | 0.45 | 0.86 | 3.26 | 2.02 | 3.04 | ------ | 4.99 | ------ | 4.4 |
| | Water level depth | ft | ------ | ------ | ------ | 21.32 | 21.15 | 19.95 | 19.4 | 20.94 | ------ | 39.34 | ------ | 39.4 |
| **Supplemental** | Alkalinity as CaCO3, Total | mg/L | ------ | ------ | ------ | ------ | ------ | 15.1 | ------ | 15.2 | 15.2 | ------ | ------ | ------ |
| | Alkalinity, Bicarbonate as CaCO3 | mg/L | ------ | 13 | ------ | ------ | ------ | 15.1 | ------ | 15.2 | 15.2 | ------ | ------ | ------ |
| | Alkalinity, Carbonate as CaCO3 | mg/L | ------ | < 1.0 | ------ | ------ | ------ | < 5.0 | ------ | < 1.8 | < 5.00 | ------ | ------ | ------ |
| | Aluminum | mg/L | ------ | < 0.032 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 0.0128 | ------ |
| | Dissolved Organic Carbon | mg/L | ------ | < 0.50 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Hardness | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 168 | ------ |
| | Iron, Total | mg/L | ------ | < 0.20 | ------ | ------ | ------ | ------ | ------ | ------ | 0.0 | ------ | ------ | ------ |
| | Iron, Ferric (Fe2) | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 0.0 | ------ | ------ | ------ |
| | Iron, Ferrous | mg/L | ------ | < 0.20 | ------ | ------ | ------ | ------ | ------ | ------ | 0.0 | ------ | ------ | ------ |
| | Magnesium | mg/L | ------ | 4.4 | ------ | ------ | ------ | 5.0 | ------ | 5.3 | 4.7 | ------ | 17.9 | ------ |
| | Manganese | mg/L | ------ | < 0.0061 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 0.114 | ------ |
| | Nickel | mg/L | ------ | 0.0011 J | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nitrate as N | mg/L | ------ | 0.41 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphate | mg/L | ------ | 0.027 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphorus, Total Orthophosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Potassium | mg/L | ------ | 3.1 | ------ | ------ | ------ | 3.4 | ------ | 3.4 | 3.2 | ------ | 4.93 | ------ |
| | Silica | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 26.7 | ------ |
| | Silicon | mg/L | ------ | 12.7 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 12.5 | ------ |
| | Silver | mg/L | ------ | < 0.00028 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Sodium | mg/L | ------ | 6.3 | ------ | ------ | ------ | 7.0 | ------ | 7.6 | 7.0 | ------ | 21 | ------ |
| | Sulfide | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Total Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Zinc | mg/L | < 0.018 | < 0.018 | < 0.018 | 0.042 | 0.039 | 0.038 | 0.23 | 0.23 | 0.45 | ------ | < 0.018 | < 0.018 |

**NOTES:**
1. mg/L - milligrams per Liter; pCi/L - picocuries per Liter; S.U. - Standard
2. < indicates the substance was not detected above the analytical metho
3. J indicates the substance was detected at such low levels that the pre
4. Radium data are a combination of radium isotopes 226 and 228. Whe

| | Analyte | Units | DGWC-15 7/12/2017 | DGWC-15 10/25/2017 | DGWC-15 2/28/2018 | DGWC-15 7/11/2018 | DGWC-15 11/7/2018 | DGWC-15 3/14/2019 | DGWC-15 8/28/2019 | DGWC-15 10/17/2019 | DGWC-15 3/3/2020 | DGWC-15 8/13/2020 | DGWC-15 9/23/2020 | DGWC-15 3/2/2021 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Appendix III** | Boron | mg/L | 1.49 | 1.47 | 1.6 | 1.4 | 0.8 | 1.6 | ------ | 1.5 | 1.7 | ------ | 1.6 | 1.4 |
| | Calcium | mg/L | 38.4 | 36.2 | 35 | 37.5 | 11.4 | 34.7 | ------ | 37 | 37.8 | ------ | 35.6 | 36.0 |
| | Chloride | mg/L | 21 | 21 | 20.1 | 21.4 | 22.4 | 24 | ------ | 22 | 22.7 | ------ | 22.4 | 22.8 |
| | Fluoride | mg/L | 0.07 J | 0.26 J | < 0.029 | < 0.029 | < 0.029 | 0.057 J | < 0.050 | 0.079 J | < 0.050 | < 0.050 | < 0.050 | < 0.050 |
| | pH, field measured | S.U. | 5.81 | 5.9 | ------ | ------ | ------ | ------ | ------ | ------ | 5.79 | 6.58 | 5.85 | 5.81 |
| | Sulfate | mg/L | 170 | 180 | 168 | 154 | 168 | 195 | ------ | 146 | 148 | ------ | 146 | 148 |
| | Total Dissolved Solids | mg/L | 490 | 290 | 313 | 320 | 325 | 340 | ------ | 319 | 323 | ------ | 317 | 272 |
| **Appendix IV** | Antimony | mg/L | < 0.00060 | < 0.00060 | < 0.00078 | < 0.00078 | < 0.00078 | ------ | 0.00033 J | < 0.00027 | < 0.00027 | 0.00073 J | < 0.00028 | < 0.00028 |
| | Arsenic | mg/L | < 0.00050 | < 0.00050 | < 0.00057 | < 0.00057 | < 0.00057 | ------ | < 0.00035 | 0.00064 J | < 0.00035 | 0.0013 J | < 0.00078 | < 0.00078 |
| | Barium | mg/L | 0.0517 | 0.0474 | 0.045 | 0.05 | 0.042 | ------ | 0.047 | 0.046 | 0.05 | 0.06 | 0.043 | 0.043 |
| | Beryllium | mg/L | < 0.000090 | < 0.000090 | < 0.000050 | < 0.000050 | < 0.00057 J | ------ | < 0.000074 | < 0.000074 | < 0.000074 | 0.00022 J | 0.000058 J | < 0.000046 |
| | Cadmium | mg/L | < 0.00010 | < 0.00010 | < 0.000093 | < 0.000093 | < 0.00031 J | ------ | < 0.00011 | < 0.00011 | 0.00012 J | 0.00013 J | < 0.00012 | < 0.00012 |
| | Chromium | mg/L | < 0.00050 | < 0.00050 | < 0.0016 | < 0.0016 | 0.0024 J | ------ | < 0.00039 | 0.00058 J | 0.00046 J | 0.0048 J | < 0.00055 | < 0.00055 |
| | Cobalt | mg/L | 0.002 J | 0.0019 J | < 0.0016 J | 0.0018 J | 0.025 | ------ | 0.0015 J | 0.0018 J | 0.0018 J | 0.0024 J | 0.0018 J | 0.0013 J |
| | Fluoride | mg/L | 0.07 J | 0.26 J | < 0.029 | < 0.029 | < 0.029 | 0.057 J | < 0.050 | 0.079 J | < 0.050 | < 0.050 | < 0.050 | < 0.050 |
| | Lead | mg/L | 0.0001 J | < 0.000070 | < 0.00027 | < 0.00027 | < 0.00027 | ------ | 0.000059 J | < 0.000046 | < 0.000046 | 0.0012 J | 0.000082 J | < 0.000036 |
| | Lithium | mg/L | 0.006 J | 0.0061 J | 0.0062 J | 0.0058 J | < 0.00097 | ------ | 0.0063 J | 0.0064 J | 0.0059 J | 0.0089 J | 0.006 J | 0.0051 J |
| | Mercury | mg/L | < 0.000041 | < 0.000036 | < 0.000036 | < 0.000036 | < 0.000036 | ------ | < 0.00014 | < 0.00014 | < 0.00014 | < 0.000078 | < 0.000078 | < 0.000078 |
| | Molybdenum | mg/L | < 0.0010 | < 0.0010 | < 0.0019 | < 0.0019 | < 0.0019 | ------ | < 0.00095 | < 0.00095 | < 0.00095 | < 0.00069 | < 0.00069 | < 0.00069 |
| | Selenium | mg/L | < 0.0018 | < 0.0018 | < 0.0014 | < 0.0014 | 0.0079 J | ------ | < 0.0013 | < 0.0013 | < 0.0013 | 0.0018 J | < 0.0016 | < 0.0016 |
| | Thallium | mg/L | < 0.000050 | < 0.000050 | < 0.00014 | < 0.00014 | < 0.00016 J | ------ | < 0.000052 | < 0.000052 | < 0.000052 | < 0.00014 | < 0.00014 | < 0.00014 |
| | Radium | pCi/L | 0.584 U | 0.454 U | 1.25 | 2.13 | 0.786 U | ------ | 1.01 U | 1.03 U | 0.293 U | 3.58 | 1.69 U | 0.599 U |
| | Radium-226 | pCi/L | 0.584 | 0.309 U | 0.459 | 0.513 | 0.244 | ------ | 0.544 | 0.619 | 0.293 | 1.97 | 0.408 U | 0.0977 U |
| | Radium-228 | pCi/L | -0.0433 U | 0.145 U | 0.794 | 1.62 | 0.542 U | ------ | 0.467 U | 0.406 U | -0.119 U | 1.61 | 1.28 U | 0.501 U |
| **Field Measured** | Conductivity | uS/cm | 458.4 | 469.54 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 453.6 | 439.52 | 436.57 |
| | Dissolved Oxygen | mg/L | 0.11 | 0.54 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 8.7 | 0.26 | 0.49 |
| | Oxidation Reduction Potential | millivolts | 62.5 | 29.8 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 93.9 | 32.89 | 173.6 |
| | Temperature | Deg C | 22.88 | 20.66 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 28.36 | 21.81 | 17.65 |
| | Turbidity | ntu | 4.83 | 2.43 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 4.7 | 1.35 | 0.45 |
| | Water level depth | ft | 40.4 | 39.43 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 39.6 | 41.3 | 41.2 |
| **Supplemental** | Alkalinity as CaCO3, Total | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 15.6 |
| | Alkalinity, Bicarbonate as CaCO3 | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 8.5 | ------ | ------ | ------ | 15.6 |
| | Alkalinity, Carbonate as CaCO3 | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 1.0 | ------ | ------ | ------ | < 5.0 |
| | Aluminum | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 0.032 | ------ | ------ | ------ | ------ |
| | Dissolved Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 0.50 | ------ | ------ | ------ | ------ |
| | Hardness | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Total | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 0.2 | ------ | ------ | ------ | ------ |
| | Iron, Ferric (Fe2) | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 0.20 | ------ | ------ | ------ | ------ |
| | Iron, Ferrous | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 0.20 | ------ | ------ | ------ | ------ |
| | Magnesium | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 16.5 | ------ | ------ | ------ | 15.4 |
| | Manganese | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 0.073 | ------ | ------ | ------ | ------ |
| | Nickel | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nitrate as N | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 0.029 J | ------ | ------ | ------ | ------ |
| | Phosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphorus, Total Orthophosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 0.020 | ------ | ------ | ------ | ------ |
| | Potassium | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 4.5 | ------ | ------ | ------ | 4.5 |
| | Silica | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silicon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 13.2 | ------ | ------ | ------ | ------ |
| | Silver | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Sodium | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 19.6 | ------ | ------ | ------ | 22.2 |
| | Sulfide | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Total Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Zinc | mg/L | ------ | ------ | < 0.018 | < 0.018 | < 0.018 | < 0.018 | < 0.018 | ------ | ------ | ------ | ------ | ------ |

**NOTES:**
1. mg/L - milligrams per Liter; pCi/L - picocuries per Liter; S.U. - Standard
2. < indicates the substance was not detected above the analytical metho
3. J indicates the substance was detected at such low levels that the pre
4. Radium data are a combination of radium isotopes 226 and 228. Whe

| Analyte | | Units | DGWC-15 | DGWC-15 | DGWC-15 | DGWC-17 | DGWC-17 | DGWC-17 | DGWC-17 | DGWC-17 | DGWC-17 | DGWC-17 | DGWC-17 | DGWC-17 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 9/9/2021 | 1/24/2022 | 9/13/2022 | 9/7/2016 | 12/8/2016 | 12/8/2016 | 3/30/2017 | 7/12/2017 | 10/25/2017 | 2/28/2018 | 7/11/2018 | 11/7/2018 |
| **Appendix III** | Boron | mg/L | 1.6 | 1.4 | 1.50 | 0.683 | 0.756 | 0.688 | 0.743 | 0.62 | 0.739 | 0.63 | 0.79 | 1.6 |
| | Calcium | mg/L | 34.4 | 33.2 | 34.4 | 8.61 | 9.38 | 7.92 | 9.56 | 10.4 | 10.9 | 10.9 | 13 J | 37 |
| | Chloride | mg/L | 21.9 | 21.5 | 21.90 | 17 | 18 B | 19 | 20 | 18 | 19 | 17 | 19.5 | 21.4 |
| | Fluoride | mg/L | < 0.050 | < 0.050 | 0.065 J | 0.32 | 0.33 | 0.31 | 0.1 J | 0.27 J | 0.49 | 0.54 | 0.15 J | 0.095 J |
| | pH, field measured | S.U. | 5.83 | 6.06 | 5.82 | 5.05 | ------ | 5.12 | 5.08 | 5 | 5.73 | ------ | ------ | ------ |
| | Sulfate | mg/L | 139 | 127 | 145 | 230 | 240 B | 240 | 260 | 230 | 240 | 203 | 234 | 248 |
| | Total Dissolved Solids | mg/L | 292 | 294 | 289 | 353 | ------ | 408 | 338 | 417 | 343 | 364 | 393 | 408 |
| **Appendix IV** | Antimony | mg/L | < 0.00078 | < 0.00078 | < 0.00078 | < 0.00080 | < 0.00080 | < 0.00080 | < 0.00030 | < 0.00060 | < 0.00060 | < 0.00078 | < 0.00078 | < 0.00078 |
| | Arsenic | mg/L | < 0.0011 | < 0.0011 | < 0.0022 | < 0.0016 | < 0.0016 | < 0.0016 | 0.0008 J | < 0.00050 | 0.0007 J | < 0.00073 J | < 0.00057 | < 0.00057 |
| | Barium | mg/L | 0.041 | 0.041 | 0.042 | 0.0694 | 0.0625 | 0.062 | 0.0615 | 0.0532 | 0.0544 | 0.053 | 0.053 | 0.044 |
| | Beryllium | mg/L | < 0.000054 | < 0.000054 | < 0.000054 | 0.0006 J | 0.0006 J | 0.0005 J | 0.0006 J | 0.0005 J | 0.0005 J | 0.00053 J | 0.00058 J | < 0.000050 |
| | Cadmium | mg/L | < 0.00011 | < 0.00011 | < 0.00011 | 0.0003 J | 0.0002 J | 0.0003 J | 0.0003 J | 0.0002 J | 0.0002 J | 0.00022 J | 0.00029 J | < 0.000093 |
| | Chromium | mg/L | < 0.0011 | < 0.0011 | < 0.0011 | 0.0026 J | 0.0022 J | 0.0025 J | 0.0026 J | 0.0022 J | 0.0024 J | 0.0022 J | 0.0024 J | < 0.0016 |
| | Cobalt | mg/L | 0.0016 J | 0.0015 J | 0.0016 J | 0.0247 | 0.0285 | 0.029 | 0.0283 | 0.023 | 0.0259 | < 0.020 | 0.025 | < 0.0016 J |
| | Fluoride | mg/L | < 0.050 | < 0.050 | 0.065 J | 0.32 | 0.33 | 0.31 | 0.1 J | 0.27 J | 0.49 | 0.54 | 0.15 J | 0.095 J |
| | Lead | mg/L | < 0.00089 | < 0.00089 | < 0.00089 | < 0.00010 | < 0.00010 | < 0.00010 | 0.0001 J | < 0.000070 | < 0.000070 | < 0.00027 | < 0.00027 | < 0.00027 |
| | Lithium | mg/L | 0.0057 J | 0.0051 J | 0.0057 J | < 0.0021 | < 0.0021 | < 0.0021 | < 0.0011 | < 0.0015 | < 0.0015 | < 0.00097 | < 0.00097 | 0.0058 J |
| | Mercury | mg/L | < 0.000078 | < 0.00013 | < 0.00013 | 0.00006 J | < 0.000040 | < 0.000041 | 0.00012 J | 0.00005 J | 0.00005 J | < 0.000036 | < 0.000036 | 0.000059 J |
| | Molybdenum | mg/L | < 0.00074 | < 0.00074 | < 0.00074 | < 0.0017 | < 0.0017 | < 0.0017 | < 0.00060 | < 0.0010 | < 0.0010 | < 0.0019 | < 0.0019 | < 0.0019 |
| | Selenium | mg/L | < 0.0014 | < 0.0014 | < 0.0014 | 0.007 J | 0.0087 J | 0.0087 J | 0.0099 J | 0.0072 J | 0.0078 J | 0.0072 J | 0.007 J | < 0.0014 |
| | Thallium | mg/L | < 0.00018 | < 0.00018 | < 0.00018 | < 0.00020 | < 0.00020 | < 0.00020 | 0.0002 J | 0.0002 J | 0.0002 J | 0.00015 J | 0.00017 J | < 0.00014 |
| | Radium | pCi/L | 0.624 U | 0.534 U | 0.761 U | 1.17 | ------ | 1.65 | 0.865 U | 0.362 U | 0.401 U | 1.1 U | 0.64 U | 0.795 U |
| | Radium-226 | pCi/L | 0.259 U | 0.135 U | ------ | 0.177 U | ------ | 0.121 U | ------ | 0.362 | 0.235 U | 0.223 U | 0.165 U | 0.413 |
| | Radium-228 | pCi/L | 0.365 U | 0.399 U | ------ | 0.995 | ------ | 1.53 | ------ | -0.115 U | 0.166 U | 0.874 | 0.475 U | 0.382 U |
| **Field Measured** | Conductivity | uS/cm | 424.16 | 792 | ------ | 503.83 | ------ | 584.54 | 575.68 | 553.4 | 554.02 | ------ | ------ | ------ |
| | Dissolved Oxygen | mg/L | 0.49 | 0.69 | ------ | 0.19 | ------ | 0.3 | 0.13 | 0.26 | 0.27 | ------ | ------ | ------ |
| | Oxidation Reduction Potential | millivolts | 114.9 | 14.1 | ------ | 118.6 | ------ | 89.77 | -32.96 | 58.9 | 31.91 | ------ | ------ | ------ |
| | Temperature | Deg C | 21.64 | 18.33 | ------ | 26.8 | ------ | 15.57 | 21.56 | 22.38 | 19.7 | ------ | ------ | ------ |
| | Turbidity | ntu | 2.34 | 0.78 | ------ | 4.58 | ------ | 3.84 | 3.4 | 1.22 | 0.37 | ------ | ------ | ------ |
| | Water level depth | ft | 40.9 | 41.44 | ------ | 27.82 | ------ | 28.2 | 28.04 | 26.33 | 27.45 | ------ | ------ | ------ |
| **Supplemental** | Alkalinity as CaCO3, Total | mg/L | ------ | 17.4 | 17.3 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Alkalinity, Bicarbonate as CaCO3 | mg/L | ------ | 17.4 | 17.3 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Alkalinity, Carbonate as CaCO3 | mg/L | ------ | < 1.8 | < 5.00 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Aluminum | mg/L | ------ | ------ | ------ | ------ | 0.181 | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Dissolved Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Hardness | mg/L | ------ | ------ | ------ | ------ | 225 | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Total | mg/L | ------ | ------ | 0.1 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Ferric (Fe2) | mg/L | ------ | ------ | 0.1 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Ferrous | mg/L | ------ | ------ | 0.0 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Magnesium | mg/L | ------ | 14.3 | 14.9 | ------ | 49 | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Manganese | mg/L | ------ | ------ | ------ | ------ | 0.993 | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nickel | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nitrate as N | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphorus, Total Orthophosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Potassium | mg/L | ------ | 4.3 | 4.4 | ------ | 3.71 | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silica | mg/L | ------ | ------ | ------ | ------ | 10.3 | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silicon | mg/L | ------ | ------ | ------ | ------ | 4.83 | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silver | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Sodium | mg/L | ------ | 20.2 | 21.5 | ------ | 16.5 | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Sulfide | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Total Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Zinc | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |

**NOTES:**
1. mg/L - milligrams per Liter; pCi/L - picocuries per Liter; S.U. - Standard
2. < indicates the substance was not detected above the analytical meth
3. J indicates the substance was detected at such low levels that the pre
4. Radium data are a combination of radium isotopes 226 and 228. Whe

| | Analyte | Units | DGWC-17 3/13/2019 | DGWC-17 8/27/2019 | DGWC-17 10/18/2019 | DGWC-17 3/4/2020 | DGWC-17 8/14/2020 | DGWC-17 9/24/2020 | DGWC-17 3/3/2021 | DGWC-17 9/13/2021 | DGWC-17 1/24/2022 | DGWC-17 9/14/2022 | DGWC-19 9/1/2016 | DGWC-19 12/7/2016 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Appendix III** | Boron | mg/L | 0.76 | ------ | 0.82 | 0.85 | ------ | 0.88 | 0.71 | 0.78 | 0.9 | 0.87 | 3.08 | 2.58 |
| | Calcium | mg/L | 11.9 J | ------ | 12.9 | 15.8 | ------ | 12.7 | 14.3 | 15.8 | 15.6 | 16.4 | 65.6 | 67.3 |
| | Chloride | mg/L | 19.9 | ------ | 22 | 19.6 | ------ | 22.7 | 20.9 | 18.2 | 19.2 | 19.00 | 41 | 41 |
| | Fluoride | mg/L | 0.084 J | 0.24 J | 0.086 J | < 0.050 | 0.069 J | 0.056 J | 0.085 J | 0.063 J | < 0.050 | 0.1 | 0.75 | 0.4 |
| | pH, field measured | S.U. | ------ | ------ | ------ | 5.07 | 5.01 | 5.1 | 5.23 | 5.06 | 5.15 | 5.08 | 4.64 | ------ |
| | Sulfate | mg/L | 268 | ------ | 222 | 222 | ------ | 259 | 237 | 222 | 225 | 268 | 240 | 240 |
| | Total Dissolved Solids | mg/L | 802 | ------ | 403 | 414 | ------ | 411 | 384 | 424 | 426 | 434 | 396 | ------ |
| **Appendix IV** | Antimony | mg/L | ------ | < 0.00027 | < 0.00027 | < 0.00027 | < 0.00028 | 0.00045 J | < 0.00028 | < 0.00078 | < 0.00078 | < 0.00078 | < 0.00080 | < 0.00080 |
| | Arsenic | mg/L | ------ | < 0.00035 | 0.0012 J | 0.0014 J | < 0.00078 | 0.0011 J | < 0.00078 | < 0.0011 | 0.0014 J | < 0.0022 | 0.0022 J | 0.0021 J |
| | Barium | mg/L | ------ | 0.05 | 0.045 | 0.044 | 0.046 | 0.033 | 0.036 | 0.031 | 0.031 | 0.031 | 0.0214 | 0.021 |
| | Beryllium | mg/L | ------ | 0.00066 J | 0.00071 J | 0.00062 J | 0.00064 J | 0.0006 J | 0.00056 | 0.00052 | 0.00059 | 0.00058 | 0.0019 J | 0.0018 J |
| | Cadmium | mg/L | ------ | 0.00033 J | 0.00029 J | 0.00028 J | 0.00029 J | 0.00024 J | 0.00023 J | 0.00023 J | 0.00027 J | 0.00024 J | 0.0004 J | 0.0003 J |
| | Chromium | mg/L | ------ | 0.0031 J | 0.0027 J | 0.0035 J | 0.0033 J | 0.0029 J | 0.0028 J | 0.0027 J | 0.0029 J | 0.0023 J | 0.0031 J | 0.0025 J |
| | Cobalt | mg/L | ------ | 0.031 | 0.023 | 0.023 | 0.026 | 0.028 | 0.016 | 0.019 | 0.019 | 0.016 | 0.0553 | 0.0562 |
| | Fluoride | mg/L | 0.084 J | 0.24 J | 0.086 J | < 0.050 | 0.069 J | 0.056 J | 0.085 J | 0.063 J | < 0.050 | 0.1 | 0.75 | 0.4 |
| | Lead | mg/L | ------ | 0.00009 J | 0.000074 J | 0.00013 J | 0.00017 J | 0.000079 J | 0.00015 J | < 0.00089 | < 0.00089 | < 0.00089 | < 0.00010 | < 0.00010 |
| | Lithium | mg/L | ------ | 0.00089 J | 0.00096 J | 0.0011 J | 0.0015 J | 0.00096 J | 0.0011 J | < 0.00073 | < 0.00073 | < 0.00073 | 0.0034 J | 0.0031 J |
| | Mercury | mg/L | ------ | 0.00016 J | < 0.00014 | < 0.00014 | 0.000098 J | 0.000082 J | < 0.000078 | 0.000086 J | < 0.00013 | < 0.00013 | 0.00004 J | < 0.000040 |
| | Molybdenum | mg/L | ------ | < 0.00095 | < 0.00095 | < 0.00095 | < 0.00069 | < 0.00069 | < 0.00069 | < 0.00074 | < 0.00074 | < 0.00074 | < 0.0017 | < 0.0017 |
| | Selenium | mg/L | ------ | 0.0073 J | 0.0093 J | 0.0074 J | 0.0084 J | 0.015 | 0.0072 | 0.0071 | 0.0064 | 0.0064 | 0.0093 J | 0.0102 |
| | Thallium | mg/L | ------ | 0.00018 J | 0.00014 J | 0.00019 J | 0.00019 J | 0.00018 J | 0.00017 J | < 0.00018 | < 0.00018 | < 0.00018 | 0.0005 J | 0.0005 J |
| | Radium | pCi/L | ------ | 1.12 | 0.89 U | 0.493 U | 0.804 U | 0.369 U | 0.660 U | 0.85 U | 0.692 U | 0.489 U | 1.07 U | ------ |
| | Radium-226 | pCi/L | ------ | 0.442 | 0.721 | 0.324 | -0.0503 U | 0.155 U | 0.397 U | 0.171 U | 0.102 U | ------ | 0.0154 U | ------ |
| | Radium-228 | pCi/L | ------ | 0.675 | 0.169 U | 0.169 U | 0.804 U | 0.214 U | 0.263 U | 0.679 U | 0.59 | ------ | 1.05 | ------ |
| **Field Measured** | Conductivity | uS/cm | ------ | ------ | ------ | ------ | 627.6 | 612.09 | 596.5 | 598.52 | 603.24 | ------ | 632.92 | ------ |
| | Dissolved Oxygen | mg/L | ------ | ------ | ------ | ------ | 0.08 | 0.1 | 3.67 | 0.6 | 0.4 | ------ | 0.33 | ------ |
| | Oxidation Reduction Potential | millivolts | ------ | ------ | ------ | ------ | 245.6 | 30.28 | 140.6 | 99.5 | 41.2 | ------ | 584.1 | ------ |
| | Temperature | Deg C | ------ | ------ | ------ | ------ | 20.28 | 18.87 | 17.89 | 20.03 | 18.65 | ------ | 27.44 | ------ |
| | Turbidity | ntu | ------ | ------ | ------ | ------ | 4.83 | 4.04 | 4.73 | 2.24 | 4.91 | ------ | 4.72 | ------ |
| | Water level depth | ft | ------ | ------ | ------ | ------ | 32.6 | 32.85 | 33 | 34.85 | 36.17 | ------ | 21.35 | ------ |
| **Supplemental** | Alkalinity as CaCO3, Total | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | < 5.0 | ------ | 5.2 | < 5.00 | ------ | ------ |
| | Alkalinity, Bicarbonate as CaCO3 | mg/L | ------ | ------ | 3.5 | ------ | ------ | ------ | < 5.0 | ------ | 5.2 | < 5.00 | ------ | ------ |
| | Alkalinity, Carbonate as CaCO3 | mg/L | ------ | ------ | < 1.0 | ------ | ------ | ------ | < 5.0 | ------ | < 1.8 | < 5.00 | ------ | ------ |
| | Aluminum | mg/L | ------ | ------ | 0.54 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 0.37 |
| | Dissolved Organic Carbon | mg/L | ------ | ------ | < 0.50 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Hardness | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 232 |
| | Iron, Total | mg/L | ------ | ------ | 0.4 | ------ | ------ | ------ | ------ | ------ | ------ | < 0.025 | ------ | ------ |
| | Iron, Ferric (Fe2) | mg/L | ------ | ------ | < 0.20 | ------ | ------ | ------ | ------ | ------ | ------ | < 0.025 | ------ | ------ |
| | Iron, Ferrous | mg/L | ------ | ------ | < 0.20 | ------ | ------ | ------ | ------ | ------ | ------ | 0.0 | ------ | ------ |
| | Magnesium | mg/L | ------ | ------ | 53.8 | ------ | ------ | ------ | 48.4 | ------ | 49.2 | 52.8 | ------ | 15.6 |
| | Manganese | mg/L | ------ | ------ | 0.73 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 2.21 |
| | Nickel | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nitrate as N | mg/L | ------ | ------ | 0.87 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphorus, Total Orthophosphate | mg/L | ------ | ------ | < 0.020 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Potassium | mg/L | ------ | ------ | 4 | ------ | ------ | ------ | 4.0 | ------ | 3.6 | 3.7 | ------ | 3.87 |
| | Silica | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 6.21 |
| | Silicon | mg/L | ------ | ------ | 5.7 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 2.9 |
| | Silver | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Sodium | mg/L | ------ | ------ | 17.1 | ------ | ------ | ------ | 17.5 | ------ | 16.9 | 17.5 | ------ | 18 |
| | Sulfide | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Total Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Zinc | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |

**NOTES:**
1. mg/L - milligrams per Liter; pCi/L - picocuries per Liter; S.U. - Standard
2. < indicates the substance was not detected above the analytical meth
3. J indicates the substance was detected at such low levels that the pre
4. Radium data are a combination of radium isotopes 226 and 228. Whe

**APPENDIX A**
**ANALYTICAL RESULTS (2016 - 2022)**
Plant McDonough-Atkinson Ash Pond 1 and Ash Pond 2 and 3/4
Atlanta, Georgia

| Analyte | | Units | DGWC-19<br>12/7/2016 | DGWC-19<br>3/29/2017 | DGWC-19<br>7/12/2017 | DGWC-19<br>10/25/2017 | DGWC-19<br>2/28/2018 | DGWC-19<br>7/11/2018 | DGWC-19<br>11/7/2018 | DGWC-19<br>3/13/2019 | DGWC-19<br>8/28/2019 | DGWC-19<br>10/16/2019 | DGWC-19<br>3/3/2020 | DGWC-19<br>8/11/2020 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Boron | mg/L | 3.34 | 3.96 | 2.82 | 3.19 | 2.9 | 3.7 | 2.6 | 2.6 | ------ | 2.2 | 3.1 | ------ |
| | Calcium | mg/L | 68.3 | 68 | 70 | 77 | 72 | 82.7 | 81.7 | 76.9 | ------ | 85.7 | 86.8 | ------ |
| | Chloride | mg/L | 41 | 42 | 41 | 41 | 36.4 | 38.2 | 38.8 | 40.1 | ------ | 33.2 | 30.9 | ------ |
| **Appendix III** | Fluoride | mg/L | 0.37 | 0.35 | 0.34 | 0.9 | 1.2 | 0.37 | 0.2 J | 0.22 J | 0.2 | 0.23 J | 0.056 J | 0.2 |
| | pH, field measured | S.U. | 4.63 | 4.7 | 4.76 | 4.66 | ------ | ------ | ------ | ------ | ------ | ------ | 4.89 | 4.9 |
| | Sulfate | mg/L | 250 | 250 | 250 | 270 | 244 | 249 | 266 | 299 | ------ | 323 | 292 | ------ |
| | Total Dissolved Solids | mg/L | 400 | 390 | 360 | 423 | 440 | 457 | 461 | 113 | ------ | 500 | 526 | ------ |
| | Antimony | mg/L | < 0.00080 | < 0.00030 | < 0.00060 | < 0.00060 | < 0.00078 | < 0.00078 | < 0.00078 | ------ | < 0.00027 | < 0.00027 | < 0.00027 | < 0.00028 |
| | Arsenic | mg/L | < 0.0016 | 0.002 J | 0.0016 J | 0.0022 J | < 0.0028 J | 0.0009 J | < 0.0012 J | ------ | 0.00049 J | 0.00046 J | < 0.00035 | 0.0014 J |
| | Barium | mg/L | 0.0191 | 0.0209 | 0.0212 | 0.021 | 0.021 | 0.023 | 0.024 | ------ | 0.026 | 0.024 | 0.028 | 0.027 |
| | Beryllium | mg/L | 0.0021 J | 0.0017 J | 0.0018 J | 0.0019 J | 0.002 J | 0.002 J | 0.002 J | ------ | 0.0018 J | 0.0017 J | 0.0021 J | 0.002 J |
| | Cadmium | mg/L | 0.0004 J | 0.0004 J | 0.0004 J | 0.0004 J | 0.00035 J | 0.00039 J | < 0.00031 J | ------ | 0.00033 J | 0.00034 J | 0.00037 J | 0.0003 J |
| | Chromium | mg/L | < 0.00090 | 0.0025 J | 0.0023 J | 0.0024 J | 0.0021 J | 0.0022 J | 0.0028 J | ------ | 0.0028 J | 0.0024 J | 0.0028 J | 0.0024 J |
| | Cobalt | mg/L | 0.0561 | 0.0534 | 0.0489 | 0.0514 | 0.051 | 0.051 | 0.048 | ------ | 0.048 | 0.046 | 0.054 | 0.049 |
| | Fluoride | mg/L | 0.37 | 0.35 | 0.34 | 0.9 | 1.2 | 0.37 | 0.2 J | 0.22 J | 0.2 | 0.23 J | 0.056 J | 0.2 |
| **Appendix IV** | Lead | mg/L | < 0.00010 | < 0.000070 | < 0.000070 | < 0.000070 | < 0.00027 | < 0.00027 | < 0.00027 | ------ | 0.00026 J | < 0.000046 | 0.00007 J | 0.000053 J |
| | Lithium | mg/L | 0.0034 J | 0.0031 J | 0.0032 J | 0.0031 J | 0.0031 J | 0.0034 J | 0.0034 J | ------ | 0.0032 J | 0.0026 J | 0.0034 J | 0.0031 J |
| | Mercury | mg/L | 0.00005 J | 0.00009 J | < 0.000041 | < 0.000036 | < 0.000036 | < 0.000036 | < 0.000036 | ------ | < 0.00014 | < 0.00014 | < 0.00014 | < 0.000078 |
| | Molybdenum | mg/L | < 0.0017 | < 0.00060 | < 0.0010 | < 0.0010 | < 0.0019 | < 0.0019 | < 0.0019 | ------ | < 0.00095 | < 0.00095 | < 0.00095 | < 0.00069 |
| | Selenium | mg/L | < 0.0010 | 0.0071 J | 0.0065 J | 0.0087 J | 0.011 | 0.0036 J | 0.0068 J | ------ | 0.004 J | 0.006 J | 0.0066 J | 0.0096 J |
| | Thallium | mg/L | 0.0005 J | 0.0004 J | 0.0005 J | 0.0004 J | 0.00049 J | 0.0005 J | < 0.00052 J | ------ | 0.00053 J | 0.00053 J | 0.0006 J | 0.00059 J |
| | Radium | pCi/L | 0.903 U | 0.302 U | 0.283 U | 0.927 U | 0.813 U | 0.751 U | 1.02 | ------ | 0.661 U | 1.79 | 0.383 U | 0.723 U |
| | Radium-226 | pCi/L | 0.166 U | ------ | 0.26 U | 0.394 | 0.296 U | 0.267 U | 0.294 | ------ | 0.276 U | 0.495 | 0.383 | 0.265 U |
| | Radium-228 | pCi/L | 0.737 U | ------ | 0.0232 U | 0.533 U | 0.517 U | 0.484 U | 0.726 U | ------ | 0.385 U | 1.29 | -0.299 U | 0.458 U |
| | Conductivity | uS/cm | 618.01 | 629.46 | 656.3 | 642.75 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 751.9 |
| | Dissolved Oxygen | mg/L | 0.81 | 0.28 | 0.22 | 0.18 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 0.22 |
| **Field** | Oxidation Reduction Potential | millivolts | 547.9 | 580.16 | 59.8 | 91.2 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 306.5 |
| **Measured** | Temperature | Deg C | 18.88 | 24.38 | 25.69 | 17.41 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 20.96 |
| | Turbidity | ntu | 1.2 | 4.48 | 4.51 | 0.73 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 4.35 |
| | Water level depth | ft | 22.22 | 21.75 | 19.73 | 20.92 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 24.72 |
| | Alkalinity as CaCO3, Total | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Alkalinity, Bicarbonate as CaCO3 | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 2.5 | ------ | ------ |
| | Alkalinity, Carbonate as CaCO3 | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 1.0 | ------ | ------ |
| | Aluminum | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 0.44 | ------ | ------ |
| | Dissolved Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 0.50 | ------ | ------ |
| | Hardness | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Total | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 0.20 | ------ | ------ |
| | Iron, Ferric (Fe2) | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 0.20 | ------ | ------ |
| | Iron, Ferrous | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 0.20 | ------ | ------ |
| | Magnesium | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 12.1 | ------ | ------ |
| | Manganese | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 2 | ------ | ------ |
| **Supplemental** | Nickel | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 0.012 | ------ | ------ |
| | Nitrate as N | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 0.013 J | ------ | ------ |
| | Phosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 0.00321 | ------ | ------ |
| | Phosphorus, Total Orthophosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Potassium | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 3.9 | ------ | ------ |
| | Silica | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silicon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 2.8 | ------ | ------ |
| | Silver | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 0.00028 | ------ | ------ |
| | Sodium | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 29.3 | ------ | ------ |
| | Sulfide | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Total Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Zinc | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |

**NOTES:**
1. mg/L - milligrams per Liter; pCi/L - picocuries per Liter; S.U. - Standard
2. < indicates the substance was not detected above the analytical metho
3. J indicates the substance was detected at such low levels that the pre
4. Radium data are a combination of radium isotopes 226 and 228. Whe

**APPENDIX A**
**ANALYTICAL RESULTS (2016 - 2022)**
Plant McDonough-Atkinson Ash Pond 1 and Ash Pond 2 and 3/4
Atlanta, Georgia

| Analyte | | Units | DGWC-19 | DGWC-19 | DGWC-19 | DGWC-19 | DGWC-19 | DGWC-2 | DGWC-2 | DGWC-2 | DGWC-2 | DGWC-2 | DGWC-2 | DGWC-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 9/22/2020 | 3/2/2021 | 9/9/2021 | 1/25/2022 | 9/14/2022 | 7/11/2017 | 2/27/2018 | 2/27/2018 | 7/11/2018 | 11/6/2018 | 3/12/2019 | 8/27/2019 |
| | Boron | mg/L | 2.6 | 2.3 | 2.7 | 2.5 | 2.40 | ------ | 1.1 | ------ | 0.82 | 0.9 | 0.72 | ------ |
| | Calcium | mg/L | 103 | 93.2 | 93.6 | 101 | 105.0 | ------ | 66.7 | ------ | 55 | 54.5 | 52.2 | ------ |
| | Chloride | mg/L | 27.6 | 27.0 | 25.4 | 23.7 | 18.70 | ------ | 4.1 | ------ | 3.3 | 3.7 | 3.1 | ------ |
| **Appendix III** | Fluoride | mg/L | 0.084 J | 0.19 | 0.18 | 0.16 | 0.18 | ------ | 0.28 J | ------ | 0.6 | < 0.029 | < 0.052 J | < 0.029 |
| | pH, field measured | S.U. | 4.91 | 4.84 | 4.82 | 4.79 | 4.81 | 5.87 | 5.85 | ------ | ------ | ------ | ------ | ------ |
| | Sulfate | mg/L | 310 | 324 | 315 | 288 | 388 | ------ | 189 | ------ | 162 | 190 | 159 | ------ |
| | Total Dissolved Solids | mg/L | 513 | 513 | 480 | 694 | 572 | ------ | 401 | ------ | 334 | 334 | 297 | ------ |
| | Antimony | mg/L | 0.00036 J | < 0.00028 | < 0.00078 | < 0.00078 | < 0.00078 | ------ | < 0.00078 | ------ | < 0.00078 | < 0.00078 | ------ | < 0.00027 |
| | Arsenic | mg/L | 0.0017 J | 0.0013 J | 0.0027 J | 0.0014 J | < 0.0022 | ------ | < 0.00057 | ------ | < 0.00057 | < 0.00057 | ------ | 0.00099 J |
| | Barium | mg/L | 0.026 | 0.026 | 0.025 | 0.026 | 0.027 | ------ | 0.021 | ------ | 0.022 | 0.021 | ------ | 0.023 |
| | Beryllium | mg/L | 0.002 J | 0.0019 | 0.0022 | 0.0019 | 0.0018 | ------ | < 0.000050 | ------ | < 0.000050 | < 0.000050 | ------ | < 0.000074 |
| | Cadmium | mg/L | 0.00036 J | 0.00035 J | 0.00037 J | 0.00041 J | 0.00032 J | ------ | 0.00062 J | ------ | 0.00018 J | 0.00014 J | ------ | 0.00012 J |
| | Chromium | mg/L | 0.003 J | 0.0024 J | 0.003 J | 0.0029 J | 0.0024 J | ------ | < 0.0016 | ------ | < 0.0016 | < 0.0016 | ------ | 0.0004 J |
| | Cobalt | mg/L | 0.051 | 0.051 | 0.055 | 0.054 | 0.052 | ------ | 0.042 | ------ | 0.02 | 0.024 | ------ | 0.0088 J |
| | Fluoride | mg/L | 0.084 J | 0.19 | 0.18 | 0.16 | 0.18 | ------ | 0.28 J | ------ | 0.6 | < 0.029 | < 0.052 J | < 0.029 |
| **Appendix IV** | Lead | mg/L | 0.00016 J | 0.000045 J | < 0.00089 | < 0.00089 | < 0.00089 | ------ | < 0.00027 | ------ | < 0.00027 | < 0.00027 | ------ | 0.00006 J |
| | Lithium | mg/L | 0.0034 J | 0.0030 J | 0.0035 J | 0.0031 J | 0.0032 J | ------ | 0.088 | ------ | 0.033 J | 0.037 J | ------ | 0.032 J |
| | Mercury | mg/L | < 0.000078 | < 0.000078 | < 0.000078 | < 0.00013 | < 0.00013 | ------ | < 0.000036 | ------ | < 0.000036 | < 0.00064 | ------ | < 0.00014 |
| | Molybdenum | mg/L | < 0.00069 | < 0.00069 | < 0.00074 | < 0.00074 | < 0.00074 | ------ | < 0.0019 | ------ | < 0.0019 | < 0.0019 | ------ | 0.002 J |
| | Selenium | mg/L | 0.0052 J | 0.0091 | 0.0083 | 0.0029 J | 0.0073 | ------ | 0.0017 J | ------ | 0.0045 J | 0.0046 J | ------ | 0.0069 J |
| | Thallium | mg/L | 0.0005 J | 0.00056 J | 0.00056 J | 0.00057 J | 0.00056 J | ------ | < 0.00014 | ------ | < 0.00014 | < 0.00014 | ------ | < 0.000052 |
| | Radium | pCi/L | 0.96 U | 0.775 U | 0.239 U | 0.415 U | 0.674 U | ------ | ------ | 0.863 U | 0.663 U | 0.664 | ------ | 1.6 |
| | Radium-226 | pCi/L | 0.48 | 0.140 U | 0.126 U | 0.115 U | ------ | ------ | ------ | 0.308 U | 0.663 | 0.273 | ------ | 0.982 |
| | Radium-228 | pCi/L | 0.48 U | 0.635 U | 0.113 U | 0.3 U | ------ | ------ | ------ | 0.555 U | -0.56 U | 0.391 U | ------ | 0.621 U |
| | Conductivity | uS/cm | 749.02 | 767.8 | 692.04 | 799.57 | ------ | 738.5 | 551.07 | ------ | ------ | ------ | ------ | ------ |
| | Dissolved Oxygen | mg/L | 0.2 | 0.55 | 0.41 | 0.17 | ------ | 0.28 | 0.28 | ------ | ------ | ------ | ------ | ------ |
| **Field Measured** | Oxidation Reduction Potential | millivolts | 472.72 | 524.8 | 436.6 | 494 | ------ | 65.2 | 112.2 | ------ | ------ | ------ | ------ | ------ |
| | Temperature | Deg C | 20.3 | 16.94 | 22.27 | 18.97 | ------ | 22.18 | 19.77 | ------ | ------ | ------ | ------ | ------ |
| | Turbidity | ntu | 3.42 | 0.82 | 4.96 | 4.1 | ------ | 0.83 | 2.98 | ------ | ------ | ------ | ------ | ------ |
| | Water level depth | ft | 24.5 | 24.49 | 24.98 | 25.5 | ------ | 28.6 | 30.74 | ------ | ------ | ------ | ------ | ------ |
| | Alkalinity as CaCO3, Total | mg/L | ------ | < 5.0 | ------ | 3.5 J | < 5.00 | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Alkalinity, Bicarbonate as CaCO3 | mg/L | ------ | < 5.0 | ------ | 3.5 J | < 5.00 | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Alkalinity, Carbonate as CaCO3 | mg/L | ------ | < 5.0 | ------ | < 1.8 | < 5.00 | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Aluminum | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Dissolved Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Hardness | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Total | mg/L | ------ | ------ | ------ | ------ | 0.026 J | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Ferric (Fe2) | mg/L | ------ | ------ | ------ | ------ | 0.026 J | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Ferrous | mg/L | ------ | ------ | ------ | ------ | 0.0 | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Magnesium | mg/L | ------ | 12.2 | ------ | 13 | 12.1 | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Manganese | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| **Supplemental** | Nickel | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nitrate as N | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphorus, Total Orthophosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Potassium | mg/L | ------ | 3.9 | ------ | 4.2 | 4.1 | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silica | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silicon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silver | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Sodium | mg/L | ------ | 33.2 | ------ | 35.9 | 38.9 | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Sulfide | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Total Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Zinc | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |

**NOTES:**
1. mg/L - milligrams per Liter; pCi/L - picocuries per Liter; S.U. - Standard
2. < indicates the substance was not detected above the analytical metho
3. J indicates the substance was detected at such low levels that the pre
4. Radium data are a combination of radium isotopes 226 and 228. Whe

| Analyte | | Units | DGWC-2 10/17/2019 | DGWC-2 3/3/2020 | DGWC-2 8/11/2020 | DGWC-2 9/23/2020 | DGWC-2 3/2/2021 | DGWC-2 9/9/2021 | DGWC-2 1/20/2022 | DGWC-2 9/20/2022 | DGWC-20 9/2/2016 | DGWC-20 12/7/2016 | DGWC-20 12/7/2016 | DGWC-20 3/29/2017 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Appendix III** | Boron | mg/L | 0.73 | 0.68 | ------ | 0.57 | 0.52 | 0.51 | 0.5 | 0.42 | 6.77 | 6.04 | 4.74 | 8.23 |
| | Calcium | mg/L | 47.2 | 48.4 | ------ | 44.4 | 44.0 | 42 | 44.6 | 37.8 | 96.3 | 91.9 | 0.977 | 95.7 |
| | Chloride | mg/L | 2.8 | 2.3 | ------ | 2.1 | 2.1 | 2.1 | 2 | 2.00 | 15 | 16 | 19 | 17 |
| | Fluoride | mg/L | 0.042 J | < 0.050 | < 0.050 | < 0.050 | < 0.050 | 0.053 J | < 0.050 | 0.076 J | 0.66 | 0.66 | 0.76 | 0.34 |
| | pH, field measured | S.U. | ------ | 5.94 | 6.04 | 5.99 | 6.01 | 6 | 5.93 | 5.98 | 4.7 | 4.68 | ------ | 4.7 |
| | Sulfate | mg/L | 134 | 118 | ------ | 122 | 112 | 110 | 101 | 98.4 | 580 | 650 | 580 | 640 |
| | Total Dissolved Solids | mg/L | 302 | 277 | ------ | 267 | 241 | 260 | 238 | 230 | 1100 | 930 | ------ | 923 |
| **Appendix IV** | Antimony | mg/L | < 0.00027 | < 0.00027 | < 0.00028 | < 0.00028 | < 0.00028 | < 0.00078 | < 0.00078 | < 0.00078 | < 0.00080 | < 0.00080 | < 0.00080 | < 0.00030 |
| | Arsenic | mg/L | < 0.00035 | 0.0025 J | < 0.00078 | < 0.00078 | < 0.00078 | < 0.0011 | 0.0023 J | < 0.0022 | 0.0159 | 0.0037 J | 0.0169 | 0.015 |
| | Barium | mg/L | 0.022 | 0.022 | 0.022 | 0.023 | 0.023 | 0.022 | 0.022 | 0.02 | 0.0097 J | 0.0087 J | 0.0111 | 0.0094 J |
| | Beryllium | mg/L | < 0.000074 | < 0.000074 | < 0.000046 | < 0.000046 | < 0.000046 | < 0.000054 | < 0.000054 | < 0.000054 | 0.0026 J | 0.0035 | 0.0035 | 0.0026 J |
| | Cadmium | mg/L | 0.00013 J | 0.00014 J | < 0.00012 | 0.00013 J | < 0.00012 | < 0.00011 | < 0.00011 | < 0.00011 | 0.0023 | 0.0023 | 0.0023 | 0.0021 |
| | Chromium | mg/L | 0.00046 J | < 0.00039 | 0.00067 J | < 0.00055 | 0.00064 J | < 0.0011 | < 0.0011 | < 0.0011 | 0.0017 J | < 0.00090 | 0.0019 J | 0.0016 J |
| | Cobalt | mg/L | 0.0084 | 0.0073 | 0.0064 | 0.0062 | 0.0055 | 0.0048 J | 0.004 J | 0.0028 J | 0.497 | 0.614 | 0.608 | 0.443 |
| | Fluoride | mg/L | 0.042 J | < 0.050 | < 0.050 | < 0.050 | < 0.050 | 0.053 J | < 0.050 | 0.076 J | 0.66 | 0.66 | 0.76 | 0.34 |
| | Lead | mg/L | 0.000086 J | < 0.000046 | 0.000064 J | 0.000094 J | 0.00014 J | < 0.00089 | < 0.00089 | < 0.00089 | < 0.00060 | < 0.00010 | < 0.00010 | < 0.00030 |
| | Lithium | mg/L | 0.029 J | 0.026 J | 0.028 J | 0.022 J | 0.023 J | 0.024 J | 0.024 J | 0.021 J | 0.0021 J | 0.005 J | 0.0053 J | 0.0021 J |
| | Mercury | mg/L | < 0.00014 | < 0.00014 | < 0.000078 | < 0.000078 | < 0.000078 | < 0.000078 | < 0.00013 | < 0.00013 | < 0.000041 | 0.00008 J | < 0.000040 | 0.00008 J |
| | Molybdenum | mg/L | 0.0018 J | 0.0022 J | 0.002 J | 0.0022 J | 0.0021 J | 0.0023 J | 0.0022 J | 0.0021 J | < 0.0017 | < 0.0017 | < 0.0017 | < 0.00060 |
| | Selenium | mg/L | 0.0051 J | 0.0047 J | 0.0053 J | 0.0046 J | 0.0037 J | 0.0031 J | 0.0031 J | 0.0018 J | 0.0671 | 0.0056 J | 0.0901 | 0.0521 |
| | Thallium | mg/L | < 0.000052 | < 0.000052 | < 0.00014 | < 0.00014 | < 0.00014 | < 0.00018 | < 0.00018 | < 0.00018 | < 0.0010 | 0.0006 J | 0.0006 J | 0.0006 J |
| | Radium | pCi/L | 1.74 | 1.23 | 1.37 | 1.96 U | 1.54 U | 1.22 U | 0.722 U | 0.450 U | 1.48 | 1.26 U | ------ | 0.373 U |
| | Radium-226 | pCi/L | 1.11 | 0.664 | 0.613 | 0.971 | 0.417 U | 0.4 U | 0.508 | ------ | 0.149 U | 0.359 U | ------ | ------ |
| | Radium-228 | pCi/L | 0.631 U | 0.565 U | 0.755 U | 0.988 U | 1.12 U | 0.815 U | 0.214 U | ------ | 1.33 | 0.905 U | ------ | ------ |
| **Field Measured** | Conductivity | uS/cm | ------ | ------ | 385.3 | 377 | 394.5 | 372.41 | 363.96 | ------ | 1171.6 | 1178.3 | ------ | 1166.4 |
| | Dissolved Oxygen | mg/L | ------ | ------ | 0.56 | 0.2 | 0.2 | 0.2 | 0.15 | ------ | 0.25 | 0.64 | ------ | 0.28 |
| | Oxidation Reduction Potential | millivolts | ------ | ------ | 110.2 | 44.7 | 168.6 | 109.3 | 156.9 | ------ | 116.5 | 149.32 | ------ | 358.1 |
| | Temperature | Deg C | ------ | ------ | 19.57 | 19.21 | 15.27 | 20.8 | 16.94 | ------ | 21.5 | 17.59 | ------ | 22.94 |
| | Turbidity | ntu | ------ | ------ | 3.67 | 2.44 | 3.7 | 4.19 | 4.26 | ------ | 4.9 | 1.56 | ------ | 1.97 |
| | Water level depth | ft | ------ | ------ | 31.12 | 30.9 | 30.61 | 30.15 | 29.75 | ------ | 19.92 | 20.89 | ------ | 21.1 |
| **Supplemental** | Alkalinity as CaCO3, Total | mg/L | ------ | ------ | ------ | ------ | 55.5 | ------ | 48.7 | 47.5 | ------ | ------ | ------ | ------ |
| | Alkalinity, Bicarbonate as CaCO3 | mg/L | 54 | ------ | ------ | ------ | 55.5 | ------ | 48.7 | 47.5 | ------ | ------ | ------ | ------ |
| | Alkalinity, Carbonate as CaCO3 | mg/L | < 20 | ------ | ------ | ------ | < 5.0 | ------ | < 1.8 | < 5.00 | ------ | ------ | ------ | ------ |
| | Aluminum | mg/L | 0.2 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 75.4 | ------ |
| | Dissolved Organic Carbon | mg/L | < 0.50 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Hardness | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 225 | ------ |
| | Iron, Total | mg/L | 0.4 | ------ | ------ | ------ | ------ | ------ | ------ | < 0.025 | ------ | ------ | ------ | ------ |
| | Iron, Ferric (Fe2) | mg/L | < 0.20 | ------ | ------ | ------ | ------ | ------ | ------ | < 0.025 | ------ | ------ | ------ | ------ |
| | Iron, Ferrous | mg/L | < 0.20 | ------ | ------ | ------ | ------ | ------ | ------ | 0.0 | ------ | ------ | ------ | ------ |
| | Magnesium | mg/L | 10.4 | ------ | ------ | ------ | 9.5 | ------ | 9.2 | 7.6 | ------ | ------ | 53.9 | ------ |
| | Manganese | mg/L | 1.4 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 23.2 | ------ |
| | Nickel | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nitrate as N | mg/L | 0.095 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphorus, Total Orthophosphate | mg/L | < 0.020 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Potassium | mg/L | 6.1 | ------ | ------ | ------ | 6.1 | ------ | 6 | 5.1 | ------ | ------ | 8.78 | ------ |
| | Silica | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 13.1 | ------ |
| | Silicon | mg/L | 14.8 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 6.14 | ------ |
| | Silver | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Sodium | mg/L | 11 | ------ | ------ | ------ | 10.5 | ------ | 10.4 | 9.5 | ------ | ------ | 39.9 | ------ |
| | Sulfide | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Total Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Zinc | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |

**NOTES:**
1. mg/L - milligrams per Liter; pCi/L - picocuries per Liter; S.U. - Standard
2. < indicates the substance was not detected above the analytical meth
3. J indicates the substance was detected at such low levels that the pre
4. Radium data are a combination of radium isotopes 226 and 228. Whe

| | Analyte | Units | DGWC-20 7/12/2017 | DGWC-20 10/25/2017 | DGWC-20 2/28/2018 | DGWC-20 7/11/2018 | DGWC-20 11/7/2018 | DGWC-20 3/13/2019 | DGWC-20 8/29/2019 | DGWC-20 10/17/2019 | DGWC-20 3/4/2020 | DGWC-20 8/13/2020 | DGWC-20 9/22/2020 | DGWC-20 3/2/2021 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Appendix III** | Boron | mg/L | 6.81 | 8.94 | 6.3 | 5.7 | 5 | 5.6 | ------ | 5 | 3.6 | ------ | 4.9 | 3.4 |
| | Calcium | mg/L | 100 | 97.3 | 86.3 | 92.4 | 85.9 | 86.4 | ------ | 86.9 | 103 | ------ | 79.2 | 74.7 |
| | Chloride | mg/L | 18 | 20 | 18.6 | 20.4 | 21.5 | 24.8 | ------ | 24.9 | 27.8 | ------ | 25.8 | 28.0 |
| | Fluoride | mg/L | 0.41 | 0.68 | 0.76 | 1.3 | 0.099 J | 0.45 | 0.78 | 0.26 J | 1.5 | 0.9 | 0.15 | 1.4 |
| | pH, field measured | S.U. | 4.67 | 4.71 | 4.51 | ------ | ------ | ------ | ------ | ------ | 4.22 | 4.36 | 4.66 | 4.45 |
| | Sulfate | mg/L | 630 | 610 | 584 | 501 | 554 | 539 | ------ | 426 | 434 | ------ | 408 | 458 |
| | Total Dissolved Solids | mg/L | 956 | 854 | 888 | 826 | 834 | 639 | ------ | 751 | 761 | ------ | 724 | 742 |
| **Appendix IV** | Antimony | mg/L | < 0.00060 | < 0.00060 | < 0.00078 | < 0.00078 | < 0.00078 | ------ | < 0.00027 | < 0.00027 | < 0.00027 | < 0.00028 | < 0.00028 | < 0.00028 |
| | Arsenic | mg/L | 0.0121 | 0.0135 | 0.018 | 0.0055 | 0.0054 | ------ | 0.0064 | 0.0094 | 0.029 | 0.014 | 0.0063 | 0.019 |
| | Barium | mg/L | 0.0099 J | 0.0096 J | 0.0094 J | 0.01 | 0.011 | ------ | 0.018 | 0.015 | 0.017 | 0.019 | 0.011 | 0.021 |
| | Beryllium | mg/L | 0.0025 J | 0.0027 J | 0.0025 J | 0.0026 J | 0.0024 J | ------ | 0.005 | 0.0041 | 0.0089 | 0.0063 | 0.0027 J | 0.0057 |
| | Cadmium | mg/L | 0.0021 | 0.002 | 0.0018 | 0.0018 | 0.0018 | ------ | 0.002 J | 0.0017 J | 0.0026 | 0.0021 J | 0.0014 J | 0.0025 |
| | Chromium | mg/L | < 0.0023 | 0.0015 J | < 0.0016 | < 0.0016 | 0.0032 J | ------ | 0.0017 J | 0.0015 J | 0.0032 J | 0.0023 J | 0.0013 J | 0.0022 J |
| | Cobalt | mg/L | 0.538 | 0.432 | 0.46 | 0.47 | 0.42 | ------ | 0.66 | 0.57 | 0.84 | 0.73 | 0.47 | 0.77 |
| | Fluoride | mg/L | 0.41 | 0.68 | 0.76 | 1.3 | 0.099 J | 0.45 | 0.78 | 0.26 J | 1.5 | 0.9 | 0.15 | 1.4 |
| | Lead | mg/L | < 0.00030 | < 0.00030 | < 0.0014 | < 0.0014 | < 0.00027 | ------ | 0.00015 J | 0.000097 J | 0.00068 J | 0.00044 J | 0.00013 J | 0.00047 J |
| | Lithium | mg/L | 0.0019 J | 0.0022 J | 0.0019 J | 0.0022 J | 0.0019 J | ------ | 0.0093 J | 0.0075 J | 0.019 J | 0.012 J | 0.0026 J | 0.011 J |
| | Mercury | mg/L | < 0.000041 | < 0.000036 | < 0.000036 | < 0.000036 | 0.000038 J | ------ | < 0.00014 | < 0.00014 | < 0.00014 | < 0.000078 | < 0.000078 | 0.000090 J |
| | Molybdenum | mg/L | < 0.0010 | < 0.0010 | < 0.0019 | < 0.0019 | < 0.0019 | ------ | < 0.00095 | < 0.00095 | < 0.00095 | < 0.00069 | < 0.00069 | < 0.00069 |
| | Selenium | mg/L | 0.0483 | 0.0506 | 0.076 | 0.022 | 0.044 | ------ | 0.029 | 0.071 | 0.071 | 0.091 | 0.023 | 0.078 |
| | Thallium | mg/L | 0.0006 J | 0.0005 J | < 0.00071 | < 0.00071 | < 0.00053 J | ------ | 0.00084 J | 0.00062 J | 0.0023 J | 0.0016 J | 0.00055 J | 0.0014 J |
| | Radium | pCi/L | 0.91 U | 0.853 U | 0.727 U | 1.3 | 0.746 U | ------ | 0.996 U | 2 | 1.67 | 1.77 | 1.61 U | 1.76 |
| | Radium-226 | pCi/L | 0.345 | 0.382 | 0.298 U | 0.31 U | 0.451 | ------ | 0.666 | 0.395 U | 0.763 | 0.379 U | 0.6 | 0.281 U |
| | Radium-228 | pCi/L | 0.565 U | 0.471 U | 0.429 U | 0.992 | 0.295 U | ------ | 0.33 U | 1.6 | 0.908 | 1.39 | 1.01 U | 1.48 |
| **Field Measured** | Conductivity | uS/cm | 1138.8 | 1086.48 | 1090.86 | ------ | ------ | ------ | ------ | ------ | ------ | 966.7 | 926.17 | 982.62 |
| | Dissolved Oxygen | mg/L | 0.17 | 0.17 | 0.23 | ------ | ------ | ------ | ------ | ------ | ------ | 0.15 | 0.24 | 0.65 |
| | Oxidation Reduction Potential | millivolts | 75.1 | 110.8 | 154.3 | ------ | ------ | ------ | ------ | ------ | ------ | 278.1 | 113.29 | 402.9 |
| | Temperature | Deg C | 24.4 | 19.96 | 18.25 | ------ | ------ | ------ | ------ | ------ | ------ | 21.38 | 19.65 | 17.85 |
| | Turbidity | ntu | 2.55 | 0.86 | 0.16 | ------ | ------ | ------ | ------ | ------ | ------ | 3.6 | 0.41 | 2.3 |
| | Water level depth | ft | 20.94 | 21.55 | 21 | ------ | ------ | ------ | ------ | ------ | ------ | 26.12 | 23.83 | 22.63 |
| **Supplemental** | Alkalinity as CaCO3, Total | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 5.0 |
| | Alkalinity, Bicarbonate as CaCO3 | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 1.0 | ------ | ------ | ------ | < 5.0 |
| | Alkalinity, Carbonate as CaCO3 | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 1.0 | ------ | ------ | ------ | < 5.0 |
| | Aluminum | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 0.79 | ------ | ------ | ------ | ------ |
| | Dissolved Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 0.50 | ------ | ------ | ------ | ------ |
| | Hardness | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Total | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 0.1 | ------ | ------ | ------ | ------ |
| | Iron, Ferric (Fe2) | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 0.55 | ------ | ------ | ------ | ------ |
| | Iron, Ferrous | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 0.20 | ------ | ------ | ------ | ------ |
| | Magnesium | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 42 | ------ | ------ | ------ | 22.3 |
| | Manganese | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 20.6 | ------ | ------ | ------ | ------ |
| | Nickel | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nitrate as N | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 0.042 J | ------ | ------ | ------ | ------ |
| | Phosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphorus, Total Orthophosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 0.020 | ------ | ------ | ------ | ------ |
| | Potassium | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 8.5 | ------ | ------ | ------ | 9.6 |
| | Silica | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silicon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 7.3 | ------ | ------ | ------ | ------ |
| | Silver | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Sodium | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 25.2 | ------ | ------ | ------ | 17.9 |
| | Sulfide | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Total Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Zinc | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |

**NOTES:**
1. mg/L - milligrams per Liter; pCi/L - picocuries per Liter; S.U. - Standard
2. < indicates the substance was not detected above the analytical meth
3. J indicates the substance was detected at such low levels that the pre
4. Radium data are a combination of radium isotopes 226 and 228. Whe

| | Analyte | Units | DGWC-20<br>9/10/2021 | DGWC-20<br>1/21/2022 | DGWC-20<br>9/15/2022 | DGWC-21<br>9/2/2016 | DGWC-21<br>12/8/2016 | DGWC-21<br>12/8/2016 | DGWC-21<br>3/30/2017 | DGWC-21<br>7/12/2017 | DGWC-21<br>10/25/2017 | DGWC-21<br>2/28/2018 | DGWC-21<br>7/11/2018 | DGWC-21<br>11/7/2018 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Appendix III** | Boron | mg/L | 4.8 | 3.6 | 4.20 | 4.81 | 3.57 | 3.79 | 5.68 | 5.2 | 7.92 | 5.9 | 8.3 | 4.9 |
| | Calcium | mg/L | 69.8 | 104 | 70.1 | 70.2 | 70.1 | 69.8 | 72.5 | 80.4 | 75.6 | 73.2 | 82.3 | 78.5 |
| | Chloride | mg/L | 26.2 | 27 | 26.20 | 25 | 24 | 25 B | 24 | 23 | 23 | 19.9 | 20.9 | 20.5 |
| | Fluoride | mg/L | 0.25 | 1.3 | 0.69 | 0.07 J | 0.14 J | 0.15 J | < 0.0040 | 0.04 J | 0.34 | < 0.029 | < 0.029 | < 0.029 |
| | pH, field measured | S.U. | 4.67 | 4.47 | 4.58 | ------ | 5.64 | ------ | 5.79 | 5.71 | 5.68 | 5.71 | ------ | ------ |
| | Sulfate | mg/L | 399 | 406 | 462 | 300 | 280 | 280 B | 270 | 290 | 290 | 267 | 277 | 286 |
| | Total Dissolved Solids | mg/L | 678 | 702 | 618 | 459 | 491 | ------ | 436 | 505 | 474 | 480 | 485 | 516 |
| **Appendix IV** | Antimony | mg/L | < 0.00078 | < 0.00078 | < 0.00078 | < 0.00080 | < 0.00080 | < 0.00080 | < 0.00030 | < 0.00060 | < 0.00060 | < 0.00078 | 0.0013 J | < 0.00078 |
| | Arsenic | mg/L | 0.0083 | 0.015 | 0.016 | < 0.0016 | < 0.0016 | < 0.0016 | < 0.00040 | < 0.00050 | < 0.00050 | < 0.00057 | < 0.00057 | < 0.00057 |
| | Barium | mg/L | 0.0098 | 0.018 | 0.017 | 0.0252 | 0.0262 | 0.0259 | 0.0272 | 0.0276 | 0.0262 | 0.027 | 0.027 | 0.024 |
| | Beryllium | mg/L | 0.0024 | 0.007 | 0.0056 | 0.0001 J | 0.0001 J | 0.0001 J | 0.0002 J | 0.0001 J | 0.0002 J | 0.00016 J | 0.00016 J | < 0.00018 J |
| | Cadmium | mg/L | 0.0012 | 0.0028 | 0.0021 | 0.0006 J | 0.0006 J | 0.0005 J | 0.0008 J | 0.0006 J | 0.0005 J | 0.00054 J | 0.00054 J | < 0.00048 J |
| | Chromium | mg/L | < 0.0011 | 0.0021 J | 0.0014 J | < 0.00090 | < 0.00090 | < 0.00090 | 0.0005 J | 0.0006 J | < 0.00050 | < 0.0016 | < 0.0016 | < 0.0016 |
| | Cobalt | mg/L | 0.45 | 0.95 | 0.75 | 0.0085 J | 0.0095 J | 0.009 J | 0.0076 J | 0.0092 J | 0.0092 J | < 0.0094 J | 0.0097 J | 0.0096 J |
| | Fluoride | mg/L | 0.25 | 1.3 | 0.69 | 0.07 J | 0.14 J | 0.15 J | < 0.0040 | 0.04 J | 0.34 | < 0.029 | < 0.029 | < 0.029 |
| | Lead | mg/L | < 0.00089 | < 0.0089 | < 0.0044 | 0.0002 J | < 0.00010 | < 0.00010 | 0.0004 J | 0.0001 J | < 0.000070 | 0.00047 J | < 0.00027 | < 0.00027 |
| | Lithium | mg/L | 0.0023 J | 0.012 J | 0.0096 J | 0.0057 J | 0.0054 J | 0.0059 J | 0.0065 J | 0.0057 J | 0.006 J | 0.0061 J | 0.0057 J | 0.0059 J |
| | Mercury | mg/L | < 0.000078 | < 0.00013 | < 0.00013 | 0.00006 J | < 0.000041 | < 0.000040 | 0.00008 J | 0.00006 J | 0.00005 J | < 0.000036 | < 0.000036 | 0.000051 J |
| | Molybdenum | mg/L | < 0.00074 | < 0.00074 | < 0.00074 | < 0.0017 | < 0.0017 | < 0.0017 | < 0.00060 | < 0.0010 | < 0.0010 | < 0.0019 | < 0.0019 | < 0.0019 |
| | Selenium | mg/L | 0.031 | 0.041 | 0.062 | < 0.0010 | < 0.0010 | < 0.0010 | < 0.0014 | < 0.0018 | < 0.0018 | < 0.0014 | < 0.0014 | < 0.0014 |
| | Thallium | mg/L | 0.00052 J | < 0.0018 | 0.0010 J | < 0.00020 | < 0.00020 | < 0.00020 | < 0.000050 | < 0.000050 | < 0.000050 | < 0.00014 | < 0.00014 | < 0.00014 |
| | Radium | pCi/L | 0.689 U | 0.826 U | 1.38 | 0.908 U | 1.03 U | ------ | 0.884 U | 1.22 | 1.07 U | 1.45 | 1.59 | 1.16 |
| | Radium-226 | pCi/L | 0.067 U | 0.355 U | ------ | 0.177 U | 0.161 U | ------ | ------ | 0.195 U | 0.347 U | 0.266 U | 0.305 | 0.29 |
| | Radium-228 | pCi/L | 0.622 U | 0.471 U | ------ | 0.731 | 0.864 U | ------ | ------ | 1.02 | 0.72 U | 1.18 | 1.28 | 0.865 |
| **Field Measured** | Conductivity | uS/cm | 892.33 | 964.43 | ------ | ------ | 679.89 | ------ | 631.75 | 679.7 | 651.92 | 682.6 | ------ | ------ |
| | Dissolved Oxygen | mg/L | 0.13 | 0.18 | ------ | ------ | 0.28 | ------ | 1.68 | 0.24 | 0.2 | 0.29 | ------ | ------ |
| | Oxidation Reduction Potential | millivolts | 156.3 | 250 | ------ | ------ | 99.84 | ------ | 126.81 | 107.9 | 109.47 | 63.9 | ------ | ------ |
| | Temperature | Deg C | 21.75 | 17.01 | ------ | ------ | 15.42 | ------ | 20.65 | 24.61 | 20.57 | 18.29 | ------ | ------ |
| | Turbidity | ntu | 2.4 | 2.04 | ------ | ------ | 0.43 | ------ | 0.03 | 0.43 | 0.42 | 0.52 | ------ | ------ |
| | Water level depth | ft | 23.22 | 24.15 | ------ | ------ | 14.95 | ------ | 15.58 | 16.15 | 16.8 | 16.5 | ------ | ------ |
| **Supplemental** | Alkalinity as CaCO3, Total | mg/L | ------ | < 1.8 | < 5.00 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Alkalinity, Bicarbonate as CaCO3 | mg/L | ------ | < 1.8 | < 5.00 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Alkalinity, Carbonate as CaCO3 | mg/L | ------ | < 1.8 | < 5.00 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Aluminum | mg/L | ------ | ------ | ------ | ------ | ------ | < 0.0128 | ------ | ------ | ------ | ------ | ------ | ------ |
| | Dissolved Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Hardness | mg/L | ------ | ------ | ------ | ------ | ------ | 247 | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Total | mg/L | ------ | ------ | 0.034 J | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Ferric (Fe2) | mg/L | ------ | ------ | < 0.025 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Ferrous | mg/L | ------ | ------ | 0.5 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Magnesium | mg/L | ------ | 27.3 | 25.4 | ------ | ------ | 17.7 | ------ | ------ | ------ | ------ | ------ | ------ |
| | Manganese | mg/L | ------ | ------ | ------ | ------ | ------ | 1.69 | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nickel | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nitrate as N | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphorus, Total Orthophosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Potassium | mg/L | ------ | 12.8 | 7.7 | ------ | ------ | 6.6 | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silica | mg/L | ------ | ------ | ------ | ------ | ------ | 18.8 | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silicon | mg/L | ------ | ------ | ------ | ------ | ------ | 8.76 | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silver | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Sodium | mg/L | ------ | 20.6 | 17.3 | ------ | ------ | 30.4 | ------ | ------ | ------ | ------ | ------ | ------ |
| | Sulfide | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Total Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Zinc | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |

**NOTES:**
1. mg/L - milligrams per Liter; pCi/L - picocuries per Liter; S.U. - Standar
2. < indicates the substance was not detected above the analytical meth
3. J indicates the substance was detected at such low levels that the pre
4. Radium data are a combination of radium isotopes 226 and 228. Whe

| | Analyte | Units | DGWC-21 3/13/2019 | DGWC-21 8/29/2019 | DGWC-21 10/17/2019 | DGWC-21 3/3/2020 | DGWC-21 8/14/2020 | DGWC-21 9/24/2020 | DGWC-21 3/3/2021 | DGWC-21 9/9/2021 | DGWC-21 1/20/2022 | DGWC-21 9/15/2022 | DGWC-22 9/2/2016 | DGWC-22 12/8/2016 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Appendix III** | Boron | mg/L | 6.2 | ------ | 7 | 6.8 | ------ | 6.1 | 5.3 | 5.8 | 6.9 | 6.70 | 3.99 | 3.1 |
| | Calcium | mg/L | 79.9 | ------ | 79.8 | 87.4 | ------ | 80 | 82.1 | 75.3 | 83.7 | 82.2 | 61.6 | 60.1 |
| | Chloride | mg/L | 21.3 | ------ | 20.1 | 19.7 | ------ | 20 | 19.7 | 20.2 | 18.6 | 17.60 | 30 | 26 |
| | Fluoride | mg/L | 0.043 J | 0.079 J | < 0.029 | < 0.050 | < 0.050 | < 0.050 | < 0.050 | < 0.050 | < 0.050 | 0.087 J | 0.3 | 0.12 J |
| | pH, field measured | S.U. | ------ | ------ | ------ | 5.65 | 5.66 | 5.64 | 5.63 | 5.73 | 5.73 | 5.69 | 5.74 | 6.03 |
| | Sulfate | mg/L | 312 | ------ | 255 | 269 | ------ | 269 | 264 | 238 | 223 | 268 | 140 | 260 |
| | Total Dissolved Solids | mg/L | 486 | ------ | 498 | 490 | ------ | 494 | 459 | 396 | 451 | 440 | 502 | 464 |
| **Appendix IV** | Antimony | mg/L | ------ | < 0.00027 | < 0.00027 | < 0.00027 | < 0.00028 | < 0.00028 | < 0.00028 | < 0.00078 | < 0.00078 | < 0.00078 | < 0.00080 | < 0.00080 |
| | Arsenic | mg/L | ------ | < 0.00035 | < 0.00035 | < 0.00035 | < 0.00078 | < 0.00078 | < 0.00078 | < 0.0011 | < 0.0011 | < 0.0022 | < 0.0016 | < 0.0016 |
| | Barium | mg/L | ------ | 0.027 | 0.027 | 0.027 | 0.027 | 0.024 | 0.024 | 0.023 | 0.024 | 0.024 | 0.0397 | 0.0408 |
| | Beryllium | mg/L | ------ | 0.00018 J | 0.00015 J | 0.00019 J | 0.0002 J | 0.00018 J | 0.00017 J | 0.00018 J | 0.00019 J | 0.00018 J | 0.0002 J | 0.0001 J |
| | Cadmium | mg/L | ------ | 0.00087 J | 0.0006 J | 0.00063 J | 0.00054 J | 0.00073 J | 0.00044 J | 0.00012 J | < 0.00011 | 0.00029 J | 0.0003 J | 0.0004 J |
| | Chromium | mg/L | ------ | 0.00041 J | < 0.00039 | 0.00048 J | < 0.00055 | 0.00096 J | 0.0020 J | < 0.0011 | < 0.0011 | < 0.0011 | 0.0012 J | < 0.00090 |
| | Cobalt | mg/L | ------ | 0.01 | 0.01 | 0.01 | 0.0098 | 0.01 | 0.0087 | 0.0096 | 0.0076 | 0.0081 | 0.0102 | 0.0079 J |
| | Fluoride | mg/L | 0.043 J | 0.079 J | < 0.029 | < 0.050 | < 0.050 | < 0.050 | < 0.050 | < 0.050 | < 0.050 | 0.087 J | 0.3 | 0.12 J |
| | Lead | mg/L | ------ | 0.00023 J | 0.000046 J | 0.00015 J | < 0.000036 | 0.00014 J | < 0.000036 | < 0.00089 | < 0.00089 | < 0.00089 | < 0.00010 | < 0.00010 |
| | Lithium | mg/L | ------ | 0.0061 J | 0.0063 J | 0.0065 J | 0.0058 J | 0.0062 J | 0.0054 J | 0.006 J | 0.0058 J | 0.0069 J | 0.0046 J | 0.0047 J |
| | Mercury | mg/L | ------ | < 0.00014 | < 0.00014 | < 0.00014 | < 0.000078 | 0.00012 J | < 0.000078 | < 0.000078 | < 0.00013 | < 0.00013 | 0.00005 J | < 0.000041 |
| | Molybdenum | mg/L | ------ | < 0.00095 | < 0.00095 | < 0.00095 | < 0.00069 | < 0.00069 | < 0.00069 | < 0.00074 | < 0.00074 | < 0.00074 | < 0.0017 | < 0.0017 |
| | Selenium | mg/L | ------ | < 0.0013 | < 0.0013 | < 0.0013 | < 0.0016 | < 0.0016 | < 0.0016 | < 0.0014 | < 0.0014 | < 0.0014 | < 0.0010 | < 0.0010 |
| | Thallium | mg/L | ------ | < 0.000052 | < 0.000052 | < 0.000052 | < 0.00014 | < 0.00014 | < 0.00014 | < 0.00018 | < 0.00018 | < 0.00018 | < 0.00020 | < 0.00020 |
| | Radium | pCi/L | ------ | 0.582 U | 0.427 U | 0.567 U | 0.602 U | 0.396 U | 0.248 U | 0.702 U | 0.337 U | 0.771 U | 1.54 | 0.505 U |
| | Radium-226 | pCi/L | ------ | 0.582 | 0.287 U | 0.567 | 0.118 U | 0.264 U | -0.018 U | 0.148 U | 0.107 U | ------ | 0.227 | 0.0754 U |
| | Radium-228 | pCi/L | ------ | -0.0351 U | 0.14 U | -0.0636 U | 0.484 U | 0.132 U | 0.248 U | 0.554 U | 0.23 U | ------ | 1.31 | 0.43 U |
| **Field Measured** | Conductivity | uS/cm | ------ | ------ | ------ | ------ | 688 | 672.7 | 671 | 634.11 | vvv | ------ | 661.25 | 615.98 |
| | Dissolved Oxygen | mg/L | ------ | ------ | ------ | ------ | 0.32 | 0.19 | 0.22 | 0.15 | 0.27 | ------ | 0.24 | 0.18 |
| | Oxidation Reduction Potential | millivolts | ------ | ------ | ------ | ------ | 92.9 | 78.5 | 252.3 | 9 | 112.8 | ------ | 96.5 | 74.8 |
| | Temperature | Deg C | ------ | ------ | ------ | ------ | 21.31 | 19.23 | 19.64 | 21.53 | 14.3 | ------ | 22.97 | 16.22 |
| | Turbidity | ntu | ------ | ------ | ------ | ------ | 0.66 | 0.1 | 0.54 | 1.21 | 0.36 | ------ | 2.68 | 1.01 |
| | Water level depth | ft | ------ | ------ | ------ | ------ | 19.55 | 17.61 | 15.75 | 15.8 | 17.06 | ------ | 11.62 | 13.12 |
| **Supplemental** | Alkalinity as CaCO3, Total | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | 29.0 | ------ | 29.9 | 31.6 | ------ | ------ |
| | Alkalinity, Bicarbonate as CaCO3 | mg/L | ------ | ------ | 28 | ------ | ------ | ------ | 29.0 | ------ | 29.9 | 31.6 | ------ | ------ |
| | Alkalinity, Carbonate as CaCO3 | mg/L | ------ | ------ | < 20 | ------ | ------ | ------ | < 5.0 | ------ | < 1.8 | < 5.00 | ------ | ------ |
| | Aluminum | mg/L | ------ | ------ | < 0.032 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Dissolved Organic Carbon | mg/L | ------ | ------ | < 0.50 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Hardness | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Total | mg/L | ------ | ------ | < 0.015 | ------ | ------ | ------ | ------ | ------ | ------ | < 0.025 | ------ | ------ |
| | Iron, Ferric (Fe2) | mg/L | ------ | ------ | 0.69 | ------ | ------ | ------ | ------ | ------ | ------ | < 0.025 | ------ | ------ |
| | Iron, Ferrous | mg/L | ------ | ------ | < 0.20 | ------ | ------ | ------ | ------ | ------ | ------ | 0.0 | ------ | ------ |
| | Magnesium | mg/L | ------ | ------ | 16.2 | ------ | ------ | ------ | 16.3 | ------ | 17.1 | 17.5 | ------ | ------ |
| | Manganese | mg/L | ------ | ------ | 1.7 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nickel | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nitrate as N | mg/L | ------ | ------ | < 0.0050 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphorus, Total Orthophosphate | mg/L | ------ | ------ | < 0.020 | ------ | ------ | ------ | | ------ | | | ------ | ------ |
| | Potassium | mg/L | ------ | ------ | 6.5 | ------ | ------ | ------ | 6.8 | ------ | 6.8 | 6.6 | ------ | ------ |
| | Silica | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silicon | mg/L | ------ | ------ | 8.9 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silver | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Sodium | mg/L | ------ | ------ | 22.1 | ------ | ------ | ------ | 23.6 | ------ | 23 | 22.4 | ------ | ------ |
| | Sulfide | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Total Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Zinc | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |

**NOTES:**
1. mg/L - milligrams per Liter; pCi/L - picocuries per Liter; S.U. - Standarc
2. < indicates the substance was not detected above the analytical metho
3. J indicates the substance was detected at such low levels that the pre
4. Radium data are a combination of radium isotopes 226 and 228. Whe

**APPENDIX A**
**ANALYTICAL RESULTS (2016 - 2022)**
Plant McDonough-Atkinson Ash Pond 1 and Ash Pond 2 and 3/4
Atlanta, Georgia

| | Analyte | Units | DGWC-22 12/8/2016 | DGWC-22 3/29/2017 | DGWC-22 10/25/2017 | DGWC-22 2/28/2018 | DGWC-22 7/12/2018 | DGWC-22 11/7/2018 | DGWC-22 3/14/2019 | DGWC-22 8/29/2019 | DGWC-22 10/18/2019 | DGWC-22 3/3/2020 | DGWC-22 8/14/2020 | DGWC-22 9/24/2020 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Boron | mg/L | 3.23 | 4.85 | 3.9 | 5.1 | 3.6 | 3.3 | 4.1 | ------ | 4.2 | 4.6 | ------ | 4.1 |
| | Calcium | mg/L | 64.1 | 64.7 | 66.8 | 62.3 | 71 | 60.9 | 64.8 | ------ | 61.7 | 68.7 | ------ | 62.6 |
| | Chloride | mg/L | 28 B | 30 | 29 | 23.4 | 26.1 | 25.8 | 26.3 | ------ | 23.4 | 21.8 | ------ | 21.5 |
| **Appendix III** | Fluoride | mg/L | 0.14 J | 0.11 J | 0.25 J | < 0.029 | 0.13 J | < 0.029 | 0.042 J | 0.054 J | < 0.029 | < 0.050 | < 0.050 | < 0.050 |
| | pH, field measured | S.U. | ------ | 5.77 | 5.77 | 5.77 | ------ | ------ | ------ | ------ | ------ | 5.74 | 5.76 | 5.69 |
| | Sulfate | mg/L | 280 B | 290 | 290 | 278 | 197 | 320 | 297 | ------ | 254 | 242 | ------ | 262 |
| | Total Dissolved Solids | mg/L | ------ | 462 | 477 | 476 | 486 | 511 | 491 | ------ | 480 | 452 | ------ | 455 |
| | Antimony | mg/L | < 0.00080 | < 0.00030 | < 0.00060 | < 0.00078 | < 0.00078 | < 0.00078 | ------ | < 0.00027 | < 0.00027 | < 0.00027 | < 0.00028 | < 0.00028 |
| | Arsenic | mg/L | < 0.0016 | < 0.00040 | < 0.00050 | < 0.0010 J | < 0.00057 | < 0.00057 | ------ | < 0.00035 | < 0.00035 | < 0.00035 | < 0.00078 | < 0.00078 |
| | Barium | mg/L | 0.0415 | 0.0417 | 0.0384 | 0.035 | 0.036 | 0.031 | ------ | 0.031 | 0.032 | 0.035 | 0.035 | 0.031 |
| | Beryllium | mg/L | 0.0001 J | 0.0002 J | 0.0002 J | 0.00019 J | 0.00018 J | < 0.00017 J | ------ | 0.00015 J | 0.00014 J | 0.00017 J | 0.00016 J | 0.00017 J |
| | Cadmium | mg/L | 0.0004 J | 0.0004 J | 0.0007 J | 0.00086 J | < 0.00091 J | < 0.00064 J | ------ | 0.00053 J | 0.00056 J | 0.00061 J | 0.00057 J | 0.00058 J |
| | Chromium | mg/L | < 0.00090 | < 0.00030 | < 0.00050 | < 0.0016 | < 0.0016 | < 0.0016 | ------ | < 0.00039 | < 0.00039 | < 0.00039 | < 0.00055 | < 0.00055 |
| | Cobalt | mg/L | 0.0075 J | 0.0097 J | 0.0094 J | < 0.0098 J | 0.011 | 0.0088 J | ------ | 0.0094 J | 0.0084 | 0.0098 | 0.0087 | 0.01 |
| | Fluoride | mg/L | 0.14 J | 0.11 J | 0.25 J | < 0.029 | 0.13 J | < 0.029 | 0.042 J | 0.054 J | < 0.029 | < 0.050 | < 0.050 | < 0.050 |
| **Appendix IV** | Lead | mg/L | < 0.00010 | < 0.000070 | < 0.000070 | < 0.00027 | < 0.00027 | < 0.00027 | ------ | < 0.000046 | < 0.000046 | < 0.000046 | < 0.000036 | < 0.000036 |
| | Lithium | mg/L | 0.0049 J | 0.0043 J | 0.0042 J | 0.0043 J | 0.0036 J | 0.004 J | ------ | 0.0035 J | 0.0041 J | 0.0046 J | 0.0039 J | 0.0037 J |
| | Mercury | mg/L | < 0.000040 | 0.0001 J | < 0.000036 | < 0.000036 | 0.000055 J | < 0.000036 | ------ | < 0.00014 | < 0.00014 | < 0.00014 | < 0.000078 | < 0.000078 |
| | Molybdenum | mg/L | < 0.0017 | < 0.00060 | < 0.0010 | < 0.0019 | < 0.0019 | < 0.0019 | ------ | < 0.00095 | < 0.00095 | < 0.00095 | < 0.00069 | < 0.00069 |
| | Selenium | mg/L | < 0.0010 | < 0.0014 | < 0.0018 | < 0.0014 | 0.0017 J | < 0.0014 | ------ | < 0.0013 | < 0.0013 | < 0.0013 | < 0.0016 | < 0.0016 |
| | Thallium | mg/L | < 0.00020 | 0.00006 J | 0.00007 J | < 0.00014 | < 0.00014 | < 0.00014 | ------ | 0.000064 J | < 0.000052 | 0.00007 J | < 0.00014 | < 0.00014 |
| | Radium | pCi/L | ------ | 0.715 U | 1.6 | 0.918 U | 0.981 U | 0.832 U | ------ | 1.87 | 1.1 U | 0.517 U | 1.83 | 1.02 U |
| | Radium-226 | pCi/L | ------ | ------ | 0.557 | 0.522 | 0.374 | 0.395 | ------ | 0.48 | 0.693 | 0.388 | 0.2 U | 0.311 U |
| | Radium-228 | pCi/L | ------ | ------ | 1.04 | 0.396 U | 0.607 U | 0.437 U | ------ | 1.39 | 0.404 U | 0.129 U | 1.63 | 0.709 U |
| | Conductivity | uS/cm | ------ | 682.32 | 678 | 696.2 | ------ | ------ | ------ | ------ | ------ | ------ | 640.8 | 648.8 |
| | Dissolved Oxygen | mg/L | ------ | 0.28 | 0.2 | 0.25 | ------ | ------ | ------ | ------ | ------ | ------ | 0.27 | 0.44 |
| **Field** | Oxidation Reduction Potential | millivolts | ------ | -0.75 | 109.94 | 81.5 | ------ | ------ | ------ | ------ | ------ | ------ | 129.7 | 85.8 |
| **Measured** | Temperature | Deg C | ------ | 25.3 | 20.32 | 18.25 | ------ | ------ | ------ | ------ | ------ | ------ | 20.53 | 19.43 |
| | Turbidity | ntu | ------ | 0.55 | 0.49 | 0.68 | ------ | ------ | ------ | ------ | ------ | ------ | 0.22 | 0.16 |
| | Water level depth | ft | ------ | 13.81 | 16.85 | 15.81 | ------ | ------ | ------ | ------ | ------ | ------ | 21.18 | 20.41 |
| | Alkalinity as CaCO3, Total | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Alkalinity, Bicarbonate as CaCO3 | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 17 | ------ | ------ | ------ |
| | Alkalinity, Carbonate as CaCO3 | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 1.0 | ------ | ------ | ------ |
| | Aluminum | mg/L | < 0.0128 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 0.032 | ------ | ------ | ------ |
| | Dissolved Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 0.50 | ------ | ------ | ------ |
| | Hardness | mg/L | 259 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Total | mg/L | ------ | 0.0345 J | ------ | ------ | ------ | ------ | ------ | ------ | < 0.015 | ------ | ------ | ------ |
| | Iron, Ferric (Fe2) | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 0.20 | ------ | ------ | ------ |
| | Iron, Ferrous | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 0.20 | ------ | ------ | ------ |
| | Magnesium | mg/L | 24 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 22.6 | ------ | ------ | ------ |
| | Manganese | mg/L | 1.13 | 1.39 | ------ | ------ | ------ | ------ | ------ | ------ | 1.2 | ------ | ------ | ------ |
| **Supplemental** | Nickel | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nitrate as N | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 0.059 | ------ | ------ | ------ |
| | Phosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphorus, Total Orthophosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 0.020 | ------ | ------ | ------ |
| | Potassium | mg/L | 6.63 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 6.5 | ------ | ------ | ------ |
| | Silica | mg/L | 24.8 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silicon | mg/L | 11.6 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 11.5 | ------ | ------ | ------ |
| | Silver | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Sodium | mg/L | 26.4 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 26.7 | ------ | ------ | ------ |
| | Sulfide | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Total Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Zinc | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |

**NOTES:**
1. mg/L - milligrams per Liter; pCi/L - picocuries per Liter; S.U. - Standarc
2. < indicates the substance was not detected above the analytical metho
3. J indicates the substance was detected at such low levels that the pre
4. Radium data are a combination of radium isotopes 226 and 228. Whe

| Analyte | | Units | DGWC-22 | DGWC-22 | DGWC-22 | DGWC-22 | DGWC-23 | DGWC-23 | DGWC-23 | DGWC-23 | DGWC-23 | DGWC-23 | DGWC-23 | DGWC-23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 3/3/2021 | 9/10/2021 | 1/20/2022 | 9/16/2022 | 3/30/2017 | 7/12/2017 | 10/26/2017 | 3/1/2018 | 7/12/2018 | 11/8/2018 | 3/14/2019 | 8/29/2019 |
| **Appendix III** | Boron | mg/L | 3.9 | 4.5 | 4.2 | 4.20 | 4.68 | 3.74 | 4.07 | 4.37 | 4 | 4.7 | 4.7 | ------ |
| | Calcium | mg/L | 62.3 | 62.3 | 67.3 | 66.2 | 68.1 | 70 | 67.2 | 66.5 | 72 | 73.5 | 73.2 | ------ |
| | Chloride | mg/L | 20.6 | 17.3 | 18.1 | 18.00 | 17 | 16 | 17 | 14.8 | 15.2 | 14.6 | 15.2 | ------ |
| | Fluoride | mg/L | < 0.050 | < 0.050 | < 0.050 | 0.068 J | 0.12 J | 0.22 J | 0.66 | 0.18 | 0.25 J | 0.052 J | 0.092 J | 0.095 J |
| | pH, field measured | S.U. | 5.71 | 5.65 | 5.72 | 5.62 | 6.03 | 5.97 | 5.9 | ------ | ------ | ------ | ------ | ------ |
| | Sulfate | mg/L | 252 | 234 | 221 | 265 | 220 | 220 | 220 | 209 | 202 | 292 | 266 | ------ |
| | Total Dissolved Solids | mg/L | 442 | 468 | 434 | 462 | 380 | 461 | 446 | 454 | 432 | 450 | 453 | ------ |
| **Appendix IV** | Antimony | mg/L | < 0.00028 | < 0.00078 | < 0.00078 | < 0.00078 | < 0.00030 | < 0.00060 | < 0.00060 | < 0.00078 | < 0.00078 | < 0.00078 | ------ | < 0.00027 |
| | Arsenic | mg/L | < 0.00078 | < 0.0011 | < 0.0011 | < 0.0022 | < 0.00040 | < 0.00050 | < 0.00050 | < 0.00057 | < 0.00057 | < 0.00057 | ------ | < 0.00035 |
| | Barium | mg/L | 0.031 | 0.027 | 0.029 | 0.029 | 0.0184 | 0.0186 | 0.0176 | 0.0164 | 0.022 | 0.022 | ------ | 0.025 |
| | Beryllium | mg/L | 0.00013 J | 0.00014 J | 0.00014 J | 0.00023 J | 0.0004 J | 0.0004 J | 0.0004 J | < 0.000050 | 0.00035 J | < 0.00047 J | ------ | 0.00041 J |
| | Cadmium | mg/L | 0.00050 | 0.00061 | 0.00052 | 0.00065 | 0.0002 J | 0.0002 J | 0.0003 J | < 0.000093 | < 0.00028 J | < 0.00032 J | ------ | 0.00022 J |
| | Chromium | mg/L | < 0.00055 | < 0.0011 | < 0.0011 | < 0.0011 | 0.0012 J | 0.0007 J | 0.0007 J | < 0.0016 | < 0.0016 | < 0.0016 | ------ | < 0.00039 |
| | Cobalt | mg/L | 0.0078 | 0.0076 | 0.0075 | 0.0098 | < 0.00050 | < 0.00030 | < 0.00030 | < 0.00052 | < 0.00052 | < 0.00091 J | ------ | 0.00036 J |
| | Fluoride | mg/L | < 0.050 | < 0.050 | < 0.050 | 0.068 J | 0.12 J | 0.22 J | 0.66 | 0.18 | 0.25 J | 0.052 J | 0.092 J | 0.095 J |
| | Lead | mg/L | < 0.000036 | < 0.00089 | < 0.00089 | < 0.00089 | < 0.000070 | < 0.000070 | < 0.000070 | < 0.00027 | < 0.00027 | < 0.00027 | ------ | 0.000066 J |
| | Lithium | mg/L | 0.0038 J | 0.0039 J | 0.0032 J | 0.0033 J | 0.0162 J | 0.0068 J | 0.0049 J | 0.0759 | 0.0047 J | 0.0053 J | ------ | 0.0017 J |
| | Mercury | mg/L | < 0.000078 | 0.00011 J | < 0.00013 | < 0.00013 | 0.0002 J | 0.00012 J | 0.00012 J | < 0.000036 | 0.00016 J | 0.00014 J | ------ | < 0.00014 |
| | Molybdenum | mg/L | < 0.00069 | < 0.00074 | < 0.00074 | < 0.00074 | 0.0084 J | 0.0092 J | 0.0077 J | 0.0045 J | 0.012 | 0.012 | ------ | 0.014 |
| | Selenium | mg/L | < 0.0016 | < 0.0014 | < 0.0014 | < 0.0014 | < 0.0014 | < 0.0018 | < 0.0018 | < 0.0014 | < 0.0014 | < 0.0014 | ------ | < 0.0013 |
| | Thallium | mg/L | < 0.00014 | < 0.00018 | < 0.00018 | < 0.00018 | < 0.000050 | < 0.000050 | < 0.000050 | < 0.00014 | < 0.00014 | < 0.00020 J | ------ | < 0.000052 |
| | Radium | pCi/L | 0.547 U | 0.616 U | 0.298 U | 1.01 | 0.297 U | 0.703 U | 0.984 U | 0.743 U | 0.918 U | 1.47 | ------ | 2.21 |
| | Radium-226 | pCi/L | -0.0221 U | 0.0544 U | 0.244 U | ------ | ------ | 0.243 | 0.468 | 0.511 | 0.335 | 0.526 | ------ | 1.06 |
| | Radium-228 | pCi/L | 0.547 U | 0.562 U | 0.0536 U | ------ | ------ | 0.46 U | 0.516 U | 0.232 U | 0.583 U | 0.941 | ------ | 1.15 |
| **Field Measured** | Conductivity | uS/cm | 662.7 | 622.77 | 645.57 | ------ | 636.24 | 635.6 | 616.92 | ------ | ------ | ------ | ------ | ------ |
| | Dissolved Oxygen | mg/L | 0.25 | 0.17 | 0.28 | ------ | 0.55 | 0.35 | 0.24 | ------ | ------ | ------ | ------ | ------ |
| | Oxidation Reduction Potential | millivolts | 436.1 | 251.8 | 76.2 | ------ | 273.96 | 68.2 | 124.48 | ------ | ------ | ------ | ------ | ------ |
| | Temperature | Deg C | 19.18 | 20.54 | 15.71 | ------ | 23.06 | 28.59 | 16.2 | ------ | ------ | ------ | ------ | ------ |
| | Turbidity | ntu | 0.71 | 0.78 | 1.11 | ------ | 2.93 | 0.33 | 0.61 | ------ | ------ | ------ | ------ | ------ |
| | Water level depth | ft | 19 | 20.58 | 20.83 | ------ | 14.86 | 16.7 | 19.13 | ------ | ------ | ------ | ------ | ------ |
| **Supplemental** | Alkalinity as CaCO3, Total | mg/L | 24.2 | ------ | 24.4 | 24.7 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Alkalinity, Bicarbonate as CaCO3 | mg/L | 24.2 | ------ | 24.4 | 24.7 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Alkalinity, Carbonate as CaCO3 | mg/L | < 5.0 | ------ | < 1.8 | < 5.00 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Aluminum | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Dissolved Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Hardness | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Total | mg/L | ------ | ------ | ------ | < 0.025 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Ferric (Fe2) | mg/L | ------ | ------ | ------ | < 0.025 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Ferrous | mg/L | ------ | ------ | ------ | 0.0 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Magnesium | mg/L | 22.1 | ------ | 23.5 | 22.8 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Manganese | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nickel | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nitrate as N | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphorus, Total Orthophosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Potassium | mg/L | 6.7 | ------ | 6.8 | 6.8 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silica | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silicon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silver | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Sodium | mg/L | 28.4 | ------ | 30.6 | 30.4 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Sulfide | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Total Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Zinc | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |

**NOTES:**
1. mg/L - milligrams per Liter; pCi/L - picocuries per Liter; S.U. - Standarc
2. < indicates the substance was not detected above the analytical methc
3. J indicates the substance was detected at such low levels that the pre
4. Radium data are a combination of radium isotopes 226 and 228. Whe

| | Analyte | Units | DGWC-23 10/18/2019 | DGWC-23 3/4/2020 | DGWC-23 8/13/2020 | DGWC-23 9/24/2020 | DGWC-23 3/3/2021 | DGWC-23 9/9/2021 | DGWC-23 1/20/2022 | DGWC-23 9/20/2022 | DGWC-37 9/8/2016 | DGWC-37 12/7/2016 | DGWC-37 12/7/2016 | DGWC-37 3/30/2017 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Appendix III** | Boron | mg/L | 4.5 | 4.8 | ------ | 4.6 | 4.0 | 4.7 | 4.5 | 4.60 | 1.58 | 2.01 | 1.57 | 1.47 |
| | Calcium | mg/L | 67.7 | 69.8 | ------ | 73.7 | 68.1 | 76.4 | 82.7 | 90.0 | 52.5 | 29.7 | 60.3 | 62.6 |
| | Chloride | mg/L | 14.4 | 13.9 | ------ | 13.7 | 14.0 | 12.3 | 12 | 11.60 | 6.2 | 6.1 | 6.3 | 6.3 |
| | Fluoride | mg/L | 0.079 J | 0.075 J | 0.1 | 0.075 J | 0.063 J | 0.084 J | < 0.050 | 0.11 | 0.08 J | 0.21 J | 0.24 J | 0.05 J |
| | pH, field measured | S.U. | ------ | 5.68 | 6 | 6.19 | 5.85 | 6 | 5.95 | 6 | 6.32 | 6.32 | ------ | 6.22 |
| | Sulfate | mg/L | 203 | 204 | ------ | 215 | 221 | 217 | 211 | 242 | 97 | 100 | 100 | 110 |
| | Total Dissolved Solids | mg/L | 448 | 408 | ------ | 456 | 425 | 455 | 453 | 511 | 279 | 300 | ------ | 273 |
| **Appendix IV** | Antimony | mg/L | < 0.00027 | < 0.00027 | < 0.00028 | < 0.00028 | < 0.00028 | < 0.00078 | < 0.00078 | < 0.00078 | < 0.00080 | < 0.00080 | < 0.00080 | < 0.00030 |
| | Arsenic | mg/L | < 0.00035 | < 0.00035 | < 0.00078 | < 0.00078 | < 0.00078 | < 0.0011 | < 0.0011 | < 0.0022 | < 0.0016 | 0.0019 J | < 0.0016 | < 0.00040 |
| | Barium | mg/L | 0.019 | 0.032 | 0.027 | 0.02 | 0.019 | 0.021 | 0.024 | 0.019 | 0.123 | 0.125 | 0.126 | 0.11 |
| | Beryllium | mg/L | 0.00038 J | 0.00077 J | 0.00041 J | 0.00045 J | 0.00050 | 0.0005 J | 0.00046 J | 0.00037 J | < 0.000080 | < 0.000080 | < 0.000080 | < 0.000070 |
| | Cadmium | mg/L | 0.00022 J | 0.00024 J | 0.00027 J | 0.00018 J | 0.00015 J | 0.00019 J | 0.00012 J | 0.00017 J | 0.0002 J | 0.0001 J | < 0.000070 | 0.0001 J |
| | Chromium | mg/L | 0.00041 J | 0.00081 J | 0.00085 J | 0.00084 J | 0.0014 J | < 0.0011 | < 0.0011 | < 0.0011 | < 0.00090 | < 0.00090 | < 0.00090 | < 0.00030 |
| | Cobalt | mg/L | < 0.00030 | 0.00043 J | 0.00048 J | < 0.00038 | 0.00039 J | 0.00049 J | 0.00058 J | 0.00053 J | < 0.00050 | 0.0005 J | < 0.00050 | < 0.00050 |
| | Fluoride | mg/L | 0.079 J | 0.075 J | 0.1 | 0.075 J | 0.063 J | 0.084 J | < 0.050 | 0.11 | 0.08 J | 0.21 J | 0.24 J | 0.05 J |
| | Lead | mg/L | < 0.000046 | < 0.000046 | < 0.000036 | < 0.000036 | < 0.000036 | < 0.00089 | < 0.00089 | < 0.00089 | < 0.00010 | < 0.00010 | < 0.00010 | 0.0014 J |
| | Lithium | mg/L | 0.0039 J | 0.004 J | 0.0052 J | 0.0045 J | 0.014 J | 0.0081 J | 0.0029 J | 0.0051 J | < 0.0021 | < 0.0021 | < 0.0021 | 0.0029 J |
| | Mercury | mg/L | < 0.00014 | 0.00026 | 0.00014 J | 0.0002 J | 0.00033 | 0.00011 J | < 0.00013 | < 0.00013 | < 0.000041 | < 0.000041 | < 0.000040 | 0.00006 J |
| | Molybdenum | mg/L | 0.0091 J | 0.0047 J | 0.013 | 0.0088 J | 0.0026 J | 0.01 | 0.0073 J | 0.0095 J | < 0.0017 | < 0.0017 | < 0.0017 | < 0.00060 |
| | Selenium | mg/L | < 0.0013 | < 0.0013 | < 0.0016 | < 0.0016 | < 0.0016 | < 0.0014 | < 0.0014 | < 0.0014 | < 0.0010 | < 0.0010 | < 0.0010 | < 0.0014 |
| | Thallium | mg/L | < 0.000052 | < 0.000052 | < 0.00014 | < 0.00014 | < 0.00014 | < 0.00018 | < 0.00018 | < 0.00018 | < 0.00020 | < 0.00020 | < 0.00020 | < 0.000050 |
| | Radium | pCi/L | 1.32 | 1.39 | 1.48 U | 1.49 | 1.05 U | 1.81 | 0.61 U | 1.17 U | 0.827 U | 0.56 U | ------ | 0.302 U |
| | Radium-226 | pCi/L | 1.03 | 0.791 | 0.504 | 0.324 U | 0.354 U | 0.903 | 0.404 | ------ | 0.184 U | 0.19 U | ------ | ------ |
| | Radium-228 | pCi/L | 0.294 U | 0.601 U | 0.971 U | 1.17 | 0.695 U | 0.903 | 0.206 U | ------ | 0.643 U | 0.37 U | ------ | ------ |
| **Field Measured** | Conductivity | uS/cm | ------ | ------ | 651.5 | 701.78 | 628.3 | 660.71 | 656.99 | ------ | 471.7 | 475.96 | ------ | 483.28 |
| | Dissolved Oxygen | mg/L | ------ | ------ | 0.29 | 0.26 | 0.53 | 0.43 | 0.2 | ------ | 0.19 | 0.14 | ------ | 0.16 |
| | Oxidation Reduction Potential | millivolts | ------ | ------ | 109.9 | 100.38 | 516.4 | 62.5 | 80.1 | ------ | 54.3 | 56.59 | ------ | 57.52 |
| | Temperature | Deg C | ------ | ------ | 23.01 | 18.3 | 17.27 | 20.78 | 15.61 | ------ | 20.74 | 18.97 | ------ | 18.3 |
| | Turbidity | ntu | ------ | ------ | 2.05 | 0.35 | 0.43 | 2.79 | 1.08 | ------ | 2.32 | 1.14 | ------ | 0.07 |
| | Water level depth | ft | ------ | ------ | 22.14 | 24.5 | 21.35 | 24.15 | 21.41 | ------ | 13.2 | 12.92 | ------ | 13.35 |
| **Supplemental** | Alkalinity as CaCO3, Total | mg/L | ------ | ------ | ------ | ------ | 67.7 | ------ | 72.8 | 87.3 | ------ | ------ | ------ | ------ |
| | Alkalinity, Bicarbonate as CaCO3 | mg/L | 81 | ------ | ------ | ------ | 67.7 | ------ | 72.8 | 87.3 | ------ | ------ | ------ | ------ |
| | Alkalinity, Carbonate as CaCO3 | mg/L | < 20 | ------ | ------ | ------ | < 5.0 | ------ | < 1.8 | < 5.00 | ------ | ------ | ------ | ------ |
| | Aluminum | mg/L | < 0.032 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 0.0128 | ------ |
| | Dissolved Organic Carbon | mg/L | < 0.50 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Hardness | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 215 | ------ |
| | Iron, Total | mg/L | 0.036 J | ------ | ------ | ------ | ------ | ------ | ------ | < 0.025 | ------ | ------ | ------ | ------ |
| | Iron, Ferric (Fe2) | mg/L | < 0.20 | ------ | ------ | ------ | ------ | ------ | ------ | < 0.025 | ------ | ------ | ------ | ------ |
| | Iron, Ferrous | mg/L | < 0.20 | ------ | ------ | ------ | ------ | ------ | ------ | 0.0 | ------ | ------ | ------ | ------ |
| | Magnesium | mg/L | 18.5 | ------ | ------ | ------ | 16.8 | ------ | 19.9 | 20.4 | ------ | ------ | 15.6 | ------ |
| | Manganese | mg/L | 1.8 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 0.205 | ------ |
| | Nickel | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nitrate as N | mg/L | < 0.0050 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphorus, Total Orthophosphate | mg/L | < 0.020 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Potassium | mg/L | 8.2 | ------ | ------ | ------ | 11.0 | ------ | 7 | 7.7 | ------ | ------ | 4.28 | ------ |
| | Silica | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 23.6 | ------ |
| | Silicon | mg/L | 10.3 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 11 | ------ |
| | Silver | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Sodium | mg/L | 24.4 | ------ | ------ | ------ | 22.1 | ------ | 22.6 | 22.9 | ------ | ------ | ------ | ------ |
| | Sulfide | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Total Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Zinc | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |

**NOTES:**
1. mg/L - milligrams per Liter; pCi/L - picocuries per Liter; S.U. - Standarc
2. < indicates the substance was not detected above the analytical methc
3. J indicates the substance was detected at such low levels that the pre
4. Radium data are a combination of radium isotopes 226 and 228. Whe

| Analyte | | Units | DGWC-37<br>10/26/2017 | DGWC-37<br>1/23/2018 | DGWC-37<br>3/1/2018 | DGWC-37<br>7/12/2018 | DGWC-37<br>11/8/2018 | DGWC-37<br>3/13/2019 | DGWC-37<br>8/28/2019 | DGWC-37<br>10/18/2019 | DGWC-37<br>3/9/2020 | DGWC-37<br>8/13/2020 | DGWC-37<br>9/24/2020 | DGWC-37<br>3/11/2021 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Appendix III** | Boron | mg/L | 1.86 | ------ | 1.87 | 1.5 | 1.4 | 1.8 | ------ | 1.3 | 1.8 | ------ | 1.6 | 1.4 |
| | Calcium | mg/L | 60.8 | 57.7 | 57 | 59.1 | 53.6 | 54.8 | ------ | ------ | 64.2 | ------ | 55.9 | 56.0 |
| | Chloride | mg/L | 6.4 | 6.3 | 6.3 | 5.8 | 5.8 | 6.9 | ------ | 5.8 | 6 | ------ | 5.6 | 5.6 |
| | Fluoride | mg/L | 0.08 J | ------ | 0.22 | 0.32 | < 0.029 | 0.08 J | 0.074 J | 0.075 J | 0.054 J | 0.068 J | 0.061 J | 0.057 J |
| | pH, field measured | S.U. | 6.33 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 6.34 | 6.34 | 6.3 | 6.49 |
| | Sulfate | mg/L | 97 | 102 | 94.6 | 89.2 | 102 | 92.2 | ------ | 76.4 | 90.3 | ------ | 84.1 | 81.9 |
| | Total Dissolved Solids | mg/L | 340 | ------ | 311 | 290 | 295 | 286 | ------ | 269 | 357 | ------ | 280 | 255 |
| **Appendix IV** | Antimony | mg/L | < 0.00060 | ------ | < 0.00078 | < 0.00078 | < 0.00078 | ------ | < 0.00027 | < 0.00027 | < 0.00027 | < 0.00028 | < 0.00028 | < 0.00028 |
| | Arsenic | mg/L | < 0.00050 | < 0.0050 | < 0.00057 | < 0.00057 | < 0.00057 | ------ | < 0.00035 | < 0.00035 | < 0.00035 | < 0.00078 | < 0.00078 | < 0.00078 |
| | Barium | mg/L | 0.112 | ------ | 0.102 | 0.11 | 0.11 | ------ | 0.086 | 0.079 | 0.092 | 0.088 | 0.094 | 0.075 |
| | Beryllium | mg/L | < 0.000090 | ------ | < 0.000050 | 0.00007 J | < 0.000050 | ------ | 0.000086 J | < 0.000074 | < 0.000074 | 0.0001 J | 0.000088 J | < 0.000046 |
| | Cadmium | mg/L | < 0.00010 | ------ | < 0.000093 | < 0.000093 | < 0.000093 | ------ | < 0.00011 | < 0.00011 | < 0.00011 | < 0.00012 | 0.00027 J | < 0.00012 |
| | Chromium | mg/L | 0.0007 J | ------ | < 0.0016 | < 0.0016 | < 0.0016 | ------ | < 0.00039 | < 0.00039 | < 0.00039 | 0.00058 J | < 0.00055 | < 0.00055 |
| | Cobalt | mg/L | 0.0003 J | ------ | < 0.00052 | < 0.00052 | < 0.00052 | ------ | < 0.00030 | < 0.00030 | < 0.00030 | < 0.00038 | < 0.00038 | < 0.00038 |
| | Fluoride | mg/L | 0.08 J | ------ | 0.22 | 0.32 | < 0.029 | 0.08 J | 0.074 J | 0.075 J | 0.054 J | 0.068 J | 0.061 J | 0.057 J |
| | Lead | mg/L | < 0.000070 | ------ | < 0.00027 | < 0.00027 | < 0.00027 | ------ | 0.000061 J | < 0.000046 | < 0.000046 | < 0.000036 | < 0.000036 | < 0.000036 |
| | Lithium | mg/L | 0.0018 J | ------ | 0.0024 J | 0.0028 J | 0.0023 J | ------ | 0.0025 J | 0.0026 J | 0.0017 J | 0.0023 J | 0.0021 J | 0.0024 J |
| | Mercury | mg/L | < 0.000036 | ------ | < 0.000036 | 0.000044 J | < 0.000036 | ------ | < 0.00014 | < 0.00014 | < 0.00014 | < 0.000078 | 0.000091 J | ------ |
| | Molybdenum | mg/L | < 0.0010 | ------ | < 0.0019 | < 0.0019 | < 0.0019 | ------ | < 0.00095 | < 0.00095 | < 0.00095 | < 0.00069 | < 0.00069 | < 0.00069 |
| | Selenium | mg/L | < 0.0018 | ------ | < 0.0014 | < 0.0014 | < 0.0014 | ------ | < 0.0013 | < 0.0013 | < 0.0013 | < 0.0016 | < 0.0016 | < 0.0016 |
| | Thallium | mg/L | < 0.000050 | ------ | < 0.00014 | < 0.00014 | < 0.00014 | ------ | < 0.000052 | < 0.000052 | < 0.000052 | < 0.00014 | < 0.00014 | < 0.00014 |
| | Radium | pCi/L | 1.04 U | ------ | 0.344 U | 0.566 U | 0.623 U | ------ | 1.24 U | ------ | 0.499 U | 0.99 | 1.03 U | 0.956 U |
| | Radium-226 | pCi/L | 0.607 | ------ | 0.344 U | 0.273 | 0.451 | ------ | 0.508 | ------ | 0.499 | 0.166 | 0.28 U | 0.369 U |
| | Radium-228 | pCi/L | 0.428 U | ------ | -0.28 U | 0.293 U | 0.172 U | ------ | 0.736 U | ------ | -0.0603 U | 0.824 | 0.746 U | 0.587 U |
| **Field Measured** | Conductivity | uS/cm | 485.74 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 411.9 | 425.4 | 411.53 |
| | Dissolved Oxygen | mg/L | 0.31 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 1.06 | 0.99 | 1.18 |
| | Oxidation Reduction Potential | millivolts | 73.4 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 226.3 | 85.6 | 730.71 |
| | Temperature | Deg C | 18.11 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 22.44 | 19.01 | 17.35 |
| | Turbidity | ntu | 1.16 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 4.63 | 1.22 | 0.82 |
| | Water level depth | ft | 13.39 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 14.35 | 13.73 | 13.85 |
| **Supplemental** | Alkalinity as CaCO3, Total | mg/L | ------ | 136 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 132 |
| | Alkalinity, Bicarbonate as CaCO3 | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 117 | ------ | ------ | ------ | 132 |
| | Alkalinity, Carbonate as CaCO3 | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 20 | ------ | ------ | ------ | < 5.0 |
| | Aluminum | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 0.032 | ------ | ------ | ------ | ------ |
| | Dissolved Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 0.52 J | ------ | ------ | ------ | ------ |
| | Hardness | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Total | mg/L | ------ | 0.1 | ------ | ------ | ------ | ------ | ------ | < 0.20 | ------ | ------ | ------ | ------ |
| | Iron, Ferric (Fe2) | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Ferrous | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 0.20 | ------ | ------ | ------ | ------ |
| | Magnesium | mg/L | ------ | 12.3 | ------ | ------ | ------ | ------ | ------ | 10.9 | ------ | ------ | ------ | 12 |
| | Manganese | mg/L | ------ | 0.154 | ------ | ------ | ------ | ------ | ------ | 0.11 | ------ | ------ | ------ | ------ |
| | Nickel | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nitrate as N | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 0.3 | ------ | ------ | ------ | ------ |
| | Phosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphorus, Total Orthophosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 0.089 | ------ | ------ | ------ | ------ |
| | Potassium | mg/L | ------ | 4.16 | ------ | ------ | ------ | ------ | ------ | 3.7 | ------ | ------ | ------ | 3.9 |
| | Silica | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silicon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 13 | ------ | ------ | ------ | ------ |
| | Silver | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Sodium | mg/L | ------ | 10.5 | ------ | ------ | ------ | ------ | ------ | 10.9 | ------ | ------ | ------ | 10.7 |
| | Sulfide | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Total Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Zinc | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |

**NOTES:**
1. mg/L - milligrams per Liter; pCi/L - picocuries per Liter; S.U. - Standarc
2. < indicates the substance was not detected above the analytical methc
3. J indicates the substance was detected at such low levels that the pre
4. Radium data are a combination of radium isotopes 226 and 228. Whe

**APPENDIX A**
**ANALYTICAL RESULTS (2016 - 2022)**
Plant McDonough-Atkinson Ash Pond 1 and Ash Pond 2 and 3/4
Atlanta, Georgia

| | Analyte | Units | DGWC-37 9/16/2021 | DGWC-37 1/21/2022 | DGWC-37 9/9/2022 | DGWC-38 9/8/2016 | DGWC-38 12/7/2016 | DGWC-38 12/7/2016 | DGWC-38 3/30/2017 | DGWC-38 10/26/2017 | DGWC-38 1/23/2018 | DGWC-38 3/1/2018 | DGWC-38 7/12/2018 | DGWC-38 11/8/2018 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Boron | mg/L | 1.4 | 1.4 | 2.00 | 2.69 | 3.08 | 2.25 | 3.19 | 2.92 | ------ | 3.08 | 2.8 | 3.4 |
| | Calcium | mg/L | 63 | 64.4 | 66.2 | 70.3 | 38.4 | 81.3 | 80.3 | 81.3 | 79.9 | 81.8 | 86.7 | 86.6 |
| | Chloride | mg/L | 5.6 | 5.7 | 5.40 | 7.4 | 7.4 | 7.4 | 7.7 | 8.2 | 8.2 | 8.1 | 8 | 8.1 |
| **Appendix III** | Fluoride | mg/L | 0.084 J | 0.053 J | 0.082 J | 0.1 J | 0.27 J | 0.26 J | 0.12 J | 0.47 | ------ | < 0.029 | 0.23 J | < 0.029 |
| | pH, field measured | S.U. | 6.33 | 6.31 | 6.3 | 6.01 | 6.07 | ------ | 5.97 | 6.06 | ------ | ------ | ------ | ------ |
| | Sulfate | mg/L | 95 | 89.8 | 96.6 | 270 | 250 | 270 | 290 | 260 | 238 | 242 | 256 | 291 |
| | Total Dissolved Solids | mg/L | 278 | 316 | 300 | 437 | 478 | ------ | 448 | 554 | ------ | 492 | 478 | 507 |
| | Antimony | mg/L | < 0.00078 | < 0.00078 | < 0.00078 | < 0.00080 | < 0.00080 | < 0.00080 | < 0.00030 | < 0.00060 | ------ | < 0.00078 | < 0.00078 | < 0.00078 |
| | Arsenic | mg/L | < 0.0011 | < 0.0011 | < 0.0022 | < 0.0016 | < 0.0016 | < 0.0016 | < 0.00040 | < 0.00050 | < 0.0050 | < 0.00057 | < 0.00057 | < 0.00057 |
| | Barium | mg/L | 0.083 | 0.085 | 0.079 | 0.0333 | 0.0336 | 0.0337 | 0.0325 | 0.0333 | ------ | 0.0333 | 0.034 | 0.035 |
| | Beryllium | mg/L | 0.000059 J | 0.000059 J | 0.000057 J | < 0.000080 | < 0.000080 | < 0.000080 | < 0.000070 | < 0.000090 | ------ | < 0.000050 | < 0.000050 | < 0.000050 |
| | Cadmium | mg/L | 0.00013 J | < 0.00011 | < 0.00011 | 0.0002 J | 0.0002 J | 0.0002 J | 0.0002 J | 0.0002 J | ------ | < 0.000093 | < 0.00024 J | 0.00024 J |
| | Chromium | mg/L | < 0.0011 | < 0.0011 | < 0.0011 | < 0.00090 | < 0.00090 | < 0.00090 | < 0.00030 | 0.0005 J | ------ | < 0.0016 | < 0.0016 | < 0.0016 |
| | Cobalt | mg/L | < 0.00039 | < 0.00039 | < 0.00039 | 0.0015 J | 0.0017 J | 0.0014 J | 0.0016 J | 0.0016 J | ------ | < 0.00052 | 0.0015 J | 0.0016 J |
| | Fluoride | mg/L | 0.084 J | 0.053 J | 0.082 J | 0.1 J | 0.27 J | 0.26 J | 0.12 J | 0.47 | ------ | < 0.029 | 0.23 J | < 0.029 |
| **Appendix IV** | Lead | mg/L | < 0.00089 | < 0.00089 | < 0.00089 | < 0.00010 | < 0.00010 | 0.0004 J | < 0.000070 | 0.0001 J | ------ | < 0.00027 | < 0.00027 | < 0.00027 |
| | Lithium | mg/L | 0.0021 J | 0.002 J | 0.0019 J | 0.0032 J | 0.0035 J | 0.0031 J | 0.0035 J | 0.0034 J | ------ | 0.0033 J | 0.0034 J | 0.003 J |
| | Mercury | mg/L | < 0.000078 | < 0.00013 | < 0.00013 | < 0.000041 | < 0.000041 | < 0.000040 | 0.00007 J | < 0.000036 | ------ | < 0.000036 | 0.00004 J | < 0.000036 |
| | Molybdenum | mg/L | < 0.00074 | < 0.00074 | < 0.00074 | < 0.0017 | < 0.0017 | < 0.0017 | 0.0011 J | 0.0011 J | ------ | < 0.0019 | < 0.0019 | < 0.0019 |
| | Selenium | mg/L | < 0.0014 | < 0.0014 | < 0.0014 | < 0.0010 | < 0.0010 | < 0.0010 | < 0.0014 | < 0.0018 | ------ | < 0.0014 | < 0.0014 | < 0.0014 |
| | Thallium | mg/L | < 0.00018 | < 0.00018 | < 0.00018 | < 0.00020 | < 0.00020 | < 0.00020 | 0.0001 J | 0.0001 J | ------ | < 0.00014 | < 0.00014 | < 0.00014 |
| | Radium | pCi/L | 0.691 U | 0.343 U | 0.719 U | 1.48 | 0.22 U | ------ | 0.519 U | 1.13 U | ------ | 0.985 U | 0.615 U | 0.58 U |
| | Radium-226 | pCi/L | 0.0559 U | 0.1 U | ------ | 0.424 | 0.00686 U | ------ | ------ | 0.42 U | ------ | 0.138 U | 0.283 | 0.422 |
| | Radium-228 | pCi/L | 0.635 U | 0.243 U | ------ | 1.06 | 0.213 U | ------ | ------ | 0.714 U | ------ | 0.847 | 0.332 U | 0.158 U |
| | Conductivity | uS/cm | 434.56 | 481.56 | ------ | 675.85 | 695.23 | ------ | 687.66 | 685.29 | ------ | ------ | ------ | ------ |
| | Dissolved Oxygen | mg/L | 1.25 | 0.65 | ------ | 0.23 | 0.16 | ------ | 0.11 | 0.24 | ------ | ------ | ------ | ------ |
| **Field Measured** | Oxidation Reduction Potential | millivolts | 78.1 | 95.2 | ------ | 63 | 56.93 | ------ | 60.66 | 351.2 | ------ | ------ | ------ | ------ |
| | Temperature | Deg C | 18.86 | 15.96 | ------ | 22.16 | 17.61 | ------ | 19.53 | 21.77 | ------ | ------ | ------ | ------ |
| | Turbidity | ntu | 2.4 | 0.5 | ------ | 1.53 | 0.52 | ------ | 0.14 | 2 | ------ | ------ | ------ | ------ |
| | Water level depth | ft | 13.9 | 13.45 | ------ | 6.16 | 6.17 | ------ | 6.45 | 6.74 | ------ | ------ | ------ | ------ |
| | Alkalinity as CaCO3, Total | mg/L | ------ | 128 | 134.0 | ------ | ------ | ------ | ------ | ------ | 83 | ------ | ------ | ------ |
| | Alkalinity, Bicarbonate as CaCO3 | mg/L | ------ | 128 | 134.0 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Alkalinity, Carbonate as CaCO3 | mg/L | ------ | < 1.8 | < 5.0 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Aluminum | mg/L | ------ | ------ | ------ | ------ | ------ | < 0.0128 | ------ | ------ | ------ | ------ | ------ | ------ |
| | Dissolved Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Hardness | mg/L | ------ | ------ | ------ | ------ | ------ | 320 | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Total | mg/L | ------ | ------ | 0.1 | ------ | ------ | ------ | ------ | ------ | < 0.040 | ------ | ------ | ------ |
| | Iron, Ferric (Fe2) | mg/L | ------ | ------ | 0.1 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Ferrous | mg/L | ------ | ------ | 0.0 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Magnesium | mg/L | ------ | 13.9 | 14.7 | ------ | ------ | 28.5 | ------ | ------ | 27.2 | ------ | ------ | ------ |
| | Manganese | mg/L | ------ | ------ | ------ | ------ | ------ | 0.64 | ------ | ------ | 0.649 | ------ | ------ | ------ |
| **Supplemental** | Nickel | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nitrate as N | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphorus, Total Orthophosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Potassium | mg/L | ------ | 4.1 | 4.4 | ------ | ------ | 4.25 | ------ | ------ | 4.18 | ------ | ------ | ------ |
| | Silica | mg/L | ------ | ------ | ------ | ------ | ------ | 21.7 | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silicon | mg/L | ------ | ------ | ------ | ------ | ------ | 10.1 | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silver | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Sodium | mg/L | ------ | 11.1 | 11.0 | ------ | ------ | 12 | ------ | ------ | 10.9 | ------ | ------ | ------ |
| | Sulfide | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Total Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Zinc | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |

**NOTES:**
1. mg/L - milligrams per Liter; pCi/L - picocuries per Liter; S.U. - Standard
2. < indicates the substance was not detected above the analytical meth
3. J indicates the substance was detected at such low levels that the pre
4. Radium data are a combination of radium isotopes 226 and 228. Whe

| | Analyte | Units | DGWC-38 | DGWC-38 | DGWC-38 | DGWC-38 | DGWC-38 | DGWC-38 | DGWC-38 | DGWC-38 | DGWC-38 | DGWC-38 | DGWC-39 | DGWC-39 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 3/13/2019 | 8/28/2019 | 10/18/2019 | 3/9/2020 | 8/13/2020 | 9/24/2020 | 3/11/2021 | 9/15/2021 | 1/21/2022 | 9/12/2022 | 9/8/2016 | 12/7/2016 |
| Appendix III | Boron | mg/L | 2.9 | ------ | 3.1 | 3 | ------ | 2.9 | 2.7 | 2.8 | 2.8 | 2.80 | 3.35 | 3.63 |
| | Calcium | mg/L | 85.3 | ------ | [illegible] | 91.9 | ------ | 84.1 | 85.8 | 88.3 | 91 | 87.6 | 87.2 | 96.7 |
| | Chloride | mg/L | 9.1 | ------ | 8.6 | 8.1 | ------ | 8.2 | 8.0 | 7.6 | 8.5 | 8.50 | 9.2 | 8.9 |
| | Fluoride | mg/L | 0.084 J | 0.066 J | 0.073 J | 0.064 J | 0.06 J | 0.057 J | 0.058 J | 0.06 J | 0.1 | 0.12 | 0.17 J | 0.33 |
| | pH, field measured | S.U. | ------ | ------ | ------ | 6.12 | 6.05 | 6.05 | 6.22 | 6.08 | 6.08 | 6.05 | 6.47 | 6.43 |
| | Sulfate | mg/L | 300 | ------ | 239 | 244 | ------ | 240 | 154 | 219 | 188 | 234 | 280 | 250 |
| | Total Dissolved Solids | mg/L | 487 | ------ | 494 | 554 | ------ | 489 | 463 | 474 | 482 | 468 | 522 | 565 |
| Appendix IV | Antimony | mg/L | ------ | < 0.00027 | < 0.00027 | < 0.00027 | < 0.00028 | < 0.00028 | < 0.00028 | < 0.00078 | < 0.00078 | < 0.00078 | < 0.00080 | < 0.00080 |
| | Arsenic | mg/L | ------ | < 0.00035 | < 0.00035 | < 0.00035 | < 0.00078 | < 0.00078 | < 0.00078 | < 0.0011 | < 0.0011 | < 0.0022 | < 0.0016 | < 0.0016 |
| | Barium | mg/L | ------ | 0.033 | 0.032 | 0.032 | 0.032 | 0.032 | 0.032 | 0.032 | 0.031 | 0.027 | 0.0978 | 0.0844 |
| | Beryllium | mg/L | ------ | < 0.000074 | < 0.000074 | < 0.000074 | < 0.000046 | 0.000058 J | < 0.000046 | < 0.000054 | < 0.000054 | < 0.000054 | < 0.000080 | < 0.000080 |
| | Cadmium | mg/L | ------ | 0.0003 J | 0.00016 J | 0.00017 J | 0.00021 J | 0.00081 J | < 0.00012 | 0.00021 J | 0.0002 J | 0.00013 J | < 0.000070 | < 0.000070 |
| | Chromium | mg/L | ------ | < 0.00039 | 0.00092 J | 0.00044 J | < 0.00055 | < 0.00055 | < 0.00055 | < 0.0011 | < 0.0011 | < 0.0011 | < 0.00090 | < 0.00090 |
| | Cobalt | mg/L | ------ | 0.0016 J | 0.0016 J | 0.0016 J | 0.0014 J | 0.0013 J | 0.0017 J | 0.0016 J | 0.0017 J | 0.0014 J | 0.0068 J | 0.0071 J |
| | Fluoride | mg/L | 0.084 J | 0.066 J | 0.073 J | 0.064 J | 0.06 J | 0.057 J | 0.058 J | 0.06 J | 0.1 | 0.12 | 0.17 J | 0.33 |
| | Lead | mg/L | ------ | < 0.000046 | 0.000074 J | 0.000061 J | < 0.000036 | 0.00014 J | 0.00014 J | < 0.00089 | < 0.00089 | < 0.00089 | < 0.00010 | < 0.00010 |
| | Lithium | mg/L | ------ | 0.0034 J | 0.0032 J | 0.0033 J | 0.0028 J | 0.0029 J | 0.0030 J | 0.0029 J | 0.0025 J | 0.0030 J | < 0.0021 | < 0.0021 |
| | Mercury | mg/L | ------ | < 0.00014 | < 0.00014 | < 0.00014 | < 0.000078 | 0.000085 J | ------ | < 0.000078 | < 0.00013 | < 0.00013 | < 0.000041 | < 0.000041 |
| | Molybdenum | mg/L | ------ | < 0.00095 | < 0.00095 | 0.001 J | 0.00098 J | 0.001 J | 0.00092 J | 0.00099 J | 0.0013 J | 0.0012 J | < 0.0017 | < 0.0017 |
| | Selenium | mg/L | ------ | < 0.0013 | < 0.0013 | < 0.0013 | < 0.0016 | < 0.0016 | 0.0019 J | < 0.0014 | < 0.0014 | < 0.0014 | < 0.0010 | < 0.0010 |
| | Thallium | mg/L | ------ | 0.00014 J | 0.0001 J | 0.00016 J | 0.00016 J | 0.00015 J | < 0.00014 | < 0.00018 | < 0.00018 | < 0.00018 | < 0.00020 | < 0.00020 |
| | Radium | pCi/L | ------ | 0.517 U | ------ | 1.04 | 0.132 U | 0.593 U | 0.0784 U | 2.37 | 0.0873 U | 0.479 U | 1.44 | 2.16 |
| | Radium-226 | pCi/L | ------ | 0.517 | ------ | 0.673 | 0.132 U | 0.156 U | 0.0784 U | 0.543 | 0.0873 U | ------ | 0.157 U | 0.0206 U |
| | Radium-228 | pCi/L | ------ | -0.0409 U | ------ | 0.364 U | -0.316 U | 0.437 U | -0.0501 U | 1.83 | -0.0214 U | ------ | 1.28 | 2.14 |
| Field Measured | Conductivity | uS/cm | ------ | ------ | ------ | ------ | 672.4 | 658.75 | 665.3 | 690.15 | 702.88 | ------ | 854.01 | 863.97 |
| | Dissolved Oxygen | mg/L | ------ | ------ | ------ | ------ | 0.13 | 0.19 | 0.56 | 0.14 | 0.25 | ------ | 0.37 | 0.16 |
| | Oxidation Reduction Potential | millivolts | ------ | ------ | ------ | ------ | 286.8 | 70.6 | 723.2 | 38.7 | 113.8 | ------ | -29.3 | -21.52 |
| | Temperature | Deg C | ------ | ------ | ------ | ------ | 23.22 | 19.73 | 16.87 | 19.64 | 15.79 | ------ | 23.51 | 18.97 |
| | Turbidity | ntu | ------ | ------ | ------ | ------ | 1.56 | 2.12 | 1.65 | 4.77 | 3.33 | ------ | 1.09 | 4.06 |
| | Water level depth | ft | ------ | ------ | ------ | ------ | 6.89 | 6.34 | 6.79 | 6.15 | 6.2 | ------ | 7.91 | 7.02 |
| Supplemental | Alkalinity as CaCO3, Total | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | 84.6 | ------ | 94 | 87.1 | ------ | ------ |
| | Alkalinity, Bicarbonate as CaCO3 | mg/L | ------ | ------ | 81 | ------ | ------ | ------ | 84.6 | ------ | 94 | 87.1 | ------ | ------ |
| | Alkalinity, Carbonate as CaCO3 | mg/L | ------ | ------ | < 20 | ------ | ------ | ------ | < 5.0 | ------ | < 1.8 | < 5.0 | ------ | ------ |
| | Aluminum | mg/L | ------ | ------ | < 0.032 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Dissolved Organic Carbon | mg/L | ------ | ------ | < 0.50 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Hardness | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Total | mg/L | ------ | ------ | < 0.20 | ------ | ------ | ------ | ------ | ------ | ------ | 0.0 | ------ | ------ |
| | Iron, Ferric (Fe2) | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 0.0 | ------ | ------ |
| | Iron, Ferrous | mg/L | ------ | ------ | < 0.20 | ------ | ------ | ------ | ------ | ------ | ------ | 0.0 | ------ | ------ |
| | Magnesium | mg/L | ------ | ------ | 28.6 | ------ | ------ | ------ | 25.7 | ------ | 27.3 | 26.4 | ------ | ------ |
| | Manganese | mg/L | ------ | ------ | 0.67 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nickel | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nitrate as N | mg/L | ------ | ------ | < 0.0050 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphate | mg/L | ------ | ------ | | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphorus, Total Orthophosphate | mg/L | ------ | ------ | < 0.020 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Potassium | mg/L | ------ | ------ | 4.8 | ------ | ------ | ------ | 4.3 | ------ | 4.5 | 4.1 | ------ | ------ |
| | Silica | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silicon | mg/L | ------ | ------ | 11.4 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silver | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Sodium | mg/L | ------ | ------ | 13.8 | ------ | ------ | ------ | 12.1 | ------ | 12.4 | 12.0 | ------ | ------ |
| | Sulfide | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Total Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Zinc | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |

**NOTES:**
1. mg/L - milligrams per Liter; pCi/L - picocuries per Liter; S.U. - Standarc
2. < indicates the substance was not detected above the analytical methc
3. J indicates the substance was detected at such low levels that the pre
4. Radium data are a combination of radium isotopes 226 and 228. Whe

**APPENDIX A**
**ANALYTICAL RESULTS (2016 - 2022)**
Plant McDonough-Atkinson Ash Pond 1 and Ash Pond 2 and 3/4
Atlanta, Georgia

| | Analyte | Units | DGWC-39 12/7/2016 | DGWC-39 3/30/2017 | DGWC-39 10/26/2017 | DGWC-39 1/23/2018 | DGWC-39 3/1/2018 | DGWC-39 7/12/2018 | DGWC-39 11/8/2018 | DGWC-39 3/13/2019 | DGWC-39 8/28/2019 | DGWC-39 10/18/2019 | DGWC-39 3/9/2020 | DGWC-39 8/13/2020 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appendix III | Boron | mg/L | 2.86 | 3.57 | 3.41 | ------ | 2.86 | 3 | 3.4 | 3.4 | ------ | 3.6 | 2.9 | ------ |
| | Calcium | mg/L | 100 | 98.9 | 90.6 | 81.5 | 79.6 | 89.8 | 89 | 96.3 | ------ | 93 | 100 | ------ |
| | Chloride | mg/L | 9 | 8.7 | 8.3 | 8.2 | 8.1 | 7.7 | 7.7 | 8.2 | ------ | 8 | 7.5 | ------ |
| | Fluoride | mg/L | 0.56 | 0.17 J | 0.54 | ------ | 0.13 | 0.13 J | 0.072 J | 0.085 J | 0.086 J | 0.14 J | 0.075 J | 0.076 J |
| | pH, field measured | S.U. | ------ | 6.42 | 6.49 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 6.37 | 6.39 |
| | Sulfate | mg/L | 280 | 310 | 210 | 181 | 166 | 169 | 200 | 265 | ------ | 182 | 171 | ------ |
| | Total Dissolved Solids | mg/L | ------ | 496 | 532 | ------ | 440 | 463 | 485 | 526 | ------ | 489 | 508 | ------ |
| Appendix IV | Antimony | mg/L | < 0.00080 | < 0.00030 | < 0.00060 | ------ | < 0.00078 | < 0.00078 | < 0.00078 | ------ | < 0.00027 | < 0.00027 | < 0.00027 | < 0.00028 |
| | Arsenic | mg/L | < 0.0016 | 0.0007 J | < 0.00050 | < 0.0050 | 0.0011 J | 0.00057 J | < 0.00057 | ------ | < 0.00035 | 0.00075 J | 0.00039 J | < 0.00078 |
| | Barium | mg/L | 0.0901 | 0.0858 | 0.0899 | ------ | 0.0742 | 0.094 | 0.1 | ------ | 0.099 | 0.1 | 0.076 | 0.089 |
| | Beryllium | mg/L | < 0.000080 | < 0.000070 | < 0.000090 | ------ | < 0.000050 | < 0.000050 | < 0.000050 | ------ | < 0.000074 | < 0.000074 | < 0.000074 | < 0.000046 |
| | Cadmium | mg/L | < 0.000070 | < 0.000060 | < 0.00010 | ------ | < 0.000093 | < 0.000093 | < 0.000093 | ------ | < 0.00011 | < 0.00011 | < 0.00011 | < 0.00012 |
| | Chromium | mg/L | < 0.00090 | < 0.00030 | < 0.00050 | ------ | < 0.0016 | < 0.0016 | < 0.0016 | ------ | < 0.00039 | < 0.00039 | < 0.00039 | < 0.00055 |
| | Cobalt | mg/L | 0.007 J | 0.006 J | 0.0062 J | ------ | < 0.00052 | 0.0059 J | 0.0062 J | ------ | 0.0067 J | 0.007 | 0.007 | 0.006 |
| | Fluoride | mg/L | 0.56 | 0.17 J | 0.54 | ------ | 0.13 | 0.13 J | 0.072 J | 0.085 J | 0.086 J | 0.14 J | 0.075 J | 0.076 J |
| | Lead | mg/L | < 0.00010 | < 0.000070 | < 0.000070 | ------ | < 0.00027 | < 0.00027 | < 0.00027 | ------ | 0.00008 J | < 0.000046 | < 0.000046 | < 0.000036 |
| | Lithium | mg/L | < 0.0021 | < 0.0011 | < 0.0015 | ------ | < 0.00097 | < 0.00097 | < 0.00097 | ------ | < 0.00078 | < 0.00078 | < 0.00078 | < 0.00081 |
| | Mercury | mg/L | < 0.000040 | 0.000059 J | < 0.000036 | ------ | < 0.000036 | < 0.000036 | < 0.000036 | ------ | < 0.00014 | < 0.00014 | < 0.00014 | < 0.000078 |
| | Molybdenum | mg/L | < 0.0017 | < 0.00060 | < 0.0010 | ------ | < 0.0019 | < 0.0019 | < 0.0019 | ------ | < 0.00095 | < 0.00095 | < 0.00095 | < 0.00069 |
| | Selenium | mg/L | < 0.0010 | < 0.0014 | < 0.0018 | ------ | < 0.0014 | < 0.0014 | < 0.0014 | ------ | < 0.0013 | < 0.0013 | < 0.0013 | < 0.0016 |
| | Thallium | mg/L | < 0.00020 | 0.0001 J | 0.0001 J | ------ | < 0.00014 | < 0.00014 | < 0.00014 | ------ | 0.000069 J | < 0.000052 | 0.000071 J | < 0.00014 |
| | Radium | pCi/L | ------ | 0.264 U | 0.875 U | ------ | 1.24 | 0.935 U | 1.15 U | ------ | 1.15 U | ------ | 1.36 | 0.626 U |
| | Radium-226 | pCi/L | ------ | ------ | 0.56 | ------ | 0.14 U | 0.196 | 0.54 | ------ | 0.396 | ------ | 0.694 | 0.255 U |
| | Radium-228 | pCi/L | ------ | ------ | 0.315 U | ------ | 1.1 | 0.739 U | 0.609 U | ------ | 0.754 U | ------ | 0.664 U | 0.371 U |
| Field Measured | Conductivity | uS/cm | ------ | 796.77 | 786.98 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 768.8 |
| | Dissolved Oxygen | mg/L | ------ | 0.08 | 0.2 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 0.17 |
| | Oxidation Reduction Potential | millivolts | ------ | -42.08 | 23.9 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 22 |
| | Temperature | Deg C | ------ | 20.84 | 22.04 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 20.22 |
| | Turbidity | ntu | ------ | 4.77 | 4.89 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 3.12 |
| | Water level depth | ft | ------ | 7.2 | 7.9 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 10.49 |
| Supplemental | Alkalinity as CaCO3, Total | mg/L | ------ | ------ | ------ | 194 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Alkalinity, Bicarbonate as CaCO3 | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 216 | ------ | ------ |
| | Alkalinity, Carbonate as CaCO3 | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 20 | ------ | ------ |
| | Aluminum | mg/L | < 0.0128 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 0.049 J | ------ | ------ |
| | Dissolved Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 0.96 J | ------ | ------ |
| | Hardness | mg/L | 364 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Total | mg/L | ------ | 11.2 | ------ | 9.4 | ------ | ------ | ------ | ------ | ------ | 11.2 | ------ | ------ |
| | Iron, Ferric (Fe2) | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 11.2 | ------ | ------ |
| | Iron, Ferrous | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 0.7 | ------ | ------ |
| | Magnesium | mg/L | 27.5 | ------ | ------ | 19.7 | ------ | ------ | ------ | ------ | ------ | 25 | ------ | ------ |
| | Manganese | mg/L | 13.6 | 12.7 | ------ | 11.3 | ------ | ------ | ------ | ------ | ------ | 13.3 | ------ | ------ |
| | Nickel | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nitrate as N | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 0.0050 | ------ | ------ |
| | Phosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphorus, Total Orthophosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 0.020 | ------ | ------ |
| | Potassium | mg/L | 2.67 | ------ | ------ | 2.36 | ------ | ------ | ------ | ------ | ------ | 2.9 | ------ | ------ |
| | Silica | mg/L | 4.76 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silicon | mg/L | 2.22 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 2.7 | ------ | ------ |
| | Silver | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Sodium | mg/L | 15 | ------ | ------ | 11 | ------ | ------ | ------ | ------ | ------ | 16.9 | ------ | ------ |
| | Sulfide | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Total Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Zinc | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |

**NOTES:**
1. mg/L - milligrams per Liter; pCi/L - picocuries per Liter; S.U. - Standarc
2. < indicates the substance was not detected above the analytical metho
3. J indicates the substance was detected at such low levels that the pre
4. Radium data are a combination of radium isotopes 226 and 228. Whe

| Analyte | | Units | DGWC-39 | DGWC-39 | DGWC-39 | DGWC-39 | DGWC-39 | DGWC-4 | DGWC-4 | DGWC-4 | DGWC-4 | DGWC-4 | DGWC-4 | DGWC-4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 9/25/2020 | 3/11/2021 | 9/17/2021 | 1/20/2022 | 9/7/2022 | 3/28/2017 | 7/11/2017 | 10/24/2017 | 11/15/2017 | 2/27/2018 | 7/10/2018 | 11/6/2018 |
| **Appendix III** | Boron | mg/L | 3.3 | 2.5 | 2.8 | 2.8 | 3.30 | 4.01 | 3.85 | 3.82 | ------ | 4.1 | 4.5 | 4.1 |
| | Calcium | mg/L | 92.5 | 91.9 | 98.6 | 96.2 | 92.5 | 229 | 249 | 232 | ------ | 245 | 275 | 284 |
| | Chloride | mg/L | 7.9 | 7.7 | 8.3 | 8 | 8.20 | 29 | 28 | 28 | 27 | 24.6 | 24.9 | 24.8 |
| | Fluoride | mg/L | 0.086 J | 0.083 J | 0.13 | 0.1 | 0.11 | 0.17 J | 0.02 J | < 0.030 | 0.79 | < 0.029 | 0.36 | < 0.029 |
| | pH, field measured | S.U. | 6.38 | 6.66 | 6.49 | 6.52 | 6.43 | 6.01 | 6.04 | 5.99 | 5.92 | ------ | ------ | ------ |
| | Sulfate | mg/L | 153 | 123 | 156 | 123 | 146 | 680 | 740 | 930 | 820 | 811 | 787 | 902 |
| | Total Dissolved Solids | mg/L | 460 | 440 | 446 | 416 | 449 | 1160 | 1160 | 229 | 1330 | 1380 | 1390 | 1480 |
| **Appendix IV** | Antimony | mg/L | < 0.00028 | < 0.00028 | < 0.00078 | < 0.00078 | < 0.00078 | < 0.00030 | < 0.00060 | < 0.00060 | ------ | < 0.00078 | < 0.00078 | < 0.00078 |
| | Arsenic | mg/L | 0.00087 J | < 0.00078 | < 0.0011 | 0.0019 J | < 0.0022 | 0.0005 J | 0.0008 J | < 0.00050 | ------ | < 0.00057 | < 0.00057 | < 0.00057 |
| | Barium | mg/L | 0.1 | 0.078 | 0.09 | 0.093 | 0.099 | 0.0363 | 0.0301 | 0.0351 | ------ | 0.036 | 0.036 | 0.035 |
| | Beryllium | mg/L | < 0.000046 | < 0.000046 | < 0.000054 | < 0.000054 | < 0.000054 | 0.0002 J | 0.0001 J | 0.0002 J | ------ | 0.00018 J | 0.00017 J | < 0.00021 J |
| | Cadmium | mg/L | < 0.00012 | < 0.00012 | < 0.00011 | < 0.00011 | < 0.00011 | 0.0006 J | 0.0006 J | 0.0007 J | ------ | 0.00074 J | 0.00065 J | 0.00071 J |
| | Chromium | mg/L | < 0.00055 | < 0.00055 | < 0.0011 | < 0.0011 | < 0.0011 | 0.0005 J | < 0.00050 | < 0.00050 | ------ | < 0.0016 | < 0.0016 | < 0.0016 |
| | Cobalt | mg/L | 0.0061 | 0.0058 | 0.0076 | 0.0061 | 0.0065 | 0.0018 J | 0.0015 J | 0.0017 J | ------ | 0.0018 J | 0.0018 J | 0.0018 J |
| | Fluoride | mg/L | 0.086 J | 0.083 J | 0.13 | 0.1 | 0.11 | 0.17 J | 0.02 J | < 0.030 | 0.79 | < 0.029 | 0.36 | < 0.029 |
| | Lead | mg/L | 0.00022 J | < 0.000036 | < 0.00089 | < 0.00089 | < 0.00089 | 0.0002 J | < 0.000070 | < 0.000070 | ------ | < 0.00027 | < 0.00027 | < 0.00027 |
| | Lithium | mg/L | < 0.00081 | < 0.00081 | < 0.00073 | < 0.00073 | < 0.00073 | 0.0031 J | 0.0022 J | 0.0024 J | ------ | 0.0027 J | 0.003 J | 0.0029 J |
| | Mercury | mg/L | < 0.000078 | ------ | < 0.000078 | < 0.00013 | < 0.00013 | < 0.000041 | < 0.000041 | < 0.000036 | ------ | < 0.000036 | < 0.000055 J | < 0.00059 |
| | Molybdenum | mg/L | < 0.00069 | < 0.00069 | < 0.00074 | < 0.00074 | < 0.00074 | 0.008 J | 0.0041 J | 0.0072 J | ------ | 0.0069 J | 0.0044 J | 0.0065 J |
| | Selenium | mg/L | < 0.0016 | < 0.0016 | < 0.0014 | < 0.0014 | < 0.0014 | < 0.0014 | < 0.0018 | < 0.0018 | ------ | < 0.0014 | < 0.0014 | < 0.0014 |
| | Thallium | mg/L | < 0.00014 | < 0.00014 | < 0.00018 | < 0.00018 | < 0.00018 | < 0.000050 | < 0.000050 | < 0.000050 | ------ | < 0.00014 | < 0.00014 | < 0.00014 |
| | Radium | pCi/L | 0.181 U | 0.969 U | 0.911 U | 0.172 U | 0.637 U | 1.36 | 1.13 | 1.24 | ------ | 1.82 | 1.37 | 1.2 |
| | Radium-226 | pCi/L | 0.0807 U | 0.0788 U | 0.149 U | 0.172 U | ------ | ------ | 0.372 | 0.882 | ------ | 0.695 | 0.588 | 0.503 |
| | Radium-228 | pCi/L | 0.0999 U | 0.89 U | 0.762 U | -0.207 U | ------ | ------ | 0.754 | 0.361 U | ------ | 1.12 | 0.777 U | 0.701 |
| **Field Measured** | Conductivity | uS/cm | 754.07 | 726.2 | 767.17 | 745.4 | ------ | 1464.33 | 1484 | 1501.7 | 1654.8 | ------ | ------ | ------ |
| | Dissolved Oxygen | mg/L | 0.21 | 0.09 | 0.78 | 0.14 | ------ | 0.2 | 0.23 | 0.21 | 0.29 | ------ | ------ | ------ |
| | Oxidation Reduction Potential | millivolts | 13.6 | 436 | -18.6 | -39 | ------ | 83.26 | 67.7 | 74.8 | 112.4 | ------ | ------ | ------ |
| | Temperature | Deg C | 21.11 | 15.71 | 21.37 | 15.12 | ------ | 19.99 | 21.9 | 20.2 | 16.07 | ------ | ------ | ------ |
| | Turbidity | ntu | 3.65 | 4.68 | 2.66 | 4.95 | ------ | 7.45 | 0.24 | 2.2 | 1.2 | ------ | ------ | ------ |
| | Water level depth | ft | 7.55 | 8.55 | 7 | 6.97 | ------ | 16.38 | 16.17 | 18.66 | 19.08 | ------ | ------ | ------ |
| **Supplemental** | Alkalinity as CaCO3, Total | mg/L | ------ | 245 | ------ | 229 | 256.0 | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Alkalinity, Bicarbonate as CaCO3 | mg/L | ------ | 245 | ------ | 229 | 256.0 | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Alkalinity, Carbonate as CaCO3 | mg/L | ------ | < 5.0 | ------ | < 1.8 | < 5.0 | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Aluminum | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Dissolved Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Hardness | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Total | mg/L | ------ | ------ | ------ | ------ | 12.3 | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Ferric (Fe2) | mg/L | ------ | ------ | ------ | ------ | 6.3 | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Ferrous | mg/L | ------ | ------ | ------ | ------ | 6.0 | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Magnesium | mg/L | ------ | 22.6 | ------ | 24 | 22.4 | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Manganese | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nickel | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nitrate as N | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphorus, Total Orthophosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Potassium | mg/L | ------ | 2.4 | ------ | 2.8 | 2.9 | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silica | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silicon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silver | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Sodium | mg/L | ------ | 14.4 | ------ | 13.9 | 13.6 | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Sulfide | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Total Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Zinc | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |

**NOTES:**
1. mg/L - milligrams per Liter; pCi/L - picocuries per Liter; S.U. - Standarc
2. < indicates the substance was not detected above the analytical methc
3. J indicates the substance was detected at such low levels that the pre
4. Radium data are a combination of radium isotopes 226 and 228. Whe

**APPENDIX A**
**ANALYTICAL RESULTS (2016 - 2022)**
Plant McDonough-Atkinson Ash Pond 1 and Ash Pond 2 and 3/4
Atlanta, Georgia

| | Analyte | Units | DGWC-4 | DGWC-4 | DGWC-4 | DGWC-4 | DGWC-4 | DGWC-4 | DGWC-4 | DGWC-4 | DGWC-4 | DGWC-4 | DGWC-40 | DGWC-40 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 3/12/2019 | 8/27/2019 | 10/15/2019 | 3/2/2020 | 8/12/2020 | 9/22/2020 | 3/1/2021 | 9/10/2021 | 1/24/2022 | 9/19/2022 | 9/2/2016 | 12/8/2016 |
| | Boron | mg/L | 4.6 | ------ | 5 | 5.9 | ------ | 4.3 | 4.7 | 5 | 5.1 | 4.80 | 0.895 | 0.841 |
| | Calcium | mg/L | 295 | ------ | 276 | 320 | ------ | 263 | 322 | 285 | 299 | 376.0 | 39.6 | 37.9 |
| | Chloride | mg/L | 24.2 | ------ | 20.9 | 18.7 | ------ | 17 | 15.0 | 13.9 | 12.5 | 11.20 | 20 | 18 |
| **Appendix III** | Fluoride | mg/L | < 0.082 J | < 0.029 | < 0.029 | < 0.050 | < 0.050 | < 0.050 | < 0.050 | < 0.050 | < 0.050 | 0.061 J | 0.5 | 0.35 |
| | pH, field measured | S.U. | ------ | ------ | ------ | 5.88 | 5.93 | 5.88 | 5.82 | 5.83 | 5.79 | 5.76 | 4.77 | 4.77 |
| | Sulfate | mg/L | 987 | ------ | 888 | 840 | ------ | 800 | 840 | 823 | 816 | 925 | 230 | 270 |
| | Total Dissolved Solids | mg/L | 1490 | ------ | 1520 | 1540 | ------ | 1400 | 1140 | 1520 | 1520 | 1670 | 583 | 319 |
| | Antimony | mg/L | ------ | < 0.00027 | < 0.00027 | 0.00058 J | < 0.00028 | < 0.00028 | 0.00049 J | < 0.00078 | < 0.00078 | < 0.00078 | < 0.00080 | < 0.00080 |
| | Arsenic | mg/L | ------ | < 0.00035 | < 0.00035 | < 0.00035 | < 0.00078 | < 0.00078 | < 0.00078 | < 0.0011 | 0.0011 J | < 0.0022 | < 0.0016 | < 0.0016 |
| | Barium | mg/L | ------ | 0.036 | 0.033 | 0.036 | 0.036 | 0.03 | 0.039 | 0.032 | 0.035 | 0.032 | 0.0171 | 0.0163 |
| | Beryllium | mg/L | ------ | 0.00024 J | 0.00022 J | 0.00025 J | 0.00024 J | 0.00019 J | 0.00027 J | 0.00028 J | 0.00033 J | 0.00034 J | 0.0028 J | 0.0026 J |
| | Cadmium | mg/L | ------ | 0.00072 J | 0.00077 J | 0.00088 J | 0.0008 J | 0.00065 J | 0.00085 | 0.0009 | 0.00098 | 0.00091 | 0.0008 J | 0.0007 J |
| | Chromium | mg/L | ------ | < 0.00039 | < 0.00039 | < 0.00039 | < 0.00055 | < 0.00055 | < 0.00055 | < 0.0011 | < 0.0011 | < 0.0011 | < 0.00090 | < 0.00090 |
| | Cobalt | mg/L | ------ | 0.0018 J | 0.0018 J | 0.0021 J | 0.0018 J | 0.0014 J | 0.0020 J | 0.0019 J | 0.0019 J | 0.0018 J | 0.0382 | 0.0318 |
| | Fluoride | mg/L | < 0.082 J | < 0.029 | < 0.029 | < 0.050 | < 0.050 | < 0.050 | < 0.050 | < 0.050 | < 0.050 | 0.061 J | 0.5 | 0.35 |
| **Appendix IV** | Lead | mg/L | ------ | 0.000049 J | 0.0001 J | < 0.000046 | < 0.000036 | < 0.000036 | 0.00012 J | < 0.00089 | < 0.00089 | < 0.00089 | < 0.00010 | < 0.00010 |
| | Lithium | mg/L | ------ | 0.0033 J | 0.0029 J | 0.0035 J | 0.0031 J | 0.0026 J | 0.0035 J | 0.0035 J | 0.0038 J | 0.0037 J | 0.0022 J | < 0.0021 |
| | Mercury | mg/L | ------ | < 0.00014 | < 0.00014 | < 0.00014 | < 0.000078 | < 0.000078 | < 0.000078 | 0.00013 J | 0.00022 | < 0.00013 | 0.000044 J | < 0.000041 |
| | Molybdenum | mg/L | ------ | 0.0065 J | 0.0061 J | 0.0059 J | 0.0057 J | 0.0028 J | 0.0051 J | 0.0052 J | 0.0045 J | 0.0037 J | < 0.0017 | < 0.0017 |
| | Selenium | mg/L | ------ | < 0.0013 | 0.0014 J | < 0.0013 | < 0.0016 | < 0.0016 | < 0.0016 | < 0.0014 | < 0.0014 | < 0.0014 | 0.0019 J | 0.0022 J |
| | Thallium | mg/L | ------ | < 0.000052 | 0.000073 J | < 0.000052 | < 0.00014 | < 0.00014 | < 0.00014 | < 0.00018 | < 0.00018 | < 0.00018 | < 0.00020 | < 0.00020 |
| | Radium | pCi/L | ------ | 1.79 | 2.11 U | 1.99 | 1.95 | 1.43 U | 1.05 U | 1.46 | 0.944 U | 1.55 | 1.44 | 2.56 |
| | Radium-226 | pCi/L | ------ | 0.752 | 1.06 | 0.968 | 0.708 | 0.536 | 0.778 | 0.266 U | 0.33 | ------ | 0.0392 U | 0.0616 U |
| | Radium-228 | pCi/L | ------ | 1.04 | 1.05 U | 1.02 | 1.24 | 0.89 U | 0.273 U | 1.19 | 0.614 U | ------ | 1.4 | 2.5 |
| | Conductivity | uS/cm | ------ | ------ | ------ | ------ | 1744 | 1697.7 | 1762.53 | 1768.7 | 2004 | ------ | 520.89 | 550.25 |
| | Dissolved Oxygen | mg/L | ------ | ------ | ------ | ------ | 0.16 | 0.22 | 0.13 | 0.42 | 0.42 | ------ | 1.31 | 1.00 |
| **Field** | Oxidation Reduction Potential | millivolts | ------ | ------ | ------ | ------ | 123.6 | 41.1 | 132.6 | 72.2 | 62 | ------ | 167.8 | 125.2 |
| **Measured** | Temperature | Deg C | ------ | ------ | ------ | ------ | 19.94 | 17.64 | 16.78 | 19.1 | 17.36 | ------ | 22.47 | 16 |
| | Turbidity | ntu | ------ | ------ | ------ | ------ | 2.02 | 0.18 | 3.18 | 4.53 | 2.73 | ------ | 1.57 | 0.82 |
| | Water level depth | ft | ------ | ------ | ------ | ------ | 24.15 | 23.62 | 23.41 | 24.42 | 24.43 | ------ | 18.04 | 17.86 |
| | Alkalinity as CaCO3, Total | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | 151 | ------ | 131 | 127.0 | ------ | ------ |
| | Alkalinity, Bicarbonate as CaCO3 | mg/L | ------ | ------ | 136 | ------ | ------ | ------ | 151 | ------ | 131 | 127.0 | ------ | ------ |
| | Alkalinity, Carbonate as CaCO3 | mg/L | ------ | ------ | < 20 | ------ | ------ | ------ | < 5.0 | ------ | < 1.8 | < 5.00 | ------ | ------ |
| | Aluminum | mg/L | ------ | ------ | < 0.032 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Dissolved Organic Carbon | mg/L | ------ | ------ | < 0.50 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Hardness | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Total | mg/L | ------ | ------ | < 0.20 | ------ | ------ | ------ | ------ | ------ | ------ | < 0.025 | ------ | ------ |
| | Iron, Ferric (Fe2) | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 0.025 | ------ | ------ |
| | Iron, Ferrous | mg/L | ------ | ------ | < 0.20 | ------ | ------ | ------ | ------ | ------ | ------ | 0.0 | ------ | ------ |
| | Magnesium | mg/L | ------ | ------ | 33.3 | ------ | ------ | ------ | 39.0 | ------ | 37.7 | 41.3 | ------ | ------ |
| | Manganese | mg/L | ------ | ------ | 24.5 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| **Supplemental** | Nickel | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nitrate as N | mg/L | ------ | ------ | 0.094 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphate | mg/L | ------ | ------ | 0.0 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphorus, Total Orthophosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Potassium | mg/L | ------ | ------ | 9 | ------ | ------ | ------ | 10.4 | ------ | 9.8 | 10.5 | ------ | ------ |
| | Silica | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silicon | mg/L | ------ | ------ | 12.9 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silver | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Sodium | mg/L | ------ | ------ | 51.1 | ------ | ------ | ------ | 63.0 | ------ | 55.1 | 59.4 | ------ | ------ |
| | Sulfide | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Total Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Zinc | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |

**NOTES:**
1. mg/L - milligrams per Liter; pCi/L - picocuries per Liter; S.U. - Standarc
2. < indicates the substance was not detected above the analytical methc
3. J indicates the substance was detected at such low levels that the prec
4. Radium data are a combination of radium isotopes 226 and 228. Whe

**APPENDIX A**
**ANALYTICAL RESULTS (2016 - 2022)**
Plant McDonough-Atkinson Ash Pond 1 and Ash Pond 2 and 3/4
Atlanta, Georgia

| | Analyte | Units | DGWC-40 12/8/2016 | DGWC-40 3/30/2017 | DGWC-40 10/26/2017 | DGWC-40 1/24/2018 | DGWC-40 3/2/2018 | DGWC-40 7/12/2018 | DGWC-40 11/8/2018 | DGWC-40 3/13/2019 | DGWC-40 8/28/2019 | DGWC-40 10/18/2019 | DGWC-40 3/4/2020 | DGWC-40 8/13/2020 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Appendix III** | Boron | mg/L | 0.913 | 0.937 | 0.873 | ------ | 0.974 | 0.92 | 0.8 | 0.8 | ------ | 0.9 | 0.86 | ------ |
| | Calcium | mg/L | 43.3 | 43.9 | 41.8 | 40.8 | 43.2 | 47.1 | 43.5 | 41 | ------ | 43.7 | 49.6 | ------ |
| | Chloride | mg/L | 17 B | 20 | 21 | 18.7 | 19.5 | 19.9 | 19.3 | 19.7 | ------ | 19.2 | 20.6 | ------ |
| | Fluoride | mg/L | 0.3 | 0.21 J | 0.5 | ------ | 0.33 | 0.57 | 0.11 J | 0.15 J | 0.14 | 0.13 J | 0.11 J | 0.16 |
| | pH, field measured | S.U. | ------ | 4.84 | 4.79 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 4.64 | 4.65 |
| | Sulfate | mg/L | 220 B | 240 | 220 | 230 | 219 | 222 | 273 | 445 | ------ | 205 | 177 | ------ |
| | Total Dissolved Solids | mg/L | ------ | 344 | 373 | ------ | 359 | 365 | 399 | 333 351 | ------ | 360 | 400 | ------ |
| **Appendix IV** | Antimony | mg/L | < 0.00080 | < 0.00030 | < 0.00060 | ------ | < 0.00078 | < 0.00078 | < 0.00078 | ------ | < 0.00027 | < 0.00027 | < 0.00027 | < 0.00028 |
| | Arsenic | mg/L | < 0.0016 | 0.0006 J | < 0.00050 | < 0.00032 | 0.0011 J | < 0.00057 | < 0.00057 | ------ | < 0.00035 | < 0.00035 | 0.00065 J | < 0.00078 |
| | Barium | mg/L | 0.0165 | 0.0177 | 0.0168 | ------ | 0.0169 | 0.018 | 0.017 | ------ | 0.017 | 0.019 | 0.018 | 0.018 |
| | Beryllium | mg/L | 0.0027 J | 0.003 | 0.0027 J | ------ | 0.0033 | 0.0032 | 0.0027 J | ------ | 0.0032 | 0.0033 | 0.0039 | 0.0033 |
| | Cadmium | mg/L | 0.0007 J | 0.0007 J | 0.0008 J | ------ | < 0.000093 | < 0.00087 J | 0.00076 J | ------ | 0.00087 J | 0.00088 J | 0.00093 J | 0.00084 J |
| | Chromium | mg/L | < 0.00090 | 0.0007 J | 0.0007 J | ------ | < 0.0016 | < 0.0016 | < 0.0016 | ------ | 0.00061 J | 0.00078 J | 0.0011 J | 0.00072 J |
| | Cobalt | mg/L | 0.0313 | 0.0364 | 0.0371 | ------ | 0.0425 | 0.044 | 0.036 | ------ | 0.044 | 0.043 | 0.055 | 0.044 |
| | Fluoride | mg/L | 0.3 | 0.21 J | 0.5 | ------ | 0.33 | 0.57 | 0.11 J | 0.15 J | 0.14 | 0.13 J | 0.11 J | 0.16 |
| | Lead | mg/L | < 0.00010 | 0.00007 J | 0.00007 J | ------ | < 0.00027 | < 0.00027 | < 0.00027 | ------ | 0.000081 J | 0.00015 J | 0.00017 J | 0.000049 J |
| | Lithium | mg/L | 0.0022 J | 0.0023 J | 0.0021 J | ------ | 0.0023 J | 0.0022 J | 0.002 J | ------ | 0.0022 J | 0.0024 J | 0.0027 J | 0.0022 J |
| | Mercury | mg/L | < 0.000040 | 0.00009 J | < 0.000036 | ------ | < 0.000036 | 0.000045 J | < 0.000036 | ------ | < 0.00014 | < 0.00014 | < 0.00014 | < 0.000078 |
| | Molybdenum | mg/L | < 0.0017 | < 0.00060 | < 0.0010 | ------ | < 0.0019 | < 0.0019 | < 0.0019 | ------ | < 0.00095 | < 0.00095 | < 0.00095 | < 0.00069 |
| | Selenium | mg/L | 0.0032 J | 0.0023 J | 0.0036 J | ------ | < 0.0014 | < 0.0014 | 0.0016 J | ------ | 0.0017 J | 0.0027 J | 0.0049 J | 0.0018 J |
| | Thallium | mg/L | < 0.00020 | 0.00006 J | 0.00007 J | ------ | < 0.00014 | < 0.00014 | < 0.00014 | ------ | 0.00007 J | < 0.000052 | 0.000068 J | < 0.00014 |
| | Radium | pCi/L | ------ | 0.0844 U | 0.748 U | ------ | 0.485 U | 0.231 U | 0.465 U | ------ | 0.592 U | ------ | 1.62 | 1.6 |
| | Radium-226 | pCi/L | ------ | ------ | 0.661 | ------ | 0.298 U | 0.231 | 0.328 | ------ | 0.403 | ------ | 1.07 | 0.193 U |
| | Radium-228 | pCi/L | ------ | ------ | 0.0869 U | ------ | 0.187 U | -0.236 U | 0.137 U | ------ | 0.189 U | ------ | 0.554 U | 1.41 |
| **Field Measured** | Conductivity | uS/cm | ------ | 541.81 | 544.7 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 535.1 |
| | Dissolved Oxygen | mg/L | ------ | 2.65 | 1.26 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 2.79 |
| | Oxidation Reduction Potential | millivolts | ------ | 182.24 | 108.7 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 106 |
| | Temperature | Deg C | ------ | 22.8 | 20.58 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 21.2 |
| | Turbidity | ntu | ------ | 0.52 | 0.02 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 1.16 |
| | Water level depth | ft | ------ | 17.2 | 17.8 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 19.4 |
| **Supplemental** | Alkalinity as CaCO3, Total | mg/L | ------ | ------ | ------ | 1.5 | ------ | ------ | ------ | ------ | ------ | | ------ | ------ |
| | Alkalinity, Bicarbonate as CaCO3 | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 1.0 | ------ | ------ |
| | Alkalinity, Carbonate as CaCO3 | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 1.0 | ------ | ------ |
| | Aluminum | mg/L | 0.234 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 0.41 | ------ | ------ |
| | Dissolved Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 0.50 | ------ | ------ |
| | Hardness | mg/L | 203 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | | ------ | ------ |
| | Iron, Total | mg/L | ------ | ------ | ------ | < 0.0043 | ------ | ------ | ------ | ------ | ------ | 0.2 | ------ | ------ |
| | Iron, Ferric (Fe2) | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 0.2 | ------ | ------ |
| | Iron, Ferrous | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 0.20 | ------ | ------ |
| | Magnesium | mg/L | 23 | ------ | ------ | 20.5 | ------ | ------ | ------ | ------ | ------ | 19.6 | ------ | ------ |
| | Manganese | mg/L | 2.84 | ------ | ------ | 2.73 | ------ | ------ | ------ | ------ | ------ | 3.3 | ------ | ------ |
| | Nickel | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | | ------ | ------ |
| | Nitrate as N | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 1 | ------ | ------ |
| | Phosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | | ------ | ------ |
| | Phosphorus, Total Orthophosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 0.020 | ------ | ------ |
| | Potassium | mg/L | 5.42 | ------ | ------ | 5.52 | ------ | ------ | ------ | ------ | ------ | 5.7 | ------ | ------ |
| | Silica | mg/L | 19.7 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | | ------ | ------ |
| | Silicon | mg/L | 9.18 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 9.4 | ------ | ------ |
| | Silver | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | | ------ | ------ |
| | Sodium | mg/L | 19.4 | ------ | ------ | 16.8 | ------ | ------ | ------ | ------ | ------ | 17.8 | ------ | ------ |
| | Sulfide | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Total Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Zinc | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |

**NOTES:**

1. mg/L - milligrams per Liter; pCi/L - picocuries per Liter; S.U. - Standarc
2. < indicates the substance was not detected above the analytical metho
3. J indicates the substance was detected at such low levels that the pre
4. Radium data are a combination of radium isotopes 226 and 228. Whe

**APPENDIX A**
**ANALYTICAL RESULTS (2016 - 2022)**
Plant McDonough-Atkinson Ash Pond 1 and Ash Pond 2 and 3/4
Atlanta, Georgia

| | Analyte | Units | DGWC-40 | DGWC-40 | DGWC-40 | DGWC-40 | DGWC-40 | DGWC-42 | DGWC-42 | DGWC-42 | DGWC-42 | DGWC-42 | DGWC-42 | DGWC-42 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 9/23/2020 | 3/8/2021 | 9/14/2021 | 1/19/2022 | 9/7/2022 | 9/7/2016 | 12/8/2016 | 12/8/2016 | 10/25/2017 | 1/23/2018 | 2/28/2018 | 7/11/2018 |
| **Appendix III** | Boron | mg/L | 0.76 | 0.72 | 0.7 | 0.82 | 0.84 | 0.924 | 1.05 | 0.957 | 0.982 | ------ | 0.92 | 0.83 |
| | Calcium | mg/L | 41.9 | 44.9 | 45.1 | 44.7 | 44.8 | 43.6 | 48.5 | 45.8 | 50.9 | 45.7 | 45.1 | 47.8 |
| | Chloride | mg/L | 19.7 | 19.1 | 16.7 | 16.5 | 15.00 | 33 | 32 B | 32 | 32 | 26.2 | 29 | 29.3 |
| | Fluoride | mg/L | 0.054 J | 0.17 | 0.13 | 0.12 | 0.14 | 0.02 J | 0.07 J | 0.06 J | < 0.030 | ------ | < 0.029 | < 0.029 |
| | pH, field measured | S.U. | 4.78 | 4.79 | 4.67 | 4.66 | 4.54 | 5.35 | ------ | 5.41 | 5.38 | ------ | 5.37 | ------ |
| | Sulfate | mg/L | 190 | 191 | 186 | 177 | 203 | 370 | 370 B | 350 | 370 | 349 | 350 | 366 |
| | Total Dissolved Solids | mg/L | 357 | 346 | 347 | 336 | 339 | 611 | ------ | 535 | 626 | ------ | 616 | 638 |
| **Appendix IV** | Antimony | mg/L | < 0.00028 | 0.00033 J | < 0.00078 | < 0.00078 | < 0.00078 | < 0.00080 | < 0.00080 | < 0.00080 | < 0.00060 | ------ | < 0.00078 | < 0.00078 |
| | Arsenic | mg/L | < 0.00078 | < 0.00078 | < 0.0011 | 0.003 J | < 0.0022 | < 0.0016 | < 0.0016 | < 0.0016 | < 0.00050 | < 0.0050 | < 0.0011 J | < 0.00057 |
| | Barium | mg/L | 0.019 | 0.016 | 0.027 | 0.018 | 0.016 | 0.0194 | 0.0194 | 0.0189 | 0.0196 | ------ | 0.017 | 0.02 |
| | Beryllium | mg/L | 0.0031 | 0.0030 | 0.0032 | 0.0034 | 0.0031 | 0.0021 J | 0.0024 J | 0.0023 J | 0.0026 J | ------ | 0.0029 J | 0.0029 J |
| | Cadmium | mg/L | 0.0008 J | 0.00072 | 0.00086 | 0.00085 | 0.00081 | 0.0007 J | 0.0004 J | 0.0003 J | 0.0005 J | ------ | 0.00025 J | 0.0024 |
| | Chromium | mg/L | 0.0011 J | 0.00060 J | 0.0021 J | < 0.0011 | < 0.0011 | < 0.00090 | < 0.00090 | < 0.00090 | 0.0005 J | ------ | < 0.0016 | < 0.0016 |
| | Cobalt | mg/L | 0.046 | 0.039 | 0.05 | 0.042 | 0.037 | 0.0695 | 0.0638 | 0.0652 | 0.0435 | ------ | < 0.017 | 0.019 |
| | Fluoride | mg/L | 0.054 J | 0.17 | 0.13 | 0.12 | 0.14 | 0.02 J | 0.07 J | 0.06 J | < 0.030 | ------ | < 0.029 | < 0.029 |
| | Lead | mg/L | 0.00028 J | 0.000054 J | < 0.00089 | < 0.00089 | < 0.00089 | 0.0002 J | < 0.00010 | 0.0002 J | 0.0002 J | ------ | < 0.00027 | 0.00052 J |
| | Lithium | mg/L | 0.0022 J | 0.0022 J | 0.003 J | 0.0024 J | 0.0023 J | 0.012 J | 0.0126 J | 0.0118 J | 0.0122 J | ------ | 0.012 J | 0.01 J |
| | Mercury | mg/L | < 0.000078 | | < 0.000078 | < 0.00013 | < 0.00013 | < 0.000041 | < 0.000040 | < 0.000041 | < 0.000036 | ------ | < 0.000036 | < 0.000036 |
| | Molybdenum | mg/L | < 0.00069 | < 0.00069 | < 0.00074 | < 0.00074 | < 0.00074 | < 0.0017 | < 0.0017 | < 0.0017 | < 0.0010 | ------ | < 0.0019 | < 0.0019 |
| | Selenium | mg/L | 0.0067 J | 0.0023 J | 0.0015 J | < 0.0014 | 0.0018 J | < 0.0010 | < 0.0010 | < 0.0010 | < 0.0018 | ------ | < 0.0014 | < 0.0014 |
| | Thallium | mg/L | < 0.00014 | < 0.00014 | < 0.00018 | < 0.00018 | < 0.00018 | < 0.00020 | < 0.00020 | < 0.00020 | 0.00009 J | ------ | < 0.00014 | < 0.00014 |
| | Radium | pCi/L | 1.28 U | 0.714 U | 1.8 | 1.7 | 0.772 U | 0.876 U | ------ | 0.955 | 1.46 | ------ | 0.882 U | 0.924 U |
| | Radium-226 | pCi/L | 0.414 U | 0.147 U | 0.192 U | 0.123 U | ------ | 0.00696 U | ------ | 0.177 | 0.444 | ------ | 0.555 | 0.556 |
| | Radium-228 | pCi/L | 0.869 U | 0.567 U | 1.61 | 1.58 | ------ | 0.869 | ------ | 0.778 U | 1.02 | ------ | 0.327 U | 0.368 U |
| **Field Measured** | Conductivity | uS/cm | 546.1 | 474.3 | 511.89 | 547.83 | ------ | 775.3 | ------ | 832.42 | 895.85 | ------ | 848.87 | ------ |
| | Dissolved Oxygen | mg/L | 2.28 | 2.83 | 2.46 | 2.5 | ------ | 0.31 | ------ | 0.37 | 0.31 | ------ | 0.21 | ------ |
| | Oxidation Reduction Potential | millivolts | 165.5 | 98 | 220.3 | 142.8 | ------ | 145.1 | ------ | 47.26 | 69.15 | ------ | 93.2 | ------ |
| | Temperature | Deg C | 21.03 | 19.61 | 21.18 | 19.19 | ------ | 27.68 | ------ | 14.95 | 19.3 | ------ | 18.39 | ------ |
| | Turbidity | ntu | 1.8 | 0.45 | 1.85 | 1.18 | ------ | 3.05 | ------ | 2.58 | 4.63 | ------ | 3.95 | ------ |
| | Water level depth | ft | 17.58 | 17.1 | 17.6 | 17.35 | ------ | 26.57 | ------ | 28.73 | 31.01 | ------ | 31.13 | ------ |
| **Supplemental** | Alkalinity as CaCO3, Total | mg/L | ------ | < 5.0 | ------ | < 1.8 | < 5.0 | ------ | | ------ | ------ | 5.5 | ------ | ------ |
| | Alkalinity, Bicarbonate as CaCO3 | mg/L | ------ | < 5.0 | ------ | < 1.8 | < 5.0 | ------ | | ------ | ------ | | ------ | ------ |
| | Alkalinity, Carbonate as CaCO3 | mg/L | ------ | < 5.0 | ------ | < 1.8 | < 5.0 | ------ | | ------ | ------ | | ------ | ------ |
| | Aluminum | mg/L | ------ | | ------ | | | ------ | 0.0209 J | ------ | ------ | | ------ | ------ |
| | Dissolved Organic Carbon | mg/L | ------ | | ------ | | | ------ | | ------ | ------ | | ------ | ------ |
| | Hardness | mg/L | ------ | | ------ | | | ------ | 273 | ------ | ------ | | ------ | ------ |
| | Iron, Total | mg/L | ------ | | ------ | | < 0.025 | ------ | | ------ | ------ | 0.4 | ------ | ------ |
| | Iron, Ferric (Fe2) | mg/L | ------ | | ------ | | < 0.025 | ------ | | ------ | ------ | | ------ | ------ |
| | Iron, Ferrous | mg/L | ------ | | ------ | | 0.0 | ------ | | ------ | ------ | | ------ | ------ |
| | Magnesium | mg/L | ------ | 18.8 | ------ | 19.9 | 19.4 | ------ | 36.9 | ------ | ------ | 36.5 | ------ | ------ |
| | Manganese | mg/L | ------ | | ------ | | | ------ | 8.83 | ------ | ------ | 11.1 | ------ | ------ |
| | Nickel | mg/L | ------ | | ------ | | | ------ | | ------ | ------ | | ------ | ------ |
| | Nitrate as N | mg/L | ------ | | ------ | | | ------ | | ------ | ------ | | ------ | ------ |
| | Phosphate | mg/L | ------ | | ------ | | | ------ | | ------ | ------ | | ------ | ------ |
| | Phosphorus, Total Orthophosphate | mg/L | ------ | | ------ | | | ------ | | ------ | ------ | | ------ | ------ |
| | Potassium | mg/L | ------ | 6 | ------ | 5.9 | 5.9 | ------ | 6.24 | ------ | ------ | 5.97 | ------ | ------ |
| | Silica | mg/L | ------ | | ------ | | | ------ | 26.5 | ------ | ------ | | ------ | ------ |
| | Silicon | mg/L | ------ | | ------ | | | ------ | 12.4 | ------ | ------ | | ------ | ------ |
| | Silver | mg/L | ------ | | ------ | | | ------ | | ------ | ------ | | ------ | ------ |
| | Sodium | mg/L | ------ | 20.7 | ------ | 19.9 | 19.2 | ------ | 53.6 | ------ | ------ | 58.7 | ------ | ------ |
| | Sulfide | mg/L | ------ | | ------ | | | ------ | | ------ | ------ | | ------ | ------ |
| | Total Organic Carbon | mg/L | ------ | | ------ | | | ------ | | ------ | ------ | | ------ | ------ |
| | Zinc | mg/L | ------ | | ------ | | | ------ | | ------ | ------ | | ------ | ------ |

**NOTES:**
1. mg/L - milligrams per Liter; pCi/L - picocuries per Liter; S.U. - Standarc
2. < indicates the substance was not detected above the analytical methc
3. J indicates the substance was detected at such low levels that the pre
4. Radium data are a combination of radium isotopes 226 and 228. Whe

| Analyte | | Units | DGWC-42 | DGWC-42 | DGWC-42 | DGWC-42 | DGWC-42 | DGWC-42 | DGWC-42 | DGWC-42 | DGWC-42 | DGWC-42 | DGWC-42 | DGWC-47 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 11/7/2018 | 3/14/2019 | 8/28/2019 | 10/17/2019 | 3/4/2020 | 8/13/2020 | 9/22/2020 | 3/3/2021 | 9/13/2021 | 1/20/2022 | 9/13/2022 | 9/1/2016 |
| **Appendix III** | Boron | mg/L | 0.89 | 0.89 | ------ | 0.94 | 1 | ------ | 0.88 | 0.87 | 0.95 | 0.83 | 1.10 | 0.345 |
| | Calcium | mg/L | 45.5 | 43.5 | ------ | 44.1 | 48.8 | ------ | 43.8 | 38.8 | 38.9 | 38.1 | 34.2 | 69.3 |
| | Chloride | mg/L | 28.6 | 24.8 | ------ | 25.8 | 23.6 | ------ | 22.1 | 20.8 | 17.1 | 18.2 | 18.70 | 12 |
| | Fluoride | mg/L | < 0.029 | < 0.029 | < 0.050 | < 0.029 | < 0.050 | < 0.050 | < 0.050 | < 0.050 | < 0.050 | < 0.050 | < 0.050 | 1.8 |
| | pH, field measured | S.U. | ------ | ------ | ------ | ------ | 5.18 | 5.34 | 5.76 | 5.30 | 5.15 | 5.27 | 5.04 | 5.11 |
| | Sulfate | mg/L | 439 | 404 | ------ | 321 | 329 | ------ | 320 | 329 | 285 | 281 | 326 | 470 |
| | Total Dissolved Solids | mg/L | 626 | 630 | ------ | 612 | 721 | ------ | 547 | 531 | 508 | 504 | 540 | 704 |
| **Appendix IV** | Antimony | mg/L | < 0.00078 | ------ | < 0.00027 | < 0.00027 | < 0.00027 | < 0.00028 | < 0.00028 | < 0.00028 | < 0.00078 | < 0.00078 | < 0.00078 | < 0.00080 |
| | Arsenic | mg/L | < 0.00057 | ------ | < 0.00035 | < 0.00035 | < 0.00035 | < 0.00078 | < 0.00078 | < 0.00078 | < 0.0011 | < 0.0011 | < 0.0022 | 0.0037 J |
| | Barium | mg/L | 0.017 | ------ | 0.018 | 0.018 | 0.015 | 0.027 | 0.016 | 0.015 | 0.014 | 0.014 | 0.016 | 0.0162 |
| | Beryllium | mg/L | 0.0031 | ------ | 0.0023 J | 0.0027 J | 0.0029 J | 0.0026 J | 0.0013 J | 0.0023 | 0.0024 | 0.002 | 0.0028 | 0.0165 |
| | Cadmium | mg/L | < 0.00091 J | ------ | 0.0015 J | 0.00058 J | 0.00037 J | 0.0013 J | 0.0007 J | 0.00038 J | 0.00042 J | 0.00038 J | 0.00069 | 0.0017 |
| | Chromium | mg/L | < 0.0016 | ------ | < 0.00039 | 0.00041 J | 0.00042 J | 0.0021 J | 0.001 J | < 0.00055 | < 0.0011 | < 0.0011 | < 0.0011 | < 0.00090 |
| | Cobalt | mg/L | 0.02 | ------ | 0.029 | 0.03 | 0.014 | 0.025 | 0.014 | 0.0087 | 0.008 | 0.0056 | 0.0069 | 0.536 |
| | Fluoride | mg/L | < 0.029 | < 0.029 | < 0.050 | < 0.029 | < 0.050 | < 0.050 | < 0.050 | < 0.050 | < 0.050 | < 0.050 | < 0.050 | 1.8 |
| | Lead | mg/L | 0.00047 J | ------ | 0.00036 J | 0.00026 J | 0.0001 J | 0.0016 J | 0.00074 J | 0.00024 J | < 0.00089 | < 0.00089 | < 0.00089 | 0.0005 J |
| | Lithium | mg/L | 0.012 J | ------ | 0.01 J | 0.011 J | 0.0091 J | 0.011 J | 0.0099 J | 0.0079 J | 0.015 J | 0.0069 J | 0.0091 J | 0.0854 |
| | Mercury | mg/L | < 0.000036 | ------ | < 0.00014 | < 0.00014 | < 0.00014 | < 0.000078 | < 0.000078 | < 0.000078 | < 0.000078 | < 0.00013 | < 0.00013 | < 0.000041 |
| | Molybdenum | mg/L | < 0.0019 | ------ | < 0.00095 | < 0.00095 | < 0.00095 | < 0.00069 | < 0.00069 | < 0.00069 | < 0.00074 | < 0.00074 | < 0.00074 | < 0.0017 |
| | Selenium | mg/L | < 0.0014 | ------ | < 0.0013 | < 0.0013 | < 0.0013 | < 0.0016 | < 0.0016 | < 0.0016 | < 0.0014 | < 0.0014 | < 0.0014 | 0.0217 |
| | Thallium | mg/L | < 0.00014 | ------ | 0.000069 J | < 0.000052 | < 0.000052 | < 0.00014 | < 0.00014 | < 0.00014 | < 0.00018 | < 0.00018 | < 0.00018 | 0.0002 J |
| | Radium | pCi/L | 0.654 U | ------ | 0.883 U | 1.38 | 0.722 U | 1.23 U | 1.03 U | 0.920 U | 1.15 U | 0.0465 U | 0.829 U | 4.47 |
| | Radium-226 | pCi/L | 0.385 | ------ | 0.507 | 0.408 U | 0.615 | 0.248 U | 0.268 U | 0.165 U | 0.128 U | 0.0182 U | ------ | 2.03 |
| | Radium-228 | pCi/L | 0.269 U | ------ | 0.376 U | 0.967 | 0.107 U | 0.977 | 0.758 U | 0.755 | 1.02 | 0.0283 U | ------ | 2.44 |
| **Field Measured** | Conductivity | uS/cm | ------ | ------ | ------ | ------ | ------ | 792.9 | 758.9 | 791.59 | 708.11 | 770.9 | ------ | 861.87 |
| | Dissolved Oxygen | mg/L | ------ | ------ | ------ | ------ | ------ | 0.13 | 7.93 | 0.09 | 0.8 | 0.29 | ------ | 0.17 |
| | Oxidation Reduction Potential | millivolts | ------ | ------ | ------ | ------ | ------ | 129.7 | 141.8 | 71.3 | 72.4 | 96.3 | ------ | -15.7 |
| | Temperature | Deg C | ------ | ------ | ------ | ------ | ------ | 20.68 | 19.99 | 19.01 | 22.85 | 17.18 | ------ | 26.16 |
| | Turbidity | ntu | ------ | ------ | ------ | ------ | ------ | 4.01 | 4.2 | 6.67 | 2.65 | 2.93 | ------ | 1.86 |
| | Water level depth | ft | ------ | ------ | ------ | ------ | ------ | 35.17 | 31.5 | 31.3 | 29.85 | 30.9 | ------ | 20.62 |
| **Supplemental** | Alkalinity as CaCO3, Total | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 9.4 | ------ | 9.1 | 6.4 | ------ |
| | Alkalinity, Bicarbonate as CaCO3 | mg/L | ------ | ------ | ------ | 6 | ------ | ------ | ------ | 9.4 | ------ | 9.1 | 6.4 | ------ |
| | Alkalinity, Carbonate as CaCO3 | mg/L | ------ | ------ | ------ | < 1.0 | ------ | ------ | ------ | < 5.0 | ------ | < 1.8 | < 5.00 | ------ |
| | Aluminum | mg/L | ------ | ------ | ------ | 0.22 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Dissolved Organic Carbon | mg/L | ------ | ------ | ------ | < 0.50 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Hardness | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Total | mg/L | ------ | ------ | ------ | 0.7 | ------ | ------ | ------ | ------ | ------ | ------ | 0.2 | ------ |
| | Iron, Ferric (Fe2) | mg/L | ------ | ------ | ------ | 1 | ------ | ------ | ------ | ------ | ------ | ------ | 0.2 | ------ |
| | Iron, Ferrous | mg/L | ------ | ------ | ------ | < 0.20 | ------ | ------ | ------ | ------ | ------ | ------ | 0.0 | ------ |
| | Magnesium | mg/L | ------ | ------ | ------ | 31.3 | ------ | ------ | ------ | 31.6 | ------ | 29.7 | 25.0 | ------ |
| | Manganese | mg/L | ------ | ------ | ------ | 9.2 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nickel | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nitrate as N | mg/L | ------ | ------ | ------ | < 0.0050 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphorus, Total Orthophosphate | mg/L | ------ | ------ | ------ | < 0.020 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Potassium | mg/L | ------ | ------ | ------ | 5.3 | ------ | ------ | ------ | 5.3 | ------ | 5.2 | 5.3 | ------ |
| | Silica | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silicon | mg/L | ------ | ------ | ------ | 13.3 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silver | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Sodium | mg/L | ------ | ------ | ------ | 53.5 | ------ | ------ | ------ | 59.0 | ------ | 62.3 | 78.3 | ------ |
| | Sulfide | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Total Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Zinc | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |

**NOTES:**
1. mg/L - milligrams per Liter; pCi/L - picocuries per Liter; S.U. - Standard
2. < indicates the substance was not detected above the analytical meth
3. J indicates the substance was detected at such low levels that the pre
4. Radium data are a combination of radium isotopes 226 and 228. Whe

**APPENDIX A**
**ANALYTICAL RESULTS (2016 - 2022)**
Plant McDonough-Atkinson Ash Pond 1 and Ash Pond 2 and 3/4
Atlanta, Georgia

| | Analyte | Units | DGWC-47 12/8/2016 | DGWC-47 12/8/2016 | DGWC-47 10/26/2017 | DGWC-47 3/1/2018 | DGWC-47 7/12/2018 | DGWC-47 11/7/2018 | DGWC-47 3/14/2019 | DGWC-47 8/29/2019 | DGWC-47 10/17/2019 | DGWC-47 3/4/2020 | DGWC-47 8/12/2020 | DGWC-47 9/23/2020 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Appendix III** | Boron | mg/L | 0.352 | 0.403 | 0.269 | 0.296 | 0.26 | 0.3 | 0.26 | ------ | 0.25 | 0.24 | ------ | 0.21 |
| | Calcium | mg/L | 71.1 | 70.2 | 46.7 | 44.2 | 41.6 | 38.6 | 36.6 | ------ | 36.2 | 36 | ------ | 22.3 |
| | Chloride | mg/L | 12 | 12 B | 6.6 | 10.7 | 9.5 | 8.6 | 6.6 | ------ | 7 | 4.4 | ------ | 3.3 |
| | Fluoride | mg/L | 1.1 | 2 | 1 | 1.4 | 0.96 | 0.74 | 1.6 | 0.52 | 0.46 | 0.74 | 0.22 | 0.11 |
| | pH, field measured | S.U. | 5.71 | ------ | 4.41 | ------ | ------ | ------ | ------ | ------ | ------ | 3.86 | 4.43 | 4.4 |
| | Sulfate | mg/L | 400 | 410 B | 290 | 245 | 240 | 143 | 238 | ------ | 179 | 176 | ------ | 111 |
| | Total Dissolved Solids | mg/L | 587 | | 444 | 435 | 372 | 348 | 378 | ------ | 327 | 334 | ------ | 229 |
| **Appendix IV** | Antimony | mg/L | < 0.00080 | < 0.00080 | < 0.00060 | < 0.00078 | < 0.00078 | < 0.00078 | ------ | < 0.00027 | < 0.00027 | < 0.00027 | < 0.00028 | 0.0012 J |
| | Arsenic | mg/L | 0.0032 J | 0.0046 J | 0.0016 J | 0.0029 J | 0.0023 J | < 0.0022 J | ------ | 0.00089 J | 0.0013 J | 0.0012 J | 0.00081 J | < 0.00078 |
| | Barium | mg/L | 0.0247 | 0.0192 | 0.0152 | 0.0164 | 0.015 | 0.02 | ------ | 0.018 | 0.019 | 0.017 | 0.016 | 0.014 |
| | Beryllium | mg/L | 0.0116 | 0.0218 | 0.0119 | 0.0146 | 0.013 | 0.014 | ------ | 0.011 | 0.0093 | 0.01 | 0.0068 | 0.0069 |
| | Cadmium | mg/L | 0.0002 J | 0.0015 | 0.0015 | 0.0025 | 0.0021 | 0.0016 | ------ | 0.0021 J | 0.0033 | 0.0017 J | 0.001 J | 0.0013 J |
| | Chromium | mg/L | < 0.00090 | < 0.00090 | < 0.00050 | < 0.0016 | < 0.0016 | < 0.0016 | ------ | < 0.00039 | < 0.00039 | < 0.00039 | < 0.00055 | < 0.00055 |
| | Cobalt | mg/L | 0.381 | 0.608 | 0.383 | 0.401 | 0.36 | 0.35 | ------ | 0.28 | 0.26 | 0.28 | 0.21 | 0.17 |
| | Fluoride | mg/L | 1.1 | 2 | 1 | 1.4 | 0.96 | 0.74 | 1.6 | 0.52 | 0.46 | 0.74 | 0.22 | 0.11 |
| | Lead | mg/L | < 0.00010 | 0.0003 J | 0.0009 J | < 0.00027 | 0.001 J | 0.00091 J | ------ | 0.0006 J | 0.0011 J | 0.00088 J | 0.0004 J | 0.00053 J |
| | Lithium | mg/L | 0.0667 | 0.0933 | 0.071 | 0.0772 | 0.073 | 0.082 | ------ | 0.056 | 0.066 | 0.063 | 0.054 | 0.046 |
| | Mercury | mg/L | < 0.000041 | < 0.000040 | < 0.000036 | < 0.000036 | < 0.000036 | < 0.000036 | ------ | < 0.00014 | < 0.00014 | < 0.00014 | < 0.000078 | < 0.000078 |
| | Molybdenum | mg/L | < 0.0017 | < 0.0017 | < 0.0010 | < 0.0019 | < 0.0019 | < 0.0019 | ------ | < 0.00095 | < 0.00095 | < 0.00095 | < 0.00069 | < 0.00069 |
| | Selenium | mg/L | 0.017 | 0.0271 | 0.0097 J | 0.0124 | 0.015 | 0.0045 J | ------ | 0.004 J | 0.0062 J | 0.0065 J | 0.002 J | < 0.0016 |
| | Thallium | mg/L | < 0.00020 | 0.0003 J | 0.0003 J | 0.00032 J | 0.00031 J | < 0.00032 J | ------ | 0.00025 J | 0.00025 J | 0.00021 J | 0.00018 J | 0.00026 J |
| | Radium | pCi/L | 2.88 | ------ | 2.88 | 2.21 | 1.73 | 1.72 | ------ | 3.05 | 2.58 | 1.68 | 2.56 | 2.3 U |
| | Radium-226 | pCi/L | 0.569 | ------ | 1.73 | 1.03 | 0.435 | 0.982 | ------ | 1.68 | 1.15 | 0.93 | 0.87 | 0.961 |
| | Radium-228 | pCi/L | 2.31 | ------ | 1.15 | 1.18 | 1.29 | 0.736 U | ------ | 1.37 | 1.43 | 0.751 | 1.69 | 1.34 U |
| **Field Measured** | Conductivity | uS/cm | 789.84 | ------ | 597.76 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 418 | 318.8 |
| | Dissolved Oxygen | mg/L | 0.12 | ------ | 0.31 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 0.24 | 1.14 |
| | Oxidation Reduction Potential | millivolts | -2.8 | ------ | 90.22 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 585 | 141.3 |
| | Temperature | Deg C | 15.57 | ------ | 22.04 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 24.19 | 21.76 |
| | Turbidity | ntu | 1.63 | ------ | 0.4 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 0.33 | 0.34 |
| | Water level depth | ft | 20.28 | ------ | 19.85 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 24.61 | 23.7 |
| **Supplemental** | Alkalinity as CaCO3, Total | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Alkalinity, Bicarbonate as CaCO3 | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 20 | ------ | ------ | ------ |
| | Alkalinity, Carbonate as CaCO3 | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 20 | ------ | ------ | ------ |
| | Aluminum | mg/L | ------ | 3.5 | ------ | ------ | ------ | ------ | ------ | ------ | 1.1 | ------ | ------ | ------ |
| | Dissolved Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 0.50 | ------ | ------ | ------ |
| | Hardness | mg/L | ------ | 272 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Total | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 3.5 | ------ | ------ | ------ |
| | Iron, Ferric (Fe2) | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 0.20 | ------ | ------ | ------ |
| | Iron, Ferrous | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 2.5 | ------ | ------ | ------ |
| | Magnesium | mg/L | ------ | 23.4 | ------ | ------ | ------ | ------ | ------ | ------ | 10 | ------ | ------ | ------ |
| | Manganese | mg/L | ------ | 24.6 | ------ | ------ | ------ | ------ | ------ | ------ | 10.5 | ------ | ------ | ------ |
| | Nickel | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nitrate as N | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 0.0050 | ------ | ------ | ------ |
| | Phosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphorus, Total Orthophosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 0.020 | ------ | ------ | ------ |
| | Potassium | mg/L | ------ | 9.6 | ------ | ------ | ------ | ------ | ------ | ------ | 6.4 | ------ | ------ | ------ |
| | Silica | mg/L | ------ | 57.9 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silicon | mg/L | ------ | 27 | ------ | ------ | ------ | ------ | ------ | ------ | 23 | ------ | ------ | ------ |
| | Silver | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Sodium | mg/L | ------ | 23.2 | ------ | ------ | ------ | ------ | ------ | ------ | 11.7 | ------ | ------ | ------ |
| | Sulfide | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Total Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Zinc | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |

**NOTES:**
1. mg/L - milligrams per Liter; pCi/L - picocuries per Liter; S.U. - Standarc
2. < indicates the substance was not detected above the analytical methc
3. J indicates the substance was detected at such low levels that the pre
4. Radium data are a combination of radium isotopes 226 and 228. Whe

| Analyte | | Units | DGWC-47 3/3/2021 | DGWC-47 9/10/2021 | DGWC-47 1/21/2022 | DGWC-47 9/13/2022 | DGWC-48 9/1/2016 | DGWC-48 12/8/2016 | DGWC-48 12/8/2016 | DGWC-48 3/30/2017 | DGWC-48 10/26/2017 | DGWC-48 3/2/2018 | DGWC-48 7/12/2018 | DGWC-48 11/7/2018 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Boron | mg/L | 0.17 | 0.16 | 0.17 | 0.18 | 0.955 | 0.919 | 1.01 | 0.925 | 0.746 | 0.878 | 0.82 | 0.74 |
| | Calcium | mg/L | 25.5 | 24.4 | 31 | 24.8 | 95.1 | 105 | 104 | 98.6 | 94 | 86.6 | 89.1 | 88 |
| | Chloride | mg/L | 2.9 | 2.4 | 3.1 | 3.30 | 18 | 17 | 17 B | 16 | 14 | 12.8 | 11.7 | 11.4 |
| **Appendix III** | Fluoride | mg/L | 0.71 | 0.22 | 0.64 | 0.47 | 1.5 | 1.6 | 1.4 | 0.86 | 1.7 | 1.1 | 0.65 | 0.63 |
| | pH, field measured | S.U. | 3.98 | 4.1 | 3.72 | 4.15 | 4.7 | 4.58 | ------ | 4.19 | 4.39 | ------ | ------ | ------ |
| | Sulfate | mg/L | 143 | 123 | 135 | 150 | 540 | 540 | 550 B | 550 | 510 | 456 | 409 | 432 |
| | Total Dissolved Solids | mg/L | 228 | 274 | 289 | 277 | 845 | 777 | ------ | 775 | 753 | 704 | 705 | 678 |
| | Antimony | mg/L | < 0.00028 | < 0.00078 | < 0.00078 | < 0.00078 | < 0.00080 | < 0.00080 | < 0.00080 | < 0.00030 | < 0.00060 | < 0.00078 | < 0.00078 | < 0.00078 |
| | Arsenic | mg/L | < 0.00078 | 0.0016 J | 0.0036 J | < 0.0022 | < 0.0016 | < 0.0016 | < 0.0016 | 0.0015 J | 0.0008 J | 0.0017 J | 0.0015 J | < 0.00057 |
| | Barium | mg/L | 0.020 | 0.021 | 0.017 | 0.022 | 0.0157 | 0.0155 | 0.0159 | 0.0131 | 0.0117 | 0.0131 | 0.013 | 0.014 |
| | Beryllium | mg/L | 0.0081 | 0.009 | 0.01 | 0.0094 | 0.008 | 0.0086 | 0.009 | 0.0106 | 0.0078 | 0.0096 | 0.0086 | 0.0078 |
| | Cadmium | mg/L | 0.0016 | 0.0014 | 0.0019 | 0.0011 | 0.0013 | 0.0042 | 0.002 | 0.0089 | 0.0032 | 0.0049 | 0.0032 | 0.0031 |
| | Chromium | mg/L | < 0.00055 | < 0.0011 | < 0.0011 | < 0.0011 | < 0.00090 | < 0.00090 | < 0.00090 | < 0.00030 | < 0.00050 | < 0.0016 | < 0.0016 | < 0.0016 |
| | Cobalt | mg/L | 0.20 | 0.23 | 0.24 | 0.21 | 0.539 | 0.575 | 0.559 | 0.573 | 0.482 | 0.49 | 0.46 | 0.48 |
| | Fluoride | mg/L | 0.71 | 0.22 | 0.64 | 0.47 | 1.5 | 1.6 | 1.4 | 0.86 | 1.7 | 1.1 | 0.65 | 0.63 |
| **Appendix IV** | Lead | mg/L | 0.00070 J | < 0.00089 | < 0.00089 | < 0.00089 | 0.0008 J | 0.0019 J | 0.0013 J | 0.0035 J | 0.0022 J | < 0.00027 | 0.0014 J | 0.0023 J |
| | Lithium | mg/L | 0.049 | 0.053 | 0.055 | 0.05 | 0.125 | 0.122 | 0.139 | 0.144 | 0.115 | 0.129 | 0.12 | 0.12 |
| | Mercury | mg/L | < 0.000078 | < 0.000078 | < 0.00013 | < 0.00013 | < 0.000041 | < 0.000041 | < 0.000040 | 0.00006 J | < 0.000036 | < 0.000036 | < 0.000036 | < 0.000036 |
| | Molybdenum | mg/L | < 0.00069 | < 0.00074 | < 0.00074 | < 0.00074 | < 0.0017 | < 0.0017 | < 0.0017 | < 0.00060 | < 0.0010 | < 0.0019 | < 0.0019 | < 0.0019 |
| | Selenium | mg/L | 0.0039 J | 0.0035 J | 0.0016 J | 0.0031 J | 0.0084 J | 0.0084 J | 0.009 J | 0.0079 J | 0.0058 J | < 0.0014 | 0.013 | 0.0038 J |
| | Thallium | mg/L | 0.00023 J | 0.00036 J | 0.00028 J | 0.00021 J | < 0.00020 | < 0.00020 | < 0.00020 | 0.00009 J | 0.00009 J | < 0.00014 | < 0.00014 | < 0.00014 |
| | Radium | pCi/L | 1.27 U | 2.32 | 0.785 U | 1.97 | 2.37 | 2.87 | ------ | 1.71 | 3.74 | 2.26 | 1.81 | 1.94 |
| | Radium-226 | pCi/L | 0.608 U | 0.479 | 0.3 U | ------ | 0.282 | 0.435 | ------ | ------ | 1.66 | 1.05 | 0.401 | 0.593 |
| | Radium-228 | pCi/L | 0.660 U | 1.84 | 0.485 U | ------ | 2.09 | 2.43 | ------ | ------ | 2.08 | 1.21 | 1.41 | 1.35 |
| | Conductivity | uS/cm | 374.13 | 341.4 | 408.32 | ------ | 978.61 | 1112.43 | ------ | 1036.59 | 979.55 | ------ | ------ | ------ |
| | Dissolved Oxygen | mg/L | 0.16 | 0.45 | 0.5 | ------ | 0.17 | 0.16 | ------ | 0.43 | 0.18 | ------ | ------ | ------ |
| **Field** | Oxidation Reduction Potential | millivolts | 380.7 | 314.6 | 219.9 | ------ | 37.6 | 118.34 | ------ | 275.33 | 118.81 | ------ | ------ | ------ |
| **Measured** | Temperature | Deg C | 16.63 | 23.63 | 408.32 | ------ | 24.93 | 15.74 | ------ | 24.05 | 21.38 | ------ | ------ | ------ |
| | Turbidity | ntu | 0.88 | 2.5 | 0.5 | ------ | 0.28 | 1.32 | ------ | 0.58 | 2.28 | ------ | ------ | ------ |
| | Water level depth | ft | 18.1 | 18.47 | 219.9 | ------ | 16.99 | 17.25 | ------ | 16.65 | 17.2 | ------ | ------ | ------ |
| | Alkalinity as CaCO3, Total | mg/L | < 5.0 | ------ | < 1.8 | < 5.00 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Alkalinity, Bicarbonate as CaCO3 | mg/L | < 5.0 | ------ | < 1.8 | < 5.00 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Alkalinity, Carbonate as CaCO3 | mg/L | < 5.0 | ------ | < 1.8 | < 5.00 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Aluminum | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | 1.79 | ------ | ------ | ------ | ------ | ------ |
| | Dissolved Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Hardness | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | 357 | ------ | ------ | ------ | ------ | ------ |
| | Iron, Total | mg/L | ------ | ------ | ------ | 3.6 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Ferric (Fe2) | mg/L | ------ | ------ | ------ | 3.1 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Ferrous | mg/L | ------ | ------ | ------ | 0.5 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Magnesium | mg/L | 7.7 | ------ | 9 | 7.3 | ------ | ------ | 23.9 | ------ | ------ | ------ | ------ | ------ |
| | Manganese | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | 18.3 | ------ | ------ | ------ | ------ | ------ |
| **Supplemental** | Nickel | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nitrate as N | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphorus, Total Orthophosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Potassium | mg/L | 5.7 | ------ | 6.4 | 5.4 | ------ | ------ | 18.3 | ------ | ------ | ------ | ------ | ------ |
| | Silica | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | 63.8 | ------ | ------ | ------ | ------ | ------ |
| | Silicon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | 29.8 | ------ | ------ | ------ | ------ | ------ |
| | Silver | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Sodium | mg/L | 8.1 | ------ | 9.3 | 7.8 | ------ | ------ | 36.2 | ------ | ------ | ------ | ------ | ------ |
| | Sulfide | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Total Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Zinc | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |

**NOTES:**
1. mg/L - milligrams per Liter; pCi/L - picocuries per Liter; S.U. - Standarc
2. < indicates the substance was not detected above the analytical methc
3. J indicates the substance was detected at such low levels that the pre
4. Radium data are a combination of radium isotopes 226 and 228. Whe

| | Analyte | Units | DGWC-48 3/14/2019 | DGWC-48 8/29/2019 | DGWC-48 10/18/2019 | DGWC-48 3/4/2020 | DGWC-48 8/13/2020 | DGWC-48 9/23/2020 | DGWC-48 3/3/2021 | DGWC-48 9/10/2021 | DGWC-48 1/24/2022 | DGWC-48 9/13/2022 | DGWC-5 8/31/2016 | DGWC-5 12/6/2016 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Boron | mg/L | 0.72 | ------ | 0.74 | 0.77 | ------ | 0.65 | 0.57 | 0.55 | 0.61 | 0.61 | 7.5 | 5.64 |
| | Calcium | mg/L | 74.6 | ------ | 72.7 | 79.7 | ------ | 72.2 | 66.0 | 68.7 | 61.2 | 65.3 | 82.6 | 73.9 |
| | Chloride | mg/L | 10.2 | ------ | 9.6 | 9.1 | ------ | 8 | 14.2 | 10.9 | 11.3 | 8.90 | 8.6 | 8 |
| **Appendix III** | Fluoride | mg/L | 1.4 | 0.78 | 0.46 | 0.7 | 0.47 | 0.32 | 0.67 | 0.47 | 0.59 | 0.43 | 1 | 0.76 |
| | pH, field measured | S.U. | ------ | ------ | ------ | 4.27 | 4.26 | 4.64 | 4.14 | 4.3 | 4.03 | 4.25 | 4.31 | 4.43 |
| | Sulfate | mg/L | 450 | ------ | 336 | 368 | ------ | 313 | 312 | 272 | 265 | 309 | 400 | 460 |
| | Total Dissolved Solids | mg/L | 625 | ------ | 593 | 630 | ------ | 575 | 521 | 532 | 500 | 527 | 524 | 690 |
| | Antimony | mg/L | ------ | < 0.00027 | < 0.00027 | < 0.00027 | < 0.00028 | 0.00039 J | < 0.00028 | 0.0018 J | < 0.00078 | < 0.00078 | < 0.00080 | < 0.00080 |
| | Arsenic | mg/L | ------ | < 0.00035 | 0.00079 J | 0.0006 J | < 0.00078 | < 0.00078 | < 0.00078 | < 0.0011 | < 0.0011 | < 0.0022 | 0.0035 J | 0.0032 J |
| | Barium | mg/L | ------ | 0.014 | 0.014 | 0.014 | 0.013 | 0.013 | 0.014 | 0.013 | 0.014 | 0.014 | 0.0266 | 0.0186 |
| | Beryllium | mg/L | ------ | 0.0081 | 0.0099 | 0.008 | 0.0071 | 0.0072 | 0.0068 | 0.007 | 0.0069 | 0.0071 | 0.0054 | 0.0064 |
| | Cadmium | mg/L | ------ | 0.003 | 0.0028 | 0.0036 | 0.0028 | 0.0025 | 0.0033 | 0.0028 | 0.0029 | 0.0026 | 0.0002 J | 0.0004 J |
| | Chromium | mg/L | ------ | < 0.00039 | < 0.00039 | 0.0004 J | < 0.00055 | < 0.00055 | < 0.00055 | < 0.0011 | < 0.0011 | < 0.0011 | < 0.0047 | < 0.00090 |
| | Cobalt | mg/L | ------ | 0.42 | 0.41 | 0.42 | 0.35 | 0.37 | 0.36 | 0.36 | 0.34 | 0.31 | 0.055 | 0.0432 |
| | Fluoride | mg/L | 1.4 | 0.78 | 0.46 | 0.7 | 0.47 | 0.32 | 0.67 | 0.47 | 0.59 | 0.43 | 1 | 0.76 |
| **Appendix IV** | Lead | mg/L | ------ | 0.001 J | 0.00095 J | 0.0012 J | 0.00092 J | 0.001 J | 0.0011 | 0.00099 J | 0.0011 | 0.00093 J | 0.0002 J | 0.0004 J |
| | Lithium | mg/L | ------ | 0.11 | 0.11 | 0.12 | 0.098 | 0.1 | 0.096 | 0.095 | 0.11 | 0.099 | 0.0026 J | 0.0046 J |
| | Mercury | mg/L | ------ | < 0.00014 | < 0.00014 | < 0.00014 | < 0.000078 | < 0.000078 | < 0.000078 | < 0.000078 | < 0.00013 | < 0.00013 | 0.00015 J | 0.00012 J |
| | Molybdenum | mg/L | ------ | < 0.00095 | < 0.00095 | < 0.00095 | < 0.00069 | < 0.00069 | < 0.00069 | < 0.00074 | < 0.00074 | < 0.00074 | < 0.0017 | < 0.0017 |
| | Selenium | mg/L | ------ | 0.0023 J | 0.005 J | 0.0061 J | 0.0029 J | 0.0016 J | 0.0025 J | 0.0022 J | < 0.0014 | 0.0019 J | 0.0182 | 0.012 |
| | Thallium | mg/L | ------ | 0.000078 J | < 0.000052 | 0.000068 J | < 0.00014 | < 0.00014 | < 0.00014 | < 0.00018 | < 0.00018 | < 0.00018 | < 0.0010 | < 0.00020 |
| | Radium | pCi/L | ------ | 2.37 | 1.42 | 1.31 | 1.74 | 1.51 U | 1.41 | 2.21 | 0.668 U | 1.42 | 2.49 | 0.348 U |
| | Radium-226 | pCi/L | ------ | 0.973 | 0.552 | 0.598 | 0.717 | 0.337 U | 0.478 U | 0.387 | 0.228 | ------ | 0.504 | 0.283 |
| | Radium-228 | pCi/L | ------ | 1.4 | 0.866 | 0.707 | 1.02 | 1.17 U | 0.936 | 1.82 | 0.44 U | ------ | 1.99 | 0.0648 U |
| | Conductivity | uS/cm | ------ | ------ | ------ | ------ | 729.9 | 742.5 | 730.41 | 690.22 | 1294.2 | ------ | 597.73 | 759.39 |
| | Dissolved Oxygen | mg/L | ------ | ------ | ------ | ------ | 0.27 | 0.09 | 0.12 | 0.43 | 0.17 | ------ | 0.19 | 0.25 |
| **Field** | Oxidation Reduction Potential | millivolts | ------ | ------ | ------ | ------ | 109.6 | 137.1 | 316.3 | 203.1 | 303.2 | ------ | 332.5 | 168.6 |
| **Measured** | Temperature | Deg C | ------ | ------ | ------ | ------ | 20.35 | 20.03 | 17.95 | 20.34 | 17.93 | ------ | 26.09 | 17.72 |
| | Turbidity | ntu | ------ | ------ | ------ | ------ | 0.75 | 0.54 | 3.77 | 0.54 | 0.54 | ------ | 2.02 | 3.45 |
| | Water level depth | ft | ------ | ------ | ------ | ------ | 19.75 | 18.25 | 16.2 | 13.78 | 15.38 | ------ | 5.9 | 5.3 |
| | Alkalinity as CaCO3, Total | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | < 5.0 | ------ | < 1.8 | < 5.00 | ------ | ------ |
| | Alkalinity, Bicarbonate as CaCO3 | mg/L | ------ | ------ | < 20 | ------ | ------ | ------ | < 5.0 | ------ | < 1.8 | < 5.00 | ------ | ------ |
| | Alkalinity, Carbonate as CaCO3 | mg/L | ------ | ------ | < 20 | ------ | ------ | ------ | < 5.0 | ------ | < 1.8 | < 5.00 | ------ | ------ |
| | Aluminum | mg/L | ------ | ------ | 1.3 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Dissolved Organic Carbon | mg/L | ------ | ------ | < 0.50 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Hardness | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Total | mg/L | ------ | ------ | 5.2 | ------ | ------ | ------ | ------ | ------ | ------ | 4.1 | ------ | ------ |
| | Iron, Ferric (Fe2) | mg/L | ------ | ------ | 4.9 | ------ | ------ | ------ | ------ | ------ | ------ | 1.6 | ------ | ------ |
| | Iron, Ferrous | mg/L | ------ | ------ | 0.3 | ------ | ------ | ------ | ------ | ------ | ------ | 2.5 | ------ | ------ |
| | Magnesium | mg/L | ------ | ------ | 17.5 | ------ | ------ | ------ | 15.9 | ------ | 14.2 | 15.1 | ------ | ------ |
| | Manganese | mg/L | ------ | ------ | 13.7 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| **Supplemental** | Nickel | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nitrate as N | mg/L | ------ | ------ | < 0.0050 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphorus, Total Orthophosphate | mg/L | ------ | ------ | < 0.020 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Potassium | mg/L | ------ | ------ | 15.2 | ------ | ------ | ------ | 14.7 | ------ | 13.2 | 14.0 | ------ | ------ |
| | Silica | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silicon | mg/L | ------ | ------ | 28 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silver | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Sodium | mg/L | ------ | ------ | 25.6 | ------ | ------ | ------ | 21.8 | ------ | 19.7 | 21.7 | ------ | ------ |
| | Sulfide | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Total Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Zinc | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |

**NOTES:**
1. mg/L - milligrams per Liter; pCi/L - picocuries per Liter; S.U. - Standarc
2. < indicates the substance was not detected above the analytical metho
3. J indicates the substance was detected at such low levels that the pre
4. Radium data are a combination of radium isotopes 226 and 228. Whe

| | Analyte | Units | DGWC-5 | DGWC-5 | DGWC-5 | DGWC-5 | DGWC-5 | DGWC-5 | DGWC-5 | DGWC-5 | DGWC-5 | DGWC-5 | DGWC-5 | DGWC-5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 12/6/2016 | 3/28/2017 | 7/11/2017 | 10/25/2017 | 2/27/2018 | 7/10/2018 | 11/6/2018 | 3/12/2019 | 8/27/2019 | 10/16/2019 | 3/2/2020 | 8/12/2020 |
| **Appendix III** | Boron | mg/L | 5.01 | 6.16 | 4.61 | 4 | 4.3 | 3.2 | 4.2 | 4.3 | ------ | 4.3 | 5.5 | ------ |
| | Calcium | mg/L | 97.1 | 89.1 | 84.6 | 95.6 | 108 | 71.4 | 124 | 110 | ------ | 109 | 116 | ------ |
| | Chloride | mg/L | 7.7 | 9.5 | 9 | 9.4 | 9.7 | 9.7 | 10.2 | 10.6 | ------ | 11.6 | 10.5 | ------ |
| | Fluoride | mg/L | 0.6 | 1.2 | 0.7 | 1.4 | 1.3 | 0.42 | 0.04 J | 0.31 | 0.32 | 0.32 | 0.33 | 0.13 |
| | pH, field measured | S.U. | ------ | 4.44 | 4.46 | 4.54 | ------ | ------ | ------ | ------ | ------ | | 4.8 | 4.84 |
| | Sulfate | mg/L | 440 | 380 | 440 | 510 | 453 | 400 | 556 | 484 | ------ | 493 | 455 | ------ |
| | Total Dissolved Solids | mg/L | ------ | 545 | 612 | 650 | 698 | 635 | 809 | 711 | ------ | 702 | 759 | ------ |
| **Appendix IV** | Antimony | mg/L | < 0.00080 | < 0.00030 | < 0.00060 | < 0.00060 | < 0.00078 | < 0.00078 | < 0.00078 | | < 0.00027 | < 0.00027 | 0.00032 J | < 0.00028 |
| | Arsenic | mg/L | 0.013 | 0.0385 | 0.0203 | 0.0119 | 0.0094 | 0.0057 | < 0.00057 | | < 0.00035 | 0.0036 J | 0.0052 | 0.002 J |
| | Barium | mg/L | 0.0178 | 0.0187 | 0.0174 J | 0.0175 | 0.017 | 0.015 | 0.016 | | 0.017 | 0.02 | 0.018 | 0.017 |
| | Beryllium | mg/L | 0.0081 J R | 0.0049 | 0.005 | 0.0069 | 0.0086 | 0.0048 | 0.01 | | 0.01 | 0.0072 | 0.0098 | 0.0081 |
| | Cadmium | mg/L | 0.0007 J | 0.0002 J | 0.0003 J | 0.0006 J | 0.00072 J | 0.00034 J | 0.00098 J | | 0.00082 J | 0.00069 J | 0.00089 J | 0.00079 J |
| | Chromium | mg/L | < 0.00090 | < 0.00030 | < 0.0045 | < 0.00050 | < 0.0016 | < 0.0016 | < 0.0016 | | < 0.00039 | < 0.00039 | 0.00045 J | < 0.00055 |
| | Cobalt | mg/L | 0.0273 | 0.04 | 0.0351 J | 0.0209 | 0.024 | 0.025 | 0.019 | | 0.02 | 0.022 | 0.028 | 0.021 |
| | Fluoride | mg/L | 0.6 | 1.2 | 0.7 | 1.4 | 1.3 | 0.42 | 0.04 J | 0.31 | 0.32 | 0.32 | 0.33 | 0.13 |
| | Lead | mg/L | < 0.00010 | < 0.00030 | < 0.00030 | 0.0024 J | < 0.00027 | < 0.00027 | < 0.00027 | | 0.000051 J | 0.000085 J | 0.000051 J | 0.000063 J |
| | Lithium | mg/L | < 0.0206 R | 0.0028 J | 0.0031 J | 0.0055 J | 0.0066 J | 0.0034 J | 0.0082 J | | 0.008 J | 0.006 J | 0.0079 J | 0.0067 J |
| | Mercury | mg/L | < 0.000040 | 0.00017 J | 0.0002 J | 0.00009 J | < 0.000090 J | < 0.00018 J | < 0.00055 | | 0.00016 J | < 0.00014 | < 0.00014 | 0.00017 J |
| | Molybdenum | mg/L | < 0.0017 | < 0.00060 | < 0.0010 | < 0.0010 | < 0.0019 | < 0.0019 | < 0.0019 | | < 0.00095 | < 0.00095 | < 0.00095 | < 0.00069 |
| | Selenium | mg/L | 0.0514 | 0.168 | 0.0607 | 0.034 | 0.035 | 0.019 | 0.0026 J | | 0.0031 J | 0.015 | 0.032 | 0.011 |
| | Thallium | mg/L | < 0.00020 | 0.0002 J | < 0.00030 | < 0.00030 | < 0.00014 | < 0.00014 | < 0.00014 | | < 0.000052 | 0.000078 J | 0.000062 J | < 0.00014 |
| | Radium | pCi/L | ------ | 0.693 U | 1.38 | 2.06 | 1.97 | 1.03 U | 1.13 | | 1.81 | 1.63 | 2.28 | 1.13 |
| | Radium-226 | pCi/L | ------ | ------ | 0.33 | 1.98 | 0.637 | 0.357 | 0.584 | | 0.679 | 0.949 | 1.1 | 0.362 |
| | Radium-228 | pCi/L | ------ | ------ | 1.05 | 0.0791 U | 1.33 | 0.677 U | 0.548 U | | 1.13 | 0.683 U | 1.18 | 0.772 U |
| **Field Measured** | Conductivity | uS/cm | ------ | 719.7 | 658.5 | 703.21 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 911.2 |
| | Dissolved Oxygen | mg/L | ------ | 1.38 | 1.1 | 0.42 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 0.72 |
| | Oxidation Reduction Potential | millivolts | ------ | 337.08 | 91.6 | 479.45 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 380 |
| | Temperature | Deg C | ------ | 20.15 | 23.83 | 18 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 19.73 |
| | Turbidity | ntu | ------ | 0.32 | 0.39 | 0.9 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 0.45 |
| | Water level depth | ft | ------ | 5.99 | 5.93 | 6.35 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 10.28 |
| **Supplemental** | Alkalinity as CaCO3, Total | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Alkalinity, Bicarbonate as CaCO3 | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 1 | ------ | ------ |
| | Alkalinity, Carbonate as CaCO3 | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 1.0 | ------ | ------ |
| | Aluminum | mg/L | 0.794 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 0.54 | ------ | ------ |
| | Dissolved Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 0.50 | ------ | ------ |
| | Hardness | mg/L | 347 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Total | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 0.20 | ------ | ------ |
| | Iron, Ferric (Fe2) | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Ferrous | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 0.20 | ------ | ------ |
| | Magnesium | mg/L | 25.3 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 25.2 | ------ | ------ |
| | Manganese | mg/L | 20.3 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 21.9 | ------ | ------ |
| | Nickel | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 0.0299 | ------ | ------ |
| | Nitrate as N | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 0.3 | ------ | ------ |
| | Phosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 0.0 | ------ | ------ |
| | Phosphorus, Total Orthophosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Potassium | mg/L | 4.59 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 4.4 | ------ | ------ |
| | Silica | mg/L | 34.4 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silicon | mg/L | 16.1 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 18.6 | ------ | ------ |
| | Silver | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 0.00028 | ------ | ------ |
| | Sodium | mg/L | 18.4 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 20.1 | ------ | ------ |
| | Sulfide | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Total Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Zinc | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |

**NOTES:**
1. mg/L - milligrams per Liter; pCi/L - picocuries per Liter; S.U. - Standarc
2. < indicates the substance was not detected above the analytical metho
3. J indicates the substance was detected at such low levels that the pre
4. Radium data are a combination of radium isotopes 226 and 228. Whe

| | Analyte | Units | DGWC-5 | DGWC-5 | DGWC-5 | DGWC-5 | DGWC-5 | DGWC-67 | DGWC-67 | DGWC-67 | DGWC-67 | DGWC-67 | DGWC-67 | DGWC-67 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 9/22/2020 | 3/2/2021 | 9/10/2021 | 1/24/2022 | 9/14/2022 | 3/31/2017 | 10/26/2017 | 1/26/2018 | 3/2/2018 | 7/13/2018 | 11/8/2018 | 3/13/2019 |
| **Appendix III** | Boron | mg/L | 4.6 | 4.3 | 4.7 | 4.4 | 5.00 | 3.91 | 3.21 | | 3.49 | 3.1 | 3.5 | 3.5 |
| | Calcium | mg/L | 99.2 | 114 | 123 | 112 | 117.0 | 44.5 | 40.4 | 39 | 40.1 | 43.3 | 40.1 | 41.2 |
| | Chloride | mg/L | 10.5 | 9.8 | 9.9 | 9.9 | 11.20 | 5.9 | 6 | 6.1 | 5.8 | 5.9 | 6.1 | 6.8 |
| | Fluoride | mg/L | 0.12 | 0.15 | 0.16 | 0.19 | 0.27 | < 0.020 | < 0.030 | | < 0.029 | 0.25 J | 0.5 | 0.07 J |
| | pH, field measured | S.U. | 4.83 | 5.00 | 4.89 | 4.79 | 4.75 | 6.25 | 6.64 | ------ | ------ | ------ | ------ | ------ |
| | Sulfate | mg/L | 423 | 412 | 449 | 434 | 505 | 110 | 100 | 101 | 98.5 | 136 | 118 | 233 |
| | Total Dissolved Solids | mg/L | 716 | 730 | 792 | 810 | 850 | ------ | 319 | ------ | 264 | 297 | 295 | 278 |
| **Appendix IV** | Antimony | mg/L | < 0.00028 | 0.0015 J | < 0.00078 | < 0.00078 | < 0.00078 | < 0.00030 | < 0.00060 | ------ | < 0.00078 | 0.0023 J | < 0.00078 | ------ |
| | Arsenic | mg/L | 0.0062 | 0.0013 J | 0.0031 J | 0.0019 J | 0.0038 J | < 0.00040 | < 0.00050 | < 0.00032 | < 0.00057 | < 0.00057 | < 0.00057 | ------ |
| | Barium | mg/L | 0.017 | 0.017 | 0.015 | 0.018 | 0.018 | 0.12 | 0.105 | ------ | 0.104 | 0.11 | 0.11 | ------ |
| | Beryllium | mg/L | 0.0081 | 0.0063 | 0.0075 | 0.0084 | 0.01 | < 0.000070 | < 0.000090 | ------ | < 0.000050 | < 0.000050 | < 0.000050 | ------ |
| | Cadmium | mg/L | 0.00072 J | 0.00075 | 0.00093 | 0.00094 | 0.00087 | < 0.000060 | < 0.00010 | ------ | < 0.000093 | < 0.000093 | < 0.000093 | ------ |
| | Chromium | mg/L | < 0.00055 | < 0.00055 | < 0.0011 | < 0.0011 | < 0.0011 | < 0.00030 | < 0.00050 | ------ | < 0.0016 | < 0.0016 | < 0.0016 | ------ |
| | Cobalt | mg/L | 0.02 | 0.021 | 0.022 | 0.025 | 0.027 | 0.0065 J | 0.0022 J | ------ | < 0.00052 | 0.0017 J | 0.002 J | ------ |
| | Fluoride | mg/L | 0.12 | 0.15 | 0.16 | 0.19 | 0.27 | < 0.020 | < 0.030 | ------ | < 0.029 | 0.25 J | 0.5 | 0.07 J |
| | Lead | mg/L | 0.000048 J | 0.000080 J | < 0.00089 | < 0.00089 | < 0.00089 | < 0.000070 | < 0.000070 | ------ | < 0.00027 | < 0.00027 | < 0.00027 | ------ |
| | Lithium | mg/L | 0.0065 J | 0.0064 J | 0.0071 J | 0.0068 J | 0.0081 J | 0.0062 J | 0.0043 J | ------ | 0.0047 J | 0.0041 J | 0.0039 J | ------ |
| | Mercury | mg/L | 0.0002 J | 0.000094 J | 0.0003 | 0.00028 | 0.00022 | 0.00007 J | < 0.000036 | ------ | < 0.000036 | < 0.000036 | < 0.000036 | ------ |
| | Molybdenum | mg/L | < 0.00069 | < 0.00069 | < 0.00074 | < 0.00074 | < 0.00074 | 0.0006 J | < 0.0010 | ------ | < 0.0019 | < 0.0019 | < 0.0019 | ------ |
| | Selenium | mg/L | 0.04 | 0.0081 | 0.0099 | 0.0048 J | 0.019 | < 0.0014 | < 0.0018 | ------ | < 0.0014 | < 0.0014 | < 0.0014 | ------ |
| | Thallium | mg/L | < 0.00014 | < 0.00014 | < 0.00018 | < 0.00018 | < 0.00018 | < 0.000050 | < 0.000050 | ------ | < 0.00014 | < 0.00014 | < 0.00014 | ------ |
| | Radium | pCi/L | 1.4 U | 0.971 U | 1.15 | 0.807 U | 0.665 U | ------ | 0.619 U | ------ | 1.31 | 0.667 U | 0.911 U | ------ |
| | Radium-226 | pCi/L | 0.561 U | 0.303 U | 0.121 U | 0.26 | ------ | ------ | 0.333 U | ------ | 0.702 | 0.228 U | 0.36 | ------ |
| | Radium-228 | pCi/L | 0.841 U | 0.668 U | 1.03 | 0.547 U | ------ | ------ | 0.286 U | ------ | 0.611 U | 0.439 U | 0.551 U | ------ |
| **Field Measured** | Conductivity | uS/cm | 894.3 | 952.58 | 942.71 | 1081 | ------ | 421.85 | 378.07 | ------ | ------ | ------ | ------ | ------ |
| | Dissolved Oxygen | mg/L | 0.33 | 0.37 | 0.44 | 0.35 | ------ | 0.2 | 0.15 | ------ | ------ | ------ | ------ | ------ |
| | Oxidation Reduction Potential | millivolts | 528.8 | 505.2 | 551.6 | 503.2 | ------ | -10.85 | 65.38 | ------ | ------ | ------ | ------ | ------ |
| | Temperature | Deg C | 19.52 | 15.62 | 20.15 | 16.85 | ------ | 18.43 | 17.66 | ------ | ------ | ------ | ------ | ------ |
| | Turbidity | ntu | 0.15 | 1.13 | 4.41 | 1.5 | ------ | 2.51 | 0.71 | ------ | ------ | ------ | ------ | ------ |
| | Water level depth | ft | 9.23 | 11.2 | 11.5 | 9.79 | ------ | 8.31 | 9.26 | ------ | ------ | ------ | ------ | ------ |
| **Supplemental** | Alkalinity as CaCO3, Total | mg/L | ------ | 9.4 | ------ | 6.2 | < 5.00 | ------ | ------ | 104 | ------ | ------ | ------ | ------ |
| | Alkalinity, Bicarbonate as CaCO3 | mg/L | ------ | 9.4 | ------ | 6.2 | < 5.00 | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Alkalinity, Carbonate as CaCO3 | mg/L | ------ | < 5.0 | ------ | < 1.8 | < 5.00 | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Aluminum | mg/L | ------ | ------ | ------ | ------ | ------ | < 0.0162 | ------ | ------ | ------ | ------ | ------ | ------ |
| | Dissolved Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Hardness | mg/L | ------ | ------ | ------ | ------ | ------ | 193 | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Total | mg/L | ------ | ------ | ------ | ------ | < 0.025 | ------ | ------ | 0.0184 J | ------ | ------ | ------ | ------ |
| | Iron, Ferric (Fe2) | mg/L | ------ | ------ | ------ | ------ | < 0.025 | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Ferrous | mg/L | ------ | ------ | ------ | ------ | 0.0 | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Magnesium | mg/L | ------ | 23.9 | ------ | 23.1 | 24.5 | 19.9 | ------ | 16.3 | ------ | ------ | ------ | ------ |
| | Manganese | mg/L | ------ | ------ | ------ | ------ | ------ | 0.933 | ------ | 0.473 | ------ | ------ | ------ | ------ |
| | Nickel | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nitrate as N | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphorus, Total Orthophosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Potassium | mg/L | ------ | 4.4 | ------ | 3.9 | 3.9 | 4.37 | ------ | 3.87 | ------ | ------ | ------ | ------ |
| | Silica | mg/L | ------ | ------ | ------ | ------ | ------ | 22.4 | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silicon | mg/L | ------ | ------ | ------ | ------ | ------ | 10.5 | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silver | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Sodium | mg/L | ------ | 19.1 | ------ | 18.3 | 19.8 | 11.9 | ------ | 9.58 | ------ | ------ | ------ | ------ |
| | Sulfide | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Total Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Zinc | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |

**NOTES:**
1. mg/L - milligrams per Liter; pCi/L - picocuries per Liter; S.U. - Standarc
2. < indicates the substance was not detected above the analytical methc
3. J indicates the substance was detected at such low levels that the pre
4. Radium data are a combination of radium isotopes 226 and 228. Whe

| | Analyte | Units | DGWC-67 8/28/2019 | DGWC-67 10/17/2019 | DGWC-67 3/9/2020 | DGWC-67 8/13/2020 | DGWC-67 9/23/2020 | DGWC-67 3/11/2021 | DGWC-67 9/16/2021 | DGWC-67 1/19/2022 | DGWC-67 9/8/2022 | DGWC-68 3/31/2017 | DGWC-68 4/12/2017 | DGWC-68 1/22/2018 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Appendix III** | Boron | mg/L | ------ | 3.6 | 3.6 | ------ | 3.2 | 3.4 | 3.4 | 4.1 | 4.30 | 1.54 | 1.16 | 1.53 |
| | Calcium | mg/L | ------ | 42.4 | 46.9 | ------ | 42 | 45.4 | 46 | 48.8 | 47.4 | 54 | ------ | ------ |
| | Chloride | mg/L | ------ | 6.9 | 6.7 | ------ | 7.1 | 7.4 | 7.9 | 8.3 | 8.90 | 3.8 | ------ | 3.8 |
| | Fluoride | mg/L | < 0.050 | 0.038 J | < 0.050 | < 0.050 | < 0.050 | < 0.050 | 0.069 J | < 0.050 | 0.096 J | 0.54 | ------ | 0.65 |
| | pH, field measured | S.U. | ------ | ------ | 6.23 | 6.28 | 6.23 | 6.28 | 6.2 | 6.21 | 6.21 | 6.68 | 6.63 | ------ |
| | Sulfate | mg/L | ------ | 99.4 | 100 | ------ | 99.8 | 76.7 | 101 | 97.2 | 117 | 38 | ------ | ------ |
| | Total Dissolved Solids | mg/L | ------ | 281 | 209 | ------ | 296 | 265 | 282 | 272 | 252 | ------ | ------ | 263 |
| **Appendix IV** | Antimony | mg/L | < 0.00027 | < 0.00027 | < 0.00027 | < 0.00028 | < 0.00028 | < 0.00028 | < 0.00078 | < 0.00078 | < 0.00078 | < 0.00030 | ------ | < 0.00060 |
| | Arsenic | mg/L | < 0.00035 | 0.00042 J | < 0.00035 | < 0.00078 | < 0.00078 | 0.00080 J | < 0.0011 | 0.0033 J | < 0.0022 | 0.459 | 0.498 | 0.536 |
| | Barium | mg/L | 0.11 | 0.1 | 0.11 | 0.095 | 0.1 | 0.11 | 0.088 | 0.091 | 0.082 | 0.0859 | ------ | 0.117 |
| | Beryllium | mg/L | < 0.000074 | < 0.000074 | < 0.000074 | < 0.000046 | < 0.000046 | < 0.000046 | < 0.000054 | < 0.000054 | < 0.000054 | < 0.000070 | ------ | < 0.000091 |
| | Cadmium | mg/L | 0.00017 J | < 0.00011 | 0.00021 J | 0.00015 J | 0.00018 J | 0.00053 | < 0.00011 | < 0.00011 | < 0.00011 | 0.0001 J | ------ | < 0.00014 |
| | Chromium | mg/L | < 0.00039 | < 0.00039 | 0.00088 J | < 0.00055 | < 0.00055 | 0.0014 J | < 0.0011 | < 0.0011 | < 0.0011 | < 0.00030 | ------ | < 0.00045 |
| | Cobalt | mg/L | 0.0013 J | 0.0013 J | 0.0015 J | 0.0015 J | 0.0011 J | 0.0016 J | 0.0012 J | 0.0011 J | 0.0010 J | 0.0028 J | ------ | 0.0032 J |
| | Fluoride | mg/L | < 0.050 | 0.038 J | < 0.050 | < 0.050 | < 0.050 | < 0.050 | 0.069 J | < 0.050 | 0.096 J | 0.54 | ------ | 0.65 |
| | Lead | mg/L | < 0.000046 | < 0.000046 | 0.000047 J | 0.000056 J | < 0.000036 | 0.00025 J | < 0.00089 | < 0.00089 | < 0.00089 | < 0.000070 | ------ | < 0.000067 |
| | Lithium | mg/L | 0.0046 J | 0.0047 J | 0.0048 J | 0.0044 J | 0.0043 J | 0.0050 J | 0.0044 J | 0.0046 J | 0.0048 J | 0.002 J | ------ | < 0.0015 |
| | Mercury | mg/L | < 0.00014 | < 0.00014 | < 0.00014 | < 0.000078 | < 0.000078 | | < 0.000078 | < 0.00013 | < 0.00013 | 0.00007 J | ------ | 0.00006 J |
| | Molybdenum | mg/L | < 0.00095 | < 0.00095 | < 0.00095 | < 0.00069 | < 0.00069 | < 0.00069 | < 0.00074 | < 0.00074 | < 0.00074 | 0.214 | ------ | 0.225 |
| | Selenium | mg/L | < 0.0013 | < 0.0013 | < 0.0013 | < 0.0016 | < 0.0016 | 0.0027 J | < 0.0014 | < 0.0014 | < 0.0014 | < 0.0070 | ------ | < 0.0018 |
| | Thallium | mg/L | < 0.000052 | < 0.000052 | < 0.000052 | < 0.00014 | < 0.00014 | < 0.00014 | < 0.00018 | < 0.00018 | < 0.00018 | 0.00008 J | ------ | < 0.000052 |
| | Radium | pCi/L | 0.751 U | ------ | 0.819 U | 0.897 U | 0.131 U | 1.55 | 0.201 U | 0.853 U | 0.699 U | ------ | ------ | 1.28 |
| | Radium-226 | pCi/L | 0.54 | ------ | 0.617 | 0.305 | 0.131 U | 0.249 U | 0.126 U | 0.177 U | ------ | ------ | ------ | 0.829 |
| | Radium-228 | pCi/L | 0.211 U | ------ | 0.202 U | 0.592 U | -0.234 U | 1.3 | 0.075 U | 0.676 U | ------ | ------ | ------ | 0.447 U |
| **Field Measured** | Conductivity | uS/cm | ------ | ------ | ------ | 419.9 | 419.94 | 444.47 | 417.25 | 438.06 | ------ | 424.85 | 425.37 | ------ |
| | Dissolved Oxygen | mg/L | ------ | ------ | ------ | 0.1 | 0.29 | 0.1 | 0.05 | 0.2 | ------ | 0.13 | 0.21 | ------ |
| | Oxidation Reduction Potential | millivolts | ------ | ------ | ------ | 245 | 52.2 | 97.4 | 67.5 | 50.3 | ------ | -31.56 | -24.09 | ------ |
| | Temperature | Deg C | ------ | ------ | ------ | 22.42 | 20.32 | 19.18 | 19.16 | 17.32 | ------ | 18.61 | 19.41 | ------ |
| | Turbidity | ntu | ------ | ------ | ------ | 1.94 | 3.22 | 3.1 | 3 | 1.55 | ------ | 1.98 | 0.81 | ------ |
| | Water level depth | ft | ------ | ------ | ------ | 10.93 | 9.9 | 10.59 | 10.85 | 9.95 | ------ | 3.28 | 3.13 | ------ |
| **Supplemental** | Alkalinity as CaCO3, Total | mg/L | ------ | ------ | ------ | ------ | ------ | 98 | ------ | 91.5 | 99.1 | ------ | ------ | 184 |
| | Alkalinity, Bicarbonate as CaCO3 | mg/L | ------ | 93 | ------ | ------ | ------ | 98 | ------ | 91.5 | 99.1 | ------ | ------ | ------ |
| | Alkalinity, Carbonate as CaCO3 | mg/L | ------ | < 20 | ------ | ------ | ------ | < 5.0 | ------ | < 1.8 | < 5.0 | ------ | ------ | ------ |
| | Aluminum | mg/L | ------ | < 0.032 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 0.0162 | ------ | ------ |
| | Dissolved Organic Carbon | mg/L | ------ | < 0.50 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Hardness | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 191 | ------ | ------ |
| | Iron, Total | mg/L | ------ | < 0.20 | ------ | ------ | ------ | ------ | ------ | ------ | < 0.025 | ------ | ------ | ------ |
| | Iron, Ferric (Fe2) | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 0.025 | ------ | ------ | ------ |
| | Iron, Ferrous | mg/L | ------ | < 0.20 | ------ | ------ | ------ | ------ | ------ | ------ | 0.0 | ------ | ------ | ------ |
| | Magnesium | mg/L | ------ | 17.9 | ------ | ------ | ------ | 18.1 | ------ | 19.2 | 18.5 | 13.7 | ------ | 12.1 |
| | Manganese | mg/L | ------ | 0.39 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 6.39 | ------ | 5.52 |
| | Nickel | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nitrate as N | mg/L | ------ | 0.007 J | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphorus, Total Orthophosphate | mg/L | ------ | < 0.020 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Potassium | mg/L | ------ | 4 | ------ | ------ | ------ | 4 | ------ | 3.9 | 3.8 | 5.06 | ------ | 4.75 |
| | Silica | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 24.3 | ------ | ------ |
| | Silicon | mg/L | ------ | 10.3 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 11.4 | ------ | ------ |
| | Silver | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Sodium | mg/L | ------ | 11.3 | ------ | ------ | ------ | 10.6 | ------ | 11.3 | 10.8 | 11.6 | ------ | 8 |
| | Sulfide | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Total Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Zinc | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |

**NOTES:**
1. mg/L - milligrams per Liter; pCi/L - picocuries per Liter; S.U. - Standard
2. < indicates the substance was not detected above the analytical meth
3. J indicates the substance was detected at such low levels that the pre
4. Radium data are a combination of radium isotopes 226 and 228. Whe

| Analyte | | Units | DGWC-68A<br>5/1/2017 | DGWC-68A<br>10/26/2017 | DGWC-68A<br>1/22/2018 | DGWC-68A<br>3/2/2018 | DGWC-68A<br>7/13/2018 | DGWC-68A<br>11/8/2018 | DGWC-68A<br>3/13/2019 | DGWC-68A<br>8/28/2019 | DGWC-68A<br>10/16/2019 | DGWC-68A<br>3/9/2020 | DGWC-68A<br>8/13/2020 | DGWC-68A<br>9/23/2020 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Appendix III** | Boron | mg/L | ------ | 2.05 | ------ | 2.05 | 1.7 | 1.8 | 1.9 | ------ | 1.5 | 1.8 | ------ | 1.7 |
| | Calcium | mg/L | ------ | 48.2 | 45.5 | 48.9 | 52.4 | 46.8 | 47.5 | ------ | 49.7 | 54 | ------ | 50.2 |
| | Chloride | mg/L | ------ | 4.4 | 4.2 | 4.2 | 4 | < 0.024 | 4.6 | ------ | 4.2 | 3.6 | ------ | 3.6 |
| | Fluoride | mg/L | ------ | 0.11 J | ------ | 0.23 | 0.099 J | 0.04 J | 0.12 J | 0.1 | 0.093 J | 0.082 J | 0.076 J | 0.07 J |
| | pH, field measured | S.U. | ------ | 7.01 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 6.6 | 6.63 | 6.6 |
| | Sulfate | mg/L | ------ | 48 | 43.1 | 44.7 | 43.3 | 43.5 | 44.1 | ------ | 32.1 | 37.4 | ------ | 38.7 |
| | Total Dissolved Solids | mg/L | ------ | 287 | ------ | 252 | 275 | 277 | 267 | ------ | 218 | 188 | ------ | 251 |
| **Appendix IV** | Antimony | mg/L | ------ | < 0.00060 | ------ | < 0.00078 | < 0.00078 | < 0.00078 | ------ | < 0.00027 | < 0.00027 | < 0.00027 | < 0.00028 | < 0.00028 |
| | Arsenic | mg/L | < 0.00040 | < 0.00050 | < 0.00052 | < 0.00057 | < 0.00057 | 0.0006 J | ------ | < 0.00035 | < 0.00035 | < 0.00035 | < 0.00078 | < 0.00078 |
| | Barium | mg/L | ------ | 0.0878 | ------ | 0.0878 | 0.091 | 0.092 | ------ | 0.089 | 0.089 | 0.088 | 0.088 | 0.094 |
| | Beryllium | mg/L | ------ | < 0.000090 | ------ | < 0.000050 | 0.000084 J | < 0.000050 | ------ | < 0.000074 | < 0.000074 | < 0.000074 | < 0.000046 | < 0.000046 |
| | Cadmium | mg/L | ------ | < 0.00010 | ------ | < 0.000093 | 0.00019 J | 0.00025 J | ------ | 0.00017 J | 0.00017 J | 0.00026 J | 0.00021 J | 0.00024 J |
| | Chromium | mg/L | ------ | < 0.00050 | ------ | < 0.0016 | < 0.0016 | < 0.0016 | ------ | < 0.00039 | < 0.00039 | < 0.00039 | < 0.00055 | < 0.00055 |
| | Cobalt | mg/L | ------ | < 0.00030 | ------ | < 0.00052 | < 0.00052 | < 0.00052 | ------ | < 0.00030 | < 0.00030 | < 0.00030 | < 0.00038 | < 0.00038 |
| | Fluoride | mg/L | ------ | 0.11 J | ------ | 0.23 | 0.099 J | 0.04 J | 0.12 J | 0.1 | 0.093 J | 0.082 J | 0.076 J | 0.07 J |
| | Lead | mg/L | ------ | < 0.000070 | ------ | < 0.00027 | < 0.00027 | < 0.00027 | ------ | < 0.000046 | < 0.000046 | < 0.000046 | < 0.000036 | 0.00035 J |
| | Lithium | mg/L | ------ | < 0.0015 | ------ | < 0.00097 | < 0.00097 | < 0.00097 | ------ | < 0.00078 | < 0.00078 | < 0.00078 | < 0.00081 | < 0.00081 |
| | Mercury | mg/L | ------ | < 0.000036 | ------ | < 0.000036 | < 0.000036 | < 0.000036 | ------ | < 0.00014 | < 0.00014 | < 0.00014 | < 0.000078 | < 0.000078 |
| | Molybdenum | mg/L | ------ | 0.226 | ------ | 0.215 | 0.22 | 0.2 | ------ | 0.21 | 0.22 | 0.19 | 0.19 | 0.2 |
| | Selenium | mg/L | ------ | < 0.0018 | ------ | < 0.0014 | < 0.0014 | < 0.0014 | ------ | < 0.0013 | < 0.0013 | < 0.0013 | < 0.0016 | < 0.0016 |
| | Thallium | mg/L | ------ | < 0.000050 | ------ | < 0.00014 | 0.00015 J | < 0.00014 | ------ | < 0.000052 | < 0.000052 | < 0.000052 | < 0.00014 | < 0.00014 |
| | Radium | pCi/L | ------ | 0.477 U | ------ | 1.13 | 0.407 U | 0.393 U | ------ | 1.77 | 2.12 | 1.33 | 1.46 | 0.563 U |
| | Radium-226 | pCi/L | ------ | 0.477 | ------ | 0.336 | 0.175 U | 0.393 | ------ | 0.635 | 0.323 U | 0.84 | 0.16 U | 0.11 U |
| | Radium-228 | pCi/L | ------ | -0.0971 U | ------ | 0.796 | 0.232 U | -0.0363 U | ------ | 1.13 | 1.8 | 0.489 U | 1.3 | 0.453 U |
| **Field Measured** | Conductivity | uS/cm | ------ | 397.84 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 429.5 | 429.65 |
| | Dissolved Oxygen | mg/L | ------ | 0.14 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 0.09 | 0.25 |
| | Oxidation Reduction Potential | millivolts | ------ | 51.12 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 238.7 | 46.4 |
| | Temperature | Deg C | ------ | 20.48 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 21.07 | 21.24 |
| | Turbidity | ntu | ------ | 0.6 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 0.98 | 1.12 |
| | Water level depth | ft | ------ | 9.91 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 10.8 | 10.13 |
| **Supplemental** | Alkalinity as CaCO3, Total | mg/L | ------ | ------ | 187 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Alkalinity, Bicarbonate as CaCO3 | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 213 | ------ | ------ | ------ |
| | Alkalinity, Carbonate as CaCO3 | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 20 | ------ | ------ | ------ |
| | Aluminum | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 0.056 J | ------ | ------ | ------ |
| | Dissolved Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 0.50 | ------ | ------ | ------ |
| | Hardness | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Total | mg/L | ------ | ------ | 0.0319 J | ------ | ------ | ------ | ------ | ------ | < 0.20 | ------ | ------ | ------ |
| | Iron, Ferric (Fe2) | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 0.20 | ------ | ------ | ------ |
| | Iron, Ferrous | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 0.20 | ------ | ------ | ------ |
| | Magnesium | mg/L | ------ | ------ | 18.6 | ------ | ------ | ------ | ------ | ------ | 18.9 | ------ | ------ | ------ |
| | Manganese | mg/L | ------ | ------ | 0.116 | ------ | ------ | ------ | ------ | ------ | 0.057 | ------ | ------ | ------ |
| | Nickel | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 0.0023 J | ------ | ------ | ------ |
| | Nitrate as N | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 0.011 J | ------ | ------ | ------ |
| | Phosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 0.054 | ------ | ------ | ------ |
| | Phosphorus, Total Orthophosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 0.054 | ------ | ------ | ------ |
| | Potassium | mg/L | ------ | ------ | 3.5 | ------ | ------ | ------ | ------ | ------ | 4 | ------ | ------ | ------ |
| | Silica | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silicon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 7.7 | ------ | ------ | ------ |
| | Silver | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 0.00028 | ------ | ------ | ------ |
| | Sodium | mg/L | ------ | ------ | 8.76 | ------ | ------ | ------ | ------ | ------ | 9.7 | ------ | ------ | ------ |
| | Sulfide | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Total Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Zinc | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |

**NOTES:**
1. mg/L - milligrams per Liter; pCi/L - picocuries per Liter; S.U. - Standarc
2. < indicates the substance was not detected above the analytical methc
3. J indicates the substance was detected at such low levels that the pre
4. Radium data are a combination of radium isotopes 226 and 228. Whe

**APPENDIX A**
**ANALYTICAL RESULTS (2016 - 2022)**
Plant McDonough-Atkinson Ash Pond 1 and Ash Pond 2 and 3/4
Atlanta, Georgia

| | Analyte | Units | DGWC-68A 3/10/2021 | DGWC-68A 9/16/2021 | DGWC-68A 10/27/2021 | DGWC-68A 1/25/2022 | DGWC-68A 9/7/2022 | DGWC-69 3/31/2017 | DGWC-69 4/12/2017 | DGWC-69 10/26/2017 | DGWC-69 11/15/2017 | DGWC-69 1/26/2018 | DGWC-69 3/2/2018 | DGWC-69 7/13/2018 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Appendix III** | Boron | mg/L | 1.7 | 1.3 | ------ | 2.2 | 2.00 | 0.531 | 0.207 | 0.779 | 0.667 | ------ | 0.0478 | 0.043 |
| | Calcium | mg/L | 54.2 | 60.6 | ------ | 60.4 | 53.5 | 22.1 | ------ | 33.3 | 30.6 | 9.67 J | 8.09 | 7.9 |
| | Chloride | mg/L | 3.6 | 3.4 | ------ | 3.8 | 4.10 | 4.5 | ------ | 4.2 | 4.7 | 6.5 | 6.4 | 5.3 |
| | Fluoride | mg/L | 0.070 J | 0.55 | ------ | 0.067 J | 0.11 | 0.18 J | ------ | 0.29 J | 0.28 J | ------ | 0.18 | 0.19 J |
| | pH, field measured | S.U. | 6.74 | 6.79 | 6.56 | 6.53 | 6.62 | 6.26 | 6.19 | 6.69 | 6.22 | ------ | ------ | ------ |
| | Sulfate | mg/L | 38.4 | 22.3 | ------ | 36.3 | 36.5 | 22 | ------ | 31 | 29 | 12.6 | 10.1 | 8.6 |
| | Total Dissolved Solids | mg/L | 232 | 259 | ------ | 259 | 256 | ------ | ------ | 234 | 188 | ------ | 73 | 95 |
| **Appendix IV** | Antimony | mg/L | 0.00032 J | < 0.00078 | ------ | < 0.00078 | < 0.00078 | < 0.00030 | ------ | < 0.00060 | < 0.00060 | ------ | < 0.00078 | < 0.00078 |
| | Arsenic | mg/L | < 0.00078 | 0.46 | 0.0016 J | < 0.0011 | < 0.0022 | 0.0233 | 0.0077 | 0.114 | 0.164 | 0.0463 | 0.0127 | 0.017 |
| | Barium | mg/L | 0.090 | 0.13 | 0.0863 | 0.1 | 0.098 | 0.0951 | ------ | 0.136 | 0.107 | ------ | 0.0671 | 0.074 |
| | Beryllium | mg/L | 0.000061 J | < 0.000054 | ------ | < 0.000054 | < 0.000054 | < 0.000070 | ------ | < 0.000090 | < 0.000090 | ------ | < 0.000050 | 0.000058 J |
| | Cadmium | mg/L | < 0.00012 | < 0.00011 | ------ | 0.00035 J | 0.00020 J | 0.00009 J | ------ | < 0.00010 | < 0.00010 | ------ | < 0.000093 | < 0.000093 |
| | Chromium | mg/L | < 0.00055 | 0.0014 J | < 0.0011 | < 0.0011 | < 0.0011 | < 0.00030 | ------ | < 0.00050 | < 0.00050 | ------ | < 0.0016 | < 0.0016 |
| | Cobalt | mg/L | < 0.00038 | 0.0032 J | < 0.00039 | < 0.00039 | < 0.00039 | 0.0024 J | ------ | 0.0031 J | 0.0028 J | ------ | < 0.00052 | < 0.00052 |
| | Fluoride | mg/L | 0.070 J | 0.55 | ------ | 0.067 J | 0.11 | 0.18 J | ------ | 0.29 J | 0.28 J | ------ | 0.18 | 0.19 J |
| | Lead | mg/L | 0.000067 J | < 0.00089 | ------ | < 0.00089 | < 0.00089 | < 0.000070 | ------ | < 0.000070 | 0.00009 J | ------ | < 0.00027 | < 0.00027 |
| | Lithium | mg/L | < 0.00081 | 0.00082 J | ------ | < 0.00073 | < 0.00073 | 0.0037 J | ------ | 0.0034 J | 0.0034 J | ------ | 0.0028 J | 0.0026 J |
| | Mercury | mg/L | | < 0.000078 | ------ | < 0.00013 | < 0.00013 | 0.00007 J | ------ | < 0.000036 | < 0.000036 | ------ | < 0.000036 | < 0.000036 |
| | Molybdenum | mg/L | 0.20 | 0.18 | ------ | 0.23 | 0.2 | 0.0144 | ------ | 0.0244 | 0.0237 | ------ | 0.0072 J | 0.007 J |
| | Selenium | mg/L | 0.0017 J | < 0.0014 | ------ | < 0.0014 | < 0.0014 | < 0.0014 | ------ | < 0.0018 | < 0.0018 | ------ | < 0.0014 | < 0.0014 |
| | Thallium | mg/L | < 0.00014 | < 0.00018 | ------ | < 0.00018 | < 0.00018 | < 0.000050 | ------ | < 0.000050 | < 0.000050 | ------ | < 0.00014 | < 0.00014 |
| | Radium | pCi/L | 0.568 U | 1.74 | ------ | 0.323 U | 0.174 U | ------ | ------ | 2.04 | 1.99 | ------ | 0.918 U | 1.36 U |
| | Radium-226 | pCi/L | 0.0288 U | 1.17 | ------ | 0.189 U | ------ | ------ | ------ | 1.46 | ------ | ------ | 0.468 | 0.694 |
| | Radium-228 | pCi/L | 0.539 U | 0.568 U | ------ | 0.134 U | ------ | ------ | ------ | 0.575 U | ------ | ------ | 0.45 U | 0.664 U |
| **Field Measured** | Conductivity | uS/cm | 386.4 | 490.46 | ------ | 458.89 | ------ | 194.65 | 148.06 | 299.2 | 293.9 | ------ | ------ | ------ |
| | Dissolved Oxygen | mg/L | 0.14 | 0.05 | ------ | 0.13 | ------ | 0.24 | 0.61 | 0.15 | 0.18 | ------ | ------ | ------ |
| | Oxidation Reduction Potential | millivolts | 656.5 | -28.3 | ------ | 63.5 | ------ | -38.67 | 37.76 | 23.22 | 18.3 | ------ | ------ | ------ |
| | Temperature | Deg C | 17.72 | 19.41 | ------ | 17.27 | ------ | 19.86 | 19.77 | 21.69 | 19.5 | ------ | ------ | ------ |
| | Turbidity | ntu | 0.67 | 4.6 | ------ | 3.45 | ------ | 3.71 | 1.87 | 2.75 | 4.62 | ------ | ------ | ------ |
| | Water level depth | ft | 10.3 | 3.92 | ------ | 10.19 | ------ | 5.47 | 5.58 | 7.36 | 6.84 | ------ | ------ | ------ |
| **Supplemental** | Alkalinity as CaCO3, Total | mg/L | 208 | ------ | ------ | 192 | 201.0 | ------ | ------ | ------ | ------ | 44 | ------ | ------ |
| | Alkalinity, Bicarbonate as CaCO3 | mg/L | 208 | ------ | ------ | 192 | 201.0 | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Alkalinity, Carbonate as CaCO3 | mg/L | < 5.0 | ------ | ------ | < 1.8 | < 5.0 | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Aluminum | mg/L | ------ | ------ | ------ | ------ | ------ | < 0.0162 | ------ | ------ | ------ | ------ | ------ | ------ |
| | Dissolved Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Hardness | mg/L | ------ | ------ | ------ | ------ | ------ | 76.1 | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Total | mg/L | ------ | ------ | ------ | ------ | 0.1 | ------ | ------ | ------ | ------ | 2.04 | ------ | ------ |
| | Iron, Ferric (Fe2) | mg/L | ------ | ------ | ------ | ------ | 0.1 | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Ferrous | mg/L | ------ | ------ | ------ | ------ | 0.0 | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Magnesium | mg/L | 18.7 | ------ | ------ | 19.9 | 17.6 | 5.08 | ------ | ------ | ------ | 2.41 | ------ | ------ |
| | Manganese | mg/L | ------ | ------ | ------ | ------ | ------ | 1.3 | ------ | ------ | ------ | 0.435 | ------ | ------ |
| | Nickel | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nitrate as N | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphorus, Total Orthophosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Potassium | mg/L | 4 | ------ | ------ | 4.5 | 3.8 | 4.11 | ------ | ------ | ------ | 3.03 | ------ | ------ |
| | Silica | mg/L | ------ | ------ | ------ | ------ | ------ | 27.9 | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silicon | mg/L | ------ | ------ | ------ | ------ | ------ | 13 | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silver | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Sodium | mg/L | 10 | ------ | ------ | 11.1 | 9.6 | 9.69 | ------ | ------ | ------ | 9.09 | ------ | ------ |
| | Sulfide | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Total Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Zinc | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |

**NOTES:**
1. mg/L - milligrams per Liter; pCi/L - picocuries per Liter; S.U. - Standarc
2. < indicates the substance was not detected above the analytical methc
3. J indicates the substance was detected at such low levels that the pre
4. Radium data are a combination of radium isotopes 226 and 228. Whe

| Analyte | | Units | DGWC-69 | DGWC-69 | DGWC-69 | DGWC-69 | DGWC-69 | DGWC-69 | DGWC-69 | DGWC-69 | DGWC-69 | DGWC-69 | DGWC-69 | DGWC-8 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 11/8/2018 | 3/13/2019 | 8/28/2019 | 10/16/2019 | 3/9/2020 | 8/13/2020 | 9/23/2020 | 3/10/2021 | 9/16/2021 | 1/25/2022 | 9/7/2022 | 12/6/2016 |
| **Appendix III** | Boron | mg/L | 0.054 | 0.028 J | ------ | 0.38 | 0.035 J | ------ | 0.041 J | 0.024 J | 0.32 | 0.035 J | 0.23 | 2.58 |
| | Calcium | mg/L | 8.5 | 7.6 | ------ | 16.2 | 8.6 | ------ | 8 | 8.5 | 18 | 9.2 | 13.1 | 89.7 |
| | Chloride | mg/L | 5.9 | 6.2 | ------ | 4.7 | 5.7 | ------ | 4.7 | 5.0 | 4.5 | 5.4 | 4.90 | 9.8 |
| | Fluoride | mg/L | 0.12 J | 0.086 J | 0.07 J | 0.13 J | 0.068 J | 0.084 J | 0.064 J | 0.055 J | 0.11 | 0.054 J | 0.11 | 0.37 |
| | pH, field measured | S.U. | ------ | ------ | ------ | ------ | 6.12 | 6.26 | 6.08 | 6.13 | 6.16 | 6.02 | 6.2 | ------ |
| | Sulfate | mg/L | 9.7 | 8.4 | ------ | 13.3 | 7.6 | ------ | 5.9 | 6.4 | 17.9 | 7.1 | 11.6 | 460 |
| | Total Dissolved Solids | mg/L | < 112 | 95 | ------ | 108 | 115 | ------ | 102 | 78.0 | 113 | 84 | 102 | ------ |
| **Appendix IV** | Antimony | mg/L | < 0.00078 | ------ | < 0.00027 | < 0.00027 | < 0.00027 | 0.0019 J | < 0.00028 | 0.0018 J | < 0.00078 | < 0.00078 | < 0.00078 | < 0.00080 |
| | Arsenic | mg/L | 0.02 | ------ | 0.025 | 0.023 | 0.029 | 0.029 | 0.032 | 0.028 | 0.023 | 0.028 | 0.024 | < 0.0016 |
| | Barium | mg/L | 0.072 | ------ | 0.061 | 0.1 | 0.057 | 0.13 | 0.055 | 0.048 | 0.078 | 0.049 | 0.065 | 0.0435 |
| | Beryllium | mg/L | < 0.000050 | ------ | < 0.000074 | < 0.000074 | 0.000075 J | 0.000063 J | 0.000061 J | 0.000050 J | < 0.000054 | 0.000059 J | < 0.000054 | 0.0031 J R |
| | Cadmium | mg/L | < 0.000093 | ------ | < 0.00011 | 0.00017 J | < 0.00011 | < 0.00012 | < 0.00012 | < 0.00012 | < 0.00011 | < 0.00011 | < 0.00011 | 0.0024 |
| | Chromium | mg/L | < 0.0016 | ------ | 0.00049 J | < 0.00039 | 0.0012 J | < 0.00055 | 0.0011 J | 0.00090 J | < 0.0011 | 0.0013 J | < 0.0011 | < 0.00090 |
| | Cobalt | mg/L | < 0.00052 | ------ | < 0.00030 | < 0.00030 | < 0.00030 | < 0.00038 | < 0.00038 | < 0.00038 | < 0.00039 | < 0.00039 | < 0.00039 | 0.0898 |
| | Fluoride | mg/L | 0.12 J | 0.086 J | 0.07 J | 0.13 J | 0.068 J | 0.084 J | 0.064 J | 0.055 J | 0.11 | 0.054 J | 0.11 | 0.37 |
| | Lead | mg/L | < 0.00027 | ------ | < 0.000046 | < 0.000046 | 0.00009 J | 0.000059 J | 0.00017 J | 0.00010 J | < 0.00089 | < 0.00089 | < 0.00089 | < 0.00010 |
| | Lithium | mg/L | 0.0025 J | ------ | 0.0024 J | 0.0032 J | 0.0025 J | 0.0031 J | 0.0023 J | 0.0023 J | 0.0023 J | 0.0026 J | 0.0025 J | < 0.0206 R |
| | Mercury | mg/L | < 0.000036 | ------ | < 0.00014 | < 0.00014 | < 0.00014 | < 0.000078 | < 0.000078 | | < 0.000078 | < 0.00013 | < 0.00013 | 0.00005 J |
| | Molybdenum | mg/L | 0.0059 J | ------ | 0.0059 J | 0.01 | 0.0062 J | 0.011 | 0.0056 J | 0.0056 J | 0.009 J | 0.0057 J | 0.0067 J | < 0.0017 |
| | Selenium | mg/L | < 0.0014 | ------ | < 0.0013 | < 0.0013 | < 0.0013 | < 0.0016 | < 0.0016 | < 0.0016 | < 0.0014 | < 0.0014 | < 0.0014 | 0.0055 J |
| | Thallium | mg/L | < 0.00014 | ------ | < 0.000052 | < 0.000052 | < 0.000052 | < 0.00014 | < 0.00014 | < 0.00014 | < 0.00018 | < 0.00018 | < 0.00018 | < 0.00020 |
| | Radium | pCi/L | 0.719 U | ------ | 1.38 | 0.826 U | 1.39 | 2.66 | 1.8 | 1.6 | 2.06 | 0.834 U | 1.82 | ------ |
| | Radium-226 | pCi/L | 0.719 | ------ | 1.14 | 0.542 | 0.839 | 1.54 | 1.2 | 0.867 | 1.22 | 0.713 | ------ | ------ |
| | Radium-228 | pCi/L | -0.368 U | ------ | 0.236 U | 0.284 U | 0.549 U | 1.12 | 0.596 U | 0.728 U | 0.839 U | 0.121 U | ------ | ------ |
| **Field Measured** | Conductivity | uS/cm | ------ | ------ | ------ | ------ | ------ | 226 | 113.04 | 97.2 | 175.58 | 116.45 | ------ | ------ |
| | Dissolved Oxygen | mg/L | ------ | ------ | ------ | ------ | ------ | 0.6 | 3.25 | 3.58 | 1.93 | 2.48 | ------ | ------ |
| | Oxidation Reduction Potential | millivolts | ------ | ------ | ------ | ------ | ------ | 296.8 | 56.3 | 317.7 | 69.8 | 94.7 | ------ | ------ |
| | Temperature | Deg C | ------ | ------ | ------ | ------ | ------ | 22.46 | 20.84 | 17.91 | 19.97 | 17.55 | ------ | ------ |
| | Turbidity | ntu | ------ | ------ | ------ | ------ | ------ | 3.78 | 4.77 | 1.26 | 2.94 | 3.87 | ------ | ------ |
| | Water level depth | ft | ------ | ------ | ------ | ------ | ------ | 7.4 | 6.42 | 6.52 | 6.35 | 6.32 | ------ | ------ |
| **Supplemental** | Alkalinity as CaCO3, Total | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 38.3 | ------ | 37.9 | 54.2 | ------ |
| | Alkalinity, Bicarbonate as CaCO3 | mg/L | ------ | ------ | ------ | 65 | ------ | ------ | ------ | 38.3 | ------ | 37.9 | 54.2 | ------ |
| | Alkalinity, Carbonate as CaCO3 | mg/L | ------ | ------ | ------ | < 20 | ------ | ------ | ------ | < 5.0 | ------ | < 1.8 | < 5.0 | ------ |
| | Aluminum | mg/L | ------ | ------ | ------ | < 0.032 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 0.224 |
| | Dissolved Organic Carbon | mg/L | ------ | ------ | ------ | < 0.50 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Hardness | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 413 |
| | Iron, Total | mg/L | ------ | ------ | ------ | < 0.20 | ------ | ------ | ------ | ------ | ------ | ------ | 0.1 | ------ |
| | Iron, Ferric (Fe2) | mg/L | ------ | ------ | ------ | < 0.20 | ------ | ------ | ------ | ------ | ------ | ------ | 0.1 | ------ |
| | Iron, Ferrous | mg/L | ------ | ------ | ------ | < 0.20 | ------ | ------ | ------ | ------ | ------ | ------ | 0.0 | ------ |
| | Magnesium | mg/L | ------ | ------ | ------ | 3.9 | ------ | ------ | ------ | 2.3 | ------ | 2.4 | 3.4 | 46 |
| | Manganese | mg/L | ------ | ------ | ------ | 0.37 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 5 |
| | Nickel | mg/L | ------ | ------ | ------ | 0.0092 J | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nitrate as N | mg/L | ------ | ------ | ------ | 0.17 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphate | mg/L | ------ | ------ | ------ | 0.027 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphorus, Total Orthophosphate | mg/L | ------ | ------ | ------ | 0.027 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Potassium | mg/L | ------ | ------ | ------ | 3.5 | ------ | ------ | ------ | 2.4 | ------ | 2.6 | 2.8 | 5.83 |
| | Silica | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 22 |
| | Silicon | mg/L | ------ | ------ | ------ | 13.6 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 10.3 |
| | Silver | mg/L | ------ | ------ | ------ | < 0.00028 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Sodium | mg/L | ------ | ------ | ------ | 9.3 | ------ | ------ | ------ | 9.8 | ------ | 10.8 | 9.6 | 22.3 |
| | Sulfide | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Total Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Zinc | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |

**NOTES:**
1. mg/L - milligrams per Liter; pCi/L - picocuries per Liter; S.U. - Standard
2. < indicates the substance was not detected above the analytical meth
3. J indicates the substance was detected at such low levels that the pre
4. Radium data are a combination of radium isotopes 226 and 228. Whe

| Analyte | | Units | DGWC-8<br>3/29/2017 | DGWC-8<br>7/11/2017 | DGWC-8<br>10/24/2017 | DGWC-8<br>2/27/2018 | DGWC-8<br>7/10/2018 | DGWC-8<br>11/6/2018 | DGWC-8<br>3/12/2019 | DGWC-8<br>8/28/2019 | DGWC-8<br>10/16/2019 | DGWC-8<br>3/3/2020 | DGWC-8<br>8/12/2020 | DGWC-8<br>9/23/2020 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Appendix III** | Boron | mg/L | 3.04 | 2.55 | 2.29 | 2.1 | 1.8 | 1.7 | 1.5 | ------ | 1.2 | 1.5 | ------ | 1 |
| | Calcium | mg/L | 90.5 | 91.1 | 78.1 | 64.2 | 59.3 | 57 | 54.3 | ------ | 47.3 | 46 | ------ | 39.3 |
| | Chloride | mg/L | 9.9 | 9.7 | 9.9 | 9.5 | 8.7 | 10.5 | 10.7 | ------ | 10.4 | 9.6 | ------ | 9.1 |
| | Fluoride | mg/L | 0.51 | 0.2 J | 0.82 | 0.59 | 0.14 J | 0.35 | 0.35 | 0.098 J | 0.14 J | < 0.050 | 0.056 J | < 0.050 |
| | pH, field measured | S.U. | 5.23 | 5.33 | 5.05 | ------ | ------ | ------ | ------ | ------ | ------ | 5.12 | 5.3 | 5.21 |
| | Sulfate | mg/L | 660 | 440 | 430 | 340 | 280 | 307 | 295 | ------ | 235 | 195 | ------ | 178 |
| | Total Dissolved Solids | mg/L | 654 | 679 | 468 | 520 | 472 | 456 | 438 | ------ | 374 | 369 | ------ | 333 |
| **Appendix IV** | Antimony | mg/L | < 0.00030 | < 0.00060 | < 0.00060 | < 0.00078 | < 0.00078 | < 0.00078 | ------ | < 0.00027 | < 0.00027 | < 0.00027 | < 0.00028 | < 0.00028 |
| | Arsenic | mg/L | 0.001 J | 0.0012 J | 0.0015 J | 0.002 J | < 0.00057 | < 0.00057 | ------ | < 0.00035 | < 0.00035 | 0.00096 J | < 0.00078 | < 0.00078 |
| | Barium | mg/L | 0.044 | 0.0389 | 0.0369 | 0.035 | 0.03 | 0.027 | ------ | 0.025 | 0.027 | 0.026 | 0.034 | 0.025 |
| | Beryllium | mg/L | 0.0031 | 0.0022 J | 0.0042 | 0.0047 | 0.003 | 0.0028 J | ------ | 0.0021 J | 0.0019 J | 0.0018 J | 0.0018 J | 0.0015 J |
| | Cadmium | mg/L | 0.0024 | 0.0021 | 0.0029 | 0.0029 | 0.0025 | 0.0027 | ------ | 0.0022 J | 0.0022 J | 0.002 J | 0.0021 J | 0.0018 J |
| | Chromium | mg/L | 0.0004 J | < 0.00050 | < 0.00050 | < 0.0016 | < 0.0016 | < 0.0016 | ------ | < 0.00039 | 0.0013 J | 0.00061 J | 0.0028 J | 0.00086 J |
| | Cobalt | mg/L | 0.0902 | 0.0601 | 0.123 | 0.13 | 0.072 | 0.077 | ------ | 0.051 | 0.054 | 0.044 | 0.053 | 0.04 |
| | Fluoride | mg/L | 0.51 | 0.2 J | 0.82 | 0.59 | 0.14 J | 0.35 | 0.35 | 0.098 J | 0.14 J | < 0.050 | 0.056 J | < 0.050 |
| | Lead | mg/L | 0.0001 J | < 0.000070 | < 0.000070 | < 0.00027 | < 0.00027 | < 0.00027 | ------ | 0.000082 J | 0.00029 J | 0.00023 J | 0.0007 J | 0.00011 J |
| | Lithium | mg/L | 0.0059 J | 0.0045 J | 0.0072 J | 0.0075 J | 0.0061 J | 0.0051 J | ------ | 0.0048 J | 0.0045 J | 0.0052 J | 0.0058 J | 0.0045 J |
| | Mercury | mg/L | 0.00012 J | 0.00006 J | < 0.000036 | < 0.000042 J | < 0.000082 J | < 0.00044 J | ------ | < 0.00014 | < 0.00014 | < 0.00014 | 0.000079 J | < 0.000078 |
| | Molybdenum | mg/L | < 0.00060 | < 0.0010 | < 0.0010 | < 0.0019 | < 0.0019 | < 0.0019 | ------ | < 0.00095 | < 0.00095 | < 0.00095 | < 0.00069 | < 0.00069 |
| | Selenium | mg/L | 0.0048 J | 0.0031 J | 0.0069 J | 0.0096 J | < 0.0014 | 0.0019 J | ------ | < 0.0013 | 0.0016 J | 0.0018 J | < 0.0016 | 0.0028 J |
| | Thallium | mg/L | 0.0002 J | 0.0001 J | 0.0003 J | 0.00033 J | 0.00027 J | 0.00027 J | ------ | 0.00022 J | 0.00025 J | 0.00023 J | 0.00023 J | 0.0002 J |
| | Radium | pCi/L | 0.28 U | 0.209 U | 0.615 U | 1.05 U | 0.363 U | 0.577 U | ------ | 0.815 U | 0.999 U | 0.481 U | 0.721 U | 0.8 U |
| | Radium-226 | pCi/L | | 0.174 | 0.615 | 0.536 | 0.363 | 0.371 | ------ | 0.474 | 0.649 | 0.294 U | 0.247 U | 0.335 U |
| | Radium-228 | pCi/L | | 0.0346 U | -0.0176 U | 0.509 U | -0.0736 U | 0.206 U | ------ | 0.341 U | 0.35 U | 0.187 U | 0.474 U | 0.465 U |
| **Field Measured** | Conductivity | uS/cm | 894.25 | 871.5 | 819.77 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 494.9 | 458.5 |
| | Dissolved Oxygen | mg/L | 0.2 | 0.2 | 0.18 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 4.97 | 0.4 |
| | Oxidation Reduction Potential | millivolts | 32.31 | 94.3 | 115.81 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 152.9 | 36.5 |
| | Temperature | Deg C | 21.24 | 23.33 | 17.78 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 20.68 | 21.01 |
| | Turbidity | ntu | 0.47 | 0.51 | 0.44 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 4.94 | 2.54 |
| | Water level depth | ft | 18.88 | 15.15 | 21.26 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 32.4 | 33 |
| **Supplemental** | Alkalinity as CaCO3, Total | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Alkalinity, Bicarbonate as CaCO3 | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 4 | ------ | ------ | ------ |
| | Alkalinity, Carbonate as CaCO3 | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 1.0 | ------ | ------ | ------ |
| | Aluminum | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 0.82 | ------ | ------ | ------ |
| | Dissolved Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 0.50 | ------ | ------ | ------ |
| | Hardness | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Total | mg/L | 0.0055 J | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 0.20 | ------ | ------ | ------ |
| | Iron, Ferric (Fe2) | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 0.20 | ------ | ------ | ------ |
| | Iron, Ferrous | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 0.20 | ------ | ------ | ------ |
| | Magnesium | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 22 | ------ | ------ | ------ |
| | Manganese | mg/L | 5.09 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 5.4 | ------ | ------ | ------ |
| | Nickel | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 0.018 | ------ | ------ | ------ |
| | Nitrate as N | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 1.3 | ------ | ------ | ------ |
| | Phosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 0.037 | ------ | ------ | ------ |
| | Phosphorus, Total Orthophosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Potassium | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 5.2 | ------ | ------ | ------ |
| | Silica | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silicon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 12.2 | ------ | ------ | ------ |
| | Silver | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 0.00028 | ------ | ------ | ------ |
| | Sodium | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 15.5 | ------ | ------ | ------ |
| | Sulfide | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Total Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Zinc | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |

**NOTES:**

1. mg/L - milligrams per Liter; pCi/L - picocuries per Liter; S.U. - Standard
2. < indicates the substance was not detected above the analytical meth
3. J indicates the substance was detected at such low levels that the pre
4. Radium data are a combination of radium isotopes 226 and 228. Whe

| | Analyte | Units | DGWC-8 | DGWC-8 | DGWC-8 | DGWC-8 | DGWC-9 | DGWC-9 | DGWC-9 | DGWC-9 | DGWC-9 | DGWC-9 | DGWC-9 | DGWC-9 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 3/2/2021 | 9/13/2021 | 1/25/2022 | 9/15/2022 | 12/6/2016 | 3/28/2017 | 7/11/2017 | 10/24/2017 | 2/27/2018 | 7/11/2018 | 11/6/2018 | 3/12/2019 |
| **Appendix III** | Boron | mg/L | 0.96 | 0.86 | 0.98 | 0.83 | 1.85 | 2.01 | 1.78 | 1.72 | 1.7 | 1.4 | 1.4 | 1.2 |
| | Calcium | mg/L | 35.6 | 36 | 36.8 | 29.3 | 66.2 | 71.6 | 73.7 | 92.5 | 73.1 | 88.5 | 81.1 | 78.1 |
| | Chloride | mg/L | 8.6 | 8.2 | 9.3 | 8.30 | 6.2 | 6.6 | 6.9 | 6.7 | 8.2 | 10.5 | 8.7 | 8.5 |
| | Fluoride | mg/L | 0.059 J | 0.069 J | < 0.050 | 0.077 J | 1.2 | 1.1 | 1.1 | 1.7 | 1.2 | 1.3 | 1.1 | 0.97 |
| | pH, field measured | S.U. | 6.60 | 5.05 | 5.16 | 5.2 | 4.15 | 4.16 | 4.23 | 4.06 | ------ | ------ | ------ | ------ |
| | Sulfate | mg/L | 152 | 145 | 134 | 134 | 330 | 300 | 320 | 430 | 327 | 344 | 438 | 362 |
| | Total Dissolved Solids | mg/L | 291 | 306 | 281 | 234 | ------ | 404 | 436 | 599 | 482 | 532 | 554 | 493 |
| **Appendix IV** | Antimony | mg/L | 0.00046 J | < 0.00078 | < 0.00078 | < 0.00078 | < 0.00080 | < 0.00030 | < 0.00060 | < 0.00060 | < 0.00078 | < 0.00078 | < 0.00078 | ------ |
| | Arsenic | mg/L | < 0.00078 | < 0.0011 | < 0.0011 | < 0.0022 | 0.0206 | 0.0243 | 0.0194 | 0.0249 | 0.04 | 0.016 | 0.017 | ------ |
| | Barium | mg/L | 0.029 | 0.019 | 0.019 | 0.021 | 0.0154 | 0.017 | 0.0154 J | 0.0148 | 0.015 | 0.017 | 0.015 | ------ |
| | Beryllium | mg/L | 0.0012 | 0.0015 | 0.0012 | 0.00088 | 0.0047 J R | 0.0052 | 0.0048 | 0.0051 | 0.0057 | 0.0058 | 0.006 | ------ |
| | Cadmium | mg/L | 0.0017 | 0.002 | 0.0016 | 0.0011 | 0.0005 J | 0.0005 J | 0.0005 J | 0.0006 J | 0.00058 J | 0.00067 J | 0.0006 J | ------ |
| | Chromium | mg/L | 0.0015 J | < 0.0011 | < 0.0011 | < 0.0011 | < 0.00090 | 0.001 J | < 0.0045 | < 0.0023 | < 0.0016 | < 0.0016 | < 0.0016 | ------ |
| | Cobalt | mg/L | 0.033 | 0.028 | 0.019 | 0.0046 J | 0.115 | 0.124 | 0.136 | 0.151 | 0.16 | 0.18 | 0.2 | ------ |
| | Fluoride | mg/L | 0.059 J | 0.069 J | < 0.050 | 0.077 J | 1.2 | 1.1 | 1.1 | 1.7 | 1.2 | 1.3 | 1.1 | 0.97 |
| | Lead | mg/L | 0.00027 J | < 0.00089 | < 0.00089 | < 0.00089 | < 0.00010 | < 0.00030 | < 0.00030 | < 0.00030 | < 0.00027 | < 0.0014 | < 0.0014 | ------ |
| | Lithium | mg/L | 0.0046 J | 0.0034 J | 0.0032 J | 0.0039 J | 0.0231 J R | 0.0249 J | 0.022 J | 0.0281 J | 0.031 J | 0.028 J | 0.028 J | ------ |
| | Mercury | mg/L | < 0.000078 | < 0.000078 | < 0.00013 | < 0.00013 | < 0.000040 | < 0.000041 | < 0.000041 | < 0.000036 | < 0.000042 J | < 0.000036 | < 0.00046 J | ------ |
| | Molybdenum | mg/L | < 0.00069 | < 0.00074 | < 0.00074 | < 0.00074 | < 0.0017 | < 0.00060 | < 0.0010 | < 0.0010 | < 0.0019 | < 0.0019 | < 0.0019 | ------ |
| | Selenium | mg/L | < 0.0016 | < 0.0014 | < 0.0014 | < 0.0014 | 0.0837 | 0.0954 | 0.0561 | 0.0653 | 0.13 | 0.045 | 0.12 | ------ |
| | Thallium | mg/L | 0.00019 J | 0.00019 J | 0.00019 J | < 0.00018 | 0.0006 J | 0.0007 J | 0.0007 J | 0.0006 J | 0.00038 J | < 0.00071 | < 0.00071 | ------ |
| | Radium | pCi/L | 0.751 U | 0.916 U | 0.356 U | 0.896 | ------ | 1.06 | 0.62 U | 1.21 | 1.79 | 1.81 | 1.13 | ------ |
| | Radium-226 | pCi/L | 0.204 U | -0.0716 U | 0.0721 U | ------ | ------ | ------ | 0.328 | 0.565 | 0.605 | 0.667 | 0.49 | ------ |
| | Radium-228 | pCi/L | 0.547 U | 0.916 | 0.284 U | ------ | ------ | ------ | 0.292 U | 0.649 U | 1.18 | 1.14 | 0.637 | ------ |
| **Field Measured** | Conductivity | uS/cm | 442.51 | 395.76 | 426.6 | ------ | 614.24 | 605.44 | 622.8 | 656.24 | ------ | ------ | ------ | ------ |
| | Dissolved Oxygen | mg/L | 0.42 | 0.82 | 0.42 | ------ | 0.18 | 0.2 | 0.23 | 0.27 | ------ | ------ | ------ | ------ |
| | Oxidation Reduction Potential | millivolts | 82.3 | 121.3 | 120 | ------ | 100.14 | 171.65 | 49 | 121.55 | ------ | ------ | ------ | ------ |
| | Temperature | Deg C | 17.41 | 20.84 | 18.44 | ------ | 16.15 | 21.82 | 25.65 | 20.83 | ------ | ------ | ------ | ------ |
| | Turbidity | ntu | 6.6 | 1.06 | 1.94 | ------ | 0.76 | 0.9 | 0.06 | 1.8 | ------ | ------ | ------ | ------ |
| | Water level depth | ft | 34.52 | 37.32 | 39.6 | ------ | 16.1 | 17.05 | 12.12 | 19.44 | ------ | ------ | ------ | ------ |
| **Supplemental** | Alkalinity as CaCO3, Total | mg/L | 6.0 | ------ | 8.3 | 9.2 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Alkalinity, Bicarbonate as CaCO3 | mg/L | 6.0 | ------ | 8.3 | 9.2 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Alkalinity, Carbonate as CaCO3 | mg/L | < 5.0 | ------ | < 1.8 | < 5.00 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Aluminum | mg/L | ------ | ------ | ------ | ------ | 4.73 | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Dissolved Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Hardness | mg/L | ------ | ------ | ------ | ------ | 202 | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Total | mg/L | ------ | ------ | ------ | < 0.025 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Ferric (Fe2) | mg/L | ------ | ------ | ------ | < 0.025 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Ferrous | mg/L | ------ | ------ | ------ | 0.0 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Magnesium | mg/L | 17.4 | ------ | 17.9 | 15.0 | 8.98 | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Manganese | mg/L | ------ | ------ | ------ | ------ | 3.12 | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nickel | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nitrate as N | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphorus, Total Orthophosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Potassium | mg/L | 4.6 | ------ | 4.4 | 3.7 | 5.85 | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silica | mg/L | ------ | ------ | ------ | ------ | 15.2 | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silicon | mg/L | ------ | ------ | ------ | ------ | 7.1 | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silver | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Sodium | mg/L | 13.2 | ------ | 14.4 | 12.3 | 11.7 | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Sulfide | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Total Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Zinc | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |

**NOTES:**
1. mg/L - milligrams per Liter; pCi/L - picocuries per Liter; S.U. - Standard
2. < indicates the substance was not detected above the analytical meth
3. J indicates the substance was detected at such low levels that the pre
4. Radium data are a combination of radium isotopes 226 and 228. Whe

**APPENDIX A**
**ANALYTICAL RESULTS (2016 - 2022)**
Plant McDonough-Atkinson Ash Pond 1 and Ash Pond 2 and 3/4
Atlanta, Georgia

| Analyte | | Units | DGWC-9 8/27/2019 | DGWC-9 10/17/2019 | DGWC-9 3/3/2020 | DGWC-9 8/11/2020 | DGWC-9 9/22/2020 | DGWC-9 3/2/2021 | DGWC-9 9/10/2021 | DGWC-9 1/26/2022 | DGWC-9 9/19/2022 | B-100 7/23/2020 | B-100 8/3/2020 | B-100 8/17/2020 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appendix III | Boron | mg/L | ------ | 1.2 | 1.1 | ------ | 0.78 | 0.77 | 0.54 | 0.69 | 0.80 | ------ | ------ | ------ |
| | Calcium | mg/L | ------ | 75.6 | 59.5 | ------ | 54.7 | 48.8 | 47.7 | 48.4 | 45.1 | ------ | ------ | ------ |
| | Chloride | mg/L | ------ | 10 | 6.6 | ------ | 8 | 8.4 | 9 | 9.1 | 13.20 | ------ | ------ | ------ |
| | Fluoride | mg/L | 0.68 | 1.2 | 1.4 | 1.3 | 0.99 | 0.93 | 2 | 1.2 | 0.8 | ------ | ------ | < 0.050 |
| | pH, field measured | S.U. | ------ | ------ | 4.07 | 4 | 4 | 3.99 | 3.98 | 3.68 / 3.88 | 3.98 | ------ | 4.93 | 5.02 |
| | Sulfate | mg/L | ------ | 331 | 247 | ------ | 282 | 266 | 264 | 245 | 274 | ------ | ------ | ------ |
| | Total Dissolved Solids | mg/L | ------ | 550 | 444 | ------ | 461 | 449 | 466 | 409 | 456 | ------ | ------ | ------ |
| Appendix IV | Antimony | mg/L | < 0.00027 | < 0.00027 | < 0.00027 | < 0.00028 | < 0.00028 | < 0.00028 | < 0.00078 | < 0.00078 | < 0.00078 | ------ | ------ | 0.0013 J |
| | Arsenic | mg/L | 0.021 | 0.033 | 0.015 | 0.022 | 0.04 | 0.021 | 0.031 | 0.012 | 0.016 | < 0.00078 | ------ | < 0.00078 |
| | Barium | mg/L | 0.016 | 0.015 | 0.016 | 0.016 | 0.015 | 0.017 | 0.014 | 0.016 | 0.017 | ------ | ------ | 0.015 |
| | Beryllium | mg/L | 0.007 | 0.0063 | 0.0048 | 0.0062 | 0.0049 | 0.0050 | 0.0049 | 0.0054 | 0.0047 | ------ | ------ | 0.0004 J |
| | Cadmium | mg/L | 0.00071 J | 0.00064 J | 0.00059 J | 0.00059 J | 0.00059 J | 0.00057 | 0.00053 | 0.00059 | 0.00076 | ------ | ------ | 0.00059 J |
| | Chromium | mg/L | 0.00048 J | 0.00051 J | 0.0057 J | 0.00061 J | < 0.00055 | 0.00059 J | < 0.0011 | 0.0029 J | < 0.0011 | ------ | ------ | < 0.00055 |
| | Cobalt | mg/L | 0.24 | 0.21 | 0.2 | 0.22 | 0.16 | 0.18 | 0.21 | 0.22 | 0.25 | 0.086 | 0.087 | 0.077 |
| | Fluoride | mg/L | 0.68 | 1.2 | 1.4 | 1.3 | 0.99 | 0.93 | 2 | 1.2 | 0.8 | ------ | ------ | < 0.050 |
| | Lead | mg/L | < 0.00023 | < 0.00023 | 0.00017 J | < 0.00018 | 0.00015 J | 0.00028 J | < 0.00089 | < 0.0044 | < 0.0044 | ------ | ------ | 0.000088 J |
| | Lithium | mg/L | 0.031 J | 0.029 J | 0.028 J | 0.032 | 0.025 J | 0.028 J | 0.027 J | 0.029 J | 0.023 J | ------ | ------ | 0.0013 J |
| | Mercury | mg/L | 0.00021 J | 0.00042 J | < 0.00014 | 0.00026 | 0.00013 J | 0.00017 J | 0.00014 J | 0.00014 J | 0.0002 | ------ | ------ | 0.00011 J |
| | Molybdenum | mg/L | < 0.00095 | < 0.00095 | < 0.00095 | < 0.00069 | < 0.00069 | < 0.00069 | < 0.00074 | < 0.00074 | < 0.00074 | ------ | ------ | < 0.00069 |
| | Selenium | mg/L | 0.067 | 0.19 | 0.046 | 0.11 | 0.23 | 0.070 | 0.057 | 0.025 | 0.048 | ------ | ------ | < 0.0016 |
| | Thallium | mg/L | 0.00053 J | 0.00076 J | 0.00044 J | < 0.00072 | 0.00043 J | < 0.00072 | 0.0004 J | < 0.00090 | < 0.00090 | ------ | ------ | < 0.00014 |
| | Radium | pCi/L | 1.55 | 0.702 U | 1.37 | 0.819 U | 1.15 U | 1.29 U | 1.28 | 0.789 U | 1.38 | ------ | ------ | 1.4 U |
| | Radium-226 | pCi/L | 0.834 | 0.702 | 0.926 | 0.349 | 0.326 U | 0.603 | 0.252 U | 0.237 | ------ | ------ | ------ | 0.277 U |
| | Radium-228 | pCi/L | 0.72 | -0.342 U | 0.447 U | 0.47 U | 0.823 U | 0.683 U | 1.03 | 0.552 U | ------ | ------ | ------ | 1.12 |
| Field Measured | Conductivity | uS/cm | ------ | ------ | ------ | 675.8 | 684.09 | 697.6 | 649.01 | 679.25 | ------ | ------ | ------ | 874.4 |
| | Dissolved Oxygen | mg/L | ------ | ------ | ------ | 0.84 | 1.79 | 3.87 | 2.66 | 2.53 | ------ | ------ | ------ | 0.72 |
| | Oxidation Reduction Potential | millivolts | ------ | ------ | ------ | 123.7 | 148.7 | 389.1 | 366.3 | 376.2 | ------ | ------ | ------ | 90.9 |
| | Temperature | Deg C | ------ | ------ | ------ | 20.93 | 17.77 | 14.85 | 19.19 | 18.08 | ------ | ------ | ------ | 22.32 |
| | Turbidity | ntu | ------ | ------ | ------ | 1.8 | 1.39 | 2.17 | 0.87 | 1.23 | ------ | ------ | ------ | 2.79 |
| | Water level depth | ft | ------ | ------ | ------ | 25.98 | 24.34 | 28.41 | 25.16 | ------ | ------ | ------ | ------ | 34.92 |
| Supplemental | Alkalinity as CaCO3, Total | mg/L | ------ | ------ | ------ | ------ | ------ | < 5.0 | ------ | < 1.8 | < 5.00 | ------ | ------ | ------ |
| | Alkalinity, Bicarbonate as CaCO3 | mg/L | ------ | < 20 | ------ | ------ | ------ | < 5.0 | ------ | < 1.8 | < 5.00 | ------ | ------ | ------ |
| | Alkalinity, Carbonate as CaCO3 | mg/L | ------ | < 20 | ------ | ------ | ------ | < 5.0 | ------ | < 1.8 | < 5.00 | ------ | ------ | ------ |
| | Aluminum | mg/L | ------ | 8.7 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Dissolved Organic Carbon | mg/L | ------ | 0.55 J | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Hardness | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Total | mg/L | ------ | < 0.015 | ------ | ------ | ------ | ------ | ------ | ------ | < 0.025 | ------ | ------ | ------ |
| | Iron, Ferric (Fe2) | mg/L | ------ | < 0.20 | ------ | ------ | ------ | ------ | ------ | ------ | < 0.025 | ------ | ------ | ------ |
| | Iron, Ferrous | mg/L | ------ | < 0.20 | ------ | ------ | ------ | ------ | ------ | ------ | 0.0 | ------ | ------ | ------ |
| | Magnesium | mg/L | ------ | 11.4 | ------ | ------ | ------ | 6.7 | ------ | 5.9 | 8.3 | ------ | ------ | ------ |
| | Manganese | mg/L | ------ | 5.7 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nickel | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nitrate as N | mg/L | ------ | 1.4 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphorus, Total Orthophosphate | mg/L | ------ | < 0.020 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Potassium | mg/L | ------ | 6.5 | ------ | ------ | ------ | 5.3 | ------ | 5.4 | 5.7 | ------ | ------ | ------ |
| | Silica | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silicon | mg/L | ------ | 9.1 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silver | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Sodium | mg/L | ------ | 20 | ------ | ------ | ------ | 28.4 | ------ | 32.6 | 34.3 | ------ | ------ | ------ |
| | Sulfide | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Total Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Zinc | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |

**NOTES:**
1. mg/L - milligrams per Liter; pCi/L - picocuries per Liter; S.U. - Standarc
2. < indicates the substance was not detected above the analytical methc
3. J indicates the substance was detected at such low levels that the pre
4. Radium data are a combination of radium isotopes 226 and 228. Whe

| | Analyte | Units | B-100 | B-100 | B-100 | B-100 | B-100 | B-100 | B-101D | B-101D | B-101D | B-101D | B-101D | B-102D |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 9/25/2020 | 3/8/2021 | 9/13/2021 | 1/21/2022 | 1/21/2022 | 9/8/2022 | 1/12/2021 | 3/5/2021 | 9/13/2021 | 1/26/2022 | 9/16/2022 | 1/11/2021 |
| **Appendix III** | Boron | mg/L | 0.27 | 0.24 | 0.24 | ------ | 0.24 | 0.24 | 1.70 | 1.9 | 1.6 | 1.4 | 1.40 | 2.7 |
| | Calcium | mg/L | 44.7 | 47.7 | 51.5 | ------ | 49.9 | 46.0 | 56.3 | 68.9 | 53.6 | 49.7 | 57 .0 | 73.0 |
| | Chloride | mg/L | 13.2 | 12.9 | 11.1 | ------ | 11.3 | 10.20 | 20.6 | 9.0 | 8.7 | 9 | 8.70 | 9.8 |
| | Fluoride | mg/L | < 0.050 | < 0.050 | < 0.050 | ------ | < 0.050 | 0.072 J | 0.052 J | 0.053 J | 0.051 J | < 0.050 | 0.099 J | 0.077 J |
| | pH, field measured | S.U. | 5.53 | 5.32 | 5.27 | 5.23 | 5.23 | 5.24 | 5.26 | 6.52 | 6.07 | 5.87 | 5.92 | 5.55 |
| | Sulfate | mg/L | 385 | 388 | 351 | ------ | 344 | 399 | 207 | 236 | 174 | 144 | 223 | 249 |
| | Total Dissolved Solids | mg/L | 724 | 660 | 636 | ------ | 638 | 606 | 405 | 462 | 343 | 290 | 365 | 442 |
| **Appendix IV** | Antimony | mg/L | < 0.00028 | 0.0017 J | < 0.00078 | ------ | < 0.00078 | < 0.00078 | 0.00039 J | 0.0019 J | 0.001 J | 0.00082 J | < 0.00078 | < 0.00028 |
| | Arsenic | mg/L | < 0.00078 | < 0.00078 | < 0.0011 | ------ | < 0.0011 | < 0.0022 | < 0.00078 | 0.0017 J | < 0.0011 | < 0.0011 | < 0.0022 | < 0.00078 |
| | Barium | mg/L | 0.022 | 0.022 | 0.021 | ------ | 0.023 | 0.021 | 0.076 | 0.064 | 0.076 | 0.062 | 0.063 | 0.024 |
| | Beryllium | mg/L | 0.00035 J | 0.00046 J | 0.00053 | ------ | 0.00053 | 0.00058 | 0.000066 J | 0.000047 J | 0.000067 J | 0.000079 J | 0.000067 J | 0.0013 J |
| | Cadmium | mg/L | 0.00027 J | 0.00027 J | 0.00029 J | ------ | 0.00059 | 0.00027 J | < 0.00012 | < 0.00012 | < 0.00011 | 0.00011 J | < 0.00011 | 0.00080 J |
| | Chromium | mg/L | 0.00094 J | 0.00057 J | < 0.0011 | ------ | < 0.0011 | < 0.0011 | < 0.00055 | < 0.00055 | 0.0014 J | < 0.0011 | < 0.0011 | < 0.00055 |
| | Cobalt | mg/L | 0.034 | 0.029 | 0.035 | ------ | 0.034 | 0.028 | 0.0034 J | 0.0023 J | 0.003 J | 0.0028 J | 0.0035 J | 0.015 |
| | Fluoride | mg/L | < 0.050 | < 0.050 | < 0.050 | ------ | < 0.050 | 0.072 J | 0.052 J | 0.053 J | 0.051 J | < 0.050 | 0.099 J | 0.077 J |
| | Lead | mg/L | 0.00021 J | 0.00018 J | < 0.00089 | ------ | < 0.00089 | < 0.00089 | < 0.000036 | 0.000065 J | < 0.00089 | < 0.00089 | < 0.00089 | 0.000050 J |
| | Lithium | mg/L | 0.0027 J | 0.0024 J | 0.0022 J | ------ | 0.0021 J | 0.0023 J | 0.012 J | 0.015 J | 0.011 J | 0.0098 J | 0.011 J | 0.015 J |
| | Mercury | mg/L | < 0.000078 | ------ | < 0.000078 | ------ | < 0.00013 | < 0.00013 | < 0.000078 | 0.00014 J | < 0.000078 | < 0.00013 | < 0.00013 | < 0.000078 |
| | Molybdenum | mg/L | < 0.00069 | < 0.00069 | < 0.00074 | ------ | < 0.00074 | < 0.00074 | 0.0022 J | < 0.00069 | < 0.00074 | < 0.00074 | < 0.00074 | < 0.00069 |
| | Selenium | mg/L | < 0.0016 | 0.0019 J | < 0.0014 | ------ | < 0.0014 | < 0.0014 | < 0.0016 | 0.0031 J | < 0.0014 | < 0.0014 | < 0.0014 | < 0.0016 |
| | Thallium | mg/L | < 0.00014 | < 0.00014 | < 0.00018 | ------ | < 0.00018 | < 0.00018 | < 0.00014 | < 0.00014 | < 0.00018 | < 0.00018 | < 0.00018 | < 0.00014 |
| | Radium | pCi/L | 0.799 U | 0.168 U | 0.774 U | 0.769 U | ------ | 0.643 U | 1.91 | 2.17 | 1.8 | 1.21 | 1.64 | 0.635 U |
| | Radium-226 | pCi/L | 0.132 U | 0.145 U | 0.116 U | 0.0921 U | ------ | ------ | 0.74 | 0.885 | 0.33 U | 0.422 | ------ | 0.312 |
| | Radium-228 | pCi/L | 0.667 U | 0.0231 U | 0.658 U | 0.677 U | ------ | ------ | 1.17 | 1.28 | 1.47 | 0.79 | ------ | 0.323 U |
| **Field Measured** | Conductivity | uS/cm | 929.9 | 877.32 | 750.79 | 871.77 | ------ | ------ | 634.12 | 636.9 | 509.33 | 474.04 | ------ | 590.16 |
| | Dissolved Oxygen | mg/L | 0.11 | 0.12 | 0.13 | 0.17 | ------ | ------ | 0.39 | 0.29 | 0.93 | 1.84 | ------ | 1.09 |
| | Oxidation Reduction Potential | millivolts | 106.4 | 24.6 | 29.3 | 37.8 | ------ | ------ | 56.60 | 249.8 | 44.7 | 94.2 | ------ | 55.2 |
| | Temperature | Deg C | 21.46 | 21.46 | 23.12 | 16.89 | ------ | ------ | 10.53 | 15.52 | 26.6 | 15.94 | ------ | 14.4 |
| | Turbidity | ntu | 4.79 | 4.4 | 4.33 | 4.06 | ------ | ------ | 1.18 | 1.85 | 2.36 | 3.5 | ------ | 0.72 |
| | Water level depth | ft | 32.25 | 33.54 | 35 | 33.39 | ------ | ------ | 29.31 | 35.54 | 30.82 | 32.9 | ------ | 31.95 |
| **Supplemental** | Alkalinity as CaCO3, Total | mg/L | ------ | 34.1 | ------ | ------ | 32.2 | 31.5 | ------ | 50.4 | ------ | 32.9 | 35.5 | ------ |
| | Alkalinity, Bicarbonate as CaCO3 | mg/L | ------ | 34.1 | ------ | ------ | 32.2 | 31.5 | ------ | 50.4 | ------ | 32.9 | 35.5 | ------ |
| | Alkalinity, Carbonate as CaCO3 | mg/L | ------ | < 5.0 | ------ | ------ | < 1.8 | < 5.0 | ------ | < 5.0 | ------ | < 1.8 | < 5.00 | ------ |
| | Aluminum | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Dissolved Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Hardness | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Total | mg/L | ------ | ------ | ------ | ------ | ------ | 25.0 | ------ | ------ | ------ | ------ | 0.1 | ------ |
| | Iron, Ferric (Fe2) | mg/L | ------ | ------ | ------ | ------ | ------ | 18.0 | ------ | ------ | ------ | ------ | 0.1 | ------ |
| | Iron, Ferrous | mg/L | ------ | ------ | ------ | ------ | ------ | 7.0 | ------ | ------ | ------ | ------ | 0.0 | ------ |
| | Magnesium | mg/L | ------ | 48.8 | ------ | ------ | 49.7 | 46.3 | ------ | 25.9 | ------ | 16.4 | 20.7 | ------ |
| | Manganese | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nickel | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nitrate as N | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphorus, Total Orthophosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Potassium | mg/L | ------ | 1.3 | ------ | ------ | 1.5 | 1.2 | ------ | 5.8 | ------ | 5.9 | 6.0 | ------ |
| | Silica | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silicon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silver | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Sodium | mg/L | ------ | 28.8 | ------ | ------ | 28.3 | 27.0 | ------ | 20.8 | ------ | 19.3 | 18.9 | ------ |
| | Sulfide | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Total Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Zinc | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |

**NOTES:**
1. mg/L - milligrams per Liter; pCi/L - picocuries per Liter; S.U. - Standard
2. < indicates the substance was not detected above the analytical meth
3. J indicates the substance was detected at such low levels that the pre
4. Radium data are a combination of radium isotopes 226 and 228. Whe

| | Analyte | Units | B-102D | B-102D | B-102D | B-102D | B-104D | B-104D | B-104D | B-104D | B-104D | B-104D | B-105D | B-105D |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 3/4/2021 | 9/10/2021 | 1/27/2022 | 9/15/2022 | 12/9/2020 | 1/12/2021 | 3/4/2021 | 9/14/2021 | 1/24/2022 | 9/13/2022 | 12/9/2020 | 3/8/2021 |
| **Appendix III** | Boron | mg/L | 2.5 | 2.5 | 2.7 | 2.30 | 0.26 J | 0.28 | 0.26 | 0.23 | 0.24 | 0.26 | 0.79 | 0.64 |
| | Calcium | mg/L | 79.7 | 84.7 | 86.9 | 70.3 | 154 | 156 | 150 | 151 | 163 | 153.0 | 76.9 | 79.6 |
| | Chloride | mg/L | 10.4 | 10.2 | 10.4 | 9.90 | 7.7 | 7.5 | 7.9 | 7.9 | 7.8 | 8.00 | 17.1 | 17.4 |
| | Fluoride | mg/L | 0.11 | 0.083 J | 0.062 J | 0.11 | 0.33 | 0.36 | 0.43 | 0.5 | 0.28 | 0.35 | 0.075 J | 0.32 |
| | pH, field measured | S.U. | 5.43 | 5.36 | 5.33 | 5.43 | 6.44 | 6.24 | 6.27 | 8.58 | 6.48 | 6.49 | 6.48 | 6.37 |
| | Sulfate | mg/L | 256 | 271 | 231 | 258 | 415 | 471 | 474 | 456 | 423 | 505 | 220 | 228 |
| | Total Dissolved Solids | mg/L | 459 | 474 | 459 | 437 | 862 | 836 | 818 | 776 | 806 | 832 | 474 | 477 |
| **Appendix IV** | Antimony | mg/L | < 0.00028 | < 0.00078 | < 0.00078 | < 0.00078 | 0.00079 J | 0.00048 J | 0.00077 J | < 0.00078 | 0.001 J | < 0.00078 | < 0.00028 | 0.00069 J |
| | Arsenic | mg/L | < 0.00078 | < 0.0011 | < 0.0011 | < 0.0022 | < 0.00078 | < 0.00078 | 0.0025 J | 0.0019 J | 0.0035 J | < 0.0022 | < 0.00078 | 0.0025 J |
| | Barium | mg/L | 0.022 | 0.02 | 0.022 | 0.019 | 0.026 | 0.022 | 0.021 | 0.021 | 0.024 | 0.021 | 0.030 | 0.041 |
| | Beryllium | mg/L | 0.0012 | 0.0011 | 0.0011 | 0.001 | 0.0013 J | 0.0015 J | 0.0015 | 0.0011 | 0.0012 | 0.0014 | < 0.000046 | < 0.000046 |
| | Cadmium | mg/L | 0.00081 | 0.00083 | 0.00091 | 0.00091 | < 0.00012 | < 0.00012 | < 0.00012 | < 0.00011 | < 0.00011 | < 0.00011 | < 0.00012 | < 0.00012 |
| | Chromium | mg/L | < 0.00055 | < 0.0011 | < 0.0011 | < 0.0011 | 0.0011 J | < 0.00055 | < 0.00055 | < 0.0011 | < 0.0011 | < 0.0011 | < 0.00055 | < 0.00055 |
| | Cobalt | mg/L | 0.014 | 0.013 | 0.014 | 0.012 | 0.17 | 0.19 | 0.19 | 0.1 | 0.1 | 0.14 | 0.012 | 0.0042 J |
| | Fluoride | mg/L | 0.11 | 0.083 J | 0.062 J | 0.11 | 0.33 | 0.36 | 0.43 | 0.5 | 0.28 | 0.35 | 0.075 J | 0.32 |
| | Lead | mg/L | 0.000059 J | < 0.00089 | < 0.00089 | < 0.00089 | 0.000051 J | < 0.000036 | < 0.000036 | < 0.00089 | < 0.00089 | < 0.00089 | 0.000052 J | < 0.000036 |
| | Lithium | mg/L | 0.014 J | 0.012 J | 0.013 J | 0.013 J | 0.039 J | 0.039 | 0.038 | 0.036 | 0.036 | 0.04 | 0.014 J | 0.015 J |
| | Mercury | mg/L | < 0.000078 | < 0.000078 | < 0.00013 | < 0.00013 | 0.000079 J | < 0.000078 | < 0.000078 | < 0.000078 | < 0.00013 | < 0.00013 | 0.000087 J | |
| | Molybdenum | mg/L | < 0.00069 | < 0.00074 | < 0.00074 | 0.0015 J | 0.0012 J | < 0.00069 | < 0.00069 | < 0.00074 | 0.00083 J | < 0.00074 | < 0.00069 | 0.0011 J |
| | Selenium | mg/L | < 0.0016 | < 0.0014 | < 0.0014 | < 0.0014 | < 0.0016 | 0.0016 J | 0.0031 J | < 0.0014 | < 0.0014 | < 0.0014 | < 0.0016 | < 0.0016 |
| | Thallium | mg/L | < 0.00014 | < 0.00018 | < 0.00018 | < 0.00018 | < 0.00014 | < 0.00014 | < 0.00014 | < 0.00018 | < 0.00018 | < 0.00018 | < 0.00014 | < 0.00014 |
| | Radium | pCi/L | 0.789 U | 1.74 | 0.628 U | 0.61 U | 15.2 | 17 | 14.5 | 9.6 | 11.9 | 9.12 | 1.25 U | 1.87 |
| | Radium-226 | pCi/L | 0.188 U | 0.642 | 0.142 U | ------ | 5.14 | 3.85 | 4.48 | 2.74 | 3.53 | ------ | 0.378 U | 0.363 U |
| | Radium-228 | pCi/L | 0.601 U | 1.1 | 0.486 U | ------ | 10.1 | 13.1 | 9.97 | 6.86 | 8.37 | ------ | 0.873 U | 1.51 |
| **Field Measured** | Conductivity | uS/cm | 596.2 | 643.64 | 693.29 | ------ | 1060.17 | 1076.86 | 1019.6 | 1037.6 | 1921.5 | ------ | 674.08 | 607.5 |
| | Dissolved Oxygen | mg/L | 0.31 | 0.24 | 0.39 | ------ | 1.53 | 0.57 | 0.28 | 0.4 | 0.18 | ------ | 1.03 | 0.28 |
| | Oxidation Reduction Potential | millivolts | 162.8 | 55.7 | 55.4 | ------ | 10.5 | 20.6 | -7.80 | -105.5 | -63.8 | ------ | 23.2 | 49.4 |
| | Temperature | Deg C | 17.19 | 22.05 | 16.47 | ------ | 17.26 | 14.12 | 18.89 | 27.06 | 18.42 | ------ | 18.49 | 19.7 |
| | Turbidity | ntu | 0.41 | 0.88 | 1.38 | ------ | 2.85 | 0.97 | 1.42 | 2.17 | 3.49 | ------ | 1.05 | 0.59 |
| | Water level depth | ft | 31.8 | 30.2 | 31.95 | ------ | 9.73 | 10.73 | 9.17 | 8.61 | 12.48 | ------ | 18.09 | 17.6 |
| **Supplemental** | Alkalinity as CaCO3, Total | mg/L | 9.4 | ------ | 10.1 | 11.6 | ------ | ------ | 72.2 | ------ | 85.1 | 69.1 | ------ | 91.1 |
| | Alkalinity, Bicarbonate as CaCO3 | mg/L | 9.4 | ------ | 10.1 | 11.6 | ------ | ------ | 72.2 | ------ | 85.1 | 69.1 | ------ | 91.1 |
| | Alkalinity, Carbonate as CaCO3 | mg/L | < 5.0 | ------ | < 1.8 | < 5.00 | ------ | ------ | < 5.0 | ------ | < 1.8 | < 5.00 | ------ | < 5.0 |
| | Aluminum | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Dissolved Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Hardness | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Total | mg/L | ------ | ------ | ------ | 0.033 J | ------ | ------ | ------ | ------ | ------ | 10.3 | ------ | ------ |
| | Iron, Ferric (Fe2) | mg/L | ------ | ------ | ------ | 0.033 J | ------ | ------ | ------ | ------ | ------ | 8.3 | ------ | ------ |
| | Iron, Ferrous | mg/L | ------ | ------ | ------ | 0.0 | ------ | ------ | ------ | ------ | ------ | 2.0 | ------ | |
| | Magnesium | mg/L | 16.3 | ------ | 17.3 | 15.0 | ------ | ------ | 26.3 | ------ | 27.8 | 27.5 | ------ | 24.8 |
| | Manganese | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nickel | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nitrate as N | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphorus, Total Orthophosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Potassium | mg/L | 6.6 | ------ | 6.9 | 6.2 | ------ | ------ | 8.5 | ------ | 8.7 | 8.2 | ------ | 10.4 |
| | Silica | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silicon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silver | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Sodium | mg/L | 18.5 | ------ | 20.4 | 17.9 | ------ | ------ | 18.8 | ------ | 19.7 | 19.6 | ------ | 19.5 |
| | Sulfide | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Total Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Zinc | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |

**NOTES:**
1. mg/L - milligrams per Liter; pCi/L - picocuries per Liter; S.U. - Standarc
2. < indicates the substance was not detected above the analytical metho
3. J indicates the substance was detected at such low levels that the pre
4. Radium data are a combination of radium isotopes 226 and 228. Whe

**APPENDIX A**
**ANALYTICAL RESULTS (2016 - 2022)**
Plant McDonough-Atkinson Ash Pond 1 and Ash Pond 2 and 3/4
Atlanta, Georgia

| | Analyte | Units | B-105D | B-105D | B-105D | B-106D | B-106D | B-106D | B-106D | B-106D | B-107D | B-107D | B-107D | B-107D |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 9/15/2021 | 1/19/2022 | 9/7/2022 | 12/17/2020 | 3/4/2021 | 9/13/2021 | 1/25/2022 | 9/16/2022 | 12/9/2020 | 3/4/2021 | 9/13/2021 | 1/24/2022 |
| Appendix III | Boron | mg/L | 0.76 | 0.88 | 0.87 | ------ | 1.4 | 1.3 | 1.2 | 1.00 | 11.7 | 12.0 | 10.7 | 12.3 |
| | Calcium | mg/L | 72.7 | 74.2 | 73.2 | ------ | 42.1 | 42.1 | 40 | 35.3 | 85.4 | 83.9 | 83.6 | 89.9 |
| | Chloride | mg/L | 17.4 | 16.3 | 16.40 | ------ | 7.8 | 7 | 7.4 | 6.60 | 12.5 | 13.0 | 11.7 | 12.8 |
| | Fluoride | mg/L | 0.078 J | 0.058 J | 0.11 | ------ | 0.055 J | 0.052 J | < 0.050 | 0.080 J | < 0.050 | < 0.050 | < 0.050 | < 0.050 |
| | pH, field measured | S.U. | 6.38 | 6.62 | 6.44 | 5.82 | 5.85 | 5.91 | 5.84 | 5.82 | 5.91 | 5.97 | 5.88 | 6.05 |
| | Sulfate | mg/L | 240 | 220 | 263 | ------ | 170 | 147 | 132 | 137 | 273 | 309 | 275 | 276 |
| | Total Dissolved Solids | mg/L | 455 | 453 | 479 | ------ | 321 | 296 | 295 | 240 | 564 | 525 | 567 | 552 |
| Appendix IV | Antimony | mg/L | 0.0082 | < 0.00078 | < 0.00078 | ------ | < 0.00028 | < 0.00078 | < 0.00078 | < 0.00078 | < 0.00028 | < 0.00028 | < 0.00078 | < 0.00078 |
| | Arsenic | mg/L | < 0.0011 | 0.0051 | 0.0026 J | ------ | < 0.00078 | < 0.0011 | < 0.0011 | < 0.0022 | < 0.00078 | < 0.00078 | < 0.0011 | < 0.0011 |
| | Barium | mg/L | 0.037 | 0.04 | 0.035 | ------ | 0.021 | 0.02 | 0.02 | 0.021 | 0.13 | 0.12 | 0.087 | 0.092 |
| | Beryllium | mg/L | < 0.000054 | < 0.000054 | < 0.000054 | ------ | 0.00013 J | 0.00013 J | 0.00011 J | 0.00011 J | < 0.00023 | 0.000050 J | < 0.000054 | < 0.000054 |
| | Cadmium | mg/L | < 0.00011 | < 0.00011 | < 0.00011 | ------ | 0.00021 J | 0.00024 J | 0.00012 J | < 0.00011 | < 0.00012 | < 0.00012 | < 0.00011 | < 0.00011 |
| | Chromium | mg/L | 0.0012 J | < 0.0011 | < 0.0011 | ------ | < 0.00055 | < 0.0011 | < 0.0011 | < 0.0011 | < 0.00055 | < 0.00055 | < 0.0011 | < 0.0011 |
| | Cobalt | mg/L | 0.0065 | 0.006 | 0.0040 J | ------ | 0.00070 J | 0.00056 J | < 0.00039 | < 0.00039 | 0.0017 J | 0.0012 J | 0.00083 J | 0.00088 J |
| | Fluoride | mg/L | 0.078 J | 0.058 J | 0.11 | ------ | 0.055 J | 0.052 J | < 0.050 | 0.080 J | < 0.050 | < 0.050 | < 0.050 | < 0.050 |
| | Lead | mg/L | < 0.00089 | < 0.00089 | < 0.00089 | ------ | < 0.000036 | < 0.00089 | < 0.00089 | < 0.00089 | 0.000044 J | < 0.000036 | < 0.00089 | < 0.00089 |
| | Lithium | mg/L | 0.014 J | 0.013 J | 0.013 J | ------ | 0.0054 J | 0.0056 J | 0.0055 J | 0.0054 J | 0.017 J | 0.015 J | 0.014 J | 0.015 J |
| | Mercury | mg/L | < 0.000078 | < 0.00013 | 0.00014 J | ------ | < 0.000078 | < 0.000078 | < 0.00013 | < 0.00013 | 0.00016 J | < 0.000078 | < 0.000078 | < 0.00013 |
| | Molybdenum | mg/L | < 0.00074 | < 0.00074 | < 0.00074 | ------ | < 0.00069 | < 0.00074 | < 0.00074 | < 0.00074 | < 0.00069 | < 0.00069 | < 0.00074 | < 0.00074 |
| | Selenium | mg/L | < 0.0014 | < 0.0014 | < 0.0014 | ------ | < 0.0016 | < 0.0014 | < 0.0014 | < 0.0014 | < 0.0016 | < 0.0016 | < 0.0014 | < 0.0014 |
| | Thallium | mg/L | < 0.00018 | < 0.00018 | < 0.00018 | ------ | < 0.00014 | < 0.00018 | < 0.00018 | < 0.00018 | < 0.00014 | < 0.00014 | < 0.00018 | < 0.00018 |
| | Radium | pCi/L | 2.01 | 2.45 | 3.05 | 0.952 U | 0.681 U | 0.625 U | 0.454 U | 0.655 U | 1.49 | 2.14 | 0.813 U | 1.14 U |
| | Radium-226 | pCi/L | 0.392 | 0.399 | ------ | 0.195 U | 0.159 U | 0.159 U | -0.0175 U | ------ | 0.806 | 0.627 | 0.349 U | 0.446 |
| | Radium-228 | pCi/L | 1.62 | 2.05 | ------ | 0.757 U | 0.522 U | 0.466 U | 0.454 U | ------ | 0.683 U | 1.51 | 0.464 U | 0.691 U |
| Field Measured | Conductivity | uS/cm | 634.64 | 602.01 | ------ | 479.77 | 472.92 | 406.42 | 439.97 | ------ | 751.9 | 704.6 | 648.52 | 714.01 |
| | Dissolved Oxygen | mg/L | 5.26 | 2.16 | ------ | 0.9 | 0.35 | 0.42 | 0.6 | ------ | 0.3 | 0.27 | 0.06 | 0.26 |
| | Oxidation Reduction Potential | millivolts | -9.2 | -46.4 | ------ | -111.9 | 87.9 | 23.3 | 41 | ------ | 95.8 | 268 | -41.7 | -2.9 |
| | Temperature | Deg C | 20.42 | 18.48 | ------ | 13.93 | 18.01 | 20.62 | 18.03 | ------ | 17.85 | 20.6 | 21.69 | 16.82 |
| | Turbidity | ntu | 2.46 | 1.54 | ------ | 1.33 | 0.55 | 2.39 | 0.99 | ------ | 1.24 | 0.53 | 4.75 | 0.5 |
| | Water level depth | ft | 19 | 17.45 | ------ | 35.61 | 35.95 | 38.42 | 40.3 | ------ | 21.64 | 21.55 | 22.15 | 22.75 |
| Supplemental | Alkalinity as CaCO3, Total | mg/L | ------ | 38.4 | 42.0 | ------ | 24.0 | ------ | 25.5 | 29.9 | ------ | 31.5 | ------ | 31.3 |
| | Alkalinity, Bicarbonate as CaCO3 | mg/L | ------ | 38.4 | 42.0 | ------ | 24.0 | ------ | 25.5 | 29.9 | ------ | 31.5 | ------ | 31.3 |
| | Alkalinity, Carbonate as CaCO3 | mg/L | ------ | < 1.8 | < 5.0 | ------ | < 5.0 | ------ | < 1.8 | < 5.00 | ------ | < 5.0 | ------ | < 1.8 |
| | Aluminum | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Dissolved Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Hardness | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Total | mg/L | ------ | ------ | 1.9 | ------ | ------ | ------ | ------ | 0.031 J | ------ | ------ | ------ | ------ |
| | Iron, Ferric (Fe2) | mg/L | ------ | ------ | 1.9 | ------ | ------ | ------ | ------ | 0.031 J | ------ | ------ | ------ | ------ |
| | Iron, Ferrous | mg/L | ------ | ------ | 0.0 | ------ | ------ | ------ | ------ | 0.0 | ------ | ------ | ------ | ------ |
| | Magnesium | mg/L | ------ | 26.7 | 25.2 | ------ | 18.5 | ------ | 18 | 16.7 | ------ | 29.6 | ------ | 32.3 |
| | Manganese | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nickel | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nitrate as N | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphorus, Total Orthophosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Potassium | mg/L | ------ | 8.6 | 8.2 | ------ | 4.2 | ------ | 4 | 3.8 | ------ | 6.5 | ------ | 6.3 |
| | Silica | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silicon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silver | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Sodium | mg/L | ------ | 19.2 | 19.9 | ------ | 16.5 | ------ | 15.8 | 14.6 | ------ | 19.2 | ------ | 20.6 |
| | Sulfide | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Total Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Zinc | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |

**NOTES:**
1. mg/L - milligrams per Liter; pCi/L - picocuries per Liter; S.U. - Standarc
2. < indicates the substance was not detected above the analytical metho
3. J indicates the substance was detected at such low levels that the pre
4. Radium data are a combination of radium isotopes 226 and 228. Whe

**APPENDIX A**
**ANALYTICAL RESULTS (2016 - 2022)**
Plant McDonough-Atkinson Ash Pond 1 and Ash Pond 2 and 3/4
Atlanta, Georgia

| Analyte | | Units | B-107D | B-108D | B-108D | B-108D | B-108D | B-108D | B-109D | B-109D | B-109D | B-109D | B-109D | B-110D |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 9/14/2022 | 12/9/2020 | 3/4/2021 | 9/14/2021 | 1/24/2022 | 9/15/2022 | 1/13/2021 | 3/8/2021 | 9/10/2021 | 1/20/2022 | 9/20/2022 | 12/17/2020 |
| Appendix III | Boron | mg/L | 11.20 | 6.7 | 6.4 | 6.8 | 6.8 | 7.10 | 0.46 | 0.55 | 0.41 | 0.6 | 0.61 | 0.28 |
| | Calcium | mg/L | 82.6 | 90.5 | 86.6 | 83.3 | 88.2 | 85.1 | 40.3 | 40.2 | 42.1 | 40 | 40.5 | 47.8 |
| | Chloride | mg/L | 12.90 | 29.1 | 29.4 | 28.8 | 32.9 | 27.60 | 3.1 | 3.9 | 4.8 | 3.7 | 3.50 | 2.1 |
| | Fluoride | mg/L | 0.053 J | < 0.050 | < 0.050 | < 0.050 | < 0.050 | 0.061 J | 0.17 | 0.14 | 0.15 | 0.11 | 0.15 | 0.72 |
| | pH, field measured | S.U. | 5.87 | 5.94 | 5.88 | 5.81 | 5.99 | 5.86 | 6.42 | 6.42 | 6.86 | 6.43 | 6.38 | 6.99 |
| | Sulfate | mg/L | 327 | 277 | 309 | 299 | 277 | 318 | 99.8 | 102 | 93.2 | 93.1 | 108 | 51.4 |
| | Total Dissolved Solids | mg/L | 582 | 573 | 569 | 576 | 502 | 540 | 303 | 305 | 284 | 309 | 327 | 251 |
| Appendix IV | Antimony | mg/L | < 0.00078 | < 0.00028 | < 0.00028 | < 0.00078 | < 0.00078 | < 0.00078 | 0.00042 J | 0.00084 J | 0.004 | < 0.00078 | < 0.00078 | < 0.00028 |
| | Arsenic | mg/L | < 0.0022 | < 0.00078 | < 0.00078 | < 0.0011 | < 0.0011 | < 0.0022 | < 0.00078 | < 0.00078 | < 0.0011 | 0.0026 J | < 0.0022 | 0.0017 J |
| | Barium | mg/L | 0.057 | 0.066 | 0.060 | 0.06 | 0.056 | 0.054 | 0.060 | 0.056 | 0.022 | 0.047 | 0.055 | 0.0061 J |
| | Beryllium | mg/L | < 0.000054 | < 0.00023 | < 0.000046 | < 0.000054 | < 0.000054 | < 0.000054 | 0.000059 J | 0.000079 J | < 0.000054 | 0.000071 J | 0.000080 J | < 0.000046 |
| | Cadmium | mg/L | < 0.00011 | < 0.00012 | < 0.00012 | < 0.00011 | < 0.00011 | < 0.00011 | < 0.00012 | < 0.00012 | < 0.00011 | < 0.00011 | < 0.00011 | < 0.00012 |
| | Chromium | mg/L | < 0.0011 | < 0.00055 | < 0.00055 | < 0.0011 | < 0.0011 | < 0.0011 | < 0.00055 | 0.00061 J | < 0.0011 | < 0.0011 | < 0.0011 | < 0.00055 |
| | Cobalt | mg/L | 0.00061 J | 0.0048 J | 0.0017 J | 0.0017 J | 0.00061 J | 0.0010 J | < 0.00038 | < 0.00038 | < 0.00039 | < 0.00039 | < 0.00039 | 0.0016 J |
| | Fluoride | mg/L | 0.053 J | < 0.050 | < 0.050 | < 0.050 | < 0.050 | 0.061 J | 0.17 | 0.14 | 0.15 | 0.11 | 0.15 | 0.72 |
| | Lead | mg/L | < 0.00089 | < 0.000036 | < 0.000036 | < 0.00089 | < 0.00089 | < 0.00089 | < 0.000036 | < 0.000036 | < 0.00089 | < 0.00089 | < 0.00089 | < 0.000036 |
| | Lithium | mg/L | 0.015 J | 0.016 J | 0.014 J | 0.015 J | 0.014 J | 0.016 J | 0.016 J | 0.014 J | 0.013 J | 0.014 J | 0.013 J | 0.011 J |
| | Mercury | mg/L | < 0.00013 | 0.00014 J | < 0.000078 | < 0.000078 | < 0.00013 | < 0.00013 | < 0.000078 | < 0.000078 | < 0.000078 | < 0.00013 | < 0.00013 | < 0.000078 |
| | Molybdenum | mg/L | < 0.00074 | < 0.00069 | < 0.00069 | < 0.00074 | < 0.00074 | < 0.00074 | 0.0022 J | 0.0014 J | 0.0011 J | 0.0012 J | 0.0014 J | 0.076 |
| | Selenium | mg/L | < 0.0014 | < 0.0016 | 0.0016 J | < 0.0014 | < 0.0014 | < 0.0014 | < 0.0016 | < 0.0016 | < 0.0014 | < 0.0014 | < 0.0014 | < 0.0016 |
| | Thallium | mg/L | < 0.00018 | < 0.00014 | < 0.00014 | < 0.00018 | < 0.00018 | < 0.00018 | < 0.00014 | < 0.00014 | < 0.00018 | < 0.00018 | < 0.00018 | < 0.00014 |
| | Radium | pCi/L | 0.737 U | 1.31 U | 2.02 | 0.917 U | 0.812 U | 1.36 | 11.8 | 12.1 | 9.45 | 16.2 | 16.5 | 0.979 U |
| | Radium-226 | pCi/L | ------ | 0.615 | 0.648 | 0.302 U | 0.812 | ------ | 4.32 | 4.98 | 3.09 | 6.82 | ------ | 0.645 |
| | Radium-228 | pCi/L | ------ | 0.699 U | 1.37 | 0.615 U | -0.262 U | ------ | 7.46 | 7.14 | 6.36 | 9.4 | ------ | 0.334 U |
| Field Measured | Conductivity | uS/cm | ------ | 799.7 | 755.7 | 766.58 | 744.83 | ------ | 433.95 | 429.44 | 314.33 | 435.76 | ------ | 423.4 |
| | Dissolved Oxygen | mg/L | ------ | 0.23 | 0.35 | 0.05 | 0.5 | ------ | 0.65 | 0.21 | 8.5 | 0.28 | ------ | 2.92 |
| | Oxidation Reduction Potential | millivolts | ------ | 95.4 | 358.9 | 29.9 | -39.6 | ------ | 22.5 | -75.3 | -84.2 | -71.7 | ------ | 130.7 |
| | Temperature | Deg C | ------ | 16.46 | 19.18 | 21.84 | 19.05 | ------ | 8.59 | 18.73 | 27.11 | 15.35 | ------ | 6.36 |
| | Turbidity | ntu | ------ | 0.06 | 0.87 | 2.38 | 0.36 | ------ | 3.39 | 2.7 | 3.86 | 1.17 | ------ | 1.12 |
| | Water level depth | ft | ------ | 21.45 | 20.54 | 21 | 21.65 | ------ | 39.36 | 41.33 | 38.61 | 42.31 | ------ | 8.75 |
| Supplemental | Alkalinity as CaCO3, Total | mg/L | 28.0 | ------ | 30.4 | ------ | 26.8 | 27.4 | ------ | 99.2 | ------ | 99.6 | 96.2 | ------ |
| | Alkalinity, Bicarbonate as CaCO3 | mg/L | 28.0 | ------ | 30.4 | ------ | 26.8 | 27.4 | ------ | 99.2 | ------ | 99.6 | 96.2 | ------ |
| | Alkalinity, Carbonate as CaCO3 | mg/L | < 5.00 | ------ | < 5.0 | ------ | < 1.8 | < 5.00 | ------ | < 5.0 | ------ | < 1.8 | < 5.00 | ------ |
| | Aluminum | mg/L | | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Dissolved Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Hardness | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Total | mg/L | 0.4 | ------ | ------ | ------ | ------ | 0.4 | ------ | ------ | ------ | ------ | 13.6 | ------ |
| | Iron, Ferric (Fe2) | mg/L | < 0.025 | ------ | ------ | ------ | ------ | < 0.025 | ------ | ------ | ------ | ------ | 11.1 | ------ |
| | Iron, Ferrous | mg/L | 0.5 | ------ | ------ | ------ | ------ | 0.5 | ------ | ------ | ------ | ------ | 2.5 | ------ |
| | Magnesium | mg/L | 30.4 | ------ | 34.6 | ------ | 34.9 | 34.4 | ------ | 11.7 | ------ | 11.3 | 11.7 | ------ |
| | Manganese | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nickel | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nitrate as N | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphorus, Total Orthophosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Potassium | mg/L | 5.9 | ------ | 5.7 | ------ | 5.4 | 5.5 | ------ | 8.2 | ------ | 7.4 | 7.4 | ------ |
| | Silica | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silicon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silver | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Sodium | mg/L | 19.2 | ------ | 18.3 | ------ | 18.2 | 17.9 | | 22.0 | ------ | 21.1 | 22.1 | ------ |
| | Sulfide | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Total Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Zinc | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |

**NOTES:**
1. mg/L - milligrams per Liter; pCi/L - picocuries per Liter; S.U. - Standarc
2. < indicates the substance was not detected above the analytical metho
3. J indicates the substance was detected at such low levels that the pre
4. Radium data are a combination of radium isotopes 226 and 228. Whe

| | Analyte | Units | B-110D | B-110D | B-111D | B-111D | B-111D | B-111D | B-111D | B-111D | B-112D | B-112D | B-112D | B-112D |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1/13/2021 | 3/16/2021 | 12/9/2020 | 1/12/2021 | 3/5/2021 | 9/14/2021 | 1/24/2022 | 9/14/2022 | 4/15/2021 | 9/16/2021 | 1/19/2022 | 9/7/2022 |
| **Appendix III** | Boron | mg/L | 0.27 | 0.28 | 0.34 J | 0.26 | 0.44 | 0.32 | 0.49 | 0.24 | 0.26 | 0.27 | 0.31 | 0.26 |
| | Calcium | mg/L | 48.6 | 49.9 | 105 | 103 | 110 | 98.4 | 107 | 90.7 | 34.6 | 28.4 | 24.1 | 26.5 |
| | Chloride | mg/L | 1.8 | 2 | 12.8 | 15.7 | 39.2 | 27.3 | 30.6 | 10.30 | 10.0 | 2.7 | 2.5 | 2.90 |
| | Fluoride | mg/L | 0.64 | 0.76 | 0.33 | 0.32 | 0.51 | 0.57 | 0.38 | 0.38 | 0.30 | 0.34 | 0.25 | 0.27 |
| | pH, field measured | S.U. | 7.22 | 7.53 | 6.64 | 6.71 | 6.69 | 7.29 | 7.11 | 7.09 | 6.83 | 6.74 | 6.74 | 6.72 |
| | Sulfate | mg/L | 48.2 | 51.4 | 197 | 222 | 270 | 243 | 238 | 228 | 95.6 | 21.2 | 18.4 | 18.2 |
| | Total Dissolved Solids | mg/L | 222 | 194 | 490 | 500 | 634 | 586 | 566 | 470 | 289 | 162 | 167 | 153 |
| **Appendix IV** | Antimony | mg/L | < 0.00028 | < 0.00028 | < 0.00028 | < 0.00028 | 0.00060 J | < 0.00078 | < 0.00078 | < 0.00078 | 0.00041 J | < 0.00078 | < 0.00078 | < 0.00078 |
| | Arsenic | mg/L | 0.0030 J | 0.0036 J | < 0.00078 | < 0.00078 | 0.0023 J | 0.0029 J | 0.0022 J | < 0.0022 | 0.00078 J | < 0.0011 | 0.005 | < 0.0022 |
| | Barium | mg/L | 0.0064 J | 0.0061 | 0.027 | 0.027 | 0.038 | 0.043 | 0.038 | 0.028 | 0.026 | 0.0032 J | 0.0034 J | 0.0026 J |
| | Beryllium | mg/L | < 0.000046 | < 0.000046 | < 0.00023 | < 0.000046 | < 0.000046 | < 0.000054 | < 0.000054 | < 0.000054 | < 0.000046 | < 0.000054 | < 0.000054 | < 0.000054 |
| | Cadmium | mg/L | < 0.00012 | < 0.00012 | < 0.00012 | < 0.00012 | < 0.00012 | < 0.00011 | < 0.00011 | < 0.00011 | < 0.00012 | < 0.00011 | < 0.00011 | < 0.00011 |
| | Chromium | mg/L | < 0.00055 | < 0.00055 | < 0.00055 | < 0.00055 | < 0.00055 | < 0.0011 | < 0.0011 | < 0.0011 | 0.00085 J | 0.0014 J | < 0.0011 | < 0.0011 |
| | Cobalt | mg/L | 0.0013 J | 0.00083 J | 0.00076 J | 0.00070 J | 0.00052 J | < 0.00039 | 0.00041 J | < 0.00039 | 0.0025 J | 0.00054 J | < 0.00039 | < 0.00039 |
| | Fluoride | mg/L | 0.64 | 0.76 | 0.33 | 0.32 | 0.51 | 0.57 | 0.38 | 0.38 | 0.30 | 0.34 | 0.25 | 0.27 |
| | Lead | mg/L | < 0.000036 | < 0.000036 | 0.000058 J | 0.000051 J | < 0.000036 | < 0.00089 | < 0.00089 | < 0.00089 | 0.00014 J | < 0.00089 | < 0.00089 | < 0.00089 |
| | Lithium | mg/L | 0.013 J | 0.013 J | 0.021 J | 0.021 J | 0.028 J | 0.029 J | 0.026 J | 0.020 J | 0.0045 J | 0.0038 J | 0.0044 J | 0.0039 J |
| | Mercury | mg/L | < 0.000078 | | 0.000094 J | < 0.000078 | < 0.000078 | < 0.000078 | < 0.00013 | < 0.00013 | < 0.000078 | < 0.000078 | < 0.00013 | < 0.00013 |
| | Molybdenum | mg/L | 0.078 | 0.076 | 0.0055 J | 0.0054 J | 0.0067 J | 0.013 | 0.0052 J | 0.0069 J | 0.037 | 0.032 | 0.032 | 0.028 |
| | Selenium | mg/L | < 0.0016 | 0.0016 J | < 0.0016 | < 0.0016 | 0.0022 J | < 0.0014 | < 0.0014 | < 0.0014 | < 0.0016 | < 0.0014 | < 0.0014 | < 0.0014 |
| | Thallium | mg/L | < 0.00014 | < 0.00014 | < 0.00014 | < 0.00014 | < 0.00014 | < 0.00018 | < 0.00018 | < 0.00018 | < 0.00014 | < 0.00018 | < 0.00018 | < 0.00018 |
| | Radium | pCi/L | 1.05 U | 1.26 | 12.3 | 9.63 | 9.05 | 4.39 | 5.68 | 6.23 | 0.945 U | 0.241 U | 0.738 U | 0.755 U |
| | Radium-226 | pCi/L | 0.454 | 0.447 | 6.52 | 4.68 | 4 | 2.47 | 3.19 | ------ | 0.404 | 0.241 U | 0.0331 U | ------ |
| | Radium-228 | pCi/L | 0.593 U | 0.809 U | 5.80 | 4.95 | 5.05 | 1.92 | 2.49 | ------ | 0.541 U | -0.18 U | 0.705 U | ------ |
| **Field Measured** | Conductivity | uS/cm | 377.5 | 360.8 | 734.3 | 717.6 | 887.8 | 947.92 | 972.44 | ------ | ------ | 289.94 | 274.2 | ------ |
| | Dissolved Oxygen | mg/L | 3.95 | 2.96 | 0.13 | 0.2 | 0.28 | 0.29 | 0.2 | ------ | ------ | 0.14 | 0.16 | ------ |
| | Oxidation Reduction Potential | millivolts | 112.4 | 124.7 | -1.9 | 22.5 | -13.6 | -94.6 | -147.2 | ------ | ------ | 13.3 | 5.2 | ------ |
| | Temperature | Deg C | 12.09 | 12.82 | 17.85 | 15.16 | 17.27 | 22.05 | 16.87 | ------ | ------ | 19.87 | 16.6 | ------ |
| | Turbidity | ntu | 1.2 | 0.63 | 0.6 | 1.58 | 1.21 | 2.12 | 0.95 | ------ | ------ | 3.77 | 1.75 | ------ |
| | Water level depth | ft | 8.81 | 8.6 | 12.75 | 11.93 | 11.78 | 12.3 | 12.58 | ------ | ------ | 7.42 | 7.28 | ------ |
| **Supplemental** | Alkalinity as CaCO3, Total | mg/L | ------ | 151 | ------ | ------ | 146 | ------ | 131 | 112.0 | 115 | ------ | 117 | 106.0 |
| | Alkalinity, Bicarbonate as CaCO3 | mg/L | ------ | 151 | ------ | ------ | 146 | ------ | 131 | 112.0 | 115 | ------ | 117 | 106.0 |
| | Alkalinity, Carbonate as CaCO3 | mg/L | ------ | < 5.0 | ------ | ------ | < 5.0 | ------ | < 1.8 | < 5.00 | < 5.0 | ------ | < 1.8 | < 5.0 |
| | Aluminum | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Dissolved Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Hardness | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Total | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 2.2 | ------ | ------ | ------ | 0.026 J |
| | Iron, Ferric (Fe2) | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 0.7 | ------ | ------ | ------ | 0.026 J |
| | Iron, Ferrous | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 1.5 | ------ | ------ | ------ | 0.0 |
| | Magnesium | mg/L | ------ | 7 | ------ | ------ | 11.5 | ------ | 11.1 | 8.8 | 9.0 | ------ | 7.6 | 8.0 |
| | Manganese | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nickel | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nitrate as N | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphorus, Total Orthophosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Potassium | mg/L | ------ | 2.4 | ------ | ------ | 19.6 | ------ | 16.6 | 6.2 | 4.2 | ------ | 2.5 | 3.1 |
| | Silica | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silicon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silver | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Sodium | mg/L | ------ | 18.4 | ------ | ------ | 54.5 | ------ | 57 | 38.8 | 61.1 | ------ | 12.9 | 15.0 |
| | Sulfide | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Total Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Zinc | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |

**NOTES:**
1. mg/L - milligrams per Liter; pCi/L - picocuries per Liter; S.U. - Standard
2. < indicates the substance was not detected above the analytical meth
3. J indicates the substance was detected at such low levels that the pre
4. Radium data are a combination of radium isotopes 226 and 228. Whe

| Analyte | | Units | B-113D | B-113D | B-113D | B-113D | B-113D | B-115D | B-115D | B-115D | B-115D | B-116D | B-116D | B-116D |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 3/26/2021 | 4/16/2021 | 9/17/2021 | 1/26/2022 | 9/12/2022 | 4/14/2021 | 9/14/2021 | 1/20/2022 | 9/14/2022 | 4/13/2021 | 9/9/2021 | 1/19/2022 |
| **Appendix III** | Boron | mg/L | 0.034 J | 0.16 | 0.089 | 0.12 | 0.05 | 0.69 | 0.61 | 0.55 | 0.58 | < 0.0052 | < 0.0086 | < 0.0086 |
| | Calcium | mg/L | ------ | 47.2 | 44.1 | 48.4 | 36.5 | 52.0 | 63 | 83.6 | 65.5 | 10.6 | 9.9 | 10.7 |
| | Chloride | mg/L | ------ | 6.7 | 48.8 | 19.8 | 7.60 | 7.9 | 9 | 15.8 | 10.70 | 3.2 | 2.7 | 2.6 |
| | Fluoride | mg/L | ------ | 0.71 | 0.87 | 0.74 | 1 | 0.99 | 1 | 0.59 | 0.63 | < 0.050 | < 0.050 | < 0.050 |
| | pH, field measured | S.U. | 8.42 | 7.77 | 7.97 | 7.66 / 7.86 | 7.95 | 4.80 | 5.38 | 5.77 | 5.76 | 6.06 | 6.02 | 6.04 |
| | Sulfate | mg/L | ------ | 46.5 | 89.1 | 55.5 | 35 | 256 | 278 | 293 | 297 | 1.3 | 0.73 J | 0.73 J |
| | Total Dissolved Solids | mg/L | ------ | 229 | 329 | 234 | 197 | 480 | 499 | 553 | 519 | 96 | 93 | 93 |
| **Appendix IV** | Antimony | mg/L | ------ | 0.0021 J | < 0.00078 | < 0.00078 | < 0.00078 | < 0.00028 | < 0.00078 | < 0.00078 | < 0.00078 | < 0.00028 | < 0.00078 | < 0.00078 |
| | Arsenic | mg/L | ------ | < 0.00078 | < 0.0011 | 0.0018 J | < 0.0022 | 0.0028 J | 0.0018 J | 0.0027 J | < 0.0022 | 0.0012 J | < 0.0011 | < 0.0011 |
| | Barium | mg/L | ------ | 0.0032 J | 0.0048 J | 0.0051 | 0.0051 | 0.018 | 0.016 | 0.015 | 0.014 | 0.02 | 0.017 | 0.019 |
| | Beryllium | mg/L | ------ | < 0.000046 | < 0.000054 | < 0.000054 | < 0.000054 | 0.012 | 0.011 | 0.011 | 0.01 | < 0.000046 | < 0.000054 | < 0.000054 |
| | Cadmium | mg/L | ------ | 0.00019 J | < 0.00011 | < 0.00011 | < 0.00011 | 0.00041 J | 0.00035 J | 0.00029 J | 0.00018 J | < 0.00012 | < 0.00011 | < 0.00011 |
| | Chromium | mg/L | ------ | 0.0011 J | < 0.0011 | < 0.0011 | < 0.0011 | < 0.00055 | < 0.0011 | < 0.0011 | < 0.0011 | < 0.00055 | < 0.0011 | < 0.0011 |
| | Cobalt | mg/L | ------ | < 0.00038 | < 0.00039 | < 0.00039 | < 0.00039 | 0.30 | 0.28 | 0.24 | 0.23 | < 0.00038 | < 0.00039 | < 0.00039 |
| | Fluoride | mg/L | ------ | 0.71 | 0.87 | 0.74 | 1 | 0.99 | 1 | 0.59 | 0.63 | < 0.050 | < 0.050 | < 0.050 |
| | Lead | mg/L | ------ | 0.00014 J | < 0.00089 | < 0.00089 | < 0.00089 | 0.00032 J | < 0.00089 | < 0.00089 | < 0.00089 | < 0.000036 | < 0.00089 | < 0.00089 |
| | Lithium | mg/L | ------ | 0.013 J | 0.013 J | 0.014 J | 0.0084 J | 0.089 | 0.085 | 0.081 | 0.082 | 0.0066 J | 0.0055 J | 0.0061 J |
| | Mercury | mg/L | ------ | < 0.000078 | < 0.000078 | < 0.00013 | < 0.00013 | < 0.000078 | < 0.000078 | < 0.00013 | < 0.00013 | 0.00018 J | < 0.000078 | < 0.00013 |
| | Molybdenum | mg/L | 0.025 | 0.078 | 0.074 | 0.074 | 0.052 | < 0.00069 | < 0.00074 | < 0.00074 | < 0.00074 | < 0.00069 | < 0.00074 | < 0.00074 |
| | Selenium | mg/L | ------ | < 0.0016 | < 0.0014 | < 0.0014 | < 0.0014 | 0.0060 | 0.0041 J | 0.0022 J | 0.0045 J | < 0.0016 | < 0.0014 | < 0.0014 |
| | Thallium | mg/L | ------ | < 0.00014 | < 0.00018 | < 0.00018 | < 0.00018 | < 0.00014 | < 0.00018 | < 0.00018 | < 0.00018 | < 0.00014 | < 0.00018 | < 0.00018 |
| | Radium | pCi/L | ------ | 0.852 U | 1.08 U | 0.596 U | 0.440 U | 14.7 | 11.9 | 9.86 | 13.3 | 0.505 U | 0.887 U | 1.04 |
| | Radium-226 | pCi/L | ------ | 0.379 | 0.28 U | 0.241 U | ------ | 3.73 | 3.07 | 3.68 | ------ | 0.0948 U | 0.388 U | 0.103 U |
| | Radium-228 | pCi/L | ------ | 0.473 U | 0.803 U | 0.355 U | ------ | 11 | 8.87 | 6.18 | ------ | 0.41 U | 0.499 U | 0.934 |
| **Field Measured** | Conductivity | uS/cm | ------ | ------ | 604.44 | 451.44 | ------ | ------ | 639.99 | 848.81 | ------ | 128.4 | 108.28 | 125.22 |
| | Dissolved Oxygen | mg/L | ------ | ------ | 0.23 | 1.36 | ------ | ------ | 0.04 | 0.19 | ------ | 4.31 | 4.72 | 4.61 |
| | Oxidation Reduction Potential | millivolts | ------ | ------ | -115.3 | 13.9 | ------ | ------ | 35.5 | 26.1 | ------ | 1078.8 | 75.1 | 58.5 |
| | Temperature | Deg C | ------ | ------ | 19.02 | 13.86 | ------ | ------ | 22.8 | 16.99 | ------ | 18.52 | 19.23 | 17.23 |
| | Turbidity | ntu | ------ | ------ | 0.83 | 4.1 | ------ | ------ | 1.76 | 3.77 | ------ | 1.55 | 3.76 | 2.81 |
| | Water level depth | ft | ------ | ------ | 21.9 | 7.52 | ------ | ------ | 24.85 | 22.76 | ------ | 41.6 | 42.7 | 42.6 |
| **Supplemental** | Alkalinity as CaCO3, Total | mg/L | ------ | 136 | ------ | 125 | 125.0 | < 5.0 | ------ | 12 | 8.9 | 57.0 | ------ | 51 |
| | Alkalinity, Bicarbonate as CaCO3 | mg/L | ------ | 136 | ------ | 125 | 125.0 | < 5.0 | ------ | 12 | 8.9 | 57.0 | ------ | 51 |
| | Alkalinity, Carbonate as CaCO3 | mg/L | ------ | < 5.0 | ------ | < 1.8 | < 5.0 | < 5.0 | ------ | < 1.8 | < 5.00 | < 5.0 | ------ | < 1.8 |
| | Aluminum | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Dissolved Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Hardness | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Total | mg/L | ------ | ------ | ------ | ------ | 0.3 | ------ | ------ | ------ | 7.5 | ------ | ------ | ------ |
| | Iron, Ferric (Fe2) | mg/L | ------ | ------ | ------ | ------ | 0.3 | ------ | ------ | ------ | 1.0 | ------ | ------ | ------ |
| | Iron, Ferrous | mg/L | ------ | ------ | ------ | ------ | 0.0 | ------ | ------ | ------ | 6.5 | ------ | ------ | ------ |
| | Magnesium | mg/L | ------ | 6.7 | ------ | 7.2 | 4.8 | 16.6 | ------ | 19.5 | 16.6 | 3.7 | ------ | 3.8 |
| | Manganese | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nickel | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nitrate as N | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphorus, Total Orthophosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Potassium | mg/L | ------ | 4.4 | ------ | 10.5 | 4.8 | 9.1 | ------ | 12.2 | 10.1 | 3.0 | ------ | 2.5 |
| | Silica | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silicon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silver | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Sodium | mg/L | ------ | 20.6 | ------ | 29.1 | 22.2 | 18.7 | ------ | 26.7 | 21.8 | 8.2 | ------ | 8.2 |
| | Sulfide | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Total Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Zinc | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |

**NOTES:**
1. mg/L - milligrams per Liter; pCi/L - picocuries per Liter; S.U. - Standarc
2. < indicates the substance was not detected above the analytical metho
3. J indicates the substance was detected at such low levels that the pre
4. Radium data are a combination of radium isotopes 226 and 228. Whe

**APPENDIX A**
**ANALYTICAL RESULTS (2016 - 2022)**
Plant McDonough-Atkinson Ash Pond 1 and Ash Pond 2 and 3/4
Atlanta, Georgia

| | Analyte | Units | B-116D | B-117D | B-117D | B-117D | B-117D | B-118 | B-118 | B-118 | B-118 | B-119D | B-119D | B-119D |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 9/8/2022 | 4/14/2021 | 9/8/2021 | 1/19/2022 | 9/15/2022 | 4/13/2021 | 9/8/2021 | 1/19/2022 | 9/9/2022 | 4/13/2021 | 9/8/2021 | 1/19/2022 |
| **Appendix III** | Boron | mg/L | < 0.0086 | < 0.0052 | < 0.0086 | < 0.0086 | 0.011 J | < 0.0052 | < 0.0086 | < 0.0086 | < 0.0086 | 0.039 J | 0.018 J | 0.012 J |
| | Calcium | mg/L | 10.1 | 9.8 | 11.3 | 9.7 | 9.5 | 6.5 | 5 | 5.1 | 5.2 | 20.5 | 20.2 | 16.1 |
| | Chloride | mg/L | 2.40 | 4.9 | 6 | 5 | 4.60 | 5.2 | 3 | 2.8 | 3.10 | 9.9 | 7.5 | 3.8 |
| | Fluoride | mg/L | 0.065 J | 0.056 J | 0.058 J | 0.058 J | 0.090 J | 0.055 J | < 0.050 | < 0.050 | 0.080 J | 0.12 | 0.16 | 0.099 J |
| | pH, field measured | S.U. | 5.97 | 6.06 | 6 | 6.02 | 5.86 | 6.02 | 6.01 | 6.01 | 6.49 | 6.64 | 6.88 | 6.61 |
| | Sulfate | mg/L | 0.54 J | 11.7 | 31.1 | 21.5 | 14.4 | 7 | 0.99 J | 1.1 | 2.8 | 82.2 | 76.2 | 31.1 |
| | Total Dissolved Solids | mg/L | 82 | 115 | 152 | 129 | 106 | 89 | 65 | 81 | 78 | 229 | 191 | 145 |
| **Appendix IV** | Antimony | mg/L | < 0.00078 | < 0.00028 | < 0.00078 | < 0.00078 | < 0.00078 | < 0.00028 | < 0.00078 | 0.002 J | < 0.00078 | < 0.00028 | 0.00087 J | 0.0019 J |
| | Arsenic | mg/L | < 0.0022 | 0.0015 J | < 0.0011 | < 0.0011 | < 0.0022 | 0.00094 J | 0.0011 J | < 0.0011 | < 0.0022 | 0.0019 J | 0.0014 J | < 0.0011 |
| | Barium | mg/L | 0.017 | 0.048 | 0.048 | 0.047 | 0.043 | 0.032 | 0.021 | 0.025 | 0.022 | 0.0087 | 0.008 | 0.0047 J |
| | Beryllium | mg/L | < 0.000054 | < 0.000046 | < 0.000054 | < 0.000054 | < 0.000054 | < 0.000046 | < 0.000054 | < 0.000054 | < 0.000054 | < 0.000046 | < 0.000054 | < 0.000054 |
| | Cadmium | mg/L | < 0.00011 | < 0.00012 | < 0.00011 | < 0.00011 | < 0.00011 | < 0.00012 | < 0.00011 | < 0.00011 | < 0.00011 | < 0.00012 | < 0.00011 | < 0.00011 |
| | Chromium | mg/L | < 0.0011 | < 0.00055 | < 0.0011 | < 0.0011 | < 0.0011 | 0.00059 J | < 0.0011 | 0.0015 J | 0.0017 J | < 0.00055 | < 0.0011 | < 0.0011 |
| | Cobalt | mg/L | < 0.00039 | 0.00079 J | 0.00043 J | < 0.00039 | < 0.00039 | 0.0009 J | < 0.00039 | < 0.00039 | < 0.00039 | 0.0015 J | 0.00077 J | 0.00066 J |
| | Fluoride | mg/L | 0.065 J | 0.056 J | 0.058 J | 0.058 J | 0.090 J | 0.055 J | < 0.050 | < 0.050 | 0.080 J | 0.12 | 0.16 | 0.099 J |
| | Lead | mg/L | < 0.00089 | < 0.000036 | < 0.00089 | < 0.00089 | < 0.00089 | 0.00012 J | < 0.00089 | < 0.00089 | < 0.00089 | < 0.000036 | < 0.00089 | < 0.00089 |
| | Lithium | mg/L | 0.0054 J | 0.013 J | 0.0069 J | 0.0085 J | 0.0094 J | 0.0019 J | 0.0028 J | 0.0027 J | 0.0024 J | 0.0045 J | 0.0028 J | 0.0031 J |
| | Mercury | mg/L | < 0.00013 | < 0.000078 | < 0.000078 | < 0.00013 | < 0.00013 | < 0.000078 | < 0.000078 | < 0.00013 | < 0.00013 | < 0.000078 | < 0.000078 | < 0.00013 |
| | Molybdenum | mg/L | < 0.00074 | 0.00081 J | < 0.00074 | < 0.00074 | < 0.00074 | 0.0056 J | 0.0056 J | 0.0056 J | 0.0047 J | 0.027 | 0.022 | 0.02 |
| | Selenium | mg/L | < 0.0014 | < 0.0016 | < 0.0014 | < 0.0014 | < 0.0014 | < 0.0016 | < 0.0014 | < 0.0014 | < 0.0014 | < 0.0016 | < 0.0014 | < 0.0014 |
| | Thallium | mg/L | < 0.00018 | < 0.00014 | < 0.00018 | < 0.00018 | < 0.00018 | < 0.00014 | < 0.00018 | < 0.00018 | < 0.00018 | < 0.00014 | < 0.00018 | < 0.00018 |
| | Radium | pCi/L | 0.686 U | 1.2 | 0.695 U | 0.125 U | 0.875 U | 0.948 U | 0.0324 U | 0.832 U | 0.787 U | 0.904 U | 0.168 U | 0.858 U |
| | Radium-226 | pCi/L | ------ | ------ | ------ | ------ | ------ | 0.21 | -0.0218 U | 0.0637 U | ------ | 0.118 U | -0.019 U | 0.0374 U |
| | Radium-228 | pCi/L | ------ | ------ | ------ | ------ | ------ | 0.738 U | 0.0324 U | 0.768 | ------ | 0.786 U | 0.168 U | 0.821 U |
| **Field Measured** | Conductivity | uS/cm | ------ | ------ | ------ | ------ | ------ | 100.1 | 91.98 | 86.28 | ------ | ------ | 305.64 | 258.23 |
| | Dissolved Oxygen | mg/L | ------ | ------ | ------ | ------ | ------ | 4.26 | 4.7 | 5.28 | ------ | ------ | 1.64 | 1.31 |
| | Oxidation Reduction Potential | millivolts | ------ | ------ | ------ | ------ | ------ | 188.1 | 88.6 | 49.2 | ------ | ------ | 33.6 | -2.6 |
| | Temperature | Deg C | ------ | ------ | ------ | ------ | ------ | 16.76 | 18.91 | 15.78 | ------ | ------ | 20.36 | 14.23 |
| | Turbidity | ntu | ------ | ------ | ------ | ------ | ------ | 4.79 | 2.05 | 4.43 | ------ | ------ | 0.93 | 1.54 |
| | Water level depth | ft | ------ | ------ | ------ | ------ | ------ | 51.1 | 50.73 | 51.28 | ------ | ------ | 50.85 | 48.98 |
| **Supplemental** | Alkalinity as CaCO3, Total | mg/L | 50.3 | 48.5 | | 40.3 | 42.0 | 40.1 | ------ | 36.7 | 35.2 | 77.1 | ------ | 66.2 |
| | Alkalinity, Bicarbonate as CaCO3 | mg/L | 50.3 | 48.5 | | 40.3 | 42.0 | 40.1 | ------ | 36.7 | 35.2 | 77.1 | ------ | 66.2 |
| | Alkalinity, Carbonate as CaCO3 | mg/L | < 5.0 | < 5.0 | | < 1.8 | < 5.0 | < 5.0 | ------ | < 1.8 | < 5.0 | < 5.0 | ------ | < 1.8 |
| | Aluminum | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Dissolved Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Hardness | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Total | mg/L | 0.1 | | | | < 0.025 | ------ | ------ | ------ | 0.1 | ------ | ------ | ------ |
| | Iron, Ferric (Fe2) | mg/L | 0.1 | | | | < 0.025 | ------ | ------ | ------ | 0.1 | ------ | ------ | ------ |
| | Iron, Ferrous | mg/L | 0.0 | | | | 0.0 | ------ | ------ | ------ | 0.0 | ------ | ------ | ------ |
| | Magnesium | mg/L | 3.4 | 1.6 | | 1.5 | 1.5 | 2.4 | ------ | 2.1 | 2.0 | 5.0 | ------ | 4 |
| | Manganese | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nickel | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nitrate as N | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphorus, Total Orthophosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Potassium | mg/L | 2.2 | 2.6 | | 2.6 | 2.6 | 3.3 | ------ | 2.3 | 2.3 | 2.9 | ------ | 2.3 |
| | Silica | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silicon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silver | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Sodium | mg/L | 7.7 | 13.8 | | 17.8 | 16.6 | 12.3 | ------ | 9 | 10.0 | 44.7 | ------ | 24.8 |
| | Sulfide | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Total Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Zinc | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |

**NOTES:**
1. mg/L - milligrams per Liter; pCi/L - picocuries per Liter; S.U. - Standard
2. < indicates the substance was not detected above the analytical metho
3. J indicates the substance was detected at such low levels that the pre
4. Radium data are a combination of radium isotopes 226 and 228. Whe

| | Analyte | Units | B-119D | B-120D | B-120D | B-120D | B-120D | B-122D | B-123D | B-26 | B-27 | B-28 | B-29 | B-3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 9/12/2022 | 4/15/2021 | 9/14/2021 | 1/20/2022 | 9/19/2022 | 9/14/2022 | 9/20/2022 | 12/6/2016 | 12/6/2016 | 1/23/2018 | 1/24/2018 | 8/17/2020 |
| **Appendix III** | Boron | mg/L | 0.05 | 1.9 | 1.7 | 1.9 | 1.70 | 0.25 | 0.49 | 0.565 | 0.988 | ------ | ------ | ------ |
| | Calcium | mg/L | 10.4 | 171 | 162 | 158 | 142.0 | 51.0 | 90.8 | 52.6 | 153 | 52.1 | 56.4 | ------ |
| | Chloride | mg/L | 1.80 | 6.2 | 6.1 | 6 | 5.80 | 15.50 | 8.60 | 2.9 | 7 | 27 | 13.9 | ------ |
| | Fluoride | mg/L | 0.084 J | < 0.050 | < 0.050 | < 0.050 | 0.057 J | 0.17 | 0.57 | 0.2 J | 0.83 | ------ | ------ | 0.077 J |
| | pH, field measured | S.U. | 6.57 | 5.46 | 5.3 | 5.28 | 5.21 | 6.07 | 7.13 | ------ | ------ | ------ | ------ | 5.51 |
| | Sulfate | mg/L | 2.8 | 556 | 552 | 475 | 489 | 121 | 292 | 210 | 710 | 277 | 199 | ------ |
| | Total Dissolved Solids | mg/L | 87 | 982 | 882 | 816 | 867 | 315 | 533 | ------ | ------ | ------ | ------ | ------ |
| **Appendix IV** | Antimony | mg/L | 0.0015 J | 0.00029 J | < 0.00078 | < 0.00078 | < 0.00078 | < 0.00078 | < 0.00078 | < 0.00080 | < 0.00080 | ------ | ------ | < 0.00028 |
| | Arsenic | mg/L | < 0.0022 | < 0.00078 | < 0.0011 | 0.0016 J | < 0.0022 | < 0.0022 | < 0.0022 | < 0.0016 | 0.0021 J | < 0.0050 | < 0.00052 | < 0.00078 |
| | Barium | mg/L | 0.0029 J | 0.044 | 0.031 | 0.025 | 0.023 | 0.046 | 0.023 | 0.0171 | 0.0342 | ------ | ------ | 0.026 |
| | Beryllium | mg/L | < 0.000054 | 0.00085 | 0.00087 | 0.0011 | 0.0011 | 0.00028 J | 0.00022 J | < 0.00080 R | 0.0157 | ------ | ------ | 0.0035 |
| | Cadmium | mg/L | < 0.00011 | 0.0010 | 0.0011 | 0.00098 | 0.0012 | < 0.00011 | < 0.00011 | < 0.000070 | 0.0041 | ------ | ------ | 0.00077 J |
| | Chromium | mg/L | < 0.0011 | < 0.00055 | < 0.0011 | < 0.0011 | < 0.0011 | < 0.0011 | < 0.0011 | < 0.00090 | < 0.00090 | ------ | ------ | < 0.00055 |
| | Cobalt | mg/L | 0.0031 J | 0.017 | 0.0055 | 0.0045 J | 0.0027 J | 0.0033 J | 0.056 | < 0.00050 | 0.577 | ------ | ------ | 0.061 |
| | Fluoride | mg/L | 0.084 J | < 0.050 | < 0.050 | < 0.050 | 0.057 J | 0.17 | 0.57 | 0.2 J | 0.83 | ------ | ------ | 0.077 J |
| | Lead | mg/L | < 0.00089 | 0.00019 J | < 0.00089 | < 0.00089 | < 0.00089 | < 0.00089 | < 0.00089 | < 0.00010 | 0.0002 J | ------ | ------ | < 0.000036 |
| | Lithium | mg/L | 0.0045 J | 0.088 | 0.077 | 0.079 | 0.076 | 0.013 J | 0.034 | 0.0214 J R | 0.0366 J | ------ | ------ | 0.58 |
| | Mercury | mg/L | < 0.00013 | < 0.000078 | < 0.000078 | < 0.00013 | < 0.00013 | < 0.00013 | < 0.00013 | < 0.000040 | < 0.000040 | ------ | ------ | 0.0001 J |
| | Molybdenum | mg/L | 0.015 | 0.00089 J | < 0.00074 | < 0.00074 | < 0.00074 | 0.0011 J | 0.0015 J | < 0.0017 | < 0.0017 | ------ | ------ | 0.0015 J |
| | Selenium | mg/L | < 0.0014 | 0.0016 J | 0.0022 J | 0.0021 J | 0.0038 J | < 0.0014 | < 0.0014 | 0.0053 J | 0.0379 | ------ | ------ | 0.0021 J |
| | Thallium | mg/L | < 0.00018 | < 0.00014 | < 0.00018 | < 0.00018 | < 0.00018 | < 0.00018 | < 0.00018 | < 0.00020 | < 0.00020 | ------ | ------ | < 0.00014 |
| | Radium | pCi/L | 0.328 U | 2.31 | 3.68 | 1.21 U | 2.22 | 7.94 | 2.95 | ------ | ------ | ------ | ------ | 1.78 U |
| | Radium-226 | pCi/L | ------ | 0.0454 U | 1.17 | 0.914 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 0.992 |
| | Radium-228 | pCi/L | ------ | 2.26 | 2.51 | 0.3 U | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 0.784 U |
| **Field Measured** | Conductivity | uS/cm | ------ | 1164.1 | 1133.2 | 1117.6 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 1166.8 |
| | Dissolved Oxygen | mg/L | ------ | 0.14 | 0.21 | 1.22 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 0.17 |
| | Oxidation Reduction Potential | millivolts | ------ | 12.8 | 102.8 | -33.5 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 151.2 |
| | Temperature | Deg C | ------ | 18.06 | 20.66 | 16.02 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 20.13 |
| | Turbidity | ntu | ------ | 3.22 | 2.08 | 2.13 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 1.72 |
| | Water level depth | ft | ------ | 33.91 | 34.56 | 35 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 35.38 |
| **Supplemental** | Alkalinity as CaCO3, Total | mg/L | 60.6 | 52.2 | ------ | 35.8 | 27.8 | 123.0 | 38.5 | ------ | ------ | 22 | 9.5 | ------ |
| | Alkalinity, Bicarbonate as CaCO3 | mg/L | 60.6 | 52.2 | ------ | 35.8 | 27.8 | 123.0 | 38.5 | ------ | ------ | ------ | ------ | ------ |
| | Alkalinity, Carbonate as CaCO3 | mg/L | < 5.0 | < 5.0 | ------ | < 1.8 | < 5.00 | < 5.0 | < 5.0 | ------ | ------ | ------ | ------ | ------ |
| | Aluminum | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 0.0234 J | 1.45 | ------ | ------ | ------ |
| | Dissolved Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Hardness | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 189 | 584 | ------ | ------ | ------ |
| | Iron, Total | mg/L | 1.5 | ------ | ------ | ------ | 0.1 | 13.8 | 5.4 | ------ | ------ | < 0.040 | < 0.0043 | ------ |
| | Iron, Ferric (Fe2) | mg/L | 1.5 | ------ | ------ | ------ | 0.1 | 9.8 | 0.9 | ------ | ------ | ------ | ------ | ------ |
| | Iron, Ferrous | mg/L | 0.0 | ------ | ------ | ------ | 0.0 | 4.0 | 4.5 | ------ | ------ | ------ | ------ | ------ |
| | Magnesium | mg/L | 3.2 | 35.7 | ------ | 34.3 | 31.8 | 9.9 | 13.0 | 14.1 | 48.8 | 27.7 | 18.9 | ------ |
| | Manganese | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 0.0303 | 22.9 | 1.01 | 0.163 | ------ |
| | Nickel | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nitrate as N | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphorus, Total Orthophosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Potassium | mg/L | 2.0 | 11.4 | ------ | 9.8 | 9.3 | 4.0 | 7.6 | 5.12 | 14.7 | 4.91 | 2.76 | ------ |
| | Silica | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 52.5 | 51.5 | ------ | ------ | ------ |
| | Silicon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 24.5 | 24.1 | ------ | ------ | ------ |
| | Silver | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Sodium | mg/L | 10.2 | 38.8 | ------ | 35.7 | 33.1 | 31.3 | 29.0 | 28.8 | 26.2 | 22.7 | 18.4 | ------ |
| | Sulfide | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Total Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Zinc | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |

**NOTES:**
1. mg/L - milligrams per Liter; pCi/L - picocuries per Liter; S.U. - Standarc
2. < indicates the substance was not detected above the analytical methc
3. J indicates the substance was detected at such low levels that the pre
4. Radium data are a combination of radium isotopes 226 and 228. Whe

| | Analyte | Units | B-3 | B-31 | B-41 | B-50 | B-51 | B-54 | B-54 | B-54 | B-56 | B-56 | B-56 | B-56 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 11/11/2020 | 1/25/2018 | 1/24/2018 | 1/23/2018 | 1/25/2018 | 9/17/2019 | 10/22/2019 | 3/10/2021 | 8/17/2020 | 9/28/2020 | 3/3/2021 | 9/13/2021 |
| Appendix III | Boron | mg/L | 2.6 | ------ | ------ | ------ | ------ | 5.8 | 4.8 | ------ | ------ | 1.4 | 1.4 | 1.5 |
| | Calcium | mg/L | 147 | 68.3 | 78.5 | 64.8 | 54.5 | ------ | 143 | ------ | ------ | 15.1 | 18.5 | 15.2 |
| | Chloride | mg/L | ------ | 7.3 | 22.1 | 16.3 | 5.6 | ------ | 9.1 | ------ | ------ | 8.7 | 8.3 | 7.1 |
| | Fluoride | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | 0.22 J | ------ | 0.19 | 0.098 J | 0.34 | 0.2 |
| | pH, field measured | S.U. | 5.42 | ------ | ------ | ------ | ------ | 5.22 | ------ | 5.33 | 4.82 | 4.9 | 4.71 | 4.69 |
| | Sulfate | mg/L | ------ | 281 | 361 | 426 | 92.6 | ------ | 877 | ------ | ------ | 211 | 225 | 189 |
| | Total Dissolved Solids | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | 950 | ------ | ------ | 320 | 303 | 321 |
| Appendix IV | Antimony | mg/L | < 0.00028 | ------ | ------ | ------ | ------ | < 0.00027 | < 0.00027 | ------ | < 0.00028 | < 0.00028 | < 0.00028 | < 0.00078 |
| | Arsenic | mg/L | < 0.00078 | < 0.00032 | < 0.00032 | 0.0043 J | < 0.00032 | 0.0018 J | 0.0025 J | ------ | 0.0032 J | 0.0047 J | 0.0030 J | 0.0031 J |
| | Barium | mg/L | 0.027 | ------ | ------ | ------ | ------ | 0.017 | 0.021 | ------ | 0.03 | 0.026 | 0.028 | 0.026 |
| | Beryllium | mg/L | 0.0028 J | ------ | ------ | ------ | ------ | 0.0028 J | 0.0029 J | ------ | 0.0013 J | 0.0012 J | 0.0011 | 0.0012 |
| | Cadmium | mg/L | 0.00069 J | ------ | ------ | ------ | ------ | 0.0018 J | 0.002 J | ------ | 0.00029 J | 0.00024 J | 0.00026 J | 0.00028 J |
| | Chromium | mg/L | 0.00068 J | ------ | ------ | ------ | ------ | < 0.00039 | 0.0011 J | ------ | 0.0014 J | < 0.00055 | 0.00059 J | < 0.0011 |
| | Cobalt | mg/L | 0.049 | ------ | ------ | ------ | ------ | 0.018 | 0.026 | ------ | 0.042 | 0.042 | 0.050 | 0.047 |
| | Fluoride | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | 0.22 J | ------ | 0.19 | 0.098 J | 0.34 | 0.2 |
| | Lead | mg/L | 0.000093 J | ------ | ------ | ------ | ------ | < 0.000046 | 0.00012 J | ------ | 0.00022 J | 0.000091 J | 0.00010 J | < 0.00089 |
| | Lithium | mg/L | 0.61 | ------ | ------ | ------ | ------ | 0.0062 J | 0.0063 J | 0.0059 J | 0.0056 J | 0.005 J | 0.0051 J | 0.0055 J |
| | Mercury | mg/L | < 0.000078 | ------ | ------ | ------ | ------ | 0.0003 J | 0.00021 J | ------ | 0.00016 J | < 0.000078 | < 0.000078 | < 0.000078 |
| | Molybdenum | mg/L | 0.0017 J | ------ | ------ | ------ | ------ | < 0.00095 | < 0.00095 | ------ | < 0.00069 | < 0.00069 | < 0.00069 | < 0.00074 |
| | Selenium | mg/L | 0.0039 J | ------ | ------ | ------ | ------ | 0.0097 J | 0.012 | ------ | 0.011 | 0.029 | 0.013 | 0.011 |
| | Thallium | mg/L | < 0.00014 | ------ | ------ | ------ | ------ | 0.00014 J | 0.00016 J | ------ | 0.00016 J | 0.00023 J | 0.00026 J | 0.00024 J |
| | Radium | pCi/L | ------ | ------ | ------ | ------ | ------ | ------ | 1.97 | ------ | 1.15 U | 1.39 | 1.01 U | 0.854 U |
| | Radium-226 | pCi/L | ------ | ------ | ------ | ------ | ------ | ------ | 0.862 | ------ | 0.436 U | 0.471 | 0.592 U | 0.33 U |
| | Radium-228 | pCi/L | ------ | ------ | ------ | ------ | ------ | ------ | 1.11 | ------ | 0.712 U | 0.914 | 0.414 U | 0.524 U |
| Field Measured | Conductivity | uS/cm | 1201.9 | ------ | ------ | ------ | ------ | 1236 | ------ | 944.1 | 478.2 | 425 | 528.96 | 474.76 |
| | Dissolved Oxygen | mg/L | 0.18 | ------ | ------ | ------ | ------ | 0.03 | ------ | 0.17 | 0.52 | 0.06 | 0.1 | 0.23 |
| | Oxidation Reduction Potential | millivolts | 523 | ------ | ------ | ------ | ------ | 160.4 | ------ | 652.2 | 160.3 | 125.6 | 38.2 | 85.7 |
| | Temperature | Deg C | 19.54 | ------ | ------ | ------ | ------ | 20.95 | ------ | 19.31 | 22.96 | 19.23 | 18.12 | 21.75 |
| | Turbidity | ntu | 6.27 | ------ | ------ | ------ | ------ | 0.05 | ------ | 0.47 | 4.38 | 2.64 | 1.93 | 3.44 |
| | Water level depth | ft | 35.5 | ------ | ------ | ------ | ------ | 5.91 | ------ | 8.76 | 29.52 | 29.24 | 28.79 | 26.97 |
| Supplemental | Alkalinity as CaCO3, Total | mg/L | ------ | 30 | 10 | < 20 | 117 | ------ | ------ | ------ | ------ | ------ | < 5.0 | ------ |
| | Alkalinity, Bicarbonate as CaCO3 | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | 12 | ------ | ------ | ------ | < 5.0 | ------ |
| | Alkalinity, Carbonate as CaCO3 | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | < 1.0 | ------ | ------ | ------ | < 5.0 | ------ |
| | Aluminum | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | 0.19 | ------ | ------ | ------ | ------ | ------ |
| | Dissolved Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | < 0.50 | ------ | ------ | ------ | ------ | ------ |
| | Hardness | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Total | mg/L | ------ | 0.0087 J | < 0.0043 | 3.7 | 0.0562 | ------ | < 0.015 | ------ | ------ | ------ | ------ | ------ |
| | Iron, Ferric (Fe2) | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | < 0.20 | ------ | ------ | ------ | ------ | ------ |
| | Iron, Ferrous | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | < 0.20 | ------ | ------ | ------ | ------ | ------ |
| | Magnesium | mg/L | ------ | 15.1 | 27.3 | 24.5 | 8.01 | ------ | 49.7 | ------ | ------ | ------ | 34.2 | ------ |
| | Manganese | mg/L | ------ | 0.0256 | 0.494 | 12.2 | 0.194 | ------ | 9.4 | ------ | ------ | ------ | ------ | ------ |
| | Nickel | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nitrate as N | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | 0.38 | ------ | ------ | ------ | ------ | ------ |
| | Phosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphorus, Total Orthophosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | < 0.020 | ------ | ------ | ------ | ------ | ------ |
| | Potassium | mg/L | ------ | 4.47 | 5.17 | 9.46 | 4.04 | ------ | 8.4 | ------ | ------ | ------ | 5.0 | ------ |
| | Silica | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silicon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | 14.3 | ------ | ------ | ------ | ------ | ------ |
| | Silver | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | < 0.00028 | ------ | ------ | ------ | ------ | ------ |
| | Sodium | mg/L | ------ | 29.3 | 26.8 | 21.6 | 13.4 | ------ | 25.4 | ------ | ------ | ------ | 19.4 | ------ |
| | Sulfide | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Total Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Zinc | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |

**NOTES:**
1. mg/L - milligrams per Liter; pCi/L - picocuries per Liter; S.U. - Standarc
2. < indicates the substance was not detected above the analytical methc
3. J indicates the substance was detected at such low levels that the pre
4. Radium data are a combination of radium isotopes 226 and 228. Whe

**APPENDIX A**
**ANALYTICAL RESULTS (2016 - 2022)**
Plant McDonough-Atkinson Ash Pond 1 and Ash Pond 2 and 3/4
Atlanta, Georgia

| | Analyte | Units | B-56 | B-56 | B-57 | B-60 | B-60 | B-61 | B-61 | B-61 | B-62 | B-62 | B-62 | B-62 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1/27/2022 | 9/16/2022 | 1/15/2021 | 9/11/2019 | 10/21/2019 | 1/28/2019 | 9/11/2019 | 10/22/2019 | 1/30/2019 | 9/11/2019 | 10/21/2019 | 8/13/2020 |
| Appendix III | Boron | mg/L | 1.6 | 1.60 | 0.43 | 0.31 | 0.28 | 0.73 | 0.52 | 0.59 | 0.14 | 0.068 | 0.058 | ------ |
| | Calcium | mg/L | 19.8 | 18.4 | 132 | ------ | [illegible] | 54.5 | ------ | [illegible] | 51.4 | ------ | ------ | ------ |
| | Chloride | mg/L | 7.6 | 6.90 | 25.5 | ------ | 28.6 | 10 | ------ | 10.6 | 7.1 | ------ | 6.5 | ------ |
| | Fluoride | mg/L | 0.21 | 0.22 | 1.1 | ------ | 0.54 | 0.31 | ------ | 0.15 J | 0.43 | ------ | 0.23 J | 0.11 |
| | pH, field measured | S.U. | 4.7 | 4.56 | 3.83 | 4.55 | ------ | ------ | ------ | ------ | ------ | 6.27 | ------ | 6.4 |
| | Sulfate | mg/L | 185 | 234 | 1080 | ------ | 858 | 268 | ------ | 308 | 74.7 | ------ | 55.3 | ------ |
| | Total Dissolved Solids | mg/L | 344 | 353 | 1430 | ------ | 1100 | 439 | ------ | 389 | 287 | ------ | 180 | ------ |
| Appendix IV | Antimony | mg/L | 0.0011 J | < 0.00078 | < 0.00028 | < 0.00027 | < 0.00027 | < 0.00078 | 0.00043 J | < 0.00027 | < 0.00078 | < 0.00027 | < 0.00027 | < 0.00028 |
| | Arsenic | mg/L | 0.0045 J | < 0.0022 | 0.0032 J | 0.0016 J | 0.0008 J | < 0.00057 | < 0.00035 | < 0.00035 | < 0.00057 | < 0.00035 | < 0.00035 | < 0.00078 |
| | Barium | mg/L | 0.03 | 0.028 | 0.0099 J | 0.011 | 0.011 | 0.013 | 0.013 | 0.014 | 0.018 | 0.023 | 0.026 | 0.026 |
| | Beryllium | mg/L | 0.0012 | 0.0013 | 0.017 | 0.0057 | 0.005 | < 0.000050 | 0.00085 J | 0.00088 J | < 0.000050 | 0.00012 J | 0.000078 J | 0.00011 J |
| | Cadmium | mg/L | 0.00025 J | 0.00030 J | 0.0034 | 0.001 J | 0.00079 J | < 0.000093 | 0.00044 J | 0.00045 J | < 0.000093 | < 0.00011 | < 0.00011 | < 0.00012 |
| | Chromium | mg/L | 0.0014 J | < 0.0011 | < 0.00055 | < 0.00039 | 0.0005 J | < 0.0016 | < 0.00039 | < 0.00039 | < 0.0016 | < 0.00039 | 0.00098 J | < 0.00055 |
| | Cobalt | mg/L | 0.052 | 0.051 | 0.47 | 0.31 | 0.29 | 0.078 | 0.066 | 0.073 | < 0.00052 | 0.0003 J | 0.00031 J | < 0.00038 |
| | Fluoride | mg/L | 0.21 | 0.22 | 1.1 | ------ | 0.54 | 0.31 | ------ | 0.15 J | 0.43 | ------ | 0.23 J | 0.11 |
| | Lead | mg/L | < 0.00089 | < 0.00089 | 0.00087 J | 0.0008 J | 0.0007 J | < 0.00027 | 0.00012 J | 0.00013 J | < 0.00027 | < 0.000046 | < 0.000046 | < 0.000036 |
| | Lithium | mg/L | 0.0061 J | 0.0057 J | 0.11 | 0.03 J | 0.028 J | < 0.00097 | 0.0014 J | 0.0015 J | < 0.00097 | 0.0078 J | 0.0078 J | 0.0087 J |
| | Mercury | mg/L | < 0.00013 | < 0.00013 | < 0.000078 | < 0.00014 | < 0.00014 | < 0.000036 | < 0.00014 | < 0.00014 | < 0.000036 | < 0.00014 | < 0.00014 | < 0.000078 |
| | Molybdenum | mg/L | < 0.00074 | < 0.00074 | < 0.00069 | < 0.00095 | < 0.00095 | < 0.0019 | < 0.00095 | < 0.00095 | < 0.0019 | < 0.00095 | < 0.00095 | < 0.00069 |
| | Selenium | mg/L | 0.0066 | 0.01 | 0.015 | 0.0074 J | 0.0072 J | < 0.0014 | 0.0017 J | 0.0022 J | < 0.0014 | < 0.0013 | < 0.0013 | < 0.0016 |
| | Thallium | mg/L | 0.00032 J | 0.00024 J | 0.00051 J | 0.00039 J | 0.00035 J | < 0.00014 | 0.00034 J | 0.00037 J | < 0.00014 | < 0.000052 | < 0.000052 | < 0.00014 |
| | Radium | pCi/L | 0.831 U | 0.752 U | 2.36 | ------ | ------ | 1.92 | ------ | 1.31 | 1.97 | ------ | ------ | 1.63 |
| | Radium-226 | pCi/L | 0.306 U | ------ | 1.24 | ------ | ------ | 0.535 | ------ | 0.332 U | 0.897 | ------ | ------ | 0.647 |
| | Radium-228 | pCi/L | 0.525 U | ------ | 1.12 | ------ | ------ | 1.38 | ------ | 0.978 | 1.07 | ------ | ------ | 0.986 |
| Field Measured | Conductivity | uS/cm | 545.98 | ------ | 1779.7 | 1323.3 | ------ | ------ | ------ | ------ | ------ | 269.3 | ------ | 279.7 |
| | Dissolved Oxygen | mg/L | 3.68 | ------ | 0.26 | 0.21 | ------ | ------ | ------ | ------ | ------ | 0.19 | ------ | 0.25 |
| | Oxidation Reduction Potential | millivolts | 104.4 | ------ | 113.2 | 180.9 | ------ | ------ | ------ | ------ | ------ | 14 | ------ | -5.8 |
| | Temperature | Deg C | 17.26 | ------ | 16.02 | 25.22 | ------ | ------ | ------ | ------ | ------ | 21.03 | ------ | 19.59 |
| | Turbidity | ntu | 4.96 | ------ | 3.33 | 1.3 | ------ | ------ | ------ | ------ | ------ | 1.68 | ------ | 3.3 |
| | Water level depth | ft | 28.59 | ------ | 19.09 | 32.6 | ------ | ------ | ------ | ------ | ------ | 16.04 | ------ | 17.2 |
| Supplemental | Alkalinity as CaCO3, Total | mg/L | < 1.8 | < 5.00 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Alkalinity, Bicarbonate as CaCO3 | mg/L | < 1.8 | < 5.00 | ------ | ------ | < 20 | ------ | ------ | 1 | ------ | ------ | 70 | ------ |
| | Alkalinity, Carbonate as CaCO3 | mg/L | < 1.8 | < 5.00 | ------ | ------ | < 20 | ------ | ------ | < 1.0 | ------ | ------ | < 20 | ------ |
| | Aluminum | mg/L | ------ | ------ | ------ | ------ | 2.1 | ------ | ------ | 0.22 | ------ | ------ | < 0.032 | ------ |
| | Dissolved Organic Carbon | mg/L | ------ | ------ | ------ | ------ | 0.87 J | ------ | ------ | ------ | ------ | ------ | < 0.50 | ------ |
| | Hardness | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Total | mg/L | ------ | 0.1 | ------ | ------ | 52.3 | ------ | ------ | 2.4 | ------ | ------ | 78.5 | ------ |
| | Iron, Ferric (Fe2) | mg/L | ------ | 0.1 | ------ | ------ | 52.3 | ------ | ------ | 0.4 | ------ | ------ | 78.5 | ------ |
| | Iron, Ferrous | mg/L | ------ | 0.0 | ------ | ------ | 33.9 | ------ | ------ | 2.0 | ------ | ------ | 2.7 | ------ |
| | Magnesium | mg/L | 34.1 | 34.1 | ------ | ------ | 35.5 | ------ | ------ | 15.8 | ------ | ------ | 5.2 | ------ |
| | Manganese | mg/L | ------ | ------ | ------ | ------ | 21.7 | ------ | ------ | 9.4 | ------ | ------ | 0.36 | ------ |
| | Nickel | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nitrate as N | mg/L | ------ | ------ | ------ | ------ | < 0.0050 | ------ | ------ | < 0.0050 | ------ | ------ | 0.005 J | ------ |
| | Phosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphorus, Total Orthophosphate | mg/L | ------ | ------ | ------ | ------ | 0.025 | ------ | ------ | < 0.020 | ------ | ------ | < 0.020 | ------ |
| | Potassium | mg/L | 5.1 | 5.0 | ------ | ------ | 13.4 | ------ | ------ | 7.3 | ------ | ------ | 2.3 | ------ |
| | Silica | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silicon | mg/L | ------ | ------ | ------ | ------ | 22 | ------ | ------ | 5.9 | ------ | ------ | 15.1 | ------ |
| | Silver | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 0.00028 | ------ | ------ | ------ | ------ |
| | Sodium | mg/L | 20.7 | 22.2 | ------ | ------ | 64.4 | ------ | ------ | 23.9 | ------ | ------ | 10.2 | ------ |
| | Sulfide | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Total Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Zinc | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |

**NOTES:**
1. mg/L - milligrams per Liter; pCi/L - picocuries per Liter; S.U. - Standarc
2. < indicates the substance was not detected above the analytical methc
3. J indicates the substance was detected at such low levels that the pre
4. Radium data are a combination of radium isotopes 226 and 228. Whe

**APPENDIX A**
**ANALYTICAL RESULTS (2016 - 2022)**
Plant McDonough-Atkinson Ash Pond 1 and Ash Pond 2 and 3/4
Atlanta, Georgia

| Analyte | | Units | B-62 | B-62 | B-62 | B-62 | B-62 | B-63 | B-63 | B-63 | B-63 | B-63 | B-63 | B-63 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 9/24/2020 | 3/12/2021 | 9/9/2021 | 1/20/2022 | 9/9/2022 | 1/28/2019 | 9/11/2019 | 10/22/2019 | 3/12/2021 | 9/14/2021 | 1/20/2022 | 9/14/2022 |
| Appendix III | Boron | mg/L | 0.074 J | 0.092 J | 0.068 | 0.077 | 0.06 | 0.44 | 0.26 | 0.22 | ------ | 0.35 | 0.21 | 0.38 |
| | Calcium | mg/L | 28.8 | 28.8 | 29.2 | 36.3 | 31.4 | < 0.69 | ------ | ------ | ------ | 22.7 | 22.9 | 26.3 |
| | Chloride | mg/L | 5.7 | 5.9 | 5.8 | 5.6 | 5.30 | 7.9 | ------ | 18 | ------ | 7.1 | 15 | 6.50 |
| | Fluoride | mg/L | 0.093 J | 0.11 | 0.14 | 0.099 J | 0.13 | 0.45 | ------ | 0.2 J | ------ | 0.16 | 0.12 | 0.14 |
| | pH, field measured | S.U. | 6.55 | 6.34 | 6.31 | 6.32 | 6.22 | ------ | 5.48 | ------ | 5.51 | 5.46 | 5.46 | 5.31 |
| | Sulfate | mg/L | 50.6 | 46.5 | 49.2 | 50.3 | 45.8 | 87.9 | ------ | 56.5 | ------ | 73.2 | 49.4 | 93.3 |
| | Total Dissolved Solids | mg/L | 170 | 172 | 174 | 187 | 160 | 204 | ------ | 178 | ------ | 170 | 177 | 206 |
| Appendix IV | Antimony | mg/L | 0.00046 J | < 0.0014 | < 0.00078 | < 0.00078 | < 0.00078 | < 0.00078 | < 0.00027 | 0.00066 J | ------ | < 0.00078 | < 0.00078 | < 0.00078 |
| | Arsenic | mg/L | < 0.00078 | < 0.0039 | < 0.0011 | 0.0033 J | < 0.0022 | < 0.00057 | < 0.00035 | < 0.00035 | ------ | < 0.0011 | 0.0022 J | < 0.0022 |
| | Barium | mg/L | 0.025 | 0.027 | 0.021 | 0.021 | 0.018 | 0.028 | 0.021 | 0.021 | ------ | 0.026 | 0.02 | 0.032 |
| | Beryllium | mg/L | 0.00013 J | < 0.00023 | 0.00014 J | 0.00015 J | 0.00013 J | < 0.000050 | 0.00035 J | 0.0003 J | ------ | 0.00042 J | 0.00034 J | 0.00053 |
| | Cadmium | mg/L | < 0.00012 | < 0.00059 | < 0.00011 | < 0.00011 | < 0.00011 | < 0.000093 | < 0.00011 | 0.00014 J | ------ | 0.00025 J | < 0.00011 | 0.00018 J |
| | Chromium | mg/L | < 0.00055 | < 0.0028 | < 0.0011 | < 0.0011 | < 0.0011 | < 0.0016 | < 0.00039 | 0.00064 J | ------ | < 0.0011 | < 0.0011 | < 0.0011 |
| | Cobalt | mg/L | < 0.00038 | < 0.0019 | < 0.00039 | < 0.00039 | < 0.00039 | 0.053 | 0.043 | 0.046 | 0.046 | 0.037 | 0.039 | 0.05 |
| | Fluoride | mg/L | 0.093 J | 0.11 | 0.14 | 0.099 J | 0.13 | 0.45 | ------ | 0.2 J | ------ | 0.16 | 0.12 | 0.14 |
| | Lead | mg/L | < 0.000036 | < 0.00018 | < 0.00089 | < 0.00089 | < 0.00089 | < 0.00027 | 0.000047 J | 0.000073 J | ------ | < 0.00089 | < 0.00089 | < 0.00089 |
| | Lithium | mg/L | 0.0084 J | 0.0087 J | 0.0094 J | 0.0092 J | 0.0085 J | < 0.00097 | 0.0064 J | 0.0062 J | 0.0066 J | 0.0064 J | 0.0062 J | 0.0072 J |
| | Mercury | mg/L | < 0.000078 | < 0.000078 | < 0.000078 | < 0.00013 | < 0.00013 | < 0.000036 | < 0.00014 | < 0.00014 | ------ | < 0.000078 | < 0.00013 | < 0.00013 |
| | Molybdenum | mg/L | < 0.00069 | < 0.0034 | < 0.00074 | < 0.00074 | < 0.00074 | < 0.0019 | < 0.00095 | < 0.00095 | ------ | < 0.00074 | < 0.00074 | < 0.00074 |
| | Selenium | mg/L | < 0.0016 | < 0.0078 | < 0.0014 | < 0.0014 | < 0.0014 | < 0.0014 | < 0.0013 | < 0.0013 | ------ | < 0.0014 | < 0.0014 | < 0.0014 |
| | Thallium | mg/L | < 0.00014 | < 0.00072 | < 0.00018 | < 0.00018 | < 0.00018 | < 0.00014 | < 0.000052 | < 0.000052 | ------ | < 0.00018 | < 0.00018 | < 0.00018 |
| | Radium | pCi/L | 1.28 U | 1.18 U | 1.7 | 1.71 | 1.96 | 2.14 | ------ | 1.28 U | ------ | 1.68 | 0.846 U | 1.61 |
| | Radium-226 | pCi/L | 0.669 | 0.815 | 0.757 | 0.869 | ------ | 0.903 | ------ | 0.872 | ------ | 0.981 | 0.455 | ------ |
| | Radium-228 | pCi/L | 0.608 U | 0.369 U | 0.946 | 0.844 | ------ | 1.24 | ------ | 0.407 U | ------ | 0.703 U | 0.391 U | ------ |
| Field Measured | Conductivity | uS/cm | 296 | 276.4 | 268.58 | 304.59 | ------ | ------ | 249.5 | ------ | 284.18 | 262.66 | 278.9 | ------ |
| | Dissolved Oxygen | mg/L | 0.23 | 0.26 | 0.18 | 1.07 | ------ | ------ | 0.15 | ------ | 0.07 | 0.17 | 0.05 | ------ |
| | Oxidation Reduction Potential | millivolts | 57 | 1.3 | 14.5 | -16.6 | ------ | ------ | 163.2 | ------ | 93.6 | 76.2 | 43.5 | ------ |
| | Temperature | Deg C | 18.16 | 17.35 | 19.81 | 15.84 | ------ | ------ | 24.09 | ------ | 25.96 | 22.09 | 17.79 | ------ |
| | Turbidity | ntu | 4.35 | 3.98 | 3 | 4.19 | ------ | ------ | 0.15 | ------ | 3.97 | 4.95 | 4.87 | ------ |
| | Water level depth | ft | 15.6 | 15.6 | 12.4 | 15.48 | ------ | ------ | 29.6 | ------ | 29.62 | 29.34 | 28.84 | ------ |
| Supplemental | Alkalinity as CaCO3, Total | mg/L | ------ | 67.4 | ------ | 81 | 70.3 | ------ | ------ | ------ | ------ | ------ | 50.8 | 33.2 |
| | Alkalinity, Bicarbonate as CaCO3 | mg/L | ------ | 67.4 | ------ | 81 | 70.3 | ------ | ------ | 39 | ------ | ------ | 50.8 | 33.2 |
| | Alkalinity, Carbonate as CaCO3 | mg/L | ------ | < 5.0 | ------ | < 1.8 | < 5.0 | ------ | ------ | < 20 | ------ | ------ | < 1.8 | < 5.00 |
| | Aluminum | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 0.043 J | ------ | ------ | ------ | ------ |
| | Dissolved Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 1 J | ------ | ------ | ------ | ------ |
| | Hardness | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Total | mg/L | ------ | ------ | ------ | ------ | 6.5 | ------ | ------ | 0.3 | ------ | ------ | ------ | 1.6 |
| | Iron, Ferric (Fe2) | mg/L | ------ | ------ | ------ | ------ | 5.0 | ------ | ------ | 0.3 | ------ | ------ | ------ | 0.1 |
| | Iron, Ferrous | mg/L | ------ | ------ | ------ | ------ | 1.5 | ------ | ------ | < 0.20 | ------ | ------ | ------ | 1.5 |
| | Magnesium | mg/L | ------ | 5.6 | ------ | 5.6 | 5.1 | ------ | ------ | 7.2 | ------ | ------ | 8 | 9.3 |
| | Manganese | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 4.2 | ------ | ------ | ------ | ------ |
| | Nickel | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nitrate as N | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 0.0095 J | ------ | ------ | ------ | ------ |
| | Phosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphorus, Total Orthophosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 0.020 | ------ | ------ | ------ | ------ |
| | Potassium | mg/L | ------ | 2.2 | ------ | 2.8 | 2.4 | ------ | ------ | 2.3 | ------ | ------ | 2.8 | 2.7 |
| | Silica | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silicon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 13.2 | ------ | ------ | ------ | ------ |
| | Silver | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 0.00028 | ------ | ------ | ------ | ------ |
| | Sodium | mg/L | ------ | 10.4 | ------ | 10.8 | 10.2 | ------ | ------ | 11.4 | ------ | ------ | 11.7 | 13.0 |
| | Sulfide | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Total Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Zinc | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |

**NOTES:**
1. mg/L - milligrams per Liter; pCi/L - picocuries per Liter; S.U. - Standarc
2. < indicates the substance was not detected above the analytical methc
3. J indicates the substance was detected at such low levels that the pre
4. Radium data are a combination of radium isotopes 226 and 228. Whe

**APPENDIX A**
**ANALYTICAL RESULTS (2016 - 2022)**
Plant McDonough-Atkinson Ash Pond 1 and Ash Pond 2 and 3/4
Atlanta, Georgia

| Analyte | | Units | B-64 | B-64 | B-64 | B-64 | B-65 | B-65 | B-65 | B-65 | B-66 | B-66 | B-66 | B-66 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1/28/2019 | 9/12/2019 | 10/21/2019 | 3/10/2021 | 1/28/2019 | 9/12/2019 | 9/17/2019 | 10/21/2019 | 1/30/2019 | 9/12/2019 | 10/21/2019 | 3/12/2021 |
| Appendix III | Boron | mg/L | 3.9 | 3.3 | 2.8 | ------ | 1.4 | 1.2 | 1.3 | 1.1 | 2 | 2 | 1.9 | ------ |
| | Calcium | mg/L | 157 | ------ | ------ | ------ | 52.8 | ------ | ------ | 44.5 | 62.4 | ------ | 66.9 | ------ |
| | Chloride | mg/L | 6.6 | ------ | 6.7 | ------ | 9.7 | ------ | ------ | 9.9 | 9.3 | ------ | 9.9 | ------ |
| | Fluoride | mg/L | < 0.029 | ------ | 0.048 J | ------ | < 0.029 | ------ | ------ | 0.095 J | 0.51 | ------ | 0.3 J | ------ |
| | pH, field measured | S.U. | ------ | 5.03 | ------ | 4.98 | ------ | 6.87 | 5.73 | ------ | ------ | ------ | ------ | 6.53 |
| | Sulfate | mg/L | 598 | ------ | 837 | ------ | 251 | ------ | ------ | 268 | 292 | ------ | 302 | ------ |
| | Total Dissolved Solids | mg/L | 962 | ------ | 1110 | ------ | 454 | ------ | ------ | 403 | 601 | ------ | 617 | ------ |
| Appendix IV | Antimony | mg/L | < 0.00078 | < 0.00027 | < 0.00027 | ------ | < 0.00078 | < 0.00027 | 0.00061 J | 0.00034 J | < 0.00078 | < 0.00027 | < 0.00027 | ------ |
| | Arsenic | mg/L | < 0.00057 | < 0.00035 | < 0.00035 | ------ | < 0.00057 | 0.00036 J | < 0.00035 | < 0.00035 | < 0.00057 | < 0.00035 | < 0.00035 | < 0.00078 |
| | Barium | mg/L | 0.015 | 0.018 | 0.017 | ------ | 0.03 | 0.027 | 0.028 | 0.027 | 0.016 | 0.017 | 0.018 | ------ |
| | Beryllium | mg/L | 0.0044 | 0.0051 | 0.0045 | ------ | < 0.000050 | < 0.000074 | < 0.000074 | < 0.000074 | < 0.000050 | < 0.000074 | < 0.000074 | ------ |
| | Cadmium | mg/L | < 0.000093 | 0.001 J | 0.001 J | ------ | 0.0014 | 0.0014 J | 0.0015 J | 0.0014 J | < 0.000093 | < 0.00011 | < 0.00011 | ------ |
| | Chromium | mg/L | < 0.0016 | < 0.00039 | < 0.00039 | ------ | < 0.0016 | < 0.00039 | < 0.00039 | < 0.00039 | < 0.0016 | < 0.00039 | < 0.00039 | ------ |
| | Cobalt | mg/L | < 0.00052 | 0.0043 J | 0.0043 J | ------ | 0.047 | 0.036 | 0.041 | 0.041 | < 0.00052 | 0.006 | 0.0074 | 0.010 |
| | Fluoride | mg/L | < 0.029 | | 0.048 J | ------ | < 0.029 | ------ | ------ | 0.095 J | 0.51 | ------ | 0.3 J | ------ |
| | Lead | mg/L | < 0.00027 | < 0.000046 | < 0.000046 | ------ | < 0.00027 | < 0.000046 | < 0.000046 | < 0.000046 | < 0.00027 | < 0.000046 | < 0.000046 | ------ |
| | Lithium | mg/L | < 0.00097 | 0.012 J | 0.011 J | 0.0111 J | < 0.00097 | 0.0099 J | 0.01 J | 0.0098 J | < 0.00097 | < 0.00078 | < 0.00078 | ------ |
| | Mercury | mg/L | < 0.000036 | < 0.00014 | < 0.00014 | ------ | < 0.000036 | < 0.00014 | < 0.00014 | < 0.00014 | < 0.000036 | < 0.00014 | < 0.00014 | ------ |
| | Molybdenum | mg/L | < 0.0019 | < 0.00095 | < 0.00095 | ------ | < 0.0019 | < 0.00095 | < 0.00095 | < 0.00095 | < 0.0019 | 0.0018 J | 0.0015 J | ------ |
| | Selenium | mg/L | < 0.0014 | 0.0017 J | 0.0013 J | ------ | < 0.0014 | < 0.0013 | < 0.0013 | < 0.0013 | < 0.0014 | < 0.0013 | < 0.0013 | ------ |
| | Thallium | mg/L | < 0.00014 | < 0.000052 | < 0.000052 | ------ | < 0.00014 | < 0.000052 | 0.000062 J | < 0.000052 | < 0.00014 | < 0.000052 | < 0.000052 | ------ |
| | Radium | pCi/L | 2.43 | ------ | ------ | ------ | 1.05 | ------ | ------ | ------ | 0.975 U | ------ | ------ | ------ |
| | Radium-226 | pCi/L | 0.815 | ------ | ------ | ------ | 0.307 U | ------ | ------ | ------ | 0.404 | ------ | ------ | ------ |
| | Radium-228 | pCi/L | 1.61 | ------ | ------ | ------ | 0.738 | ------ | ------ | ------ | 0.571 U | ------ | ------ | ------ |
| Field Measured | Conductivity | uS/cm | ------ | 1204.5 | ------ | 835.5 | ------ | 867.1 | 549.6 | ------ | ------ | ------ | ------ | 740.8 |
| | Dissolved Oxygen | mg/L | ------ | 0.15 | ------ | 0.29 | ------ | 0.44 | 0.1 | ------ | ------ | ------ | ------ | 0.33 |
| | Oxidation Reduction Potential | millivolts | ------ | 468.5 | ------ | 295.5 | ------ | -45.2 | 76.6 | ------ | ------ | ------ | ------ | 25.6 |
| | Temperature | Deg C | ------ | 21.19 | ------ | 17.45 | ------ | 30.56 | 25.82 | ------ | ------ | ------ | ------ | 18.92 |
| | Turbidity | ntu | ------ | 0.2 | ------ | 0.94 | ------ | 0.45 | 0.64 | ------ | ------ | ------ | ------ | 0.67 |
| | Water level depth | ft | ------ | 6.4 | ------ | 10.22 | ------ | 22.19 | 18.79 | ------ | ------ | ------ | ------ | 21.61 |
| Supplemental | Alkalinity as CaCO3, Total | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Alkalinity, Bicarbonate as CaCO3 | mg/L | ------ | ------ | < 20 | ------ | ------ | ------ | ------ | < 20 | ------ | ------ | 158 | ------ |
| | Alkalinity, Carbonate as CaCO3 | mg/L | ------ | ------ | < 20 | ------ | ------ | ------ | ------ | < 20 | ------ | ------ | < 20 | ------ |
| | Aluminum | mg/L | ------ | ------ | < 0.032 | ------ | ------ | ------ | ------ | < 0.032 | ------ | ------ | < 0.032 | ------ |
| | Dissolved Organic Carbon | mg/L | ------ | ------ | < 0.50 | ------ | ------ | ------ | ------ | < 0.50 | ------ | ------ | 2.8 | ------ |
| | Hardness | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Total | mg/L | ------ | ------ | < 0.20 | ------ | ------ | ------ | ------ | < 0.20 | ------ | ------ | 1.5 | ------ |
| | Iron, Ferric (Fe2) | mg/L | ------ | ------ | < 0.20 | ------ | ------ | ------ | ------ | < 0.20 | ------ | ------ | 1.5 | ------ |
| | Iron, Ferrous | mg/L | ------ | ------ | < 0.20 | ------ | ------ | ------ | ------ | < 0.20 | ------ | ------ | < 0.20 | ------ |
| | Magnesium | mg/L | ------ | ------ | 36 | ------ | ------ | ------ | ------ | 24.1 | ------ | ------ | 41 | ------ |
| | Manganese | mg/L | ------ | ------ | 29.2 | ------ | ------ | ------ | ------ | 5.5 | ------ | ------ | 5.2 | ------ |
| | Nickel | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nitrate as N | mg/L | ------ | ------ | 0.029 J | ------ | ------ | ------ | ------ | 0.12 | ------ | ------ | < 0.0050 | ------ |
| | Phosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphorus, Total Orthophosphate | mg/L | ------ | ------ | 0.046 | ------ | ------ | ------ | ------ | < 0.020 | ------ | ------ | < 0.020 | ------ |
| | Potassium | mg/L | ------ | ------ | 5.4 | ------ | ------ | ------ | ------ | 5.9 | ------ | ------ | 6.5 | ------ |
| | Silica | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silicon | mg/L | ------ | ------ | 25.8 | ------ | ------ | ------ | ------ | 13.7 | ------ | ------ | 12.3 | ------ |
| | Silver | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Sodium | mg/L | ------ | ------ | 24.9 | ------ | ------ | ------ | ------ | 14.5 | ------ | ------ | 50.3 | ------ |
| | Sulfide | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Total Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Zinc | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |

**NOTES:**
1. mg/L - milligrams per Liter; pCi/L - picocuries per Liter; S.U. - Standarc
2. < indicates the substance was not detected above the analytical methc
3. J indicates the substance was detected at such low levels that the pre
4. Radium data are a combination of radium isotopes 226 and 228. Whe

**APPENDIX A**
**ANALYTICAL RESULTS (2016 - 2022)**
Plant McDonough-Atkinson Ash Pond 1 and Ash Pond 2 and 3/4
Atlanta, Georgia

| | Analyte | Units | B-66 | B-66 | B-66 | B-68 | B-68 | B-7 | B-7 | B-7 | B-72 | B-72 | B-73 | B-73 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 9/14/2021 | 1/25/2022 | 9/16/2022 | 10/22/2019 | 3/11/2021 | 9/12/2019 | 9/17/2019 | 10/22/2019 | 5/4/2017 | 1/25/2018 | 5/2/2017 | 1/25/2018 |
| Appendix III | Boron | mg/L | 2.1 | 2.3 | 2.20 | 1.4 | ------ | 4.6 | 4.3 | 4.1 | ------ | ------ | ------ | ------ |
| | Calcium | mg/L | 60.9 | 54.9 | 63.9 | ------ | ------ | ------ | ------ | ------ | ------ | 38.1 | ------ | 45 |
| | Chloride | mg/L | 8.9 | 8.7 | 8.40 | 4.2 | ------ | ------ | ------ | 12.7 | ------ | 5.4 | ------ | 3.8 |
| | Fluoride | mg/L | 0.22 | 0.12 | 0.18 | 0.53 | ------ | ------ | ------ | 0.12 J | ------ | ------ | ------ | ------ |
| | pH, field measured | S.U. | 5.54 | 6.35 | 6.6 | ------ | 6.78 | ------ | 4.34 | ------ | ------ | ------ | ------ | ------ |
| | Sulfate | mg/L | 268 | 240 | 285 | 25.6 | ------ | ------ | ------ | 800 | ------ | 96 | ------ | 41.5 |
| | Total Dissolved Solids | mg/L | 490 | 482 | 498 | 225 | ------ | ------ | ------ | 816 | ------ | ------ | ------ | ------ |
| Appendix IV | Antimony | mg/L | < 0.00078 | < 0.00078 | < 0.00078 | < 0.00027 | ------ | < 0.00027 | < 0.00027 | < 0.00027 | ------ | ------ | ------ | ------ |
| | Arsenic | mg/L | < 0.0011 | < 0.0011 | < 0.0022 | 0.42 | 0.47 | 0.0032 J | 0.0029 J | 0.0035 J | < 0.00040 | < 0.00032 | 0.0066 | 0.0125 |
| | Barium | mg/L | 0.018 | 0.021 | 0.02 | 0.12 | ------ | 0.018 | 0.016 | 0.017 | ------ | ------ | ------ | ------ |
| | Beryllium | mg/L | < 0.000054 | < 0.000054 | < 0.000054 | < 0.000074 | ------ | 0.0018 J | 0.0019 J | 0.0019 J | ------ | ------ | ------ | ------ |
| | Cadmium | mg/L | < 0.00011 | < 0.00011 | < 0.00011 | < 0.00011 | ------ | 0.0089 | 0.0089 | 0.0088 | ------ | ------ | ------ | ------ |
| | Chromium | mg/L | < 0.0011 | < 0.0011 | < 0.0011 | < 0.00039 | ------ | 0.0018 J | 0.0019 J | 0.0021 J | ------ | ------ | ------ | ------ |
| | Cobalt | mg/L | 0.012 | 0.013 | 0.012 | 0.0033 J | ------ | 0.15 | 0.14 | 0.15 | ------ | ------ | ------ | ------ |
| | Fluoride | mg/L | 0.22 | 0.12 | 0.18 | 0.53 | ------ | ------ | ------ | 0.12 J | ------ | ------ | ------ | ------ |
| | Lead | mg/L | < 0.00089 | < 0.00089 | < 0.00089 | 0.000071 J | ------ | 0.000082 J | 0.0001 J | 0.00013 J | ------ | ------ | ------ | ------ |
| | Lithium | mg/L | < 0.00073 | 0.00073 J | < 0.00073 | 0.00095 J | ------ | 0.0061 J | 0.0056 J | 0.0056 J | ------ | ------ | ------ | ------ |
| | Mercury | mg/L | < 0.000078 | < 0.00013 | < 0.00013 | < 0.00014 | ------ | 0.00021 J | 0.00033 J | 0.00029 J | ------ | ------ | ------ | ------ |
| | Molybdenum | mg/L | < 0.00074 | < 0.00074 | < 0.00074 | 0.21 | 0.18 | < 0.00095 | < 0.00095 | < 0.00095 | ------ | ------ | ------ | ------ |
| | Selenium | mg/L | < 0.0014 | < 0.0014 | < 0.0014 | < 0.0013 | ------ | 0.02 | 0.019 | 0.02 | ------ | ------ | ------ | ------ |
| | Thallium | mg/L | < 0.00018 | < 0.00018 | < 0.00018 | 0.000071 J | ------ | 0.00051 J | 0.0005 J | 0.00056 J | ------ | ------ | ------ | ------ |
| | Radium | pCi/L | 0.421 U | 0 U | 0.832 U | 1.6 | ------ | ------ | ------ | 0.772 U | ------ | ------ | ------ | ------ |
| | Radium-226 | pCi/L | 0.152 U | -0.0327 U | ------ | 0.834 | ------ | ------ | ------ | 0.506 | ------ | ------ | ------ | ------ |
| | Radium-228 | pCi/L | 0.269 U | -0.0963 U | ------ | 0.766 U | ------ | ------ | ------ | 0.266 U | ------ | ------ | ------ | ------ |
| Field Measured | Conductivity | uS/cm | 759.32 | 1556 | ------ | ------ | 466.68 | ------ | 1088.5 | ------ | ------ | ------ | ------ | ------ |
| | Dissolved Oxygen | mg/L | 0.47 | 0.16 | ------ | ------ | 0.1 | ------ | 0.51 | ------ | ------ | ------ | ------ | ------ |
| | Oxidation Reduction Potential | millivolts | 14.5 | -14.5 | ------ | ------ | -51.4 | ------ | 163.8 | ------ | ------ | ------ | ------ | ------ |
| | Temperature | Deg C | 22.27 | 18.78 | ------ | ------ | 18.82 | ------ | 20.4 | ------ | ------ | ------ | ------ | ------ |
| | Turbidity | ntu | 2.1 | 2.26 | ------ | ------ | 4.23 | ------ | 0.89 | ------ | ------ | ------ | ------ | ------ |
| | Water level depth | ft | 20.1 | 20.42 | ------ | ------ | 4.25 | ------ | 21.11 | ------ | ------ | ------ | ------ | ------ |
| Supplemental | Alkalinity as CaCO3, Total | mg/L | ------ | 96.3 | 119.0 | ------ | ------ | ------ | ------ | ------ | ------ | 102 | ------ | 164 |
| | Alkalinity, Bicarbonate as CaCO3 | mg/L | ------ | 96.3 | 119.0 | 197 | ------ | ------ | ------ | < 20 | ------ | ------ | ------ | ------ |
| | Alkalinity, Carbonate as CaCO3 | mg/L | ------ | < 1.8 | < 5.00 | < 20 | ------ | ------ | ------ | < 20 | ------ | ------ | ------ | ------ |
| | Aluminum | mg/L | ------ | ------ | ------ | < 0.032 | ------ | ------ | ------ | 0.56 | ------ | ------ | ------ | ------ |
| | Dissolved Organic Carbon | mg/L | ------ | ------ | ------ | 0.53 J | ------ | ------ | ------ | < 0.50 | ------ | ------ | ------ | ------ |
| | Hardness | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Total | mg/L | ------ | ------ | 3.0 | 5 | ------ | ------ | ------ | < 0.076 | ------ | 0.027 J | ------ | 0.291 |
| | Iron, Ferric (Fe2) | mg/L | ------ | ------ | 0.5 | 5 | ------ | ------ | ------ | < 0.20 | ------ | ------ | ------ | ------ |
| | Iron, Ferrous | mg/L | ------ | ------ | 2.5 | < 0.20 | ------ | ------ | ------ | < 0.20 | ------ | ------ | ------ | ------ |
| | Magnesium | mg/L | ------ | 40.9 | 44.0 | 13.3 | ------ | ------ | ------ | 43.7 | ------ | 13.2 | ------ | 14.1 |
| | Manganese | mg/L | ------ | ------ | ------ | 6 | ------ | ------ | ------ | 19.6 | ------ | 0.343 | ------ | 3.64 |
| | Nickel | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nitrate as N | mg/L | ------ | ------ | ------ | 0.0064 J | ------ | ------ | ------ | 0.57 | ------ | ------ | ------ | ------ |
| | Phosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphorus, Total Orthophosphate | mg/L | ------ | ------ | ------ | < 0.020 | ------ | ------ | ------ | < 0.020 | ------ | ------ | ------ | ------ |
| | Potassium | mg/L | ------ | 5.3 | 5.5 | 5.2 | ------ | ------ | ------ | 9.5 | ------ | 3.93 | ------ | 3.7 |
| | Silica | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silicon | mg/L | ------ | ------ | ------ | 11.8 | ------ | ------ | ------ | 15.3 | ------ | ------ | ------ | ------ |
| | Silver | mg/L | ------ | ------ | ------ | < 0.00028 | ------ | ------ | ------ | < 0.00028 | ------ | ------ | ------ | ------ |
| | Sodium | mg/L | ------ | 35.1 | 30.5 | 8.9 | ------ | ------ | ------ | 22.2 | ------ | 14 | ------ | 8.11 |
| | Sulfide | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Total Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Zinc | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |

**NOTES:**
1. mg/L - milligrams per Liter; pCi/L - picocuries per Liter; S.U. - Standard
2. < indicates the substance was not detected above the analytical meth
3. J indicates the substance was detected at such low levels that the pre
4. Radium data are a combination of radium isotopes 226 and 228. Whe

# APPENDIX A
## ANALYTICAL RESULTS (2016 - 2022)
Plant McDonough-Atkinson Ash Pond 1 and Ash Pond 2 and 3/4
Atlanta, Georgia

| | Analyte | Units | B-73 3/11/2021 | B-74 5/3/2017 | B-74 1/26/2018 | B-74 8/14/2020 | B-74 9/25/2020 | B-76 9/18/2019 | B-76 (filtered) 9/18/2019 | B-76 9/18/2019 | B-76 10/22/2019 | B-76 3/12/2021 | B-77 9/18/2019 | B-77 9/18/2019 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appendix III | Boron | mg/L | ------ | ------ | ------ | ------ | 0.3 | 0.40 | 0.40 | 0.37 | 0.39 | | 0.31 | 0.33 |
| | Calcium | mg/L | ------ | ------ | 23.7 J | ------ | 18.6 | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Chloride | mg/L | ------ | ------ | 6.4 | ------ | 6 | ------ | ------ | ------ | 23.1 | ------ | ------ | ------ |
| | Fluoride | mg/L | ------ | ------ | ------ | 0.16 | 0.14 | ------ | ------ | ------ | 1 | ------ | ------ | ------ |
| | pH, field measured | S.U. | 6.71 | ------ | ------ | 6.19 | 6.16 | 5.68 | ------ | ------ | ------ | 5.72 | 6.14 | 6.14 |
| | Sulfate | mg/L | ------ | ------ | 28.5 | ------ | 20.1 | ------ | ------ | ------ | 894 | ------ | ------ | ------ |
| | Total Dissolved Solids | mg/L | ------ | ------ | ------ | ------ | 134 | ------ | ------ | ------ | 832 | ------ | ------ | ------ |
| Appendix IV | Antimony | mg/L | ------ | ------ | ------ | < 0.00028 | < 0.00028 | < 0.00027 | < 0.00027 | < 0.00027 | < 0.00027 | ------ | 0.00066 J | 0.00063 J |
| | Arsenic | mg/L | 0.012 J | 0.0034 J | 0.0098 | 0.01 | 0.012 | 0.0034 J | 0.0026 J | 0.0027 J | 0.0041 J | ------ | 0.00052 J | < 0.00035 |
| | Barium | mg/L | ------ | ------ | ------ | 0.077 | 0.066 | 0.047 | 0.035 | 0.049 | 0.032 | ------ | 0.093 | 0.082 |
| | Beryllium | mg/L | ------ | ------ | ------ | 0.000076 J | 0.000097 J | 0.012 | 0.011 | 0.009 | 0.014 | ------ | 0.00024 J | < 0.000074 |
| | Cadmium | mg/L | ------ | ------ | ------ | 0.00026 J | 0.00017 J | 0.0018 J | 0.0017 J | 0.0014 J | 0.00033 J | ------ | < 0.00011 | < 0.00011 |
| | Chromium | mg/L | ------ | ------ | ------ | < 0.00055 | < 0.00055 | 0.0042 J | 0.00098 J | 0.0025 J | 0.00087 J | ------ | 0.002 J | < 0.00039 |
| | Cobalt | mg/L | ------ | ------ | ------ | 0.0023 J | 0.0028 J | 0.45 | 0.46 | 0.39 | 0.47 | 0.35 | 0.0034 | 0.0028 J |
| | Fluoride | mg/L | ------ | ------ | ------ | 0.16 | 0.14 | ------ | ------ | ------ | 1 | ------ | ------ | ------ |
| | Lead | mg/L | ------ | ------ | ------ | < 0.000036 | 0.000041 J | 0.0012 J | 0.00022 J | 0.00047 J | < 0.000046 | ------ | 0.0014 J | < 0.000046 |
| | Lithium | mg/L | ------ | ------ | ------ | 0.0011 J | 0.0014 J | 0.046 | 0.045 | 0.041 | 0.045 | 0.019 J | 0.0049 J | 0.0039 J |
| | Mercury | mg/L | ------ | ------ | ------ | < 0.000078 | < 0.000078 | < 0.00014 | < 0.00014 | < 0.00014 | < 0.00014 | ------ | < 0.00014 | < 0.00014 |
| | Molybdenum | mg/L | ------ | ------ | ------ | 0.052 | 0.049 | < 0.00095 | < 0.00095 | < 0.00095 | < 0.00095 | ------ | < 0.00095 | < 0.00095 |
| | Selenium | mg/L | ------ | ------ | ------ | < 0.0016 | < 0.0016 | 0.012 | 0.011 | 0.0088 J | 0.013 | ------ | 0.0013 J | < 0.0013 |
| | Thallium | mg/L | ------ | ------ | ------ | < 0.00014 | < 0.00014 | 0.00028 J | 0.00024 J | 0.0002 J | < 0.000052 | ------ | < 0.000052 | < 0.000052 |
| | Radium | pCi/L | ------ | ------ | ------ | 1.67 | 1.29 U | ------ | ------ | ------ | 2.54 | ------ | 0.617 | ------ |
| | Radium-226 | pCi/L | ------ | ------ | ------ | 0.678 | 0.485 | ------ | ------ | ------ | 0.983 | ------ | 0.428 | ------ |
| | Radium-228 | pCi/L | ------ | ------ | ------ | 0.989 | 0.804 U | ------ | ------ | ------ | 1.56 | ------ | 0.189 | ------ |
| Field Measured | Conductivity | uS/cm | 383.83 | ------ | ------ | 207.8 | 198.68 | 954 | ------ | ------ | ------ | 990.63 | 240.52 | 240.52 |
| | Dissolved Oxygen | mg/L | 0.24 | ------ | ------ | 0.06 | 0.14 | 0.69 | ------ | ------ | ------ | 0.08 | 2.1 | 2.1 |
| | Oxidation Reduction Potential | millivolts | 34.9 | ------ | ------ | 221.5 | 62.5 | 81.3 | ------ | ------ | ------ | 97.4 | 49.4 | 49.4 |
| | Temperature | Deg C | 20.26 | ------ | ------ | 19.59 | 19.42 | 23.83 | ------ | ------ | ------ | 18.12 | 22 | 22 |
| | Turbidity | ntu | 6.8 | ------ | ------ | 2.51 | 4.67 | 9.34 | ------ | ------ | ------ | 1.22 | 7.08 | 7.08 |
| | Water level depth | ft | 4.65 | ------ | ------ | 5.19 | 3.92 | 19.33 | ------ | ------ | ------ | 15.4 | 34.7 | 34.7 |
| Supplemental | Alkalinity as CaCO3, Total | mg/L | ------ | ------ | 90 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Alkalinity, Bicarbonate as CaCO3 | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 13.5 | ------ | ------ | ------ |
| | Alkalinity, Carbonate as CaCO3 | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 1.0 | ------ | ------ | ------ |
| | Aluminum | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 2.7 | ------ | ------ | ------ |
| | Dissolved Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Hardness | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Total | mg/L | ------ | ------ | 1.22 | ------ | ------ | ------ | ------ | ------ | < 0.20 | ------ | ------ | ------ |
| | Iron, Ferric (Fe2) | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 0.20 | ------ | ------ | ------ |
| | Iron, Ferrous | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 30.7 | ------ | ------ | ------ |
| | Magnesium | mg/L | ------ | ------ | 7.04 | ------ | ------ | ------ | ------ | ------ | 27.7 | ------ | ------ | ------ |
| | Manganese | mg/L | ------ | ------ | 2.53 | ------ | ------ | ------ | ------ | ------ | 20.7 | ------ | ------ | ------ |
| | Nickel | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nitrate as N | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 0.0050 | ------ | ------ | ------ |
| | Phosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphorus, Total Orthophosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 0.020 | ------ | ------ | ------ |
| | Potassium | mg/L | ------ | ------ | 3.3 | ------ | ------ | ------ | ------ | ------ | 10.8 | ------ | ------ | ------ |
| | Silica | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silicon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 23.2 | ------ | ------ | ------ |
| | Silver | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 0.00028 | ------ | ------ | ------ |
| | Sodium | mg/L | ------ | ------ | 9.85 | ------ | ------ | ------ | ------ | ------ | 47.4 | ------ | ------ | ------ |
| | Sulfide | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Total Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Zinc | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |

**NOTES:**
1. mg/L - milligrams per Liter; pCi/L - picocuries per Liter; S.U. - Standard
2. < indicates the substance was not detected above the analytical meth
3. J indicates the substance was detected at such low levels that the pre
4. Radium data are a combination of radium isotopes 226 and 228. Whe

**APPENDIX A**
**ANALYTICAL RESULTS (2016 - 2022)**
Plant McDonough-Atkinson Ash Pond 1 and Ash Pond 2 and 3/4
Atlanta, Georgia

| | Analyte | Units | B-77 | B-77 | B-77 | B-77 | B-77 | B-77 | B-77 | B-77 | B-78 | B-78 | B-78 | B-79 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 9/18/2019 | 10/24/2019 | 8/13/2020 | 9/24/2020 | 3/4/2021 | 9/14/2021 | 1/20/2022 | 9/13/2022 | 9/23/2019 | 10/22/2019 | 3/12/2021 | 9/22/2019 |
| Appendix III | Boron | mg/L | 0.3 | 0.31 | ------ | 0.27 | 0.35 | 0.29 | 0.28 | 0.33 | 5.7 | 6.4 | ------ | 6.3 |
| | Calcium | mg/L | ------ | 15.6 | ------ | 17.9 | 14.8 | 17 | 18.6 | 15.7 | ------ | ------ | ------ | ------ |
| | Chloride | mg/L | ------ | 3.3 | ------ | 5.3 | 2.9 | 4.7 | 5 | 2.40 | ------ | 12.5 | ------ | ------ |
| | Fluoride | mg/L | ------ | 0.096 J | < 0.050 | < 0.050 | < 0.050 | 0.078 J | < 0.050 | 0.08 J | ------ | 0.16 J | ------ | ------ |
| | pH, field measured | S.U. | ------ | ------ | 6.14 | 6.46 | 6.33 | 6.42 | 6.48 | 6.34 | ------ | ------ | 4.57 | ------ |
| | Sulfate | mg/L | ------ | 8.6 | ------ | 2.9 | 4.9 | 2.5 | < 0.50 | 10 | ------ | 840 | ------ | ------ |
| | Total Dissolved Solids | mg/L | ------ | 106 | ------ | 124 | 128 | 94 | 129 | 113 | ------ | 775 | ------ | ------ |
| Appendix IV | Antimony | mg/L | < 0.00027 | < 0.00027 | 0.00043 J | 0.00036 J | 0.00063 J | < 0.00078 | < 0.00078 | < 0.00078 | < 0.00027 | < 0.00027 | ------ | 0.00061 J |
| | Arsenic | mg/L | < 0.00035 | 0.0029 J | 0.002 J | 0.0025 J | 0.0020 J | < 0.0011 | 0.003 J | < 0.0022 | 0.0019 J | 0.0024 J | ------ | < 0.00035 |
| | Barium | mg/L | 0.086 | 0.1 | 0.11 | 0.12 | 0.11 | 0.12 | 0.13 | 0.089 | 0.044 | 0.019 | ------ | 0.06 |
| | Beryllium | mg/L | 0.00011 J | < 0.000074 | 0.00014 J | 0.000053 J | 0.000057 J | < 0.000054 | < 0.000054 | 0.00013 J | 0.0085 | 0.0087 | ------ | 0.0029 J |
| | Cadmium | mg/L | < 0.00011 | < 0.00011 | < 0.00012 | < 0.00012 | < 0.00012 | < 0.00011 | < 0.00011 | < 0.00011 | 0.00094 J | 0.00078 J | ------ | 0.00084 J |
| | Chromium | mg/L | 0.00068 J | < 0.00039 | 0.0021 J | 0.0007 J | 0.00098 J | < 0.0011 | < 0.0011 | < 0.0011 | 0.0015 J | 0.00085 J | ------ | 0.0018 J |
| | Cobalt | mg/L | 0.0031 J | 0.0021 J | 0.0011 J | 0.0004 J | 0.0017 J | < 0.00039 | < 0.00039 | < 0.00039 | 0.059 | 0.048 | ------ | 0.02 |
| | Fluoride | mg/L | ------ | 0.096 J | < 0.050 | < 0.050 | < 0.050 | 0.078 J | < 0.050 | 0.080 J | ------ | 0.16 J | ------ | ------ |
| | Lead | mg/L | 0.00032 J | < 0.000046 | 0.0016 J | 0.00021 J | 0.00029 J | < 0.00089 | < 0.00089 | < 0.00089 | 0.00011 J | 0.0001 J | ------ | 0.00014 J |
| | Lithium | mg/L | 0.0047 J | 0.0036 J | 0.0018 J | 0.00095 J | 0.0011 J | < 0.00073 | < 0.00073 | 0.0020 J | 0.012 J | 0.0071 J | 0.010 J | 0.0099 J |
| | Mercury | mg/L | < 0.00014 | < 0.00014 | < 0.000078 | < 0.000078 | < 0.000078 | < 0.000078 | < 0.00013 | < 0.00013 | < 0.00014 | < 0.00014 | ------ | < 0.00014 |
| | Molybdenum | mg/L | < 0.00095 | < 0.00095 | < 0.00069 | < 0.00069 | < 0.00069 | < 0.00074 | < 0.00074 | < 0.00074 | < 0.00095 | < 0.00095 | ------ | 0.0014 J |
| | Selenium | mg/L | < 0.0013 | < 0.0013 | < 0.0016 | < 0.0016 | 0.0017 J | < 0.0014 | < 0.0014 | < 0.0014 | 0.015 | 0.023 | ------ | 0.0024 J |
| | Thallium | mg/L | < 0.000052 | < 0.000052 | < 0.00014 | < 0.00014 | < 0.00014 | < 0.00018 | < 0.00018 | < 0.00018 | 0.00011 J | 0.00016 J | ------ | 0.000056 J |
| | Radium | pCi/L | ------ | 1.87 | 2.17 | 0.761 U | 2.16 | 0.617 U | 0.92 | 1.11 | ------ | 1.96 | ------ | ------ |
| | Radium-226 | pCi/L | ------ | 0.988 | 0.782 | 0.664 | 0.543 U | 0.428 | 0.553 | ------ | ------ | 0.722 | ------ | ------ |
| | Radium-228 | pCi/L | ------ | 0.885 | 1.39 | 0.0967 U | 1.62 | 0.189 U | 0.367 U | ------ | ------ | 1.24 | ------ | ------ |
| Field Measured | Conductivity | uS/cm | ------ | ------ | 274 | 419.8 | 314.07 | 350.45 | 417.83 | ------ | ------ | ------ | 916.6 | ------ |
| | Dissolved Oxygen | mg/L | ------ | ------ | 0.19 | 0.09 | 0.1 | 0.28 | 0.2 | ------ | ------ | ------ | 0.17 | ------ |
| | Oxidation Reduction Potential | millivolts | ------ | ------ | -40.9 | 23.2 | -64.7 | -72.4 | -78.5 | ------ | ------ | ------ | 384.7 | ------ |
| | Temperature | Deg C | ------ | ------ | 27.52 | 20.16 | 19.86 | 22.81 | 17.35 | ------ | ------ | ------ | 18.37 | ------ |
| | Turbidity | ntu | ------ | ------ | 4.79 | 2.81 | 4.74 | 2.54 | 4.62 | ------ | ------ | ------ | 0.89 | ------ |
| | Water level depth | ft | ------ | ------ | 31.33 | 30.05 | 30.9 | 30.12 | 30.01 | ------ | ------ | ------ | 12.64 | ------ |
| Supplemental | Alkalinity as CaCO3, Total | mg/L | ------ | ------ | ------ | ------ | 104 | ------ | 158 | 86.2 | ------ | ------ | ------ | ------ |
| | Alkalinity, Bicarbonate as CaCO3 | mg/L | ------ | 110 | ------ | ------ | 104 | ------ | 158 | 86.2 | ------ | 6.5 | ------ | ------ |
| | Alkalinity, Carbonate as CaCO3 | mg/L | ------ | < 20 | ------ | ------ | < 5.0 | ------ | < 1.8 | < 5.00 | ------ | < 1.0 | ------ | ------ |
| | Aluminum | mg/L | ------ | < 0.032 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 0.39 | ------ | ------ |
| | Dissolved Organic Carbon | mg/L | ------ | 2.2 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Hardness | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Total | mg/L | ------ | 29 | ------ | ------ | ------ | ------ | ------ | 29.8 | ------ | 0.2 | ------ | ------ |
| | Iron, Ferric (Fe2) | mg/L | ------ | 10.8 | ------ | ------ | ------ | ------ | ------ | 22.8 | ------ | 0.2 | ------ | ------ |
| | Iron, Ferrous | mg/L | ------ | 18.2 | ------ | ------ | ------ | ------ | ------ | 7.0 | ------ | < 0.20 | ------ | ------ |
| | Magnesium | mg/L | ------ | 4.2 | ------ | ------ | 4.3 | ------ | 6.2 | 4.6 | ------ | 21.5 | ------ | ------ |
| | Manganese | mg/L | ------ | 2.3 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 28.5 | ------ | ------ |
| | Nickel | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nitrate as N | mg/L | ------ | 0.009 J | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 0.6 | ------ | ------ |
| | Phosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphorus, Total Orthophosphate | mg/L | ------ | < 0.020 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 0.020 | ------ | ------ |
| | Potassium | mg/L | ------ | 1.1 | ------ | ------ | 1.3 | ------ | 2.4 | 1.1 | ------ | 4 | ------ | ------ |
| | Silica | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silicon | mg/L | ------ | 11 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 18.1 | ------ | ------ |
| | Silver | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 0.00028 | ------ | ------ |
| | Sodium | mg/L | ------ | 8.1 | ------ | ------ | 7.5 | ------ | 7.8 | 7.7 | ------ | 21.8 | ------ | ------ |
| | Sulfide | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Total Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Zinc | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |

**NOTES:**
1. mg/L - milligrams per Liter; pCi/L - picocuries per Liter; S.U. - Standard
2. < indicates the substance was not detected above the analytical meth
3. J indicates the substance was detected at such low levels that the pre
4. Radium data are a combination of radium isotopes 226 and 228. Whe

**APPENDIX A**
**ANALYTICAL RESULTS (2016 - 2022)**
Plant McDonough-Atkinson Ash Pond 1 and Ash Pond 2 and 3/4
Atlanta, Georgia

| Analyte | | Units | B-79 | B-79 | B-80 | B-80 | B-81 | B-81 | B-81 | B-82 | B-82 | B-82 | B-82 | B-82 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 10/22/2019 | 3/11/2021 | 9/20/2019 | 10/22/2019 | 9/21/2019 | 9/25/2019 | 10/22/2019 | 9/23/2019 | 10/21/2019 | 8/17/2020 | 9/28/2020 | 3/12/2021 |
| **Appendix III** | Boron | mg/L | 6 | ------ | 11.2 | 8 | 2.1 | 2.1 | 3.8 | 1.4 | 1.2 | ------ | 1.1 | ------ |
| | Calcium | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 22.[illegible] | ------ | 26.5 | ------ |
| | Chloride | mg/L | 11.3 | ------ | ------ | 14.1 | ------ | ------ | 12.5 | ------ | 14.3 | ------ | 9.9 | ------ |
| | Fluoride | mg/L | 0.077 J | ------ | ------ | 0.83 | ------ | ------ | 0.18 J | ------ | 0.2 J | < 0.050 | < 0.050 | ------ |
| | pH, field measured | S.U. | ------ | 5.05 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 5.48 | 5.84 | 5.29 |
| | Sulfate | mg/L | 897 | ------ | ------ | 642 | ------ | ------ | 593 | ------ | 334 | ------ | 287 | ------ |
| | Total Dissolved Solids | mg/L | 844 | ------ | ------ | 891 | ------ | ------ | 817 | ------ | 458 | ------ | 454 | ------ |
| **Appendix IV** | Antimony | mg/L | < 0.00027 | ------ | < 0.00027 | < 0.00027 | 0.00033 J | < 0.00027 | < 0.00027 | < 0.00027 | < 0.00027 | < 0.00028 | < 0.00028 | ------ |
| | Arsenic | mg/L | < 0.00035 | ------ | < 0.00035 | < 0.00035 | < 0.00035 | < 0.00035 | < 0.00035 | < 0.00035 | < 0.00035 | < 0.00078 | < 0.00078 | < 0.00078 |
| | Barium | mg/L | 0.037 | ------ | 0.035 | 0.022 | 0.088 | 0.08 | 0.068 | 0.031 | 0.03 | 0.024 | 0.023 | ------ |
| | Beryllium | mg/L | 0.0062 | ------ | 0.0021 J | 0.00014 J | 0.00035 J | < 0.000074 | 0.00022 J | 0.0015 J | 0.0011 J | 0.0014 J | 0.0015 J | ------ |
| | Cadmium | mg/L | 0.00092 J | ------ | 0.0023 J | < 0.00011 | 0.0012 J | 0.0012 J | < 0.00011 | 0.00044 J | 0.00035 J | 0.00058 J | 0.00066 J | ------ |
| | Chromium | mg/L | < 0.00039 | ------ | 0.00085 J | < 0.00039 | 0.0018 J | < 0.00039 | < 0.00039 | 0.0011 J | < 0.00039 | < 0.00055 | < 0.00055 | ------ |
| | Cobalt | mg/L | 0.008 | ------ | 0.012 | 0.013 | 0.032 | 0.034 | 0.074 | 0.0038 J | 0.0089 | 0.0028 J | 0.0053 | 0.0021 J |
| | Fluoride | mg/L | 0.077 J | ------ | ------ | 0.83 | ------ | ------ | 0.18 J | ------ | 0.2 J | < 0.050 | < 0.050 | ------ |
| | Lead | mg/L | 0.000052 J | ------ | 0.00043 J | < 0.000046 | 0.00074 J | 0.000095 J | < 0.000046 | 0.00016 J | < 0.000046 | 0.000059 J | 0.00011 J | ------ |
| | Lithium | mg/L | 0.0046 J | < 0.0040 | 0.0058 J | 0.0049 J | 0.013 J | 0.016 J | 0.014 J | 0.0039 J | 0.0036 J | 0.0016 J | 0.001 J | ------ |
| | Mercury | mg/L | < 0.00014 | ------ | < 0.00014 | < 0.00014 | < 0.00014 | < 0.00014 | < 0.00014 | < 0.00014 | < 0.00014 | 0.00011 J | < 0.000078 | ------ |
| | Molybdenum | mg/L | < 0.00095 | ------ | < 0.00095 | 0.0047 J | 0.003 J | 0.0041 J | 0.0026 J | < 0.00095 | < 0.00095 | < 0.00069 | < 0.00069 | ------ |
| | Selenium | mg/L | 0.0028 J | ------ | 0.0043 J | < 0.0013 | < 0.0013 | < 0.0013 | < 0.0013 | < 0.0013 | 0.0016 J | < 0.0016 | 0.0021 J | ------ |
| | Thallium | mg/L | < 0.000052 | ------ | 0.00011 J | < 0.000052 | 0.000097 J | < 0.000052 | < 0.000052 | 0.000099 J | 0.00011 J | < 0.00014 | < 0.00014 | ------ |
| | Radium | pCi/L | 1.08 U | ------ | ------ | 1.01 U | ------ | ------ | 1.11 U | ------ | ------ | 0.662 U | 0.747 U | ------ |
| | Radium-226 | pCi/L | 1.04 | ------ | ------ | 0.532 | ------ | ------ | 0.935 | ------ | ------ | 0.119 U | 0.157 U | ------ |
| | Radium-228 | pCi/L | 0.0443 U | ------ | ------ | 0.476 U | ------ | ------ | 0.173 U | ------ | ------ | 0.543 U | 0.59 U | ------ |
| **Field Measured** | Conductivity | uS/cm | ------ | 757.38 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 605.4 | 568.5 | 612.5 |
| | Dissolved Oxygen | mg/L | ------ | 0.35 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 0.15 | 0.12 | 0.2 |
| | Oxidation Reduction Potential | millivolts | ------ | 494.28 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 119.9 | 112.1 | 89.4 |
| | Temperature | Deg C | ------ | 17.81 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 21.22 | 19.72 | 19.77 |
| | Turbidity | ntu | ------ | 0.63 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 3.55 | 3.26 | 1.58 |
| | Water level depth | ft | ------ | 8.85 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 19.78 | 17.4 | 16.81 |
| **Supplemental** | Alkalinity as CaCO3, Total | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Alkalinity, Bicarbonate as CaCO3 | mg/L | 12.5 | ------ | ------ | 77 | ------ | ------ | 63 | ------ | 15.5 | ------ | ------ | ------ |
| | Alkalinity, Carbonate as CaCO3 | mg/L | < 1.0 | ------ | ------ | < 20 | ------ | ------ | < 20 | ------ | < 1.0 | ------ | ------ | ------ |
| | Aluminum | mg/L | 0.064 J | ------ | ------ | < 0.032 | ------ | ------ | < 0.032 | ------ | 0.12 | ------ | ------ | ------ |
| | Dissolved Organic Carbon | mg/L | 0.53 J | ------ | ------ | 8.5 | ------ | ------ | 0.97 J | ------ | 1.2 | ------ | ------ | ------ |
| | Hardness | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Total | mg/L | 1.4 | ------ | ------ | 9.6 | ------ | ------ | 11.2 | ------ | < 0.20 | ------ | ------ | ------ |
| | Iron, Ferric (Fe2) | mg/L | < 0.20 | ------ | ------ | 1.9 | ------ | ------ | 2.5 | ------ | < 0.20 | ------ | ------ | ------ |
| | Iron, Ferrous | mg/L | 1.5 | ------ | ------ | 7.7 | ------ | ------ | 8.7 | ------ | < 0.20 | ------ | ------ | ------ |
| | Magnesium | mg/L | 46.4 | ------ | ------ | 45 | ------ | ------ | 43.6 | ------ | 51.9 | ------ | ------ | ------ |
| | Manganese | mg/L | 6.7 | ------ | ------ | 23.1 | ------ | ------ | 19.3 | ------ | 1.8 | ------ | ------ | ------ |
| | Nickel | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nitrate as N | mg/L | 0.4 | ------ | ------ | < 0.0050 | ------ | ------ | < 0.0050 | ------ | 0.22 | ------ | ------ | ------ |
| | Phosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphorus, Total Orthophosphate | mg/L | < 0.020 | ------ | ------ | < 0.020 | ------ | ------ | < 0.020 | ------ | < 0.020 | ------ | ------ | ------ |
| | Potassium | mg/L | 7.3 | ------ | ------ | 8.2 | ------ | ------ | 11 | ------ | 4.4 | ------ | ------ | ------ |
| | Silica | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silicon | mg/L | 14.4 | ------ | ------ | 10.9 | ------ | ------ | 12.6 | ------ | 6 | ------ | ------ | ------ |
| | Silver | mg/L | < 0.00028 | ------ | ------ | < 0.00028 | ------ | ------ | < 0.00028 | ------ | ------ | ------ | ------ | ------ |
| | Sodium | mg/L | 27.3 | ------ | ------ | 29.2 | ------ | ------ | 22.4 | ------ | 25.8 | ------ | ------ | ------ |
| | Sulfide | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Total Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Zinc | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |

**NOTES:**
1. mg/L - milligrams per Liter; pCi/L - picocuries per Liter; S.U. - Standard
2. < indicates the substance was not detected above the analytical meth
3. J indicates the substance was detected at such low levels that the pre
4. Radium data are a combination of radium isotopes 226 and 228. Whe

| | Analyte | Units | B-82 | B-82 | B-82 | B-83 | B-83 | B-83 | B-83 | B-83 | B-83 | B-83 | B-84 | B-85 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 9/14/2021 | 1/25/2022 | 9/16/2022 | 10/21/2019 | 8/14/2020 | 9/25/2020 | 3/4/2021 | 9/16/2021 | 1/21/2022 | 9/13/2022 | 10/21/2019 | 11/21/2019 |
| **Appendix III** | Boron | mg/L | 0.78 | 0.7 | 0.61 | 0.28 | ------ | 0.35 | 0.33 | 0.3 | 0.32 | 0.33 | 0.96 | 5.45 |
| | Calcium | mg/L | 33.4 | 36.4 | 34.3 | 28.3 | ------ | 39.8 | 39.1 | 39.4 | 40.8 | 36.2 | 32.6 | 137 |
| | Chloride | mg/L | 9.5 | 9.9 | 9.40 | 3.4 | ------ | 3 | 3.2 | 2.6 | 2.4 | 2.50 | 28.4 | 8.4 |
| | Fluoride | mg/L | 0.052 J | < 0.050 | 0.079 J | 0.13 J | 0.05 J | < 0.050 | 0.071 J | 0.066 J | < 0.050 | 0.081 J | 0.077 J | ------ |
| | pH, field measured | S.U. | 5.15 | 5.07 | 5.02 | ------ | 5.59 | 5.97 | 5.60 | 5.58 | 5.56 | 5.6 | ------ | ------ |
| | Sulfate | mg/L | 326 | 363 | 404 | 103 | ------ | 107 | 113 | 106 | 106 | 109 | 334 | 568 |
| | Total Dissolved Solids | mg/L | 536 | 668 | 468 | 214 | ------ | 244 | 234 | 223 | 236 | 210 | 541 | ------ |
| **Appendix IV** | Antimony | mg/L | < 0.00078 | < 0.00078 | < 0.00078 | < 0.00027 | < 0.00028 | < 0.00028 | < 0.00028 | < 0.00078 | < 0.00078 | < 0.00078 | < 0.00027 | ------ |
| | Arsenic | mg/L | < 0.0011 | 0.003 J | < 0.0022 | < 0.00035 | < 0.00078 | < 0.00078 | < 0.00078 | < 0.0011 | 0.0014 J | < 0.0022 | < 0.00035 | ------ |
| | Barium | mg/L | 0.022 | 0.026 | 0.02 | 0.034 | 0.056 | 0.027 | 0.032 | 0.03 | 0.024 | 0.025 | 0.047 | ------ |
| | Beryllium | mg/L | 0.0017 | 0.0021 | 0.002 | 0.00039 J | 0.0007 J | 0.00028 J | 0.00037 J | 0.00028 J | 0.00039 J | 0.00044 J | 0.00012 J | ------ |
| | Cadmium | mg/L | 0.0007 | 0.00072 | 0.00073 | 0.00041 J | 0.00037 J | 0.00026 J | 0.00032 J | 0.0003 J | 0.0003 J | 0.00031 J | < 0.00011 | ------ |
| | Chromium | mg/L | < 0.0011 | < 0.0011 | < 0.0011 | 0.0017 J | 0.005 J | 0.0051 J | 0.0049 J | 0.003 J | 0.0034 J | 0.0022 J | < 0.00039 | ------ |
| | Cobalt | mg/L | 0.0015 J | 0.0039 J | 0.0017 J | 0.018 | 0.021 | 0.0073 | 0.0099 | 0.011 | 0.011 | 0.012 | 0.081 | ------ |
| | Fluoride | mg/L | 0.052 J | < 0.050 | 0.079 J | 0.13 J | 0.05 J | < 0.050 | 0.071 J | 0.066 J | < 0.050 | 0.081 J | 0.077 J | ------ |
| | Lead | mg/L | < 0.00089 | < 0.00089 | < 0.00089 | 0.00012 J | 0.00092 J | 0.000065 J | 0.00017 J | < 0.00089 | < 0.00089 | < 0.00089 | < 0.000046 | ------ |
| | Lithium | mg/L | 0.001 J | 0.00082 J | 0.00078 J | 0.003 J | 0.0045 J | 0.0018 J | 0.0024 J | 0.0021 J | 0.0022 J | 0.0027 J | 0.0031 J | ------ |
| | Mercury | mg/L | < 0.000078 | < 0.00013 | < 0.00013 | < 0.00014 | < 0.000078 | < 0.000078 | < 0.000078 | < 0.000078 | < 0.00013 | < 0.00013 | < 0.00014 | ------ |
| | Molybdenum | mg/L | < 0.00074 | < 0.00074 | < 0.00074 | < 0.00095 | < 0.00069 | < 0.00069 | < 0.00069 | < 0.00074 | < 0.00074 | < 0.00074 | < 0.00095 | ------ |
| | Selenium | mg/L | < 0.0014 | 0.002 J | < 0.0014 | 0.0082 J | 0.015 | 0.019 | 0.024 | 0.025 | 0.027 | 0.024 | < 0.0013 | ------ |
| | Thallium | mg/L | < 0.00018 | < 0.00018 | < 0.00018 | 0.000072 J | < 0.00014 | < 0.00014 | < 0.00014 | < 0.00018 | < 0.00018 | < 0.00018 | < 0.000052 | ------ |
| | Radium | pCi/L | 1.03 U | 0.33 U | 0.694 U | ------ | 0.95 U | 0.0359 U | 1.15 U | 0.442 U | 0.549 U | 0.893 U | ------ | ------ |
| | Radium-226 | pCi/L | 0.295 U | 0.209 U | ------ | ------ | 0.367 U | 0.0359 U | 0.314 U | 0.207 U | -0.0529 U | ------ | ------ | ------ |
| | Radium-228 | pCi/L | 0.739 U | 0.121 U | ------ | ------ | 0.583 U | -0.0284 U | 0.831 U | 0.235 U | 0.549 U | ------ | ------ | ------ |
| **Field Measured** | Conductivity | uS/cm | 772.42 | 1905.1 | ------ | ------ | 329.3 | 392.3 | 384.11 | 360.59 | 375.2 | ------ | ------ | ------ |
| | Dissolved Oxygen | mg/L | 0.4 | 0.76 | ------ | ------ | 0.12 | 0.39 | 0.52 | 0.16 | 0.59 | ------ | ------ | ------ |
| | Oxidation Reduction Potential | millivolts | 172.5 | 76 | ------ | ------ | 94.2 | 104.3 | 79.3 | 102.8 | 152 | ------ | ------ | ------ |
| | Temperature | Deg C | 21.7 | 18.86 | ------ | ------ | 23.5 | 20.61 | 20.43 | 20.88 | 18.08 | ------ | ------ | ------ |
| | Turbidity | ntu | 3.92 | 0.85 | ------ | ------ | 4.83 | 3.3 | 4.7 | 4.3 | 0.97 | ------ | ------ | ------ |
| | Water level depth | ft | 15.8 | 14.36 | ------ | ------ | 32.4 | 29.82 | 30.5 | 29.15 | 30.7 | ------ | ------ | ------ |
| **Supplemental** | Alkalinity as CaCO3, Total | mg/L | ------ | 9.1 | 5.0 | ------ | ------ | ------ | 38.2 | ------ | 38.7 | 39.2 | ------ | < 20 |
| | Alkalinity, Bicarbonate as CaCO3 | mg/L | ------ | 9.1 | 5.0 | 36 | ------ | ------ | 38.2 | ------ | 38.7 | 39.2 | 52 | < 20 |
| | Alkalinity, Carbonate as CaCO3 | mg/L | ------ | < 1.8 | < 5.00 | < 20 | ------ | ------ | < 5.0 | ------ | < 1.8 | < 5.00 | < 20 | < 20 |
| | Aluminum | mg/L | ------ | ------ | ------ | 0.21 | ------ | ------ | ------ | ------ | ------ | ------ | < 0.032 | 0.509 J |
| | Dissolved Organic Carbon | mg/L | ------ | ------ | ------ | < 0.50 | ------ | ------ | ------ | ------ | ------ | ------ | 2.2 | ------ |
| | Hardness | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Total | mg/L | ------ | ------ | 0.1 | 0.32 | ------ | ------ | ------ | ------ | ------ | < 0.025 | < 0.20 | < 0.20 |
| | Iron, Ferric (Fe2) | mg/L | ------ | ------ | 0.1 | 0.32 | ------ | ------ | ------ | ------ | ------ | < 0.025 | < 0.20 | < 0.20 |
| | Iron, Ferrous | mg/L | ------ | ------ | 0.0 | < 0.20 | ------ | ------ | ------ | ------ | ------ | 0.0 | < 0.20 | 0.23 |
| | Magnesium | mg/L | ------ | 80.4 | 79.6 | 9.8 | ------ | ------ | 10.2 | ------ | 11.1 | 10.1 | 32.1 | 46.9 |
| | Manganese | mg/L | ------ | ------ | ------ | 3.5 | ------ | ------ | ------ | ------ | ------ | ------ | 16.6 | 8.68 |
| | Nickel | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nitrate as N | mg/L | ------ | ------ | ------ | 3 | ------ | ------ | ------ | ------ | ------ | ------ | < 0.0050 | ------ |
| | Phosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphorus, Total Orthophosphate | mg/L | ------ | ------ | ------ | < 0.020 | ------ | ------ | ------ | ------ | ------ | ------ | < 0.020 | ------ |
| | Potassium | mg/L | ------ | 5.2 | 5.2 | 2.9 | ------ | ------ | 2.4 | ------ | 2.5 | 2.6 | 9.8 | 8.13 |
| | Silica | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silicon | mg/L | ------ | ------ | ------ | 6.5 | ------ | ------ | ------ | ------ | ------ | ------ | 12.2 | 14.5 |
| | Silver | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Sodium | mg/L | ------ | 18 | 17.1 | 10.7 | ------ | ------ | 13.1 | ------ | 12.1 | 9.6 | 36.6 | 25.4 |
| | Sulfide | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Total Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Zinc | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |

**NOTES:**
1. mg/L - milligrams per Liter; pCi/L - picocuries per Liter; S.U. - Standard
2. < indicates the substance was not detected above the analytical meth
3. J indicates the substance was detected at such low levels that the pre
4. Radium data are a combination of radium isotopes 226 and 228. Whe

**APPENDIX A**
**ANALYTICAL RESULTS (2016 - 2022)**
Plant McDonough-Atkinson Ash Pond 1 and Ash Pond 2 and 3/4
Atlanta, Georgia

| | Analyte | Units | B-86 | B-87 | B-87 | B-87 | B-88 | B-88 | B-88 | B-88 | B-88 | B-88 | B-88 | B-89 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 11/21/2019 | 11/25/2019 | 11/25/2019 | 12/10/2019 | 11/22/2019 | 8/17/2020 | 9/25/2020 | 3/5/2021 | 9/13/2021 | 1/27/2022 | 9/16/2022 | 11/25/2019 |
| **Appendix III** | Boron | mg/L | 5.26 | 14.0 | 14.6 | 14.2 | 3.6 | ------ | 1.8 | 3.5 | 2 | 2.7 | 2.10 | 1.09 |
| | Calcium | mg/L | 153 | 336 | 327 | | 156 | ------ | 79.8 | 128 | 80.5 | 105 | 97.6 | 38.9 |
| | Chloride | mg/L | 8.9 | 11.5 | ------ | ------ | 9.1 | ------ | 10 | 7.8 | 8.2 | 8.8 | 8.70 | 11.5 |
| | Fluoride | mg/L | ------ | ------ | ------ | ------ | ------ | < 0.050 | < 0.050 | < 0.050 | < 0.050 | < 0.050 | 0.054 J | ------ |
| | pH, field measured | S.U. | ------ | ------ | ------ | ------ | ------ | 5.76 | 5.75 | 5.21 | 5.68 | 5.5 | 5.47 | ------ |
| | Sulfate | mg/L | 531 | 179 | ------ | ------ | 619 | ------ | 344 | 497 | 321 | 371 | 433 | 207 |
| | Total Dissolved Solids | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | 624 | 798 | 572 | 654 | 564 | ------ |
| **Appendix IV** | Antimony | mg/L | ------ | ------ | ------ | ------ | ------ | < 0.00028 | < 0.00028 | < 0.00028 | < 0.00078 | < 0.00078 | < 0.00078 | ------ |
| | Arsenic | mg/L | ------ | ------ | ------ | ------ | ------ | < 0.00078 | < 0.00078 | < 0.00078 | < 0.0011 | < 0.0011 | < 0.0022 | ------ |
| | Barium | mg/L | ------ | ------ | ------ | ------ | ------ | 0.022 | 0.021 | 0.022 | 0.016 | 0.018 | 0.016 | ------ |
| | Beryllium | mg/L | 0.0028 J | ------ | ------ | ------ | ------ | 0.0014 J | 0.00063 J | 0.0050 | 0.001 | 0.0019 | 0.0013 | ------ |
| | Cadmium | mg/L | ------ | ------ | ------ | ------ | ------ | 0.0018 J | 0.00022 J | 0.0065 | 0.0013 | 0.0036 | 0.0019 | ------ |
| | Chromium | mg/L | ------ | ------ | ------ | ------ | ------ | 0.0014 J | 0.00085 J | 0.0017 J | < 0.0011 | < 0.0011 | < 0.0011 | ------ |
| | Cobalt | mg/L | ------ | ------ | ------ | ------ | 0.018 J | 0.0031 J | 0.0015 J | 0.022 | 0.0018 J | 0.0038 J | 0.0014 J | 0.0032 J |
| | Fluoride | mg/L | ------ | ------ | ------ | ------ | ------ | < 0.050 | < 0.050 | < 0.050 | < 0.050 | < 0.050 | 0.054 J | ------ |
| | Lead | mg/L | ------ | ------ | ------ | ------ | ------ | 0.00081 J | 0.00035 J | 0.012 | < 0.00089 | 0.0022 | < 0.00089 | ------ |
| | Lithium | mg/L | ------ | ------ | ------ | ------ | ------ | 0.006 J | 0.0016 J | 0.029 J | 0.0017 J | 0.0066 J | 0.0021 J | ------ |
| | Mercury | mg/L | ------ | ------ | ------ | ------ | ------ | 0.00011 J | < 0.000078 | 0.00010 J | < 0.000078 | < 0.00013 | < 0.00013 | ------ |
| | Molybdenum | mg/L | ------ | ------ | ------ | ------ | ------ | 0.0012 J | 0.0012 J | < 0.00069 | < 0.00074 | < 0.00074 | < 0.00074 | ------ |
| | Selenium | mg/L | ------ | ------ | ------ | ------ | ------ | 0.0017 J | 0.0033 J | 0.0033 J | 0.0021 J | < 0.0014 | 0.0020 J | ------ |
| | Thallium | mg/L | ------ | ------ | ------ | ------ | ------ | < 0.00014 | < 0.00014 | 0.00020 J | < 0.00018 | < 0.00018 | < 0.00018 | ------ |
| | Radium | pCi/L | ------ | ------ | ------ | ------ | ------ | 2.47 | 0.925 U | 2.84 | 0.771 U | 1.18 | 1.25 | ------ |
| | Radium-226 | pCi/L | ------ | ------ | ------ | ------ | ------ | 0.556 | 0.925 | 1.28 | 0.437 U | 0.584 | ------ | ------ |
| | Radium-228 | pCi/L | ------ | ------ | ------ | ------ | ------ | 1.91 | -0.198 U | 1.56 | 0.334 U | 0.593 U | ------ | ------ |
| **Field Measured** | Conductivity | uS/cm | ------ | ------ | ------ | ------ | ------ | 976.7 | 758.3 | 1081.98 | 735.87 | 884.11 | ------ | ------ |
| | Dissolved Oxygen | mg/L | ------ | ------ | ------ | ------ | ------ | 0.19 | 0.15 | 0.15 | 0.25 | 0.11 | ------ | ------ |
| | Oxidation Reduction Potential | millivolts | ------ | ------ | ------ | ------ | ------ | 83.3 | 26.5 | 123.9 | 55.6 | 53.3 | ------ | ------ |
| | Temperature | Deg C | ------ | ------ | ------ | ------ | ------ | 20.64 | 19.03 | 17.75 | 19.72 | 18.78 | ------ | ------ |
| | Turbidity | ntu | ------ | ------ | ------ | ------ | ------ | 4.58 | 1.2 | 4.5 | 2.2 | 3.92 | ------ | ------ |
| | Water level depth | ft | ------ | ------ | ------ | ------ | ------ | 32.4 | 33.6 | 38.27 | 36.85 | 36.5 | ------ | ------ |
| **Supplemental** | Alkalinity as CaCO3, Total | mg/L | < 20 | < 1.0 | ------ | ------ | 25 | ------ | ------ | < 5.0 | ------ | 13.9 | 15.8 | 10.5 |
| | Alkalinity, Bicarbonate as CaCO3 | mg/L | < 20 | < 1.0 | ------ | ------ | 25 | ------ | ------ | < 5.0 | ------ | 13.9 | 15.8 | 10.5 |
| | Alkalinity, Carbonate as CaCO3 | mg/L | < 20 | < 1.0 | ------ | ------ | < 20 | ------ | ------ | < 5.0 | ------ | < 1.8 | < 5.00 | < 1.0 |
| | Aluminum | mg/L | 0.329 J | 0.65 J | 0.048 J | ------ | 0.13 J | ------ | ------ | ------ | ------ | ------ | ------ | < 0.089 |
| | Dissolved Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Hardness | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Total | mg/L | 0.34 | 0.41 | ------ | ------ | 0.49 | ------ | ------ | ------ | ------ | ------ | 0.3 | < 0.20 |
| | Iron, Ferric (Fe2) | mg/L | 0.34 | 0.41 | ------ | ------ | 0.49 | ------ | ------ | ------ | ------ | ------ | 0.3 | < 0.20 |
| | Iron, Ferrous | mg/L | < 0.20 | 1.4 | ------ | ------ | < 0.20 | ------ | ------ | ------ | ------ | ------ | 0.0 | < 0.20 |
| | Magnesium | mg/L | 47.2 | 95.0 | 98.1 | ------ | 45.9 | ------ | ------ | 40.4 | ------ | 37.4 | 35.7 | 20.2 |
| | Manganese | mg/L | 8.31 | 5.8 | 5.8 | ------ | 16.4 | ------ | ------ | ------ | ------ | ------ | ------ | 0.91 |
| | Nickel | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nitrate as N | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphorus, Total Orthophosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Potassium | mg/L | 8.29 | 13.1 | 12.8 | ------ | 12.1 | ------ | ------ | 9.6 | ------ | 11.2 | 11.3 | 5.8 |
| | Silica | mg/L | ------ | ------ | ------ | ------ | | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silicon | mg/L | 14.5 | ------ | ------ | ------ | 19.6 | ------ | ------ | ------ | ------ | ------ | ------ | 15.1 |
| | Silver | mg/L | ------ | ------ | ------ | ------ | | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Sodium | mg/L | 25.8 | 33.7 | ------ | ------ | 28.5 | ------ | ------ | 25.0 | ------ | 29.7 | 28.6 | 25.1 |
| | Sulfide | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Total Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Zinc | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |

**NOTES:**
1. mg/L - milligrams per Liter; pCi/L - picocuries per Liter; S.U. - Standard
2. < indicates the substance was not detected above the analytical meth
3. J indicates the substance was detected at such low levels that the pre
4. Radium data are a combination of radium isotopes 226 and 228. Whe

**APPENDIX A**
**ANALYTICAL RESULTS (2016 - 2022)**
Plant McDonough-Atkinson Ash Pond 1 and Ash Pond 2 and 3/4
Atlanta, Georgia

| Analyte | | Units | B-89 8/14/2020 | B-89 9/23/2020 | B-90 12/16/2019 | B-90 1/2/2020 | B-90 3/10/2021 | B-90 1/26/2022 | B-90 9/12/2022 | B-91 12/17/2019 | B-91 1/2/2020 | B-91 3/10/2021 | B-91 1/26/2022 | B-91 9/12/2022 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appendix III | Boron | mg/L | ------ | 0.76 | 5.6 | 5.6 | 4.4 | 3.2 | 2.60 | 6.4 | 6.2 | 4.3 | 3.6 | 2.90 |
| | Calcium | mg/L | ------ | 31.4 | 179 | 151 | ------ | ------ | ------ | 180 | 162 | ------ | ------ | ------ |
| | Chloride | mg/L | ------ | 9.1 | 8.8 | 8.3 | ------ | ------ | ------ | 8.6 | 8.3 | ------ | ------ | ------ |
| | Fluoride | mg/L | < 0.050 | < 0.050 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | pH, field measured | S.U. | 5.83 | 5.87 | ------ | ------ | 5.48 | 5.45 | 5.35 | ------ | ------ | 5.34 | 5.29 | 5.28 |
| | Sulfate | mg/L | ------ | 138 | 620 | 570 | ------ | ------ | ------ | 730 | 589 | ------ | ------ | ------ |
| | Total Dissolved Solids | mg/L | ------ | 260 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| Appendix IV | Antimony | mg/L | < 0.00028 | < 0.00028 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Arsenic | mg/L | < 0.00078 | < 0.00078 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Barium | mg/L | 0.031 | 0.028 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Beryllium | mg/L | 0.000074 J | 0.000054 J | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Cadmium | mg/L | 0.00063 J | 0.00057 J | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Chromium | mg/L | < 0.00055 | 0.00072 J | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Cobalt | mg/L | 0.0058 | 0.0025 J | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Fluoride | mg/L | < 0.050 | < 0.050 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Lead | mg/L | < 0.000036 | < 0.000036 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Lithium | mg/L | 0.0055 J | 0.0055 J | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Mercury | mg/L | 0.00014 J | 0.00008 J | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Molybdenum | mg/L | < 0.00069 | < 0.00069 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Selenium | mg/L | < 0.0016 | < 0.0016 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Thallium | mg/L | < 0.00014 | < 0.00014 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Radium | pCi/L | 1.49 U | 0.537 U | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Radium-226 | pCi/L | 0.116 U | 0.232 U | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Radium-228 | pCi/L | 1.37 | 0.305 U | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| Field Measured | Conductivity | uS/cm | 448.7 | 401.1 | ------ | ------ | 966.7 | 825.91 | ------ | ------ | ------ | 1040.63 | 902.58 | ------ |
| | Dissolved Oxygen | mg/L | 0.24 | 0.21 | ------ | ------ | 0.37 | 0.34 | ------ | ------ | ------ | 0.49 | 0.07 | ------ |
| | Oxidation Reduction Potential | millivolts | 106.1 | 156.4 | ------ | ------ | 589.2 | 97.8 | ------ | ------ | ------ | 97.5 | 49.8 | ------ |
| | Temperature | Deg C | 20.31 | 21.06 | ------ | ------ | 18.87 | 16.94 | ------ | ------ | ------ | 21.61 | 17.9 | ------ |
| | Turbidity | ntu | 0 | 0.3 | ------ | ------ | 2.08 | 0.84 | ------ | ------ | ------ | 4.15 | 0.79 | ------ |
| | Water level depth | ft | 23.44 | 23.1 | ------ | ------ | 3.32 | 2.66 | ------ | ------ | ------ | 5.65 | 4 | ------ |
| Supplemental | Alkalinity as CaCO3, Total | mg/L | ------ | ------ | 34.5 | 29.5 | ------ | ------ | ------ | < 20 | 14 | ------ | ------ | ------ |
| | Alkalinity, Bicarbonate as CaCO3 | mg/L | ------ | ------ | 34.5 | 29.5 | ------ | ------ | ------ | < 20 | ------ | ------ | ------ | ------ |
| | Alkalinity, Carbonate as CaCO3 | mg/L | ------ | ------ | < 20 | < 20 | ------ | ------ | ------ | < 20 | ------ | ------ | ------ | ------ |
| | Aluminum | mg/L | ------ | ------ | 0.15 | 0.11 | ------ | ------ | ------ | 0.23 | 0.064 J | ------ | ------ | ------ |
| | Dissolved Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Hardness | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Total | mg/L | ------ | ------ | 0.86 | 0.2 | ------ | ------ | ------ | 0.2 | < 0.20 | ------ | ------ | ------ |
| | Iron, Ferric (Fe2) | mg/L | ------ | ------ | 0.86 | 0.2 | ------ | ------ | ------ | 0.2 | < 0.20 | ------ | ------ | ------ |
| | Iron, Ferrous | mg/L | ------ | ------ | 0.4 | 1.1 | ------ | ------ | ------ | < 0.20 | < 0.20 | ------ | ------ | ------ |
| | Magnesium | mg/L | ------ | ------ | 53.1 | 49.5 | ------ | ------ | ------ | 54 | 52.7 | ------ | ------ | ------ |
| | Manganese | mg/L | ------ | ------ | 11.1 | 10.9 | ------ | ------ | ------ | 9.6 | 9.3 | ------ | ------ | ------ |
| | Nickel | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nitrate as N | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphorus, Total Orthophosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Potassium | mg/L | ------ | ------ | 11.3 | 9.5 | ------ | ------ | ------ | 9.1 | 8.5 | ------ | ------ | ------ |
| | Silica | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silicon | mg/L | ------ | ------ | 14.7 | 14.1 | ------ | ------ | ------ | 14.9 | 14.3 | ------ | ------ | ------ |
| | Silver | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Sodium | mg/L | ------ | ------ | 29.9 | 27.9 | ------ | ------ | ------ | 26.5 | 25.4 | ------ | ------ | ------ |
| | Sulfide | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Total Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Zinc | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |

**NOTES:**
1. mg/L - milligrams per Liter; pCi/L - picocuries per Liter; S.U. - Standarc
2. < indicates the substance was not detected above the analytical methc
3. J indicates the substance was detected at such low levels that the pre
4. Radium data are a combination of radium isotopes 226 and 228. Whe

| Analyte | | Units | B-92 12/18/2019 | B-92 1/2/2020 | B-92 3/9/2021 | B-92 9/15/2021 | B-92 1/26/2022 | B-92 9/12/2022 | B-93 12/19/2019 | B-93 1/2/2020 | B-93 8/19/2020 | B-93 9/28/2020 | B-93 3/9/2021 | B-93 9/15/2021 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Appendix III** | Boron | mg/L | 3.9 | 3.9 | 2.9 | 2.3 | 2.7 | 2.90 | 3.3 | 3.3 | ------ | 3 | 3.4 | 3.1 |
| | Calcium | mg/L | 139 | 127 | ------ | 110 | 96 | 104.0 | 168 | 156 | ------ | 110 | 127 | 129 |
| | Chloride | mg/L | 9.4 | 9.4 | ------ | 10.4 | 9.4 | 10.20 | 10.4 | 10.4 | ------ | 10.8 | 13.5 | 13.2 |
| | Fluoride | mg/L | ------ | ------ | ------ | 0.18 | 0.3 | 0.24 | ------ | ------ | 0.32 | 0.3 | 0.34 | 0.34 |
| | pH, field measured | S.U. | ------ | ------ | 4.62 | 4.55 | 4.5 | 4.56 | ------ | ------ | 4.78 | 4.67 | 4.73 | 4.6 |
| | Sulfate | mg/L | 481 | 461 | ------ | 384 | 305 | 394 | 533 | 544 | ------ | 419 | 488 | 478 |
| | Total Dissolved Solids | mg/L | ------ | ------ | ------ | 612 | 572 | 696 | ------ | ------ | ------ | 686 | 790 | 812 |
| **Appendix IV** | Antimony | mg/L | ------ | ------ | ------ | < 0.00078 | < 0.00078 | < 0.00078 | ------ | ------ | < 0.00028 | 0.0014 J | < 0.0014 | < 0.00078 |
| | Arsenic | mg/L | ------ | ------ | ------ | 0.0012 J | 0.0015 J | < 0.0022 | ------ | ------ | 0.0013 J | 0.0027 J | < 0.0039 | < 0.0011 |
| | Barium | mg/L | ------ | ------ | ------ | 0.015 | 0.016 | 0.017 | ------ | ------ | 0.018 | 0.017 | 0.016 J | 0.016 |
| | Beryllium | mg/L | 0.022 | 0.023 | 0.017 | 0.014 | 0.018 | 0.017 | 0.0069 | 0.011 | 0.015 | 0.015 | 0.017 | 0.015 |
| | Cadmium | mg/L | ------ | ------ | ------ | 0.00096 | 0.001 | 0.0014 | ------ | ------ | 0.00077 J | 0.00074 J | 0.00075 J | 0.00088 |
| | Chromium | mg/L | ------ | ------ | ------ | < 0.0011 | < 0.0011 | < 0.0011 | ------ | ------ | 0.00057 J | 0.00066 J | < 0.0028 | < 0.0011 |
| | Cobalt | mg/L | ------ | ------ | ------ | 0.063 | 0.071 | 0.073 | 0.066 | 0.07 | 0.068 | 0.064 | 0.061 | 0.062 |
| | Fluoride | mg/L | ------ | ------ | ------ | 0.18 | 0.3 | 0.24 | ------ | ------ | 0.32 | 0.3 | 0.34 | 0.34 |
| | Lead | mg/L | ------ | ------ | ------ | < 0.00089 | < 0.00089 | < 0.00089 | ------ | ------ | 0.00012 J | 0.00012 J | < 0.00018 | < 0.00089 |
| | Lithium | mg/L | ------ | ------ | ------ | 0.012 J | 0.015 J | 0.015 J | ------ | ------ | 0.011 J | 0.011 J | 0.012 J | 0.011 J |
| | Mercury | mg/L | ------ | ------ | ------ | 0.00017 J | < 0.00013 | 0.00015 J | ------ | ------ | 0.00026 | 0.00024 J | 0.00015 J | 0.000098 J |
| | Molybdenum | mg/L | ------ | ------ | ------ | < 0.00074 | < 0.00074 | < 0.00074 | ------ | ------ | < 0.00069 | < 0.00069 | < 0.0034 | < 0.00074 |
| | Selenium | mg/L | ------ | ------ | ------ | 0.0067 | 0.0039 J | 0.012 | ------ | ------ | 0.018 | 0.036 | 0.0099 J | 0.0076 |
| | Thallium | mg/L | ------ | ------ | ------ | < 0.00018 | < 0.00018 | 0.00020 J | ------ | ------ | < 0.00014 | < 0.00014 | < 0.00072 | < 0.00018 |
| | Radium | pCi/L | ------ | ------ | ------ | 1.39 | 1.27 U | 2.34 | ------ | ------ | 1.19 U | 1.54 | 0.786 U | 1.84 |
| | Radium-226 | pCi/L | ------ | ------ | ------ | 0.416 U | 0.415 | ------ | ------ | ------ | 0.725 | 0.391 U | 0.307 U | 0.372 U |
| | Radium-228 | pCi/L | ------ | ------ | ------ | 0.977 | 0.857 U | ------ | ------ | ------ | 0.467 U | 1.15 | 0.479 U | 1.47 |
| **Field Measured** | Conductivity | uS/cm | ------ | ------ | 963.1 | 925.76 | 1683.4 | ------ | ------ | ------ | 913.1 | 851.93 | 1024.81 | 1029.5 |
| | Dissolved Oxygen | mg/L | ------ | ------ | 0.19 | 0.12 | 0.11 | ------ | ------ | ------ | 0.56 | 0.33 | 0.37 | 0.32 |
| | Oxidation Reduction Potential | millivolts | ------ | ------ | 674.9 | 567.8 | 342.4 | ------ | ------ | ------ | 190 | 446.58 | 520.6 | 521 |
| | Temperature | Deg C | ------ | ------ | 17.72 | 20.08 | 16.61 | ------ | ------ | ------ | 19.68 | 19.19 | 21.23 | 20.7 |
| | Turbidity | ntu | ------ | ------ | 0.67 | 1.78 | 0.42 | ------ | ------ | ------ | 4.52 | 3.36 | 1.38 | 2.67 |
| | Water level depth | ft | ------ | ------ | 7.55 | 5.95 | 5.32 | ------ | ------ | ------ | 8.68 | 7.38 | 9.12 | 9.41 |
| **Supplemental** | Alkalinity as CaCO3, Total | mg/L | < 20 | < 1.0 | ------ | ------ | < 1.8 | < 5.00 | 40 | 37 | ------ | ------ | < 5.0 | ------ |
| | Alkalinity, Bicarbonate as CaCO3 | mg/L | < 20 | ------ | ------ | ------ | < 1.8 | < 5.00 | 40 | 37 | ------ | ------ | < 5.0 | ------ |
| | Alkalinity, Carbonate as CaCO3 | mg/L | < 20 | ------ | ------ | ------ | < 1.8 | < 5.00 | < 20 | < 20 | ------ | ------ | < 5.0 | ------ |
| | Aluminum | mg/L | 0.61 | 0.76 | ------ | ------ | ------ | ------ | 0.51 | 0.4 | ------ | ------ | ------ | ------ |
| | Dissolved Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Hardness | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Total | mg/L | < 0.20 | 0.37 | ------ | ------ | ------ | 0.036 J | 0.32 J | 0.66 | ------ | ------ | ------ | ------ |
| | Iron, Ferric (Fe2) | mg/L | < 0.20 | 0.31 | ------ | ------ | ------ | 0.036 J | 0.32 J | 0.66 | ------ | ------ | ------ | ------ |
| | Iron, Ferrous | mg/L | < 0.20 | < 0.20 | ------ | ------ | ------ | 0.0 | < 0.50 | 0.49 | ------ | ------ | ------ | ------ |
| | Magnesium | mg/L | 22.1 | 20.7 | ------ | ------ | 15.5 | 17.4 | 29.1 | 26.8 | ------ | ------ | 22.9 | ------ |
| | Manganese | mg/L | 29.2 | 28 | ------ | ------ | ------ | ------ | 34.8 | 33.1 | ------ | ------ | ------ | ------ |
| | Nickel | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nitrate as N | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphorus, Total Orthophosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Potassium | mg/L | 8.1 | 6.7 | ------ | ------ | 6.1 | 5.7 | 11.5 | 9.1 | ------ | ------ | 6.5 | ------ |
| | Silica | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silicon | mg/L | 23.1 | 22.5 | ------ | ------ | ------ | ------ | 25.3 | 23.2 | ------ | ------ | ------ | ------ |
| | Silver | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Sodium | mg/L | 23.9 | 20.4 | ------ | ------ | 18.7 | 18.4 | 27.9 | 27.3 | ------ | ------ | 24.1 | ------ |
| | Sulfide | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Total Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Zinc | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |

**NOTES:**
1. mg/L - milligrams per Liter; pCi/L - picocuries per Liter; S.U. - Standard
2. < indicates the substance was not detected above the analytical meth
3. J indicates the substance was detected at such low levels that the pre
4. Radium data are a combination of radium isotopes 226 and 228. Whe

**APPENDIX A**
**ANALYTICAL RESULTS (2016 - 2022)**
Plant McDonough-Atkinson Ash Pond 1 and Ash Pond 2 and 3/4
Atlanta, Georgia

| Analyte | | Units | B-93 | B-93 | B-94 | B-94 | B-95 | B-95 | B-95 | B-95 | B-95 | B-96 | B-96 | B-96 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1/26/2022 | 9/12/2022 | 1/30/2020 | 2/4/2020 | 2/17/2020 | 2/26/2020 | 3/9/2021 | 1/26/2022 | 9/12/2022 | 2/14/2020 | 2/26/2020 | 3/9/2021 |
| Appendix III | Boron | mg/L | 3.6 | 3.60 | 13.2 | 14 | 4.5 | 4.4 | 2.8 | 2 | 1.50 | 4.3 | 3.8 | 4.5 |
| | Calcium | mg/L | 141 | 133.0 | 346 | 352 | 132 | ------ | ------ | ------ | ------ | 163 | ------ | ------ |
| | Chloride | mg/L | 14.7 | 15.00 | 9 | 8.4 | 8.4 | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Fluoride | mg/L | 0.41 | 0.4 | ------ | < 0.050 | ------ | ------ | ------ | ------ | -- | ------ | ------ | ------ |
| | pH, field measured | S.U. | 4.74 | 4.7 0 | ------ | ------ | ------ | ------ | 5.36 | 5.33 | 5.33 | ------ | ------ | 4.99 |
| | Sulfate | mg/L | 477 | 508 | 1120 | 1120 | 274 | ------ | ------ | | -- | ------ | ------ | ------ |
| | Total Dissolved Solids | mg/L | 766 | 884 | ------ | ------ | ------ | ------ | ------ | | -- | ------ | ------ | ------ |
| Appendix IV | Antimony | mg/L | < 0.00078 | 0.00096 J | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Arsenic | mg/L | 0.002 J | < 0.0022 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Barium | mg/L | 0.021 | 0.015 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Beryllium | mg/L | 0.017 | 0.017 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Cadmium | mg/L | 0.00079 | 0.00084 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Chromium | mg/L | 0.0011 J | < 0.0011 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Cobalt | mg/L | 0.064 | 0.057 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Fluoride | mg/L | 0.41 | 0.4 | ------ | < 0.050 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Lead | mg/L | < 0.00089 | < 0.0044 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Lithium | mg/L | 0.013 J | 0.013 J | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Mercury | mg/L | < 0.00013 | 0.00016 J | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Molybdenum | mg/L | < 0.00074 | < 0.00074 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Selenium | mg/L | 0.0063 | 0.013 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Thallium | mg/L | < 0.00018 | < 0.00090 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Radium | pCi/L | 0.758 U | 1.09 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Radium-226 | pCi/L | 0.24 U | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Radium-228 | pCi/L | 0.518 U | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| Field Measured | Conductivity | uS/cm | 2242.6 | ------ | ------ | ------ | ------ | ------ | 757.4 | 592.65 | ------ | ------ | ------ | 1020.3 |
| | Dissolved Oxygen | mg/L | 0.86 | ------ | ------ | ------ | ------ | ------ | 0.15 | 0.09 | ------ | ------ | ------ | 0.26 |
| | Oxidation Reduction Potential | millivolts | 276.7 | ------ | ------ | ------ | ------ | ------ | 440.1 | 44.5 | ------ | ------ | ------ | 238.5 |
| | Temperature | Deg C | 18.24 | ------ | ------ | ------ | ------ | ------ | 16.73 | 18.17 | ------ | ------ | ------ | 18.23 |
| | Turbidity | ntu | 3.8 | ------ | ------ | ------ | ------ | ------ | 2.49 | 3.12 | ------ | ------ | ------ | 3.83 |
| | Water level depth | ft | 8 | ------ | ------ | ------ | ------ | ------ | 3.23 | 3.2 | ------ | ------ | ------ | 7.15 |
| Supplemental | Alkalinity as CaCO3, Total | mg/L | 4 J | < 5.00 | 28.1 | 27.7 | 23.6 | 20.1 | ------ | ------ | ------ | 17.5 | 13.3 | ------ |
| | Alkalinity, Bicarbonate as CaCO3 | mg/L | 4 J | < 5.00 | 28.1 | 27.7 | 23.6 | 20.1 | ------ | ------ | ------ | 17.5 | 13.3 | ------ |
| | Alkalinity, Carbonate as CaCO3 | mg/L | < 1.8 | < 5.00 | < 5.0 | < 5.0 | < 5.0 | < 5.0 | ------ | ------ | ------ | < 5.0 | < 5.0 | ------ |
| | Aluminum | mg/L | ------ | ------ | 0.33 | 0.15 | 0.26 | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Dissolved Organic Carbon | mg/L | ------ | ------ | ------ | ------ | < 0.50 | 0.55 J | ------ | ------ | ------ | < 0.50 | < 0.50 | ------ |
| | Hardness | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Total | mg/L | ------ | < 0.025 | 0.6 | 0.57 | 118 | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Ferric (Fe2) | mg/L | ------ | < 0.025 | 0.6 | 0.57 | 118 | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Ferrous | mg/L | ------ | 0.0 | < 0.50 | < 0.50 | < 0.50 | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Magnesium | mg/L | 23.6 | 22.4 | 90.3 | 86.3 | 40.1 | ------ | ------ | ------ | ------ | 32 | ------ | ------ |
| | Manganese | mg/L | ------ | ------ | 3.4 | 1.9 | 7.7 | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nickel | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nitrate as N | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphorus, Total Orthophosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Potassium | mg/L | 7.5 | 6.5 | 10.9 | 9.6 | 10.1 | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silica | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silicon | mg/L | ------ | ------ | 21.7 | 18.6 | 13.7 | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silver | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Sodium | mg/L | 25.4 | 24.5 | 28.5 | 31.7 | 24.4 | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Sulfide | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Total Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Zinc | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |

**NOTES:**
1. mg/L - milligrams per Liter; pCi/L - picocuries per Liter; S.U. - Standard
2. < indicates the substance was not detected above the analytical metho
3. J indicates the substance was detected at such low levels that the pre
4. Radium data are a combination of radium isotopes 226 and 228. Whe

| Analyte | | Units | B-96 1/26/2022 | B-96 9/13/2022 | B-97 2/17/2020 | B-97 2/27/2020 | B-97 3/9/2021 | B-97 9/15/2021 | B-97 1/26/2022 | B-97 9/13/2022 | B-98 2/17/2020 | B-98 2/27/2020 | B-98 3/15/2021 | B-98 9/15/2021 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Appendix III** | Boron | mg/L | 3.7 | 3.40 | ------ | ------ | ------ | 3.3 | 3.7 | 3.70 | ------ | ------ | ------ | 2.6 |
| | Calcium | mg/L | ------ | ------ | 190 | ------ | ------ | 178 | 198 | 201.0 | 85.9 | ------ | ------ | 105 |
| | Chloride | mg/L | ------ | ------ | 20.9 | ------ | ------ | 18.8 | 19.8 | 19.50 | 96.8 | ------ | ------ | 29.9 |
| | Fluoride | mg/L | ------ | ------ | ------ | ------ | ------ | 0.085 J | 0.088 J | 0.14 | ------ | ------ | ------ | 0.098 J |
| | pH, field measured | S.U. | 5.01 | 5.03 | ------ | ------ | 5.55 | 5.49 | 6.52 / 5.52 | 5.54 | ------ | ------ | 6.3 | 5.4 |
| | Sulfate | mg/L | ------ | ------ | 242 | ------ | | 551 | 531 | 677 | 150 | ------ | ------ | 325 |
| | Total Dissolved Solids | mg/L | ------ | ------ | ------ | ------ | ------ | 892 | 930 | 1050 | ------ | ------ | ------ | 524 |
| **Appendix IV** | Antimony | mg/L | ------ | ------ | ------ | ------ | ------ | < 0.00078 | < 0.00078 | < 0.00078 | ------ | ------ | ------ | < 0.00078 |
| | Arsenic | mg/L | ------ | ------ | ------ | ------ | ------ | < 0.0011 | 0.0014 J | < 0.0022 | ------ | ------ | ------ | < 0.0011 |
| | Barium | mg/L | ------ | ------ | ------ | ------ | ------ | 0.02 | 0.02 | 0.02 | ------ | ------ | ------ | 0.082 |
| | Beryllium | mg/L | ------ | ------ | < 0.000074 | 0.0019 J | 0.0019 | 0.0016 | 0.0017 | 0.0017 | < 0.000074 | < 0.000074 | < 0.000046 | 0.00087 |
| | Cadmium | mg/L | ------ | ------ | ------ | ------ | ------ | 0.00056 | 0.00055 | 0.00055 | ------ | ------ | ------ | 0.0003 J |
| | Chromium | mg/L | ------ | ------ | ------ | ------ | ------ | < 0.0011 | < 0.0011 | < 0.0011 | ------ | ------ | ------ | < 0.0011 |
| | Cobalt | mg/L | ------ | ------ | ------ | ------ | ------ | 0.003 J | 0.003 J | 0.0029 J | < 0.00030 | ------ | < 0.00038 | 0.0048 J |
| | Fluoride | mg/L | ------ | ------ | ------ | ------ | ------ | 0.085 J | 0.088 J | 0.14 | ------ | ------ | ------ | 0.098 J |
| | Lead | mg/L | ------ | ------ | ------ | ------ | ------ | < 0.00089 | < 0.00089 | < 0.00089 | ------ | ------ | ------ | < 0.00089 |
| | Lithium | mg/L | ------ | ------ | ------ | ------ | ------ | 0.0042 J | 0.0047 J | 0.0052 J | ------ | ------ | ------ | 0.0012 J |
| | Mercury | mg/L | ------ | ------ | ------ | ------ | ------ | < 0.000078 | < 0.00013 | < 0.00013 | ------ | ------ | ------ | < 0.000078 |
| | Molybdenum | mg/L | ------ | ------ | ------ | ------ | ------ | < 0.00074 | < 0.00074 | < 0.00074 | ------ | ------ | ------ | < 0.00074 |
| | Selenium | mg/L | ------ | ------ | ------ | ------ | ------ | 0.0024 J | 0.0015 J | 0.0032 J | ------ | ------ | ------ | 0.0033 J |
| | Thallium | mg/L | ------ | ------ | ------ | ------ | ------ | < 0.00018 | < 0.00018 | < 0.00018 | ------ | ------ | ------ | < 0.00018 |
| | Radium | pCi/L | ------ | ------ | ------ | ------ | ------ | 2.11 | 1.47 U | 1.11 | ------ | ------ | ------ | 2.2 |
| | Radium-226 | pCi/L | ------ | ------ | ------ | ------ | ------ | 0.566 | 0.566 | ------ | ------ | ------ | ------ | 1.31 |
| | Radium-228 | pCi/L | ------ | ------ | ------ | ------ | ------ | 1.54 | 0.899 U | ------ | ------ | ------ | ------ | 0.889 |
| **Field Measured** | Conductivity | uS/cm | 1017.8 | ------ | ------ | ------ | 1188.1 | 1261.6 | 2663.6 | ------ | ------ | ------ | 185.25 | 851.03 |
| | Dissolved Oxygen | mg/L | 0.09 | ------ | ------ | ------ | 0.15 | 0.11 | 0.09 | ------ | ------ | ------ | 3.29 | 0.08 |
| | Oxidation Reduction Potential | millivolts | 416.3 | ------ | ------ | ------ | 593.6 | 530.9 | 262 | ------ | ------ | ------ | 116.6 | 96.6 |
| | Temperature | Deg C | 18.14 | ------ | ------ | ------ | 18.92 | 20.98 | 17.38 | ------ | ------ | ------ | 17.39 | 20.71 |
| | Turbidity | ntu | 0.56 | ------ | ------ | ------ | 1.31 | 0.98 | 0.15 | ------ | ------ | ------ | 1.78 | 4.89 |
| | Water level depth | ft | 5.9 | ------ | ------ | ------ | 5.72 | 6.45 | 5.61 | ------ | ------ | ------ | 8.7 | 9.64 |
| **Supplemental** | Alkalinity as CaCO3, Total | mg/L | ------ | ------ | 46.9 | 45.7 | ------ | ------ | 53 | 54.0 | 157 | 85.6 | ------ | ------ |
| | Alkalinity, Bicarbonate as CaCO3 | mg/L | ------ | ------ | 46.9 | 45.7 | ------ | ------ | 53 | 54.0 | 157 | 85.6 | ------ | ------ |
| | Alkalinity, Carbonate as CaCO3 | mg/L | ------ | ------ | < 5.0 | < 5.0 | ------ | ------ | < 1.8 | < 5.00 | < 5.0 | < 5.0 | ------ | ------ |
| | Aluminum | mg/L | ------ | ------ | < 0.032 | ------ | ------ | ------ | ------ | ------ | 0.28 | ------ | ------ | ------ |
| | Dissolved Organic Carbon | mg/L | ------ | ------ | < 0.50 | 0.78 J | ------ | ------ | ------ | ------ | 13.2 | 5.4 | ------ | ------ |
| | Hardness | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Total | mg/L | ------ | ------ | 81.4 | ------ | ------ | ------ | ------ | < 0.025 | 90.4 | ------ | ------ | ------ |
| | Iron, Ferric (Fe2) | mg/L | ------ | ------ | 81.4 | ------ | ------ | ------ | ------ | < 0.025 | 90.4 | ------ | ------ | ------ |
| | Iron, Ferrous | mg/L | ------ | ------ | < 0.50 | ------ | ------ | ------ | ------ | 0.0 | < 0.50 | ------ | ------ | ------ |
| | Magnesium | mg/L | ------ | ------ | 30.3 | ------ | ------ | ------ | 32.6 | 34.3 | 6.3 | ------ | ------ | ------ |
| | Manganese | mg/L | ------ | ------ | 10.9 | ------ | ------ | ------ | ------ | ------ | 2.6 | ------ | ------ | ------ |
| | Nickel | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nitrate as N | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphorus, Total Orthophosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Potassium | mg/L | ------ | ------ | 5.7 | ------ | ------ | ------ | 5.5 | 5.6 | 8.6 | ------ | ------ | ------ |
| | Silica | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silicon | mg/L | ------ | ------ | 11.5 | ------ | ------ | ------ | ------ | ------ | 7.1 | ------ | ------ | ------ |
| | Silver | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Sodium | mg/L | ------ | ------ | 34.7 | ------ | ------ | ------ | 38.8 | 40.1 | 107 | ------ | ------ | ------ |
| | Sulfide | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Total Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Zinc | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |

**NOTES:**
1. mg/L - milligrams per Liter; pCi/L - picocuries per Liter; S.U. - Standard
2. < indicates the substance was not detected above the analytical meth
3. J indicates the substance was detected at such low levels that the pre
4. Radium data are a combination of radium isotopes 226 and 228. Whe

| | Analyte | Units | B-98 | B-98 | B-99 | B-99 | B-99 | B-99 | B-99 | CR+0.2 | CR+0.2 | CR+0.2 | CR+0.2 | CR+0.4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1/26/2022 | 9/13/2022 | 7/23/2020 | 8/3/2020 | 3/9/2021 | 1/26/2022 | 9/12/2022 | 11/10/2020 | 2/2/2021 | 3/9/2021 | 9/7/2021 | 11/10/2020 |
| Appendix III | Boron | mg/L | 0.12 | 0.62 | 3.8 | 4 | 3.1 | 2.7 | 2.20 | ------ | < 0.040 | < 0.0052 | < 0.0086 | ------ |
| | Calcium | mg/L | 31.9 | 63.3 | ------ | ------ | ------ | ------ | ------ | 4.1 | 5 | 5.2 | 6.6 | 4.2 |
| | Chloride | mg/L | 4.9 | 4.90 | ------ | ------ | ------ | ------ | ------ | 4.8 | 6.2 | 6.4 | 9.7 | 4.8 |
| | Fluoride | mg/L | 0.13 | 0.18 | ------ | ------ | ------ | ------ | ------ | < 0.10 | < 0.10 | < 0.050 | 0.14 | < 0.10 |
| | pH, field measured | S.U. | 6.52 | 6.18 | ------ | 5.81 | 5.73 | 5.67 | 5.71 | 7.42 | 7.57 | 7.3 | ------ | 7.35 |
| | Sulfate | mg/L | 18.4 | 92.1 | ------ | ------ | ------ | ------ | ------ | 3.0 | 4.4 | 3.8 | 6.4 | 3.0 |
| | Total Dissolved Solids | mg/L | 139 | 267 | ------ | ------ | ------ | ------ | ------ | 45.0 | 41 | 28.0 | 73 | 43.0 |
| Appendix IV | Antimony | mg/L | < 0.00078 | < 0.00078 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Arsenic | mg/L | < 0.0011 | < 0.0022 | ------ | ------ | ------ | ------ | ------ | ------ | < 0.0000050 | < 0.00078 | < 0.0011 | ------ |
| | Barium | mg/L | 0.035 | 0.092 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Beryllium | mg/L | 0.000068 J | 0.000062 J | ------ | ------ | ------ | ------ | ------ | < 0.00050 | < 0.00050 | < 0.000046 | ------ | < 0.00050 |
| | Cadmium | mg/L | < 0.00011 | 0.00031 J | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Chromium | mg/L | 0.0013 J | < 0.0011 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Cobalt | mg/L | < 0.00039 | 0.00063 J | ------ | ------ | ------ | ------ | ------ | < 0.0050 | < 0.0050 | < 0.00038 | < 0.00039 | < 0.0050 |
| | Fluoride | mg/L | 0.13 | 0.18 | ------ | ------ | ------ | ------ | ------ | < 0.10 | < 0.10 | < 0.050 | 0.14 | < 0.10 |
| | Lead | mg/L | < 0.00089 | < 0.00089 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Lithium | mg/L | 0.0013 J | 0.0011 J | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Mercury | mg/L | < 0.00013 | < 0.00013 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Molybdenum | mg/L | 0.0015 J | 0.00084 J | ------ | ------ | ------ | ------ | ------ | ------ | < 0.010 | < 0.00069 | < 0.00074 | ------ |
| | Selenium | mg/L | < 0.0014 | < 0.0014 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Thallium | mg/L | < 0.00018 | < 0.00018 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Radium | pCi/L | 0.52 U | 2.03 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Radium-226 | pCi/L | 0.52 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Radium-228 | pCi/L | -2.35 U | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| Field Measured | Conductivity | uS/cm | 396.52 | ------ | ------ | ------ | 772.1 | 776.4 | ------ | ------ | 80 | ------ | ------ | ------ |
| | Dissolved Oxygen | mg/L | 2.27 | ------ | ------ | ------ | 0.1 | 0.15 | ------ | ------ | 13.08 | ------ | ------ | ------ |
| | Oxidation Reduction Potential | millivolts | 133.1 | ------ | ------ | ------ | 137.4 | 118.7 | ------ | ------ | -3.4 | ------ | ------ | ------ |
| | Temperature | Deg C | 17.71 | ------ | ------ | ------ | 16.38 | 14.85 | ------ | ------ | 7.91 | ------ | ------ | ------ |
| | Turbidity | ntu | 3.94 | ------ | ------ | ------ | 4.09 | 3.51 | ------ | ------ | 13.7 | ------ | ------ | ------ |
| | Water level depth | ft | 8.91 | ------ | ------ | ------ | 3.9 | 3.41 | ------ | ------ | ------ | ------ | ------ | ------ |
| Supplemental | Alkalinity as CaCO3, Total | mg/L | 70.2 | 102.0 | ------ | ------ | ------ | ------ | ------ | 20.2 | 20.4 | 17.3 | 26.9 | 17.3 |
| | Alkalinity, Bicarbonate as CaCO3 | mg/L | 70.2 | 102.0 | ------ | ------ | ------ | ------ | ------ | 20.2 | 20.4 | 17.3 | 26.9 | 17.3 |
| | Alkalinity, Carbonate as CaCO3 | mg/L | < 1.8 | < 5.00 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Aluminum | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Dissolved Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Hardness | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Total | mg/L | ------ | 0.1 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Ferric (Fe2) | mg/L | ------ | 0.1 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Ferrous | mg/L | ------ | 0.0 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Magnesium | mg/L | 2.2 | 4.7 | ------ | ------ | ------ | ------ | ------ | 2.0 | 2 | 2.2 | 2.7 | 2.0 |
| | Manganese | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nickel | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nitrate as N | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphorus, Total Orthophosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Potassium | mg/L | 5.9 | 8.2 | ------ | ------ | ------ | ------ | ------ | 2.5 | 2.7 | 2.7 | 3.3 | 2.4 |
| | Silica | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silicon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silver | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Sodium | mg/L | 4.8 | 8.9 | ------ | ------ | ------ | ------ | ------ | 5.5 | 6.8 | 6.7 | 9.9 | 5.4 |
| | Sulfide | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Total Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Zinc | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |

**NOTES:**
1. mg/L - milligrams per Liter; pCi/L - picocuries per Liter; S.U. - Standard
2. < indicates the substance was not detected above the analytical metho
3. J indicates the substance was detected at such low levels that the pre
4. Radium data are a combination of radium isotopes 226 and 228. Whe

| | Analyte | Units | CR+0.4 | CR+0.4 | CR+0.4 | CR-0.1 | CR-0.1 | CR-0.1 | CR-0.2 | CR-0.2 | CR-0.2 | CR-0.2 | CR-0.5 | CR-0.5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 2/2/2021 | 3/9/2021 | 9/7/2021 | 2/2/2021 | 3/9/2021 | 9/7/2021 | 11/10/2020 | 2/2/2021 | 3/9/2021 | 9/7/2021 | 11/10/2020 | 2/2/2021 |
| Appendix III | Boron | mg/L | < 0.040 | < 0.0052 | < 0.0086 | < 0.040 | < 0.0052 | < 0.0086 | ------ | < 0.040 | < 0.0052 | 0.046 | ------ | < 0.040 |
| | Calcium | mg/L | 5.3 | 4.7 | 6.7 | 5.2 | 5.3 | 6.6 | 4.3 | 5 | 5.2 | 6.6 | 4.3 | 5.2 |
| | Chloride | mg/L | 6.3 | 7.0 | 9.9 | 6.6 | 6.5 | 9.8 | 11.2 | 6.2 | 6.6 | 9.8 | 4.9 | 6.2 |
| | Fluoride | mg/L | < 0.10 | < 0.050 | 0.14 | < 0.10 | < 0.050 | 0.14 | < 0.10 | < 0.10 | < 0.050 | 0.13 | < 0.10 | < 0.10 |
| | pH, field measured | S.U. | 7.65 | 7.4 | ------ | 7.78 | 7.2 | ------ | 7.82 | 7.48 | 7.0 | ------ | 7.40 | 7.46 |
| | Sulfate | mg/L | 4.5 | 4.3 | 7 | 4.8 | 4.2 | 8 | 3.2 | 4.3 | 3.8 | 7.3 | 3.0 | 4.3 |
| | Total Dissolved Solids | mg/L | 27 | 42.0 | 77 | 25 | 45.0 | 78 | 48.0 | 38 | 50.0 | 77 | 47.0 | 31 |
| Appendix IV | Antimony | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Arsenic | mg/L | < 0.0000050 | < 0.00078 | < 0.0011 | < 0.0000050 | < 0.00078 | ------ | ------ | < 0.0000050 | < 0.00078 | < 0.0011 | ------ | < 0.0000050 |
| | Barium | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Beryllium | mg/L | < 0.00050 | < 0.000046 | ------ | < 0.00050 | < 0.000046 | ------ | < 0.00050 | < 0.00050 | < 0.000046 | ------ | < 0.00050 | < 0.00050 |
| | Cadmium | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Chromium | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Cobalt | mg/L | < 0.0050 | < 0.00038 | < 0.00039 | < 0.0050 | < 0.00038 | < 0.00039 | < 0.0050 | < 0.0050 | < 0.00038 | < 0.00039 | < 0.0050 | < 0.0050 |
| | Fluoride | mg/L | < 0.10 | < 0.050 | 0.14 | < 0.10 | < 0.050 | 0.14 | < 0.10 | < 0.10 | < 0.050 | 0.13 | < 0.10 | < 0.10 |
| | Lead | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Lithium | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Mercury | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Molybdenum | mg/L | < 0.010 | < 0.00069 | < 0.00074 | < 0.010 | < 0.00069 | ------ | ------ | < 0.010 | < 0.00069 | ------ | ------ | < 0.010 |
| | Selenium | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | < 0.0014 | ------ | ------ |
| | Thallium | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Radium | pCi/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Radium-226 | pCi/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Radium-228 | pCi/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| Field Measured | Conductivity | uS/cm | 80 | ------ | ------ | 83 | ------ | ------ | ------ | 79 | ------ | ------ | ------ | 78 |
| | Dissolved Oxygen | mg/L | 13.02 | ------ | ------ | 12.92 | ------ | ------ | ------ | 13 | ------ | ------ | ------ | 13.05 |
| | Oxidation Reduction Potential | millivolts | -4.8 | ------ | ------ | -8.1 | ------ | ------ | ------ | -19.3 | ------ | ------ | ------ | -20.8 |
| | Temperature | Deg C | 7.87 | ------ | ------ | 8.02 | ------ | ------ | ------ | 8.11 | ------ | ------ | ------ | 8.19 |
| | Turbidity | ntu | 14.2 | ------ | ------ | 16.0 | ------ | ------ | ------ | 14 | ------ | ------ | ------ | 14.4 |
| | Water level depth | ft | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| Supplemental | Alkalinity as CaCO3, Total | mg/L | 20.5 | 17.7 | 26.6 | 20.7 | 17.2 | 26.8 | 20.7 | 17.2 | 17.6 | 27.5 | 20.2 | 17 |
| | Alkalinity, Bicarbonate as CaCO3 | mg/L | 20.5 | 17.7 | 26.6 | 20.7 | 17.2 | 26.8 | 20.7 | 17.2 | 17.6 | 27.5 | 20.2 | 17 |
| | Alkalinity, Carbonate as CaCO3 | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Aluminum | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Dissolved Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Hardness | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Total | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Ferric (Fe2) | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Ferrous | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Magnesium | mg/L | 2.1 | 2.2 | 2.9 | 2.1 | 2.1 | 2.7 | 2.1 | 2.1 | 2.0 | 2.8 | 2.0 | 2.1 |
| | Manganese | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nickel | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nitrate as N | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphorus, Total Orthophosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Potassium | mg/L | 2.8 | 2.6 | 3.4 | 2.8 | 2.7 | 3.2 | 2.6 | 2.8 | 2.7 | 3.3 | 2.5 | 2.8 |
| | Silica | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silicon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silver | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Sodium | mg/L | 7 | 6.5 | 10 | 7 | 6.6 | 9.4 | 5.9 | 6.8 | 6.6 | 9.7 | 5.7 | 7 |
| | Sulfide | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Total Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Zinc | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |

**NOTES:**
1. mg/L - milligrams per Liter; pCi/L - picocuries per Liter; S.U. - Standarc
2. < indicates the substance was not detected above the analytical metho
3. J indicates the substance was detected at such low levels that the pre
4. Radium data are a combination of radium isotopes 226 and 228. Whe

| | Analyte | Units | CR-0.5 | CR-0.5 | CR-0.8 | CR-0.8 | CR-0.8 | DW_DS | DW_DS | DW_DS | DW_DS | DW_US | DW_US | DW_US |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 3/9/2021 | 9/7/2021 | 11/10/2020 | 2/2/2021 | 3/9/2021 | 11/10/2020 | 2/2/2021 | 3/9/2021 | 9/7/2021 | 11/10/2020 | 2/2/2021 | 3/9/2021 |
| **Appendix III** | Boron | mg/L | < 0.0052 | < 0.0086 | ------ | < 0.040 | < 0.0052 | ------ | < 0.040 | < 0.0052 | < 0.0086 | ------ | < 0.040 | < 0.0052 |
| | Calcium | mg/L | 5.5 | 6.5 | 4.4 | 4.9 | 5.0 | 4.3 | 5.1 | 5.1 | 7.3 | 4.2 | 4.9 | 5.4 |
| | Chloride | mg/L | 6.7 | 9.6 | 5.1 | 6.4 | 6.3 | 4.8 | 6.1 | 6.2 | 9.8 | 4.9 | 6.1 | 6.4 |
| | Fluoride | mg/L | < 0.050 | 0.14 | < 0.10 | < 0.10 | < 0.050 | < 0.10 | < 0.10 | < 0.050 | 0.14 | < 0.10 | < 0.10 | < 0.050 |
| | pH, field measured | S.U. | 7.0 | ------ | 7.62 | 7.15 | 7.1 | 7.03 | 7.7 | 7.3 | ------ | 6.90 | 7.51 | 7.1 |
| | Sulfate | mg/L | 3.7 | 6.3 | 3.2 | 4.5 | 3.8 | 3.0 | 4.3 | 3.6 | 10.4 | 3.1 | 4.3 | 3.7 |
| | Total Dissolved Solids | mg/L | 77.0 | 75 | 50.0 | 30 | 21.0 | 38.0 | 30 | 47.0 | 83 | 43.0 | 29 | 28.0 |
| **Appendix IV** | Antimony | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Arsenic | mg/L | < 0.00078 | < 0.0011 | ------ | < 0.0000050 | < 0.00078 | ------ | < 0.0000050 | < 0.00078 | ------ | ------ | < 0.0000050 | < 0.00078 |
| | Barium | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Beryllium | mg/L | < 0.000046 | ------ | < 0.00050 | < 0.00050 | < 0.000046 | < 0.00050 | < 0.00050 | < 0.000046 | ------ | < 0.00050 | < 0.00050 | < 0.000046 |
| | Cadmium | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Chromium | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Cobalt | mg/L | < 0.00038 | < 0.00039 | < 0.0050 | < 0.0050 | < 0.00038 | < 0.0050 | < 0.0050 | < 0.00038 | < 0.00039 | < 0.0050 | < 0.0050 | < 0.00038 |
| | Fluoride | mg/L | < 0.050 | 0.14 | < 0.10 | < 0.10 | < 0.050 | < 0.10 | < 0.10 | < 0.050 | 0.14 | < 0.10 | < 0.10 | < 0.050 |
| | Lead | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Lithium | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Mercury | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Molybdenum | mg/L | < 0.00069 | ------ | ------ | < 0.010 | < 0.00069 | ------ | < 0.010 | < 0.00069 | | | < 0.010 | < 0.00069 |
| | Selenium | mg/L | ------ | < 0.0014 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Thallium | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Radium | pCi/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Radium-226 | pCi/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Radium-228 | pCi/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| **Field Measured** | Conductivity | uS/cm | ------ | ------ | ------ | 80 | ------ | ------ | 79 | ------ | ------ | ------ | 79 | ------ |
| | Dissolved Oxygen | mg/L | ------ | ------ | ------ | 13.97 | ------ | ------ | 14.72 | ------ | ------ | ------ | 12.87 | ------ |
| | Oxidation Reduction Potential | millivolts | ------ | ------ | ------ | -21.3 | ------ | ------ | -11 | ------ | ------ | ------ | -9.8 | ------ |
| | Temperature | Deg C | ------ | ------ | ------ | 8.32 | ------ | ------ | 8.01 | ------ | ------ | ------ | 8.07 | ------ |
| | Turbidity | ntu | ------ | ------ | ------ | 14 | ------ | ------ | 11.8 | ------ | ------ | ------ | 12.3 | ------ |
| | Water level depth | ft | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| **Supplemental** | Alkalinity as CaCO3, Total | mg/L | 17.0 | 27.1 | 20 | 17 | 17.2 | 17.7 | 16.7 | 17.4 | 26.4 | 20.3 | 20.1 | 17.4 |
| | Alkalinity, Bicarbonate as CaCO3 | mg/L | 17.0 | 27.1 | 20 | 17 | 17.2 | 17.7 | 16.7 | 17.4 | 26.4 | 20.3 | 20.1 | 17.4 |
| | Alkalinity, Carbonate as CaCO3 | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Aluminum | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Dissolved Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Hardness | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Total | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Ferric (Fe2) | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Ferrous | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Magnesium | mg/L | 2.1 | 2.6 | 2.0 | 2.1 | 2.1 | 2.0 | 2 | 2.1 | 2.9 | 2.0 | 2 | 2.2 |
| | Manganese | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nickel | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nitrate as N | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphorus, Total Orthophosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Potassium | mg/L | 2.7 | 3.1 | 2.5 | 2.8 | 2.6 | 2.5 | 2.7 | 2.6 | 3.2 | 2.6 | 2.7 | 2.7 |
| | Silica | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silicon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silver | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Sodium | mg/L | 6.9 | 9.2 | 5.6 | 7 | 6.5 | 5.6 | 6.9 | 6.4 | 9.6 | 5.5 | 6.8 | 6.8 |
| | Sulfide | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Total Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Zinc | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |

**NOTES:**
1. mg/L - milligrams per Liter; pCi/L - picocuries per Liter; S.U. - Standarc
2. < indicates the substance was not detected above the analytical methc
3. J indicates the substance was detected at such low levels that the pre‹
4. Radium data are a combination of radium isotopes 226 and 228. Whe

**APPENDIX A**
**ANALYTICAL RESULTS (2016 - 2022)**
Plant McDonough-Atkinson Ash Pond 1 and Ash Pond 2 and 3/4
Atlanta, Georgia

| Analyte | | Units | DW_US | EW-OF | SW-1 | SW-1 | SW-1 | SW-2 | SW-2 | SW-2 | SW-3 | SW-3 | SW-3 | SW-4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 9/7/2021 | 1/14/2021 | 3/11/2020 | 3/1/2021 | 1/19/2022 | 3/11/2020 | 3/1/2021 | 1/19/2022 | 3/11/2020 | 3/1/2021 | 1/19/2022 | 3/11/2020 |
| | Boron | mg/L | 0.073 | 5.3 | 0.15 | 0.13 | 0.5 | 0.22 | 0.11 | 0.091 | 0.52 | 0.24 | 0.2 | 0.52 |
| | Calcium | mg/L | 6.7 | 158 | ------ | 23.3 | ------ | ------ | 30.8 | ------ | ------ | 32.0 | ------ | ------ |
| | Chloride | mg/L | 9.9 | 8.6 | ------ | 4.9 | ------ | ------ | 8.3 | ------ | ------ | 8.2 | ------ | ------ |
| **Appendix III** | Fluoride | mg/L | 0.14 | 0.14 | ------ | 0.078 J | ------ | ------ | 0.26 | ------ | ------ | 0.29 | ------ | ------ |
| | pH, field measured | S.U. | ------ | 6.61 | 7.05 | 6.79 | 6.84 | 7.33 | 7.36 | 7.43 | 7.2 | 7.50 | 7.39 | 7.09 |
| | Sulfate | mg/L | 6.5 | 550 | ------ | 28.1 | ------ | ------ | 42.4 | ------ | ------ | 47.3 | ------ | ------ |
| | Total Dissolved Solids | mg/L | 82 | 974 | ------ | 121 | ------ | ------ | 153 | ------ | ------ | 124 | ------ | ------ |
| | Antimony | mg/L | ------ | < 0.00028 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Arsenic | mg/L | ------ | 0.0016 J | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Barium | mg/L | ------ | 0.029 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Beryllium | mg/L | ------ | 0.0027 J | < 0.000074 | ------ | ------ | < 0.000074 | ------ | ------ | 0.00011 J | ------ | ------ | 0.00015 J |
| | Cadmium | mg/L | ------ | 0.00090 J | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Chromium | mg/L | ------ | < 0.00055 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Cobalt | mg/L | < 0.00039 | 0.037 | 0.00096 J | ------ | ------ | 0.0031 J | ------ | ------ | 0.0047 J | ------ | ------ | 0.0025 J |
| | Fluoride | mg/L | 0.14 | 0.14 | ------ | 0.078 J | ------ | ------ | 0.26 | ------ | ------ | 0.29 | ------ | ------ |
| **Appendix IV** | Lead | mg/L | ------ | 0.00020 J | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Lithium | mg/L | ------ | 0.0064 J | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Mercury | mg/L | ------ | 0.00014 J | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Molybdenum | mg/L | | < 0.00069 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Selenium | mg/L | ------ | 0.012 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Thallium | mg/L | ------ | < 0.00014 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Radium | pCi/L | ------ | 2.12 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Radium-226 | pCi/L | ------ | 1.36 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Radium-228 | pCi/L | ------ | 0.763 U | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Conductivity | uS/cm | ------ | 1168.9 | ------ | 205.8 | 381.3 | ------ | 265.6 | 241.77 | ------ | 265.7 | 255.14 | ------ |
| | Dissolved Oxygen | mg/L | ------ | 5.74 | ------ | 7.2 | 7.41 | ------ | 9.2 | 9.64 | ------ | 9.16 | 10.07 | ------ |
| **Field Measured** | Oxidation Reduction Potential | millivolts | ------ | 113.5 | ------ | 208.1 | 21.7 | ------ | 232.3 | 38.7 | ------ | 178.9 | 2.5 | ------ |
| | Temperature | Deg C | ------ | 13.51 | ------ | 14.44 | 12.4 | ------ | 14.7 | 11.2 | ------ | 14.6 | 11.15 | ------ |
| | Turbidity | ntu | ------ | 3.41 | ------ | 11.8 | 5.36 | ------ | 4.69 | 6.46 | ------ | 11.87 | 5.63 | ------ |
| | Water level depth | ft | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Alkalinity as CaCO3, Total | mg/L | 28 | 8.2 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Alkalinity, Bicarbonate as CaCO3 | mg/L | 28 | 8.2 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Alkalinity, Carbonate as CaCO3 | mg/L | ------ | < 5.0 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Aluminum | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Dissolved Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Hardness | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Total | mg/L | ------ | 0.21 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Ferric (Fe2) | mg/L | ------ | 0.21 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Ferrous | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Magnesium | mg/L | 2.8 | 35.3 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Manganese | mg/L | ------ | 5.4 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| **Supplemental** | Nickel | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nitrate as N | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphorus, Total Orthophosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Potassium | mg/L | 3.4 | 6.2 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silica | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silicon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silver | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Sodium | mg/L | 10.1 | 25.9 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Sulfide | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Total Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Zinc | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |

**NOTES:**
1. mg/L - milligrams per Liter; pCi/L - picocuries per Liter; S.U. - Standarc
2. < indicates the substance was not detected above the analytical metho
3. J indicates the substance was detected at such low levels that the pre
4. Radium data are a combination of radium isotopes 226 and 228. Whe

| | Analyte | Units | SW-4 3/1/2021 | SW-4 1/19/2022 | UT01_DS 11/10/2020 | UT01_DS 2/2/2021 | UT01_DS 3/9/2021 | UT01_DS 9/7/2021 | UT01_US 11/10/2020 | UT01_US 2/2/2021 | UT01_US 3/9/2021 | UT01_US 9/7/2021 | UT02 11/10/2020 | UT02 2/2/2021 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Appendix III** | Boron | mg/L | 0.33 | 0.55 | ------ | 0.11 | 0.064 | 0.13 | ------ | 0.046 | < 0.0052 | 0.041 | | 0.063 |
| | Calcium | mg/L | 31.1 | ------ | 22.3 | 17.4 | 12.2 | 18.5 | 21.3 | 17.2 | 14.1 | 16.3 | 21.9 | 17.4 |
| | Chloride | mg/L | 6.8 | ------ | 11.5 | 9.9 | 10.4 | 12.7 | 12.0 | 10.7 | 11.2 | 13.3 | 11.7 | 10.4 |
| | Fluoride | mg/L | 0.15 | ------ | 0.18 | 0.17 | 0.49 | 0.31 | 0.18 | 0.22 | 0.42 | 0.34 | 0.18 | 0.17 |
| | pH, field measured | S.U. | 7.40 | 7.02 | 7.18 | 7.19 | 7.4 | ------ | 7.30 | 7.07 | 7.3 | ------ | 7.31 | 7.05 |
| | Sulfate | mg/L | 46.1 | ------ | 20.5 | 16.5 | 12.9 | 16.7 | 16.1 | 14.5 | 12.6 | 13.2 | 16.5 | 15.5 |
| | Total Dissolved Solids | mg/L | 176 | ------ | 145.0 | 100 | 96.0 | 130 | 132.0 | 97 | 80.0 | 117 | 127.0 | 99 |
| **Appendix IV** | Antimony | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Arsenic | mg/L | ------ | ------ | ------ | < 0.0000050 | < 0.00078 | < 0.0011 | ------ | < 0.0000050 | < 0.00078 | < 0.0011 | ------ | < 0.0000050 |
| | Barium | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Beryllium | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Cadmium | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Chromium | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Cobalt | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Fluoride | mg/L | 0.15 | ------ | 0.18 | 0.17 | 0.49 | 0.31 | 0.18 | 0.22 | 0.42 | 0.34 | 0.18 | 0.17 |
| | Lead | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Lithium | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Mercury | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Molybdenum | mg/L | ------ | ------ | < 0.010 | < 0.010 | < 0.00069 | < 0.00074 | < 0.010 | < 0.010 | < 0.00069 | < 0.00074 | < 0.010 | < 0.010 |
| | Selenium | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Thallium | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Radium | pCi/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Radium-226 | pCi/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Radium-228 | pCi/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| **Field Measured** | Conductivity | uS/cm | 263.8 | 330.8 | ------ | 252 | ------ | ------ | ------ | 187 | ------ | ------ | ------ | 190 |
| | Dissolved Oxygen | mg/L | 8.7 | 9.34 | ------ | 10.6 | ------ | ------ | ------ | 11.82 | ------ | ------ | ------ | 11.9 |
| | Oxidation Reduction Potential | millivolts | 181.65 | 32.9 | ------ | 110.4 | ------ | ------ | ------ | 144.3 | ------ | ------ | ------ | 147.3 |
| | Temperature | Deg C | 14.8 | 12.86 | ------ | 8.56 | ------ | ------ | ------ | 8.17 | ------ | ------ | ------ | 8.11 |
| | Turbidity | ntu | 11.9 | 4.82 | ------ | 5.96 | ------ | ------ | ------ | 4.05 | ------ | ------ | ------ | 4.19 |
| | Water level depth | ft | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| **Supplemental** | Alkalinity as CaCO3, Total | mg/L | ------ | ------ | 68.8 | 55.1 | 32.2 | 62.2 | 68.8 | 53.5 | 40.0 | 60.1 | 67.9 | 54.7 |
| | Alkalinity, Bicarbonate as CaCO3 | mg/L | ------ | ------ | 68.8 | 55.1 | 32.2 | 62.2 | 68.8 | 53.5 | 40.0 | 60.1 | 67.9 | 54.7 |
| | Alkalinity, Carbonate as CaCO3 | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Aluminum | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Dissolved Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Hardness | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Total | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Ferric (Fe2) | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Iron, Ferrous | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Magnesium | mg/L | ------ | ------ | 4.8 | 3.6 | 2.8 | 3.9 | 4.2 | 3.3 | 2.9 | 3.3 | 4.4 | 3.3 |
| | Manganese | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nickel | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Nitrate as N | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Phosphorus, Total Orthophosphate | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Potassium | mg/L | ------ | ------ | 3.9 | 2.9 | 2.8 | 3.5 | 3.6 | 2.9 | 2.8 | 3.2 | 3.8 | 3 |
| | Silica | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silicon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Silver | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Sodium | mg/L | ------ | ------ | 13.9 | 12.2 | 10.5 | 13.4 | 14.2 | 12.7 | 11.7 | 13.3 | 14.4 | 12.7 |
| | Sulfide | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Total Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| | Zinc | mg/L | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |

**NOTES:**
1. mg/L - milligrams per Liter; pCi/L - picocuries per Liter; S.U. - Standarc
2. < indicates the substance was not detected above the analytical metho
3. J indicates the substance was detected at such low levels that the pre
4. Radium data are a combination of radium isotopes 226 and 228. Whe

**APPENDIX A**
**ANALYTICAL RESULTS (2016 - 2022)**
Plant McDonough-Atkinson Ash Pond 1 and Ash Pond 2 and 3/4
Atlanta, Georgia

| Analyte | | Units | UT02 | UT02 | UT03 | UT03 | UT03 |
|---|---|---|---|---|---|---|---|
| | | | 3/9/2021 | 9/7/2021 | 2/2/2021 | 3/9/2021 | 9/7/2021 |
| Appendix III | Boron | mg/L | 0.063 | 0.081 | 0.069 | 0.054 | 0.088 |
| | Calcium | mg/L | 13.2 | 17.3 | 17.3 | 12.7 | 17.4 |
| | Chloride | mg/L | 10.7 | 13.1 | 10.2 | 10.4 | 12.9 |
| | Fluoride | mg/L | 0.45 | 0.32 | 0.17 | 0.47 | 0.32 |
| | pH, field measured | S.U. | 7.0 | ------ | 7.01 | 7.3 | ------ |
| | Sulfate | mg/L | 14.2 | 15.2 | 15.4 | 13.4 | 15.1 |
| | Total Dissolved Solids | mg/L | 89.0 | 120 | 98 | 84.0 | 72 |
| Appendix IV | Antimony | mg/L | ------ | ------ | ------ | ------ | ------ |
| | Arsenic | mg/L | < 0.00078 | < 0.0011 | < 0.0000050 | < 0.00078 | < 0.0011 |
| | Barium | mg/L | ------ | ------ | ------ | ------ | ------ |
| | Beryllium | mg/L | ------ | ------ | ------ | ------ | ------ |
| | Cadmium | mg/L | ------ | ------ | ------ | ------ | ------ |
| | Chromium | mg/L | ------ | ------ | ------ | ------ | ------ |
| | Cobalt | mg/L | ------ | ------ | ------ | ------ | ------ |
| | Fluoride | mg/L | 0.45 | 0.32 | 0.17 | 0.47 | 0.32 |
| | Lead | mg/L | ------ | ------ | ------ | ------ | ------ |
| | Lithium | mg/L | ------ | ------ | ------ | ------ | ------ |
| | Mercury | mg/L | ------ | ------ | ------ | ------ | ------ |
| | Molybdenum | mg/L | < 0.00069 | ------ | < 0.010 | < 0.00069 | < 0.00074 |
| | Selenium | mg/L | ------ | ------ | ------ | ------ | ------ |
| | Thallium | mg/L | ------ | ------ | ------ | ------ | ------ |
| | Radium | pCi/L | ------ | ------ | ------ | ------ | ------ |
| | Radium-226 | pCi/L | ------ | ------ | ------ | ------ | ------ |
| | Radium-228 | pCi/L | ------ | ------ | ------ | ------ | ------ |
| Field Measured | Conductivity | uS/cm | ------ | ------ | 189 | ------ | ------ |
| | Dissolved Oxygen | mg/L | ------ | ------ | 11.17 | ------ | ------ |
| | Oxidation Reduction Potential | millivolts | ------ | ------ | 143.9 | ------ | ------ |
| | Temperature | Deg C | ------ | ------ | 7.44 | ------ | ------ |
| | Turbidity | ntu | ------ | ------ | 4.6 | ------ | ------ |
| | Water level depth | ft | ------ | ------ | ------ | ------ | ------ |
| Supplemental | Alkalinity as CaCO3, Total | mg/L | 34.9 | 62.5 | 54.3 | 33.3 | 60.6 |
| | Alkalinity, Bicarbonate as CaCO3 | mg/L | 34.9 | 62.5 | 54.3 | 33.3 | 60.6 |
| | Alkalinity, Carbonate as CaCO3 | mg/L | ------ | ------ | ------ | ------ | ------ |
| | Aluminum | mg/L | ------ | ------ | ------ | ------ | ------ |
| | Dissolved Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ |
| | Hardness | mg/L | ------ | ------ | ------ | ------ | ------ |
| | Iron, Total | mg/L | ------ | ------ | ------ | ------ | ------ |
| | Iron, Ferric (Fe2) | mg/L | ------ | ------ | ------ | ------ | ------ |
| | Iron, Ferrous | mg/L | ------ | ------ | ------ | ------ | ------ |
| | Magnesium | mg/L | 2.8 | 3.6 | 3.4 | 2.8 | 3.5 |
| | Manganese | mg/L | ------ | ------ | ------ | ------ | ------ |
| | Nickel | mg/L | ------ | ------ | ------ | ------ | ------ |
| | Nitrate as N | mg/L | ------ | ------ | ------ | ------ | ------ |
| | Phosphate | mg/L | ------ | ------ | ------ | ------ | ------ |
| | Phosphorus, Total Orthophosphate | mg/L | ------ | ------ | ------ | ------ | ------ |
| | Potassium | mg/L | 2.7 | 3.2 | 2.9 | 2.7 | 3.2 |
| | Silica | mg/L | ------ | ------ | ------ | ------ | ------ |
| | Silicon | mg/L | ------ | ------ | ------ | ------ | ------ |
| | Silver | mg/L | ------ | ------ | ------ | ------ | ------ |
| | Sodium | mg/L | 10.9 | 13.4 | 12.6 | 10.8 | 13.2 |
| | Sulfide | mg/L | ------ | ------ | ------ | ------ | ------ |
| | Total Organic Carbon | mg/L | ------ | ------ | ------ | ------ | ------ |
| | Zinc | mg/L | ------ | ------ | ------ | ------ | ------ |

**NOTES:**
1. mg/L - milligrams per Liter; pCi/L - picocuries per Liter; S.U. - Standarc
2. < indicates the substance was not detected above the analytical metho
3. J indicates the substance was detected at such low levels that the pre
4. Radium data are a combination of radium isotopes 226 and 228. Whe

**APPENDIX B**

# Total Metals Laboratory Results

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

February 20, 2018

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

RE: Project: Plant McDonough Ash Ponds
Pace Project No.: 261016

Dear Joju Abraham:

Enclosed are the analytical results for sample(s) received by the laboratory on January 22, 2018. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

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

Sincerely,

Betsy McDaniel

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

Enclosures

cc: Kristen Jurinko, Golder Associates Inc.
Maria Padilla, Georgia Power - Coal Combustion Residuals
Dawn Prell, Golder Associates Inc.

Pace Analytical
www.pacelabs.com

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

## CERTIFICATIONS

| | |
|---|---|
| Project: | Plant McDonough Ash Ponds |
| Pace Project No.: | 261016 |

**Atlanta Certification IDs**

| | |
|---|---|
| 110 Technology Parkway Peachtree Corners, GA 30092 | North Carolina Certification #: 381 |
| Florida DOH Certification #: E87315 | South Carolina Certification #: 98011001 |
| Georgia DW Inorganics Certification #: 812 | Texas Certification #: T104704397-08-TX |
| Georgia DW Microbiology Certification #: 812 | Virginia Certification #: 460204 |

**Pennsylvania Certification IDs**

| | |
|---|---|
| 1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601 | Montana Certification #: Cert 0082 |
| L-A-B DOD-ELAP Accreditation #: L2417 | Nebraska Certification #: NE-05-29-14 |
| Alabama Certification #: 41590 | Nevada Certification #: PA014572015-1 |
| Arizona Certification #: AZ0734 | New Hampshire/TNI Certification #: 2976 |
| Arkansas Certification | New Jersey/TNI Certification #: PA 051 |
| California Certification #: 04222CA | New Mexico Certification #: PA01457 |
| Colorado Certification | New York/TNI Certification #: 10888 |
| Connecticut Certification #: PH-0694 | North Carolina Certification #: 42706 |
| Delaware Certification | North Dakota Certification #: R-190 |
| Florida/TNI Certification #: E87683 | Oregon/TNI Certification #: PA200002 |
| Georgia Certification #: C040 | Pennsylvania/TNI Certification #: 65-00282 |
| Guam Certification | Puerto Rico Certification #: PA01457 |
| Hawaii Certification | Rhode Island Certification #: 65-00282 |
| Idaho Certification | South Dakota Certification |
| Illinois Certification | Tennessee Certification #: TN2867 |
| Indiana Certification | Texas/TNI Certification #: T104704188-14-8 |
| Iowa Certification #: 391 | Utah/TNI Certification #: PA014572015-5 |
| Kansas/TNI Certification #: E-10358 | USDA Soil Permit #: P330-14-00213 |
| Kentucky Certification #: 90133 | Vermont Dept. of Health: ID# VT-0282 |
| Louisiana DHH/TNI Certification #: LA140008 | Virgin Island/PADEP Certification |
| Louisiana DEQ/TNI Certification #: 4086 | Virginia/VELAP Certification #: 460198 |
| Maine Certification #: PA00091 | Washington Certification #: C868 |
| Maryland Certification #: 308 | West Virginia DEP Certification #: 143 |
| Massachusetts Certification #: M-PA1457 | West Virginia DHHR Certification #: 9964C |
| Michigan/PADEP Certification | Wisconsin Certification |
| Missouri Certification #: 235 | Wyoming Certification #: 8TMS-L |

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

## SAMPLE SUMMARY

Project: Plant McDonough Ash Ponds
Pace Project No.: 261016

| Lab ID | Sample ID | Matrix | Date Collected | Date Received |
|---|---|---|---|---|
| **261016001** | **DGWC-68** | Water | 01/22/18 11:50 | 01/22/18 17:10 |
| **261016002** | **EB-1** | Water | 01/22/18 12:30 | 01/22/18 17:10 |
| **261016003** | **FB-1** | Water | 01/22/18 11:35 | 01/22/18 17:10 |
| **261016004** | **FD-1** | Water | 01/22/18 00:00 | 01/22/18 17:10 |
| **261016005** | **DGWC-68** | Water | 01/22/18 11:50 | 01/22/18 17:10 |
| **261016006** | **EB-1** | Water | 01/22/18 12:30 | 01/22/18 17:10 |
| **261016007** | **FB-1** | Water | 01/22/18 11:35 | 01/22/18 17:10 |
| **261016008** | **FD-1** | Water | 01/22/18 00:00 | 01/22/18 17:10 |

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

## SAMPLE ANALYTE COUNT

Project: Plant McDonough Ash Ponds
Pace Project No.: 261016

| Lab ID | Sample ID | Method | Analysts | Analytes Reported | Laboratory |
|---|---|---|---|---|---|
| **261016001** | **DGWC-68** | EPA 6020B | KLH | 14 | PASI-GA |
| | | EPA 7470A | MTC | 1 | PASI-GA |
| | | SM 2540C | JPT | 1 | PASI-GA |
| | | EPA 300.0 | RLC | 3 | PASI-GA |
| **261016002** | **EB-1** | EPA 6020B | KLH | 14 | PASI-GA |
| | | EPA 7470A | MTC | 1 | PASI-GA |
| | | SM 2540C | JPT | 1 | PASI-GA |
| | | EPA 300.0 | RLC | 3 | PASI-GA |
| **261016003** | **FB-1** | EPA 6020B | KLH | 14 | PASI-GA |
| | | EPA 7470A | MTC | 1 | PASI-GA |
| | | SM 2540C | JPT | 1 | PASI-GA |
| | | EPA 300.0 | RLC | 3 | PASI-GA |
| **261016004** | **FD-1** | EPA 6020B | KLH | 14 | PASI-GA |
| | | EPA 7470A | MTC | 1 | PASI-GA |
| | | SM 2540C | JPT | 1 | PASI-GA |
| | | EPA 300.0 | RLC | 3 | PASI-GA |
| **261016005** | **DGWC-68** | EPA 9315 | JC2 | 1 | PASI-PA |
| | | EPA 9320 | JLW | 1 | PASI-PA |
| | | Total Radium Calculation | CMC | 1 | PASI-PA |
| **261016006** | **EB-1** | EPA 9315 | JC2 | 1 | PASI-PA |
| | | EPA 9320 | JLW | 1 | PASI-PA |
| | | Total Radium Calculation | CMC | 1 | PASI-PA |
| **261016007** | **FB-1** | EPA 9315 | JC2 | 1 | PASI-PA |
| | | EPA 9320 | JLW | 1 | PASI-PA |
| | | Total Radium Calculation | CMC | 1 | PASI-PA |
| **261016008** | **FD-1** | EPA 9315 | JC2 | 1 | PASI-PA |
| | | EPA 9320 | JLW | 1 | PASI-PA |
| | | Total Radium Calculation | CMC | 1 | PASI-PA |

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

# ANALYTICAL RESULTS

Project: Plant McDonough Ash Ponds
Pace Project No.: 261016

**Sample: DGWC-68** **Lab ID: 261016001** Collected: 01/22/18 11:50 Received: 01/22/18 17:10 Matrix: Water

| Parameters | Results | Units | Report Limit | MDL | DF | Prepared | Analyzed | CAS No. | Qual |
|---|---|---|---|---|---|---|---|---|---|
| **6020B MET ICPMS** | Analytical Method: EPA 6020B Preparation Method: EPA 3005A | | | | | | | | |
| Antimony | ND | ug/L | 3.0 | 0.60 | 1 | 01/31/18 15:28 | 02/01/18 14:28 | 7440-36-0 | |
| Arsenic | **536** | ug/L | 5.0 | 0.52 | 1 | 01/31/18 15:28 | 02/01/18 14:28 | 7440-38-2 | |
| Barium | **117** | ug/L | 10.0 | 0.42 | 1 | 01/31/18 15:28 | 02/01/18 14:28 | 7440-39-3 | |
| Beryllium | ND | ug/L | 3.0 | 0.091 | 1 | 01/31/18 15:28 | 02/01/18 14:28 | 7440-41-7 | |
| Boron | **1530** | ug/L | 40.0 | 6.0 | 1 | 01/31/18 15:28 | 02/02/18 17:53 | 7440-42-8 | |
| Cadmium | ND | ug/L | 1.0 | 0.14 | 1 | 01/31/18 15:28 | 02/01/18 14:28 | 7440-43-9 | |
| Calcium | **53400** | ug/L | 25000 | 2020 | 50 | 01/31/18 15:28 | 02/01/18 14:34 | 7440-70-2 | M6 |
| Chromium | ND | ug/L | 10.0 | 0.45 | 1 | 01/31/18 15:28 | 02/01/18 14:28 | 7440-47-3 | |
| Cobalt | **3.2J** | ug/L | 10.0 | 0.26 | 1 | 01/31/18 15:28 | 02/01/18 14:28 | 7440-48-4 | |
| Lead | ND | ug/L | 5.0 | 0.067 | 1 | 01/31/18 15:28 | 02/01/18 14:28 | 7439-92-1 | |
| Lithium | ND | ug/L | 50.0 | 1.5 | 1 | 01/31/18 15:28 | 02/01/18 14:28 | 7439-93-2 | N2 |
| Molybdenum | **225** | ug/L | 10.0 | 1.0 | 1 | 01/31/18 15:28 | 02/01/18 14:28 | 7439-98-7 | |
| Selenium | ND | ug/L | 10.0 | 1.8 | 1 | 01/31/18 15:28 | 02/01/18 14:28 | 7782-49-2 | |
| Thallium | ND | ug/L | 1.0 | 0.052 | 1 | 01/31/18 15:28 | 02/01/18 14:28 | 7440-28-0 | |
| **7470 Mercury** | Analytical Method: EPA 7470A Preparation Method: EPA 7470A | | | | | | | | |
| Mercury | **0.060J** | ug/L | 0.20 | 0.036 | 1 | 02/07/18 09:48 | 02/07/18 15:23 | 7439-97-6 | |
| **2540C Total Dissolved Solids** | Analytical Method: SM 2540C | | | | | | | | |
| Total Dissolved Solids | **263** | mg/L | 10.0 | 10.0 | 1 | | 01/26/18 18:10 | | |
| **300.0 IC Anions 28 Days** | Analytical Method: EPA 300.0 | | | | | | | | |
| Chloride | **3.8** | mg/L | 1.0 | 0.024 | 1 | | 01/31/18 06:16 | 16887-00-6 | |
| Fluoride | **0.65** | mg/L | 0.10 | 0.029 | 1 | | 01/31/18 06:16 | 16984-48-8 | |
| Sulfate | **28.4J** | mg/L | 50.0 | 0.17 | 10 | | 02/05/18 18:00 | 14808-79-8 | |

## REPORT OF LABORATORY ANALYSIS

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

# ANALYTICAL RESULTS

Project: Plant McDonough Ash Ponds
Pace Project No.: 261016

**Sample: EB-1** **Lab ID: 261016002** Collected: 01/22/18 12:30 Received: 01/22/18 17:10 Matrix: Water

| Parameters | Results | Units | Report Limit | MDL | DF | Prepared | Analyzed | CAS No. | Qual |
|---|---|---|---|---|---|---|---|---|---|
| **6020B MET ICPMS** | Analytical Method: EPA 6020B Preparation Method: EPA 3005A | | | | | | | | |
| Antimony | **0.96J** | ug/L | 3.0 | 0.60 | 1 | 01/31/18 15:28 | 02/01/18 15:25 | 7440-36-0 | |
| Arsenic | ND | ug/L | 5.0 | 0.52 | 1 | 01/31/18 15:28 | 02/01/18 15:25 | 7440-38-2 | |
| Barium | **0.61J** | ug/L | 10.0 | 0.42 | 1 | 01/31/18 15:28 | 02/01/18 15:25 | 7440-39-3 | |
| Beryllium | ND | ug/L | 3.0 | 0.091 | 1 | 01/31/18 15:28 | 02/01/18 15:25 | 7440-41-7 | |
| Boron | ND | ug/L | 40.0 | 6.0 | 1 | 01/31/18 15:28 | 02/01/18 15:25 | 7440-42-8 | |
| Cadmium | ND | ug/L | 1.0 | 0.14 | 1 | 01/31/18 15:28 | 02/01/18 15:25 | 7440-43-9 | |
| Calcium | **45.4J** | ug/L | 500 | 40.4 | 1 | 01/31/18 15:28 | 02/01/18 15:25 | 7440-70-2 | |
| Chromium | ND | ug/L | 10.0 | 0.45 | 1 | 01/31/18 15:28 | 02/01/18 15:25 | 7440-47-3 | |
| Cobalt | ND | ug/L | 10.0 | 0.26 | 1 | 01/31/18 15:28 | 02/01/18 15:25 | 7440-48-4 | |
| Lead | **0.28J** | ug/L | 5.0 | 0.067 | 1 | 01/31/18 15:28 | 02/01/18 15:25 | 7439-92-1 | |
| Lithium | ND | ug/L | 50.0 | 1.5 | 1 | 01/31/18 15:28 | 02/01/18 15:25 | 7439-93-2 | N2 |
| Molybdenum | ND | ug/L | 10.0 | 1.0 | 1 | 01/31/18 15:28 | 02/01/18 15:25 | 7439-98-7 | |
| Selenium | ND | ug/L | 10.0 | 1.8 | 1 | 01/31/18 15:28 | 02/01/18 15:25 | 7782-49-2 | |
| Thallium | ND | ug/L | 1.0 | 0.052 | 1 | 01/31/18 15:28 | 02/01/18 15:25 | 7440-28-0 | |
| **7470 Mercury** | Analytical Method: EPA 7470A Preparation Method: EPA 7470A | | | | | | | | |
| Mercury | **0.076J** | ug/L | 0.20 | 0.036 | 1 | 02/07/18 09:48 | 02/07/18 15:26 | 7439-97-6 | |
| **2540C Total Dissolved Solids** | Analytical Method: SM 2540C | | | | | | | | |
| Total Dissolved Solids | ND | mg/L | 10.0 | 10.0 | 1 | | 01/26/18 18:10 | | |
| **300.0 IC Anions 28 Days** | Analytical Method: EPA 300.0 | | | | | | | | |
| Chloride | **0.025J** | mg/L | 1.0 | 0.024 | 1 | | 02/05/18 18:23 | 16887-00-6 | B |
| Fluoride | ND | mg/L | 0.10 | 0.029 | 1 | | 02/05/18 18:23 | 16984-48-8 | |
| Sulfate | ND | mg/L | 5.0 | 0.017 | 1 | | 02/05/18 18:23 | 14808-79-8 | |

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

# ANALYTICAL RESULTS

Project: Plant McDonough Ash Ponds
Pace Project No.: 261016

**Sample: FB-1** **Lab ID: 261016003** Collected: 01/22/18 11:35 Received: 01/22/18 17:10 Matrix: Water

| Parameters | Results | Units | Report Limit | MDL | DF | Prepared | Analyzed | CAS No. | Qual |
|---|---|---|---|---|---|---|---|---|---|
| **6020B MET ICPMS** | Analytical Method: EPA 6020B Preparation Method: EPA 3005A | | | | | | | | |
| Antimony | ND | ug/L | 3.0 | 0.60 | 1 | 01/31/18 15:28 | 02/01/18 15:31 | 7440-36-0 | |
| Arsenic | ND | ug/L | 5.0 | 0.52 | 1 | 01/31/18 15:28 | 02/01/18 15:31 | 7440-38-2 | |
| Barium | **0.62J** | ug/L | 10.0 | 0.42 | 1 | 01/31/18 15:28 | 02/01/18 15:31 | 7440-39-3 | |
| Beryllium | ND | ug/L | 3.0 | 0.091 | 1 | 01/31/18 15:28 | 02/01/18 15:31 | 7440-41-7 | |
| Boron | ND | ug/L | 40.0 | 6.0 | 1 | 01/31/18 15:28 | 02/01/18 15:31 | 7440-42-8 | |
| Cadmium | ND | ug/L | 1.0 | 0.14 | 1 | 01/31/18 15:28 | 02/01/18 15:31 | 7440-43-9 | |
| Calcium | ND | ug/L | 500 | 40.4 | 1 | 01/31/18 15:28 | 02/01/18 15:31 | 7440-70-2 | |
| Chromium | ND | ug/L | 10.0 | 0.45 | 1 | 01/31/18 15:28 | 02/01/18 15:31 | 7440-47-3 | |
| Cobalt | ND | ug/L | 10.0 | 0.26 | 1 | 01/31/18 15:28 | 02/01/18 15:31 | 7440-48-4 | |
| Lead | **0.074J** | ug/L | 5.0 | 0.067 | 1 | 01/31/18 15:28 | 02/01/18 15:31 | 7439-92-1 | |
| Lithium | ND | ug/L | 50.0 | 1.5 | 1 | 01/31/18 15:28 | 02/01/18 15:31 | 7439-93-2 | N2 |
| Molybdenum | ND | ug/L | 10.0 | 1.0 | 1 | 01/31/18 15:28 | 02/01/18 15:31 | 7439-98-7 | |
| Selenium | ND | ug/L | 10.0 | 1.8 | 1 | 01/31/18 15:28 | 02/01/18 15:31 | 7782-49-2 | |
| Thallium | ND | ug/L | 1.0 | 0.052 | 1 | 01/31/18 15:28 | 02/01/18 15:31 | 7440-28-0 | |
| **7470 Mercury** | Analytical Method: EPA 7470A Preparation Method: EPA 7470A | | | | | | | | |
| Mercury | **0.050J** | ug/L | 0.20 | 0.036 | 1 | 02/07/18 09:48 | 02/07/18 15:35 | 7439-97-6 | |
| **2540C Total Dissolved Solids** | Analytical Method: SM 2540C | | | | | | | | |
| Total Dissolved Solids | ND | mg/L | 10.0 | 10.0 | 1 | | 01/30/18 15:59 | | H1 |
| **300.0 IC Anions 28 Days** | Analytical Method: EPA 300.0 | | | | | | | | |
| Chloride | **0.028J** | mg/L | 1.0 | 0.024 | 1 | | 01/31/18 07:47 | 16887-00-6 | B |
| Fluoride | ND | mg/L | 0.10 | 0.029 | 1 | | 01/31/18 07:47 | 16984-48-8 | |
| Sulfate | ND | mg/L | 5.0 | 0.017 | 1 | | 01/31/18 07:47 | 14808-79-8 | |

**REPORT OF LABORATORY ANALYSIS**

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

# ANALYTICAL RESULTS

Project: Plant McDonough Ash Ponds
Pace Project No.: 261016

**Sample: FD-1** **Lab ID: 261016004** Collected: 01/22/18 00:00 Received: 01/22/18 17:10 Matrix: Water

| Parameters | Results | Units | Report Limit | MDL | DF | Prepared | Analyzed | CAS No. | Qual |
|---|---|---|---|---|---|---|---|---|---|
| **6020B MET ICPMS** | Analytical Method: EPA 6020B Preparation Method: EPA 3005A | | | | | | | | |
| Antimony | ND | ug/L | 3.0 | 0.60 | 1 | 01/31/18 15:28 | 02/01/18 15:37 | 7440-36-0 | |
| Arsenic | **473** | ug/L | 5.0 | 0.52 | 1 | 01/31/18 15:28 | 02/01/18 15:37 | 7440-38-2 | |
| Barium | **107** | ug/L | 10.0 | 0.42 | 1 | 01/31/18 15:28 | 02/01/18 15:37 | 7440-39-3 | |
| Beryllium | ND | ug/L | 3.0 | 0.091 | 1 | 01/31/18 15:28 | 02/01/18 15:37 | 7440-41-7 | |
| Boron | **1420** | ug/L | 40.0 | 6.0 | 1 | 01/31/18 15:28 | 02/02/18 17:59 | 7440-42-8 | |
| Cadmium | ND | ug/L | 1.0 | 0.14 | 1 | 01/31/18 15:28 | 02/01/18 15:37 | 7440-43-9 | |
| Calcium | **46600** | ug/L | 25000 | 2020 | 50 | 01/31/18 15:28 | 02/01/18 15:42 | 7440-70-2 | |
| Chromium | ND | ug/L | 10.0 | 0.45 | 1 | 01/31/18 15:28 | 02/01/18 15:37 | 7440-47-3 | |
| Cobalt | **3.0J** | ug/L | 10.0 | 0.26 | 1 | 01/31/18 15:28 | 02/01/18 15:37 | 7440-48-4 | |
| Lead | ND | ug/L | 5.0 | 0.067 | 1 | 01/31/18 15:28 | 02/01/18 15:37 | 7439-92-1 | |
| Lithium | ND | ug/L | 50.0 | 1.5 | 1 | 01/31/18 15:28 | 02/01/18 15:37 | 7439-93-2 | |
| Molybdenum | **215** | ug/L | 10.0 | 1.0 | 1 | 01/31/18 15:28 | 02/01/18 15:37 | 7439-98-7 | |
| Selenium | ND | ug/L | 10.0 | 1.8 | 1 | 01/31/18 15:28 | 02/01/18 15:37 | 7782-49-2 | |
| Thallium | ND | ug/L | 1.0 | 0.052 | 1 | 01/31/18 15:28 | 02/01/18 15:37 | 7440-28-0 | |
| **7470 Mercury** | Analytical Method: EPA 7470A Preparation Method: EPA 7470A | | | | | | | | |
| Mercury | **0.057J** | ug/L | 0.20 | 0.036 | 1 | 02/07/18 09:48 | 02/07/18 15:37 | 7439-97-6 | |
| **2540C Total Dissolved Solids** | Analytical Method: SM 2540C | | | | | | | | |
| Total Dissolved Solids | **266** | mg/L | 10.0 | 10.0 | 1 | | 01/26/18 18:11 | | |
| **300.0 IC Anions 28 Days** | Analytical Method: EPA 300.0 | | | | | | | | |
| Chloride | **3.8** | mg/L | 1.0 | 0.024 | 1 | | 02/06/18 18:08 | 16887-00-6 | |
| Fluoride | **0.57** | mg/L | 0.10 | 0.029 | 1 | | 02/06/18 18:08 | 16984-48-8 | |
| Sulfate | **28.7J** | mg/L | 50.0 | 0.17 | 10 | | 02/05/18 18:45 | 14808-79-8 | |

Pace Analytical®
www.pacelabs.com

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

## QUALITY CONTROL DATA

Project: Plant McDonough Ash Ponds
Pace Project No.: 261016

QC Batch: 630 | Analysis Method: EPA 7470A
QC Batch Method: EPA 7470A | Analysis Description: 7470 Mercury
Associated Lab Samples: 261016001, 261016002, 261016003, 261016004

METHOD BLANK: 5209 | Matrix: Water
Associated Lab Samples: 261016001, 261016002, 261016003, 261016004

| Parameter | Units | Blank Result | Reporting Limit | MDL | Analyzed | Qualifiers |
|---|---|---|---|---|---|---|
| Mercury | ug/L | ND | 0.20 | 0.036 | 02/07/18 15:07 | |

LABORATORY CONTROL SAMPLE: 5210

| Parameter | Units | Spike Conc. | LCS Result | LCS % Rec | % Rec Limits | Qualifiers |
|---|---|---|---|---|---|---|
| Mercury | ug/L | 2.5 | 2.5 | 100 | 80-120 | |

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 5211 5212

| Parameter | Units | 261048001 Result | MS Spike Conc. | MSD Spike Conc. | MS Result | MSD Result | MS % Rec | MSD % Rec | % Rec Limits | RPD | Max RPD | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mercury | ug/L | ND | 2.5 | 2.5 | 2.5 | 2.5 | 98 | 101 | 75-125 | 3 | 20 | |

SAMPLE DUPLICATE: 5213

| Parameter | Units | 261048001 Result | Dup Result | RPD | Max RPD | Qualifiers |
|---|---|---|---|---|---|---|
| Mercury | ug/L | ND | ND | | 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.**

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

## QUALITY CONTROL DATA

Project: Plant McDonough Ash Ponds
Pace Project No.: 261016

QC Batch: 310 Analysis Method: EPA 6020B
QC Batch Method: EPA 3005A Analysis Description: 6020B MET
Associated Lab Samples: 261016001, 261016002, 261016003, 261016004

METHOD BLANK: 1716 Matrix: Water
Associated Lab Samples: 261016001, 261016002, 261016003, 261016004

| Parameter | Units | Blank Result | Reporting Limit | MDL | Analyzed | Qualifiers |
|---|---|---|---|---|---|---|
| Antimony | ug/L | ND | 3.0 | 0.60 | 02/01/18 14:05 | |
| Arsenic | ug/L | ND | 5.0 | 0.52 | 02/01/18 14:05 | |
| Barium | ug/L | ND | 10.0 | 0.42 | 02/01/18 14:05 | |
| Beryllium | ug/L | ND | 3.0 | 0.091 | 02/01/18 14:05 | |
| Boron | ug/L | ND | 40.0 | 6.0 | 02/01/18 14:05 | |
| Cadmium | ug/L | ND | 1.0 | 0.14 | 02/01/18 14:05 | |
| Calcium | ug/L | ND | 500 | 40.4 | 02/01/18 14:05 | |
| Chromium | ug/L | ND | 10.0 | 0.45 | 02/01/18 14:05 | |
| Cobalt | ug/L | ND | 10.0 | 0.26 | 02/01/18 14:05 | |
| Lead | ug/L | ND | 5.0 | 0.067 | 02/01/18 14:05 | |
| Lithium | ug/L | ND | 50.0 | 1.5 | 02/01/18 14:05 | |
| Molybdenum | ug/L | ND | 10.0 | 1.0 | 02/01/18 14:05 | |
| Selenium | ug/L | ND | 10.0 | 1.8 | 02/01/18 14:05 | |
| Thallium | ug/L | ND | 1.0 | 0.052 | 02/01/18 14:05 | |

LABORATORY CONTROL SAMPLE: 1717

| Parameter | Units | Spike Conc. | LCS Result | LCS % Rec | % Rec Limits | Qualifiers |
|---|---|---|---|---|---|---|
| Antimony | ug/L | 100 | 113 | 113 | 80-120 | |
| Arsenic | ug/L | 100 | 103 | 103 | 80-120 | |
| Barium | ug/L | 100 | 105 | 105 | 80-120 | |
| Beryllium | ug/L | 100 | 109 | 109 | 80-120 | |
| Boron | ug/L | 1000 | 1110 | 111 | 80-120 | |
| Cadmium | ug/L | 100 | 105 | 105 | 80-120 | |
| Calcium | ug/L | 1000 | 1050 | 105 | 80-120 | |
| Chromium | ug/L | 100 | 106 | 106 | 80-120 | |
| Cobalt | ug/L | 100 | 102 | 102 | 80-120 | |
| Lead | ug/L | 100 | 101 | 101 | 80-120 | |
| Lithium | ug/L | 100 | 107 | 107 | 80-120 | |
| Molybdenum | ug/L | 100 | 107 | 107 | 80-120 | |
| Selenium | ug/L | 100 | 103 | 103 | 80-120 | |
| Thallium | ug/L | 100 | 103 | 103 | 80-120 | |

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1766 1765

| Parameter | Units | 261016001 Result | MS Spike Conc. | MSD Spike Conc. | MS Result | MSD Result | MS % Rec | MSD % Rec | % Rec Limits | RPD | Max RPD | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Antimony | ug/L | ND | 100 | 100 | 111 | 113 | 111 | 113 | 75-125 | 2 | 20 | |

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

## REPORT OF LABORATORY ANALYSIS

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

# QUALITY CONTROL DATA

Project: Plant McDonough Ash Ponds
Pace Project No.: 261016

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1766 1765

| Parameter | Units | 261016001 Result | MS Spike Conc. | MSD Spike Conc. | MS Result | MSD Result | MS % Rec | MSD % Rec | % Rec Limits | RPD | Max RPD | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Arsenic | ug/L | 536 | 100 | 100 | 606 | 624 | 70 | 88 | 75-125 | 3 | 20 | |
| Barium | ug/L | 117 | 100 | 100 | 215 | 222 | 98 | 105 | 75-125 | 3 | 20 | |
| Beryllium | ug/L | ND | 100 | 100 | 99.5 | 103 | 99 | 103 | 75-125 | 3 | 20 | |
| Boron | ug/L | 1530 | 1000 | 1000 | 2470 | 2470 | 94 | 93 | 75-125 | 0 | 20 | |
| Cadmium | ug/L | ND | 100 | 100 | 101 | 105 | 101 | 105 | 75-125 | 3 | 20 | |
| Calcium | ug/L | 53400 | 1000 | 1000 | 50100 | 52600 | -321 | -79 | 75-125 | 5 | 20 | M6 |
| Chromium | ug/L | ND | 100 | 100 | 103 | 105 | 103 | 105 | 75-125 | 2 | 20 | |
| Cobalt | ug/L | 3.2J | 100 | 100 | 102 | 103 | 99 | 100 | 75-125 | 1 | 20 | |
| Lead | ug/L | ND | 100 | 100 | 97.4 | 99.2 | 97 | 99 | 75-125 | 2 | 20 | |
| Lithium | ug/L | ND | 100 | 100 | 97.4 | 99.9 | 96 | 99 | 75-125 | 3 | 20 | |
| Molybdenum | ug/L | 225 | 100 | 100 | 316 | 322 | 91 | 97 | 75-125 | 2 | 20 | |
| Selenium | ug/L | ND | 100 | 100 | 98.9 | 100 | 98 | 100 | 75-125 | 2 | 20 | |
| Thallium | ug/L | ND | 100 | 100 | 100 | 99.6 | 100 | 100 | 75-125 | 0 | 20 | |

SAMPLE DUPLICATE: 1718

| Parameter | Units | 92371048001 Result | Dup Result | RPD | Max RPD | Qualifiers |
|---|---|---|---|---|---|---|
| Antimony | ug/L | ND | ND | | 20 | |
| Arsenic | ug/L | ND | ND | | 20 | |
| Barium | ug/L | 23.1 | 22.6 | 2 | 20 | |
| Beryllium | ug/L | ND | ND | | 20 | |
| Boron | ug/L | ND | ND | | 20 | |
| Cadmium | ug/L | ND | ND | | 20 | |
| Calcium | ug/L | 2390 | 2460 | 3 | 20 | |
| Chromium | ug/L | ND | 0.56J | | 20 | |
| Cobalt | ug/L | 43.6 | 43.5 | 0 | 20 | |
| Lead | ug/L | ND | 0.11J | | 20 | |
| Lithium | ug/L | ND | ND | | 20 | |
| Molybdenum | ug/L | ND | ND | | 20 | |
| Selenium | ug/L | ND | ND | | 20 | |
| Thallium | ug/L | ND | ND | | 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.**

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

## QUALITY CONTROL DATA

Project: Plant McDonough Ash Ponds
Pace Project No.: 261016

QC Batch: 128 | Analysis Method: SM 2540C
QC Batch Method: SM 2540C | Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 261016001, 261016002, 261016004

LABORATORY CONTROL SAMPLE: 837

| Parameter | Units | Spike Conc. | LCS Result | LCS % Rec | % Rec Limits | Qualifiers |
|---|---|---|---|---|---|---|
| Total Dissolved Solids | mg/L | 400 | 393 | 98 | 84-108 | |

SAMPLE DUPLICATE: 838

| Parameter | Units | 261016001 Result | Dup Result | RPD | Max RPD | Qualifiers |
|---|---|---|---|---|---|---|
| Total Dissolved Solids | mg/L | 263 | 261 | 1 | 10 | |

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

**REPORT OF LABORATORY ANALYSIS**

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

# QUALITY CONTROL DATA

Project: Plant McDonough Ash Ponds
Pace Project No.: 261016

QC Batch: 227 — Analysis Method: SM 2540C
QC Batch Method: SM 2540C — Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 261016003

LABORATORY CONTROL SAMPLE: 1281

| Parameter | Units | Spike Conc. | LCS Result | LCS % Rec | % Rec Limits | Qualifiers |
|---|---|---|---|---|---|---|
| Total Dissolved Solids | mg/L | 400 | 378 | 94 | 84-108 | |

SAMPLE DUPLICATE: 1282

| Parameter | Units | 261016003 Result | Dup Result | RPD | Max RPD | Qualifiers |
|---|---|---|---|---|---|---|
| Total Dissolved Solids | mg/L | ND | ND | | 10 | H1 |

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.

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

# QUALITY CONTROL DATA

Project: Plant McDonough Ash Ponds
Pace Project No.: 261016

QC Batch: 263 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 261016001, 261016002, 261016003, 261016004

METHOD BLANK: 1503 Matrix: Water
Associated Lab Samples: 261016001, 261016002, 261016003, 261016004

| Parameter | Units | Blank Result | Reporting Limit | MDL | Analyzed | Qualifiers |
|---|---|---|---|---|---|---|
| Chloride | mg/L | 0.030J | 1.0 | 0.024 | 01/31/18 04:48 | |
| Fluoride | mg/L | ND | 0.10 | 0.029 | 01/31/18 04:48 | |
| Sulfate | mg/L | ND | 5.0 | 0.017 | 01/31/18 04:48 | |

LABORATORY CONTROL SAMPLE: 1504

| Parameter | Units | Spike Conc. | LCS Result | LCS % Rec | % Rec Limits | Qualifiers |
|---|---|---|---|---|---|---|
| Chloride | mg/L | 10 | 10.3 | 103 | 90-110 | |
| Fluoride | mg/L | 10 | 10.1 | 101 | 90-110 | |
| Sulfate | mg/L | 10 | 10.2 | 102 | 90-110 | |

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1505 1506

| Parameter | Units | 261016001 Result | MS Spike Conc. | MSD Spike Conc. | MS Result | MSD Result | MS % Rec | MSD % Rec | % Rec Limits | RPD | Max RPD | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Chloride | mg/L | 3.8 | 10 | 10 | 13.9 | 14.0 | 101 | 101 | 90-110 | 1 | 15 | |
| Fluoride | mg/L | 0.65 | 10 | 10 | 10.7 | 10.8 | 101 | 102 | 90-110 | 1 | 15 | |
| Sulfate | mg/L | 28.4J | 10 | 10 | 37.8 | 38.1 | 94 | 97 | 90-110 | 1 | 15 | |

**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.**

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

# ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: Plant McDonough Ash Ponds
Pace Project No.: 261016

**Sample: DGWC-68** **Lab ID: 261016005** Collected: 01/22/18 11:50 Received: 01/22/18 17:10 Matrix: Water
PWS: Site ID: Sample Type:

| Parameters | Method | Act ± Unc (MDC) Carr Trac | Units | Analyzed | CAS No. | Qual |
|---|---|---|---|---|---|---|
| Radium-226 | EPA 9315 | **0.829 ± 0.347 (0.357) C:91% T:NA** | pCi/L | 02/09/18 08:29 | 13982-63-3 | |
| Radium-228 | EPA 9320 | **0.447 ± 0.306 (0.580) C:81% T:85%** | pCi/L | 02/12/18 14:57 | 15262-20-1 | |
| Total Radium | Total Radium Calculation | **1.28 ± 0.653 (0.937)** | pCi/L | 02/14/18 13:59 | 7440-14-4 | |

## REPORT OF LABORATORY ANALYSIS

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

# ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: Plant McDonough Ash Ponds
Pace Project No.: 261016

**Sample: EB-1** **Lab ID: 261016006** Collected: 01/22/18 12:30 Received: 01/22/18 17:10 Matrix: Water
PWS: Site ID: Sample Type:

| Parameters | Method | Act ± Unc (MDC) Carr Trac | Units | Analyzed | CAS No. | Qual |
|---|---|---|---|---|---|---|
| Radium-226 | EPA 9315 | **0.397 ± 0.262 (0.387) C:81% T:NA** | pCi/L | 02/09/18 08:29 | 13982-63-3 | |
| Radium-228 | EPA 9320 | **0.310 ± 0.276 (0.553) C:79% T:90%** | pCi/L | 02/12/18 14:57 | 15262-20-1 | |
| Total Radium | Total Radium Calculation | **0.707 ± 0.538 (0.940)** | pCi/L | 02/14/18 13:59 | 7440-14-4 | |

## REPORT OF LABORATORY ANALYSIS

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

## ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: Plant McDonough Ash Ponds
Pace Project No.: 261016

**Sample: FB-1** | **Lab ID: 261016007** | Collected: 01/22/18 11:35 | Received: 01/22/18 17:10 | Matrix: Water
PWS: | Site ID: | Sample Type:

| Parameters | Method | Act ± Unc (MDC) Carr Trac | Units | Analyzed | CAS No. | Qual |
|---|---|---|---|---|---|---|
| Radium-226 | EPA 9315 | **0.0991 ± 0.176 (0.397) C:83% T:NA** | pCi/L | 02/09/18 08:29 | 13982-63-3 | |
| Radium-228 | EPA 9320 | **0.348 ± 0.325 (0.662) C:82% T:81%** | pCi/L | 02/12/18 14:58 | 15262-20-1 | |
| Total Radium | Total Radium Calculation | **0.447 ± 0.501 (1.06)** | pCi/L | 02/14/18 13:59 | 7440-14-4 | |

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

# ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: Plant McDonough Ash Ponds
Pace Project No.: 261016

**Sample: FD-1** | **Lab ID: 261016008** | Collected: 01/22/18 00:00 | Received: 01/22/18 17:10 | Matrix: Water
PWS: | Site ID: | Sample Type:

| Parameters | Method | Act ± Unc (MDC) Carr Trac | Units | Analyzed | CAS No. | Qual |
|---|---|---|---|---|---|---|
| Radium-226 | EPA 9315 | **1.31 ± 0.488 (0.441) C:67% T:NA** | pCi/L | 02/09/18 09:59 | 13982-63-3 | |
| Radium-228 | EPA 9320 | **0.293 ± 0.263 (0.525) C:79% T:89%** | pCi/L | 02/12/18 14:58 | 15262-20-1 | |
| Total Radium | Total Radium Calculation | **1.60 ± 0.751 (0.966)** | pCi/L | 02/14/18 13:59 | 7440-14-4 | |

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

# QUALITY CONTROL - RADIOCHEMISTRY

Project: Plant McDonough Ash Ponds
Pace Project No.: 261016

QC Batch: 287241 Analysis Method: EPA 9315
QC Batch Method: EPA 9315 Analysis Description: 9315 Total Radium
Associated Lab Samples: 261016005, 261016006, 261016007, 261016008

METHOD BLANK: 1408135 Matrix: Water
Associated Lab Samples: 261016005, 261016006, 261016007, 261016008

| Parameter | Act ± Unc (MDC) Carr Trac | Units | Analyzed | Qualifiers |
|---|---|---|---|---|
| Radium-226 | 0.203 ± 0.190 (0.337) C:93% T:NA | pCi/L | 02/09/18 08:29 | |

**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

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

## QUALITY CONTROL - RADIOCHEMISTRY

Project: Plant McDonough Ash Ponds
Pace Project No.: 261016

QC Batch: 287242    Analysis Method: EPA 9320
QC Batch Method: EPA 9320    Analysis Description: 9320 Radium 228
Associated Lab Samples: 261016005, 261016006, 261016007, 261016008

METHOD BLANK: 1408136    Matrix: Water
Associated Lab Samples: 261016005, 261016006, 261016007, 261016008

| Parameter | Act ± Unc (MDC) Carr Trac | Units | Analyzed | Qualifiers |
|---|---|---|---|---|
| Radium-228 | -0.163 ± 0.246 (0.615) C:81% T:86% | pCi/L | 02/12/18 14:57 | |

**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

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

# QUALIFIERS

Project: Plant McDonough Ash Ponds
Pace Project No.: 261016

## 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.
S - Surrogate
1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.
Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.
LCS(D) - Laboratory Control Sample (Duplicate)
MS(D) - Matrix Spike (Duplicate)
DUP - Sample Duplicate
RPD - Relative Percent Difference
NC - Not Calculable.
SG - Silica Gel - Clean-Up
U - Indicates the compound was analyzed for, but not detected.
N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.
Act - Activity
Unc - Uncertainty: SDWA = 1.96 sigma count uncertainty, all other matrices = Expanded Uncertainty (95% confidence interval).
Gamma Spec = Expanded Uncertainty (95.4% Confidence Interval)
(MDC) - Minimum Detectable Concentration
Trac - Tracer Recovery (%)
Carr - Carrier Recovery (%)
Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.
TNI - The NELAC Institute.

## LABORATORIES

| | |
|---|---|
| PASI-GA | Pace Analytical Services - Atlanta, GA |
| PASI-PA | Pace Analytical Services - Greensburg |

## ANALYTE QUALIFIERS

| | |
|---|---|
| B | Analyte was detected in the associated method blank. |
| H1 | Analysis conducted outside the EPA method holding time. |
| M6 | Matrix spike and Matrix spike duplicate recovery not evaluated against control limits due to sample dilution. |
| N2 | The lab does not hold NELAC/TNI accreditation for this parameter. |

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

## QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Plant McDonough Ash Ponds
Pace Project No.: 261016

| Lab ID | Sample ID | QC Batch Method | QC Batch | Analytical Method | Analytical Batch |
|---|---|---|---|---|---|
| **261016001** | **DGWC-68** | EPA 3005A | 310 | EPA 6020B | 327 |
| **261016002** | **EB-1** | EPA 3005A | 310 | EPA 6020B | 327 |
| **261016003** | **FB-1** | EPA 3005A | 310 | EPA 6020B | 327 |
| **261016004** | **FD-1** | EPA 3005A | 310 | EPA 6020B | 327 |
| **261016001** | **DGWC-68** | EPA 7470A | 630 | EPA 7470A | 644 |
| **261016002** | **EB-1** | EPA 7470A | 630 | EPA 7470A | 644 |
| **261016003** | **FB-1** | EPA 7470A | 630 | EPA 7470A | 644 |
| **261016004** | **FD-1** | EPA 7470A | 630 | EPA 7470A | 644 |
| **261016005** | **DGWC-68** | EPA 9315 | 287241 | | |
| **261016006** | **EB-1** | EPA 9315 | 287241 | | |
| **261016007** | **FB-1** | EPA 9315 | 287241 | | |
| **261016008** | **FD-1** | EPA 9315 | 287241 | | |
| **261016005** | **DGWC-68** | EPA 9320 | 287242 | | |
| **261016006** | **EB-1** | EPA 9320 | 287242 | | |
| **261016007** | **FB-1** | EPA 9320 | 287242 | | |
| **261016008** | **FD-1** | EPA 9320 | 287242 | | |
| **261016005** | **DGWC-68** | Total Radium Calculation | 288095 | | |
| **261016006** | **EB-1** | Total Radium Calculation | 288095 | | |
| **261016007** | **FB-1** | Total Radium Calculation | 288095 | | |
| **261016008** | **FD-1** | Total Radium Calculation | 288095 | | |
| **261016001** | **DGWC-68** | SM 2540C | 128 | | |
| **261016002** | **EB-1** | SM 2540C | 128 | | |
| **261016003** | **FB-1** | SM 2540C | 227 | | |
| **261016004** | **FD-1** | SM 2540C | 128 | | |
| **261016001** | **DGWC-68** | EPA 300.0 | 263 | | |
| **261016002** | **EB-1** | EPA 300.0 | 263 | | |
| **261016003** | **FB-1** | EPA 300.0 | 263 | | |
| **261016004** | **FD-1** | EPA 300.0 | 263 | | |

# CHAIN OF COUSTODY RECORD

Pace Analytical®

Pace Analytical Services, Inc.
110 TECHNOLOGY PARKWAY, PEACHTREE CORNERS, GA 30092
(770) 734-4200 : FAX (770) 734-4201 : www.asi-lab.com



CLIENT NAME: Georgia Power

CLIENT ADDRESS/PHONE NUMBER/FAX NUMBER:
241 Ralph McGill Blvd SE B10185
Atlanta, GA 30308
404-506-7239

REPORT TO: Tim Richards

CC: Rachel Kirkman, Kristen Jurinko

REQUESTED COMPLETION DATE:

PO #: laburch@southernco.com

PROJECT NAME/STATE: Plant McDonough AP

PROJECT #: 1668496 Phase II CCR

ANALYSIS REQUESTED

| | | | | | | | Metals App. III & IV (EPA 6020/7470) | Cl, F, $SO_4$ & TDS (EPA 300.0 & SM 2540C) | Radium 226 & 228 (SW-846 9315/9320) | LAB ID NUMBER | REMARKS/ADDITIONAL INFORMATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | CONTAINER TYPE: | | P | P | P | | |
| | | | | | PRESERVATION: | | 3 | 7 | 3 | | |
| Collection DATE | Collection TIME | MATRIX CODE* | COMP | GRAB | SAMPLE IDENTIFICATION | # of CONTAINERS | | | | | |
| 01/22/18 | 1150 | GW | | x | DGWC-68 | 6 | 1 | 1 | 4 | 1 | Hold analysis for Client Confirmation/Extra Radium |
| 01/22/18 | 1230 | W | | x | EB-1 | 4 | 1 | 1 | 2 | 2 | |
| 01/22/18 | 1135 | W | | x | FB-1 | 4 | 1 | 1 | 2 | 3 | |
| 01/22/18 | – | GW | | x | FD-1 | 4 | 1 | 1 | 2 | 4 | |

CONTAINER TYPE:
P - PLASTIC
A - AMBER GLASS
G - CLEAR GLASS
V - VOA VIAL
S - STERILE
O - OTHER

PRESERVATION:
1 - HCl, ≤6°C
2 - $H_2SO_4$, ≤6°C
3 - $HNO_3$
4 - NaOH, ≤6°C
5 - NaOH/ZnAc, ≤6°C
6 - $Na_2S_2O_3$, ≤8°C
7 - ≤6°C not frozen

*MATRIX CODES:
DW - DRINKING WATER
WW - WASTEWATER
GW - GROUNDWATER
SW - SURFACE WATER
~~ST - STORM WATER~~
W - WATER
S - SOIL
SL - SLUDGE
SD - SOLID
A - AIR
~~L - LIQUID~~
P - PRODUCT

SAMPLED BY AND TITLE: Ben Hodges Field Lead — DATE/TIME: 1/22/18 1700

RELINQUISHED BY: [signature] — DATE/TIME: 1/22/18 1716

RECEIVED BY: — DATE/TIME:

RELINQUISHED BY: — DATE/TIME:

RECEIVED BY LAB: [signature] — DATE/TIME: 01/22/18 1710

SAMPLE SHIPPED VIA: UPS FED-EX USPS COURIER CLIENT OTHER FS

pH checked: Yes No NA

Ice: Yes No NA

Temperature: Min: 4.3 Max:

Custody Seal: Intact Broken Not Present

\# of Coolers:

Cooler ID:

WO#: 261016

261016

DGWC-68 COC.xlsx

# Sample Condition Upon Receipt

Pace Analytical

Client Name: GA Power

Project #

**WO#:261016**

PM: BM Due Date: 01/30/18

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 THR-083 Type of Ice: Wet Blue None ☐ Samples on ice, cooling process has begun

Cooler Temperature 4.3 Biological Tissue is Frozen: Yes No

Temp should be above freezing to 6°C

Date and Initials of person examining contents: 1/22/18 MR

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: -Includes date/time/ID/Analysis Matrix: GW | ☑Yes | ☐No | ☐N/A | 12. |
| 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 Services, LLC**
110 Technology Parkway
Peachtree Corners, GA 30092
(770)734-4200

February 08, 2018

Kristen Jurinko
Golder Associates - Atlanta
3730 Chamblee Tucker Road
Atlanta, GA 30341

RE: Project: McDonough Advanced Engineering
Pace Project No.: 261081

Dear Kristen Jurinko:

Enclosed are the analytical results for sample(s) received by the laboratory on January 24, 2018. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

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

Sincerely,

Betsy McDaniel

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

Enclosures

cc: Tim Richards, Golder Associates - Atlanta

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

## CERTIFICATIONS

| | |
|---|---|
| Project: | McDonough Advanced Engineering |
| Pace Project No.: | 261081 |

**Atlanta Certification IDs**

| | |
|---|---|
| 110 Technology Parkway Peachtree Corners, GA 30092 | North Carolina Certification #: 381 |
| Florida DOH Certification #: E87315 | South Carolina Certification #: 98011001 |
| Georgia DW Inorganics Certification #: 812 | Texas Certification #: T104704397-08-TX |
| Georgia DW Microbiology Certification #: 812 | Virginia Certification #: 460204 |

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

## SAMPLE SUMMARY

Project: McDonough Advanced Engineering
Pace Project No.: 261081

| Lab ID | Sample ID | Matrix | Date Collected | Date Received |
|---|---|---|---|---|
| **261081001** | **DGWC-42** | Water | 01/23/18 13:35 | 01/24/18 13:00 |
| **261081002** | **B-50** | Water | 01/23/18 10:35 | 01/24/18 13:00 |
| **261081003** | **DGWA-70A** | Water | 01/23/18 09:05 | 01/24/18 13:00 |
| **261081004** | **B-28** | Water | 01/23/18 15:10 | 01/24/18 13:00 |
| **261081005** | **DGWC-37** | Water | 01/23/18 14:30 | 01/24/18 13:00 |
| **261081006** | **DGWC-38** | Water | 01/23/18 12:30 | 01/24/18 13:00 |
| **261081007** | **DGWC-39** | Water | 01/23/18 10:25 | 01/24/18 13:00 |

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

# SAMPLE ANALYTE COUNT

Project: McDonough Advanced Engineering
Pace Project No.: 261081

| Lab ID | Sample ID | Method | Analysts | Analytes Reported |
|---|---|---|---|---|
| **261081001** | **DGWC-42** | EPA 6020B | KLH | 7 |
| | | EPA 6020B | KLH | 3 |
| | | EPA 300.0 | RLC | 2 |
| **261081002** | **B-50** | EPA 6020B | KLH | 7 |
| | | EPA 6020B | KLH | 3 |
| | | EPA 300.0 | RLC | 2 |
| **261081003** | **DGWA-70A** | EPA 6020B | KLH | 7 |
| | | EPA 6020B | KLH | 3 |
| | | EPA 300.0 | RLC | 2 |
| **261081004** | **B-28** | EPA 6020B | KLH | 7 |
| | | EPA 6020B | KLH | 3 |
| | | EPA 300.0 | RLC | 2 |
| **261081005** | **DGWC-37** | EPA 6020B | KLH | 7 |
| | | EPA 6020B | KLH | 3 |
| | | EPA 300.0 | RLC | 2 |
| **261081006** | **DGWC-38** | EPA 6020B | KLH | 7 |
| | | EPA 6020B | KLH | 3 |
| | | EPA 300.0 | RLC | 2 |
| **261081007** | **DGWC-39** | EPA 6020B | KLH | 7 |
| | | EPA 6020B | KLH | 3 |
| | | EPA 300.0 | RLC | 2 |

Pace Analytical®
www.pacelabs.com

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

# ANALYTICAL RESULTS

Project: McDonough Advanced Engineering
Pace Project No.: 261081

**Sample: DGWC-42** **Lab ID: 261081001** Collected: 01/23/18 13:35 Received: 01/24/18 13:00 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 | | | | | | | | |
| Arsenic | ND | ug/L | 5.0 | 0.52 | 1 | 01/29/18 12:37 | 02/05/18 17:24 | 7440-38-2 | |
| Calcium | **45700** | ug/L | 25000 | 2020 | 50 | 01/29/18 12:37 | 02/05/18 17:29 | 7440-70-2 | |
| Iron | **523** | ug/L | 40.0 | 4.3 | 1 | 01/29/18 12:37 | 02/05/18 17:24 | 7439-89-6 | N2 |
| Magnesium | **36500** | ug/L | 2500 | 314 | 50 | 01/29/18 12:37 | 02/05/18 17:29 | 7439-95-4 | |
| Manganese | **11100** | ug/L | 500 | 38.2 | 50 | 01/29/18 12:37 | 02/05/18 17:29 | 7439-96-5 | |
| Potassium | **5970** | ug/L | 100 | 16.5 | 1 | 01/29/18 12:37 | 02/05/18 17:24 | 7440-09-7 | |
| Sodium | **58700** | ug/L | 5000 | 674 | 50 | 01/29/18 12:37 | 02/05/18 17:29 | 7440-23-5 | |
| **6020B MET ICPMS, Dissolved** | Analytical Method: EPA 6020B Preparation Method: EPA 3005A | | | | | | | | |
| Arsenic, Dissolved | ND | ug/L | 5.0 | 0.52 | 1 | 01/31/18 15:52 | 02/01/18 22:17 | 7440-38-2 | |
| Iron, Dissolved | **415** | ug/L | 40.0 | 4.3 | 1 | 01/31/18 15:52 | 02/01/18 22:17 | 7439-89-6 | N2 |
| Manganese, Dissolved | **10500** | ug/L | 500 | 38.2 | 50 | 01/31/18 15:52 | 02/02/18 19:20 | 7439-96-5 | |
| **300.0 IC Anions 28 Days** | Analytical Method: EPA 300.0 | | | | | | | | |
| Chloride | **26.2** | mg/L | 12.5 | 1.2 | 50 | | 02/05/18 19:08 | 16887-00-6 | M1 |
| Sulfate | **349** | mg/L | 50.0 | 0.85 | 50 | | 02/05/18 19:08 | 14808-79-8 | M1 |

**REPORT OF LABORATORY ANALYSIS**

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

# ANALYTICAL RESULTS

Project: McDonough Advanced Engineering
Pace Project No.: 261081

**Sample: B-50** **Lab ID: 261081002** Collected: 01/23/18 10:35 Received: 01/24/18 13:00 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 | | | | | | | | |
| Arsenic | **4.3J** | ug/L | 5.0 | 0.52 | 1 | 01/29/18 12:37 | 02/05/18 17:52 | 7440-38-2 | |
| Calcium | **64800** | ug/L | 25000 | 2020 | 50 | 01/29/18 12:37 | 02/05/18 17:58 | 7440-70-2 | |
| Iron | **3590** | ug/L | 40.0 | 4.3 | 1 | 01/29/18 12:37 | 02/05/18 17:52 | 7439-89-6 | N2 |
| Magnesium | **24500** | ug/L | 2500 | 314 | 50 | 01/29/18 12:37 | 02/05/18 17:58 | 7439-95-4 | |
| Manganese | **12200** | ug/L | 500 | 38.2 | 50 | 01/29/18 12:37 | 02/05/18 17:58 | 7439-96-5 | |
| Potassium | **9460** | ug/L | 100 | 16.5 | 1 | 01/29/18 12:37 | 02/06/18 15:15 | 7440-09-7 | |
| Sodium | **21600** | ug/L | 5000 | 674 | 50 | 01/29/18 12:37 | 02/05/18 17:58 | 7440-23-5 | |
| **6020B MET ICPMS, Dissolved** | Analytical Method: EPA 6020B Preparation Method: EPA 3005A | | | | | | | | |
| Arsenic, Dissolved | **4.5J** | ug/L | 5.0 | 0.52 | 1 | 01/31/18 15:52 | 02/01/18 22:22 | 7440-38-2 | |
| Iron, Dissolved | **3700** | ug/L | 40.0 | 4.3 | 1 | 01/31/18 15:52 | 02/01/18 22:22 | 7439-89-6 | N2 |
| Manganese, Dissolved | **11600** | ug/L | 500 | 38.2 | 50 | 01/31/18 15:52 | 02/02/18 19:26 | 7439-96-5 | |
| **300.0 IC Anions 28 Days** | Analytical Method: EPA 300.0 | | | | | | | | |
| Chloride | **16.3** | mg/L | 0.25 | 0.024 | 1 | | 01/26/18 20:11 | 16887-00-6 | M1 |
| Sulfate | **426** | mg/L | 50.0 | 0.85 | 50 | | 02/05/18 19:31 | 14808-79-8 | M1 |

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

# ANALYTICAL RESULTS

Project: McDonough Advanced Engineering
Pace Project No.: 261081

**Sample: DGWA-70A** **Lab ID: 261081003** Collected: 01/23/18 09:05 Received: 01/24/18 13:00 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 | | | | | | | | |
| Arsenic | ND | ug/L | 5.0 | 0.52 | 1 | 01/29/18 12:37 | 02/05/18 18:04 | 7440-38-2 | |
| Calcium | **4950** | ug/L | 500 | 40.4 | 1 | 01/29/18 12:37 | 02/05/18 18:04 | 7440-70-2 | |
| Iron | **182** | ug/L | 40.0 | 4.3 | 1 | 01/29/18 12:37 | 02/05/18 18:04 | 7439-89-6 | N2 |
| Magnesium | **2180** | ug/L | 50.0 | 6.3 | 1 | 01/29/18 12:37 | 02/05/18 18:04 | 7439-95-4 | |
| Manganese | **21.2** | ug/L | 10.0 | 0.76 | 1 | 01/29/18 12:37 | 02/05/18 18:04 | 7439-96-5 | |
| Potassium | **1660** | ug/L | 100 | 16.5 | 1 | 01/29/18 12:37 | 02/06/18 15:21 | 7440-09-7 | |
| Sodium | **3610** | ug/L | 100 | 13.5 | 1 | 01/29/18 12:37 | 02/05/18 18:04 | 7440-23-5 | |
| **6020B MET ICPMS, Dissolved** | Analytical Method: EPA 6020B Preparation Method: EPA 3005A | | | | | | | | |
| Arsenic, Dissolved | ND | ug/L | 5.0 | 0.52 | 1 | 01/31/18 15:52 | 02/01/18 22:28 | 7440-38-2 | |
| Iron, Dissolved | **27.9J** | ug/L | 40.0 | 4.3 | 1 | 01/31/18 15:52 | 02/01/18 22:28 | 7439-89-6 | N2 |
| Manganese, Dissolved | **18.1** | ug/L | 10.0 | 0.76 | 1 | 01/31/18 15:52 | 02/01/18 22:28 | 7439-96-5 | |
| **300.0 IC Anions 28 Days** | Analytical Method: EPA 300.0 | | | | | | | | |
| Chloride | **2.4** | mg/L | 0.25 | 0.024 | 1 | | 01/26/18 20:32 | 16887-00-6 | |
| Sulfate | **0.67J** | mg/L | 1.0 | 0.017 | 1 | | 01/26/18 20:32 | 14808-79-8 | |

**REPORT OF LABORATORY ANALYSIS**

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

## ANALYTICAL RESULTS

Project: McDonough Advanced Engineering
Pace Project No.: 261081

**Sample: B-28** **Lab ID: 261081004** Collected: 01/23/18 15:10 Received: 01/24/18 13:00 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 | | | | | | | | |
| Arsenic | ND | ug/L | 5.0 | 0.52 | 1 | 01/29/18 12:37 | 02/05/18 18:15 | 7440-38-2 | |
| Calcium | **52100** | ug/L | 25000 | 2020 | 50 | 01/29/18 12:37 | 02/05/18 18:21 | 7440-70-2 | |
| Iron | **6.4J** | ug/L | 40.0 | 4.3 | 1 | 01/29/18 12:37 | 02/05/18 18:15 | 7439-89-6 | N2 |
| Magnesium | **27700** | ug/L | 2500 | 314 | 50 | 01/29/18 12:37 | 02/05/18 18:21 | 7439-95-4 | |
| Manganese | **1010** | ug/L | 500 | 38.2 | 50 | 01/29/18 12:37 | 02/05/18 18:21 | 7439-96-5 | |
| Potassium | **4910** | ug/L | 100 | 16.5 | 1 | 01/29/18 12:37 | 02/06/18 15:27 | 7440-09-7 | |
| Sodium | **22700** | ug/L | 5000 | 674 | 50 | 01/29/18 12:37 | 02/05/18 18:21 | 7440-23-5 | |
| **6020B MET ICPMS, Dissolved** | Analytical Method: EPA 6020B Preparation Method: EPA 3005A | | | | | | | | |
| Arsenic, Dissolved | ND | ug/L | 5.0 | 0.52 | 1 | 01/31/18 15:52 | 02/01/18 22:34 | 7440-38-2 | |
| Iron, Dissolved | ND | ug/L | 40.0 | 4.3 | 1 | 01/31/18 15:52 | 02/01/18 22:34 | 7439-89-6 | N2 |
| Manganese, Dissolved | **1010** | ug/L | 50.0 | 3.8 | 5 | 01/31/18 15:52 | 02/02/18 19:14 | 7439-96-5 | M1 |
| **300.0 IC Anions 28 Days** | Analytical Method: EPA 300.0 | | | | | | | | |
| Chloride | **27.0** | mg/L | 6.2 | 0.60 | 25 | | 02/05/18 19:54 | 16887-00-6 | |
| Sulfate | **277** | mg/L | 25.0 | 0.42 | 25 | | 02/05/18 19:54 | 14808-79-8 | |

Pace Analytical®
www.pacelabs.com

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

# ANALYTICAL RESULTS

Project: McDonough Advanced Engineering
Pace Project No.: 261081

**Sample: DGWC-37** **Lab ID: 261081005** Collected: 01/23/18 14:30 Received: 01/24/18 13:00 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 | | | | | | | | |
| Arsenic | ND | ug/L | 5.0 | 0.52 | 1 | 01/29/18 12:37 | 02/05/18 18:27 | 7440-38-2 | |
| Calcium | **57700** | ug/L | 25000 | 2020 | 50 | 01/29/18 12:37 | 02/05/18 18:32 | 7440-70-2 | |
| Iron | **122** | ug/L | 40.0 | 4.3 | 1 | 01/29/18 12:37 | 02/05/18 18:27 | 7439-89-6 | N2 |
| Magnesium | **12300** | ug/L | 2500 | 314 | 50 | 01/29/18 12:37 | 02/05/18 18:32 | 7439-95-4 | |
| Manganese | **154** | ug/L | 10.0 | 0.76 | 1 | 01/29/18 12:37 | 02/05/18 18:27 | 7439-96-5 | |
| Potassium | **4160** | ug/L | 100 | 16.5 | 1 | 01/29/18 12:37 | 02/06/18 15:32 | 7440-09-7 | |
| Sodium | **10500** | ug/L | 5000 | 674 | 50 | 01/29/18 12:37 | 02/05/18 18:32 | 7440-23-5 | |
| **6020B MET ICPMS, Dissolved** | Analytical Method: EPA 6020B Preparation Method: EPA 3005A | | | | | | | | |
| Arsenic, Dissolved | ND | ug/L | 5.0 | 0.52 | 1 | 01/31/18 15:52 | 02/01/18 23:08 | 7440-38-2 | |
| Iron, Dissolved | **70.5** | ug/L | 40.0 | 4.3 | 1 | 01/31/18 15:52 | 02/01/18 23:08 | 7439-89-6 | N2 |
| Manganese, Dissolved | **153** | ug/L | 10.0 | 0.76 | 1 | 01/31/18 15:52 | 02/01/18 23:08 | 7439-96-5 | |
| **300.0 IC Anions 28 Days** | Analytical Method: EPA 300.0 | | | | | | | | |
| Chloride | **6.3** | mg/L | 0.25 | 0.024 | 1 | | 01/26/18 21:16 | 16887-00-6 | |
| Sulfate | **102** | mg/L | 10.0 | 0.17 | 10 | | 02/05/18 20:17 | 14808-79-8 | |

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

# ANALYTICAL RESULTS

Project: McDonough Advanced Engineering
Pace Project No.: 261081

**Sample: DGWC-38** **Lab ID: 261081006** Collected: 01/23/18 12:30 Received: 01/24/18 13:00 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 | | | | | | | | |
| Arsenic | ND | ug/L | 5.0 | 0.52 | 1 | 01/29/18 12:37 | 02/05/18 18:38 | 7440-38-2 | |
| Calcium | **79900** | ug/L | 25000 | 2020 | 50 | 01/29/18 12:37 | 02/05/18 18:44 | 7440-70-2 | |
| Iron | **22.1J** | ug/L | 40.0 | 4.3 | 1 | 01/29/18 12:37 | 02/05/18 18:38 | 7439-89-6 | N2 |
| Magnesium | **27200** | ug/L | 2500 | 314 | 50 | 01/29/18 12:37 | 02/05/18 18:44 | 7439-95-4 | |
| Manganese | **649** | ug/L | 10.0 | 0.76 | 1 | 01/29/18 12:37 | 02/05/18 18:38 | 7439-96-5 | |
| Potassium | **4180** | ug/L | 100 | 16.5 | 1 | 01/29/18 12:37 | 02/06/18 15:38 | 7440-09-7 | |
| Sodium | **10900** | ug/L | 5000 | 674 | 50 | 01/29/18 12:37 | 02/05/18 18:44 | 7440-23-5 | |
| **6020B MET ICPMS, Dissolved** | Analytical Method: EPA 6020B Preparation Method: EPA 3005A | | | | | | | | |
| Arsenic, Dissolved | ND | ug/L | 5.0 | 0.52 | 1 | 01/31/18 15:52 | 02/01/18 23:14 | 7440-38-2 | |
| Iron, Dissolved | ND | ug/L | 40.0 | 4.3 | 1 | 01/31/18 15:52 | 02/01/18 23:14 | 7439-89-6 | N2 |
| Manganese, Dissolved | **645** | ug/L | 10.0 | 0.76 | 1 | 01/31/18 15:52 | 02/01/18 23:14 | 7439-96-5 | |
| **300.0 IC Anions 28 Days** | Analytical Method: EPA 300.0 | | | | | | | | |
| Chloride | **8.2** | mg/L | 0.25 | 0.024 | 1 | | 01/26/18 21:38 | 16887-00-6 | |
| Sulfate | **238** | mg/L | 25.0 | 0.42 | 25 | | 02/05/18 20:39 | 14808-79-8 | |

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

# ANALYTICAL RESULTS

Project: McDonough Advanced Engineering
Pace Project No.: 261081

**Sample: DGWC-39** **Lab ID: 261081007** Collected: 01/23/18 10:25 Received: 01/24/18 13:00 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 | | | | | | | | |
| Arsenic | ND | ug/L | 5.0 | 0.52 | 1 | 01/29/18 12:37 | 02/05/18 19:27 | 7440-38-2 | |
| Calcium | **81500** | ug/L | 25000 | 2020 | 50 | 01/29/18 12:37 | 02/05/18 19:33 | 7440-70-2 | |
| Iron | **11300** | ug/L | 2000 | 214 | 50 | 01/29/18 12:37 | 02/05/18 19:33 | 7439-89-6 | N2 |
| Magnesium | **19700** | ug/L | 2500 | 314 | 50 | 01/29/18 12:37 | 02/05/18 19:33 | 7439-95-4 | |
| Manganese | **11300** | ug/L | 500 | 38.2 | 50 | 01/29/18 12:37 | 02/05/18 19:33 | 7439-96-5 | |
| Potassium | **2360** | ug/L | 100 | 16.5 | 1 | 01/29/18 12:37 | 02/06/18 15:44 | 7440-09-7 | |
| Sodium | **11000** | ug/L | 5000 | 674 | 50 | 01/29/18 12:37 | 02/05/18 19:33 | 7440-23-5 | |
| **6020B MET ICPMS, Dissolved** | Analytical Method: EPA 6020B Preparation Method: EPA 3005A | | | | | | | | |
| Arsenic, Dissolved | ND | ug/L | 5.0 | 0.52 | 1 | 01/31/18 15:52 | 02/01/18 23:20 | 7440-38-2 | |
| Iron, Dissolved | **9350** | ug/L | 2000 | 214 | 50 | 01/31/18 15:52 | 02/02/18 19:31 | 7439-89-6 | N2 |
| Manganese, Dissolved | **11300** | ug/L | 500 | 38.2 | 50 | 01/31/18 15:52 | 02/02/18 19:31 | 7439-96-5 | |
| **300.0 IC Anions 28 Days** | Analytical Method: EPA 300.0 | | | | | | | | |
| Chloride | **8.2** | mg/L | 0.25 | 0.024 | 1 | | 01/26/18 21:59 | 16887-00-6 | |
| Sulfate | **181** | mg/L | 10.0 | 0.17 | 10 | | 02/05/18 21:02 | 14808-79-8 | |

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

# QUALITY CONTROL DATA

Project: McDonough Advanced Engineering
Pace Project No.: 261081

QC Batch: 121 | Analysis Method: EPA 6020B
QC Batch Method: EPA 3005A | Analysis Description: 6020B MET
Associated Lab Samples: 261081001, 261081002, 261081003, 261081004, 261081005, 261081006, 261081007

METHOD BLANK: 806 Matrix: Water
Associated Lab Samples: 261081001, 261081002, 261081003, 261081004, 261081005, 261081006, 261081007

| Parameter | Units | Blank Result | Reporting Limit | MDL | Analyzed | Qualifiers |
|---|---|---|---|---|---|---|
| Arsenic | ug/L | ND | 5.0 | 0.52 | 02/06/18 13:34 | |
| Calcium | ug/L | ND | 500 | 40.4 | 02/06/18 13:34 | |
| Iron | ug/L | ND | 40.0 | 4.3 | 02/06/18 13:34 | N2 |
| Magnesium | ug/L | ND | 50.0 | 6.3 | 02/06/18 13:34 | |
| Manganese | ug/L | ND | 10.0 | 0.76 | 02/06/18 13:34 | |
| Potassium | ug/L | ND | 100 | 16.5 | 02/06/18 13:34 | |
| Sodium | ug/L | ND | 100 | 13.5 | 02/06/18 13:34 | |

LABORATORY CONTROL SAMPLE: 807

| Parameter | Units | Spike Conc. | LCS Result | LCS % Rec | % Rec Limits | Qualifiers |
|---|---|---|---|---|---|---|
| Arsenic | ug/L | 100 | 96.7 | 97 | 80-120 | |
| Calcium | ug/L | 1000 | 942 | 94 | 80-120 | |
| Iron | ug/L | 1000 | 988 | 99 | 80-120 | N2 |
| Magnesium | ug/L | 1000 | 1000 | 100 | 80-120 | |
| Manganese | ug/L | 100 | 102 | 102 | 80-120 | |
| Potassium | ug/L | 1000 | 925 | 92 | 80-120 | |
| Sodium | ug/L | 1000 | 977 | 98 | 80-120 | |

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 808 809

| Parameter | Units | 261032001 Result | MS Spike Conc. | MSD Spike Conc. | MS Result | MSD Result | MS % Rec | MSD % Rec | % Rec Limits | RPD | Max RPD | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Arsenic | ug/L | ND | 100 | 100 | 98.1 | 99.8 | 98 | 100 | 75-125 | 2 | 20 | |
| Calcium | ug/L | 5800 | 1000 | 1000 | 6660 | 6870 | 85 | 106 | 75-125 | 3 | 20 | |
| Iron | ug/L | 57.6 | 1000 | 1000 | 1270 | 1280 | 100 | 101 | 75-125 | 1 | 20 | N2 |
| Magnesium | ug/L | 941 | 1000 | 1000 | 1940 | 1950 | 100 | 101 | 75-125 | 1 | 20 | |
| Manganese | ug/L | 98.7 | 100 | 100 | 200 | 206 | 100 | 106 | 75-125 | 3 | 20 | |
| Potassium | ug/L | 745 | 1000 | 1000 | 1760 | 1760 | 102 | 101 | 75-125 | 0 | 20 | |
| Sodium | ug/L | 8970 | 1000 | 1000 | 9730 | 9950 | 76 | 97 | 75-125 | 2 | 20 | |

SAMPLE DUPLICATE: 810

| Parameter | Units | 261048003 Result | Dup Result | RPD | Max RPD | Qualifiers |
|---|---|---|---|---|---|---|
| Arsenic | ug/L | ND | ND | | 20 | |
| Calcium | ug/L | 3860 | 3890 | 1 | 20 | |
| Iron | ug/L | 841 | 884 | 5 | 20 | N2 |

**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

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

# QUALITY CONTROL DATA

Project: McDonough Advanced Engineering
Pace Project No.: 261081

SAMPLE DUPLICATE: 810

| Parameter | Units | 261048003 Result | Dup Result | RPD | Max RPD | Qualifiers |
|---|---|---|---|---|---|---|
| Magnesium | ug/L | 1360 | 1420 | 4 | 20 | |
| Manganese | ug/L | 16.9 | 18.2 | 7 | 20 | |
| Potassium | ug/L | 2630 | 2660 | 1 | 20 | |
| Sodium | ug/L | 5090 | 5270 | 3 | 20 | |

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

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

# QUALITY CONTROL DATA

Project: McDonough Advanced Engineering
Pace Project No.: 261081

QC Batch: 262 Analysis Method: EPA 6020B
QC Batch Method: EPA 3005A Analysis Description: 6020B MET Dissolved
Associated Lab Samples: 261081001, 261081002, 261081003, 261081004, 261081005, 261081006, 261081007

METHOD BLANK: 1501 Matrix: Water
Associated Lab Samples: 261081001, 261081002, 261081003, 261081004, 261081005, 261081006, 261081007

| Parameter | Units | Blank Result | Reporting Limit | MDL | Analyzed | Qualifiers |
|---|---|---|---|---|---|---|
| Arsenic, Dissolved | ug/L | ND | 5.0 | 0.52 | 02/01/18 21:48 | |
| Iron, Dissolved | ug/L | ND | 40.0 | 4.3 | 02/01/18 21:48 | N2 |
| Manganese, Dissolved | ug/L | ND | 10.0 | 0.76 | 02/01/18 21:48 | |

LABORATORY CONTROL SAMPLE: 1502

| Parameter | Units | Spike Conc. | LCS Result | LCS % Rec | % Rec Limits | Qualifiers |
|---|---|---|---|---|---|---|
| Arsenic, Dissolved | ug/L | 100 | 104 | 104 | 80-120 | |
| Iron, Dissolved | ug/L | 1000 | 1090 | 109 | 80-120 | N2 |
| Manganese, Dissolved | ug/L | 100 | 109 | 109 | 80-120 | |

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1781 1782

| Parameter | Units | 261081004 Result | MS Spike Conc. | MSD Spike Conc. | MS Result | MSD Result | MS % Rec | MSD % Rec | % Rec Limits | RPD | Max RPD | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Arsenic, Dissolved | ug/L | ND | 100 | 100 | 107 | 104 | 107 | 104 | 75-125 | 2 | 20 | |
| Iron, Dissolved | ug/L | ND | 1000 | 1000 | 1030 | 1020 | 103 | 102 | 75-125 | 1 | 20 | N2 |
| Manganese, Dissolved | ug/L | 1010 | 100 | 100 | 1100 | 1070 | 86 | 60 | 75-125 | 2 | 20 | M1 |

**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.**

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

# QUALITY CONTROL DATA

Project: McDonough Advanced Engineering
Pace Project No.: 261081

QC Batch: 137 | Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 | Analysis Description: 300.0 IC Anions
Associated Lab Samples: 261081001, 261081002, 261081003, 261081004, 261081005, 261081006, 261081007

METHOD BLANK: 893 | Matrix: Water
Associated Lab Samples: 261081001, 261081002, 261081003, 261081004, 261081005, 261081006, 261081007

| Parameter | Units | Blank Result | Reporting Limit | MDL | Analyzed | Qualifiers |
|---|---|---|---|---|---|---|
| Chloride | mg/L | ND | 0.25 | 0.024 | 01/26/18 17:40 | |
| Sulfate | mg/L | ND | 1.0 | 0.017 | 01/26/18 17:40 | |

LABORATORY CONTROL SAMPLE: 894

| Parameter | Units | Spike Conc. | LCS Result | LCS % Rec | % Rec Limits | Qualifiers |
|---|---|---|---|---|---|---|
| Chloride | mg/L | 10 | 10.3 | 103 | 90-110 | |
| Sulfate | mg/L | 10 | 10.2 | 102 | 90-110 | |

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 895 896

| Parameter | Units | 261081001 Result | MS Spike Conc. | MSD Spike Conc. | MS Result | MSD Result | MS % Rec | MSD % Rec | % Rec Limits | RPD | Max RPD | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Chloride | mg/L | 26.2 | 10 | 10 | 35.0 | 35.0 | 88 | 88 | 90-110 | 0 | 15 | M1 |
| Sulfate | mg/L | 349 | 10 | 10 | 229 | 229 | -1200 | -1200 | 90-110 | 0 | 15 | M1 |

MATRIX SPIKE SAMPLE: 897

| Parameter | Units | 261081002 Result | Spike Conc. | MS Result | MS % Rec | % Rec Limits | Qualifiers |
|---|---|---|---|---|---|---|---|
| Chloride | mg/L | 16.3 | 10 | 24.1 | 78 | 90-110 | M1 |
| Sulfate | mg/L | 426 | 10 | 251 | -1750 | 90-110 | M1 |

**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

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

# QUALIFIERS

Project: McDonough Advanced Engineering
Pace Project No.: 261081

## 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.

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

| | |
|---|---|
| M1 | Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery. |
| N2 | The lab does not hold NELAC/TNI accreditation for this parameter. |

Pace Analytical www.pacelabs.com

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

## QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: McDonough Advanced Engineering
Pace Project No.: 261081

| Lab ID | Sample ID | QC Batch Method | QC Batch | Analytical Method | Analytical Batch |
|---|---|---|---|---|---|
| **261081001** | **DGWC-42** | EPA 3005A | 121 | EPA 6020B | 191 |
| **261081002** | **B-50** | EPA 3005A | 121 | EPA 6020B | 191 |
| **261081003** | **DGWA-70A** | EPA 3005A | 121 | EPA 6020B | 191 |
| **261081004** | **B-28** | EPA 3005A | 121 | EPA 6020B | 191 |
| **261081005** | **DGWC-37** | EPA 3005A | 121 | EPA 6020B | 191 |
| **261081006** | **DGWC-38** | EPA 3005A | 121 | EPA 6020B | 191 |
| **261081007** | **DGWC-39** | EPA 3005A | 121 | EPA 6020B | 191 |
| **261081001** | **DGWC-42** | EPA 3005A | 262 | EPA 6020B | 328 |
| **261081002** | **B-50** | EPA 3005A | 262 | EPA 6020B | 328 |
| **261081003** | **DGWA-70A** | EPA 3005A | 262 | EPA 6020B | 328 |
| **261081004** | **B-28** | EPA 3005A | 262 | EPA 6020B | 328 |
| **261081005** | **DGWC-37** | EPA 3005A | 262 | EPA 6020B | 328 |
| **261081006** | **DGWC-38** | EPA 3005A | 262 | EPA 6020B | 328 |
| **261081007** | **DGWC-39** | EPA 3005A | 262 | EPA 6020B | 328 |
| **261081001** | **DGWC-42** | EPA 300.0 | 137 | | |
| **261081002** | **B-50** | EPA 300.0 | 137 | | |
| **261081003** | **DGWA-70A** | EPA 300.0 | 137 | | |
| **261081004** | **B-28** | EPA 300.0 | 137 | | |
| **261081005** | **DGWC-37** | EPA 300.0 | 137 | | |
| **261081006** | **DGWC-38** | EPA 300.0 | 137 | | |
| **261081007** | **DGWC-39** | EPA 300.0 | 137 | | |

# CHAIN OF CUSTODY RECORD

Pace Analytical

Pace Analytical Services, Inc.
110 TECHNOLOGY PARKWAY, PEACHTREE CORNERS, GA 30092
(770) 734-4200 : FAX (770) 734-4201 : www.asi-lab.com



CLIENT NAME: Georgia Power

CLIENT ADDRESS/PHONE NUMBER/FAX NUMBER: 241 Ralph McGill Blvd SE B10185, Atlanta, GA 30308, 404-508-7239

REPORT TO: Tim Richards (Tim_Richards@golder.com) — CC: KJurinko@golder.com

REQUESTED COMPLETION DATE: — PO #: laburch@southernco.com

PROJECT NAME/STATE: Plant McDonough AP- AE Sampling

PROJECT #: 1779172

ANALYSIS REQUESTED

| Collection DATE | Collection TIME | MATRIX CODE* | COMP | GRAB | SAMPLE IDENTIFICATION | # of CONTAINERS | Cl, SO4 EPA 9056 (Container type: P; Preservation: 7) | *Metals, Dissolved (EPA 6010/6020) (field filtered) As, Fe, Mn (P; 3&7) | *Metals (EPA 6010/6020) As, Ca, Fe, Mg, Mn, Na, K (P; 3&7) | LAB ID NUMBER | REMARKS/ADDITIONAL INFORMATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 01/23/18 | 1335 | GW | | x | DGWC-42 | 3 | 1 | 1 | 1 | 1 | |
| 01/23/18 | 1035 | GW | | x | B-50 | 3 | 1 | 1 | 1 | 2 | |
| 01/23/18 | 0905 | GW | | x | DGWA-70A | 3 | 1 | 1 | 1 | 3 | |
| 01/23/18 | 1510 | GW | | x | B-28 | 3 | 1 | 1 | 1 | 4 | |
| 01/23/18 | 1430 | GW | | x | DGWC-37 | 3 | 1 | 1 | 1 | 5 | |
| 01/23/18 | 1230 | GW | | x | DGWC-38 | 3 | 1 | 1 | 1 | 6 | |
| 01/23/18 | 1025 | GW | | x | DGWC-39 | 3 | 1 | 1 | 1 | 7 | |

CONTAINER TYPE
- P - PLASTIC
- A - AMBER GLASS
- G - CLEAR GLASS
- V - VOA VIAL
- S - STERILE
- O - OTHER

PRESERVATION
- 1 - HCl, ≤6°C
- 2 - $H_2SO_4$, ≤6°C
- 3 - $HNO_3$
- 4 - NaOH, ≤6°C
- 5 - NaOH/ZnAc, ≤6°C
- 6 - $Na_2S_2O_3$, ≤6°C
- 7 - ≤6°C not frozen

*MATRIX CODES:
- DW - DRINKING WATER
- WW - WASTEWATER
- GW - GROUNDWATER
- SW - SURFACE WATER
- ST - STORM WATER
- W - WATER
- S - SOIL
- SL - SLUDGE
- SD - SOLID
- A - AIR
- L - LIQUID
- P - PRODUCT

SAMPLED BY AND TITLE: Ben Hodges, Field Lead — DATE/TIME: 1/24/18 1000

RELINQUISHED BY: Ben H — DATE/TIME: 1/24/18 093

RECEIVED BY: Mike Nguyen — DATE/TIME: 1/24/18 0930

RELINQUISHED BY: — DATE/TIME:

RECEIVED BY LAB: M Lalman — DATE/TIME: 01/24/18 1300

SAMPLE SHIPPED VIA: UPS FED-EX USPS COURIER CLIENT OTHER — Pace

pH checked: Yes No NA — Ice: Yes No NA

Temperature: Min: 2.3 Max:

Custody Seal: Intact Broken Not Present — # of Coolers — Cooler ID:

WO#: 261081

261081

1_23_18_McDonough AP-1 COC.xlsx

# Sample Condition Upon Receipt

Pace Analytical

Client Name: Golder Associates  Project # ____________

**WO#: 261081**

PM: BM  Due Date: 01/31/18
CLIENT: Golder-ATL

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☑ Pace Other ____
Tracking #: ____________

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

Packing Material: ☑ Bubble Wrap ☐ Bubble Bags ☐ None ☐ Other ____

Thermometer Used: THR-083  Type of Ice: Wet Blue None  ☐ Samples on ice, cooling process has begun

Cooler Temperature ____________  Biological Tissue is Frozen: Yes No

Temp should be above freezing to 6°C

Date and Initials of person examining contents: 1/24/18 MR

| | | | | 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: GW | | | | |
| 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

February 09, 2018

Kristen Jurinko
Golder Associates - Atlanta
3730 Chamblee Tucker Road
Atlanta, GA 30341

RE: Project: McDonough Advanced Engineering
Pace Project No.: 261131

Dear Kristen Jurinko:

Enclosed are the analytical results for sample(s) received by the laboratory on January 23, 2018. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

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

Sincerely,

Betsy McDaniel

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

Enclosures

cc: Tim Richards, Golder Associates - Atlanta

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

# CERTIFICATIONS

| | |
|---|---|
| Project: | McDonough Advanced Engineering |
| Pace Project No.: | 261131 |

**Atlanta Certification IDs**

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
Texas Certification #: T104704397-08-TX
Virginia Certification #: 460204

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

## SAMPLE SUMMARY

Project: McDonough Advanced Engineering
Pace Project No.: 261131

| Lab ID | Sample ID | Matrix | Date Collected | Date Received |
|---|---|---|---|---|
| **261032003** | **DGWC-68** | Water | 01/22/18 11:50 | 01/23/18 12:20 |

## REPORT OF LABORATORY ANALYSIS

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

# SAMPLE ANALYTE COUNT

Project: McDonough Advanced Engineering
Pace Project No.: 261131

| Lab ID | Sample ID | Method | Analysts | Analytes Reported |
|---|---|---|---|---|
| **261032003** | **DGWC-68** | EPA 6020B | KLH | 7 |
| | | EPA 6020B | KLH | 3 |
| | | EPA 300.0 | RLC | 2 |

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

# ANALYTICAL RESULTS

Project: McDonough Advanced Engineering
Pace Project No.: 261131

**Sample: DGWC-68** **Lab ID: 261032003** Collected: 01/22/18 11:50 Received: 01/23/18 12:20 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 | | | | | | | | |
| Arsenic | **467** | ug/L | 5.0 | 0.52 | 1 | 01/29/18 12:37 | 02/05/18 17:12 | 7440-38-2 | |
| Calcium | **49700** | ug/L | 25000 | 2020 | 50 | 01/29/18 12:37 | 02/05/18 17:18 | 7440-70-2 | |
| Iron | **5260** | ug/L | 40.0 | 4.3 | 1 | 01/29/18 12:37 | 02/05/18 17:12 | 7439-89-6 | |
| Magnesium | **12100** | ug/L | 2500 | 314 | 50 | 01/29/18 12:37 | 02/05/18 17:18 | 7439-95-4 | |
| Manganese | **5520** | ug/L | 500 | 38.2 | 50 | 01/29/18 12:37 | 02/05/18 17:18 | 7439-96-5 | |
| Potassium | **4750** | ug/L | 100 | 16.5 | 1 | 01/29/18 12:37 | 02/05/18 17:12 | 7440-09-7 | |
| Sodium | **8000** | ug/L | 100 | 13.5 | 1 | 01/29/18 12:37 | 02/05/18 17:12 | 7440-23-5 | |
| **6020B MET ICPMS, Dissolved** | Analytical Method: EPA 6020B Preparation Method: EPA 3005A | | | | | | | | |
| Arsenic, Dissolved | **447** | ug/L | 5.0 | 0.52 | 1 | 01/31/18 15:52 | 02/01/18 22:11 | 7440-38-2 | |
| Iron, Dissolved | **4760** | ug/L | 40.0 | 4.3 | 1 | 01/31/18 15:52 | 02/01/18 22:11 | 7439-89-6 | |
| Manganese, Dissolved | **5130** | ug/L | 100 | 7.6 | 10 | 01/31/18 15:52 | 02/05/18 14:15 | 7439-96-5 | |
| **300.0 IC Anions 28 Days** | Analytical Method: EPA 300.0 | | | | | | | | |
| Chloride | **3.8** | mg/L | 0.25 | 0.024 | 1 | | 01/24/18 21:31 | 16887-00-6 | |
| Sulfate | **30.2** | mg/L | 10.0 | 0.17 | 10 | | 02/05/18 16:31 | 14808-79-8 | |

Pace Analytical®
www.pacelabs.com

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

## QUALITY CONTROL DATA

Project: McDonough Advanced Engineering
Pace Project No.: 261131

QC Batch: 121 | Analysis Method: EPA 6020B
QC Batch Method: EPA 3005A | Analysis Description: 6020B MET
Associated Lab Samples: 261032003

METHOD BLANK: 806 | Matrix: Water
Associated Lab Samples: 261032003

| Parameter | Units | Blank Result | Reporting Limit | MDL | Analyzed | Qualifiers |
|---|---|---|---|---|---|---|
| Arsenic | ug/L | ND | 5.0 | 0.52 | 02/06/18 13:34 | |
| Calcium | ug/L | ND | 500 | 40.4 | 02/06/18 13:34 | |
| Iron | ug/L | ND | 40.0 | 4.3 | 02/06/18 13:34 | |
| Magnesium | ug/L | ND | 50.0 | 6.3 | 02/06/18 13:34 | |
| Manganese | ug/L | ND | 10.0 | 0.76 | 02/06/18 13:34 | |
| Potassium | ug/L | ND | 100 | 16.5 | 02/06/18 13:34 | |
| Sodium | ug/L | ND | 100 | 13.5 | 02/06/18 13:34 | |

LABORATORY CONTROL SAMPLE: 807

| Parameter | Units | Spike Conc. | LCS Result | LCS % Rec | % Rec Limits | Qualifiers |
|---|---|---|---|---|---|---|
| Arsenic | ug/L | 100 | 96.7 | 97 | 80-120 | |
| Calcium | ug/L | 1000 | 942 | 94 | 80-120 | |
| Iron | ug/L | 1000 | 988 | 99 | 80-120 | |
| Magnesium | ug/L | 1000 | 1000 | 100 | 80-120 | |
| Manganese | ug/L | 100 | 102 | 102 | 80-120 | |
| Potassium | ug/L | 1000 | 925 | 92 | 80-120 | |
| Sodium | ug/L | 1000 | 977 | 98 | 80-120 | |

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 808 809

| Parameter | Units | 261032001 Result | MS Spike Conc. | MSD Spike Conc. | MS Result | MSD Result | MS % Rec | MSD % Rec | % Rec Limits | RPD | Max RPD | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Arsenic | ug/L | ND | 100 | 100 | 98.1 | 99.8 | 98 | 100 | 75-125 | 2 | 20 | |
| Calcium | ug/L | 5800 | 1000 | 1000 | 6660 | 6870 | 85 | 106 | 75-125 | 3 | 20 | |
| Iron | ug/L | 57.6 | 1000 | 1000 | 1270 | 1280 | 100 | 101 | 75-125 | 1 | 20 | |
| Magnesium | ug/L | 941 | 1000 | 1000 | 1940 | 1950 | 100 | 101 | 75-125 | 1 | 20 | |
| Manganese | ug/L | 98.7 | 100 | 100 | 200 | 206 | 100 | 106 | 75-125 | 3 | 20 | |
| Potassium | ug/L | 745 | 1000 | 1000 | 1760 | 1760 | 102 | 101 | 75-125 | 0 | 20 | |
| Sodium | ug/L | 8970 | 1000 | 1000 | 9730 | 9950 | 76 | 97 | 75-125 | 2 | 20 | |

SAMPLE DUPLICATE: 810

| Parameter | Units | 261048003 Result | Dup Result | RPD | Max RPD | Qualifiers |
|---|---|---|---|---|---|---|
| Arsenic | ug/L | ND | ND | | 20 | |
| Calcium | ug/L | 3860 | 3890 | 1 | 20 | |
| Iron | ug/L | 841 | 884 | 5 | 20 | |

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

## REPORT OF LABORATORY ANALYSIS

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

# QUALITY CONTROL DATA

Project: McDonough Advanced Engineering
Pace Project No.: 261131

SAMPLE DUPLICATE: 810

| Parameter | Units | 261048003 Result | Dup Result | RPD | Max RPD | Qualifiers |
|---|---|---|---|---|---|---|
| Magnesium | ug/L | 1360 | 1420 | 4 | 20 | |
| Manganese | ug/L | 16.9 | 18.2 | 7 | 20 | |
| Potassium | ug/L | 2630 | 2660 | 1 | 20 | |
| Sodium | ug/L | 5090 | 5270 | 3 | 20 | |

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

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

# QUALITY CONTROL DATA

Project: McDonough Advanced Engineering
Pace Project No.: 261131

QC Batch: 262 — Analysis Method: EPA 6020B
QC Batch Method: EPA 3005A — Analysis Description: 6020B MET Dissolved
Associated Lab Samples: 261032003

METHOD BLANK: 1501 — Matrix: Water
Associated Lab Samples: 261032003

| Parameter | Units | Blank Result | Reporting Limit | MDL | Analyzed | Qualifiers |
|---|---|---|---|---|---|---|
| Arsenic, Dissolved | ug/L | ND | 5.0 | 0.52 | 02/01/18 21:48 | |
| Iron, Dissolved | ug/L | ND | 40.0 | 4.3 | 02/01/18 21:48 | |
| Manganese, Dissolved | ug/L | ND | 10.0 | 0.76 | 02/01/18 21:48 | |

LABORATORY CONTROL SAMPLE: 1502

| Parameter | Units | Spike Conc. | LCS Result | LCS % Rec | % Rec Limits | Qualifiers |
|---|---|---|---|---|---|---|
| Arsenic, Dissolved | ug/L | 100 | 104 | 104 | 80-120 | |
| Iron, Dissolved | ug/L | 1000 | 1090 | 109 | 80-120 | |
| Manganese, Dissolved | ug/L | 100 | 109 | 109 | 80-120 | |

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1781 1782

| Parameter | Units | 261081004 Result | MS Spike Conc. | MSD Spike Conc. | MS Result | MSD Result | MS % Rec | MSD % Rec | % Rec Limits | RPD | Max RPD | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Arsenic, Dissolved | ug/L | ND | 100 | 100 | 107 | 104 | 107 | 104 | 75-125 | 2 | 20 | |
| Iron, Dissolved | ug/L | ND | 1000 | 1000 | 1030 | 1020 | 103 | 102 | 75-125 | 1 | 20 | |
| Manganese, Dissolved | ug/L | 1010 | 100 | 100 | 1100 | 1070 | 86 | 60 | 75-125 | 2 | 20 | M1 |

**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.**

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

# QUALITY CONTROL DATA

Project: McDonough Advanced Engineering
Pace Project No.: 261131

QC Batch: 39 | Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 | Analysis Description: 300.0 IC Anions
Associated Lab Samples: 261032003

METHOD BLANK: 291 | Matrix: Water
Associated Lab Samples: 261032003

| Parameter | Units | Blank Result | Reporting Limit | MDL | Analyzed | Qualifiers |
|---|---|---|---|---|---|---|
| Chloride | mg/L | ND | 0.25 | 0.024 | 01/24/18 17:11 | |
| Sulfate | mg/L | ND | 1.0 | 0.017 | 01/24/18 17:11 | |

LABORATORY CONTROL SAMPLE: 292

| Parameter | Units | Spike Conc. | LCS Result | LCS % Rec | % Rec Limits | Qualifiers |
|---|---|---|---|---|---|---|
| Chloride | mg/L | 10 | 10.3 | 103 | 90-110 | |
| Sulfate | mg/L | 10 | 10.2 | 102 | 90-110 | |

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 293 294

| Parameter | Units | 261032001 Result | MS Spike Conc. | MSD Spike Conc. | MS Result | MSD Result | MS % Rec | MSD % Rec | % Rec Limits | RPD | Max RPD | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Chloride | mg/L | 3.8 | 10 | 10 | 13.5 | 13.4 | 96 | 96 | 90-110 | 0 | 15 | |
| Sulfate | mg/L | 7.6 | 10 | 10 | 17.2 | 17.2 | 96 | 96 | 90-110 | 0 | 15 | |

**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.**

# QUALIFIERS

Project: McDonough Advanced Engineering
Pace Project No.: 261131

## 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.

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

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

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

# QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: McDonough Advanced Engineering
Pace Project No.: 261131

| Lab ID | Sample ID | QC Batch Method | QC Batch | Analytical Method | Analytical Batch |
|---|---|---|---|---|---|
| **261032003** | **DGWC-68** | EPA 3005A | 121 | EPA 6020B | 191 |
| **261032003** | **DGWC-68** | EPA 3005A | 262 | EPA 6020B | 328 |
| **261032003** | **DGWC-68** | EPA 300.0 | 39 | | |

# CHAIN OF CUSTODY RECORD

Pace Analytical

Pace Analytical Services, Inc.
110 TECHNOLOGY PARKWAY, PEACHTREE CORNERS, GA 30092
(770) 734-4200 : FAX (770) 734-4201 : www.asi-lab.com

PAGE: ______ OF ______

CLIENT NAME: Georgia Power

CLIENT ADDRESS/PHONE NUMBER/FAX NUMBER:
241 Ralph McGill Blvd SE B10185
Atlanta, GA 30308
404-506-7239

REPORT TO: Tim Richards (Tim_Richards@golder.com)

CC: KJurinko@golder.com

REQUESTED COMPLETION DATE:

PO #: laburch@southernco.com

PROJECT NAME/STATE: Plant McDonough AP- AE Sampling

PROJECT #: 1779172

ANALYSIS REQUESTED

| Collection DATE | Collection TIME | MATRIX CODE* | COMP | GRAB | SAMPLE IDENTIFICATION | # of CONTAINERS | Cl, SO4 EPA 9056 (Container type: P; Preservation: 7) | *Metals, Dissolved (EPA 6010/6020) (field filtered) As, Fe, Mn (Container type: P; Preservation: 3&7) | *Metals (EPA 6010/6020) As, Ca, Fe, Mg, Mn, Na, K (Container type: P; Preservation: 3&7) | LAB ID NUMBER | REMARKS/ADDITIONAL INFORMATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 01/22/18 | 1130 | GW | | x | DGWA-71 | 3 | 1 | 1 | 1 | | |
| 01/22/18 | 1335 | GW | | x | DGWC-68A | 3 | 1 | 1 | 1 | | |
| 01/22/18 | 1150 | GW | | x | DGWC-68 | 3 | 1 | 1 | 1 | | |

CONTAINER TYPE:
P - PLASTIC
A - AMBER GLASS
G - CLEAR GLASS
V - VOA VIAL
S - STERILE
O - OTHER

PRESERVATION:
1 - HCl, ≤6°C
2 - $H_2SO_4$, ≤6°C
3 - $HNO_3$
4 - NaOH, ≤6°C
5 - NaOH/ZnAc, ≤6°C
6 - $Na_2S_2O_3$, ≤6°C
7 - ≤6°C not frozen

*MATRIX CODES:
DW - DRINKING WATER
WW - WASTEWATER
GW - GROUNDWATER
SW - SURFACE WATER
ST - STORM WATER
W - WATER
S - SOIL
SL - SLUDGE
SD - SOLID
A - AIR
L - LIQUID
P - PRODUCT

SAMPLED BY AND TITLE: Ben Hodges Field Lead — DATE/TIME: 1/23/18 1000

RELINQUISHED BY: [signature] — DATE/TIME: 1/23/18 094

RECEIVED BY: Mike Nguyen — DATE/TIME: 1/23/18 0945

RELINQUISHED BY: — DATE/TIME:

RECEIVED BY LAB: [signature] 1/23/18 — DATE/TIME: 01/23/18 1220

SAMPLE SHIPPED VIA: UPS FED-EX USPS COURIER CLIENT OTHER FS Pace

pH checked: Yes No NA — Ice: Yes No NA — Temperature: Min: 1.3 Max: — Custody Seal: Intact Broken Not Present — # of Coolers — Cooler ID:

LAB USE ONLY

WO# : 261032

261032

1_22_18_McDonough AP-1 COC.xlsx

Received by lab: MDahman

## Sample Condition Upon Receipt

Pace Analytical

Client Name: Golder Associates Project #

**WO#:261032**

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☑ Pace Other

PM: BM Due Date: 01/30/18

CLIENT: Golder-ATL

Tracking #:

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

Packing Material: ☑ Bubble Wrap ☐ Bubble Bags ☐ None ☐ Other

Thermometer Used THR-083 Type of Ice: Wet Blue None ☐ Samples on ice, cooling process has begun

Cooler Temperature 1.3 Biological Tissue is Frozen: Yes No

Temp should be above freezing to 6°C

Date and Initials of person examining contents: 1/23/18 MR

| | | | | 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: GW | | | | |
| 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

February 08, 2018

Kristen Jurinko
Golder Associates - Atlanta
3730 Chamblee Tucker Road
Atlanta, GA 30341

RE: Project: McDonough Advanced Engineering
Pace Project No.: 261197

Dear Kristen Jurinko:

Enclosed are the analytical results for sample(s) received by the laboratory on January 26, 2018. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

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

Sincerely,

Betsy McDaniel

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

Enclosures

cc: Tim Richards, Golder Associates - Atlanta

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

# CERTIFICATIONS

| | |
|---|---|
| Project: | McDonough Advanced Engineering |
| Pace Project No.: | 261197 |

**Atlanta Certification IDs**

| | |
|---|---|
| 110 Technology Parkway Peachtree Corners, GA 30092 | North Carolina Certification #: 381 |
| Florida DOH Certification #: E87315 | South Carolina Certification #: 98011001 |
| Georgia DW Inorganics Certification #: 812 | Texas Certification #: T104704397-08-TX |
| Georgia DW Microbiology Certification #: 812 | Virginia Certification #: 460204 |

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

## SAMPLE SUMMARY

Project: McDonough Advanced Engineering
Pace Project No.: 261197

| Lab ID | Sample ID | Matrix | Date Collected | Date Received |
|---|---|---|---|---|
| **261197001** | **AP-1 B-3** | Water | 01/24/18 13:50 | 01/26/18 11:30 |
| **261197002** | **AP-1 B-7** | Water | 01/25/18 11:05 | 01/26/18 11:30 |

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

## SAMPLE ANALYTE COUNT

Project: McDonough Advanced Engineering
Pace Project No.: 261197

| Lab ID | Sample ID | Method | Analysts | Analytes Reported |
|---|---|---|---|---|
| **261197001** | **AP-1 B-3** | EPA 6020B | KLH | 7 |
| | | EPA 6020B | KLH | 3 |
| | | EPA 300.0 | RLC | 2 |
| **261197002** | **AP-1 B-7** | EPA 6020B | KLH | 7 |
| | | EPA 6020B | KLH | 3 |
| | | EPA 300.0 | RLC | 2 |

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

# ANALYTICAL RESULTS

Project: McDonough Advanced Engineering
Pace Project No.: 261197

**Sample: AP-1 B-3** **Lab ID: 261197001** Collected: 01/24/18 13:50 Received: 01/26/18 11:30 Matrix: Water

| Parameters | Results | Units | Report Limit | MDL | DF | Prepared | Analyzed | CAS No. | Qual |
|---|---|---|---|---|---|---|---|---|---|
| **6020B MET ICPMS** | Analytical Method: EPA 6020B Preparation Method: EPA 3005A | | | | | | | | |
| Arsenic | **2070** | ug/L | 250 | 26.1 | 50 | 02/02/18 08:44 | 02/05/18 22:19 | 7440-38-2 | |
| Calcium | **65400** | ug/L | 25000 | 2020 | 50 | 02/02/18 08:44 | 02/05/18 22:19 | 7440-70-2 | |
| Iron | **28200** | ug/L | 2000 | 214 | 50 | 02/02/18 08:44 | 02/05/18 22:19 | 7439-89-6 | N2 |
| Magnesium | **20300** | ug/L | 2500 | 314 | 50 | 02/02/18 08:44 | 02/05/18 22:19 | 7439-95-4 | |
| Manganese | **2710** | ug/L | 500 | 38.2 | 50 | 02/02/18 08:44 | 02/05/18 22:19 | 7439-96-5 | |
| Potassium | **8140** | ug/L | 5000 | 825 | 50 | 02/02/18 08:44 | 02/06/18 16:54 | 7440-09-7 | |
| Sodium | **11200** | ug/L | 5000 | 674 | 50 | 02/02/18 08:44 | 02/05/18 22:19 | 7440-23-5 | |
| **6020B MET ICPMS, Dissolved** | Analytical Method: EPA 6020B Preparation Method: EPA 3005A | | | | | | | | |
| Arsenic, Dissolved | **2140** | ug/L | 50.0 | 5.2 | 10 | 01/31/18 15:52 | 02/02/18 19:43 | 7440-38-2 | |
| Iron, Dissolved | **28300** | ug/L | 400 | 42.7 | 10 | 01/31/18 15:52 | 02/02/18 19:43 | 7439-89-6 | N2 |
| Manganese, Dissolved | **2690** | ug/L | 100 | 7.6 | 10 | 01/31/18 15:52 | 02/02/18 19:43 | 7439-96-5 | |
| **300.0 IC Anions 28 Days** | Analytical Method: EPA 300.0 | | | | | | | | |
| Chloride | **9.1** | mg/L | 0.25 | 0.024 | 1 | | 02/01/18 00:05 | 16887-00-6 | |
| Sulfate | **173** | mg/L | 10.0 | 0.17 | 10 | | 02/06/18 16:59 | 14808-79-8 | |

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

# ANALYTICAL RESULTS

Project: McDonough Advanced Engineering
Pace Project No.: 261197

**Sample: AP-1 B-7** **Lab ID: 261197002** Collected: 01/25/18 11:05 Received: 01/26/18 11:30 Matrix: Water

| Parameters | Results | Units | Report Limit | MDL | DF | Prepared | Analyzed | CAS No. | Qual |
|---|---|---|---|---|---|---|---|---|---|
| **6020B MET ICPMS** | Analytical Method: EPA 6020B Preparation Method: EPA 3005A | | | | | | | | |
| Arsenic | **1930** | ug/L | 250 | 26.1 | 50 | 02/02/18 08:44 | 02/05/18 22:30 | 7440-38-2 | |
| Calcium | **52100** | ug/L | 25000 | 2020 | 50 | 02/02/18 08:44 | 02/05/18 22:30 | 7440-70-2 | |
| Iron | **11000** | ug/L | 2000 | 214 | 50 | 02/02/18 08:44 | 02/05/18 22:30 | 7439-89-6 | N2 |
| Magnesium | **9730** | ug/L | 50.0 | 6.3 | 1 | 02/02/18 08:44 | 02/05/18 22:24 | 7439-95-4 | |
| Manganese | **3000** | ug/L | 500 | 38.2 | 50 | 02/02/18 08:44 | 02/05/18 22:30 | 7439-96-5 | |
| Potassium | **9520** | ug/L | 5000 | 825 | 50 | 02/02/18 08:44 | 02/06/18 17:00 | 7440-09-7 | |
| Sodium | **5970** | ug/L | 100 | 13.5 | 1 | 02/02/18 08:44 | 02/05/18 22:24 | 7440-23-5 | |
| **6020B MET ICPMS, Dissolved** | Analytical Method: EPA 6020B Preparation Method: EPA 3005A | | | | | | | | |
| Arsenic, Dissolved | **1880** | ug/L | 50.0 | 5.2 | 10 | 01/31/18 15:52 | 02/02/18 19:49 | 7440-38-2 | |
| Iron, Dissolved | **9240** | ug/L | 40.0 | 4.3 | 1 | 01/31/18 15:52 | 02/02/18 00:00 | 7439-89-6 | N2 |
| Manganese, Dissolved | **2980** | ug/L | 100 | 7.6 | 10 | 01/31/18 15:52 | 02/02/18 19:49 | 7439-96-5 | |
| **300.0 IC Anions 28 Days** | Analytical Method: EPA 300.0 | | | | | | | | |
| Chloride | **3.5** | mg/L | 0.25 | 0.024 | 1 | | 02/01/18 00:26 | 16887-00-6 | |
| Sulfate | **63.0** | mg/L | 5.0 | 0.085 | 5 | | 02/06/18 18:31 | 14808-79-8 | |

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

# QUALITY CONTROL DATA

Project: McDonough Advanced Engineering
Pace Project No.: 261197

QC Batch: 391 | Analysis Method: EPA 6020B
QC Batch Method: EPA 3005A | Analysis Description: 6020B MET
Associated Lab Samples: 261197001, 261197002

METHOD BLANK: 2160 | Matrix: Water
Associated Lab Samples: 261197001, 261197002

| Parameter | Units | Blank Result | Reporting Limit | MDL | Analyzed | Qualifiers |
|---|---|---|---|---|---|---|
| Arsenic | ug/L | ND | 5.0 | 0.52 | 02/05/18 20:53 | |
| Calcium | ug/L | ND | 500 | 40.4 | 02/05/18 20:53 | |
| Iron | ug/L | ND | 40.0 | 4.3 | 02/05/18 20:53 | N2 |
| Magnesium | ug/L | ND | 50.0 | 6.3 | 02/05/18 20:53 | |
| Manganese | ug/L | ND | 10.0 | 0.76 | 02/05/18 20:53 | |
| Potassium | ug/L | ND | 100 | 16.5 | 02/06/18 16:31 | |
| Sodium | ug/L | ND | 100 | 13.5 | 02/05/18 20:53 | |

LABORATORY CONTROL SAMPLE: 2161

| Parameter | Units | Spike Conc. | LCS Result | LCS % Rec | % Rec Limits | Qualifiers |
|---|---|---|---|---|---|---|
| Arsenic | ug/L | 100 | 100 | 100 | 80-120 | |
| Calcium | ug/L | 1000 | 1040 | 104 | 80-120 | |
| Iron | ug/L | 1000 | 1010 | 101 | 80-120 | N2 |
| Magnesium | ug/L | 1000 | 1020 | 102 | 80-120 | |
| Manganese | ug/L | 100 | 105 | 105 | 80-120 | |
| Potassium | ug/L | 1000 | 1010 | 101 | 80-120 | |
| Sodium | ug/L | 1000 | 1040 | 104 | 80-120 | |

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 4201 | 4202

| Parameter | Units | 261118002 Result | MS Spike Conc. | MSD Spike Conc. | MS Result | MSD Result | MS % Rec | MSD % Rec | % Rec Limits | RPD | Max RPD | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Arsenic | ug/L | ND | 100 | 100 | 99.8 | 100 | 100 | 100 | 75-125 | 0 | 20 | |
| Calcium | ug/L | 6130 | 1000 | 1000 | 7870 | 7270 | 174 | 114 | 75-125 | 8 | 20 | M1 |
| Iron | ug/L | 347 | 1000 | 1000 | 1330 | 1410 | 99 | 106 | 75-125 | 5 | 20 | N2 |
| Magnesium | ug/L | 2020 | 1000 | 1000 | 3030 | 3170 | 101 | 115 | 75-125 | 5 | 20 | |
| Manganese | ug/L | 11.2 | 100 | 100 | 113 | 120 | 102 | 109 | 75-125 | 6 | 20 | |
| Potassium | ug/L | 3590 | 1000 | 1000 | 4580 | 4800 | 99 | 121 | 75-125 | 5 | 20 | |
| Sodium | ug/L | 8760 | 1000 | 1000 | 9530 | 9950 | 76 | 119 | 75-125 | 4 | 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.**

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

# QUALITY CONTROL DATA

Project: McDonough Advanced Engineering
Pace Project No.: 261197

QC Batch: 262 | Analysis Method: EPA 6020B
QC Batch Method: EPA 3005A | Analysis Description: 6020B MET Dissolved
Associated Lab Samples: 261197001, 261197002

METHOD BLANK: 1501 | Matrix: Water
Associated Lab Samples: 261197001, 261197002

| Parameter | Units | Blank Result | Reporting Limit | MDL | Analyzed | Qualifiers |
|---|---|---|---|---|---|---|
| Arsenic, Dissolved | ug/L | ND | 5.0 | 0.52 | 02/01/18 21:48 | |
| Iron, Dissolved | ug/L | ND | 40.0 | 4.3 | 02/01/18 21:48 | N2 |
| Manganese, Dissolved | ug/L | ND | 10.0 | 0.76 | 02/01/18 21:48 | |

LABORATORY CONTROL SAMPLE: 1502

| Parameter | Units | Spike Conc. | LCS Result | LCS % Rec | % Rec Limits | Qualifiers |
|---|---|---|---|---|---|---|
| Arsenic, Dissolved | ug/L | 100 | 104 | 104 | 80-120 | |
| Iron, Dissolved | ug/L | 1000 | 1090 | 109 | 80-120 | N2 |
| Manganese, Dissolved | ug/L | 100 | 109 | 109 | 80-120 | |

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1781 1782

| Parameter | Units | 261081004 Result | MS Spike Conc. | MSD Spike Conc. | MS Result | MSD Result | MS % Rec | MSD % Rec | % Rec Limits | RPD | Max RPD | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Arsenic, Dissolved | ug/L | ND | 100 | 100 | 107 | 104 | 107 | 104 | 75-125 | 2 | 20 | |
| Iron, Dissolved | ug/L | ND | 1000 | 1000 | 1030 | 1020 | 103 | 102 | 75-125 | 1 | 20 | N2 |
| Manganese, Dissolved | ug/L | 1010 | 100 | 100 | 1100 | 1070 | 86 | 60 | 75-125 | 2 | 20 | M1 |

**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

Pace Analytical®
www.pacelabs.com

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

## QUALITY CONTROL DATA

Project: McDonough Advanced Engineering
Pace Project No.: 261197

QC Batch: 291 | Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 | Analysis Description: 300.0 IC Anions
Associated Lab Samples: 261197001, 261197002

METHOD BLANK: 1608 | Matrix: Water
Associated Lab Samples: 261197001, 261197002

| Parameter | Units | Blank Result | Reporting Limit | MDL | Analyzed | Qualifiers |
|---|---|---|---|---|---|---|
| Chloride | mg/L | ND | 0.25 | 0.024 | 01/31/18 21:20 | |
| Sulfate | mg/L | ND | 1.0 | 0.017 | 01/31/18 21:20 | |

LABORATORY CONTROL SAMPLE: 1609

| Parameter | Units | Spike Conc. | LCS Result | LCS % Rec | % Rec Limits | Qualifiers |
|---|---|---|---|---|---|---|
| Chloride | mg/L | 10 | 10.4 | 104 | 90-110 | |
| Sulfate | mg/L | 10 | 10.3 | 103 | 90-110 | |

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1610 1611

| Parameter | Units | 261248001 Result | MS Spike Conc. | MSD Spike Conc. | MS Result | MSD Result | MS % Rec | MSD % Rec | % Rec Limits | RPD | Max RPD | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Chloride | mg/L | 6.3 | 10 | 10 | 16.3 | 16.3 | 100 | 100 | 90-110 | 0 | 15 | |
| Sulfate | mg/L | 20.5 | 10 | 10 | 28.6 | 28.6 | 80 | 80 | 90-110 | 0 | 15 | M1 |

MATRIX SPIKE SAMPLE: 1612

| Parameter | Units | 261248002 Result | Spike Conc. | MS Result | MS % Rec | % Rec Limits | Qualifiers |
|---|---|---|---|---|---|---|---|
| Chloride | mg/L | 6.3 | 10 | 16.7 | 105 | 90-110 | |
| Sulfate | mg/L | 20.5 | 10 | 28.8 | 84 | 90-110 | M1 |

**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.**

## QUALIFIERS

Project: McDonough Advanced Engineering
Pace Project No.: 261197

### 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.

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

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

N2 The lab does not hold NELAC/TNI accreditation for this parameter.

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

## QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: McDonough Advanced Engineering
Pace Project No.: 261197

| Lab ID | Sample ID | QC Batch Method | QC Batch | Analytical Method | Analytical Batch |
|---|---|---|---|---|---|
| **261197001** | **AP-1 B-3** | EPA 3005A | 391 | EPA 6020B | 517 |
| **261197002** | **AP-1 B-7** | EPA 3005A | 391 | EPA 6020B | 517 |
| **261197001** | **AP-1 B-3** | EPA 3005A | 262 | EPA 6020B | 328 |
| **261197002** | **AP-1 B-7** | EPA 3005A | 262 | EPA 6020B | 328 |
| **261197001** | **AP-1 B-3** | EPA 300.0 | 291 | | |
| **261197002** | **AP-1 B-7** | EPA 300.0 | 291 | | |

# CHAIN OF CUSTODY RECORD

PaceAnalytical

Pace Analytical Services, Inc.
110 TECHNOLOGY PARKWAY, PEACHTREE CORNERS, GA 30092
(770) 734-4200 : FAX (770) 734-4201 : www.asi-lab.com

PAGE: 1 OF 1

CLIENT NAME: Georgia Power

CLIENT ADDRESS/PHONE NUMBER/FAX NUMBER:
241 Ralph McGill Blvd SE B10185
Atlanta, GA 30308
404-506-7239

REPORT TO: Tim Richards (Tim_Richards@golder.com)

CC: KJurinko@golder.com

REQUESTED COMPLETION DATE:

PO #: laburch@southernco.com

PROJECT NAME/STATE: Plant McDonough AP- AE Sampling

PROJECT #: 1779172

ANALYSIS REQUESTED

| Collection DATE | Collection TIME | MATRIX CODE* | COMP | GRAB | SAMPLE IDENTIFICATION | # of CONTAINERS | Cl, SO4 EPA 9056 (P, 7) | *Metals, Dissolved (EPA 6010/6020) (field filtered) As, Fe, Mn (P, 3&7) | *Metals (EPA 6010/6020) As, Ca, Fe, Mg, Mn, Na, K (P, 3&7) | LAB ID NUMBER | REMARKS/ADDITIONAL INFORMATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 01/24/18 | 1350 | GW | | x | AP-1 B-3 | 3 | 1 | 1 | 1 | 1 | |
| 01/25/18 | 1105 | GW | | x | AP-1 B-7 | 3 | 1 | 1 | 1 | 2 | |

CONTAINER TYPE
- P - PLASTIC
- A - AMBER GLASS
- G - CLEAR GLASS
- V - VOA VIAL
- S - STERILE
- O - OTHER

PRESERVATION
- 1 - HCl, ≤6°C
- 2 - $H_2SO_4$, ≤6°C
- 3 - $HNO_3$
- 4 - NaOH, ≤6°C
- 5 - NaOH/ZnAc, ≤6°C
- 6 - $Na_2S_2O_3$, ≤6°C
- 7 - ≤6°C not frozen

*MATRIX CODES:
- DW - DRINKING WATER
- WW - WASTEWATER
- GW - GROUNDWATER
- SW - SURFACE WATER
- ST - STORM WATER
- W - WATER
- S - SOIL
- SL - SLUDGE
- SD - SOLID
- A - AIR
- L - LIQUID
- P - PRODUCT

SAMPLED BY AND TITLE: Ben Hodges Field Lead — DATE/TIME: 1/25/18 1700

RELINQUISHED BY: [signature] — DATE/TIME: 1/26/18 1000

RECEIVED BY: Mike Nguyen — DATE/TIME: 1/26/18 1000

RELINQUISHED BY: — DATE/TIME:

RECEIVED BY LAB: M Zalman — DATE/TIME: 01/26/18 1130

SAMPLE SHIPPED VIA: UPS FED-EX USPS COURIER CLIENT OTHER FS — Pace

pH checked: Yes No NA — Ice: Yes No NA — Temperature: Min: 0.5 Max:

Custody Seal: Intact Broken Not Present — # of Coolers — Cooler ID:

WO#: 261197

261197

AE_Piezometers_McDonough AP-1 COC.xlsx

# Sample Condition Upon Receipt

Pace Analytical

Client Name: Golder Associates Project #

**WO#: 261197**

**PM: BM Due Date: 02/02/18**

**CLIENT: Golder-ATL**

**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** THR-083 Type of Ice: (Wet) Blue None ☐ Samples on ice, cooling process has begun

**Cooler Temperature** 0.5 Biological Tissue is Frozen: Yes No

Temp should be above freezing to 6°C

Date and Initials of person examining contents: 1/26/18 MR

| | | | | 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: GW | | | | |
| 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 Services, LLC**
110 Technology Parkway
Peachtree Corners, GA 30092
(770)734-4200

February 08, 2018

Kristen Jurinko
Golder Associates - Atlanta
3730 Chamblee Tucker Road
Atlanta, GA 30341

RE: Project: McDonough Advanced Engineering
Pace Project No.: 261198

Dear Kristen Jurinko:

Enclosed are the analytical results for sample(s) received by the laboratory on January 26, 2018. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

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

Sincerely,

Betsy McDaniel

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

Enclosures

cc: Tim Richards, Golder Associates - Atlanta

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

# CERTIFICATIONS

| | |
|---|---|
| Project: | McDonough Advanced Engineering |
| Pace Project No.: | 261198 |

**Atlanta Certification IDs**

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
Texas Certification #: T104704397-08-TX
Virginia Certification #: 460204

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

## SAMPLE SUMMARY

Project: McDonough Advanced Engineering
Pace Project No.: 261198

| Lab ID | Sample ID | Matrix | Date Collected | Date Received |
|---|---|---|---|---|
| **261198001** | **B-51** | Water | 01/25/18 10:20 | 01/26/18 11:30 |
| **261198002** | **B-73** | Water | 01/25/18 13:00 | 01/26/18 11:30 |
| **261198003** | **B-72** | Water | 01/25/18 15:40 | 01/26/18 11:30 |
| **261198004** | **FB-2** | Water | 01/25/18 15:30 | 01/26/18 11:30 |
| **261198005** | **EB-2** | Water | 01/25/18 16:10 | 01/26/18 11:30 |
| **261198006** | **FD-2** | Water | 01/25/18 00:00 | 01/26/18 11:30 |
| **261198007** | **B-31** | Water | 01/25/18 15:15 | 01/26/18 11:30 |
| **261198008** | **FD-1** | Water | 01/25/18 00:00 | 01/26/18 11:30 |
| **261198009** | **FB-1** | Water | 01/25/18 14:45 | 01/26/18 11:30 |
| **261198010** | **EB-1** | Water | 01/25/18 16:00 | 01/26/18 11:30 |

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

## SAMPLE ANALYTE COUNT

Project: McDonough Advanced Engineering
Pace Project No.: 261198

| Lab ID | Sample ID | Method | Analysts | Analytes Reported |
|---|---|---|---|---|
| **261198001** | **B-51** | EPA 6020B | CSW | 7 |
| | | EPA 6020B | KLH | 3 |
| | | EPA 300.0 | RLC | 2 |
| **261198002** | **B-73** | EPA 6020B | CSW | 7 |
| | | EPA 6020B | KLH | 3 |
| | | EPA 300.0 | RLC | 2 |
| **261198003** | **B-72** | EPA 6020B | CSW | 7 |
| | | EPA 6020B | KLH | 3 |
| | | EPA 300.0 | RLC | 2 |
| **261198004** | **FB-2** | EPA 6020B | CSW | 7 |
| | | EPA 300.0 | RLC | 2 |
| **261198005** | **EB-2** | EPA 6020B | CSW | 7 |
| | | EPA 300.0 | RLC | 2 |
| **261198006** | **FD-2** | EPA 6020B | CSW | 7 |
| | | EPA 6020B | KLH | 3 |
| | | EPA 300.0 | RLC | 2 |
| **261198007** | **B-31** | EPA 6020B | CSW | 7 |
| | | EPA 6020B | KLH | 3 |
| | | EPA 300.0 | RLC | 2 |
| **261198008** | **FD-1** | EPA 6020B | CSW | 7 |
| | | EPA 6020B | CSW | 3 |
| | | EPA 300.0 | RLC | 2 |
| **261198009** | **FB-1** | EPA 6020B | CSW | 7 |
| | | EPA 300.0 | RLC | 2 |
| **261198010** | **EB-1** | EPA 6020B | CSW | 7 |
| | | EPA 300.0 | RLC | 2 |

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

# ANALYTICAL RESULTS

Project: McDonough Advanced Engineering
Pace Project No.: 261198

**Sample: B-51** **Lab ID: 261198001** Collected: 01/25/18 10:20 Received: 01/26/18 11:30 Matrix: Water

| Parameters | Results | Units | Report Limit | MDL | DF | Prepared | Analyzed | CAS No. | Qual |
|---|---|---|---|---|---|---|---|---|---|
| **6020B MET ICPMS** | Analytical Method: EPA 6020B Preparation Method: EPA 3005A | | | | | | | | |
| Arsenic | ND | ug/L | 5.0 | 0.52 | 1 | 02/05/18 10:25 | 02/07/18 19:51 | 7440-38-2 | |
| Calcium | **54500** | ug/L | 25000 | 2020 | 50 | 02/05/18 10:25 | 02/07/18 19:57 | 7440-70-2 | |
| Iron | **56.2** | ug/L | 40.0 | 4.3 | 1 | 02/05/18 10:25 | 02/07/18 19:51 | 7439-89-6 | N2 |
| Magnesium | **8010** | ug/L | 50.0 | 6.3 | 1 | 02/05/18 10:25 | 02/07/18 19:51 | 7439-95-4 | |
| Manganese | **194** | ug/L | 10.0 | 0.76 | 1 | 02/05/18 10:25 | 02/07/18 19:51 | 7439-96-5 | |
| Potassium | **4040** | ug/L | 100 | 16.5 | 1 | 02/05/18 10:25 | 02/07/18 19:51 | 7440-09-7 | |
| Sodium | **13400** | ug/L | 100 | 13.5 | 1 | 02/05/18 10:25 | 02/07/18 19:51 | 7440-23-5 | |
| **6020B MET ICPMS, Dissolved** | Analytical Method: EPA 6020B Preparation Method: EPA 3005A | | | | | | | | |
| Arsenic, Dissolved | ND | ug/L | 5.0 | 0.52 | 1 | 01/31/18 15:52 | 02/02/18 00:05 | 7440-38-2 | |
| Iron, Dissolved | **45.2** | ug/L | 40.0 | 4.3 | 1 | 01/31/18 15:52 | 02/02/18 00:05 | 7439-89-6 | N2 |
| Manganese, Dissolved | **177** | ug/L | 10.0 | 0.76 | 1 | 01/31/18 15:52 | 02/02/18 00:05 | 7439-96-5 | |
| **300.0 IC Anions 28 Days** | Analytical Method: EPA 300.0 | | | | | | | | |
| Chloride | **5.6** | mg/L | 0.25 | 0.024 | 1 | | 02/01/18 00:47 | 16887-00-6 | |
| Sulfate | **92.6** | mg/L | 5.0 | 0.085 | 5 | | 02/06/18 18:54 | 14808-79-8 | |

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

## ANALYTICAL RESULTS

Project: McDonough Advanced Engineering
Pace Project No.: 261198

**Sample: B-73** **Lab ID: 261198002** Collected: 01/25/18 13:00 Received: 01/26/18 11:30 Matrix: Water

| Parameters | Results | Units | Report Limit | MDL | DF | Prepared | Analyzed | CAS No. | Qual |
|---|---|---|---|---|---|---|---|---|---|
| **6020B MET ICPMS** | Analytical Method: EPA 6020B Preparation Method: EPA 3005A | | | | | | | | |
| Arsenic | **12.5** | ug/L | 5.0 | 0.52 | 1 | 02/05/18 10:25 | 02/07/18 20:03 | 7440-38-2 | |
| Calcium | **45000** | ug/L | 25000 | 2020 | 50 | 02/05/18 10:25 | 02/07/18 20:08 | 7440-70-2 | |
| Iron | **291** | ug/L | 40.0 | 4.3 | 1 | 02/05/18 10:25 | 02/07/18 20:03 | 7439-89-6 | N2 |
| Magnesium | **14100** | ug/L | 50.0 | 6.3 | 1 | 02/05/18 10:25 | 02/07/18 20:03 | 7439-95-4 | |
| Manganese | **3640** | ug/L | 10.0 | 0.76 | 1 | 02/05/18 10:25 | 02/07/18 20:03 | 7439-96-5 | |
| Potassium | **3700** | ug/L | 100 | 16.5 | 1 | 02/05/18 10:25 | 02/07/18 20:03 | 7440-09-7 | |
| Sodium | **8110** | ug/L | 100 | 13.5 | 1 | 02/05/18 10:25 | 02/07/18 20:03 | 7440-23-5 | |
| **6020B MET ICPMS, Dissolved** | Analytical Method: EPA 6020B Preparation Method: EPA 3005A | | | | | | | | |
| Arsenic, Dissolved | **12.5** | ug/L | 5.0 | 0.52 | 1 | 01/31/18 15:52 | 02/02/18 00:11 | 7440-38-2 | |
| Iron, Dissolved | **20.9J** | ug/L | 40.0 | 4.3 | 1 | 01/31/18 15:52 | 02/02/18 00:11 | 7439-89-6 | N2 |
| Manganese, Dissolved | **3570** | ug/L | 100 | 7.6 | 10 | 01/31/18 15:52 | 02/02/18 19:54 | 7439-96-5 | |
| **300.0 IC Anions 28 Days** | Analytical Method: EPA 300.0 | | | | | | | | |
| Chloride | **3.8** | mg/L | 0.25 | 0.024 | 1 | | 02/01/18 01:07 | 16887-00-6 | |
| Sulfate | **41.5** | mg/L | 5.0 | 0.085 | 5 | | 02/06/18 19:16 | 14808-79-8 | |

Pace Analytical
www.pacelabs.com

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

## ANALYTICAL RESULTS

Project: McDonough Advanced Engineering
Pace Project No.: 261198

**Sample: B-72** **Lab ID: 261198003** Collected: 01/25/18 15:40 Received: 01/26/18 11:30 Matrix: Water

| Parameters | Results | Units | Report Limit | MDL | DF | Prepared | Analyzed | CAS No. | Qual |
|---|---|---|---|---|---|---|---|---|---|
| **6020B MET ICPMS** | Analytical Method: EPA 6020B Preparation Method: EPA 3005A | | | | | | | | |
| Arsenic | ND | ug/L | 5.0 | 0.52 | 1 | 02/05/18 10:25 | 02/07/18 20:14 | 7440-38-2 | |
| Calcium | **38100** | ug/L | 25000 | 2020 | 50 | 02/05/18 10:25 | 02/07/18 20:20 | 7440-70-2 | |
| Iron | **60.3** | ug/L | 40.0 | 4.3 | 1 | 02/05/18 10:25 | 02/07/18 20:14 | 7439-89-6 | N2 |
| Magnesium | **13200** | ug/L | 50.0 | 6.3 | 1 | 02/05/18 10:25 | 02/07/18 20:14 | 7439-95-4 | |
| Manganese | **368** | ug/L | 10.0 | 0.76 | 1 | 02/05/18 10:25 | 02/07/18 20:14 | 7439-96-5 | |
| Potassium | **3930** | ug/L | 100 | 16.5 | 1 | 02/05/18 10:25 | 02/07/18 20:14 | 7440-09-7 | |
| Sodium | **14000** | ug/L | 100 | 13.5 | 1 | 02/05/18 10:25 | 02/07/18 20:14 | 7440-23-5 | |
| **6020B MET ICPMS, Dissolved** | Analytical Method: EPA 6020B Preparation Method: EPA 3005A | | | | | | | | |
| Arsenic, Dissolved | ND | ug/L | 5.0 | 0.52 | 1 | 01/31/18 15:52 | 02/02/18 00:17 | 7440-38-2 | |
| Iron, Dissolved | **27.0J** | ug/L | 40.0 | 4.3 | 1 | 01/31/18 15:52 | 02/02/18 00:17 | 7439-89-6 | N2 |
| Manganese, Dissolved | **343** | ug/L | 10.0 | 0.76 | 1 | 01/31/18 15:52 | 02/02/18 00:17 | 7439-96-5 | |
| **300.0 IC Anions 28 Days** | Analytical Method: EPA 300.0 | | | | | | | | |
| Chloride | **5.4** | mg/L | 0.25 | 0.024 | 1 | | 02/01/18 01:28 | 16887-00-6 | |
| Sulfate | **96.0** | mg/L | 10.0 | 0.17 | 10 | | 02/06/18 19:38 | 14808-79-8 | |

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

# ANALYTICAL RESULTS

Project: McDonough Advanced Engineering
Pace Project No.: 261198

**Sample: FB-2** **Lab ID: 261198004** Collected: 01/25/18 15:30 Received: 01/26/18 11:30 Matrix: Water

| Parameters | Results | Units | Report Limit | MDL | DF | Prepared | Analyzed | CAS No. | Qual |
|---|---|---|---|---|---|---|---|---|---|
| **6020B MET ICPMS** | Analytical Method: EPA 6020B Preparation Method: EPA 3005A | | | | | | | | |
| Arsenic | ND | ug/L | 5.0 | 0.52 | 1 | 02/05/18 10:25 | 02/07/18 20:25 | 7440-38-2 | |
| Calcium | ND | ug/L | 500 | 40.4 | 1 | 02/05/18 10:25 | 02/07/18 20:25 | 7440-70-2 | |
| Iron | ND | ug/L | 40.0 | 4.3 | 1 | 02/05/18 10:25 | 02/07/18 20:25 | 7439-89-6 | N2 |
| Magnesium | ND | ug/L | 50.0 | 6.3 | 1 | 02/05/18 10:25 | 02/07/18 20:25 | 7439-95-4 | |
| Manganese | ND | ug/L | 10.0 | 0.76 | 1 | 02/05/18 10:25 | 02/07/18 20:25 | 7439-96-5 | |
| Potassium | ND | ug/L | 100 | 16.5 | 1 | 02/05/18 10:25 | 02/07/18 20:25 | 7440-09-7 | |
| Sodium | ND | ug/L | 100 | 13.5 | 1 | 02/05/18 10:25 | 02/07/18 20:25 | 7440-23-5 | |
| **300.0 IC Anions 28 Days** | Analytical Method: EPA 300.0 | | | | | | | | |
| Chloride | **0.028J** | mg/L | 0.25 | 0.024 | 1 | | 02/01/18 01:48 | 16887-00-6 | |
| Sulfate | **0.069J** | mg/L | 1.0 | 0.017 | 1 | | 02/01/18 01:48 | 14808-79-8 | |

Pace Analytical®
www.pacelabs.com

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

# ANALYTICAL RESULTS

Project: McDonough Advanced Engineering
Pace Project No.: 261198

**Sample: EB-2** **Lab ID: 261198005** Collected: 01/25/18 16:10 Received: 01/26/18 11:30 Matrix: Water

| Parameters | Results | Units | Report Limit | MDL | DF | Prepared | Analyzed | CAS No. | Qual |
|---|---|---|---|---|---|---|---|---|---|
| **6020B MET ICPMS** | Analytical Method: EPA 6020B Preparation Method: EPA 3005A | | | | | | | | |
| Arsenic | ND | ug/L | 5.0 | 0.52 | 1 | 02/05/18 10:25 | 02/07/18 20:31 | 7440-38-2 | |
| Calcium | ND | ug/L | 500 | 40.4 | 1 | 02/05/18 10:25 | 02/07/18 20:31 | 7440-70-2 | |
| Iron | **5.3J** | ug/L | 40.0 | 4.3 | 1 | 02/05/18 10:25 | 02/07/18 20:31 | 7439-89-6 | N2 |
| Magnesium | ND | ug/L | 50.0 | 6.3 | 1 | 02/05/18 10:25 | 02/07/18 20:31 | 7439-95-4 | |
| Manganese | ND | ug/L | 10.0 | 0.76 | 1 | 02/05/18 10:25 | 02/07/18 20:31 | 7439-96-5 | |
| Potassium | ND | ug/L | 100 | 16.5 | 1 | 02/05/18 10:25 | 02/07/18 20:31 | 7440-09-7 | |
| Sodium | ND | ug/L | 100 | 13.5 | 1 | 02/05/18 10:25 | 02/07/18 20:31 | 7440-23-5 | |
| **300.0 IC Anions 28 Days** | Analytical Method: EPA 300.0 | | | | | | | | |
| Chloride | ND | mg/L | 0.25 | 0.024 | 1 | | 02/01/18 03:32 | 16887-00-6 | |
| Sulfate | ND | mg/L | 1.0 | 0.017 | 1 | | 02/01/18 03:32 | 14808-79-8 | |

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

# ANALYTICAL RESULTS

Project: McDonough Advanced Engineering
Pace Project No.: 261198

**Sample: FD-2** **Lab ID: 261198006** Collected: 01/25/18 00:00 Received: 01/26/18 11:30 Matrix: Water

| Parameters | Results | Units | Report Limit | MDL | DF | Prepared | Analyzed | CAS No. | Qual |
|---|---|---|---|---|---|---|---|---|---|
| **6020B MET ICPMS** | Analytical Method: EPA 6020B Preparation Method: EPA 3005A | | | | | | | | |
| Arsenic | ND | ug/L | 5.0 | 0.52 | 1 | 02/05/18 10:25 | 02/07/18 20:48 | 7440-38-2 | |
| Calcium | **37800** | ug/L | 25000 | 2020 | 50 | 02/05/18 10:25 | 02/07/18 20:54 | 7440-70-2 | |
| Iron | **62.5** | ug/L | 40.0 | 4.3 | 1 | 02/05/18 10:25 | 02/07/18 20:48 | 7439-89-6 | N2 |
| Magnesium | **13600** | ug/L | 50.0 | 6.3 | 1 | 02/05/18 10:25 | 02/07/18 20:48 | 7439-95-4 | |
| Manganese | **365** | ug/L | 10.0 | 0.76 | 1 | 02/05/18 10:25 | 02/07/18 20:48 | 7439-96-5 | |
| Potassium | **4110** | ug/L | 100 | 16.5 | 1 | 02/05/18 10:25 | 02/07/18 20:48 | 7440-09-7 | |
| Sodium | **14300** | ug/L | 100 | 13.5 | 1 | 02/05/18 10:25 | 02/07/18 20:48 | 7440-23-5 | |
| **6020B MET ICPMS, Dissolved** | Analytical Method: EPA 6020B Preparation Method: EPA 3005A | | | | | | | | |
| Arsenic, Dissolved | ND | ug/L | 5.0 | 0.52 | 1 | 01/31/18 15:52 | 02/02/18 00:23 | 7440-38-2 | |
| Iron, Dissolved | **72.5** | ug/L | 40.0 | 4.3 | 1 | 01/31/18 15:52 | 02/02/18 00:23 | 7439-89-6 | N2 |
| Manganese, Dissolved | **340** | ug/L | 10.0 | 0.76 | 1 | 01/31/18 15:52 | 02/02/18 00:23 | 7439-96-5 | |
| **300.0 IC Anions 28 Days** | Analytical Method: EPA 300.0 | | | | | | | | |
| Chloride | **5.4** | mg/L | 0.25 | 0.024 | 1 | | 02/01/18 03:52 | 16887-00-6 | |
| Sulfate | **94.3** | mg/L | 10.0 | 0.17 | 10 | | 02/06/18 17:22 | 14808-79-8 | |

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

# ANALYTICAL RESULTS

Project: McDonough Advanced Engineering
Pace Project No.: 261198

**Sample: B-31** **Lab ID: 261198007** Collected: 01/25/18 15:15 Received: 01/26/18 11:30 Matrix: Water

| Parameters | Results | Units | Report Limit | MDL | DF | Prepared | Analyzed | CAS No. | Qual |
|---|---|---|---|---|---|---|---|---|---|
| **6020B MET ICPMS** | Analytical Method: EPA 6020B Preparation Method: EPA 3005A | | | | | | | | |
| Arsenic | ND | ug/L | 5.0 | 0.52 | 1 | 02/05/18 10:25 | 02/07/18 21:00 | 7440-38-2 | |
| Calcium | **68300** | ug/L | 25000 | 2020 | 50 | 02/05/18 10:25 | 02/07/18 21:06 | 7440-70-2 | |
| Iron | **8.7J** | ug/L | 40.0 | 4.3 | 1 | 02/05/18 10:25 | 02/07/18 21:00 | 7439-89-6 | N2 |
| Magnesium | **15100** | ug/L | 50.0 | 6.3 | 1 | 02/05/18 10:25 | 02/07/18 21:00 | 7439-95-4 | |
| Manganese | **25.6** | ug/L | 10.0 | 0.76 | 1 | 02/05/18 10:25 | 02/07/18 21:00 | 7439-96-5 | |
| Potassium | **4470** | ug/L | 100 | 16.5 | 1 | 02/05/18 10:25 | 02/07/18 21:00 | 7440-09-7 | |
| Sodium | **29300** | ug/L | 5000 | 674 | 50 | 02/05/18 10:25 | 02/07/18 21:06 | 7440-23-5 | |
| **6020B MET ICPMS, Dissolved** | Analytical Method: EPA 6020B Preparation Method: EPA 3005A | | | | | | | | |
| Arsenic, Dissolved | ND | ug/L | 5.0 | 0.52 | 1 | 01/31/18 15:52 | 02/02/18 00:28 | 7440-38-2 | |
| Iron, Dissolved | ND | ug/L | 40.0 | 4.3 | 1 | 01/31/18 15:52 | 02/02/18 00:28 | 7439-89-6 | N2 |
| Manganese, Dissolved | **25.3** | ug/L | 10.0 | 0.76 | 1 | 01/31/18 15:52 | 02/02/18 00:28 | 7439-96-5 | |
| **300.0 IC Anions 28 Days** | Analytical Method: EPA 300.0 | | | | | | | | |
| Chloride | **7.3** | mg/L | 0.25 | 0.024 | 1 | | 02/01/18 04:34 | 16887-00-6 | |
| Sulfate | **281** | mg/L | 20.0 | 0.34 | 20 | | 02/06/18 20:01 | 14808-79-8 | |

Pace Analytical www.pacelabs.com

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

# ANALYTICAL RESULTS

Project: McDonough Advanced Engineering
Pace Project No.: 261198

**Sample: FD-1** **Lab ID: 261198008** Collected: 01/25/18 00:00 Received: 01/26/18 11:30 Matrix: Water

| Parameters | Results | Units | Report Limit | MDL | DF | Prepared | Analyzed | CAS No. | Qual |
|---|---|---|---|---|---|---|---|---|---|
| **6020B MET ICPMS** | Analytical Method: EPA 6020B Preparation Method: EPA 3005A | | | | | | | | |
| Arsenic | ND | ug/L | 5.0 | 0.52 | 1 | 02/05/18 10:25 | 02/07/18 21:11 | 7440-38-2 | |
| Calcium | **72400** | ug/L | 25000 | 2020 | 50 | 02/05/18 10:25 | 02/07/18 21:17 | 7440-70-2 | |
| Iron | **13.2J** | ug/L | 40.0 | 4.3 | 1 | 02/05/18 10:25 | 02/07/18 21:11 | 7439-89-6 | N2 |
| Magnesium | **15200** | ug/L | 50.0 | 6.3 | 1 | 02/05/18 10:25 | 02/07/18 21:11 | 7439-95-4 | |
| Manganese | **25.8** | ug/L | 10.0 | 0.76 | 1 | 02/05/18 10:25 | 02/07/18 21:11 | 7439-96-5 | |
| Potassium | **4470** | ug/L | 100 | 16.5 | 1 | 02/05/18 10:25 | 02/07/18 21:11 | 7440-09-7 | |
| Sodium | **31300** | ug/L | 5000 | 674 | 50 | 02/05/18 10:25 | 02/07/18 21:17 | 7440-23-5 | |
| **6020B MET ICPMS, Dissolved** | Analytical Method: EPA 6020B Preparation Method: EPA 3005A | | | | | | | | |
| Arsenic, Dissolved | **0.54J** | ug/L | 5.0 | 0.52 | 1 | 02/05/18 10:44 | 02/07/18 23:52 | 7440-38-2 | |
| Iron, Dissolved | **10.0J** | ug/L | 40.0 | 4.3 | 1 | 02/05/18 10:44 | 02/07/18 23:52 | 7439-89-6 | N2 |
| Manganese, Dissolved | **25.7** | ug/L | 10.0 | 0.76 | 1 | 02/05/18 10:44 | 02/07/18 23:52 | 7439-96-5 | |
| **300.0 IC Anions 28 Days** | Analytical Method: EPA 300.0 | | | | | | | | |
| Chloride | **7.3** | mg/L | 0.25 | 0.024 | 1 | | 02/01/18 04:54 | 16887-00-6 | |
| Sulfate | **280** | mg/L | 20.0 | 0.34 | 20 | | 02/06/18 20:23 | 14808-79-8 | |

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

# ANALYTICAL RESULTS

Project: McDonough Advanced Engineering
Pace Project No.: 261198

**Sample: FB-1** **Lab ID: 261198009** Collected: 01/25/18 14:45 Received: 01/26/18 11:30 Matrix: Water

| Parameters | Results | Units | Report Limit | MDL | DF | Prepared | Analyzed | CAS No. | Qual |
|---|---|---|---|---|---|---|---|---|---|
| **6020B MET ICPMS** | Analytical Method: EPA 6020B Preparation Method: EPA 3005A | | | | | | | | |
| Arsenic | ND | ug/L | 5.0 | 0.52 | 1 | 02/05/18 10:25 | 02/07/18 21:23 | 7440-38-2 | |
| Calcium | ND | ug/L | 500 | 40.4 | 1 | 02/05/18 10:25 | 02/07/18 21:23 | 7440-70-2 | |
| Iron | ND | ug/L | 40.0 | 4.3 | 1 | 02/05/18 10:25 | 02/07/18 21:23 | 7439-89-6 | N2 |
| Magnesium | ND | ug/L | 50.0 | 6.3 | 1 | 02/05/18 10:25 | 02/07/18 21:23 | 7439-95-4 | |
| Manganese | ND | ug/L | 10.0 | 0.76 | 1 | 02/05/18 10:25 | 02/07/18 21:23 | 7439-96-5 | |
| Potassium | ND | ug/L | 100 | 16.5 | 1 | 02/05/18 10:25 | 02/07/18 21:23 | 7440-09-7 | |
| Sodium | ND | ug/L | 100 | 13.5 | 1 | 02/05/18 10:25 | 02/07/18 21:23 | 7440-23-5 | |
| **300.0 IC Anions 28 Days** | Analytical Method: EPA 300.0 | | | | | | | | |
| Chloride | **0.047J** | mg/L | 0.25 | 0.024 | 1 | | 02/01/18 05:15 | 16887-00-6 | |
| Sulfate | ND | mg/L | 1.0 | 0.017 | 1 | | 02/01/18 05:15 | 14808-79-8 | |

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

# ANALYTICAL RESULTS

Project: McDonough Advanced Engineering
Pace Project No.: 261198

**Sample: EB-1** **Lab ID: 261198010** Collected: 01/25/18 16:00 Received: 01/26/18 11:30 Matrix: Water

| Parameters | Results | Units | Report Limit | MDL | DF | Prepared | Analyzed | CAS No. | Qual |
|---|---|---|---|---|---|---|---|---|---|
| **6020B MET ICPMS** | Analytical Method: EPA 6020B Preparation Method: EPA 3005A | | | | | | | | |
| Arsenic | ND | ug/L | 5.0 | 0.52 | 1 | 02/05/18 10:25 | 02/07/18 21:28 | 7440-38-2 | |
| Calcium | ND | ug/L | 500 | 40.4 | 1 | 02/05/18 10:25 | 02/07/18 21:28 | 7440-70-2 | |
| Iron | ND | ug/L | 40.0 | 4.3 | 1 | 02/05/18 10:25 | 02/07/18 21:28 | 7439-89-6 | N2 |
| Magnesium | ND | ug/L | 50.0 | 6.3 | 1 | 02/05/18 10:25 | 02/07/18 21:28 | 7439-95-4 | |
| Manganese | ND | ug/L | 10.0 | 0.76 | 1 | 02/05/18 10:25 | 02/07/18 21:28 | 7439-96-5 | |
| Potassium | ND | ug/L | 100 | 16.5 | 1 | 02/05/18 10:25 | 02/07/18 21:28 | 7440-09-7 | |
| Sodium | ND | ug/L | 100 | 13.5 | 1 | 02/05/18 10:25 | 02/07/18 21:28 | 7440-23-5 | |
| **300.0 IC Anions 28 Days** | Analytical Method: EPA 300.0 | | | | | | | | |
| Chloride | **0.027J** | mg/L | 0.25 | 0.024 | 1 | | 02/01/18 05:35 | 16887-00-6 | |
| Sulfate | ND | mg/L | 1.0 | 0.017 | 1 | | 02/01/18 05:35 | 14808-79-8 | |

Pace Analytical
www.pacelabs.com

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

## QUALITY CONTROL DATA

Project: McDonough Advanced Engineering
Pace Project No.: 261198

QC Batch: 416 — Analysis Method: EPA 6020B
QC Batch Method: EPA 3005A — Analysis Description: 6020B MET
Associated Lab Samples: 261198001, 261198002, 261198003, 261198004, 261198005, 261198006, 261198007, 261198008, 261198009, 261198010

METHOD BLANK: 4267 — Matrix: Water
Associated Lab Samples: 261198001, 261198002, 261198003, 261198004, 261198005, 261198006, 261198007, 261198008, 261198009, 261198010

| Parameter | Units | Blank Result | Reporting Limit | MDL | Analyzed | Qualifiers |
|---|---|---|---|---|---|---|
| Arsenic | ug/L | ND | 5.0 | 0.52 | 02/07/18 19:40 | |
| Calcium | ug/L | ND | 500 | 40.4 | 02/07/18 19:40 | |
| Iron | ug/L | ND | 40.0 | 4.3 | 02/07/18 19:40 | N2 |
| Magnesium | ug/L | ND | 50.0 | 6.3 | 02/07/18 19:40 | |
| Manganese | ug/L | ND | 10.0 | 0.76 | 02/07/18 19:40 | |
| Potassium | ug/L | ND | 100 | 16.5 | 02/07/18 19:40 | |
| Sodium | ug/L | ND | 100 | 13.5 | 02/07/18 19:40 | |

LABORATORY CONTROL SAMPLE: 4268

| Parameter | Units | Spike Conc. | LCS Result | LCS % Rec | % Rec Limits | Qualifiers |
|---|---|---|---|---|---|---|
| Arsenic | ug/L | 100 | 102 | 102 | 80-120 | |
| Calcium | ug/L | 1000 | 1020 | 102 | 80-120 | |
| Iron | ug/L | 1000 | 1020 | 102 | 80-120 | N2 |
| Magnesium | ug/L | 1000 | 1050 | 105 | 80-120 | |
| Manganese | ug/L | 100 | 105 | 105 | 80-120 | |
| Potassium | ug/L | 1000 | 1070 | 107 | 80-120 | |
| Sodium | ug/L | 1000 | 1040 | 104 | 80-120 | |

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 4269 4270

| Parameter | Units | 261140001 Result | MS Spike Conc. | MSD Spike Conc. | MS Result | MSD Result | MS % Rec | MSD % Rec | % Rec Limits | RPD | Max RPD | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Arsenic | ug/L | ND | 100 | 100 | 102 | 101 | 101 | 101 | 75-125 | 0 | 20 | |
| Calcium | ug/L | 2190 | 1000 | 1000 | 3130 | 3260 | 94 | 107 | 75-125 | 4 | 20 | |
| Iron | ug/L | 33.6J | 1000 | 1000 | 1050 | 1080 | 102 | 105 | 75-125 | 3 | 20 | N2 |
| Magnesium | ug/L | 1830 | 1000 | 1000 | 2780 | 2880 | 95 | 104 | 75-125 | 4 | 20 | |
| Manganese | ug/L | 1.6J | 100 | 100 | 106 | 108 | 105 | 106 | 75-125 | 1 | 20 | |
| Potassium | ug/L | 1630 | 1000 | 1000 | 2690 | 2800 | 106 | 117 | 75-125 | 4 | 20 | |
| Sodium | ug/L | 4300 | 1000 | 1000 | 5330 | 5510 | 103 | 121 | 75-125 | 3 | 20 | |

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

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

# QUALITY CONTROL DATA

Project: McDonough Advanced Engineering
Pace Project No.: 261198

QC Batch: 262 Analysis Method: EPA 6020B
QC Batch Method: EPA 3005A Analysis Description: 6020B MET Dissolved
Associated Lab Samples: 261198001, 261198002, 261198003, 261198006, 261198007

METHOD BLANK: 1501 Matrix: Water
Associated Lab Samples: 261198001, 261198002, 261198003, 261198006, 261198007

| Parameter | Units | Blank Result | Reporting Limit | MDL | Analyzed | Qualifiers |
|---|---|---|---|---|---|---|
| Arsenic, Dissolved | ug/L | ND | 5.0 | 0.52 | 02/01/18 21:48 | |
| Iron, Dissolved | ug/L | ND | 40.0 | 4.3 | 02/01/18 21:48 | N2 |
| Manganese, Dissolved | ug/L | ND | 10.0 | 0.76 | 02/01/18 21:48 | |

LABORATORY CONTROL SAMPLE: 1502

| Parameter | Units | Spike Conc. | LCS Result | LCS % Rec | % Rec Limits | Qualifiers |
|---|---|---|---|---|---|---|
| Arsenic, Dissolved | ug/L | 100 | 104 | 104 | 80-120 | |
| Iron, Dissolved | ug/L | 1000 | 1090 | 109 | 80-120 | N2 |
| Manganese, Dissolved | ug/L | 100 | 109 | 109 | 80-120 | |

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1781 1782

| Parameter | Units | 261081004 Result | MS Spike Conc. | MSD Spike Conc. | MS Result | MSD Result | MS % Rec | MSD % Rec | % Rec Limits | RPD | Max RPD | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Arsenic, Dissolved | ug/L | ND | 100 | 100 | 107 | 104 | 107 | 104 | 75-125 | 2 | 20 | |
| Iron, Dissolved | ug/L | ND | 1000 | 1000 | 1030 | 1020 | 103 | 102 | 75-125 | 1 | 20 | N2 |
| Manganese, Dissolved | ug/L | 1010 | 100 | 100 | 1100 | 1070 | 86 | 60 | 75-125 | 2 | 20 | M1 |

**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.**

Pace Analytical
www.pacelabs.com

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

# QUALITY CONTROL DATA

Project: McDonough Advanced Engineering
Pace Project No.: 261198

QC Batch: 414 | Analysis Method: EPA 6020B
QC Batch Method: EPA 3005A | Analysis Description: 6020B MET Dissolved
Associated Lab Samples: 261198008

METHOD BLANK: 4261 | Matrix: Water
Associated Lab Samples: 261198008

| Parameter | Units | Blank Result | Reporting Limit | MDL | Analyzed | Qualifiers |
|---|---|---|---|---|---|---|
| Arsenic, Dissolved | ug/L | ND | 5.0 | 0.52 | 02/07/18 23:40 | |
| Iron, Dissolved | ug/L | ND | 40.0 | 4.3 | 02/07/18 23:40 | N2 |
| Manganese, Dissolved | ug/L | ND | 10.0 | 0.76 | 02/07/18 23:40 | |

LABORATORY CONTROL SAMPLE: 4262

| Parameter | Units | Spike Conc. | LCS Result | LCS % Rec | % Rec Limits | Qualifiers |
|---|---|---|---|---|---|---|
| Arsenic, Dissolved | ug/L | 100 | 98.9 | 99 | 80-120 | |
| Iron, Dissolved | ug/L | 1000 | 1010 | 101 | 80-120 | N2 |
| Manganese, Dissolved | ug/L | 100 | 102 | 102 | 80-120 | |

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 4416 4417

| Parameter | Units | 261218001 Result | MS Spike Conc. | MSD Spike Conc. | MS Result | MSD Result | MS % Rec | MSD % Rec | % Rec Limits | RPD | Max RPD | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Arsenic, Dissolved | ug/L | 7.1 | 100 | 100 | 109 | 111 | 102 | 104 | 75-125 | 2 | 20 | |
| Iron, Dissolved | ug/L | 709 | 1000 | 1000 | 1700 | 1720 | 99 | 102 | 75-125 | 1 | 20 | N2 |
| Manganese, Dissolved | ug/L | 2530 | 100 | 100 | 2290 | 2520 | -241 | -13 | 75-125 | 9 | 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

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

## QUALITY CONTROL DATA

Project: McDonough Advanced Engineering
Pace Project No.: 261198

QC Batch: 291 | Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 | Analysis Description: 300.0 IC Anions
Associated Lab Samples: 261198001, 261198002, 261198003, 261198004, 261198005, 261198006, 261198007, 261198008, 261198009, 261198010

METHOD BLANK: 1608 | Matrix: Water
Associated Lab Samples: 261198001, 261198002, 261198003, 261198004, 261198005, 261198006, 261198007, 261198008, 261198009, 261198010

| Parameter | Units | Blank Result | Reporting Limit | MDL | Analyzed | Qualifiers |
|---|---|---|---|---|---|---|
| Chloride | mg/L | ND | 0.25 | 0.024 | 01/31/18 21:20 | |
| Sulfate | mg/L | ND | 1.0 | 0.017 | 01/31/18 21:20 | |

LABORATORY CONTROL SAMPLE: 1609

| Parameter | Units | Spike Conc. | LCS Result | LCS % Rec | % Rec Limits | Qualifiers |
|---|---|---|---|---|---|---|
| Chloride | mg/L | 10 | 10.4 | 104 | 90-110 | |
| Sulfate | mg/L | 10 | 10.3 | 103 | 90-110 | |

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1610 1611

| Parameter | Units | 261248001 Result | MS Spike Conc. | MSD Spike Conc. | MS Result | MSD Result | MS % Rec | MSD % Rec | % Rec Limits | RPD | Max RPD | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Chloride | mg/L | 6.3 | 10 | 10 | 16.3 | 16.3 | 100 | 100 | 90-110 | 0 | 15 | |
| Sulfate | mg/L | 20.5 | 10 | 10 | 28.6 | 28.6 | 80 | 80 | 90-110 | 0 | 15 | M1 |

MATRIX SPIKE SAMPLE: 1612

| Parameter | Units | 261248002 Result | Spike Conc. | MS Result | MS % Rec | % Rec Limits | Qualifiers |
|---|---|---|---|---|---|---|---|
| Chloride | mg/L | 6.3 | 10 | 16.7 | 105 | 90-110 | |
| Sulfate | mg/L | 20.5 | 10 | 28.8 | 84 | 90-110 | M1 |

**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.**

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

# QUALIFIERS

Project: McDonough Advanced Engineering
Pace Project No.: 261198

## 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.

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

| | |
|---|---|
| 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. |
| N2 | The lab does not hold NELAC/TNI accreditation for this parameter. |

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

# QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: McDonough Advanced Engineering
Pace Project No.: 261198

| Lab ID | Sample ID | QC Batch Method | QC Batch | Analytical Method | Analytical Batch |
|---|---|---|---|---|---|
| **261198001** | **B-51** | EPA 3005A | 416 | EPA 6020B | 665 |
| **261198002** | **B-73** | EPA 3005A | 416 | EPA 6020B | 665 |
| **261198003** | **B-72** | EPA 3005A | 416 | EPA 6020B | 665 |
| **261198004** | **FB-2** | EPA 3005A | 416 | EPA 6020B | 665 |
| **261198005** | **EB-2** | EPA 3005A | 416 | EPA 6020B | 665 |
| **261198006** | **FD-2** | EPA 3005A | 416 | EPA 6020B | 665 |
| **261198007** | **B-31** | EPA 3005A | 416 | EPA 6020B | 665 |
| **261198008** | **FD-1** | EPA 3005A | 416 | EPA 6020B | 665 |
| **261198009** | **FB-1** | EPA 3005A | 416 | EPA 6020B | 665 |
| **261198010** | **EB-1** | EPA 3005A | 416 | EPA 6020B | 665 |
| **261198001** | **B-51** | EPA 3005A | 262 | EPA 6020B | 328 |
| **261198002** | **B-73** | EPA 3005A | 262 | EPA 6020B | 328 |
| **261198003** | **B-72** | EPA 3005A | 262 | EPA 6020B | 328 |
| **261198006** | **FD-2** | EPA 3005A | 262 | EPA 6020B | 328 |
| **261198007** | **B-31** | EPA 3005A | 262 | EPA 6020B | 328 |
| **261198008** | **FD-1** | EPA 3005A | 414 | EPA 6020B | 670 |
| **261198001** | **B-51** | EPA 300.0 | 291 | | |
| **261198002** | **B-73** | EPA 300.0 | 291 | | |
| **261198003** | **B-72** | EPA 300.0 | 291 | | |
| **261198004** | **FB-2** | EPA 300.0 | 291 | | |
| **261198005** | **EB-2** | EPA 300.0 | 291 | | |
| **261198006** | **FD-2** | EPA 300.0 | 291 | | |
| **261198007** | **B-31** | EPA 300.0 | 291 | | |
| **261198008** | **FD-1** | EPA 300.0 | 291 | | |
| **261198009** | **FB-1** | EPA 300.0 | 291 | | |
| **261198010** | **EB-1** | EPA 300.0 | 291 | | |

# CHAIN OF CUSTODY RECORD

Pace Analytical

Pace Analytical Services, Inc.
110 TECHNOLOGY PARKWAY, PEACHTREE CORNERS, GA 30092
(770) 734-4200 : FAX (770) 734-4201 : www.asi-lab.com

PAGE: 1 OF 1

CLIENT NAME: Georgia Power

CLIENT ADDRESS/PHONE NUMBER/FAX NUMBER:
241 Ralph McGill Blvd SE B10185
Atlanta, GA 30308
404-506-7239

REPORT TO: Tim Richards (Tim_Richards@golder.com)

CC: KJurinko@golder.com

REQUESTED COMPLETION DATE:

PO #: laburch@southernco.com

PROJECT NAME/STATE: Plant McDonough AP- AE Sampling

PROJECT #: 1779172

ANALYSIS REQUESTED

| | | | | | | | | CONTAINER TYPE: | P | P | P | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | PRESERVATION: | 7 | 3&7 | 3&7 | |
| Collection DATE | Collection TIME | MATRIX CODE* | COMP | GRAB | SAMPLE IDENTIFICATION | # of CONTAINERS | | | Cl, SO4 EPA 9056 | *Metals, Dissolved (EPA 6010/6020) (field filtered) As, Fe, Mn | *Metals (EPA 6010/6020) As, Ca, Fe, Mg, Mn, Na, K | LAB ID NUMBER |
| 01/25/18 | 1020 | GW | | x | B-51 | 3 | | | 1 | 1 | 1 | 1 |
| 01/25/18 | 1300 | GW | | x | B-73 | 3 | | | 1 | 1 | 1 | 2 |
| 01/25/18 | 1540 | GW | | x | B-72 | 3 | | | 1 | 1 | 1 | 3 |
| 01/25/18 | 1530 | W | | x | FB-2 | 2 | | | 1 | | 1 | 4 |
| 01/25/18 | 1610 | W | | x | EB-2 | 2 | | | 1 | | 1 | 5 |
| 01/25/18 | - | GW | | x | FD-2 | 3 | | | 1 | 1 | 1 | 6 |
| 01/25/18 | 1515 | GW | | x | B-31 | 3 | | | 1 | 1 | 1 | 7 |
| 01/25/18 | - | GW | | x | FD-1 | 3 | | | 1 | 1 | 1 | 8 |
| 01/25/18 | 1445 | W | | x | FB-1 | 2 | | | 1 | | 1 | 9 |
| 01/25/18 | 1600 | W | | x | EB-1 | 2 | | | 1 | | 1 | 10 |

CONTAINER TYPE
- P - PLASTIC
- A - AMBER GLASS
- G - CLEAR GLASS
- V - VOA VIAL
- S - STERILE
- O - OTHER

PRESERVATION
- 1 - HCl, ≤6°C
- 2 - $H_2SO_4$, ≤6°C
- 3 - $HNO_3$
- 4 - NaOH, ≤6°C
- 5 - NaOH/ZnAc, ≤6°C
- 6 - $Na_2S_2O_3$, ≤6°C
- 7 - ≤6°C not frozen

*MATRIX CODES:
- DW - DRINKING WATER
- WW - WASTEWATER
- GW - GROUNDWATER
- SW - SURFACE WATER
- ~~ST - STORM WATER~~
- W - WATER
- S - SOIL
- SL - SLUDGE
- SD - SOLID
- A - AIR
- L - LIQUID
- P - PRODUCT

REMARKS/ADDITIONAL INFORMATION

SAMPLED BY AND TITLE: Ben Hodges Field Lead — DATE/TIME: 1/25/18 1700

RELINQUISHED BY: [signature] — DATE/TIME: 1/26/18 1000

RECEIVED BY: Mike Nguyen — DATE/TIME: 1/26/18 1000

RELINQUISHED BY: — DATE/TIME:

RECEIVED BY LAB: [signature] — DATE/TIME: 01/26/18 1130

SAMPLE SHIPPED VIA: UPS FED-EX USPS COURIER CLIENT OTHER FS — Pace

pH checked: Yes No NA

Ice: Yes No NA

Temperature: Min: 2.3 Max:

Custody Seal: Intact Broken Not Present

# of Coolers

Cooler ID:

WO# : 261198

261198

1_25_18_McDonough AP-1 COC.xlsx

# Sample Condition Upon Receipt

Pace Analytical

Client Name: Golder Associates   Project # ____

**WO#: 261198**

PM: BM   Due Date: 02/02/18
CLIENT: Golder-ATL

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: THR-083   Type of Ice: Wet Blue None   ☐ Samples on ice, cooling process has begun

Cooler Temperature: 0.3   Biological Tissue is Frozen: Yes No

Temp should be above freezing to 6°C

Date and Initials of person examining contents: 1/26/18 MR

| | | | | 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: GW | | | | |
| 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

BROOKS APPLIED LABS
18804 North Creek Parkway, Ste 100, Bothell, WA 98011 • USA • T: 206 632 6206 F: 206 632 6017 • info@brooksapplied.com

July 24, 2017

Golder Associates - Greensboro
ATTN: Rachel Kirkman
5B Oak Branch Drive
Greensboro, NC, 27407
Rachel)Kirkman@golder.com

RE: Project GOL-GB1701

Dear Rachel Kirkman,

On July 7, 2017, Brooks Applied Labs (BAL) received four (4) water samples in a sealed container with a temperature of 3.0°C. The samples were logged-in for total recoverable and dissolved arsenic [As] and arsenic speciation analyses, including arsenite [As(III)], arsenate [As(V)], monomethylarsonic acid [MMAs], and dimethylarsinic acid [DMAs].

The samples submitted for dissolved arsenic and arsenic speciation analyses were filtered in the field by the client.

All samples were received, prepared, analyzed, and stored according to BAL SOPs and EPA methodology. Reagent water for dilutions and sample preservatives is monitored for contamination to account for any biases associated with the sample results.

*Total Recoverable and Dissolved Arsenic Quantitation by ICP-QQQ-MS*

Arsenic quantitation was performed by inductively coupled plasma triple quadrupole mass spectrometry (ICP-QQQ-MS). The ICP-QQQ-MS uses advanced interference removal techniques to ensure accuracy of the sample results. For more information, please visit the *Interference Reduction Technology* section on our website, brooksapplied.com. Prior to analysis all total recoverable arsenic sample fractions were preserved to (*1% $HNO_3$ (v/v) + 1% HCl (v/v)*) and oven digested in the same containers the samples were received in.

The total recoverable and dissolved arsenic results were *not* method blank corrected as described in the calculations section of the relevant BAL SOP(s) and were evaluated using reporting limits adjusted to account for sample aliquot size. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

*Arsenic Speciation Analysis by IC-ICP-CRC-MS*

Arsenic speciation analysis was performed by ion chromatography coupled to an inductively coupled plasma collision reaction cell mass spectrometer (IC-ICP-CRC-MS).

The arsenic speciation results were *not* method blank corrected as described in the calculations section of the relevant BAL SOP(s) and were evaluated using reporting limits adjusted to account for sample aliquot size. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

If the native sample result and/or the DUP result is not detected (ND) above the MDL, then the associated RPD is not calculated (N/C).

All data was reported without qualification (aside from concentration qualifiers) and all associated quality control sample results met the acceptance criteria.

BAL, an accredited laboratory, certifies that the reported results of all analyses for which BAL is NELAP accredited meet all NELAP requirements. For more information please see the *Report Information* page in your report.

Please feel free to contact me if you have any questions regarding this report.

Sincerely,

Jeremy Maute
Project Manager
Brooks Applied Labs, LLC
jeremy@brooksapplied.com

Anna Prestbo
Project Coordinator
Brooks Applied Labs, LLC
annap@brooksapplied.com

**Project ID:** GOL-GB1701
**PM:** Jeremy Maute

**Client PM:** Rachel Kirkman
**Client Project:** GPC-Plant McDonough

# Report Information

## Laboratory Accreditation

BAL is accredited by the *National Environmental Laboratory Accreditation Program* (NELAP) through the State of Florida Department of Health, Bureau of Laboratories (E87982) and is certified to perform many environmental analyses. BAL is also certified by many other states to perform environmental analyses. For a current list of our accreditations/certifications, please visit our website at <http://www.brooksapplied.com/resources/certificates-permits/>. Results reported relate only to the samples listed in the report.

## Field Quality Control Samples

Please be notified that certain EPA methods require the collection of field quality control samples of an appropriate type and frequency; failure to do so is considered a deviation from some methods and for compliance purposes should only be done with the approval of regulatory authorities. Please see the specific EPA methods for details regarding required field quality control samples.

## Common Abbreviations

| | | | |
|---|---|---|---|
| **AR** | as received | **MS** | matrix spike |
| **BAL** | Brooks Applied Labs | **MSD** | matrix spike duplicate |
| **BLK** | method blank | **ND** | non-detect |
| **BS** | blank spike | **NR** | non-reportable |
| **CAL** | calibration standard | **N/C** | not calculated |
| **CCB** | continuing calibration blank | **PS** | post preparation spike |
| **CCV** | continuing calibration verification | **REC** | percent recovery |
| **COC** | chain of custody record | **RPD** | relative percent difference |
| **D** | dissolved fraction | **SCV** | secondary calibration verification |
| **DUP** | duplicate | **SOP** | standard operating procedure |
| **IBL** | instrument blank | **SRM** | standard reference material |
| **ICV** | initial calibration verification | **T** | total fraction |
| **MDL** | method detection limit | **TR** | total recoverable fraction |
| **MRL** | method reporting limit | | |

## Definition of Data Qualifiers

(Effective 9/23/09)

| | |
|---|---|
| **E** | An estimated value due to the presence of interferences. A full explanation is presented in the narrative. |
| **H** | Holding time and/or preservation requirements not met. Result is estimated. |
| **J** | Detected by the instrument, the result is > the MDL but ≤ the MRL. Result is reported and considered an estimate. |
| **J-1** | Estimated value. A full explanation is presented in the narrative. |
| **J-M** | Duplicate precision (RPD) for associated QC sample was not within acceptance criteria. Result is estimated. |
| **J-N** | Spike recovery for associated QC sample was not within acceptance criteria. Result is estimated. |
| **M** | Duplicate precision (RPD) was not within acceptance criteria. Result is estimated. |
| **N** | Spike recovery was not within acceptance criteria. Result is estimated. |
| **R** | Rejected, unusable value. A full explanation is presented in the narrative. |
| **U** | Result is ≤ the MDL or client requested reporting limit (CRRL). Result reported as the MDL or CRRL. |
| **X** | Result is not BLK-corrected and is within 10x the absolute value of the highest detectable BLK in the batch. Result is estimated. |

These qualifiers are based on those previously utilized by Brooks Applied Labs, those found in the EPA SOW ILM03.0, Exhibit B, Section III, pg. B-18, and the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review; USEPA; January 2010. These supersede all previous qualifiers ever employed by BAL.

**Project ID:** GOL-GB1701
**PM:** Jeremy Maute

**Client PM:** Rachel Kirkman
**Client Project:** GPC-Plant McDonough

# Sample Information

| Sample | Lab ID | Report Matrix | Type | Sampled | Received |
|---|---|---|---|---|---|
| *FB-1* | 1727041-01 | Water | Sample | 07/06/2017 | 07/07/2017 |
| *FB-1* | 1727041-02 | Water | Sample | 07/06/2017 | 07/07/2017 |
| *B-70A* | 1727041-03 | Water | Sample | 07/06/2017 | 07/07/2017 |
| *B-70A* | 1727041-04 | Water | Sample | 07/06/2017 | 07/07/2017 |
| *B-70A* | 1727041-05 | Water | Sample | 07/06/2017 | 07/07/2017 |
| *B-69* | 1727041-06 | Water | Sample | 07/06/2017 | 07/07/2017 |
| *B-69* | 1727041-07 | Water | Sample | 07/06/2017 | 07/07/2017 |
| *B-69* | 1727041-08 | Water | Sample | 07/06/2017 | 07/07/2017 |
| *B-68* | 1727041-09 | Water | Sample | 07/06/2017 | 07/07/2017 |
| *B-68* | 1727041-10 | Water | Sample | 07/06/2017 | 07/07/2017 |
| *B-68* | 1727041-11 | Water | Sample | 07/06/2017 | 07/07/2017 |

# Batch Summary

| Analyte | Lab Matrix | Method | Prepared | Analyzed | Batch | Sequence |
|---|---|---|---|---|---|---|
| As | Water | EPA 1638 Mod | 07/14/2017 | 07/18/2017 | B171701 | 1700855 |
| As | Water | EPA 1638 Mod | 07/14/2017 | 07/20/2017 | B171701 | 1700863 |
| As(III) | Water | SOP BAL-4100 | 07/11/2017 | 07/12/2017 | B171687 | 1700824 |
| As(V) | Water | SOP BAL-4100 | 07/11/2017 | 07/12/2017 | B171687 | 1700824 |
| DMAs | Water | SOP BAL-4100 | 07/11/2017 | 07/12/2017 | B171687 | 1700824 |
| MMAs | Water | SOP BAL-4100 | 07/11/2017 | 07/12/2017 | B171687 | 1700824 |

**Project ID:** GOL-GB1701
**PM:** Jeremy Maute

**Client PM:** Rachel Kirkman
**Client Project:** GPC-Plant McDonough

# Sample Results

| Sample | Analyte | Report Matrix | Basis | Result | Qualifier | MDL | MRL | Unit | Batch | Sequence |
|---|---|---|---|---|---|---|---|---|---|---|
| ***B-68*** | | | | | | | | | | |
| 1727041-09 | As | Water | TR | 552 | | 0.112 | 0.408 | µg/L | B171701 | 1700855 |
| 1727041-10 | As | Water | D | 533 | | 0.112 | 0.408 | µg/L | B171701 | 1700855 |
| 1727041-11 | As(III) | Water | D | 504 | | 0.200 | 1.00 | µg/L | B171687 | 1700824 |
| 1727041-11 | As(V) | Water | D | 38.3 | | 0.200 | 1.00 | µg/L | B171687 | 1700824 |
| 1727041-11 | DMAs | Water | D | ≤ 0.250 | U | 0.250 | 1.05 | µg/L | B171687 | 1700824 |
| 1727041-11 | MMAs | Water | D | ≤ 0.200 | U | 0.200 | 1.15 | µg/L | B171687 | 1700824 |
| ***B-69*** | | | | | | | | | | |
| 1727041-06 | As | Water | TR | 21.8 | | 0.112 | 0.408 | µg/L | B171701 | 1700855 |
| 1727041-07 | As | Water | D | 23.0 | | 0.112 | 0.408 | µg/L | B171701 | 1700855 |
| 1727041-08 | As(III) | Water | D | 20.6 | | 0.200 | 1.00 | µg/L | B171687 | 1700824 |
| 1727041-08 | As(V) | Water | D | 2.02 | | 0.200 | 1.00 | µg/L | B171687 | 1700824 |
| 1727041-08 | DMAs | Water | D | ≤ 0.250 | U | 0.250 | 1.05 | µg/L | B171687 | 1700824 |
| 1727041-08 | MMAs | Water | D | ≤ 0.200 | U | 0.200 | 1.15 | µg/L | B171687 | 1700824 |
| ***B-70A*** | | | | | | | | | | |
| 1727041-03 | As | Water | TR | ≤ 0.112 | U | 0.112 | 0.408 | µg/L | B171701 | 1700863 |
| 1727041-04 | As | Water | D | ≤ 0.112 | U | 0.112 | 0.408 | µg/L | B171701 | 1700863 |
| 1727041-05 | As(III) | Water | D | ≤ 0.080 | U | 0.080 | 0.400 | µg/L | B171687 | 1700824 |
| 1727041-05 | As(V) | Water | D | 0.121 | J | 0.080 | 0.400 | µg/L | B171687 | 1700824 |
| 1727041-05 | DMAs | Water | D | ≤ 0.100 | U | 0.100 | 0.420 | µg/L | B171687 | 1700824 |
| 1727041-05 | MMAs | Water | D | ≤ 0.080 | U | 0.080 | 0.460 | µg/L | B171687 | 1700824 |
| ***FB-1*** | | | | | | | | | | |
| 1727041-01 | As | Water | TR | ≤ 0.112 | U | 0.112 | 0.408 | µg/L | B171701 | 1700863 |
| 1727041-02 | As(III) | Water | D | ≤ 0.080 | U | 0.080 | 0.400 | µg/L | B171687 | 1700824 |
| 1727041-02 | As(V) | Water | D | 0.096 | J | 0.080 | 0.400 | µg/L | B171687 | 1700824 |
| 1727041-02 | DMAs | Water | D | ≤ 0.100 | U | 0.100 | 0.420 | µg/L | B171687 | 1700824 |
| 1727041-02 | MMAs | Water | D | ≤ 0.080 | U | 0.080 | 0.460 | µg/L | B171687 | 1700824 |

**Project ID:** GOL-GB1701
**PM:** Jeremy Maute

**Client PM:** Rachel Kirkman
**Client Project:** GPC-Plant McDonough

# Accuracy & Precision Summary

**Batch:** B171687
**Lab Matrix:** Water
**Method:** SOP BAL-4100

| Sample | Analyte | Native | Spike | Result | Units | REC & Limits | | RPD & Limits | |
|---|---|---|---|---|---|---|---|---|---|
| **B171687-BS1** | **Blank Spike, (1714053)** | | | | | | | | |
| | As(III) | | 5.000 | 5.138 | µg/L | 103% | 75-125 | | |
| | As(V) | | 5.000 | 4.431 | µg/L | 89% | 75-125 | | |
| | DMAs | | 3.198 | 2.805 | µg/L | 88% | 75-125 | | |
| **B171687-BS2** | **Blank Spike, (1714054)** | | | | | | | | |
| | As(V) | | 0.3510 | 0.280 | µg/L | 80% | 75-125 | | |
| | MMAs | | 4.554 | 4.641 | µg/L | 102% | 75-125 | | |
| **B171687-DUP1** | **Duplicate, (1727041-11)** | | | | | | | | |
| | As(III) | 504.1 | | 498.1 | µg/L | | | 1% | 25 |
| | As(V) | 38.27 | | 38.53 | µg/L | | | 0.7% | 25 |
| | DMAs | ND | | ND | µg/L | | | N/C | 25 |
| | MMAs | ND | | ND | µg/L | | | N/C | 25 |
| **B171687-MS1** | **Matrix Spike, (1727041-11)** | | | | | | | | |
| | As(III) | 504.1 | 50.00 | 543.2 | µg/L | NR | 75-125 | | |
| | As(V) | 38.27 | 50.00 | 86.89 | µg/L | 97% | 75-125 | | |
| | DMAs | ND | 49.00 | 48.01 | µg/L | 98% | 75-125 | | |
| | MMAs | ND | 50.35 | 49.88 | µg/L | 99% | 75-125 | | |
| **B171687-MSD1** | **Matrix Spike Duplicate, (1727041-11)** | | | | | | | | |
| | As(III) | 504.1 | 50.00 | 550.4 | µg/L | NR | 75-125 | N/C | 25 |
| | As(V) | 38.27 | 50.00 | 87.68 | µg/L | 99% | 75-125 | 0.9% | 25 |
| | DMAs | ND | 49.00 | 49.04 | µg/L | 100% | 75-125 | 2% | 25 |
| | MMAs | ND | 50.35 | 50.45 | µg/L | 100% | 75-125 | 1% | 25 |

**Project ID:** GOL-GB1701
**PM:** Jeremy Maute

**Client PM:** Rachel Kirkman
**Client Project:** GPC-Plant McDonough

# Accuracy & Precision Summary

**Batch:** B171701
**Lab Matrix:** Water
**Method:** EPA 1638 Mod

| Sample | Analyte | Native | Spike | Result | Units | REC & Limits | | RPD & Limits | |
|---|---|---|---|---|---|---|---|---|---|
| **B171701-BS1** | **Blank Spike, (1727001)** | | | | | | | | |
| | As | | 20.41 | 21.02 | µg/L | 103% | 75-125 | | |
| **B171701-SRM1** | **Standard Reference Material (1724007, T221 as SRM)** | | | | | | | | |
| | As | | 17.70 | 18.31 | µg/L | 103% | 75-125 | | |
| **B171701-SRM2** | **Standard Reference Material (1721039, NIST 1640a (batch SRM))** | | | | | | | | |
| | As | | 8.075 | 8.057 | µg/L | 100% | 75-125 | | |
| **B171701-SRM3** | **Standard Reference Material (1724007, T221 as SRM)** | | | | | | | | |
| | As | | 17.70 | 18.84 | µg/L | 106% | 75-125 | | |
| **B171701-SRM4** | **Standard Reference Material (1721039, NIST 1640a (batch SRM))** | | | | | | | | |
| | As | | 8.075 | 7.761 | µg/L | 96% | 75-125 | | |
| **B171701-DUP2** | **Duplicate, (1727041-03)** | | | | | | | | |
| | As | ND | | ND | µg/L | | | N/C | 20 |
| **B171701-MS2** | **Matrix Spike, (1727041-03)** | | | | | | | | |
| | As | ND | 102.0 | 99.99 | µg/L | 98% | 75-125 | | |
| **B171701-MSD2** | **Matrix Spike Duplicate, (1727041-03)** | | | | | | | | |
| | As | ND | 102.0 | 101.3 | µg/L | 99% | 75-125 | 1% | 20 |

18804 North Creek Parkway, Suite 100, Bothell, WA 98011 · P(206) 632-6206 · F(206) 632-6017 · info@brooksapplied.com · www.brooksapplied.com

# Method Blanks & Reporting Limits

**Batch:** B171687
**Matrix:** Water
**Method:** SOP BAL-4100
**Analyte:** As(III)

| Sample | Result | Units |
|---|---|---|
| B171687-BLK1 | 0.00 | µg/L |
| B171687-BLK2 | 0.00 | µg/L |
| B171687-BLK3 | 0.00 | µg/L |
| B171687-BLK4 | 0.00 | µg/L |

**Average:** 0.000 **MDL:** 0.004
**Limit:** 0.020 **MRL:** 0.020

**Analyte:** As(V)

| Sample | Result | Units |
|---|---|---|
| B171687-BLK1 | 0.001 | µg/L |
| B171687-BLK2 | 0.0005 | µg/L |
| B171687-BLK3 | 0.00009 | µg/L |
| B171687-BLK4 | -0.0008 | µg/L |

**Average:** 0.000 **MDL:** 0.004
**Limit:** 0.020 **MRL:** 0.020

**Analyte:** DMAs

| Sample | Result | Units |
|---|---|---|
| B171687-BLK1 | 0.00 | µg/L |
| B171687-BLK2 | 0.00 | µg/L |
| B171687-BLK3 | 0.00 | µg/L |
| B171687-BLK4 | 0.00 | µg/L |

**Average:** 0.000 **MDL:** 0.005
**Limit:** 0.021 **MRL:** 0.021

**Project ID:** GOL-GB1701
**PM:** Jeremy Maute

**Client PM:** Rachel Kirkman
**Client Project:** GPC-Plant McDonough

# Method Blanks & Reporting Limits

**Analyte:** MMAs

| Sample | Result | Units |
|---|---|---|
| B171687-BLK1 | 0.00 | µg/L |
| B171687-BLK2 | 0.00 | µg/L |
| B171687-BLK3 | 0.00 | µg/L |
| B171687-BLK4 | 0.00 | µg/L |

**Average:** 0.000 **MDL:** 0.004
**Limit:** 0.023 **MRL:** 0.023

**Project ID:** GOL-GB1701
**PM:** Jeremy Maute

**Client PM:** Rachel Kirkman
**Client Project:** GPC-Plant McDonough

# Method Blanks & Reporting Limits

**Batch:** B171701
**Matrix:** Water
**Method:** EPA 1638 Mod
**Analyte:** As

| Sample | Result | Units |
|---|---|---|
| B171701-BLK5 | -0.001 | µg/L |
| B171701-BLK6 | 0.002 | µg/L |
| B171701-BLK7 | -0.002 | µg/L |
| B171701-BLK8 | -0.004 | µg/L |

**Average:** -0.001
**Limit:** 0.040

**MDL:** 0.011
**MRL:** 0.040

18804 North Creek Parkway, Suite 100, Bothell, WA 98011 · P(206) 632-6206 · F(206) 632-6017 · info@brooksapplied.com · www.brooksapplied.com

**Project ID:** GOL-GB1701
**PM:** Jeremy Maute

**Client PM:** Rachel Kirkman
**Client Project:** GPC-Plant McDonough

# Sample Containers

**Lab ID:** 1727041-01 **Report Matrix:** Water **Collected:** 07/06/2017
**Sample:** FB-1 **Sample Type:** Sample **Received:** 07/07/2017

| Des | Container | Size | Lot | Preservation | Pres-Lot | pH | Ship. Cont. |
|---|---|---|---|---|---|---|---|
| A | Bottle HDPE ICP-W | 125 mL | 17-0079 | 0.2% HNO3 (BAL) | 1724042 | <2 | Cooler |

**Comments:** Half Filtered int0 1727041-12

**Lab ID:** 1727041-02 **Report Matrix:** Water **Collected:** 07/06/2017
**Sample:** FB-1 **Sample Type:** Sample **Received:** 07/07/2017

| Des | Container | Size | Lot | Preservation | Pres-Lot | pH | Ship. Cont. |
|---|---|---|---|---|---|---|---|
| A | Vacutainer | 6 mL | 16-0257 | EDTA (PP) | NA | 4-6 | Cooler |
| B | EXTRA_VOL | 6 mL | 16-0257 | EDTA (PP) | NA | 4-6 | Cooler |

**Lab ID:** 1727041-03 **Report Matrix:** Water **Collected:** 07/06/2017
**Sample:** B-70A **Sample Type:** Sample **Received:** 07/07/2017

| Des | Container | Size | Lot | Preservation | Pres-Lot | pH | Ship. Cont. |
|---|---|---|---|---|---|---|---|
| A | Bottle HDPE ICP-W | 125 mL | 17-0079 | 0.2% HNO3 (BAL) | 1724042 | <2 | Cooler |

**Lab ID:** 1727041-04 **Report Matrix:** Water **Collected:** 07/06/2017
**Sample:** B-70A **Sample Type:** Sample **Received:** 07/07/2017

| Des | Container | Size | Lot | Preservation | Pres-Lot | pH | Ship. Cont. |
|---|---|---|---|---|---|---|---|
| A | Bottle HDPE ICP-W | 125 mL | 17-0079 | 0.2% HNO3 (BAL) | 1724042 | <2 | Cooler |

**Lab ID:** 1727041-05 **Report Matrix:** Water **Collected:** 07/06/2017
**Sample:** B-70A **Sample Type:** Sample **Received:** 07/07/2017

| Des | Container | Size | Lot | Preservation | Pres-Lot | pH | Ship. Cont. |
|---|---|---|---|---|---|---|---|
| A | Vacutainer | 6 mL | 16-0257 | EDTA (PP) | NA | 4-6 | Cooler |
| B | EXTRA_VOL | 6 mL | 16-0257 | EDTA (PP) | NA | 4-6 | Cooler |

**Project ID:** GOL-GB1701
**PM:** Jeremy Maute

**Client PM:** Rachel Kirkman
**Client Project:** GPC-Plant McDonough

# Sample Containers

**Lab ID:** 1727041-06
**Sample:** B-69
**Report Matrix:** Water
**Sample Type:** Sample
**Collected:** 07/06/2017
**Received:** 07/07/2017

| Des | Container | Size | Lot | Preservation | Pres-Lot | pH | Ship. Cont. |
|---|---|---|---|---|---|---|---|
| A | Bottle HDPE ICP-W | 125 mL | 17-0079 | 0.2% HNO3 (BAL) | 1724042 | <2 | Cooler |

**Lab ID:** 1727041-07
**Sample:** B-69
**Report Matrix:** Water
**Sample Type:** Sample
**Collected:** 07/06/2017
**Received:** 07/07/2017

| Des | Container | Size | Lot | Preservation | Pres-Lot | pH | Ship. Cont. |
|---|---|---|---|---|---|---|---|
| A | Bottle HDPE ICP-W | 125 mL | 17-0079 | 0.2% HNO3 (BAL) | 1724042 | <2 | Cooler |

**Lab ID:** 1727041-08
**Sample:** B-69
**Report Matrix:** Water
**Sample Type:** Sample
**Collected:** 07/06/2017
**Received:** 07/07/2017

| Des | Container | Size | Lot | Preservation | Pres-Lot | pH | Ship. Cont. |
|---|---|---|---|---|---|---|---|
| A | Vacutainer | 6 mL | 16-0257 | EDTA (PP) | NA | 4-6 | Cooler |
| B | EXTRA_VOL | 6 mL | 16-0257 | EDTA (PP) | NA | 4-6 | Cooler |

**Lab ID:** 1727041-09
**Sample:** B-68
**Report Matrix:** Water
**Sample Type:** Sample
**Collected:** 07/06/2017
**Received:** 07/07/2017

| Des | Container | Size | Lot | Preservation | Pres-Lot | pH | Ship. Cont. |
|---|---|---|---|---|---|---|---|
| A | Bottle HDPE ICP-W | 125 mL | 17-0079 | 0.2% HNO3 (BAL) | 1724042 | <2 | Cooler |

**Lab ID:** 1727041-10
**Sample:** B-68
**Report Matrix:** Water
**Sample Type:** Sample
**Collected:** 07/06/2017
**Received:** 07/07/2017

| Des | Container | Size | Lot | Preservation | Pres-Lot | pH | Ship. Cont. |
|---|---|---|---|---|---|---|---|
| A | Bottle HDPE ICP-W | 125 mL | 17-0079 | 0.2% HNO3 (BAL) | 1724042 | <2 | Cooler |

**Lab ID:** 1727041-11
**Sample:** B-68
**Report Matrix:** Water
**Sample Type:** Sample
**Collected:** 07/06/2017
**Received:** 07/07/2017

| Des | Container | Size | Lot | Preservation | Pres-Lot | pH | Ship. Cont. |
|---|---|---|---|---|---|---|---|
| A | Vacutainer | 6 mL | 16-0257 | EDTA (PP) | NA | 4-6 | Cooler |
| B | EXTRA_VOL | 6 mL | 16-0257 | EDTA (PP) | NA | 4-6 | Cooler |

**Project ID:** GOL-GB1701
**PM:** Jeremy Maute

**Client PM:** Rachel Kirkman
**Client Project:** GPC-Plant McDonough

# Shipping Containers

## Cooler

**Received:** July 7, 2017 9:30
**Tracking No:** 787106210796 via FedEx
**Coolant Type:** Ice
**Temperature:** 3.0 °C

**Description:** Cooler
**Damaged in transit?** No
**Returned to client?** No
**Comments:** IR#15

**Custody seals present?** Yes
**Custody seals intact?** Yes
**COC present?** Yes

BROOKS APPLIED LABS

# Chain-of-Custody Form

*Ship samples to:*
18804 North Creek Parkway, Suite 100
Bothell, WA 98011

BAL Report 1727041

For BAL use only
*Received by:* [signature] *Date:* 7/7/17
*Work Order ID:* 1727041 *Time:* 9:30
*Project ID:* GPC-GB1701

Client: Georgia Power Company PO Number: 1779172 Mailing Address: 241 Ralph McGill Blvd
Contact: John Abraham Phone: Atlanta, GA 30308
Client Project ID: Email: jabraham@southernco.com Email Receipt Confirmation? (Yes/No)
Samples Collected By: Ben Hodges - Golder Associates BAL PM:

Requested TAT (business days)

- ☒ 20 (standard)
- ☐ 15*
- ☐ 10*
- ☐ 5*
- ☐ Other ____

*Surcharges may apply to expedited TATs

| | Sample ID | Collection: Date | Collection: Time | Client Sample Info: Matrix Type | Number of Containers | Field Filtered? (Yes/No) | Preservation Type HCl /$HNO_3$/Other | BAL Analyses Required: Total Hg, EPA 1631 | Methyl Hg, EPA 1630 | ICP-MS Metals (specify) Arsenic | As Species (specify) InOrg, III, V, MMA, DMA | Se Species (specify) Se(IV), Se(VI), SeCN, Uknown | Filtration | Other (specify) | Other (specify) | Comments: Specify Here |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | FB-1 | 7/6/17 | 0900 | Water | 3 | ~~No~~ Yes | | | | 1 | 2 | ~~X~~ | | | | |
| 2 | B-70A | 7/6/17 | 0955 | Water | 4 | Yes/No | | | | 2 | 2 | | | | | Filtered/unfiltered As |
| 3 | B-69 | 7/6/17 | 1515 | Water | 4 | Yes/No | | | | 2 | 2 | | | | | (Total/Dissolved) |
| 4 | B-68 | 7/6/17 | 1335 | Water | 4 | Yes/No | | | | 2 | 2 | | | | | on all samples |
| 5 | | | | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | |
| | Trip Blank | | | | | | | | | | | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| Relinquished By: [signature] | Date: 7/6/17 | Time: 1700 | Relinquished By: | Date: | Time: |
| Received By: | Date: | Time: | Total Number of Packages: | | |

Page 1 of 1 List Hazardous Contaminants: ____

samples@brooksapplied.com | brooksapplied.com

BROOKS APPLIED LABS
18804 North Creek Parkway, Ste 100, Bothell, WA 98011 • USA • T: 206 632 6206 F: 206 632 6017 • info@brooksapplied.com

December 11, 2017

Golder Associates - Greensboro
ATTN: Rachel Kirkman
5B Oak Branch Drive
Greensboro, NC, 27407
Rachel)Kirkman@golder.com

RE: Project GOL-GB1701

Dear Rachel Kirkman,

On November 14, 2017, Brooks Applied Labs (BAL) received one (1) water sample in a sealed container with a temperature of 3.0°C. The sample was logged-in for total recoverable and dissolved arsenic [As] and arsenic speciation analyses, including arsenite [As(III)], arsenate [As(V)], monomethylarsonic acid [MMAs], and dimethylarsinic acid [DMAs].

The fractions submitted for dissolved arsenic and arsenic speciation analyses were filtered in the field by the client.

All samples were received, prepared, analyzed, and stored according to BAL SOPs and EPA methodology. Reagent water for dilutions and sample preservatives is monitored for contamination to account for any biases associated with the sample results.

*Total Recoverable and Dissolved Arsenic Quantitation by ICP-QQQ-MS*
Arsenic quantitation was performed by inductively coupled plasma triple quadrupole mass spectrometry (ICP-QQQ-MS). The ICP-QQQ-MS uses advanced interference removal techniques to ensure accuracy of the sample results. For more information, please visit the *Interference Reduction Technology* section on our website, brooksapplied.com. Prior to analysis all total recoverable arsenic sample fractions were preserved to (*1% $HNO_3$ (v/v) + 1% HCl (v/v)*) and oven digested in the same containers the samples were received in.

The total recoverable and dissolved arsenic results were *not* method blank corrected as described in the calculations section of the relevant BAL SOP(s) and were evaluated using reporting limits adjusted to account for sample aliquot size. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

The matrix spike and matrix spike duplicate (B173142-MS2/B173142-MSD2) associated with sample 1746012-01 were spiked below the native sample concentration. Recoveries are not valid indicators of data quality but have been included as a demonstration of instrument precision.

*Arsenic Speciation Analysis by IC-ICP-CRC-MS*

Arsenic speciation analysis was performed by ion chromatography coupled to an inductively coupled plasma collision reaction cell mass spectrometer (IC-ICP-CRC-MS).

The blank spike (B173144-BS1) for DMA yielded an elevated recovery (129%). Sample results were non-detect for DMA and were determined to not have been adversely affected, therefore no qualification is necessary.

The arsenic speciation results were *not* method blank corrected as described in the calculations section of the relevant BAL SOP(s) and were evaluated using reporting limits adjusted to account for sample aliquot size. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

If the native sample result and/or the DUP result is not detected (ND) above the MDL, then the associated RPD is not calculated (N/C).

All data was reported without qualification (aside from concentration qualifiers) and all associated quality control sample results met the acceptance criteria.

BAL, an accredited laboratory, certifies that the reported results of all analyses for which BAL is NELAP accredited meet all NELAP requirements. For more information please see the *Report Information* page in your report.

Please feel free to contact me if you have any questions regarding this report.

Sincerely,

Jeremy Maute
Senior Project Manager
Brooks Applied Labs, LLC
jeremy@brooksapplied.com

Margaret Shultz
Project Coordinator
Brooks Applied Labs, LLC
margaret@brooksapplied.com

**Project ID:** GOL-GB1701
**PM:** Jeremy Maute

**Client PM:** Rachel Kirkman
**Client Project:** GOL-GB1701

# Report Information

## Laboratory Accreditation

BAL is accredited by the *National Environmental Laboratory Accreditation Program* (NELAP) through the State of Florida Department of Health, Bureau of Laboratories (E87982) and is certified to perform many environmental analyses. BAL is also certified by many other states to perform environmental analyses. For a current list of our accreditations/certifications, please visit our website at <http://www.brooksapplied.com/resources/certificates-permits/>. Results reported relate only to the samples listed in the report.

## Field Quality Control Samples

Please be notified that certain EPA methods require the collection of field quality control samples of an appropriate type and frequency; failure to do so is considered a deviation from some methods and for compliance purposes should only be done with the approval of regulatory authorities. Please see the specific EPA methods for details regarding required field quality control samples.

## Common Abbreviations

| | | | |
|---|---|---|---|
| **AR** | as received | **MS** | matrix spike |
| **BAL** | Brooks Applied Labs | **MSD** | matrix spike duplicate |
| **BLK** | method blank | **ND** | non-detect |
| **BS** | blank spike | **NR** | non-reportable |
| **CAL** | calibration standard | **N/C** | not calculated |
| **CCB** | continuing calibration blank | **PS** | post preparation spike |
| **CCV** | continuing calibration verification | **REC** | percent recovery |
| **COC** | chain of custody record | **RPD** | relative percent difference |
| **D** | dissolved fraction | **SCV** | secondary calibration verification |
| **DUP** | duplicate | **SOP** | standard operating procedure |
| **IBL** | instrument blank | **SRM** | standard reference material |
| **ICV** | initial calibration verification | **T** | total fraction |
| **MDL** | method detection limit | **TR** | total recoverable fraction |
| **MRL** | method reporting limit | | |

## Definition of Data Qualifiers

(Effective 9/23/09)

| | |
|---|---|
| **E** | An estimated value due to the presence of interferences. A full explanation is presented in the narrative. |
| **H** | Holding time and/or preservation requirements not met. Result is estimated. |
| **J** | Detected by the instrument, the result is > the MDL but ≤ the MRL. Result is reported and considered an estimate. |
| **J-1** | Estimated value. A full explanation is presented in the narrative. |
| **J-M** | Duplicate precision (RPD) for associated QC sample was not within acceptance criteria. Result is estimated. |
| **J-N** | Spike recovery for associated QC sample was not within acceptance criteria. Result is estimated. |
| **M** | Duplicate precision (RPD) was not within acceptance criteria. Result is estimated. |
| **N** | Spike recovery was not within acceptance criteria. Result is estimated. |
| **R** | Rejected, unusable value. A full explanation is presented in the narrative. |
| **U** | Result is ≤ the MDL or client requested reporting limit (CRRL). Result reported as the MDL or CRRL. |
| **X** | Result is not BLK-corrected and is within 10x the absolute value of the highest detectable BLK in the batch. Result is estimated. |

These qualifiers are based on those previously utilized by Brooks Applied Labs, those found in the EPA SOW ILM03.0, Exhibit B, Section III, pg. B-18, and the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review; USEPA; January 2010. These supersede all previous qualifiers ever employed by BAL.

**Project ID:** GOL-GB1701
**PM:** Jeremy Maute

**Client PM:** Rachel Kirkman
**Client Project:** GOL-GB1701

# Sample Information

| Sample | Lab ID | Report Matrix | Type | Sampled | Received |
|---|---|---|---|---|---|
| *AP-1 B-3A* | 1746012-01 | Groundwater | Sample | 11/13/2017 | 11/14/2017 |
| *AP-1 B-3A* | 1746012-02 | Groundwater | Sample | 11/13/2017 | 11/14/2017 |

# Batch Summary

| Analyte | Lab Matrix | Method | Prepared | Analyzed | Batch | Sequence |
|---|---|---|---|---|---|---|
| As | Water | EPA 1638 Mod | 11/21/2017 | 11/28/2017 | B173142 | 1701480 |
| As(III) | Water | SOP BAL-4100 | 11/16/2017 | 11/17/2017 | B173144 | 1701421 |
| As(V) | Water | SOP BAL-4100 | 11/16/2017 | 11/17/2017 | B173144 | 1701421 |
| DMAs | Water | SOP BAL-4100 | 11/16/2017 | 11/17/2017 | B173144 | 1701421 |
| MMAs | Water | SOP BAL-4100 | 11/16/2017 | 11/17/2017 | B173144 | 1701421 |

# Sample Results

| Sample | Analyte | Report Matrix | Basis | Result | Qualifier | MDL | MRL | Unit | Batch | Sequence |
|---|---|---|---|---|---|---|---|---|---|---|
| ***AP-1 B-3A*** | | | | | | | | | | |
| 1746012-01 | As | Groundwater | TR | 2220 | | 0.561 | 2.04 | µg/L | B173142 | 1701480 |
| ***AP-1 B-3A*** | | | | | | | | | | |
| 1746012-02 | As | Groundwater | D | 2130 | | 0.561 | 2.04 | µg/L | B173142 | 1701480 |
| 1746012-02 | As(III) | Groundwater | D | 1660 | | 2.00 | 10.0 | µg/L | B173144 | 1701421 |
| 1746012-02 | As(V) | Groundwater | D | 214 | | 2.00 | 10.0 | µg/L | B173144 | 1701421 |
| 1746012-02 | DMAs | Groundwater | D | ≤ 2.50 | U | 2.50 | 10.5 | µg/L | B173144 | 1701421 |
| 1746012-02 | MMAs | Groundwater | D | ≤ 2.00 | U | 2.00 | 11.5 | µg/L | B173144 | 1701421 |

# Accuracy & Precision Summary

**Batch:** B173142
**Lab Matrix:** Water
**Method:** EPA 1638 Mod

| Sample | Analyte | Native | Spike | Result | Units | REC & Limits | | RPD & Limits | |
|---|---|---|---|---|---|---|---|---|---|
| **B173142-BS1** | **Blank Spike, (1747054)** | | | | | | | | |
| | As | | 25.00 | 19.18 | µg/L | 77% | 75-125 | | |
| **B173142-BS2** | **Blank Spike, (1747054)** | | | | | | | | |
| | As | | 25.00 | 19.31 | µg/L | 77% | 75-125 | | |
| **B173142-BS3** | **Blank Spike, (1747054)** | | | | | | | | |
| | As | | 25.00 | 18.89 | µg/L | 76% | 75-125 | | |
| **B173142-DUP2** | **Duplicate, (1746012-01)** | | | | | | | | |
| | As | 2222 | | 2226 | µg/L | | | 0.2% | 20 |
| **B173142-MS2** | **Matrix Spike, (1746012-01)** | | | | | | | | |
| | As | 2222 | 1020 | 3362 | µg/L | 112% | 75-125 | | |
| **B173142-MSD2** | **Matrix Spike Duplicate, (1746012-01)** | | | | | | | | |
| | As | 2222 | 1020 | 3314 | µg/L | 107% | 75-125 | 1% | 20 |

**Batch:** B173144
**Lab Matrix:** Water
**Method:** SOP BAL-4100

| Sample | Analyte | Native | Spike | Result | Units | REC & Limits | | RPD & Limits | |
|---|---|---|---|---|---|---|---|---|---|
| **B173144-BS1** | **Blank Spike, (1736006)** | | | | | | | | |
| | As(III) | | 5.010 | 4.760 | µg/L | 95% | 75-125 | | |
| | As(V) | | 5.000 | 4.681 | µg/L | 94% | 75-125 | | |
| | DMAs | | 3.198 | 4.121 | µg/L | *129%* | 75-125 | | |
| **B173144-BS2** | **Blank Spike, (1714054)** | | | | | | | | |
| | MMAs | | 4.634 | 4.904 | µg/L | 106% | 75-125 | | |

**Project ID:** GOL-GB1701
**PM:** Jeremy Maute

**Client PM:** Rachel Kirkman
**Client Project:** GOL-GB1701

# Accuracy & Precision Summary

**Batch:** B173144
**Lab Matrix:** Water
**Method:** SOP BAL-4100

| Sample | Analyte | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|---|---|---|---|---|---|---|---|
| **B173144-DUP1** | **Duplicate, (1746039-01)** | | | | | | |
| | As(III) | ND | | ND | µg/L | | N/C 25 |
| | As(V) | 0.215 | | 0.205 | µg/L | | 5% 25 |
| | DMAs | ND | | ND | µg/L | | N/C 25 |
| | MMAs | ND | | ND | µg/L | | N/C 25 |
| **B173144-MS1** | **Matrix Spike, (1746039-01)** | | | | | | |
| | As(III) | ND | 20.00 | 19.15 | µg/L | 96% 75-125 | |
| | As(V) | 0.215 | 20.00 | 19.72 | µg/L | 98% 75-125 | |
| | DMAs | ND | 20.40 | 19.52 | µg/L | 96% 75-125 | |
| | MMAs | ND | 20.00 | 19.25 | µg/L | 96% 75-125 | |
| **B173144-MSD1** | **Matrix Spike Duplicate, (1746039-01)** | | | | | | |
| | As(III) | ND | 20.00 | 19.10 | µg/L | 96% 75-125 | 0.2% 25 |
| | As(V) | 0.215 | 20.00 | 19.34 | µg/L | 96% 75-125 | 2% 25 |
| | DMAs | ND | 20.40 | 19.63 | µg/L | 96% 75-125 | 0.5% 25 |
| | MMAs | ND | 20.00 | 19.33 | µg/L | 97% 75-125 | 0.4% 25 |

**Project ID:** GOL-GB1701
**PM:** Jeremy Maute

**Client PM:** Rachel Kirkman
**Client Project:** GOL-GB1701

# Method Blanks & Reporting Limits

**Batch:** B173142
**Matrix:** Water
**Method:** EPA 1638 Mod
**Analyte:** As

| Sample | Result | Units |
|---|---|---|
| B173142-BLK1 | 0.004 | µg/L |
| B173142-BLK2 | 0.005 | µg/L |
| B173142-BLK3 | 0.006 | µg/L |
| B173142-BLK4 | 0.005 | µg/L |
| **Average:** | 0.005 | |
| **Limit:** | 0.040 | |

**MDL:** 0.011
**MRL:** 0.040

18804 North Creek Parkway, Suite 100, Bothell, WA 98011 · P(206) 632-6206 · F(206) 632-6017 · info@brooksapplied.com · www.brooksapplied.com

# Method Blanks & Reporting Limits

**Batch:** B173144
**Matrix:** Water
**Method:** SOP BAL-4100
**Analyte:** As(III)

| Sample | Result | Units |
|---|---|---|
| B173144-BLK1 | 0.00 | µg/L |
| B173144-BLK2 | 0.00 | µg/L |
| B173144-BLK3 | 0.00 | µg/L |
| B173144-BLK4 | 0.00 | µg/L |

**Average:** 0.000 **MDL:** 0.004
**Limit:** 0.020 **MRL:** 0.020

**Analyte:** As(V)

| Sample | Result | Units |
|---|---|---|
| B173144-BLK1 | 0.00 | µg/L |
| B173144-BLK2 | 0.00 | µg/L |
| B173144-BLK3 | 0.00 | µg/L |
| B173144-BLK4 | 0.00 | µg/L |

**Average:** 0.000 **MDL:** 0.004
**Limit:** 0.020 **MRL:** 0.020

**Analyte:** DMAs

| Sample | Result | Units |
|---|---|---|
| B173144-BLK1 | 0.00 | µg/L |
| B173144-BLK2 | 0.00 | µg/L |
| B173144-BLK3 | 0.00 | µg/L |
| B173144-BLK4 | 0.00 | µg/L |

**Average:** 0.000 **MDL:** 0.005
**Limit:** 0.021 **MRL:** 0.021

**Project ID:** GOL-GB1701
**PM:** Jeremy Maute

**Client PM:** Rachel Kirkman
**Client Project:** GOL-GB1701

# Method Blanks & Reporting Limits

**Analyte:** MMAs

| Sample | Result | Units |
|---|---|---|
| B173144-BLK1 | 0.00 | µg/L |
| B173144-BLK2 | 0.00 | µg/L |
| B173144-BLK3 | 0.00 | µg/L |
| B173144-BLK4 | 0.00 | µg/L |

**Average:** 0.000
**Limit:** 0.023

**MDL:** 0.004
**MRL:** 0.023

**Project ID:** GOL-GB1701
**PM:** Jeremy Maute

**Client PM:** Rachel Kirkman
**Client Project:** GOL-GB1701

# Sample Containers

**Lab ID:** 1746012-01
**Sample:** AP-1 B-3A
**Report Matrix:** Groundwater
**Sample Type:** Sample
**Collected:** 11/13/2017
**Received:** 11/14/2017

| Des | Container | Size | Lot | Preservation | P-Lot | pH | Ship. Cont. |
|---|---|---|---|---|---|---|---|
| A | Bottle HDPE ICP-W | 125mL | 17-0169 | 0.2% HNO3 (BAL) | 1736020 | <2 | Cooler - 1746012 |

**Lab ID:** 1746012-02
**Sample:** AP-1 B-3A
**Report Matrix:** Groundwater
**Sample Type:** Sample
**Collected:** 11/13/2017
**Received:** 11/14/2017

| Des | Container | Size | Lot | Preservation | P-Lot | pH | Ship. Cont. |
|---|---|---|---|---|---|---|---|
| A | Bottle HDPE ICP-W | 125mL | 17-0169 | 0.2% HNO3 (BAL) | 1736020 | <2 | Cooler - 1746012 |
| B | Vacutainer | 6mL | 16-0257 | EDTA (PP) | | | Cooler - 1746012 |
| C | EXTRA_VOL | 6mL | 16-0257 | EDTA (PP) | | | Cooler - 1746012 |

# Shipping Containers

### Cooler - 1746012

**Received:** November 14, 2017 9:30
**Tracking No:** 788444303244 via FedEx
**Coolant Type:** Ice
**Temperature:** 3.0 °C

**Description:** Cooler
**Damaged in transit?** No
**Returned to client?** No
**Comments:** IR#8

**Custody seals present?** Yes
**Custody seals intact?** Yes
**COC present?** Yes

BAL Report 1746012

BROOKS APPLIED LABS

# Chain-of-Custody Form

*Ship samples to:*
18804 North Creek Parkway, Suite 100
Bothell, WA 98011

For BAL use only
*Received by:* Madeline Ore *Date:* 11/14/17
*Work Order ID:* *Time:* 9:30
*Project ID:*

Client: Golder Associates
Contact: Rachel Kirkman
Client Project ID:
Samples Collected By: Ben Hodges

PO Number: 1779172
Phone: 336-402-5542
Email: rachel_kirkman@golder.com

Mailing Address: 3730 Chamblee Tucker Rd Atlanta, GA 30341
Email Receipt Confirmation? (Yes/No)
BAL PM:

Requested TAT (business days)
- [x] 20 (standard)
- [ ] 15*
- [ ] 10*
- [ ] 5*
- [ ] Other ____

*Surcharges may apply to expedited TATs

| | Sample ID | Collection: Date | Collection: Time | Client Sample Info: Matrix Type | Number of Containers | Field Filtered? (Yes/No) | Preservation Type HCl /$HNO_3$/Other | BAL Analyses Required: Total Hg, EPA 1631 | Methyl Hg, EPA 1630 | ICP-MS Metals (specify) | As Species (specify) InOrg, III, V, MMA, DMA | Se Species (specify) Se(IV), Se(VI), SeCN, Uknown | Filtration | Other (specify) | Other (specify) | Comments: Specify Here |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | AP-1 B-3A | 11/13/17 | 1400 | GW | 4 | Yes/N | | | | T/D* | X | | | | | Samples for dissolved and As Speciation were field filtered |
| 2 | | | | | | | | | | | | | | | | |
| 3 | | | | | | | | | | | | | | | | |
| 4 | | | | | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | |
| | Trip Blank | | | | | | | | | | | | | | | |

| Relinquished By: | Date: | Time: | Relinquished By: | Date: | Time: |
|---|---|---|---|---|---|
| Received By: | Date: | Time: | Total Number of Packages: | | |

Page 1 of 1 List Hazardous Contaminants: ____

samples@brooksapplied.com | brooksapplied.com

BROOKS APPLIED LABS
18804 North Creek Parkway, Ste 100, Bothell, WA 98011 • USA • T: 206 632 6206 F: 206 632 6017 • info@brooksapplied.com

December 11, 2017

Golder Associates - Greensboro
ATTN: Rachel Kirkman
5B Oak Branch Drive
Greensboro, NC, 27407
Rachel)Kirkman@golder.com

RE: Project GOL-GB1701

Dear Rachel Kirkman,

On November 15, 2017, Brooks Applied Labs (BAL) received four (4) water samples in a sealed container with a temperature of 1.5°C. The sample was logged-in for total recoverable and dissolved arsenic [As] and arsenic speciation analyses, including arsenite [As(III)], arsenate [As(V)], monomethylarsonic acid [MMAs], and dimethylarsinic acid [DMAs].

The fractions submitted for dissolved arsenic and arsenic speciation analyses were filtered in the field by the client.

All samples were received, prepared, analyzed, and stored according to BAL SOPs and EPA methodology. Reagent water for dilutions and sample preservatives is monitored for contamination to account for any biases associated with the sample results.

*Total Recoverable and Dissolved Arsenic Quantitation by ICP-QQQ-MS*
Arsenic quantitation was performed by inductively coupled plasma triple quadrupole mass spectrometry (ICP-QQQ-MS). The ICP-QQQ-MS uses advanced interference removal techniques to ensure accuracy of the sample results. For more information, please visit the *Interference Reduction Technology* section on our website, brooksapplied.com. Prior to analysis all total recoverable arsenic sample fractions were preserved to (*1% $HNO_3$ (v/v) + 1% HCl (v/v)*) and oven digested in the same containers the samples were received in.

The total recoverable and dissolved arsenic results were *not* method blank corrected as described in the calculations section of the relevant BAL SOP(s) and were evaluated using reporting limits adjusted to account for sample aliquot size. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

The matrix spike and matrix spike duplicate (B173142-MS1/B173142-MSD1) associated with sample 1746016-01 were spiked at a level ≤ 25% of the native sample concentration, therefore the recoveries are not reported (NR) and the RPDs are not calculated (N/C). The actual recoveries were 87% and 75%, respectively, and the RPD between the MS and MSD was 2%.

*Arsenic Speciation Analysis by IC-ICP-CRC-MS*

Arsenic speciation analysis was performed by ion chromatography coupled to an inductively coupled plasma collision reaction cell mass spectrometer (IC-ICP-CRC-MS).

The blank spike (B173144-BS1) for DMAs yielded an elevated recovery (129%). Sample results were non-detect for DMA and were determined to not have been adversely affected, therefore no qualification is necessary.

The spiking level of the matrix spike and matrix spike duplicate (B173144-MS2/B173144-MSD2) for As(III) was below the native sample concentration (1746016-06). Recoveries are not valid indicators of data quality, but have been included as a demonstration of instrument precision.

The arsenic speciation results were *not* method blank corrected as described in the calculations section of the relevant BAL SOP(s) and were evaluated using reporting limits adjusted to account for sample aliquot size. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

If the native sample result and/or the DUP result is not detected (ND) above the MDL, then the associated RPD is not calculated (N/C).

All data was reported without qualification (aside from concentration qualifiers) and all associated quality control sample results met the acceptance criteria.

BAL, an accredited laboratory, certifies that the reported results of all analyses for which BAL is NELAP accredited meet all NELAP requirements. For more information please see the *Report Information* page in your report.

Please feel free to contact me if you have any questions regarding this report.

Sincerely,

Jeremy Maute
Senior Project Manager
Brooks Applied Labs, LLC
jeremy@brooksapplied.com

Margaret Shultz
Margaret Shultz
Project Coordinator
Brooks Applied Labs, LLC
margaret@brooksapplied.com

# Report Information

## Laboratory Accreditation

BAL is accredited by the *National Environmental Laboratory Accreditation Program* (NELAP) through the State of Florida Department of Health, Bureau of Laboratories (E87982) and is certified to perform many environmental analyses. BAL is also certified by many other states to perform environmental analyses. For a current list of our accreditations/certifications, please visit our website at <http://www.brooksapplied.com/resources/certificates-permits/>. Results reported relate only to the samples listed in the report.

## Field Quality Control Samples

Please be notified that certain EPA methods require the collection of field quality control samples of an appropriate type and frequency; failure to do so is considered a deviation from some methods and for compliance purposes should only be done with the approval of regulatory authorities. Please see the specific EPA methods for details regarding required field quality control samples.

## Common Abbreviations

| | |
|---|---|
| **AR** | as received |
| **BAL** | Brooks Applied Labs |
| **BLK** | method blank |
| **BS** | blank spike |
| **CAL** | calibration standard |
| **CCB** | continuing calibration blank |
| **CCV** | continuing calibration verification |
| **COC** | chain of custody record |
| **D** | dissolved fraction |
| **DUP** | duplicate |
| **IBL** | instrument blank |
| **ICV** | initial calibration verification |
| **MDL** | method detection limit |
| **MRL** | method reporting limit |
| **MS** | matrix spike |
| **MSD** | matrix spike duplicate |
| **ND** | non-detect |
| **NR** | non-reportable |
| **N/C** | not calculated |
| **PS** | post preparation spike |
| **REC** | percent recovery |
| **RPD** | relative percent difference |
| **SCV** | secondary calibration verification |
| **SOP** | standard operating procedure |
| **SRM** | standard reference material |
| **T** | total fraction |
| **TR** | total recoverable fraction |

## Definition of Data Qualifiers

(Effective 9/23/09)

| | |
|---|---|
| **E** | An estimated value due to the presence of interferences. A full explanation is presented in the narrative. |
| **H** | Holding time and/or preservation requirements not met. Result is estimated. |
| **J** | Detected by the instrument, the result is > the MDL but ≤ the MRL. Result is reported and considered an estimate. |
| **J-1** | Estimated value. A full explanation is presented in the narrative. |
| **J-M** | Duplicate precision (RPD) for associated QC sample was not within acceptance criteria. Result is estimated. |
| **J-N** | Spike recovery for associated QC sample was not within acceptance criteria. Result is estimated. |
| **M** | Duplicate precision (RPD) was not within acceptance criteria. Result is estimated. |
| **N** | Spike recovery was not within acceptance criteria. Result is estimated. |
| **R** | Rejected, unusable value. A full explanation is presented in the narrative. |
| **U** | Result is ≤ the MDL or client requested reporting limit (CRRL). Result reported as the MDL or CRRL. |
| **X** | Result is not BLK-corrected and is within 10x the absolute value of the highest detectable BLK in the batch. Result is estimated. |

These qualifiers are based on those previously utilized by Brooks Applied Labs, those found in the EPA SOW ILM03.0, Exhibit B, Section III, pg. B-18, and the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review; USEPA; January 2010. These supersede all previous qualifiers ever employed by BAL.

**Project ID:** GOL-GB1701
**PM:** Jeremy Maute

**Client PM:** Rachel Kirkman
**Client Project:** GOL-GB1701

# Sample Information

| Sample | Lab ID | Report Matrix | Type | Sampled | Received |
|---|---|---|---|---|---|
| *AP-1 B-7A* | 1746016-01 | Groundwater | Sample | 11/14/2017 | 11/15/2017 |
| *AP-1 B-7A* | 1746016-02 | Groundwater | Sample | 11/14/2017 | 11/15/2017 |
| *AP-1 B-7B* | 1746016-03 | Groundwater | Sample | 11/14/2017 | 11/15/2017 |
| *AP-1 B-7B* | 1746016-04 | Groundwater | Sample | 11/14/2017 | 11/15/2017 |
| *AP-1 B-3B* | 1746016-05 | Groundwater | Sample | 11/14/2017 | 11/15/2017 |
| *AP-1 B-3B* | 1746016-06 | Groundwater | Sample | 11/14/2017 | 11/15/2017 |
| *FB-1* | 1746016-07 | Water | Field Blank | 11/14/2017 | 11/15/2017 |
| *FB-1* | 1746016-08 | Water | Field Blank | 11/14/2017 | 11/15/2017 |

# Batch Summary

| Analyte | Lab Matrix | Method | Prepared | Analyzed | Batch | Sequence |
|---|---|---|---|---|---|---|
| As | Water | EPA 1638 Mod | 11/21/2017 | 11/28/2017 | B173142 | 1701471 |
| As(III) | Water | SOP BAL-4100 | 11/16/2017 | 11/17/2017 | B173144 | 1701421 |
| As(V) | Water | SOP BAL-4100 | 11/16/2017 | 11/17/2017 | B173144 | 1701421 |
| DMAs | Water | SOP BAL-4100 | 11/16/2017 | 11/17/2017 | B173144 | 1701421 |
| MMAs | Water | SOP BAL-4100 | 11/16/2017 | 11/17/2017 | B173144 | 1701421 |

**Project ID:** GOL-GB1701
**PM:** Jeremy Maute

**Client PM:** Rachel Kirkman
**Client Project:** GOL-GB1701

# Sample Results

| Sample | Analyte | Report Matrix | Basis | Result | Qualifier | MDL | MRL | Unit | Batch | Sequence |
|---|---|---|---|---|---|---|---|---|---|---|
| ***AP-1 B-7A*** | | | | | | | | | | |
| 1746016-01 | As | Groundwater | TR | 1110 | | 0.112 | 0.408 | µg/L | B173142 | 1701471 |
| ***AP-1 B-7A*** | | | | | | | | | | |
| 1746016-02 | As | Groundwater | D | 1000 | | 0.112 | 0.408 | µg/L | B173142 | 1701471 |
| 1746016-02 | As(III) | Groundwater | D | 848 | | 0.200 | 1.00 | µg/L | B173144 | 1701421 |
| 1746016-02 | As(V) | Groundwater | D | 96.7 | | 0.200 | 1.00 | µg/L | B173144 | 1701421 |
| 1746016-02 | DMAs | Groundwater | D | ≤ 0.250 | U | 0.250 | 1.05 | µg/L | B173144 | 1701421 |
| 1746016-02 | MMAs | Groundwater | D | ≤ 0.200 | U | 0.200 | 1.15 | µg/L | B173144 | 1701421 |
| ***AP-1 B-7B*** | | | | | | | | | | |
| 1746016-03 | As | Groundwater | TR | 1190 | | 0.112 | 0.408 | µg/L | B173142 | 1701471 |
| ***AP-1 B-7B*** | | | | | | | | | | |
| 1746016-04 | As | Groundwater | D | 1120 | | 0.112 | 0.408 | µg/L | B173142 | 1701471 |
| 1746016-04 | As(III) | Groundwater | D | 947 | | 0.200 | 1.00 | µg/L | B173144 | 1701421 |
| 1746016-04 | As(V) | Groundwater | D | 98.5 | | 0.200 | 1.00 | µg/L | B173144 | 1701421 |
| 1746016-04 | DMAs | Groundwater | D | ≤ 0.250 | U | 0.250 | 1.05 | µg/L | B173144 | 1701421 |
| 1746016-04 | MMAs | Groundwater | D | ≤ 0.200 | U | 0.200 | 1.15 | µg/L | B173144 | 1701421 |
| ***AP-1 B-3B*** | | | | | | | | | | |
| 1746016-05 | As | Groundwater | TR | 1850 | | 0.112 | 0.408 | µg/L | B173142 | 1701471 |
| ***AP-1 B-3B*** | | | | | | | | | | |
| 1746016-06 | As | Groundwater | D | 1800 | | 0.112 | 0.408 | µg/L | B173142 | 1701471 |
| 1746016-06 | As(III) | Groundwater | D | 1600 | | 2.00 | 10.0 | µg/L | B173144 | 1701421 |
| 1746016-06 | As(V) | Groundwater | D | 170 | | 2.00 | 10.0 | µg/L | B173144 | 1701421 |
| 1746016-06 | DMAs | Groundwater | D | ≤ 2.50 | U | 2.50 | 10.5 | µg/L | B173144 | 1701421 |
| 1746016-06 | MMAs | Groundwater | D | ≤ 2.00 | U | 2.00 | 11.5 | µg/L | B173144 | 1701421 |
| ***FB-1*** | | | | | | | | | | |
| 1746016-07 | As | Water | TR | ≤ 0.112 | U | 0.112 | 0.408 | µg/L | B173142 | 1701471 |
| ***FB-1*** | | | | | | | | | | |
| 1746016-08 | As | Water | D | ≤ 0.112 | U | 0.112 | 0.408 | µg/L | B173142 | 1701471 |
| 1746016-08 | As(III) | Water | D | ≤ 0.200 | U | 0.200 | 1.00 | µg/L | B173144 | 1701421 |
| 1746016-08 | As(V) | Water | D | 0.345 | J | 0.200 | 1.00 | µg/L | B173144 | 1701421 |
| 1746016-08 | DMAs | Water | D | ≤ 0.250 | U | 0.250 | 1.05 | µg/L | B173144 | 1701421 |
| 1746016-08 | MMAs | Water | D | ≤ 0.200 | U | 0.200 | 1.15 | µg/L | B173144 | 1701421 |

# Accuracy & Precision Summary

**Batch:** B173142
**Lab Matrix:** Water
**Method:** EPA 1638 Mod

| Sample | Analyte | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|---|---|---|---|---|---|---|---|
| **B173142-BS1** | **Blank Spike, (1747054)** | | | | | | |
| | As | | 25.00 | 19.18 | µg/L | 77% 75-125 | |
| **B173142-BS2** | **Blank Spike, (1747054)** | | | | | | |
| | As | | 25.00 | 19.31 | µg/L | 77% 75-125 | |
| **B173142-BS3** | **Blank Spike, (1747054)** | | | | | | |
| | As | | 25.00 | 18.89 | µg/L | 76% 75-125 | |
| **B173142-DUP1** | **Duplicate, (1746016-01)** | | | | | | |
| | As | 1111 | | 1092 | µg/L | | 2% 20 |
| **B173142-MS1** | **Matrix Spike, (1746016-01)** | | | | | | |
| | As | 1111 | 204.1 | 1289 | µg/L | NR 75-125 | |
| **B173142-MSD1** | **Matrix Spike Duplicate, (1746016-01)** | | | | | | |
| | As | 1111 | 204.1 | 1265 | µg/L | NR 75-125 | N/C 20 |

**Batch:** B173144
**Lab Matrix:** Water
**Method:** SOP BAL-4100

| Sample | Analyte | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|---|---|---|---|---|---|---|---|
| **B173144-BS1** | **Blank Spike, (1736006)** | | | | | | |
| | As(III) | | 5.010 | 4.760 | µg/L | 95% 75-125 | |
| | As(V) | | 5.000 | 4.681 | µg/L | 94% 75-125 | |
| | DMAs | | 3.198 | 4.121 | µg/L | *129%* 75-125 | |
| **B173144-BS2** | **Blank Spike, (1714054)** | | | | | | |
| | MMAs | | 4.634 | 4.904 | µg/L | 106% 75-125 | |

**Project ID:** GOL-GB1701
**PM:** Jeremy Maute

**Client PM:** Rachel Kirkman
**Client Project:** GOL-GB1701

# Accuracy & Precision Summary

**Batch:** B173144
**Lab Matrix:** Water
**Method:** SOP BAL-4100

| Sample | Analyte | Native | Spike | Result | Units | REC & Limits | | RPD & Limits | |
|---|---|---|---|---|---|---|---|---|---|
| **B173144-DUP3** | **Duplicate, (1746016-06)** | | | | | | | | |
| | As(III) | 1595 | | 1590 | µg/L | | | 0.3% | 25 |
| | As(V) | 169.7 | | 163.8 | µg/L | | | 4% | 25 |
| | DMAs | ND | | ND | µg/L | | | N/C | 25 |
| | MMAs | ND | | ND | µg/L | | | N/C | 25 |
| **B173144-MS2** | **Matrix Spike, (1746016-06)** | | | | | | | | |
| | As(III) | 1595 | 500.0 | 2065 | µg/L | 94% | 75-125 | | |
| | As(V) | 169.7 | 500.0 | 644.9 | µg/L | 95% | 75-125 | | |
| | DMAs | ND | 510.0 | 488.9 | µg/L | 96% | 75-125 | | |
| | MMAs | ND | 500.0 | 473.5 | µg/L | 95% | 75-125 | | |
| **B173144-MSD2** | **Matrix Spike Duplicate, (1746016-06)** | | | | | | | | |
| | As(III) | 1595 | 500.0 | 2047 | µg/L | 90% | 75-125 | 0.9% | 25 |
| | As(V) | 169.7 | 500.0 | 651.8 | µg/L | 96% | 75-125 | 1% | 25 |
| | DMAs | ND | 510.0 | 482.8 | µg/L | 95% | 75-125 | 1% | 25 |
| | MMAs | ND | 500.0 | 481.2 | µg/L | 96% | 75-125 | 2% | 25 |

**Project ID:** GOL-GB1701
**PM:** Jeremy Maute

**Client PM:** Rachel Kirkman
**Client Project:** GOL-GB1701

# Method Blanks & Reporting Limits

**Batch:** B173142
**Matrix:** Water
**Method:** EPA 1638 Mod
**Analyte:** As

| Sample | Result | Units |
|---|---|---|
| B173142-BLK1 | 0.004 | µg/L |
| B173142-BLK2 | 0.005 | µg/L |
| B173142-BLK3 | 0.006 | µg/L |
| B173142-BLK4 | 0.005 | µg/L |
| **Average:** | 0.005 | |
| **Limit:** | 0.040 | |

**MDL:** 0.011
**MRL:** 0.040

**Project ID:** GOL-GB1701
**PM:** Jeremy Maute

**Client PM:** Rachel Kirkman
**Client Project:** GOL-GB1701

# Method Blanks & Reporting Limits

**Batch:** B173144
**Matrix:** Water
**Method:** SOP BAL-4100
**Analyte:** As(III)

| Sample | Result | Units |
|---|---|---|
| B173144-BLK1 | 0.00 | µg/L |
| B173144-BLK2 | 0.00 | µg/L |
| B173144-BLK3 | 0.00 | µg/L |
| B173144-BLK4 | 0.00 | µg/L |

**Average:** 0.000 **MDL:** 0.004
**Limit:** 0.020 **MRL:** 0.020

**Analyte:** As(V)

| Sample | Result | Units |
|---|---|---|
| B173144-BLK1 | 0.00 | µg/L |
| B173144-BLK2 | 0.00 | µg/L |
| B173144-BLK3 | 0.00 | µg/L |
| B173144-BLK4 | 0.00 | µg/L |

**Average:** 0.000 **MDL:** 0.004
**Limit:** 0.020 **MRL:** 0.020

**Analyte:** DMAs

| Sample | Result | Units |
|---|---|---|
| B173144-BLK1 | 0.00 | µg/L |
| B173144-BLK2 | 0.00 | µg/L |
| B173144-BLK3 | 0.00 | µg/L |
| B173144-BLK4 | 0.00 | µg/L |

**Average:** 0.000 **MDL:** 0.005
**Limit:** 0.021 **MRL:** 0.021

# Method Blanks & Reporting Limits

**Analyte:** MMAs

| Sample | Result | Units |
|---|---|---|
| B173144-BLK1 | 0.00 | µg/L |
| B173144-BLK2 | 0.00 | µg/L |
| B173144-BLK3 | 0.00 | µg/L |
| B173144-BLK4 | 0.00 | µg/L |

**Average:** 0.000 **MDL:** 0.004
**Limit:** 0.023 **MRL:** 0.023

**Project ID:** GOL-GB1701
**PM:** Jeremy Maute

**Client PM:** Rachel Kirkman
**Client Project:** GOL-GB1701

# Sample Containers

**Lab ID:** 1746016-01
**Sample:** AP-1 B-7A
**Report Matrix:** Groundwater
**Sample Type:** Sample
**Collected:** 11/14/2017
**Received:** 11/15/2017

| Des | Container | Size | Lot | Preservation | P-Lot | pH | Ship. Cont. |
|---|---|---|---|---|---|---|---|
| A | Bottle HDPE ICP-W | 125 mL | 17-0169 | 0.2% HNO3 (BAL) | 1736020 | <2 | Cooler - 1746016 |

**Lab ID:** 1746016-02
**Sample:** AP-1 B-7A
**Report Matrix:** Groundwater
**Sample Type:** Sample
**Collected:** 11/14/2017
**Received:** 11/15/2017

| Des | Container | Size | Lot | Preservation | P-Lot | pH | Ship. Cont. |
|---|---|---|---|---|---|---|---|
| A | Bottle HDPE ICP-W | 125 mL | 17-0169 | 0.2% HNO3 (BAL) | 1736020 | <2 | Cooler - 1746016 |
| B | Vacutainer | 6 mL | 16-0257 | EDTA (PP) | n/a | n/a | Cooler - 1746016 |
| C | EXTRA_VOL | 6 mL | 16-0257 | EDTA (PP) | n/a | n/a | Cooler - 1746016 |

**Lab ID:** 1746016-03
**Sample:** AP-1 B-7B
**Report Matrix:** Groundwater
**Sample Type:** Sample
**Collected:** 11/14/2017
**Received:** 11/15/2017

| Des | Container | Size | Lot | Preservation | P-Lot | pH | Ship. Cont. |
|---|---|---|---|---|---|---|---|
| A | Bottle HDPE ICP-W | 125 mL | 17-0169 | 0.2% HNO3 (BAL) | 1736020 | <2 | Cooler - 1746016 |

**Lab ID:** 1746016-04
**Sample:** AP-1 B-7B
**Report Matrix:** Groundwater
**Sample Type:** Sample
**Collected:** 11/14/2017
**Received:** 11/15/2017

| Des | Container | Size | Lot | Preservation | P-Lot | pH | Ship. Cont. |
|---|---|---|---|---|---|---|---|
| A | Bottle HDPE ICP-W | 125 mL | 17-0169 | 0.2% HNO3 (BAL) | 1736020 | <2 | Cooler - 1746016 |
| B | Vacutainer | 6 mL | 16-0257 | EDTA (PP) | n/a | n/a | Cooler - 1746016 |
| C | EXTRA_VOL | 6 mL | 16-0257 | EDTA (PP) | n/a | n/a | Cooler - 1746016 |

**Lab ID:** 1746016-05
**Sample:** AP-1 B-3B
**Report Matrix:** Groundwater
**Sample Type:** Sample
**Collected:** 11/14/2017
**Received:** 11/15/2017

| Des | Container | Size | Lot | Preservation | P-Lot | pH | Ship. Cont. |
|---|---|---|---|---|---|---|---|
| A | Bottle HDPE ICP-W | 125 mL | 17-0169 | 0.2% HNO3 (BAL) | 1736020 | <2 | Cooler - 1746016 |

# Sample Containers

**Lab ID:** 1746016-06
**Sample:** AP-1 B-3B
**Report Matrix:** Groundwater
**Sample Type:** Sample
**Collected:** 11/14/2017
**Received:** 11/15/2017

| Des | Container | Size | Lot | Preservation | P-Lot | pH | Ship. Cont. |
|---|---|---|---|---|---|---|---|
| A | Bottle HDPE ICP-W | 125 mL | 17-0169 | 0.2% HNO3 (BAL) | 1736020 | <2 | Cooler - 1746016 |
| B | Vacutainer | 6 mL | 16-0257 | EDTA (PP) | n/a | n/a | Cooler - 1746016 |
| C | EXTRA_VOL | 6 mL | 16-0257 | EDTA (PP) | n/a | n/a | Cooler - 1746016 |

**Lab ID:** 1746016-07
**Sample:** FB-1
**Report Matrix:** Water
**Sample Type:** Field Blank
**Collected:** 11/14/2017
**Received:** 11/15/2017

| Des | Container | Size | Lot | Preservation | P-Lot | pH | Ship. Cont. |
|---|---|---|---|---|---|---|---|
| A | Bottle HDPE ICP-W | 125 mL | 17-0169 | 0.2% HNO3 (BAL) | 1736020 | <2 | Cooler - 1746016 |

**Lab ID:** 1746016-08
**Sample:** FB-1
**Report Matrix:** Water
**Sample Type:** Field Blank
**Collected:** 11/14/2017
**Received:** 11/15/2017

| Des | Container | Size | Lot | Preservation | P-Lot | pH | Ship. Cont. |
|---|---|---|---|---|---|---|---|
| A | Bottle HDPE ICP-W | 125 mL | 17-0169 | 0.2% HNO3 (BAL) | 1736020 | <2 | Cooler - 1746016 |
| B | Vacutainer | 6 mL | 16-0257 | EDTA (PP) | n/a | n/a | Cooler - 1746016 |
| C | EXTRA_VOL | 6 mL | 16-0257 | EDTA (PP) | n/a | n/a | Cooler - 1746016 |

# Shipping Containers

## Cooler - 1746016

**Received:** November 15, 2017 10:00
**Tracking No:** 788462235246 via FedEx
**Coolant Type:** Ice
**Temperature:** 1.5 °C

**Description:** Cooler
**Damaged in transit?** No
**Returned to client?** No
**Comments:** IR#15

**Custody seals present?** Yes
**Custody seals intact?** Yes
**COC present?** Yes

BROOKS APPLIED LABS

# Chain-of-Custody Form

*Ship samples to:*
18804 North Creek Parkway, Suite 100
Bothell, WA 98011

BAL Report 1746016

For BAL use only
*Received by:* Hali Heferman *Date:* 11/15/17
*Work Order ID:* ______ *Time:* 10:00
*Project ID:* ______

Client: Golder Associates
Contact: Rachel Kirkman
Client Project ID: ______
Samples Collected By: Ben Hodges

PO Number: 1779172
Phone: 336-402-5542
Email: rachel_kirkman@golder.com

Mailing Address: 3730 Chamblee Tucker Rd
Atlanta, GA 30341
Email Receipt Confirmation? (Yes/No)
BAL PM: ______

Requested TAT (business days)
- ☑ 20 (standard)
- ☐ 15*
- ☐ 10*
- ☐ 5*
- ☐ Other ____

*Surcharges may apply to expedited TATs

| | Sample ID | Collection: Date | Collection: Time | Client Sample Info: Matrix Type | Number of Containers | Field Filtered? (Yes/No) | Preservation Type HCl/$HNO_3$/Other | BAL Analyses Required: Total Hg, EPA 1631 | Methyl Hg, EPA 1630 | ICP-MS Metals (specify) | As Species (specify) InOrg, III, V, MMA, DMA | Se Species (specify) Se(IV), Se(VI), SeCN, Uknown | Filtration | Other (specify) | Other (specify) | Comments: Specify Here |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | AP-1 B-7A | 11/14/17 | 1100 | GW | 4 | Y/N | | | | T/D | X | | | | | Samples for dissolved and As Speciation were field filtered |
| 2 | AP-1 B-7B | 11/14/17 | 1700 | GW | 4 | Y/N | | | | T/D | X | | | | | |
| 3 | AP-1 B-3B | 11/14/17 | 1430 | GW | 4 | Y/N | | | | T/D | X | | | | | |
| 4 | FB-1 | 11/14/17 | 1050 | W | 4 | Y/N | | | | T/D | X | | | | | |
| 5 | | | | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | |
| | Trip Blank | | | | | | | | | | | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| Relinquished By: B. H. | Date: 11/14/17 | Time: 1830 | Relinquished By: | Date: | Time: |
| Received By: | Date: | Time: | Total Number of Packages: | | |

Page 1 of 1 List Hazardous Contaminants: ______

samples@brooksapplied.com | brooksapplied.com

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

January 07, 2021

Joju Abraham
Georgia Power-CCR
2480 Maner Road
Atlanta, GA 30339

RE: Project: PLANT MCDONOUGH AP-1 RADS
Pace Project No.: 92510818

Dear Joju Abraham:

Enclosed are the analytical results for sample(s) received by the laboratory on December 10, 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 - Greensburg

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: Stephen Benda
Daniela Herrera, Golder
Ben Hodges, Georgia Power
Jimmy Jones, Golder Associates Inc.
Kristen Jurinko
Julie Lehrman, Golder Associates Inc.
Ms. Lauren Petty, Southern Co. Services
Dawn Prell, Golder Associates Inc.
Tim Richards, Golder Associates - Atlanta

**REPORT OF LABORATORY ANALYSIS**

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

# CERTIFICATIONS

Project: PLANT MCDONOUGH AP-1 RADS
Pace Project No.: 92510818

**Pace Analytical Services Pennsylvania**

1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601
ANAB DOD-ELAP Rad Accreditation #: L2417
Alabama Certification #: 41590
Arizona Certification #: AZ0734
Arkansas Certification
California Certification #: 04222CA
Colorado Certification #: PA01547
Connecticut Certification #: PH-0694
Delaware Certification
EPA Region 4 DW Rad
Florida/TNI Certification #: E87683
Georgia Certification #: C040
Florida: Cert E871149 SEKS WET
Guam Certification
Hawaii Certification
Idaho Certification
Illinois Certification
Indiana Certification
Iowa Certification #: 391
Kansas/TNI Certification #: E-10358
Kentucky Certification #: KY90133
KY WW Permit #: KY0098221
KY WW Permit #: KY0000221
Louisiana DHH/TNI Certification #: LA180012
Louisiana DEQ/TNI Certification #: 4086
Maine Certification #: 2017020
Maryland Certification #: 308
Massachusetts Certification #: M-PA1457
Michigan/PADEP Certification #: 9991
Missouri Certification #: 235
Montana Certification #: Cert0082
Nebraska Certification #: NE-OS-29-14
Nevada Certification #: PA014572018-1
New Hampshire/TNI Certification #: 297617
New Jersey/TNI Certification #: PA051
New Mexico Certification #: PA01457
New York/TNI Certification #: 10888
North Carolina Certification #: 42706
North Dakota Certification #: R-190
Ohio EPA Rad Approval: #41249
Oregon/TNI Certification #: PA200002-010
Pennsylvania/TNI Certification #: 65-00282
Puerto Rico Certification #: PA01457
Rhode Island Certification #: 65-00282
South Dakota Certification
Tennessee Certification #: 02867
Texas/TNI Certification #: T104704188-17-3
Utah/TNI Certification #: PA014572017-9
USDA Soil Permit #: P330-17-00091
Vermont Dept. of Health: ID# VT-0282
Virgin Island/PADEP Certification
Virginia/VELAP Certification #: 9526
Washington Certification #: C868
West Virginia DEP Certification #: 143
West Virginia DHHR Certification #: 9964C
Wisconsin Approve List for Rad
Wyoming Certification #: 8TMS-L

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

## SAMPLE SUMMARY

Project: PLANT MCDONOUGH AP-1 RADS
Pace Project No.: 92510818

| Lab ID | Sample ID | Matrix | Date Collected | Date Received |
|---|---|---|---|---|
| **92510818001** | **B-105D** | Water | 12/09/20 15:30 | 12/10/20 09:05 |

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

## SAMPLE ANALYTE COUNT

Project: PLANT MCDONOUGH AP-1 RADS
Pace Project No.: 92510818

| Lab ID | Sample ID | Method | Analysts | Analytes Reported | Laboratory |
|---|---|---|---|---|---|
| **92510818001** | **B-105D** | EPA 9315 | JJY | 1 | PASI-PA |
| | | EPA 9320 | VAL | 1 | PASI-PA |
| | | Total Radium Calculation | CMC | 1 | PASI-PA |

PASI-PA = Pace Analytical Services - Greensburg

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

## ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: PLANT MCDONOUGH AP-1 RADS
Pace Project No.: 92510818

**Sample: B-105D** **Lab ID: 92510818001** Collected: 12/09/20 15:30 Received: 12/10/20 09:05 Matrix: Water
PWS: Site ID: Sample Type:

| Parameters | Method | Act ± Unc (MDC) Carr Trac | Units | Analyzed | CAS No. | Qual |
|---|---|---|---|---|---|---|
| | Pace Analytical Services - Greensburg | | | | | |
| Radium-226 | EPA 9315 | **0.378 ± 0.285 (0.479) C:92% T:NA** | pCi/L | 12/30/20 07:44 | 13982-63-3 | |
| | Pace Analytical Services - Greensburg | | | | | |
| Radium-228 | EPA 9320 | **0.873 ± 0.488 (0.898) C:72% T:80%** | pCi/L | 01/04/21 11:27 | 15262-20-1 | |
| | Pace Analytical Services - Greensburg | | | | | |
| Total Radium | Total Radium Calculation | **1.25 ± 0.773 (1.38)** | pCi/L | 01/05/21 10:13 | 7440-14-4 | |

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

# QUALITY CONTROL - RADIOCHEMISTRY

Project: PLANT MCDONOUGH AP-1 RADS
Pace Project No.: 92510818

| | | | |
|---|---|---|---|
| QC Batch: | 428417 | Analysis Method: | EPA 9315 |
| QC Batch Method: | EPA 9315 | Analysis Description: | 9315 Total Radium |
| | | Laboratory: | Pace Analytical Services - Greensburg |

Associated Lab Samples: 92510818001

METHOD BLANK: 2070210 Matrix: Water

Associated Lab Samples: 92510818001

| Parameter | Act ± Unc (MDC) Carr Trac | Units | Analyzed | Qualifiers |
|---|---|---|---|---|
| Radium-226 | -0.0869 ± 0.143 (0.495) C:87% T:NA | pCi/L | 12/30/20 07:44 | |

**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

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

## QUALITY CONTROL - RADIOCHEMISTRY

Project: PLANT MCDONOUGH AP-1 RADS
Pace Project No.: 92510818

QC Batch: 428749
QC Batch Method: EPA 9320
Analysis Method: EPA 9320
Analysis Description: 9320 Radium 228
Laboratory: Pace Analytical Services - Greensburg
Associated Lab Samples: 92510818001

METHOD BLANK: 2071921
Matrix: Water
Associated Lab Samples: 92510818001

| Parameter | Act ± Unc (MDC) Carr Trac | Units | Analyzed | Qualifiers |
|---|---|---|---|---|
| Radium-228 | -0.161 ± 0.312 (0.758) C:74% T:81% | pCi/L | 01/04/21 11:42 | |

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.

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

# QUALIFIERS

Project: PLANT MCDONOUGH AP-1 RADS
Pace Project No.: 92510818

## 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.

Act - Activity

Unc - Uncertainty: SDWA = 1.96 sigma count uncertainty, all other matrices = Expanded Uncertainty (95% confidence interval). Gamma Spec = Expanded Uncertainty (95.4% Confidence Interval)

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

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

TNI - The NELAC Institute.

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

## QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: PLANT MCDONOUGH AP-1 RADS
Pace Project No.: 92510818

| Lab ID | Sample ID | QC Batch Method | QC Batch | Analytical Method | Analytical Batch |
|---|---|---|---|---|---|
| **92510818001** | **B-105D** | EPA 9315 | 428417 | | |
| **92510818001** | **B-105D** | EPA 9320 | 428749 | | |
| **92510818001** | **B-105D** | Total Radium Calculation | 429587 | | |

| Pace Analytical | Document Name: **Sample Condition Upon Receipt(SCUR)** Document No.: **F-CAR-CS-033-Rev.07** | Document Revised: October 28, 2020 Page 1 of 2 Issuing Authority: Pace Carolinas Quality Office |
|---|---|---|

**Laboratory receiving samples:**
**Asheville** ☐ **Eden** ☐ **Greenwood** ☐ **Huntersville** ☐ **Raleigh** ☐ **Mechanicsville** ☐ **Atlanta** ☑ **Kernersville** ☐

**Sample Condition Upon Receipt** **Client Name:** Georgia power -coal **Project #:**

**WO#:92510818**

92510818

**Courier:** ☐ Fed Ex ☐ UPS ☐ USPS ☑ Client ☐ Commercial ☐ Pace ☐ Other:____

**Custody Seal Present?** ☐ Yes ☑ No **Seals Intact?** ☐ Yes ☐ No

**Date/Initials Person Examining Contents:** MT 12/10/20

**Packing Material:** ☐ Bubble Wrap ☐ Bubble Bags ☐ None ☑ Other

**Biological Tissue Frozen?** ☐ Yes ☑ No ☐ N/A

**Thermometer:** ☐ IR Gun ID: 233 **Type of Ice:** ☑ Wet ☐ Blue ☐ None

**Cooler Temp:** 2.3 **Correction Factor:** Add/Subtract (°C) ±0.4

Temp should be above freezing to 6°C
☐ Samples out of temp criteria. Samples on ice, cooling process has begun

**Cooler Temp Corrected (°C):** 2.7

**USDA Regulated Soil** ( ☐ N/A, water sample)
Did samples originate in a quarantine zone within the United States: CA, NY, or SC (check maps)? ☐ Yes ☑ No
Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? ☐ Yes ☑ No

| | | | | **Comments/Discrepancy:** |
|---|---|---|---|---|
| Chain of Custody Present? | ☑ Yes | ☐ No | ☐ N/A | 1. |
| Samples Arrived within Hold Time? | ☑ Yes | ☐ No | ☐ N/A | 2. |
| Short Hold Time Analysis (<72 hr.)? | ☐ Yes | ☑ No | ☐ N/A | 3. |
| Rush Turn Around Time Requested? | ☑ Yes | ☐ No | ☐ N/A | 4. Standard |
| Sufficient Volume? | ☑ Yes | ☐ No | ☐ N/A | 5. |
| Correct Containers Used? | ☑ Yes | ☐ No | ☐ N/A | 6. |
| -Pace Containers Used? | ☑ Yes | ☐ No | ☐ N/A | |
| Containers Intact? | ☑ Yes | ☐ No | ☐ N/A | 7. |
| Dissolved analysis: Samples Field Filtered? | ☐ Yes | ☑ No | ☐ N/A | 8. |
| Sample Labels Match COC? | ☑ Yes | ☐ No | ☐ N/A | 9. |
| -Includes Date/Time/ID/Analysis Matrix: WT | | | | |
| Headspace in VOA Vials (>5-6mm)? | ☐ Yes | ☐ No | ☑ N/A | 10. |
| Trip Blank Present? | ☐ Yes | ☐ No | ☑ N/A | 11. |
| Trip Blank Custody Seals Present? | ☐ Yes | ☐ No | ☑ N/A | |

**COMMENTS/SAMPLE DISCREPANCY** **Field Data Required?** ☐ Yes ☐ No

Lot ID of split containers:

**CLIENT NOTIFICATION/RESOLUTION**

Person contacted: ____________ Date/Time: ____________

**Project Manager SCURF Review:** ____________ **Date:** ____________

**Project Manager SRF Review:** ____________ **Date:** ____________

***Check mark top half of box if pH and/or dechlorination is verified and within the acceptance range for preservation samples.**

Project # **WO#:92510818**

PM: KLH1 Due Date: 01/04/21

CLIENT: GA-GA Power

Exceptions: VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC, LLHg

****Bottom half of box is to list number of bottles**

| 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 | 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) | DG9U-40 mL Amber Unpreserved vials (N/A) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | 1 | 1 | | | 1 | | | | | | | | | | | | | | | | | | 2 | | | | |
| 2 | | 1 | 1 | | | 1 | | | | | | | | | | | | | | | | | | 2 | | | | |
| 3 | | 1 | 1 | | | 1 | | | | | | | | | | | | | | | | | | 2 | | | | |
| 4 | | 1 | 1 | | | 1 | | | | | | | | | | | | | | | | | | 4 | | | | |
| 5 | | 1 | 1 | | | 1 | | | | | | | | | | | | | | | | | | 2 | | | | |
| 6 | | 1 | 1 | | | 1 | | | | | | | | | | | | | | | | | | 2 | | | | |
| 7 | | 1 | 1 | | | 1 | | | | | | | | | | | | | | | | | | 2 | | | | |
| 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 Office (i.e. Out of hold, incorrect preservative, out of temp, incorrect containers.

Pace Analytical

# 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 - Coal Combustion Residuals
Address: 2480 Maner Road, Atlanta, GA 30339
Email: jabraham@southernco.com
Phone: (404) 506-7239 Fax:
Requested Due Date: Standard

**Section B — Required Project Information:**
Report To: Joju Abraham
Copy To: Golder
Purchase Order #:
Project Name: Plant McDonough AP-1
Project #: 166849618

**Section C — Invoice Information:**
Attention: scsinvoices@southernco.com
Company Name:
Address:
Pace Quote:
Pace Project Manager: Kevin Herring
Pace Profile #:

Regulatory Agency:
State / Location: GA

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 |

Preservatives; Requested Analysis Filtered (Y/N): N N N N

| ITEM # | SAMPLE ID | MATRIX CODE | SAMPLE TYPE (G=GRAB C=COMP) | DATE | TIME | SAMPLE TEMP AT COLLECTION | # OF CONTAINERS | Unpreserved - Ice | H2SO4 | HNO3 | HCl | NaOH + Zn Acetate | Na2S2O3 | Methanol | Other | Analyses Test Y/N | *Metals App III and App IV Total | Cl, F, SO4 | Radium 226/228 | TDS | Residual Chlorine (Y/N) | 92510818 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | B-105D | WT | G | 12/9/2020 | 1530 | | 5 | 2 | | 3 | | | | | | | X | X | X | X | | pH 6.45 |
| 2 | | | | | | | | | | | | | | | | | | | | | | |
| 3 | | | | | | | | | | | | | | | | | | | | | | |
| 4 | | | | | | | | | | | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | | | | | | | | | | |
| 13 | | | | | | | | | | | | | | | | | | | | | | |
| 14 | | | | | | | | | | | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | | | | | | | | | | |

| ADDITIONAL COMMENTS | RELINQUISHED BY / AFFILIATION | DATE | TIME | ACCEPTED BY / AFFILIATION | DATE | TIME | SAMPLE CONDITIONS | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| *App III / IV Metals = As, Sb, B, Ba, Be, Ca, Cd, Cr, Co, Pb, Li, Hg, Mo, Se, Tl | Yong Cheng Soo | 12/10/20 | 905 | MB / Pace | 12/10/20 | 0905 | 2.3 | Y | N | Y |

SAMPLER NAME AND SIGNATURE
PRINT NAME: Yong Cheng Soo
SIGNATURE: DATE Signed: 12/10/2020

TEMP in C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

Pace Analytical
www.pacelabs.com

# Quality Control Sample Performance Assessment

***Analyst Must Manually Enter All Fields Highlighted in Yellow.***

| | |
|---|---|
| Test: | Ra-226 |
| Analyst: | JJY |
| Date: | 12/29/2020 |
| Worklist: | 58052 |
| Matrix: | DW |

| Method Blank Assessment | |
|---|---|
| MB Sample ID | 2070210 |
| MB concentration: | -0.087 |
| M/B Counting Uncertainty: | 0.142 |
| MB MDC: | 0.495 |
| MB Numerical Performance Indicator: | -1.20 |
| MB Status vs Numerical Indicator: | N/A |
| MB Status vs. MDC: | Pass |

| Laboratory Control Sample Assessment | LCSD (Y or N)? | Y |
|---|---|---|
| | LCS58052 | LCSD58052 |
| Count Date: | 12/30/2020 | 12/30/2020 |
| Spike I.D.: | 19-033 | 19-033 |
| Decay Corrected Spike Concentration (pCi/mL): | 24.041 | 24.041 |
| Volume Used (mL): | 0.10 | 0.10 |
| Aliquot Volume (L, g, F): | 0.506 | 0.504 |
| Target Conc. (pCi/L, g, F): | 4.756 | 4.766 |
| Uncertainty (Calculated): | 0.057 | 0.057 |
| Result (pCi/L, g, F): | 5.553 | 4.271 |
| LCS/LCSD Counting Uncertainty (pCi/L, g, F): | 0.831 | 0.794 |
| Numerical Performance Indicator: | 1.88 | -1.22 |
| Percent Recovery: | 116.76% | 89.61% |
| Status vs Numerical Indicator: | N/A | N/A |
| Status vs Recovery: | Pass | Pass |
| Upper % Recovery Limits: | 125% | 125% |
| Lower % Recovery Limits: | 75% | 75% |

| Duplicate Sample Assessment | | |
|---|---|---|
| Sample I.D.: | LCS58052 | Enter Duplicate sample IDs if other than LCS/LCSD in the space below. |
| Duplicate Sample I.D. | LCSD58052 | |
| Sample Result (pCi/L, g, F): | 5.553 | |
| Sample Result Counting Uncertainty (pCi/L, g, F): | 0.831 | |
| Sample Duplicate Result (pCi/L, g, F): | 4.271 | |
| Sample Duplicate Result Counting Uncertainty (pCi/L, g, F): | 0.794 | |
| Are sample and/or duplicate results below RL? | NO | |
| Duplicate Numerical Performance Indicator: | 2.185 OK | |
| (Based on the LCS/LCSD Percent Recoveries) Duplicate RPD: | 26.31% | |
| Duplicate Status vs Numerical Indicator: | N/A | |
| Duplicate Status vs RPD: | Fail*** | |
| % RPD Limit: | 25% | |

| Sample Matrix Spike Control Assessment | MS/MSD 1 | MS/MSD 2 |
|---|---|---|
| Sample Collection Date: | | |
| Sample I.D. | | |
| Sample MS I.D. | | |
| Sample MSD I.D. | | |
| Spike I.D.: | | |
| MS/MSD Decay Corrected Spike Concentration (pCi/mL): | | |
| Spike Volume Used in MS (mL): | | |
| Spike Volume Used in MSD (mL): | | |
| MS Aliquot (L, g, F): | | |
| MS Target Conc.(pCi/L, g, F): | | |
| MSD Aliquot (L, g, F): | | |
| MSD Target Conc. (pCi/L, g, F): | | |
| MS Spike Uncertainty (calculated): | | |
| MSD Spike Uncertainty (calculated): | | |
| Sample Result: | | |
| Sample Result Counting Uncertainty (pCi/L, g, F): | | |
| Sample Matrix Spike Result: | | |
| Matrix Spike Result Counting Uncertainty (pCi/L, g, F): | | |
| Sample Matrix Spike Duplicate Result: | | |
| Matrix Spike Duplicate Result Counting Uncertainty (pCi/L, g, F): | | |
| MS Numerical Performance Indicator: | | |
| MSD Numerical Performance Indicator: | | |
| MS Percent Recovery: | | |
| MSD Percent Recovery: | | |
| MS Status vs Numerical Indicator: | | |
| MSD Status vs Numerical Indicator: | | |
| MS Status vs Recovery: | | |
| MSD Status vs Recovery: | | |
| MS/MSD Upper % Recovery Limits: | | |
| MS/MSD Lower % Recovery Limits: | | |

| Matrix Spike/Matrix Spike Duplicate Sample Assessment | | |
|---|---|---|
| Sample I.D. | | |
| Sample MS I.D. | | |
| Sample MSD I.D. | | |
| Sample Matrix Spike Result: | | |
| Matrix Spike Result Counting Uncertainty (pCi/L, g, F): | | |
| Sample Matrix Spike Duplicate Result: | | |
| Matrix Spike Duplicate Result Counting Uncertainty (pCi/L, g, F): | | |
| Duplicate Numerical Performance Indicator: | | |
| (Based on the Percent Recoveries) MS/ MSD Duplicate RPD: | | |
| MS/ MSD Duplicate Status vs Numerical Indicator: | | |
| MS/ MSD Duplicate Status vs RPD: | | |
| % RPD Limit: | | |

## Evaluation of duplicate precision is not applicable if either the sample or duplicate results are below the MDC.

**Comments:**

***~~Batch must be re-prepped due to unacceptable precision.~~ N/A LAM 1/7/2021

LAM 1/7/2021

Numerical Indicator less than 3 OK for water batch

Pace Analytical™ www.pacelabs.com

# Quality Control Sample Performance Assessment

***Analyst Must Manually Enter All Fields Highlighted in Yellow.***

| | |
|---|---|
| Test: | Ra-226 |
| Analyst: | MK1 |
| Date: | 12/28/2020 |
| Batch ID: | 58061 |
| Matrix: | DW |

| Method Blank Assessment | |
|---|---|
| MB Sample ID | 2070551 |
| MB concentration: | 0.050 |
| M/B Counting Uncertainty: | 0.294 |
| MB MDC: | 0.601 |
| MB Numerical Performance Indicator: | 0.33 |
| MB Status vs Numerical Indicator: | N/A |
| MB Status vs. MDC: | Pass |

| Laboratory Control Sample Assessment | LCSD (Y or N)? | Y |
|---|---|---|
| | LCS58061 | LCSD58061 |
| Count Date: | 1/6/2021 | 1/6/2021 |
| Spike I.D.: | 20-032 | 20-032 |
| Spike Concentration (pCi/mL): | 32.180 | 32.180 |
| Volume Used (mL): | 0.10 | 0.10 |
| Aliquot Volume (L, g, F): | 0.665 | 0.658 |
| Target Conc. (pCi/L, g, F): | 4.836 | 4.890 |
| Uncertainty (Calculated): | 0.227 | 0.230 |
| Result (pCi/L, g, F): | 5.128 | 4.105 |
| LCS/LCSD Counting Uncertainty (pCi/L, g, F): | 0.996 | 0.903 |
| Numerical Performance Indicator: | 0.56 | -1.65 |
| Percent Recovery: | 106.06% | 83.95% |
| Status vs Numerical Indicator: | N/A | N/A |
| Status vs Recovery: | Pass | Pass |
| Upper % Recovery Limits: | 135% | 135% |
| Lower % Recovery Limits: | 73% | 73% |

| Duplicate Sample Assessment | | |
|---|---|---|
| Sample I.D.: | LCS58061 | Enter Duplicate sample IDs if other than LCS/LCSD in the space below. |
| Duplicate Sample I.D. | LCSD58061 | |
| Sample Result (pCi/L, g, F): | 5.128 | |
| Sample Result Counting Uncertainty (pCi/L, g, F): | 0.996 | |
| Sample Duplicate Result (pCi/L, g, F): | 4.105 | |
| Sample Duplicate Result Counting Uncertainty (pCi/L, g, F): | 0.903 | |
| Are sample and/or duplicate results below RL? | NO | |
| Duplicate Numerical Performance Indicator: | 1.492 | |
| (Based on the LCS/LCSD Percent Recoveries) Duplicate RPD: | 23.26% | |
| Duplicate Status vs Numerical Indicator: | N/A | |
| Duplicate Status vs RPD: | Pass | |
| % RPD Limit: | 32% | |

| Sample Matrix Spike Control Assessment | MS/MSD 1 | MS/MSD 2 |
|---|---|---|
| Sample Collection Date: | | |
| Sample I.D. | | |
| Sample MS I.D. | | |
| Sample MSD I.D. | | |
| Spike I.D.: | | |
| MS/MSD Decay Corrected Spike Concentration (pCi/mL): | | |
| Spike Volume Used in MS (mL): | | |
| Spike Volume Used in MSD (mL): | | |
| MS Aliquot (L, g, F): | | |
| MS Target Conc.(pCi/L, g, F): | | |
| MSD Aliquot (L, g, F): | | |
| MSD Target Conc. (pCi/L, g, F): | | |
| MS Spike Uncertainty (calculated): | | |
| MSD Spike Uncertainty (calculated): | | |
| Sample Result: | | |
| Sample Result Counting Uncertainty (pCi/L, g, F): | | |
| Sample Matrix Spike Result: | | |
| Matrix Spike Result Counting Uncertainty (pCi/L, g, F): | | |
| Sample Matrix Spike Duplicate Result: | | |
| Matrix Spike Duplicate Result Counting Uncertainty (pCi/L, g, F): | | |
| MS Numerical Performance Indicator: | | |
| MSD Numerical Performance Indicator: | | |
| MS Percent Recovery: | | |
| MSD Percent Recovery: | | |
| MS Status vs Numerical Indicator: | | |
| MSD Status vs Numerical Indicator: | | |
| MS Status vs Recovery: | | |
| MSD Status vs Recovery: | | |
| MS/MSD Upper % Recovery Limits: | | |
| MS/MSD Lower % Recovery Limits: | | |

| Matrix Spike/Matrix Spike Duplicate Sample Assessment | | |
|---|---|---|
| Sample I.D. | | |
| Sample MS I.D. | | |
| Sample MSD I.D. | | |
| Sample Matrix Spike Result: | | |
| Matrix Spike Result Counting Uncertainty (pCi/L, g, F): | | |
| Sample Matrix Spike Duplicate Result: | | |
| Matrix Spike Duplicate Result Counting Uncertainty (pCi/L, g, F): | | |
| Duplicate Numerical Performance Indicator: | | |
| (Based on the Percent Recoveries) MS/ MSD Duplicate RPD: | | |
| MS/ MSD Duplicate Status vs Numerical Indicator: | | |
| MS/ MSD Duplicate Status vs RPD: | | |
| % RPD Limit: | | |

## Evaluation of duplicate precision is not applicable if either the sample or duplicate results are below the RL.

Comments:

SLC 1/6/2021

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

January 07, 2021

Joju Abraham
Georgia Power-CCR
2480 Maner Road
Atlanta, GA 30339

RE: Project: PLANT MCDONOUGH AP-234 RADS
Pace Project No.: 92510824

Dear Joju Abraham:

Enclosed are the analytical results for sample(s) received by the laboratory on December 10, 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 - Greensburg

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: Stephen Benda
Daniela Herrera, Golder
Ben Hodges, Georgia Power
Jimmy Jones, Golder Associates Inc.
Kristen Jurinko
Julie Lehrman, Golder Associates Inc.
Ms. Lauren Petty, Southern Co. Services
Dawn Prell, Golder Associates Inc.
Tim Richards, Golder Associates - Atlanta

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

# CERTIFICATIONS

Project: PLANT MCDONOUGH AP-234 RADS
Pace Project No.: 92510824

**Pace Analytical Services Pennsylvania**

1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601
ANAB DOD-ELAP Rad Accreditation #: L2417
Alabama Certification #: 41590
Arizona Certification #: AZ0734
Arkansas Certification
California Certification #: 04222CA
Colorado Certification #: PA01547
Connecticut Certification #: PH-0694
Delaware Certification
EPA Region 4 DW Rad
Florida/TNI Certification #: E87683
Georgia Certification #: C040
Florida: Cert E871149 SEKS WET
Guam Certification
Hawaii Certification
Idaho Certification
Illinois Certification
Indiana Certification
Iowa Certification #: 391
Kansas/TNI Certification #: E-10358
Kentucky Certification #: KY90133
KY WW Permit #: KY0098221
KY WW Permit #: KY0000221
Louisiana DHH/TNI Certification #: LA180012
Louisiana DEQ/TNI Certification #: 4086
Maine Certification #: 2017020
Maryland Certification #: 308
Massachusetts Certification #: M-PA1457
Michigan/PADEP Certification #: 9991
Missouri Certification #: 235
Montana Certification #: Cert0082
Nebraska Certification #: NE-OS-29-14
Nevada Certification #: PA014572018-1
New Hampshire/TNI Certification #: 297617
New Jersey/TNI Certification #: PA051
New Mexico Certification #: PA01457
New York/TNI Certification #: 10888
North Carolina Certification #: 42706
North Dakota Certification #: R-190
Ohio EPA Rad Approval: #41249
Oregon/TNI Certification #: PA200002-010
Pennsylvania/TNI Certification #: 65-00282
Puerto Rico Certification #: PA01457
Rhode Island Certification #: 65-00282
South Dakota Certification
Tennessee Certification #: 02867
Texas/TNI Certification #: T104704188-17-3
Utah/TNI Certification #: PA014572017-9
USDA Soil Permit #: P330-17-00091
Vermont Dept. of Health: ID# VT-0282
Virgin Island/PADEP Certification
Virginia/VELAP Certification #: 9526
Washington Certification #: C868
West Virginia DEP Certification #: 143
West Virginia DHHR Certification #: 9964C
Wisconsin Approve List for Rad
Wyoming Certification #: 8TMS-L

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

## SAMPLE SUMMARY

Project: PLANT MCDONOUGH AP-234 RADS
Pace Project No.: 92510824

| Lab ID | Sample ID | Matrix | Date Collected | Date Received |
|---|---|---|---|---|
| **92510824001** | **B-104D** | Water | 12/09/20 11:45 | 12/10/20 09:05 |
| **92510824002** | **B-107D** | Water | 12/09/20 11:35 | 12/10/20 09:05 |
| **92510824003** | **B-108D** | Water | 12/09/20 09:50 | 12/10/20 09:05 |
| **92510824004** | **B-111D** | Water | 12/09/20 14:45 | 12/10/20 09:05 |
| **92510824005** | **FD** | Water | 12/09/20 00:00 | 12/10/20 09:05 |
| **92510824006** | **FB** | Water | 12/09/20 11:18 | 12/10/20 09:05 |

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

## SAMPLE ANALYTE COUNT

Project: PLANT MCDONOUGH AP-234 RADS
Pace Project No.: 92510824

| Lab ID | Sample ID | Method | Analysts | Analytes Reported | Laboratory |
|---|---|---|---|---|---|
| **92510824001** | **B-104D** | EPA 9315 | JJY | 1 | PASI-PA |
| | | EPA 9320 | VAL | 1 | PASI-PA |
| | | Total Radium Calculation | CMC | 1 | PASI-PA |
| **92510824002** | **B-107D** | EPA 9315 | JJY | 1 | PASI-PA |
| | | EPA 9320 | VAL | 1 | PASI-PA |
| | | Total Radium Calculation | CMC | 1 | PASI-PA |
| **92510824003** | **B-108D** | EPA 9315 | JJY | 1 | PASI-PA |
| | | EPA 9320 | VAL | 1 | PASI-PA |
| | | Total Radium Calculation | CMC | 1 | PASI-PA |
| **92510824004** | **B-111D** | EPA 9315 | JJY | 1 | PASI-PA |
| | | EPA 9320 | VAL | 1 | PASI-PA |
| | | Total Radium Calculation | CMC | 1 | PASI-PA |
| **92510824005** | **FD** | EPA 9315 | JJY | 1 | PASI-PA |
| | | EPA 9320 | VAL | 1 | PASI-PA |
| | | Total Radium Calculation | CMC | 1 | PASI-PA |
| **92510824006** | **FB** | EPA 9315 | JJY | 1 | PASI-PA |
| | | EPA 9320 | VAL | 1 | PASI-PA |
| | | Total Radium Calculation | CMC | 1 | PASI-PA |

PASI-PA = Pace Analytical Services - Greensburg

**REPORT OF LABORATORY ANALYSIS**

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

# ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: PLANT MCDONOUGH AP-234 RADS
Pace Project No.: 92510824

**Sample: B-104D** **Lab ID: 92510824001** Collected: 12/09/20 11:45 Received: 12/10/20 09:05 Matrix: Water
PWS: Site ID: Sample Type:

| Parameters | Method | Act ± Unc (MDC) Carr Trac | Units | Analyzed | CAS No. | Qual |
|---|---|---|---|---|---|---|
| | Pace Analytical Services - Greensburg | | | | | |
| Radium-226 | EPA 9315 | **5.14 ± 1.11 (0.547) C:92% T:NA** | pCi/L | 12/30/20 07:44 | 13982-63-3 | |
| | Pace Analytical Services - Greensburg | | | | | |
| Radium-228 | EPA 9320 | **10.1 ± 2.03 (0.796) C:65% T:85%** | pCi/L | 01/04/21 11:27 | 15262-20-1 | |
| | Pace Analytical Services - Greensburg | | | | | |
| Total Radium | Total Radium Calculation | **15.2 ± 3.14 (1.34)** | pCi/L | 01/05/21 10:13 | 7440-14-4 | |

**REPORT OF LABORATORY ANALYSIS**

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

# ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: PLANT MCDONOUGH AP-234 RADS

Pace Project No.: 92510824

**Sample: B-107D** **Lab ID: 92510824002** Collected: 12/09/20 11:35 Received: 12/10/20 09:05 Matrix: Water

PWS: Site ID: Sample Type:

| Parameters | Method | Act ± Unc (MDC) Carr Trac | Units | Analyzed | CAS No. | Qual |
|---|---|---|---|---|---|---|
| | Pace Analytical Services - Greensburg | | | | | |
| Radium-226 | EPA 9315 | **0.806 ± 0.425 (0.682) C:94% T:NA** | pCi/L | 12/30/20 07:44 | 13982-63-3 | |
| | Pace Analytical Services - Greensburg | | | | | |
| Radium-228 | EPA 9320 | **0.683 ± 0.409 (0.752) C:69% T:82%** | pCi/L | 01/04/21 11:27 | 15262-20-1 | |
| | Pace Analytical Services - Greensburg | | | | | |
| Total Radium | Total Radium Calculation | **1.49 ± 0.834 (1.43)** | pCi/L | 01/05/21 10:13 | 7440-14-4 | |

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

## ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: PLANT MCDONOUGH AP-234 RADS
Pace Project No.: 92510824

**Sample: B-108D** | **Lab ID: 92510824003** | Collected: 12/09/20 09:50 | Received: 12/10/20 09:05 | Matrix: Water
PWS: | Site ID: | Sample Type:

| Parameters | Method | Act ± Unc (MDC) Carr Trac | Units | Analyzed | CAS No. | Qual |
|---|---|---|---|---|---|---|
| | Pace Analytical Services - Greensburg | | | | | |
| Radium-226 | EPA 9315 | **0.615 ± 0.349 (0.530) C:91% T:NA** | pCi/L | 12/30/20 07:44 | 13982-63-3 | |
| | Pace Analytical Services - Greensburg | | | | | |
| Radium-228 | EPA 9320 | **0.699 ± 0.503 (0.992) C:68% T:81%** | pCi/L | 01/04/21 11:28 | 15262-20-1 | |
| | Pace Analytical Services - Greensburg | | | | | |
| Total Radium | Total Radium Calculation | **1.31 ± 0.852 (1.52)** | pCi/L | 01/05/21 10:13 | 7440-14-4 | |

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

# ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: PLANT MCDONOUGH AP-234 RADS
Pace Project No.: 92510824

**Sample: B-111D** | **Lab ID: 92510824004** | Collected: 12/09/20 14:45 | Received: 12/10/20 09:05 | Matrix: Water
PWS: | Site ID: | Sample Type:

| Parameters | Method | Act ± Unc (MDC) Carr Trac | Units | Analyzed | CAS No. | Qual |
|---|---|---|---|---|---|---|
| | Pace Analytical Services - Greensburg | | | | | |
| Radium-226 | EPA 9315 | **6.52 ± 1.34 (0.715) C:89% T:NA** | pCi/L | 12/30/20 07:44 | 13982-63-3 | |
| | Pace Analytical Services - Greensburg | | | | | |
| Radium-228 | EPA 9320 | **5.80 ± 1.25 (0.747) C:73% T:85%** | pCi/L | 01/04/21 11:28 | 15262-20-1 | |
| | Pace Analytical Services - Greensburg | | | | | |
| Total Radium | Total Radium Calculation | **12.3 ± 2.59 (1.46)** | pCi/L | 01/05/21 10:13 | 7440-14-4 | |

## REPORT OF LABORATORY ANALYSIS

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

# ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: PLANT MCDONOUGH AP-234 RADS
Pace Project No.: 92510824

**Sample: FD** | **Lab ID: 92510824005** | Collected: 12/09/20 00:00 | Received: 12/10/20 09:05 | Matrix: Water
PWS: | Site ID: | Sample Type:

| Parameters | Method | Act ± Unc (MDC) Carr Trac | Units | Analyzed | CAS No. | Qual |
|---|---|---|---|---|---|---|
| | Pace Analytical Services - Greensburg | | | | | |
| Radium-226 | EPA 9315 | **0.713 ± 0.364 (0.505) C:93% T:NA** | pCi/L | 12/30/20 07:44 | 13982-63-3 | |
| | Pace Analytical Services - Greensburg | | | | | |
| Radium-228 | EPA 9320 | **0.455 ± 0.424 (0.874) C:73% T:86%** | pCi/L | 01/04/21 11:28 | 15262-20-1 | |
| | Pace Analytical Services - Greensburg | | | | | |
| Total Radium | Total Radium Calculation | **1.17 ± 0.788 (1.38)** | pCi/L | 01/05/21 10:13 | 7440-14-4 | |

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

# ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: PLANT MCDONOUGH AP-234 RADS
Pace Project No.: 92510824

**Sample: FB** **Lab ID: 92510824006** Collected: 12/09/20 11:18 Received: 12/10/20 09:05 Matrix: Water
PWS: Site ID: Sample Type:

| Parameters | Method | Act ± Unc (MDC) Carr Trac | Units | Analyzed | CAS No. | Qual |
|---|---|---|---|---|---|---|
| | Pace Analytical Services - Greensburg | | | | | |
| Radium-226 | EPA 9315 | **0.203 ± 0.249 (0.511) C:83% T:NA** | pCi/L | 12/30/20 07:44 | 13982-63-3 | |
| | Pace Analytical Services - Greensburg | | | | | |
| Radium-228 | EPA 9320 | **0.315 ± 0.363 (0.763) C:70% T:84%** | pCi/L | 01/04/21 11:28 | 15262-20-1 | |
| | Pace Analytical Services - Greensburg | | | | | |
| Total Radium | Total Radium Calculation | **0.518 ± 0.612 (1.27)** | pCi/L | 01/05/21 10:17 | 7440-14-4 | |

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

## QUALITY CONTROL - RADIOCHEMISTRY

Project: PLANT MCDONOUGH AP-234 RADS
Pace Project No.: 92510824

| | | | |
|---|---|---|---|
| QC Batch: | 428417 | Analysis Method: | EPA 9315 |
| QC Batch Method: | EPA 9315 | Analysis Description: | 9315 Total Radium |
| | | Laboratory: | Pace Analytical Services - Greensburg |

Associated Lab Samples: 92510824001, 92510824002, 92510824003, 92510824004, 92510824005, 92510824006

METHOD BLANK: 2070210 Matrix: Water

Associated Lab Samples: 92510824001, 92510824002, 92510824003, 92510824004, 92510824005, 92510824006

| Parameter | Act ± Unc (MDC) Carr Trac | Units | Analyzed | Qualifiers |
|---|---|---|---|---|
| Radium-226 | -0.0869 ± 0.143 (0.495) C:87% T:NA | pCi/L | 12/30/20 07:44 | |

**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

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

## QUALITY CONTROL - RADIOCHEMISTRY

Project: PLANT MCDONOUGH AP-234 RADS
Pace Project No.: 92510824

| | | | |
|---|---|---|---|
| QC Batch: | 428749 | Analysis Method: | EPA 9320 |
| QC Batch Method: | EPA 9320 | Analysis Description: | 9320 Radium 228 |
| | | Laboratory: | Pace Analytical Services - Greensburg |

Associated Lab Samples: 92510824001, 92510824002, 92510824003, 92510824004, 92510824005, 92510824006

METHOD BLANK: 2071921 Matrix: Water

Associated Lab Samples: 92510824001, 92510824002, 92510824003, 92510824004, 92510824005, 92510824006

| Parameter | Act ± Unc (MDC) Carr Trac | Units | Analyzed | Qualifiers |
|---|---|---|---|---|
| Radium-228 | -0.161 ± 0.312 (0.758) C:74% T:81% | pCi/L | 01/04/21 11:42 | |

**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.**

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

## QUALIFIERS

Project: PLANT MCDONOUGH AP-234 RADS
Pace Project No.: 92510824

### 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.

Act - Activity

Unc - Uncertainty: SDWA = 1.96 sigma count uncertainty, all other matrices = Expanded Uncertainty (95% confidence interval). Gamma Spec = Expanded Uncertainty (95.4% Confidence Interval)

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

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

TNI - The NELAC Institute.

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

## QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: PLANT MCDONOUGH AP-234 RADS
Pace Project No.: 92510824

| Lab ID | Sample ID | QC Batch Method | QC Batch | Analytical Method | Analytical Batch |
|---|---|---|---|---|---|
| **92510824001** | **B-104D** | EPA 9315 | 428417 | | |
| **92510824002** | **B-107D** | EPA 9315 | 428417 | | |
| **92510824003** | **B-108D** | EPA 9315 | 428417 | | |
| **92510824004** | **B-111D** | EPA 9315 | 428417 | | |
| **92510824005** | **FD** | EPA 9315 | 428417 | | |
| **92510824006** | **FB** | EPA 9315 | 428417 | | |
| **92510824001** | **B-104D** | EPA 9320 | 428749 | | |
| **92510824002** | **B-107D** | EPA 9320 | 428749 | | |
| **92510824003** | **B-108D** | EPA 9320 | 428749 | | |
| **92510824004** | **B-111D** | EPA 9320 | 428749 | | |
| **92510824005** | **FD** | EPA 9320 | 428749 | | |
| **92510824006** | **FB** | EPA 9320 | 428749 | | |
| **92510824001** | **B-104D** | Total Radium Calculation | 429587 | | |
| **92510824002** | **B-107D** | Total Radium Calculation | 429587 | | |
| **92510824003** | **B-108D** | Total Radium Calculation | 429587 | | |
| **92510824004** | **B-111D** | Total Radium Calculation | 429587 | | |
| **92510824005** | **FD** | Total Radium Calculation | 429587 | | |
| **92510824006** | **FB** | Total Radium Calculation | 429590 | | |

| Pace Analytical | Document Name: Sample Condition Upon Receipt(SCUR) | Document Revised: October 28, 2020 Page 1 of 2 |
|---|---|---|
| | Document No.: F-CAR-CS-033-Rev.07 | Issuing Authority: Pace Carolinas Quality Office |

**Laboratory receiving samples:**
Asheville ☐ Eden ☐ Greenwood ☐ Huntersville ☐ Raleigh ☐ Mechanicsville ☐ Atlanta ☑ Kernersville ☐

**Sample Condition Upon Receipt**

**Client Name:** Georgia power - coal

**Project #:** **WO# : 92510824**

92510824

**Courier:** ☐ Fed Ex ☐ UPS ☐ USPS ☑ Client ☐ Commercial ☐ Pace ☐ Other: ____

**Custody Seal Present?** ☐ Yes ☑ No **Seals Intact?** ☐ Yes ☐ No

**Date/Initials Person Examining Contents:** MT 12/10/20

**Packing Material:** ☐ Bubble Wrap ☐ Bubble Bags ☐ None ☑ Other

**Biological Tissue Frozen?** ☐ Yes ☑ No ☐ N/A

**Thermometer:** ☐ IR Gun ID: 233

**Type of Ice:** ☑ Wet ☐ Blue ☐ None

**Cooler Temp:** 2.3 **Correction Factor: Add/Subtract (°C)** ±0.4

Temp should be above freezing to 6°C
☐ Samples out of temp criteria. Samples on ice, cooling process has begun

**Cooler Temp Corrected (°C):** 2.7

**USDA Regulated Soil** ( ☐ N/A, water sample)
Did samples originate in a quarantine zone within the United States: CA, NY, or SC (check maps)? ☐ Yes ☑ No

Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? ☐ Yes ☑ No

| | | | | Comments/Discrepancy: |
|---|---|---|---|---|
| Chain of Custody Present? | ☑ Yes | ☐ No | ☐ N/A | 1. |
| Samples Arrived within Hold Time? | ☑ Yes | ☐ No | ☐ N/A | 2. |
| Short Hold Time Analysis (<72 hr.)? | ☐ Yes | ☑ No | ☐ N/A | 3. |
| Rush Turn Around Time Requested? | ☑ Yes | ☐ No | ☐ N/A | 4. Standard |
| Sufficient Volume? | ☑ Yes | ☐ No | ☐ N/A | 5. |
| Correct Containers Used? | ☑ Yes | ☐ No | ☐ N/A | 6. |
| -Pace Containers Used? | ☑ Yes | ☐ No | ☐ N/A | |
| Containers Intact? | ☑ Yes | ☐ No | ☐ N/A | 7. |
| Dissolved analysis: Samples Field Filtered? | ☐ Yes | ☑ No | ☐ N/A | 8. |
| Sample Labels Match COC? | ☑ Yes | ☐ No | ☐ N/A | 9. |
| -Includes Date/Time/ID/Analysis Matrix: WT | | | | |
| Headspace in VOA Vials (>5-6mm)? | ☐ Yes | ☐ No | ☑ N/A | 10. |
| Trip Blank Present? | ☐ Yes | ☐ No | ☑ N/A | 11. |
| Trip Blank Custody Seals Present? | ☐ Yes | ☐ No | ☑ N/A | |

**COMMENTS/SAMPLE DISCREPANCY**

**Field Data Required?** ☐ Yes ☐ No

Lot ID of split containers:

**CLIENT NOTIFICATION/RESOLUTION**

Person contacted: ____________ Date/Time: ____________

**Project Manager SCURF Review:** ____________ **Date:** ____________

**Project Manager SRF Review:** ____________ **Date:** ____________

| Pace Analytical | Document Name: **Sample Condition Upon Receipt(SCUR)** | Document Revised: October 28, 2020 Page 2 of 2 |
|---|---|---|
| | Document No.: **F-CAR-CS-033-Rev.07** | 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 bottles**

**Project #** **WO#:92510824**

**PM: KLH1** **Due Date: 01/04/21**

**CLIENT: GA-GA Power**

| 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) | 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) | DG9U-40 mL Amber Unpreserved vials (N/A) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | 1 | 1 | | | 1 | | | | | | | | | | | | | | | | | | 2 | | | | |
| 2 | | 1 | 1 | | | 1 | | | | | | | | | | | | | | | | | | 2 | | | | |
| 3 | | 1 | 1 | | | 1 | | | | | | | | | | | | | | | | | | 2 | | | | |
| 4 | | 1 | 1 | | | 1 | | | | | | | | | | | | | | | | | | 4 | | | | |
| 5 | | 1 | 1 | | | 1 | | | | | | | | | | | | | | | | | | 2 | | | | |
| 6 | | 1 | 1 | | | 1 | | | | | | | | | | | | | | | | | | 2 | | | | |
| 7 | | 1 | 1 | | | 1 | | | | | | | | | | | | | | | | | | 2 | | | | |
| 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 Office (i.e. Out of hold, incorrect preservative, out of temp, incorrect containers.

Pace Analytical

# 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 - Coal Combustion Residuals |
| Address | 2480 Maner Road, Atlanta, GA 30339 |
| Email | jabraham@southernco.com |
| Phone | (404) 506-7239 |
| Fax | |
| Requested Due Date | Standard |

**Section B — Required Project Information:**

| | |
|---|---|
| Report To: | Joju Abraham |
| Copy To: | Golder |
| Purchase Order # | |
| Project Name: | Plant McDonough AP-234 |
| Project #: | 166849618 |

**Section C — Invoice Information:**

| | |
|---|---|
| Attention: | scsinvoices@southernco.com |
| Company Name | |
| Address | |
| Pace Quote | |
| Pace Project Manager | Kevin Herring |
| Pace Profile # | |

Regulatory Agency

State / Location: GA

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

Requested Analysis Filtered (Y/N): N N N N

925108241

| ITEM # | SAMPLE ID | MATRIX CODE | SAMPLE TYPE (G=GRAB C=COMP) | DATE | TIME | SAMPLE TEMP AT COLLECTION | # OF CONTAINERS | Unpreserved - Ice | H2SO4 | HNO3 | HCl | NaOH + Zn Acetate | Na2S2O3 | Methanol | Other | *Metals App III and App IV Total | Cl, F, SO4 | Radium 226/228 | TDS | Residual Chlorine (Y/N) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | B-104D | WT | G | 12/9/2020 | 1145 | | 5 | 2 | | 3 | | | | | | X | X | X | X | | pH 6.44 |
| 2 | B-107D | | | 12/9/2020 | 1135 | | 5 | 2 | | 3 | | | | | | X | X | X | X | | pH 5.91 |
| 3 | B-108D | | | 12/9/2020 | 950 | | 5 | 2 | | 3 | | | | | | X | X | X | X | | pH: 5.94 |
| 4 | B-111D | | | 12/9/2020 | 1445 | | 7 | 2 | | 5 | | | | | | X | X | X | X | | pH: 6.64, Extra Radium |
| 5 | FD | | | 12/9/2020 | – | | 5 | 2 | | 3 | | | | | | X | X | X | X | | |
| 6 | FB | | | 12/9/2020 | 1118 | | 5 | 2 | | 3 | | | | | | X | X | X | X | | |
| 7 | | | | | | | | | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | | | | | | | | | |
| 13 | | | | | | | | | | | | | | | | | | | | | |
| 14 | | | | | | | | | | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | | | | | | | | | |

| ADDITIONAL COMMENTS | RELINQUISHED BY / AFFILIATION | DATE | TIME | ACCEPTED BY / AFFILIATION | DATE | TIME | SAMPLE CONDITIONS | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| *App III / IV Metals = As, Sb, B, Ba, Be, Ca, Cd, Cr, Co, Pb, Li, Hg, Mo, Se, Tl | Yong Chang Soo | 12/10/20 | 0405 | [illegible] / Pace | 12/11/20 | 0405 | 2.3 | Y | N | Y |

SAMPLER NAME AND SIGNATURE

PRINT NAME: Yong Chang Soo

SIGNATURE: [signature]

DATE Signed: 12/10/2020

TEMP in C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

Pace Analytical
www.pacelabs.com

# Quality Control Sample Performance Assessment

***Analyst Must Manually Enter All Fields Highlighted in Yellow.***

| | |
|---|---|
| Test: | Ra-226 |
| Analyst: | JJY |
| Date: | 12/29/2020 |
| Worklist: | 58052 |
| Matrix: | DW |

| Method Blank Assessment | |
|---|---|
| MB Sample ID | 2070210 |
| MB concentration: | -0.087 |
| M/B Counting Uncertainty: | 0.142 |
| MB MDC: | 0.495 |
| MB Numerical Performance Indicator: | -1.20 |
| MB Status vs Numerical Indicator: | N/A |
| MB Status vs. MDC: | Pass |

| Laboratory Control Sample Assessment | LCSD (Y or N)? | Y |
|---|---|---|
| | LCS58052 | LCSD58052 |
| Count Date: | 12/30/2020 | 12/30/2020 |
| Spike I.D.: | 19-033 | 19-033 |
| Decay Corrected Spike Concentration (pCi/mL): | 24.041 | 24.041 |
| Volume Used (mL): | 0.10 | 0.10 |
| Aliquot Volume (L, g, F): | 0.506 | 0.504 |
| Target Conc. (pCi/L, g, F): | 4.756 | 4.766 |
| Uncertainty (Calculated): | 0.057 | 0.057 |
| Result (pCi/L, g, F): | 5.553 | 4.271 |
| LCS/LCSD Counting Uncertainty (pCi/L, g, F): | 0.831 | 0.794 |
| Numerical Performance Indicator: | 1.88 | -1.22 |
| Percent Recovery: | 116.76% | 89.61% |
| Status vs Numerical Indicator: | N/A | N/A |
| Status vs Recovery: | Pass | Pass |
| Upper % Recovery Limits: | 125% | 125% |
| Lower % Recovery Limits: | 75% | 75% |

| Duplicate Sample Assessment | | |
|---|---|---|
| Sample I.D.: | LCS58052 | Enter Duplicate sample IDs if other than LCS/LCSD in the space below. |
| Duplicate Sample I.D. | LCSD58052 | |
| Sample Result (pCi/L, g, F): | 5.553 | |
| Sample Result Counting Uncertainty (pCi/L, g, F): | 0.831 | |
| Sample Duplicate Result (pCi/L, g, F): | 4.271 | |
| Sample Duplicate Result Counting Uncertainty (pCi/L, g, F): | 0.794 | |
| Are sample and/or duplicate results below RL? | NO | |
| Duplicate Numerical Performance Indicator: | 2.185 OK | |
| (Based on the LCS/LCSD Percent Recoveries) Duplicate RPD: | 26.31% | |
| Duplicate Status vs Numerical Indicator: | N/A | |
| Duplicate Status vs RPD: | Fail*** | |
| % RPD Limit: | 25% | |

| Sample Matrix Spike Control Assessment | MS/MSD 1 | MS/MSD 2 |
|---|---|---|
| Sample Collection Date: | | |
| Sample I.D. | | |
| Sample MS I.D. | | |
| Sample MSD I.D. | | |
| Spike I.D.: | | |
| MS/MSD Decay Corrected Spike Concentration (pCi/mL): | | |
| Spike Volume Used in MS (mL): | | |
| Spike Volume Used in MSD (mL): | | |
| MS Aliquot (L, g, F): | | |
| MS Target Conc.(pCi/L, g, F): | | |
| MSD Aliquot (L, g, F): | | |
| MSD Target Conc. (pCi/L, g, F): | | |
| MS Spike Uncertainty (calculated): | | |
| MSD Spike Uncertainty (calculated): | | |
| Sample Result: | | |
| Sample Result Counting Uncertainty (pCi/L, g, F): | | |
| Sample Matrix Spike Result: | | |
| Matrix Spike Result Counting Uncertainty (pCi/L, g, F): | | |
| Sample Matrix Spike Duplicate Result: | | |
| Matrix Spike Duplicate Result Counting Uncertainty (pCi/L, g, F): | | |
| MS Numerical Performance Indicator: | | |
| MSD Numerical Performance Indicator: | | |
| MS Percent Recovery: | | |
| MSD Percent Recovery: | | |
| MS Status vs Numerical Indicator: | | |
| MSD Status vs Numerical Indicator: | | |
| MS Status vs Recovery: | | |
| MSD Status vs Recovery: | | |
| MS/MSD Upper % Recovery Limits: | | |
| MS/MSD Lower % Recovery Limits: | | |

| Matrix Spike/Matrix Spike Duplicate Sample Assessment | | |
|---|---|---|
| Sample I.D. | | |
| Sample MS I.D. | | |
| Sample MSD I.D. | | |
| Sample Matrix Spike Result: | | |
| Matrix Spike Result Counting Uncertainty (pCi/L, g, F): | | |
| Sample Matrix Spike Duplicate Result: | | |
| Matrix Spike Duplicate Result Counting Uncertainty (pCi/L, g, F): | | |
| Duplicate Numerical Performance Indicator: | | |
| (Based on the Percent Recoveries) MS/ MSD Duplicate RPD: | | |
| MS/ MSD Duplicate Status vs Numerical Indicator: | | |
| MS/ MSD Duplicate Status vs RPD: | | |
| % RPD Limit: | | |

## Evaluation of duplicate precision is not applicable if either the sample or duplicate results are below the MDC.

**Comments:**

***~~Batch must be re-prepped due to unacceptable precision.~~ N/A LAM 1/7/2021

LAM 1/7/2021

Numerical Indicator less than 3 OK for water batch

Pace Analytical™
www.pacelabs.com

# Quality Control Sample Performance Assessment

***Analyst Must Manually Enter All Fields Highlighted in Yellow.***

| | |
|---|---|
| Test: | Ra-226 |
| Analyst: | MK1 |
| Date: | 12/28/2020 |
| Batch ID: | 58061 |
| Matrix: | DW |

| Method Blank Assessment | |
|---|---|
| MB Sample ID | 2070551 |
| MB concentration: | 0.050 |
| M/B Counting Uncertainty: | 0.294 |
| MB MDC: | 0.601 |
| MB Numerical Performance Indicator: | 0.33 |
| MB Status vs Numerical Indicator: | N/A |
| MB Status vs. MDC: | Pass |

| Laboratory Control Sample Assessment | LCSD (Y or N)? | Y |
|---|---|---|
| | LCS58061 | LCSD58061 |
| Count Date: | 1/6/2021 | 1/6/2021 |
| Spike I.D.: | 20-032 | 20-032 |
| Spike Concentration (pCi/mL): | 32.180 | 32.180 |
| Volume Used (mL): | 0.10 | 0.10 |
| Aliquot Volume (L, g, F): | 0.665 | 0.658 |
| Target Conc. (pCi/L, g, F): | 4.836 | 4.890 |
| Uncertainty (Calculated): | 0.227 | 0.230 |
| Result (pCi/L, g, F): | 5.128 | 4.105 |
| LCS/LCSD Counting Uncertainty (pCi/L, g, F): | 0.996 | 0.903 |
| Numerical Performance Indicator: | 0.56 | -1.65 |
| Percent Recovery: | 106.06% | 83.95% |
| Status vs Numerical Indicator: | N/A | N/A |
| Status vs Recovery: | Pass | Pass |
| Upper % Recovery Limits: | 135% | 135% |
| Lower % Recovery Limits: | 73% | 73% |

| Duplicate Sample Assessment | | |
|---|---|---|
| Sample I.D.: | LCS58061 | Enter Duplicate sample IDs if other than LCS/LCSD in the space below. |
| Duplicate Sample I.D. | LCSD58061 | |
| Sample Result (pCi/L, g, F): | 5.128 | |
| Sample Result Counting Uncertainty (pCi/L, g, F): | 0.996 | |
| Sample Duplicate Result (pCi/L, g, F): | 4.105 | |
| Sample Duplicate Result Counting Uncertainty (pCi/L, g, F): | 0.903 | |
| Are sample and/or duplicate results below RL? | NO | |
| Duplicate Numerical Performance Indicator: | 1.492 | |
| (Based on the LCS/LCSD Percent Recoveries) Duplicate RPD: | 23.26% | |
| Duplicate Status vs Numerical Indicator: | N/A | |
| Duplicate Status vs RPD: | Pass | |
| % RPD Limit: | 32% | |

| Sample Matrix Spike Control Assessment | MS/MSD 1 | MS/MSD 2 |
|---|---|---|
| Sample Collection Date: | | |
| Sample I.D. | | |
| Sample MS I.D. | | |
| Sample MSD I.D. | | |
| Spike I.D.: | | |
| MS/MSD Decay Corrected Spike Concentration (pCi/mL): | | |
| Spike Volume Used in MS (mL): | | |
| Spike Volume Used in MSD (mL): | | |
| MS Aliquot (L, g, F): | | |
| MS Target Conc.(pCi/L, g, F): | | |
| MSD Aliquot (L, g, F): | | |
| MSD Target Conc. (pCi/L, g, F): | | |
| MS Spike Uncertainty (calculated): | | |
| MSD Spike Uncertainty (calculated): | | |
| Sample Result: | | |
| Sample Result Counting Uncertainty (pCi/L, g, F): | | |
| Sample Matrix Spike Result: | | |
| Matrix Spike Result Counting Uncertainty (pCi/L, g, F): | | |
| Sample Matrix Spike Duplicate Result: | | |
| Matrix Spike Duplicate Result Counting Uncertainty (pCi/L, g, F): | | |
| MS Numerical Performance Indicator: | | |
| MSD Numerical Performance Indicator: | | |
| MS Percent Recovery: | | |
| MSD Percent Recovery: | | |
| MS Status vs Numerical Indicator: | | |
| MSD Status vs Numerical Indicator: | | |
| MS Status vs Recovery: | | |
| MSD Status vs Recovery: | | |
| MS/MSD Upper % Recovery Limits: | | |
| MS/MSD Lower % Recovery Limits: | | |

| Matrix Spike/Matrix Spike Duplicate Sample Assessment | | |
|---|---|---|
| Sample I.D. | | |
| Sample MS I.D. | | |
| Sample MSD I.D. | | |
| Sample Matrix Spike Result: | | |
| Matrix Spike Result Counting Uncertainty (pCi/L, g, F): | | |
| Sample Matrix Spike Duplicate Result: | | |
| Matrix Spike Duplicate Result Counting Uncertainty (pCi/L, g, F): | | |
| Duplicate Numerical Performance Indicator: | | |
| (Based on the Percent Recoveries) MS/ MSD Duplicate RPD: | | |
| MS/ MSD Duplicate Status vs Numerical Indicator: | | |
| MS/ MSD Duplicate Status vs RPD: | | |
| % RPD Limit: | | |

## Evaluation of duplicate precision is not applicable if either the sample or duplicate results are below the RL.

**Comments:**

SLC 1/6/2021

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

December 28, 2020

Joju Abraham
Georgia Power-CCR
2480 Maner Road
Atlanta, GA 30339

RE: Project: PLANT MCDONOUGH AP-1
Pace Project No.: 92510827

Dear Joju Abraham:

Enclosed are the analytical results for sample(s) received by the laboratory on December 10, 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: Stephen Benda
Daniela Herrera, Golder
Ben Hodges, Georgia Power
Jimmy Jones, Golder Associates Inc.
Kristen Jurinko
Julie Lehrman, Golder Associates Inc.
Ms. Lauren Petty, Southern Co. Services
Dawn Prell, Golder Associates Inc.
Tim Richards, Golder Associates - Atlanta

**REPORT OF LABORATORY ANALYSIS**

# CERTIFICATIONS

| | |
|---|---|
| Project: | PLANT MCDONOUGH AP-1 |
| Pace Project No.: | 92510827 |

**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
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
North Carolina Certification #: 381
South Carolina Certification #: 98011001

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

# SAMPLE SUMMARY

Project: PLANT MCDONOUGH AP-1
Pace Project No.: 92510827

| Lab ID | Sample ID | Matrix | Date Collected | Date Received |
| --- | --- | --- | --- | --- |
| **92510827001** | **B-105D** | Water | 12/09/20 15:30 | 12/10/20 09:05 |

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

# SAMPLE ANALYTE COUNT

Project: PLANT MCDONOUGH AP-1
Pace Project No.: 92510827

| Lab ID | Sample ID | Method | Analysts | Analytes Reported |
|---|---|---|---|---|
| **92510827001** | **B-105D** | EPA 6010D | KH | 1 |
| | | EPA 6020B | CW1 | 13 |
| | | EPA 7470A | VB | 1 |
| | | SM 2450C-2011 | AW1 | 1 |
| | | EPA 300.0 Rev 2.1 1993 | CDC | 3 |

PASI-A = Pace Analytical Services - Asheville
PASI-C = Pace Analytical Services - Charlotte
PASI-GA = Pace Analytical Services - Peachtree Corners, GA

Pace Analytical®
www.pacelabs.com

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

# ANALYTICAL RESULTS

Project: PLANT MCDONOUGH AP-1
Pace Project No.: 92510827

**Sample: B-105D** **Lab ID: 92510827001** Collected: 12/09/20 15:30 Received: 12/10/20 09:05 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 | | 12/10/20 10:39 | | |
| pH | **6.48** | Std. Units | | | 1 | | 12/10/20 10:39 | | |
| **6010D ATL ICP** | Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Peachtree Corners, GA | | | | | | | | |
| Calcium | **76.9** | mg/L | 1.0 | 0.070 | 1 | 12/17/20 10:10 | 12/17/20 22:37 | 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 | 12/16/20 13:14 | 12/18/20 19:32 | 7440-36-0 | |
| Arsenic | ND | mg/L | 0.0050 | 0.00078 | 1 | 12/16/20 13:14 | 12/18/20 19:32 | 7440-38-2 | |
| Barium | **0.030** | mg/L | 0.010 | 0.00071 | 1 | 12/16/20 13:14 | 12/18/20 19:32 | 7440-39-3 | |
| Beryllium | ND | mg/L | 0.0030 | 0.000046 | 1 | 12/16/20 13:14 | 12/18/20 19:32 | 7440-41-7 | |
| Boron | **0.79** | mg/L | 0.10 | 0.0052 | 1 | 12/16/20 13:14 | 12/18/20 19:32 | 7440-42-8 | |
| Cadmium | ND | mg/L | 0.0025 | 0.00012 | 1 | 12/16/20 13:14 | 12/18/20 19:32 | 7440-43-9 | |
| Chromium | ND | mg/L | 0.010 | 0.00055 | 1 | 12/16/20 13:14 | 12/18/20 19:32 | 7440-47-3 | |
| Cobalt | **0.012** | mg/L | 0.0050 | 0.00038 | 1 | 12/16/20 13:14 | 12/18/20 19:32 | 7440-48-4 | |
| Lead | **0.000052J** | mg/L | 0.0050 | 0.000036 | 1 | 12/16/20 13:14 | 12/18/20 19:32 | 7439-92-1 | |
| Lithium | **0.014J** | mg/L | 0.030 | 0.00081 | 1 | 12/16/20 13:14 | 12/18/20 19:32 | 7439-93-2 | |
| Molybdenum | ND | mg/L | 0.010 | 0.00069 | 1 | 12/16/20 13:14 | 12/18/20 19:32 | 7439-98-7 | |
| Selenium | ND | mg/L | 0.010 | 0.0016 | 1 | 12/16/20 13:14 | 12/18/20 19:32 | 7782-49-2 | |
| Thallium | ND | mg/L | 0.0010 | 0.00014 | 1 | 12/16/20 13:14 | 12/18/20 19:32 | 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 | 12/14/20 08:30 | 12/14/20 14:05 | 7439-97-6 | |
| **2540C Total Dissolved Solids** | Analytical Method: SM 2450C-2011 Pace Analytical Services - Peachtree Corners, GA | | | | | | | | |
| Total Dissolved Solids | **474** | mg/L | 10.0 | 10.0 | 1 | | 12/10/20 11:53 | | |
| **300.0 IC Anions 28 Days** | Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville | | | | | | | | |
| Chloride | **17.1** | mg/L | 1.0 | 0.60 | 1 | | 12/16/20 00:52 | 16887-00-6 | |
| Fluoride | **0.075J** | mg/L | 0.10 | 0.050 | 1 | | 12/16/20 00:52 | 16984-48-8 | |
| Sulfate | **220** | mg/L | 5.0 | 2.5 | 5 | | 12/16/20 10:31 | 14808-79-8 | |

## REPORT OF LABORATORY ANALYSIS

Pace Analytical®
www.pacelabs.com

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

# QUALITY CONTROL DATA

Project: PLANT MCDONOUGH AP-1
Pace Project No.: 92510827

QC Batch: 587757
QC Batch Method: EPA 3010A
Analysis Method: EPA 6010D
Analysis Description: 6010D ATL
Laboratory: Pace Analytical Services - Peachtree Corners, GA
Associated Lab Samples: 92510827001

METHOD BLANK: 3106013    Matrix: Water
Associated Lab Samples: 92510827001

| Parameter | Units | Blank Result | Reporting Limit | MDL | Analyzed | Qualifiers |
|---|---|---|---|---|---|---|
| Calcium | mg/L | ND | 1.0 | 0.070 | 12/17/20 22:24 | |

LABORATORY CONTROL SAMPLE: 3106014

| Parameter | Units | Spike Conc. | LCS Result | LCS % Rec | % Rec Limits | Qualifiers |
|---|---|---|---|---|---|---|
| Calcium | mg/L | 1 | 1.1 | 108 | 80-120 | |

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3106015    3106016

| Parameter | Units | 92510829003 Result | MS Spike Conc. | MSD Spike Conc. | MS Result | MSD Result | MS % Rec | MSD % Rec | % Rec Limits | RPD | Max RPD | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Calcium | mg/L | 90.5 | 1 | 1 | 88.9 | 89.0 | -151 | -150 | 75-125 | 0 | 20 | M1 |

**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

Pace Analytical®
www.pacelabs.com

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

# QUALITY CONTROL DATA

Project: PLANT MCDONOUGH AP-1
Pace Project No.: 92510827

QC Batch: 587466 | Analysis Method: EPA 6020B
QC Batch Method: EPA 3005A | Analysis Description: 6020 MET
Laboratory: Pace Analytical Services - Peachtree Corners, GA

Associated Lab Samples: 92510827001

METHOD BLANK: 3104613 Matrix: Water
Associated Lab Samples: 92510827001

| Parameter | Units | Blank Result | Reporting Limit | MDL | Analyzed | Qualifiers |
|---|---|---|---|---|---|---|
| Antimony | mg/L | ND | 0.0030 | 0.00028 | 12/18/20 19:20 | |
| Arsenic | mg/L | ND | 0.0050 | 0.00078 | 12/18/20 19:20 | |
| Barium | mg/L | ND | 0.010 | 0.00071 | 12/18/20 19:20 | |
| Beryllium | mg/L | ND | 0.0030 | 0.000046 | 12/18/20 19:20 | |
| Boron | mg/L | ND | 0.10 | 0.0052 | 12/18/20 19:20 | |
| Cadmium | mg/L | ND | 0.0025 | 0.00012 | 12/18/20 19:20 | |
| Chromium | mg/L | ND | 0.010 | 0.00055 | 12/18/20 19:20 | |
| Cobalt | mg/L | ND | 0.0050 | 0.00038 | 12/18/20 19:20 | |
| Lead | mg/L | ND | 0.0050 | 0.000036 | 12/18/20 19:20 | |
| Lithium | mg/L | ND | 0.030 | 0.00081 | 12/18/20 19:20 | |
| Molybdenum | mg/L | ND | 0.010 | 0.00069 | 12/18/20 19:20 | |
| Selenium | mg/L | ND | 0.010 | 0.0016 | 12/18/20 19:20 | |
| Thallium | mg/L | ND | 0.0010 | 0.00014 | 12/18/20 19:20 | |

LABORATORY CONTROL SAMPLE: 3104614

| 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 | 0.098 | 98 | 80-120 | |
| Beryllium | mg/L | 0.1 | 0.10 | 100 | 80-120 | |
| Boron | mg/L | 1 | 1.0 | 102 | 80-120 | |
| Cadmium | mg/L | 0.1 | 0.10 | 102 | 80-120 | |
| Chromium | mg/L | 0.1 | 0.10 | 105 | 80-120 | |
| Cobalt | mg/L | 0.1 | 0.10 | 100 | 80-120 | |
| Lead | mg/L | 0.1 | 0.10 | 100 | 80-120 | |
| Lithium | mg/L | 0.1 | 0.10 | 102 | 80-120 | |
| Molybdenum | mg/L | 0.1 | 0.10 | 103 | 80-120 | |
| Selenium | mg/L | 0.1 | 0.096 | 96 | 80-120 | |
| Thallium | mg/L | 0.1 | 0.098 | 98 | 80-120 | |

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3104615 3104616

| Parameter | Units | 92510827001 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 | 0.11 | 0.10 | 110 | 104 | 75-125 | 6 | 20 | |
| Arsenic | mg/L | ND | 0.1 | 0.1 | 0.10 | 0.097 | 102 | 97 | 75-125 | 5 | 20 | |

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

## REPORT OF LABORATORY ANALYSIS

Pace Analytical®
www.pacelabs.com

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

## QUALITY CONTROL DATA

Project: PLANT MCDONOUGH AP-1
Pace Project No.: 92510827

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3104615 3104616

| Parameter | Units | 92510827001 Result | MS Spike Conc. | MSD Spike Conc. | MS Result | MSD Result | MS % Rec | MSD % Rec | % Rec Limits | RPD | Max RPD | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Barium | mg/L | 0.030 | 0.1 | 0.1 | 0.13 | 0.12 | 99 | 94 | 75-125 | 4 | 20 | |
| Beryllium | mg/L | ND | 0.1 | 0.1 | 0.098 | 0.089 | 98 | 89 | 75-125 | 9 | 20 | |
| Boron | mg/L | 0.79 | 1 | 1 | 1.9 | 1.8 | 113 | 98 | 75-125 | 8 | 20 | |
| Cadmium | mg/L | ND | 0.1 | 0.1 | 0.10 | 0.10 | 104 | 100 | 75-125 | 4 | 20 | |
| Chromium | mg/L | ND | 0.1 | 0.1 | 0.10 | 0.10 | 105 | 101 | 75-125 | 3 | 20 | |
| Cobalt | mg/L | 0.012 | 0.1 | 0.1 | 0.11 | 0.11 | 101 | 97 | 75-125 | 3 | 20 | |
| Lead | mg/L | 0.000052J | 0.1 | 0.1 | 0.098 | 0.093 | 98 | 93 | 75-125 | 6 | 20 | |
| Lithium | mg/L | 0.014J | 0.1 | 0.1 | 0.11 | 0.10 | 95 | 89 | 75-125 | 5 | 20 | |
| Molybdenum | mg/L | ND | 0.1 | 0.1 | 0.11 | 0.10 | 107 | 103 | 75-125 | 3 | 20 | |
| Selenium | mg/L | ND | 0.1 | 0.1 | 0.097 | 0.092 | 97 | 92 | 75-125 | 5 | 20 | |
| Thallium | mg/L | ND | 0.1 | 0.1 | 0.097 | 0.091 | 97 | 91 | 75-125 | 6 | 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.**

Pace Analytical®
www.pacelabs.com

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

## QUALITY CONTROL DATA

Project: PLANT MCDONOUGH AP-1
Pace Project No.: 92510827

QC Batch: 586401
QC Batch Method: EPA 7470A
Analysis Method: EPA 7470A
Analysis Description: 7470 Mercury
Laboratory: Pace Analytical Services - Peachtree Corners, GA
Associated Lab Samples: 92510827001

METHOD BLANK: 3099362    Matrix: Water
Associated Lab Samples: 92510827001

| Parameter | Units | Blank Result | Reporting Limit | MDL | Analyzed | Qualifiers |
|---|---|---|---|---|---|---|
| Mercury | mg/L | ND | 0.00050 | 0.000078 | 12/14/20 12:56 | |

LABORATORY CONTROL SAMPLE: 3099363

| Parameter | Units | Spike Conc. | LCS Result | LCS % Rec | % Rec Limits | Qualifiers |
|---|---|---|---|---|---|---|
| Mercury | mg/L | 0.0025 | 0.0021 | 84 | 80-120 | |

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3099364    3099365

| Parameter | Units | 92510829001 Result | MS Spike Conc. | MSD Spike Conc. | MS Result | MSD Result | MS % Rec | MSD % Rec | % Rec Limits | RPD | Max RPD | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mercury | mg/L | 0.000079J | 0.0025 | 0.0025 | 0.0020 | 0.0024 | 77 | 92 | 75-125 | 17 | 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.**

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

# QUALITY CONTROL DATA

Project: PLANT MCDONOUGH AP-1
Pace Project No.: 92510827

QC Batch: 585931
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: 92510827001

METHOD BLANK: 3096989 Matrix: Water
Associated Lab Samples: 92510827001

| Parameter | Units | Blank Result | Reporting Limit | MDL | Analyzed | Qualifiers |
|---|---|---|---|---|---|---|
| Total Dissolved Solids | mg/L | ND | 10.0 | 10.0 | 12/10/20 11:52 | |

LABORATORY CONTROL SAMPLE: 3096990

| Parameter | Units | Spike Conc. | LCS Result | LCS % Rec | % Rec Limits | Qualifiers |
|---|---|---|---|---|---|---|
| Total Dissolved Solids | mg/L | 400 | 417 | 104 | 84-108 | |

SAMPLE DUPLICATE: 3097556

| Parameter | Units | 92510779001 Result | Dup Result | RPD | Max RPD | Qualifiers |
|---|---|---|---|---|---|---|
| Total Dissolved Solids | mg/L | 105 | 101 | 4 | 10 | |

SAMPLE DUPLICATE: 3097589

| Parameter | Units | 92510794007 Result | Dup Result | RPD | Max RPD | Qualifiers |
|---|---|---|---|---|---|---|
| Total Dissolved Solids | mg/L | 299 | 287 | 4 | 10 | |

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

Pace Analytical®
www.pacelabs.com

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

## QUALITY CONTROL DATA

Project: PLANT MCDONOUGH AP-1
Pace Project No.: 92510827

QC Batch: 586999
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: 92510827001

METHOD BLANK: 3102402 Matrix: Water
Associated Lab Samples: 92510827001

| Parameter | Units | Blank Result | Reporting Limit | MDL | Analyzed | Qualifiers |
|---|---|---|---|---|---|---|
| Chloride | mg/L | ND | 1.0 | 0.60 | 12/15/20 18:20 | |
| Fluoride | mg/L | ND | 0.10 | 0.050 | 12/15/20 18:20 | |
| Sulfate | mg/L | ND | 1.0 | 0.50 | 12/15/20 18:20 | |

LABORATORY CONTROL SAMPLE: 3102403

| 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 | 2.5 | 98 | 90-110 | |
| Sulfate | mg/L | 50 | 47.4 | 95 | 90-110 | |

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3102404 3102405

| Parameter | Units | 92511446001 Result | MS Spike Conc. | MSD Spike Conc. | MS Result | MSD Result | MS % Rec | MSD % Rec | % Rec Limits | RPD | Max RPD | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Chloride | mg/L | 5.9 | 50 | 50 | 60.1 | 59.7 | 109 | 108 | 90-110 | 1 | 10 | |
| Fluoride | mg/L | ND | 2.5 | 2.5 | 2.7 | 2.7 | 105 | 104 | 90-110 | 1 | 10 | |
| Sulfate | mg/L | 2.2 | 50 | 50 | 54.0 | 53.7 | 104 | 103 | 90-110 | 1 | 10 | |

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3102406 3102407

| Parameter | Units | 92511524002 Result | MS Spike Conc. | MSD Spike Conc. | MS Result | MSD Result | MS % Rec | MSD % Rec | % Rec Limits | RPD | Max RPD | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Chloride | mg/L | 73.9 | 50 | 50 | 108 | 109 | 68 | 69 | 90-110 | 1 | 10 | M1 |
| Fluoride | mg/L | 0.41 | 2.5 | 2.5 | 2.9 | 2.9 | 99 | 99 | 90-110 | 0 | 10 | |
| Sulfate | mg/L | 89.4 | 50 | 50 | 121 | 122 | 63 | 65 | 90-110 | 1 | 10 | M1 |

**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.**

# QUALIFIERS

Project: PLANT MCDONOUGH AP-1
Pace Project No.: 92510827

## 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.

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

## QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: PLANT MCDONOUGH AP-1
Pace Project No.: 92510827

| Lab ID | Sample ID | QC Batch Method | QC Batch | Analytical Method | Analytical Batch |
|---|---|---|---|---|---|
| **92510827001** | **B-105D** | | | | |
| **92510827001** | **B-105D** | EPA 3010A | 587757 | EPA 6010D | 587879 |
| **92510827001** | **B-105D** | EPA 3005A | 587466 | EPA 6020B | 587562 |
| **92510827001** | **B-105D** | EPA 7470A | 586401 | EPA 7470A | 586700 |
| **92510827001** | **B-105D** | SM 2450C-2011 | 585931 | | |
| **92510827001** | **B-105D** | EPA 300.0 Rev 2.1 1993 | 586999 | | |

| Pace Analytical | Document Name: Sample Condition Upon Receipt(SCUR) | Document Revised: October 28, 2020 Page 1 of 2 |
|---|---|---|
| | Document No.: F-CAR-CS-033-Rev.07 | Issuing Authority: Pace Carolinas Quality Office |

**Laboratory receiving samples:**
Asheville ☐ Eden ☐ Greenwood ☐ Huntersville ☐ Raleigh ☐ Mechanicsville ☐ Atlanta ☒ Kernersville ☐

**Sample Condition Upon Receipt**

**Client Name:** Georgia power - coal

**Project #:**

**WO#: 92510827**

92510827

**Courier:** ☐ Commercial ☐ Fed Ex ☐ UPS ☐ USPS ☒ Client ☐ Pace ☐ Other:____

**Custody Seal Present?** ☐ Yes ☒ No **Seals Intact?** ☐ Yes ☐ No

**Date/Initials Person Examining Contents:** MT 12/10/20

**Packing Material:** ☐ Bubble Wrap ☐ Bubble Bags ☐ None ☒ Other

**Biological Tissue Frozen?** ☐ Yes ☒ No ☐ N/A

**Thermometer:** ☐ IR Gun ID: 233

**Type of Ice:** ☒ Wet ☐ Blue ☐ None

**Cooler Temp:** 2.3 **Correction Factor: Add/Subtract (°C)** ±0.4

Temp should be above freezing to 6°C
☐ Samples out of temp criteria. Samples on ice, cooling process has begun

**Cooler Temp Corrected (°C):** 2.7

**USDA Regulated Soil** ( ☐ N/A, water sample)

Did samples originate in a quarantine zone within the United States: CA, NY, or SC (check maps)? ☐ Yes ☒ No

Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? ☐ Yes ☒ No

| | | | | Comments/Discrepancy: |
|---|---|---|---|---|
| Chain of Custody Present? | ☒ Yes | ☐ No | ☐ N/A | 1. |
| Samples Arrived within Hold Time? | ☒ Yes | ☐ No | ☐ N/A | 2. |
| Short Hold Time Analysis (<72 hr.)? | ☐ Yes | ☒ No | ☐ N/A | 3. |
| Rush Turn Around Time Requested? | ☒ Yes | ☐ No | ☐ N/A | 4. Standard |
| Sufficient Volume? | ☒ Yes | ☐ No | ☐ N/A | 5. |
| Correct Containers Used? | ☒ Yes | ☐ No | ☐ N/A | 6. |
| -Pace Containers Used? | ☒ Yes | ☐ No | ☐ N/A | |
| Containers Intact? | ☒ Yes | ☐ No | ☐ N/A | 7. |
| Dissolved analysis: Samples Field Filtered? | ☐ Yes | ☒ No | ☐ N/A | 8. |
| Sample Labels Match COC? | ☒ Yes | ☐ No | ☐ N/A | 9. |
| -Includes Date/Time/ID/Analysis Matrix: WT | | | | |
| Headspace in VOA Vials (>5-6mm)? | ☐ Yes | ☐ No | ☒ N/A | 10. |
| Trip Blank Present? | ☐ Yes | ☐ No | ☒ N/A | 11. |
| Trip Blank Custody Seals Present? | ☐ Yes | ☐ No | ☒ N/A | |

**COMMENTS/SAMPLE DISCREPANCY**

**Field Data Required?** ☐ Yes ☐ No

Lot ID of split containers:

**CLIENT NOTIFICATION/RESOLUTION**

Person contacted: ____________ Date/Time: ____________

**Project Manager SCURF Review:** ____________ **Date:** ____________

**Project Manager SRF Review:** ____________ **Date:** ____________

***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 bottles**

Project # **WO#: 92510827**

PM: KLH1 Due Date: 12/24/20

CLIENT: GA-GA Power

| 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) | 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) | DG9U-40 mL Amber Unpreserved vials (N/A) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | 1 | 1 | | | 1 | | | | | | | | | | | | | | | | | | 2 | | | | |
| 2 | | 1 | 1 | | | 1 | | | | | | | | | | | | | | | | | | 2 | | | | |
| 3 | | 1 | 1 | | | 1 | | | | | | | | | | | | | | | | | | 2 | | | | |
| 4 | | 1 | 1 | | | 1 | | | | | | | | | | | | | | | | | | 4 | | | | |
| 5 | | 1 | 1 | | | 1 | | | | | | | | | | | | | | | | | | 2 | | | | |
| 6 | | 1 | | | | 1 | | | | | | | | | | | | | | | | | | 2 | | | | |
| 7 | | 1 | 1 | | | 1 | | | | | | | | | | | | | | | | | | 2 | | | | |
| 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 Office (i.e. Out of hold, incorrect preservative, out of temp, incorrect containers.

Pace Analytical

# 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 - Coal Combustion Residuals |
| Address | 2480 Maner Road, Atlanta, GA 30339 |
| Email | jabraham@southernco.com |
| Phone | (404) 506-7239 |
| Fax | |
| Requested Due Date | Standard |

**Section B — Required Project Information:**

| | |
|---|---|
| Report To | Joju Abraham |
| Copy To | Golder |
| Purchase Order # | |
| Project Name | Plant McDonough AP-1 |
| Project # | 166849818 |

**Section C — Invoice Information:**

| | |
|---|---|
| Attention | scsinvoices@southernco.com |
| Company Name | |
| Address | |
| Pace Quote | |
| Pace Project Manager | Kevin Herring |
| Pace Profile # | |

| Regulatory Agency | |
|---|---|
| State / Location | GA |

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

Requested Analysis Filtered (Y/N)

| ITEM # | SAMPLE ID | MATRIX CODE | SAMPLE TYPE (G=GRAB C=COMP) | DATE | TIME | SAMPLE TEMP AT COLLECTION | # OF CONTAINERS | Unpreserved - Ice | H2SO4 | HNO3 | HCl | NaOH + Zn Acetate | Na2S2O3 | Methanol | Other | Analyses Test Y/N | *Metals App III and App IV Total (N) | Cl, F, SO4 (N) | Radium 226/228 (N) | TDS (N) | Residual Chlorine (Y/N) | 92510827 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | B-105D | WT | G | 12/9/2020 | 1530 | | 5 | 2 | | 3 | | | | | | | X | X | X | X | | pH 6.48 |
| 2 | | | | | | | | | | | | | | | | | | | | | | |
| 3 | | | | | | | | | | | | | | | | | | | | | | |
| 4 | | | | | | | | | | | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | | | | | | | | | | |
| 13 | | | | | | | | | | | | | | | | | | | | | | |
| 14 | | | | | | | | | | | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | | | | | | | | | | |

| ADDITIONAL COMMENTS | RELINQUISHED BY / AFFILIATION | DATE | TIME | ACCEPTED BY / AFFILIATION | DATE | TIME | SAMPLE CONDITIONS | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| *App III / IV Metals = As, Sb, B, Ba, Be, Ca, Cd, Cr, Co, Pb, Li, Hg, Mo, Se, Tl | Yong Cheng Soo | 12/10/20 | 905 | ML / Pace | 12/10/20 | 0905 | 2.3 | Y | N | Y |

SAMPLER NAME AND SIGNATURE

PRINT NAME: Yong Cheng Soo

SIGNATURE: [signature] DATE Signed: 12/10/2020

TEMP in C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

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

December 28, 2020

Joju Abraham
Georgia Power-CCR
2480 Maner Road
Atlanta, GA 30339

RE: Project: PLANT MCDONOUGH AP-234
Pace Project No.: 92510829

Dear Joju Abraham:

Enclosed are the analytical results for sample(s) received by the laboratory on December 10, 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: Stephen Benda
Daniela Herrera, Golder
Ben Hodges, Georgia Power
Jimmy Jones, Golder Associates Inc.
Kristen Jurinko
Julie Lehrman, Golder Associates Inc.
Ms. Lauren Petty, Southern Co. Services
Dawn Prell, Golder Associates Inc.
Tim Richards, Golder Associates - Atlanta

# CERTIFICATIONS

| | |
|---|---|
| Project: | PLANT MCDONOUGH AP-234 |
| Pace Project No.: | 92510829 |

**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
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
North Carolina Certification #: 381
South Carolina Certification #: 98011001

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

# SAMPLE SUMMARY

Project: PLANT MCDONOUGH AP-234
Pace Project No.: 92510829

| Lab ID | Sample ID | Matrix | Date Collected | Date Received |
|---|---|---|---|---|
| **92510829001** | **B-104D** | Water | 12/09/20 11:45 | 12/10/20 09:05 |
| **92510829002** | **B-107D** | Water | 12/09/20 11:35 | 12/10/20 09:05 |
| **92510829003** | **B-108D** | Water | 12/09/20 09:50 | 12/10/20 09:05 |
| **92510829004** | **B-111D** | Water | 12/09/20 14:45 | 12/10/20 09:05 |
| **92510829005** | **FD** | Water | 12/09/20 00:00 | 12/10/20 09:05 |
| **92510829006** | **FB** | Water | 12/09/20 11:18 | 12/10/20 09:05 |

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

## SAMPLE ANALYTE COUNT

Project: PLANT MCDONOUGH AP-234
Pace Project No.: 92510829

| Lab ID | Sample ID | Method | Analysts | Analytes Reported |
|---|---|---|---|---|
| **92510829001** | **B-104D** | EPA 6010D | KH | 1 |
| | | EPA 6020B | CW1 | 13 |
| | | EPA 7470A | VB | 1 |
| | | SM 2450C-2011 | AW1 | 1 |
| | | EPA 300.0 Rev 2.1 1993 | CDC | 3 |
| **92510829002** | **B-107D** | EPA 6010D | KH | 1 |
| | | EPA 6020B | CW1 | 13 |
| | | EPA 7470A | VB | 1 |
| | | SM 2450C-2011 | AW1 | 1 |
| | | EPA 300.0 Rev 2.1 1993 | CDC | 3 |
| **92510829003** | **B-108D** | EPA 6010D | KH | 1 |
| | | EPA 6020B | CW1 | 13 |
| | | EPA 7470A | VB | 1 |
| | | SM 2450C-2011 | AW1 | 1 |
| | | EPA 300.0 Rev 2.1 1993 | CDC | 3 |
| **92510829004** | **B-111D** | EPA 6010D | KH | 1 |
| | | EPA 6020B | CW1 | 13 |
| | | EPA 7470A | VB | 1 |
| | | SM 2450C-2011 | AW1 | 1 |
| | | EPA 300.0 Rev 2.1 1993 | CDC | 3 |
| **92510829005** | **FD** | EPA 6010D | KH | 1 |
| | | EPA 6020B | CW1 | 13 |
| | | EPA 7470A | VB | 1 |
| | | SM 2450C-2011 | AW1 | 1 |
| | | EPA 300.0 Rev 2.1 1993 | CDC | 3 |
| **92510829006** | **FB** | EPA 6010D | KH | 1 |
| | | EPA 6020B | CW1 | 13 |
| | | EPA 7470A | VB | 1 |
| | | SM 2450C-2011 | AW1 | 1 |
| | | EPA 300.0 Rev 2.1 1993 | CDC | 3 |

PASI-A = Pace Analytical Services - Asheville
PASI-C = Pace Analytical Services - Charlotte
PASI-GA = Pace Analytical Services - Peachtree Corners, GA

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

# ANALYTICAL RESULTS

Project: PLANT MCDONOUGH AP-234
Pace Project No.: 92510829

**Sample: B-104D** **Lab ID: 92510829001** Collected: 12/09/20 11:45 Received: 12/10/20 09:05 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 | | 12/28/20 12:34 | | |
| pH | **6.44** | Std. Units | | | 1 | | 12/28/20 12:34 | | |
| **6010D ATL ICP** | Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Peachtree Corners, GA | | | | | | | | |
| Calcium | **154** | mg/L | 1.0 | 0.070 | 1 | 12/17/20 10:10 | 12/17/20 22:43 | 7440-70-2 | |
| **6020 MET ICPMS** | Analytical Method: EPA 6020B Preparation Method: EPA 3005A Pace Analytical Services - Peachtree Corners, GA | | | | | | | | |
| Antimony | **0.00079J** | mg/L | 0.0030 | 0.00028 | 1 | 12/16/20 13:14 | 12/18/20 19:54 | 7440-36-0 | |
| Arsenic | ND | mg/L | 0.0050 | 0.00078 | 1 | 12/16/20 13:14 | 12/18/20 19:54 | 7440-38-2 | |
| Barium | **0.026** | mg/L | 0.010 | 0.00071 | 1 | 12/16/20 13:14 | 12/18/20 19:54 | 7440-39-3 | |
| Beryllium | **0.0013J** | mg/L | 0.015 | 0.00023 | 5 | 12/16/20 13:14 | 12/22/20 13:23 | 7440-41-7 | D3 |
| Boron | **0.26J** | mg/L | 0.50 | 0.026 | 5 | 12/16/20 13:14 | 12/22/20 13:23 | 7440-42-8 | |
| Cadmium | ND | mg/L | 0.0025 | 0.00012 | 1 | 12/16/20 13:14 | 12/18/20 19:54 | 7440-43-9 | |
| Chromium | **0.0011J** | mg/L | 0.010 | 0.00055 | 1 | 12/16/20 13:14 | 12/18/20 19:54 | 7440-47-3 | |
| Cobalt | **0.17** | mg/L | 0.0050 | 0.00038 | 1 | 12/16/20 13:14 | 12/18/20 19:54 | 7440-48-4 | |
| Lead | **0.000051J** | mg/L | 0.0050 | 0.000036 | 1 | 12/16/20 13:14 | 12/18/20 19:54 | 7439-92-1 | |
| Lithium | **0.039J** | mg/L | 0.15 | 0.0040 | 5 | 12/16/20 13:14 | 12/22/20 13:23 | 7439-93-2 | D3 |
| Molybdenum | **0.0012J** | mg/L | 0.010 | 0.00069 | 1 | 12/16/20 13:14 | 12/18/20 19:54 | 7439-98-7 | |
| Selenium | ND | mg/L | 0.010 | 0.0016 | 1 | 12/16/20 13:14 | 12/18/20 19:54 | 7782-49-2 | |
| Thallium | ND | mg/L | 0.0010 | 0.00014 | 1 | 12/16/20 13:14 | 12/18/20 19:54 | 7440-28-0 | |
| **7470 Mercury** | Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Peachtree Corners, GA | | | | | | | | |
| Mercury | **0.000079J** | mg/L | 0.00050 | 0.000078 | 1 | 12/14/20 08:30 | 12/14/20 13:44 | 7439-97-6 | |
| **2540C Total Dissolved Solids** | Analytical Method: SM 2450C-2011 Pace Analytical Services - Peachtree Corners, GA | | | | | | | | |
| Total Dissolved Solids | **862** | mg/L | 20.0 | 20.0 | 1 | | 12/10/20 11:54 | | |
| **300.0 IC Anions 28 Days** | Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville | | | | | | | | |
| Chloride | **7.7** | mg/L | 1.0 | 0.60 | 1 | | 12/16/20 01:05 | 16887-00-6 | |
| Fluoride | **0.33** | mg/L | 0.10 | 0.050 | 1 | | 12/16/20 01:05 | 16984-48-8 | |
| Sulfate | **415** | mg/L | 10.0 | 5.0 | 10 | | 12/16/20 10:45 | 14808-79-8 | |

## REPORT OF LABORATORY ANALYSIS

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

# ANALYTICAL RESULTS

Project: PLANT MCDONOUGH AP-234
Pace Project No.: 92510829

**Sample: B-107D** **Lab ID: 92510829002** Collected: 12/09/20 11:35 Received: 12/10/20 09:05 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 | | 12/28/20 12:34 | | |
| pH | **5.91** | Std. Units | | | 1 | | 12/28/20 12:34 | | |
| **6010D ATL ICP** | Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Peachtree Corners, GA | | | | | | | | |
| Calcium | **85.4** | mg/L | 1.0 | 0.070 | 1 | 12/17/20 10:10 | 12/17/20 22:49 | 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 | 12/16/20 13:14 | 12/18/20 20:00 | 7440-36-0 | |
| Arsenic | ND | mg/L | 0.0050 | 0.00078 | 1 | 12/16/20 13:14 | 12/18/20 20:00 | 7440-38-2 | |
| Barium | **0.13** | mg/L | 0.010 | 0.00071 | 1 | 12/16/20 13:14 | 12/18/20 20:00 | 7440-39-3 | |
| Beryllium | ND | mg/L | 0.015 | 0.00023 | 5 | 12/16/20 13:14 | 12/22/20 13:28 | 7440-41-7 | D3 |
| Boron | **11.7** | mg/L | 0.50 | 0.026 | 5 | 12/16/20 13:14 | 12/22/20 13:28 | 7440-42-8 | |
| Cadmium | ND | mg/L | 0.0025 | 0.00012 | 1 | 12/16/20 13:14 | 12/18/20 20:00 | 7440-43-9 | |
| Chromium | ND | mg/L | 0.010 | 0.00055 | 1 | 12/16/20 13:14 | 12/18/20 20:00 | 7440-47-3 | |
| Cobalt | **0.0017J** | mg/L | 0.0050 | 0.00038 | 1 | 12/16/20 13:14 | 12/18/20 20:00 | 7440-48-4 | |
| Lead | **0.000044J** | mg/L | 0.0050 | 0.000036 | 1 | 12/16/20 13:14 | 12/18/20 20:00 | 7439-92-1 | |
| Lithium | **0.017J** | mg/L | 0.15 | 0.0040 | 5 | 12/16/20 13:14 | 12/22/20 13:28 | 7439-93-2 | D3 |
| Molybdenum | ND | mg/L | 0.010 | 0.00069 | 1 | 12/16/20 13:14 | 12/18/20 20:00 | 7439-98-7 | |
| Selenium | ND | mg/L | 0.010 | 0.0016 | 1 | 12/16/20 13:14 | 12/18/20 20:00 | 7782-49-2 | |
| Thallium | ND | mg/L | 0.0010 | 0.00014 | 1 | 12/16/20 13:14 | 12/18/20 20:00 | 7440-28-0 | |
| **7470 Mercury** | Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Peachtree Corners, GA | | | | | | | | |
| Mercury | **0.00016J** | mg/L | 0.00050 | 0.000078 | 1 | 12/14/20 08:30 | 12/14/20 13:53 | 7439-97-6 | |
| **2540C Total Dissolved Solids** | Analytical Method: SM 2450C-2011 Pace Analytical Services - Peachtree Corners, GA | | | | | | | | |
| Total Dissolved Solids | **564** | mg/L | 10.0 | 10.0 | 1 | | 12/10/20 11:54 | | |
| **300.0 IC Anions 28 Days** | Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville | | | | | | | | |
| Chloride | **12.5** | mg/L | 1.0 | 0.60 | 1 | | 12/19/20 01:17 | 16887-00-6 | |
| Fluoride | ND | mg/L | 0.10 | 0.050 | 1 | | 12/19/20 01:17 | 16984-48-8 | |
| Sulfate | **273** | mg/L | 6.0 | 3.0 | 6 | | 12/19/20 12:19 | 14808-79-8 | M6 |

Pace Analytical
www.pacelabs.com

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

## ANALYTICAL RESULTS

Project: PLANT MCDONOUGH AP-234
Pace Project No.: 92510829

**Sample: B-108D** **Lab ID: 92510829003** Collected: 12/09/20 09:50 Received: 12/10/20 09:05 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 | | 12/28/20 12:34 | | |
| pH | **5.94** | Std. Units | | | 1 | | 12/28/20 12:34 | | |
| **6010D ATL ICP** | Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Peachtree Corners, GA | | | | | | | | |
| Calcium | **90.5** | mg/L | 1.0 | 0.070 | 1 | 12/17/20 10:10 | 12/17/20 22:55 | 7440-70-2 | M1 |
| **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 | 12/16/20 13:14 | 12/18/20 20:06 | 7440-36-0 | |
| Arsenic | ND | mg/L | 0.0050 | 0.00078 | 1 | 12/16/20 13:14 | 12/18/20 20:06 | 7440-38-2 | |
| Barium | **0.066** | mg/L | 0.010 | 0.00071 | 1 | 12/16/20 13:14 | 12/18/20 20:06 | 7440-39-3 | |
| Beryllium | ND | mg/L | 0.015 | 0.00023 | 5 | 12/16/20 13:14 | 12/22/20 13:34 | 7440-41-7 | D3 |
| Boron | **6.7** | mg/L | 0.50 | 0.026 | 5 | 12/16/20 13:14 | 12/22/20 13:34 | 7440-42-8 | |
| Cadmium | ND | mg/L | 0.0025 | 0.00012 | 1 | 12/16/20 13:14 | 12/18/20 20:06 | 7440-43-9 | |
| Chromium | ND | mg/L | 0.010 | 0.00055 | 1 | 12/16/20 13:14 | 12/18/20 20:06 | 7440-47-3 | |
| Cobalt | **0.0048J** | mg/L | 0.0050 | 0.00038 | 1 | 12/16/20 13:14 | 12/18/20 20:06 | 7440-48-4 | |
| Lead | ND | mg/L | 0.0050 | 0.000036 | 1 | 12/16/20 13:14 | 12/18/20 20:06 | 7439-92-1 | |
| Lithium | **0.016J** | mg/L | 0.15 | 0.0040 | 5 | 12/16/20 13:14 | 12/22/20 13:34 | 7439-93-2 | D3 |
| Molybdenum | ND | mg/L | 0.010 | 0.00069 | 1 | 12/16/20 13:14 | 12/18/20 20:06 | 7439-98-7 | |
| Selenium | ND | mg/L | 0.010 | 0.0016 | 1 | 12/16/20 13:14 | 12/18/20 20:06 | 7782-49-2 | |
| Thallium | ND | mg/L | 0.0010 | 0.00014 | 1 | 12/16/20 13:14 | 12/18/20 20:06 | 7440-28-0 | |
| **7470 Mercury** | Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Peachtree Corners, GA | | | | | | | | |
| Mercury | **0.00014J** | mg/L | 0.00050 | 0.000078 | 1 | 12/14/20 08:30 | 12/14/20 13:55 | 7439-97-6 | |
| **2540C Total Dissolved Solids** | Analytical Method: SM 2450C-2011 Pace Analytical Services - Peachtree Corners, GA | | | | | | | | |
| Total Dissolved Solids | **573** | mg/L | 10.0 | 10.0 | 1 | | 12/10/20 11:54 | | |
| **300.0 IC Anions 28 Days** | Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville | | | | | | | | |
| Chloride | **29.1** | mg/L | 1.0 | 0.60 | 1 | | 12/19/20 02:41 | 16887-00-6 | |
| Fluoride | ND | mg/L | 0.10 | 0.050 | 1 | | 12/19/20 02:41 | 16984-48-8 | |
| Sulfate | **277** | mg/L | 6.0 | 3.0 | 6 | | 12/19/20 13:03 | 14808-79-8 | |

Pace Analytical®
www.pacelabs.com

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

## ANALYTICAL RESULTS

Project: PLANT MCDONOUGH AP-234
Pace Project No.: 92510829

**Sample: B-111D** **Lab ID: 92510829004** Collected: 12/09/20 14:45 Received: 12/10/20 09:05 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 | | 12/28/20 12:34 | | |
| pH | **6.64** | Std. Units | | | 1 | | 12/28/20 12:34 | | |
| **6010D ATL ICP** | Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Peachtree Corners, GA | | | | | | | | |
| Calcium | **105** | mg/L | 1.0 | 0.070 | 1 | 12/17/20 10:10 | 12/17/20 23:31 | 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 | 12/16/20 13:14 | 12/18/20 20:12 | 7440-36-0 | |
| Arsenic | ND | mg/L | 0.0050 | 0.00078 | 1 | 12/16/20 13:14 | 12/18/20 20:12 | 7440-38-2 | |
| Barium | **0.027** | mg/L | 0.010 | 0.00071 | 1 | 12/16/20 13:14 | 12/18/20 20:12 | 7440-39-3 | |
| Beryllium | ND | mg/L | 0.015 | 0.00023 | 5 | 12/16/20 13:14 | 12/22/20 13:40 | 7440-41-7 | D3 |
| Boron | **0.34J** | mg/L | 0.50 | 0.026 | 5 | 12/16/20 13:14 | 12/22/20 13:40 | 7440-42-8 | D3 |
| Cadmium | ND | mg/L | 0.0025 | 0.00012 | 1 | 12/16/20 13:14 | 12/18/20 20:12 | 7440-43-9 | |
| Chromium | ND | mg/L | 0.010 | 0.00055 | 1 | 12/16/20 13:14 | 12/18/20 20:12 | 7440-47-3 | |
| Cobalt | **0.00076J** | mg/L | 0.0050 | 0.00038 | 1 | 12/16/20 13:14 | 12/18/20 20:12 | 7440-48-4 | |
| Lead | **0.000058J** | mg/L | 0.0050 | 0.000036 | 1 | 12/16/20 13:14 | 12/18/20 20:12 | 7439-92-1 | |
| Lithium | **0.021J** | mg/L | 0.15 | 0.0040 | 5 | 12/16/20 13:14 | 12/22/20 13:40 | 7439-93-2 | D3 |
| Molybdenum | **0.0055J** | mg/L | 0.010 | 0.00069 | 1 | 12/16/20 13:14 | 12/18/20 20:12 | 7439-98-7 | |
| Selenium | ND | mg/L | 0.010 | 0.0016 | 1 | 12/16/20 13:14 | 12/18/20 20:12 | 7782-49-2 | |
| Thallium | ND | mg/L | 0.0010 | 0.00014 | 1 | 12/16/20 13:14 | 12/18/20 20:12 | 7440-28-0 | |
| **7470 Mercury** | Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Peachtree Corners, GA | | | | | | | | |
| Mercury | **0.000094J** | mg/L | 0.00050 | 0.000078 | 1 | 12/14/20 08:30 | 12/14/20 13:58 | 7439-97-6 | |
| **2540C Total Dissolved Solids** | Analytical Method: SM 2450C-2011 Pace Analytical Services - Peachtree Corners, GA | | | | | | | | |
| Total Dissolved Solids | **490** | mg/L | 10.0 | 10.0 | 1 | | 12/10/20 11:54 | | |
| **300.0 IC Anions 28 Days** | Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville | | | | | | | | |
| Chloride | **12.8** | mg/L | 1.0 | 0.60 | 1 | | 12/19/20 02:55 | 16887-00-6 | |
| Fluoride | **0.33** | mg/L | 0.10 | 0.050 | 1 | | 12/19/20 02:55 | 16984-48-8 | |
| Sulfate | **197** | mg/L | 5.0 | 2.5 | 5 | | 12/19/20 13:18 | 14808-79-8 | |

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

# ANALYTICAL RESULTS

Project: PLANT MCDONOUGH AP-234
Pace Project No.: 92510829

**Sample: FD** **Lab ID: 92510829005** Collected: 12/09/20 00:00 Received: 12/10/20 09:05 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<br>Pace Analytical Services - Peachtree Corners, GA | | | | | | | | |
| Calcium | **89.7** | mg/L | 1.0 | 0.070 | 1 | 12/17/20 10:10 | 12/17/20 23:37 | 7440-70-2 | |
| **6020 MET ICPMS** | Analytical Method: EPA 6020B Preparation Method: EPA 3005A<br>Pace Analytical Services - Peachtree Corners, GA | | | | | | | | |
| Antimony | ND | mg/L | 0.0030 | 0.00028 | 1 | 12/16/20 13:14 | 12/18/20 20:34 | 7440-36-0 | |
| Arsenic | ND | mg/L | 0.0050 | 0.00078 | 1 | 12/16/20 13:14 | 12/18/20 20:34 | 7440-38-2 | |
| Barium | **0.061** | mg/L | 0.010 | 0.00071 | 1 | 12/16/20 13:14 | 12/18/20 20:34 | 7440-39-3 | |
| Beryllium | ND | mg/L | 0.015 | 0.00023 | 5 | 12/16/20 13:14 | 12/22/20 13:45 | 7440-41-7 | D3 |
| Boron | **6.4** | mg/L | 0.50 | 0.026 | 5 | 12/16/20 13:14 | 12/22/20 13:45 | 7440-42-8 | |
| Cadmium | ND | mg/L | 0.0025 | 0.00012 | 1 | 12/16/20 13:14 | 12/18/20 20:34 | 7440-43-9 | |
| Chromium | ND | mg/L | 0.010 | 0.00055 | 1 | 12/16/20 13:14 | 12/18/20 20:34 | 7440-47-3 | |
| Cobalt | **0.0044J** | mg/L | 0.0050 | 0.00038 | 1 | 12/16/20 13:14 | 12/18/20 20:34 | 7440-48-4 | |
| Lead | ND | mg/L | 0.0050 | 0.000036 | 1 | 12/16/20 13:14 | 12/18/20 20:34 | 7439-92-1 | |
| Lithium | **0.015J** | mg/L | 0.15 | 0.0040 | 5 | 12/16/20 13:14 | 12/22/20 13:45 | 7439-93-2 | D3 |
| Molybdenum | ND | mg/L | 0.010 | 0.00069 | 1 | 12/16/20 13:14 | 12/18/20 20:34 | 7439-98-7 | |
| Selenium | ND | mg/L | 0.010 | 0.0016 | 1 | 12/16/20 13:14 | 12/18/20 20:34 | 7782-49-2 | |
| Thallium | ND | mg/L | 0.0010 | 0.00014 | 1 | 12/16/20 13:14 | 12/18/20 20:34 | 7440-28-0 | |
| **7470 Mercury** | Analytical Method: EPA 7470A Preparation Method: EPA 7470A<br>Pace Analytical Services - Peachtree Corners, GA | | | | | | | | |
| Mercury | **0.000097J** | mg/L | 0.00050 | 0.000078 | 1 | 12/14/20 08:30 | 12/14/20 14:00 | 7439-97-6 | |
| **2540C Total Dissolved Solids** | Analytical Method: SM 2450C-2011<br>Pace Analytical Services - Peachtree Corners, GA | | | | | | | | |
| Total Dissolved Solids | **569** | mg/L | 10.0 | 10.0 | 1 | | 12/10/20 12:04 | | |
| **300.0 IC Anions 28 Days** | Analytical Method: EPA 300.0 Rev 2.1 1993<br>Pace Analytical Services - Asheville | | | | | | | | |
| Chloride | **29.0** | mg/L | 1.0 | 0.60 | 1 | | 12/19/20 03:09 | 16887-00-6 | |
| Fluoride | ND | mg/L | 0.10 | 0.050 | 1 | | 12/19/20 03:09 | 16984-48-8 | |
| Sulfate | **276** | mg/L | 6.0 | 3.0 | 6 | | 12/19/20 13:33 | 14808-79-8 | |

## REPORT OF LABORATORY ANALYSIS

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

## ANALYTICAL RESULTS

Project: PLANT MCDONOUGH AP-234
Pace Project No.: 92510829

**Sample: FB** **Lab ID: 92510829006** Collected: 12/09/20 11:18 Received: 12/10/20 09:05 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<br>Pace Analytical Services - Peachtree Corners, GA | | | | | | | | |
| Calcium | ND | mg/L | 1.0 | 0.070 | 1 | 12/17/20 10:10 | 12/17/20 23:43 | 7440-70-2 | |
| **6020 MET ICPMS** | Analytical Method: EPA 6020B Preparation Method: EPA 3005A<br>Pace Analytical Services - Peachtree Corners, GA | | | | | | | | |
| Antimony | ND | mg/L | 0.0030 | 0.00028 | 1 | 12/16/20 13:14 | 12/18/20 20:40 | 7440-36-0 | |
| Arsenic | ND | mg/L | 0.0050 | 0.00078 | 1 | 12/16/20 13:14 | 12/18/20 20:40 | 7440-38-2 | |
| Barium | ND | mg/L | 0.010 | 0.00071 | 1 | 12/16/20 13:14 | 12/18/20 20:40 | 7440-39-3 | |
| Beryllium | ND | mg/L | 0.0030 | 0.000046 | 1 | 12/16/20 13:14 | 12/18/20 20:40 | 7440-41-7 | |
| Boron | **0.044J** | mg/L | 0.10 | 0.0052 | 1 | 12/16/20 13:14 | 12/18/20 20:40 | 7440-42-8 | |
| Cadmium | ND | mg/L | 0.0025 | 0.00012 | 1 | 12/16/20 13:14 | 12/18/20 20:40 | 7440-43-9 | |
| Chromium | ND | mg/L | 0.010 | 0.00055 | 1 | 12/16/20 13:14 | 12/18/20 20:40 | 7440-47-3 | |
| Cobalt | ND | mg/L | 0.0050 | 0.00038 | 1 | 12/16/20 13:14 | 12/18/20 20:40 | 7440-48-4 | |
| Lead | **0.000048J** | mg/L | 0.0050 | 0.000036 | 1 | 12/16/20 13:14 | 12/18/20 20:40 | 7439-92-1 | |
| Lithium | ND | mg/L | 0.030 | 0.00081 | 1 | 12/16/20 13:14 | 12/18/20 20:40 | 7439-93-2 | |
| Molybdenum | ND | mg/L | 0.010 | 0.00069 | 1 | 12/16/20 13:14 | 12/18/20 20:40 | 7439-98-7 | |
| Selenium | ND | mg/L | 0.010 | 0.0016 | 1 | 12/16/20 13:14 | 12/18/20 20:40 | 7782-49-2 | |
| Thallium | ND | mg/L | 0.0010 | 0.00014 | 1 | 12/16/20 13:14 | 12/18/20 20:40 | 7440-28-0 | |
| **7470 Mercury** | Analytical Method: EPA 7470A Preparation Method: EPA 7470A<br>Pace Analytical Services - Peachtree Corners, GA | | | | | | | | |
| Mercury | **0.000087J** | mg/L | 0.00050 | 0.000078 | 1 | 12/14/20 08:30 | 12/14/20 14:03 | 7439-97-6 | |
| **2540C Total Dissolved Solids** | Analytical Method: SM 2450C-2011<br>Pace Analytical Services - Peachtree Corners, GA | | | | | | | | |
| Total Dissolved Solids | ND | mg/L | 10.0 | 10.0 | 1 | | 12/10/20 12:04 | | |
| **300.0 IC Anions 28 Days** | Analytical Method: EPA 300.0 Rev 2.1 1993<br>Pace Analytical Services - Asheville | | | | | | | | |
| Chloride | ND | mg/L | 1.0 | 0.60 | 1 | | 12/19/20 03:23 | 16887-00-6 | |
| Fluoride | ND | mg/L | 0.10 | 0.050 | 1 | | 12/19/20 03:23 | 16984-48-8 | |
| Sulfate | ND | mg/L | 1.0 | 0.50 | 1 | | 12/19/20 03:23 | 14808-79-8 | |

**REPORT OF LABORATORY ANALYSIS**

Pace Analytical®
www.pacelabs.com

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

## QUALITY CONTROL DATA

Project: PLANT MCDONOUGH AP-234
Pace Project No.: 92510829

QC Batch: 587757
QC Batch Method: EPA 3010A
Analysis Method: EPA 6010D
Analysis Description: 6010D ATL
Laboratory: Pace Analytical Services - Peachtree Corners, GA
Associated Lab Samples: 92510829001, 92510829002, 92510829003, 92510829004, 92510829005, 92510829006

METHOD BLANK: 3106013 Matrix: Water
Associated Lab Samples: 92510829001, 92510829002, 92510829003, 92510829004, 92510829005, 92510829006

| Parameter | Units | Blank Result | Reporting Limit | MDL | Analyzed | Qualifiers |
|---|---|---|---|---|---|---|
| Calcium | mg/L | ND | 1.0 | 0.070 | 12/17/20 22:24 | |

LABORATORY CONTROL SAMPLE: 3106014

| Parameter | Units | Spike Conc. | LCS Result | LCS % Rec | % Rec Limits | Qualifiers |
|---|---|---|---|---|---|---|
| Calcium | mg/L | 1 | 1.1 | 108 | 80-120 | |

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3106015 3106016

| Parameter | Units | 92510829003 Result | MS Spike Conc. | MSD Spike Conc. | MS Result | MSD Result | MS % Rec | MSD % Rec | % Rec Limits | RPD | Max RPD | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Calcium | mg/L | 90.5 | 1 | 1 | 88.9 | 89.0 | -151 | -150 | 75-125 | 0 | 20 | M1 |

**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.**

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

# QUALITY CONTROL DATA

Project: PLANT MCDONOUGH AP-234
Pace Project No.: 92510829

QC Batch: 587466 | Analysis Method: EPA 6020B
QC Batch Method: EPA 3005A | Analysis Description: 6020 MET
Laboratory: Pace Analytical Services - Peachtree Corners, GA
Associated Lab Samples: 92510829001, 92510829002, 92510829003, 92510829004, 92510829005, 92510829006

METHOD BLANK: 3104613 Matrix: Water
Associated Lab Samples: 92510829001, 92510829002, 92510829003, 92510829004, 92510829005, 92510829006

| Parameter | Units | Blank Result | Reporting Limit | MDL | Analyzed | Qualifiers |
|---|---|---|---|---|---|---|
| Antimony | mg/L | ND | 0.0030 | 0.00028 | 12/18/20 19:20 | |
| Arsenic | mg/L | ND | 0.0050 | 0.00078 | 12/18/20 19:20 | |
| Barium | mg/L | ND | 0.010 | 0.00071 | 12/18/20 19:20 | |
| Beryllium | mg/L | ND | 0.0030 | 0.000046 | 12/18/20 19:20 | |
| Boron | mg/L | ND | 0.10 | 0.0052 | 12/18/20 19:20 | |
| Cadmium | mg/L | ND | 0.0025 | 0.00012 | 12/18/20 19:20 | |
| Chromium | mg/L | ND | 0.010 | 0.00055 | 12/18/20 19:20 | |
| Cobalt | mg/L | ND | 0.0050 | 0.00038 | 12/18/20 19:20 | |
| Lead | mg/L | ND | 0.0050 | 0.000036 | 12/18/20 19:20 | |
| Lithium | mg/L | ND | 0.030 | 0.00081 | 12/18/20 19:20 | |
| Molybdenum | mg/L | ND | 0.010 | 0.00069 | 12/18/20 19:20 | |
| Selenium | mg/L | ND | 0.010 | 0.0016 | 12/18/20 19:20 | |
| Thallium | mg/L | ND | 0.0010 | 0.00014 | 12/18/20 19:20 | |

LABORATORY CONTROL SAMPLE: 3104614

| 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 | 0.098 | 98 | 80-120 | |
| Beryllium | mg/L | 0.1 | 0.10 | 100 | 80-120 | |
| Boron | mg/L | 1 | 1.0 | 102 | 80-120 | |
| Cadmium | mg/L | 0.1 | 0.10 | 102 | 80-120 | |
| Chromium | mg/L | 0.1 | 0.10 | 105 | 80-120 | |
| Cobalt | mg/L | 0.1 | 0.10 | 100 | 80-120 | |
| Lead | mg/L | 0.1 | 0.10 | 100 | 80-120 | |
| Lithium | mg/L | 0.1 | 0.10 | 102 | 80-120 | |
| Molybdenum | mg/L | 0.1 | 0.10 | 103 | 80-120 | |
| Selenium | mg/L | 0.1 | 0.096 | 96 | 80-120 | |
| Thallium | mg/L | 0.1 | 0.098 | 98 | 80-120 | |

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3104615 3104616

| Parameter | Units | 92510827001 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 | 0.11 | 0.10 | 110 | 104 | 75-125 | 6 | 20 | |
| Arsenic | mg/L | ND | 0.1 | 0.1 | 0.10 | 0.097 | 102 | 97 | 75-125 | 5 | 20 | |

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

## REPORT OF LABORATORY ANALYSIS

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

# QUALITY CONTROL DATA

Project: PLANT MCDONOUGH AP-234
Pace Project No.: 92510829

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3104615 3104616

| Parameter | Units | 92510827001 Result | MS Spike Conc. | MSD Spike Conc. | MS Result | MSD Result | MS % Rec | MSD % Rec | % Rec Limits | RPD | Max RPD | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Barium | mg/L | 0.030 | 0.1 | 0.1 | 0.13 | 0.12 | 99 | 94 | 75-125 | 4 | 20 | |
| Beryllium | mg/L | ND | 0.1 | 0.1 | 0.098 | 0.089 | 98 | 89 | 75-125 | 9 | 20 | |
| Boron | mg/L | 0.79 | 1 | 1 | 1.9 | 1.8 | 113 | 98 | 75-125 | 8 | 20 | |
| Cadmium | mg/L | ND | 0.1 | 0.1 | 0.10 | 0.10 | 104 | 100 | 75-125 | 4 | 20 | |
| Chromium | mg/L | ND | 0.1 | 0.1 | 0.10 | 0.10 | 105 | 101 | 75-125 | 3 | 20 | |
| Cobalt | mg/L | 0.012 | 0.1 | 0.1 | 0.11 | 0.11 | 101 | 97 | 75-125 | 3 | 20 | |
| Lead | mg/L | 0.000052J | 0.1 | 0.1 | 0.098 | 0.093 | 98 | 93 | 75-125 | 6 | 20 | |
| Lithium | mg/L | 0.014J | 0.1 | 0.1 | 0.11 | 0.10 | 95 | 89 | 75-125 | 5 | 20 | |
| Molybdenum | mg/L | ND | 0.1 | 0.1 | 0.11 | 0.10 | 107 | 103 | 75-125 | 3 | 20 | |
| Selenium | mg/L | ND | 0.1 | 0.1 | 0.097 | 0.092 | 97 | 92 | 75-125 | 5 | 20 | |
| Thallium | mg/L | ND | 0.1 | 0.1 | 0.097 | 0.091 | 97 | 91 | 75-125 | 6 | 20 | |

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

## REPORT OF LABORATORY ANALYSIS

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

# QUALITY CONTROL DATA

Project: PLANT MCDONOUGH AP-234
Pace Project No.: 92510829

QC Batch: 586401
QC Batch Method: EPA 7470A
Analysis Method: EPA 7470A
Analysis Description: 7470 Mercury
Laboratory: Pace Analytical Services - Peachtree Corners, GA
Associated Lab Samples: 92510829001, 92510829002, 92510829003, 92510829004, 92510829005, 92510829006

METHOD BLANK: 3099362 Matrix: Water
Associated Lab Samples: 92510829001, 92510829002, 92510829003, 92510829004, 92510829005, 92510829006

| Parameter | Units | Blank Result | Reporting Limit | MDL | Analyzed | Qualifiers |
|---|---|---|---|---|---|---|
| Mercury | mg/L | ND | 0.00050 | 0.000078 | 12/14/20 12:56 | |

LABORATORY CONTROL SAMPLE: 3099363

| Parameter | Units | Spike Conc. | LCS Result | LCS % Rec | % Rec Limits | Qualifiers |
|---|---|---|---|---|---|---|
| Mercury | mg/L | 0.0025 | 0.0021 | 84 | 80-120 | |

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3099364 3099365

| Parameter | Units | 92510829001 Result | MS Spike Conc. | MSD Spike Conc. | MS Result | MSD Result | MS % Rec | MSD % Rec | % Rec Limits | RPD | Max RPD | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mercury | mg/L | 0.000079J | 0.0025 | 0.0025 | 0.0020 | 0.0024 | 77 | 92 | 75-125 | 17 | 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.**

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

# QUALITY CONTROL DATA

Project: PLANT MCDONOUGH AP-234
Pace Project No.: 92510829

QC Batch: 585931 | Analysis Method: SM 2450C-2011
QC Batch Method: SM 2450C-2011 | Analysis Description: 2540C Total Dissolved Solids
Laboratory: Pace Analytical Services - Peachtree Corners, GA
Associated Lab Samples: 92510829001, 92510829002, 92510829003, 92510829004, 92510829005, 92510829006

METHOD BLANK: 3096989 Matrix: Water
Associated Lab Samples: 92510829001, 92510829002, 92510829003, 92510829004, 92510829005, 92510829006

| Parameter | Units | Blank Result | Reporting Limit | MDL | Analyzed | Qualifiers |
|---|---|---|---|---|---|---|
| Total Dissolved Solids | mg/L | ND | 10.0 | 10.0 | 12/10/20 11:52 | |

LABORATORY CONTROL SAMPLE: 3096990

| Parameter | Units | Spike Conc. | LCS Result | LCS % Rec | % Rec Limits | Qualifiers |
|---|---|---|---|---|---|---|
| Total Dissolved Solids | mg/L | 400 | 417 | 104 | 84-108 | |

SAMPLE DUPLICATE: 3097556

| Parameter | Units | 92510779001 Result | Dup Result | RPD | Max RPD | Qualifiers |
|---|---|---|---|---|---|---|
| Total Dissolved Solids | mg/L | 105 | 101 | 4 | 10 | |

SAMPLE DUPLICATE: 3097589

| Parameter | Units | 92510794007 Result | Dup Result | RPD | Max RPD | Qualifiers |
|---|---|---|---|---|---|---|
| Total Dissolved Solids | mg/L | 299 | 287 | 4 | 10 | |

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

## REPORT OF LABORATORY ANALYSIS

Pace Analytical®
www.pacelabs.com

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

## QUALITY CONTROL DATA

Project: PLANT MCDONOUGH AP-234
Pace Project No.: 92510829

QC Batch: 586999
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: 92510829001

METHOD BLANK: 3102402 Matrix: Water
Associated Lab Samples: 92510829001

| Parameter | Units | Blank Result | Reporting Limit | MDL | Analyzed | Qualifiers |
|---|---|---|---|---|---|---|
| Chloride | mg/L | ND | 1.0 | 0.60 | 12/15/20 18:20 | |
| Fluoride | mg/L | ND | 0.10 | 0.050 | 12/15/20 18:20 | |
| Sulfate | mg/L | ND | 1.0 | 0.50 | 12/15/20 18:20 | |

LABORATORY CONTROL SAMPLE: 3102403

| 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 | 2.5 | 98 | 90-110 | |
| Sulfate | mg/L | 50 | 47.4 | 95 | 90-110 | |

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3102404 3102405

| Parameter | Units | 92511446001 Result | MS Spike Conc. | MSD Spike Conc. | MS Result | MSD Result | MS % Rec | MSD % Rec | % Rec Limits | RPD | Max RPD | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Chloride | mg/L | 5.9 | 50 | 50 | 60.1 | 59.7 | 109 | 108 | 90-110 | 1 | 10 | |
| Fluoride | mg/L | ND | 2.5 | 2.5 | 2.7 | 2.7 | 105 | 104 | 90-110 | 1 | 10 | |
| Sulfate | mg/L | 2.2 | 50 | 50 | 54.0 | 53.7 | 104 | 103 | 90-110 | 1 | 10 | |

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3102406 3102407

| Parameter | Units | 92511524002 Result | MS Spike Conc. | MSD Spike Conc. | MS Result | MSD Result | MS % Rec | MSD % Rec | % Rec Limits | RPD | Max RPD | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Chloride | mg/L | 73.9 | 50 | 50 | 108 | 109 | 68 | 69 | 90-110 | 1 | 10 | M1 |
| Fluoride | mg/L | 0.41 | 2.5 | 2.5 | 2.9 | 2.9 | 99 | 99 | 90-110 | 0 | 10 | |
| Sulfate | mg/L | 89.4 | 50 | 50 | 121 | 122 | 63 | 65 | 90-110 | 1 | 10 | M1 |

**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.**

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

# QUALITY CONTROL DATA

Project: PLANT MCDONOUGH AP-234
Pace Project No.: 92510829

QC Batch: 587003 — Analysis Method: EPA 300.0 Rev 2.1 1993
QC Batch Method: EPA 300.0 Rev 2.1 1993 — Analysis Description: 300.0 IC Anions
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92510829002, 92510829003, 92510829004, 92510829005, 92510829006

METHOD BLANK: 3102423 — Matrix: Water
Associated Lab Samples: 92510829002, 92510829003, 92510829004, 92510829005, 92510829006

| Parameter | Units | Blank Result | Reporting Limit | MDL | Analyzed | Qualifiers |
|---|---|---|---|---|---|---|
| Chloride | mg/L | ND | 1.0 | 0.60 | 12/19/20 00:49 | |
| Fluoride | mg/L | ND | 0.10 | 0.050 | 12/19/20 00:49 | |
| Sulfate | mg/L | ND | 1.0 | 0.50 | 12/19/20 00:49 | |

LABORATORY CONTROL SAMPLE: 3102424

| 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 | 2.7 | 109 | 90-110 | |
| Sulfate | mg/L | 50 | 48.5 | 97 | 90-110 | |

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3102425 3102426

| Parameter | Units | 92510829002 Result | MS Spike Conc. | MSD Spike Conc. | MS Result | MSD Result | MS % Rec | MSD % Rec | % Rec Limits | RPD | Max RPD | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Chloride | mg/L | 12.5 | 50 | 50 | 65.8 | 66.0 | 107 | 107 | 90-110 | 0 | 10 | |
| Fluoride | mg/L | ND | 2.5 | 2.5 | 2.7 | 2.7 | 106 | 108 | 90-110 | 2 | 10 | |
| Sulfate | mg/L | 273 | 50 | 50 | 312 | 313 | 77 | 80 | 90-110 | 0 | 10 | M6 |

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3102427 3102428

| Parameter | Units | 92511102002 Result | MS Spike Conc. | MSD Spike Conc. | MS Result | MSD Result | MS % Rec | MSD % Rec | % Rec Limits | RPD | Max RPD | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Chloride | mg/L | 29.7 | 50 | 50 | 82.6 | 83.7 | 106 | 108 | 90-110 | 1 | 10 | |
| Fluoride | mg/L | ND | 2.5 | 2.5 | 2.7 | 2.8 | 106 | 110 | 90-110 | 3 | 10 | |
| Sulfate | mg/L | 42.8 | 50 | 50 | 93.8 | 94.6 | 102 | 104 | 90-110 | 1 | 10 | |

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

# QUALIFIERS

Project: PLANT MCDONOUGH AP-234
Pace Project No.: 92510829

## 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

| | |
|---|---|
| D3 | Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference. |
| 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. |

Pace Analytical www.pacelabs.com

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

## QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: PLANT MCDONOUGH AP-234
Pace Project No.: 92510829

| Lab ID | Sample ID | QC Batch Method | QC Batch | Analytical Method | Analytical Batch |
|---|---|---|---|---|---|
| **92510829001** | **B-104D** | | | | |
| **92510829002** | **B-107D** | | | | |
| **92510829003** | **B-108D** | | | | |
| **92510829004** | **B-111D** | | | | |
| **92510829001** | **B-104D** | EPA 3010A | 587757 | EPA 6010D | 587879 |
| **92510829002** | **B-107D** | EPA 3010A | 587757 | EPA 6010D | 587879 |
| **92510829003** | **B-108D** | EPA 3010A | 587757 | EPA 6010D | 587879 |
| **92510829004** | **B-111D** | EPA 3010A | 587757 | EPA 6010D | 587879 |
| **92510829005** | **FD** | EPA 3010A | 587757 | EPA 6010D | 587879 |
| **92510829006** | **FB** | EPA 3010A | 587757 | EPA 6010D | 587879 |
| **92510829001** | **B-104D** | EPA 3005A | 587466 | EPA 6020B | 587562 |
| **92510829002** | **B-107D** | EPA 3005A | 587466 | EPA 6020B | 587562 |
| **92510829003** | **B-108D** | EPA 3005A | 587466 | EPA 6020B | 587562 |
| **92510829004** | **B-111D** | EPA 3005A | 587466 | EPA 6020B | 587562 |
| **92510829005** | **FD** | EPA 3005A | 587466 | EPA 6020B | 587562 |
| **92510829006** | **FB** | EPA 3005A | 587466 | EPA 6020B | 587562 |
| **92510829001** | **B-104D** | EPA 7470A | 586401 | EPA 7470A | 586700 |
| **92510829002** | **B-107D** | EPA 7470A | 586401 | EPA 7470A | 586700 |
| **92510829003** | **B-108D** | EPA 7470A | 586401 | EPA 7470A | 586700 |
| **92510829004** | **B-111D** | EPA 7470A | 586401 | EPA 7470A | 586700 |
| **92510829005** | **FD** | EPA 7470A | 586401 | EPA 7470A | 586700 |
| **92510829006** | **FB** | EPA 7470A | 586401 | EPA 7470A | 586700 |
| **92510829001** | **B-104D** | SM 2450C-2011 | 585931 | | |
| **92510829002** | **B-107D** | SM 2450C-2011 | 585931 | | |
| **92510829003** | **B-108D** | SM 2450C-2011 | 585931 | | |
| **92510829004** | **B-111D** | SM 2450C-2011 | 585931 | | |
| **92510829005** | **FD** | SM 2450C-2011 | 585931 | | |
| **92510829006** | **FB** | SM 2450C-2011 | 585931 | | |
| **92510829001** | **B-104D** | EPA 300.0 Rev 2.1 1993 | 586999 | | |
| **92510829002** | **B-107D** | EPA 300.0 Rev 2.1 1993 | 587003 | | |
| **92510829003** | **B-108D** | EPA 300.0 Rev 2.1 1993 | 587003 | | |
| **92510829004** | **B-111D** | EPA 300.0 Rev 2.1 1993 | 587003 | | |
| **92510829005** | **FD** | EPA 300.0 Rev 2.1 1993 | 587003 | | |
| **92510829006** | **FB** | EPA 300.0 Rev 2.1 1993 | 587003 | | |

| Pace Analytical | Document Name: **Sample Condition Upon Receipt(SCUR)** | Document Revised: October 28, 2020 Page 1 of 2 |
|---|---|---|
| | Document No.: **F-CAR-CS-033-Rev.07** | Issuing Authority: Pace Carolinas Quality Office |

**Laboratory receiving samples:**
**Asheville** ☐ **Eden** ☐ **Greenwood** ☐ **Huntersville** ☐ **Raleigh** ☐ **Mechanicsville** ☐ **Atlanta** ☑ **Kernersville** ☐

**Sample Condition Upon Receipt**

**Client Name:** Georgia power -coal

**Project #:**

**WO# : 92510829**

92510829

**Courier:** ☐ Fed Ex ☐ UPS ☐ USPS ☑ Client ☐ Commercial ☐ Pace ☐ Other: ____

**Custody Seal Present?** ☐ Yes ☑ No **Seals Intact?** ☐ Yes ☐ No

**Date/Initials Person Examining Contents:** MT 12/10/20

**Packing Material:** ☐ Bubble Wrap ☐ Bubble Bags ☐ None ☑ Other

**Biological Tissue Frozen?** ☐ Yes ☑ No ☐ N/A

**Thermometer:** ☐ IR Gun ID: 233

**Type of Ice:** ☑ Wet ☐ Blue ☐ None

**Cooler Temp:** 2.3 **Correction Factor: Add/Subtract (°C)** ±0.4

Temp should be above freezing to 6°C
☐ Samples out of temp criteria. Samples on ice, cooling process has begun

**Cooler Temp Corrected (°C):** 2.7

**USDA Regulated Soil** ( ☐ N/A, water sample)
Did samples originate in a quarantine zone within the United States: CA, NY, or SC (check maps)? ☐ Yes ☑ No

Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? ☐ Yes ☑ No

| | | | | Comments/Discrepancy: |
|---|---|---|---|---|
| Chain of Custody Present? | ☑ Yes | ☐ No | ☐ N/A | 1. |
| Samples Arrived within Hold Time? | ☑ Yes | ☐ No | ☐ N/A | 2. |
| **Short Hold Time Analysis (<72 hr.)?** | ☐ Yes | ☑ No | ☐ N/A | 3. |
| **Rush Turn Around Time Requested?** | ☑ Yes | ☐ No | ☐ N/A | 4. standard |
| Sufficient Volume? | ☑ Yes | ☐ No | ☐ N/A | 5. |
| Correct Containers Used? | ☑ Yes | ☐ No | ☐ N/A | 6. |
| -Pace Containers Used? | ☑ Yes | ☐ No | ☐ N/A | |
| Containers Intact? | ☑ Yes | ☐ No | ☐ N/A | 7. |
| Dissolved analysis: Samples Field Filtered? | ☐ Yes | ☑ No | ☐ N/A | 8. |
| Sample Labels Match COC? | ☑ Yes | ☐ No | ☐ N/A | 9. |
| -Includes Date/Time/ID/Analysis Matrix: WT | | | | |
| Headspace in VOA Vials (>5-6mm)? | ☐ Yes | ☐ No | ☑ N/A | 10. |
| Trip Blank Present? | ☐ Yes | ☐ No | ☑ N/A | 11. |
| Trip Blank Custody Seals Present? | ☐ Yes | ☐ No | ☑ N/A | |

**COMMENTS/SAMPLE DISCREPANCY**

**Field Data Required?** ☐ Yes ☐ No

Lot ID of split containers:

**CLIENT NOTIFICATION/RESOLUTION**

Person contacted: ____________ Date/Time: ____________

**Project Manager SCURF Review:** ____________ **Date:** ____________

**Project Manager SRF Review:** ____________ **Date:** ____________

| Pace Analytical® | Document Name: **Sample Condition Upon Receipt(SCUR)** | Document Revised: October 28, 2020 Page 2 of 2 |
|---|---|---|
| | Document No.: **F-CAR-CS-033-Rev.07** | Issuing Authority: Pace Carolinas Quality Office |

***Check mark top half of box if pH and/or dechlorination is verified and within the acceptance range for preservation samples.**

**Project #**

# WO#:92510829

**PM: KLH1** **Due Date: 12/24/20**

**CLIENT: GA-GA Power**

**Exceptions:** VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC, LLHg

****Bottom half of box is to list number of bottles**

| 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 | 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) | DG9U-40 mL Amber Unpreserved vials (N/A) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | 1 | 1 | | | 1 | | | | | | | | | | | | | | | | | | 2 | | | | |
| 2 | | 1 | 1 | | | 1 | | | | | | | | | | | | | | | | | | 2 | | | | |
| 3 | | 1 | 1 | | | 1 | | | | | | | | | | | | | | | | | | 2 | | | | |
| 4 | | 1 | 1 | | | 1 | | | | | | | | | | | | | | | | | | 4 | | | | |
| 5 | | 1 | 1 | | | 1 | | | | | | | | | | | | | | | | | | 2 | | | | |
| 6 | | 1 | 1 | | | 1 | | | | | | | | | | | | | | | | | | 2 | | | | |
| 7 | | 1 | 1 | | | 1 | | | | | | | | | | | | | | | | | | 2 | | | | |
| 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 Office (i.e. Out of hold, incorrect preservative, out of temp, incorrect containers.

Pace Analytical

# 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 - Coal Combustion Residuals |
| Address | 2480 Maner Road |
| | Atlanta, GA 30339 |
| Email | jabraham@southernco.com |
| Phone | (404) 506-7239 Fax |
| Requested Due Date | Standard |

**Section B**
**Required Project Information:**

| | |
|---|---|
| Report To: | Joju Abraham |
| Copy To: | Golder |
| Purchase Order # | |
| Project Name: | Plant McDonough AP-234 |
| Project #: | 166849618 |

**Section C**
**Invoice Information:**

| | |
|---|---|
| Attention: | scsinvoices@southernco.com |
| Company Name | |
| Address: | |
| Pace Quote | |
| Pace Project Manager | Kevin Herring |
| Pace Profile #: | |

| Regulatory Agency | |
|---|---|
| State / Location | GA |

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 |

Requested Analysis Filtered (Y/N): N N N N

| ITEM # | SAMPLE ID | MATRIX CODE (see valid codes to left) | SAMPLE TYPE (G=GRAB C=COMP) | DATE | TIME | SAMPLE TEMP AT COLLECTION | # OF CONTAINERS | Unpreserved - Ice | H2SO4 | HNO3 | HCl | NaOH + Zn Acetate | Na2S2O3 | Methanol | Other | *Metals App III and App IV Total | Cl, F, SO4 | Radium 226/228 | TDS | Residual Chlorine (Y/N) | 92510829 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | B-104D | WT | G | 12/9/2020 | 1145 | | 5 | 2 | | 3 | | | | | | X | X | X | X | | pH 6.44 |
| 2 | B-107D | | | 12/9/2020 | 1135 | | 5 | 2 | | 3 | | | | | | X | X | X | X | | pH 5.91 |
| 3 | B-108D | | | 12/9/2020 | 950 | | 5 | 2 | | 3 | | | | | | X | X | X | X | | pH 5.94 |
| 4 | B-111D | | | 12/9/2020 | 1445 | | 7 | 2 | | 5 | | | | | | X | X | X | X | | pH: 6.64, Extra Radium |
| 5 | FD | | | 12/9/2020 | – | | 5 | 2 | | 3 | | | | | | X | X | X | X | | |
| 6 | FB | | | 12/9/2020 | 1118 | | 5 | 2 | | 3 | | | | | | X | X | X | X | | |
| 7 | | | | | | | | | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | | | | | | | | | |
| 13 | | | | | | | | | | | | | | | | | | | | | |
| 14 | | | | | | | | | | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | | | | | | | | | |

| ADDITIONAL COMMENTS | RELINQUISHED BY / AFFILIATION | DATE | TIME | ACCEPTED BY / AFFILIATION | DATE | TIME | SAMPLE CONDITIONS | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| *App III / IV Metals = As, Sb, B, Ba, Be, Ca, Cd, Cr, Co, Pb, Li, Hg, Mo, Se, Tl | Yong Chang Soo | 12/10/20 | 0405 | [illegible] / Pace | 12/10/20 | 0405 | 2.3 | Y | N | Y |

SAMPLER NAME AND SIGNATURE

PRINT NAME: Yong Chang Soo

SIGNATURE: [signature]

DATE Signed: 12/10/2020

TEMP in C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

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

January 11, 2021

Joju Abraham
Georgia Power-CCR
2480 Maner Road
Atlanta, GA 30339

RE: Project: PLANT MCDONOUGH AP-1 RADS
Pace Project No.: 92512943

Dear Joju Abraham:

Enclosed are the analytical results for sample(s) received by the laboratory on December 18, 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 - Greensburg

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: Stephen Benda
Daniela Herrera, Golder
Ben Hodges, Georgia Power
Jimmy Jones, Golder Associates Inc.
Kristen Jurinko
Julie Lehrman, Golder Associates Inc.
Ms. Lauren Petty, Southern Co. Services
Dawn Prell, Golder Associates Inc.
Tim Richards, Golder Associates - Atlanta

**REPORT OF LABORATORY ANALYSIS**

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

## CERTIFICATIONS

Project: PLANT MCDONOUGH AP-1 RADS
Pace Project No.: 92512943

**Pace Analytical Services Pennsylvania**

1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601
ANAB DOD-ELAP Rad Accreditation #: L2417
Alabama Certification #: 41590
Arizona Certification #: AZ0734
Arkansas Certification
California Certification #: 04222CA
Colorado Certification #: PA01547
Connecticut Certification #: PH-0694
Delaware Certification
EPA Region 4 DW Rad
Florida/TNI Certification #: E87683
Georgia Certification #: C040
Florida: Cert E871149 SEKS WET
Guam Certification
Hawaii Certification
Idaho Certification
Illinois Certification
Indiana Certification
Iowa Certification #: 391
Kansas/TNI Certification #: E-10358
Kentucky Certification #: KY90133
KY WW Permit #: KY0098221
KY WW Permit #: KY0000221
Louisiana DHH/TNI Certification #: LA180012
Louisiana DEQ/TNI Certification #: 4086
Maine Certification #: 2017020
Maryland Certification #: 308
Massachusetts Certification #: M-PA1457
Michigan/PADEP Certification #: 9991
Missouri Certification #: 235
Montana Certification #: Cert0082
Nebraska Certification #: NE-OS-29-14
Nevada Certification #: PA014572018-1
New Hampshire/TNI Certification #: 297617
New Jersey/TNI Certification #: PA051
New Mexico Certification #: PA01457
New York/TNI Certification #: 10888
North Carolina Certification #: 42706
North Dakota Certification #: R-190
Ohio EPA Rad Approval: #41249
Oregon/TNI Certification #: PA200002-010
Pennsylvania/TNI Certification #: 65-00282
Puerto Rico Certification #: PA01457
Rhode Island Certification #: 65-00282
South Dakota Certification
Tennessee Certification #: 02867
Texas/TNI Certification #: T104704188-17-3
Utah/TNI Certification #: PA014572017-9
USDA Soil Permit #: P330-17-00091
Vermont Dept. of Health: ID# VT-0282
Virgin Island/PADEP Certification
Virginia/VELAP Certification #: 9526
Washington Certification #: C868
West Virginia DEP Certification #: 143
West Virginia DHHR Certification #: 9964C
Wisconsin Approve List for Rad
Wyoming Certification #: 8TMS-L

**REPORT OF LABORATORY ANALYSIS**

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

# SAMPLE SUMMARY

Project: PLANT MCDONOUGH AP-1 RADS
Pace Project No.: 92512943

| Lab ID | Sample ID | Matrix | Date Collected | Date Received |
|---|---|---|---|---|
| **92512943001** | **B-110D** | Water | 12/17/20 15:40 | 12/18/20 15:30 |

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

# SAMPLE ANALYTE COUNT

Project: PLANT MCDONOUGH AP-1 RADS
Pace Project No.: 92512943

| Lab ID | Sample ID | Method | Analysts | Analytes Reported | Laboratory |
|---|---|---|---|---|---|
| **92512943001** | **B-110D** | EPA 9315 | LAL | 1 | PASI-PA |
| | | EPA 9320 | VAL | 1 | PASI-PA |
| | | Total Radium Calculation | CMC | 1 | PASI-PA |

PASI-PA = Pace Analytical Services - Greensburg

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

## ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: PLANT MCDONOUGH AP-1 RADS
Pace Project No.: 92512943

**Sample: B-110D** **Lab ID: 92512943001** Collected: 12/17/20 15:40 Received: 12/18/20 15:30 Matrix: Water
PWS: Site ID: Sample Type:

| Parameters | Method | Act ± Unc (MDC) Carr Trac | Units | Analyzed | CAS No. | Qual |
|---|---|---|---|---|---|---|
| | Pace Analytical Services - Greensburg | | | | | |
| Radium-226 | EPA 9315 | **0.645 ± 0.382 (0.631) C:88% T:NA** | pCi/L | 01/06/21 07:24 | 13982-63-3 | |
| | Pace Analytical Services - Greensburg | | | | | |
| Radium-228 | EPA 9320 | **0.334 ± 0.541 (1.17) C:72% T:79%** | pCi/L | 01/05/21 13:26 | 15262-20-1 | |
| | Pace Analytical Services - Greensburg | | | | | |
| Total Radium | Total Radium Calculation | **0.979 ± 0.923 (1.80)** | pCi/L | 01/06/21 14:34 | 7440-14-4 | |

**REPORT OF LABORATORY ANALYSIS**

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

## QUALITY CONTROL - RADIOCHEMISTRY

Project: PLANT MCDONOUGH AP-1 RADS
Pace Project No.: 92512943

QC Batch: 428750
QC Batch Method: EPA 9320
Analysis Method: EPA 9320
Analysis Description: 9320 Radium 228
Laboratory: Pace Analytical Services - Greensburg
Associated Lab Samples: 92512943001

METHOD BLANK: 2071922
Matrix: Water
Associated Lab Samples: 92512943001

| Parameter | Act ± Unc (MDC) Carr Trac | Units | Analyzed | Qualifiers |
|---|---|---|---|---|
| Radium-228 | 0.694 ± 0.380 (0.676) C:79% T:80% | pCi/L | 01/05/21 13:26 | |

**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.**

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

## QUALITY CONTROL - RADIOCHEMISTRY

Project: PLANT MCDONOUGH AP-1 RADS
Pace Project No.: 92512943

| | | | |
|---|---|---|---|
| QC Batch: | 429175 | Analysis Method: | EPA 9315 |
| QC Batch Method: | EPA 9315 | Analysis Description: | 9315 Total Radium |
| | | Laboratory: | Pace Analytical Services - Greensburg |

Associated Lab Samples: 92512943001

METHOD BLANK: 2073293 Matrix: Water

Associated Lab Samples: 92512943001

| Parameter | Act ± Unc (MDC) Carr Trac | Units | Analyzed | Qualifiers |
|---|---|---|---|---|
| Radium-226 | 0.176 ± 0.138 (0.246) C:97% T:NA | pCi/L | 01/05/21 17:40 | |

**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**

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

## QUALIFIERS

Project: PLANT MCDONOUGH AP-1 RADS
Pace Project No.: 92512943

**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.

Act - Activity

Unc - Uncertainty: SDWA = 1.96 sigma count uncertainty, all other matrices = Expanded Uncertainty (95% confidence interval).
Gamma Spec = Expanded Uncertainty (95.4% Confidence Interval)

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

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

TNI - The NELAC Institute.

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

# QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: PLANT MCDONOUGH AP-1 RADS
Pace Project No.: 92512943

| Lab ID | Sample ID | QC Batch Method | QC Batch | Analytical Method | Analytical Batch |
|---|---|---|---|---|---|
| **92512943001** | **B-110D** | EPA 9315 | 429175 | | |
| **92512943001** | **B-110D** | EPA 9320 | 428750 | | |
| **92512943001** | **B-110D** | Total Radium Calculation | 429861 | | |

| Pace Analytical | Document Name: **Sample Condition Upon Receipt(SCUR)** | Document Revised: October 28, 2020 Page 1 of 2 |
|---|---|---|
| | Document No.: **F-CAR-CS-033-Rev.07** | Issuing Authority: Pace Carolinas Quality Office |

**Laboratory receiving samples:**
**Asheville** ☐ **Eden** ☐ **Greenwood** ☐ **Huntersville** ☐ **Raleigh** ☐ **Mechanicsville** ☐ **Atlanta** ☑ **Kernersville** ☐

**Sample Condition Upon Receipt** **Client Name:** GA Power **Project #:**

**WO# : 92512943**

92512943

**Courier:** ☐ Commercial ☐ Fed Ex ☐ Pace ☐ UPS ☐ USPS ☐ Other:____ ☑ Client

**Custody Seal Present?** ☐ Yes ☑ No **Seals Intact?** ☐ Yes ☐ No

**Date/Initials Person Examining Contents:** 12/08/20 LOH

**Packing Material:** ☐ Bubble Wrap ☐ Bubble Bags ☑ None ☐ Other

**Biological Tissue Frozen?** ☐ Yes ☑ No ☐ N/A

**Thermometer:** ☑ IR Gun ID: 233

**Type of Ice:** ☑ Wet ☐ Blue ☐ None

**Cooler Temp:** 3.7 **Correction Factor:** Add/Subtract (°C) 0.4

**Cooler Temp Corrected (°C):** 4.1

Temp should be above freezing to 6°C
☐ Samples out of temp criteria. Samples on ice, cooling process has begun

**USDA Regulated Soil (** ☑ N/A, water sample)
Did samples originate in a quarantine zone within the United States: CA, NY, or SC (check maps)? ☐ Yes ☐ No

Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? ☐ Yes ☐ No

| | | | | Comments/Discrepancy: |
|---|---|---|---|---|
| Chain of Custody Present? | ☑ Yes | ☐ No | ☐ N/A | 1. |
| Samples Arrived within Hold Time? | ☑ Yes | ☐ No | ☐ N/A | 2. |
| **Short Hold Time Analysis (<72 hr.)?** | ☐ Yes | ☑ No | ☐ N/A | 3. |
| **Rush Turn Around Time Requested?** | ☐ Yes | ☑ No | ☐ N/A | 4. |
| Sufficient Volume? | ☑ Yes | ☐ No | ☐ N/A | 5. |
| Correct Containers Used? | ☑ Yes | ☐ No | ☐ N/A | 6. |
| -Pace Containers Used? | ☑ Yes | ☐ No | ☐ N/A | |
| Containers Intact? | ☑ Yes | ☐ No | ☐ N/A | 7. |
| Dissolved analysis: Samples Field Filtered? | ☐ Yes | ☐ No | ☑ N/A | 8. |
| Sample Labels Match COC? | ☑ Yes | ☐ No | ☐ N/A | 9. |
| -Includes Date/Time/ID/Analysis Matrix: | W | | | |
| Headspace in VOA Vials (>5-6mm)? | ☐ Yes | ☐ No | ☑ N/A | 10. |
| Trip Blank Present? | ☐ Yes | ☐ No | ☑ N/A | 11. |
| Trip Blank Custody Seals Present? | ☐ Yes | ☐ No | ☑ N/A | |

**COMMENTS/SAMPLE DISCREPANCY**

**Field Data Required?** ☐ Yes ☐ No

Lot ID of split containers:

**CLIENT NOTIFICATION/RESOLUTION**

Person contacted: ____________ Date/Time: ____________

**Project Manager SCURF Review:** ____________ **Date:** ____________

**Project Manager SRF Review:** ____________ **Date:** ____________

| Pace Analytical® | Document Name: **Sample Condition Upon Receipt(SCUR)** | Document Revised: October 28, 2020<br>Page 2 of 2 |
|---|---|---|
| | Document No.: **F-CAR-CS-033-Rev.07** | Issuing Authority:<br>Pace Carolinas Quality Office |

***Check mark top half of box if pH and/or dechlorination is verified and within the acceptance range for preservation samples.**

**Project #** **WO#:92512943**

**PM: KLH1** **Due Date: 01/12/21**

**CLIENT: GA-GA Power**

**Exceptions:** VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC, LLHg

****Bottom half of box is to list number of bottles**

| 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 | 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) | DG9U-40 mL Amber Unpreserved vials (N/A) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | 1 | 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 # |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | | | | |
| | | | | | | |

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.

# 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 - Coal Combustion Residuals |
| Address: | 2480 Maner Road<br>Atlanta, GA 30339 |
| Email: | jabraham@southernco.com |
| Phone: | (404) 506-7239 |
| Fax: | |
| Requested Due Date: | Standard |

**Section B**
**Required Project Information:**

| | |
|---|---|
| Report To: | Joju Abraham |
| Copy To: | Golder |
| Purchase Order #: | |
| Project Name: | Plant McDonough AP-1 |
| Project #: | 166849618 |

**Section C**
**Invoice Information:**

| | |
|---|---|
| Attention: | scsinvoices@southernco.com |
| Company Name: | |
| Address: | |
| Pace Quote: | |
| Pace Project Manager: | Kevin Herring |
| Pace Profile #: | |

| Regulatory Agency | |
|---|---|
| State / Location | GA |

**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 |

Requested Analysis Filtered (Y/N)

Preservatives

| ITEM # | SAMPLE ID | MATRIX CODE (see valid codes to left) | SAMPLE TYPE (G=GRAB C=COMP) | DATE | TIME | SAMPLE TEMP AT COLLECTION | # OF CONTAINERS | Unpreserved - Ice | H2SO4 | HNO3 | HCl | NaOH + Zn Acetate | Na2S2O3 | Methanol | Other | Analyses Test Y/N | *Metals App III and App IV Total (N) | Cl, F, SO4 (N) | Radium 226/228 (N) | TDS (N) | Residual Chlorine (Y/N) | 425124473 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | B-110D | WT | G | 12/17/2020 | 1540 | | 5 | 2 | | 3 | | | | | | | X | X | X | X | | pH: 6.99 |
| 2 | | | | | | | | | | | | | | | | | | | | | | |
| 3 | | | | | | | | | | | | | | | | | | | | | | |
| 4 | | | | | | | | | | | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | | | | | | | | | | |
| 13 | | | | | | | | | | | | | | | | | | | | | | |
| 14 | | | | | | | | | | | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | | | | | | | | | | |

| ADDITIONAL COMMENTS | RELINQUISHED BY / AFFILIATION | DATE | TIME | ACCEPTED BY / AFFILIATION | DATE | TIME | SAMPLE CONDITIONS |
|---|---|---|---|---|---|---|---|
| *App III / IV Metals = As, Sb, B, Ba, Be, Ca, Cd, Cr, Co, Pb, Li, Hg, Mo, Se, Tl | Yong Cheng Soo | 12/18/20 | | [signature] | 12/18/20 | 1530 | |

**SAMPLER NAME AND SIGNATURE**

| | |
|---|---|
| PRINT NAME | Yong Cheng Soo |
| SIGNATURE | [signature] |
| DATE Signed: | 12/18/2020 |

| TEMP in C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N) |
|---|---|---|---|
| | | | |

Pace Analytical
www.pacelabs.com

# Quality Control Sample Performance Assessment

***Analyst Must Manually Enter All Fields Highlighted in Yellow.***

| | |
|---|---|
| Test: | Ra-226 |
| Analyst: | LAL |
| Date: | 1/5/2021 |
| Worklist: | 58138 |
| Matrix: | DW |

| Method Blank Assessment | |
|---|---|
| MB Sample ID | 2073293 |
| MB concentration: | 0.176 |
| M/B Counting Uncertainty: | 0.135 |
| MB MDC: | 0.246 |
| MB Numerical Performance Indicator: | 2.55 |
| MB Status vs Numerical Indicator: | N/A |
| MB Status vs. MDC: | Pass |

| Laboratory Control Sample Assessment | LCSD (Y or N)? | N |
|---|---|---|
| | LCS58138 | LCSD58138 |
| Count Date: | 1/6/2021 | |
| Spike I.D.: | 19-033 | |
| Decay Corrected Spike Concentration (pCi/mL): | 24.041 | |
| Volume Used (mL): | 0.10 | |
| Aliquot Volume (L, g, F): | 0.515 | |
| Target Conc. (pCi/L, g, F): | 4.669 | |
| Uncertainty (Calculated): | 0.056 | |
| Result (pCi/L, g, F): | 4.726 | |
| LCS/LCSD Counting Uncertainty (pCi/L, g, F): | 0.782 | |
| Numerical Performance Indicator: | 0.14 | |
| Percent Recovery: | 101.21% | |
| Status vs Numerical Indicator: | N/A | |
| Status vs Recovery: | Pass | |
| Upper % Recovery Limits: | 125% | |
| Lower % Recovery Limits: | 75% | |

| Duplicate Sample Assessment | | |
|---|---|---|
| Sample I.D.: | 92512557001 | Enter Duplicate sample IDs if other than LCS/LCSD in the space below. |
| Duplicate Sample I.D. | 92512557001DUP | |
| Sample Result (pCi/L, g, F): | 0.259 | |
| Sample Result Counting Uncertainty (pCi/L, g, F): | 0.248 | |
| Sample Duplicate Result (pCi/L, g, F): | 0.181 | |
| Sample Duplicate Result Counting Uncertainty (pCi/L, g, F): | 0.219 | |
| Are sample and/or duplicate results below RL? | ~~See Below~~ ## | |
| Duplicate Numerical Performance Indicator: | 0.458 | 92512557001 |
| Duplicate RPD: | 35.10% | 92512557001DUP |
| Duplicate Status vs Numerical Indicator: | N/A | |
| Duplicate Status vs RPD: | Fail*** | |
| % RPD Limit: | 25% | |

| Sample Matrix Spike Control Assessment | MS/MSD 1 | MS/MSD 2 |
|---|---|---|
| Sample Collection Date: | | |
| Sample I.D. | | |
| Sample MS I.D. | | |
| Sample MSD I.D. | | |
| Spike I.D.: | | |
| MS/MSD Decay Corrected Spike Concentration (pCi/mL): | | |
| Spike Volume Used in MS (mL): | | |
| Spike Volume Used in MSD (mL): | | |
| MS Aliquot (L, g, F): | | |
| MS Target Conc.(pCi/L, g, F): | | |
| MSD Aliquot (L, g, F): | | |
| MSD Target Conc. (pCi/L, g, F): | | |
| MS Spike Uncertainty (calculated): | | |
| MSD Spike Uncertainty (calculated): | | |
| Sample Result: | | |
| Sample Result Counting Uncertainty (pCi/L, g, F): | | |
| Sample Matrix Spike Result: | | |
| Matrix Spike Result Counting Uncertainty (pCi/L, g, F): | | |
| Sample Matrix Spike Duplicate Result: | | |
| Matrix Spike Duplicate Result Counting Uncertainty (pCi/L, g, F): | | |
| MS Numerical Performance Indicator: | | |
| MSD Numerical Performance Indicator: | | |
| MS Percent Recovery: | | |
| MSD Percent Recovery: | | |
| MS Status vs Numerical Indicator: | | |
| MSD Status vs Numerical Indicator: | | |
| MS Status vs Recovery: | | |
| MSD Status vs Recovery: | | |
| MS/MSD Upper % Recovery Limits: | | |
| MS/MSD Lower % Recovery Limits: | | |

| Matrix Spike/Matrix Spike Duplicate Sample Assessment | | |
|---|---|---|
| Sample I.D. | | |
| Sample MS I.D. | | |
| Sample MSD I.D. | | |
| Sample Matrix Spike Result: | | |
| Matrix Spike Result Counting Uncertainty (pCi/L, g, F): | | |
| Sample Matrix Spike Duplicate Result: | | |
| Matrix Spike Duplicate Result Counting Uncertainty (pCi/L, g, F): | | |
| Duplicate Numerical Performance Indicator: | | |
| (Based on the Percent Recoveries) MS/ MSD Duplicate RPD: | | |
| MS/ MSD Duplicate Status vs Numerical Indicator: | | |
| MS/ MSD Duplicate Status vs RPD: | | |
| % RPD Limit: | | |

## Evaluation of duplicate precision is not applicable if either the sample or duplicate results are below the MDC.

**Comments:**

***~~Batch must be re-prepped due to unacceptable precision~~. N/A
LAM 1/6/21

KLB
1-6-2021

LAM 1/6/21

# Quality Control Sample Performance Assessment

Pace Analytical
www.pacelabs.com

**Analyst Must Manually Enter All Fields Highlighted in Yellow.**

| | |
|---|---|
| Test: | Ra-226 |
| Analyst: | LAL |
| Date: | 1/5/2021 |
| Worklist: | 58138 |
| Matrix: | DW |

| Method Blank Assessment | |
|---|---|
| MB Sample ID | 2073293 |
| MB concentration: | 0.176 |
| M/B Counting Uncertainty: | 0.135 |
| MB MDC: | 0.246 |
| MB Numerical Performance Indicator: | 2.55 |
| MB Status vs Numerical Indicator: | N/A |
| MB Status vs. MDC: | Pass |

| Laboratory Control Sample Assessment | LCSD (Y or N)? | Y |
|---|---|---|
| | LCS58138 | LCSD58138 |
| Count Date: | 1/6/2021 | 1/6/2021 |
| Spike I.D.: | 19-033 | 19-033 |
| Decay Corrected Spike Concentration (pCi/mL): | 24.041 | 24.041 |
| Volume Used (mL): | 0.10 | 0.10 |
| Aliquot Volume (L, g, F): | 0.515 | 0.507 |
| Target Conc. (pCi/L, g, F): | 4.669 | 4.743 |
| Uncertainty (Calculated): | 0.056 | 0.057 |
| Result (pCi/L, g, F): | 4.726 | 4.173 |
| LCS/LCSD Counting Uncertainty (pCi/L, g, F): | 0.782 | 0.736 |
| Numerical Performance Indicator: | 0.14 | -1.51 |
| Percent Recovery: | 101.21% | 87.98% |
| Status vs Numerical Indicator: | N/A | N/A |
| Status vs Recovery: | Pass | Pass |
| Upper % Recovery Limits: | 125% | 125% |
| Lower % Recovery Limits: | 75% | 75% |

| Duplicate Sample Assessment | | |
|---|---|---|
| Sample I.D.: | LCS58138 | Enter Duplicate sample IDs if other than LCS/LCSD in the space below. |
| Duplicate Sample I.D. | LCSD58138 | |
| Sample Result (pCi/L, g, F): | 4.726 | |
| Sample Result Counting Uncertainty (pCi/L, g, F): | 0.782 | |
| Sample Duplicate Result (pCi/L, g, F): | 4.173 | |
| Sample Duplicate Result Counting Uncertainty (pCi/L, g, F): | 0.736 | |
| Are sample and/or duplicate results below RL? | NO | |
| Duplicate Numerical Performance Indicator: | 1.009 | 92512557001 |
| (Based on the LCS/LCSD Percent Recoveries) Duplicate RPD: | 13.99% | 92512557001DUP |
| Duplicate Status vs Numerical Indicator: | N/A | |
| Duplicate Status vs RPD: | Pass | |
| % RPD Limit: | 25% | |

| Sample Matrix Spike Control Assessment | MS/MSD 1 | MS/MSD 2 |
|---|---|---|
| Sample Collection Date: | | |
| Sample I.D. | | |
| Sample MS I.D. | | |
| Sample MSD I.D. | | |
| Spike I.D.: | | |
| MS/MSD Decay Corrected Spike Concentration (pCi/mL): | | |
| Spike Volume Used in MS (mL): | | |
| Spike Volume Used in MSD (mL): | | |
| MS Aliquot (L, g, F): | | |
| MS Target Conc.(pCi/L, g, F): | | |
| MSD Aliquot (L, g, F): | | |
| MSD Target Conc. (pCi/L, g, F): | | |
| MS Spike Uncertainty (calculated): | | |
| MSD Spike Uncertainty (calculated): | | |
| Sample Result: | | |
| Sample Result Counting Uncertainty (pCi/L, g, F): | | |
| Sample Matrix Spike Result: | | |
| Matrix Spike Result Counting Uncertainty (pCi/L, g, F): | | |
| Sample Matrix Spike Duplicate Result: | | |
| Matrix Spike Duplicate Result Counting Uncertainty (pCi/L, g, F): | | |
| MS Numerical Performance Indicator: | | |
| MSD Numerical Performance Indicator: | | |
| MS Percent Recovery: | | |
| MSD Percent Recovery: | | |
| MS Status vs Numerical Indicator: | | |
| MSD Status vs Numerical Indicator: | | |
| MS Status vs Recovery: | | |
| MSD Status vs Recovery: | | |
| MS/MSD Upper % Recovery Limits: | | |
| MS/MSD Lower % Recovery Limits: | | |

| Matrix Spike/Matrix Spike Duplicate Sample Assessment | | |
|---|---|---|
| Sample I.D. | | |
| Sample MS I.D. | | |
| Sample MSD I.D. | | |
| Sample Matrix Spike Result: | | |
| Matrix Spike Result Counting Uncertainty (pCi/L, g, F): | | |
| Sample Matrix Spike Duplicate Result: | | |
| Matrix Spike Duplicate Result Counting Uncertainty (pCi/L, g, F): | | |
| Duplicate Numerical Performance Indicator: | | |
| (Based on the Percent Recoveries) MS/ MSD Duplicate RPD: | | |
| MS/ MSD Duplicate Status vs Numerical Indicator: | | |
| MS/ MSD Duplicate Status vs RPD: | | |
| % RPD Limit: | | |

## Evaluation of duplicate precision is not applicable if either the sample or duplicate results are below the MDC.

**Comments:**

KB
1-6-2021

VAM 1/6/21

# Quality Control Sample Performance Assessment

Pace Analytical
www.pacelabs.com

**Analyst Must Manually Enter All Fields Highlighted in Yellow.**

| | |
|---|---|
| Test: | Ra-228 |
| Analyst: | VAL |
| Date: | 12/31/2020 |
| Worklist: | 58095 |
| Matrix: | WT |

| Method Blank Assessment | |
|---|---|
| MB Sample ID | 2071922 |
| MB concentration: | 0.694 |
| M/B 2 Sigma CSU: | 0.380 |
| MB MDC: | 0.676 |
| MB Numerical Performance Indicator: | 3.58 |
| MB Status vs Numerical Indicator: | Fail* |
| MB Status vs. MDC: | See Comment* |

| Laboratory Control Sample Assessment | LCSD (Y or N)? | Y |
|---|---|---|
| | LCS58095 | LCSD58095 |
| Count Date: | 1/5/2021 | 1/5/2021 |
| Spike I.D.: | 20-030 | 20-030 |
| Decay Corrected Spike Concentration (pCi/mL): | 37.002 | 37.002 |
| Volume Used (mL): | 0.10 | 0.10 |
| Aliquot Volume (L, g, F): | 0.803 | 0.801 |
| Target Conc. (pCi/L, g, F): | 4.610 | 4.617 |
| Uncertainty (Calculated): | 0.226 | 0.226 |
| Result (pCi/L, g, F): | 5.581 | 5.412 |
| LCS/LCSD 2 Sigma CSU (pCi/L, g, F): | 1.255 | 1.220 |
| Numerical Performance Indicator: | 1.49 | 1.25 |
| Percent Recovery: | 121.08% | 117.21% |
| Status vs Numerical Indicator: | N/A | N/A |
| Status vs Recovery: | Pass | Pass |
| Upper % Recovery Limits: | 135% | 135% |
| Lower % Recovery Limits: | 60% | 60% |

| Sample Matrix Spike Control Assessment | MS/MSD 1 | MS/MSD 2 |
|---|---|---|
| Sample Collection Date: | | |
| Sample I.D. | | |
| Sample MS I.D. | | |
| Sample MSD I.D. | | |
| Spike I.D.: | | |
| MS/MSD Decay Corrected Spike Concentration (pCi/mL): | | |
| Spike Volume Used in MS (mL): | | |
| Spike Volume Used in MSD (mL): | | |
| MS Aliquot (L, g, F): | | |
| MS Target Conc.(pCi/L, g, F): | | |
| MSD Aliquot (L, g, F): | | |
| MSD Target Conc. (pCi/L, g, F): | | |
| MS Spike Uncertainty (calculated): | | |
| MSD Spike Uncertainty (calculated): | | |
| Sample Result: | | |
| Sample Result 2 Sigma CSU (pCi/L, g, F): | | |
| Sample Matrix Spike Result: | | |
| Matrix Spike Result 2 Sigma CSU (pCi/L, g, F): | | |
| Sample Matrix Spike Duplicate Result: | | |
| Matrix Spike Duplicate Result 2 Sigma CSU (pCi/L, g, F): | | |
| MS Numerical Performance Indicator: | | |
| MSD Numerical Performance Indicator: | | |
| MS Percent Recovery: | | |
| MSD Percent Recovery: | | |
| MS Status vs Numerical Indicator: | | |
| MSD Status vs Numerical Indicator: | | |
| MS Status vs Recovery: | | |
| MSD Status vs Recovery: | | |
| MS/MSD Upper % Recovery Limits: | | |
| MS/MSD Lower % Recovery Limits: | | |

| Duplicate Sample Assessment | | |
|---|---|---|
| Sample I.D.: | LCS58095 | Enter Duplicate sample IDs if other than LCS/LCSD in the space below. |
| Duplicate Sample I.D. | LCSD58095 | |
| Sample Result (pCi/L, g, F): | 5.581 | |
| Sample Result 2 Sigma CSU (pCi/L, g, F): | 1.255 | |
| Sample Duplicate Result (pCi/L, g, F): | 5.412 | |
| Sample Duplicate Result 2 Sigma CSU (pCi/L, g, F): | 1.220 | |
| Are sample and/or duplicate results below RL? | NO | |
| Duplicate Numerical Performance Indicator: | 0.190 | |
| (Based on the LCS/LCSD Percent Recoveries) Duplicate RPD: | 3.25% | |
| Duplicate Status vs Numerical Indicator: | Pass | |
| Duplicate Status vs RPD: | Pass | |
| % RPD Limit: | 36% | |

| Matrix Spike/Matrix Spike Duplicate Sample Assessment | | |
|---|---|---|
| Sample I.D. | | |
| Sample MS I.D. | | |
| Sample MSD I.D. | | |
| Sample Matrix Spike Result: | | |
| Matrix Spike Result 2 Sigma CSU (pCi/L, g, F): | | |
| Sample Matrix Spike Duplicate Result: | | |
| Matrix Spike Duplicate Result 2 Sigma CSU (pCi/L, g, F): | | |
| Duplicate Numerical Performance Indicator: | | |
| (Based on the Percent Recoveries) MS/ MSD Duplicate RPD: | | |
| MS/ MSD Duplicate Status vs Numerical Indicator: | | |
| MS/ MSD Duplicate Status vs RPD: | | |
| % RPD Limit: | | |

## Evaluation of duplicate precision is not applicable if either the sample or duplicate results are below the MDC.

**Comments:**
*The method blank result is below the reporting limit for this analysis and is acceptable.

1/6/21

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

January 11, 2021

Joju Abraham
Georgia Power-CCR
2480 Maner Road
Atlanta, GA 30339

RE: Project: PLANT MCDONOUGH AP-234 RADS
Pace Project No.: 92512944

Dear Joju Abraham:

Enclosed are the analytical results for sample(s) received by the laboratory on December 18, 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 - Greensburg

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: Stephen Benda
Daniela Herrera, Golder
Ben Hodges, Georgia Power
Jimmy Jones, Golder Associates Inc.
Kristen Jurinko
Julie Lehrman, Golder Associates Inc.
Ms. Lauren Petty, Southern Co. Services
Dawn Prell, Golder Associates Inc.
Tim Richards, Golder Associates - Atlanta

**REPORT OF LABORATORY ANALYSIS**

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

## CERTIFICATIONS

Project: PLANT MCDONOUGH AP-234 RADS
Pace Project No.: 92512944

**Pace Analytical Services Pennsylvania**

1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601
ANAB DOD-ELAP Rad Accreditation #: L2417
Alabama Certification #: 41590
Arizona Certification #: AZ0734
Arkansas Certification
California Certification #: 04222CA
Colorado Certification #: PA01547
Connecticut Certification #: PH-0694
Delaware Certification
EPA Region 4 DW Rad
Florida/TNI Certification #: E87683
Georgia Certification #: C040
Florida: Cert E871149 SEKS WET
Guam Certification
Hawaii Certification
Idaho Certification
Illinois Certification
Indiana Certification
Iowa Certification #: 391
Kansas/TNI Certification #: E-10358
Kentucky Certification #: KY90133
KY WW Permit #: KY0098221
KY WW Permit #: KY0000221
Louisiana DHH/TNI Certification #: LA180012
Louisiana DEQ/TNI Certification #: 4086
Maine Certification #: 2017020
Maryland Certification #: 308
Massachusetts Certification #: M-PA1457
Michigan/PADEP Certification #: 9991
Missouri Certification #: 235
Montana Certification #: Cert0082
Nebraska Certification #: NE-OS-29-14
Nevada Certification #: PA014572018-1
New Hampshire/TNI Certification #: 297617
New Jersey/TNI Certification #: PA051
New Mexico Certification #: PA01457
New York/TNI Certification #: 10888
North Carolina Certification #: 42706
North Dakota Certification #: R-190
Ohio EPA Rad Approval: #41249
Oregon/TNI Certification #: PA200002-010
Pennsylvania/TNI Certification #: 65-00282
Puerto Rico Certification #: PA01457
Rhode Island Certification #: 65-00282
South Dakota Certification
Tennessee Certification #: 02867
Texas/TNI Certification #: T104704188-17-3
Utah/TNI Certification #: PA014572017-9
USDA Soil Permit #: P330-17-00091
Vermont Dept. of Health: ID# VT-0282
Virgin Island/PADEP Certification
Virginia/VELAP Certification #: 9526
Washington Certification #: C868
West Virginia DEP Certification #: 143
West Virginia DHHR Certification #: 9964C
Wisconsin Approve List for Rad
Wyoming Certification #: 8TMS-L

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

# SAMPLE SUMMARY

Project: PLANT MCDONOUGH AP-234 RADS
Pace Project No.: 92512944

| Lab ID | Sample ID | Matrix | Date Collected | Date Received |
|---|---|---|---|---|
| **92512944001** | **B-102D** | Water | 12/17/20 10:15 | 12/18/20 15:30 |
| **92512944002** | **B-106D** | Water | 12/17/20 13:05 | 12/18/20 15:30 |
| **92512944003** | **EB** | Water | 12/17/20 09:50 | 12/18/20 15:30 |

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

# SAMPLE ANALYTE COUNT

Project: PLANT MCDONOUGH AP-234 RADS
Pace Project No.: 92512944

| Lab ID | Sample ID | Method | Analysts | Analytes Reported | Laboratory |
|---|---|---|---|---|---|
| **92512944001** | **B-102D** | EPA 9315 | LAL | 1 | PASI-PA |
| | | EPA 9320 | VAL | 1 | PASI-PA |
| | | Total Radium Calculation | CMC | 1 | PASI-PA |
| **92512944002** | **B-106D** | EPA 9315 | LAL | 1 | PASI-PA |
| | | EPA 9320 | VAL | 1 | PASI-PA |
| | | Total Radium Calculation | CMC | 1 | PASI-PA |
| **92512944003** | **EB** | EPA 9315 | LAL | 1 | PASI-PA |
| | | EPA 9320 | VAL | 1 | PASI-PA |
| | | Total Radium Calculation | CMC | 1 | PASI-PA |

PASI-PA = Pace Analytical Services - Greensburg

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

# ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: PLANT MCDONOUGH AP-234 RADS
Pace Project No.: 92512944

**Sample: B-102D** | **Lab ID: 92512944001** | Collected: 12/17/20 10:15 | Received: 12/18/20 15:30 | Matrix: Water
PWS: | Site ID: | Sample Type:

| Parameters | Method | Act ± Unc (MDC) Carr Trac | Units | Analyzed | CAS No. | Qual |
|---|---|---|---|---|---|---|
| | Pace Analytical Services - Greensburg | | | | | |
| Radium-226 | EPA 9315 | **0.162 ± 0.271 (0.610) C:89% T:NA** | pCi/L | 01/06/21 07:00 | 13982-63-3 | |
| | Pace Analytical Services - Greensburg | | | | | |
| Radium-228 | EPA 9320 | **1.06 ± 0.644 (1.24) C:70% T:73%** | pCi/L | 01/05/21 13:26 | 15262-20-1 | |
| | Pace Analytical Services - Greensburg | | | | | |
| Total Radium | Total Radium Calculation | **1.22 ± 0.915 (1.85)** | pCi/L | 01/06/21 14:34 | 7440-14-4 | |

## REPORT OF LABORATORY ANALYSIS

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

# ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: PLANT MCDONOUGH AP-234 RADS
Pace Project No.: 92512944

**Sample: B-106D** | **Lab ID: 92512944002** | Collected: 12/17/20 13:05 | Received: 12/18/20 15:30 | Matrix: Water
PWS: | Site ID: | Sample Type:

| Parameters | Method | Act ± Unc (MDC) Carr Trac | Units | Analyzed | CAS No. | Qual |
|---|---|---|---|---|---|---|
| | Pace Analytical Services - Greensburg | | | | | |
| Radium-226 | EPA 9315 | **0.195 ± 0.379 (0.872) C:68% T:NA** | pCi/L | 01/06/21 07:00 | 13982-63-3 | |
| | Pace Analytical Services - Greensburg | | | | | |
| Radium-228 | EPA 9320 | **0.757 ± 0.568 (1.13) C:69% T:75%** | pCi/L | 01/05/21 13:26 | 15262-20-1 | |
| | Pace Analytical Services - Greensburg | | | | | |
| Total Radium | Total Radium Calculation | **0.952 ± 0.947 (2.00)** | pCi/L | 01/06/21 14:34 | 7440-14-4 | |

## REPORT OF LABORATORY ANALYSIS

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

## ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: PLANT MCDONOUGH AP-234 RADS
Pace Project No.: 92512944

**Sample: EB** | **Lab ID: 92512944003** | Collected: 12/17/20 09:50 | Received: 12/18/20 15:30 | Matrix: Water
PWS: | Site ID: | Sample Type:

| Parameters | Method | Act ± Unc (MDC) Carr Trac | Units | Analyzed | CAS No. | Qual |
|---|---|---|---|---|---|---|
| | Pace Analytical Services - Greensburg | | | | | |
| Radium-226 | EPA 9315 | **-0.0835 ± 0.164 (0.513) C:94% T:NA** | pCi/L | 01/06/21 07:24 | 13982-63-3 | |
| | Pace Analytical Services - Greensburg | | | | | |
| Radium-228 | EPA 9320 | **0.531 ± 0.595 (1.26) C:70% T:79%** | pCi/L | 01/05/21 13:26 | 15262-20-1 | |
| | Pace Analytical Services - Greensburg | | | | | |
| Total Radium | Total Radium Calculation | **0.531 ± 0.759 (1.77)** | pCi/L | 01/06/21 14:34 | 7440-14-4 | |

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

## QUALITY CONTROL - RADIOCHEMISTRY

Project: PLANT MCDONOUGH AP-234 RADS
Pace Project No.: 92512944

| | | | |
|---|---|---|---|
| QC Batch: | 428750 | Analysis Method: | EPA 9320 |
| QC Batch Method: | EPA 9320 | Analysis Description: | 9320 Radium 228 |
| | | Laboratory: | Pace Analytical Services - Greensburg |

Associated Lab Samples: 92512944001, 92512944002, 92512944003

METHOD BLANK: 2071922 Matrix: Water

Associated Lab Samples: 92512944001, 92512944002, 92512944003

| Parameter | Act ± Unc (MDC) Carr Trac | Units | Analyzed | Qualifiers |
|---|---|---|---|---|
| Radium-228 | 0.694 ± 0.380 (0.676) C:79% T:80% | pCi/L | 01/05/21 13:26 | |

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.

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

## QUALITY CONTROL - RADIOCHEMISTRY

Project: PLANT MCDONOUGH AP-234 RADS
Pace Project No.: 92512944

| | | | |
|---|---|---|---|
| QC Batch: | 429175 | Analysis Method: | EPA 9315 |
| QC Batch Method: | EPA 9315 | Analysis Description: | 9315 Total Radium |
| | | Laboratory: | Pace Analytical Services - Greensburg |

Associated Lab Samples: 92512944001, 92512944002, 92512944003

METHOD BLANK: 2073293 Matrix: Water

Associated Lab Samples: 92512944001, 92512944002, 92512944003

| Parameter | Act ± Unc (MDC) Carr Trac | Units | Analyzed | Qualifiers |
|---|---|---|---|---|
| Radium-226 | 0.176 ± 0.138 (0.246) C:97% T:NA | pCi/L | 01/05/21 17:40 | |

**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

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

## QUALIFIERS

| | |
|---|---|
| Project: | PLANT MCDONOUGH AP-234 RADS |
| Pace Project No.: | 92512944 |

### 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.

Act - Activity

Unc - Uncertainty: SDWA = 1.96 sigma count uncertainty, all other matrices = Expanded Uncertainty (95% confidence interval). Gamma Spec = Expanded Uncertainty (95.4% Confidence Interval)

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

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

TNI - The NELAC Institute.

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

## QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: PLANT MCDONOUGH AP-234 RADS
Pace Project No.: 92512944

| Lab ID | Sample ID | QC Batch Method | QC Batch | Analytical Method | Analytical Batch |
|---|---|---|---|---|---|
| **92512944001** | **B-102D** | EPA 9315 | 429175 | | |
| **92512944002** | **B-106D** | EPA 9315 | 429175 | | |
| **92512944003** | **EB** | EPA 9315 | 429175 | | |
| **92512944001** | **B-102D** | EPA 9320 | 428750 | | |
| **92512944002** | **B-106D** | EPA 9320 | 428750 | | |
| **92512944003** | **EB** | EPA 9320 | 428750 | | |
| **92512944001** | **B-102D** | Total Radium Calculation | 429861 | | |
| **92512944002** | **B-106D** | Total Radium Calculation | 429861 | | |
| **92512944003** | **EB** | Total Radium Calculation | 429861 | | |

| Pace Analytical® | Document Name: **Sample Condition Upon Receipt(SCUR)** | Document Revised: October 28, 2020 Page 1 of 2 |
|---|---|---|
| | Document No.: **F-CAR-CS-033-Rev.07** | Issuing Authority: Pace Carolinas Quality Office |

**Laboratory receiving samples:**
**Asheville** ☐ **Eden** ☐ **Greenwood** ☐ **Huntersville** ☐ **Raleigh** ☐ **Mechanicsville** ☐ **Atlanta** ☑ **Kernersville** ☐

**WO# : 92512944**

92512944

Sample Condition Upon Receipt

**Client Name:** GAlower

**Project #:**

**Courier:** ☐ Fed Ex ☐ UPS ☐ USPS ☑ Client ☐ Commercial ☐ Pace ☐ Other:____

**Custody Seal Present?** ☐ Yes ☑ No **Seals Intact?** ☐ Yes ☐ No

**Date/Initials Person Examining Contents:** 12/18/20 LOH

**Packing Material:** ☐ Bubble Wrap ☐ Bubble Bags ☑ None ☐ Other

**Biological Tissue Frozen?** ☐ Yes ☑ No ☐ N/A

**Thermometer:** ☑ IR Gun ID: 233

**Type of Ice:** ☑ Wet ☐ Blue ☐ None

**Cooler Temp:** 3.7 **Correction Factor:** Add/Subtract (°C) 0.4

Temp should be above freezing to 6°C
☐ Samples out of temp criteria. Samples on ice, cooling process has begun

**Cooler Temp Corrected (°C):** 4.1

**USDA Regulated Soil** (☑ N/A, water sample)

Did samples originate in a quarantine zone within the United States: CA, NY, or SC (check maps)? ☐ Yes ☐ No

Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? ☐ Yes ☐ No

| | | | | Comments/Discrepancy: |
|---|---|---|---|---|
| Chain of Custody Present? | ☑ Yes | ☐ No | ☐ N/A | 1. |
| Samples Arrived within Hold Time? | ☑ Yes | ☐ No | ☐ N/A | 2. |
| **Short Hold Time Analysis (<72 hr.)?** | ☐ Yes | ☑ No | ☐ N/A | 3. |
| **Rush Turn Around Time Requested?** | ☐ Yes | ☑ No | ☐ N/A | 4. |
| Sufficient Volume? | ☑ Yes | ☐ No | ☐ N/A | 5. |
| Correct Containers Used? | ☑ Yes | ☐ No | ☐ N/A | 6. |
| -Pace Containers Used? | ☑ Yes | ☐ No | ☐ N/A | |
| Containers Intact? | ☑ Yes | ☐ No | ☐ N/A | 7. |
| Dissolved analysis: Samples Field Filtered? | ☐ Yes | ☐ No | ☑ N/A | 8. |
| Sample Labels Match COC? | ☑ Yes | ☐ No | ☐ N/A | 9. |
| -Includes Date/Time/ID/Analysis Matrix: W | | | | |
| Headspace in VOA Vials (>5-6mm)? | ☐ Yes | ☐ No | ☑ N/A | 10. |
| Trip Blank Present? | ☐ Yes | ☐ No | ☑ N/A | 11. |
| Trip Blank Custody Seals Present? | ☐ Yes | ☐ No | ☑ N/A | |

**COMMENTS/SAMPLE DISCREPANCY**

**Field Data Required?** ☐ Yes ☐ No

Lot ID of split containers:

**CLIENT NOTIFICATION/RESOLUTION**

Person contacted: ____________________ Date/Time: ____________________

**Project Manager SCURF Review:** ____________________ **Date:** ____________

**Project Manager SRF Review:** ____________________ **Date:** ____________

| Pace Analytical | Document Name: **Sample Condition Upon Receipt(SCUR)** | Document Revised: October 28, 2020 <br> Page 2 of 2 |
|---|---|---|
| | Document No.: **F-CAR-CS-033-Rev.07** | Issuing Authority: <br> Pace Carolinas Quality Office |

***Check mark top half of box if pH and/or dechlorination is verified and within the acceptance range for preservation samples.**

**Project #** **WO#:92512944**

**PM: KLH1** **Due Date: 01/12/21**

**CLIENT: GA-GA Power**

Exceptions: VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC, LLHg

****Bottom half of box is to list number of bottles**

| 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) | BPN | 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) | DG9U-40 mL Amber Unpreserved vials (N/A) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | 1 | 1 | | ✓ 1 | | | | | | | | | | | | | | | | | | | ✓ 2 | | | | |
| 2 | | 1 | 1 | | ✓ 1 | | | | | | | | | | | | | | | | | | | ✓ 2 | | | | |
| 3 | | 1 | 1 | | ✓ 1 | | | | | | | | | | | | | | | | | | | ✓ 2 | | | | |
| 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

## pH Adjustment Log for Preserved Samples

| Sample ID | Type of Preservative | pH upon receipt | Date preservation adjusted | Time preservation adjusted | Amount of Preservative added | Lot # |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | | | | |
| | | | | | | |

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

Pace Analytical

# 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: Georgia Power - Coal Combustion Residuals | Report To: Joju Abraham | Attention: scsinvoices@southernco.com |
| Address: 2480 Maner Road | Copy To: Golder | Company Name: |
| Atlanta, GA 30339 | | Address: |
| Email: jabraham@southernco.com | Purchase Order #: | Pace Quote: |
| Phone: (404) 506-7239 Fax | Project Name: Plant McDonough AP-234 | Pace Project Manager: Kevin Herring |
| Requested Due Date: Standard | Project #: 166849618 | Pace Profile #: |

Regulatory Agency

State / Location: GA

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 — One Character per box. (A-Z, 0-9 / , -) Sample Ids must be unique

| ITEM # | SAMPLE ID | MATRIX CODE (see valid codes to left) | SAMPLE TYPE (G=GRAB C=COMP) | DATE | TIME | SAMPLE TEMP AT COLLECTION | # OF CONTAINERS | Unpreserved - Ice | H2SO4 | HNO3 | HCl | NaOH + Zn Acetate | Na2S2O3 | Methanol | Other | *Metals App III and App IV Total (N) | Cl, F, SO4 (N) | Radium 226/228 (N) | TDS (N) | Residual Chlorine (Y/N) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | B-102D | WT | G | 12/17/2020 | 1015 | | 5 | 2 | | 3 | | | | | | X | X | X | X | | pH 5.39 |
| 2 | B-106D | WT | G | 12/17/2020 | 1305 | | 5 | 2 | | 3 | | | | | | X | X | X | X | | pH 5.82 |
| 3 | EB | WT | G | 12/17/2020 | 950 | | 5 | 2 | | 3 | | | | | | X | X | X | X | | |
| 4 | | | | | | | | | | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | | | | | | | | | |
| 13 | | | | | | | | | | | | | | | | | | | | | |
| 14 | | | | | | | | | | | | | | | | | | | | | |
| 16 | | | | | | | | | | | | | | | | | | | | | |

Requested Analysis Filtered (Y/N)

| ADDITIONAL COMMENTS | RELINQUISHED BY / AFFILIATION | DATE | TIME | ACCEPTED BY / AFFILIATION | DATE | TIME | SAMPLE CONDITIONS |
|---|---|---|---|---|---|---|---|
| *App III / IV Metals = As, Sb, B, Ba, Be, Ca, Cd, Cr, Co, Pb, Li, Hg, Mo, Se, Tl | Yong Cheng Soo | 12/18/20 | | Chuck Fink | 12/18/20 | 1530 | |

SAMPLER NAME AND SIGNATURE

PRINT NAME: Yong Cheng Soo

SIGNATURE: DATE Signed: 12/8/2020

TEMP in C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

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

January 05, 2021

Joju Abraham
Georgia Power-CCR
2480 Maner Road
Atlanta, GA 30339

RE: Project: PLANT MCDONOUGH AP-1
Pace Project No.: 92512947

Dear Joju Abraham:

Enclosed are the analytical results for sample(s) received by the laboratory on December 18, 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: Stephen Benda
Daniela Herrera, Golder
Ben Hodges, Georgia Power
Jimmy Jones, Golder Associates Inc.
Kristen Jurinko
Julie Lehrman, Golder Associates Inc.
Ms. Lauren Petty, Southern Co. Services
Dawn Prell, Golder Associates Inc.
Tim Richards, Golder Associates - Atlanta

**REPORT OF LABORATORY ANALYSIS**

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

# CERTIFICATIONS

| | |
|---|---|
| Project: | PLANT MCDONOUGH AP-1 |
| Pace Project No.: | 92512947 |

**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
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
North Carolina Certification #: 381
South Carolina Certification #: 98011001

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

## SAMPLE SUMMARY

Project: PLANT MCDONOUGH AP-1
Pace Project No.: 92512947

| Lab ID | Sample ID | Matrix | Date Collected | Date Received |
|---|---|---|---|---|
| **92512947001** | **B-110D** | Water | 12/17/20 15:40 | 12/18/20 15:30 |

**REPORT OF LABORATORY ANALYSIS**

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

# SAMPLE ANALYTE COUNT

Project: PLANT MCDONOUGH AP-1
Pace Project No.: 92512947

| Lab ID | Sample ID | Method | Analysts | Analytes Reported |
|---|---|---|---|---|
| **92512947001** | **B-110D** | EPA 6010D | DRB | 1 |
| | | EPA 6020B | CW1 | 13 |
| | | EPA 7470A | VB | 1 |
| | | SM 2450C-2011 | AW1 | 1 |
| | | EPA 300.0 Rev 2.1 1993 | CDC | 3 |

PASI-A = Pace Analytical Services - Asheville
PASI-C = Pace Analytical Services - Charlotte
PASI-GA = Pace Analytical Services - Peachtree Corners, GA

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

# ANALYTICAL RESULTS

Project: PLANT MCDONOUGH AP-1
Pace Project No.: 92512947

**Sample: B-110D** **Lab ID: 92512947001** Collected: 12/17/20 15:40 Received: 12/18/20 15:30 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 | | 12/18/20 16:56 | | |
| pH | **6.99** | Std. Units | | | 1 | | 12/18/20 16:56 | | |
| **6010D ATL ICP** | Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Peachtree Corners, GA | | | | | | | | |
| Calcium | **47.8** | mg/L | 1.0 | 0.070 | 1 | 12/28/20 09:00 | 12/28/20 21:49 | 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 | 12/30/20 09:56 | 12/30/20 19:52 | 7440-36-0 | |
| Arsenic | **0.0017J** | mg/L | 0.0050 | 0.00078 | 1 | 12/30/20 09:56 | 12/30/20 19:52 | 7440-38-2 | |
| Barium | **0.0061J** | mg/L | 0.010 | 0.00071 | 1 | 12/30/20 09:56 | 12/30/20 19:52 | 7440-39-3 | |
| Beryllium | ND | mg/L | 0.0030 | 0.000046 | 1 | 12/30/20 09:56 | 12/31/20 17:17 | 7440-41-7 | |
| Boron | **0.28** | mg/L | 0.10 | 0.0052 | 1 | 12/30/20 09:56 | 12/30/20 19:52 | 7440-42-8 | |
| Cadmium | ND | mg/L | 0.0025 | 0.00012 | 1 | 12/30/20 09:56 | 12/30/20 19:52 | 7440-43-9 | |
| Chromium | ND | mg/L | 0.010 | 0.00055 | 1 | 12/30/20 09:56 | 12/30/20 19:52 | 7440-47-3 | |
| Cobalt | **0.0016J** | mg/L | 0.0050 | 0.00038 | 1 | 12/30/20 09:56 | 12/30/20 19:52 | 7440-48-4 | |
| Lead | ND | mg/L | 0.0050 | 0.000036 | 1 | 12/30/20 09:56 | 12/30/20 19:52 | 7439-92-1 | |
| Lithium | **0.011J** | mg/L | 0.030 | 0.00081 | 1 | 12/30/20 09:56 | 12/30/20 19:52 | 7439-93-2 | |
| Molybdenum | **0.076** | mg/L | 0.010 | 0.00069 | 1 | 12/30/20 09:56 | 12/30/20 19:52 | 7439-98-7 | |
| Selenium | ND | mg/L | 0.010 | 0.0016 | 1 | 12/30/20 09:56 | 12/30/20 19:52 | 7782-49-2 | |
| Thallium | ND | mg/L | 0.0010 | 0.00014 | 1 | 12/30/20 09:56 | 12/30/20 19:52 | 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 | 12/22/20 07:10 | 12/22/20 13:31 | 7439-97-6 | |
| **2540C Total Dissolved Solids** | Analytical Method: SM 2450C-2011 Pace Analytical Services - Peachtree Corners, GA | | | | | | | | |
| Total Dissolved Solids | **251** | mg/L | 10.0 | 10.0 | 1 | | 12/22/20 17:33 | | |
| **300.0 IC Anions 28 Days** | Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville | | | | | | | | |
| Chloride | **2.1** | mg/L | 1.0 | 0.60 | 1 | | 12/23/20 23:28 | 16887-00-6 | |
| Fluoride | **0.72** | mg/L | 0.10 | 0.050 | 1 | | 12/23/20 23:28 | 16984-48-8 | |
| Sulfate | **51.4** | mg/L | 1.0 | 0.50 | 1 | | 12/23/20 23:28 | 14808-79-8 | |

Pace Analytical
www.pacelabs.com

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

## QUALITY CONTROL DATA

Project: PLANT MCDONOUGH AP-1
Pace Project No.: 92512947

QC Batch: 589491
QC Batch Method: EPA 3010A
Analysis Method: EPA 6010D
Analysis Description: 6010D ATL
Laboratory: Pace Analytical Services - Peachtree Corners, GA

Associated Lab Samples: 92512947001

METHOD BLANK: 3113717 Matrix: Water
Associated Lab Samples: 92512947001

| Parameter | Units | Blank Result | Reporting Limit | MDL | Analyzed | Qualifiers |
|---|---|---|---|---|---|---|
| Calcium | mg/L | ND | 1.0 | 0.070 | 12/28/20 21:38 | |

LABORATORY CONTROL SAMPLE: 3113718

| Parameter | Units | Spike Conc. | LCS Result | LCS % Rec | % Rec Limits | Qualifiers |
|---|---|---|---|---|---|---|
| Calcium | mg/L | 1 | 1.0 | 104 | 80-120 | |

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3113719 3113720

| Parameter | Units | 92512951001 Result | MS Spike Conc. | MSD Spike Conc. | MS Result | MSD Result | MS % Rec | MSD % Rec | % Rec Limits | RPD | Max RPD | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Calcium | mg/L | 71.5 | 1 | 1 | 75.6 | 73.7 | 406 | 223 | 75-125 | 2 | 20 | M1 |

**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.**

Pace Analytical®
www.pacelabs.com

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

# QUALITY CONTROL DATA

Project: PLANT MCDONOUGH AP-1
Pace Project No.: 92512947

QC Batch: 589986
QC Batch Method: EPA 3005A
Analysis Method: EPA 6020B
Analysis Description: 6020 MET
Laboratory: Pace Analytical Services - Peachtree Corners, GA
Associated Lab Samples: 92512947001

METHOD BLANK: 3115564 Matrix: Water
Associated Lab Samples: 92512947001

| Parameter | Units | Blank Result | Reporting Limit | MDL | Analyzed | Qualifiers |
|---|---|---|---|---|---|---|
| Antimony | mg/L | ND | 0.0030 | 0.00028 | 12/30/20 19:40 | |
| Arsenic | mg/L | ND | 0.0050 | 0.00078 | 12/30/20 19:40 | |
| Barium | mg/L | ND | 0.010 | 0.00071 | 12/30/20 19:40 | |
| Beryllium | mg/L | ND | 0.0030 | 0.000046 | 12/31/20 16:06 | |
| Boron | mg/L | ND | 0.10 | 0.0052 | 12/30/20 19:40 | |
| Cadmium | mg/L | ND | 0.0025 | 0.00012 | 12/30/20 19:40 | |
| Chromium | mg/L | ND | 0.010 | 0.00055 | 12/30/20 19:40 | |
| Cobalt | mg/L | ND | 0.0050 | 0.00038 | 12/30/20 19:40 | |
| Lead | mg/L | ND | 0.0050 | 0.000036 | 12/30/20 19:40 | |
| Lithium | mg/L | ND | 0.030 | 0.00081 | 12/30/20 19:40 | |
| Molybdenum | mg/L | ND | 0.010 | 0.00069 | 12/30/20 19:40 | |
| Selenium | mg/L | ND | 0.010 | 0.0016 | 12/30/20 19:40 | |
| Thallium | mg/L | ND | 0.0010 | 0.00014 | 12/30/20 19:40 | |

LABORATORY CONTROL SAMPLE: 3115565

| Parameter | Units | Spike Conc. | LCS Result | LCS % Rec | % Rec Limits | Qualifiers |
|---|---|---|---|---|---|---|
| Antimony | mg/L | 0.1 | 0.093 | 93 | 80-120 | |
| Arsenic | mg/L | 0.1 | 0.089 | 89 | 80-120 | |
| Barium | mg/L | 0.1 | 0.086 | 86 | 80-120 | |
| Beryllium | mg/L | 0.1 | 0.097 | 97 | 80-120 | |
| Boron | mg/L | 1 | 0.91 | 91 | 80-120 | |
| Cadmium | mg/L | 0.1 | 0.092 | 92 | 80-120 | |
| Chromium | mg/L | 0.1 | 0.092 | 92 | 80-120 | |
| Cobalt | mg/L | 0.1 | 0.092 | 92 | 80-120 | |
| Lead | mg/L | 0.1 | 0.088 | 88 | 80-120 | |
| Lithium | mg/L | 0.1 | 0.086 | 86 | 80-120 | |
| Molybdenum | mg/L | 0.1 | 0.095 | 95 | 80-120 | |
| Selenium | mg/L | 0.1 | 0.088 | 88 | 80-120 | |
| Thallium | mg/L | 0.1 | 0.088 | 88 | 80-120 | |

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3115566 3115567

| Parameter | Units | 92512947001 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 | 0.094 | 0.093 | 94 | 93 | 75-125 | 1 | 20 | |
| Arsenic | mg/L | 0.0017J | 0.1 | 0.1 | 0.095 | 0.094 | 93 | 92 | 75-125 | 1 | 20 | |

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

## REPORT OF LABORATORY ANALYSIS

Pace Analytical
www.pacelabs.com

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

## QUALITY CONTROL DATA

Project: PLANT MCDONOUGH AP-1
Pace Project No.: 92512947

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3115566 3115567

| Parameter | Units | 92512947001 Result | MS Spike Conc. | MSD Spike Conc. | MS Result | MSD Result | MS % Rec | MSD % Rec | % Rec Limits | RPD | Max RPD | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Barium | mg/L | 0.0061J | 0.1 | 0.1 | 0.094 | 0.091 | 87 | 85 | 75-125 | 2 | 20 | |
| Beryllium | mg/L | ND | 0.1 | 0.1 | 0.097 | 0.097 | 97 | 97 | 75-125 | 0 | 20 | |
| Boron | mg/L | 0.28 | 1 | 1 | 1.1 | 1.1 | 80 | 85 | 75-125 | 5 | 20 | |
| Cadmium | mg/L | ND | 0.1 | 0.1 | 0.091 | 0.091 | 91 | 91 | 75-125 | 0 | 20 | |
| Chromium | mg/L | ND | 0.1 | 0.1 | 0.090 | 0.090 | 90 | 90 | 75-125 | 0 | 20 | |
| Cobalt | mg/L | 0.0016J | 0.1 | 0.1 | 0.091 | 0.091 | 90 | 89 | 75-125 | 0 | 20 | |
| Lead | mg/L | ND | 0.1 | 0.1 | 0.089 | 0.086 | 89 | 86 | 75-125 | 3 | 20 | |
| Lithium | mg/L | 0.011J | 0.1 | 0.1 | 0.094 | 0.093 | 82 | 82 | 75-125 | 0 | 20 | |
| Molybdenum | mg/L | 0.076 | 0.1 | 0.1 | 0.17 | 0.17 | 96 | 91 | 75-125 | 3 | 20 | |
| Selenium | mg/L | ND | 0.1 | 0.1 | 0.091 | 0.089 | 91 | 89 | 75-125 | 2 | 20 | |
| Thallium | mg/L | ND | 0.1 | 0.1 | 0.089 | 0.087 | 89 | 87 | 75-125 | 3 | 20 | |

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

### REPORT OF LABORATORY ANALYSIS

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

## QUALITY CONTROL DATA

Project: PLANT MCDONOUGH AP-1
Pace Project No.: 92512947

QC Batch: 588542
QC Batch Method: EPA 7470A
Analysis Method: EPA 7470A
Analysis Description: 7470 Mercury
Laboratory: Pace Analytical Services - Peachtree Corners, GA
Associated Lab Samples: 92512947001

METHOD BLANK: 3109729 Matrix: Water
Associated Lab Samples: 92512947001

| Parameter | Units | Blank Result | Reporting Limit | MDL | Analyzed | Qualifiers |
|---|---|---|---|---|---|---|
| Mercury | mg/L | ND | 0.00050 | 0.000078 | 12/22/20 12:50 | |

LABORATORY CONTROL SAMPLE: 3109730

| 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: 3109731 3109732

| Parameter | Units | 92512574004 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 | 0.0023 | 89 | 90 | 75-125 | 1 | 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.**

Pace Analytical®
www.pacelabs.com

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

## QUALITY CONTROL DATA

Project: PLANT MCDONOUGH AP-1
Pace Project No.: 92512947

QC Batch: 588927
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: 92512947001

METHOD BLANK: 3111378    Matrix: Water
Associated Lab Samples: 92512947001

| Parameter | Units | Blank Result | Reporting Limit | MDL | Analyzed | Qualifiers |
|---|---|---|---|---|---|---|
| Total Dissolved Solids | mg/L | ND | 10.0 | 10.0 | 12/22/20 17:31 | |

LABORATORY CONTROL SAMPLE: 3111379

| Parameter | Units | Spike Conc. | LCS Result | LCS % Rec | % Rec Limits | Qualifiers |
|---|---|---|---|---|---|---|
| Total Dissolved Solids | mg/L | 400 | 386 | 96 | 84-108 | |

SAMPLE DUPLICATE: 3111380

| Parameter | Units | 92512580004 Result | Dup Result | RPD | Max RPD | Qualifiers |
|---|---|---|---|---|---|---|
| Total Dissolved Solids | mg/L | 294 | 295 | 0 | 10 | |

SAMPLE DUPLICATE: 3111381

| Parameter | Units | 92513185001 Result | Dup Result | RPD | Max RPD | Qualifiers |
|---|---|---|---|---|---|---|
| Total Dissolved Solids | mg/L | 339 | 340 | 0 | 10 | |

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

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

# QUALITY CONTROL DATA

Project: PLANT MCDONOUGH AP-1
Pace Project No.: 92512947

QC Batch: 589104 | Analysis Method: EPA 300.0 Rev 2.1 1993
QC Batch Method: EPA 300.0 Rev 2.1 1993 | Analysis Description: 300.0 IC Anions
Laboratory: Pace Analytical Services - Asheville

Associated Lab Samples: 92512947001

METHOD BLANK: 3112052 Matrix: Water
Associated Lab Samples: 92512947001

| Parameter | Units | Blank Result | Reporting Limit | MDL | Analyzed | Qualifiers |
|---|---|---|---|---|---|---|
| Chloride | mg/L | ND | 1.0 | 0.60 | 12/23/20 16:31 | |
| Fluoride | mg/L | ND | 0.10 | 0.050 | 12/23/20 16:31 | |
| Sulfate | mg/L | ND | 1.0 | 0.50 | 12/23/20 16:31 | |

LABORATORY CONTROL SAMPLE: 3112053

| 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 | 2.5 | 102 | 90-110 | |
| Sulfate | mg/L | 50 | 52.0 | 104 | 90-110 | |

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3112054 3112055

| Parameter | Units | 92513456002 Result | MS Spike Conc. | MSD Spike Conc. | MS Result | MSD Result | MS % Rec | MSD % Rec | % Rec Limits | RPD | Max RPD | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Chloride | mg/L | 409 | 50 | 50 | 471 | 456 | 125 | 94 | 90-110 | 3 | 10 | M6 |
| Fluoride | mg/L | 0.14 | 2.5 | 2.5 | 2.1 | 2.1 | 77 | 79 | 90-110 | 2 | 10 | M1 |
| Sulfate | mg/L | 403 | 50 | 50 | 466 | 450 | 126 | 93 | 90-110 | 4 | 10 | M6 |

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3112056 3112057

| Parameter | Units | 92512580004 Result | MS Spike Conc. | MSD Spike Conc. | MS Result | MSD Result | MS % Rec | MSD % Rec | % Rec Limits | RPD | Max RPD | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Chloride | mg/L | 3.4 | 50 | 50 | 57.4 | 57.5 | 108 | 108 | 90-110 | 0 | 10 | |
| Fluoride | mg/L | 0.18 | 2.5 | 2.5 | 2.7 | 2.7 | 102 | 102 | 90-110 | 0 | 10 | |
| Sulfate | mg/L | 11.3 | 50 | 50 | 65.5 | 65.6 | 108 | 109 | 90-110 | 0 | 10 | |

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

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

# QUALIFIERS

Project: PLANT MCDONOUGH AP-1
Pace Project No.: 92512947

---

**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.

## REPORT OF LABORATORY ANALYSIS

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

## QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: PLANT MCDONOUGH AP-1
Pace Project No.: 92512947

| Lab ID | Sample ID | QC Batch Method | QC Batch | Analytical Method | Analytical Batch |
|---|---|---|---|---|---|
| **92512947001** | **B-110D** | | | | |
| **92512947001** | **B-110D** | EPA 3010A | 589491 | EPA 6010D | 589516 |
| **92512947001** | **B-110D** | EPA 3005A | 589986 | EPA 6020B | 590063 |
| **92512947001** | **B-110D** | EPA 7470A | 588542 | EPA 7470A | 588758 |
| **92512947001** | **B-110D** | SM 2450C-2011 | 588927 | | |
| **92512947001** | **B-110D** | EPA 300.0 Rev 2.1 1993 | 589104 | | |

| Pace Analytical® | Document Name: **Sample Condition Upon Receipt(SCUR)** | Document Revised: October 28, 2020 Page 1 of 2 |
|---|---|---|
| | Document No.: **F-CAR-CS-033-Rev.07** | Issuing Authority: Pace Carolinas Quality Office |

**Laboratory receiving samples:**
**Asheville** ☐ **Eden** ☐ **Greenwood** ☐ **Huntersville** ☐ **Raleigh** ☐ **Mechanicsville** ☐ **Atlanta** ☑ **Kernersville** ☐

**Sample Condition Upon Receipt**

**Client Name:** GA Power

**Project #** **WO# : 92512947**

92512947

**Courier:** ☐ Fed Ex ☐ UPS ☐ USPS ☑ Client ☐ Commercial ☐ Pace ☐ Other: ____

**Custody Seal Present?** ☐ Yes ☑ No **Seals Intact?** ☐ Yes ☐ No

**Date/Initials Person Examining Contents:** 12/18/20 LG4

**Packing Material:** ☐ Bubble Wrap ☐ Bubble Bags ☑ None ☐ Other

**Biological Tissue Frozen?** ☐ Yes ☑ No ☐ N/A

**Thermometer:** ☑ IR Gun ID: 233

**Type of Ice:** ☑ Wet ☐ Blue ☐ None

**Cooler Temp:** 3.7 **Correction Factor:** Add/Subtract (°C) 0.4

**Temp should be above freezing to 6°C**
☐ Samples out of temp criteria. Samples on ice, cooling process has begun

**Cooler Temp Corrected (°C):** 4.1

**USDA Regulated Soil** ( ☑ N/A, water sample)

Did samples originate in a quarantine zone within the United States: CA, NY, or SC (check maps)? ☐ Yes ☐ No

Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? ☐ Yes ☐ No

| | | | | **Comments/Discrepancy:** |
|---|---|---|---|---|
| Chain of Custody Present? | ☑ Yes | ☐ No | ☐ N/A | 1. |
| Samples Arrived within Hold Time? | ☑ Yes | ☐ No | ☐ N/A | 2. |
| **Short Hold Time Analysis (<72 hr.)?** | ☐ Yes | ☑ No | ☐ N/A | 3. |
| **Rush Turn Around Time Requested?** | ☐ Yes | ☑ No | ☐ N/A | 4. |
| Sufficient Volume? | ☑ Yes | ☐ No | ☐ N/A | 5. |
| Correct Containers Used? | ☑ Yes | ☐ No | ☐ N/A | 6. |
| -Pace Containers Used? | ☑ Yes | ☐ No | ☐ N/A | |
| Containers Intact? | ☑ Yes | ☐ No | ☐ N/A | 7. |
| Dissolved analysis: Samples Field Filtered? | ☐ Yes | ☐ No | ☑ N/A | 8. |
| Sample Labels Match COC? | ☑ Yes | ☐ No | ☐ N/A | 9. |
| -Includes Date/Time/ID/Analysis Matrix: W | | | | |
| Headspace in VOA Vials (>5-6mm)? | ☐ Yes | ☐ No | ☑ N/A | 10. |
| Trip Blank Present? | ☐ Yes | ☐ No | ☑ N/A | 11. |
| Trip Blank Custody Seals Present? | ☐ Yes | ☐ No | ☑ N/A | |

**COMMENTS/SAMPLE DISCREPANCY**

**Field Data Required?** ☐ Yes ☐ No

Lot ID of split containers:

**CLIENT NOTIFICATION/RESOLUTION**

Person contacted: ____________ Date/Time: ____________

**Project Manager SCURF Review:** ____________ **Date:** ____________

**Project Manager SRF Review:** ____________ **Date:** ____________

| Pace Analytical | Document Name: **Sample Condition Upon Receipt(SCUR)** | Document Revised: October 28, 2020 Page 2 of 2 |
|---|---|---|
| | Document No.: **F-CAR-CS-033-Rev.07** | Issuing Authority: Quality Office |

***Check mark top half of box if pH and/or dechlorination is verified and within the acceptance range for preservation samples.**

**Project #** **WO# : 92512947**

**PM: KLH1** **Due Date: 01/05/21**

**CLIENT: GA-GA Power**

Exceptions: VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC, LLHg

****Bottom half of box is to list number of bottles**

| 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) | 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) | DG9U-40 mL Amber Unpreserved vials (N/A) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | 1 | 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 # |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | | | | |
| | | | | | | |

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

# 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 - Coal Combustion Residuals
Address: 2480 Maner Road
Atlanta, GA 30339
Email: jabraham@southernco.com
Phone: (404) 506-7239 Fax:
Requested Due Date: Standard

**Section B**
**Required Project Information:**

Report To: Joju Abraham
Copy To: Golder
Purchase Order #:
Project Name: Plant McDonough AP-1
Project #: 166849618

**Section C**
**Invoice Information:**

Attention: scsinvoices@southernco.com
Company Name:
Address:
Pace Quote:
Pace Project Manager: Kevin Herring
Pace Profile #:

Regulatory Agency:
State / Location: GA

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 |

Requested Analysis Filtered (Y/N)

| ITEM # | SAMPLE ID | MATRIX CODE (see valid codes to left) | SAMPLE TYPE (G=GRAB C=COMP) | DATE | TIME | SAMPLE TEMP AT COLLECTION | # OF CONTAINERS | Unpreserved - Ice | H2SO4 | HNO3 | HCl | NaOH + Zn Acetate | Na2S2O3 | Methanol | Other | Analyses Test Y/N | *Metals App III and App IV Total (N) | Cl, F, SO4 (N) | Radium 226/228 (N) | TDS (N) | Residual Chlorine (Y/N) | G2512447 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | B-110D | WT | G | 12/17/2020 | 1540 | | 5 | 2 | | 3 | | | | | | | X | X | X | X | | pH: 6.99 |
| 2 | | | | | | | | | | | | | | | | | | | | | | |
| 3 | | | | | | | | | | | | | | | | | | | | | | |
| 4 | | | | | | | | | | | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | | | | | | | | | | |
| 13 | | | | | | | | | | | | | | | | | | | | | | |
| 14 | | | | | | | | | | | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | | | | | | | | | | |

| ADDITIONAL COMMENTS | RELINQUISHED BY / AFFILIATION | DATE | TIME | ACCEPTED BY / AFFILIATION | DATE | TIME | SAMPLE CONDITIONS |
|---|---|---|---|---|---|---|---|
| *App III / IV Metals = As, Sb, B, Ba, Be, Ca, Cd, Cl, Co, Pb, Li, Hg, Mo, Se, Tl | Yong Cheng Soo | 12/18/20 | | Charles Hecke | 12/18/20 | 1530 | |

SAMPLER NAME AND SIGNATURE

PRINT NAME: Yong Cheng Soo
SIGNATURE:
DATE Signed: 12/18/2020

TEMP in C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

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

January 05, 2021

Joju Abraham
Georgia Power-CCR
2480 Maner Road
Atlanta, GA 30339

RE: Project: PLANT MCDONOUGH AP-234
Pace Project No.: 92512951

Dear Joju Abraham:

Enclosed are the analytical results for sample(s) received by the laboratory on December 18, 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: Stephen Benda
Daniela Herrera, Golder
Ben Hodges, Georgia Power
Jimmy Jones, Golder Associates Inc.
Kristen Jurinko
Julie Lehrman, Golder Associates Inc.
Ms. Lauren Petty, Southern Co. Services
Dawn Prell, Golder Associates Inc.
Tim Richards, Golder Associates - Atlanta

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

# CERTIFICATIONS

| | |
|---|---|
| Project: | PLANT MCDONOUGH AP-234 |
| Pace Project No.: | 92512951 |

**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
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
North Carolina Certification #: 381
South Carolina Certification #: 98011001

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

# SAMPLE SUMMARY

Project: PLANT MCDONOUGH AP-234
Pace Project No.: 92512951

| Lab ID | Sample ID | Matrix | Date Collected | Date Received |
|---|---|---|---|---|
| **92512951001** | **B-102D** | Water | 12/17/20 10:15 | 12/18/20 15:30 |
| **92512951002** | **B-106D** | Water | 12/17/20 13:05 | 12/18/20 15:30 |
| **92512951003** | **EB** | Water | 12/17/20 09:50 | 12/18/20 15:30 |

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

## SAMPLE ANALYTE COUNT

Project: PLANT MCDONOUGH AP-234
Pace Project No.: 92512951

| Lab ID | Sample ID | Method | Analysts | Analytes Reported |
|---|---|---|---|---|
| **92512951001** | **B-102D** | EPA 6010D | DRB | 1 |
| | | EPA 6020B | CW1 | 13 |
| | | EPA 7470A | VB | 1 |
| | | SM 2450C-2011 | AW1 | 1 |
| | | EPA 300.0 Rev 2.1 1993 | CDC | 3 |
| **92512951002** | **B-106D** | EPA 6010D | DRB | 1 |
| | | EPA 6020B | CW1 | 13 |
| | | EPA 7470A | VB | 1 |
| | | SM 2450C-2011 | AW1 | 1 |
| | | EPA 300.0 Rev 2.1 1993 | CDC | 3 |
| **92512951003** | **EB** | EPA 6010D | DRB | 1 |
| | | EPA 6020B | CW1 | 13 |
| | | EPA 7470A | VB | 1 |
| | | SM 2450C-2011 | AW1 | 1 |
| | | EPA 300.0 Rev 2.1 1993 | CDC | 3 |

PASI-A = Pace Analytical Services - Asheville
PASI-C = Pace Analytical Services - Charlotte
PASI-GA = Pace Analytical Services - Peachtree Corners, GA

Pace Analytical®
www.pacelabs.com

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

# ANALYTICAL RESULTS

Project: PLANT MCDONOUGH AP-234
Pace Project No.: 92512951

**Sample: B-102D** **Lab ID: 92512951001** Collected: 12/17/20 10:15 Received: 12/18/20 15:30 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 | | 12/18/20 17:05 | | |
| pH | **5.39** | Std. Units | | | 1 | | 12/18/20 17:05 | | |
| **6010D ATL ICP** | Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Peachtree Corners, GA | | | | | | | | |
| Calcium | **71.5** | mg/L | 1.0 | 0.070 | 1 | 12/28/20 09:00 | 12/28/20 21:54 | 7440-70-2 | M1 |
| **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 | 12/30/20 09:56 | 12/30/20 20:15 | 7440-36-0 | |
| Arsenic | ND | mg/L | 0.0050 | 0.00078 | 1 | 12/30/20 09:56 | 12/30/20 20:15 | 7440-38-2 | |
| Barium | **0.022** | mg/L | 0.010 | 0.00071 | 1 | 12/30/20 09:56 | 12/30/20 20:15 | 7440-39-3 | |
| Beryllium | **0.0014J** | mg/L | 0.0030 | 0.000046 | 1 | 12/30/20 09:56 | 12/31/20 17:40 | 7440-41-7 | |
| Boron | **2.4** | mg/L | 0.10 | 0.0052 | 1 | 12/30/20 09:56 | 12/30/20 20:15 | 7440-42-8 | |
| Cadmium | **0.00067J** | mg/L | 0.0025 | 0.00012 | 1 | 12/30/20 09:56 | 12/30/20 20:15 | 7440-43-9 | |
| Chromium | ND | mg/L | 0.010 | 0.00055 | 1 | 12/30/20 09:56 | 12/30/20 20:15 | 7440-47-3 | |
| Cobalt | **0.014** | mg/L | 0.0050 | 0.00038 | 1 | 12/30/20 09:56 | 12/30/20 20:15 | 7440-48-4 | |
| Lead | **0.000037J** | mg/L | 0.0050 | 0.000036 | 1 | 12/30/20 09:56 | 12/30/20 20:15 | 7439-92-1 | |
| Lithium | **0.012J** | mg/L | 0.030 | 0.00081 | 1 | 12/30/20 09:56 | 12/30/20 20:15 | 7439-93-2 | |
| Molybdenum | ND | mg/L | 0.010 | 0.00069 | 1 | 12/30/20 09:56 | 12/30/20 20:15 | 7439-98-7 | |
| Selenium | ND | mg/L | 0.010 | 0.0016 | 1 | 12/30/20 09:56 | 12/30/20 20:15 | 7782-49-2 | |
| Thallium | ND | mg/L | 0.0010 | 0.00014 | 1 | 12/30/20 09:56 | 12/30/20 20:15 | 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 | 12/22/20 07:10 | 12/22/20 13:33 | 7439-97-6 | |
| **2540C Total Dissolved Solids** | Analytical Method: SM 2450C-2011 Pace Analytical Services - Peachtree Corners, GA | | | | | | | | |
| Total Dissolved Solids | **449** | mg/L | 10.0 | 10.0 | 1 | | 12/22/20 17:34 | | |
| **300.0 IC Anions 28 Days** | Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville | | | | | | | | |
| Chloride | **10.3** | mg/L | 1.0 | 0.60 | 1 | | 12/23/20 23:43 | 16887-00-6 | |
| Fluoride | **0.079J** | mg/L | 0.10 | 0.050 | 1 | | 12/23/20 23:43 | 16984-48-8 | |
| Sulfate | **249** | mg/L | 5.0 | 2.5 | 5 | | 12/24/20 11:51 | 14808-79-8 | |

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

# ANALYTICAL RESULTS

Project: PLANT MCDONOUGH AP-234
Pace Project No.: 92512951

**Sample: B-106D** **Lab ID: 92512951002** Collected: 12/17/20 13:05 Received: 12/18/20 15:30 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 | | 12/18/20 17:05 | | |
| pH | **5.82** | Std. Units | | | 1 | | 12/18/20 17:05 | | |
| **6010D ATL ICP** | Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Peachtree Corners, GA | | | | | | | | |
| Calcium | **43.2** | mg/L | 1.0 | 0.070 | 1 | 12/28/20 09:00 | 12/28/20 22:25 | 7440-70-2 | |
| **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 | 12/30/20 09:56 | 12/30/20 20:20 | 7440-36-0 | |
| Arsenic | ND | mg/L | 0.0050 | 0.00078 | 1 | 12/30/20 09:56 | 12/30/20 20:20 | 7440-38-2 | |
| Barium | **0.022** | mg/L | 0.010 | 0.00071 | 1 | 12/30/20 09:56 | 12/30/20 20:20 | 7440-39-3 | |
| Beryllium | **0.00012J** | mg/L | 0.0030 | 0.000046 | 1 | 12/30/20 09:56 | 12/31/20 17:45 | 7440-41-7 | |
| Boron | **1.4** | mg/L | 0.10 | 0.0052 | 1 | 12/30/20 09:56 | 12/30/20 20:20 | 7440-42-8 | |
| Cadmium | **0.00020J** | mg/L | 0.0025 | 0.00012 | 1 | 12/30/20 09:56 | 12/30/20 20:20 | 7440-43-9 | |
| Chromium | ND | mg/L | 0.010 | 0.00055 | 1 | 12/30/20 09:56 | 12/30/20 20:20 | 7440-47-3 | |
| Cobalt | **0.00087J** | mg/L | 0.0050 | 0.00038 | 1 | 12/30/20 09:56 | 12/30/20 20:20 | 7440-48-4 | |
| Lead | ND | mg/L | 0.0050 | 0.000036 | 1 | 12/30/20 09:56 | 12/30/20 20:20 | 7439-92-1 | |
| Lithium | **0.0048J** | mg/L | 0.030 | 0.00081 | 1 | 12/30/20 09:56 | 12/30/20 20:20 | 7439-93-2 | |
| Molybdenum | ND | mg/L | 0.010 | 0.00069 | 1 | 12/30/20 09:56 | 12/30/20 20:20 | 7439-98-7 | |
| Selenium | ND | mg/L | 0.010 | 0.0016 | 1 | 12/30/20 09:56 | 12/30/20 20:20 | 7782-49-2 | |
| Thallium | ND | mg/L | 0.0010 | 0.00014 | 1 | 12/30/20 09:56 | 12/30/20 20:20 | 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 | 12/22/20 07:10 | 12/22/20 13:35 | 7439-97-6 | |
| **2540C Total Dissolved Solids** | Analytical Method: SM 2450C-2011 Pace Analytical Services - Peachtree Corners, GA | | | | | | | | |
| Total Dissolved Solids | **340** | mg/L | 10.0 | 10.0 | 1 | | 12/22/20 17:34 | | |
| **300.0 IC Anions 28 Days** | Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville | | | | | | | | |
| Chloride | **8.0** | mg/L | 1.0 | 0.60 | 1 | | 12/24/20 01:42 | 16887-00-6 | |
| Fluoride | **0.052J** | mg/L | 0.10 | 0.050 | 1 | | 12/24/20 01:42 | 16984-48-8 | |
| Sulfate | **179** | mg/L | 4.0 | 2.0 | 4 | | 12/24/20 12:50 | 14808-79-8 | |

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

# ANALYTICAL RESULTS

Project: PLANT MCDONOUGH AP-234
Pace Project No.: 92512951

**Sample: EB** **Lab ID: 92512951003** Collected: 12/17/20 09:50 Received: 12/18/20 15:30 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<br>Pace Analytical Services - Peachtree Corners, GA | | | | | | | | |
| Calcium | ND | mg/L | 1.0 | 0.070 | 1 | 12/28/20 09:00 | 12/28/20 22:30 | 7440-70-2 | |
| **6020 MET ICPMS** | Analytical Method: EPA 6020B Preparation Method: EPA 3005A<br>Pace Analytical Services - Peachtree Corners, GA | | | | | | | | |
| Antimony | ND | mg/L | 0.0030 | 0.00028 | 1 | 12/30/20 09:56 | 12/30/20 20:26 | 7440-36-0 | |
| Arsenic | ND | mg/L | 0.0050 | 0.00078 | 1 | 12/30/20 09:56 | 12/30/20 20:26 | 7440-38-2 | |
| Barium | ND | mg/L | 0.010 | 0.00071 | 1 | 12/30/20 09:56 | 12/30/20 20:26 | 7440-39-3 | |
| Beryllium | ND | mg/L | 0.0030 | 0.000046 | 1 | 12/30/20 09:56 | 12/31/20 17:51 | 7440-41-7 | |
| Boron | **0.010J** | mg/L | 0.10 | 0.0052 | 1 | 12/30/20 09:56 | 12/30/20 20:26 | 7440-42-8 | |
| Cadmium | ND | mg/L | 0.0025 | 0.00012 | 1 | 12/30/20 09:56 | 12/30/20 20:26 | 7440-43-9 | |
| Chromium | **0.00058J** | mg/L | 0.010 | 0.00055 | 1 | 12/30/20 09:56 | 12/30/20 20:26 | 7440-47-3 | |
| Cobalt | ND | mg/L | 0.0050 | 0.00038 | 1 | 12/30/20 09:56 | 12/30/20 20:26 | 7440-48-4 | |
| Lead | ND | mg/L | 0.0050 | 0.000036 | 1 | 12/30/20 09:56 | 12/30/20 20:26 | 7439-92-1 | |
| Lithium | ND | mg/L | 0.030 | 0.00081 | 1 | 12/30/20 09:56 | 12/30/20 20:26 | 7439-93-2 | |
| Molybdenum | ND | mg/L | 0.010 | 0.00069 | 1 | 12/30/20 09:56 | 12/30/20 20:26 | 7439-98-7 | |
| Selenium | ND | mg/L | 0.010 | 0.0016 | 1 | 12/30/20 09:56 | 12/30/20 20:26 | 7782-49-2 | |
| Thallium | ND | mg/L | 0.0010 | 0.00014 | 1 | 12/30/20 09:56 | 12/30/20 20:26 | 7440-28-0 | |
| **7470 Mercury** | Analytical Method: EPA 7470A Preparation Method: EPA 7470A<br>Pace Analytical Services - Peachtree Corners, GA | | | | | | | | |
| Mercury | ND | mg/L | 0.00050 | 0.000078 | 1 | 12/22/20 07:10 | 12/22/20 13:38 | 7439-97-6 | |
| **2540C Total Dissolved Solids** | Analytical Method: SM 2450C-2011<br>Pace Analytical Services - Peachtree Corners, GA | | | | | | | | |
| Total Dissolved Solids | ND | mg/L | 10.0 | 10.0 | 1 | | 12/22/20 17:34 | | |
| **300.0 IC Anions 28 Days** | Analytical Method: EPA 300.0 Rev 2.1 1993<br>Pace Analytical Services - Asheville | | | | | | | | |
| Chloride | ND | mg/L | 1.0 | 0.60 | 1 | | 12/24/20 01:57 | 16887-00-6 | |
| Fluoride | ND | mg/L | 0.10 | 0.050 | 1 | | 12/24/20 01:57 | 16984-48-8 | |
| Sulfate | ND | mg/L | 1.0 | 0.50 | 1 | | 12/24/20 01:57 | 14808-79-8 | |

Pace Analytical®
www.pacelabs.com

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

## QUALITY CONTROL DATA

Project: PLANT MCDONOUGH AP-234
Pace Project No.: 92512951

QC Batch: 589491
QC Batch Method: EPA 3010A
Analysis Method: EPA 6010D
Analysis Description: 6010D ATL
Laboratory: Pace Analytical Services - Peachtree Corners, GA
Associated Lab Samples: 92512951001, 92512951002, 92512951003

METHOD BLANK: 3113717 Matrix: Water
Associated Lab Samples: 92512951001, 92512951002, 92512951003

| Parameter | Units | Blank Result | Reporting Limit | MDL | Analyzed | Qualifiers |
|---|---|---|---|---|---|---|
| Calcium | mg/L | ND | 1.0 | 0.070 | 12/28/20 21:38 | |

LABORATORY CONTROL SAMPLE: 3113718

| Parameter | Units | Spike Conc. | LCS Result | LCS % Rec | % Rec Limits | Qualifiers |
|---|---|---|---|---|---|---|
| Calcium | mg/L | 1 | 1.0 | 104 | 80-120 | |

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3113719 3113720

| Parameter | Units | 92512951001 Result | MS Spike Conc. | MSD Spike Conc. | MS Result | MSD Result | MS % Rec | MSD % Rec | % Rec Limits | RPD | Max RPD | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Calcium | mg/L | 71.5 | 1 | 1 | 75.6 | 73.7 | 406 | 223 | 75-125 | 2 | 20 | M1 |

**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.**

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

# QUALITY CONTROL DATA

Project: PLANT MCDONOUGH AP-234
Pace Project No.: 92512951

QC Batch: 589986
QC Batch Method: EPA 3005A
Analysis Method: EPA 6020B
Analysis Description: 6020 MET
Laboratory: Pace Analytical Services - Peachtree Corners, GA
Associated Lab Samples: 92512951001, 92512951002, 92512951003

METHOD BLANK: 3115564 Matrix: Water
Associated Lab Samples: 92512951001, 92512951002, 92512951003

| Parameter | Units | Blank Result | Reporting Limit | MDL | Analyzed | Qualifiers |
|---|---|---|---|---|---|---|
| Antimony | mg/L | ND | 0.0030 | 0.00028 | 12/30/20 19:40 | |
| Arsenic | mg/L | ND | 0.0050 | 0.00078 | 12/30/20 19:40 | |
| Barium | mg/L | ND | 0.010 | 0.00071 | 12/30/20 19:40 | |
| Beryllium | mg/L | ND | 0.0030 | 0.000046 | 12/31/20 16:06 | |
| Boron | mg/L | ND | 0.10 | 0.0052 | 12/30/20 19:40 | |
| Cadmium | mg/L | ND | 0.0025 | 0.00012 | 12/30/20 19:40 | |
| Chromium | mg/L | ND | 0.010 | 0.00055 | 12/30/20 19:40 | |
| Cobalt | mg/L | ND | 0.0050 | 0.00038 | 12/30/20 19:40 | |
| Lead | mg/L | ND | 0.0050 | 0.000036 | 12/30/20 19:40 | |
| Lithium | mg/L | ND | 0.030 | 0.00081 | 12/30/20 19:40 | |
| Molybdenum | mg/L | ND | 0.010 | 0.00069 | 12/30/20 19:40 | |
| Selenium | mg/L | ND | 0.010 | 0.0016 | 12/30/20 19:40 | |
| Thallium | mg/L | ND | 0.0010 | 0.00014 | 12/30/20 19:40 | |

LABORATORY CONTROL SAMPLE: 3115565

| Parameter | Units | Spike Conc. | LCS Result | LCS % Rec | % Rec Limits | Qualifiers |
|---|---|---|---|---|---|---|
| Antimony | mg/L | 0.1 | 0.093 | 93 | 80-120 | |
| Arsenic | mg/L | 0.1 | 0.089 | 89 | 80-120 | |
| Barium | mg/L | 0.1 | 0.086 | 86 | 80-120 | |
| Beryllium | mg/L | 0.1 | 0.097 | 97 | 80-120 | |
| Boron | mg/L | 1 | 0.91 | 91 | 80-120 | |
| Cadmium | mg/L | 0.1 | 0.092 | 92 | 80-120 | |
| Chromium | mg/L | 0.1 | 0.092 | 92 | 80-120 | |
| Cobalt | mg/L | 0.1 | 0.092 | 92 | 80-120 | |
| Lead | mg/L | 0.1 | 0.088 | 88 | 80-120 | |
| Lithium | mg/L | 0.1 | 0.086 | 86 | 80-120 | |
| Molybdenum | mg/L | 0.1 | 0.095 | 95 | 80-120 | |
| Selenium | mg/L | 0.1 | 0.088 | 88 | 80-120 | |
| Thallium | mg/L | 0.1 | 0.088 | 88 | 80-120 | |

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3115566 3115567

| Parameter | Units | 92512947001 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 | 0.094 | 0.093 | 94 | 93 | 75-125 | 1 | 20 | |
| Arsenic | mg/L | 0.0017J | 0.1 | 0.1 | 0.095 | 0.094 | 93 | 92 | 75-125 | 1 | 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.**

Pace Analytical
www.pacelabs.com

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

## QUALITY CONTROL DATA

Project: PLANT MCDONOUGH AP-234
Pace Project No.: 92512951

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3115566 3115567

| Parameter | Units | 92512947001 Result | MS Spike Conc. | MSD Spike Conc. | MS Result | MSD Result | MS % Rec | MSD % Rec | % Rec Limits | RPD | Max RPD | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Barium | mg/L | 0.0061J | 0.1 | 0.1 | 0.094 | 0.091 | 87 | 85 | 75-125 | 2 | 20 | |
| Beryllium | mg/L | ND | 0.1 | 0.1 | 0.097 | 0.097 | 97 | 97 | 75-125 | 0 | 20 | |
| Boron | mg/L | 0.28 | 1 | 1 | 1.1 | 1.1 | 80 | 85 | 75-125 | 5 | 20 | |
| Cadmium | mg/L | ND | 0.1 | 0.1 | 0.091 | 0.091 | 91 | 91 | 75-125 | 0 | 20 | |
| Chromium | mg/L | ND | 0.1 | 0.1 | 0.090 | 0.090 | 90 | 90 | 75-125 | 0 | 20 | |
| Cobalt | mg/L | 0.0016J | 0.1 | 0.1 | 0.091 | 0.091 | 90 | 89 | 75-125 | 0 | 20 | |
| Lead | mg/L | ND | 0.1 | 0.1 | 0.089 | 0.086 | 89 | 86 | 75-125 | 3 | 20 | |
| Lithium | mg/L | 0.011J | 0.1 | 0.1 | 0.094 | 0.093 | 82 | 82 | 75-125 | 0 | 20 | |
| Molybdenum | mg/L | 0.076 | 0.1 | 0.1 | 0.17 | 0.17 | 96 | 91 | 75-125 | 3 | 20 | |
| Selenium | mg/L | ND | 0.1 | 0.1 | 0.091 | 0.089 | 91 | 89 | 75-125 | 2 | 20 | |
| Thallium | mg/L | ND | 0.1 | 0.1 | 0.089 | 0.087 | 89 | 87 | 75-125 | 3 | 20 | |

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

Pace Analytical®
www.pacelabs.com

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

## QUALITY CONTROL DATA

Project: PLANT MCDONOUGH AP-234
Pace Project No.: 92512951

| | | | |
|---|---|---|---|
| QC Batch: | 588542 | Analysis Method: | EPA 7470A |
| QC Batch Method: | EPA 7470A | Analysis Description: | 7470 Mercury |
| | | Laboratory: | Pace Analytical Services - Peachtree Corners, GA |

Associated Lab Samples: 92512951001, 92512951002, 92512951003

METHOD BLANK: 3109729 Matrix: Water

Associated Lab Samples: 92512951001, 92512951002, 92512951003

| Parameter | Units | Blank Result | Reporting Limit | MDL | Analyzed | Qualifiers |
|---|---|---|---|---|---|---|
| Mercury | mg/L | ND | 0.00050 | 0.000078 | 12/22/20 12:50 | |

LABORATORY CONTROL SAMPLE: 3109730

| 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: 3109731 3109732

| Parameter | Units | 92512574004 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 | 0.0023 | 89 | 90 | 75-125 | 1 | 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.**

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

## QUALITY CONTROL DATA

Project: PLANT MCDONOUGH AP-234
Pace Project No.: 92512951

QC Batch: 588927
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: 92512951001, 92512951002, 92512951003

METHOD BLANK: 3111378 Matrix: Water
Associated Lab Samples: 92512951001, 92512951002, 92512951003

| Parameter | Units | Blank Result | Reporting Limit | MDL | Analyzed | Qualifiers |
|---|---|---|---|---|---|---|
| Total Dissolved Solids | mg/L | ND | 10.0 | 10.0 | 12/22/20 17:31 | |

LABORATORY CONTROL SAMPLE: 3111379

| Parameter | Units | Spike Conc. | LCS Result | LCS % Rec | % Rec Limits | Qualifiers |
|---|---|---|---|---|---|---|
| Total Dissolved Solids | mg/L | 400 | 386 | 96 | 84-108 | |

SAMPLE DUPLICATE: 3111380

| Parameter | Units | 92512580004 Result | Dup Result | RPD | Max RPD | Qualifiers |
|---|---|---|---|---|---|---|
| Total Dissolved Solids | mg/L | 294 | 295 | 0 | 10 | |

SAMPLE DUPLICATE: 3111381

| Parameter | Units | 92513185001 Result | Dup Result | RPD | Max RPD | Qualifiers |
|---|---|---|---|---|---|---|
| Total Dissolved Solids | mg/L | 339 | 340 | 0 | 10 | |

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

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

# QUALITY CONTROL DATA

Project: PLANT MCDONOUGH AP-234
Pace Project No.: 92512951

| | | | |
|---|---|---|---|
| QC Batch: | 589104 | Analysis Method: | EPA 300.0 Rev 2.1 1993 |
| QC Batch Method: | EPA 300.0 Rev 2.1 1993 | Analysis Description: | 300.0 IC Anions |
| | | Laboratory: | Pace Analytical Services - Asheville |

Associated Lab Samples: 92512951001

METHOD BLANK: 3112052 Matrix: Water

Associated Lab Samples: 92512951001

| Parameter | Units | Blank Result | Reporting Limit | MDL | Analyzed | Qualifiers |
|---|---|---|---|---|---|---|
| Chloride | mg/L | ND | 1.0 | 0.60 | 12/23/20 16:31 | |
| Fluoride | mg/L | ND | 0.10 | 0.050 | 12/23/20 16:31 | |
| Sulfate | mg/L | ND | 1.0 | 0.50 | 12/23/20 16:31 | |

LABORATORY CONTROL SAMPLE: 3112053

| 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 | 2.5 | 102 | 90-110 | |
| Sulfate | mg/L | 50 | 52.0 | 104 | 90-110 | |

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3112054 3112055

| Parameter | Units | 92513456002 Result | MS Spike Conc. | MSD Spike Conc. | MS Result | MSD Result | MS % Rec | MSD % Rec | % Rec Limits | RPD | Max RPD | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Chloride | mg/L | 409 | 50 | 50 | 471 | 456 | 125 | 94 | 90-110 | 3 | 10 | M6 |
| Fluoride | mg/L | 0.14 | 2.5 | 2.5 | 2.1 | 2.1 | 77 | 79 | 90-110 | 2 | 10 | M1 |
| Sulfate | mg/L | 403 | 50 | 50 | 466 | 450 | 126 | 93 | 90-110 | 4 | 10 | M6 |

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3112056 3112057

| Parameter | Units | 92512580004 Result | MS Spike Conc. | MSD Spike Conc. | MS Result | MSD Result | MS % Rec | MSD % Rec | % Rec Limits | RPD | Max RPD | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Chloride | mg/L | 3.4 | 50 | 50 | 57.4 | 57.5 | 108 | 108 | 90-110 | 0 | 10 | |
| Fluoride | mg/L | 0.18 | 2.5 | 2.5 | 2.7 | 2.7 | 102 | 102 | 90-110 | 0 | 10 | |
| Sulfate | mg/L | 11.3 | 50 | 50 | 65.5 | 65.6 | 108 | 109 | 90-110 | 0 | 10 | |

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

## REPORT OF LABORATORY ANALYSIS

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

## QUALITY CONTROL DATA

Project: PLANT MCDONOUGH AP-234
Pace Project No.: 92512951

QC Batch: 589110
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: 92512951002, 92512951003

METHOD BLANK: 3112064 Matrix: Water
Associated Lab Samples: 92512951002, 92512951003

| Parameter | Units | Blank Result | Reporting Limit | MDL | Analyzed | Qualifiers |
|---|---|---|---|---|---|---|
| Chloride | mg/L | ND | 1.0 | 0.60 | 12/23/20 23:58 | |
| Fluoride | mg/L | ND | 0.10 | 0.050 | 12/23/20 23:58 | |
| Sulfate | mg/L | ND | 1.0 | 0.50 | 12/23/20 23:58 | |

LABORATORY CONTROL SAMPLE: 3112065

| Parameter | Units | Spike Conc. | LCS Result | LCS % Rec | % Rec Limits | Qualifiers |
|---|---|---|---|---|---|---|
| Chloride | mg/L | 50 | 52.4 | 105 | 90-110 | |
| Fluoride | mg/L | 2.5 | 2.6 | 102 | 90-110 | |
| Sulfate | mg/L | 50 | 52.8 | 106 | 90-110 | |

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3112066 3112067

| Parameter | Units | 92513456001 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 | 492 | 491 | 86 | 84 | 90-110 | 0 | 10 | M6 |
| Fluoride | mg/L | 0.17 | 2.5 | 2.5 | 2.0 | 1.9 | 74 | 71 | 90-110 | 4 | 10 | M1 |
| Sulfate | mg/L | 125 | 50 | 50 | 173 | 173 | 95 | 95 | 90-110 | 0 | 10 | |

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3112068 3112069

| Parameter | Units | 92511640003 Result | MS Spike Conc. | MSD Spike Conc. | MS Result | MSD Result | MS % Rec | MSD % Rec | % Rec Limits | RPD | Max RPD | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Chloride | mg/L | 5.0 | 50 | 50 | 59.6 | 59.5 | 109 | 109 | 90-110 | 0 | 10 | |
| Fluoride | mg/L | 0.19 | 2.5 | 2.5 | 2.9 | 2.9 | 108 | 107 | 90-110 | 1 | 10 | |
| Sulfate | mg/L | 106 | 50 | 50 | 158 | 159 | 104 | 106 | 90-110 | 1 | 10 | |

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

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

## QUALIFIERS

Project: PLANT MCDONOUGH AP-234
Pace Project No.: 92512951

### 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. |

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

## QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: PLANT MCDONOUGH AP-234
Pace Project No.: 92512951

| Lab ID | Sample ID | QC Batch Method | QC Batch | Analytical Method | Analytical Batch |
|---|---|---|---|---|---|
| **92512951001** | **B-102D** | | | | |
| **92512951002** | **B-106D** | | | | |
| **92512951001** | **B-102D** | EPA 3010A | 589491 | EPA 6010D | 589516 |
| **92512951002** | **B-106D** | EPA 3010A | 589491 | EPA 6010D | 589516 |
| **92512951003** | **EB** | EPA 3010A | 589491 | EPA 6010D | 589516 |
| **92512951001** | **B-102D** | EPA 3005A | 589986 | EPA 6020B | 590063 |
| **92512951002** | **B-106D** | EPA 3005A | 589986 | EPA 6020B | 590063 |
| **92512951003** | **EB** | EPA 3005A | 589986 | EPA 6020B | 590063 |
| **92512951001** | **B-102D** | EPA 7470A | 588542 | EPA 7470A | 588758 |
| **92512951002** | **B-106D** | EPA 7470A | 588542 | EPA 7470A | 588758 |
| **92512951003** | **EB** | EPA 7470A | 588542 | EPA 7470A | 588758 |
| **92512951001** | **B-102D** | SM 2450C-2011 | 588927 | | |
| **92512951002** | **B-106D** | SM 2450C-2011 | 588927 | | |
| **92512951003** | **EB** | SM 2450C-2011 | 588927 | | |
| **92512951001** | **B-102D** | EPA 300.0 Rev 2.1 1993 | 589104 | | |
| **92512951002** | **B-106D** | EPA 300.0 Rev 2.1 1993 | 589110 | | |
| **92512951003** | **EB** | EPA 300.0 Rev 2.1 1993 | 589110 | | |

| Pace Analytical® | Document Name: **Sample Condition Upon Receipt(SCUR)** | Document Revised: October 28, 2020 Page 1 of 2 |
|---|---|---|
| | Document No.: **F-CAR-CS-033-Rev.07** | Issuing Authority: Pace Carolinas Quality Office |

**Laboratory receiving samples:**

**Asheville** ☐ **Eden** ☐ **Greenwood** ☐ **Huntersville** ☐ **Raleigh** ☐ **Mechanicsville** ☐ **Atlanta** ☑ **Kernersville** ☐

**Sample Condition Upon Receipt** **Client Name:** GA Power **Project #:**

**WO# : 92512951**

92512951

**Courier:** ☐ Fed Ex ☐ UPS ☐ USPS ☑ Client ☐ Commercial ☐ Pace ☐ Other:____

**Custody Seal Present?** ☐ Yes ☑ No **Seals Intact?** ☐ Yes ☐ No

**Date/Initials Person Examining Contents:** 12/18/20 LOH

**Packing Material:** ☐ Bubble Wrap ☐ Bubble Bags ☑ None ☐ Other

**Biological Tissue Frozen?** ☐ Yes ☑ No ☐ N/A

**Thermometer:** ☑ IR Gun ID: 233

**Type of Ice:** ☑ Wet ☐ Blue ☐ None

**Cooler Temp:** 3.7 **Correction Factor:** Add/Subtract (°C) 0.4

Temp should be above freezing to 6°C
☐ Samples out of temp criteria. Samples on ice, cooling process has begun

**Cooler Temp Corrected (°C):** 4.1

**USDA Regulated Soil** (☑ N/A, water sample)

Did samples originate in a quarantine zone within the United States: CA, NY, or SC (check maps)? ☐ Yes ☐ No

Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? ☐ Yes ☐ No

| | | | | **Comments/Discrepancy:** |
|---|---|---|---|---|
| Chain of Custody Present? | ☑ Yes | ☐ No | ☐ N/A | 1. |
| Samples Arrived within Hold Time? | ☑ Yes | ☐ No | ☐ N/A | 2. |
| **Short Hold Time Analysis (<72 hr.)?** | ☐ Yes | ☑ No | ☐ N/A | 3. |
| **Rush Turn Around Time Requested?** | ☐ Yes | ☑ No | ☐ N/A | 4. |
| Sufficient Volume? | ☑ Yes | ☐ No | ☐ N/A | 5. |
| Correct Containers Used? | ☑ Yes | ☐ No | ☐ N/A | 6. |
| -Pace Containers Used? | ☑ Yes | ☐ No | ☐ N/A | |
| Containers Intact? | ☑ Yes | ☐ No | ☐ N/A | 7. |
| Dissolved analysis: Samples Field Filtered? | ☐ Yes | ☐ No | ☑ N/A | 8. |
| Sample Labels Match COC? | ☑ Yes | ☐ No | ☐ N/A | 9. |
| -Includes Date/Time/ID/Analysis Matrix: W | | | | |
| Headspace in VOA Vials (>5-6mm)? | ☐ Yes | ☐ No | ☑ N/A | 10. |
| Trip Blank Present? | ☐ Yes | ☐ No | ☑ N/A | 11. |
| Trip Blank Custody Seals Present? | ☐ Yes | ☐ No | ☑ N/A | |

**COMMENTS/SAMPLE DISCREPANCY**

**Field Data Required?** ☐ Yes ☐ No

Lot ID of split containers:

**CLIENT NOTIFICATION/RESOLUTION**

Person contacted: ____________ Date/Time: ____________

**Project Manager SCURF Review:** ____________ **Date:** ____________

**Project Manager SRF Review:** ____________ **Date:** ____________

***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 bottles**

**Project #** WO#: 92512951

PM: KLH1 Due Date: 01/05/21

CLIENT: GA-GA Power

| 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) | BP/N | 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) | DG9U-40 mL Amber Unpreserved vials (N/A) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | 1 | 1 | | ✓ 1 | | | | | | | | | | | | | | | | | | | ✓ 2 | | | | |
| 2 | | 1 | 1 | | ✓ 1 | | | | | | | | | | | | | | | | | | | ✓ 2 | | | | |
| 3 | | 1 | 1 | | ✓ 1 | | | | | | | | | | | | | | | | | | | ✓ 2 | | | | |
| 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

## pH Adjustment Log for Preserved Samples

| Sample ID | Type of Preservative | pH upon receipt | Date preservation adjusted | Time preservation adjusted | Amount of Preservative added | Lot # |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | | | | |
| | | | | | | |

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

Pace Analytical

# 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 - Coal Combustion Residuals |
| Address: | 2480 Maner Road, Atlanta, GA 30339 |
| Email: | jabraham@southernco.com |
| Phone: | (404) 506-7239 |
| Fax: | |
| Requested Due Date: | Standard |

**Section B — Required Project Information:**

| | |
|---|---|
| Report To: | Joju Abraham |
| Copy To: | Golder |
| Purchase Order #: | |
| Project Name: | Plant McDonough AP-234 |
| Project #: | 168849818 |

**Section C — Invoice Information**

| | |
|---|---|
| Attention: | scsinvoices@southernco.com |
| Company Name: | |
| Address: | |
| Pace Quote: | |
| Pace Project Manager: | Kevin Herring |
| Pace Profile #: | |

| Regulatory Agency | |
|---|---|
| State / Location | GA |

**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 |

Requested Analysis Filtered (Y/N): N N N N

| ITEM # | SAMPLE ID | MATRIX CODE (see valid codes to left) | SAMPLE TYPE (G=GRAB C=COMP) | DATE | TIME | SAMPLE TEMP AT COLLECTION | # OF CONTAINERS | Unpreserved - Ice | H2SO4 | HNO3 | HCl | NaOH + Zn Acetate | Na2S2O3 | Methanol | Other | Analyses Test Y/N | *Metals App III and App IV Total | Cl, F, SO4 | Radium 226/228 | TDS | Residual Chlorine (Y/N) | 4251254 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | B-102D | WT | G | 12/17/2020 | 1015 | | 5 | 2 | | 3 | | | | | | | X | X | X | X | | pH 5.39 |
| 2 | B-106D | WT | G | 12/17/2020 | 1305 | | 5 | 2 | | 3 | | | | | | | X | X | X | X | | pH 5.82 |
| 3 | EB | WT | G | 12/17/2020 | 950 | | 5 | 2 | | 3 | | | | | | | X | X | X | X | | |
| 4 | | | | | | | | | | | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | | | | | | | | | | |
| 13 | | | | | | | | | | | | | | | | | | | | | | |
| 14 | | | | | | | | | | | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | | | | | | | | | | |

| ADDITIONAL COMMENTS | RELINQUISHED BY / AFFILIATION | DATE | TIME | ACCEPTED BY / AFFILIATION | DATE | TIME | SAMPLE CONDITIONS |
|---|---|---|---|---|---|---|---|
| *App III / IV Metals = As, Sb, B, Ba, Be, Ca, Cd, Cr, Co, Pb, Li, Hg, Mo, Se, Tl | Yong Cheng Soo | 12/18/20 | | Charles Fenk | 12/18/20 | 1530 | |

**SAMPLER NAME AND SIGNATURE**

| | |
|---|---|
| PRINT NAME | Yong Cheng Soo |
| SIGNATURE | |
| DATE Signed | 12/18/2020 |

| TEMP in C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N) |
|---|---|---|---|
| | | | |

**PACE ANALYTICAL SERVICES, LLC.**

Environmental Monitoring & Laboratory Analysis
110 Technology Parkway, Peachtree Corners, GA 30092
(770) 734-4200 FAX (770) 734-4201

# Laboratory Report

**Prepared For:**

**Georgia Power**
**2480 Maner Road**
**Atlanta, GA 30339**

**Attention:** **Mr. Joju Abraham**

**Report Number:** **AAG0117**
**July 17, 2017**

**Project: Plant McDonough**

**Project #:1779172**

We appreciate the opportunity to provide the analytical support for your project. The analytical results in this report are based upon information supplied by you, the client, and are for your exclusive use. If you have any questions regarding this data package, please do not hesitate to call.

Approved:

Project Manager

## PACE ANALYTICAL SERVICES, LLC.

Environmental Monitoring & Laboratory Analysis
110 Technology Parkway, Peachtree Corners, GA 30092
(770) 734-4200 FAX (770) 734-4201

Georgia Power
2480 Maner Road
Atlanta GA, 30339
Attention: Mr. Joju Abraham

July 17, 2017

### ANALYTICAL REPORT FOR SAMPLES

| Sample ID | Laboratory ID | Matrix | Date Sampled | Date Received |
|---|---|---|---|---|
| B-68 | AAG0117-01 | Ground Water | 07/06/17 13:35 | 07/07/17 09:35 |
| B-69 | AAG0117-02 | Ground Water | 07/06/17 15:15 | 07/07/17 09:35 |
| B-70A | AAG0117-03 | Ground Water | 07/06/17 09:55 | 07/07/17 09:35 |

**PACE ANALYTICAL SERVICES, LLC.**

Environmental Monitoring & Laboratory Analysis
110 Technology Parkway, Peachtree Corners, GA 30092
(770) 734-4200 FAX (770) 734-4201

Georgia Power
2480 Maner Road
Atlanta GA, 30339
Attention: Mr. Joju Abraham

July 17, 2017

**Report No.: AAG0117**

**Project: Plant McDonough**

**Client ID: B-68**

**Lab Number ID: AAG0117-01**

**Date/Time Sampled: 7/6/2017 1:35:00PM**

**Date/Time Received: 7/7/2017 9:35:00AM**

**Matrix: Ground Water**

| Analyte | Result | RL | Units | Method | Qual. | DF | Preparation Date | Analytical Date | Batch | Init. |
|---|---|---|---|---|---|---|---|---|---|---|
| **General Chemistry** | | | | | | | | | | |
| Biochemical Oxygen Demand | ND | 2.0 | mg/L | SM 5210 B | | 1 | 7/07/17 13:45 | 7/12/17 9:00 | 7070128 | RNB |
| Chemical Oxygen Demand | 147 | 10 | mg/L | EPA 410.4 | | 1 | 7/10/17 11:00 | 7/10/17 15:00 | 7070194 | ALS |
| Dissolved Organic Carbon | ND | 1.0 | mg/L | EPA 9060A | | 1 | 7/10/17 15:15 | 7/11/17 8:03 | 7070192 | djs |
| Ferrous Iron | ND | 0.20 | mg/L | SM 3500-Fe B | H-01 | 1 | 7/11/17 11:20 | 7/11/17 11:20 | 7070215 | DJS |
| Total Sulfide | ND | 0.2 | mg/L | SM 4500-S D | | 1 | 7/11/17 14:00 | 7/11/17 14:00 | 7070216 | DJS |
| Total Organic Carbon | 2.1 | 1.0 | mg/L | EPA 9060A | | 1 | 7/10/17 15:15 | 7/10/17 21:36 | 7070189 | djs |
| **Inorganic Anions** | | | | | | | | | | |
| Sulfate | 37 | 5.0 | mg/L | EPA 9056A | | 1 | 7/07/17 10:15 | 7/07/17 15:24 | 7070130 | SLH |
| **Metals, Total** | | | | | | | | | | |
| Iron | 4.87 | 0.0400 | mg/L | EPA 6010D | | 1 | 7/11/17 14:15 | 7/12/17 12:04 | 7070219 | FBS |
| **Metals** | | | | | | | | | | |
| Ferric Iron | 4.87 | 0.200 | mg/L | Calc. | | 1 | 7/11/17 14:15 | 7/12/17 12:04 | [CALC] | FBS |

PACE ANALYTICAL SERVICES, LLC.

Environmental Monitoring & Laboratory Analysis
110 Technology Parkway, Peachtree Corners, GA 30092
(770) 734-4200 FAX (770) 734-4201

Georgia Power
2480 Maner Road
Atlanta GA, 30339
Attention: Mr. Joju Abraham

July 17, 2017

**Report No.: AAG0117**

**Project: Plant McDonough**

**Client ID: B-69**

**Lab Number ID: AAG0117-02**

**Date/Time Sampled: 7/6/2017 3:15:00PM**

**Date/Time Received: 7/7/2017 9:35:00AM**

**Matrix: Ground Water**

| Analyte | Result | RL | Units | Method | Qual. | DF | Preparation Date | Analytical Date | Batch | Init. |
|---|---|---|---|---|---|---|---|---|---|---|
| **General Chemistry** | | | | | | | | | | |
| Biochemical Oxygen Demand | ND | 2.0 | mg/L | SM 5210 B | | 1 | 7/07/17 13:45 | 7/12/17 9:00 | 7070128 | RNB |
| Chemical Oxygen Demand | 103 | 10 | mg/L | EPA 410.4 | | 1 | 7/10/17 11:00 | 7/10/17 15:00 | 7070194 | ALS |
| Dissolved Organic Carbon | ND | 1.0 | mg/L | EPA 9060A | | 1 | 7/10/17 15:15 | 7/11/17 8:37 | 7070192 | djs |
| Ferrous Iron | ND | 0.20 | mg/L | SM 3500-Fe B | H-01 | 1 | 7/11/17 11:20 | 7/11/17 11:20 | 7070215 | DJS |
| Total Sulfide | ND | 0.2 | mg/L | SM 4500-S D | | 1 | 7/11/17 14:00 | 7/11/17 14:00 | 7070216 | DJS |
| Total Organic Carbon | ND | 1.0 | mg/L | EPA 9060A | | 1 | 7/10/17 15:15 | 7/10/17 21:53 | 7070189 | djs |
| **Inorganic Anions** | | | | | | | | | | |
| Sulfate | 17 | 5.0 | mg/L | EPA 9056A | | 1 | 7/07/17 10:15 | 7/07/17 17:08 | 7070130 | SLH |
| **Metals, Total** | | | | | | | | | | |
| Iron | 0.630 | 0.0400 | mg/L | EPA 6010D | | 1 | 7/11/17 14:15 | 7/12/17 12:11 | 7070219 | FBS |
| **Metals** | | | | | | | | | | |
| Ferric Iron | 0.630 | 0.200 | mg/L | Calc. | | 1 | 7/11/17 14:15 | 7/12/17 12:11 | [CALC] | FBS |

PACE ANALYTICAL SERVICES, LLC.

Environmental Monitoring & Laboratory Analysis
110 Technology Parkway, Peachtree Corners, GA 30092
(770) 734-4200 FAX (770) 734-4201

Georgia Power
2480 Maner Road
Atlanta GA, 30339
Attention: Mr. Joju Abraham

July 17, 2017

**Report No.: AAG0117**

**Project: Plant McDonough**

**Client ID: B-70A**

**Lab Number ID: AAG0117-03**

**Date/Time Sampled: 7/6/2017 9:55:00AM**

**Date/Time Received: 7/7/2017 9:35:00AM**

**Matrix: Ground Water**

| Analyte | Result | RL | Units | Method | Qual. | DF | Preparation Date | Analytical Date | Batch | Init. |
|---|---|---|---|---|---|---|---|---|---|---|
| **General Chemistry** | | | | | | | | | | |
| Biochemical Oxygen Demand | ND | 2.0 | mg/L | SM 5210 B | | 1 | 7/07/17 13:45 | 7/12/17 9:00 | 7070128 | RNB |
| Chemical Oxygen Demand | 66 | 10 | mg/L | EPA 410.4 | | 1 | 7/10/17 11:00 | 7/10/17 15:00 | 7070194 | ALS |
| Dissolved Organic Carbon | 1.5 | 1.0 | mg/L | EPA 9060A | | 1 | 7/10/17 15:15 | 7/11/17 9:11 | 7070192 | djs |
| Ferrous Iron | ND | 0.20 | mg/L | SM 3500-Fe B | H-01 | 1 | 7/11/17 11:20 | 7/11/17 11:20 | 7070215 | DJS |
| Total Sulfide | ND | 0.2 | mg/L | SM 4500-S D | | 1 | 7/11/17 14:00 | 7/11/17 14:00 | 7070216 | DJS |
| Total Organic Carbon | 3.6 | 1.0 | mg/L | EPA 9060A | | 1 | 7/10/17 15:15 | 7/10/17 22:09 | 7070189 | djs |
| **Inorganic Anions** | | | | | | | | | | |
| Sulfate | ND | 5.0 | mg/L | EPA 9056A | J | 1 | 7/07/17 10:15 | 7/07/17 17:28 | 7070130 | SLH |
| **Metals, Total** | | | | | | | | | | |
| Iron | 0.141 | 0.0400 | mg/L | EPA 6010D | | 1 | 7/11/17 14:15 | 7/12/17 12:15 | 7070219 | FBS |
| **Metals** | | | | | | | | | | |
| Ferric Iron | ND | 0.200 | mg/L | Calc. | | 1 | 7/11/17 14:15 | 7/12/17 12:15 | [CALC] | FBS |

PACE ANALYTICAL SERVICES, LLC.
Environmental Monitoring & Laboratory Analysis
110 Technology Parkway, Peachtree Corners, GA 30092
(770) 734-4200 FAX (770) 734-4201

Georgia Power
2480 Maner Road
Atlanta GA, 30339
Attention: Mr. Joju Abraham

July 17, 2017

**Report No.: AAG0117**

## General Chemistry - Quality Control

| Analyte | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Qual |
|---|---|---|---|---|---|---|---|---|---|---|
| **Batch 7070128 - SM 5210 B** | | | | | | | | | | |
| **Blank (7070128-BLK1)** | | | | | Prepared: 07/07/17 Analyzed: 07/12/17 | | | | | |
| Biochemical Oxygen Demand | ND | 2.0 | mg/L | | | | | | | |
| **LCS (7070128-BS1)** | | | | | Prepared: 07/07/17 Analyzed: 07/12/17 | | | | | |
| Biochemical Oxygen Demand | 216 | 2.0 | mg/L | 198.00 | | 109 | 85-115 | | | |
| **Duplicate (7070128-DUP1)** | | **Source: AAG0109-01** | | | Prepared: 07/07/17 Analyzed: 07/12/17 | | | | | |
| Biochemical Oxygen Demand | 97.0 | 9.0 | mg/L | | 95.0 | | | 2 | 20 | |
| **Batch 7070189 - EPA 9060A** | | | | | | | | | | |
| **Blank (7070189-BLK1)** | | | | | Prepared & Analyzed: 07/10/17 | | | | | |
| Total Organic Carbon | ND | 1.0 | mg/L | | | | | | | |
| **LCS (7070189-BS1)** | | | | | Prepared & Analyzed: 07/10/17 | | | | | |
| Total Organic Carbon | 20.1 | 1.0 | mg/L | 20.000 | | 100 | 88-112 | | | |
| **Matrix Spike (7070189-MS1)** | | **Source: AAF1111-12** | | | Prepared & Analyzed: 07/10/17 | | | | | |
| Total Organic Carbon | 25.8 | 1.0 | mg/L | 20.000 | 5.6 | 101 | 67-141 | | | |
| **Matrix Spike Dup (7070189-MSD1)** | | **Source: AAF1111-12** | | | Prepared & Analyzed: 07/10/17 | | | | | |
| Total Organic Carbon | 25.7 | 1.0 | mg/L | 20.000 | 5.6 | 101 | 67-141 | 0.04 | 16 | |
| **Batch 7070192 - EPA 9060A** | | | | | | | | | | |
| **Blank (7070192-BLK1)** | | | | | Prepared: 07/10/17 Analyzed: 07/11/17 | | | | | |
| Dissolved Organic Carbon | ND | 1.0 | mg/L | | | | | | | |

**PACE ANALYTICAL SERVICES, LLC.**

Environmental Monitoring & Laboratory Analysis
110 Technology Parkway, Peachtree Corners, GA 30092
(770) 734-4200 FAX (770) 734-4201

Georgia Power
2480 Maner Road
Atlanta GA, 30339
Attention: Mr. Joju Abraham

July 17, 2017

**Report No.: AAG0117**

## General Chemistry - Quality Control

| Analyte | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Qual |
|---|---|---|---|---|---|---|---|---|---|---|
| **Batch 7070192 - EPA 9060A** | | | | | | | | | | |
| **LCS (7070192-BS1)** | | | | | Prepared: 07/10/17 Analyzed: 07/11/17 | | | | | |
| Dissolved Organic Carbon | 19.4 | 1.0 | mg/L | 20.000 | | 97 | 88-112 | | | |
| **Duplicate (7070192-DUP1)** | **Source: AAG0031-02** | | | | Prepared: 07/10/17 Analyzed: 07/11/17 | | | | | |
| Dissolved Organic Carbon | 1.8 | 1.0 | mg/L | | 1.8 | | | 2 | 14 | |
| **Duplicate (7070192-DUP2)** | **Source: AAG0032-01** | | | | Prepared: 07/10/17 Analyzed: 07/11/17 | | | | | |
| Dissolved Organic Carbon | 1.7 | 1.0 | mg/L | | 1.6 | | | 10 | 14 | |
| **Duplicate (7070192-DUP3)** | **Source: AAG0117-01** | | | | Prepared: 07/10/17 Analyzed: 07/11/17 | | | | | |
| Dissolved Organic Carbon | ND | 1.0 | mg/L | | ND | | | | 14 | |
| **Duplicate (7070192-DUP4)** | **Source: AAG0117-02** | | | | Prepared: 07/10/17 Analyzed: 07/11/17 | | | | | |
| Dissolved Organic Carbon | ND | 1.0 | mg/L | | ND | | | | 14 | |
| **Duplicate (7070192-DUP5)** | **Source: AAG0117-03** | | | | Prepared: 07/10/17 Analyzed: 07/11/17 | | | | | |
| Dissolved Organic Carbon | 1.2 | 1.0 | mg/L | | 1.5 | | | 17 | 14 | QR-03 |
| **Batch 7070194 - EPA 410.4** | | | | | | | | | | |
| **Blank (7070194-BLK1)** | | | | | Prepared & Analyzed: 07/10/17 | | | | | |
| Chemical Oxygen Demand | ND | 10 | mg/L | | | | | | | |
| **LCS (7070194-BS1)** | | | | | Prepared & Analyzed: 07/10/17 | | | | | |
| Chemical Oxygen Demand | 216 | 10 | mg/L | 200.00 | | 108 | 90-110 | | | |
| **Duplicate (7070194-DUP1)** | **Source: AAF0580-01RE1** | | | | Prepared & Analyzed: 07/10/17 | | | | | |
| Chemical Oxygen Demand | 67 | 10 | mg/L | | 74 | | | 11 | 10 | QR-03 |

PACE ANALYTICAL SERVICES, LLC.
Environmental Monitoring & Laboratory Analysis
110 Technology Parkway, Peachtree Corners, GA 30092
(770) 734-4200 FAX (770) 734-4201

Georgia Power
2480 Maner Road
Atlanta GA, 30339
Attention: Mr. Joju Abraham

July 17, 2017

**Report No.: AAG0117**

## General Chemistry - Quality Control

| Analyte | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Qual |
|---|---|---|---|---|---|---|---|---|---|---|
| **Batch 7070194 - EPA 410.4** | | | | | | | | | | |
| **Matrix Spike (7070194-MS1)** | **Source: AAG0094-01** | | | | Prepared & Analyzed: 07/10/17 | | | | | |
| Chemical Oxygen Demand | 266 | 10 | mg/L | 200.00 | 193 | 36 | 90-110 | | | QM-05 |
| **Matrix Spike (7070194-MS2)** | **Source: AAG0117-01** | | | | Prepared & Analyzed: 07/10/17 | | | | | |
| Chemical Oxygen Demand | 358 | 10 | mg/L | 200.00 | 147 | 105 | 90-110 | | | |
| **Matrix Spike Dup (7070194-MSD1)** | **Source: AAG0094-01** | | | | Prepared & Analyzed: 07/10/17 | | | | | |
| Chemical Oxygen Demand | 254 | 10 | mg/L | 200.00 | 193 | 30 | 90-110 | 5 | 10 | QM-05 |
| **Batch 7070215 - SM 3500-Fe B** | | | | | | | | | | |
| **Blank (7070215-BLK1)** | | | | | Prepared & Analyzed: 07/11/17 | | | | | |
| Ferrous Iron | ND | 0.20 | mg/L | | | | | | | |
| **LCS (7070215-BS1)** | | | | | Prepared & Analyzed: 07/11/17 | | | | | |
| Ferrous Iron | 0.42 | 0.20 | mg/L | 0.40000 | | 106 | 80-120 | | | |
| **Matrix Spike (7070215-MS1)** | **Source: AAG0117-01** | | | | Prepared & Analyzed: 07/11/17 | | | | | |
| Ferrous Iron | 0.52 | 0.20 | mg/L | 0.40000 | ND | 130 | 80-120 | | | QM-05 |
| **Matrix Spike Dup (7070215-MSD1)** | **Source: AAG0117-01** | | | | Prepared & Analyzed: 07/11/17 | | | | | |
| Ferrous Iron | 0.50 | 0.20 | mg/L | 0.40000 | ND | 126 | 80-120 | 4 | 10 | QM-05 |
| **Batch 7070216 - SM 4500-S D** | | | | | | | | | | |
| **Blank (7070216-BLK1)** | | | | | Prepared & Analyzed: 07/11/17 | | | | | |
| Total Sulfide | ND | 0.2 | mg/L | | | | | | | |

**PACE ANALYTICAL SERVICES, LLC.**

Environmental Monitoring & Laboratory Analysis
110 Technology Parkway, Peachtree Corners, GA 30092
(770) 734-4200 FAX (770) 734-4201

Georgia Power
2480 Maner Road
Atlanta GA, 30339
Attention: Mr. Joju Abraham

July 17, 2017

**Report No.: AAG0117**

## General Chemistry - Quality Control

| Analyte | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Qual |
|---|---|---|---|---|---|---|---|---|---|---|
| **Batch 7070216 - SM 4500-S D** | | | | | | | | | | |
| **LCS (7070216-BS1)** | | | | | Prepared & Analyzed: 07/11/17 | | | | | |
| Total Sulfide | 0.519 | 0.2 | mg/L | 0.50100 | | 104 | 80-120 | | | |
| **Matrix Spike (7070216-MS1)** | | **Source: AAG0112-01** | | | Prepared & Analyzed: 07/11/17 | | | | | |
| Total Sulfide | 0.665 | 0.2 | mg/L | 0.50100 | ND | 133 | 30-129 | | | QM-05 |
| **Matrix Spike Dup (7070216-MSD1)** | | **Source: AAG0112-01** | | | Prepared & Analyzed: 07/11/17 | | | | | |
| Total Sulfide | 0.688 | 0.2 | mg/L | 0.50100 | ND | 137 | 30-129 | 3.40 | 10 | QM-05 |

PACE ANALYTICAL SERVICES, LLC.

Environmental Monitoring & Laboratory Analysis
110 Technology Parkway, Peachtree Corners, GA 30092
(770) 734-4200 FAX (770) 734-4201

Georgia Power
2480 Maner Road
Atlanta GA, 30339
Attention: Mr. Joju Abraham

July 17, 2017

**Report No.: AAG0117**

## Inorganic Anions - Quality Control

| Analyte | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Qual |
|---|---|---|---|---|---|---|---|---|---|---|
| **Batch 7070130 - EPA 300.0** | | | | | | | | | | |
| **Blank (7070130-BLK1)** | | | | | Prepared & Analyzed: 07/07/17 | | | | | |
| Sulfate | ND | 5.0 | mg/L | | | | | | | |
| **LCS (7070130-BS1)** | | | | | Prepared & Analyzed: 07/07/17 | | | | | |
| Sulfate | 10.1 | 5.0 | mg/L | 10.050 | | 100 | 90-110 | | | |
| **Matrix Spike (7070130-MS1)** | **Source: AAG0109-03** | | | | Prepared & Analyzed: 07/07/17 | | | | | |
| Sulfate | 38.1 | 5.0 | mg/L | 10.050 | 31.0 | 71 | 90-110 | | | QM-05 |
| **Matrix Spike (7070130-MS2)** | **Source: AAG0117-03** | | | | Prepared & Analyzed: 07/07/17 | | | | | |
| Sulfate | 12.5 | 5.0 | mg/L | 10.050 | 2.35 | 101 | 90-110 | | | |
| **Matrix Spike Dup (7070130-MSD1)** | **Source: AAG0109-03** | | | | Prepared & Analyzed: 07/07/17 | | | | | |
| Sulfate | 38.2 | 5.0 | mg/L | 10.050 | 31.0 | 71 | 90-110 | 0.2 | 15 | QM-05 |

PACE ANALYTICAL SERVICES, LLC.

Environmental Monitoring & Laboratory Analysis
110 Technology Parkway, Peachtree Corners, GA 30092
(770) 734-4200 FAX (770) 734-4201

Georgia Power
2480 Maner Road
Atlanta GA, 30339
Attention: Mr. Joju Abraham

July 17, 2017

**Report No.: AAG0117**

## Metals, Total - Quality Control

| Analyte | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Qual |
|---|---|---|---|---|---|---|---|---|---|---|
| **Batch 7070219 - EPA 3010A** | | | | | | | | | | |
| **Blank (7070219-BLK1)** | | | | | Prepared: 07/11/17 Analyzed: 07/12/17 | | | | | |
| Iron | ND | 0.0400 | mg/L | | | | | | | |
| **LCS (7070219-BS1)** | | | | | Prepared: 07/11/17 Analyzed: 07/12/17 | | | | | |
| Iron | 1.02 | 0.0400 | mg/L | 1.0000 | | 102 | 80-120 | | | |
| **Matrix Spike (7070219-MS1)** | | **Source: AAG0117-01** | | | Prepared: 07/11/17 Analyzed: 07/12/17 | | | | | |
| Iron | 6.09 | 0.0400 | mg/L | 1.0000 | 4.87 | 122 | 75-125 | | | |
| **Matrix Spike Dup (7070219-MSD1)** | | **Source: AAG0117-01** | | | Prepared: 07/11/17 Analyzed: 07/12/17 | | | | | |
| Iron | 5.84 | 0.0400 | mg/L | 1.0000 | 4.87 | 97 | 75-125 | 4 | 20 | |
| **Post Spike (7070219-PS1)** | | **Source: AAG0117-01** | | | Prepared: 07/11/17 Analyzed: 07/12/17 | | | | | |
| Iron | 6.04 | | mg/L | 1.0000 | 4.87 | 117 | 80-120 | | | |

**PACE ANALYTICAL SERVICES, LLC.**

Environmental Monitoring & Laboratory Analysis
110 Technology Parkway, Peachtree Corners, GA 30092
(770) 734-4200  FAX (770) 734-4201

Georgia Power
2480 Maner Road
Atlanta GA, 30339
Attention: Mr. Joju Abraham

July 17, 2017

## Laboratory Certifications

| Code | Description | Number | Expires |
|---|---|---|---|
| GADW | Georgia DW Inorganics Eff: 07/01/2016 | 812 | 08/30/2017 |
| GADWM | Georgia DW Microbiology Eff: 07/01/2015 | 812 | 12/09/2019 |
| NC | North Carolina | 381 | 12/31/2017 |
| NELAC | FL DOH (Non-Pot. Water, Solids) Eff:: 07/01/2016 | E87315 | 06/30/2018 |
| NELDW | FL DOH NELAC (Drinking Water) Eff: 07/01/2016 | E87315 | 06/30/2018 |
| SC | South Carolina | 98011001 | 08/30/2017 |
| TX | Texas | T104704397-08-TX | 03/31/2018 |
| VA | Virginia | 460204 | 12/14/2017 |

**PACE ANALYTICAL SERVICES, LLC.**

Environmental Monitoring & Laboratory Analysis
110 Technology Parkway, Peachtree Corners, GA 30092
(770) 734-4200 FAX (770) 734-4201

Georgia Power
2480 Maner Road
Atlanta GA, 30339
Attention: Mr. Joju Abraham

July 17, 2017

# Legend

**Definition of Laboratory Terms**

**ND** - None Detected at the Reporting Limit
**TIC** - Tentatively Identified Compound
**CFU** - Colony Forming Units
**SOP** - Method run per Pace Standard Operating Procedure
**RL** - Reporting Limit
**DF** - Dilution Factor
***** - Analyte not included in the NELAC list of certified analytes.

**Sample Information**

N-Nitrosodiphenylamine breaks down to diphenylamine in the GCMS; both analytes are reported as N-Nitrososdiphenylamine. Pace is not NELAC certified for diphenylamine.
Phthalic acid and phthalic anhydride are reported as dimethyl phthalate
Maleic acid and maleic anhydride are reported as dimethyl malate
1,2-Diphenylhydrazine breaks down to azobenzene in the GCMS; both analytes are reported as azobenzene
Drinking Water Records will be available for at least 5 years and are subject to disposal after the 5 years have elapsed.

**Definition of Qualifiers**

**QR-03** The RPD value for the sample duplicate or MS/MSD was outside of QC acceptance limits due to suspected matrix interference and/or non-homogeneous sample matrix.

**QM-05** The spike recovery was outside acceptance limits for the MS and/or MSD and/or PDS due to suspected matrix interference. Sample results for the QC batch were accepted based on acceptable LCS recoveries.

**J** Estimated value less than Reporting Limit (RL) but greater than Method Detection Limit(MDL) (CLP J-Flag).

**H-01** Sample was received outside of the EPA recommended holding time or was received with insufficient time to run sample within the EPA recommended holding time.

**Note: Unless otherwise noted, all results are reported on an as received basis.**

PACE ANALYTICAL SERVICES, LLC.

Environmental Monitoring & Laboratory Analysis
110 Technology Parkway, Peachtree Corners, GA 30092
(770) 734-4200  FAX (770) 734-4201

Georgia Power
2480 Maner Road
Atlanta GA, 30339
Attention: Mr. Joju Abraham

July 17, 2017

## Report Notes

The Ferrous Irons were received out of hold.   MMR

## CHAIN OF CUSTODY RECORD

Pace Analytical® www.pacelabs.com

**Pace Analytical Services, LLC - Atlanta GA**
110 TECHNOLOGY PARKWAY, PEACHTREE CORNERS, GA 30092
(770) 734-4200 : FAX (770) 734-4201

PAGE: 1 OF 1

CLIENT NAME: Georgia Power Company

CLIENT ADDRESS/PHONE NUMBER/FAX NUMBER: 241 Ralph McGill Blvd Atlanta, GA 30308

REPORT TO: Joju Abraham | CC: rkirkman@golder.com

REQUESTED COMPLETION DATE: Standard | PO #: 1779172

PROJECT NAME/STATE: Plant McDonough Investigation

PROJECT #: 1779172

| | | | | | | | ANALYSIS REQUESTED | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | CONTAINER TYPE: | P | P | P | V | V | P | P | | |
| | | | | | | PRESERVATION: | 7 | 2 | 5 | 7 | 1 | 7 | 3 | | |
| Collection DATE | Collection TIME | MATRIX CODE* | COMP | GRAB | SAMPLE IDENTIFICATION | # of CONTAINERS | BOD/Sulfate | COD | Sulfide | DOC | TOC | Ferrous Iron | Metals (Fe) | LAB ID NUMBER | REMARKS/ADDITIONAL INFORMATION |
| 7/6/17 | 1335 | GW | | X | B-68 | 9 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 1 | All results are subject |
| 7/6/17 | 1515 | GW | | X | B-69 | 9 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 2 | to Attorney client |
| 7/6/17 | 0955 | GW | | X | B-70A | 9 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 3 | privilege |

**CONTAINER TYPE**
- P - PLASTIC
- A - AMBER GLASS
- G - CLEAR GLASS
- V - VOA VIAL
- S - STERILE
- O - OTHER

**PRESERVATION**
- 1 - HCl, ≤6°C
- 2 - $H_2SO_4$, ≤6°C
- 3 - $HNO_3$
- 4 - NaOH, ≤6°C
- 5 - NaOH/ZnAc, ≤6°C
- 6 - $Na_2S_2O_3$, ≤6°C
- 7 - ≤6°C not frozen

***MATRIX CODES:**
- DW - DRINKING WATER
- WW - WASTEWATER
- GW - GROUNDWATER
- SW - SURFACE WATER
- ST - STORM WATER
- W - WATER
- S - SOIL
- SL - SLUDGE
- SD - SOLID
- A - AIR
- L - LIQUID
- P - PRODUCT

SAMPLED BY AND TITLE: [signature] | DATE/TIME: 7/6/17 1600 | RELINQUISHED BY: [signature] | DATE/TIME: 7/7/17 0935

RECEIVED BY: | DATE/TIME: | RELINQUISHED BY: | DATE/TIME:

RECEIVED BY LAB: Ralman | DATE/TIME: 07/07/17 0935

SAMPLE SHIPPED VIA: UPS FED-EX USPS COURIER CLIENT OTHER FS

Checked: Yes No NA | Ice: Yes No NA | Temperature: 3.6 Min: 3.6 Max: | Custody Seal: Intact Broken Not Present N/A | # of Coolers: | Cooler ID:

FOR LAB USE ONLY
LAB #: AAG0117
Entered into LIMS: MR
Tracking #:

Rev. 12/15/2016

**PACE ANALYTICAL SERVICES, LLC.**

Environmental Monitoring & Laboratory Analysis
110 Technology Parkway, Peachtree Corners, GA 30092
(770) 734-4200 FAX (770) 734-4201


**LOG-IN CHECKLIST** **Printed: 7/7/2017 2:54:53PM**

**Attn:** Mr. Joju Abraham

**Client:** Georgia Power
**Project:** Plant McDonough
**Date Received:** 07/07/17 09:35

**Work Order:** AAG0117
**Logged In By:** Mohammad M. Rahman

**OBSERVATIONS**

**#Samples:** 3 **#Containers:** 27

**Minimum Temp(C):** 3.6 **Maximum Temp(C):** 3.6 **Custody Seal(s) Used:** N/A

**CHECKLIST ITEMS**

| | |
|---|---|
| COC included with Samples | YES |
| Sample Container(s) Intact | YES |
| Chain of Custody Complete | YES |
| Sample Container(s) Match COC | YES |
| Custody seal Intact | N/A |
| Temperature in Compliance | YES |
| Sufficient Sample Volume for Analysis | YES |
| Zero Headspace Maintained for VOA Analyses | YES |
| Samples labeled preserved (If Applicable) | YES |
| Samples received within Allowable Hold Times | NO |
| Samples Received on Ice | YES |
| Preservation Confirmed | YES |

**Comments:**

The Ferrous Irons were received out of hold. MMR

**PACE ANALYTICAL SERVICES, LLC.**

Environmental Monitoring & Laboratory Analysis
110 Technology Parkway, Peachtree Corners, GA 30092
(770) 734-4200 FAX (770) 734-4201

# Laboratory Report

**Prepared For:**

**Golder Associates - Atlanta**
**3730 Chamblee Tucker Road**
**Atlanta, GA 30341**

**Attention: Mr. Tim Richards**

**Report Number: AAK0414**

**November 21, 2017**

**Project: Plant McDonough**

**Project #:1777449**

We appreciate the opportunity to provide the analytical support for your project. The analytical results in this report are based upon information supplied by you, the client, and are for your exclusive use. If you have any questions regarding this data package, please do not hesitate to call.

Approved:

Betsy McDaniel

Project Manager

**PACE ANALYTICAL SERVICES, LLC.**

Environmental Monitoring & Laboratory Analysis
110 Technology Parkway, Peachtree Corners, GA 30092
(770) 734-4200 FAX (770) 734-4201

Golder Associates - Atlanta
3730 Chamblee Tucker Road
Atlanta GA, 30341
Attention: Mr. Tim Richards

November 21, 2017

**ANALYTICAL REPORT FOR SAMPLES**

| Sample ID | Laboratory ID | Matrix | Date Sampled | Date Received |
|---|---|---|---|---|
| AP-1_Composite Profile | AAK0414-01 | Soil | 11/13/17 10:55 | 11/13/17 14:05 |

## PACE ANALYTICAL SERVICES, LLC.

Environmental Monitoring & Laboratory Analysis
110 Technology Parkway, Peachtree Corners, GA 30092
(770) 734-4200 FAX (770) 734-4201

Golder Associates - Atlanta
3730 Chamblee Tucker Road
Atlanta GA, 30341
Attention: Mr. Tim Richards

November 21, 2017

### Case Narrative

The Total Organic Carbon analysis by method EPA 9060 was performed by Pace-Green Bay, 1241 Bellevue Street, Suite 9, Green Bay WI 54302. The Pace-Green Bay lab contact is Cindy Varga at 715-223-5638. Please see the attached subcontractor report.

**PACE ANALYTICAL SERVICES, LLC.**

Environmental Monitoring & Laboratory Analysis
110 Technology Parkway, Peachtree Corners, GA 30092
(770) 734-4200 FAX (770) 734-4201

Golder Associates - Atlanta
3730 Chamblee Tucker Road
Atlanta GA, 30341
Attention: Mr. Tim Richards

November 21, 2017

**Report No.: AAK0414**
**Client ID: AP-1_Composite Profile**
**Date/Time Sampled: 11/13/2017 10:55:00AM**
**Matrix: Soil**

**Project: Plant McDonough**
**Lab Number ID: AAK0414-01**
**Date/Time Received: 11/13/2017 2:05:00PM**

| Analyte | Result | RL | Units | Method | Qual. | DF | Preparation Date | Analytical Date | Batch | Init. |
|---|---|---|---|---|---|---|---|---|---|---|
| **General Chemistry** | | | | | | | | | | |
| pH | 6.69 | | pH Units | EPA 9045D | | 1 | 11/13/17 16:15 | 11/13/17 16:15 | 7110346 | JAD |
| % Solids | 71.7 | 0.04 | % by Weight | SOP Moisture | | 1 | 11/16/17 10:40 | 11/16/17 10:40 | 7110462 | JPT |
| Sulfide | ND | 3.5 | mg/kg dry | EPA 9030B/9034 | | 1 | 11/14/17 13:00 | 11/14/17 17:15 | 7110374 | DJS |
| **Inorganic Anions** | | | | | | | | | | |
| Sulfate, Extractable | ND | 68 | mg/kg dry | EPA 9056A | | 1 | 11/15/17 10:27 | 11/15/17 15:15 | 7110409 | RLC |
| **Metals, Total** | | | | | | | | | | |
| Calcium | 1920 | 34.3 | mg/kg dry | EPA 6010D | | 1 | 11/15/17 16:10 | 11/16/17 12:51 | 7110395 | FBS |

Environmental Monitoring & Laboratory Analysis
110 Technology Parkway, Peachtree Corners, GA 30092
(770) 734-4200 FAX (770) 734-4201

Golder Associates - Atlanta
3730 Chamblee Tucker Road
Atlanta GA, 30341
Attention: Mr. Tim Richards

November 21, 2017

**Report No.: AAK0414**

## General Chemistry - Quality Control

| Analyte | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Qual |
|---|---|---|---|---|---|---|---|---|---|---|
| **Batch 7110346 - EPA 9045D** | | | | | | | | | | |
| **Duplicate (7110346-DUP1)** | **Source: AAK0414-01** | | | | Prepared & Analyzed: 11/13/17 | | | | | |
| pH | 6.70 | | pH Units | | 6.69 | | | 0.1 | 5 | |
| **Batch 7110374 - EPA 9030** | | | | | | | | | | |
| **Blank (7110374-BLK1)** | | | | | Prepared & Analyzed: 11/14/17 | | | | | |
| Sulfide | ND | 2.5 | mg/kg wet | | | | | | | |
| **LCS (7110374-BS1)** | | | | | Prepared & Analyzed: 11/14/17 | | | | | |
| Sulfide | 98.8 | 2.5 | mg/kg wet | 103.60 | | 95 | 40-104 | | | |
| **Matrix Spike (7110374-MS1)** | **Source: AAK0309-01** | | | | Prepared & Analyzed: 11/14/17 | | | | | |
| Sulfide | 57.1 | 2.7 | mg/kg dry | 112.39 | ND | 51 | 10-143 | | | |
| **Batch 7110462 - % Solids** | | | | | | | | | | |
| **Duplicate (7110462-DUP1)** | **Source: AAK0414-01** | | | | Prepared & Analyzed: 11/16/17 | | | | | |
| % Solids | 71.5 | 0.04 | % by Weight | | 71.7 | | | 0.3 | 10 | |
| **Duplicate (7110462-DUP2)** | **Source: AAK0513-01** | | | | Prepared & Analyzed: 11/16/17 | | | | | |
| % Solids | 82.7 | 0.04 | % by Weight | | 79.1 | | | 4 | 10 | |

**PACE ANALYTICAL SERVICES, LLC.**

Environmental Monitoring & Laboratory Analysis
110 Technology Parkway, Peachtree Corners, GA 30092
(770) 734-4200 FAX (770) 734-4201

Golder Associates - Atlanta
3730 Chamblee Tucker Road
Atlanta GA, 30341
Attention: Mr. Tim Richards

November 21, 2017

**Report No.: AAK0414**

## Inorganic Anions - Quality Control

| Analyte | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Qual |
|---|---|---|---|---|---|---|---|---|---|---|
| **Batch 7110409 - EPA 9056A** | | | | | | | | | | |
| **Blank (7110409-BLK1)** | | | | | Prepared & Analyzed: 11/15/17 | | | | | |
| Sulfate, Extractable | ND | 50 | mg/kg wet | | | | | | | |
| **LCS (7110409-BS1)** | | | | | Prepared & Analyzed: 11/15/17 | | | | | |
| Sulfate, Extractable | 102 | 49 | mg/kg wet | 97.351 | | 105 | 90-110 | | | |
| **Matrix Spike (7110409-MS1)** | | **Source: AAK0219-05** | | | Prepared & Analyzed: 11/15/17 | | | | | |
| Sulfate, Extractable | 8600 | 350 | mg/kg dry | 700.29 | 7810 | 112 | 90-110 | | | QM-05 |
| **Matrix Spike Dup (7110409-MSD1)** | | **Source: AAK0219-05** | | | Prepared & Analyzed: 11/15/17 | | | | | |
| Sulfate, Extractable | 8170 | 350 | mg/kg dry | 699.98 | 7810 | 51 | 90-110 | 5 | 15 | QM-05 |

# PACE ANALYTICAL SERVICES, LLC.

Environmental Monitoring & Laboratory Analysis
110 Technology Parkway, Peachtree Corners, GA 30092
(770) 734-4200 FAX (770) 734-4201

Golder Associates - Atlanta
3730 Chamblee Tucker Road
Atlanta GA, 30341
Attention: Mr. Tim Richards

November 21, 2017

**Report No.: AAK0414**

## Metals, Total - Quality Control

| Analyte | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Qual |
|---|---|---|---|---|---|---|---|---|---|---|
| **Batch 7110395 - EPA 3050B** | | | | | | | | | | |
| **Blank (7110395-BLK1)** | | | | | Prepared: 11/15/17 Analyzed: 11/16/17 | | | | | |
| Calcium | ND | 25.0 | mg/kg wet | | | | | | | |
| **LCS (7110395-BS1)** | | | | | Prepared: 11/15/17 Analyzed: 11/16/17 | | | | | |
| Calcium | 26.6 | 25.0 | mg/kg wet | 25.000 | | 107 | 80-120 | | | |
| **Duplicate (7110395-DUP1)** | | **Source: AAK0486-02** | | | Prepared: 11/15/17 Analyzed: 11/16/17 | | | | | |
| Calcium | 5090 | 28.0 | mg/kg dry | | 644 | | | 155 | 20 | QR-03 |
| **Matrix Spike (7110395-MS1)** | | **Source: AAK0345-07** | | | Prepared: 11/15/17 Analyzed: 11/16/17 | | | | | |
| Calcium | 310 | 28.2 | mg/kg dry | 28.165 | 361 | 0 | 75-125 | | | QR-01 |
| **Matrix Spike Dup (7110395-MSD1)** | | **Source: AAK0345-07** | | | Prepared: 11/15/17 Analyzed: 11/16/17 | | | | | |
| Calcium | 337 | 27.8 | mg/kg dry | 27.751 | 361 | 0 | 75-125 | 8 | 20 | QR-01 |
| **Post Spike (7110395-PS1)** | | **Source: AAK0345-07** | | | Prepared: 11/15/17 Analyzed: 11/16/17 | | | | | |
| Calcium | 13.1 | | mg/L | 1.0000 | 12.9 | 26 | 80-120 | | | QR-01 |

**PACE ANALYTICAL SERVICES, LLC.**

Environmental Monitoring & Laboratory Analysis
110 Technology Parkway, Peachtree Corners, GA 30092
(770) 734-4200 FAX (770) 734-4201

Golder Associates - Atlanta
3730 Chamblee Tucker Road
Atlanta GA, 30341
Attention: Mr. Tim Richards

November 21, 2017

## Laboratory Certifications

| Code | Description | Number | Expires |
|---|---|---|---|
| GADW | Georgia DW Inorganics Eff: 07/01/2016 | 812 | 06/30/2018 |
| GADWM | Georgia DW Microbiology Eff: 07/01/2015 | 812 | 12/09/2019 |
| NC | North Carolina | 381 | 12/31/2017 |
| NELAC | FL DOH (Non-Pot. Water, Solids) Eff:: 07/01/2016 | E87315 | 06/30/2018 |
| NELDW | FL DOH NELAC (Drinking Water) Eff: 07/01/2016 | E87315 | 06/30/2018 |
| SC | South Carolina | 98011001 | 11/30/2017 |
| TX | Texas | T104704397-08-TX | 03/31/2018 |
| VA | Virginia | 460204 | 12/14/2017 |

PACE ANALYTICAL SERVICES, LLC.

Environmental Monitoring & Laboratory Analysis
110 Technology Parkway, Peachtree Corners, GA 30092
(770) 734-4200 FAX (770) 734-4201

Golder Associates - Atlanta
3730 Chamblee Tucker Road
Atlanta GA, 30341
Attention: Mr. Tim Richards

November 21, 2017

# Legend

**Definition of Laboratory Terms**

**ND** - None Detected at the Reporting Limit
**TIC** - Tentatively Identified Compound
**CFU** - Colony Forming Units
**SOP** - Method run per Pace Standard Operating Procedure
**RL** - Reporting Limit
**DF** - Dilution Factor
***** - Analyte not included in the NELAC list of certified analytes.

**Sample Information**

N-Nitrosodiphenylamine breaks down to diphenylamine in the GCMS; both analytes are reported as N-Nitrososdiphenylamine. Pace is not NELAC certified for diphenylamine.
Phthalic acid and phthalic anhydride are reported as dimethyl phthalate
Maleic acid and maleic anhydride are reported as dimethyl malate
1,2-Diphenylhydrazine breaks down to azobenzene in the GCMS; both analytes are reported as azobenzene
Drinking Water Records will be available for at least 5 years and are subject to disposal after the 5 years have elapsed.

**Definition of Qualifiers**

**QR-03** The RPD value for the sample duplicate or MS/MSD was outside of QC acceptance limits due to suspected matrix interference and/or non-homogeneous sample matrix.

**QR-01** RPD was outside acceptance limits due to sample concentrations near or below the reporting limit.

**QM-05** The spike recovery was outside acceptance limits for the MS and/or MSD and/or PDS due to suspected matrix interference. Sample results for the QC batch were accepted based on acceptable LCS recoveries.

**Note: Unless otherwise noted, all results are reported on an as received basis.**

**CHAIN OF CUSTODY RECORD**

**Pace Analytical Services, LLC - Atlanta GA**
110 TECHNOLOGY PARKWAY, PEACHTREE CORNERS, GA 30092
(770) 734-4200 : FAX (770) 734-4201
www.pacelabs.com



CLIENT NAME: Golder Associates

CLIENT ADDRESS/PHONE NUMBER/FAX NUMBER: 3730 Chamblee-Tucker Rd Atlanta GA 30341

REPORT TO: Tim Richards timothy_richards@golder.com

CC:

REQUESTED COMPLETION DATE:

PO #: 1777449

PROJECT NAME/STATE: Plant McDonough GA

PROJECT #: 1777449

ANALYSIS REQUESTED

| Collection DATE | Collection TIME | MATRIX CODE* | COMP | GRAB | SAMPLE IDENTIFICATION | # of CONTAINERS | TOC / EPA 9060 (A) | Metals (Ca only) EPA 6010 (G) | PH, Sulfate, Sulfide, % solids (G) | LAB ID NUMBER | REMARKS/ADDITIONAL INFORMATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 11/13/17 | 1055 | S | X | | AP-1 - Composite Profile | 3 | 1 | 1 | 1 | 1 | 3 jars of 1 blended sample |

CONTAINER TYPE:
- P - PLASTIC
- A - AMBER GLASS
- G - CLEAR GLASS
- V - VOA VIAL
- S - STERILE
- O - OTHER

PRESERVATION:
- 1 - HCl, ≤6°C
- 2 - $H_2SO_4$, ≤6°C
- 3 - $HNO_3$
- 4 - NaOH, ≤6°C
- 5 - NaOH/ZnAc, ≤6°C
- 6 - $Na_2S_2O_3$, ≤6°C
- 7 - ≤6°C not frozen

*MATRIX CODES:
- DW - DRINKING WATER
- WW - WASTEWATER
- GW - GROUNDWATER
- SW - SURFACE WATER
- ST - STORM WATER
- W - WATER
- S - SOIL
- SL - SLUDGE
- SD - SOLID
- A - AIR
- L - LIQUID
- P - PRODUCT

SAMPLED BY AND TITLE: Chris Gargen — DATE/TIME: 11/13/17 1055

RELINQUISHED BY: [signature] — DATE/TIME: 11/13/17 1405

RECEIVED BY: — DATE/TIME:

RELINQUISHED BY: — DATE/TIME:

RECEIVED BY LAB: [signature] — DATE/TIME: 11/13/17 1405

SAMPLE SHIPPED VIA: UPS FED-EX USPS COURIER CLIENT OTHER FS

Checked: No NA — Ice: Yes No NA — Temperature: Min: 5.0°C Max:

Custody Seal: Intact Broken Not Present N/A — # of Coolers — Cooler ID:

FOR LAB USE ONLY

LAB #: AAK0414

Entered into LIMS: CMA

Tracking #:

Rev. 12/15/201

## Sample Condition Upon Receipt

Pace Analytical

Client Name: Golder Assoc.   Project # AAK 0419

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☑ Client ☐ Commercial ☐ Pace Other ______

Tracking #: ______

Optional
Proj. Due Date:
Proj. Name:

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

Packing Material: ☐ Bubble Wrap ☑ Bubble Bags ☐ None ☐ Other ______

Thermometer Used: THR082   Type of Ice: Wet Blue None   ☐ Samples on ice, cooling process has begun

Cooler Temperature: 5.0°C   Biological Tissue is Frozen: Yes No

Temp should be above freezing to 6°C

Date and Initials of person examining contents: 11/13/17 CZT

| | | 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 (Not CH) | 6. pH |
| **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: SD | | |
| 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.

Environmental Monitoring & Laboratory Analysis
110 Technology Parkway, Peachtree Corners, GA 30092
(770) 734-4200 FAX (770) 734-4201

**LOG-IN CHECKLIST** **Printed: 11/14/2017 10:19:29AM**

**Attn:** Mr. Tim Richards

**Client:** Golder Associates - Atlanta
**Project:** Plant McDonough
**Date Received:** 11/13/17 14:05

**Work Order:** AAK0414
**Logged In By:** Charles Hawks

**OBSERVATIONS**

**#Samples:** 1 **#Containers:** 3

**Minimum Temp(C):** 5.0 **Maximum Temp(C):** 5.0 **Custody Seal(s) Used:** Yes

**CHECKLIST ITEMS**

| | |
|---|---|
| COC included with Samples | YES |
| Sample Container(s) Intact | YES |
| Chain of Custody Complete | YES |
| Sample Container(s) Match COC | YES |
| Custody seal Intact | YES |
| Temperature in Compliance | YES |
| Sufficient Sample Volume for Analysis | YES |
| Zero Headspace Maintained for VOA Analyses | YES |
| Samples labeled preserved (If Applicable) | YES |
| Samples received within Allowable Hold Times | YES |
| Samples Received on Ice | YES |
| Preservation Confirmed | YES |

**Comments:**

**Pace Analytical Services, LLC**
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

November 22, 2017

Betsy McDaniel
Pace Analytical Atlanta
110 Technology Parkway
Peachtree Corners, GA 30092

RE: Project: AAK0414 PLANT MCDONOUGH
Pace Project No.: 40160761

Dear Betsy McDaniel:

Enclosed are the analytical results for sample(s) received by the laboratory on November 14, 2017. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

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

Sincerely,

Cindy Varga
cindy.varga@pacelabs.com
(920)469-2436
Project Manager

Enclosures

**Pace Analytical Services, LLC**
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

# CERTIFICATIONS

| | |
|---|---|
| Project: | AAK0414 PLANT MCDONOUGH |
| Pace Project No.: | 40160761 |

**Green Bay Certification IDs**

1241 Bellevue Street, Green Bay, WI 54302
Florida/NELAP Certification #: E87948
Illinois Certification #: 200050
Kentucky UST Certification #: 82
Louisiana Certification #: 04168
Minnesota Certification #: 055-999-334
New York Certification #: 12064
North Dakota Certification #: R-150
Virginia VELAP ID: 460263
South Carolina Certification #: 83006001
Texas Certification #: T104704529-14-1
Wisconsin Certification #: 405132750
Wisconsin DATCP Certification #: 105-444
USDA Soil Permit #: P330-16-00157
Federal Fish & Wildlife Permit #: LE51774A-0

**Pace Analytical Services, LLC**
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

# SAMPLE SUMMARY

Project: AAK0414 PLANT MCDONOUGH
Pace Project No.: 40160761

| Lab ID | Sample ID | Matrix | Date Collected | Date Received |
|---|---|---|---|---|
| **40160761001** | **AP-1 COMPOSITE PROFILE** | Solid | 11/13/17 10:55 | 11/14/17 09:45 |

**Pace Analytical Services, LLC**
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

## SAMPLE ANALYTE COUNT

Project: AAK0414 PLANT MCDONOUGH
Pace Project No.: 40160761

| Lab ID | Sample ID | Method | Analysts | Analytes Reported |
|---|---|---|---|---|
| **40160761001** | **AP-1 COMPOSITE PROFILE** | ASTM D2974-87 | KTS | 1 |
| | | EPA 9060 | TJJ | 6 |

Pace Analytical www.pacelabs.com

**Pace Analytical Services, LLC**
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

## ANALYTICAL RESULTS

Project: AAK0414 PLANT MCDONOUGH
Pace Project No.: 40160761

**Sample: AP-1 COMPOSITE PROFILE** **Lab ID: 40160761001** Collected: 11/13/17 10:55 Received: 11/14/17 09:45 Matrix: Solid

***Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.***

| Parameters | Results | Units | PQL | DF | Prepared | Analyzed | CAS No. | Qual |
|---|---|---|---|---|---|---|---|---|
| **Percent Moisture** | Analytical Method: ASTM D2974-87 | | | | | | | |
| Percent Moisture | **28.9** | % | 0.10 | 1 | | 11/21/17 10:38 | | |
| **Total Organic Carbon Quad** | Analytical Method: EPA 9060 | | | | | | | |
| Total Organic Carbon | **41100** | mg/kg | 15000 | 1 | | 11/16/17 16:19 | 7440-44-0 | |
| Total Organic Carbon | **45600** | mg/kg | 14500 | 1 | | 11/16/17 16:37 | 7440-44-0 | |
| Total Organic Carbon | **48700** | mg/kg | 14000 | 1 | | 11/16/17 16:43 | 7440-44-0 | |
| Total Organic Carbon | **49100** | mg/kg | 14100 | 1 | | 11/16/17 16:56 | 7440-44-0 | |
| Mean Total Organic Carbon | **46100** | mg/kg | 14400 | 1 | | 11/16/17 16:19 | 7440-44-0 | |
| ***Surrogates*** | | | | | | | | |
| RSD% | **8.0** | % | | 1 | | 11/16/17 16:19 | | |

**Pace Analytical Services, LLC**
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

# QUALITY CONTROL DATA

Project: AAK0414 PLANT MCDONOUGH
Pace Project No.: 40160761

| | | | |
|---|---|---|---|
| QC Batch: | 274974 | Analysis Method: | ASTM D2974-87 |
| QC Batch Method: | ASTM D2974-87 | Analysis Description: | Dry Weight/Percent Moisture |
| Associated Lab Samples: | 40160761001 | | |

SAMPLE DUPLICATE: 1617682

| Parameter | Units | 40161094010 Result | Dup Result | RPD | Max RPD | Qualifiers |
|---|---|---|---|---|---|---|
| Percent Moisture | % | 14.8 | 14.9 | 1 | 10 | |

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

## REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

# QUALITY CONTROL DATA

Project: AAK0414 PLANT MCDONOUGH
Pace Project No.: 40160761

QC Batch: 274252 Analysis Method: EPA 9060
QC Batch Method: EPA 9060 Analysis Description: 9060 TOC Average
Associated Lab Samples: 40160761001

METHOD BLANK: 1613744 Matrix: Solid
Associated Lab Samples: 40160761001

| Parameter | Units | Blank Result | Reporting Limit | Analyzed | Qualifiers |
|---|---|---|---|---|---|
| Mean Total Organic Carbon | mg/kg | <194 | 647 | 11/16/17 11:45 | |

LABORATORY CONTROL SAMPLE: 1613745

| Parameter | Units | Spike Conc. | LCS Result | LCS % Rec | % Rec Limits | Qualifiers |
|---|---|---|---|---|---|---|
| Mean Total Organic Carbon | mg/kg | 120000 | 119000 | 99 | 80-120 | |

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1613746 1613747

| Parameter | Units | 35345339001 Result | MS Spike Conc. | MSD Spike Conc. | MS Result | MSD Result | MS % Rec | MSD % Rec | % Rec Limits | RPD | Max RPD | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mean Total Organic Carbon | mg/kg | 7190 | 27000 | 27100 | 30200 | 32300 | 85 | 93 | 50-150 | 7 | 30 | |

**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

**Pace Analytical Services, LLC**
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

# QUALIFIERS

Project: AAK0414 PLANT MCDONOUGH
Pace Project No.: 40160761

## 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.

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.

Pace Analytical®
www.pacelabs.com

**Pace Analytical Services, LLC**
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

## QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AAK0414 PLANT MCDONOUGH
Pace Project No.: 40160761

| Lab ID | Sample ID | QC Batch Method | QC Batch | Analytical Method | Analytical Batch |
|---|---|---|---|---|---|
| **40160761001** | **AP-1 COMPOSITE PROFILE** | ASTM D2974-87 | 274974 | | |
| **40160761001** | **AP-1 COMPOSITE PROFILE** | EPA 9060 | 274252 | | |
| **40160761001** | **AP-1 COMPOSITE PROFILE** | EPA 9060 | 274253 | | |

40160761

RMW

Chain of Custody

Pace Analytical®
www.pacelabs.com

Workorder: AAK0414 Workorder Name: Plant McDonough Owner Received Date: 11/13/2017 Results Requested By: 11/22/2017

| Report To: | Subcontract To: |
|---|---|
| Betsy McDaniel | Cindy Varga |
| Pace Analytical Atlanta | Pace - Green Bay |
| 110 Technology Parkway | 1241 Bellevue St, Ste 9 |
| Peachtree Corners, GA 30092 | Green Bay, WI 54302 |
| Phone (770)-734-4200 | Phone (715) 223-5638 |

| | Item | Sample ID | Sample Type | Collect Date/Time | Lab ID | Matrix | Preserved Containers | Requested Analysis: TOC EPA 9060 4 injections | LAB USE ONLY |
|---|---|---|---|---|---|---|---|---|---|
| 001 | 1 | AP-1 Composite Profile | C | 11/13/2017 10:55 | AAK0414-01 | S | 1 | X | 1-4ozagA |
| | 2 | | | | | | | | |
| | 3 | | | | | | | | |
| | 4 | | | | | | | | |
| | 5 | | | | | | | | |
| | 6 | | | | | | | | |
| | 7 | | | | | | | | |
| | 8 | | | | | | | | |
| | 9 | | | | | | | | |
| | 10 | | | | | | | | |

| Transfers | Released By | Date/Time | Received By | Date/Time | Comments |
|---|---|---|---|---|---|
| 1 | Chandler Hendy | 11/13/17 1700 | | | |
| 2 | Fed Ex | 11-14-17 0945 | Susan Kluge Pace | 11-14-17 0945 | |
| 3 | | | | | |

| Cooler Temperature on Receipt 3 °C | Custody Seal Y or N | Received on Ice Y or N | Sample Intact Y or N |
|---|---|---|---|

***In order to maintain client confidentiality, location/name of the sampling site, sampler's name and signature may not be provided on this COC This chain of custody is considered complete as is since this information is available in the owner laboratory.

Pace Analytical™

**Pace Analytical Services, Inc**
1241 Bellevue Street Suite 9
Green Bay, WI 54302
Phone: 920 469 2436
Fax: 920 469 8827

# Regulated Domestic and Foreign Soils Checklist

**Project #:** 40160761 **Time:** 0945
**Initials:** SKW **Date:** 11-14-17

**Origin (Circle One):** Domestic Foreign
**If "Domestic", State of Origin (Circle One):** AL AR AZ CA FL GA ID LA MS NC NM NY OK OR SC TN TX
**If "Foreign", Country of Origin:** ____________
Note: Soils from Hawaii and Puerto Rico are of Foreign Origin

**Sample analysis will take place at (Circle all that apply):**
Green Bay Subcontract Laboratory
**Name of Subcontract Laboratory:** ____________

| | Action | Completed |
|---|---|---|
| 1) Did "Regulated" sticker get placed on Samples? | Regulated sticker must be placed onto each sample container. | Yes / No |
| 2) If samples were sent to a subcontract laboratory, do they hold a valid Soil Permit and Compliance Agreement from the USDA? If not being subcontracted please circle NA. | Subcontract Laboratories are required to hold a valid Soil Permit and Compliance Agreement before we can send soil samples to them. Verify validity by contacting USDA/APHIS. | Yes / No / NA |
| 3) Were Samples placed in designate container in Walk-In Cooler? | Regulated samples retained in the Green Bay Laboratory must be stored in designated containers in the Walk-In Cooler. | Yes / No |
| 4) Were there signs of breakage or leakage? If no please complete 5, circle NA for 6 and move to 7. If yes please circle NA for 5, and move to 6. | Check for broken glass or loose soil in the cooler. | Yes / No |
| 5) Were ice and melt water separated from cooler and disposed of properly? (No signs of breakage or leakage) | Foreign and Domestic Sources: Ice and melt water can be disposed of by dumping down the sink. | Yes / No / NA |
| 6) Were ice and melt water separated from cooler and disposed of properly? (Signs of breakage or leakage) | Foreign and Domestic Sources: Ice and melt water must be baked at 140°C then cooled and dumped down the sink. Soils must be disposed of by baking and then placing in appropriate waste barrel. | Yes / No / NA |
| 7) Was the cooler decontaminated? | Soak cooler for 30 minutes with 1:10 bleach solution, drain in sink, let cooler air dry. | Yes / No |

Comments:

40160761

# Sample Condition Upon Receipt

Pace Analytical

Client Name: Golder Assoc.  Project # AAK 0419

**Courier:** ☐ Fed Ex ☐ UPS ☐ USPS ☑ Client ☐ Commercial ☐ Pace Other ______

**Tracking #:** ______

Optional
Proj. Due Date:
Proj. Name:

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

**Packing Material:** ☐ Bubble Wrap ☑ Bubble Bags ☐ None ☐ Other ______

**Thermometer Used** THR082  **Type of Ice:** Wet Blue None  ☐ Samples on ice, cooling process has begun

**Cooler Temperature** 5.0°C  **Biological Tissue is Frozen:** Yes No

Temp should be above freezing to 6°C

Date and Initials of person examining contents: 11/13/17 C2F

| | | | | **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. pH |
| **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: SD | | | | |
| 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

PaceAnalytical

# Sample Condition Upon Receipt

Pace Analytical Services, LLC. - Green Bay WI
1241 Bellevue Street, Suite 9
Green Bay, WI 54302

**Client Name:** Pace, GA

Project #: **WO#: 40160761**

40160761

**Courier:** ☒ Fed Ex ☐ UPS ☐ Client ☐ Pace Other:

**Tracking #:** 7413 6059 8265

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

**Custody Seal on Samples Present:** ☐ yes ☒ no Seals intact: ☐ yes ☐ no

**Packing Material:** ☐ Bubble Wrap ☒ Bubble Bags ☐ None ☐ Other

**Thermometer Used** SR68 **Type of Ice:** Wet Blue Dry None ☒ Samples on ice, cooling process has begun

**Cooler Temperature** Uncorr: 3 /Corr: 3 **Biological Tissue is Frozen:** ☐ yes ☐ no

**Temp Blank Present:** ☒ yes ☐ no

Temp should be above freezing to 6°C.
Biota Samples may be received at ≤ 0°C.

**Person examining contents:**
Date: 11-14-17
Initials: Sew

| | | | | 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. IRWO 11-14-17 Sew |
| Samples Arrived within Hold Time: | ☒Yes | ☐No | ☐N/A | 5. |
| - VOA Samples frozen upon receipt | ☐Yes | ☐No | | Date/Time: |
| **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 | |
| -Pace IR 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: S | | | | |
| All containers needing preservation have been checked. (Non-Compliance noted in 13.) | ☐Yes | ☐No | ☒N/A | 13. ☐ HNO3 ☐ H2SO4 ☐ NaOH ☐ NaOH +ZnAct |
| All containers needing preservation are found to be in compliance with EPA recommendation. (HNO3, H2SO4 ≤2; NaOH+ZnAct ≥9, NaOH ≥12) | ☐Yes | ☐No | ☒N/A | |
| exceptions: VOA, coliform, TOC, TOX, TOH, O&G, WIDROW, Phenolics, OTHER: | ☐Yes | ☒No | | Initial when completed / Lab Std #ID of preservative / Date/ Time: |
| Headspace in VOA Vials ( >6mm): | ☐Yes | ☐No | ☒N/A | 14. |
| Trip Blank Present: | ☐Yes | ☐No | ☒N/A | 15. |
| Trip Blank Custody Seals Present | ☐Yes | ☐No | ☒N/A | |
| Pace Trip Blank Lot # (if purchased): | | | | |

**Client Notification/ Resolution:** If checked, see attached form for additional comments ☐

Person Contacted: Date/Time:

Comments/ Resolution: Plastic around cap of sample. 11-14-17 Sew

**Project Manager Review:** Ok **Date:** 11/14/17

F-GB-C-031-Rev.04 (12Dec2016) SCUR.xls
Pace Analytical Services LLC. - Green Bay WI

# ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Pensacola
3355 McLemore Drive
Pensacola, FL 32514
Tel: (850)474-1001

TestAmerica Job ID: 400-137545-1
Client Project/Site: CCR Plant McDonough

For:
Southern Company
241 Ralph McGill Blvd SE
B10185
Atlanta, Georgia 30308

Attn: Joju Abraham

*Authorized for release by:*
*5/17/2017 6:14:54 PM*


Cheyenne Whitmire, Project Manager II
(850)471-6222
cheyenne.whitmire@testamericainc.com




*The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.*

*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.*

# Table of Contents

Cover Page . . . . . . . . . . 1
Table of Contents . . . . . . . . . . 2
Detection Summary . . . . . . . . . . 3
Method Summary . . . . . . . . . . 4
Sample Summary . . . . . . . . . . 5
Client Sample Results . . . . . . . . . . 6
Definitions . . . . . . . . . . 7
Chronicle . . . . . . . . . . 8
QC Association . . . . . . . . . . 9
QC Sample Results . . . . . . . . . . 10
Chain of Custody . . . . . . . . . . 12
Receipt Checklists . . . . . . . . . . 13
Certification Summary . . . . . . . . . . 14

# Detection Summary

Client: Southern Company
Project/Site: CCR Plant McDonough

TestAmerica Job ID: 400-137545-1

## Client Sample ID: B-68A — Lab Sample ID: 400-137545-1

No Detections.

## Client Sample ID: B-73 — Lab Sample ID: 400-137545-2

| Analyte | Result | Qualifier | RL | MDL | Unit | Dil Fac | D | Method | Prep Type |
|---|---|---|---|---|---|---|---|---|---|
| Arsenic | 0.0063 | | 0.0013 | 0.00046 | mg/L | 5 | | 6020 | Total Recoverable |

## Client Sample ID: B-74 — Lab Sample ID: 400-137545-3

| Analyte | Result | Qualifier | RL | MDL | Unit | Dil Fac | D | Method | Prep Type |
|---|---|---|---|---|---|---|---|---|---|
| Arsenic | 0.0033 | | 0.0013 | 0.00046 | mg/L | 5 | | 6020 | Total Recoverable |

## Client Sample ID: B-72 — Lab Sample ID: 400-137545-4

No Detections.

This Detection Summary does not include radiochemical test results.

# Method Summary



| Method | Method Description | Protocol | Laboratory |
|---|---|---|---|
| 6020 | Metals (ICP/MS) | SW846 | TAL PEN |

**Protocol References:**

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

**Laboratory References:**

TAL PEN = TestAmerica Pensacola, 3355 McLemore Drive, Pensacola, FL 32514, TEL (850)474-1001

# Sample Summary

Client: Southern Company
Project/Site: CCR Plant McDonough

TestAmerica Job ID: 400-137545-1

| Lab Sample ID | Client Sample ID | Matrix | Collected | Received |
|---|---|---|---|---|
| 400-137545-1 | B-68A | Water | 05/01/17 14:23 | 05/05/17 08:23 |
| 400-137545-2 | B-73 | Water | 05/02/17 14:09 | 05/05/17 08:23 |
| 400-137545-3 | B-74 | Water | 05/03/17 10:16 | 05/05/17 08:23 |
| 400-137545-4 | B-72 | Water | 05/04/17 09:36 | 05/05/17 08:23 |

## Client Sample ID: B-68A
**Lab Sample ID: 400-137545-1**
**Date Collected: 05/01/17 14:23**
**Matrix: Water**
**Date Received: 05/05/17 08:23**

### Method: 6020 - Metals (ICP/MS) - Total Recoverable

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Arsenic | <0.00046 | | 0.0013 | 0.00046 | mg/L | | 05/15/17 16:40 | 05/16/17 15:57 | 5 |

## Client Sample ID: B-73
**Lab Sample ID: 400-137545-2**
**Date Collected: 05/02/17 14:09**
**Matrix: Water**
**Date Received: 05/05/17 08:23**

### Method: 6020 - Metals (ICP/MS) - Total Recoverable

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Arsenic** | **0.0063** | | 0.0013 | 0.00046 | mg/L | | 05/15/17 16:40 | 05/16/17 16:02 | 5 |

## Client Sample ID: B-74
**Lab Sample ID: 400-137545-3**
**Date Collected: 05/03/17 10:16**
**Matrix: Water**
**Date Received: 05/05/17 08:23**

### Method: 6020 - Metals (ICP/MS) - Total Recoverable

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Arsenic** | **0.0033** | | 0.0013 | 0.00046 | mg/L | | 05/15/17 16:40 | 05/16/17 16:06 | 5 |

## Client Sample ID: B-72
**Lab Sample ID: 400-137545-4**
**Date Collected: 05/04/17 09:36**
**Matrix: Water**
**Date Received: 05/05/17 08:23**

### Method: 6020 - Metals (ICP/MS) - Total Recoverable

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Arsenic | <0.00046 | | 0.0013 | 0.00046 | mg/L | | 05/15/17 16:40 | 05/16/17 16:11 | 5 |

Client: Southern Company
Project/Site: CCR Plant McDonough

TestAmerica Job ID: 400-137545-1

## 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 |
| 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) |
| MDA | Minimum Detectable Activity (Radiochemistry) |
| MDC | Minimum Detectable Concentration (Radiochemistry) |
| MDL | Method Detection Limit |
| ML | Minimum Level (Dioxin) |
| NC | Not Calculated |
| ND | Not Detected at the reporting limit (or MDL or EDL if shown) |
| PQL | Practical Quantitation Limit |
| 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) |

# Lab Chronicle

Client: Southern Company
Project/Site: CCR Plant McDonough

TestAmerica Job ID: 400-137545-1

## Client Sample ID: B-68A
**Lab Sample ID: 400-137545-1**
**Date Collected: 05/01/17 14:23**
**Matrix: Water**
**Date Received: 05/05/17 08:23**

| Prep Type | Batch Type | Batch Method | Run | Dilution Factor | Batch Number | Prepared or Analyzed | Analyst | Lab |
|---|---|---|---|---|---|---|---|---|
| Total Recoverable | Prep | 3005A | | | 353567 | 05/15/17 16:40 | JAP | TAL PEN |
| Total Recoverable | Analysis | 6020 | | 5 | 353834 | 05/16/17 15:57 | DRE | TAL PEN |

## Client Sample ID: B-73
**Lab Sample ID: 400-137545-2**
**Date Collected: 05/02/17 14:09**
**Matrix: Water**
**Date Received: 05/05/17 08:23**

| Prep Type | Batch Type | Batch Method | Run | Dilution Factor | Batch Number | Prepared or Analyzed | Analyst | Lab |
|---|---|---|---|---|---|---|---|---|
| Total Recoverable | Prep | 3005A | | | 353567 | 05/15/17 16:40 | JAP | TAL PEN |
| Total Recoverable | Analysis | 6020 | | 5 | 353834 | 05/16/17 16:02 | DRE | TAL PEN |

## Client Sample ID: B-74
**Lab Sample ID: 400-137545-3**
**Date Collected: 05/03/17 10:16**
**Matrix: Water**
**Date Received: 05/05/17 08:23**

| Prep Type | Batch Type | Batch Method | Run | Dilution Factor | Batch Number | Prepared or Analyzed | Analyst | Lab |
|---|---|---|---|---|---|---|---|---|
| Total Recoverable | Prep | 3005A | | | 353567 | 05/15/17 16:40 | JAP | TAL PEN |
| Total Recoverable | Analysis | 6020 | | 5 | 353834 | 05/16/17 16:06 | DRE | TAL PEN |

## Client Sample ID: B-72
**Lab Sample ID: 400-137545-4**
**Date Collected: 05/04/17 09:36**
**Matrix: Water**
**Date Received: 05/05/17 08:23**

| Prep Type | Batch Type | Batch Method | Run | Dilution Factor | Batch Number | Prepared or Analyzed | Analyst | Lab |
|---|---|---|---|---|---|---|---|---|
| Total Recoverable | Prep | 3005A | | | 353567 | 05/15/17 16:40 | JAP | TAL PEN |
| Total Recoverable | Analysis | 6020 | | 5 | 353834 | 05/16/17 16:11 | DRE | TAL PEN |

**Laboratory References:**
TAL PEN = TestAmerica Pensacola, 3355 McLemore Drive, Pensacola, FL 32514, TEL (850)474-1001

# QC Association Summary

## Metals

### Prep Batch: 353567

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 400-137545-1 | B-68A | Total Recoverable | Water | 3005A | |
| 400-137545-2 | B-73 | Total Recoverable | Water | 3005A | |
| 400-137545-3 | B-74 | Total Recoverable | Water | 3005A | |
| 400-137545-4 | B-72 | Total Recoverable | Water | 3005A | |
| MB 400-353567/1-A ^5 | Method Blank | Total Recoverable | Water | 3005A | |
| LCS 400-353567/2-A | Lab Control Sample | Total Recoverable | Water | 3005A | |
| 400-137660-D-7-E MS ^5 | Matrix Spike | Total Recoverable | Water | 3005A | |
| 400-137660-D-7-F MSD ^5 | Matrix Spike Duplicate | Total Recoverable | Water | 3005A | |

### Prep Batch: 353646

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| MB 400-353646/1-A ^5 | Method Blank | Total Recoverable | Water | 3005A | |
| LCS 400-353646/2-A | Lab Control Sample | Total Recoverable | Water | 3005A | |
| 600-147744-F-1-E MS ^5 | Matrix Spike | Total Recoverable | Water | 3005A | |
| 600-147744-F-1-F MSD ^5 | Matrix Spike Duplicate | Total Recoverable | Water | 3005A | |

### Analysis Batch: 353834

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 400-137545-1 | B-68A | Total Recoverable | Water | 6020 | 353567 |
| 400-137545-2 | B-73 | Total Recoverable | Water | 6020 | 353567 |
| 400-137545-3 | B-74 | Total Recoverable | Water | 6020 | 353567 |
| 400-137545-4 | B-72 | Total Recoverable | Water | 6020 | 353567 |
| MB 400-353567/1-A ^5 | Method Blank | Total Recoverable | Water | 6020 | 353567 |
| MB 400-353646/1-A ^5 | Method Blank | Total Recoverable | Water | 6020 | 353646 |
| LCS 400-353567/2-A | Lab Control Sample | Total Recoverable | Water | 6020 | 353567 |
| LCS 400-353646/2-A | Lab Control Sample | Total Recoverable | Water | 6020 | 353646 |
| 400-137660-D-7-E MS ^5 | Matrix Spike | Total Recoverable | Water | 6020 | 353567 |
| 400-137660-D-7-F MSD ^5 | Matrix Spike Duplicate | Total Recoverable | Water | 6020 | 353567 |
| 600-147744-F-1-E MS ^5 | Matrix Spike | Total Recoverable | Water | 6020 | 353646 |
| 600-147744-F-1-F MSD ^5 | Matrix Spike Duplicate | Total Recoverable | Water | 6020 | 353646 |

# QC Sample Results

Client: Southern Company
Project/Site: CCR Plant McDonough

TestAmerica Job ID: 400-137545-1

## Method: 6020 - Metals (ICP/MS)

**Lab Sample ID: MB 400-353567/1-A ^5**
**Matrix: Water**
**Analysis Batch: 353834**

**Client Sample ID: Method Blank**
**Prep Type: Total Recoverable**
**Prep Batch: 353567**

| Analyte | MB Result | MB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Arsenic | <0.00046 | | 0.0013 | 0.00046 | mg/L | | 05/15/17 14:44 | 05/16/17 14:41 | 5 |

**Lab Sample ID: LCS 400-353567/2-A**
**Matrix: Water**
**Analysis Batch: 353834**

**Client Sample ID: Lab Control Sample**
**Prep Type: Total Recoverable**
**Prep Batch: 353567**

| Analyte | Spike Added | LCS Result | LCS Qualifier | Unit | D | %Rec | %Rec. Limits |
|---|---|---|---|---|---|---|---|
| Arsenic | 0.0500 | 0.0530 | | mg/L | | 106 | 80 - 120 |

**Lab Sample ID: 400-137660-D-7-E MS ^5**
**Matrix: Water**
**Analysis Batch: 353834**

**Client Sample ID: Matrix Spike**
**Prep Type: Total Recoverable**
**Prep Batch: 353567**

| Analyte | Sample Result | Sample Qualifier | Spike Added | MS Result | MS Qualifier | Unit | D | %Rec | %Rec. Limits |
|---|---|---|---|---|---|---|---|---|---|
| Arsenic | <0.00046 | | 0.0500 | 0.0540 | | mg/L | | 108 | 75 - 125 |

**Lab Sample ID: 400-137660-D-7-F MSD ^5**
**Matrix: Water**
**Analysis Batch: 353834**

**Client Sample ID: Matrix Spike Duplicate**
**Prep Type: Total Recoverable**
**Prep Batch: 353567**

| Analyte | Sample Result | Sample Qualifier | Spike Added | MSD Result | MSD Qualifier | Unit | D | %Rec | %Rec. Limits | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Arsenic | <0.00046 | | 0.0500 | 0.0525 | | mg/L | | 105 | 75 - 125 | 3 | 20 |

**Lab Sample ID: MB 400-353646/1-A ^5**
**Matrix: Water**
**Analysis Batch: 353834**

**Client Sample ID: Method Blank**
**Prep Type: Total Recoverable**
**Prep Batch: 353646**

| Analyte | MB Result | MB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Arsenic | <0.00046 | | 0.0013 | 0.00046 | mg/L | | 05/16/17 10:27 | 05/16/17 17:51 | 5 |

**Lab Sample ID: LCS 400-353646/2-A**
**Matrix: Water**
**Analysis Batch: 353834**

**Client Sample ID: Lab Control Sample**
**Prep Type: Total Recoverable**
**Prep Batch: 353646**

| Analyte | Spike Added | LCS Result | LCS Qualifier | Unit | D | %Rec | %Rec. Limits |
|---|---|---|---|---|---|---|---|
| Arsenic | 0.0500 | 0.0530 | | mg/L | | 106 | 80 - 120 |

**Lab Sample ID: 600-147744-F-1-E MS ^5**
**Matrix: Water**
**Analysis Batch: 353834**

**Client Sample ID: Matrix Spike**
**Prep Type: Total Recoverable**
**Prep Batch: 353646**

| Analyte | Sample Result | Sample Qualifier | Spike Added | MS Result | MS Qualifier | Unit | D | %Rec | %Rec. Limits |
|---|---|---|---|---|---|---|---|---|---|
| Arsenic | 0.0020 | | 0.0500 | 0.0559 | | mg/L | | 108 | 75 - 125 |

**Lab Sample ID: 600-147744-F-1-F MSD ^5**
**Matrix: Water**
**Analysis Batch: 353834**

**Client Sample ID: Matrix Spike Duplicate**
**Prep Type: Total Recoverable**
**Prep Batch: 353646**

| Analyte | Sample Result | Sample Qualifier | Spike Added | MSD Result | MSD Qualifier | Unit | D | %Rec | %Rec. Limits | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Arsenic | 0.0020 | | 0.0500 | 0.0565 | | mg/L | | 109 | 75 - 125 | 1 | 20 |

**TestAmerica Pensacola**
3355 McLemore Drive
Pensacola, FL 32514
Phone (850) 474-1001 Fax (850) 478-2671

# Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

681-Atlanta

| Client Information | | | |
|---|---|---|---|
| Client Contact: ~~Ms. Lauren Petty~~ JoJu Abraham | Sampler: A. Ellis | Lab PM: Whitmire, Cheyenne R | Carrier Tracking No(s): |
| Company: ~~Southern Company~~ GA Power | Phone: 404-506-7239 | E-Mail: cheyenne.whitmire@testamericainc.com | COC No: 400-65039-26695.1 |
| Address: ~~600 18th Street North~~ 241 Ralph McGill Blv | Due Date Requested: | | Page: Page 1 of 1 |
| City: ~~Birmingham~~ Atlanta | TAT Requested (days): | | Job #: |
| State, Zip: ~~AL, 35203~~ GA 30308 | | | |
| Phone: | PO #: SCS10347656 | | |
| Email: ~~lmpetty@southernco.com~~ JABRAHAM@SOUTHERNCO.COM | WO #: | | |
| Project Name: CCR - Plant McDonough | Project #: 40007041 | | |
| Site: | SSOW#: | | |

Analysis Requested: 6020 - Arsenic

400-137545 COC

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA
M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)
Other:

| Sample Identification | Sample Date | Sample Time | Sample Type (C=comp, G=grab) | Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air) | 6020 - Arsenic | Total Number of containers | Special Instructions/Note: |
|---|---|---|---|---|---|---|---|
| | | | | Preservation Code: | D | | |
| B-68A | 5.1.17 | 1423 | G | Water | 1 | | |
| B-73 | 5.2.17 | 1409 | G | Water | 1 | | |
| B-74 | 5.3.17 | 1016 | G | Water | 1 | | |
| B-72 | 5.4.17 | 936 | G | Water | 1 | | |
| | | | | ~~Water~~ | | | |

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal ( A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For ______ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

| Empty Kit Relinquished by: | Date: | Time: | Method of Shipment: |
|---|---|---|---|

| Relinquished by: | Date/Time: | Company | Received by: | Date/Time: | Company |
|---|---|---|---|---|---|
| A. Ellis | 5 4 17 1630 | Golder | [signature] | 5/5/17 0823 | |
| | | | | | |
| | | | | | |

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.: | Cooler Temperature(s) °C and Other Remarks: 1.5 IK2

# Login Sample Receipt Checklist

Client: Southern Company

Job Number: 400-137545-1
SDG Number:

**Login Number: 137545**
**List Number: 1**
**Creator: Franklin, Justin H**

**List Source: TestAmerica Pensacola**

| Question | Answer | Comment |
|---|---|---|
| Radioactivity wasn't checked or is </= background as measured by a survey meter. | N/A | |
| The cooler's custody seal, if present, is intact. | True | |
| Sample custody seals, if present, are intact. | N/A | |
| The cooler or samples do not appear to have been compromised or tampered with. | True | |
| Samples were received on ice. | True | |
| Cooler Temperature is acceptable. | True | |
| Cooler Temperature is recorded. | True | 1.5°C IR-2 |
| COC is present. | True | |
| COC is filled out in ink and legible. | True | |
| COC is filled out with all pertinent information. | True | |
| Is the Field Sampler's name present on COC? | True | |
| There are no discrepancies between the containers received and the COC. | True | |
| Samples are received within Holding Time (excluding tests with immediate HTs) | True | |
| Sample containers have legible labels. | True | |
| Containers are not broken or leaking. | True | |
| Sample collection date/times are provided. | True | |
| Appropriate sample containers are used. | True | |
| Sample bottles are completely filled. | True | |
| Sample Preservation Verified. | True | |
| There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs | True | |
| Containers requiring zero headspace have no headspace or bubble is <6mm (1/4"). | N/A | |
| Multiphasic samples are not present. | True | |
| Samples do not require splitting or compositing. | True | |
| Residual Chlorine Checked. | N/A | |

## Accreditation/Certification Summary

Client: Southern Company
Project/Site: CCR Plant McDonough

TestAmerica Job ID: 400-137545-1



### Laboratory: TestAmerica Pensacola

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

| Authority | Program | EPA Region | Identification Number | Expiration Date |
|---|---|---|---|---|
| Alabama | State Program | 4 | 40150 | 06-30-17 |
| Arizona | State Program | 9 | AZ0710 | 01-11-18 |
| Arkansas DEQ | State Program | 6 | 88-0689 | 09-01-17 |
| California | ELAP | 9 | 2510 | 03-31-18 |
| Florida | NELAP | 4 | E81010 | 06-30-17 |
| Georgia | State Program | 4 | N/A | 06-30-17 |
| Illinois | NELAP | 5 | 200041 | 10-09-17 |
| Iowa | State Program | 7 | 367 | 08-01-18 |
| Kansas | NELAP | 7 | E-10253 | 10-31-17 |
| Kentucky (UST) | State Program | 4 | 53 | 06-30-17 |
| Kentucky (WW) | State Program | 4 | 98030 | 12-31-17 |
| L-A-B | ISO/IEC 17025 | | L2471 | 02-22-20 |
| Louisiana | NELAP | 6 | 30976 | 06-30-17 |
| Louisiana (DW) | NELAP Secondary AB | 6 | LA170005 | 12-31-17 |
| Maryland | State Program | 3 | 233 | 09-30-17 |
| Massachusetts | State Program | 1 | M-FL094 | 06-30-17 |
| Michigan | State Program | 5 | 9912 | 06-30-17 |
| New Jersey | NELAP | 2 | FL006 | 06-30-17 |
| North Carolina (WW/SW) | State Program | 4 | 314 | 12-31-17 |
| Oklahoma | State Program | 6 | 9810 | 08-31-17 |
| Pennsylvania | NELAP | 3 | 68-00467 | 01-31-18 |
| Rhode Island | State Program | 1 | LAO00307 | 12-30-17 |
| South Carolina | State Program | 4 | 96026 | 06-30-17 |
| Tennessee | State Program | 4 | TN02907 | 06-30-17 |
| Texas | NELAP | 6 | T104704286-16-10 | 09-30-17 |
| USDA | Federal | | P330-16-00172 | 05-24-19 |
| Virginia | NELAP | 3 | 460166 | 06-14-17 |
| Washington | State Program | 10 | C915 | 05-15-17 * |
| West Virginia DEP | State Program | 3 | 136 | 06-30-17 |

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

**APPENDIX C**

# XRD Results

# Quantitative X-Ray Diffraction by Rietveld Refinement

| | |
|---|---|
| ***Report Prepared for:*** | *Golder Associates* |
| ***Project Number/ LIMS No.*** | *17836-01/MI4519-JAN20* |
| ***Sample Receipt:*** | *January 21, 2020* |
| ***Sample Analysis:*** | *January 22, 2020* |
| ***Reporting Date:*** | *January 23, 2020* |

---

| | |
|---|---|
| ***Instrument:*** | BRUKER AXS D8 Advance Diffractometer |
| ***Test Conditions:*** | Co radiation, 35 kV, 40 mA<br>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

Lain Glossop, H.B.Sc.
Senior Mineralogist



SGS Minerals
a division of SGS Canada Inc.
P.O. Box 4300, 185 Concession Street, Lakefield, Ontario, Canada K0L 2H0
Tel: (705) 652-2000 Fax: (705) 652-6365 www.sgs.com www.sgs.com/met
Member of the SGS Group (SGS SA)

## 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.

Golder Associates
17836-01/MI4519-JAN20
23-Jan-20

## Summary of Rietveld Quantitative Analysis X-Ray Diffraction Results

| **Mineral/Compound** | **B-76 (28-38') JAN4519-01** (wt %) | **B-77 (32-40') JAN4519-02** (wt %) | **B-78 (25-30') JAN4519-03** (wt %) | **B-79 (30-35') JAN4519-04** (wt %) | **B-81 (45.4-47.5') JAN4519-05** (wt %) | **B-82 (35.5-37.5') JAN4519-06** (wt %) | **B-84 (43.5-45') JAN4519-07** (wt %) | **B-85 (23.5-25') JAN4519-08** (wt %) | **B-87 (33.5-35') JAN4519-09** (wt %) | **B-92 (6-8') JAN4519-10** (wt %) | **B-93 (6-8') JAN4519-11** (wt %) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Quartz | 49.3 | 46.2 | 32.5 | 21.5 | 39.7 | 31.3 | 34.3 | 33.5 | 28.7 | 45.0 | 38.5 |
| Albite | 10.9 | 4.6 | 38.5 | 39.2 | 19.7 | 3.2 | 3.5 | 25.7 | 26.4 | 5.1 | 15.8 |
| Microcline | 6.5 | 5.9 | 12.5 | 10.7 | 23.3 | 4.8 | - | 16.3 | 12.9 | 5.4 | 16.8 |
| Chlorite | 4.6 | 7.2 | - | - | - | 5.4 | 7.0 | - | - | - | - |
| Kaolinite | 10.6 | 13.7 | | 6.2 | 6.1 | 11.8 | 13.3 | 6.1 | 7.0 | 18.9 | 18.1 |
| Muscovite | 12.5 | 11.1 | 7.7 | 10.2 | 9.1 | 22.9 | 16.2 | 4.4 | 7.0 | 19.3 | 10.0 |
| Biotite | 4.0 | 3.9 | 3.8 | 5.4 | - | 7.2 | 4.9 | 4.0 | 6.2 | 2.5 | - |
| Pyrite | 0.6 | - | - | - | - | 0.5 | - | - | - | - | - |
| Magnetite | 0.8 | - | - | 0.6 | - | 2.8 | - | - | - | 1.1 | 0.3 |
| Gibbsite | - | 1.9 | - | - | - | - | - | - | - | - | - |
| Sillimanite | - | 2.3 | - | - | - | - | - | - | - | 1.2 | - |
| Montmorillonite | - | 3.2 | - | - | - | 2.3 | - | 4.0 | 4.8 | - | - |
| Anhydrite | - | - | 0.4 | 0.6 | - | - | 1.2 | 0.8 | 0.8 | 1.5 | - |
| Anorthite | - | - | 3.8 | 3.9 | 2.2 | - | - | 3.8 | 4.5 | - | - |
| Dolomite | - | - | 0.2 | - | - | - | - | - | - | - | - |
| Ankerite | - | - | 0.7 | 0.4 | - | - | - | 0.6 | 0.9 | - | 0.5 |
| Diopside | - | - | - | 1.2 | - | - | - | 0.8 | 0.7 | - | - |
| Hematite | - | - | - | - | - | 2.0 | - | - | - | - | - |
| Talc | - | - | - | - | - | 4.1 | - | - | - | - | - |
| Magnesite | - | - | - | - | - | 1.7 | - | - | - | - | - |
| Orthoclase | - | - | - | - | - | - | 19.7 | - | - | - | - |
| TOTAL | 100 | 100 | 100 | 100 | 100 | 100 | 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.*

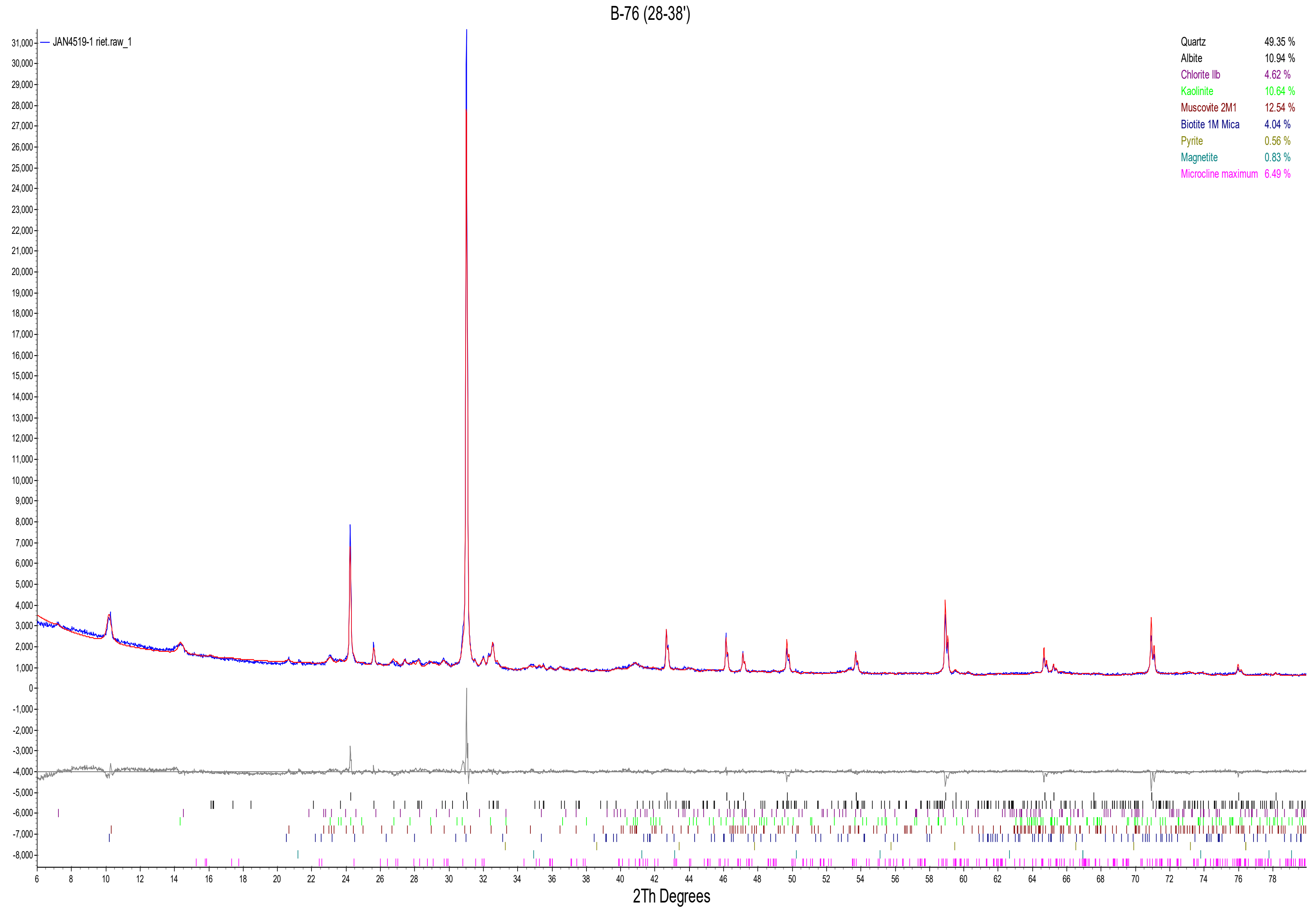
*Dashes indicate that the mineral was not identified by the analyst and not included in the refinement calculation for the sample.*

*The weight percent quantities indicated have been normalized to a sum of 100%. The quantity of amorphous material has not been determined.*

# Mineral List

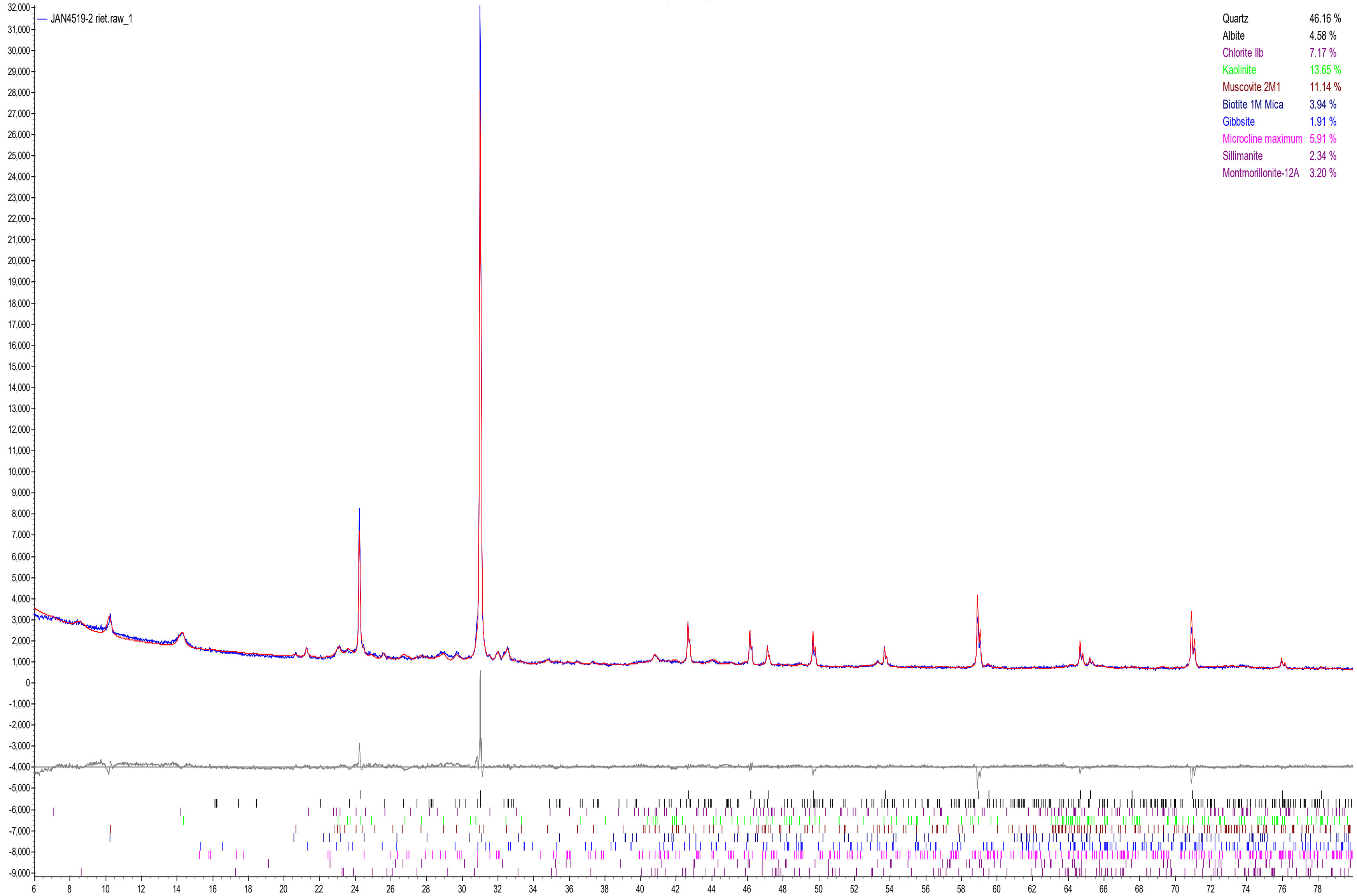
| Mineral/Compound | Formula |
|---|---|
| Quartz | $SiO_2$ |
| Albite | $NaAlSi_3O_8$ |
| Microcline | $KAlSi_3O_8$ |
| Chlorite | $(Fe,(Mg,Mn)_5,Al)(Si_3Al)O_{10}(OH)_8$ |
| Kaolinite | $Al_2Si_2O_5(OH)_4$ |
| Muscovite | $KAl_2(AlSi_3O_{10})(OH)_2$ |
| Biotite | $K(Mg,Fe)_3(AlSi_3O_{10})(OH)_2$ |
| Pyrite | $FeS_2$ |
| Magnetite | $Fe_3O_4$ |
| Gibbsite | $Al(OH)_3$ |
| Sillimanite | $Al_2SiO_5$ |
| Montmorillonite | $(Na,Ca)_{0.3}(Al,Mg)_2Si_2O_{10}(OH)_2 \cdot 10H_2O$ |
| Anhydrite | $CaSO_4$ |
| Anorthite | $CaAl_2Si_2O_8$ |
| Dolomite | $CaMg(CO_3)_2$ |
| Ankerite | $CaFe(CO_3)_2$ |
| Diopside | $CaMgSi_2O_6$ |
| Hematite | $Fe_2O_3$ |
| Talc | $Mg_3Si_4O_{10}(OH)_2$ |
| Magnesite | $MgCO_3$ |
| Orthoclase | $KAlSi_3O_8$ |

Golder Associates
17836-01/MI4519-JAN20
23-Jan-20

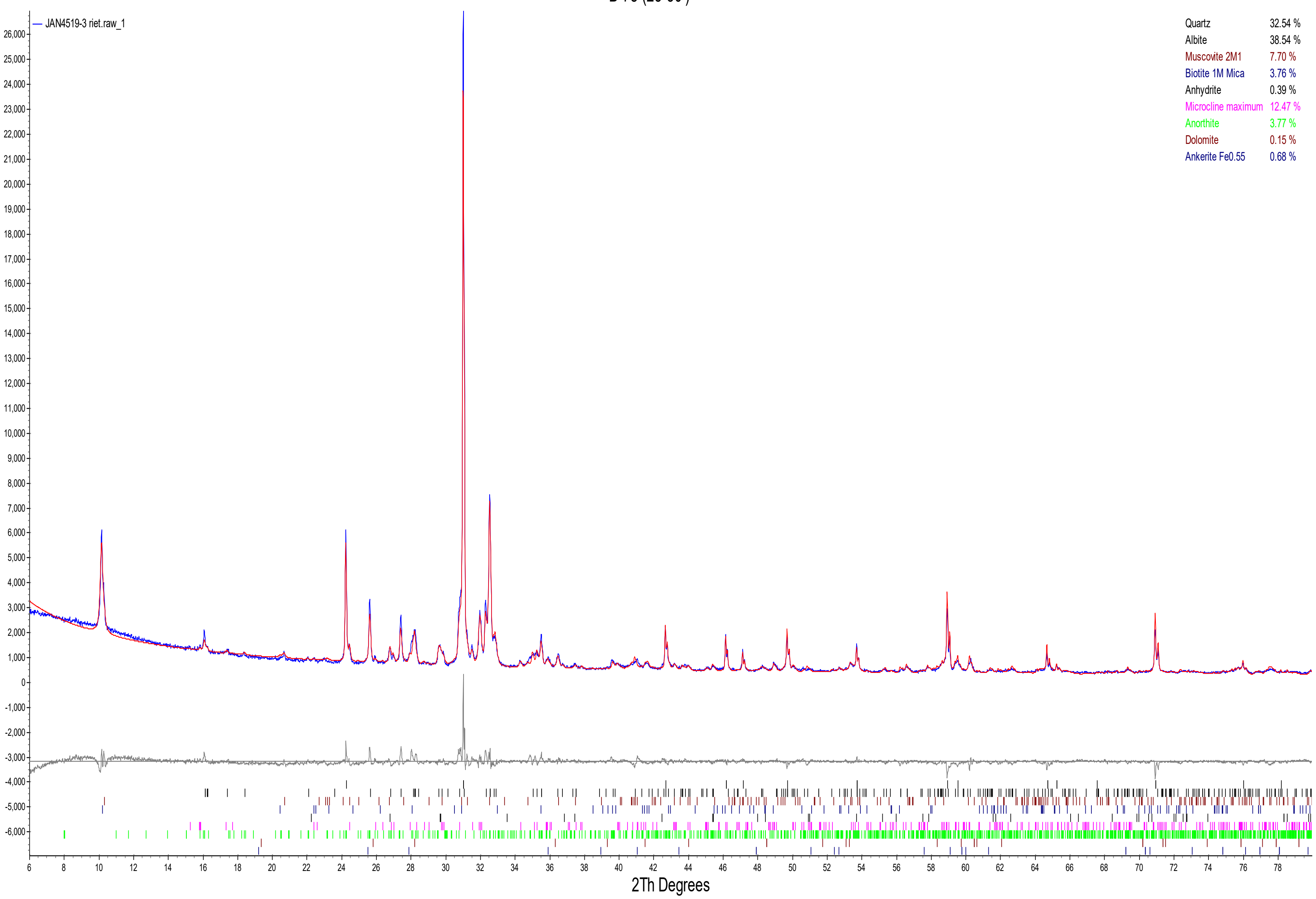


Golder Associates
17836-01/MI4519-JAN20
23-Jan-20

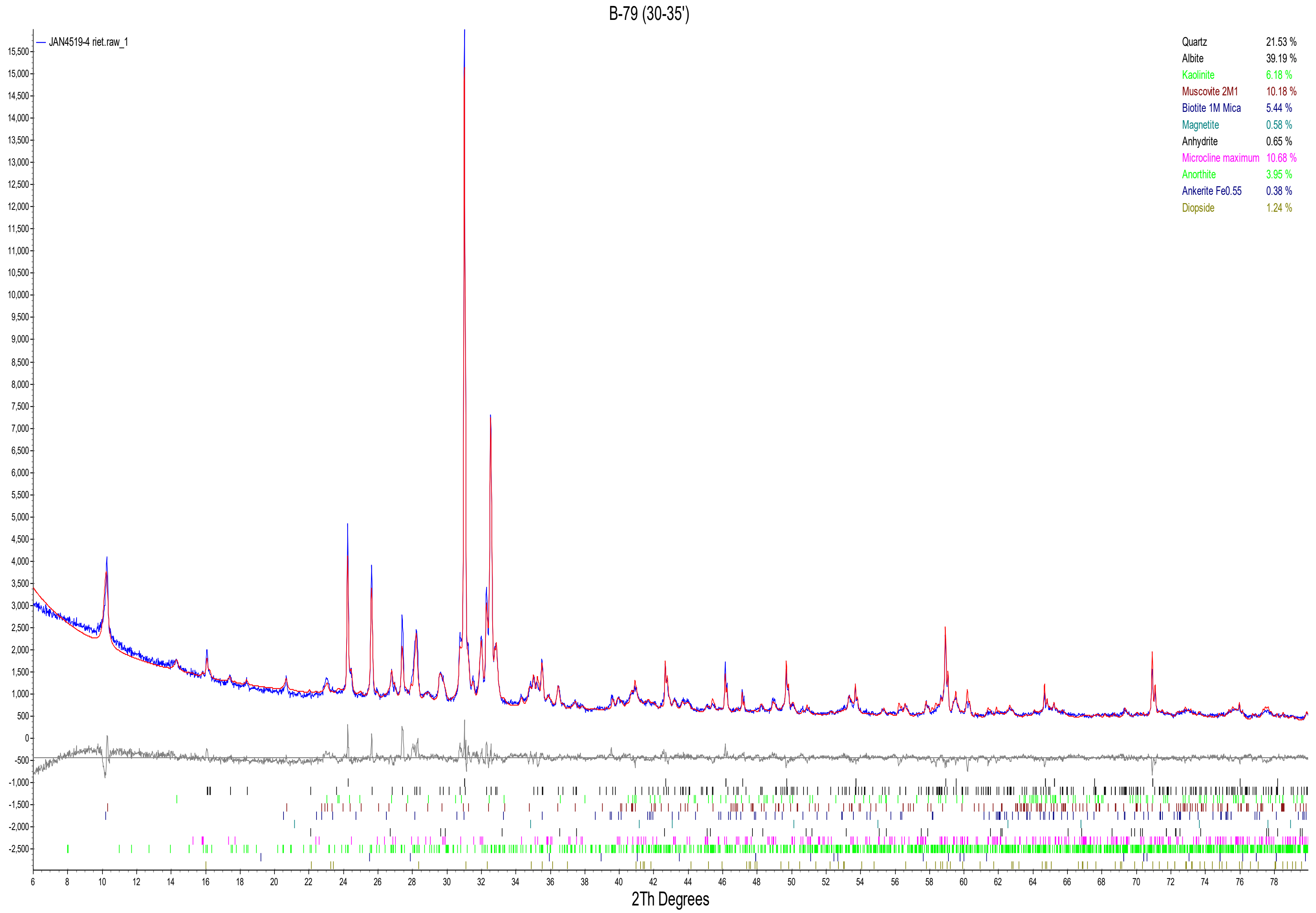
B-77 (32-40')



B-78 (25-30')

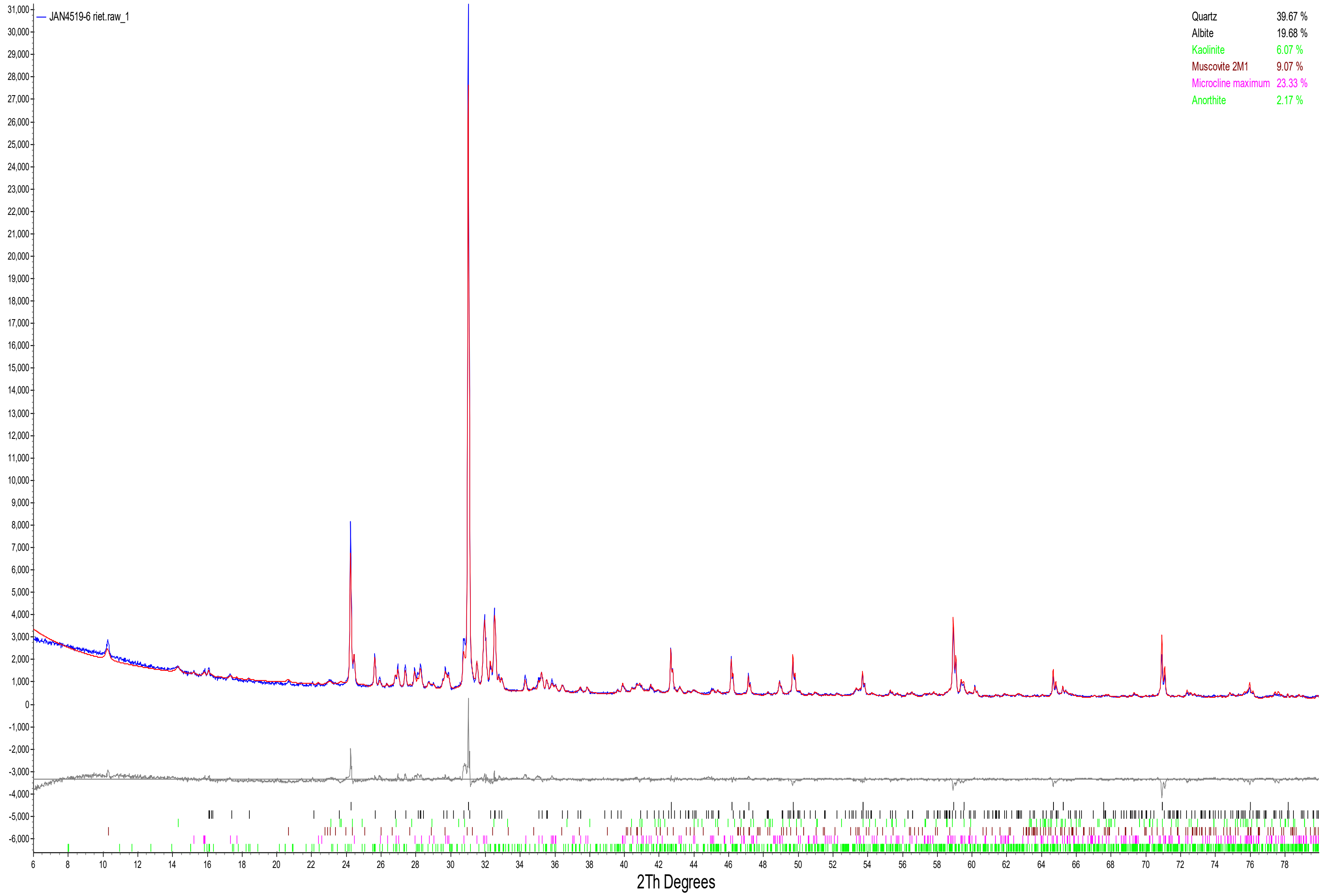

JAN4519-3 riet.raw_1
Quartz 32.54 %
Albite 38.54 %
Muscovite 2M1 7.70 %
Biotite 1M Mica 3.76 %
Anhydrite 0.39 %
Microcline maximum 12.47 %
Anorthite 3.77 %
Dolomite 0.15 %
Ankerite Fe0.55 0.68 %
2Th Degrees

Golder Associates
17836-01/MI4519-JAN20
23-Jan-20

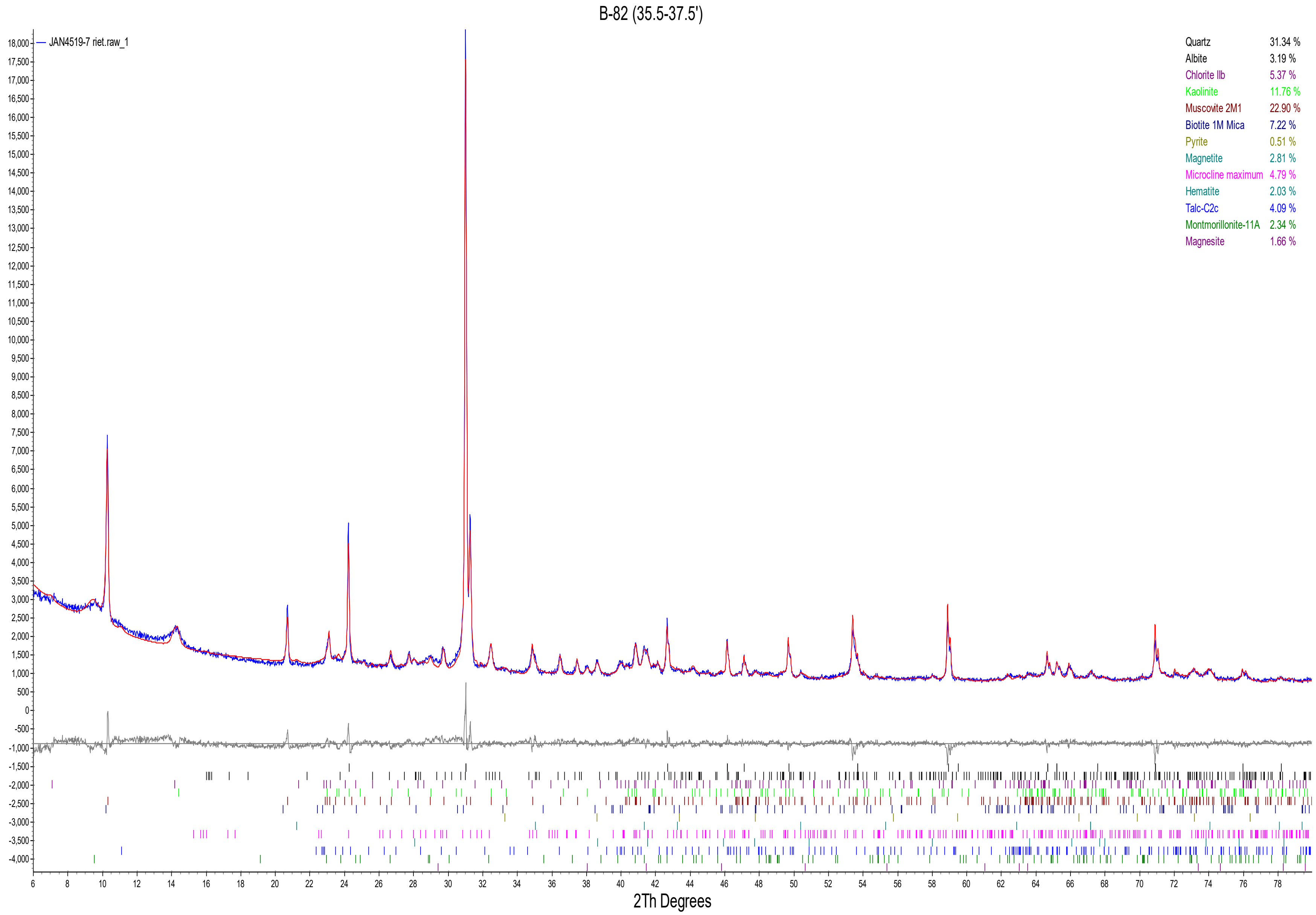


Golder Associates
17836-01/MI4519-JAN20
23-Jan-20

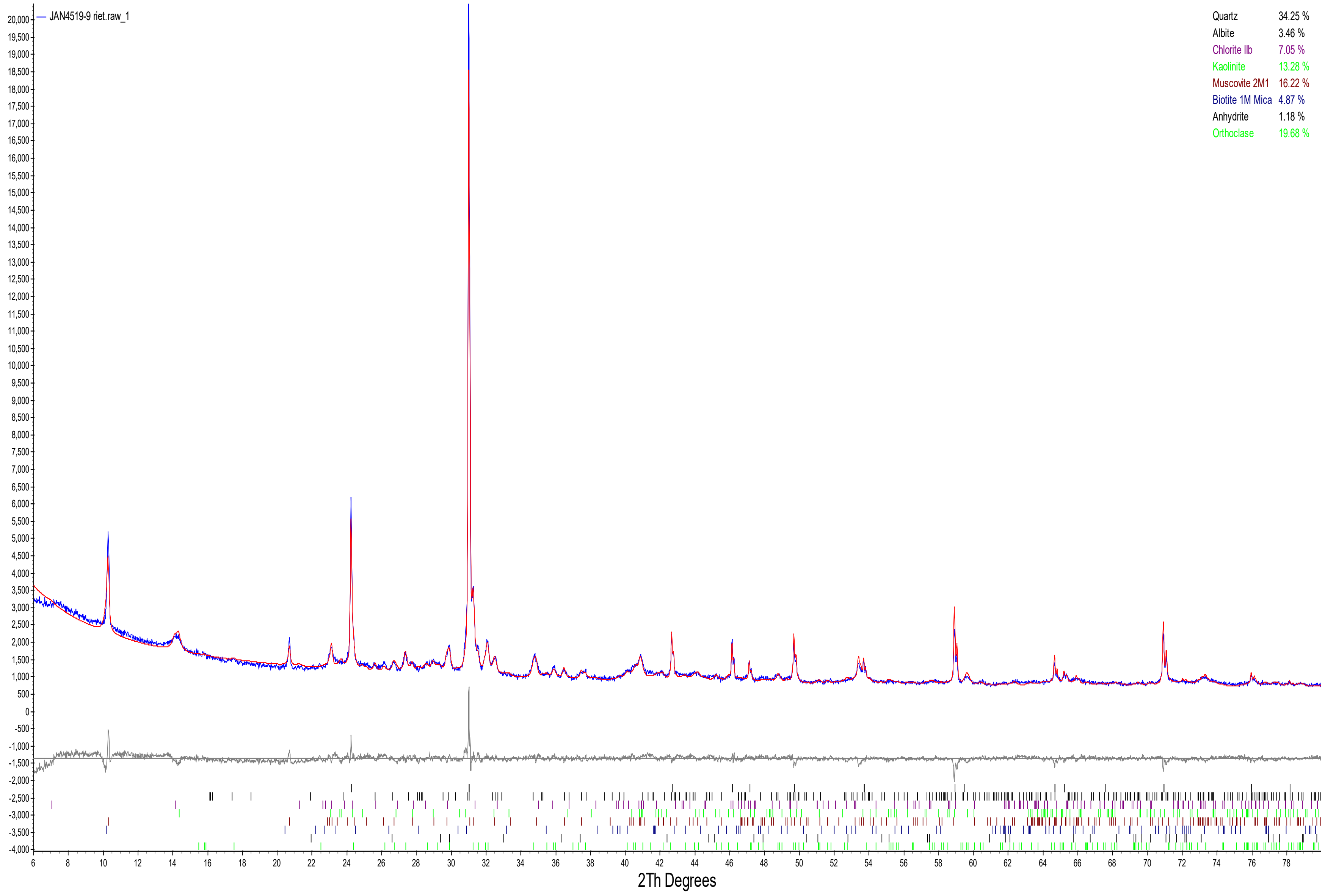
B-81 (45.4-47.5')



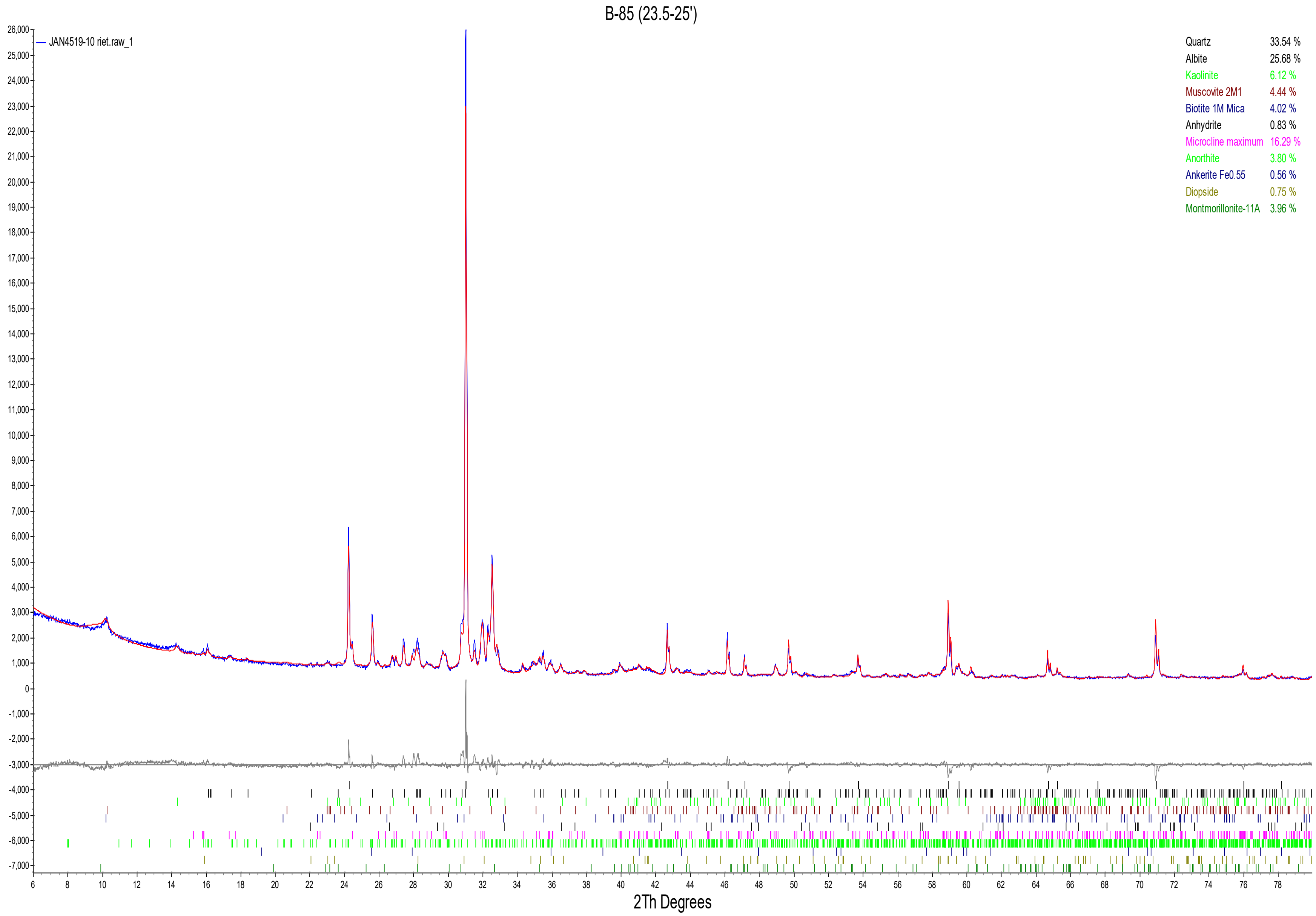
Golder Associates
17836-01/MI4519-JAN20
23-Jan-20



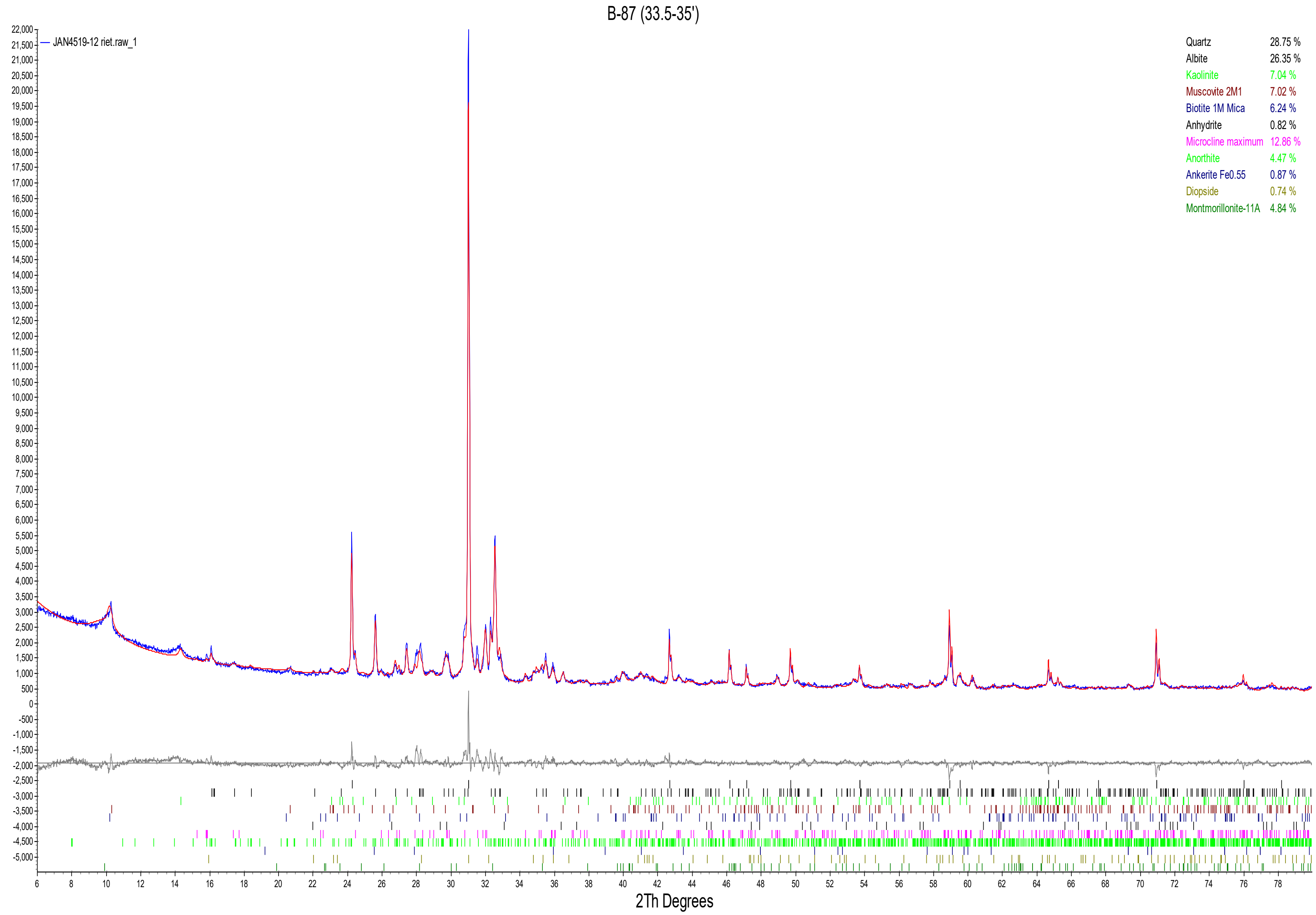
B-84 (43.5-45')

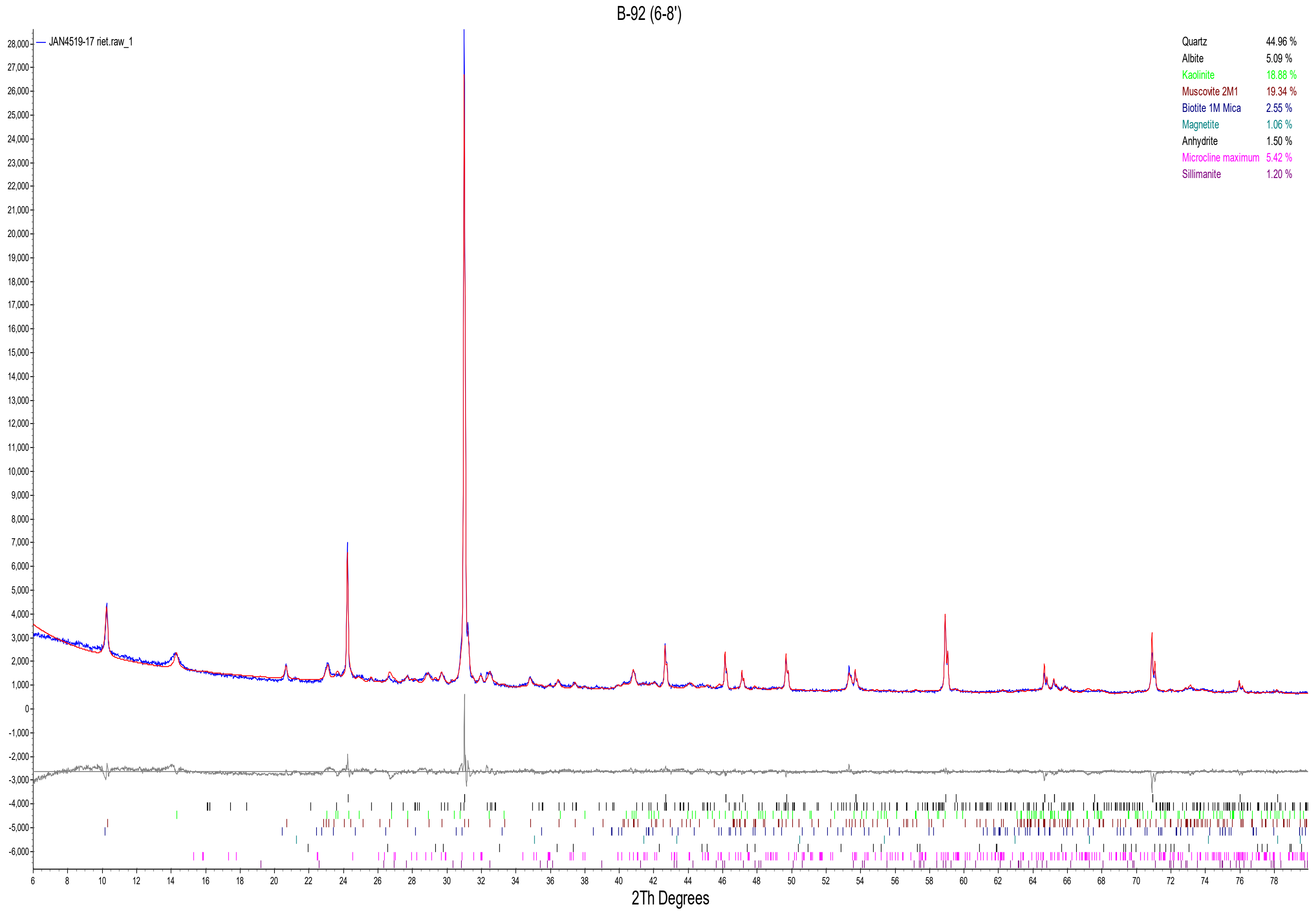

JAN4519-9 riet.raw_1
Quartz 34.25 %
Albite 3.46 %
Chlorite IIb 7.05 %
Kaolinite 13.28 %
Muscovite 2M1 16.22 %
Biotite 1M Mica 4.87 %
Anhydrite 1.18 %
Orthoclase 19.68 %
2Th Degrees

Golder Associates
17836-01/MI4519-JAN20
23-Jan-20

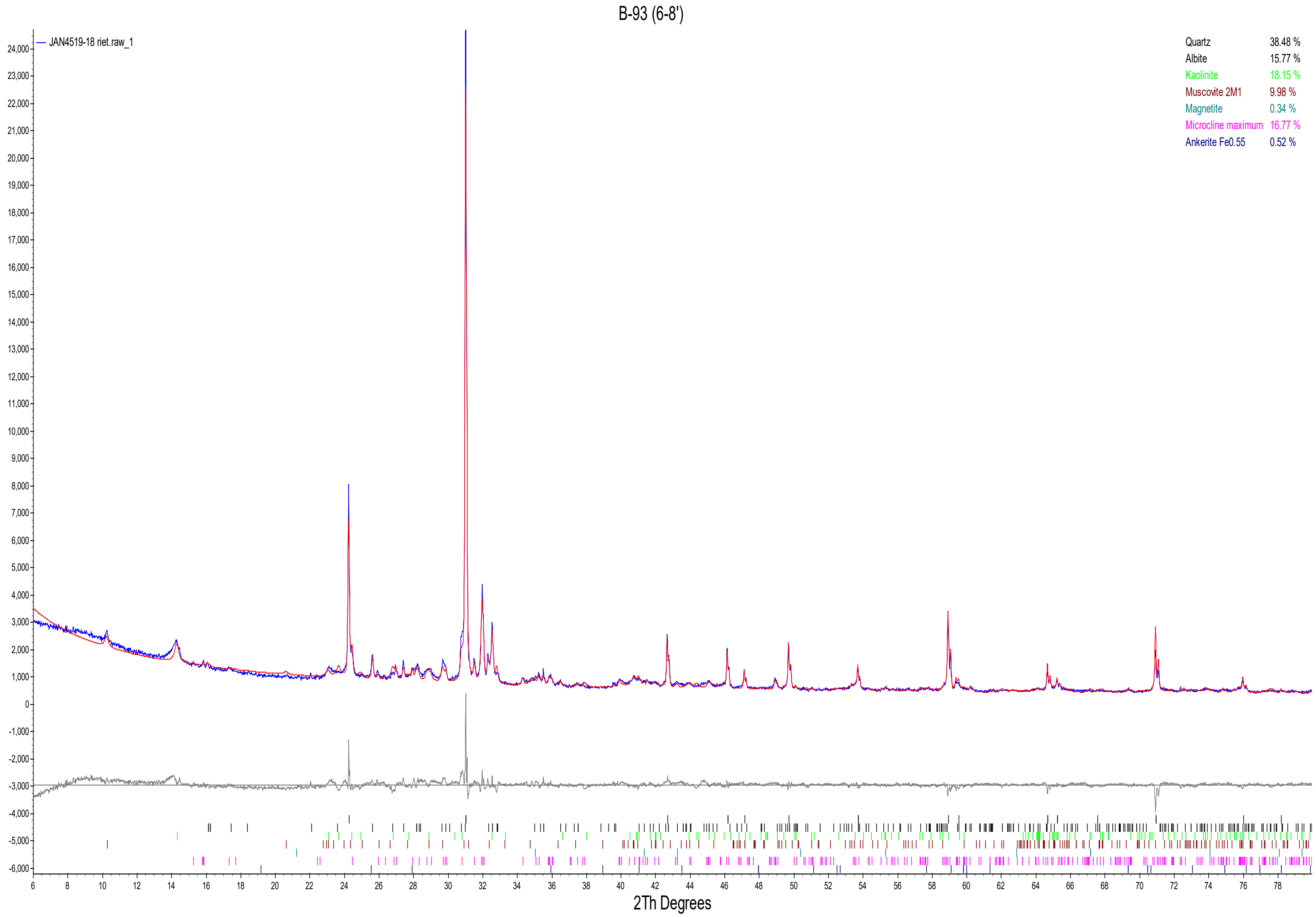


Golder Associates
17836-01/MI4519-JAN20
23-Jan-20




B-92 (6-8')
JAN4519-17 riet.raw_1
Quartz 44.96 %
Albite 5.09 %
Kaolinite 18.88 %
Muscovite 2M1 19.34 %
Biotite 1M Mica 2.55 %
Magnetite 1.06 %
Anhydrite 1.50 %
Microcline maximum 5.42 %
Sillimanite 1.20 %
2Th Degrees

Golder Associates
17836-01/MI4519-JAN20
23-Jan-20



# Quantitative X-Ray Diffraction by Rietveld Refinement

| | |
|---|---|
| ***Report Prepared for:*** | *Golder Associates* |
| ***Project Number/ LIMS No.*** | *17836-01/MI4510-FEB20* |
| ***Sample Receipt:*** | *February 13, 2020* |
| ***Sample Analysis:*** | *February 13, 2020* |
| ***Reporting Date:*** | *February 20, 2020* |

---

| | |
|---|---|
| ***Instrument:*** | BRUKER AXS D8 Advance Diffractometer |
| ***Test Conditions:*** | Co radiation, 35 kV, 40 mA<br>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



SGS Minerals
a division of SGS Canada Inc.
P.O. Box 4300, 185 Concession Street, Lakefield, Ontario, Canada K0L 2H0
Tel: (705) 652-2000 Fax: (705) 652-6365 www.sgs.com www.sgs.com/met
Member of the SGS Group (SGS SA)

## 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.



SGS Minerals
a division of SGS Canada Inc.
P.O. Box 4300, 185 Concession Street, Lakefield, Ontario, Canada K0L 2H0
Tel: (705) 652-2000 Fax: (705) 652-6365 www.sgs.com www.sgs.com/met
Member of the SGS Group (SGS SA)

## Summary of Rietveld Quantitative Analysis X-Ray Diffraction Results

| Mineral/Compound | B-94 FEB4510-01 (wt %) | DGWC-9 FEB4510-02 (wt %) | DGWC-10 FEB4510-03 (wt %) | DGWA-71 FEB4510-04 (wt %) | DGWA-70A FEB4510-05 (wt %) | A1: 3-6 FEB4510-06 (wt %) | A1: 16-17.5 FEB4510-07 (wt %) | A1: 19-20.5 FEB4510-08 (wt %) | A2: 3-6 FEB4510-09 (wt %) | A3: 3-6 FEB4510-10 (wt %) |
|---|---|---|---|---|---|---|---|---|---|---|
| Quartz | 24.9 | 49.9 | 40.2 | 24.7 | 29.9 | 22.6 | 21.7 | 25.4 | 29.2 | 20.3 |
| Albite | 31.0 | - | - | 38.6 | - | 4.3 | - | 12.7 | - | - |
| Microcline | 21.1 | 1.1 | 1.0 | 7.1 | 2.5 | 0.8 | - | 11.5 | - | 2.9 |
| Anorthite | 5.8 | 3.0 | 3.8 | 5.0 | 3.1 | - | 4.3 | - | - | - |
| Muscovite | 6.8 | 19.6 | 17.4 | 4.3 | 19.2 | 6.5 | 4.7 | 3.6 | 2.5 | - |
| Biotite | 6.5 | 5.0 | 4.5 | 2.9 | 8.8 | - | - | 3.5 | 0.8 | 1.0 |
| Epidote | 3.4 | - | - | 2.3 | 4.5 | - | - | 0.7 | 4.1 | 4.2 |
| Diopside | 0.6 | 0.9 | 1.2 | 1.9 | 3.4 | - | - | 0.6 | 7.4 | 5.8 |
| Kaolinite | - | 18.5 | 26.0 | 12.4 | - | - | - | 18.6 | 4.3 | 2.7 |
| Pyrite | - | 0.1 | - | - | - | - | 0.7 | - | - | - |
| Magnetite | - | 0.9 | 1.6 | - | 1.4 | 7.0 | 6.2 | 1.3 | 11.0 | 10.0 |
| Anhydrite | - | 0.5 | - | - | - | - | - | 3.0 | 0.0 | - |
| Magnesite | - | 0.6 | 0.2 | - | 0.4 | - | - | - | - | - |
| Hematite | - | 0.1 | 2.6 | - | 2.7 | 5.2 | 4.6 | 1.3 | 9.8 | 7.7 |
| Almandine | - | - | 1.4 | - | - | - | - | - | - | - |
| Palygorskite | - | - | - | 0.1 | 0.2 | - | - | - | - | - |
| Calcite | - | - | - | 0.6 | - | - | - | - | - | 1.0 |
| Andesine | - | - | - | - | 21.9 | - | - | - | - | - |
| Magnesiohornblende | - | - | - | - | 2.3 | - | - | - | - | - |
| Mullite | - | - | - | - | - | 53.7 | 57.0 | 17.8 | 30.7 | 44.5 |
| Rutile | - | - | - | - | - | - | 0.8 | - | 0.2 | - |
| TOTAL | 100 | 100 | 100 | 100 | 100 | 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.*

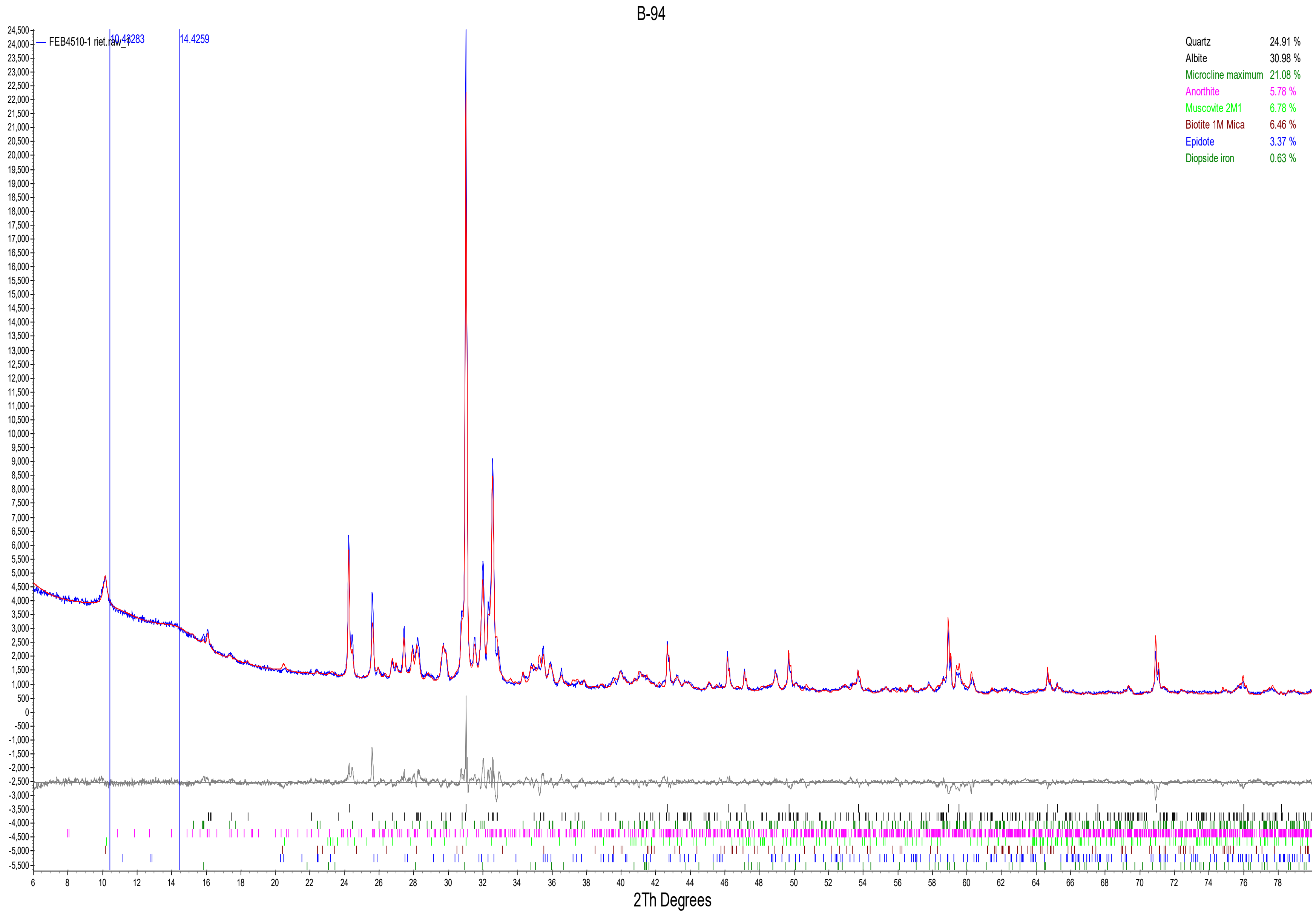
*Dashes indicate that the mineral was not identified by the analyst and not included in the refinement calculation for the sample.*

*The weight percent quantities indicated have been normalized to a sum of 100%. The quantity of amorphous material has not been determined.*

## Mineral List

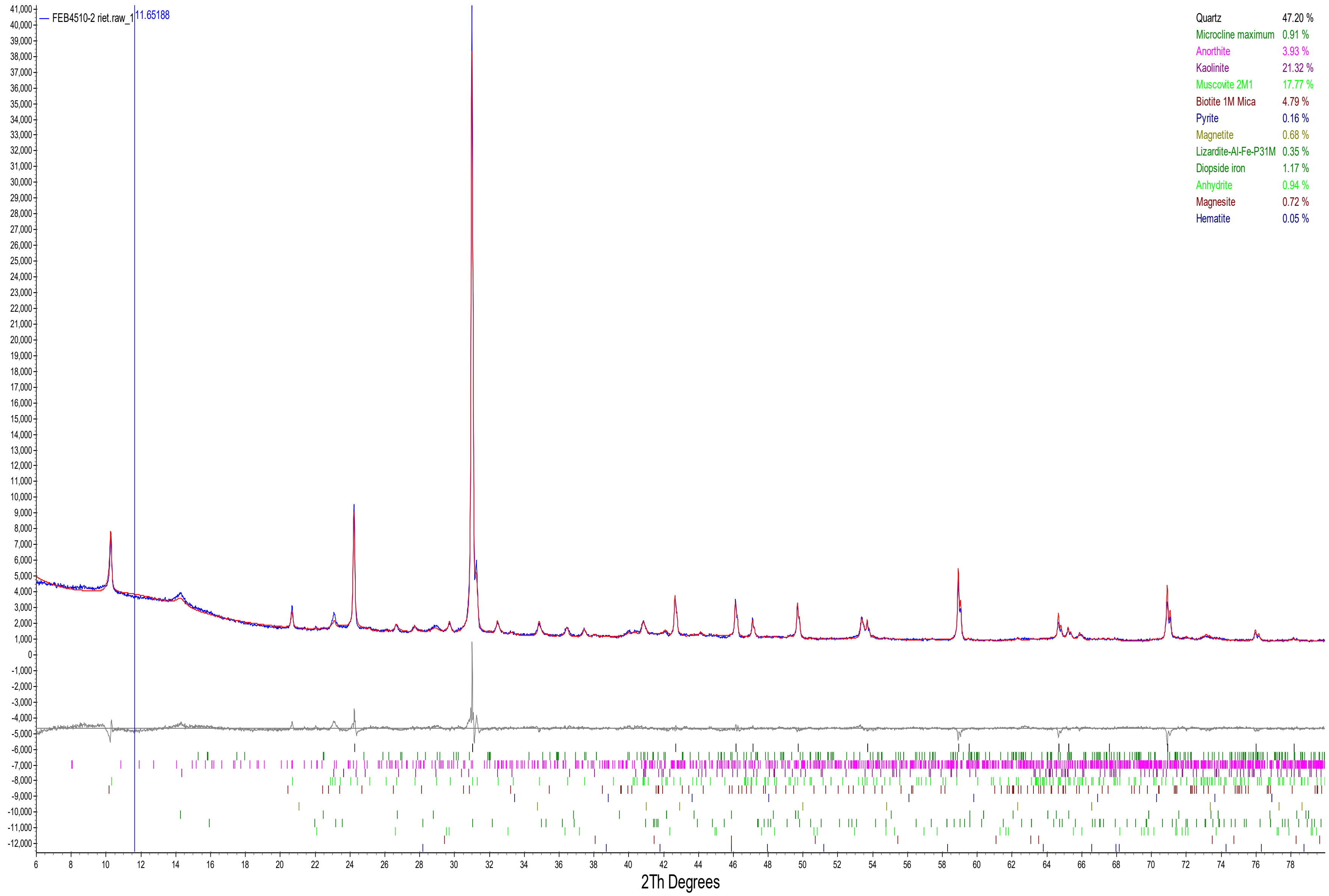
| Mineral/Compound | Formula |
|---|---|
| Quartz | $SiO_2$ |
| Albite | $NaAlSi_3O_8$ |
| Microcline | $KAlSi_3O_8$ |
| Anorthite | $CaAl_2Si_2O_8$ |
| Muscovite | $KAl_2(AlSi_3O_{10})(OH)_2$ |
| Biotite | $K(Mg,Fe)_3(AlSi_3O_{10})(OH)_2$ |
| Epidote | $Ca_2(Al,Fe)Al_2O(SiO_4)(Si_2O_7)(OH)$ |
| Diopside | $CaMgSi_2O_6$ |
| Kaolinite | $Al_2Si_2O_5(OH)_4$ |
| Pyrite | $FeS_2$ |
| Magnetite | $Fe_3O_4$ |
| Anhydrite | $CaSO_4$ |
| Magnesite | $MgCO_3$ |
| Hematite | $Fe_2O_3$ |
| Almandine | $Fe_3Al_2Si_3O_{12}$ |
| Palygorskite | $(Mg,Al)_2Si_4O_{10}(OH)\cdot 4H_2O$ |
| Calcite | $CaCO_3$ |
| Andesine | $Na_{0.685}Ca_{0.347}Al_{1.46}Si_{2.54}O_8$ |
| Magnesiohornblende | $Ca_2(Mg,Fe)_4Al(Si_7Al)O_{22}(OH,F)_2$ |
| Mullite | $\sim Al_6Si_3O_{15}$ |
| Rutile | $TiO_2$ |

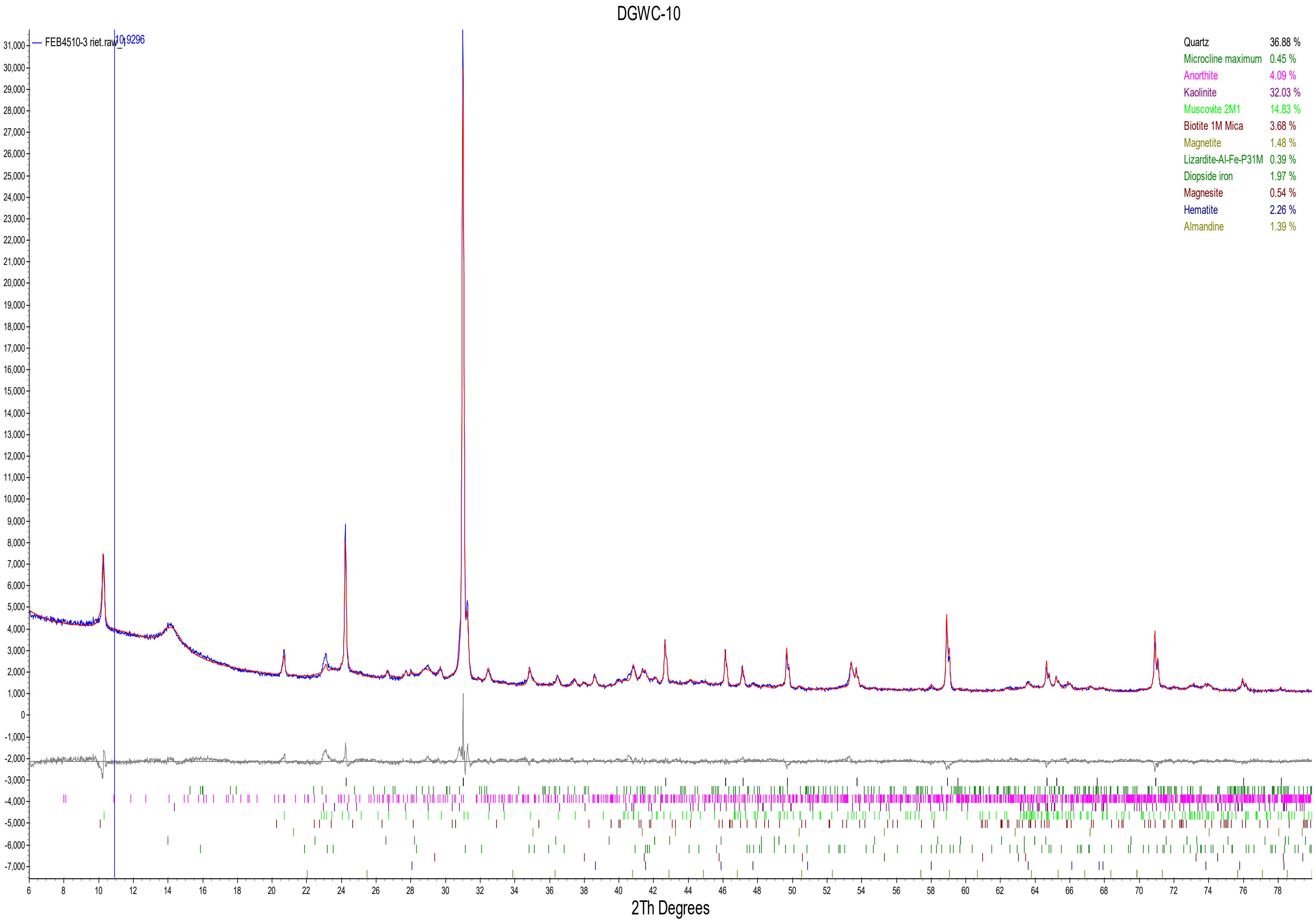
Golder Associates
17836-01/MI4510-FEB20
02/20/2020



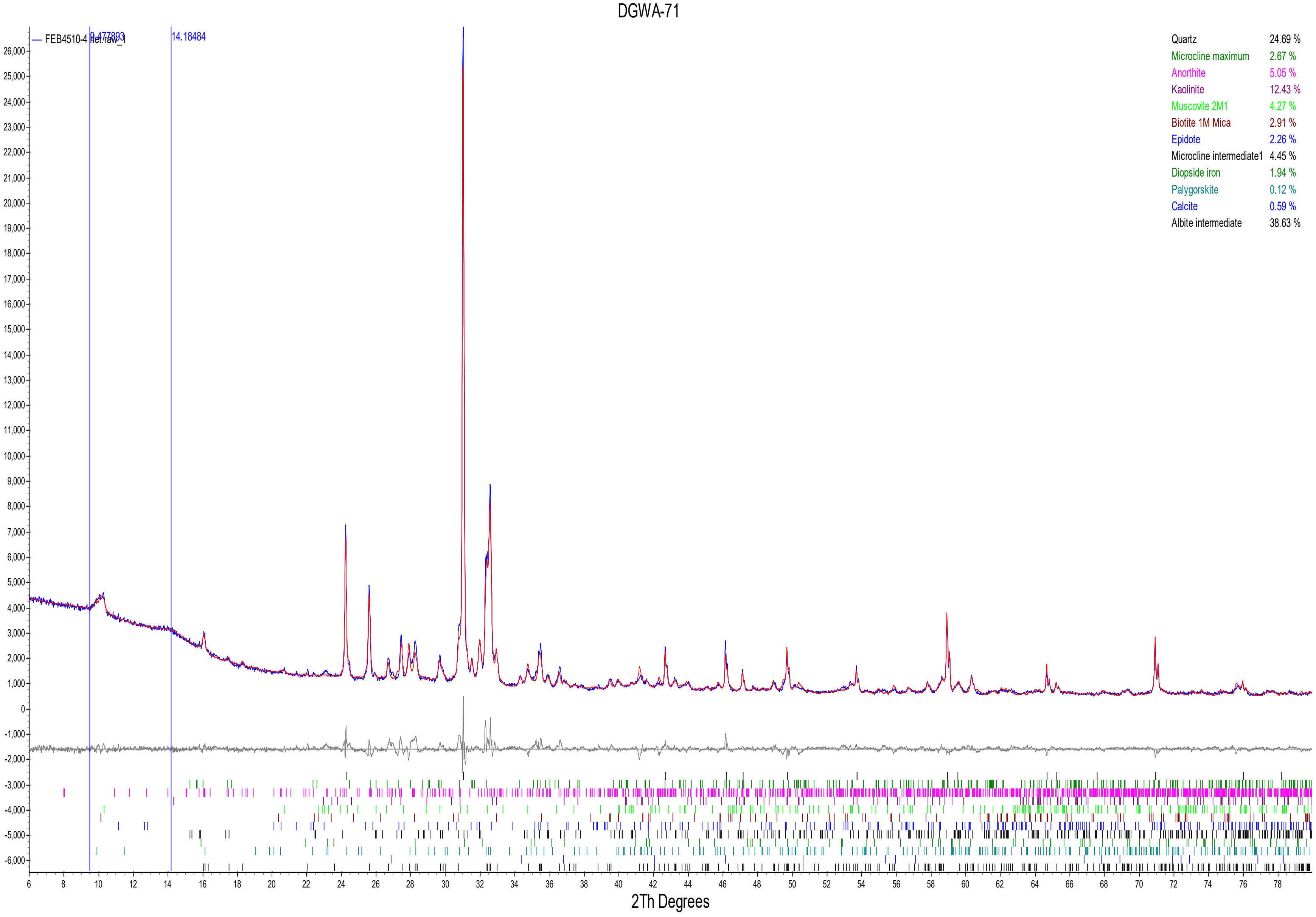
Golder Associates
17836-01/MI4510-FEB20
02/20/2020

DGWC-9

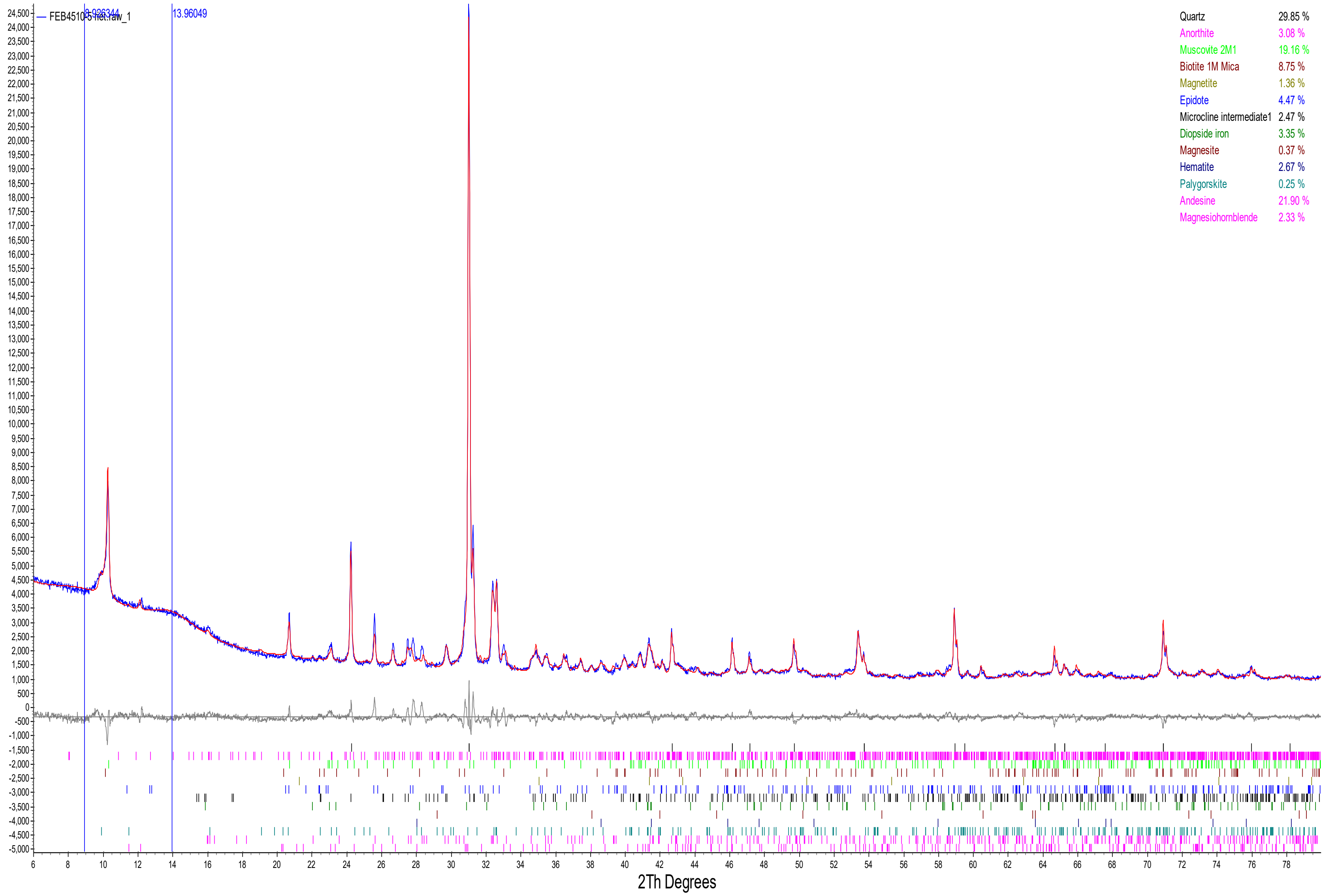



DGWC-10
FEB4510-3 riet.raw_1
10.9296
Quartz 36.88 %
Microcline maximum 0.45 %
Anorthite 4.09 %
Kaolinite 32.03 %
Muscovite 2M1 14.83 %
Biotite 1M Mica 3.68 %
Magnetite 1.48 %
Lizardite-Al-Fe-P31M 0.39 %
Diopside iron 1.97 %
Magnesite 0.54 %
Hematite 2.26 %
Almandine 1.39 %
2Th Degrees

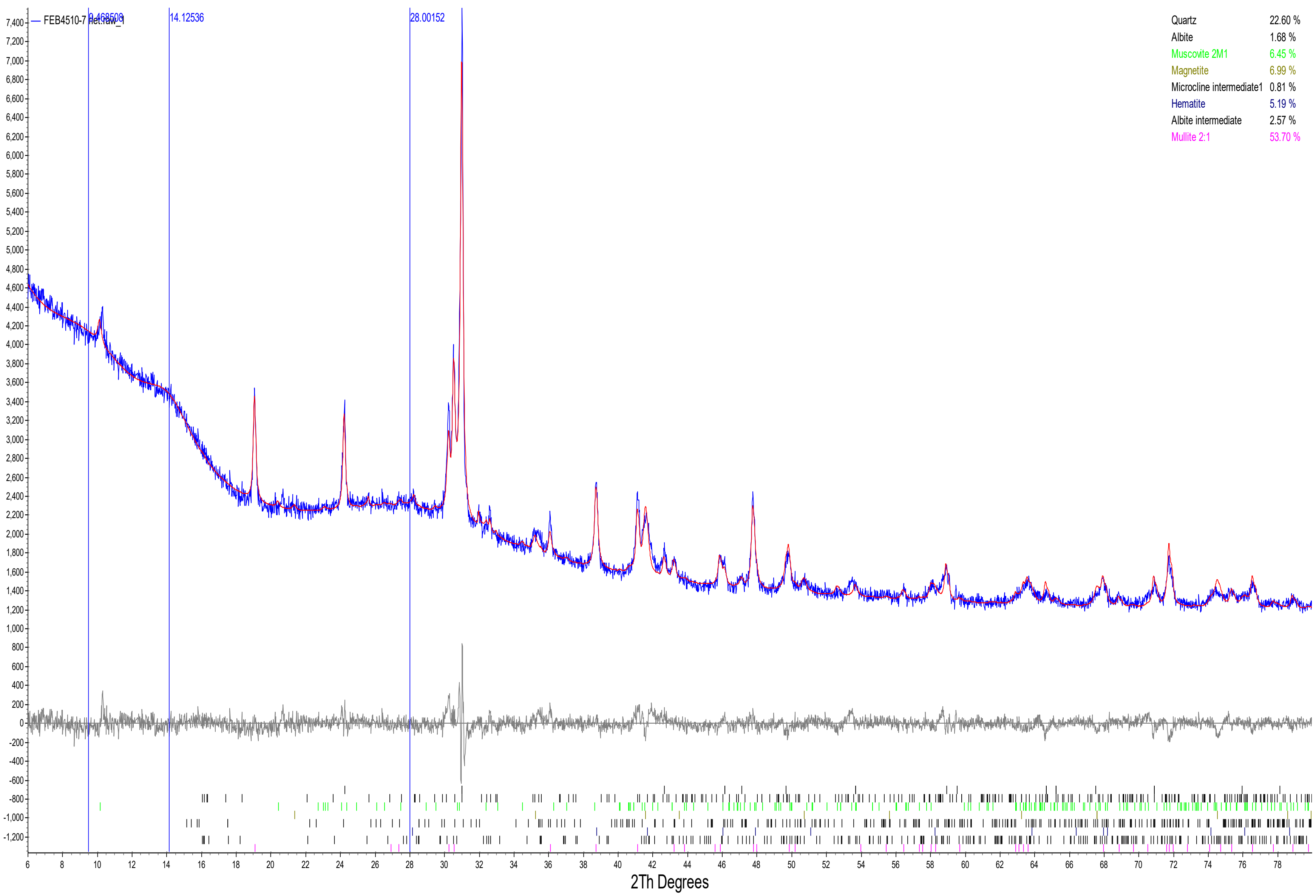
Golder Associates
17836-01/MI4510-FEB20
02/20/2020



DGWA-70A

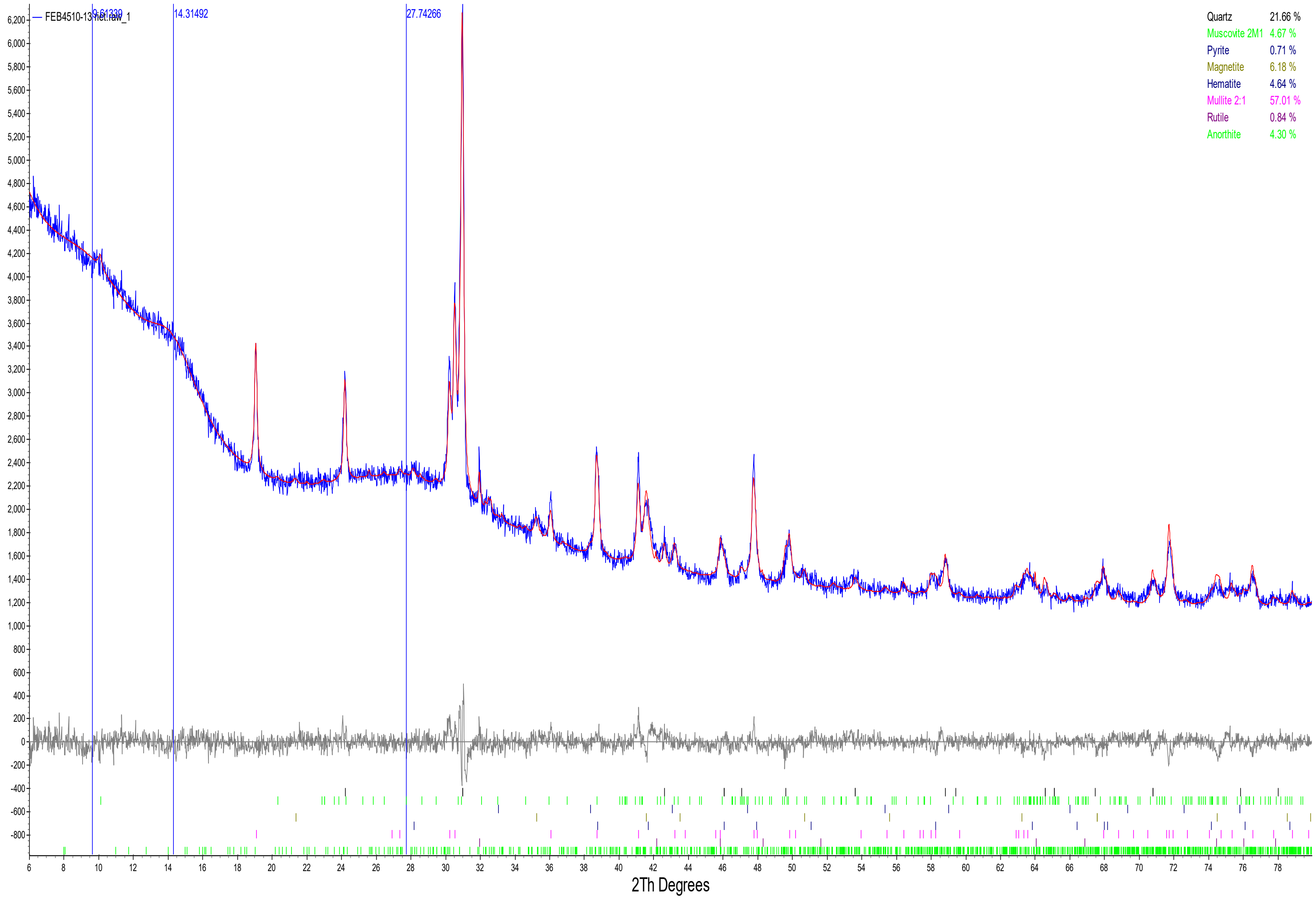

FEB4510-5 riet.raw_1
8.926344
13.96049
Quartz 29.85 %
Anorthite 3.08 %
Muscovite 2M1 19.16 %
Biotite 1M Mica 8.75 %
Magnetite 1.36 %
Epidote 4.47 %
Microcline intermediate1 2.47 %
Diopside iron 3.35 %
Magnesite 0.37 %
Hematite 2.67 %
Palygorskite 0.25 %
Andesine 21.90 %
Magnesiohornblende 2.33 %
24,500
24,000
23,500
23,000
22,500
22,000
21,500
21,000
20,500
20,000
19,500
19,000
18,500
18,000
17,500
17,000
16,500
16,000
15,500
15,000
14,500
14,000
13,500
13,000
12,500
12,000
11,500
11,000
10,500
10,000
9,500
9,000
8,500
8,000
7,500
7,000
6,500
6,000
5,500
5,000
4,500
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0
-500
-1,000
-1,500
-2,000
-2,500
-3,000
-3,500
-4,000
-4,500
-5,000
6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72 74 76 78
2Th Degrees

A1: 3-6

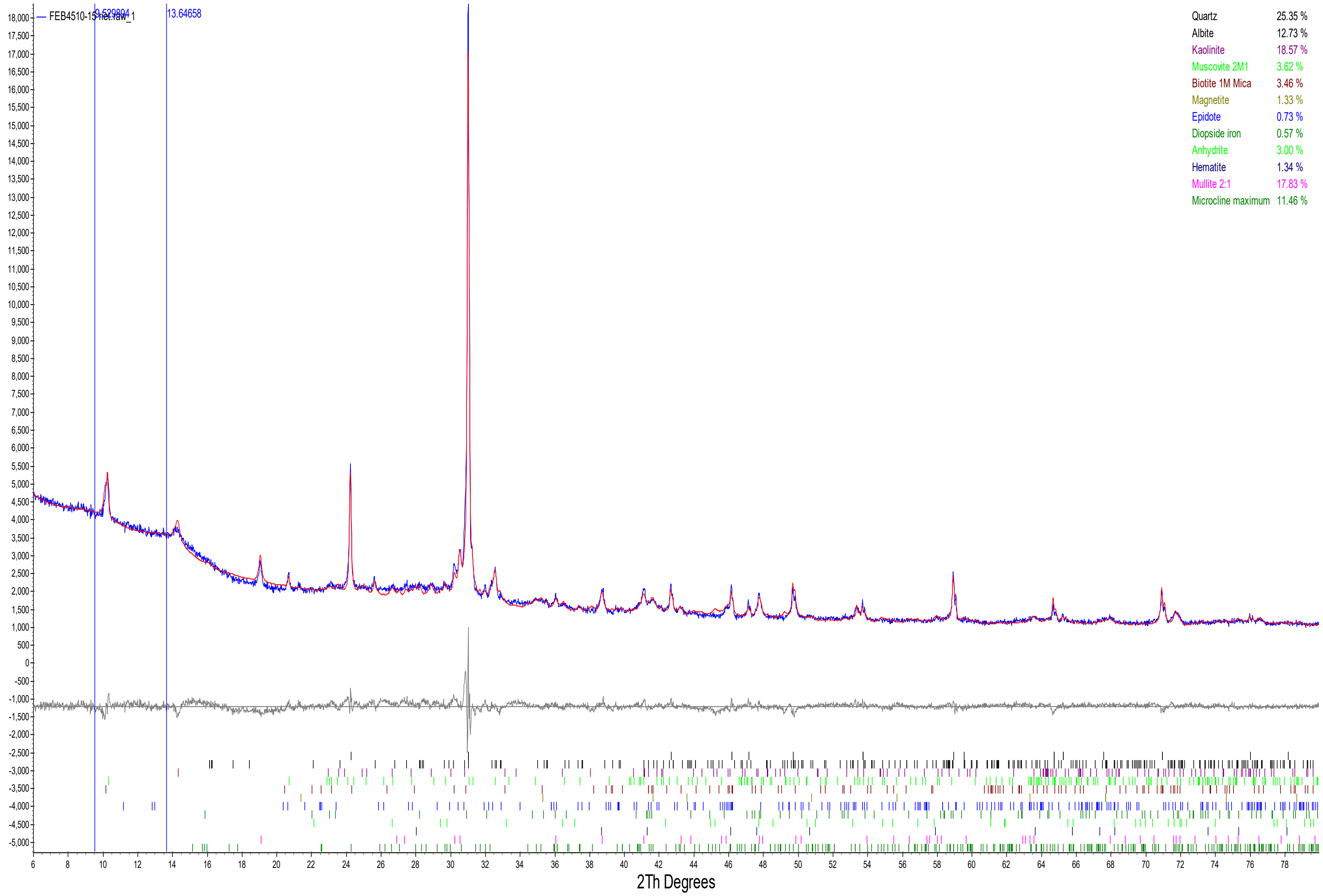

FEB4510-7 net.raw_1
9.468508
14.12536
28.00152
Quartz 22.60 %
Albite 1.68 %
Muscovite 2M1 6.45 %
Magnetite 6.99 %
Microcline intermediate1 0.81 %
Hematite 5.19 %
Albite intermediate 2.57 %
Mullite 2:1 53.70 %
2Th Degrees

Golder Associates
17836-01/MI4510-FEB20
02/20/2020

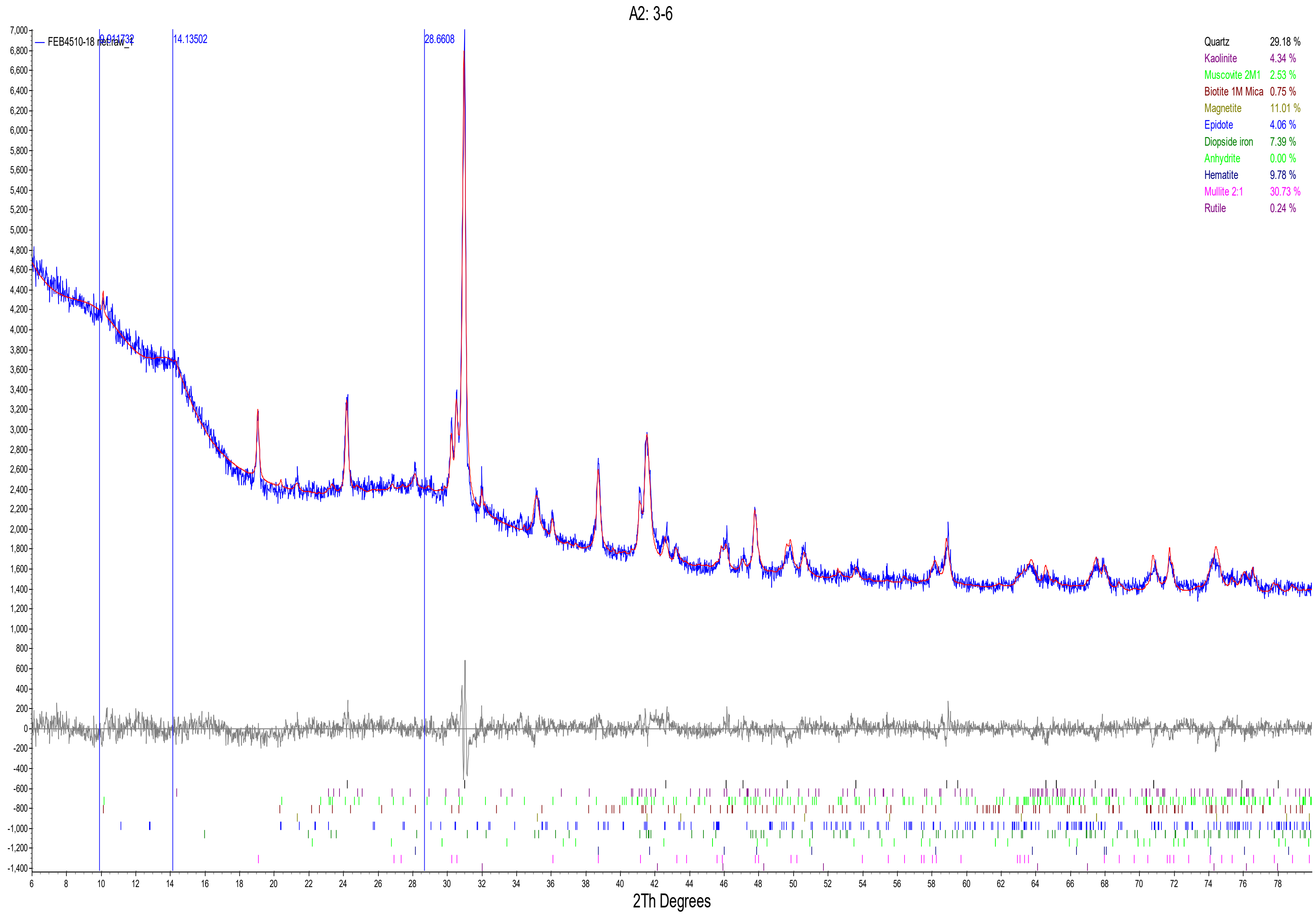
A1: 16-17.5



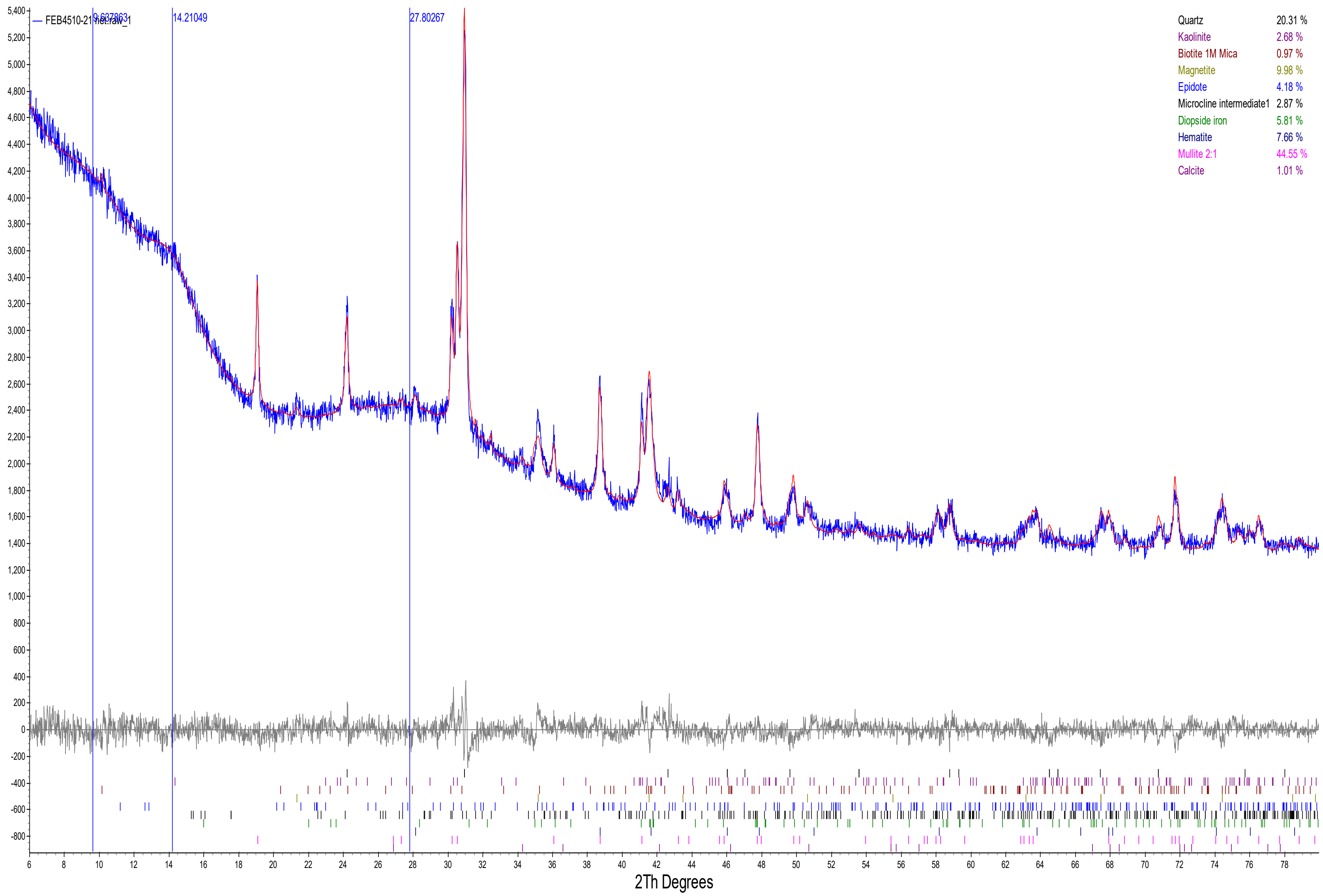
A1: 19-20.5


FEB4510-15-net.raw_1
9.529994
13.64658
Quartz 25.35 %
Albite 12.73 %
Kaolinite 18.57 %
Muscovite 2M1 3.62 %
Biotite 1M Mica 3.46 %
Magnetite 1.33 %
Epidote 0.73 %
Diopside iron 0.57 %
Anhydrite 3.00 %
Hematite 1.34 %
Mullite 2:1 17.83 %
Microcline maximum 11.46 %
2Th Degrees

Golder Associates
17836-01/MI4510-FEB20
02/20/2020



A3: 3-6


FEB4510-21 riet.raw_1
9.637863
14.21049
27.80267
Quartz 20.31 %
Kaolinite 2.68 %
Biotite 1M Mica 0.97 %
Magnetite 9.98 %
Epidote 4.18 %
Microcline intermediate1 2.87 %
Diopside iron 5.81 %
Hematite 7.66 %
Mullite 2:1 44.55 %
Calcite 1.01 %
2Th Degrees

## Quantitative X-Ray Diffraction by Rietveld Refinement

***Report Prepared for:*** *Golder Associates Inc*

***Project Number/ LIMS No.*** *18502-05/MI5010-MAY22*

***Sample Receipt:*** *May 8, 2022*

***Sample Analysis:*** *May 13, 2022*

***Reporting Date:*** *June 8, 2022*

---

***Instrument:*** BRUKER AXS D8 Advance Diffractometer

***Test Conditions:*** Co radiation, 35 kV, 40 mA; Detector: LYNXEYE
Regular Scanning: Step: 0.02°, Step time: 0.75s, 2θ range: 6-80°

***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 Natural Resources 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 Inc. - Minerals: https://www.scc.ca/en/search/palcan.

## Method Summary

The Rietveld Method of Mineral Identification by XRD (ME-LR-MIN-MET-MN-D05) method used by SGS Natural Resources 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.

## Summary of Rietveld Quantitative Analysis X-Ray Diffraction Results

| Mineral/Compound | B-113D-19-20' MAY5010-01 (wt %) | B-104D-55-56' MAY5010-02 (wt %) | B-115D-75-76' MAY5010-03 (wt %) | B-47-11-12' MAY5010-04 (wt %) | B-48-23-24' MAY5010-05 (wt %) |
|---|---|---|---|---|---|
| Quartz | 69.5 | 32.1 | 32.8 | 25.7 | 45.6 |
| Lizardite | 0.6 | - | - | - | - |
| Rutile | 0.9 | 1.6 | 1.7 | 1.0 | 1.4 |
| Magnetite | 1.0 | - | - | - | - |
| Muscovite | 7.4 | 12.1 | 17.1 | 38.9 | 1.8 |
| Kaolinite | 8.0 | - | - | - | - |
| Pyrite | 0.2 | - | - | - | - |
| Hematite | 0.3 | - | 0.2 | 0.7 | - |
| Phlogopite | 6.0 | - | - | - | - |
| Albite | 5.4 | 32.9 | 28.9 | 6.1 | 36.9 |
| Illite-Montmorillonite | 0.8 | - | - | - | - |
| Chlorite | - | 3.9 | 6.1 | 5.0 | 2.3 |
| Ilmenite | - | 0.8 | 0.7 | - | 0.5 |
| Biotite | - | 10.7 | 9.8 | 9.8 | 7.1 |
| Orthoclase | - | 1.9 | 2.6 | 3.8 | 1.4 |
| Diopside | - | 3.8 | - | 5.2 | 3.0 |
| Stilpnomelane | - | - | - | 2.0 | - |
| Magnesite | - | - | - | 1.8 | - |
| Actinolite | - | - | - | - | - |
| Gypsum | - | - | - | - | - |
| Gibbsite | - | - | - | - | - |
| Spessartine | - | - | - | - | - |
| Calcite | - | - | - | - | - |
| 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.*

## Summary of Rietveld Quantitative Analysis X-Ray Diffraction Results

| Mineral/Compound | DGWC-121-38-40' MAY5010-06 (wt %) | DGWC-121-49-50' MAY5010-07 (wt %) | B-122D-39-40' MAY5010-08 (wt %) | B-123D-27-28' MAY5010-09 (wt %) | B-123D-145' MAY5010-10 (wt %) |
|---|---|---|---|---|---|
| Quartz | 45.1 | 45.9 | 66.2 | 35.5 | 37.6 |
| Lizardite | 0.9 | - | 0.8 | 1.5 | - |
| Rutile | 1.2 | 0.4 | - | 1.5 | 0.8 |
| Magnetite | 1.9 | 0.5 | 0.8 | - | - |
| Muscovite | 18.4 | 10.6 | 12.1 | 7.8 | 0.6 |
| Kaolinite | - | - | - | 30.7 | - |
| Pyrite | - | 0.2 | - | - | - |
| Hematite | 1.4 | - | - | - | - |
| Phlogopite | 5.0 | 10.4 | - | 5.8 | - |
| Albite | 13.1 | 24.1 | 4.8 | 3.2 | 41.5 |
| Illite-Montmorillonite | - | - | - | 3.3 | - |
| Chlorite | 5.5 | 3.0 | 1.1 | - | 0.4 |
| Ilmenite | 0.7 | 1.0 | - | - | 0.8 |
| Biotite | - | - | 2.6 | - | 10.2 |
| Orthoclase | 5.4 | 1.2 | 5.2 | 10.1 | 1.4 |
| Diopside | 1.3 | 2.6 | - | 0.6 | 1.7 |
| Stilpnomelane | - | - | 2.2 | - | - |
| Magnesite | - | - | - | - | - |
| Actinolite | - | - | 1.0 | - | 0.9 |
| Gypsum | - | - | 0.4 | - | - |
| Gibbsite | - | - | 2.9 | - | - |
| Spessartine | - | - | - | - | 2.7 |
| Calcite | - | - | - | - | 1.5 |
| TOTAL | 100 | 100 | 100 | 100 | 100 |

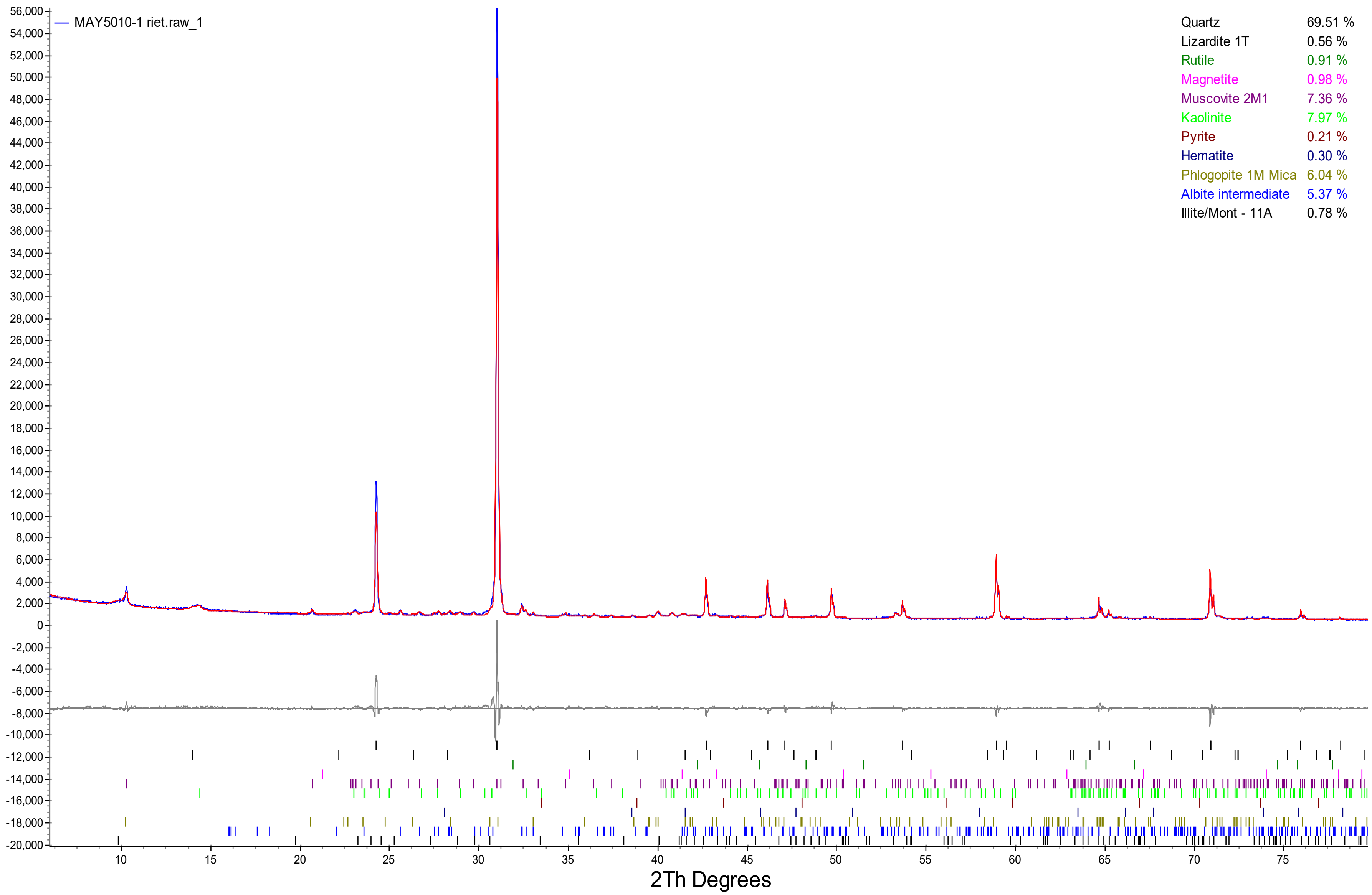
*Zero values indicate that the mineral was included in the refinement, but the calculated concentration is below a measurable value.*
*Dashes indicate that the mineral was not identified by the analyst and not included in the refinement calculation for the sample.*
*The weight percent quantities indicated have been normalized to a sum of 100%.*
*The quantity of amorphous material has not been determined.*

## Mineral List

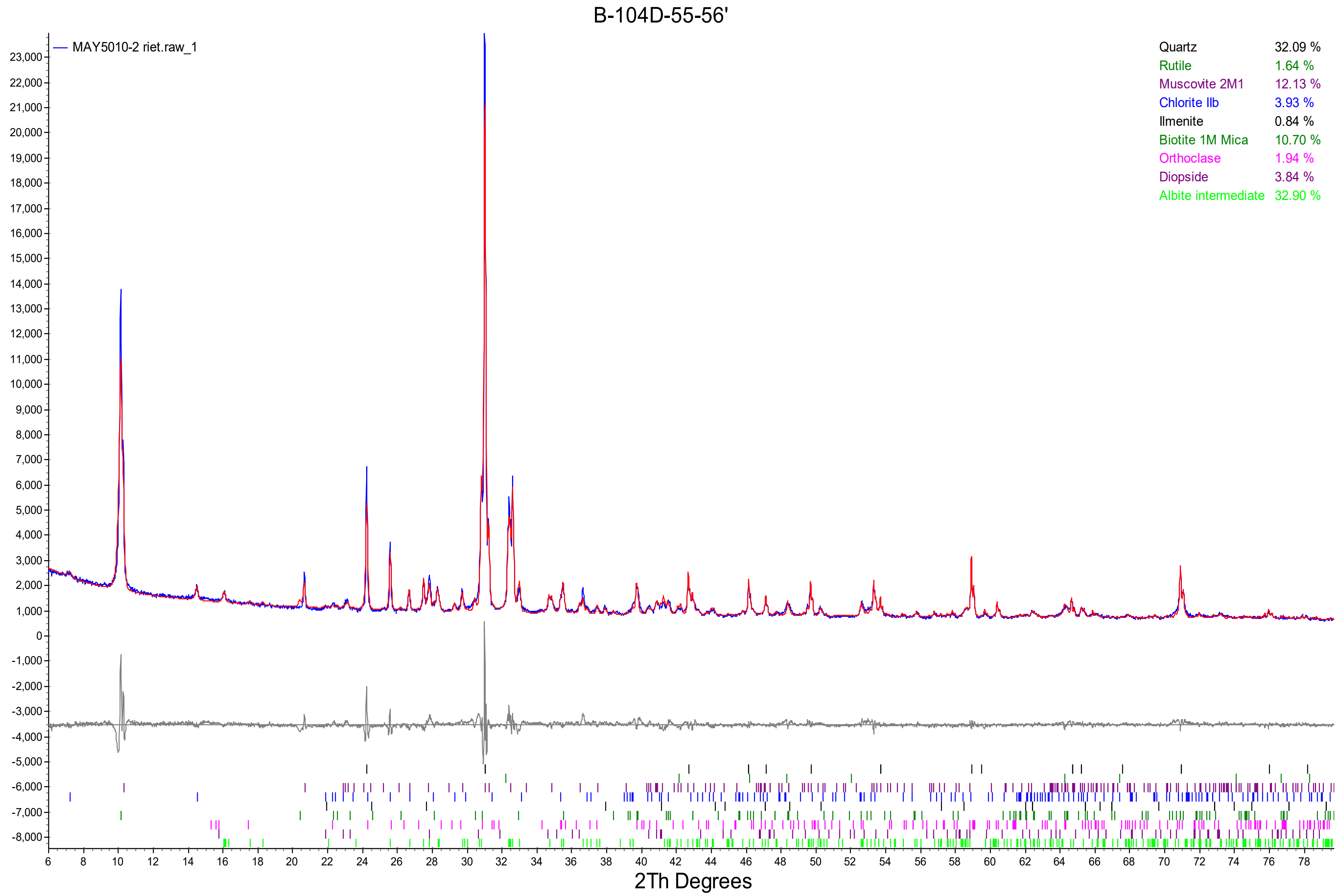
| Mineral/Compound | Formula |
|---|---|
| Quartz | $SiO_2$ |
| Lizardite | $Mg_3Si_2O_5(OH)_4$ |
| Rutile | $TiO_2$ |
| Magnetite | $Fe_3O_4$ |
| Muscovite | $KAl_2(AlSi_3O_{10})(OH)_2$ |
| Kaolinite | $Al_2Si_2O_5(OH)_4$ |
| Pyrite | $FeS_2$ |
| Hematite | $Fe_2O_3$ |
| Phlogopite | $KMg_3(AlSi_3O_{10})(OH)_2$ |
| Albite | $NaAlSi_3O_8$ |
| Illite-Montmorillonite | $KAl_4(Si,Al)_8O_{20}(OH)_4 \cdot 8H_2O$ |
| Chlorite | $(Fe,(Mg,Mn)_5,Al)(Si_3Al)O_{10}(OH)_8$ |
| Ilmenite | $FeTiO_3$ |
| Biotite | $K(Mg,Fe)_3(AlSi_3O_{10})(OH)_2$ |
| Orthoclase | $KAlSi_3O_8$ |
| Diopside | $CaMgSi_2O_6$ |
| Stilpnomelane | $K(Fe^{2+},Mg,Fe^{3+})_8(Si,Al)_{12}(O,OH)_{27} \cdot n(H_2O)$ |
| Magnesite | $MgCO_3$ |
| Actinolite | $Ca_2(Mg,Fe)_5Si_8O_{22}(OH)_2$ |
| Gypsum | $CaSO_4 \cdot 2H_2O$ |
| Gibbsite | $Al(OH)_3$ |
| Spessartine | $Mn_3Al_2Si_3O_{12}$ |
| Calcite | $CaCO_3$ |

Golder Associates Inc
18502-05/MI5010-MAY22
08-Jun-22

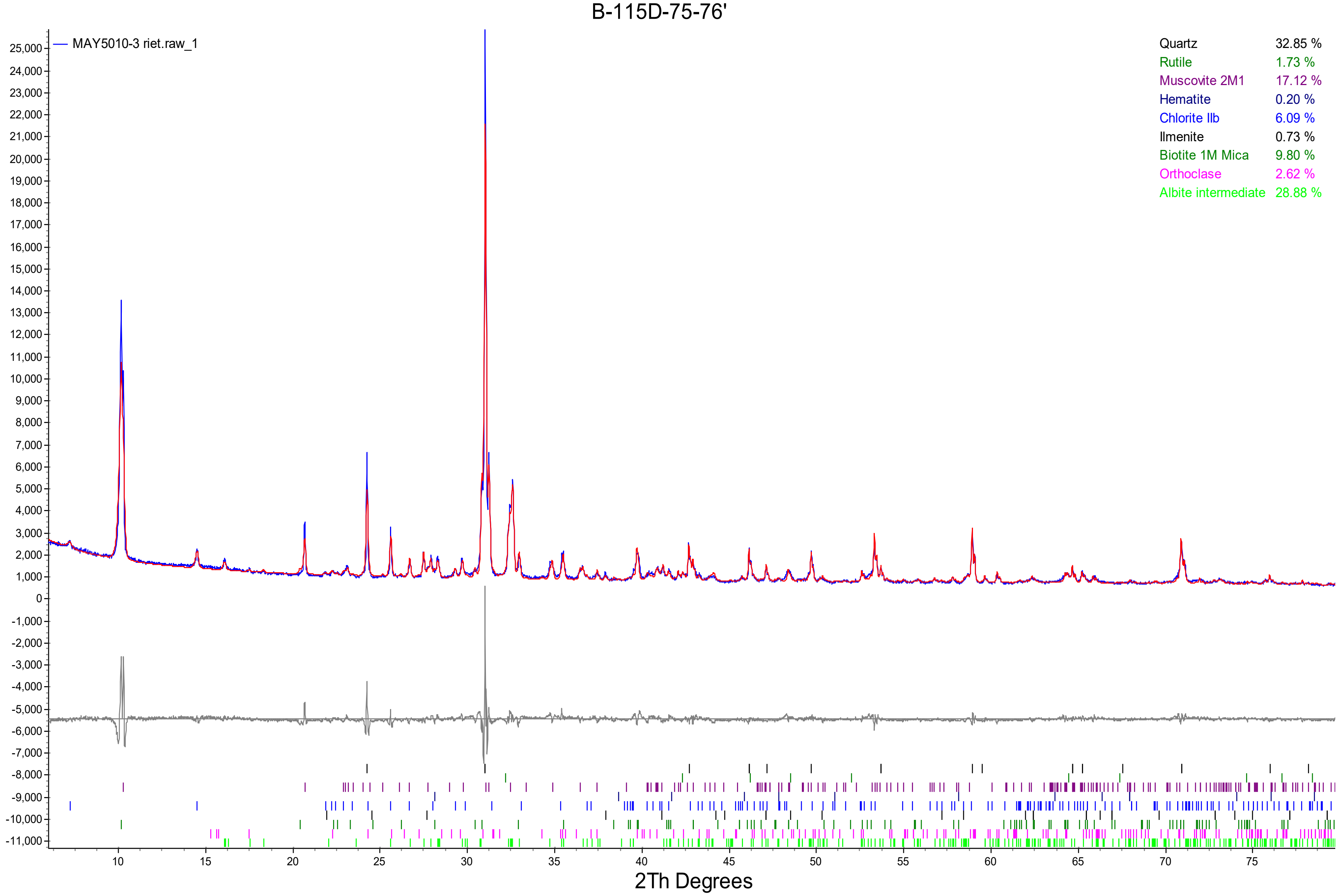
B-113D-19-20'



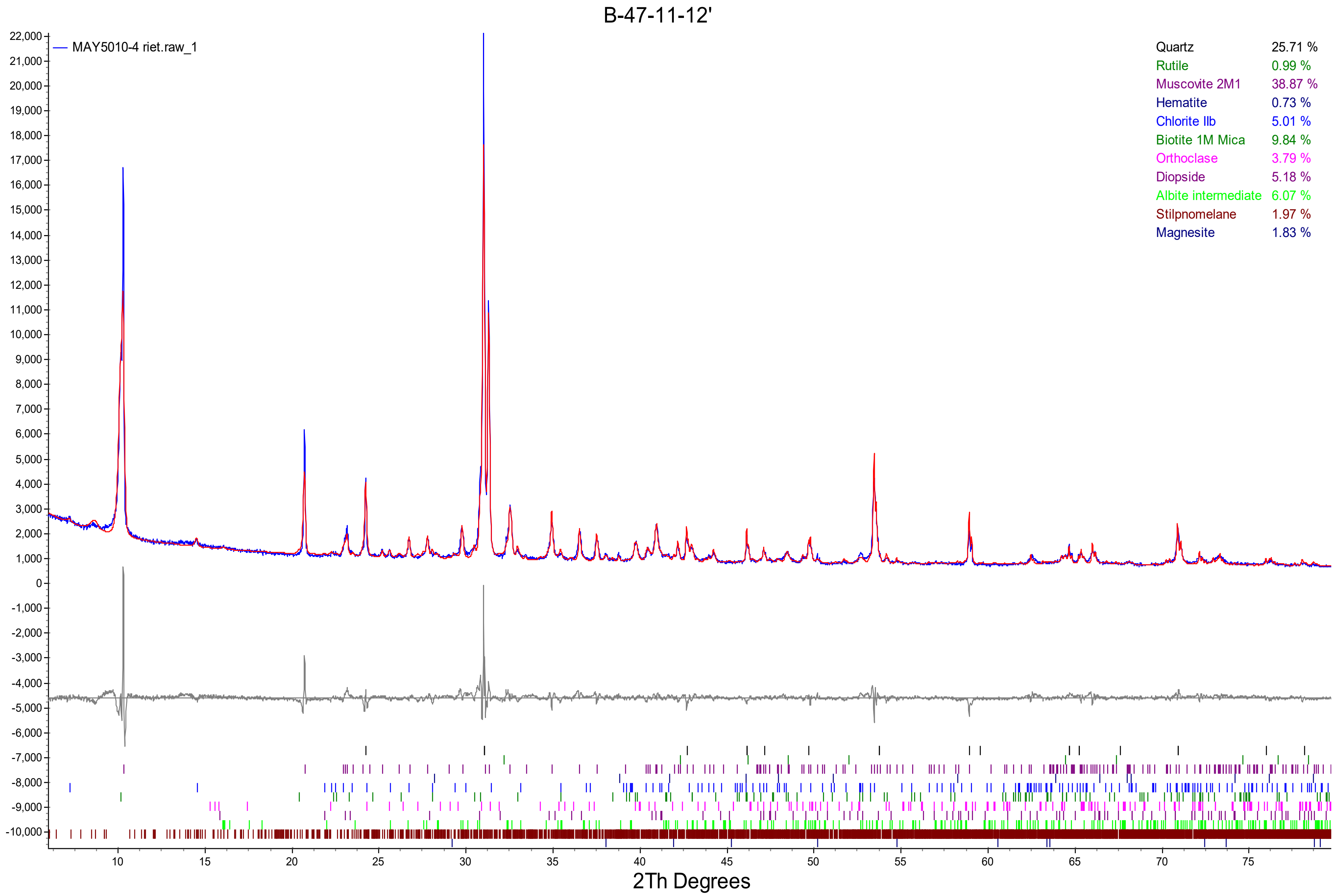
Golder Associates Inc
18502-05/MI5010-MAY22
08-Jun-22



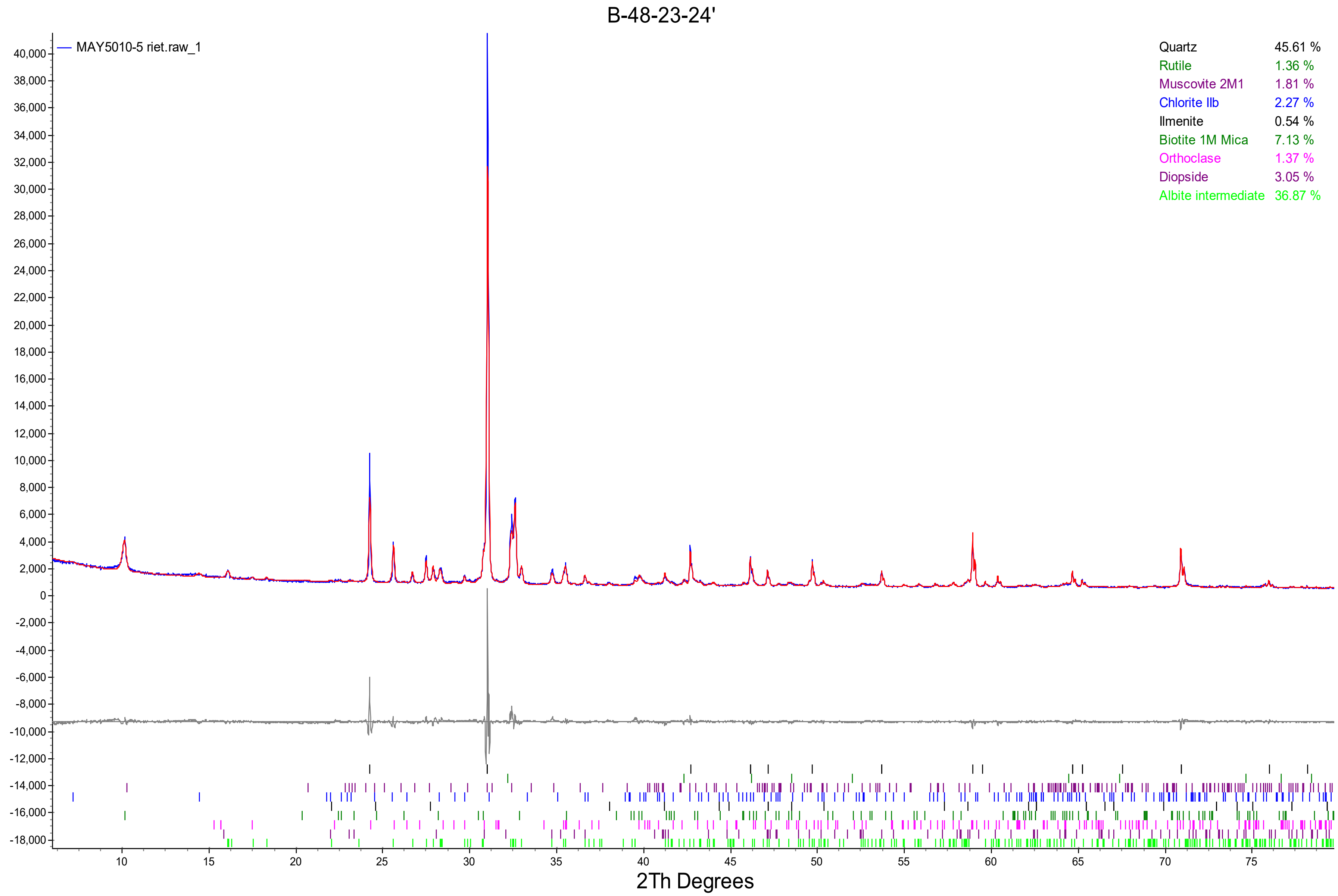
Golder Associates Inc
18502-05/MI5010-MAY22
08-Jun-22



Golder Associates Inc
18502-05/MI5010-MAY22
08-Jun-22

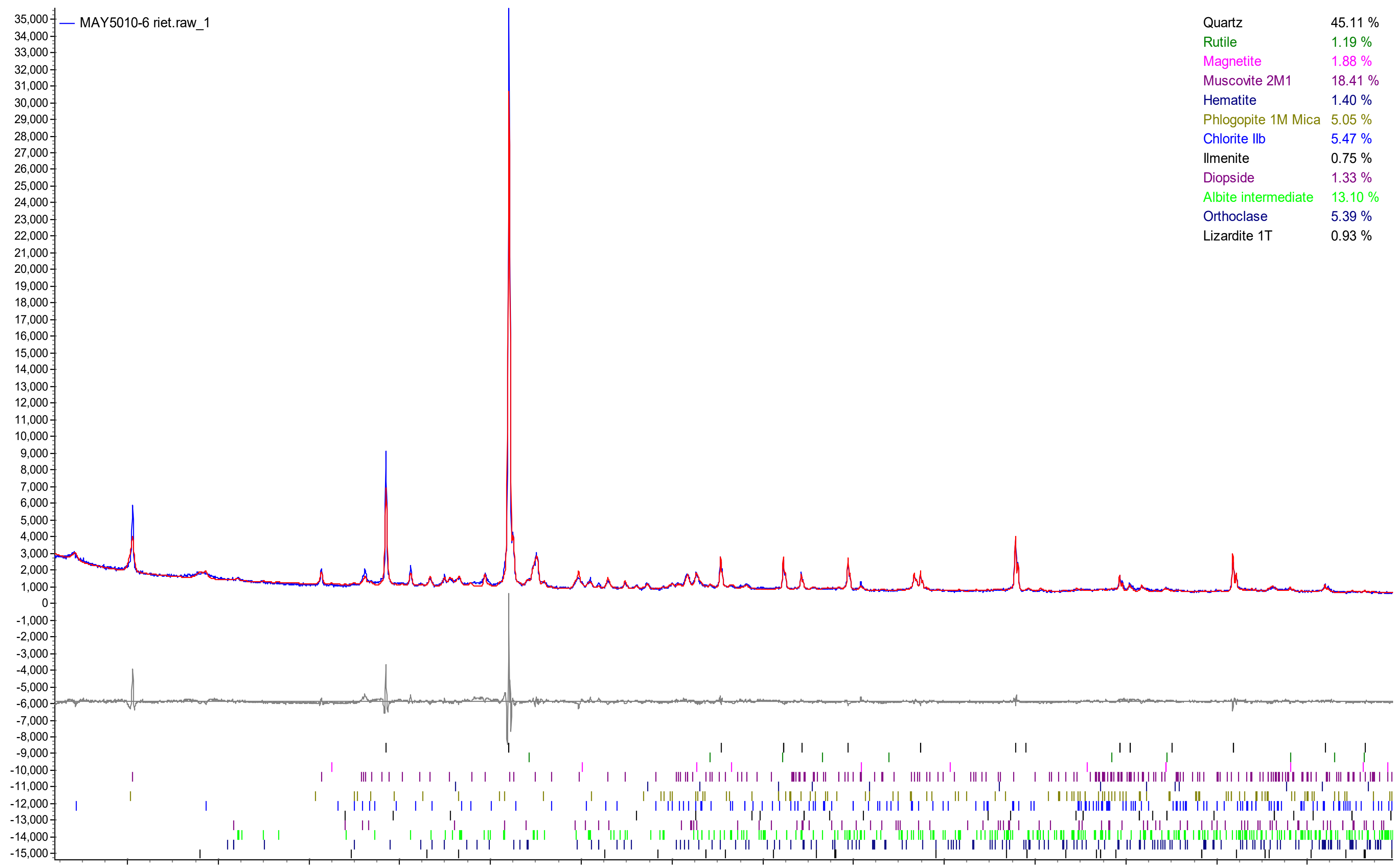


Golder Associates Inc
18502-05/MI5010-MAY22
08-Jun-22



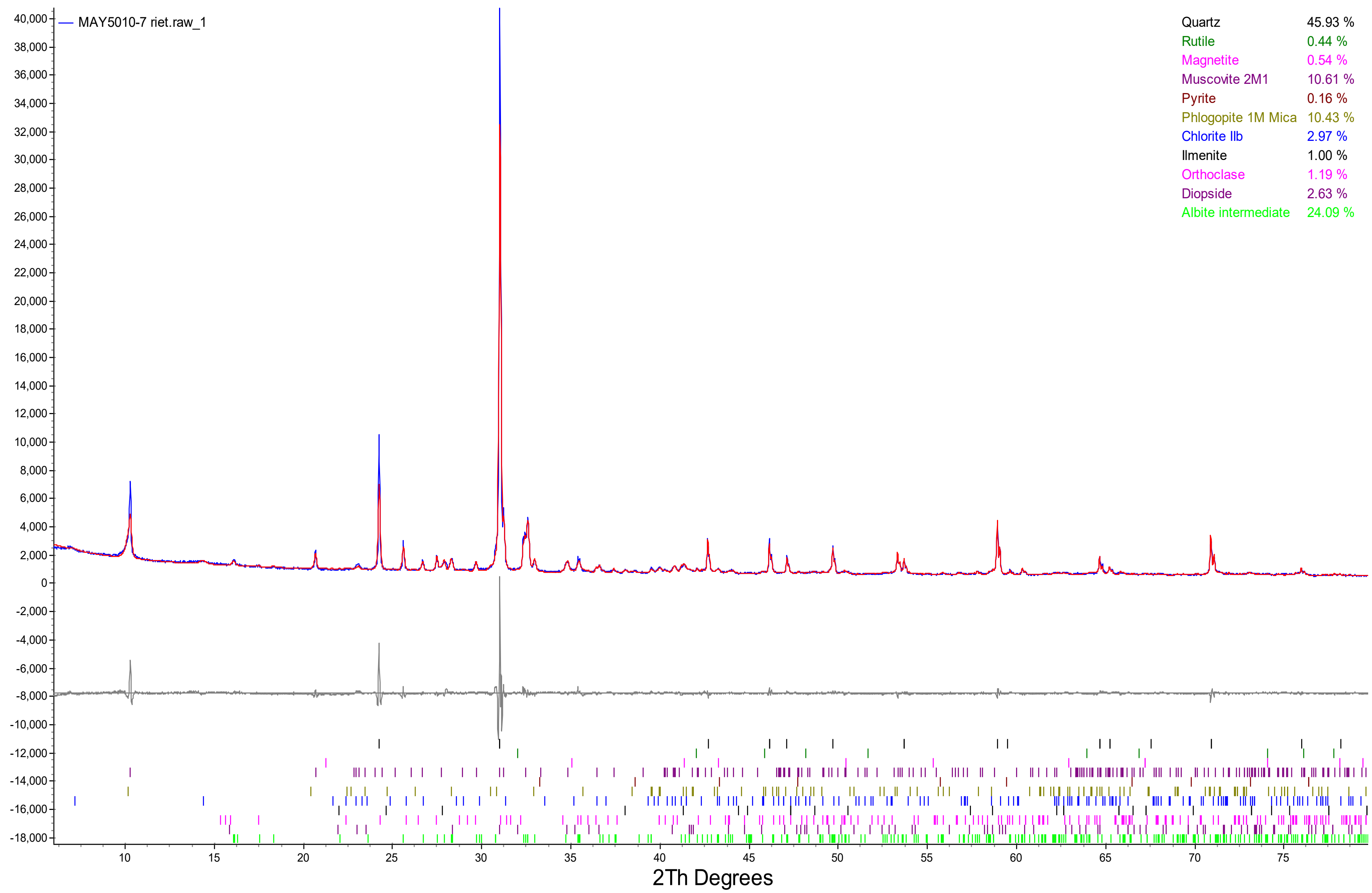
Golder Associates Inc
18502-05/MI5010-MAY22
08-Jun-22

DGWC-121-38-40'

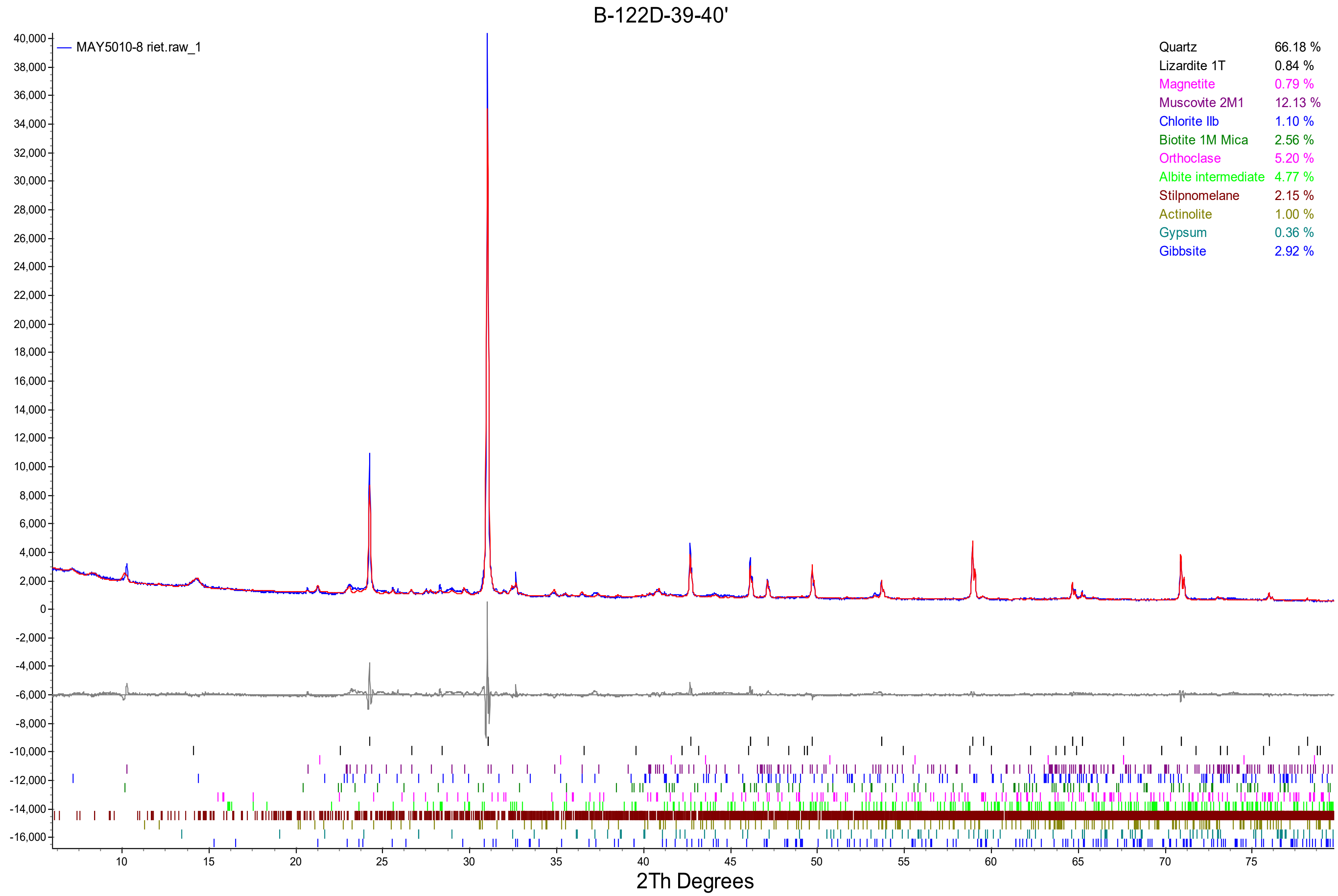


Golder Associates Inc
18502-05/MI5010-MAY22
08-Jun-22

DGWC-121-49-50'

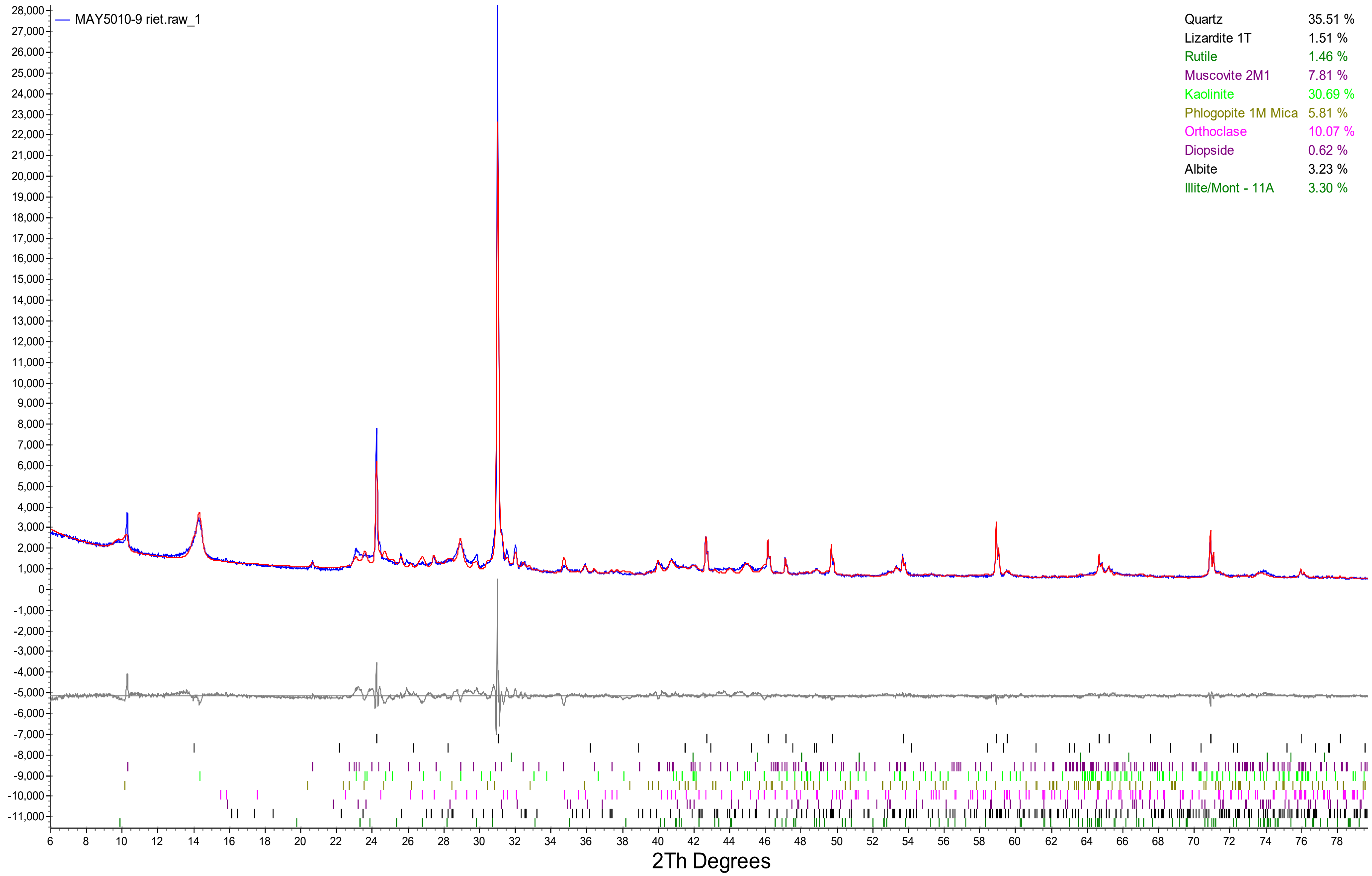


Golder Associates Inc
18502-05/MI5010-MAY22
08-Jun-22

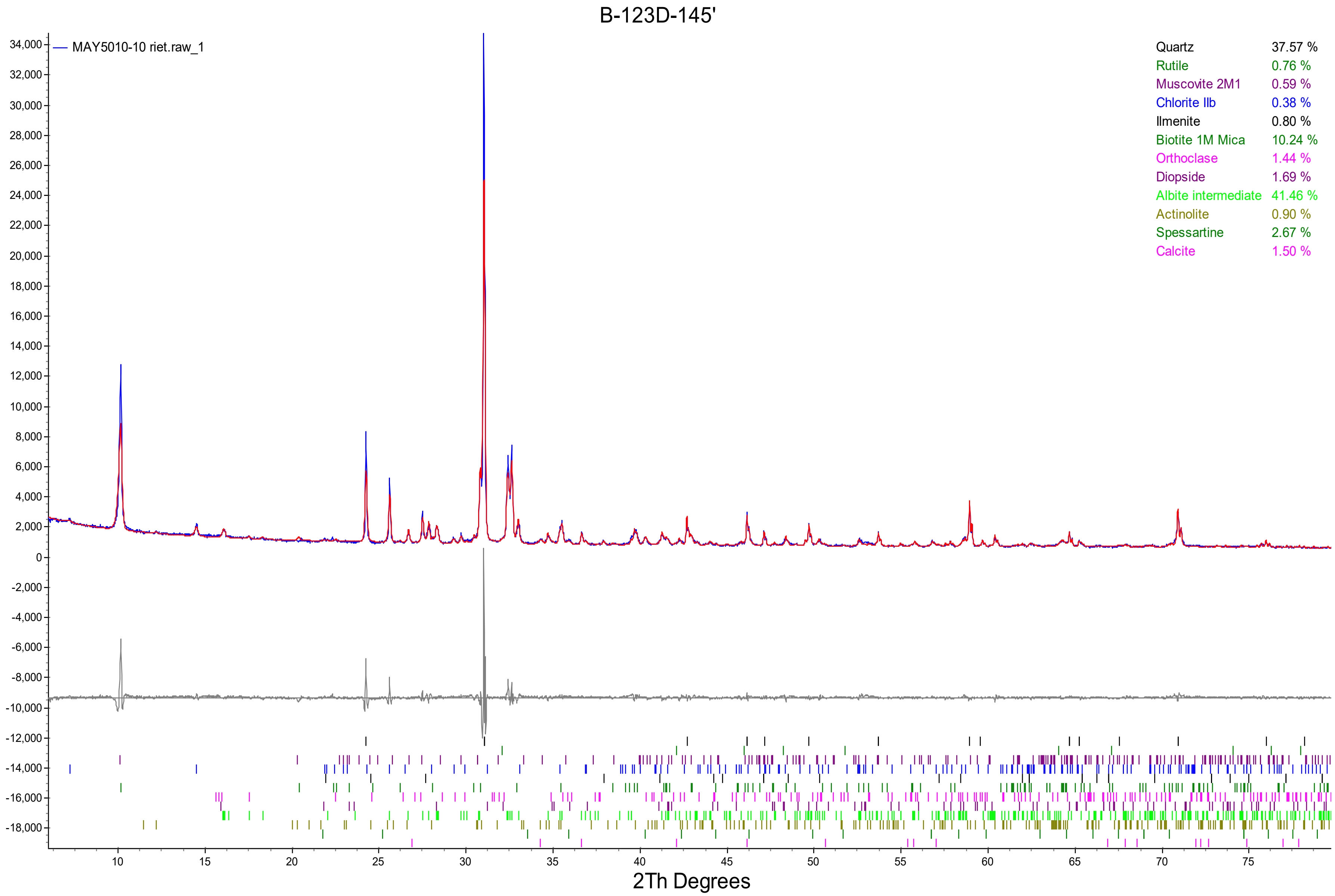


Golder Associates Inc
18502-05/MI5010-MAY22
08-Jun-22

B-123D-27-28'



Golder Associates Inc
18502-05/MI5010-MAY22
08-Jun-22



**APPENDIX D**

# Sequential Extraction Results

eurofins | Environment Testing
TestAmerica

# ANALYTICAL REPORT

Eurofins TestAmerica, Knoxville
5815 Middlebrook Pike
Knoxville, TN 37921
Tel: (865)291-3000

Laboratory Job ID: 140-18228-1
Client Project/Site: GPC Plant McDonough (166849618)

For:
Golder Associates Inc.
27200 Haggerty Road, Suite B-12
Farmington Hills, Michigan 48331-5719

Attn: Dawn Prell

Ryan Henry

*Authorized for release by:*
*3/12/2020 1:45:40 PM*


Ryan Henry, Project Manager I
(865)291-3000
william.henry@testamericainc.com


*This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.*




1 2 3 4 5 6 7 8 9 10 11 12 13

# Table of Contents

Cover Page . . . . . . . . . . 1
Table of Contents . . . . . . . . . . 2
Definitions/Glossary . . . . . . . . . . 3
Case Narrative . . . . . . . . . . 4
Sample Summary . . . . . . . . . . 6
Client Sample Results . . . . . . . . . . 7
Default Detection Limits . . . . . . . . . . 22
QC Sample Results . . . . . . . . . . 25
QC Association Summary . . . . . . . . . . 34
Lab Chronicle . . . . . . . . . . 40
Method Summary . . . . . . . . . . 50
Certification Summary . . . . . . . . . . 51
Chain of Custody . . . . . . . . . . 53

# Definitions/Glossary

Client: Golder Associates Inc. Job ID: 140-18228-1
Project/Site: GPC Plant McDonough (166849618)

## Qualifiers

### Metals

| Qualifier | Qualifier Description |
|---|---|
| * | LCS or LCSD is outside acceptance limits. |
| * | RPD of the LCS and LCSD exceeds the control limits |
| B | Compound was found in the blank and sample. |
| J | Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value. |
| L | A negative instrument reading had an absolute value greater than the reporting limit |

## 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 |
| 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) |
| MDA | Minimum Detectable Activity (Radiochemistry) |
| MDC | Minimum Detectable Concentration (Radiochemistry) |
| MDL | Method Detection Limit |
| ML | Minimum Level (Dioxin) |
| NC | Not Calculated |
| ND | Not Detected at the reporting limit (or MDL or EDL if shown) |
| PQL | Practical Quantitation Limit |
| 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) |

## Job ID: 140-18228-1

### Laboratory: Eurofins TestAmerica, Knoxville

**Narrative**

**Job Narrative**
**140-18228-1**

**Receipt**
The samples were received on 2/12/2020 at 9:50am and arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 2.1º C.

**Receipt Exceptions**
The Field Sampler was not listed on the Chain of Custody.

**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 ($MgSO_4$), 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 $HCl$-$HNO_3$-$H_2O$, 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, $HNO_3$, HCl and $H_3BO_3$. 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, $HNO_3$, HCl and $H_3BO_3$. 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 = $(C \times V \times V1 \times D) / (W \times S \times V2)$

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

## Job ID: 140-18228-1 (Continued)

### Laboratory: Eurofins TestAmerica, Knoxville (Continued)

S = Percent solids/100

A method blank, laboratory control sample and laboratory control sample duplicate were prepared and analyzed with each SEP step in 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.

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 samples were diluted due to the presence of titanium, iron, manganese, and aluminum which interferes with Cobalt, Chromium, Arsenic, Cadmium and Selenium: DGWC-19 (34-39) (140-18228-1), DGWC-20 (34-39) (140-18228-2), DGWA-53 (25.7-26.9) (140-18228-3), DGWC-68A (24-29) (140-18228-4) and DGWC-69 (19-24) (140-18228-5). Elevated reporting limits (RLs) are provided.

Method 6010B SEP: Due to sample matrix effect on the internal standard (ISTD), a dilution was required for the following sample: DGWC-69 (19-24) (140-18228-5).

Method 6010B SEP: The following samples were diluted due to the presence of Titanium, Iron, and Aluminum which interferes with Chromium, Cobalt, Arsenic, Cadmium and Selenium: DGWC-19 (34-39) (140-18228-1), DGWC-20 (34-39) (140-18228-2), DGWA-53 (25.7-26.9) (140-18228-3), DGWC-68A (24-29) (140-18228-4) and DGWC-69 (19-24) (140-18228-5). Elevated reporting limits (RLs) are provided.

Method 6010B SEP: The following samples were diluted due to the nature of the sample matrix: DGWC-19 (34-39) (140-18228-1), DGWC-20 (34-39) (140-18228-2), DGWA-53 (25.7-26.9) (140-18228-3), DGWC-68A (24-29) (140-18228-4) and DGWC-69 (19-24) (140-18228-5). Elevated reporting limits (RLs) are provided. The serial dilution analysis indicated a matrix issue with results being higher than the undiluted results. The 1:10 analysis and the associated serial dilution test had results that were better correlated and within the acceptance criteria.

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: Golder Associates Inc.

Job ID: 140-18228-1

Project/Site: GPC Plant McDonough (166849618)

| Lab Sample ID | Client Sample ID | Matrix | Collected | Received | Asset ID |
|---|---|---|---|---|---|
| 140-18228-1 | DGWC-19 (34-39) | Solid | 02/05/20 00:00 | 02/12/20 09:50 | |
| 140-18228-2 | DGWC-20 (34-39) | Solid | 02/05/20 00:00 | 02/12/20 09:50 | |
| 140-18228-3 | DGWA-53 (25.7-26.9) | Solid | 02/05/20 00:00 | 02/12/20 09:50 | |
| 140-18228-4 | DGWC-68A (24-29) | Solid | 02/05/20 00:00 | 02/12/20 09:50 | |
| 140-18228-5 | DGWC-69 (19-24) | Solid | 02/05/20 00:00 | 02/12/20 09:50 | |

## Client Sample ID: DGWC-19 (34-39)

**Lab Sample ID: 140-18228-1**

**Date Collected: 02/05/20 00:00**

**Matrix: Solid**

**Date Received: 02/12/20 09:50**

### Method: 6010B SEP - SEP Metals (ICP) - Step 1

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Aluminum** | **48** | **J** | 51 | 8.1 | mg/Kg | ☼ | 02/19/20 08:00 | 02/24/20 15:41 | 4 |
| **Arsenic** | **1.1** | **J** | 2.5 | 0.66 | mg/Kg | ☼ | 02/19/20 08:00 | 02/24/20 15:41 | 4 |
| **Barium** | **0.65** | **J** | 13 | 0.61 | mg/Kg | ☼ | 02/19/20 08:00 | 02/24/20 15:41 | 4 |
| Beryllium | ND | | 1.3 | 0.39 | mg/Kg | ☼ | 02/19/20 08:00 | 02/24/20 15:41 | 4 |
| Cadmium | ND | | 1.3 | 0.081 | mg/Kg | ☼ | 02/19/20 08:00 | 02/24/20 15:41 | 4 |
| Chromium | ND | | 2.5 | 0.35 | mg/Kg | ☼ | 02/19/20 08:00 | 02/24/20 15:41 | 4 |
| **Cobalt** | **0.33** | **J** | 13 | 0.23 | mg/Kg | ☼ | 02/19/20 08:00 | 02/24/20 15:41 | 4 |
| Iron | ND | | 25 | 15 | mg/Kg | ☼ | 02/19/20 08:00 | 02/24/20 15:41 | 4 |
| Lithium | ND | | 13 | 0.76 | mg/Kg | ☼ | 02/19/20 08:00 | 02/24/20 15:41 | 4 |
| **Manganese** | **8.4** | | 3.8 | 0.16 | mg/Kg | ☼ | 02/19/20 08:00 | 02/24/20 15:41 | 4 |
| Molybdenum | ND | | 10 | 0.41 | mg/Kg | ☼ | 02/19/20 08:00 | 02/24/20 15:41 | 4 |
| Selenium | ND | | 2.5 | 0.86 | mg/Kg | ☼ | 02/19/20 08:00 | 02/24/20 15:41 | 4 |

### Method: 6010B SEP - SEP Metals (ICP) - Step 2

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Aluminum** | **30** | **J *** | 38 | 6.1 | mg/Kg | ☼ | 02/20/20 08:00 | 02/25/20 12:08 | 3 |
| Arsenic | ND | * | 1.9 | 0.49 | mg/Kg | ☼ | 02/20/20 08:00 | 02/25/20 12:08 | 3 |
| **Barium** | **1.0** | **J *** | 9.5 | 0.45 | mg/Kg | ☼ | 02/20/20 08:00 | 02/25/20 12:08 | 3 |
| Beryllium | ND | * | 0.95 | 0.061 | mg/Kg | ☼ | 02/20/20 08:00 | 02/25/20 12:08 | 3 |
| Cadmium | ND | | 0.95 | 0.042 | mg/Kg | ☼ | 02/20/20 08:00 | 02/25/20 12:08 | 3 |
| Chromium | ND | | 1.9 | 0.27 | mg/Kg | ☼ | 02/20/20 08:00 | 02/25/20 12:08 | 3 |
| Cobalt | ND | | 9.5 | 0.24 | mg/Kg | ☼ | 02/20/20 08:00 | 02/25/20 12:08 | 3 |
| Iron | ND | * | 19 | 11 | mg/Kg | ☼ | 02/20/20 08:00 | 02/25/20 12:08 | 3 |
| Lithium | ND | | 9.5 | 0.57 | mg/Kg | ☼ | 02/20/20 08:00 | 02/25/20 12:08 | 3 |
| **Manganese** | **1.6** | **J** | 2.8 | 1.1 | mg/Kg | ☼ | 02/20/20 08:00 | 02/25/20 12:08 | 3 |
| Molybdenum | ND | | 7.6 | 0.31 | mg/Kg | ☼ | 02/20/20 08:00 | 02/25/20 12:08 | 3 |
| **Selenium** | **1.2** | **J** | 1.9 | 0.64 | mg/Kg | ☼ | 02/20/20 08:00 | 02/25/20 12:08 | 3 |

### Method: 6010B SEP - SEP Metals (ICP) - Step 3

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Aluminum** | **260** | | 13 | 2.7 | mg/Kg | ☼ | 02/21/20 08:00 | 02/25/20 14:12 | 1 |
| Arsenic | ND | | 0.63 | 0.16 | mg/Kg | ☼ | 02/21/20 08:00 | 02/25/20 14:12 | 1 |
| **Barium** | **4.1** | **B** | 3.2 | 0.15 | mg/Kg | ☼ | 02/21/20 08:00 | 02/25/20 14:12 | 1 |
| **Beryllium** | **0.17** | **J** | 0.32 | 0.019 | mg/Kg | ☼ | 02/21/20 08:00 | 02/25/20 14:12 | 1 |
| **Cadmium** | **0.068** | **J B *** | 0.32 | 0.014 | mg/Kg | ☼ | 02/21/20 08:00 | 02/25/20 14:12 | 1 |
| **Chromium** | **0.21** | **J** | 0.63 | 0.088 | mg/Kg | ☼ | 02/21/20 08:00 | 02/25/20 14:12 | 1 |
| **Cobalt** | **19** | | 3.2 | 0.057 | mg/Kg | ☼ | 02/21/20 08:00 | 02/25/20 14:12 | 1 |
| **Iron** | **490** | | 6.3 | 3.7 | mg/Kg | ☼ | 02/21/20 08:00 | 02/25/20 14:12 | 1 |
| **Lithium** | **1.5** | **J** | 3.2 | 0.19 | mg/Kg | ☼ | 02/21/20 08:00 | 02/25/20 14:12 | 1 |
| **Manganese** | **450** | **B** | 0.95 | 0.034 | mg/Kg | ☼ | 02/21/20 08:00 | 02/25/20 14:12 | 1 |
| Molybdenum | ND | | 2.5 | 0.10 | mg/Kg | ☼ | 02/21/20 08:00 | 02/25/20 14:12 | 1 |
| Selenium | ND | | 0.63 | 0.21 | mg/Kg | ☼ | 02/21/20 08:00 | 02/25/20 14:12 | 1 |

### Method: 6010B SEP - SEP Metals (ICP) - Step 4

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Aluminum** | **1600** | | 13 | 2.0 | mg/Kg | ☼ | 02/24/20 08:00 | 02/26/20 12:53 | 1 |
| Arsenic | ND | | 0.63 | 0.28 | mg/Kg | ☼ | 02/24/20 08:00 | 02/26/20 12:53 | 1 |
| **Barium** | **33** | | 3.2 | 0.15 | mg/Kg | ☼ | 02/24/20 08:00 | 02/26/20 12:53 | 1 |
| **Beryllium** | **1.2** | | 0.32 | 0.020 | mg/Kg | ☼ | 02/24/20 08:00 | 02/26/20 12:53 | 1 |
| **Cadmium** | **0.10** | **J** | 0.32 | 0.014 | mg/Kg | ☼ | 02/24/20 08:00 | 02/26/20 12:53 | 1 |

# Client Sample Results

Client: Golder Associates Inc. Job ID: 140-18228-1
Project/Site: GPC Plant McDonough (166849618)

## Client Sample ID: DGWC-19 (34-39) Lab Sample ID: 140-18228-1

**Date Collected: 02/05/20 00:00** **Matrix: Solid**
**Date Received: 02/12/20 09:50**

### Method: 6010B SEP - SEP Metals (ICP) - Step 4 (Continued)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Chromium** | **3.7** | | 0.63 | 0.088 | mg/Kg | ☼ | 02/24/20 08:00 | 02/26/20 12:53 | 1 |
| **Cobalt** | **7.9** | | 3.2 | 0.067 | mg/Kg | ☼ | 02/24/20 08:00 | 02/26/20 12:53 | 1 |
| **Iron** | **7900** | | 6.3 | 3.7 | mg/Kg | ☼ | 02/24/20 08:00 | 02/26/20 12:53 | 1 |
| **Lithium** | **4.7** | | 3.2 | 0.19 | mg/Kg | ☼ | 02/24/20 08:00 | 02/26/20 12:53 | 1 |
| **Manganese** | **210** | | 0.95 | 0.16 | mg/Kg | ☼ | 02/24/20 08:00 | 02/26/20 12:53 | 1 |
| **Molybdenum** | **0.19** | **J** | 2.5 | 0.10 | mg/Kg | ☼ | 02/24/20 08:00 | 02/26/20 12:53 | 1 |
| **Selenium** | **0.99** | **B *** | 0.63 | 0.59 | mg/Kg | ☼ | 02/24/20 08:00 | 02/26/20 12:53 | 1 |

### Method: 6010B SEP - SEP Metals (ICP) - Step 5

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Aluminum** | **750** | ***** | 190 | 30 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 13:39 | 5 |
| Arsenic | ND | * | 9.5 | 2.4 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 13:39 | 5 |
| **Barium** | **42** | **J *** | 47 | 2.3 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 13:39 | 5 |
| Beryllium | ND | * | 4.7 | 0.40 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 13:39 | 5 |
| Cadmium | ND | | 4.7 | 0.20 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 13:39 | 5 |
| **Chromium** | **21** | | 9.5 | 1.3 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 13:39 | 5 |
| Cobalt | ND | * | 47 | 0.76 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 13:39 | 5 |
| **Iron** | **56** | **J *** | 95 | 56 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 13:39 | 5 |
| **Lithium** | **3.5** | **J B *** | 47 | 2.8 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 13:39 | 5 |
| **Manganese** | **31** | ***** | 14 | 2.3 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 13:39 | 5 |
| Molybdenum | ND | | 38 | 1.6 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 13:39 | 5 |
| Selenium | ND | | 9.5 | 3.3 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 13:39 | 5 |

### Method: 6010B SEP - SEP Metals (ICP) - Step 6

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Aluminum** | **12000** | | 13 | 2.0 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 15:43 | 1 |
| **Arsenic** | **1.1** | | 0.63 | 0.19 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 15:43 | 1 |
| **Barium** | **65** | | 3.2 | 0.15 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 15:43 | 1 |
| **Beryllium** | **1.3** | | 0.32 | 0.015 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 15:43 | 1 |
| **Cadmium** | **0.026** | **J** | 0.32 | 0.014 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 15:43 | 1 |
| **Chromium** | **18** | | 0.63 | 0.088 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 15:43 | 1 |
| **Cobalt** | **12** | | 3.2 | 0.058 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 15:43 | 1 |
| **Iron** | **17000** | | 6.3 | 3.7 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 15:43 | 1 |
| **Lithium** | **28** | | 3.2 | 0.19 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 15:43 | 1 |
| **Manganese** | **51** | | 0.95 | 0.32 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 15:43 | 1 |
| Molybdenum | ND | | 2.5 | 0.13 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 15:43 | 1 |
| Selenium | ND | | 0.63 | 0.21 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 15:43 | 1 |

### Method: 6010B SEP - SEP Metals (ICP) - Step 7

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Aluminum** | **61000** | | 130 | 20 | mg/Kg | ☼ | 02/27/20 08:00 | 03/04/20 14:44 | 10 |
| **Arsenic** | **4.1** | **B** | 3.2 | 0.82 | mg/Kg | ☼ | 02/27/20 08:00 | 03/04/20 16:01 | 5 |
| **Barium** | **380** | | 32 | 1.5 | mg/Kg | ☼ | 02/27/20 08:00 | 03/04/20 14:44 | 10 |
| **Beryllium** | **2.2** | | 0.32 | 0.0095 | mg/Kg | ☼ | 02/27/20 08:00 | 03/04/20 12:56 | 1 |
| Cadmium | ND | | 1.6 | 0.069 | mg/Kg | ☼ | 02/27/20 08:00 | 03/04/20 16:01 | 5 |
| **Chromium** | **55** | | 0.63 | 0.088 | mg/Kg | ☼ | 02/27/20 08:00 | 03/04/20 12:56 | 1 |
| **Cobalt** | **16** | **J** | 32 | 1.9 | mg/Kg | ☼ | 02/27/20 08:00 | 03/04/20 14:44 | 10 |
| **Iron** | **37000** | | 32 | 26 | mg/Kg | ☼ | 02/27/20 08:00 | 03/04/20 16:01 | 5 |
| **Lithium** | **23** | | 3.2 | 0.19 | mg/Kg | ☼ | 02/27/20 08:00 | 03/04/20 12:56 | 1 |
| **Manganese** | **350** | | 0.95 | 0.066 | mg/Kg | ☼ | 02/27/20 08:00 | 03/04/20 12:56 | 1 |

## Client Sample ID: DGWC-19 (34-39) Lab Sample ID: 140-18228-1

**Date Collected: 02/05/20 00:00** **Matrix: Solid**
**Date Received: 02/12/20 09:50**

### Method: 6010B SEP - SEP Metals (ICP) - Step 7 (Continued)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Molybdenum | ND | | 2.5 | 0.10 | mg/Kg | ☼ | 02/27/20 08:00 | 03/04/20 12:56 | 1 |
| Selenium | ND | | 3.2 | 1.1 | mg/Kg | ☼ | 02/27/20 08:00 | 03/04/20 16:01 | 5 |

### Method: 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Aluminum** | **76000** | | 10 | 1.6 | mg/Kg | | | 03/12/20 09:36 | 1 |
| **Arsenic** | **6.3** | | 0.50 | 0.13 | mg/Kg | | | 03/12/20 09:36 | 1 |
| **Barium** | **530** | | 2.5 | 0.12 | mg/Kg | | | 03/12/20 09:36 | 1 |
| **Beryllium** | **4.9** | | 0.25 | 0.0075 | mg/Kg | | | 03/12/20 09:36 | 1 |
| **Cadmium** | **0.20** | **J** | 0.25 | 0.011 | mg/Kg | | | 03/12/20 09:36 | 1 |
| **Chromium** | **97** | | 0.50 | 0.070 | mg/Kg | | | 03/12/20 09:36 | 1 |
| **Cobalt** | **55** | | 2.5 | 0.023 | mg/Kg | | | 03/12/20 09:36 | 1 |
| **Iron** | **62000** | | 5.0 | 4.1 | mg/Kg | | | 03/12/20 09:36 | 1 |
| **Lithium** | **61** | | 2.5 | 0.15 | mg/Kg | | | 03/12/20 09:36 | 1 |
| **Manganese** | **1100** | | 0.75 | 0.052 | mg/Kg | | | 03/12/20 09:36 | 1 |
| **Molybdenum** | **0.19** | **J** | 2.0 | 0.082 | mg/Kg | | | 03/12/20 09:36 | 1 |
| **Selenium** | **2.2** | | 0.50 | 0.17 | mg/Kg | | | 03/12/20 09:36 | 1 |

### Method: 6010B - SEP Metals (ICP) - Total

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Aluminum** | **110000** | | 130 | 20 | mg/Kg | ☼ | 02/14/20 08:00 | 03/06/20 12:20 | 10 |
| **Arsenic** | **11** | | 3.2 | 0.82 | mg/Kg | ☼ | 02/14/20 08:00 | 03/06/20 13:52 | 5 |
| **Barium** | **640** | | 32 | 1.5 | mg/Kg | ☼ | 02/14/20 08:00 | 03/06/20 12:20 | 10 |
| **Beryllium** | **6.1** | | 0.32 | 0.0095 | mg/Kg | ☼ | 02/14/20 08:00 | 03/05/20 12:22 | 1 |
| Cadmium | ND | | 1.6 | 0.069 | mg/Kg | ☼ | 02/14/20 08:00 | 03/06/20 13:52 | 5 |
| **Chromium** | **110** | | 0.63 | 0.088 | mg/Kg | ☼ | 02/14/20 08:00 | 03/05/20 12:22 | 1 |
| **Cobalt** | **36** | | 32 | 1.9 | mg/Kg | ☼ | 02/14/20 08:00 | 03/06/20 12:20 | 10 |
| **Iron** | **79000** | | 32 | 26 | mg/Kg | ☼ | 02/14/20 08:00 | 03/06/20 13:52 | 5 |
| **Lithium** | **64** | | 3.2 | 0.19 | mg/Kg | ☼ | 02/14/20 08:00 | 03/05/20 12:22 | 1 |
| **Manganese** | **710** | | 0.95 | 0.066 | mg/Kg | ☼ | 02/14/20 08:00 | 03/05/20 12:22 | 1 |
| **Molybdenum** | **0.13** | **J** | 2.5 | 0.10 | mg/Kg | ☼ | 02/14/20 08:00 | 03/05/20 12:22 | 1 |
| Selenium | ND | | 3.2 | 1.1 | mg/Kg | ☼ | 02/14/20 08:00 | 03/06/20 13:52 | 5 |

### General Chemistry

| Analyte | Result | Qualifier | RL | RL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Percent Moisture** | **20.8** | | 0.1 | 0.1 | % | | | 02/19/20 11:57 | 1 |

# Client Sample Results

Client: Golder Associates Inc.
Project/Site: GPC Plant McDonough (166849618)

Job ID: 140-18228-1

## Client Sample ID: DGWC-20 (34-39)

**Lab Sample ID: 140-18228-2**
**Date Collected: 02/05/20 00:00**
**Matrix: Solid**
**Date Received: 02/12/20 09:50**

### Method: 6010B SEP - SEP Metals (ICP) - Step 1

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Aluminum** | **11** | **J** | 48 | 7.7 | mg/Kg | ☼ | 02/19/20 08:00 | 02/24/20 15:46 | 4 |
| **Arsenic** | **0.92** | **J** | 2.4 | 0.63 | mg/Kg | ☼ | 02/19/20 08:00 | 02/24/20 15:46 | 4 |
| Barium | ND | | 12 | 0.58 | mg/Kg | ☼ | 02/19/20 08:00 | 02/24/20 15:46 | 4 |
| Beryllium | ND | | 1.2 | 0.37 | mg/Kg | ☼ | 02/19/20 08:00 | 02/24/20 15:46 | 4 |
| Cadmium | ND | | 1.2 | 0.077 | mg/Kg | ☼ | 02/19/20 08:00 | 02/24/20 15:46 | 4 |
| Chromium | ND | | 2.4 | 0.34 | mg/Kg | ☼ | 02/19/20 08:00 | 02/24/20 15:46 | 4 |
| **Cobalt** | **0.98** | **J** | 12 | 0.22 | mg/Kg | ☼ | 02/19/20 08:00 | 02/24/20 15:46 | 4 |
| Iron | ND | | 24 | 14 | mg/Kg | ☼ | 02/19/20 08:00 | 02/24/20 15:46 | 4 |
| Lithium | ND | | 12 | 0.72 | mg/Kg | ☼ | 02/19/20 08:00 | 02/24/20 15:46 | 4 |
| **Manganese** | **31** | | 3.6 | 0.15 | mg/Kg | ☼ | 02/19/20 08:00 | 02/24/20 15:46 | 4 |
| Molybdenum | ND | | 9.6 | 0.40 | mg/Kg | ☼ | 02/19/20 08:00 | 02/24/20 15:46 | 4 |
| Selenium | ND | | 2.4 | 0.82 | mg/Kg | ☼ | 02/19/20 08:00 | 02/24/20 15:46 | 4 |

### Method: 6010B SEP - SEP Metals (ICP) - Step 2

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Aluminum** | **11** | **J *** | 36 | 5.8 | mg/Kg | ☼ | 02/20/20 08:00 | 02/25/20 12:13 | 3 |
| Arsenic | ND | * | 1.8 | 0.47 | mg/Kg | ☼ | 02/20/20 08:00 | 02/25/20 12:13 | 3 |
| **Barium** | **1.6** | **J *** | 9.0 | 0.43 | mg/Kg | ☼ | 02/20/20 08:00 | 02/25/20 12:13 | 3 |
| Beryllium | ND | * | 0.90 | 0.058 | mg/Kg | ☼ | 02/20/20 08:00 | 02/25/20 12:13 | 3 |
| Cadmium | ND | | 0.90 | 0.040 | mg/Kg | ☼ | 02/20/20 08:00 | 02/25/20 12:13 | 3 |
| Chromium | ND | | 1.8 | 0.25 | mg/Kg | ☼ | 02/20/20 08:00 | 02/25/20 12:13 | 3 |
| Cobalt | ND | | 9.0 | 0.23 | mg/Kg | ☼ | 02/20/20 08:00 | 02/25/20 12:13 | 3 |
| Iron | ND | * | 18 | 10 | mg/Kg | ☼ | 02/20/20 08:00 | 02/25/20 12:13 | 3 |
| Lithium | ND | | 9.0 | 0.54 | mg/Kg | ☼ | 02/20/20 08:00 | 02/25/20 12:13 | 3 |
| **Manganese** | **4.3** | | 2.7 | 1.0 | mg/Kg | ☼ | 02/20/20 08:00 | 02/25/20 12:13 | 3 |
| Molybdenum | ND | | 7.2 | 0.30 | mg/Kg | ☼ | 02/20/20 08:00 | 02/25/20 12:13 | 3 |
| **Selenium** | **0.62** | **J** | 1.8 | 0.61 | mg/Kg | ☼ | 02/20/20 08:00 | 02/25/20 12:13 | 3 |

### Method: 6010B SEP - SEP Metals (ICP) - Step 3

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Aluminum** | **160** | | 12 | 2.5 | mg/Kg | ☼ | 02/21/20 08:00 | 02/25/20 14:18 | 1 |
| Arsenic | ND | | 0.60 | 0.16 | mg/Kg | ☼ | 02/21/20 08:00 | 02/25/20 14:18 | 1 |
| **Barium** | **3.7** | **B** | 3.0 | 0.14 | mg/Kg | ☼ | 02/21/20 08:00 | 02/25/20 14:18 | 1 |
| **Beryllium** | **0.098** | **J** | 0.30 | 0.018 | mg/Kg | ☼ | 02/21/20 08:00 | 02/25/20 14:18 | 1 |
| **Cadmium** | **0.057** | **J B *** | 0.30 | 0.013 | mg/Kg | ☼ | 02/21/20 08:00 | 02/25/20 14:18 | 1 |
| **Chromium** | **0.12** | **J** | 0.60 | 0.084 | mg/Kg | ☼ | 02/21/20 08:00 | 02/25/20 14:18 | 1 |
| **Cobalt** | **7.2** | | 3.0 | 0.054 | mg/Kg | ☼ | 02/21/20 08:00 | 02/25/20 14:18 | 1 |
| **Iron** | **380** | | 6.0 | 3.5 | mg/Kg | ☼ | 02/21/20 08:00 | 02/25/20 14:18 | 1 |
| **Lithium** | **0.24** | **J** | 3.0 | 0.18 | mg/Kg | ☼ | 02/21/20 08:00 | 02/25/20 14:18 | 1 |
| **Manganese** | **390** | **B** | 0.90 | 0.033 | mg/Kg | ☼ | 02/21/20 08:00 | 02/25/20 14:18 | 1 |
| Molybdenum | ND | | 2.4 | 0.099 | mg/Kg | ☼ | 02/21/20 08:00 | 02/25/20 14:18 | 1 |
| **Selenium** | **0.21** | **J B** | 0.60 | 0.20 | mg/Kg | ☼ | 02/21/20 08:00 | 02/25/20 14:18 | 1 |

### Method: 6010B SEP - SEP Metals (ICP) - Step 4

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Aluminum** | **1200** | | 12 | 1.9 | mg/Kg | ☼ | 02/24/20 08:00 | 02/26/20 12:58 | 1 |
| Arsenic | ND | | 0.60 | 0.26 | mg/Kg | ☼ | 02/24/20 08:00 | 02/26/20 12:58 | 1 |
| **Barium** | **11** | | 3.0 | 0.14 | mg/Kg | ☼ | 02/24/20 08:00 | 02/26/20 12:58 | 1 |
| **Beryllium** | **0.52** | | 0.30 | 0.019 | mg/Kg | ☼ | 02/24/20 08:00 | 02/26/20 12:58 | 1 |
| **Cadmium** | **0.10** | **J** | 0.30 | 0.013 | mg/Kg | ☼ | 02/24/20 08:00 | 02/26/20 12:58 | 1 |

# Client Sample Results

Client: Golder Associates Inc. | Job ID: 140-18228-1
Project/Site: GPC Plant McDonough (166849618)

## Client Sample ID: DGWC-20 (34-39) | Lab Sample ID: 140-18228-2

**Date Collected: 02/05/20 00:00** | **Matrix: Solid**
**Date Received: 02/12/20 09:50**

### Method: 6010B SEP - SEP Metals (ICP) - Step 4 (Continued)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Chromium** | **1.2** | | 0.60 | 0.084 | mg/Kg | ☼ | 02/24/20 08:00 | 02/26/20 12:58 | 1 |
| **Cobalt** | **3.0** | | 3.0 | 0.064 | mg/Kg | ☼ | 02/24/20 08:00 | 02/26/20 12:58 | 1 |
| **Iron** | **4900** | | 6.0 | 3.5 | mg/Kg | ☼ | 02/24/20 08:00 | 02/26/20 12:58 | 1 |
| **Lithium** | **2.3** | **J** | 3.0 | 0.18 | mg/Kg | ☼ | 02/24/20 08:00 | 02/26/20 12:58 | 1 |
| **Manganese** | **230** | | 0.90 | 0.16 | mg/Kg | ☼ | 02/24/20 08:00 | 02/26/20 12:58 | 1 |
| Molybdenum | ND | | 2.4 | 0.099 | mg/Kg | ☼ | 02/24/20 08:00 | 02/26/20 12:58 | 1 |
| **Selenium** | **1.3** | **B *** | 0.60 | 0.57 | mg/Kg | ☼ | 02/24/20 08:00 | 02/26/20 12:58 | 1 |

### Method: 6010B SEP - SEP Metals (ICP) - Step 5

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Aluminum** | **570** | ***** | 180 | 28 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 13:44 | 5 |
| Arsenic | ND | * | 9.0 | 2.3 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 13:44 | 5 |
| **Barium** | **7.7** | **J *** | 45 | 2.2 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 13:44 | 5 |
| Beryllium | ND | * | 4.5 | 0.38 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 13:44 | 5 |
| Cadmium | ND | | 4.5 | 0.19 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 13:44 | 5 |
| **Chromium** | **1.5** | **J** | 9.0 | 1.3 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 13:44 | 5 |
| Cobalt | ND | * | 45 | 0.72 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 13:44 | 5 |
| Iron | ND | * | 90 | 53 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 13:44 | 5 |
| **Lithium** | **2.6** | **J B *** | 45 | 2.6 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 13:44 | 5 |
| **Manganese** | **16** | ***** | 14 | 2.2 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 13:44 | 5 |
| Molybdenum | ND | | 36 | 1.5 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 13:44 | 5 |
| Selenium | ND | | 9.0 | 3.1 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 13:44 | 5 |

### Method: 6010B SEP - SEP Metals (ICP) - Step 6

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Aluminum** | **8900** | | 12 | 1.9 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 15:48 | 1 |
| **Arsenic** | **0.85** | | 0.60 | 0.18 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 15:48 | 1 |
| **Barium** | **49** | | 3.0 | 0.14 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 15:48 | 1 |
| **Beryllium** | **0.54** | | 0.30 | 0.014 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 15:48 | 1 |
| **Cadmium** | **0.015** | **J** | 0.30 | 0.013 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 15:48 | 1 |
| **Chromium** | **9.9** | | 0.60 | 0.084 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 15:48 | 1 |
| **Cobalt** | **9.1** | | 3.0 | 0.055 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 15:48 | 1 |
| **Iron** | **12000** | | 6.0 | 3.5 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 15:48 | 1 |
| **Lithium** | **15** | | 3.0 | 0.18 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 15:48 | 1 |
| **Manganese** | **79** | | 0.90 | 0.30 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 15:48 | 1 |
| Molybdenum | ND | | 2.4 | 0.12 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 15:48 | 1 |
| Selenium | ND | | 0.60 | 0.20 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 15:48 | 1 |

### Method: 6010B SEP - SEP Metals (ICP) - Step 7

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Aluminum** | **46000** | | 120 | 19 | mg/Kg | ☼ | 02/27/20 08:00 | 03/04/20 14:49 | 10 |
| **Arsenic** | **2.0** | **J B** | 3.0 | 0.78 | mg/Kg | ☼ | 02/27/20 08:00 | 03/04/20 16:06 | 5 |
| **Barium** | **470** | | 30 | 1.4 | mg/Kg | ☼ | 02/27/20 08:00 | 03/04/20 14:49 | 10 |
| **Beryllium** | **0.83** | | 0.30 | 0.0090 | mg/Kg | ☼ | 02/27/20 08:00 | 03/04/20 13:01 | 1 |
| Cadmium | ND | | 1.5 | 0.066 | mg/Kg | ☼ | 02/27/20 08:00 | 03/04/20 16:06 | 5 |
| **Chromium** | **45** | | 0.60 | 0.084 | mg/Kg | ☼ | 02/27/20 08:00 | 03/04/20 13:01 | 1 |
| **Cobalt** | **8.6** | **J** | 30 | 1.8 | mg/Kg | ☼ | 02/27/20 08:00 | 03/04/20 14:49 | 10 |
| **Iron** | **33000** | | 30 | 25 | mg/Kg | ☼ | 02/27/20 08:00 | 03/04/20 16:06 | 5 |
| **Lithium** | **13** | | 3.0 | 0.18 | mg/Kg | ☼ | 02/27/20 08:00 | 03/04/20 13:01 | 1 |
| **Manganese** | **230** | | 0.90 | 0.063 | mg/Kg | ☼ | 02/27/20 08:00 | 03/04/20 13:01 | 1 |

## Client Sample ID: DGWC-20 (34-39)

**Lab Sample ID: 140-18228-2**

**Date Collected: 02/05/20 00:00**

**Matrix: Solid**

**Date Received: 02/12/20 09:50**

### Method: 6010B SEP - SEP Metals (ICP) - Step 7 (Continued)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Molybdenum | ND | | 2.4 | 0.099 | mg/Kg | ☼ | 02/27/20 08:00 | 03/04/20 13:01 | 1 |
| Selenium | ND | | 3.0 | 1.0 | mg/Kg | ☼ | 02/27/20 08:00 | 03/04/20 16:06 | 5 |

### Method: 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Aluminum** | **56000** | | 10 | 1.6 | mg/Kg | | | 03/12/20 09:36 | 1 |
| **Arsenic** | **3.7** | | 0.50 | 0.13 | mg/Kg | | | 03/12/20 09:36 | 1 |
| **Barium** | **540** | | 2.5 | 0.12 | mg/Kg | | | 03/12/20 09:36 | 1 |
| **Beryllium** | **2.0** | | 0.25 | 0.0075 | mg/Kg | | | 03/12/20 09:36 | 1 |
| **Cadmium** | **0.18** | **J** | 0.25 | 0.011 | mg/Kg | | | 03/12/20 09:36 | 1 |
| **Chromium** | **57** | | 0.50 | 0.070 | mg/Kg | | | 03/12/20 09:36 | 1 |
| **Cobalt** | **29** | | 2.5 | 0.023 | mg/Kg | | | 03/12/20 09:36 | 1 |
| **Iron** | **50000** | | 5.0 | 4.1 | mg/Kg | | | 03/12/20 09:36 | 1 |
| **Lithium** | **33** | | 2.5 | 0.15 | mg/Kg | | | 03/12/20 09:36 | 1 |
| **Manganese** | **980** | | 0.75 | 0.052 | mg/Kg | | | 03/12/20 09:36 | 1 |
| Molybdenum | ND | | 2.0 | 0.082 | mg/Kg | | | 03/12/20 09:36 | 1 |
| **Selenium** | **2.1** | | 0.50 | 0.17 | mg/Kg | | | 03/12/20 09:36 | 1 |

### Method: 6010B - SEP Metals (ICP) - Total

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Aluminum** | **83000** | | 120 | 19 | mg/Kg | ☼ | 02/14/20 08:00 | 03/06/20 12:25 | 10 |
| **Arsenic** | **5.8** | | 3.0 | 0.78 | mg/Kg | ☼ | 02/14/20 08:00 | 03/06/20 13:57 | 5 |
| **Barium** | **470** | | 30 | 1.4 | mg/Kg | ☼ | 02/14/20 08:00 | 03/06/20 12:25 | 10 |
| **Beryllium** | **2.1** | | 0.30 | 0.0090 | mg/Kg | ☼ | 02/14/20 08:00 | 03/05/20 12:28 | 1 |
| Cadmium | ND | | 1.5 | 0.066 | mg/Kg | ☼ | 02/14/20 08:00 | 03/06/20 13:57 | 5 |
| **Chromium** | **53** | | 0.60 | 0.084 | mg/Kg | ☼ | 02/14/20 08:00 | 03/05/20 12:28 | 1 |
| **Cobalt** | **39** | | 30 | 1.8 | mg/Kg | ☼ | 02/14/20 08:00 | 03/06/20 12:25 | 10 |
| **Iron** | **62000** | | 30 | 25 | mg/Kg | ☼ | 02/14/20 08:00 | 03/06/20 13:57 | 5 |
| **Lithium** | **35** | | 3.0 | 0.18 | mg/Kg | ☼ | 02/14/20 08:00 | 03/05/20 12:28 | 1 |
| **Manganese** | **1500** | | 4.5 | 0.31 | mg/Kg | ☼ | 02/14/20 08:00 | 03/06/20 13:57 | 5 |
| Molybdenum | ND | | 2.4 | 0.099 | mg/Kg | ☼ | 02/14/20 08:00 | 03/05/20 12:28 | 1 |
| Selenium | ND | | 3.0 | 1.0 | mg/Kg | ☼ | 02/14/20 08:00 | 03/06/20 13:57 | 5 |

### General Chemistry

| Analyte | Result | Qualifier | RL | RL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Percent Moisture** | **17.0** | | 0.1 | 0.1 | % | | | 02/19/20 11:57 | 1 |

1 2 3 4 5 6 7 8 9 10 11 12 13

## Client Sample ID: DGWA-53 (25.7-26.9)

**Lab Sample ID: 140-18228-3**

**Date Collected: 02/05/20 00:00**

**Date Received: 02/12/20 09:50**

**Matrix: Solid**

### Method: 6010B SEP - SEP Metals (ICP) - Step 1

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | ND | | 40 | 6.5 | mg/Kg | ☼ | 02/19/20 08:00 | 02/24/20 15:51 | 4 |
| Arsenic | ND | | 2.0 | 0.52 | mg/Kg | ☼ | 02/19/20 08:00 | 02/24/20 15:51 | 4 |
| Barium | ND | | 10 | 0.48 | mg/Kg | ☼ | 02/19/20 08:00 | 02/24/20 15:51 | 4 |
| Beryllium | ND | | 1.0 | 0.31 | mg/Kg | ☼ | 02/19/20 08:00 | 02/24/20 15:51 | 4 |
| Cadmium | ND | | 1.0 | 0.065 | mg/Kg | ☼ | 02/19/20 08:00 | 02/24/20 15:51 | 4 |
| Chromium | ND | | 2.0 | 0.28 | mg/Kg | ☼ | 02/19/20 08:00 | 02/24/20 15:51 | 4 |
| Cobalt | ND | | 10 | 0.18 | mg/Kg | ☼ | 02/19/20 08:00 | 02/24/20 15:51 | 4 |
| Iron | ND | | 20 | 12 | mg/Kg | ☼ | 02/19/20 08:00 | 02/24/20 15:51 | 4 |
| Lithium | ND | | 10 | 0.60 | mg/Kg | ☼ | 02/19/20 08:00 | 02/24/20 15:51 | 4 |
| **Manganese** | **0.52** | **J** | 3.0 | 0.13 | mg/Kg | ☼ | 02/19/20 08:00 | 02/24/20 15:51 | 4 |
| Molybdenum | ND | | 8.1 | 0.33 | mg/Kg | ☼ | 02/19/20 08:00 | 02/24/20 15:51 | 4 |
| Selenium | ND | | 2.0 | 0.69 | mg/Kg | ☼ | 02/19/20 08:00 | 02/24/20 15:51 | 4 |

### Method: 6010B SEP - SEP Metals (ICP) - Step 2

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Aluminum** | **8.2** | **J *** | 30 | 4.8 | mg/Kg | ☼ | 02/20/20 08:00 | 02/25/20 12:19 | 3 |
| Arsenic | ND | * | 1.5 | 0.39 | mg/Kg | ☼ | 02/20/20 08:00 | 02/25/20 12:19 | 3 |
| **Barium** | **1.0** | **J *** | 7.6 | 0.36 | mg/Kg | ☼ | 02/20/20 08:00 | 02/25/20 12:19 | 3 |
| Beryllium | ND | * | 0.76 | 0.048 | mg/Kg | ☼ | 02/20/20 08:00 | 02/25/20 12:19 | 3 |
| Cadmium | ND | | 0.76 | 0.033 | mg/Kg | ☼ | 02/20/20 08:00 | 02/25/20 12:19 | 3 |
| Chromium | ND | | 1.5 | 0.21 | mg/Kg | ☼ | 02/20/20 08:00 | 02/25/20 12:19 | 3 |
| Cobalt | ND | | 7.6 | 0.19 | mg/Kg | ☼ | 02/20/20 08:00 | 02/25/20 12:19 | 3 |
| **Iron** | **13** | **J *** | 15 | 8.8 | mg/Kg | ☼ | 02/20/20 08:00 | 02/25/20 12:19 | 3 |
| Lithium | ND | | 7.6 | 0.45 | mg/Kg | ☼ | 02/20/20 08:00 | 02/25/20 12:19 | 3 |
| **Manganese** | **0.94** | **J** | 2.3 | 0.85 | mg/Kg | ☼ | 02/20/20 08:00 | 02/25/20 12:19 | 3 |
| Molybdenum | ND | | 6.0 | 0.25 | mg/Kg | ☼ | 02/20/20 08:00 | 02/25/20 12:19 | 3 |
| **Selenium** | **0.86** | **J** | 1.5 | 0.51 | mg/Kg | ☼ | 02/20/20 08:00 | 02/25/20 12:19 | 3 |

### Method: 6010B SEP - SEP Metals (ICP) - Step 3

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Aluminum** | **35** | | 10 | 2.1 | mg/Kg | ☼ | 02/21/20 08:00 | 02/25/20 14:23 | 1 |
| Arsenic | ND | | 0.50 | 0.13 | mg/Kg | ☼ | 02/21/20 08:00 | 02/25/20 14:23 | 1 |
| **Barium** | **0.75** | **J B** | 2.5 | 0.12 | mg/Kg | ☼ | 02/21/20 08:00 | 02/25/20 14:23 | 1 |
| Beryllium | ND | | 0.25 | 0.015 | mg/Kg | ☼ | 02/21/20 08:00 | 02/25/20 14:23 | 1 |
| **Cadmium** | **0.052** | **J B *** | 0.25 | 0.011 | mg/Kg | ☼ | 02/21/20 08:00 | 02/25/20 14:23 | 1 |
| Chromium | ND | | 0.50 | 0.071 | mg/Kg | ☼ | 02/21/20 08:00 | 02/25/20 14:23 | 1 |
| Cobalt | ND | | 2.5 | 0.045 | mg/Kg | ☼ | 02/21/20 08:00 | 02/25/20 14:23 | 1 |
| **Iron** | **130** | | 5.0 | 2.9 | mg/Kg | ☼ | 02/21/20 08:00 | 02/25/20 14:23 | 1 |
| Lithium | ND | | 2.5 | 0.15 | mg/Kg | ☼ | 02/21/20 08:00 | 02/25/20 14:23 | 1 |
| **Manganese** | **1.1** | **B** | 0.76 | 0.027 | mg/Kg | ☼ | 02/21/20 08:00 | 02/25/20 14:23 | 1 |
| Molybdenum | ND | | 2.0 | 0.083 | mg/Kg | ☼ | 02/21/20 08:00 | 02/25/20 14:23 | 1 |
| **Selenium** | **0.22** | **J B** | 0.50 | 0.17 | mg/Kg | ☼ | 02/21/20 08:00 | 02/25/20 14:23 | 1 |

### Method: 6010B SEP - SEP Metals (ICP) - Step 4

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Aluminum** | **620** | | 10 | 1.6 | mg/Kg | ☼ | 02/24/20 08:00 | 02/26/20 13:03 | 1 |
| Arsenic | ND | | 0.50 | 0.22 | mg/Kg | ☼ | 02/24/20 08:00 | 02/26/20 13:03 | 1 |
| **Barium** | **2.7** | | 2.5 | 0.12 | mg/Kg | ☼ | 02/24/20 08:00 | 02/26/20 13:03 | 1 |
| **Beryllium** | **0.025** | **J** | 0.25 | 0.016 | mg/Kg | ☼ | 02/24/20 08:00 | 02/26/20 13:03 | 1 |
| **Cadmium** | **0.026** | **J** | 0.25 | 0.011 | mg/Kg | ☼ | 02/24/20 08:00 | 02/26/20 13:03 | 1 |

## Client Sample ID: DGWA-53 (25.7-26.9)

**Lab Sample ID: 140-18228-3**
**Date Collected: 02/05/20 00:00**
**Matrix: Solid**
**Date Received: 02/12/20 09:50**

### Method: 6010B SEP - SEP Metals (ICP) - Step 4 (Continued)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Chromium | 0.29 | J | 0.50 | 0.071 | mg/Kg | ☼ | 02/24/20 08:00 | 02/26/20 13:03 | 1 |
| Cobalt | 0.32 | J | 2.5 | 0.053 | mg/Kg | ☼ | 02/24/20 08:00 | 02/26/20 13:03 | 1 |
| Iron | 1700 | | 5.0 | 2.9 | mg/Kg | ☼ | 02/24/20 08:00 | 02/26/20 13:03 | 1 |
| Lithium | 1.6 | J | 2.5 | 0.15 | mg/Kg | ☼ | 02/24/20 08:00 | 02/26/20 13:03 | 1 |
| Manganese | 24 | | 0.76 | 0.13 | mg/Kg | ☼ | 02/24/20 08:00 | 02/26/20 13:03 | 1 |
| Molybdenum | 0.087 | J | 2.0 | 0.083 | mg/Kg | ☼ | 02/24/20 08:00 | 02/26/20 13:03 | 1 |
| Selenium | 0.98 | B * | 0.50 | 0.47 | mg/Kg | ☼ | 02/24/20 08:00 | 02/26/20 13:03 | 1 |

### Method: 6010B SEP - SEP Metals (ICP) - Step 5

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 110 | J * | 150 | 24 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 13:49 | 5 |
| Arsenic | ND | * | 7.6 | 1.9 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 13:49 | 5 |
| Barium | ND | * | 38 | 1.8 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 13:49 | 5 |
| Beryllium | ND | * | 3.8 | 0.32 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 13:49 | 5 |
| Cadmium | ND | | 3.8 | 0.16 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 13:49 | 5 |
| Chromium | ND | | 7.6 | 1.1 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 13:49 | 5 |
| Cobalt | ND | * | 38 | 0.60 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 13:49 | 5 |
| Iron | ND | * | 76 | 44 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 13:49 | 5 |
| Lithium | 2.3 | J B * | 38 | 2.2 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 13:49 | 5 |
| Manganese | ND | * | 11 | 1.9 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 13:49 | 5 |
| Molybdenum | 1.3 | J | 30 | 1.3 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 13:49 | 5 |
| Selenium | ND | | 7.6 | 2.6 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 13:49 | 5 |

### Method: 6010B SEP - SEP Metals (ICP) - Step 6

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 1900 | | 10 | 1.6 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 15:53 | 1 |
| Arsenic | 0.66 | | 0.50 | 0.15 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 15:53 | 1 |
| Barium | 14 | | 2.5 | 0.12 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 15:53 | 1 |
| Beryllium | 0.024 | J | 0.25 | 0.012 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 15:53 | 1 |
| Cadmium | ND | | 0.25 | 0.011 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 15:53 | 1 |
| Chromium | 0.61 | | 0.50 | 0.071 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 15:53 | 1 |
| Cobalt | 1.1 | J | 2.5 | 0.046 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 15:53 | 1 |
| Iron | 4400 | | 5.0 | 2.9 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 15:53 | 1 |
| Lithium | 5.1 | | 2.5 | 0.15 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 15:53 | 1 |
| Manganese | 85 | | 0.76 | 0.25 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 15:53 | 1 |
| Molybdenum | 0.22 | J | 2.0 | 0.10 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 15:53 | 1 |
| Selenium | ND | | 0.50 | 0.17 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 15:53 | 1 |

### Method: 6010B SEP - SEP Metals (ICP) - Step 7

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 48000 | | 100 | 16 | mg/Kg | ☼ | 02/27/20 08:00 | 03/04/20 14:54 | 10 |
| Arsenic | 0.28 | J B | 0.50 | 0.13 | mg/Kg | ☼ | 02/27/20 08:00 | 03/04/20 13:07 | 1 |
| Barium | 630 | | 25 | 1.2 | mg/Kg | ☼ | 02/27/20 08:00 | 03/04/20 14:54 | 10 |
| Beryllium | 1.0 | | 0.25 | 0.0076 | mg/Kg | ☼ | 02/27/20 08:00 | 03/04/20 13:07 | 1 |
| Cadmium | ND | | 0.25 | 0.011 | mg/Kg | ☼ | 02/27/20 08:00 | 03/04/20 13:07 | 1 |
| Chromium | ND | | 5.0 | 0.71 | mg/Kg | ☼ | 02/27/20 08:00 | 03/04/20 14:54 | 10 |
| Cobalt | 0.47 | J | 2.5 | 0.15 | mg/Kg | ☼ | 02/27/20 08:00 | 03/04/20 13:07 | 1 |
| Iron | 4200 | | 5.0 | 4.1 | mg/Kg | ☼ | 02/27/20 08:00 | 03/04/20 13:07 | 1 |
| Lithium | 4.6 | | 2.5 | 0.15 | mg/Kg | ☼ | 02/27/20 08:00 | 03/04/20 13:07 | 1 |
| Manganese | 74 | | 0.76 | 0.052 | mg/Kg | ☼ | 02/27/20 08:00 | 03/04/20 13:07 | 1 |

**Client Sample ID: DGWA-53 (25.7-26.9)** **Lab Sample ID: 140-18228-3**
**Date Collected: 02/05/20 00:00** **Matrix: Solid**
**Date Received: 02/12/20 09:50**

### Method: 6010B SEP - SEP Metals (ICP) - Step 7 (Continued)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Molybdenum | 0.094 | J | 2.0 | 0.083 | mg/Kg | ☼ | 02/27/20 08:00 | 03/04/20 13:07 | 1 |
| Selenium | ND | | 0.50 | 0.17 | mg/Kg | ☼ | 02/27/20 08:00 | 03/04/20 13:07 | 1 |

### Method: 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 51000 | | 10 | 1.6 | mg/Kg | | | 03/12/20 09:36 | 1 |
| Arsenic | 0.94 | | 0.50 | 0.13 | mg/Kg | | | 03/12/20 09:36 | 1 |
| Barium | 650 | | 2.5 | 0.12 | mg/Kg | | | 03/12/20 09:36 | 1 |
| Beryllium | 1.1 | | 0.25 | 0.0075 | mg/Kg | | | 03/12/20 09:36 | 1 |
| Cadmium | 0.078 | J | 0.25 | 0.011 | mg/Kg | | | 03/12/20 09:36 | 1 |
| Chromium | 0.89 | | 0.50 | 0.070 | mg/Kg | | | 03/12/20 09:36 | 1 |
| Cobalt | 1.8 | J | 2.5 | 0.023 | mg/Kg | | | 03/12/20 09:36 | 1 |
| Iron | 10000 | | 5.0 | 4.1 | mg/Kg | | | 03/12/20 09:36 | 1 |
| Lithium | 14 | | 2.5 | 0.15 | mg/Kg | | | 03/12/20 09:36 | 1 |
| Manganese | 190 | | 0.75 | 0.052 | mg/Kg | | | 03/12/20 09:36 | 1 |
| Molybdenum | 1.7 | J | 2.0 | 0.082 | mg/Kg | | | 03/12/20 09:36 | 1 |
| Selenium | 2.1 | | 0.50 | 0.17 | mg/Kg | | | 03/12/20 09:36 | 1 |

### Method: 6010B - SEP Metals (ICP) - Total

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 56000 | | 100 | 16 | mg/Kg | ☼ | 02/14/20 08:00 | 03/06/20 12:30 | 10 |
| Arsenic | 1.3 | | 0.50 | 0.13 | mg/Kg | ☼ | 02/14/20 08:00 | 03/05/20 12:34 | 1 |
| Barium | 520 | | 25 | 1.2 | mg/Kg | ☼ | 02/14/20 08:00 | 03/06/20 12:30 | 10 |
| Beryllium | 1.1 | | 0.25 | 0.0076 | mg/Kg | ☼ | 02/14/20 08:00 | 03/05/20 12:34 | 1 |
| Cadmium | ND | | 0.25 | 0.011 | mg/Kg | ☼ | 02/14/20 08:00 | 03/05/20 12:34 | 1 |
| Chromium | 1.7 | J B | 5.0 | 0.71 | mg/Kg | ☼ | 02/14/20 08:00 | 03/06/20 12:30 | 10 |
| Cobalt | 1.4 | J | 2.5 | 0.15 | mg/Kg | ☼ | 02/14/20 08:00 | 03/05/20 12:34 | 1 |
| Iron | 9900 | | 5.0 | 4.1 | mg/Kg | ☼ | 02/14/20 08:00 | 03/05/20 12:34 | 1 |
| Lithium | 12 | | 2.5 | 0.15 | mg/Kg | ☼ | 02/14/20 08:00 | 03/05/20 12:34 | 1 |
| Manganese | 180 | | 0.76 | 0.052 | mg/Kg | ☼ | 02/14/20 08:00 | 03/05/20 12:34 | 1 |
| Molybdenum | 0.75 | J | 2.0 | 0.083 | mg/Kg | ☼ | 02/14/20 08:00 | 03/05/20 12:34 | 1 |
| Selenium | ND | | 0.50 | 0.17 | mg/Kg | ☼ | 02/14/20 08:00 | 03/05/20 12:34 | 1 |

### General Chemistry

| Analyte | Result | Qualifier | RL | RL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Percent Moisture | 0.8 | | 0.1 | 0.1 | % | | | 02/19/20 11:57 | 1 |

# Client Sample Results

Client: Golder Associates Inc. Job ID: 140-18228-1

Project/Site: GPC Plant McDonough (166849618)

## Client Sample ID: DGWC-68A (24-29) Lab Sample ID: 140-18228-4

**Date Collected: 02/05/20 00:00** **Matrix: Solid**

**Date Received: 02/12/20 09:50**

### Method: 6010B SEP - SEP Metals (ICP) - Step 1

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | ND | | 52 | 8.4 | mg/Kg | ☼ | 02/19/20 08:00 | 02/24/20 15:56 | 4 |
| Arsenic | ND | | 2.6 | 0.68 | mg/Kg | ☼ | 02/19/20 08:00 | 02/24/20 15:56 | 4 |
| **Barium** | **2.4** | **J** | 13 | 0.63 | mg/Kg | ☼ | 02/19/20 08:00 | 02/24/20 15:56 | 4 |
| Beryllium | ND | | 1.3 | 0.40 | mg/Kg | ☼ | 02/19/20 08:00 | 02/24/20 15:56 | 4 |
| Cadmium | ND | | 1.3 | 0.084 | mg/Kg | ☼ | 02/19/20 08:00 | 02/24/20 15:56 | 4 |
| Chromium | ND | | 2.6 | 0.37 | mg/Kg | ☼ | 02/19/20 08:00 | 02/24/20 15:56 | 4 |
| Cobalt | ND | | 13 | 0.23 | mg/Kg | ☼ | 02/19/20 08:00 | 02/24/20 15:56 | 4 |
| Iron | ND | | 26 | 15 | mg/Kg | ☼ | 02/19/20 08:00 | 02/24/20 15:56 | 4 |
| Lithium | ND | | 13 | 0.78 | mg/Kg | ☼ | 02/19/20 08:00 | 02/24/20 15:56 | 4 |
| **Manganese** | **3.7** | **J** | 3.9 | 0.16 | mg/Kg | ☼ | 02/19/20 08:00 | 02/24/20 15:56 | 4 |
| **Molybdenum** | **0.84** | **J** | 10 | 0.43 | mg/Kg | ☼ | 02/19/20 08:00 | 02/24/20 15:56 | 4 |
| Selenium | ND | | 2.6 | 0.89 | mg/Kg | ☼ | 02/19/20 08:00 | 02/24/20 15:56 | 4 |

### Method: 6010B SEP - SEP Metals (ICP) - Step 2

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Aluminum** | **13** | **J *** | 39 | 6.3 | mg/Kg | ☼ | 02/20/20 08:00 | 02/25/20 12:24 | 3 |
| Arsenic | ND | * | 2.0 | 0.51 | mg/Kg | ☼ | 02/20/20 08:00 | 02/25/20 12:24 | 3 |
| **Barium** | **0.78** | **J *** | 9.8 | 0.47 | mg/Kg | ☼ | 02/20/20 08:00 | 02/25/20 12:24 | 3 |
| **Beryllium** | **0.063** | **J *** | 0.98 | 0.063 | mg/Kg | ☼ | 02/20/20 08:00 | 02/25/20 12:24 | 3 |
| Cadmium | ND | | 0.98 | 0.043 | mg/Kg | ☼ | 02/20/20 08:00 | 02/25/20 12:24 | 3 |
| Chromium | ND | | 2.0 | 0.27 | mg/Kg | ☼ | 02/20/20 08:00 | 02/25/20 12:24 | 3 |
| Cobalt | ND | | 9.8 | 0.25 | mg/Kg | ☼ | 02/20/20 08:00 | 02/25/20 12:24 | 3 |
| Iron | ND | * | 20 | 11 | mg/Kg | ☼ | 02/20/20 08:00 | 02/25/20 12:24 | 3 |
| Lithium | ND | | 9.8 | 0.59 | mg/Kg | ☼ | 02/20/20 08:00 | 02/25/20 12:24 | 3 |
| **Manganese** | **7.1** | | 2.9 | 1.1 | mg/Kg | ☼ | 02/20/20 08:00 | 02/25/20 12:24 | 3 |
| Molybdenum | ND | | 7.8 | 0.32 | mg/Kg | ☼ | 02/20/20 08:00 | 02/25/20 12:24 | 3 |
| **Selenium** | **0.98** | **J** | 2.0 | 0.67 | mg/Kg | ☼ | 02/20/20 08:00 | 02/25/20 12:24 | 3 |

### Method: 6010B SEP - SEP Metals (ICP) - Step 3

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Aluminum** | **170** | | 13 | 2.7 | mg/Kg | ☼ | 02/21/20 08:00 | 02/25/20 14:44 | 1 |
| Arsenic | ND | | 0.65 | 0.17 | mg/Kg | ☼ | 02/21/20 08:00 | 02/25/20 14:44 | 1 |
| **Barium** | **7.8** | **B** | 3.3 | 0.16 | mg/Kg | ☼ | 02/21/20 08:00 | 02/25/20 14:44 | 1 |
| **Beryllium** | **0.18** | **J** | 0.33 | 0.020 | mg/Kg | ☼ | 02/21/20 08:00 | 02/25/20 14:44 | 1 |
| **Cadmium** | **0.15** | **J B *** | 0.33 | 0.014 | mg/Kg | ☼ | 02/21/20 08:00 | 02/25/20 14:44 | 1 |
| **Chromium** | **0.18** | **J** | 0.65 | 0.091 | mg/Kg | ☼ | 02/21/20 08:00 | 02/25/20 14:44 | 1 |
| **Cobalt** | **3.0** | **J** | 3.3 | 0.059 | mg/Kg | ☼ | 02/21/20 08:00 | 02/25/20 14:44 | 1 |
| **Iron** | **290** | | 6.5 | 3.8 | mg/Kg | ☼ | 02/21/20 08:00 | 02/25/20 14:44 | 1 |
| **Lithium** | **2.8** | **J** | 3.3 | 0.20 | mg/Kg | ☼ | 02/21/20 08:00 | 02/25/20 14:44 | 1 |
| **Manganese** | **600** | **B** | 0.98 | 0.035 | mg/Kg | ☼ | 02/21/20 08:00 | 02/25/20 14:44 | 1 |
| **Molybdenum** | **4.4** | | 2.6 | 0.11 | mg/Kg | ☼ | 02/21/20 08:00 | 02/25/20 14:44 | 1 |
| Selenium | ND | | 0.65 | 0.22 | mg/Kg | ☼ | 02/21/20 08:00 | 02/25/20 14:44 | 1 |

### Method: 6010B SEP - SEP Metals (ICP) - Step 4

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Aluminum** | **1400** | | 13 | 2.1 | mg/Kg | ☼ | 02/24/20 08:00 | 02/26/20 13:08 | 1 |
| Arsenic | ND | | 0.65 | 0.29 | mg/Kg | ☼ | 02/24/20 08:00 | 02/26/20 13:08 | 1 |
| **Barium** | **48** | | 3.3 | 0.16 | mg/Kg | ☼ | 02/24/20 08:00 | 02/26/20 13:08 | 1 |
| **Beryllium** | **0.77** | | 0.33 | 0.021 | mg/Kg | ☼ | 02/24/20 08:00 | 02/26/20 13:08 | 1 |
| **Cadmium** | **0.25** | **J** | 0.33 | 0.014 | mg/Kg | ☼ | 02/24/20 08:00 | 02/26/20 13:08 | 1 |

## Client Sample ID: DGWC-68A (24-29)

**Lab Sample ID: 140-18228-4**

**Date Collected: 02/05/20 00:00**

**Matrix: Solid**

**Date Received: 02/12/20 09:50**

### Method: 6010B SEP - SEP Metals (ICP) - Step 4 (Continued)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Chromium | 2.1 | | 0.65 | 0.091 | mg/Kg | ☼ | 02/24/20 08:00 | 02/26/20 13:08 | 1 |
| Cobalt | 1.2 | J | 3.3 | 0.069 | mg/Kg | ☼ | 02/24/20 08:00 | 02/26/20 13:08 | 1 |
| Iron | 4700 | | 6.5 | 3.8 | mg/Kg | ☼ | 02/24/20 08:00 | 02/26/20 13:08 | 1 |
| Lithium | 1.6 | J | 3.3 | 0.20 | mg/Kg | ☼ | 02/24/20 08:00 | 02/26/20 13:08 | 1 |
| Manganese | 220 | | 0.98 | 0.17 | mg/Kg | ☼ | 02/24/20 08:00 | 02/26/20 13:08 | 1 |
| Molybdenum | 6.1 | | 2.6 | 0.11 | mg/Kg | ☼ | 02/24/20 08:00 | 02/26/20 13:08 | 1 |
| Selenium | 0.70 | B * | 0.65 | 0.61 | mg/Kg | ☼ | 02/24/20 08:00 | 02/26/20 13:08 | 1 |

### Method: 6010B SEP - SEP Metals (ICP) - Step 5

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 390 | * | 200 | 31 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 13:55 | 5 |
| Arsenic | ND | * | 9.8 | 2.5 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 13:55 | 5 |
| Barium | 55 | * | 49 | 2.3 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 13:55 | 5 |
| Beryllium | ND | * | 4.9 | 0.41 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 13:55 | 5 |
| Cadmium | ND | | 4.9 | 0.21 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 13:55 | 5 |
| Chromium | 1.7 | J | 9.8 | 1.4 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 13:55 | 5 |
| Cobalt | ND | * | 49 | 0.78 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 13:55 | 5 |
| Iron | ND | * | 98 | 57 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 13:55 | 5 |
| Lithium | ND | * | 49 | 2.9 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 13:55 | 5 |
| Manganese | 5.5 | J * | 15 | 2.4 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 13:55 | 5 |
| Molybdenum | 1.9 | J | 39 | 1.6 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 13:55 | 5 |
| Selenium | ND | | 9.8 | 3.4 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 13:55 | 5 |

### Method: 6010B SEP - SEP Metals (ICP) - Step 6

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 11000 | | 13 | 2.1 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 15:58 | 1 |
| Arsenic | 1.2 | | 0.65 | 0.20 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 15:58 | 1 |
| Barium | 69 | | 3.3 | 0.16 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 15:58 | 1 |
| Beryllium | 0.74 | | 0.33 | 0.016 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 15:58 | 1 |
| Cadmium | 0.016 | J | 0.33 | 0.014 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 15:58 | 1 |
| Chromium | 24 | | 0.65 | 0.091 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 15:58 | 1 |
| Cobalt | 6.0 | | 3.3 | 0.060 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 15:58 | 1 |
| Iron | 12000 | | 6.5 | 3.8 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 15:58 | 1 |
| Lithium | 9.4 | | 3.3 | 0.20 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 15:58 | 1 |
| Manganese | 82 | | 0.98 | 0.33 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 15:58 | 1 |
| Molybdenum | 0.93 | J | 2.6 | 0.13 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 15:58 | 1 |
| Selenium | ND | | 0.65 | 0.22 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 15:58 | 1 |

### Method: 6010B SEP - SEP Metals (ICP) - Step 7

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 25000 | | 130 | 21 | mg/Kg | ☼ | 02/27/20 08:00 | 03/04/20 14:59 | 10 |
| Arsenic | 0.76 | B | 0.65 | 0.17 | mg/Kg | ☼ | 02/27/20 08:00 | 03/04/20 13:13 | 1 |
| Barium | 300 | | 33 | 1.6 | mg/Kg | ☼ | 02/27/20 08:00 | 03/04/20 14:59 | 10 |
| Beryllium | 1.2 | | 0.33 | 0.0098 | mg/Kg | ☼ | 02/27/20 08:00 | 03/04/20 13:13 | 1 |
| Cadmium | ND | | 0.33 | 0.014 | mg/Kg | ☼ | 02/27/20 08:00 | 03/04/20 13:13 | 1 |
| Chromium | 45 | | 0.65 | 0.091 | mg/Kg | ☼ | 02/27/20 08:00 | 03/04/20 13:13 | 1 |
| Cobalt | 3.9 | J | 16 | 0.98 | mg/Kg | ☼ | 02/27/20 08:00 | 03/04/20 16:21 | 5 |
| Iron | 14000 | | 6.5 | 5.3 | mg/Kg | ☼ | 02/27/20 08:00 | 03/04/20 13:13 | 1 |
| Lithium | 7.5 | | 3.3 | 0.20 | mg/Kg | ☼ | 02/27/20 08:00 | 03/04/20 13:13 | 1 |
| Manganese | 140 | | 0.98 | 0.068 | mg/Kg | ☼ | 02/27/20 08:00 | 03/04/20 13:13 | 1 |

## Client Sample ID: DGWC-68A (24-29)

Lab Sample ID: 140-18228-4

Date Collected: 02/05/20 00:00

Matrix: Solid

Date Received: 02/12/20 09:50

### Method: 6010B SEP - SEP Metals (ICP) - Step 7 (Continued)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Molybdenum | 0.20 | J | 2.6 | 0.11 | mg/Kg | ☼ | 02/27/20 08:00 | 03/04/20 13:13 | 1 |
| Selenium | ND | | 0.65 | 0.22 | mg/Kg | ☼ | 02/27/20 08:00 | 03/04/20 13:13 | 1 |

### Method: 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 38000 | | 10 | 1.6 | mg/Kg | | | 03/12/20 09:36 | 1 |
| Arsenic | 2.0 | | 0.50 | 0.13 | mg/Kg | | | 03/12/20 09:36 | 1 |
| Barium | 480 | | 2.5 | 0.12 | mg/Kg | | | 03/12/20 09:36 | 1 |
| Beryllium | 3.0 | | 0.25 | 0.0075 | mg/Kg | | | 03/12/20 09:36 | 1 |
| Cadmium | 0.41 | | 0.25 | 0.011 | mg/Kg | | | 03/12/20 09:36 | 1 |
| Chromium | 73 | | 0.50 | 0.070 | mg/Kg | | | 03/12/20 09:36 | 1 |
| Cobalt | 14 | | 2.5 | 0.023 | mg/Kg | | | 03/12/20 09:36 | 1 |
| Iron | 31000 | | 5.0 | 4.1 | mg/Kg | | | 03/12/20 09:36 | 1 |
| Lithium | 21 | | 2.5 | 0.15 | mg/Kg | | | 03/12/20 09:36 | 1 |
| Manganese | 1100 | | 0.75 | 0.052 | mg/Kg | | | 03/12/20 09:36 | 1 |
| Molybdenum | 14 | | 2.0 | 0.082 | mg/Kg | | | 03/12/20 09:36 | 1 |
| Selenium | 1.7 | | 0.50 | 0.17 | mg/Kg | | | 03/12/20 09:36 | 1 |

### Method: 6010B - SEP Metals (ICP) - Total

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 90000 | | 130 | 21 | mg/Kg | ☼ | 02/14/20 08:00 | 03/06/20 12:35 | 10 |
| Arsenic | 4.1 | | 3.3 | 0.85 | mg/Kg | ☼ | 02/14/20 08:00 | 03/06/20 14:02 | 5 |
| Barium | 580 | | 33 | 1.6 | mg/Kg | ☼ | 02/14/20 08:00 | 03/06/20 12:35 | 10 |
| Beryllium | 2.9 | | 0.33 | 0.0098 | mg/Kg | ☼ | 02/14/20 08:00 | 03/05/20 12:40 | 1 |
| Cadmium | 0.46 | J | 1.6 | 0.072 | mg/Kg | ☼ | 02/14/20 08:00 | 03/06/20 14:02 | 5 |
| Chromium | 75 | | 0.65 | 0.091 | mg/Kg | ☼ | 02/14/20 08:00 | 03/05/20 12:40 | 1 |
| Cobalt | 18 | | 16 | 0.98 | mg/Kg | ☼ | 02/14/20 08:00 | 03/06/20 14:02 | 5 |
| Iron | 39000 | | 33 | 27 | mg/Kg | ☼ | 02/14/20 08:00 | 03/06/20 14:02 | 5 |
| Lithium | 29 | | 3.3 | 0.20 | mg/Kg | ☼ | 02/14/20 08:00 | 03/05/20 12:40 | 1 |
| Manganese | 1300 | | 0.98 | 0.068 | mg/Kg | ☼ | 02/14/20 08:00 | 03/05/20 12:40 | 1 |
| Molybdenum | 18 | | 2.6 | 0.11 | mg/Kg | ☼ | 02/14/20 08:00 | 03/05/20 12:40 | 1 |
| Selenium | ND | | 3.3 | 1.1 | mg/Kg | ☼ | 02/14/20 08:00 | 03/06/20 14:02 | 5 |

### General Chemistry

| Analyte | Result | Qualifier | RL | RL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Percent Moisture | 23.4 | | 0.1 | 0.1 | % | | | 02/19/20 11:57 | 1 |

## Client Sample ID: DGWC-69 (19-24) Lab Sample ID: 140-18228-5

**Date Collected: 02/05/20 00:00** **Matrix: Solid**

**Date Received: 02/12/20 09:50**

### Method: 6010B SEP - SEP Metals (ICP) - Step 1

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | ND | | 47 | 7.6 | mg/Kg | ☼ | 02/19/20 08:00 | 02/24/20 16:12 | 4 |
| **Arsenic** | **0.77** | **J** | 2.4 | 0.61 | mg/Kg | ☼ | 02/19/20 08:00 | 02/24/20 16:12 | 4 |
| **Barium** | **1.7** | **J** | 12 | 0.57 | mg/Kg | ☼ | 02/19/20 08:00 | 02/24/20 16:12 | 4 |
| Beryllium | ND | | 1.2 | 0.36 | mg/Kg | ☼ | 02/19/20 08:00 | 02/24/20 16:12 | 4 |
| Cadmium | ND | | 1.2 | 0.076 | mg/Kg | ☼ | 02/19/20 08:00 | 02/24/20 16:12 | 4 |
| Chromium | ND | | 2.4 | 0.33 | mg/Kg | ☼ | 02/19/20 08:00 | 02/24/20 16:12 | 4 |
| Cobalt | ND | | 12 | 0.21 | mg/Kg | ☼ | 02/19/20 08:00 | 02/24/20 16:12 | 4 |
| Iron | ND | | 24 | 14 | mg/Kg | ☼ | 02/19/20 08:00 | 02/24/20 16:12 | 4 |
| Lithium | ND | | 12 | 0.71 | mg/Kg | ☼ | 02/19/20 08:00 | 02/24/20 16:12 | 4 |
| **Manganese** | **30** | | 3.5 | 0.15 | mg/Kg | ☼ | 02/19/20 08:00 | 02/24/20 16:12 | 4 |
| Molybdenum | ND | | 9.4 | 0.39 | mg/Kg | ☼ | 02/19/20 08:00 | 02/24/20 16:12 | 4 |
| Selenium | ND | | 2.4 | 0.80 | mg/Kg | ☼ | 02/19/20 08:00 | 02/24/20 16:12 | 4 |

### Method: 6010B SEP - SEP Metals (ICP) - Step 2

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Aluminum** | **11** | **J *** | 35 | 5.7 | mg/Kg | ☼ | 02/20/20 08:00 | 02/25/20 12:39 | 3 |
| **Arsenic** | **1.6** | **J *** | 1.8 | 0.46 | mg/Kg | ☼ | 02/20/20 08:00 | 02/25/20 12:39 | 3 |
| **Barium** | **0.62** | **J *** | 8.9 | 0.43 | mg/Kg | ☼ | 02/20/20 08:00 | 02/25/20 12:39 | 3 |
| **Beryllium** | **0.073** | **J *** | 0.89 | 0.057 | mg/Kg | ☼ | 02/20/20 08:00 | 02/25/20 12:39 | 3 |
| Cadmium | ND | | 0.89 | 0.039 | mg/Kg | ☼ | 02/20/20 08:00 | 02/25/20 12:39 | 3 |
| Chromium | ND | | 1.8 | 0.25 | mg/Kg | ☼ | 02/20/20 08:00 | 02/25/20 12:39 | 3 |
| Cobalt | ND | | 8.9 | 0.22 | mg/Kg | ☼ | 02/20/20 08:00 | 02/25/20 12:39 | 3 |
| **Iron** | **11** | **J *** | 18 | 10 | mg/Kg | ☼ | 02/20/20 08:00 | 02/25/20 12:39 | 3 |
| Lithium | ND | | 8.9 | 0.53 | mg/Kg | ☼ | 02/20/20 08:00 | 02/25/20 12:39 | 3 |
| **Manganese** | **7.9** | | 2.7 | 0.99 | mg/Kg | ☼ | 02/20/20 08:00 | 02/25/20 12:39 | 3 |
| Molybdenum | ND | | 7.1 | 0.29 | mg/Kg | ☼ | 02/20/20 08:00 | 02/25/20 12:39 | 3 |
| **Selenium** | **0.71** | **J** | 1.8 | 0.60 | mg/Kg | ☼ | 02/20/20 08:00 | 02/25/20 12:39 | 3 |

### Method: 6010B SEP - SEP Metals (ICP) - Step 3

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Aluminum** | **57** | | 24 | 5.0 | mg/Kg | ☼ | 02/21/20 08:00 | 02/25/20 15:11 | 2 |
| **Arsenic** | **15** | | 1.2 | 0.31 | mg/Kg | ☼ | 02/21/20 08:00 | 02/25/20 15:11 | 2 |
| **Barium** | **3.7** | **J B** | 5.9 | 0.28 | mg/Kg | ☼ | 02/21/20 08:00 | 02/25/20 15:11 | 2 |
| **Beryllium** | **0.099** | **J** | 0.30 | 0.018 | mg/Kg | ☼ | 02/21/20 08:00 | 02/25/20 14:49 | 1 |
| **Cadmium** | **0.065** | **J B *** | 0.59 | 0.026 | mg/Kg | ☼ | 02/21/20 08:00 | 02/25/20 15:11 | 2 |
| **Chromium** | **0.31** | **J** | 0.59 | 0.083 | mg/Kg | ☼ | 02/21/20 08:00 | 02/25/20 14:49 | 1 |
| **Cobalt** | **0.79** | **J** | 5.9 | 0.11 | mg/Kg | ☼ | 02/21/20 08:00 | 02/25/20 15:11 | 2 |
| **Iron** | **200** | | 12 | 6.8 | mg/Kg | ☼ | 02/21/20 08:00 | 02/25/20 15:11 | 2 |
| Lithium | ND | | 5.9 | 0.35 | mg/Kg | ☼ | 02/21/20 08:00 | 02/25/20 15:11 | 2 |
| **Manganese** | **52** | **B** | 0.89 | 0.032 | mg/Kg | ☼ | 02/21/20 08:00 | 02/25/20 14:49 | 1 |
| **Molybdenum** | **0.46** | **J** | 4.7 | 0.19 | mg/Kg | ☼ | 02/21/20 08:00 | 02/25/20 15:11 | 2 |
| Selenium | ND | | 1.2 | 0.40 | mg/Kg | ☼ | 02/21/20 08:00 | 02/25/20 15:11 | 2 |

### Method: 6010B SEP - SEP Metals (ICP) - Step 4

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Aluminum** | **1000** | | 12 | 1.9 | mg/Kg | ☼ | 02/24/20 08:00 | 02/26/20 13:23 | 1 |
| **Arsenic** | **7.3** | | 0.59 | 0.26 | mg/Kg | ☼ | 02/24/20 08:00 | 02/26/20 13:23 | 1 |
| **Barium** | **31** | | 3.0 | 0.14 | mg/Kg | ☼ | 02/24/20 08:00 | 02/26/20 13:23 | 1 |
| **Beryllium** | **0.31** | | 0.30 | 0.019 | mg/Kg | ☼ | 02/24/20 08:00 | 02/26/20 13:23 | 1 |
| **Cadmium** | **0.075** | **J** | 0.30 | 0.013 | mg/Kg | ☼ | 02/24/20 08:00 | 02/26/20 13:23 | 1 |

**Client Sample ID: DGWC-69 (19-24)** **Lab Sample ID: 140-18228-5**
**Date Collected: 02/05/20 00:00** **Matrix: Solid**
**Date Received: 02/12/20 09:50**

### Method: 6010B SEP - SEP Metals (ICP) - Step 4 (Continued)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Chromium | 1.8 | | 0.59 | 0.083 | mg/Kg | ☼ | 02/24/20 08:00 | 02/26/20 13:23 | 1 |
| Cobalt | 0.56 | J | 3.0 | 0.063 | mg/Kg | ☼ | 02/24/20 08:00 | 02/26/20 13:23 | 1 |
| Iron | 1800 | | 5.9 | 3.4 | mg/Kg | ☼ | 02/24/20 08:00 | 02/26/20 13:23 | 1 |
| Lithium | 0.88 | J | 3.0 | 0.18 | mg/Kg | ☼ | 02/24/20 08:00 | 02/26/20 13:23 | 1 |
| Manganese | 39 | | 0.89 | 0.15 | mg/Kg | ☼ | 02/24/20 08:00 | 02/26/20 13:23 | 1 |
| Molybdenum | 0.59 | J | 2.4 | 0.097 | mg/Kg | ☼ | 02/24/20 08:00 | 02/26/20 13:23 | 1 |
| Selenium | 0.81 | B * | 0.59 | 0.55 | mg/Kg | ☼ | 02/24/20 08:00 | 02/26/20 13:23 | 1 |

### Method: 6010B SEP - SEP Metals (ICP) - Step 5

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 250 | * | 180 | 28 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 14:10 | 5 |
| Arsenic | ND | * | 8.9 | 2.2 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 14:10 | 5 |
| Barium | 15 | J * | 44 | 2.1 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 14:10 | 5 |
| Beryllium | ND | * | 4.4 | 0.37 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 14:10 | 5 |
| Cadmium | ND | | 4.4 | 0.19 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 14:10 | 5 |
| Chromium | 1.3 | J | 8.9 | 1.2 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 14:10 | 5 |
| Cobalt | ND | * | 44 | 0.71 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 14:10 | 5 |
| Iron | ND | * | 89 | 52 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 14:10 | 5 |
| Lithium | ND | * | 44 | 2.6 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 14:10 | 5 |
| Manganese | ND | * | 13 | 2.2 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 14:10 | 5 |
| Molybdenum | ND | | 35 | 1.5 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 14:10 | 5 |
| Selenium | ND | | 8.9 | 3.1 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 14:10 | 5 |

### Method: 6010B SEP - SEP Metals (ICP) - Step 6

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 5500 | | 12 | 1.9 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 16:15 | 1 |
| Arsenic | 2.8 | | 0.59 | 0.18 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 16:15 | 1 |
| Barium | 12 | | 3.0 | 0.14 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 16:15 | 1 |
| Beryllium | 0.76 | | 0.30 | 0.014 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 16:15 | 1 |
| Cadmium | ND | | 0.30 | 0.013 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 16:15 | 1 |
| Chromium | 3.8 | | 0.59 | 0.083 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 16:15 | 1 |
| Cobalt | 2.0 | J | 3.0 | 0.054 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 16:15 | 1 |
| Iron | 6400 | | 5.9 | 3.4 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 16:15 | 1 |
| Lithium | 5.5 | | 3.0 | 0.18 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 16:15 | 1 |
| Manganese | 130 | | 0.89 | 0.30 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 16:15 | 1 |
| Molybdenum | 0.54 | J | 2.4 | 0.12 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 16:15 | 1 |
| Selenium | ND | | 0.59 | 0.20 | mg/Kg | ☼ | 02/26/20 08:00 | 03/03/20 16:15 | 1 |

### Method: 6010B SEP - SEP Metals (ICP) - Step 7

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 57000 | | 120 | 19 | mg/Kg | ☼ | 02/27/20 08:00 | 03/04/20 15:04 | 10 |
| Arsenic | 0.77 | B | 0.59 | 0.15 | mg/Kg | ☼ | 02/27/20 08:00 | 03/04/20 13:28 | 1 |
| Barium | 420 | | 30 | 1.4 | mg/Kg | ☼ | 02/27/20 08:00 | 03/04/20 15:04 | 10 |
| Beryllium | 1.9 | | 0.30 | 0.0089 | mg/Kg | ☼ | 02/27/20 08:00 | 03/04/20 13:28 | 1 |
| Cadmium | ND | | 0.30 | 0.013 | mg/Kg | ☼ | 02/27/20 08:00 | 03/04/20 13:28 | 1 |
| Chromium | 3.3 | J | 5.9 | 0.83 | mg/Kg | ☼ | 02/27/20 08:00 | 03/04/20 15:04 | 10 |
| Cobalt | 0.33 | J | 3.0 | 0.18 | mg/Kg | ☼ | 02/27/20 08:00 | 03/04/20 13:28 | 1 |
| Iron | 5500 | | 5.9 | 4.8 | mg/Kg | ☼ | 02/27/20 08:00 | 03/04/20 13:28 | 1 |
| Lithium | 6.0 | | 3.0 | 0.18 | mg/Kg | ☼ | 02/27/20 08:00 | 03/04/20 13:28 | 1 |
| Manganese | 85 | | 0.89 | 0.061 | mg/Kg | ☼ | 02/27/20 08:00 | 03/04/20 13:28 | 1 |

# Client Sample Results

Client: Golder Associates Inc.
Job ID: 140-18228-1
Project/Site: GPC Plant McDonough (166849618)

## Client Sample ID: DGWC-69 (19-24)
## Lab Sample ID: 140-18228-5

**Date Collected: 02/05/20 00:00**
**Matrix: Solid**
**Date Received: 02/12/20 09:50**

### Method: 6010B SEP - SEP Metals (ICP) - Step 7 (Continued)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Molybdenum | 0.58 | J | 2.4 | 0.097 | mg/Kg | ☼ | 02/27/20 08:00 | 03/04/20 13:28 | 1 |
| Selenium | ND | | 0.59 | 0.20 | mg/Kg | ☼ | 02/27/20 08:00 | 03/04/20 13:28 | 1 |

### Method: 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 64000 | | 10 | 1.6 | mg/Kg | | | 03/12/20 09:36 | 1 |
| Arsenic | 28 | | 0.50 | 0.13 | mg/Kg | | | 03/12/20 09:36 | 1 |
| Barium | 490 | | 2.5 | 0.12 | mg/Kg | | | 03/12/20 09:36 | 1 |
| Beryllium | 3.2 | | 0.25 | 0.0075 | mg/Kg | | | 03/12/20 09:36 | 1 |
| Cadmium | 0.14 | J | 0.25 | 0.011 | mg/Kg | | | 03/12/20 09:36 | 1 |
| Chromium | 11 | | 0.50 | 0.070 | mg/Kg | | | 03/12/20 09:36 | 1 |
| Cobalt | 3.7 | | 2.5 | 0.023 | mg/Kg | | | 03/12/20 09:36 | 1 |
| Iron | 14000 | | 5.0 | 4.1 | mg/Kg | | | 03/12/20 09:36 | 1 |
| Lithium | 12 | | 2.5 | 0.15 | mg/Kg | | | 03/12/20 09:36 | 1 |
| Manganese | 340 | | 0.75 | 0.052 | mg/Kg | | | 03/12/20 09:36 | 1 |
| Molybdenum | 2.2 | | 2.0 | 0.082 | mg/Kg | | | 03/12/20 09:36 | 1 |
| Selenium | 1.5 | | 0.50 | 0.17 | mg/Kg | | | 03/12/20 09:36 | 1 |

### Method: 6010B - SEP Metals (ICP) - Total

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 85000 | | 120 | 19 | mg/Kg | ☼ | 02/14/20 08:00 | 03/06/20 12:51 | 10 |
| Arsenic | 28 | | 0.59 | 0.15 | mg/Kg | ☼ | 02/14/20 08:00 | 03/05/20 12:55 | 1 |
| Barium | 480 | | 30 | 1.4 | mg/Kg | ☼ | 02/14/20 08:00 | 03/06/20 12:51 | 10 |
| Beryllium | 3.2 | | 0.30 | 0.0089 | mg/Kg | ☼ | 02/14/20 08:00 | 03/05/20 12:55 | 1 |
| Cadmium | 0.059 | J | 0.30 | 0.013 | mg/Kg | ☼ | 02/14/20 08:00 | 03/05/20 12:55 | 1 |
| Chromium | 9.0 | B | 3.0 | 0.41 | mg/Kg | ☼ | 02/14/20 08:00 | 03/06/20 14:07 | 5 |
| Cobalt | 3.9 | J | 15 | 0.89 | mg/Kg | ☼ | 02/14/20 08:00 | 03/06/20 14:07 | 5 |
| Iron | 13000 | | 5.9 | 4.8 | mg/Kg | ☼ | 02/14/20 08:00 | 03/05/20 12:55 | 1 |
| Lithium | 13 | | 3.0 | 0.18 | mg/Kg | ☼ | 02/14/20 08:00 | 03/05/20 12:55 | 1 |
| Manganese | 350 | | 0.89 | 0.061 | mg/Kg | ☼ | 02/14/20 08:00 | 03/05/20 12:55 | 1 |
| Molybdenum | 2.2 | J | 2.4 | 0.097 | mg/Kg | ☼ | 02/14/20 08:00 | 03/05/20 12:55 | 1 |
| Selenium | ND | L | 0.59 | 0.20 | mg/Kg | ☼ | 02/14/20 08:00 | 03/05/20 12:55 | 1 |

### General Chemistry

| Analyte | Result | Qualifier | RL | RL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Percent Moisture | 15.3 | | 0.1 | 0.1 | % | | | 02/19/20 11:57 | 1 |

# Default Detection Limits

Client: Golder Associates Inc. Job ID: 140-18228-1
Project/Site: GPC Plant McDonough (166849618)

## Method: 6010B SEP - SEP Metals (ICP) - Step 1

### Prep: 3010A

### SEP: Exchangeable

| Analyte | RL | MDL | Units |
|---|---|---|---|
| Aluminum | 10 | 1.6 | mg/Kg |
| Arsenic | 0.50 | 0.13 | mg/Kg |
| Barium | 2.5 | 0.12 | mg/Kg |
| Beryllium | 0.25 | 0.077 | mg/Kg |
| Cadmium | 0.25 | 0.016 | mg/Kg |
| Chromium | 0.50 | 0.070 | mg/Kg |
| Cobalt | 2.5 | 0.045 | mg/Kg |
| Iron | 5.0 | 2.9 | mg/Kg |
| Lithium | 2.5 | 0.15 | mg/Kg |
| Manganese | 0.75 | 0.031 | mg/Kg |
| Molybdenum | 2.0 | 0.082 | mg/Kg |
| Selenium | 0.50 | 0.17 | mg/Kg |

## Method: 6010B SEP - SEP Metals (ICP) - Step 2

### Prep: 3010A

### SEP: Carbonate

| Analyte | RL | MDL | Units |
|---|---|---|---|
| Aluminum | 10 | 1.6 | mg/Kg |
| Arsenic | 0.50 | 0.13 | mg/Kg |
| Barium | 2.5 | 0.12 | mg/Kg |
| Beryllium | 0.25 | 0.016 | mg/Kg |
| Cadmium | 0.25 | 0.011 | mg/Kg |
| Chromium | 0.50 | 0.070 | mg/Kg |
| Cobalt | 2.5 | 0.063 | mg/Kg |
| Iron | 5.0 | 2.9 | mg/Kg |
| Lithium | 2.5 | 0.15 | mg/Kg |
| Manganese | 0.75 | 0.28 | mg/Kg |
| Molybdenum | 2.0 | 0.082 | mg/Kg |
| Selenium | 0.50 | 0.17 | mg/Kg |

## Method: 6010B SEP - SEP Metals (ICP) - Step 3

### Prep: 3010A

### SEP: Non-Crystalline

| Analyte | RL | MDL | Units |
|---|---|---|---|
| Aluminum | 10 | 2.1 | mg/Kg |
| Arsenic | 0.50 | 0.13 | mg/Kg |
| Barium | 2.5 | 0.12 | mg/Kg |
| Beryllium | 0.25 | 0.015 | mg/Kg |
| Cadmium | 0.25 | 0.011 | mg/Kg |
| Chromium | 0.50 | 0.070 | mg/Kg |
| Cobalt | 2.5 | 0.045 | mg/Kg |
| Iron | 5.0 | 2.9 | mg/Kg |
| Lithium | 2.5 | 0.15 | mg/Kg |
| Manganese | 0.75 | 0.027 | mg/Kg |
| Molybdenum | 2.0 | 0.082 | mg/Kg |
| Selenium | 0.50 | 0.17 | mg/Kg |

## Method: 6010B SEP - SEP Metals (ICP) - Step 4

### Prep: 3010A

### SEP: Metal Hydroxide

## Method: 6010B SEP - SEP Metals (ICP) - Step 4
### Prep: 3010A
### SEP: Metal Hydroxide

| Analyte | RL | MDL | Units |
|---|---|---|---|
| Aluminum | 10 | 1.6 | mg/Kg |
| Arsenic | 0.50 | 0.22 | mg/Kg |
| Barium | 2.5 | 0.12 | mg/Kg |
| Beryllium | 0.25 | 0.016 | mg/Kg |
| Cadmium | 0.25 | 0.011 | mg/Kg |
| Chromium | 0.50 | 0.070 | mg/Kg |
| Cobalt | 2.5 | 0.053 | mg/Kg |
| Iron | 5.0 | 2.9 | mg/Kg |
| Lithium | 2.5 | 0.15 | mg/Kg |
| Manganese | 0.75 | 0.13 | mg/Kg |
| Molybdenum | 2.0 | 0.082 | mg/Kg |
| Selenium | 0.50 | 0.47 | mg/Kg |

## Method: 6010B SEP - SEP Metals (ICP) - Step 5
### Prep: 3010A
### SEP: Organic-Bound

| Analyte | RL | MDL | Units |
|---|---|---|---|
| Aluminum | 30 | 4.7 | mg/Kg |
| Arsenic | 1.5 | 0.38 | mg/Kg |
| Barium | 7.5 | 0.36 | mg/Kg |
| Beryllium | 0.75 | 0.063 | mg/Kg |
| Cadmium | 0.75 | 0.032 | mg/Kg |
| Chromium | 1.5 | 0.21 | mg/Kg |
| Cobalt | 7.5 | 0.12 | mg/Kg |
| Iron | 15 | 8.8 | mg/Kg |
| Lithium | 7.5 | 0.44 | mg/Kg |
| Manganese | 2.3 | 0.37 | mg/Kg |
| Molybdenum | 6.0 | 0.25 | mg/Kg |
| Selenium | 1.5 | 0.52 | mg/Kg |

## Method: 6010B SEP - SEP Metals (ICP) - Step 6
### SEP: Acid/Sulfide

| Analyte | RL | MDL | Units |
|---|---|---|---|
| Aluminum | 10 | 1.6 | mg/Kg |
| Arsenic | 0.50 | 0.15 | mg/Kg |
| Barium | 2.5 | 0.12 | mg/Kg |
| Beryllium | 0.25 | 0.012 | mg/Kg |
| Cadmium | 0.25 | 0.011 | mg/Kg |
| Chromium | 0.50 | 0.070 | mg/Kg |
| Cobalt | 2.5 | 0.046 | mg/Kg |
| Iron | 5.0 | 2.9 | mg/Kg |
| Lithium | 2.5 | 0.15 | mg/Kg |
| Manganese | 0.75 | 0.25 | mg/Kg |
| Molybdenum | 2.0 | 0.099 | mg/Kg |
| Selenium | 0.50 | 0.17 | mg/Kg |

## Method: 6010B SEP - SEP Metals (ICP) - Step 7
### Prep: Residual

| Analyte | RL | MDL | Units |
|---|---|---|---|
| Aluminum | 10 | 1.6 | mg/Kg |

## Method: 6010B SEP - SEP Metals (ICP) - Step 7 (Continued)

### Prep: Residual

| Analyte | RL | MDL | Units |
| --- | --- | --- | --- |
| Arsenic | 0.50 | 0.13 | mg/Kg |
| Barium | 2.5 | 0.12 | mg/Kg |
| Beryllium | 0.25 | 0.0075 | mg/Kg |
| Cadmium | 0.25 | 0.011 | mg/Kg |
| Chromium | 0.50 | 0.070 | mg/Kg |
| Cobalt | 2.5 | 0.15 | mg/Kg |
| Iron | 5.0 | 4.1 | mg/Kg |
| Lithium | 2.5 | 0.15 | mg/Kg |
| Manganese | 0.75 | 0.052 | mg/Kg |
| Molybdenum | 2.0 | 0.082 | mg/Kg |
| Selenium | 0.50 | 0.17 | mg/Kg |

## Method: 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7

| Analyte | RL | MDL | Units |
| --- | --- | --- | --- |
| Aluminum | 10 | 1.6 | mg/Kg |
| Arsenic | 0.50 | 0.13 | mg/Kg |
| Barium | 2.5 | 0.12 | mg/Kg |
| Beryllium | 0.25 | 0.0075 | mg/Kg |
| Cadmium | 0.25 | 0.011 | mg/Kg |
| Chromium | 0.50 | 0.070 | mg/Kg |
| Cobalt | 2.5 | 0.023 | mg/Kg |
| Iron | 5.0 | 4.1 | mg/Kg |
| Lithium | 2.5 | 0.15 | mg/Kg |
| Manganese | 0.75 | 0.052 | mg/Kg |
| Molybdenum | 2.0 | 0.082 | mg/Kg |
| Selenium | 0.50 | 0.17 | mg/Kg |

## Method: 6010B - SEP Metals (ICP) - Total

### Prep: Total

| Analyte | RL | MDL | Units |
| --- | --- | --- | --- |
| Aluminum | 10 | 1.6 | mg/Kg |
| Arsenic | 0.50 | 0.13 | mg/Kg |
| Barium | 2.5 | 0.12 | mg/Kg |
| Beryllium | 0.25 | 0.0075 | mg/Kg |
| Cadmium | 0.25 | 0.011 | mg/Kg |
| Chromium | 0.50 | 0.070 | mg/Kg |
| Cobalt | 2.5 | 0.15 | mg/Kg |
| Iron | 5.0 | 4.1 | mg/Kg |
| Lithium | 2.5 | 0.15 | mg/Kg |
| Manganese | 0.75 | 0.052 | mg/Kg |
| Molybdenum | 2.0 | 0.082 | mg/Kg |
| Selenium | 0.50 | 0.17 | mg/Kg |

## General Chemistry

| Analyte | RL | RL | Units |
| --- | --- | --- | --- |
| Percent Moisture | 0.1 | 0.1 | % |

Client: Golder Associates Inc. Job ID: 140-18228-1
Project/Site: GPC Plant McDonough (166849618)

## Method: 6010B - SEP Metals (ICP) - Total

**Lab Sample ID: MB 140-37475/17-A** **Client Sample ID: Method Blank**
**Matrix: Solid** **Prep Type: Total/NA**
**Analysis Batch: 38107** **Prep Batch: 37475**

| Analyte | MB Result | MB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | ND | | 10 | 1.6 | mg/Kg | | 02/14/20 08:00 | 03/05/20 10:40 | 1 |
| Arsenic | ND | | 0.50 | 0.13 | mg/Kg | | 02/14/20 08:00 | 03/05/20 10:40 | 1 |
| Barium | ND | | 2.5 | 0.12 | mg/Kg | | 02/14/20 08:00 | 03/05/20 10:40 | 1 |
| Beryllium | ND | | 0.25 | 0.0075 | mg/Kg | | 02/14/20 08:00 | 03/05/20 10:40 | 1 |
| Cadmium | ND | | 0.25 | 0.011 | mg/Kg | | 02/14/20 08:00 | 03/05/20 10:40 | 1 |
| Chromium | ND | | 0.50 | 0.070 | mg/Kg | | 02/14/20 08:00 | 03/05/20 10:40 | 1 |
| Cobalt | ND | | 2.5 | 0.15 | mg/Kg | | 02/14/20 08:00 | 03/05/20 10:40 | 1 |
| Iron | ND | | 5.0 | 4.1 | mg/Kg | | 02/14/20 08:00 | 03/05/20 10:40 | 1 |
| Lithium | ND | | 2.5 | 0.15 | mg/Kg | | 02/14/20 08:00 | 03/05/20 10:40 | 1 |
| Manganese | ND | | 0.75 | 0.052 | mg/Kg | | 02/14/20 08:00 | 03/05/20 10:40 | 1 |
| Molybdenum | ND | | 2.0 | 0.082 | mg/Kg | | 02/14/20 08:00 | 03/05/20 10:40 | 1 |
| Selenium | ND | | 0.50 | 0.17 | mg/Kg | | 02/14/20 08:00 | 03/05/20 10:40 | 1 |

**Lab Sample ID: MB 140-37475/17-A** **Client Sample ID: Method Blank**
**Matrix: Solid** **Prep Type: Total/NA**
**Analysis Batch: 38133** **Prep Batch: 37475**

| Analyte | MB Result | MB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | ND | | 10 | 1.6 | mg/Kg | | 02/14/20 08:00 | 03/06/20 10:50 | 1 |
| Arsenic | ND | | 0.50 | 0.13 | mg/Kg | | 02/14/20 08:00 | 03/06/20 10:50 | 1 |
| Barium | ND | | 2.5 | 0.12 | mg/Kg | | 02/14/20 08:00 | 03/06/20 10:50 | 1 |
| Beryllium | ND | | 0.25 | 0.0075 | mg/Kg | | 02/14/20 08:00 | 03/06/20 10:50 | 1 |
| Cadmium | ND | | 0.25 | 0.011 | mg/Kg | | 02/14/20 08:00 | 03/06/20 10:50 | 1 |
| Chromium | 0.0785 | J | 0.50 | 0.070 | mg/Kg | | 02/14/20 08:00 | 03/06/20 10:50 | 1 |
| Cobalt | ND | | 2.5 | 0.15 | mg/Kg | | 02/14/20 08:00 | 03/06/20 10:50 | 1 |
| Iron | ND | | 5.0 | 4.1 | mg/Kg | | 02/14/20 08:00 | 03/06/20 10:50 | 1 |
| Lithium | ND | | 2.5 | 0.15 | mg/Kg | | 02/14/20 08:00 | 03/06/20 10:50 | 1 |
| Manganese | ND | | 0.75 | 0.052 | mg/Kg | | 02/14/20 08:00 | 03/06/20 10:50 | 1 |
| Molybdenum | ND | | 2.0 | 0.082 | mg/Kg | | 02/14/20 08:00 | 03/06/20 10:50 | 1 |
| Selenium | ND | | 0.50 | 0.17 | mg/Kg | | 02/14/20 08:00 | 03/06/20 10:50 | 1 |

**Lab Sample ID: LCS 140-37475/18-A** **Client Sample ID: Lab Control Sample**
**Matrix: Solid** **Prep Type: Total/NA**
**Analysis Batch: 38107** **Prep Batch: 37475**

| Analyte | Spike Added | LCS Result | LCS Qualifier | Unit | D | %Rec | %Rec. Limits |
|---|---|---|---|---|---|---|---|
| Aluminum | 100 | 100 | | mg/Kg | | 100 | 75 - 125 |
| Arsenic | 5.00 | 5.24 | | mg/Kg | | 105 | 75 - 125 |
| Barium | 5.00 | 5.04 | | mg/Kg | | 101 | 75 - 125 |
| Beryllium | 2.50 | 2.53 | | mg/Kg | | 101 | 75 - 125 |
| Cadmium | 2.50 | 2.61 | | mg/Kg | | 105 | 75 - 125 |
| Chromium | 10.0 | 10.5 | | mg/Kg | | 105 | 75 - 125 |
| Cobalt | 5.00 | 5.13 | | mg/Kg | | 103 | 75 - 125 |
| Iron | 50.0 | 52.2 | | mg/Kg | | 104 | 75 - 125 |
| Lithium | 5.00 | 5.17 | | mg/Kg | | 103 | 75 - 125 |
| Manganese | 5.00 | 5.29 | | mg/Kg | | 106 | 75 - 125 |
| Molybdenum | 25.0 | 26.4 | | mg/Kg | | 106 | 75 - 125 |
| Selenium | 7.50 | 7.55 | | mg/Kg | | 101 | 75 - 125 |

## Method: 6010B - SEP Metals (ICP) - Total (Continued)

**Lab Sample ID: LCS 140-37475/18-A** **Client Sample ID: Lab Control Sample**
**Matrix: Solid** **Prep Type: Total/NA**
**Analysis Batch: 38133** **Prep Batch: 37475**

| Analyte | Spike Added | LCS Result | LCS Qualifier | Unit | D | %Rec | %Rec. Limits |
|---|---|---|---|---|---|---|---|
| Aluminum | 100 | 103 | | mg/Kg | | 103 | 75 - 125 |
| Arsenic | 5.00 | 5.34 | | mg/Kg | | 107 | 75 - 125 |
| Barium | 5.00 | 5.18 | | mg/Kg | | 104 | 75 - 125 |
| Beryllium | 2.50 | 2.67 | | mg/Kg | | 107 | 75 - 125 |
| Cadmium | 2.50 | 2.69 | | mg/Kg | | 108 | 75 - 125 |
| Chromium | 10.0 | 11.0 | | mg/Kg | | 110 | 75 - 125 |
| Cobalt | 5.00 | 5.39 | | mg/Kg | | 108 | 75 - 125 |
| Iron | 50.0 | 54.0 | | mg/Kg | | 108 | 75 - 125 |
| Lithium | 5.00 | 5.31 | | mg/Kg | | 106 | 75 - 125 |
| Manganese | 5.00 | 5.43 | | mg/Kg | | 109 | 75 - 125 |
| Molybdenum | 25.0 | 27.3 | | mg/Kg | | 109 | 75 - 125 |
| Selenium | 7.50 | 7.60 | | mg/Kg | | 101 | 75 - 125 |

**Lab Sample ID: LCSD 140-37475/19-A** **Client Sample ID: Lab Control Sample Dup**
**Matrix: Solid** **Prep Type: Total/NA**
**Analysis Batch: 38107** **Prep Batch: 37475**

| Analyte | Spike Added | LCSD Result | LCSD Qualifier | Unit | D | %Rec | %Rec. Limits | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 100 | 98.4 | | mg/Kg | | 98 | 75 - 125 | 2 | 30 |
| Arsenic | 5.00 | 5.19 | | mg/Kg | | 104 | 75 - 125 | 1 | 30 |
| Barium | 5.00 | 5.02 | | mg/Kg | | 100 | 75 - 125 | 0 | 30 |
| Beryllium | 2.50 | 2.54 | | mg/Kg | | 102 | 75 - 125 | 1 | 30 |
| Cadmium | 2.50 | 2.61 | | mg/Kg | | 105 | 75 - 125 | 0 | 30 |
| Chromium | 10.0 | 10.6 | | mg/Kg | | 106 | 75 - 125 | 1 | 30 |
| Cobalt | 5.00 | 5.16 | | mg/Kg | | 103 | 75 - 125 | 0 | 30 |
| Iron | 50.0 | 51.9 | | mg/Kg | | 104 | 75 - 125 | 0 | 30 |
| Lithium | 5.00 | 5.19 | | mg/Kg | | 104 | 75 - 125 | 0 | 30 |
| Manganese | 5.00 | 5.27 | | mg/Kg | | 105 | 75 - 125 | 0 | 30 |
| Molybdenum | 25.0 | 26.5 | | mg/Kg | | 106 | 75 - 125 | 0 | 30 |
| Selenium | 7.50 | 7.41 | | mg/Kg | | 99 | 75 - 125 | 2 | 30 |

**Lab Sample ID: LCSD 140-37475/19-A** **Client Sample ID: Lab Control Sample Dup**
**Matrix: Solid** **Prep Type: Total/NA**
**Analysis Batch: 38133** **Prep Batch: 37475**

| Analyte | Spike Added | LCSD Result | LCSD Qualifier | Unit | D | %Rec | %Rec. Limits | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 100 | 101 | | mg/Kg | | 101 | 75 - 125 | 2 | 30 |
| Arsenic | 5.00 | 5.28 | | mg/Kg | | 106 | 75 - 125 | 1 | 30 |
| Barium | 5.00 | 5.06 | | mg/Kg | | 101 | 75 - 125 | 2 | 30 |
| Beryllium | 2.50 | 2.61 | | mg/Kg | | 104 | 75 - 125 | 2 | 30 |
| Cadmium | 2.50 | 2.63 | | mg/Kg | | 105 | 75 - 125 | 2 | 30 |
| Chromium | 10.0 | 10.7 | | mg/Kg | | 107 | 75 - 125 | 2 | 30 |
| Cobalt | 5.00 | 5.27 | | mg/Kg | | 105 | 75 - 125 | 2 | 30 |
| Iron | 50.0 | 52.5 | | mg/Kg | | 105 | 75 - 125 | 3 | 30 |
| Lithium | 5.00 | 5.14 | | mg/Kg | | 103 | 75 - 125 | 3 | 30 |
| Manganese | 5.00 | 5.28 | | mg/Kg | | 106 | 75 - 125 | 3 | 30 |
| Molybdenum | 25.0 | 26.8 | | mg/Kg | | 107 | 75 - 125 | 2 | 30 |
| Selenium | 7.50 | 7.40 | | mg/Kg | | 99 | 75 - 125 | 3 | 30 |

Client: Golder Associates Inc. Job ID: 140-18228-1
Project/Site: GPC Plant McDonough (166849618)

## Method: 6010B SEP - SEP Metals (ICP)

**Lab Sample ID: MB 140-37545/17-B ^4** **Client Sample ID: Method Blank**
**Matrix: Solid** **Prep Type: Step 1**
**Analysis Batch: 37820** **Prep Batch: 37615**

| Analyte | MB Result | MB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | ND | | 40 | 6.4 | mg/Kg | | 02/19/20 08:00 | 02/24/20 14:09 | 4 |
| Arsenic | ND | | 2.0 | 0.52 | mg/Kg | | 02/19/20 08:00 | 02/24/20 14:09 | 4 |
| Barium | ND | | 10 | 0.48 | mg/Kg | | 02/19/20 08:00 | 02/24/20 14:09 | 4 |
| Beryllium | ND | | 1.0 | 0.31 | mg/Kg | | 02/19/20 08:00 | 02/24/20 14:09 | 4 |
| Cadmium | ND | | 1.0 | 0.064 | mg/Kg | | 02/19/20 08:00 | 02/24/20 14:09 | 4 |
| Chromium | ND | | 2.0 | 0.28 | mg/Kg | | 02/19/20 08:00 | 02/24/20 14:09 | 4 |
| Cobalt | ND | | 10 | 0.18 | mg/Kg | | 02/19/20 08:00 | 02/24/20 14:09 | 4 |
| Iron | ND | | 20 | 12 | mg/Kg | | 02/19/20 08:00 | 02/24/20 14:09 | 4 |
| Lithium | ND | | 10 | 0.60 | mg/Kg | | 02/19/20 08:00 | 02/24/20 14:09 | 4 |
| Manganese | ND | | 3.0 | 0.12 | mg/Kg | | 02/19/20 08:00 | 02/24/20 14:09 | 4 |
| Molybdenum | ND | | 8.0 | 0.33 | mg/Kg | | 02/19/20 08:00 | 02/24/20 14:09 | 4 |
| Selenium | ND | | 2.0 | 0.68 | mg/Kg | | 02/19/20 08:00 | 02/24/20 14:09 | 4 |

**Lab Sample ID: LCS 140-37545/18-B ^5** **Client Sample ID: Lab Control Sample**
**Matrix: Solid** **Prep Type: Step 1**
**Analysis Batch: 37820** **Prep Batch: 37615**

| Analyte | Spike Added | LCS Result | LCS Qualifier | Unit | D | %Rec | %Rec. Limits |
|---|---|---|---|---|---|---|---|
| Aluminum | 100 | 106 | | mg/Kg | | 106 | 75 - 125 |
| Arsenic | 5.00 | 5.28 | | mg/Kg | | 106 | 75 - 125 |
| Barium | 5.00 | 4.91 | J | mg/Kg | | 98 | 75 - 125 |
| Beryllium | 2.50 | 2.64 | | mg/Kg | | 105 | 75 - 125 |
| Cadmium | 2.50 | 2.49 | | mg/Kg | | 99 | 75 - 125 |
| Chromium | 10.0 | 10.3 | | mg/Kg | | 103 | 75 - 125 |
| Cobalt | 5.00 | 5.01 | J | mg/Kg | | 100 | 75 - 125 |
| Iron | 50.0 | 51.1 | | mg/Kg | | 102 | 75 - 125 |
| Lithium | 5.00 | 5.10 | J | mg/Kg | | 102 | 75 - 125 |
| Manganese | 5.00 | 5.16 | | mg/Kg | | 103 | 75 - 125 |
| Molybdenum | 25.0 | 25.0 | | mg/Kg | | 100 | 75 - 125 |
| Selenium | 7.50 | 7.62 | | mg/Kg | | 102 | 75 - 125 |

**Lab Sample ID: LCSD 140-37545/19-B ^5** **Client Sample ID: Lab Control Sample Dup**
**Matrix: Solid** **Prep Type: Step 1**
**Analysis Batch: 37820** **Prep Batch: 37615**

| Analyte | Spike Added | LCSD Result | LCSD Qualifier | Unit | D | %Rec | %Rec. Limits | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 100 | 111 | | mg/Kg | | 111 | 75 - 125 | 5 | 30 |
| Arsenic | 5.00 | 5.44 | | mg/Kg | | 109 | 75 - 125 | 3 | 30 |
| Barium | 5.00 | 5.11 | J | mg/Kg | | 102 | 75 - 125 | 4 | 30 |
| Beryllium | 2.50 | 2.72 | | mg/Kg | | 109 | 75 - 125 | 3 | 30 |
| Cadmium | 2.50 | 2.55 | | mg/Kg | | 102 | 75 - 125 | 2 | 30 |
| Chromium | 10.0 | 10.5 | | mg/Kg | | 105 | 75 - 125 | 3 | 30 |
| Cobalt | 5.00 | 5.10 | J | mg/Kg | | 102 | 75 - 125 | 2 | 30 |
| Iron | 50.0 | 53.5 | | mg/Kg | | 107 | 75 - 125 | 5 | 30 |
| Lithium | 5.00 | 5.31 | J | mg/Kg | | 106 | 75 - 125 | 4 | 30 |
| Manganese | 5.00 | 5.30 | | mg/Kg | | 106 | 75 - 125 | 3 | 30 |
| Molybdenum | 25.0 | 25.5 | | mg/Kg | | 102 | 75 - 125 | 2 | 30 |
| Selenium | 7.50 | 7.29 | | mg/Kg | | 97 | 75 - 125 | 4 | 30 |

## Method: 6010B SEP - SEP Metals (ICP) (Continued)

**Lab Sample ID: MB 140-37616/17-B ^3**
**Matrix: Solid**
**Analysis Batch: 37865**

**Client Sample ID: Method Blank**
**Prep Type: Step 2**
**Prep Batch: 37673**

| Analyte | MB Result | MB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | ND | | 30 | 4.8 | mg/Kg | | 02/20/20 08:00 | 02/25/20 10:34 | 3 |
| Arsenic | ND | | 1.5 | 0.39 | mg/Kg | | 02/20/20 08:00 | 02/25/20 10:34 | 3 |
| Barium | ND | | 7.5 | 0.36 | mg/Kg | | 02/20/20 08:00 | 02/25/20 10:34 | 3 |
| Beryllium | ND | | 0.75 | 0.048 | mg/Kg | | 02/20/20 08:00 | 02/25/20 10:34 | 3 |
| Cadmium | ND | | 0.75 | 0.033 | mg/Kg | | 02/20/20 08:00 | 02/25/20 10:34 | 3 |
| Chromium | 0.237 | J | 1.5 | 0.21 | mg/Kg | | 02/20/20 08:00 | 02/25/20 10:34 | 3 |
| Cobalt | ND | | 7.5 | 0.19 | mg/Kg | | 02/20/20 08:00 | 02/25/20 10:34 | 3 |
| Iron | ND | | 15 | 8.7 | mg/Kg | | 02/20/20 08:00 | 02/25/20 10:34 | 3 |
| Lithium | ND | | 7.5 | 0.45 | mg/Kg | | 02/20/20 08:00 | 02/25/20 10:34 | 3 |
| Manganese | ND | | 2.3 | 0.84 | mg/Kg | | 02/20/20 08:00 | 02/25/20 10:34 | 3 |
| Molybdenum | ND | | 6.0 | 0.25 | mg/Kg | | 02/20/20 08:00 | 02/25/20 10:34 | 3 |
| Selenium | ND | | 1.5 | 0.51 | mg/Kg | | 02/20/20 08:00 | 02/25/20 10:34 | 3 |

**Lab Sample ID: LCS 140-37616/18-B ^5**
**Matrix: Solid**
**Analysis Batch: 37865**

**Client Sample ID: Lab Control Sample**
**Prep Type: Step 2**
**Prep Batch: 37673**

| Analyte | Spike Added | LCS Result | LCS Qualifier | Unit | D | %Rec | %Rec. Limits |
|---|---|---|---|---|---|---|---|
| Aluminum | 100 | ND | * | mg/Kg | | 2 | 75 - 125 |
| Arsenic | 5.00 | 3.50 | * | mg/Kg | | 70 | 75 - 125 |
| Barium | 5.00 | 2.20 | J * | mg/Kg | | 44 | 75 - 125 |
| Beryllium | 2.50 | 1.28 | J * | mg/Kg | | 51 | 75 - 125 |
| Cadmium | 2.50 | 2.34 | | mg/Kg | | 94 | 75 - 125 |
| Chromium | 10.0 | 7.61 | | mg/Kg | | 76 | 75 - 125 |
| Cobalt | 5.00 | 4.47 | J | mg/Kg | | 89 | 75 - 125 |
| Iron | 50.0 | ND | * | mg/Kg | | 3 | 75 - 125 |
| Lithium | 5.00 | 4.91 | J | mg/Kg | | 98 | 75 - 125 |
| Manganese | 5.00 | 4.63 | | mg/Kg | | 93 | 75 - 125 |
| Molybdenum | 25.0 | 20.8 | | mg/Kg | | 83 | 75 - 125 |
| Selenium | 7.50 | 6.90 | | mg/Kg | | 92 | 75 - 125 |

**Lab Sample ID: LCSD 140-37616/19-B ^5**
**Matrix: Solid**
**Analysis Batch: 37865**

**Client Sample ID: Lab Control Sample Dup**
**Prep Type: Step 2**
**Prep Batch: 37673**

| Analyte | Spike Added | LCSD Result | LCSD Qualifier | Unit | D | %Rec | %Rec. Limits | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 100 | ND | * | mg/Kg | | 6 | 75 - 125 | 108 | 30 |
| Arsenic | 5.00 | 3.41 | * | mg/Kg | | 68 | 75 - 125 | 3 | 30 |
| Barium | 5.00 | 2.27 | J * | mg/Kg | | 45 | 75 - 125 | 3 | 30 |
| Beryllium | 2.50 | 1.31 | * | mg/Kg | | 53 | 75 - 125 | 3 | 30 |
| Cadmium | 2.50 | 2.40 | | mg/Kg | | 96 | 75 - 125 | 2 | 30 |
| Chromium | 10.0 | 7.63 | | mg/Kg | | 76 | 75 - 125 | 0 | 30 |
| Cobalt | 5.00 | 4.54 | J | mg/Kg | | 91 | 75 - 125 | 1 | 30 |
| Iron | 50.0 | ND | * | mg/Kg | | 3 | 75 - 125 | 30 | 30 |
| Lithium | 5.00 | 5.22 | J | mg/Kg | | 104 | 75 - 125 | 6 | 30 |
| Manganese | 5.00 | 4.75 | | mg/Kg | | 95 | 75 - 125 | 2 | 30 |
| Molybdenum | 25.0 | 20.9 | | mg/Kg | | 84 | 75 - 125 | 0 | 30 |
| Selenium | 7.50 | 7.11 | | mg/Kg | | 95 | 75 - 125 | 3 | 30 |

## Method: 6010B SEP - SEP Metals (ICP) (Continued)

**Lab Sample ID: MB 140-37675/17-B** **Client Sample ID: Method Blank**
**Matrix: Solid** **Prep Type: Step 3**
**Analysis Batch: 37865** **Prep Batch: 37715**

| Analyte | MB Result | MB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | ND | | 10 | 2.1 | mg/Kg | | 02/21/20 08:00 | 02/25/20 12:45 | 1 |
| Arsenic | ND | | 0.50 | 0.13 | mg/Kg | | 02/21/20 08:00 | 02/25/20 12:45 | 1 |
| Barium | 0.155 | J | 2.5 | 0.12 | mg/Kg | | 02/21/20 08:00 | 02/25/20 12:45 | 1 |
| Beryllium | ND | | 0.25 | 0.015 | mg/Kg | | 02/21/20 08:00 | 02/25/20 12:45 | 1 |
| Cadmium | 0.0720 | J | 0.25 | 0.011 | mg/Kg | | 02/21/20 08:00 | 02/25/20 12:45 | 1 |
| Chromium | ND | | 0.50 | 0.070 | mg/Kg | | 02/21/20 08:00 | 02/25/20 12:45 | 1 |
| Cobalt | ND | | 2.5 | 0.045 | mg/Kg | | 02/21/20 08:00 | 02/25/20 12:45 | 1 |
| Iron | ND | | 5.0 | 2.9 | mg/Kg | | 02/21/20 08:00 | 02/25/20 12:45 | 1 |
| Lithium | ND | | 2.5 | 0.15 | mg/Kg | | 02/21/20 08:00 | 02/25/20 12:45 | 1 |
| Manganese | 0.0555 | J | 0.75 | 0.027 | mg/Kg | | 02/21/20 08:00 | 02/25/20 12:45 | 1 |
| Molybdenum | ND | | 2.0 | 0.082 | mg/Kg | | 02/21/20 08:00 | 02/25/20 12:45 | 1 |
| Selenium | 0.188 | J | 0.50 | 0.17 | mg/Kg | | 02/21/20 08:00 | 02/25/20 12:45 | 1 |

**Lab Sample ID: LCS 140-37675/18-B** **Client Sample ID: Lab Control Sample**
**Matrix: Solid** **Prep Type: Step 3**
**Analysis Batch: 37865** **Prep Batch: 37715**

| Analyte | Spike Added | LCS Result | LCS Qualifier | Unit | D | %Rec | %Rec. Limits |
|---|---|---|---|---|---|---|---|
| Aluminum | 100 | 99.2 | | mg/Kg | | 99 | 75 - 125 |
| Arsenic | 5.00 | 4.93 | | mg/Kg | | 99 | 75 - 125 |
| Barium | 5.00 | 5.10 | | mg/Kg | | 102 | 75 - 125 |
| Beryllium | 2.50 | 2.63 | | mg/Kg | | 105 | 75 - 125 |
| Cadmium | 2.50 | 1.58 | * | mg/Kg | | 63 | 75 - 125 |
| Chromium | 10.0 | 10.3 | | mg/Kg | | 103 | 75 - 125 |
| Cobalt | 5.00 | 4.94 | | mg/Kg | | 99 | 75 - 125 |
| Iron | 50.0 | 51.9 | | mg/Kg | | 104 | 75 - 125 |
| Lithium | 5.00 | 5.20 | | mg/Kg | | 104 | 75 - 125 |
| Manganese | 5.00 | 5.28 | | mg/Kg | | 106 | 75 - 125 |
| Molybdenum | 25.0 | 26.0 | | mg/Kg | | 104 | 75 - 125 |
| Selenium | 7.50 | 7.78 | | mg/Kg | | 104 | 75 - 125 |

**Lab Sample ID: LCSD 140-37675/19-B** **Client Sample ID: Lab Control Sample Dup**
**Matrix: Solid** **Prep Type: Step 3**
**Analysis Batch: 37865** **Prep Batch: 37715**

| Analyte | Spike Added | LCSD Result | LCSD Qualifier | Unit | D | %Rec | %Rec. Limits | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 100 | 97.4 | | mg/Kg | | 97 | 75 - 125 | 2 | 30 |
| Arsenic | 5.00 | 4.93 | | mg/Kg | | 99 | 75 - 125 | 0 | 30 |
| Barium | 5.00 | 5.05 | | mg/Kg | | 101 | 75 - 125 | 1 | 30 |
| Beryllium | 2.50 | 2.63 | | mg/Kg | | 105 | 75 - 125 | 0 | 30 |
| Cadmium | 2.50 | 1.58 | * | mg/Kg | | 63 | 75 - 125 | 0 | 30 |
| Chromium | 10.0 | 10.2 | | mg/Kg | | 102 | 75 - 125 | 1 | 30 |
| Cobalt | 5.00 | 4.91 | | mg/Kg | | 98 | 75 - 125 | 1 | 30 |
| Iron | 50.0 | 51.6 | | mg/Kg | | 103 | 75 - 125 | 1 | 30 |
| Lithium | 5.00 | 5.19 | | mg/Kg | | 104 | 75 - 125 | 0 | 30 |
| Manganese | 5.00 | 5.23 | | mg/Kg | | 105 | 75 - 125 | 1 | 30 |
| Molybdenum | 25.0 | 25.8 | | mg/Kg | | 103 | 75 - 125 | 1 | 30 |
| Selenium | 7.50 | 7.85 | | mg/Kg | | 105 | 75 - 125 | 1 | 30 |

Client: Golder Associates Inc.
Job ID: 140-18228-1
Project/Site: GPC Plant McDonough (166849618)



## Method: 6010B SEP - SEP Metals (ICP) (Continued)

**Lab Sample ID: MB 140-37716/17-B**
**Matrix: Solid**
**Analysis Batch: 37910**

**Client Sample ID: Method Blank**
**Prep Type: Step 4**
**Prep Batch: 37755**

| Analyte | MB Result | MB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | ND | | 10 | 1.6 | mg/Kg | | 02/24/20 08:00 | 02/26/20 11:22 | 1 |
| Arsenic | ND | | 0.50 | 0.22 | mg/Kg | | 02/24/20 08:00 | 02/26/20 11:22 | 1 |
| Barium | ND | | 2.5 | 0.12 | mg/Kg | | 02/24/20 08:00 | 02/26/20 11:22 | 1 |
| Beryllium | ND | | 0.25 | 0.016 | mg/Kg | | 02/24/20 08:00 | 02/26/20 11:22 | 1 |
| Cadmium | ND | | 0.25 | 0.011 | mg/Kg | | 02/24/20 08:00 | 02/26/20 11:22 | 1 |
| Chromium | ND | | 0.50 | 0.070 | mg/Kg | | 02/24/20 08:00 | 02/26/20 11:22 | 1 |
| Cobalt | ND | | 2.5 | 0.053 | mg/Kg | | 02/24/20 08:00 | 02/26/20 11:22 | 1 |
| Iron | ND | | 5.0 | 2.9 | mg/Kg | | 02/24/20 08:00 | 02/26/20 11:22 | 1 |
| Lithium | ND | | 2.5 | 0.15 | mg/Kg | | 02/24/20 08:00 | 02/26/20 11:22 | 1 |
| Manganese | ND | | 0.75 | 0.13 | mg/Kg | | 02/24/20 08:00 | 02/26/20 11:22 | 1 |
| Molybdenum | ND | | 2.0 | 0.082 | mg/Kg | | 02/24/20 08:00 | 02/26/20 11:22 | 1 |
| Selenium | 1.20 | | 0.50 | 0.47 | mg/Kg | | 02/24/20 08:00 | 02/26/20 11:22 | 1 |

**Lab Sample ID: LCS 140-37716/18-B**
**Matrix: Solid**
**Analysis Batch: 37910**

**Client Sample ID: Lab Control Sample**
**Prep Type: Step 4**
**Prep Batch: 37755**

| Analyte | Spike Added | LCS Result | LCS Qualifier | Unit | D | %Rec | %Rec. Limits |
|---|---|---|---|---|---|---|---|
| Aluminum | 100 | 94.7 | | mg/Kg | | 95 | 75 - 125 |
| Arsenic | 5.00 | 4.98 | | mg/Kg | | 100 | 75 - 125 |
| Barium | 5.00 | 4.80 | | mg/Kg | | 96 | 75 - 125 |
| Beryllium | 2.50 | 2.63 | | mg/Kg | | 105 | 75 - 125 |
| Cadmium | 2.50 | 2.52 | | mg/Kg | | 101 | 75 - 125 |
| Chromium | 10.0 | 10.0 | | mg/Kg | | 100 | 75 - 125 |
| Cobalt | 5.00 | 4.94 | | mg/Kg | | 99 | 75 - 125 |
| Iron | 50.0 | 49.5 | | mg/Kg | | 99 | 75 - 125 |
| Lithium | 5.00 | 4.97 | | mg/Kg | | 99 | 75 - 125 |
| Manganese | 5.00 | 5.03 | | mg/Kg | | 101 | 75 - 125 |
| Molybdenum | 25.0 | 25.3 | | mg/Kg | | 101 | 75 - 125 |
| Selenium | 7.50 | 0.629 | * | mg/Kg | | 8 | 75 - 125 |

**Lab Sample ID: LCSD 140-37716/19-B**
**Matrix: Solid**
**Analysis Batch: 37910**

**Client Sample ID: Lab Control Sample Dup**
**Prep Type: Step 4**
**Prep Batch: 37755**

| Analyte | Spike Added | LCSD Result | LCSD Qualifier | Unit | D | %Rec | %Rec. Limits | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 100 | 97.4 | | mg/Kg | | 97 | 75 - 125 | 3 | 30 |
| Arsenic | 5.00 | 5.09 | | mg/Kg | | 102 | 75 - 125 | 2 | 30 |
| Barium | 5.00 | 4.87 | | mg/Kg | | 97 | 75 - 125 | 1 | 30 |
| Beryllium | 2.50 | 2.65 | | mg/Kg | | 106 | 75 - 125 | 1 | 30 |
| Cadmium | 2.50 | 2.53 | | mg/Kg | | 101 | 75 - 125 | 1 | 30 |
| Chromium | 10.0 | 10.2 | | mg/Kg | | 102 | 75 - 125 | 1 | 30 |
| Cobalt | 5.00 | 5.00 | | mg/Kg | | 100 | 75 - 125 | 1 | 30 |
| Iron | 50.0 | 49.5 | | mg/Kg | | 99 | 75 - 125 | 0 | 30 |
| Lithium | 5.00 | 5.01 | | mg/Kg | | 100 | 75 - 125 | 1 | 30 |
| Manganese | 5.00 | 5.05 | | mg/Kg | | 101 | 75 - 125 | 1 | 30 |
| Molybdenum | 25.0 | 26.1 | | mg/Kg | | 104 | 75 - 125 | 3 | 30 |
| Selenium | 7.50 | 0.921 | * | mg/Kg | | 12 | 75 - 125 | 38 | 30 |

## Method: 6010B SEP - SEP Metals (ICP) (Continued)

**Lab Sample ID: MB 140-37756/17-B ^5**
**Matrix: Solid**
**Analysis Batch: 38037**

**Client Sample ID: Method Blank**
**Prep Type: Step 5**
**Prep Batch: 37858**

| Analyte | MB Result | MB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | ND | | 150 | 24 | mg/Kg | | 02/26/20 08:00 | 03/03/20 12:03 | 5 |
| Arsenic | ND | | 7.5 | 1.9 | mg/Kg | | 02/26/20 08:00 | 03/03/20 12:03 | 5 |
| Barium | ND | | 38 | 1.8 | mg/Kg | | 02/26/20 08:00 | 03/03/20 12:03 | 5 |
| Beryllium | ND | | 3.8 | 0.32 | mg/Kg | | 02/26/20 08:00 | 03/03/20 12:03 | 5 |
| Cadmium | ND | | 3.8 | 0.16 | mg/Kg | | 02/26/20 08:00 | 03/03/20 12:03 | 5 |
| Chromium | ND | | 7.5 | 1.1 | mg/Kg | | 02/26/20 08:00 | 03/03/20 12:03 | 5 |
| Cobalt | ND | | 38 | 0.60 | mg/Kg | | 02/26/20 08:00 | 03/03/20 12:03 | 5 |
| Iron | ND | | 75 | 44 | mg/Kg | | 02/26/20 08:00 | 03/03/20 12:03 | 5 |
| Lithium | 7.27 | J | 38 | 2.2 | mg/Kg | | 02/26/20 08:00 | 03/03/20 12:03 | 5 |
| Manganese | ND | | 11 | 1.9 | mg/Kg | | 02/26/20 08:00 | 03/03/20 12:03 | 5 |
| Molybdenum | ND | | 30 | 1.3 | mg/Kg | | 02/26/20 08:00 | 03/03/20 12:03 | 5 |
| Selenium | ND | | 7.5 | 2.6 | mg/Kg | | 02/26/20 08:00 | 03/03/20 12:03 | 5 |

**Lab Sample ID: LCS 140-37756/18-B ^5**
**Matrix: Solid**
**Analysis Batch: 38037**

**Client Sample ID: Lab Control Sample**
**Prep Type: Step 5**
**Prep Batch: 37858**

| Analyte | Spike Added | LCS Result | LCS Qualifier | Unit | D | %Rec | %Rec. Limits |
|---|---|---|---|---|---|---|---|
| Aluminum | 300 | ND | * | mg/Kg | | -0.7 | 75 - 125 |
| Arsenic | 15.0 | 11.0 | * | mg/Kg | | 73 | 75 - 125 |
| Barium | 15.0 | 8.18 | J * | mg/Kg | | 55 | 75 - 125 |
| Beryllium | 7.50 | 3.92 | * | mg/Kg | | 52 | 75 - 125 |
| Cadmium | 7.50 | 8.34 | | mg/Kg | | 111 | 75 - 125 |
| Chromium | 30.0 | 33.4 | | mg/Kg | | 111 | 75 - 125 |
| Cobalt | 15.0 | 1.72 | J * | mg/Kg | | 11 | 75 - 125 |
| Iron | 150 | ND | * | mg/Kg | | 2 | 75 - 125 |
| Lithium | 15.0 | 20.8 | J * | mg/Kg | | 138 | 75 - 125 |
| Manganese | 15.0 | ND | * | mg/Kg | | 6 | 75 - 125 |
| Molybdenum | 75.0 | 60.1 | | mg/Kg | | 80 | 75 - 125 |
| Selenium | 22.5 | 25.7 | | mg/Kg | | 114 | 75 - 125 |

**Lab Sample ID: LCSD 140-37756/19-B ^5**
**Matrix: Solid**
**Analysis Batch: 38037**

**Client Sample ID: Lab Control Sample Dup**
**Prep Type: Step 5**
**Prep Batch: 37858**

| Analyte | Spike Added | LCSD Result | LCSD Qualifier | Unit | D | %Rec | %Rec. Limits | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 300 | ND | * | mg/Kg | | -2 | 75 - 125 | 102 | 30 |
| Arsenic | 15.0 | 11.8 | | mg/Kg | | 79 | 75 - 125 | 7 | 30 |
| Barium | 15.0 | 8.59 | J * | mg/Kg | | 57 | 75 - 125 | 5 | 30 |
| Beryllium | 7.50 | 4.13 | * | mg/Kg | | 55 | 75 - 125 | 5 | 30 |
| Cadmium | 7.50 | 8.63 | | mg/Kg | | 115 | 75 - 125 | 3 | 30 |
| Chromium | 30.0 | 34.4 | | mg/Kg | | 115 | 75 - 125 | 3 | 30 |
| Cobalt | 15.0 | 1.91 | J * | mg/Kg | | 13 | 75 - 125 | 10 | 30 |
| Iron | 150 | ND | * | mg/Kg | | 4 | 75 - 125 | 61 | 30 |
| Lithium | 15.0 | 21.9 | J * | mg/Kg | | 146 | 75 - 125 | 5 | 30 |
| Manganese | 15.0 | ND | * | mg/Kg | | 8 | 75 - 125 | 37 | 30 |
| Molybdenum | 75.0 | 60.9 | | mg/Kg | | 81 | 75 - 125 | 1 | 30 |
| Selenium | 22.5 | 26.6 | | mg/Kg | | 118 | 75 - 125 | 3 | 30 |

## Method: 6010B SEP - SEP Metals (ICP) (Continued)

**Lab Sample ID: MB 140-37859/17-A**
**Matrix: Solid**
**Analysis Batch: 38037**

**Client Sample ID: Method Blank**
**Prep Type: Step 6**
**Prep Batch: 37859**

| Analyte | MB Result | MB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | ND | | 10 | 1.6 | mg/Kg | | 02/26/20 08:00 | 03/03/20 14:15 | 1 |
| Arsenic | ND | | 0.50 | 0.15 | mg/Kg | | 02/26/20 08:00 | 03/03/20 14:15 | 1 |
| Barium | ND | | 2.5 | 0.12 | mg/Kg | | 02/26/20 08:00 | 03/03/20 14:15 | 1 |
| Beryllium | ND | | 0.25 | 0.012 | mg/Kg | | 02/26/20 08:00 | 03/03/20 14:15 | 1 |
| Cadmium | ND | | 0.25 | 0.011 | mg/Kg | | 02/26/20 08:00 | 03/03/20 14:15 | 1 |
| Chromium | ND | | 0.50 | 0.070 | mg/Kg | | 02/26/20 08:00 | 03/03/20 14:15 | 1 |
| Cobalt | ND | | 2.5 | 0.046 | mg/Kg | | 02/26/20 08:00 | 03/03/20 14:15 | 1 |
| Iron | ND | | 5.0 | 2.9 | mg/Kg | | 02/26/20 08:00 | 03/03/20 14:15 | 1 |
| Lithium | ND | | 2.5 | 0.15 | mg/Kg | | 02/26/20 08:00 | 03/03/20 14:15 | 1 |
| Manganese | ND | | 0.75 | 0.25 | mg/Kg | | 02/26/20 08:00 | 03/03/20 14:15 | 1 |
| Molybdenum | ND | | 2.0 | 0.099 | mg/Kg | | 02/26/20 08:00 | 03/03/20 14:15 | 1 |
| Selenium | ND | | 0.50 | 0.17 | mg/Kg | | 02/26/20 08:00 | 03/03/20 14:15 | 1 |

**Lab Sample ID: LCS 140-37859/18-A**
**Matrix: Solid**
**Analysis Batch: 38037**

**Client Sample ID: Lab Control Sample**
**Prep Type: Step 6**
**Prep Batch: 37859**

| Analyte | Spike Added | LCS Result | LCS Qualifier | Unit | D | %Rec | %Rec. Limits |
|---|---|---|---|---|---|---|---|
| Aluminum | 100 | 87.8 | | mg/Kg | | 88 | 75 - 125 |
| Arsenic | 5.00 | 4.82 | | mg/Kg | | 96 | 75 - 125 |
| Barium | 5.00 | 4.73 | | mg/Kg | | 95 | 75 - 125 |
| Beryllium | 2.50 | 2.51 | | mg/Kg | | 101 | 75 - 125 |
| Cadmium | 2.50 | 2.45 | | mg/Kg | | 98 | 75 - 125 |
| Chromium | 10.0 | 9.65 | | mg/Kg | | 97 | 75 - 125 |
| Cobalt | 5.00 | 4.75 | | mg/Kg | | 95 | 75 - 125 |
| Iron | 50.0 | 44.8 | | mg/Kg | | 90 | 75 - 125 |
| Lithium | 5.00 | 4.98 | | mg/Kg | | 100 | 75 - 125 |
| Manganese | 5.00 | 4.88 | | mg/Kg | | 98 | 75 - 125 |
| Molybdenum | 25.0 | 24.4 | | mg/Kg | | 97 | 75 - 125 |
| Selenium | 7.50 | 7.18 | | mg/Kg | | 96 | 75 - 125 |

**Lab Sample ID: LCSD 140-37859/19-A**
**Matrix: Solid**
**Analysis Batch: 38037**

**Client Sample ID: Lab Control Sample Dup**
**Prep Type: Step 6**
**Prep Batch: 37859**

| Analyte | Spike Added | LCSD Result | LCSD Qualifier | Unit | D | %Rec | %Rec. Limits | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 100 | 93.6 | | mg/Kg | | 94 | 75 - 125 | 6 | 30 |
| Arsenic | 5.00 | 5.12 | | mg/Kg | | 102 | 75 - 125 | 6 | 30 |
| Barium | 5.00 | 5.01 | | mg/Kg | | 100 | 75 - 125 | 6 | 30 |
| Beryllium | 2.50 | 2.67 | | mg/Kg | | 107 | 75 - 125 | 6 | 30 |
| Cadmium | 2.50 | 2.61 | | mg/Kg | | 104 | 75 - 125 | 6 | 30 |
| Chromium | 10.0 | 10.2 | | mg/Kg | | 102 | 75 - 125 | 6 | 30 |
| Cobalt | 5.00 | 5.06 | | mg/Kg | | 101 | 75 - 125 | 6 | 30 |
| Iron | 50.0 | 47.7 | | mg/Kg | | 95 | 75 - 125 | 6 | 30 |
| Lithium | 5.00 | 5.25 | | mg/Kg | | 105 | 75 - 125 | 5 | 30 |
| Manganese | 5.00 | 5.11 | | mg/Kg | | 102 | 75 - 125 | 5 | 30 |
| Molybdenum | 25.0 | 25.5 | | mg/Kg | | 102 | 75 - 125 | 5 | 30 |
| Selenium | 7.50 | 7.62 | | mg/Kg | | 102 | 75 - 125 | 6 | 30 |

## Method: 6010B SEP - SEP Metals (ICP) (Continued)

**Lab Sample ID: MB 140-37903/17-A** **Client Sample ID: Method Blank**
**Matrix: Solid** **Prep Type: Step 7**
**Analysis Batch: 38070** **Prep Batch: 37903**

| Analyte | MB Result | MB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | ND | | 10 | 1.6 | mg/Kg | | 02/27/20 08:00 | 03/04/20 11:18 | 1 |
| Arsenic | 0.138 | J | 0.50 | 0.13 | mg/Kg | | 02/27/20 08:00 | 03/04/20 11:18 | 1 |
| Barium | ND | | 2.5 | 0.12 | mg/Kg | | 02/27/20 08:00 | 03/04/20 11:18 | 1 |
| Beryllium | ND | | 0.25 | 0.0075 | mg/Kg | | 02/27/20 08:00 | 03/04/20 11:18 | 1 |
| Cadmium | ND | | 0.25 | 0.011 | mg/Kg | | 02/27/20 08:00 | 03/04/20 11:18 | 1 |
| Chromium | ND | | 0.50 | 0.070 | mg/Kg | | 02/27/20 08:00 | 03/04/20 11:18 | 1 |
| Cobalt | ND | | 2.5 | 0.15 | mg/Kg | | 02/27/20 08:00 | 03/04/20 11:18 | 1 |
| Iron | ND | | 5.0 | 4.1 | mg/Kg | | 02/27/20 08:00 | 03/04/20 11:18 | 1 |
| Lithium | ND | | 2.5 | 0.15 | mg/Kg | | 02/27/20 08:00 | 03/04/20 11:18 | 1 |
| Manganese | ND | | 0.75 | 0.052 | mg/Kg | | 02/27/20 08:00 | 03/04/20 11:18 | 1 |
| Molybdenum | ND | | 2.0 | 0.082 | mg/Kg | | 02/27/20 08:00 | 03/04/20 11:18 | 1 |
| Selenium | ND | | 0.50 | 0.17 | mg/Kg | | 02/27/20 08:00 | 03/04/20 11:18 | 1 |

**Lab Sample ID: LCS 140-37903/18-A** **Client Sample ID: Lab Control Sample**
**Matrix: Solid** **Prep Type: Step 7**
**Analysis Batch: 38070** **Prep Batch: 37903**

| Analyte | Spike Added | LCS Result | LCS Qualifier | Unit | D | %Rec | %Rec. Limits |
|---|---|---|---|---|---|---|---|
| Aluminum | 100 | 98.3 | | mg/Kg | | 98 | 75 - 125 |
| Arsenic | 5.00 | 5.27 | | mg/Kg | | 105 | 75 - 125 |
| Barium | 5.00 | 4.99 | | mg/Kg | | 100 | 75 - 125 |
| Beryllium | 2.50 | 2.57 | | mg/Kg | | 103 | 75 - 125 |
| Cadmium | 2.50 | 2.62 | | mg/Kg | | 105 | 75 - 125 |
| Chromium | 10.0 | 10.6 | | mg/Kg | | 106 | 75 - 125 |
| Cobalt | 5.00 | 5.21 | | mg/Kg | | 104 | 75 - 125 |
| Iron | 50.0 | 52.0 | | mg/Kg | | 104 | 75 - 125 |
| Lithium | 5.00 | 5.13 | | mg/Kg | | 103 | 75 - 125 |
| Manganese | 5.00 | 5.22 | | mg/Kg | | 104 | 75 - 125 |
| Molybdenum | 25.0 | 26.4 | | mg/Kg | | 106 | 75 - 125 |
| Selenium | 7.50 | 7.56 | | mg/Kg | | 101 | 75 - 125 |

**Lab Sample ID: LCSD 140-37903/19-A** **Client Sample ID: Lab Control Sample Dup**
**Matrix: Solid** **Prep Type: Step 7**
**Analysis Batch: 38070** **Prep Batch: 37903**

| Analyte | Spike Added | LCSD Result | LCSD Qualifier | Unit | D | %Rec | %Rec. Limits | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 100 | 96.8 | | mg/Kg | | 97 | 75 - 125 | 2 | 30 |
| Arsenic | 5.00 | 5.14 | | mg/Kg | | 103 | 75 - 125 | 3 | 30 |
| Barium | 5.00 | 4.90 | | mg/Kg | | 98 | 75 - 125 | 2 | 30 |
| Beryllium | 2.50 | 2.52 | | mg/Kg | | 101 | 75 - 125 | 2 | 30 |
| Cadmium | 2.50 | 2.57 | | mg/Kg | | 103 | 75 - 125 | 2 | 30 |
| Chromium | 10.0 | 10.3 | | mg/Kg | | 103 | 75 - 125 | 2 | 30 |
| Cobalt | 5.00 | 5.09 | | mg/Kg | | 102 | 75 - 125 | 2 | 30 |
| Iron | 50.0 | 50.9 | | mg/Kg | | 102 | 75 - 125 | 2 | 30 |
| Lithium | 5.00 | 4.99 | | mg/Kg | | 100 | 75 - 125 | 3 | 30 |
| Manganese | 5.00 | 5.10 | | mg/Kg | | 102 | 75 - 125 | 2 | 30 |
| Molybdenum | 25.0 | 26.0 | | mg/Kg | | 104 | 75 - 125 | 2 | 30 |
| Selenium | 7.50 | 7.38 | | mg/Kg | | 98 | 75 - 125 | 3 | 30 |

## Metals

### Prep Batch: 37475

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 140-18228-1 | DGWC-19 (34-39) | Total/NA | Solid | Total | |
| 140-18228-2 | DGWC-20 (34-39) | Total/NA | Solid | Total | |
| 140-18228-3 | DGWA-53 (25.7-26.9) | Total/NA | Solid | Total | |
| 140-18228-4 | DGWC-68A (24-29) | Total/NA | Solid | Total | |
| 140-18228-5 | DGWC-69 (19-24) | Total/NA | Solid | Total | |
| MB 140-37475/17-A | Method Blank | Total/NA | Solid | Total | |
| LCS 140-37475/18-A | Lab Control Sample | Total/NA | Solid | Total | |
| LCSD 140-37475/19-A | Lab Control Sample Dup | Total/NA | Solid | Total | |

### SEP Batch: 37545

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 140-18228-1 | DGWC-19 (34-39) | Step 1 | Solid | Exchangeable | |
| 140-18228-2 | DGWC-20 (34-39) | Step 1 | Solid | Exchangeable | |
| 140-18228-3 | DGWA-53 (25.7-26.9) | Step 1 | Solid | Exchangeable | |
| 140-18228-4 | DGWC-68A (24-29) | Step 1 | Solid | Exchangeable | |
| 140-18228-5 | DGWC-69 (19-24) | Step 1 | Solid | Exchangeable | |
| MB 140-37545/17-B ^4 | Method Blank | Step 1 | Solid | Exchangeable | |
| LCS 140-37545/18-B ^5 | Lab Control Sample | Step 1 | Solid | Exchangeable | |
| LCSD 140-37545/19-B ^5 | Lab Control Sample Dup | Step 1 | Solid | Exchangeable | |

### Prep Batch: 37615

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 140-18228-1 | DGWC-19 (34-39) | Step 1 | Solid | 3010A | 37545 |
| 140-18228-2 | DGWC-20 (34-39) | Step 1 | Solid | 3010A | 37545 |
| 140-18228-3 | DGWA-53 (25.7-26.9) | Step 1 | Solid | 3010A | 37545 |
| 140-18228-4 | DGWC-68A (24-29) | Step 1 | Solid | 3010A | 37545 |
| 140-18228-5 | DGWC-69 (19-24) | Step 1 | Solid | 3010A | 37545 |
| MB 140-37545/17-B ^4 | Method Blank | Step 1 | Solid | 3010A | 37545 |
| LCS 140-37545/18-B ^5 | Lab Control Sample | Step 1 | Solid | 3010A | 37545 |
| LCSD 140-37545/19-B ^5 | Lab Control Sample Dup | Step 1 | Solid | 3010A | 37545 |

### SEP Batch: 37616

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 140-18228-1 | DGWC-19 (34-39) | Step 2 | Solid | Carbonate | |
| 140-18228-2 | DGWC-20 (34-39) | Step 2 | Solid | Carbonate | |
| 140-18228-3 | DGWA-53 (25.7-26.9) | Step 2 | Solid | Carbonate | |
| 140-18228-4 | DGWC-68A (24-29) | Step 2 | Solid | Carbonate | |
| 140-18228-5 | DGWC-69 (19-24) | Step 2 | Solid | Carbonate | |
| MB 140-37616/17-B ^3 | Method Blank | Step 2 | Solid | Carbonate | |
| LCS 140-37616/18-B ^5 | Lab Control Sample | Step 2 | Solid | Carbonate | |
| LCSD 140-37616/19-B ^5 | Lab Control Sample Dup | Step 2 | Solid | Carbonate | |

### Prep Batch: 37673

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 140-18228-1 | DGWC-19 (34-39) | Step 2 | Solid | 3010A | 37616 |
| 140-18228-2 | DGWC-20 (34-39) | Step 2 | Solid | 3010A | 37616 |
| 140-18228-3 | DGWA-53 (25.7-26.9) | Step 2 | Solid | 3010A | 37616 |
| 140-18228-4 | DGWC-68A (24-29) | Step 2 | Solid | 3010A | 37616 |
| 140-18228-5 | DGWC-69 (19-24) | Step 2 | Solid | 3010A | 37616 |
| MB 140-37616/17-B ^3 | Method Blank | Step 2 | Solid | 3010A | 37616 |
| LCS 140-37616/18-B ^5 | Lab Control Sample | Step 2 | Solid | 3010A | 37616 |

## Metals (Continued)

### Prep Batch: 37673 (Continued)

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| LCSD 140-37616/19-B ^5 | Lab Control Sample Dup | Step 2 | Solid | 3010A | 37616 |

### SEP Batch: 37675

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 140-18228-1 | DGWC-19 (34-39) | Step 3 | Solid | Non-Crystalline | |
| 140-18228-2 | DGWC-20 (34-39) | Step 3 | Solid | Non-Crystalline | |
| 140-18228-3 | DGWA-53 (25.7-26.9) | Step 3 | Solid | Non-Crystalline | |
| 140-18228-4 | DGWC-68A (24-29) | Step 3 | Solid | Non-Crystalline | |
| 140-18228-5 | DGWC-69 (19-24) | Step 3 | Solid | Non-Crystalline | |
| MB 140-37675/17-B | Method Blank | Step 3 | Solid | Non-Crystalline | |
| LCS 140-37675/18-B | Lab Control Sample | Step 3 | Solid | Non-Crystalline | |
| LCSD 140-37675/19-B | Lab Control Sample Dup | Step 3 | Solid | Non-Crystalline | |

### Prep Batch: 37715

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 140-18228-1 | DGWC-19 (34-39) | Step 3 | Solid | 3010A | 37675 |
| 140-18228-2 | DGWC-20 (34-39) | Step 3 | Solid | 3010A | 37675 |
| 140-18228-3 | DGWA-53 (25.7-26.9) | Step 3 | Solid | 3010A | 37675 |
| 140-18228-4 | DGWC-68A (24-29) | Step 3 | Solid | 3010A | 37675 |
| 140-18228-5 | DGWC-69 (19-24) | Step 3 | Solid | 3010A | 37675 |
| MB 140-37675/17-B | Method Blank | Step 3 | Solid | 3010A | 37675 |
| LCS 140-37675/18-B | Lab Control Sample | Step 3 | Solid | 3010A | 37675 |
| LCSD 140-37675/19-B | Lab Control Sample Dup | Step 3 | Solid | 3010A | 37675 |

### SEP Batch: 37716

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 140-18228-1 | DGWC-19 (34-39) | Step 4 | Solid | Metal Hydroxide | |
| 140-18228-2 | DGWC-20 (34-39) | Step 4 | Solid | Metal Hydroxide | |
| 140-18228-3 | DGWA-53 (25.7-26.9) | Step 4 | Solid | Metal Hydroxide | |
| 140-18228-4 | DGWC-68A (24-29) | Step 4 | Solid | Metal Hydroxide | |
| 140-18228-5 | DGWC-69 (19-24) | Step 4 | Solid | Metal Hydroxide | |
| MB 140-37716/17-B | Method Blank | Step 4 | Solid | Metal Hydroxide | |
| LCS 140-37716/18-B | Lab Control Sample | Step 4 | Solid | Metal Hydroxide | |
| LCSD 140-37716/19-B | Lab Control Sample Dup | Step 4 | Solid | Metal Hydroxide | |

### Prep Batch: 37755

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 140-18228-1 | DGWC-19 (34-39) | Step 4 | Solid | 3010A | 37716 |
| 140-18228-2 | DGWC-20 (34-39) | Step 4 | Solid | 3010A | 37716 |
| 140-18228-3 | DGWA-53 (25.7-26.9) | Step 4 | Solid | 3010A | 37716 |
| 140-18228-4 | DGWC-68A (24-29) | Step 4 | Solid | 3010A | 37716 |
| 140-18228-5 | DGWC-69 (19-24) | Step 4 | Solid | 3010A | 37716 |
| MB 140-37716/17-B | Method Blank | Step 4 | Solid | 3010A | 37716 |
| LCS 140-37716/18-B | Lab Control Sample | Step 4 | Solid | 3010A | 37716 |
| LCSD 140-37716/19-B | Lab Control Sample Dup | Step 4 | Solid | 3010A | 37716 |

### SEP Batch: 37756

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 140-18228-1 | DGWC-19 (34-39) | Step 5 | Solid | Organic-Bound | |
| 140-18228-2 | DGWC-20 (34-39) | Step 5 | Solid | Organic-Bound | |
| 140-18228-3 | DGWA-53 (25.7-26.9) | Step 5 | Solid | Organic-Bound | |

## Metals (Continued)

### SEP Batch: 37756 (Continued)

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 140-18228-4 | DGWC-68A (24-29) | Step 5 | Solid | Organic-Bound | |
| 140-18228-5 | DGWC-69 (19-24) | Step 5 | Solid | Organic-Bound | |
| MB 140-37756/17-B ^5 | Method Blank | Step 5 | Solid | Organic-Bound | |
| LCS 140-37756/18-B ^5 | Lab Control Sample | Step 5 | Solid | Organic-Bound | |
| LCSD 140-37756/19-B ^5 | Lab Control Sample Dup | Step 5 | Solid | Organic-Bound | |

### Analysis Batch: 37820

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 140-18228-1 | DGWC-19 (34-39) | Step 1 | Solid | 6010B SEP | 37615 |
| 140-18228-2 | DGWC-20 (34-39) | Step 1 | Solid | 6010B SEP | 37615 |
| 140-18228-3 | DGWA-53 (25.7-26.9) | Step 1 | Solid | 6010B SEP | 37615 |
| 140-18228-4 | DGWC-68A (24-29) | Step 1 | Solid | 6010B SEP | 37615 |
| 140-18228-5 | DGWC-69 (19-24) | Step 1 | Solid | 6010B SEP | 37615 |
| MB 140-37545/17-B ^4 | Method Blank | Step 1 | Solid | 6010B SEP | 37615 |
| LCS 140-37545/18-B ^5 | Lab Control Sample | Step 1 | Solid | 6010B SEP | 37615 |
| LCSD 140-37545/19-B ^5 | Lab Control Sample Dup | Step 1 | Solid | 6010B SEP | 37615 |

### Prep Batch: 37858

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 140-18228-1 | DGWC-19 (34-39) | Step 5 | Solid | 3010A | 37756 |
| 140-18228-2 | DGWC-20 (34-39) | Step 5 | Solid | 3010A | 37756 |
| 140-18228-3 | DGWA-53 (25.7-26.9) | Step 5 | Solid | 3010A | 37756 |
| 140-18228-4 | DGWC-68A (24-29) | Step 5 | Solid | 3010A | 37756 |
| 140-18228-5 | DGWC-69 (19-24) | Step 5 | Solid | 3010A | 37756 |
| MB 140-37756/17-B ^5 | Method Blank | Step 5 | Solid | 3010A | 37756 |
| LCS 140-37756/18-B ^5 | Lab Control Sample | Step 5 | Solid | 3010A | 37756 |
| LCSD 140-37756/19-B ^5 | Lab Control Sample Dup | Step 5 | Solid | 3010A | 37756 |

### SEP Batch: 37859

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 140-18228-1 | DGWC-19 (34-39) | Step 6 | Solid | Acid/Sulfide | |
| 140-18228-2 | DGWC-20 (34-39) | Step 6 | Solid | Acid/Sulfide | |
| 140-18228-3 | DGWA-53 (25.7-26.9) | Step 6 | Solid | Acid/Sulfide | |
| 140-18228-4 | DGWC-68A (24-29) | Step 6 | Solid | Acid/Sulfide | |
| 140-18228-5 | DGWC-69 (19-24) | Step 6 | Solid | Acid/Sulfide | |
| MB 140-37859/17-A | Method Blank | Step 6 | Solid | Acid/Sulfide | |
| LCS 140-37859/18-A | Lab Control Sample | Step 6 | Solid | Acid/Sulfide | |
| LCSD 140-37859/19-A | Lab Control Sample Dup | Step 6 | Solid | Acid/Sulfide | |

### Analysis Batch: 37865

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 140-18228-1 | DGWC-19 (34-39) | Step 2 | Solid | 6010B SEP | 37673 |
| 140-18228-1 | DGWC-19 (34-39) | Step 3 | Solid | 6010B SEP | 37715 |
| 140-18228-2 | DGWC-20 (34-39) | Step 2 | Solid | 6010B SEP | 37673 |
| 140-18228-2 | DGWC-20 (34-39) | Step 3 | Solid | 6010B SEP | 37715 |
| 140-18228-3 | DGWA-53 (25.7-26.9) | Step 2 | Solid | 6010B SEP | 37673 |
| 140-18228-3 | DGWA-53 (25.7-26.9) | Step 3 | Solid | 6010B SEP | 37715 |
| 140-18228-4 | DGWC-68A (24-29) | Step 2 | Solid | 6010B SEP | 37673 |
| 140-18228-4 | DGWC-68A (24-29) | Step 3 | Solid | 6010B SEP | 37715 |
| 140-18228-5 | DGWC-69 (19-24) | Step 2 | Solid | 6010B SEP | 37673 |
| 140-18228-5 | DGWC-69 (19-24) | Step 3 | Solid | 6010B SEP | 37715 |

## Metals (Continued)

### Analysis Batch: 37865 (Continued)

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 140-18228-5 | DGWC-69 (19-24) | Step 3 | Solid | 6010B SEP | 37715 |
| MB 140-37616/17-B ^3 | Method Blank | Step 2 | Solid | 6010B SEP | 37673 |
| MB 140-37675/17-B | Method Blank | Step 3 | Solid | 6010B SEP | 37715 |
| LCS 140-37616/18-B ^5 | Lab Control Sample | Step 2 | Solid | 6010B SEP | 37673 |
| LCS 140-37675/18-B | Lab Control Sample | Step 3 | Solid | 6010B SEP | 37715 |
| LCSD 140-37616/19-B ^5 | Lab Control Sample Dup | Step 2 | Solid | 6010B SEP | 37673 |
| LCSD 140-37675/19-B | Lab Control Sample Dup | Step 3 | Solid | 6010B SEP | 37715 |

### Prep Batch: 37903

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 140-18228-1 | DGWC-19 (34-39) | Step 7 | Solid | Residual | |
| 140-18228-2 | DGWC-20 (34-39) | Step 7 | Solid | Residual | |
| 140-18228-3 | DGWA-53 (25.7-26.9) | Step 7 | Solid | Residual | |
| 140-18228-4 | DGWC-68A (24-29) | Step 7 | Solid | Residual | |
| 140-18228-5 | DGWC-69 (19-24) | Step 7 | Solid | Residual | |
| MB 140-37903/17-A | Method Blank | Step 7 | Solid | Residual | |
| LCS 140-37903/18-A | Lab Control Sample | Step 7 | Solid | Residual | |
| LCSD 140-37903/19-A | Lab Control Sample Dup | Step 7 | Solid | Residual | |

### Analysis Batch: 37910

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 140-18228-1 | DGWC-19 (34-39) | Step 4 | Solid | 6010B SEP | 37755 |
| 140-18228-2 | DGWC-20 (34-39) | Step 4 | Solid | 6010B SEP | 37755 |
| 140-18228-3 | DGWA-53 (25.7-26.9) | Step 4 | Solid | 6010B SEP | 37755 |
| 140-18228-4 | DGWC-68A (24-29) | Step 4 | Solid | 6010B SEP | 37755 |
| 140-18228-5 | DGWC-69 (19-24) | Step 4 | Solid | 6010B SEP | 37755 |
| MB 140-37716/17-B | Method Blank | Step 4 | Solid | 6010B SEP | 37755 |
| LCS 140-37716/18-B | Lab Control Sample | Step 4 | Solid | 6010B SEP | 37755 |
| LCSD 140-37716/19-B | Lab Control Sample Dup | Step 4 | Solid | 6010B SEP | 37755 |

### Analysis Batch: 38037

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 140-18228-1 | DGWC-19 (34-39) | Step 5 | Solid | 6010B SEP | 37858 |
| 140-18228-1 | DGWC-19 (34-39) | Step 6 | Solid | 6010B SEP | 37859 |
| 140-18228-2 | DGWC-20 (34-39) | Step 5 | Solid | 6010B SEP | 37858 |
| 140-18228-2 | DGWC-20 (34-39) | Step 6 | Solid | 6010B SEP | 37859 |
| 140-18228-3 | DGWA-53 (25.7-26.9) | Step 5 | Solid | 6010B SEP | 37858 |
| 140-18228-3 | DGWA-53 (25.7-26.9) | Step 6 | Solid | 6010B SEP | 37859 |
| 140-18228-4 | DGWC-68A (24-29) | Step 5 | Solid | 6010B SEP | 37858 |
| 140-18228-4 | DGWC-68A (24-29) | Step 6 | Solid | 6010B SEP | 37859 |
| 140-18228-5 | DGWC-69 (19-24) | Step 5 | Solid | 6010B SEP | 37858 |
| 140-18228-5 | DGWC-69 (19-24) | Step 6 | Solid | 6010B SEP | 37859 |
| MB 140-37756/17-B ^5 | Method Blank | Step 5 | Solid | 6010B SEP | 37858 |
| MB 140-37859/17-A | Method Blank | Step 6 | Solid | 6010B SEP | 37859 |
| LCS 140-37756/18-B ^5 | Lab Control Sample | Step 5 | Solid | 6010B SEP | 37858 |
| LCS 140-37859/18-A | Lab Control Sample | Step 6 | Solid | 6010B SEP | 37859 |
| LCSD 140-37756/19-B ^5 | Lab Control Sample Dup | Step 5 | Solid | 6010B SEP | 37858 |
| LCSD 140-37859/19-A | Lab Control Sample Dup | Step 6 | Solid | 6010B SEP | 37859 |

# QC Association Summary

Client: Golder Associates Inc.
Project/Site: GPC Plant McDonough (166849618)

Job ID: 140-18228-1

## Metals

### Analysis Batch: 38070

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 140-18228-1 | DGWC-19 (34-39) | Step 7 | Solid | 6010B SEP | 37903 |
| 140-18228-1 | DGWC-19 (34-39) | Step 7 | Solid | 6010B SEP | 37903 |
| 140-18228-1 | DGWC-19 (34-39) | Step 7 | Solid | 6010B SEP | 37903 |
| 140-18228-2 | DGWC-20 (34-39) | Step 7 | Solid | 6010B SEP | 37903 |
| 140-18228-2 | DGWC-20 (34-39) | Step 7 | Solid | 6010B SEP | 37903 |
| 140-18228-2 | DGWC-20 (34-39) | Step 7 | Solid | 6010B SEP | 37903 |
| 140-18228-3 | DGWA-53 (25.7-26.9) | Step 7 | Solid | 6010B SEP | 37903 |
| 140-18228-3 | DGWA-53 (25.7-26.9) | Step 7 | Solid | 6010B SEP | 37903 |
| 140-18228-4 | DGWC-68A (24-29) | Step 7 | Solid | 6010B SEP | 37903 |
| 140-18228-4 | DGWC-68A (24-29) | Step 7 | Solid | 6010B SEP | 37903 |
| 140-18228-4 | DGWC-68A (24-29) | Step 7 | Solid | 6010B SEP | 37903 |
| 140-18228-5 | DGWC-69 (19-24) | Step 7 | Solid | 6010B SEP | 37903 |
| 140-18228-5 | DGWC-69 (19-24) | Step 7 | Solid | 6010B SEP | 37903 |
| MB 140-37903/17-A | Method Blank | Step 7 | Solid | 6010B SEP | 37903 |
| LCS 140-37903/18-A | Lab Control Sample | Step 7 | Solid | 6010B SEP | 37903 |
| LCSD 140-37903/19-A | Lab Control Sample Dup | Step 7 | Solid | 6010B SEP | 37903 |

### Analysis Batch: 38107

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 140-18228-1 | DGWC-19 (34-39) | Total/NA | Solid | 6010B | 37475 |
| 140-18228-2 | DGWC-20 (34-39) | Total/NA | Solid | 6010B | 37475 |
| 140-18228-3 | DGWA-53 (25.7-26.9) | Total/NA | Solid | 6010B | 37475 |
| 140-18228-4 | DGWC-68A (24-29) | Total/NA | Solid | 6010B | 37475 |
| 140-18228-5 | DGWC-69 (19-24) | Total/NA | Solid | 6010B | 37475 |
| MB 140-37475/17-A | Method Blank | Total/NA | Solid | 6010B | 37475 |
| LCS 140-37475/18-A | Lab Control Sample | Total/NA | Solid | 6010B | 37475 |
| LCSD 140-37475/19-A | Lab Control Sample Dup | Total/NA | Solid | 6010B | 37475 |

### Analysis Batch: 38133

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 140-18228-1 | DGWC-19 (34-39) | Total/NA | Solid | 6010B | 37475 |
| 140-18228-1 | DGWC-19 (34-39) | Total/NA | Solid | 6010B | 37475 |
| 140-18228-2 | DGWC-20 (34-39) | Total/NA | Solid | 6010B | 37475 |
| 140-18228-2 | DGWC-20 (34-39) | Total/NA | Solid | 6010B | 37475 |
| 140-18228-3 | DGWA-53 (25.7-26.9) | Total/NA | Solid | 6010B | 37475 |
| 140-18228-4 | DGWC-68A (24-29) | Total/NA | Solid | 6010B | 37475 |
| 140-18228-4 | DGWC-68A (24-29) | Total/NA | Solid | 6010B | 37475 |
| 140-18228-5 | DGWC-69 (19-24) | Total/NA | Solid | 6010B | 37475 |
| 140-18228-5 | DGWC-69 (19-24) | Total/NA | Solid | 6010B | 37475 |
| MB 140-37475/17-A | Method Blank | Total/NA | Solid | 6010B | 37475 |
| LCS 140-37475/18-A | Lab Control Sample | Total/NA | Solid | 6010B | 37475 |
| LCSD 140-37475/19-A | Lab Control Sample Dup | Total/NA | Solid | 6010B | 37475 |

### Analysis Batch: 38266

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 140-18228-1 | DGWC-19 (34-39) | Sum of Steps 1-7 | Solid | 6010B SEP | |
| 140-18228-2 | DGWC-20 (34-39) | Sum of Steps 1-7 | Solid | 6010B SEP | |
| 140-18228-3 | DGWA-53 (25.7-26.9) | Sum of Steps 1-7 | Solid | 6010B SEP | |
| 140-18228-4 | DGWC-68A (24-29) | Sum of Steps 1-7 | Solid | 6010B SEP | |
| 140-18228-5 | DGWC-69 (19-24) | Sum of Steps 1-7 | Solid | 6010B SEP | |

## General Chemistry

### Analysis Batch: 37662

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 140-18228-1 | DGWC-19 (34-39) | Total/NA | Solid | Moisture | |
| 140-18228-2 | DGWC-20 (34-39) | Total/NA | Solid | Moisture | |
| 140-18228-3 | DGWA-53 (25.7-26.9) | Total/NA | Solid | Moisture | |
| 140-18228-4 | DGWC-68A (24-29) | Total/NA | Solid | Moisture | |
| 140-18228-5 | DGWC-69 (19-24) | Total/NA | Solid | Moisture | |

# Lab Chronicle

Client: Golder Associates Inc. Job ID: 140-18228-1
Project/Site: GPC Plant McDonough (166849618)

**Client Sample ID: DGWC-19 (34-39)** **Lab Sample ID: 140-18228-1**
**Date Collected: 02/05/20 00:00** **Matrix: Solid**
**Date Received: 02/12/20 09:50**

| 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 | 37475 | 02/14/20 08:00 | KNC | TAL KNX |
| Total/NA | Analysis | 6010B | | 1 | | | 38107 | 03/05/20 12:22 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Total/NA | Prep | Total | | | 1.000 g | 50 mL | 37475 | 02/14/20 08:00 | KNC | TAL KNX |
| Total/NA | Analysis | 6010B | | 10 | | | 38133 | 03/06/20 12:20 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Total/NA | Prep | Total | | | 1.000 g | 50 mL | 37475 | 02/14/20 08:00 | KNC | TAL KNX |
| Total/NA | Analysis | 6010B | | 5 | | | 38133 | 03/06/20 13:52 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 1 | SEP | Exchangeable | | | 5.000 g | 25 mL | 37545 | 02/18/20 08:00 | KNC | TAL KNX |
| Step 1 | Prep | 3010A | | | 5 mL | 50 mL | 37615 | 02/19/20 08:00 | KNC | TAL KNX |
| Step 1 | Analysis | 6010B SEP | | 4 | | | 37820 | 02/24/20 15:41 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 2 | SEP | Carbonate | | | 5.000 g | 25 mL | 37616 | 02/19/20 08:00 | KNC | TAL KNX |
| Step 2 | Prep | 3010A | | | 5 mL | 50 mL | 37673 | 02/20/20 08:00 | KNC | TAL KNX |
| Step 2 | Analysis | 6010B SEP | | 3 | | | 37865 | 02/25/20 12:08 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 3 | SEP | Non-Crystalline | | | 5.000 g | 25 mL | 37675 | 02/20/20 08:00 | KNC | TAL KNX |
| Step 3 | Prep | 3010A | | | 5 mL | 50 mL | 37715 | 02/21/20 08:00 | KNC | TAL KNX |
| Step 3 | Analysis | 6010B SEP | | 1 | | | 37865 | 02/25/20 14:12 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 4 | SEP | Metal Hydroxide | | | 5.000 g | 25 mL | 37716 | 02/21/20 08:00 | KNC | TAL KNX |
| Step 4 | Prep | 3010A | | | 5 mL | 50 mL | 37755 | 02/24/20 08:00 | KNC | TAL KNX |
| Step 4 | Analysis | 6010B SEP | | 1 | | | 37910 | 02/26/20 12:53 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 5 | SEP | Organic-Bound | | | 5.000 g | 75 mL | 37756 | 02/24/20 08:00 | KNC | TAL KNX |
| Step 5 | Prep | 3010A | | | 5 mL | 50 mL | 37858 | 02/26/20 08:00 | KNC | TAL KNX |
| Step 5 | Analysis | 6010B SEP | | 5 | | | 38037 | 03/03/20 13:39 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 6 | SEP | Acid/Sulfide | | | 5.000 g | 250 mL | 37859 | 02/26/20 08:00 | KNC | TAL KNX |
| Step 6 | Analysis | 6010B SEP | | 1 | | | 38037 | 03/03/20 15:43 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 7 | Prep | Residual | | | 1.000 g | 50 mL | 37903 | 02/27/20 08:00 | KNC | TAL KNX |
| Step 7 | Analysis | 6010B SEP | | 1 | | | 38070 | 03/04/20 12:56 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 7 | Prep | Residual | | | 1.000 g | 50 mL | 37903 | 02/27/20 08:00 | KNC | TAL KNX |
| Step 7 | Analysis | 6010B SEP | | 10 | | | 38070 | 03/04/20 14:44 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 7 | Prep | Residual | | | 1.000 g | 50 mL | 37903 | 02/27/20 08:00 | KNC | TAL KNX |
| Step 7 | Analysis | 6010B SEP | | 5 | | | 38070 | 03/04/20 16:01 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Sum of Steps 1-7 | Analysis | 6010B SEP | | 1 | | | 38266 | 03/12/20 09:36 | DKW | TAL KNX |
| | Instrument ID: NOEQUIP | | | | | | | | | |
| Total/NA | Analysis | Moisture | | 1 | | | 37662 | 02/19/20 11:57 | BKD | TAL KNX |
| | Instrument ID: W3 | | | | | | | | | |

# Lab Chronicle

Client: Golder Associates Inc. Job ID: 140-18228-1
Project/Site: GPC Plant McDonough (166849618)

**Client Sample ID: DGWC-20 (34-39)** **Lab Sample ID: 140-18228-2**
**Date Collected: 02/05/20 00:00** **Matrix: Solid**
**Date Received: 02/12/20 09:50**

| 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 | 37475 | 02/14/20 08:00 | KNC | TAL KNX |
| Total/NA | Analysis | 6010B | | 1 | | | 38107 | 03/05/20 12:28 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Total/NA | Prep | Total | | | 1.000 g | 50 mL | 37475 | 02/14/20 08:00 | KNC | TAL KNX |
| Total/NA | Analysis | 6010B | | 10 | | | 38133 | 03/06/20 12:25 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Total/NA | Prep | Total | | | 1.000 g | 50 mL | 37475 | 02/14/20 08:00 | KNC | TAL KNX |
| Total/NA | Analysis | 6010B | | 5 | | | 38133 | 03/06/20 13:57 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 1 | SEP | Exchangeable | | | 5.000 g | 25 mL | 37545 | 02/18/20 08:00 | KNC | TAL KNX |
| Step 1 | Prep | 3010A | | | 5 mL | 50 mL | 37615 | 02/19/20 08:00 | KNC | TAL KNX |
| Step 1 | Analysis | 6010B SEP | | 4 | | | 37820 | 02/24/20 15:46 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 2 | SEP | Carbonate | | | 5.000 g | 25 mL | 37616 | 02/19/20 08:00 | KNC | TAL KNX |
| Step 2 | Prep | 3010A | | | 5 mL | 50 mL | 37673 | 02/20/20 08:00 | KNC | TAL KNX |
| Step 2 | Analysis | 6010B SEP | | 3 | | | 37865 | 02/25/20 12:13 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 3 | SEP | Non-Crystalline | | | 5.000 g | 25 mL | 37675 | 02/20/20 08:00 | KNC | TAL KNX |
| Step 3 | Prep | 3010A | | | 5 mL | 50 mL | 37715 | 02/21/20 08:00 | KNC | TAL KNX |
| Step 3 | Analysis | 6010B SEP | | 1 | | | 37865 | 02/25/20 14:18 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 4 | SEP | Metal Hydroxide | | | 5.000 g | 25 mL | 37716 | 02/21/20 08:00 | KNC | TAL KNX |
| Step 4 | Prep | 3010A | | | 5 mL | 50 mL | 37755 | 02/24/20 08:00 | KNC | TAL KNX |
| Step 4 | Analysis | 6010B SEP | | 1 | | | 37910 | 02/26/20 12:58 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 5 | SEP | Organic-Bound | | | 5.000 g | 75 mL | 37756 | 02/24/20 08:00 | KNC | TAL KNX |
| Step 5 | Prep | 3010A | | | 5 mL | 50 mL | 37858 | 02/26/20 08:00 | KNC | TAL KNX |
| Step 5 | Analysis | 6010B SEP | | 5 | | | 38037 | 03/03/20 13:44 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 6 | SEP | Acid/Sulfide | | | 5.000 g | 250 mL | 37859 | 02/26/20 08:00 | KNC | TAL KNX |
| Step 6 | Analysis | 6010B SEP | | 1 | | | 38037 | 03/03/20 15:48 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 7 | Prep | Residual | | | 1.000 g | 50 mL | 37903 | 02/27/20 08:00 | KNC | TAL KNX |
| Step 7 | Analysis | 6010B SEP | | 1 | | | 38070 | 03/04/20 13:01 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 7 | Prep | Residual | | | 1.000 g | 50 mL | 37903 | 02/27/20 08:00 | KNC | TAL KNX |
| Step 7 | Analysis | 6010B SEP | | 10 | | | 38070 | 03/04/20 14:49 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 7 | Prep | Residual | | | 1.000 g | 50 mL | 37903 | 02/27/20 08:00 | KNC | TAL KNX |
| Step 7 | Analysis | 6010B SEP | | 5 | | | 38070 | 03/04/20 16:06 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Sum of Steps 1-7 | Analysis | 6010B SEP | | 1 | | | 38266 | 03/12/20 09:36 | DKW | TAL KNX |
| | Instrument ID: NOEQUIP | | | | | | | | | |
| Total/NA | Analysis | Moisture | | 1 | | | 37662 | 02/19/20 11:57 | BKD | TAL KNX |
| | Instrument ID: W3 | | | | | | | | | |

## Client Sample ID: DGWA-53 (25.7-26.9)
## Lab Sample ID: 140-18228-3

**Date Collected: 02/05/20 00:00**
**Matrix: Solid**
**Date Received: 02/12/20 09:50**

| 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 | 37475 | 02/14/20 08:00 | KNC | TAL KNX |
| Total/NA | Analysis | 6010B | | 1 | | | 38107 | 03/05/20 12:34 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Total/NA | Prep | Total | | | 1.000 g | 50 mL | 37475 | 02/14/20 08:00 | KNC | TAL KNX |
| Total/NA | Analysis | 6010B | | 10 | | | 38133 | 03/06/20 12:30 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 1 | SEP | Exchangeable | | | 5.000 g | 25 mL | 37545 | 02/18/20 08:00 | KNC | TAL KNX |
| Step 1 | Prep | 3010A | | | 5 mL | 50 mL | 37615 | 02/19/20 08:00 | KNC | TAL KNX |
| Step 1 | Analysis | 6010B SEP | | 4 | | | 37820 | 02/24/20 15:51 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 2 | SEP | Carbonate | | | 5.000 g | 25 mL | 37616 | 02/19/20 08:00 | KNC | TAL KNX |
| Step 2 | Prep | 3010A | | | 5 mL | 50 mL | 37673 | 02/20/20 08:00 | KNC | TAL KNX |
| Step 2 | Analysis | 6010B SEP | | 3 | | | 37865 | 02/25/20 12:19 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 3 | SEP | Non-Crystalline | | | 5.000 g | 25 mL | 37675 | 02/20/20 08:00 | KNC | TAL KNX |
| Step 3 | Prep | 3010A | | | 5 mL | 50 mL | 37715 | 02/21/20 08:00 | KNC | TAL KNX |
| Step 3 | Analysis | 6010B SEP | | 1 | | | 37865 | 02/25/20 14:23 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 4 | SEP | Metal Hydroxide | | | 5.000 g | 25 mL | 37716 | 02/21/20 08:00 | KNC | TAL KNX |
| Step 4 | Prep | 3010A | | | 5 mL | 50 mL | 37755 | 02/24/20 08:00 | KNC | TAL KNX |
| Step 4 | Analysis | 6010B SEP | | 1 | | | 37910 | 02/26/20 13:03 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 5 | SEP | Organic-Bound | | | 5.000 g | 75 mL | 37756 | 02/24/20 08:00 | KNC | TAL KNX |
| Step 5 | Prep | 3010A | | | 5 mL | 50 mL | 37858 | 02/26/20 08:00 | KNC | TAL KNX |
| Step 5 | Analysis | 6010B SEP | | 5 | | | 38037 | 03/03/20 13:49 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 6 | SEP | Acid/Sulfide | | | 5.000 g | 250 mL | 37859 | 02/26/20 08:00 | KNC | TAL KNX |
| Step 6 | Analysis | 6010B SEP | | 1 | | | 38037 | 03/03/20 15:53 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 7 | Prep | Residual | | | 1.000 g | 50 mL | 37903 | 02/27/20 08:00 | KNC | TAL KNX |
| Step 7 | Analysis | 6010B SEP | | 1 | | | 38070 | 03/04/20 13:07 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 7 | Prep | Residual | | | 1.000 g | 50 mL | 37903 | 02/27/20 08:00 | KNC | TAL KNX |
| Step 7 | Analysis | 6010B SEP | | 10 | | | 38070 | 03/04/20 14:54 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Sum of Steps 1-7 | Analysis | 6010B SEP | | 1 | | | 38266 | 03/12/20 09:36 | DKW | TAL KNX |
| | Instrument ID: NOEQUIP | | | | | | | | | |
| Total/NA | Analysis | Moisture | | 1 | | | 37662 | 02/19/20 11:57 | BKD | TAL KNX |
| | Instrument ID: W3 | | | | | | | | | |

Client: Golder Associates Inc.
Job ID: 140-18228-1
Project/Site: GPC Plant McDonough (166849618)

## Client Sample ID: DGWC-68A (24-29)
## Lab Sample ID: 140-18228-4

**Date Collected: 02/05/20 00:00**
**Matrix: Solid**
**Date Received: 02/12/20 09:50**

| 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 | 37475 | 02/14/20 08:00 | KNC | TAL KNX |
| Total/NA | Analysis | 6010B | | 1 | | | 38107 | 03/05/20 12:40 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Total/NA | Prep | Total | | | 1.000 g | 50 mL | 37475 | 02/14/20 08:00 | KNC | TAL KNX |
| Total/NA | Analysis | 6010B | | 10 | | | 38133 | 03/06/20 12:35 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Total/NA | Prep | Total | | | 1.000 g | 50 mL | 37475 | 02/14/20 08:00 | KNC | TAL KNX |
| Total/NA | Analysis | 6010B | | 5 | | | 38133 | 03/06/20 14:02 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 1 | SEP | Exchangeable | | | 5.000 g | 25 mL | 37545 | 02/18/20 08:00 | KNC | TAL KNX |
| Step 1 | Prep | 3010A | | | 5 mL | 50 mL | 37615 | 02/19/20 08:00 | KNC | TAL KNX |
| Step 1 | Analysis | 6010B SEP | | 4 | | | 37820 | 02/24/20 15:56 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 2 | SEP | Carbonate | | | 5.000 g | 25 mL | 37616 | 02/19/20 08:00 | KNC | TAL KNX |
| Step 2 | Prep | 3010A | | | 5 mL | 50 mL | 37673 | 02/20/20 08:00 | KNC | TAL KNX |
| Step 2 | Analysis | 6010B SEP | | 3 | | | 37865 | 02/25/20 12:24 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 3 | SEP | Non-Crystalline | | | 5.000 g | 25 mL | 37675 | 02/20/20 08:00 | KNC | TAL KNX |
| Step 3 | Prep | 3010A | | | 5 mL | 50 mL | 37715 | 02/21/20 08:00 | KNC | TAL KNX |
| Step 3 | Analysis | 6010B SEP | | 1 | | | 37865 | 02/25/20 14:44 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 4 | SEP | Metal Hydroxide | | | 5.000 g | 25 mL | 37716 | 02/21/20 08:00 | KNC | TAL KNX |
| Step 4 | Prep | 3010A | | | 5 mL | 50 mL | 37755 | 02/24/20 08:00 | KNC | TAL KNX |
| Step 4 | Analysis | 6010B SEP | | 1 | | | 37910 | 02/26/20 13:08 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 5 | SEP | Organic-Bound | | | 5.000 g | 75 mL | 37756 | 02/24/20 08:00 | KNC | TAL KNX |
| Step 5 | Prep | 3010A | | | 5 mL | 50 mL | 37858 | 02/26/20 08:00 | KNC | TAL KNX |
| Step 5 | Analysis | 6010B SEP | | 5 | | | 38037 | 03/03/20 13:55 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 6 | SEP | Acid/Sulfide | | | 5.000 g | 250 mL | 37859 | 02/26/20 08:00 | KNC | TAL KNX |
| Step 6 | Analysis | 6010B SEP | | 1 | | | 38037 | 03/03/20 15:58 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 7 | Prep | Residual | | | 1.000 g | 50 mL | 37903 | 02/27/20 08:00 | KNC | TAL KNX |
| Step 7 | Analysis | 6010B SEP | | 1 | | | 38070 | 03/04/20 13:13 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 7 | Prep | Residual | | | 1.000 g | 50 mL | 37903 | 02/27/20 08:00 | KNC | TAL KNX |
| Step 7 | Analysis | 6010B SEP | | 10 | | | 38070 | 03/04/20 14:59 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 7 | Prep | Residual | | | 1.000 g | 50 mL | 37903 | 02/27/20 08:00 | KNC | TAL KNX |
| Step 7 | Analysis | 6010B SEP | | 5 | | | 38070 | 03/04/20 16:21 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Sum of Steps 1-7 | Analysis | 6010B SEP | | 1 | | | 38266 | 03/12/20 09:36 | DKW | TAL KNX |
| | Instrument ID: NOEQUIP | | | | | | | | | |
| Total/NA | Analysis | Moisture | | 1 | | | 37662 | 02/19/20 11:57 | BKD | TAL KNX |
| | Instrument ID: W3 | | | | | | | | | |

# Lab Chronicle

Client: Golder Associates Inc. | Job ID: 140-18228-1
Project/Site: GPC Plant McDonough (166849618)

**Client Sample ID: DGWC-69 (19-24)** | **Lab Sample ID: 140-18228-5**
**Date Collected: 02/05/20 00:00** | **Matrix: Solid**
**Date Received: 02/12/20 09:50**

| 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 | 37475 | 02/14/20 08:00 | KNC | TAL KNX |
| Total/NA | Analysis | 6010B | | 1 | | | 38107 | 03/05/20 12:55 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Total/NA | Prep | Total | | | 1.000 g | 50 mL | 37475 | 02/14/20 08:00 | KNC | TAL KNX |
| Total/NA | Analysis | 6010B | | 10 | | | 38133 | 03/06/20 12:51 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Total/NA | Prep | Total | | | 1.000 g | 50 mL | 37475 | 02/14/20 08:00 | KNC | TAL KNX |
| Total/NA | Analysis | 6010B | | 5 | | | 38133 | 03/06/20 14:07 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 1 | SEP | Exchangeable | | | 5.000 g | 25 mL | 37545 | 02/18/20 08:00 | KNC | TAL KNX |
| Step 1 | Prep | 3010A | | | 5 mL | 50 mL | 37615 | 02/19/20 08:00 | KNC | TAL KNX |
| Step 1 | Analysis | 6010B SEP | | 4 | | | 37820 | 02/24/20 16:12 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 2 | SEP | Carbonate | | | 5.000 g | 25 mL | 37616 | 02/19/20 08:00 | KNC | TAL KNX |
| Step 2 | Prep | 3010A | | | 5 mL | 50 mL | 37673 | 02/20/20 08:00 | KNC | TAL KNX |
| Step 2 | Analysis | 6010B SEP | | 3 | | | 37865 | 02/25/20 12:39 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 3 | SEP | Non-Crystalline | | | 5.000 g | 25 mL | 37675 | 02/20/20 08:00 | KNC | TAL KNX |
| Step 3 | Prep | 3010A | | | 5 mL | 50 mL | 37715 | 02/21/20 08:00 | KNC | TAL KNX |
| Step 3 | Analysis | 6010B SEP | | 1 | | | 37865 | 02/25/20 14:49 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 3 | SEP | Non-Crystalline | | | 5.000 g | 25 mL | 37675 | 02/20/20 08:00 | KNC | TAL KNX |
| Step 3 | Prep | 3010A | | | 5 mL | 50 mL | 37715 | 02/21/20 08:00 | KNC | TAL KNX |
| Step 3 | Analysis | 6010B SEP | | 2 | | | 37865 | 02/25/20 15:11 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 4 | SEP | Metal Hydroxide | | | 5.000 g | 25 mL | 37716 | 02/21/20 08:00 | KNC | TAL KNX |
| Step 4 | Prep | 3010A | | | 5 mL | 50 mL | 37755 | 02/24/20 08:00 | KNC | TAL KNX |
| Step 4 | Analysis | 6010B SEP | | 1 | | | 37910 | 02/26/20 13:23 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 5 | SEP | Organic-Bound | | | 5.000 g | 75 mL | 37756 | 02/24/20 08:00 | KNC | TAL KNX |
| Step 5 | Prep | 3010A | | | 5 mL | 50 mL | 37858 | 02/26/20 08:00 | KNC | TAL KNX |
| Step 5 | Analysis | 6010B SEP | | 5 | | | 38037 | 03/03/20 14:10 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 6 | SEP | Acid/Sulfide | | | 5.000 g | 250 mL | 37859 | 02/26/20 08:00 | KNC | TAL KNX |
| Step 6 | Analysis | 6010B SEP | | 1 | | | 38037 | 03/03/20 16:15 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 7 | Prep | Residual | | | 1.000 g | 50 mL | 37903 | 02/27/20 08:00 | KNC | TAL KNX |
| Step 7 | Analysis | 6010B SEP | | 1 | | | 38070 | 03/04/20 13:28 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 7 | Prep | Residual | | | 1.000 g | 50 mL | 37903 | 02/27/20 08:00 | KNC | TAL KNX |
| Step 7 | Analysis | 6010B SEP | | 10 | | | 38070 | 03/04/20 15:04 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Sum of Steps 1-7 | Analysis | 6010B SEP | | 1 | | | 38266 | 03/12/20 09:36 | DKW | TAL KNX |
| | Instrument ID: NOEQUIP | | | | | | | | | |
| Total/NA | Analysis | Moisture | | 1 | | | 37662 | 02/19/20 11:57 | BKD | TAL KNX |
| | Instrument ID: W3 | | | | | | | | | |

Client: Golder Associates Inc.
Project/Site: GPC Plant McDonough (166849618)

Job ID: 140-18228-1

## Client Sample ID: Method Blank
**Date Collected: N/A**
**Date Received: N/A**

**Lab Sample ID: MB 140-37475/17-A**
**Matrix: Solid**

| 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 | 37475 | 02/14/20 08:00 | KNC | TAL KNX |
| Total/NA | Analysis | 6010B | | 1 | | | 38107 | 03/05/20 10:40 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Total/NA | Prep | Total | | | 1.000 g | 50 mL | 37475 | 02/14/20 08:00 | KNC | TAL KNX |
| Total/NA | Analysis | 6010B | | 1 | | | 38133 | 03/06/20 10:50 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |

## Client Sample ID: Method Blank
**Date Collected: N/A**
**Date Received: N/A**

**Lab Sample ID: MB 140-37545/17-B ^4**
**Matrix: Solid**

| 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 | 37545 | 02/18/20 08:00 | KNC | TAL KNX |
| Step 1 | Prep | 3010A | | | 5 mL | 50 mL | 37615 | 02/19/20 08:00 | KNC | TAL KNX |
| Step 1 | Analysis | 6010B SEP | | 4 | | | 37820 | 02/24/20 14:09 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |

## Client Sample ID: Method Blank
**Date Collected: N/A**
**Date Received: N/A**

**Lab Sample ID: MB 140-37616/17-B ^3**
**Matrix: Solid**

| 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 | 37616 | 02/19/20 08:00 | KNC | TAL KNX |
| Step 2 | Prep | 3010A | | | 5 mL | 50 mL | 37673 | 02/20/20 08:00 | KNC | TAL KNX |
| Step 2 | Analysis | 6010B SEP | | 3 | | | 37865 | 02/25/20 10:34 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |

## Client Sample ID: Method Blank
**Date Collected: N/A**
**Date Received: N/A**

**Lab Sample ID: MB 140-37675/17-B**
**Matrix: Solid**

| 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 | 37675 | 02/20/20 08:00 | KNC | TAL KNX |
| Step 3 | Prep | 3010A | | | 5 mL | 50 mL | 37715 | 02/21/20 08:00 | KNC | TAL KNX |
| Step 3 | Analysis | 6010B SEP | | 1 | | | 37865 | 02/25/20 12:45 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |

## Client Sample ID: Method Blank
**Date Collected: N/A**
**Date Received: N/A**

**Lab Sample ID: MB 140-37716/17-B**
**Matrix: Solid**

| 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 | 37716 | 02/21/20 08:00 | KNC | TAL KNX |
| Step 4 | Prep | 3010A | | | 5 mL | 50 mL | 37755 | 02/24/20 08:00 | KNC | TAL KNX |
| Step 4 | Analysis | 6010B SEP | | 1 | | | 37910 | 02/26/20 11:22 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |

# Lab Chronicle

Client: Golder Associates Inc. Job ID: 140-18228-1
Project/Site: GPC Plant McDonough (166849618)

## Client Sample ID: Method Blank — Lab Sample ID: MB 140-37756/17-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 | 37756 | 02/24/20 08:00 | KNC | TAL KNX |
| Step 5 | Prep | 3010A | | | 5 mL | 50 mL | 37858 | 02/26/20 08:00 | KNC | TAL KNX |
| Step 5 | Analysis | 6010B SEP | | 5 | | | 38037 | 03/03/20 12:03 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |

## Client Sample ID: Method Blank — Lab Sample ID: MB 140-37859/17-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 | 37859 | 02/26/20 08:00 | KNC | TAL KNX |
| Step 6 | Analysis | 6010B SEP | | 1 | | | 38037 | 03/03/20 14:15 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |

## Client Sample ID: Method Blank — Lab Sample ID: MB 140-37903/17-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 | 37903 | 02/27/20 08:00 | KNC | TAL KNX |
| Step 7 | Analysis | 6010B SEP | | 1 | | | 38070 | 03/04/20 11:18 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |

## Client Sample ID: Lab Control Sample — Lab Sample ID: LCS 140-37475/18-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 | 37475 | 02/14/20 08:00 | KNC | TAL KNX |
| Total/NA | Analysis | 6010B | | 1 | | | 38107 | 03/05/20 10:46 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Total/NA | Prep | Total | | | 1.000 g | 50 mL | 37475 | 02/14/20 08:00 | KNC | TAL KNX |
| Total/NA | Analysis | 6010B | | 1 | | | 38133 | 03/06/20 10:55 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |

## Client Sample ID: Lab Control Sample — Lab Sample ID: LCS 140-37545/18-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 | 37545 | 02/18/20 08:00 | KNC | TAL KNX |
| Step 1 | Prep | 3010A | | | 5 mL | 50 mL | 37615 | 02/19/20 08:00 | KNC | TAL KNX |
| Step 1 | Analysis | 6010B SEP | | 5 | | | 37820 | 02/24/20 14:19 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |

## Client Sample ID: Lab Control Sample  Lab Sample ID: LCS 140-37616/18-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 | 37616 | 02/19/20 08:00 | KNC | TAL KNX |
| Step 2 | Prep | 3010A | | | 5 mL | 50 mL | 37673 | 02/20/20 08:00 | KNC | TAL KNX |
| Step 2 | Analysis | 6010B SEP | | 5 | | | 37865 | 02/25/20 10:44 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |

## Client Sample ID: Lab Control Sample  Lab Sample ID: LCS 140-37675/18-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 | 37675 | 02/20/20 08:00 | KNC | TAL KNX |
| Step 3 | Prep | 3010A | | | 5 mL | 50 mL | 37715 | 02/21/20 08:00 | KNC | TAL KNX |
| Step 3 | Analysis | 6010B SEP | | 1 | | | 37865 | 02/25/20 12:55 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |

## Client Sample ID: Lab Control Sample  Lab Sample ID: LCS 140-37716/18-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 | 37716 | 02/21/20 08:00 | KNC | TAL KNX |
| Step 4 | Prep | 3010A | | | 5 mL | 50 mL | 37755 | 02/24/20 08:00 | KNC | TAL KNX |
| Step 4 | Analysis | 6010B SEP | | 1 | | | 37910 | 02/26/20 11:33 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |

## Client Sample ID: Lab Control Sample  Lab Sample ID: LCS 140-37756/18-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 | 37756 | 02/24/20 08:00 | KNC | TAL KNX |
| Step 5 | Prep | 3010A | | | 5 mL | 50 mL | 37858 | 02/26/20 08:00 | KNC | TAL KNX |
| Step 5 | Analysis | 6010B SEP | | 5 | | | 38037 | 03/03/20 12:14 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |

## Client Sample ID: Lab Control Sample  Lab Sample ID: LCS 140-37859/18-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 | 37859 | 02/26/20 08:00 | KNC | TAL KNX |
| Step 6 | Analysis | 6010B SEP | | 1 | | | 38037 | 03/03/20 14:21 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |

1 2 3 4 5 6 7 8 9 10 11 12 13

## Client Sample ID: Lab Control Sample

**Lab Sample ID: LCS 140-37903/18-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 | 37903 | 02/27/20 08:00 | KNC | TAL KNX |
| Step 7 | Analysis | 6010B SEP | | 1 | | | 38070 | 03/04/20 11:23 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |

## Client Sample ID: Lab Control Sample Dup

**Lab Sample ID: LCSD 140-37475/19-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 | 37475 | 02/14/20 08:00 | KNC | TAL KNX |
| Total/NA | Analysis | 6010B | | 1 | | | 38107 | 03/05/20 10:51 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Total/NA | Prep | Total | | | 1.000 g | 50 mL | 37475 | 02/14/20 08:00 | KNC | TAL KNX |
| Total/NA | Analysis | 6010B | | 1 | | | 38133 | 03/06/20 11:00 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |

## Client Sample ID: Lab Control Sample Dup

**Lab Sample ID: LCSD 140-37545/19-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 | 37545 | 02/18/20 08:00 | KNC | TAL KNX |
| Step 1 | Prep | 3010A | | | 5 mL | 50 mL | 37615 | 02/19/20 08:00 | KNC | TAL KNX |
| Step 1 | Analysis | 6010B SEP | | 5 | | | 37820 | 02/24/20 14:24 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |

## Client Sample ID: Lab Control Sample Dup

**Lab Sample ID: LCSD 140-37616/19-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 | 37616 | 02/19/20 08:00 | KNC | TAL KNX |
| Step 2 | Prep | 3010A | | | 5 mL | 50 mL | 37673 | 02/20/20 08:00 | KNC | TAL KNX |
| Step 2 | Analysis | 6010B SEP | | 5 | | | 37865 | 02/25/20 10:50 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |

## Client Sample ID: Lab Control Sample Dup

**Lab Sample ID: LCSD 140-37675/19-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 | 37675 | 02/20/20 08:00 | KNC | TAL KNX |
| Step 3 | Prep | 3010A | | | 5 mL | 50 mL | 37715 | 02/21/20 08:00 | KNC | TAL KNX |
| Step 3 | Analysis | 6010B SEP | | 1 | | | 37865 | 02/25/20 13:00 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |

# Lab Chronicle

Client: Golder Associates Inc. Job ID: 140-18228-1
Project/Site: GPC Plant McDonough (166849618)

## Client Sample ID: Lab Control Sample Dup Lab Sample ID: LCSD 140-37716/19-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 | 37716 | 02/21/20 08:00 | KNC | TAL KNX |
| Step 4 | Prep | 3010A | | | 5 mL | 50 mL | 37755 | 02/24/20 08:00 | KNC | TAL KNX |
| Step 4 | Analysis | 6010B SEP | | 1 | | | 37910 | 02/26/20 11:37 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |

## Client Sample ID: Lab Control Sample Dup Lab Sample ID: LCSD 140-37756/19-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 | 37756 | 02/24/20 08:00 | KNC | TAL KNX |
| Step 5 | Prep | 3010A | | | 5 mL | 50 mL | 37858 | 02/26/20 08:00 | KNC | TAL KNX |
| Step 5 | Analysis | 6010B SEP | | 5 | | | 38037 | 03/03/20 12:19 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |

## Client Sample ID: Lab Control Sample Dup Lab Sample ID: LCSD 140-37859/19-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 | 37859 | 02/26/20 08:00 | KNC | TAL KNX |
| Step 6 | Analysis | 6010B SEP | | 1 | | | 38037 | 03/03/20 14:26 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |

## Client Sample ID: Lab Control Sample Dup Lab Sample ID: LCSD 140-37903/19-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 | 37903 | 02/27/20 08:00 | KNC | TAL KNX |
| Step 7 | Analysis | 6010B SEP | | 1 | | | 38070 | 03/04/20 11:28 | KNC | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |

**Laboratory References:**

TAL KNX = Eurofins TestAmerica, Knoxville, 5815 Middlebrook Pike, Knoxville, TN 37921, TEL (865)291-3000

# Method Summary



| 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

# Accreditation/Certification Summary

Client: Golder Associates Inc.
Job ID: 140-18228-1
Project/Site: GPC Plant McDonough (166849618)

## Laboratory: Eurofins TestAmerica, Knoxville

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

| Authority | Program | Identification Number | Expiration Date |
| --- | --- | --- | --- |
| Oregon | NELAP | TNI0189 | 01-02-21 |

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

| Analysis Method | Prep Method | Matrix | Analyte |
| --- | --- | --- | --- |
| 6010B | Total | Solid | Aluminum |
| 6010B | Total | Solid | Arsenic |
| 6010B | Total | Solid | Barium |
| 6010B | Total | Solid | Beryllium |
| 6010B | Total | Solid | Cadmium |
| 6010B | Total | Solid | Chromium |
| 6010B | Total | Solid | Cobalt |
| 6010B | Total | Solid | Iron |
| 6010B | Total | Solid | Lithium |
| 6010B | Total | Solid | Manganese |
| 6010B | Total | Solid | Molybdenum |
| 6010B | Total | Solid | Selenium |
| 6010B SEP | | Solid | Aluminum |
| 6010B SEP | | Solid | Arsenic |
| 6010B SEP | | Solid | Barium |
| 6010B SEP | | Solid | Beryllium |
| 6010B SEP | | Solid | Cadmium |
| 6010B SEP | | Solid | Chromium |
| 6010B SEP | | Solid | Cobalt |
| 6010B SEP | | Solid | Iron |
| 6010B SEP | | Solid | Lithium |
| 6010B SEP | | Solid | Manganese |
| 6010B SEP | | Solid | Molybdenum |
| 6010B SEP | | Solid | Selenium |
| 6010B SEP | 3010A | Solid | Aluminum |
| 6010B SEP | 3010A | Solid | Arsenic |
| 6010B SEP | 3010A | Solid | Barium |
| 6010B SEP | 3010A | Solid | Beryllium |
| 6010B SEP | 3010A | Solid | Cadmium |
| 6010B SEP | 3010A | Solid | Chromium |
| 6010B SEP | 3010A | Solid | Cobalt |
| 6010B SEP | 3010A | Solid | Iron |
| 6010B SEP | 3010A | Solid | Lithium |
| 6010B SEP | 3010A | Solid | Manganese |
| 6010B SEP | 3010A | Solid | Molybdenum |
| 6010B SEP | 3010A | Solid | Selenium |
| 6010B SEP | Acid/Sulfide | Solid | Aluminum |
| 6010B SEP | Acid/Sulfide | Solid | Arsenic |
| 6010B SEP | Acid/Sulfide | Solid | Barium |
| 6010B SEP | Acid/Sulfide | Solid | Beryllium |
| 6010B SEP | Acid/Sulfide | Solid | Cadmium |
| 6010B SEP | Acid/Sulfide | Solid | Chromium |
| 6010B SEP | Acid/Sulfide | Solid | Cobalt |
| 6010B SEP | Acid/Sulfide | Solid | Iron |
| 6010B SEP | Acid/Sulfide | Solid | Lithium |

# Accreditation/Certification Summary

Client: Golder Associates Inc.
Job ID: 140-18228-1
Project/Site: GPC Plant McDonough (166849618)

## Laboratory: Eurofins TestAmerica, Knoxville (Continued)

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

| Authority | Program | Identification Number | Expiration Date |
|---|---|---|---|
| Oregon | NELAP | TNI0189 | 01-02-21 |

| | | | |
|---|---|---|---|
| 6010B SEP | Acid/Sulfide | Solid | Manganese |
| 6010B SEP | Acid/Sulfide | Solid | Molybdenum |
| 6010B SEP | Acid/Sulfide | Solid | Selenium |
| 6010B SEP | Residual | Solid | Aluminum |
| 6010B SEP | Residual | Solid | Arsenic |
| 6010B SEP | Residual | Solid | Barium |
| 6010B SEP | Residual | Solid | Beryllium |
| 6010B SEP | Residual | Solid | Cadmium |
| 6010B SEP | Residual | Solid | Chromium |
| 6010B SEP | Residual | Solid | Cobalt |
| 6010B SEP | Residual | Solid | Iron |
| 6010B SEP | Residual | Solid | Lithium |
| 6010B SEP | Residual | Solid | Manganese |
| 6010B SEP | Residual | Solid | Molybdenum |
| 6010B SEP | Residual | Solid | Selenium |
| Moisture | | Solid | Percent Moisture |

# Chain of Custody Record
## Sample Origin: State of Georgia

**Eurofins TestAmerica, Knoxville**
5815 Middlebrook Pike
Knoxville, TN 37921-5947
phone 865.291.3000 fax 865.584.4315

eurofins | Environment Testing TestAmerica

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TestAmerica Laboratories, Inc. d/b/a Eurofins TestAmerica

| Client Contact | Project Manager: James Jones | Site Contact: Karim Minkara | Date: | TALS Project #: |
|---|---|---|---|---|
| Golder Associates | Email: james_jones@golder.com | Lab Contact: Deb Carey Coursey | Carrier: | COC No: |
| 5170 Peachtree Road, Bldg 100, Suite 300 | Tel/Fax: 615-586-1402 | | | 1 of 1 COC |
| Atlanta, GA 30341 | **Analysis Turnaround Time** | | | [1] Sampler: |
| (770) 496-1893 Phone | ☐ CALENDAR DAYS ☐ WORKING DAYS | | | [1] **Refer to note below.** |
| | TAT if different from Below ____ | | | **For Lab Use Only:** |
| Project Name: GPC Plant McDonough | ☐ 2 weeks | | | Walk-in Client: |
| Site: | ☐ 1 week | | | Lab Sampling: |
| P O # 166849618 | ☐ 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 (SWP-846/6020) | Sample Specific Notes: |
|---|---|---|---|---|---|---|---|---|---|
| DGWC-19 (34-39) | 2/5/2020 | | G | Soil | 1 | | | X | |
| DGWC-20 (34-39) | 2/5/2020 | | G | Soil | 1 | | | X | |
| DGWA-53 (25.7-26.9) | 2/5/2020 | | G | Rock | 1 | | | X | |
| DGWC-68A (24-29) | 2/5/2020 | | G | Soil | 1 | | | X | |
| DGWC-69 (19-24) | 2/5/2020 | | G | Soil | 1 | | | X | |

CUSTODY SEALS INTACT
RECEIVED AT RT 2.1/CT2.1°C
SKA 2-12-20
1 COOLER FEDX# 151693230289 SO

140-18228 Chain of Custody

[1] I attest to the validity and authenticity of this (these) sample(s). I am aware that tampering with or intentionally mislabeling the sample(s) location, date or time of collection may be considered fraud and sub...
Signature:______________________ Date________

**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: |
|---|---|---|---|---|---|
| [signature] | Golder 1330 | 2/11/20 | [signature] | 2/11/20 1330 | ETA |
| Relinquished by: [signature] | Company: 2/11/20 1600 | Date/Time: | Received by: [signature] | Company: | Date/Time: |
| Relinquished by: | Company: | Date/Time: | Received in Laboratory by: [signature] | Company: ETA KNX | Date/Time: 2-12-20 09:50 |

140056 94   763

Form No. CA-C-WI-004, Rev. 1.22, dated 12/3/2019



1 2 3 4 5 6 7 8 9 10 11 12 13

Loc: 140
**18228**

EUROFINS/TESTAMERICA KNOXVILLE SAMPLE RECEIPT/CONDITION UPON RECEIPT ANOMALY CHECKLIST Log In Number:

| Review Items | Yes | No | NA | If No, what was the problem? | Comments/Actions Taken |
|---|---|---|---|---|---|
| 1. Are the shipping containers intact? | ✓ | | | ☐ **Containers, Broken** | 10 |
| 2. Were ambient air containers received intact? | | | ✓ | ☐ Checked in lab | |
| 3. The coolers/containers custody seal if present, is it intact? | ✓ | | | ☐ Yes<br>☐ NA | |
| 4. Is the cooler temperature within limits? (> freezing temp. of water to 6 °C, VOST: 10°C)<br>Thermometer ID : 5C68<br>Correction factor: 0.0 | ✓ | | | ☐ **Cooler Out of Temp, Client Contacted, Proceed/Cancel**<br>☐ **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**<br>☐ **COC Incorrect/Incomplete**<br>☐ **COC Not Received** | |
| 8. Were all of the samples listed on the COC received? | ✓ | | | ☐ **Sample Received, Not on COC**<br>☐ **Sample on COC, Not Received** | |
| 9. Is the date/time of sample collection noted? | ✓ | | | ☐ **COC; No Date/Time; Client Contacted** | **Labeling Verified by:** **Date:** |
| 10. Was the sampler identified on the COC? | | ✓ | | ☑ **Sampler Not Listed on COC** | |
| 11. Is the client and project name/# identified? | ✓ | | | ☐ **COC Incorrect/Incomplete** | **pH test strip lot number:** |
| 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)**<br>☐ **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)<br>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 | |

| | Box 16A: pH Preservation | Box 18A: Residual Chlorine |
|---|---|---|
| Preservative: | | |
| Lot Number: | | |
| Exp Date: | | |
| Analyst: | | |
| Date: | | |
| Time: | | |

Project #: ____________ PM Instructions: ____________

Sample Receiving Associate: [signature] Date: 2-12-20

QA026R32.doc, 062719

eurofins | Environment Testing America

# ANALYTICAL REPORT

Eurofins Knoxville
5815 Middlebrook Pike
Knoxville, TN 37921
Tel: (865)291-3000

Laboratory Job ID: 140-27231-1
Client Project/Site: Plant McDonough NES Well Installation

For:
Golder Associates Inc.
5170 Peachtree Road
Building 100, Suite 300
Atlanta, Georgia 30341

Attn: Brian Steele

Ryan Henry

*Authorized for release by:*
*5/31/2022 4:28:23 PM*

Ryan Henry, Project Manager I
(865)291-3000
WilliamR.Henry@et.eurofinsus.com

LINKS

Review your project results through myEOL

Have a Question? Ask The Expert

Visit us at: www.eurofinsus.com/Env

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.

# Table of Contents

Cover Page . . . . . . . . . . 1
Table of Contents . . . . . . . . . . 2
Definitions/Glossary . . . . . . . . . . 3
Case Narrative . . . . . . . . . . 4
Sample Summary . . . . . . . . . . 7
Client Sample Results . . . . . . . . . . 8
Default Detection Limits . . . . . . . . . . 28
QC Sample Results . . . . . . . . . . 30
QC Association Summary . . . . . . . . . . 39
Lab Chronicle . . . . . . . . . . 48
Certification Summary . . . . . . . . . . 66
Method Summary . . . . . . . . . . 68
Chain of Custody . . . . . . . . . . 69

# Definitions/Glossary

Client: Golder Associates Inc. Job ID: 140-27231-1
Project/Site: Plant McDonough NES Well Installation

## Qualifiers

### Metals

| Qualifier | Qualifier Description |
|---|---|
| *1 | LCS/LCSD RPD exceeds control limits. |
| B | Compound was found in the blank and sample. |
| J | Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value. |
| L | A negative instrument reading had an absolute value greater than the reporting limit |

## 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 |

1 2 3 4 5 6 7 8 9 10 11 12 13

## Job ID: 140-27231-1

### Laboratory: Eurofins Knoxville

**Narrative**

**Job Narrative**
**140-27231-1**

**Receipt**
The samples were received on 4/25/2022 at 9:30am and arrived in good condition. The temperature of the cooler at receipt was 22.8º C.

**Receipt Exceptions**
Sample bags were received with water in them when returned from the North Canton lab. Water came from the loose ice used to return the samples. Samples 2, 3, 7 and 10 were impacted.

**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 ($MgSO_4$), 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 $HCl$-$HNO_3$-$H_2O$, 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, $HNO_3$, HCl and $H_3BO_3$. 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, $HNO_3$, HCl and $H_3BO_3$. 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 = $(C \times V \times V1 \times D) / (W \times S \times V2)$

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

## Job ID: 140-27231-1 (Continued)

### Laboratory: Eurofins Knoxville (Continued)

S = Percent solids/100

A method blank, laboratory control sample and laboratory control sample duplicate were prepared and analyzed with each SEP step in 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.

Method 6010B SEP: LCSD percent RPD was outside of the control limits for Mn. This prep method shows historically poor recovery for this analyte per SOP.

(LCSD 140-61517/15-B ^5)

Method 6010B SEP: The serial dilution performed for the following sample associated with batch 140-61994 was outside control limits. Sample matrix effects suspected: DGWC-121-38-40' (140-27231-6)

Method 6010B SEP: The following sample was diluted due to the presence of titanium which interferes with Cobalt: B-113D-19-20' (140-27231-1). Elevated reporting limits (RLs) are provided.

Method 6010B SEP: Due to sample matrix effect on the internal standard (ISTD), a dilution was required for the following sample: B-48-23-24' (140-27231-5).

Method 6010B SEP: The following sample (ICV) was analyzed twice by mistake of the analyst. The data have been rejected for the second ICV as the ICV cannot be reanalyzed per SOP. Sample results to be reported from the first ICV analyzed in analytical batch.

(ICV 140-61994/5)

Method 6010B SEP: Due to sample matrix effect on the internal standard (ISTD), a dilution was required for the following sample: B-48-23-24' (140-27231-5).

Method 6010B SEP: The following samples were diluted due to the presence of Silicon which interferes with Arsenic and Cobalt: B-113D-19-20' (140-27231-1), DGWC-121-38-40' (140-27231-6), DGWC-121-49-50' (140-27231-7), B-122D-39-40' (140-27231-8), B-123D-27-28' (140-27231-9) and B-123D-145' (140-27231-10). Elevated reporting limits (RLs) are provided.

Method 6010B SEP: The following samples were diluted due to the presence of Titanium which interferes with Cobalt: B-113D-19-20' (140-27231-1), B-104D-55-56' (140-27231-2), B-115D-75-76' (140-27231-3), B-47-11-12' (140-27231-4), B-48-23-24' (140-27231-5), DGWC-121-38-40' (140-27231-6), DGWC-121-49-50' (140-27231-7), B-122D-39-40' (140-27231-8), B-123D-27-28' (140-27231-9) and B-123D-145' (140-27231-10). Elevated reporting limits (RLs) are provided.

Method 6010B SEP: The following samples were diluted due to the nature of the sample matrix: B-113D-19-20' (140-27231-1), B-104D-55-56' (140-27231-2), B-115D-75-76' (140-27231-3), B-47-11-12' (140-27231-4), B-48-23-24' (140-27231-5), DGWC-121-38-40' (140-27231-6), DGWC-121-49-50' (140-27231-7), B-122D-39-40' (140-27231-8), B-123D-27-28' (140-27231-9) and B-123D-145' (140-27231-10). Elevated reporting limits (RLs) are provided for Aluminum.

Method 6010B: The serial dilution performed for the following sample associated with batch 140-62091 was outside control limits for Cobalt, Iron, and Manganese. Sample matrix effects are suspected: DGWC-121-38-40' (140-27231-6)

Method 6010B: The following samples were diluted due to the nature of the sample matrix: B-113D-19-20' (140-27231-1), B-104D-55-56' (140-27231-2), B-115D-75-76' (140-27231-3), B-47-11-12' (140-27231-4), B-48-23-24' (140-27231-5), DGWC-121-38-40' (140-27231-6), DGWC-121-49-50' (140-27231-7), B-122D-39-40' (140-27231-8), B-123D-27-28' (140-27231-9) and B-123D-145' (140-27231-10). Elevated reporting limits (RLs) are provided for Aluminum.

## Job ID: 140-27231-1 (Continued)

### Laboratory: Eurofins Knoxville (Continued)

Method 6010B: The following samples were diluted to bring the concentration of target analyte (Iron) within the calibration range: B-113D-19-20' (140-27231-1), B-47-11-12' (140-27231-4), DGWC-121-38-40' (140-27231-6), DGWC-121-49-50' (140-27231-7) and B-123D-27-28' (140-27231-9). Elevated reporting limits (RLs) are provided.

Method 6010B: The following samples were diluted due to the presence of Iron which interferes with Arsenic: B-113D-19-20' (140-27231-1), B-47-11-12' (140-27231-4), DGWC-121-38-40' (140-27231-6), DGWC-121-49-50' (140-27231-7) and B-123D-27-28' (140-27231-9). Elevated reporting limits (RLs) are provided.

Method 6010B: The following samples were diluted due to the presence of Titanium which interferes with Cobalt: B-113D-19-20' (140-27231-1), B-104D-55-56' (140-27231-2), B-115D-75-76' (140-27231-3), B-47-11-12' (140-27231-4), DGWC-121-38-40' (140-27231-6), DGWC-121-49-50' (140-27231-7), B-122D-39-40' (140-27231-8), B-123D-27-28' (140-27231-9) and B-123D-145' (140-27231-10). Elevated reporting limits (RLs) are provided.

Method 6010B: The following samples were diluted due to the presence of Silicon which interferes with Arsenic and Cobalt: B-115D-75-76' (140-27231-3), DGWC-121-49-50' (140-27231-7) and B-123D-145' (140-27231-10). Elevated reporting limits (RLs) are provided.

Method 6010B: Due to sample matrix effect on the internal standard (ISTD), a dilution was required for the following samples: B-104D-55-56' (140-27231-2), B-115D-75-76' (140-27231-3), B-48-23-24' (140-27231-5), DGWC-121-38-40' (140-27231-6), DGWC-121-49-50' (140-27231-7), B-122D-39-40' (140-27231-8) and B-123D-145' (140-27231-10).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

**General Chemistry**
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

**Organic Prep**
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

# Sample Summary

Client: Golder Associates Inc.
Project/Site: Plant McDonough NES Well Installation

Job ID: 140-27231-1

| Lab Sample ID | Client Sample ID | Matrix | Collected | Received |
|---|---|---|---|---|
| 140-27231-1 | B-113D-19-20' | Solid | 04/19/22 14:00 | 04/25/22 09:30 |
| 140-27231-2 | B-104D-55-56' | Solid | 04/19/22 14:00 | 04/25/22 09:30 |
| 140-27231-3 | B-115D-75-76' | Solid | 04/19/22 14:00 | 04/25/22 09:30 |
| 140-27231-4 | B-47-11-12' | Solid | 04/19/22 14:00 | 04/25/22 09:30 |
| 140-27231-5 | B-48-23-24' | Solid | 04/19/22 14:00 | 04/25/22 09:30 |
| 140-27231-6 | DGWC-121-38-40' | Solid | 04/19/22 14:00 | 04/25/22 09:30 |
| 140-27231-7 | DGWC-121-49-50' | Solid | 04/19/22 14:00 | 04/25/22 09:30 |
| 140-27231-8 | B-122D-39-40' | Solid | 04/19/22 14:00 | 04/25/22 09:30 |
| 140-27231-9 | B-123D-27-28' | Solid | 04/19/22 14:00 | 04/25/22 09:30 |
| 140-27231-10 | B-123D-145' | Solid | 04/19/22 14:00 | 04/25/22 09:30 |

# Client Sample Results

Client: Golder Associates Inc.
Project/Site: Plant McDonough NES Well Installation

Job ID: 140-27231-1

## Client Sample ID: B-113D-19-20'

**Date Collected: 04/19/22 14:00**
**Date Received: 04/25/22 09:30**

## Lab Sample ID: 140-27231-1

**Matrix: Solid**
**Percent Solids: 98.7**

### Method: 6010B SEP - SEP Metals (ICP) - Step 1

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | ND | | 41 | 6.5 | mg/Kg | ☼ | 05/05/22 08:00 | 05/09/22 11:47 | 4 |
| Arsenic | ND | | 2.0 | 0.53 | mg/Kg | ☼ | 05/05/22 08:00 | 05/09/22 11:47 | 4 |
| Cobalt | ND | | 10 | 0.18 | mg/Kg | ☼ | 05/05/22 08:00 | 05/09/22 11:47 | 4 |
| Iron | ND | | 20 | 12 | mg/Kg | ☼ | 05/05/22 08:00 | 05/09/22 11:47 | 4 |
| Lithium | ND | | 10 | 0.61 | mg/Kg | ☼ | 05/05/22 08:00 | 05/09/22 11:47 | 4 |
| **Manganese** | **5.1** | | 3.0 | 0.13 | mg/Kg | ☼ | 05/05/22 08:00 | 05/09/22 11:47 | 4 |

### Method: 6010B SEP - SEP Metals (ICP) - Step 2

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Aluminum** | **5.3** | **J** | 30 | 4.9 | mg/Kg | ☼ | 05/06/22 08:00 | 05/09/22 13:01 | 3 |
| Arsenic | ND | | 1.5 | 0.39 | mg/Kg | ☼ | 05/06/22 08:00 | 05/09/22 13:01 | 3 |
| Cobalt | ND | | 7.6 | 0.19 | mg/Kg | ☼ | 05/06/22 08:00 | 05/09/22 13:01 | 3 |
| Iron | ND | | 15 | 8.8 | mg/Kg | ☼ | 05/06/22 08:00 | 05/09/22 13:01 | 3 |
| Lithium | ND | | 7.6 | 0.46 | mg/Kg | ☼ | 05/06/22 08:00 | 05/09/22 13:01 | 3 |
| **Manganese** | **5.9** | | 2.3 | 0.85 | mg/Kg | ☼ | 05/06/22 08:00 | 05/09/22 13:01 | 3 |

### Method: 6010B SEP - SEP Metals (ICP) - Step 3

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Aluminum** | **150** | | 10 | 2.1 | mg/Kg | ☼ | 05/09/22 08:00 | 05/13/22 11:51 | 1 |
| Arsenic | ND | | 0.51 | 0.13 | mg/Kg | ☼ | 05/09/22 08:00 | 05/13/22 11:51 | 1 |
| **Cobalt** | **2.1** | **J** | 2.5 | 0.046 | mg/Kg | ☼ | 05/09/22 08:00 | 05/13/22 11:51 | 1 |
| **Iron** | **260** | | 5.1 | 2.9 | mg/Kg | ☼ | 05/09/22 08:00 | 05/13/22 11:51 | 1 |
| **Lithium** | **1.9** | **J** | 2.5 | 0.15 | mg/Kg | ☼ | 05/09/22 08:00 | 05/13/22 11:51 | 1 |
| **Manganese** | **700** | **B** | 0.76 | 0.027 | mg/Kg | ☼ | 05/09/22 08:00 | 05/13/22 11:51 | 1 |

### Method: 6010B SEP - SEP Metals (ICP) - Step 4

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Aluminum** | **1400** | | 10 | 1.6 | mg/Kg | ☼ | 05/11/22 08:00 | 05/13/22 13:06 | 1 |
| **Arsenic** | **0.38** | **J B** | 0.51 | 0.22 | mg/Kg | ☼ | 05/11/22 08:00 | 05/13/22 13:06 | 1 |
| **Cobalt** | **1.2** | **J** | 2.5 | 0.054 | mg/Kg | ☼ | 05/11/22 08:00 | 05/13/22 13:06 | 1 |
| **Iron** | **5900** | | 5.1 | 2.9 | mg/Kg | ☼ | 05/11/22 08:00 | 05/13/22 13:06 | 1 |
| **Lithium** | **1.3** | **J** | 2.5 | 0.15 | mg/Kg | ☼ | 05/11/22 08:00 | 05/13/22 13:06 | 1 |
| **Manganese** | **240** | | 0.76 | 0.13 | mg/Kg | ☼ | 05/11/22 08:00 | 05/13/22 13:06 | 1 |

### Method: 6010B SEP - SEP Metals (ICP) - Step 5

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Aluminum** | **160** | | 150 | 24 | mg/Kg | ☼ | 05/19/22 08:00 | 05/20/22 12:28 | 5 |
| Arsenic | ND | | 7.6 | 1.9 | mg/Kg | ☼ | 05/19/22 08:00 | 05/20/22 12:28 | 5 |
| Cobalt | ND | | 38 | 0.61 | mg/Kg | ☼ | 05/19/22 08:00 | 05/20/22 12:28 | 5 |
| Iron | ND | | 76 | 45 | mg/Kg | ☼ | 05/19/22 08:00 | 05/20/22 12:28 | 5 |
| Lithium | ND | | 38 | 2.2 | mg/Kg | ☼ | 05/19/22 08:00 | 05/20/22 12:28 | 5 |
| **Manganese** | **2.0** | **J *1** | 11 | 1.9 | mg/Kg | ☼ | 05/19/22 08:00 | 05/20/22 12:28 | 5 |

### Method: 6010B SEP - SEP Metals (ICP) - Step 6

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Aluminum** | **15000** | | 10 | 1.6 | mg/Kg | ☼ | 05/20/22 10:08 | 05/24/22 10:48 | 1 |
| Arsenic | ND | L | 0.51 | 0.15 | mg/Kg | ☼ | 05/20/22 10:08 | 05/24/22 10:48 | 1 |
| **Cobalt** | **10** | | 5.1 | 0.093 | mg/Kg | ☼ | 05/20/22 10:08 | 05/24/22 14:00 | 2 |
| **Iron** | **19000** | | 5.1 | 2.9 | mg/Kg | ☼ | 05/20/22 10:08 | 05/24/22 10:48 | 1 |
| **Lithium** | **9.1** | | 2.5 | 0.15 | mg/Kg | ☼ | 05/20/22 10:08 | 05/24/22 10:48 | 1 |
| **Manganese** | **100** | | 0.76 | 0.25 | mg/Kg | ☼ | 05/20/22 10:08 | 05/24/22 10:48 | 1 |

**Client Sample ID: B-113D-19-20'** **Lab Sample ID: 140-27231-1**
**Date Collected: 04/19/22 14:00** **Matrix: Solid**
**Date Received: 04/25/22 09:30** **Percent Solids: 98.7**

### Method: 6010B SEP - SEP Metals (ICP) - Step 7

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 20000 | | 100 | 16 | mg/Kg | ☼ | 05/23/22 08:00 | 05/26/22 10:46 | 10 |
| Arsenic | ND | | 1.5 | 0.39 | mg/Kg | ☼ | 05/23/22 08:00 | 05/26/22 13:55 | 3 |
| Cobalt | 1.8 | J | 7.6 | 0.079 | mg/Kg | ☼ | 05/23/22 08:00 | 05/26/22 13:55 | 3 |
| Iron | 9000 | | 5.1 | 4.2 | mg/Kg | ☼ | 05/23/22 08:00 | 05/26/22 12:14 | 1 |
| Lithium | 5.3 | | 2.5 | 0.15 | mg/Kg | ☼ | 05/23/22 08:00 | 05/26/22 12:14 | 1 |
| Manganese | 120 | | 0.76 | 0.11 | mg/Kg | ☼ | 05/23/22 08:00 | 05/26/22 12:14 | 1 |

### Method: 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 37000 | | 10 | 1.6 | mg/Kg | | | 05/31/22 15:33 | 1 |
| Arsenic | 0.38 | J | 0.50 | 0.13 | mg/Kg | | | 05/31/22 15:33 | 1 |
| Cobalt | 15 | | 2.5 | 0.023 | mg/Kg | | | 05/31/22 15:33 | 1 |
| Iron | 35000 | | 5.0 | 4.1 | mg/Kg | | | 05/31/22 15:33 | 1 |
| Lithium | 18 | | 2.5 | 0.15 | mg/Kg | | | 05/31/22 15:33 | 1 |
| Manganese | 1200 | | 0.75 | 0.052 | mg/Kg | | | 05/31/22 15:33 | 1 |

### Method: 6010B - SEP Metals (ICP) - Total

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 47000 | | 100 | 16 | mg/Kg | ☼ | 05/04/22 08:00 | 05/27/22 10:23 | 10 |
| Arsenic | ND | | 2.5 | 0.66 | mg/Kg | ☼ | 05/04/22 08:00 | 05/27/22 13:38 | 5 |
| Cobalt | 16 | | 13 | 0.13 | mg/Kg | ☼ | 05/04/22 08:00 | 05/27/22 13:38 | 5 |
| Iron | 37000 | | 25 | 21 | mg/Kg | ☼ | 05/04/22 08:00 | 05/27/22 13:38 | 5 |
| Lithium | 19 | | 2.5 | 0.15 | mg/Kg | ☼ | 05/04/22 08:00 | 05/27/22 12:03 | 1 |
| Manganese | 970 | | 0.76 | 0.11 | mg/Kg | ☼ | 05/04/22 08:00 | 05/27/22 12:03 | 1 |

## Client Sample ID: B-104D-55-56'
**Lab Sample ID: 140-27231-2**

**Date Collected: 04/19/22 14:00**
**Matrix: Solid**
**Date Received: 04/25/22 09:30**

### Method: 6010B SEP - SEP Metals (ICP) - Step 1

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | ND | | 40 | 6.4 | mg/Kg | | 05/05/22 08:00 | 05/09/22 12:32 | 4 |
| Arsenic | ND | | 2.0 | 0.52 | mg/Kg | | 05/05/22 08:00 | 05/09/22 12:32 | 4 |
| Cobalt | ND | | 10 | 0.18 | mg/Kg | | 05/05/22 08:00 | 05/09/22 12:32 | 4 |
| Iron | ND | | 20 | 12 | mg/Kg | | 05/05/22 08:00 | 05/09/22 12:32 | 4 |
| Lithium | ND | | 10 | 0.60 | mg/Kg | | 05/05/22 08:00 | 05/09/22 12:32 | 4 |
| **Manganese** | **1.1** | **J** | 3.0 | 0.12 | mg/Kg | | 05/05/22 08:00 | 05/09/22 12:32 | 4 |

### Method: 6010B SEP - SEP Metals (ICP) - Step 2

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Aluminum** | **18** | **J** | 30 | 4.8 | mg/Kg | | 05/06/22 08:00 | 05/09/22 13:56 | 3 |
| **Arsenic** | **0.42** | **J** | 1.5 | 0.39 | mg/Kg | | 05/06/22 08:00 | 05/09/22 13:56 | 3 |
| Cobalt | ND | | 7.5 | 0.19 | mg/Kg | | 05/06/22 08:00 | 05/09/22 13:56 | 3 |
| **Iron** | **76** | | 15 | 8.7 | mg/Kg | | 05/06/22 08:00 | 05/09/22 13:56 | 3 |
| **Lithium** | **0.47** | **J** | 7.5 | 0.45 | mg/Kg | | 05/06/22 08:00 | 05/09/22 13:56 | 3 |
| **Manganese** | **6.3** | | 2.3 | 0.84 | mg/Kg | | 05/06/22 08:00 | 05/09/22 13:56 | 3 |

### Method: 6010B SEP - SEP Metals (ICP) - Step 3

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Aluminum** | **60** | | 10 | 2.1 | mg/Kg | | 05/09/22 08:00 | 05/13/22 12:37 | 1 |
| Arsenic | ND | | 0.50 | 0.13 | mg/Kg | | 05/09/22 08:00 | 05/13/22 12:37 | 1 |
| Cobalt | ND | | 2.5 | 0.045 | mg/Kg | | 05/09/22 08:00 | 05/13/22 12:37 | 1 |
| **Iron** | **180** | | 5.0 | 2.9 | mg/Kg | | 05/09/22 08:00 | 05/13/22 12:37 | 1 |
| **Lithium** | **0.15** | **J** | 2.5 | 0.15 | mg/Kg | | 05/09/22 08:00 | 05/13/22 12:37 | 1 |
| **Manganese** | **2.8** | **B** | 0.75 | 0.027 | mg/Kg | | 05/09/22 08:00 | 05/13/22 12:37 | 1 |

### Method: 6010B SEP - SEP Metals (ICP) - Step 4

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Aluminum** | **800** | | 10 | 1.6 | mg/Kg | | 05/11/22 08:00 | 05/13/22 14:00 | 1 |
| **Arsenic** | **0.79** | **B** | 0.50 | 0.22 | mg/Kg | | 05/11/22 08:00 | 05/13/22 14:00 | 1 |
| **Cobalt** | **0.30** | **J** | 2.5 | 0.053 | mg/Kg | | 05/11/22 08:00 | 05/13/22 14:00 | 1 |
| **Iron** | **1800** | | 5.0 | 2.9 | mg/Kg | | 05/11/22 08:00 | 05/13/22 14:00 | 1 |
| **Lithium** | **1.8** | **J** | 2.5 | 0.15 | mg/Kg | | 05/11/22 08:00 | 05/13/22 14:00 | 1 |
| **Manganese** | **14** | | 0.75 | 0.13 | mg/Kg | | 05/11/22 08:00 | 05/13/22 14:00 | 1 |

### Method: 6010B SEP - SEP Metals (ICP) - Step 5

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Aluminum** | **110** | **J** | 150 | 24 | mg/Kg | | 05/19/22 08:00 | 05/20/22 13:23 | 5 |
| Arsenic | ND | | 7.5 | 1.9 | mg/Kg | | 05/19/22 08:00 | 05/20/22 13:23 | 5 |
| Cobalt | ND | | 38 | 0.60 | mg/Kg | | 05/19/22 08:00 | 05/20/22 13:23 | 5 |
| Iron | ND | | 75 | 44 | mg/Kg | | 05/19/22 08:00 | 05/20/22 13:23 | 5 |
| Lithium | ND | | 38 | 2.2 | mg/Kg | | 05/19/22 08:00 | 05/20/22 13:23 | 5 |
| Manganese | ND | *1 | 11 | 1.9 | mg/Kg | | 05/19/22 08:00 | 05/20/22 13:23 | 5 |

### Method: 6010B SEP - SEP Metals (ICP) - Step 6

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Aluminum** | **7500** | | 10 | 1.6 | mg/Kg | | 05/20/22 10:08 | 05/24/22 11:44 | 1 |
| Arsenic | ND | L | 0.50 | 0.15 | mg/Kg | | 05/20/22 10:08 | 05/24/22 11:44 | 1 |
| **Cobalt** | **6.9** | | 2.5 | 0.046 | mg/Kg | | 05/20/22 10:08 | 05/24/22 11:44 | 1 |
| **Iron** | **15000** | | 5.0 | 2.9 | mg/Kg | | 05/20/22 10:08 | 05/24/22 11:44 | 1 |
| **Lithium** | **16** | | 2.5 | 0.15 | mg/Kg | | 05/20/22 10:08 | 05/24/22 11:44 | 1 |
| **Manganese** | **94** | | 0.75 | 0.25 | mg/Kg | | 05/20/22 10:08 | 05/24/22 11:44 | 1 |

# Client Sample Results

Client: Golder Associates Inc. Job ID: 140-27231-1
Project/Site: Plant McDonough NES Well Installation

## Client Sample ID: B-104D-55-56'
**Lab Sample ID: 140-27231-2**
**Date Collected: 04/19/22 14:00**
**Matrix: Solid**
**Date Received: 04/25/22 09:30**

### Method: 6010B SEP - SEP Metals (ICP) - Step 7

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 23000 | | 100 | 16 | mg/Kg | | 05/23/22 08:00 | 05/26/22 11:40 | 10 |
| Arsenic | ND | L | 0.50 | 0.13 | mg/Kg | | 05/23/22 08:00 | 05/26/22 13:11 | 1 |
| Cobalt | 4.4 | J | 13 | 0.13 | mg/Kg | | 05/23/22 08:00 | 05/26/22 14:48 | 5 |
| Iron | 17000 | | 5.0 | 4.1 | mg/Kg | | 05/23/22 08:00 | 05/26/22 13:11 | 1 |
| Lithium | 14 | | 2.5 | 0.15 | mg/Kg | | 05/23/22 08:00 | 05/26/22 13:11 | 1 |
| Manganese | 450 | | 0.75 | 0.11 | mg/Kg | | 05/23/22 08:00 | 05/26/22 13:11 | 1 |

### Method: 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 31000 | | 10 | 1.6 | mg/Kg | | | 05/31/22 15:33 | 1 |
| Arsenic | 1.2 | | 0.50 | 0.13 | mg/Kg | | | 05/31/22 15:33 | 1 |
| Cobalt | 12 | | 2.5 | 0.023 | mg/Kg | | | 05/31/22 15:33 | 1 |
| Iron | 34000 | | 5.0 | 4.1 | mg/Kg | | | 05/31/22 15:33 | 1 |
| Lithium | 33 | | 2.5 | 0.15 | mg/Kg | | | 05/31/22 15:33 | 1 |
| Manganese | 560 | | 0.75 | 0.052 | mg/Kg | | | 05/31/22 15:33 | 1 |

### Method: 6010B - SEP Metals (ICP) - Total

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 35000 | | 100 | 16 | mg/Kg | | 05/04/22 08:00 | 05/27/22 11:15 | 10 |
| Arsenic | ND | | 1.5 | 0.39 | mg/Kg | | 05/04/22 08:00 | 05/27/22 14:33 | 3 |
| Cobalt | 8.5 | | 7.5 | 0.078 | mg/Kg | | 05/04/22 08:00 | 05/27/22 14:33 | 3 |
| Iron | 26000 | | 15 | 12 | mg/Kg | | 05/04/22 08:00 | 05/27/22 14:33 | 3 |
| Lithium | 28 | | 7.5 | 0.45 | mg/Kg | | 05/04/22 08:00 | 05/27/22 14:33 | 3 |
| Manganese | 360 | | 2.3 | 0.33 | mg/Kg | | 05/04/22 08:00 | 05/27/22 14:33 | 3 |

### Method: Part Size Red - Particle Size Reduction Preparation

| Analyte | Result | Qualifier | NONE | NONE | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| PSR sample generated | DONE | | | | NONE | | | 04/28/22 07:25 | 1 |

**Client Sample ID: B-115D-75-76'** **Lab Sample ID: 140-27231-3**
**Date Collected: 04/19/22 14:00** **Matrix: Solid**
**Date Received: 04/25/22 09:30**

### Method: 6010B SEP - SEP Metals (ICP) - Step 1

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | ND | | 40 | 6.4 | mg/Kg | | 05/05/22 08:00 | 05/09/22 12:46 | 4 |
| Arsenic | ND | | 2.0 | 0.52 | mg/Kg | | 05/05/22 08:00 | 05/09/22 12:46 | 4 |
| Cobalt | ND | | 10 | 0.18 | mg/Kg | | 05/05/22 08:00 | 05/09/22 12:46 | 4 |
| Iron | ND | | 20 | 12 | mg/Kg | | 05/05/22 08:00 | 05/09/22 12:46 | 4 |
| Lithium | ND | | 10 | 0.60 | mg/Kg | | 05/05/22 08:00 | 05/09/22 12:46 | 4 |
| **Manganese** | **0.40** | **J** | 3.0 | 0.12 | mg/Kg | | 05/05/22 08:00 | 05/09/22 12:46 | 4 |

### Method: 6010B SEP - SEP Metals (ICP) - Step 2

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Aluminum** | **4.9** | **J** | 30 | 4.8 | mg/Kg | | 05/06/22 08:00 | 05/09/22 14:04 | 3 |
| Arsenic | ND | | 1.5 | 0.39 | mg/Kg | | 05/06/22 08:00 | 05/09/22 14:04 | 3 |
| Cobalt | ND | | 7.5 | 0.19 | mg/Kg | | 05/06/22 08:00 | 05/09/22 14:04 | 3 |
| **Iron** | **15** | | 15 | 8.7 | mg/Kg | | 05/06/22 08:00 | 05/09/22 14:04 | 3 |
| Lithium | ND | | 7.5 | 0.45 | mg/Kg | | 05/06/22 08:00 | 05/09/22 14:04 | 3 |
| **Manganese** | **1.8** | **J** | 2.3 | 0.84 | mg/Kg | | 05/06/22 08:00 | 05/09/22 14:04 | 3 |

### Method: 6010B SEP - SEP Metals (ICP) - Step 3

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Aluminum** | **20** | | 10 | 2.1 | mg/Kg | | 05/09/22 08:00 | 05/13/22 12:51 | 1 |
| Arsenic | ND | | 0.50 | 0.13 | mg/Kg | | 05/09/22 08:00 | 05/13/22 12:51 | 1 |
| **Cobalt** | **0.091** | **J** | 2.5 | 0.045 | mg/Kg | | 05/09/22 08:00 | 05/13/22 12:51 | 1 |
| **Iron** | **51** | | 5.0 | 2.9 | mg/Kg | | 05/09/22 08:00 | 05/13/22 12:51 | 1 |
| Lithium | ND | | 2.5 | 0.15 | mg/Kg | | 05/09/22 08:00 | 05/13/22 12:51 | 1 |
| **Manganese** | **1.3** | **B** | 0.75 | 0.027 | mg/Kg | | 05/09/22 08:00 | 05/13/22 12:51 | 1 |

### Method: 6010B SEP - SEP Metals (ICP) - Step 4

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Aluminum** | **740** | | 10 | 1.6 | mg/Kg | | 05/11/22 08:00 | 05/13/22 14:05 | 1 |
| **Arsenic** | **0.77** | **B** | 0.50 | 0.22 | mg/Kg | | 05/11/22 08:00 | 05/13/22 14:05 | 1 |
| **Cobalt** | **0.43** | **J** | 2.5 | 0.053 | mg/Kg | | 05/11/22 08:00 | 05/13/22 14:05 | 1 |
| **Iron** | **1600** | | 5.0 | 2.9 | mg/Kg | | 05/11/22 08:00 | 05/13/22 14:05 | 1 |
| **Lithium** | **1.6** | **J** | 2.5 | 0.15 | mg/Kg | | 05/11/22 08:00 | 05/13/22 14:05 | 1 |
| **Manganese** | **12** | | 0.75 | 0.13 | mg/Kg | | 05/11/22 08:00 | 05/13/22 14:05 | 1 |

### Method: 6010B SEP - SEP Metals (ICP) - Step 5

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Aluminum** | **120** | **J** | 150 | 24 | mg/Kg | | 05/19/22 08:00 | 05/20/22 13:28 | 5 |
| Arsenic | ND | | 7.5 | 1.9 | mg/Kg | | 05/19/22 08:00 | 05/20/22 13:28 | 5 |
| Cobalt | ND | | 38 | 0.60 | mg/Kg | | 05/19/22 08:00 | 05/20/22 13:28 | 5 |
| Iron | ND | | 75 | 44 | mg/Kg | | 05/19/22 08:00 | 05/20/22 13:28 | 5 |
| Lithium | ND | | 38 | 2.2 | mg/Kg | | 05/19/22 08:00 | 05/20/22 13:28 | 5 |
| Manganese | ND | *1 | 11 | 1.9 | mg/Kg | | 05/19/22 08:00 | 05/20/22 13:28 | 5 |

### Method: 6010B SEP - SEP Metals (ICP) - Step 6

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Aluminum** | **6000** | | 10 | 1.6 | mg/Kg | | 05/20/22 10:08 | 05/24/22 11:49 | 1 |
| Arsenic | ND | | 0.50 | 0.15 | mg/Kg | | 05/20/22 10:08 | 05/24/22 11:49 | 1 |
| **Cobalt** | **5.9** | | 2.5 | 0.046 | mg/Kg | | 05/20/22 10:08 | 05/24/22 11:49 | 1 |
| **Iron** | **12000** | | 5.0 | 2.9 | mg/Kg | | 05/20/22 10:08 | 05/24/22 11:49 | 1 |
| **Lithium** | **12** | | 2.5 | 0.15 | mg/Kg | | 05/20/22 10:08 | 05/24/22 11:49 | 1 |
| **Manganese** | **67** | | 0.75 | 0.25 | mg/Kg | | 05/20/22 10:08 | 05/24/22 11:49 | 1 |

# Client Sample Results

Client: Golder Associates Inc. Job ID: 140-27231-1
Project/Site: Plant McDonough NES Well Installation

## Client Sample ID: B-115D-75-76'
**Lab Sample ID: 140-27231-3**
**Date Collected: 04/19/22 14:00**
**Matrix: Solid**
**Date Received: 04/25/22 09:30**

### Method: 6010B SEP - SEP Metals (ICP) - Step 7

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 22000 | | 100 | 16 | mg/Kg | | 05/23/22 08:00 | 05/26/22 11:45 | 10 |
| Arsenic | ND | L | 0.50 | 0.13 | mg/Kg | | 05/23/22 08:00 | 05/26/22 13:16 | 1 |
| Cobalt | 4.3 | J | 13 | 0.13 | mg/Kg | | 05/23/22 08:00 | 05/26/22 14:52 | 5 |
| Iron | 15000 | | 5.0 | 4.1 | mg/Kg | | 05/23/22 08:00 | 05/26/22 13:16 | 1 |
| Lithium | 10 | | 2.5 | 0.15 | mg/Kg | | 05/23/22 08:00 | 05/26/22 13:16 | 1 |
| Manganese | 320 | | 0.75 | 0.11 | mg/Kg | | 05/23/22 08:00 | 05/26/22 13:16 | 1 |

### Method: 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 29000 | | 10 | 1.6 | mg/Kg | | | 05/31/22 15:33 | 1 |
| Arsenic | 0.77 | | 0.50 | 0.13 | mg/Kg | | | 05/31/22 15:33 | 1 |
| Cobalt | 11 | | 2.5 | 0.023 | mg/Kg | | | 05/31/22 15:33 | 1 |
| Iron | 29000 | | 5.0 | 4.1 | mg/Kg | | | 05/31/22 15:33 | 1 |
| Lithium | 24 | | 2.5 | 0.15 | mg/Kg | | | 05/31/22 15:33 | 1 |
| Manganese | 410 | | 0.75 | 0.052 | mg/Kg | | | 05/31/22 15:33 | 1 |

### Method: 6010B - SEP Metals (ICP) - Total

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 36000 | | 100 | 16 | mg/Kg | | 05/04/22 08:00 | 05/27/22 11:20 | 10 |
| Arsenic | ND | | 2.5 | 0.65 | mg/Kg | | 05/04/22 08:00 | 05/27/22 14:38 | 5 |
| Cobalt | 14 | | 13 | 0.13 | mg/Kg | | 05/04/22 08:00 | 05/27/22 14:38 | 5 |
| Iron | 43000 | | 25 | 21 | mg/Kg | | 05/04/22 08:00 | 05/27/22 14:38 | 5 |
| Lithium | 44 | | 13 | 0.75 | mg/Kg | | 05/04/22 08:00 | 05/27/22 14:38 | 5 |
| Manganese | 240 | | 0.75 | 0.11 | mg/Kg | | 05/04/22 08:00 | 05/27/22 13:09 | 1 |

### Method: Part Size Red - Particle Size Reduction Preparation

| Analyte | Result | Qualifier | NONE | NONE | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| PSR sample generated | DONE | | | | NONE | | | 04/28/22 07:25 | 1 |

# Client Sample Results

Client: Golder Associates Inc. Job ID: 140-27231-1
Project/Site: Plant McDonough NES Well Installation

## Client Sample ID: B-47-11-12' Lab Sample ID: 140-27231-4
Date Collected: 04/19/22 14:00 Matrix: Solid
Date Received: 04/25/22 09:30 Percent Solids: 99.2

### Method: 6010B SEP - SEP Metals (ICP) - Step 1

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 12 | J | 40 | 6.5 | mg/Kg | ☼ | 05/05/22 08:00 | 05/09/22 11:52 | 4 |
| Arsenic | ND | | 2.0 | 0.52 | mg/Kg | ☼ | 05/05/22 08:00 | 05/09/22 11:52 | 4 |
| Cobalt | ND | | 10 | 0.18 | mg/Kg | ☼ | 05/05/22 08:00 | 05/09/22 11:52 | 4 |
| Iron | ND | | 20 | 12 | mg/Kg | ☼ | 05/05/22 08:00 | 05/09/22 11:52 | 4 |
| Lithium | ND | | 10 | 0.60 | mg/Kg | ☼ | 05/05/22 08:00 | 05/09/22 11:52 | 4 |
| Manganese | 2.5 | J | 3.0 | 0.13 | mg/Kg | ☼ | 05/05/22 08:00 | 05/09/22 11:52 | 4 |

### Method: 6010B SEP - SEP Metals (ICP) - Step 2

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 28 | J | 30 | 4.8 | mg/Kg | ☼ | 05/06/22 08:00 | 05/09/22 13:06 | 3 |
| Arsenic | ND | | 1.5 | 0.39 | mg/Kg | ☼ | 05/06/22 08:00 | 05/09/22 13:06 | 3 |
| Cobalt | ND | | 7.6 | 0.19 | mg/Kg | ☼ | 05/06/22 08:00 | 05/09/22 13:06 | 3 |
| Iron | 21 | | 15 | 8.8 | mg/Kg | ☼ | 05/06/22 08:00 | 05/09/22 13:06 | 3 |
| Lithium | 0.69 | J | 7.6 | 0.45 | mg/Kg | ☼ | 05/06/22 08:00 | 05/09/22 13:06 | 3 |
| Manganese | ND | | 2.3 | 0.85 | mg/Kg | ☼ | 05/06/22 08:00 | 05/09/22 13:06 | 3 |

### Method: 6010B SEP - SEP Metals (ICP) - Step 3

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 300 | | 10 | 2.1 | mg/Kg | ☼ | 05/09/22 08:00 | 05/13/22 11:56 | 1 |
| Arsenic | 0.21 | J | 0.50 | 0.13 | mg/Kg | ☼ | 05/09/22 08:00 | 05/13/22 11:56 | 1 |
| Cobalt | 0.22 | J | 2.5 | 0.045 | mg/Kg | ☼ | 05/09/22 08:00 | 05/13/22 11:56 | 1 |
| Iron | 1300 | | 5.0 | 2.9 | mg/Kg | ☼ | 05/09/22 08:00 | 05/13/22 11:56 | 1 |
| Lithium | 0.33 | J | 2.5 | 0.15 | mg/Kg | ☼ | 05/09/22 08:00 | 05/13/22 11:56 | 1 |
| Manganese | 9.1 | B | 0.76 | 0.027 | mg/Kg | ☼ | 05/09/22 08:00 | 05/13/22 11:56 | 1 |

### Method: 6010B SEP - SEP Metals (ICP) - Step 4

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 2000 | | 10 | 1.6 | mg/Kg | ☼ | 05/11/22 08:00 | 05/13/22 13:11 | 1 |
| Arsenic | 0.58 | B | 0.50 | 0.22 | mg/Kg | ☼ | 05/11/22 08:00 | 05/13/22 13:11 | 1 |
| Cobalt | 0.91 | J | 2.5 | 0.053 | mg/Kg | ☼ | 05/11/22 08:00 | 05/13/22 13:11 | 1 |
| Iron | 10000 | | 5.0 | 2.9 | mg/Kg | ☼ | 05/11/22 08:00 | 05/13/22 13:11 | 1 |
| Lithium | 3.9 | | 2.5 | 0.15 | mg/Kg | ☼ | 05/11/22 08:00 | 05/13/22 13:11 | 1 |
| Manganese | 8.2 | | 0.76 | 0.13 | mg/Kg | ☼ | 05/11/22 08:00 | 05/13/22 13:11 | 1 |

### Method: 6010B SEP - SEP Metals (ICP) - Step 5

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 190 | | 150 | 24 | mg/Kg | ☼ | 05/19/22 08:00 | 05/20/22 12:33 | 5 |
| Arsenic | ND | | 7.6 | 1.9 | mg/Kg | ☼ | 05/19/22 08:00 | 05/20/22 12:33 | 5 |
| Cobalt | ND | | 38 | 0.60 | mg/Kg | ☼ | 05/19/22 08:00 | 05/20/22 12:33 | 5 |
| Iron | ND | | 76 | 44 | mg/Kg | ☼ | 05/19/22 08:00 | 05/20/22 12:33 | 5 |
| Lithium | 4.2 | J | 38 | 2.2 | mg/Kg | ☼ | 05/19/22 08:00 | 05/20/22 12:33 | 5 |
| Manganese | ND | *1 | 11 | 1.9 | mg/Kg | ☼ | 05/19/22 08:00 | 05/20/22 12:33 | 5 |

### Method: 6010B SEP - SEP Metals (ICP) - Step 6

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 17000 | | 10 | 1.6 | mg/Kg | ☼ | 05/20/22 10:08 | 05/24/22 10:53 | 1 |
| Arsenic | 0.48 | J | 0.50 | 0.15 | mg/Kg | ☼ | 05/20/22 10:08 | 05/24/22 10:53 | 1 |
| Cobalt | 4.1 | | 2.5 | 0.046 | mg/Kg | ☼ | 05/20/22 10:08 | 05/24/22 10:53 | 1 |
| Iron | 25000 | | 5.0 | 2.9 | mg/Kg | ☼ | 05/20/22 10:08 | 05/24/22 10:53 | 1 |
| Lithium | 28 | | 2.5 | 0.15 | mg/Kg | ☼ | 05/20/22 10:08 | 05/24/22 10:53 | 1 |
| Manganese | 48 | | 0.76 | 0.25 | mg/Kg | ☼ | 05/20/22 10:08 | 05/24/22 10:53 | 1 |

**Client Sample ID: B-47-11-12'** **Lab Sample ID: 140-27231-4**
**Date Collected: 04/19/22 14:00** **Matrix: Solid**
**Date Received: 04/25/22 09:30** **Percent Solids: 99.2**

### Method: 6010B SEP - SEP Metals (ICP) - Step 7

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Aluminum** | **29000** | | 100 | 16 | mg/Kg | ☼ | 05/23/22 08:00 | 05/26/22 10:51 | 10 |
| Arsenic | ND | | 0.50 | 0.13 | mg/Kg | ☼ | 05/23/22 08:00 | 05/26/22 12:29 | 1 |
| **Cobalt** | **1.4** | **J** | 13 | 0.13 | mg/Kg | ☼ | 05/23/22 08:00 | 05/26/22 14:00 | 5 |
| **Iron** | **11000** | | 5.0 | 4.1 | mg/Kg | ☼ | 05/23/22 08:00 | 05/26/22 12:29 | 1 |
| **Lithium** | **13** | | 2.5 | 0.15 | mg/Kg | ☼ | 05/23/22 08:00 | 05/26/22 12:29 | 1 |
| **Manganese** | **110** | | 0.76 | 0.11 | mg/Kg | ☼ | 05/23/22 08:00 | 05/26/22 12:29 | 1 |

### Method: 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Aluminum** | **49000** | | 10 | 1.6 | mg/Kg | | | 05/31/22 15:33 | 1 |
| **Arsenic** | **1.3** | | 0.50 | 0.13 | mg/Kg | | | 05/31/22 15:33 | 1 |
| **Cobalt** | **6.6** | | 2.5 | 0.023 | mg/Kg | | | 05/31/22 15:33 | 1 |
| **Iron** | **47000** | | 5.0 | 4.1 | mg/Kg | | | 05/31/22 15:33 | 1 |
| **Lithium** | **49** | | 2.5 | 0.15 | mg/Kg | | | 05/31/22 15:33 | 1 |
| **Manganese** | **180** | | 0.75 | 0.052 | mg/Kg | | | 05/31/22 15:33 | 1 |

### Method: 6010B - SEP Metals (ICP) - Total

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Aluminum** | **63000** | | 100 | 16 | mg/Kg | ☼ | 05/04/22 08:00 | 05/27/22 10:27 | 10 |
| Arsenic | ND | | 2.5 | 0.66 | mg/Kg | ☼ | 05/04/22 08:00 | 05/27/22 13:42 | 5 |
| **Cobalt** | **8.6** | **J** | 25 | 0.26 | mg/Kg | ☼ | 05/04/22 08:00 | 05/27/22 10:27 | 10 |
| **Iron** | **54000** | | 25 | 21 | mg/Kg | ☼ | 05/04/22 08:00 | 05/27/22 13:42 | 5 |
| **Lithium** | **44** | | 2.5 | 0.15 | mg/Kg | ☼ | 05/04/22 08:00 | 05/27/22 12:09 | 1 |
| **Manganese** | **130** | | 0.76 | 0.11 | mg/Kg | ☼ | 05/04/22 08:00 | 05/27/22 12:09 | 1 |

# Client Sample Results

Client: Golder Associates Inc. Job ID: 140-27231-1
Project/Site: Plant McDonough NES Well Installation

## Client Sample ID: B-48-23-24'

Lab Sample ID: 140-27231-5
Date Collected: 04/19/22 14:00
Matrix: Solid
Date Received: 04/25/22 09:30
Percent Solids: 99.3

### Method: 6010B SEP - SEP Metals (ICP) - Step 1

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | ND | | 40 | 6.4 | mg/Kg | ☼ | 05/05/22 08:00 | 05/09/22 11:57 | 4 |
| Arsenic | ND | | 2.0 | 0.52 | mg/Kg | ☼ | 05/05/22 08:00 | 05/09/22 11:57 | 4 |
| Cobalt | ND | | 10 | 0.18 | mg/Kg | ☼ | 05/05/22 08:00 | 05/09/22 11:57 | 4 |
| Iron | ND | | 20 | 12 | mg/Kg | ☼ | 05/05/22 08:00 | 05/09/22 11:57 | 4 |
| Lithium | ND | | 10 | 0.60 | mg/Kg | ☼ | 05/05/22 08:00 | 05/09/22 11:57 | 4 |
| **Manganese** | **39** | | 3.0 | 0.12 | mg/Kg | ☼ | 05/05/22 08:00 | 05/09/22 11:57 | 4 |

### Method: 6010B SEP - SEP Metals (ICP) - Step 2

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Aluminum** | **23** | **J** | 30 | 4.8 | mg/Kg | ☼ | 05/06/22 08:00 | 05/09/22 13:11 | 3 |
| Arsenic | ND | | 1.5 | 0.39 | mg/Kg | ☼ | 05/06/22 08:00 | 05/09/22 13:11 | 3 |
| **Cobalt** | **0.28** | **J** | 7.5 | 0.19 | mg/Kg | ☼ | 05/06/22 08:00 | 05/09/22 13:11 | 3 |
| **Iron** | **22** | | 15 | 8.8 | mg/Kg | ☼ | 05/06/22 08:00 | 05/09/22 13:11 | 3 |
| **Lithium** | **0.52** | **J** | 7.5 | 0.45 | mg/Kg | ☼ | 05/06/22 08:00 | 05/09/22 13:11 | 3 |
| **Manganese** | **13** | | 2.3 | 0.85 | mg/Kg | ☼ | 05/06/22 08:00 | 05/09/22 13:11 | 3 |

### Method: 6010B SEP - SEP Metals (ICP) - Step 3

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Aluminum** | **320** | | 10 | 2.1 | mg/Kg | ☼ | 05/09/22 08:00 | 05/13/22 12:01 | 1 |
| **Arsenic** | **0.30** | **J** | 0.50 | 0.13 | mg/Kg | ☼ | 05/09/22 08:00 | 05/13/22 12:01 | 1 |
| **Cobalt** | **0.53** | **J** | 2.5 | 0.045 | mg/Kg | ☼ | 05/09/22 08:00 | 05/13/22 12:01 | 1 |
| **Iron** | **590** | | 5.0 | 2.9 | mg/Kg | ☼ | 05/09/22 08:00 | 05/13/22 12:01 | 1 |
| **Lithium** | **0.32** | **J** | 2.5 | 0.15 | mg/Kg | ☼ | 05/09/22 08:00 | 05/13/22 12:01 | 1 |
| **Manganese** | **18** | **B** | 0.75 | 0.027 | mg/Kg | ☼ | 05/09/22 08:00 | 05/13/22 12:01 | 1 |

### Method: 6010B SEP - SEP Metals (ICP) - Step 4

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Aluminum** | **2000** | | 10 | 1.6 | mg/Kg | ☼ | 05/11/22 08:00 | 05/13/22 13:16 | 1 |
| **Arsenic** | **0.79** | **B** | 0.50 | 0.22 | mg/Kg | ☼ | 05/11/22 08:00 | 05/13/22 13:16 | 1 |
| **Cobalt** | **1.7** | **J** | 2.5 | 0.053 | mg/Kg | ☼ | 05/11/22 08:00 | 05/13/22 13:16 | 1 |
| **Iron** | **6200** | | 5.0 | 2.9 | mg/Kg | ☼ | 05/11/22 08:00 | 05/13/22 13:16 | 1 |
| **Lithium** | **4.2** | | 2.5 | 0.15 | mg/Kg | ☼ | 05/11/22 08:00 | 05/13/22 13:16 | 1 |
| **Manganese** | **61** | | 0.75 | 0.13 | mg/Kg | ☼ | 05/11/22 08:00 | 05/13/22 13:16 | 1 |

### Method: 6010B SEP - SEP Metals (ICP) - Step 5

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Aluminum** | **88** | **J** | 150 | 24 | mg/Kg | ☼ | 05/19/22 08:00 | 05/20/22 12:38 | 5 |
| Arsenic | ND | | 7.5 | 1.9 | mg/Kg | ☼ | 05/19/22 08:00 | 05/20/22 12:38 | 5 |
| Cobalt | ND | | 38 | 0.60 | mg/Kg | ☼ | 05/19/22 08:00 | 05/20/22 12:38 | 5 |
| Iron | ND | | 75 | 44 | mg/Kg | ☼ | 05/19/22 08:00 | 05/20/22 12:38 | 5 |
| **Lithium** | **4.2** | **J** | 38 | 2.2 | mg/Kg | ☼ | 05/19/22 08:00 | 05/20/22 12:38 | 5 |
| Manganese | ND | *1 | 11 | 1.9 | mg/Kg | ☼ | 05/19/22 08:00 | 05/20/22 12:38 | 5 |

### Method: 6010B SEP - SEP Metals (ICP) - Step 6

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Aluminum** | **12000** | | 30 | 4.8 | mg/Kg | ☼ | 05/20/22 10:08 | 05/24/22 16:12 | 3 |
| **Arsenic** | **2.1** | | 1.5 | 0.45 | mg/Kg | ☼ | 05/20/22 10:08 | 05/24/22 16:12 | 3 |
| **Cobalt** | **2.5** | **J** | 7.5 | 0.14 | mg/Kg | ☼ | 05/20/22 10:08 | 05/24/22 16:12 | 3 |
| **Iron** | **17000** | | 15 | 8.8 | mg/Kg | ☼ | 05/20/22 10:08 | 05/24/22 16:12 | 3 |
| **Lithium** | **17** | | 7.5 | 0.45 | mg/Kg | ☼ | 05/20/22 10:08 | 05/24/22 16:12 | 3 |
| **Manganese** | **200** | | 2.3 | 0.75 | mg/Kg | ☼ | 05/20/22 10:08 | 05/24/22 16:12 | 3 |

**Client Sample ID: B-48-23-24'** **Lab Sample ID: 140-27231-5**
**Date Collected: 04/19/22 14:00** **Matrix: Solid**
**Date Received: 04/25/22 09:30** **Percent Solids: 99.3**

### Method: 6010B SEP - SEP Metals (ICP) - Step 7

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 23000 | | 100 | 16 | mg/Kg | ☼ | 05/23/22 08:00 | 05/26/22 10:55 | 10 |
| Arsenic | ND | | 0.50 | 0.13 | mg/Kg | ☼ | 05/23/22 08:00 | 05/26/22 12:34 | 1 |
| Cobalt | 0.46 | J | 13 | 0.13 | mg/Kg | ☼ | 05/23/22 08:00 | 05/26/22 14:04 | 5 |
| Iron | 4700 | | 5.0 | 4.1 | mg/Kg | ☼ | 05/23/22 08:00 | 05/26/22 12:34 | 1 |
| Lithium | 3.4 | | 2.5 | 0.15 | mg/Kg | ☼ | 05/23/22 08:00 | 05/26/22 12:34 | 1 |
| Manganese | 380 | | 0.75 | 0.11 | mg/Kg | ☼ | 05/23/22 08:00 | 05/26/22 12:34 | 1 |

### Method: 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 37000 | | 10 | 1.6 | mg/Kg | | | 05/31/22 15:33 | 1 |
| Arsenic | 3.2 | | 0.50 | 0.13 | mg/Kg | | | 05/31/22 15:33 | 1 |
| Cobalt | 5.4 | | 2.5 | 0.023 | mg/Kg | | | 05/31/22 15:33 | 1 |
| Iron | 28000 | | 5.0 | 4.1 | mg/Kg | | | 05/31/22 15:33 | 1 |
| Lithium | 29 | | 2.5 | 0.15 | mg/Kg | | | 05/31/22 15:33 | 1 |
| Manganese | 710 | | 0.75 | 0.052 | mg/Kg | | | 05/31/22 15:33 | 1 |

### Method: 6010B - SEP Metals (ICP) - Total

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 61000 | | 100 | 16 | mg/Kg | ☼ | 05/04/22 08:00 | 05/27/22 10:32 | 10 |
| Arsenic | 2.4 | J | 2.5 | 0.65 | mg/Kg | ☼ | 05/04/22 08:00 | 05/27/22 14:58 | 5 |
| Cobalt | 5.1 | J | 13 | 0.13 | mg/Kg | ☼ | 05/04/22 08:00 | 05/27/22 14:58 | 5 |
| Iron | 31000 | | 25 | 21 | mg/Kg | ☼ | 05/04/22 08:00 | 05/27/22 14:58 | 5 |
| Lithium | 29 | | 13 | 0.75 | mg/Kg | ☼ | 05/04/22 08:00 | 05/27/22 14:58 | 5 |
| Manganese | 740 | | 3.8 | 0.55 | mg/Kg | ☼ | 05/04/22 08:00 | 05/27/22 14:58 | 5 |

# Client Sample Results

Client: Golder Associates Inc. Job ID: 140-27231-1
Project/Site: Plant McDonough NES Well Installation

## Client Sample ID: DGWC-121-38-40'
**Lab Sample ID: 140-27231-6**
**Date Collected: 04/19/22 14:00**
**Matrix: Solid**
**Date Received: 04/25/22 09:30**
**Percent Solids: 82.1**

### Method: 6010B SEP - SEP Metals (ICP) - Step 1

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | ND | | 49 | 7.8 | mg/Kg | ☼ | 05/05/22 08:00 | 05/09/22 12:02 | 4 |
| Arsenic | ND | | 2.4 | 0.63 | mg/Kg | ☼ | 05/05/22 08:00 | 05/09/22 12:02 | 4 |
| Cobalt | ND | | 12 | 0.22 | mg/Kg | ☼ | 05/05/22 08:00 | 05/09/22 12:02 | 4 |
| Iron | ND | | 24 | 14 | mg/Kg | ☼ | 05/05/22 08:00 | 05/09/22 12:02 | 4 |
| Lithium | ND | | 12 | 0.73 | mg/Kg | ☼ | 05/05/22 08:00 | 05/09/22 12:02 | 4 |
| **Manganese** | **3.7** | | 3.7 | 0.15 | mg/Kg | ☼ | 05/05/22 08:00 | 05/09/22 12:02 | 4 |

### Method: 6010B SEP - SEP Metals (ICP) - Step 2

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Aluminum** | **11** | **J** | 37 | 5.8 | mg/Kg | ☼ | 05/06/22 08:00 | 05/09/22 13:16 | 3 |
| Arsenic | ND | | 1.8 | 0.47 | mg/Kg | ☼ | 05/06/22 08:00 | 05/09/22 13:16 | 3 |
| Cobalt | ND | | 9.1 | 0.23 | mg/Kg | ☼ | 05/06/22 08:00 | 05/09/22 13:16 | 3 |
| Iron | ND | | 18 | 11 | mg/Kg | ☼ | 05/06/22 08:00 | 05/09/22 13:16 | 3 |
| Lithium | ND | | 9.1 | 0.55 | mg/Kg | ☼ | 05/06/22 08:00 | 05/09/22 13:16 | 3 |
| **Manganese** | **5.2** | | 2.7 | 1.0 | mg/Kg | ☼ | 05/06/22 08:00 | 05/09/22 13:16 | 3 |

### Method: 6010B SEP - SEP Metals (ICP) - Step 3

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Aluminum** | **100** | | 12 | 2.6 | mg/Kg | ☼ | 05/09/22 08:00 | 05/13/22 12:06 | 1 |
| Arsenic | ND | | 0.61 | 0.16 | mg/Kg | ☼ | 05/09/22 08:00 | 05/13/22 12:06 | 1 |
| **Cobalt** | **5.8** | | 3.0 | 0.055 | mg/Kg | ☼ | 05/09/22 08:00 | 05/13/22 12:06 | 1 |
| **Iron** | **240** | | 6.1 | 3.5 | mg/Kg | ☼ | 05/09/22 08:00 | 05/13/22 12:06 | 1 |
| **Lithium** | **0.65** | **J** | 3.0 | 0.18 | mg/Kg | ☼ | 05/09/22 08:00 | 05/13/22 12:06 | 1 |
| **Manganese** | **440** | **B** | 0.91 | 0.033 | mg/Kg | ☼ | 05/09/22 08:00 | 05/13/22 12:06 | 1 |

### Method: 6010B SEP - SEP Metals (ICP) - Step 4

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Aluminum** | **1500** | | 12 | 1.9 | mg/Kg | ☼ | 05/11/22 08:00 | 05/13/22 13:21 | 1 |
| **Arsenic** | **0.54** | **J B** | 0.61 | 0.27 | mg/Kg | ☼ | 05/11/22 08:00 | 05/13/22 13:21 | 1 |
| **Cobalt** | **2.4** | **J** | 3.0 | 0.065 | mg/Kg | ☼ | 05/11/22 08:00 | 05/13/22 13:21 | 1 |
| **Iron** | **7400** | | 6.1 | 3.5 | mg/Kg | ☼ | 05/11/22 08:00 | 05/13/22 13:21 | 1 |
| **Lithium** | **2.3** | **J** | 3.0 | 0.18 | mg/Kg | ☼ | 05/11/22 08:00 | 05/13/22 13:21 | 1 |
| **Manganese** | **130** | | 0.91 | 0.16 | mg/Kg | ☼ | 05/11/22 08:00 | 05/13/22 13:21 | 1 |

### Method: 6010B SEP - SEP Metals (ICP) - Step 5

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Aluminum** | **110** | **J** | 180 | 29 | mg/Kg | ☼ | 05/19/22 08:00 | 05/20/22 12:43 | 5 |
| Arsenic | ND | | 9.1 | 2.3 | mg/Kg | ☼ | 05/19/22 08:00 | 05/20/22 12:43 | 5 |
| Cobalt | ND | | 46 | 0.73 | mg/Kg | ☼ | 05/19/22 08:00 | 05/20/22 12:43 | 5 |
| Iron | ND | | 91 | 54 | mg/Kg | ☼ | 05/19/22 08:00 | 05/20/22 12:43 | 5 |
| Lithium | ND | | 46 | 2.7 | mg/Kg | ☼ | 05/19/22 08:00 | 05/20/22 12:43 | 5 |
| Manganese | ND | *1 | 14 | 2.3 | mg/Kg | ☼ | 05/19/22 08:00 | 05/20/22 12:43 | 5 |

### Method: 6010B SEP - SEP Metals (ICP) - Step 6

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Aluminum** | **8400** | | 12 | 1.9 | mg/Kg | ☼ | 05/20/22 10:08 | 05/24/22 11:03 | 1 |
| Arsenic | ND | | 0.61 | 0.18 | mg/Kg | ☼ | 05/20/22 10:08 | 05/24/22 11:03 | 1 |
| **Cobalt** | **6.9** | | 3.0 | 0.056 | mg/Kg | ☼ | 05/20/22 10:08 | 05/24/22 11:03 | 1 |
| **Iron** | **21000** | | 6.1 | 3.5 | mg/Kg | ☼ | 05/20/22 10:08 | 05/24/22 11:03 | 1 |
| **Lithium** | **9.6** | | 3.0 | 0.18 | mg/Kg | ☼ | 05/20/22 10:08 | 05/24/22 11:03 | 1 |
| **Manganese** | **52** | | 0.91 | 0.30 | mg/Kg | ☼ | 05/20/22 10:08 | 05/24/22 11:03 | 1 |

**Client Sample ID: DGWC-121-38-40'** **Lab Sample ID: 140-27231-6**
**Date Collected: 04/19/22 14:00** **Matrix: Solid**
**Date Received: 04/25/22 09:30** **Percent Solids: 82.1**

### Method: 6010B SEP - SEP Metals (ICP) - Step 7

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Aluminum** | **36000** | | 120 | 19 | mg/Kg | ☼ | 05/23/22 08:00 | 05/26/22 11:00 | 10 |
| Arsenic | ND | | 3.0 | 0.79 | mg/Kg | ☼ | 05/23/22 08:00 | 05/26/22 14:09 | 5 |
| **Cobalt** | **2.4** | **J** | 15 | 0.16 | mg/Kg | ☼ | 05/23/22 08:00 | 05/26/22 14:09 | 5 |
| **Iron** | **14000** | | 6.1 | 5.0 | mg/Kg | ☼ | 05/23/22 08:00 | 05/26/22 12:40 | 1 |
| **Lithium** | **7.7** | | 3.0 | 0.18 | mg/Kg | ☼ | 05/23/22 08:00 | 05/26/22 12:40 | 1 |
| **Manganese** | **200** | | 0.91 | 0.13 | mg/Kg | ☼ | 05/23/22 08:00 | 05/26/22 12:40 | 1 |

### Method: 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Aluminum** | **46000** | | 10 | 1.6 | mg/Kg | | | 05/31/22 15:33 | 1 |
| **Arsenic** | **0.54** | | 0.50 | 0.13 | mg/Kg | | | 05/31/22 15:33 | 1 |
| **Cobalt** | **18** | | 2.5 | 0.023 | mg/Kg | | | 05/31/22 15:33 | 1 |
| **Iron** | **42000** | | 5.0 | 4.1 | mg/Kg | | | 05/31/22 15:33 | 1 |
| **Lithium** | **20** | | 2.5 | 0.15 | mg/Kg | | | 05/31/22 15:33 | 1 |
| **Manganese** | **830** | | 0.75 | 0.052 | mg/Kg | | | 05/31/22 15:33 | 1 |

### Method: 6010B - SEP Metals (ICP) - Total

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Aluminum** | **64000** | | 120 | 19 | mg/Kg | ☼ | 05/04/22 08:00 | 05/27/22 10:37 | 10 |
| Arsenic | ND | | 3.0 | 0.79 | mg/Kg | ☼ | 05/04/22 08:00 | 05/27/22 13:53 | 5 |
| **Cobalt** | **18** | | 15 | 0.16 | mg/Kg | ☼ | 05/04/22 08:00 | 05/27/22 13:53 | 5 |
| **Iron** | **50000** | | 30 | 25 | mg/Kg | ☼ | 05/04/22 08:00 | 05/27/22 13:53 | 5 |
| **Lithium** | **24** | | 15 | 0.91 | mg/Kg | ☼ | 05/04/22 08:00 | 05/27/22 13:53 | 5 |
| **Manganese** | **610** | | 0.91 | 0.13 | mg/Kg | ☼ | 05/04/22 08:00 | 05/27/22 12:20 | 1 |

# Client Sample Results

Client: Golder Associates Inc. Job ID: 140-27231-1
Project/Site: Plant McDonough NES Well Installation

## Client Sample ID: DGWC-121-49-50'

Lab Sample ID: 140-27231-7
Date Collected: 04/19/22 14:00
Matrix: Solid
Date Received: 04/25/22 09:30

### Method: 6010B SEP - SEP Metals (ICP) - Step 1

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | ND | | 40 | 6.4 | mg/Kg | | 05/05/22 08:00 | 05/09/22 12:51 | 4 |
| Arsenic | ND | | 2.0 | 0.52 | mg/Kg | | 05/05/22 08:00 | 05/09/22 12:51 | 4 |
| Cobalt | ND | | 10 | 0.18 | mg/Kg | | 05/05/22 08:00 | 05/09/22 12:51 | 4 |
| Iron | ND | | 20 | 12 | mg/Kg | | 05/05/22 08:00 | 05/09/22 12:51 | 4 |
| Lithium | ND | | 10 | 0.60 | mg/Kg | | 05/05/22 08:00 | 05/09/22 12:51 | 4 |
| **Manganese** | **0.84** | **J** | 3.0 | 0.12 | mg/Kg | | 05/05/22 08:00 | 05/09/22 12:51 | 4 |

### Method: 6010B SEP - SEP Metals (ICP) - Step 2

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | ND | | 30 | 4.8 | mg/Kg | | 05/06/22 08:00 | 05/09/22 14:09 | 3 |
| Arsenic | ND | | 1.5 | 0.39 | mg/Kg | | 05/06/22 08:00 | 05/09/22 14:09 | 3 |
| Cobalt | ND | | 7.5 | 0.19 | mg/Kg | | 05/06/22 08:00 | 05/09/22 14:09 | 3 |
| Iron | ND | | 15 | 8.7 | mg/Kg | | 05/06/22 08:00 | 05/09/22 14:09 | 3 |
| Lithium | ND | | 7.5 | 0.45 | mg/Kg | | 05/06/22 08:00 | 05/09/22 14:09 | 3 |
| **Manganese** | **3.6** | | 2.3 | 0.84 | mg/Kg | | 05/06/22 08:00 | 05/09/22 14:09 | 3 |

### Method: 6010B SEP - SEP Metals (ICP) - Step 3

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Aluminum** | **33** | | 10 | 2.1 | mg/Kg | | 05/09/22 08:00 | 05/13/22 12:56 | 1 |
| Arsenic | ND | | 0.50 | 0.13 | mg/Kg | | 05/09/22 08:00 | 05/13/22 12:56 | 1 |
| **Cobalt** | **1.0** | **J** | 2.5 | 0.045 | mg/Kg | | 05/09/22 08:00 | 05/13/22 12:56 | 1 |
| **Iron** | **62** | | 5.0 | 2.9 | mg/Kg | | 05/09/22 08:00 | 05/13/22 12:56 | 1 |
| **Lithium** | **0.18** | **J** | 2.5 | 0.15 | mg/Kg | | 05/09/22 08:00 | 05/13/22 12:56 | 1 |
| **Manganese** | **78** | **B** | 0.75 | 0.027 | mg/Kg | | 05/09/22 08:00 | 05/13/22 12:56 | 1 |

### Method: 6010B SEP - SEP Metals (ICP) - Step 4

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Aluminum** | **570** | | 10 | 1.6 | mg/Kg | | 05/11/22 08:00 | 05/13/22 14:09 | 1 |
| **Arsenic** | **0.56** | **B** | 0.50 | 0.22 | mg/Kg | | 05/11/22 08:00 | 05/13/22 14:09 | 1 |
| **Cobalt** | **0.98** | **J** | 2.5 | 0.053 | mg/Kg | | 05/11/22 08:00 | 05/13/22 14:09 | 1 |
| **Iron** | **3100** | | 5.0 | 2.9 | mg/Kg | | 05/11/22 08:00 | 05/13/22 14:09 | 1 |
| **Lithium** | **1.1** | **J** | 2.5 | 0.15 | mg/Kg | | 05/11/22 08:00 | 05/13/22 14:09 | 1 |
| **Manganese** | **42** | | 0.75 | 0.13 | mg/Kg | | 05/11/22 08:00 | 05/13/22 14:09 | 1 |

### Method: 6010B SEP - SEP Metals (ICP) - Step 5

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Aluminum** | **91** | **J** | 150 | 24 | mg/Kg | | 05/19/22 08:00 | 05/20/22 13:33 | 5 |
| Arsenic | ND | | 7.5 | 1.9 | mg/Kg | | 05/19/22 08:00 | 05/20/22 13:33 | 5 |
| Cobalt | ND | | 38 | 0.60 | mg/Kg | | 05/19/22 08:00 | 05/20/22 13:33 | 5 |
| Iron | ND | | 75 | 44 | mg/Kg | | 05/19/22 08:00 | 05/20/22 13:33 | 5 |
| Lithium | ND | | 38 | 2.2 | mg/Kg | | 05/19/22 08:00 | 05/20/22 13:33 | 5 |
| Manganese | ND | *1 | 11 | 1.9 | mg/Kg | | 05/19/22 08:00 | 05/20/22 13:33 | 5 |

### Method: 6010B SEP - SEP Metals (ICP) - Step 6

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Aluminum** | **7700** | | 10 | 1.6 | mg/Kg | | 05/20/22 10:08 | 05/24/22 11:54 | 1 |
| Arsenic | ND | L | 0.50 | 0.15 | mg/Kg | | 05/20/22 10:08 | 05/24/22 11:54 | 1 |
| **Cobalt** | **7.6** | | 2.5 | 0.046 | mg/Kg | | 05/20/22 10:08 | 05/24/22 11:54 | 1 |
| **Iron** | **17000** | | 5.0 | 2.9 | mg/Kg | | 05/20/22 10:08 | 05/24/22 11:54 | 1 |
| **Lithium** | **9.7** | | 2.5 | 0.15 | mg/Kg | | 05/20/22 10:08 | 05/24/22 11:54 | 1 |
| **Manganese** | **83** | | 0.75 | 0.25 | mg/Kg | | 05/20/22 10:08 | 05/24/22 11:54 | 1 |

## Client Sample ID: DGWC-121-49-50' Lab Sample ID: 140-27231-7

**Date Collected: 04/19/22 14:00** **Matrix: Solid**

**Date Received: 04/25/22 09:30**

### Method: 6010B SEP - SEP Metals (ICP) - Step 7

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 36000 | | 100 | 16 | mg/Kg | | 05/23/22 08:00 | 05/26/22 11:50 | 10 |
| Arsenic | ND | | 2.5 | 0.65 | mg/Kg | | 05/23/22 08:00 | 05/26/22 14:57 | 5 |
| Cobalt | 4.0 | J | 13 | 0.13 | mg/Kg | | 05/23/22 08:00 | 05/26/22 14:57 | 5 |
| Iron | 13000 | | 5.0 | 4.1 | mg/Kg | | 05/23/22 08:00 | 05/26/22 13:32 | 1 |
| Lithium | 6.3 | | 2.5 | 0.15 | mg/Kg | | 05/23/22 08:00 | 05/26/22 13:32 | 1 |
| Manganese | 290 | | 0.75 | 0.11 | mg/Kg | | 05/23/22 08:00 | 05/26/22 13:32 | 1 |

### Method: 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 45000 | | 10 | 1.6 | mg/Kg | | | 05/31/22 15:33 | 1 |
| Arsenic | 0.56 | | 0.50 | 0.13 | mg/Kg | | | 05/31/22 15:33 | 1 |
| Cobalt | 14 | | 2.5 | 0.023 | mg/Kg | | | 05/31/22 15:33 | 1 |
| Iron | 33000 | | 5.0 | 4.1 | mg/Kg | | | 05/31/22 15:33 | 1 |
| Lithium | 17 | | 2.5 | 0.15 | mg/Kg | | | 05/31/22 15:33 | 1 |
| Manganese | 490 | | 0.75 | 0.052 | mg/Kg | | | 05/31/22 15:33 | 1 |

### Method: 6010B - SEP Metals (ICP) - Total

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 50000 | | 100 | 16 | mg/Kg | | 05/04/22 08:00 | 05/27/22 11:24 | 10 |
| Arsenic | ND | | 2.5 | 0.65 | mg/Kg | | 05/04/22 08:00 | 05/27/22 14:43 | 5 |
| Cobalt | 12 | J | 13 | 0.13 | mg/Kg | | 05/04/22 08:00 | 05/27/22 14:43 | 5 |
| Iron | 36000 | | 25 | 21 | mg/Kg | | 05/04/22 08:00 | 05/27/22 14:43 | 5 |
| Lithium | 19 | | 13 | 0.75 | mg/Kg | | 05/04/22 08:00 | 05/27/22 14:43 | 5 |
| Manganese | 470 | | 0.75 | 0.11 | mg/Kg | | 05/04/22 08:00 | 05/27/22 13:15 | 1 |

### Method: Part Size Red - Particle Size Reduction Preparation

| Analyte | Result | Qualifier | NONE | NONE | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| PSR sample generated | DONE | | | | NONE | | | 04/28/22 07:25 | 1 |

# Client Sample Results

Client: Golder Associates Inc. Job ID: 140-27231-1
Project/Site: Plant McDonough NES Well Installation

## Client Sample ID: B-122D-39-40' Lab Sample ID: 140-27231-8

**Date Collected: 04/19/22 14:00** **Matrix: Solid**
**Date Received: 04/25/22 09:30** **Percent Solids: 74.2**

### Method: 6010B SEP - SEP Metals (ICP) - Step 1

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Aluminum** | **15** | **J** | 54 | 8.6 | mg/Kg | ☼ | 05/05/22 08:00 | 05/09/22 12:17 | 4 |
| Arsenic | ND | | 2.7 | 0.70 | mg/Kg | ☼ | 05/05/22 08:00 | 05/09/22 12:17 | 4 |
| **Cobalt** | **0.51** | **J** | 13 | 0.24 | mg/Kg | ☼ | 05/05/22 08:00 | 05/09/22 12:17 | 4 |
| Iron | ND | | 27 | 16 | mg/Kg | ☼ | 05/05/22 08:00 | 05/09/22 12:17 | 4 |
| Lithium | ND | | 13 | 0.81 | mg/Kg | ☼ | 05/05/22 08:00 | 05/09/22 12:17 | 4 |
| **Manganese** | **360** | | 4.0 | 0.17 | mg/Kg | ☼ | 05/05/22 08:00 | 05/09/22 12:17 | 4 |

### Method: 6010B SEP - SEP Metals (ICP) - Step 2

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Aluminum** | **77** | | 40 | 6.5 | mg/Kg | ☼ | 05/06/22 08:00 | 05/09/22 13:32 | 3 |
| Arsenic | ND | | 2.0 | 0.53 | mg/Kg | ☼ | 05/06/22 08:00 | 05/09/22 13:32 | 3 |
| **Cobalt** | **0.88** | **J** | 10 | 0.25 | mg/Kg | ☼ | 05/06/22 08:00 | 05/09/22 13:32 | 3 |
| **Iron** | **360** | | 20 | 12 | mg/Kg | ☼ | 05/06/22 08:00 | 05/09/22 13:32 | 3 |
| Lithium | ND | | 10 | 0.61 | mg/Kg | ☼ | 05/06/22 08:00 | 05/09/22 13:32 | 3 |
| **Manganese** | **81** | | 3.0 | 1.1 | mg/Kg | ☼ | 05/06/22 08:00 | 05/09/22 13:32 | 3 |

### Method: 6010B SEP - SEP Metals (ICP) - Step 3

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Aluminum** | **820** | | 13 | 2.8 | mg/Kg | ☼ | 05/09/22 08:00 | 05/13/22 12:22 | 1 |
| **Arsenic** | **0.87** | | 0.67 | 0.18 | mg/Kg | ☼ | 05/09/22 08:00 | 05/13/22 12:22 | 1 |
| **Cobalt** | **2.9** | **J** | 3.4 | 0.061 | mg/Kg | ☼ | 05/09/22 08:00 | 05/13/22 12:22 | 1 |
| **Iron** | **5100** | | 6.7 | 3.9 | mg/Kg | ☼ | 05/09/22 08:00 | 05/13/22 12:22 | 1 |
| Lithium | ND | | 3.4 | 0.20 | mg/Kg | ☼ | 05/09/22 08:00 | 05/13/22 12:22 | 1 |
| **Manganese** | **260** | **B** | 1.0 | 0.036 | mg/Kg | ☼ | 05/09/22 08:00 | 05/13/22 12:22 | 1 |

### Method: 6010B SEP - SEP Metals (ICP) - Step 4

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Aluminum** | **6600** | | 13 | 2.2 | mg/Kg | ☼ | 05/11/22 08:00 | 05/13/22 13:35 | 1 |
| **Arsenic** | **0.98** | **B** | 0.67 | 0.30 | mg/Kg | ☼ | 05/11/22 08:00 | 05/13/22 13:35 | 1 |
| **Cobalt** | **5.5** | | 3.4 | 0.071 | mg/Kg | ☼ | 05/11/22 08:00 | 05/13/22 13:35 | 1 |
| **Iron** | **13000** | | 6.7 | 3.9 | mg/Kg | ☼ | 05/11/22 08:00 | 05/13/22 13:35 | 1 |
| **Lithium** | **2.6** | **J** | 3.4 | 0.20 | mg/Kg | ☼ | 05/11/22 08:00 | 05/13/22 13:35 | 1 |
| **Manganese** | **810** | | 1.0 | 0.18 | mg/Kg | ☼ | 05/11/22 08:00 | 05/13/22 13:35 | 1 |

### Method: 6010B SEP - SEP Metals (ICP) - Step 5

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Aluminum** | **960** | | 200 | 32 | mg/Kg | ☼ | 05/19/22 08:00 | 05/20/22 13:08 | 5 |
| Arsenic | ND | | 10 | 2.6 | mg/Kg | ☼ | 05/19/22 08:00 | 05/20/22 13:08 | 5 |
| **Cobalt** | **1.1** | **J** | 51 | 0.81 | mg/Kg | ☼ | 05/19/22 08:00 | 05/20/22 13:08 | 5 |
| **Iron** | **120** | | 100 | 59 | mg/Kg | ☼ | 05/19/22 08:00 | 05/20/22 13:08 | 5 |
| Lithium | ND | | 51 | 3.0 | mg/Kg | ☼ | 05/19/22 08:00 | 05/20/22 13:08 | 5 |
| **Manganese** | **100** | ***1** | 15 | 2.5 | mg/Kg | ☼ | 05/19/22 08:00 | 05/20/22 13:08 | 5 |

### Method: 6010B SEP - SEP Metals (ICP) - Step 6

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Aluminum** | **21000** | | 13 | 2.2 | mg/Kg | ☼ | 05/20/22 10:08 | 05/24/22 11:19 | 1 |
| **Arsenic** | **0.31** | **J** | 0.67 | 0.20 | mg/Kg | ☼ | 05/20/22 10:08 | 05/24/22 11:19 | 1 |
| **Cobalt** | **4.3** | | 3.4 | 0.062 | mg/Kg | ☼ | 05/20/22 10:08 | 05/24/22 11:19 | 1 |
| **Iron** | **15000** | | 6.7 | 3.9 | mg/Kg | ☼ | 05/20/22 10:08 | 05/24/22 11:19 | 1 |
| **Lithium** | **10** | | 3.4 | 0.20 | mg/Kg | ☼ | 05/20/22 10:08 | 05/24/22 11:19 | 1 |
| **Manganese** | **100** | | 1.0 | 0.34 | mg/Kg | ☼ | 05/20/22 10:08 | 05/24/22 11:19 | 1 |

Eurofins Knoxville

## Client Sample ID: B-122D-39-40'
## Lab Sample ID: 140-27231-8

**Date Collected: 04/19/22 14:00**
**Matrix: Solid**
**Date Received: 04/25/22 09:30**
**Percent Solids: 74.2**

### Method: 6010B SEP - SEP Metals (ICP) - Step 7

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 48000 | | 130 | 22 | mg/Kg | ☼ | 05/23/22 08:00 | 05/26/22 11:16 | 10 |
| Arsenic | 0.88 | J B | 3.4 | 0.88 | mg/Kg | ☼ | 05/23/22 08:00 | 05/26/22 14:23 | 5 |
| Cobalt | 4.1 | J | 17 | 0.18 | mg/Kg | ☼ | 05/23/22 08:00 | 05/26/22 14:23 | 5 |
| Iron | 8300 | | 6.7 | 5.5 | mg/Kg | ☼ | 05/23/22 08:00 | 05/26/22 12:55 | 1 |
| Lithium | 11 | | 3.4 | 0.20 | mg/Kg | ☼ | 05/23/22 08:00 | 05/26/22 12:55 | 1 |
| Manganese | 120 | | 1.0 | 0.15 | mg/Kg | ☼ | 05/23/22 08:00 | 05/26/22 12:55 | 1 |

### Method: 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 78000 | | 10 | 1.6 | mg/Kg | | | 05/31/22 15:33 | 1 |
| Arsenic | 3.0 | | 0.50 | 0.13 | mg/Kg | | | 05/31/22 15:33 | 1 |
| Cobalt | 19 | | 2.5 | 0.023 | mg/Kg | | | 05/31/22 15:33 | 1 |
| Iron | 42000 | | 5.0 | 4.1 | mg/Kg | | | 05/31/22 15:33 | 1 |
| Lithium | 24 | | 2.5 | 0.15 | mg/Kg | | | 05/31/22 15:33 | 1 |
| Manganese | 1800 | | 0.75 | 0.052 | mg/Kg | | | 05/31/22 15:33 | 1 |

### Method: 6010B - SEP Metals (ICP) - Total

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 80000 | | 130 | 22 | mg/Kg | ☼ | 05/04/22 08:00 | 05/27/22 11:01 | 10 |
| Arsenic | 1.9 | | 0.67 | 0.18 | mg/Kg | ☼ | 05/04/22 08:00 | 05/27/22 12:37 | 1 |
| Cobalt | 19 | | 17 | 0.18 | mg/Kg | ☼ | 05/04/22 08:00 | 05/27/22 14:17 | 5 |
| Iron | 44000 | | 34 | 28 | mg/Kg | ☼ | 05/04/22 08:00 | 05/27/22 14:17 | 5 |
| Lithium | 25 | | 17 | 1.0 | mg/Kg | ☼ | 05/04/22 08:00 | 05/27/22 14:17 | 5 |
| Manganese | 1100 | | 1.0 | 0.15 | mg/Kg | ☼ | 05/04/22 08:00 | 05/27/22 12:37 | 1 |

## Client Sample ID: B-123D-27-28'

**Lab Sample ID: 140-27231-9**

Date Collected: 04/19/22 14:00
Matrix: Solid
Date Received: 04/25/22 09:30
Percent Solids: 96.5

### Method: 6010B SEP - SEP Metals (ICP) - Step 1

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Aluminum** | **94** | | 41 | 6.6 | mg/Kg | ☼ | 05/05/22 08:00 | 05/09/22 12:22 | 4 |
| Arsenic | ND | | 2.1 | 0.54 | mg/Kg | ☼ | 05/05/22 08:00 | 05/09/22 12:22 | 4 |
| **Cobalt** | **0.39** | **J** | 10 | 0.19 | mg/Kg | ☼ | 05/05/22 08:00 | 05/09/22 12:22 | 4 |
| Iron | ND | | 21 | 12 | mg/Kg | ☼ | 05/05/22 08:00 | 05/09/22 12:22 | 4 |
| Lithium | ND | | 10 | 0.62 | mg/Kg | ☼ | 05/05/22 08:00 | 05/09/22 12:22 | 4 |
| **Manganese** | **15** | | 3.1 | 0.13 | mg/Kg | ☼ | 05/05/22 08:00 | 05/09/22 12:22 | 4 |

### Method: 6010B SEP - SEP Metals (ICP) - Step 2

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Aluminum** | **41** | | 31 | 5.0 | mg/Kg | ☼ | 05/06/22 08:00 | 05/09/22 13:46 | 3 |
| Arsenic | ND | | 1.6 | 0.40 | mg/Kg | ☼ | 05/06/22 08:00 | 05/09/22 13:46 | 3 |
| Cobalt | ND | | 7.8 | 0.20 | mg/Kg | ☼ | 05/06/22 08:00 | 05/09/22 13:46 | 3 |
| Iron | ND | | 16 | 9.0 | mg/Kg | ☼ | 05/06/22 08:00 | 05/09/22 13:46 | 3 |
| Lithium | ND | | 7.8 | 0.47 | mg/Kg | ☼ | 05/06/22 08:00 | 05/09/22 13:46 | 3 |
| **Manganese** | **1.7** | **J** | 2.3 | 0.87 | mg/Kg | ☼ | 05/06/22 08:00 | 05/09/22 13:46 | 3 |

### Method: 6010B SEP - SEP Metals (ICP) - Step 3

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Aluminum** | **180** | | 10 | 2.2 | mg/Kg | ☼ | 05/09/22 08:00 | 05/13/22 12:27 | 1 |
| Arsenic | ND | | 0.52 | 0.13 | mg/Kg | ☼ | 05/09/22 08:00 | 05/13/22 12:27 | 1 |
| **Cobalt** | **0.11** | **J** | 2.6 | 0.047 | mg/Kg | ☼ | 05/09/22 08:00 | 05/13/22 12:27 | 1 |
| **Iron** | **300** | | 5.2 | 3.0 | mg/Kg | ☼ | 05/09/22 08:00 | 05/13/22 12:27 | 1 |
| Lithium | ND | | 2.6 | 0.16 | mg/Kg | ☼ | 05/09/22 08:00 | 05/13/22 12:27 | 1 |
| **Manganese** | **2.5** | **B** | 0.78 | 0.028 | mg/Kg | ☼ | 05/09/22 08:00 | 05/13/22 12:27 | 1 |

### Method: 6010B SEP - SEP Metals (ICP) - Step 4

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Aluminum** | **2200** | | 10 | 1.7 | mg/Kg | ☼ | 05/11/22 08:00 | 05/13/22 13:50 | 1 |
| **Arsenic** | **0.87** | **B** | 0.52 | 0.23 | mg/Kg | ☼ | 05/11/22 08:00 | 05/13/22 13:50 | 1 |
| **Cobalt** | **1.1** | **J** | 2.6 | 0.055 | mg/Kg | ☼ | 05/11/22 08:00 | 05/13/22 13:50 | 1 |
| **Iron** | **7500** | | 5.2 | 3.0 | mg/Kg | ☼ | 05/11/22 08:00 | 05/13/22 13:50 | 1 |
| **Lithium** | **3.2** | | 2.6 | 0.16 | mg/Kg | ☼ | 05/11/22 08:00 | 05/13/22 13:50 | 1 |
| **Manganese** | **25** | | 0.78 | 0.13 | mg/Kg | ☼ | 05/11/22 08:00 | 05/13/22 13:50 | 1 |

### Method: 6010B SEP - SEP Metals (ICP) - Step 5

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Aluminum** | **560** | | 160 | 24 | mg/Kg | ☼ | 05/19/22 08:00 | 05/20/22 13:13 | 5 |
| Arsenic | ND | | 7.8 | 2.0 | mg/Kg | ☼ | 05/19/22 08:00 | 05/20/22 13:13 | 5 |
| Cobalt | ND | | 39 | 0.62 | mg/Kg | ☼ | 05/19/22 08:00 | 05/20/22 13:13 | 5 |
| Iron | ND | | 78 | 46 | mg/Kg | ☼ | 05/19/22 08:00 | 05/20/22 13:13 | 5 |
| Lithium | ND | | 39 | 2.3 | mg/Kg | ☼ | 05/19/22 08:00 | 05/20/22 13:13 | 5 |
| Manganese | ND | *1 | 12 | 1.9 | mg/Kg | ☼ | 05/19/22 08:00 | 05/20/22 13:13 | 5 |

### Method: 6010B SEP - SEP Metals (ICP) - Step 6

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Aluminum** | **15000** | | 10 | 1.7 | mg/Kg | ☼ | 05/20/22 10:08 | 05/24/22 11:34 | 1 |
| **Arsenic** | **0.32** | **J** | 0.52 | 0.16 | mg/Kg | ☼ | 05/20/22 10:08 | 05/24/22 11:34 | 1 |
| **Cobalt** | **2.6** | | 2.6 | 0.048 | mg/Kg | ☼ | 05/20/22 10:08 | 05/24/22 11:34 | 1 |
| **Iron** | **12000** | | 5.2 | 3.0 | mg/Kg | ☼ | 05/20/22 10:08 | 05/24/22 11:34 | 1 |
| **Lithium** | **14** | | 2.6 | 0.16 | mg/Kg | ☼ | 05/20/22 10:08 | 05/24/22 11:34 | 1 |
| **Manganese** | **110** | | 0.78 | 0.26 | mg/Kg | ☼ | 05/20/22 10:08 | 05/24/22 11:34 | 1 |




1 2 3 4 5 6 7 8 9 10 11 12 13

## Client Sample ID: B-123D-27-28'

Lab Sample ID: 140-27231-9

Date Collected: 04/19/22 14:00
Matrix: Solid

Date Received: 04/25/22 09:30
Percent Solids: 96.5

### Method: 6010B SEP - SEP Metals (ICP) - Step 7

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 31000 | | 100 | 17 | mg/Kg | ☼ | 05/23/22 08:00 | 05/26/22 11:31 | 10 |
| Arsenic | ND | | 1.0 | 0.27 | mg/Kg | ☼ | 05/23/22 08:00 | 05/26/22 14:28 | 2 |
| Cobalt | 2.0 | J | 5.2 | 0.054 | mg/Kg | ☼ | 05/23/22 08:00 | 05/26/22 14:28 | 2 |
| Iron | 4400 | | 5.2 | 4.3 | mg/Kg | ☼ | 05/23/22 08:00 | 05/26/22 13:01 | 1 |
| Lithium | 8.3 | | 2.6 | 0.16 | mg/Kg | ☼ | 05/23/22 08:00 | 05/26/22 13:01 | 1 |
| Manganese | 49 | | 0.78 | 0.11 | mg/Kg | ☼ | 05/23/22 08:00 | 05/26/22 13:01 | 1 |

### Method: 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 49000 | | 10 | 1.6 | mg/Kg | | | 05/31/22 15:33 | 1 |
| Arsenic | 1.2 | | 0.50 | 0.13 | mg/Kg | | | 05/31/22 15:33 | 1 |
| Cobalt | 6.2 | | 2.5 | 0.023 | mg/Kg | | | 05/31/22 15:33 | 1 |
| Iron | 24000 | | 5.0 | 4.1 | mg/Kg | | | 05/31/22 15:33 | 1 |
| Lithium | 25 | | 2.5 | 0.15 | mg/Kg | | | 05/31/22 15:33 | 1 |
| Manganese | 200 | | 0.75 | 0.052 | mg/Kg | | | 05/31/22 15:33 | 1 |

### Method: 6010B - SEP Metals (ICP) - Total

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 96000 | | 100 | 17 | mg/Kg | ☼ | 05/04/22 08:00 | 05/27/22 11:06 | 10 |
| Arsenic | 1.8 | J | 2.6 | 0.67 | mg/Kg | ☼ | 05/04/22 08:00 | 05/27/22 14:21 | 5 |
| Cobalt | 7.8 | J | 13 | 0.13 | mg/Kg | ☼ | 05/04/22 08:00 | 05/27/22 14:21 | 5 |
| Iron | 38000 | | 26 | 21 | mg/Kg | ☼ | 05/04/22 08:00 | 05/27/22 14:21 | 5 |
| Lithium | 32 | | 2.6 | 0.16 | mg/Kg | ☼ | 05/04/22 08:00 | 05/27/22 12:42 | 1 |
| Manganese | 240 | | 0.78 | 0.11 | mg/Kg | ☼ | 05/04/22 08:00 | 05/27/22 12:42 | 1 |

**Client Sample ID: B-123D-145'**  **Lab Sample ID: 140-27231-10**
**Date Collected: 04/19/22 14:00**  **Matrix: Solid**
**Date Received: 04/25/22 09:30**

### Method: 6010B SEP - SEP Metals (ICP) - Step 1

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | ND | | 40 | 6.4 | mg/Kg | | 05/05/22 08:00 | 05/09/22 12:56 | 4 |
| Arsenic | ND | | 2.0 | 0.52 | mg/Kg | | 05/05/22 08:00 | 05/09/22 12:56 | 4 |
| Cobalt | ND | | 10 | 0.18 | mg/Kg | | 05/05/22 08:00 | 05/09/22 12:56 | 4 |
| Iron | ND | | 20 | 12 | mg/Kg | | 05/05/22 08:00 | 05/09/22 12:56 | 4 |
| Lithium | ND | | 10 | 0.60 | mg/Kg | | 05/05/22 08:00 | 05/09/22 12:56 | 4 |
| **Manganese** | **0.43** | **J** | 3.0 | 0.12 | mg/Kg | | 05/05/22 08:00 | 05/09/22 12:56 | 4 |

### Method: 6010B SEP - SEP Metals (ICP) - Step 2

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | ND | | 30 | 4.8 | mg/Kg | | 05/06/22 08:00 | 05/09/22 14:14 | 3 |
| Arsenic | ND | | 1.5 | 0.39 | mg/Kg | | 05/06/22 08:00 | 05/09/22 14:14 | 3 |
| Cobalt | ND | | 7.5 | 0.19 | mg/Kg | | 05/06/22 08:00 | 05/09/22 14:14 | 3 |
| **Iron** | **21** | | 15 | 8.7 | mg/Kg | | 05/06/22 08:00 | 05/09/22 14:14 | 3 |
| Lithium | ND | | 7.5 | 0.45 | mg/Kg | | 05/06/22 08:00 | 05/09/22 14:14 | 3 |
| **Manganese** | **9.2** | | 2.3 | 0.84 | mg/Kg | | 05/06/22 08:00 | 05/09/22 14:14 | 3 |

### Method: 6010B SEP - SEP Metals (ICP) - Step 3

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Aluminum** | **16** | | 10 | 2.1 | mg/Kg | | 05/09/22 08:00 | 05/13/22 13:01 | 1 |
| Arsenic | ND | | 0.50 | 0.13 | mg/Kg | | 05/09/22 08:00 | 05/13/22 13:01 | 1 |
| Cobalt | ND | | 2.5 | 0.045 | mg/Kg | | 05/09/22 08:00 | 05/13/22 13:01 | 1 |
| **Iron** | **42** | | 5.0 | 2.9 | mg/Kg | | 05/09/22 08:00 | 05/13/22 13:01 | 1 |
| Lithium | ND | | 2.5 | 0.15 | mg/Kg | | 05/09/22 08:00 | 05/13/22 13:01 | 1 |
| **Manganese** | **2.3** | **B** | 0.75 | 0.027 | mg/Kg | | 05/09/22 08:00 | 05/13/22 13:01 | 1 |

### Method: 6010B SEP - SEP Metals (ICP) - Step 4

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Aluminum** | **760** | | 10 | 1.6 | mg/Kg | | 05/11/22 08:00 | 05/13/22 14:14 | 1 |
| **Arsenic** | **0.61** | **B** | 0.50 | 0.22 | mg/Kg | | 05/11/22 08:00 | 05/13/22 14:14 | 1 |
| **Cobalt** | **0.22** | **J** | 2.5 | 0.053 | mg/Kg | | 05/11/22 08:00 | 05/13/22 14:14 | 1 |
| **Iron** | **1700** | | 5.0 | 2.9 | mg/Kg | | 05/11/22 08:00 | 05/13/22 14:14 | 1 |
| **Lithium** | **2.0** | **J** | 2.5 | 0.15 | mg/Kg | | 05/11/22 08:00 | 05/13/22 14:14 | 1 |
| **Manganese** | **18** | | 0.75 | 0.13 | mg/Kg | | 05/11/22 08:00 | 05/13/22 14:14 | 1 |

### Method: 6010B SEP - SEP Metals (ICP) - Step 5

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Aluminum** | **120** | **J** | 150 | 24 | mg/Kg | | 05/19/22 08:00 | 05/20/22 13:38 | 5 |
| Arsenic | ND | | 7.5 | 1.9 | mg/Kg | | 05/19/22 08:00 | 05/20/22 13:38 | 5 |
| Cobalt | ND | | 38 | 0.60 | mg/Kg | | 05/19/22 08:00 | 05/20/22 13:38 | 5 |
| Iron | ND | | 75 | 44 | mg/Kg | | 05/19/22 08:00 | 05/20/22 13:38 | 5 |
| Lithium | ND | | 38 | 2.2 | mg/Kg | | 05/19/22 08:00 | 05/20/22 13:38 | 5 |
| Manganese | ND | *1 | 11 | 1.9 | mg/Kg | | 05/19/22 08:00 | 05/20/22 13:38 | 5 |

### Method: 6010B SEP - SEP Metals (ICP) - Step 6

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Aluminum** | **4600** | | 10 | 1.6 | mg/Kg | | 05/20/22 10:08 | 05/24/22 11:59 | 1 |
| Arsenic | ND | L | 0.50 | 0.15 | mg/Kg | | 05/20/22 10:08 | 05/24/22 11:59 | 1 |
| **Cobalt** | **2.7** | | 2.5 | 0.046 | mg/Kg | | 05/20/22 10:08 | 05/24/22 11:59 | 1 |
| **Iron** | **10000** | | 5.0 | 2.9 | mg/Kg | | 05/20/22 10:08 | 05/24/22 11:59 | 1 |
| **Lithium** | **12** | | 2.5 | 0.15 | mg/Kg | | 05/20/22 10:08 | 05/24/22 11:59 | 1 |
| **Manganese** | **84** | | 0.75 | 0.25 | mg/Kg | | 05/20/22 10:08 | 05/24/22 11:59 | 1 |

**Client Sample ID: B-123D-145'** **Lab Sample ID: 140-27231-10**
**Date Collected: 04/19/22 14:00** **Matrix: Solid**
**Date Received: 04/25/22 09:30**

### Method: 6010B SEP - SEP Metals (ICP) - Step 7

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 28000 | | 100 | 16 | mg/Kg | | 05/23/22 08:00 | 05/26/22 11:55 | 10 |
| Arsenic | ND | | 2.5 | 0.65 | mg/Kg | | 05/23/22 08:00 | 05/26/22 15:02 | 5 |
| Cobalt | 2.7 | J | 13 | 0.13 | mg/Kg | | 05/23/22 08:00 | 05/26/22 15:02 | 5 |
| Iron | 14000 | | 5.0 | 4.1 | mg/Kg | | 05/23/22 08:00 | 05/26/22 13:37 | 1 |
| Lithium | 12 | | 2.5 | 0.15 | mg/Kg | | 05/23/22 08:00 | 05/26/22 13:37 | 1 |
| Manganese | 340 | | 0.75 | 0.11 | mg/Kg | | 05/23/22 08:00 | 05/26/22 13:37 | 1 |

### Method: 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 34000 | | 10 | 1.6 | mg/Kg | | | 05/31/22 15:33 | 1 |
| Arsenic | 0.61 | | 0.50 | 0.13 | mg/Kg | | | 05/31/22 15:33 | 1 |
| Cobalt | 5.6 | | 2.5 | 0.023 | mg/Kg | | | 05/31/22 15:33 | 1 |
| Iron | 26000 | | 5.0 | 4.1 | mg/Kg | | | 05/31/22 15:33 | 1 |
| Lithium | 25 | | 2.5 | 0.15 | mg/Kg | | | 05/31/22 15:33 | 1 |
| Manganese | 460 | | 0.75 | 0.052 | mg/Kg | | | 05/31/22 15:33 | 1 |

### Method: 6010B - SEP Metals (ICP) - Total

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 35000 | | 100 | 16 | mg/Kg | | 05/04/22 08:00 | 05/27/22 11:29 | 10 |
| Arsenic | ND | | 1.5 | 0.39 | mg/Kg | | 05/04/22 08:00 | 05/27/22 14:48 | 3 |
| Cobalt | 4.9 | J | 7.5 | 0.078 | mg/Kg | | 05/04/22 08:00 | 05/27/22 14:48 | 3 |
| Iron | 27000 | | 15 | 12 | mg/Kg | | 05/04/22 08:00 | 05/27/22 14:48 | 3 |
| Lithium | 29 | | 7.5 | 0.45 | mg/Kg | | 05/04/22 08:00 | 05/27/22 14:48 | 3 |
| Manganese | 410 | | 0.75 | 0.11 | mg/Kg | | 05/04/22 08:00 | 05/27/22 13:20 | 1 |

### Method: Part Size Red - Particle Size Reduction Preparation

| Analyte | Result | Qualifier | NONE | NONE | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| PSR sample generated | DONE | | | | NONE | | | 04/28/22 07:25 | 1 |

Client: Golder Associates Inc. Job ID: 140-27231-1
Project/Site: Plant McDonough NES Well Installation

## Method: 6010B SEP - SEP Metals (ICP) - Step 1
### Prep: 3010A
### SEP: Exchangeable

| Analyte | RL | MDL | Units |
|---|---|---|---|
| Aluminum | 10 | 1.6 | mg/Kg |
| Arsenic | 0.50 | 0.13 | mg/Kg |
| Cobalt | 2.5 | 0.045 | mg/Kg |
| Iron | 5.0 | 2.9 | mg/Kg |
| Lithium | 2.5 | 0.15 | mg/Kg |
| Manganese | 0.75 | 0.031 | mg/Kg |

## Method: 6010B SEP - SEP Metals (ICP) - Step 2
### Prep: 3010A
### SEP: Carbonate

| Analyte | RL | MDL | Units |
|---|---|---|---|
| Aluminum | 10 | 1.6 | mg/Kg |
| Arsenic | 0.50 | 0.13 | mg/Kg |
| Cobalt | 2.5 | 0.063 | mg/Kg |
| Iron | 5.0 | 2.9 | mg/Kg |
| Lithium | 2.5 | 0.15 | mg/Kg |
| Manganese | 0.75 | 0.28 | mg/Kg |

## Method: 6010B SEP - SEP Metals (ICP) - Step 3
### Prep: 3010A
### SEP: Non-Crystalline

| Analyte | RL | MDL | Units |
|---|---|---|---|
| Aluminum | 10 | 2.1 | mg/Kg |
| Arsenic | 0.50 | 0.13 | mg/Kg |
| Cobalt | 2.5 | 0.045 | mg/Kg |
| Iron | 5.0 | 2.9 | mg/Kg |
| Lithium | 2.5 | 0.15 | mg/Kg |
| Manganese | 0.75 | 0.027 | mg/Kg |

## Method: 6010B SEP - SEP Metals (ICP) - Step 4
### Prep: 3010A
### SEP: Metal Hydroxide

| Analyte | RL | MDL | Units |
|---|---|---|---|
| Aluminum | 10 | 1.6 | mg/Kg |
| Arsenic | 0.50 | 0.22 | mg/Kg |
| Cobalt | 2.5 | 0.053 | mg/Kg |
| Iron | 5.0 | 2.9 | mg/Kg |
| Lithium | 2.5 | 0.15 | mg/Kg |
| Manganese | 0.75 | 0.13 | mg/Kg |

## Method: 6010B SEP - SEP Metals (ICP) - Step 5
### Prep: 3010A
### SEP: Organic-Bound

| Analyte | RL | MDL | Units |
|---|---|---|---|
| Aluminum | 30 | 4.7 | mg/Kg |
| Arsenic | 1.5 | 0.38 | mg/Kg |
| Cobalt | 7.5 | 0.12 | mg/Kg |
| Iron | 15 | 8.8 | mg/Kg |
| Lithium | 7.5 | 0.44 | mg/Kg |
| Manganese | 2.3 | 0.37 | mg/Kg |

# Default Detection Limits

Client: Golder Associates Inc. Job ID: 140-27231-1
Project/Site: Plant McDonough NES Well Installation

## Method: 6010B SEP - SEP Metals (ICP) - Step 6

### SEP: Acid/Sulfide

| Analyte | RL | MDL | Units |
|---|---|---|---|
| Aluminum | 10 | 1.6 | mg/Kg |
| Arsenic | 0.50 | 0.15 | mg/Kg |
| Cobalt | 2.5 | 0.046 | mg/Kg |
| Iron | 5.0 | 2.9 | mg/Kg |
| Lithium | 2.5 | 0.15 | mg/Kg |
| Manganese | 0.75 | 0.25 | mg/Kg |

## Method: 6010B SEP - SEP Metals (ICP) - Step 7

### Prep: Residual

| Analyte | RL | MDL | Units |
|---|---|---|---|
| Aluminum | 10 | 1.6 | mg/Kg |
| Arsenic | 0.50 | 0.13 | mg/Kg |
| Cobalt | 2.5 | 0.026 | mg/Kg |
| Iron | 5.0 | 4.1 | mg/Kg |
| Lithium | 2.5 | 0.15 | mg/Kg |
| Manganese | 0.75 | 0.11 | mg/Kg |

## Method: 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7

| Analyte | RL | MDL | Units |
|---|---|---|---|
| Aluminum | 10 | 1.6 | mg/Kg |
| Arsenic | 0.50 | 0.13 | mg/Kg |
| Cobalt | 2.5 | 0.023 | mg/Kg |
| Iron | 5.0 | 4.1 | mg/Kg |
| Lithium | 2.5 | 0.15 | mg/Kg |
| Manganese | 0.75 | 0.052 | mg/Kg |

## Method: 6010B - SEP Metals (ICP) - Total

### Prep: Total

| Analyte | RL | MDL | Units |
|---|---|---|---|
| Aluminum | 10 | 1.6 | mg/Kg |
| Arsenic | 0.50 | 0.13 | mg/Kg |
| Cobalt | 2.5 | 0.026 | mg/Kg |
| Iron | 5.0 | 4.1 | mg/Kg |
| Lithium | 2.5 | 0.15 | mg/Kg |
| Manganese | 0.75 | 0.11 | mg/Kg |

## Method: 6010B - SEP Metals (ICP) - Total

**Lab Sample ID: MB 140-61285/14-A** **Client Sample ID: Method Blank**
**Matrix: Solid** **Prep Type: Total/NA**
**Analysis Batch: 62091** **Prep Batch: 61285**

| Analyte | MB Result | MB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | ND | | 10 | 1.6 | mg/Kg | | 05/04/22 08:00 | 05/27/22 11:34 | 1 |
| Arsenic | ND | | 0.50 | 0.13 | mg/Kg | | 05/04/22 08:00 | 05/27/22 11:34 | 1 |
| Cobalt | ND | | 2.5 | 0.026 | mg/Kg | | 05/04/22 08:00 | 05/27/22 11:34 | 1 |
| Iron | ND | | 5.0 | 4.1 | mg/Kg | | 05/04/22 08:00 | 05/27/22 11:34 | 1 |
| Lithium | ND | | 2.5 | 0.15 | mg/Kg | | 05/04/22 08:00 | 05/27/22 11:34 | 1 |
| Manganese | ND | | 0.75 | 0.11 | mg/Kg | | 05/04/22 08:00 | 05/27/22 11:34 | 1 |

**Lab Sample ID: LCS 140-61285/15-A** **Client Sample ID: Lab Control Sample**
**Matrix: Solid** **Prep Type: Total/NA**
**Analysis Batch: 62091** **Prep Batch: 61285**

| Analyte | Spike Added | LCS Result | LCS Qualifier | Unit | D | %Rec | %Rec Limits |
|---|---|---|---|---|---|---|---|
| Aluminum | 100 | 104 | | mg/Kg | | 104 | 80 - 120 |
| Arsenic | 5.00 | 5.22 | | mg/Kg | | 104 | 80 - 120 |
| Cobalt | 5.00 | 5.32 | | mg/Kg | | 106 | 80 - 125 |
| Iron | 50.0 | 55.0 | | mg/Kg | | 110 | 80 - 120 |
| Lithium | 5.00 | 5.30 | | mg/Kg | | 106 | 80 - 120 |
| Manganese | 5.00 | 5.38 | | mg/Kg | | 108 | 80 - 120 |

**Lab Sample ID: LCSD 140-61285/16-A** **Client Sample ID: Lab Control Sample Dup**
**Matrix: Solid** **Prep Type: Total/NA**
**Analysis Batch: 62091** **Prep Batch: 61285**

| Analyte | Spike Added | LCSD Result | LCSD Qualifier | Unit | D | %Rec | %Rec Limits | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 100 | 102 | | mg/Kg | | 102 | 80 - 120 | 1 | 30 |
| Arsenic | 5.00 | 5.18 | | mg/Kg | | 104 | 80 - 120 | 1 | 30 |
| Cobalt | 5.00 | 5.22 | | mg/Kg | | 104 | 80 - 125 | 2 | 30 |
| Iron | 50.0 | 53.5 | | mg/Kg | | 107 | 80 - 120 | 3 | 30 |
| Lithium | 5.00 | 5.21 | | mg/Kg | | 104 | 80 - 120 | 2 | 30 |
| Manganese | 5.00 | 5.27 | | mg/Kg | | 105 | 80 - 120 | 2 | 30 |

**Lab Sample ID: 140-27231-6 DU** **Client Sample ID: DGWC-121-38-40'**
**Matrix: Solid** **Prep Type: Total/NA**
**Analysis Batch: 62091** **Prep Batch: 61285**

| Analyte | Sample Result | Sample Qualifier | DU Result | DU Qualifier | Unit | D | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|---|
| Aluminum | 64000 | | 66600 | | mg/Kg | ☼ | 4 | 30 |

**Lab Sample ID: 140-27231-6 DU** **Client Sample ID: DGWC-121-38-40'**
**Matrix: Solid** **Prep Type: Total/NA**
**Analysis Batch: 62091** **Prep Batch: 61285**

| Analyte | Sample Result | Sample Qualifier | DU Result | DU Qualifier | Unit | D | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|---|
| Manganese | 610 | | 657 | | mg/Kg | ☼ | 8 | 30 |

## Method: 6010B - SEP Metals (ICP) - Total (Continued)

**Lab Sample ID: 140-27231-6 DU** **Client Sample ID: DGWC-121-38-40'**
**Matrix: Solid** **Prep Type: Total/NA**
**Analysis Batch: 62091** **Prep Batch: 61285**

| Analyte | Sample Result | Sample Qualifier | DU Result | DU Qualifier | Unit | D | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|---|
| Arsenic | ND | | ND | | mg/Kg | ☼ | NC | 30 |
| Cobalt | 18 | | 18.6 | | mg/Kg | ☼ | 4 | 30 |
| Iron | 50000 | | 52100 | | mg/Kg | ☼ | 4 | 30 |
| Lithium | 24 | | 24.4 | | mg/Kg | ☼ | 3 | 30 |

## Method: 6010B SEP - SEP Metals (ICP)

**Lab Sample ID: MB 140-61288/13-B ^4** **Client Sample ID: Method Blank**
**Matrix: Solid** **Prep Type: Step 1**
**Analysis Batch: 61514** **Prep Batch: 61349**

| Analyte | MB Result | MB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | ND | | 40 | 6.4 | mg/Kg | | 05/05/22 08:00 | 05/09/22 11:03 | 4 |
| Arsenic | ND | | 2.0 | 0.52 | mg/Kg | | 05/05/22 08:00 | 05/09/22 11:03 | 4 |
| Cobalt | ND | | 10 | 0.18 | mg/Kg | | 05/05/22 08:00 | 05/09/22 11:03 | 4 |
| Iron | ND | | 20 | 12 | mg/Kg | | 05/05/22 08:00 | 05/09/22 11:03 | 4 |
| Lithium | ND | | 10 | 0.60 | mg/Kg | | 05/05/22 08:00 | 05/09/22 11:03 | 4 |
| Manganese | ND | | 3.0 | 0.12 | mg/Kg | | 05/05/22 08:00 | 05/09/22 11:03 | 4 |

**Lab Sample ID: LCS 140-61288/14-B ^5** **Client Sample ID: Lab Control Sample**
**Matrix: Solid** **Prep Type: Step 1**
**Analysis Batch: 61514** **Prep Batch: 61349**

| Analyte | Spike Added | LCS Result | LCS Qualifier | Unit | D | %Rec | %Rec Limits |
|---|---|---|---|---|---|---|---|
| Aluminum | 100 | 97.8 | | mg/Kg | | 98 | 80 - 120 |
| Arsenic | 5.00 | 5.03 | | mg/Kg | | 101 | 80 - 120 |
| Cobalt | 5.00 | 5.13 | J | mg/Kg | | 103 | 80 - 120 |
| Iron | 50.0 | 50.8 | | mg/Kg | | 102 | 80 - 120 |
| Lithium | 5.00 | 5.22 | J | mg/Kg | | 104 | 80 - 120 |
| Manganese | 5.00 | 5.25 | | mg/Kg | | 105 | 80 - 120 |

**Lab Sample ID: LCSD 140-61288/15-B ^5** **Client Sample ID: Lab Control Sample Dup**
**Matrix: Solid** **Prep Type: Step 1**
**Analysis Batch: 61514** **Prep Batch: 61349**

| Analyte | Spike Added | LCSD Result | LCSD Qualifier | Unit | D | %Rec | %Rec Limits | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 100 | 94.7 | | mg/Kg | | 95 | 80 - 120 | 3 | 30 |
| Arsenic | 5.00 | 5.01 | | mg/Kg | | 100 | 80 - 120 | 0 | 30 |
| Cobalt | 5.00 | 5.04 | J | mg/Kg | | 101 | 80 - 120 | 2 | 30 |
| Iron | 50.0 | 49.8 | | mg/Kg | | 100 | 80 - 120 | 2 | 30 |
| Lithium | 5.00 | 5.16 | J | mg/Kg | | 103 | 80 - 120 | 1 | 30 |
| Manganese | 5.00 | 5.14 | | mg/Kg | | 103 | 80 - 120 | 2 | 30 |

**Lab Sample ID: 140-27231-6 DU** **Client Sample ID: DGWC-121-38-40'**
**Matrix: Solid** **Prep Type: Step 1**
**Analysis Batch: 61514** **Prep Batch: 61349**

| Analyte | Sample Result | Sample Qualifier | DU Result | DU Qualifier | Unit | D | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|---|
| Aluminum | ND | | ND | | mg/Kg | ☼ | NC | 30 |
| Arsenic | ND | | ND | | mg/Kg | ☼ | NC | 30 |

# QC Sample Results

Client: Golder Associates Inc. Job ID: 140-27231-1
Project/Site: Plant McDonough NES Well Installation

## Method: 6010B SEP - SEP Metals (ICP) (Continued)

**Lab Sample ID: 140-27231-6 DU**
**Matrix: Solid**
**Analysis Batch: 61514**

**Client Sample ID: DGWC-121-38-40'**
**Prep Type: Step 1**
**Prep Batch: 61349**

| Analyte | Sample Result | Sample Qualifier | DU Result | DU Qualifier | Unit | D | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|---|
| Cobalt | ND | | ND | | mg/Kg | ☼ | NC | 30 |
| Iron | ND | | ND | | mg/Kg | ☼ | NC | 30 |
| Lithium | ND | | ND | | mg/Kg | ☼ | NC | 30 |
| Manganese | 3.7 | | 3.52 | J | mg/Kg | ☼ | 5 | 30 |

**Lab Sample ID: MB 140-61360/13-B ^3**
**Matrix: Solid**
**Analysis Batch: 61514**

**Client Sample ID: Method Blank**
**Prep Type: Step 2**
**Prep Batch: 61418**

| Analyte | MB Result | MB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | ND | | 30 | 4.8 | mg/Kg | | 05/06/22 08:00 | 05/09/22 11:18 | 3 |
| Arsenic | ND | | 1.5 | 0.39 | mg/Kg | | 05/06/22 08:00 | 05/09/22 11:18 | 3 |
| Cobalt | ND | | 7.5 | 0.19 | mg/Kg | | 05/06/22 08:00 | 05/09/22 11:18 | 3 |
| Iron | ND | | 15 | 8.7 | mg/Kg | | 05/06/22 08:00 | 05/09/22 11:18 | 3 |
| Lithium | ND | | 7.5 | 0.45 | mg/Kg | | 05/06/22 08:00 | 05/09/22 11:18 | 3 |
| Manganese | ND | | 2.3 | 0.84 | mg/Kg | | 05/06/22 08:00 | 05/09/22 11:18 | 3 |

**Lab Sample ID: LCS 140-61360/14-B ^5**
**Matrix: Solid**
**Analysis Batch: 61514**

**Client Sample ID: Lab Control Sample**
**Prep Type: Step 2**
**Prep Batch: 61418**

| Analyte | Spike Added | LCS Result | LCS Qualifier | Unit | D | %Rec | %Rec Limits |
|---|---|---|---|---|---|---|---|
| Aluminum | 100 | ND | | mg/Kg | | -1 | |
| Arsenic | 5.00 | 4.09 | | mg/Kg | | 82 | 60 - 120 |
| Cobalt | 5.00 | 4.72 | J | mg/Kg | | 94 | 80 - 120 |
| Iron | 50.0 | ND | | mg/Kg | | 2 | |
| Lithium | 5.00 | 4.97 | J | mg/Kg | | 99 | 80 - 120 |
| Manganese | 5.00 | 4.73 | | mg/Kg | | 95 | 80 - 120 |

**Lab Sample ID: LCSD 140-61360/15-B ^5**
**Matrix: Solid**
**Analysis Batch: 61514**

**Client Sample ID: Lab Control Sample Dup**
**Prep Type: Step 2**
**Prep Batch: 61418**

| Analyte | Spike Added | LCSD Result | LCSD Qualifier | Unit | D | %Rec | %Rec Limits | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 100 | ND | | mg/Kg | | -6 | | 119 | |
| Arsenic | 5.00 | 3.93 | | mg/Kg | | 79 | 60 - 120 | 4 | 30 |
| Cobalt | 5.00 | 4.71 | J | mg/Kg | | 94 | 80 - 120 | 0 | 30 |
| Iron | 50.0 | ND | | mg/Kg | | 1 | | 44 | |
| Lithium | 5.00 | 5.10 | J | mg/Kg | | 102 | 80 - 120 | 3 | 30 |
| Manganese | 5.00 | 4.78 | | mg/Kg | | 96 | 80 - 120 | 1 | 30 |

**Lab Sample ID: 140-27231-6 DU**
**Matrix: Solid**
**Analysis Batch: 61514**

**Client Sample ID: DGWC-121-38-40'**
**Prep Type: Step 2**
**Prep Batch: 61418**

| Analyte | Sample Result | Sample Qualifier | DU Result | DU Qualifier | Unit | D | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|---|
| Aluminum | 11 | J | 7.83 | J | mg/Kg | ☼ | 32 | |
| Arsenic | ND | | ND | | mg/Kg | ☼ | NC | 30 |
| Cobalt | ND | | ND | | mg/Kg | ☼ | NC | 30 |
| Iron | ND | | ND | | mg/Kg | ☼ | NC | |

## Method: 6010B SEP - SEP Metals (ICP) (Continued)

**Lab Sample ID: 140-27231-6 DU** **Client Sample ID: DGWC-121-38-40'**
**Matrix: Solid** **Prep Type: Step 2**
**Analysis Batch: 61514** **Prep Batch: 61418**

| Analyte | Sample Result | Sample Qualifier | DU Result | DU Qualifier | Unit | D | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|---|
| Lithium | ND | | ND | | mg/Kg | ☼ | NC | 30 |
| Manganese | 5.2 | | 4.91 | | mg/Kg | ☼ | 7 | 30 |

**Lab Sample ID: MB 140-61419/13-B** **Client Sample ID: Method Blank**
**Matrix: Solid** **Prep Type: Step 3**
**Analysis Batch: 61682** **Prep Batch: 61466**

| Analyte | MB Result | MB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | ND | | 10 | 2.1 | mg/Kg | | 05/09/22 08:00 | 05/13/22 11:08 | 1 |
| Arsenic | ND | | 0.50 | 0.13 | mg/Kg | | 05/09/22 08:00 | 05/13/22 11:08 | 1 |
| Cobalt | ND | | 2.5 | 0.045 | mg/Kg | | 05/09/22 08:00 | 05/13/22 11:08 | 1 |
| Iron | ND | | 5.0 | 2.9 | mg/Kg | | 05/09/22 08:00 | 05/13/22 11:08 | 1 |
| Lithium | ND | | 2.5 | 0.15 | mg/Kg | | 05/09/22 08:00 | 05/13/22 11:08 | 1 |
| Manganese | 0.0880 | J | 0.75 | 0.027 | mg/Kg | | 05/09/22 08:00 | 05/13/22 11:08 | 1 |

**Lab Sample ID: LCS 140-61419/14-B** **Client Sample ID: Lab Control Sample**
**Matrix: Solid** **Prep Type: Step 3**
**Analysis Batch: 61682** **Prep Batch: 61466**

| Analyte | Spike Added | LCS Result | LCS Qualifier | Unit | D | %Rec | %Rec Limits |
|---|---|---|---|---|---|---|---|
| Aluminum | 100 | 98.3 | | mg/Kg | | 98 | 80 - 120 |
| Arsenic | 5.00 | 4.92 | | mg/Kg | | 98 | 80 - 120 |
| Cobalt | 5.00 | 5.11 | | mg/Kg | | 102 | 80 - 120 |
| Iron | 50.0 | 51.2 | | mg/Kg | | 102 | 80 - 120 |
| Lithium | 5.00 | 4.98 | | mg/Kg | | 100 | 80 - 120 |
| Manganese | 5.00 | 5.09 | | mg/Kg | | 102 | 80 - 120 |

**Lab Sample ID: LCSD 140-61419/15-B** **Client Sample ID: Lab Control Sample Dup**
**Matrix: Solid** **Prep Type: Step 3**
**Analysis Batch: 61682** **Prep Batch: 61466**

| Analyte | Spike Added | LCSD Result | LCSD Qualifier | Unit | D | %Rec | %Rec Limits | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 100 | 98.2 | | mg/Kg | | 98 | 80 - 120 | 0 | 30 |
| Arsenic | 5.00 | 5.02 | | mg/Kg | | 100 | 80 - 120 | 2 | 30 |
| Cobalt | 5.00 | 5.20 | | mg/Kg | | 104 | 80 - 120 | 2 | 30 |
| Iron | 50.0 | 52.1 | | mg/Kg | | 104 | 80 - 120 | 2 | 30 |
| Lithium | 5.00 | 5.06 | | mg/Kg | | 101 | 80 - 120 | 2 | 30 |
| Manganese | 5.00 | 5.19 | | mg/Kg | | 104 | 80 - 120 | 2 | 30 |

**Lab Sample ID: 140-27231-6 DU** **Client Sample ID: DGWC-121-38-40'**
**Matrix: Solid** **Prep Type: Step 3**
**Analysis Batch: 61682** **Prep Batch: 61466**

| Analyte | Sample Result | Sample Qualifier | DU Result | DU Qualifier | Unit | D | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|---|
| Aluminum | 100 | | 94.8 | | mg/Kg | ☼ | 8 | 30 |
| Arsenic | ND | | ND | | mg/Kg | ☼ | NC | 30 |
| Cobalt | 5.8 | | 5.10 | | mg/Kg | ☼ | 12 | 30 |
| Iron | 240 | | 225 | | mg/Kg | ☼ | 8 | 30 |
| Lithium | 0.65 | J | 0.603 | J | mg/Kg | ☼ | 8 | 30 |
| Manganese | 440 | B | 421 | | mg/Kg | ☼ | 4 | 30 |

Client: Golder Associates Inc. Job ID: 140-27231-1
Project/Site: Plant McDonough NES Well Installation

## Method: 6010B SEP - SEP Metals (ICP)

**Lab Sample ID: MB 140-61467/13-B** — **Client Sample ID: Method Blank**
**Matrix: Solid** — **Prep Type: Step 4**
**Analysis Batch: 61682** — **Prep Batch: 61516**

| Analyte | MB Result | MB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | ND | | 10 | 1.6 | mg/Kg | | 05/11/22 08:00 | 05/13/22 11:22 | 1 |
| Arsenic | 0.411 | J | 0.50 | 0.22 | mg/Kg | | 05/11/22 08:00 | 05/13/22 11:22 | 1 |
| Cobalt | ND | | 2.5 | 0.053 | mg/Kg | | 05/11/22 08:00 | 05/13/22 11:22 | 1 |
| Iron | ND | | 5.0 | 2.9 | mg/Kg | | 05/11/22 08:00 | 05/13/22 11:22 | 1 |
| Lithium | ND | | 2.5 | 0.15 | mg/Kg | | 05/11/22 08:00 | 05/13/22 11:22 | 1 |
| Manganese | ND | | 0.75 | 0.13 | mg/Kg | | 05/11/22 08:00 | 05/13/22 11:22 | 1 |

**Lab Sample ID: LCS 140-61467/14-B** — **Client Sample ID: Lab Control Sample**
**Matrix: Solid** — **Prep Type: Step 4**
**Analysis Batch: 61682** — **Prep Batch: 61516**

| Analyte | Spike Added | LCS Result | LCS Qualifier | Unit | D | %Rec | %Rec Limits |
|---|---|---|---|---|---|---|---|
| Aluminum | 100 | 102 | | mg/Kg | | 102 | 80 - 120 |
| Arsenic | 5.00 | 6.04 | | mg/Kg | | 121 | 80 - 130 |
| Cobalt | 5.00 | 5.46 | | mg/Kg | | 109 | 80 - 120 |
| Iron | 50.0 | 52.5 | | mg/Kg | | 105 | 80 - 120 |
| Lithium | 5.00 | 5.20 | | mg/Kg | | 104 | 80 - 120 |
| Manganese | 5.00 | 5.24 | | mg/Kg | | 105 | 80 - 120 |

**Lab Sample ID: LCSD 140-61467/15-B** — **Client Sample ID: Lab Control Sample Dup**
**Matrix: Solid** — **Prep Type: Step 4**
**Analysis Batch: 61682** — **Prep Batch: 61516**

| Analyte | Spike Added | LCSD Result | LCSD Qualifier | Unit | D | %Rec | %Rec Limits | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 100 | 101 | | mg/Kg | | 101 | 80 - 120 | 0 | 30 |
| Arsenic | 5.00 | 5.95 | | mg/Kg | | 119 | 80 - 130 | 1 | 30 |
| Cobalt | 5.00 | 5.49 | | mg/Kg | | 110 | 80 - 120 | 0 | 30 |
| Iron | 50.0 | 53.1 | | mg/Kg | | 106 | 80 - 120 | 1 | 30 |
| Lithium | 5.00 | 5.19 | | mg/Kg | | 104 | 80 - 120 | 0 | 30 |
| Manganese | 5.00 | 5.31 | | mg/Kg | | 106 | 80 - 120 | 1 | 30 |

**Lab Sample ID: 140-27231-6 DU** — **Client Sample ID: DGWC-121-38-40'**
**Matrix: Solid** — **Prep Type: Step 4**
**Analysis Batch: 61682** — **Prep Batch: 61516**

| Analyte | Sample Result | Sample Qualifier | DU Result | DU Qualifier | Unit | D | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|---|
| Aluminum | 1500 | | 1470 | | mg/Kg | ☼ | 0.5 | 30 |
| Arsenic | 0.54 | J B | 0.601 | J | mg/Kg | ☼ | 10 | 30 |
| Cobalt | 2.4 | J | 2.33 | J | mg/Kg | ☼ | 4 | 30 |
| Iron | 7400 | | 7670 | | mg/Kg | ☼ | 4 | 30 |
| Lithium | 2.3 | J | 2.27 | J | mg/Kg | ☼ | 0.2 | 30 |
| Manganese | 130 | | 130 | | mg/Kg | ☼ | 1 | 30 |

**Lab Sample ID: MB 140-61517/13-B ^5** — **Client Sample ID: Method Blank**
**Matrix: Solid** — **Prep Type: Step 5**
**Analysis Batch: 61895** — **Prep Batch: 61816**

| Analyte | MB Result | MB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | ND | | 150 | 24 | mg/Kg | | 05/19/22 08:00 | 05/20/22 12:13 | 5 |

## Method: 6010B SEP - SEP Metals (ICP) (Continued)

**Lab Sample ID: MB 140-61517/13-B ^5**
**Matrix: Solid**
**Analysis Batch: 61895**

**Client Sample ID: Method Blank**
**Prep Type: Step 5**
**Prep Batch: 61816**

| Analyte | MB Result | MB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Arsenic | ND | | 7.5 | 1.9 | mg/Kg | | 05/19/22 08:00 | 05/20/22 12:13 | 5 |
| Cobalt | ND | | 38 | 0.60 | mg/Kg | | 05/19/22 08:00 | 05/20/22 12:13 | 5 |
| Iron | ND | | 75 | 44 | mg/Kg | | 05/19/22 08:00 | 05/20/22 12:13 | 5 |
| Lithium | ND | | 38 | 2.2 | mg/Kg | | 05/19/22 08:00 | 05/20/22 12:13 | 5 |
| Manganese | ND | | 11 | 1.9 | mg/Kg | | 05/19/22 08:00 | 05/20/22 12:13 | 5 |

**Lab Sample ID: LCS 140-61517/14-B ^5**
**Matrix: Solid**
**Analysis Batch: 61895**

**Client Sample ID: Lab Control Sample**
**Prep Type: Step 5**
**Prep Batch: 61816**

| Analyte | Spike Added | LCS Result | LCS Qualifier | Unit | D | %Rec | %Rec Limits |
|---|---|---|---|---|---|---|---|
| Aluminum | 300 | ND | | mg/Kg | | 5 | |
| Arsenic | 15.0 | 10.0 | | mg/Kg | | 67 | 60 - 100 |
| Cobalt | 15.0 | 0.795 | J | mg/Kg | | 5 | 1 - 60 |
| Iron | 150 | ND | | mg/Kg | | -0.9 | |
| Lithium | 15.0 | 16.5 | J | mg/Kg | | 110 | 80 - 150 |
| Manganese | 15.0 | ND | | mg/Kg | | 5 | 1 - 60 |

**Lab Sample ID: LCSD 140-61517/15-B ^5**
**Matrix: Solid**
**Analysis Batch: 61895**

**Client Sample ID: Lab Control Sample Dup**
**Prep Type: Step 5**
**Prep Batch: 61816**

| Analyte | Spike Added | LCSD Result | LCSD Qualifier | Unit | D | %Rec | %Rec Limits | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 300 | ND | | mg/Kg | | 7 | | 33 | |
| Arsenic | 15.0 | 10.4 | | mg/Kg | | 69 | 60 - 100 | 4 | 30 |
| Cobalt | 15.0 | 0.960 | J | mg/Kg | | 6 | 1 - 60 | 19 | 30 |
| Iron | 150 | ND | | mg/Kg | | 0.8 | | 9514 | |
| Lithium | 15.0 | 16.9 | J | mg/Kg | | 112 | 80 - 150 | 2 | 30 |
| Manganese | 15.0 | ND | *1 | mg/Kg | | 3 | 1 - 60 | 45 | 30 |

**Lab Sample ID: 140-27231-6 DU**
**Matrix: Solid**
**Analysis Batch: 61895**

**Client Sample ID: DGWC-121-38-40'**
**Prep Type: Step 5**
**Prep Batch: 61816**

| Analyte | Sample Result | Sample Qualifier | DU Result | DU Qualifier | Unit | D | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|---|
| Aluminum | 110 | J | 115 | J | mg/Kg | ☼ | 5 | |
| Arsenic | ND | | ND | | mg/Kg | ☼ | NC | 30 |
| Cobalt | ND | | ND | | mg/Kg | ☼ | NC | 30 |
| Iron | ND | | ND | | mg/Kg | ☼ | NC | |
| Lithium | ND | | ND | | mg/Kg | ☼ | NC | 30 |
| Manganese | ND | *1 | ND | *1 | mg/Kg | ☼ | NC | 30 |

**Lab Sample ID: MB 140-61884/13-A**
**Matrix: Solid**
**Analysis Batch: 61994**

**Client Sample ID: Method Blank**
**Prep Type: Step 6**
**Prep Batch: 61884**

| Analyte | MB Result | MB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | ND | | 10 | 1.6 | mg/Kg | | 05/20/22 10:08 | 05/24/22 10:34 | 1 |
| Arsenic | ND | | 0.50 | 0.15 | mg/Kg | | 05/20/22 10:08 | 05/24/22 10:34 | 1 |
| Cobalt | ND | | 2.5 | 0.046 | mg/Kg | | 05/20/22 10:08 | 05/24/22 10:34 | 1 |

Client: Golder Associates Inc. Job ID: 140-27231-1

Project/Site: Plant McDonough NES Well Installation

## Method: 6010B SEP - SEP Metals (ICP) (Continued)

**Lab Sample ID: MB 140-61884/13-A** — **Client Sample ID: Method Blank**
**Matrix: Solid** — **Prep Type: Step 6**
**Analysis Batch: 61994** — **Prep Batch: 61884**

| Analyte | MB Result | MB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Iron | ND | | 5.0 | 2.9 | mg/Kg | | 05/20/22 10:08 | 05/24/22 10:34 | 1 |
| Lithium | ND | | 2.5 | 0.15 | mg/Kg | | 05/20/22 10:08 | 05/24/22 10:34 | 1 |
| Manganese | ND | | 0.75 | 0.25 | mg/Kg | | 05/20/22 10:08 | 05/24/22 10:34 | 1 |

**Lab Sample ID: MB 140-61884/13-A** — **Client Sample ID: Method Blank**
**Matrix: Solid** — **Prep Type: Step 6**
**Analysis Batch: 61999** — **Prep Batch: 61884**

| Analyte | MB Result | MB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | ND | | 10 | 1.6 | mg/Kg | | 05/20/22 10:08 | 05/24/22 15:56 | 1 |
| Arsenic | ND | | 0.50 | 0.15 | mg/Kg | | 05/20/22 10:08 | 05/24/22 15:56 | 1 |
| Cobalt | ND | | 2.5 | 0.046 | mg/Kg | | 05/20/22 10:08 | 05/24/22 15:56 | 1 |
| Iron | ND | | 5.0 | 2.9 | mg/Kg | | 05/20/22 10:08 | 05/24/22 15:56 | 1 |
| Lithium | ND | | 2.5 | 0.15 | mg/Kg | | 05/20/22 10:08 | 05/24/22 15:56 | 1 |
| Manganese | ND | | 0.75 | 0.25 | mg/Kg | | 05/20/22 10:08 | 05/24/22 15:56 | 1 |

**Lab Sample ID: LCS 140-61884/14-A** — **Client Sample ID: Lab Control Sample**
**Matrix: Solid** — **Prep Type: Step 6**
**Analysis Batch: 61994** — **Prep Batch: 61884**

| Analyte | Spike Added | LCS Result | LCS Qualifier | Unit | D | %Rec | %Rec Limits |
|---|---|---|---|---|---|---|---|
| Aluminum | 100 | 98.6 | | mg/Kg | | 99 | 80 - 120 |
| Arsenic | 5.00 | 5.05 | | mg/Kg | | 101 | 80 - 120 |
| Cobalt | 5.00 | 5.04 | | mg/Kg | | 101 | 80 - 120 |
| Iron | 50.0 | 51.0 | | mg/Kg | | 102 | 80 - 120 |
| Lithium | 5.00 | 4.95 | | mg/Kg | | 99 | 80 - 120 |
| Manganese | 5.00 | 5.09 | | mg/Kg | | 102 | 80 - 120 |

**Lab Sample ID: LCS 140-61884/14-A** — **Client Sample ID: Lab Control Sample**
**Matrix: Solid** — **Prep Type: Step 6**
**Analysis Batch: 61999** — **Prep Batch: 61884**

| Analyte | Spike Added | LCS Result | LCS Qualifier | Unit | D | %Rec | %Rec Limits |
|---|---|---|---|---|---|---|---|
| Aluminum | 100 | 95.9 | | mg/Kg | | 96 | 80 - 120 |
| Arsenic | 5.00 | 5.01 | | mg/Kg | | 100 | 80 - 120 |
| Cobalt | 5.00 | 5.01 | | mg/Kg | | 100 | 80 - 120 |
| Iron | 50.0 | 49.7 | | mg/Kg | | 99 | 80 - 120 |
| Lithium | 5.00 | 4.93 | | mg/Kg | | 99 | 80 - 120 |
| Manganese | 5.00 | 4.94 | | mg/Kg | | 99 | 80 - 120 |

**Lab Sample ID: LCSD 140-61884/15-A** — **Client Sample ID: Lab Control Sample Dup**
**Matrix: Solid** — **Prep Type: Step 6**
**Analysis Batch: 61994** — **Prep Batch: 61884**

| Analyte | Spike Added | LCSD Result | LCSD Qualifier | Unit | D | %Rec | %Rec Limits | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 100 | 100 | | mg/Kg | | 100 | 80 - 120 | 2 | 30 |
| Arsenic | 5.00 | 5.12 | | mg/Kg | | 102 | 80 - 120 | 1 | 30 |
| Cobalt | 5.00 | 5.12 | | mg/Kg | | 102 | 80 - 120 | 2 | 30 |
| Iron | 50.0 | 50.4 | | mg/Kg | | 101 | 80 - 120 | 1 | 30 |
| Lithium | 5.00 | 5.09 | | mg/Kg | | 102 | 80 - 120 | 3 | 30 |

Eurofins Knoxville

## Method: 6010B SEP - SEP Metals (ICP) (Continued)

**Lab Sample ID: LCSD 140-61884/15-A** **Client Sample ID: Lab Control Sample Dup**
**Matrix: Solid** **Prep Type: Step 6**
**Analysis Batch: 61994** **Prep Batch: 61884**

| Analyte | | | Spike Added | LCSD Result | LCSD Qualifier | Unit | D | %Rec | %Rec Limits | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Manganese | | | 5.00 | 5.11 | | mg/Kg | | 102 | 80 - 120 | 0 | 30 |

**Lab Sample ID: LCSD 140-61884/15-A** **Client Sample ID: Lab Control Sample Dup**
**Matrix: Solid** **Prep Type: Step 6**
**Analysis Batch: 61999** **Prep Batch: 61884**

| Analyte | | | Spike Added | LCSD Result | LCSD Qualifier | Unit | D | %Rec | %Rec Limits | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Aluminum | | | 100 | 99.0 | | mg/Kg | | 99 | 80 - 120 | 3 | 30 |
| Arsenic | | | 5.00 | 5.08 | | mg/Kg | | 102 | 80 - 120 | 1 | 30 |
| Cobalt | | | 5.00 | 5.15 | | mg/Kg | | 103 | 80 - 120 | 3 | 30 |
| Iron | | | 50.0 | 51.1 | | mg/Kg | | 102 | 80 - 120 | 3 | 30 |
| Lithium | | | 5.00 | 5.12 | | mg/Kg | | 102 | 80 - 120 | 4 | 30 |
| Manganese | | | 5.00 | 5.08 | | mg/Kg | | 102 | 80 - 120 | 3 | 30 |

**Lab Sample ID: 140-27231-6 DU** **Client Sample ID: DGWC-121-38-40'**
**Matrix: Solid** **Prep Type: Step 6**
**Analysis Batch: 61994** **Prep Batch: 61884**

| Analyte | Sample Result | Sample Qualifier | | DU Result | DU Qualifier | Unit | D | | | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 8400 | | | 8600 | | mg/Kg | ☼ | | | 3 | 30 |
| Arsenic | ND | | | ND | L | mg/Kg | ☼ | | | NC | 30 |
| Cobalt | 6.9 | | | 8.21 | | mg/Kg | ☼ | | | 17 | 30 |
| Iron | 21000 | | | 22000 | | mg/Kg | ☼ | | | 6 | 30 |
| Lithium | 9.6 | | | 9.80 | | mg/Kg | ☼ | | | 3 | 30 |
| Manganese | 52 | | | 54.6 | | mg/Kg | ☼ | | | 5 | 30 |

**Lab Sample ID: MB 140-61893/13-A** **Client Sample ID: Method Blank**
**Matrix: Solid** **Prep Type: Step 7**
**Analysis Batch: 62067** **Prep Batch: 61893**

| Analyte | MB Result | MB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 1.60 | J | 10 | 1.6 | mg/Kg | | 05/23/22 08:00 | 05/26/22 11:59 | 1 |
| Arsenic | 0.190 | J | 0.50 | 0.13 | mg/Kg | | 05/23/22 08:00 | 05/26/22 11:59 | 1 |
| Cobalt | ND | | 2.5 | 0.026 | mg/Kg | | 05/23/22 08:00 | 05/26/22 11:59 | 1 |
| Iron | ND | | 5.0 | 4.1 | mg/Kg | | 05/23/22 08:00 | 05/26/22 11:59 | 1 |
| Lithium | ND | | 2.5 | 0.15 | mg/Kg | | 05/23/22 08:00 | 05/26/22 11:59 | 1 |
| Manganese | ND | | 0.75 | 0.11 | mg/Kg | | 05/23/22 08:00 | 05/26/22 11:59 | 1 |

**Lab Sample ID: LCS 140-61893/14-A** **Client Sample ID: Lab Control Sample**
**Matrix: Solid** **Prep Type: Step 7**
**Analysis Batch: 62067** **Prep Batch: 61893**

| Analyte | | | Spike Added | LCS Result | LCS Qualifier | Unit | D | %Rec | %Rec Limits |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | | | 100 | 100 | | mg/Kg | | 100 | 80 - 120 |
| Arsenic | | | 5.00 | 5.01 | | mg/Kg | | 100 | 80 - 120 |
| Cobalt | | | 5.00 | 5.06 | | mg/Kg | | 101 | 80 - 125 |
| Iron | | | 50.0 | 51.4 | | mg/Kg | | 103 | 80 - 120 |
| Lithium | | | 5.00 | 5.03 | | mg/Kg | | 101 | 80 - 120 |
| Manganese | | | 5.00 | 5.08 | | mg/Kg | | 102 | 80 - 120 |

## Method: 6010B SEP - SEP Metals (ICP) (Continued)

**Lab Sample ID: LCSD 140-61893/15-A** **Client Sample ID: Lab Control Sample Dup**
**Matrix: Solid** **Prep Type: Step 7**
**Analysis Batch: 62067** **Prep Batch: 61893**

| Analyte | Spike Added | LCSD Result | LCSD Qualifier | Unit | D | %Rec | %Rec Limits | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 100 | 98.9 | | mg/Kg | | 99 | 80 - 120 | 1 | 30 |
| Arsenic | 5.00 | 5.12 | | mg/Kg | | 102 | 80 - 120 | 2 | 30 |
| Cobalt | 5.00 | 5.18 | | mg/Kg | | 104 | 80 - 125 | 2 | 30 |
| Iron | 50.0 | 52.0 | | mg/Kg | | 104 | 80 - 120 | 1 | 30 |
| Lithium | 5.00 | 5.13 | | mg/Kg | | 103 | 80 - 120 | 2 | 30 |
| Manganese | 5.00 | 5.18 | | mg/Kg | | 104 | 80 - 120 | 2 | 30 |

**Lab Sample ID: 140-27231-6 DU** **Client Sample ID: DGWC-121-38-40'**
**Matrix: Solid** **Prep Type: Step 7**
**Analysis Batch: 62067** **Prep Batch: 61893**

| Analyte | Sample Result | Sample Qualifier | DU Result | DU Qualifier | Unit | D | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|---|
| Aluminum | 36000 | | 46200 | | mg/Kg | ☼ | 24 | 30 |

**Lab Sample ID: 140-27231-6 DU** **Client Sample ID: DGWC-121-38-40'**
**Matrix: Solid** **Prep Type: Step 7**
**Analysis Batch: 62067** **Prep Batch: 61893**

| Analyte | Sample Result | Sample Qualifier | DU Result | DU Qualifier | Unit | D | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|---|
| Iron | 14000 | | 12900 | | mg/Kg | ☼ | 7 | 30 |
| Lithium | 7.7 | | 7.37 | | mg/Kg | ☼ | 5 | 30 |
| Manganese | 200 | | 214 | | mg/Kg | ☼ | 6 | 30 |

**Lab Sample ID: 140-27231-6 DU** **Client Sample ID: DGWC-121-38-40'**
**Matrix: Solid** **Prep Type: Step 7**
**Analysis Batch: 62067** **Prep Batch: 61893**

| Analyte | Sample Result | Sample Qualifier | DU Result | DU Qualifier | Unit | D | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|---|
| Arsenic | ND | | ND | | mg/Kg | ☼ | NC | 30 |
| Cobalt | 2.4 | J | 3.04 | J | mg/Kg | ☼ | 24 | 30 |

1 2 3 4 5 6 7 8 9 10 11 12 13

## Metals

### Prep Batch: 61285

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 140-27231-1 | B-113D-19-20' | Total/NA | Solid | Total | |
| 140-27231-2 | B-104D-55-56' | Total/NA | Solid | Total | |
| 140-27231-3 | B-115D-75-76' | Total/NA | Solid | Total | |
| 140-27231-4 | B-47-11-12' | Total/NA | Solid | Total | |
| 140-27231-5 | B-48-23-24' | Total/NA | Solid | Total | |
| 140-27231-6 | DGWC-121-38-40' | Total/NA | Solid | Total | |
| 140-27231-7 | DGWC-121-49-50' | Total/NA | Solid | Total | |
| 140-27231-8 | B-122D-39-40' | Total/NA | Solid | Total | |
| 140-27231-9 | B-123D-27-28' | Total/NA | Solid | Total | |
| 140-27231-10 | B-123D-145' | Total/NA | Solid | Total | |
| MB 140-61285/14-A | Method Blank | Total/NA | Solid | Total | |
| LCS 140-61285/15-A | Lab Control Sample | Total/NA | Solid | Total | |
| LCSD 140-61285/16-A | Lab Control Sample Dup | Total/NA | Solid | Total | |
| 140-27231-6 DU | DGWC-121-38-40' | Total/NA | Solid | Total | |

### SEP Batch: 61288

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 140-27231-1 | B-113D-19-20' | Step 1 | Solid | Exchangeable | |
| 140-27231-2 | B-104D-55-56' | Step 1 | Solid | Exchangeable | |
| 140-27231-3 | B-115D-75-76' | Step 1 | Solid | Exchangeable | |
| 140-27231-4 | B-47-11-12' | Step 1 | Solid | Exchangeable | |
| 140-27231-5 | B-48-23-24' | Step 1 | Solid | Exchangeable | |
| 140-27231-6 | DGWC-121-38-40' | Step 1 | Solid | Exchangeable | |
| 140-27231-7 | DGWC-121-49-50' | Step 1 | Solid | Exchangeable | |
| 140-27231-8 | B-122D-39-40' | Step 1 | Solid | Exchangeable | |
| 140-27231-9 | B-123D-27-28' | Step 1 | Solid | Exchangeable | |
| 140-27231-10 | B-123D-145' | Step 1 | Solid | Exchangeable | |
| MB 140-61288/13-B ^4 | Method Blank | Step 1 | Solid | Exchangeable | |
| LCS 140-61288/14-B ^5 | Lab Control Sample | Step 1 | Solid | Exchangeable | |
| LCSD 140-61288/15-B ^5 | Lab Control Sample Dup | Step 1 | Solid | Exchangeable | |
| 140-27231-6 DU | DGWC-121-38-40' | Step 1 | Solid | Exchangeable | |

### Prep Batch: 61349

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 140-27231-1 | B-113D-19-20' | Step 1 | Solid | 3010A | 61288 |
| 140-27231-2 | B-104D-55-56' | Step 1 | Solid | 3010A | 61288 |
| 140-27231-3 | B-115D-75-76' | Step 1 | Solid | 3010A | 61288 |
| 140-27231-4 | B-47-11-12' | Step 1 | Solid | 3010A | 61288 |
| 140-27231-5 | B-48-23-24' | Step 1 | Solid | 3010A | 61288 |
| 140-27231-6 | DGWC-121-38-40' | Step 1 | Solid | 3010A | 61288 |
| 140-27231-7 | DGWC-121-49-50' | Step 1 | Solid | 3010A | 61288 |
| 140-27231-8 | B-122D-39-40' | Step 1 | Solid | 3010A | 61288 |
| 140-27231-9 | B-123D-27-28' | Step 1 | Solid | 3010A | 61288 |
| 140-27231-10 | B-123D-145' | Step 1 | Solid | 3010A | 61288 |
| MB 140-61288/13-B ^4 | Method Blank | Step 1 | Solid | 3010A | 61288 |
| LCS 140-61288/14-B ^5 | Lab Control Sample | Step 1 | Solid | 3010A | 61288 |
| LCSD 140-61288/15-B ^5 | Lab Control Sample Dup | Step 1 | Solid | 3010A | 61288 |
| 140-27231-6 DU | DGWC-121-38-40' | Step 1 | Solid | 3010A | 61288 |

## Metals

### SEP Batch: 61360

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 140-27231-1 | B-113D-19-20' | Step 2 | Solid | Carbonate | |
| 140-27231-2 | B-104D-55-56' | Step 2 | Solid | Carbonate | |
| 140-27231-3 | B-115D-75-76' | Step 2 | Solid | Carbonate | |
| 140-27231-4 | B-47-11-12' | Step 2 | Solid | Carbonate | |
| 140-27231-5 | B-48-23-24' | Step 2 | Solid | Carbonate | |
| 140-27231-6 | DGWC-121-38-40' | Step 2 | Solid | Carbonate | |
| 140-27231-7 | DGWC-121-49-50' | Step 2 | Solid | Carbonate | |
| 140-27231-8 | B-122D-39-40' | Step 2 | Solid | Carbonate | |
| 140-27231-9 | B-123D-27-28' | Step 2 | Solid | Carbonate | |
| 140-27231-10 | B-123D-145' | Step 2 | Solid | Carbonate | |
| MB 140-61360/13-B ^3 | Method Blank | Step 2 | Solid | Carbonate | |
| LCS 140-61360/14-B ^5 | Lab Control Sample | Step 2 | Solid | Carbonate | |
| LCSD 140-61360/15-B ^5 | Lab Control Sample Dup | Step 2 | Solid | Carbonate | |
| 140-27231-6 DU | DGWC-121-38-40' | Step 2 | Solid | Carbonate | |

### Prep Batch: 61418

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 140-27231-1 | B-113D-19-20' | Step 2 | Solid | 3010A | 61360 |
| 140-27231-2 | B-104D-55-56' | Step 2 | Solid | 3010A | 61360 |
| 140-27231-3 | B-115D-75-76' | Step 2 | Solid | 3010A | 61360 |
| 140-27231-4 | B-47-11-12' | Step 2 | Solid | 3010A | 61360 |
| 140-27231-5 | B-48-23-24' | Step 2 | Solid | 3010A | 61360 |
| 140-27231-6 | DGWC-121-38-40' | Step 2 | Solid | 3010A | 61360 |
| 140-27231-7 | DGWC-121-49-50' | Step 2 | Solid | 3010A | 61360 |
| 140-27231-8 | B-122D-39-40' | Step 2 | Solid | 3010A | 61360 |
| 140-27231-9 | B-123D-27-28' | Step 2 | Solid | 3010A | 61360 |
| 140-27231-10 | B-123D-145' | Step 2 | Solid | 3010A | 61360 |
| MB 140-61360/13-B ^3 | Method Blank | Step 2 | Solid | 3010A | 61360 |
| LCS 140-61360/14-B ^5 | Lab Control Sample | Step 2 | Solid | 3010A | 61360 |
| LCSD 140-61360/15-B ^5 | Lab Control Sample Dup | Step 2 | Solid | 3010A | 61360 |
| 140-27231-6 DU | DGWC-121-38-40' | Step 2 | Solid | 3010A | 61360 |

### SEP Batch: 61419

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 140-27231-1 | B-113D-19-20' | Step 3 | Solid | Non-Crystalline | |
| 140-27231-2 | B-104D-55-56' | Step 3 | Solid | Non-Crystalline | |
| 140-27231-3 | B-115D-75-76' | Step 3 | Solid | Non-Crystalline | |
| 140-27231-4 | B-47-11-12' | Step 3 | Solid | Non-Crystalline | |
| 140-27231-5 | B-48-23-24' | Step 3 | Solid | Non-Crystalline | |
| 140-27231-6 | DGWC-121-38-40' | Step 3 | Solid | Non-Crystalline | |
| 140-27231-7 | DGWC-121-49-50' | Step 3 | Solid | Non-Crystalline | |
| 140-27231-8 | B-122D-39-40' | Step 3 | Solid | Non-Crystalline | |
| 140-27231-9 | B-123D-27-28' | Step 3 | Solid | Non-Crystalline | |
| 140-27231-10 | B-123D-145' | Step 3 | Solid | Non-Crystalline | |
| MB 140-61419/13-B | Method Blank | Step 3 | Solid | Non-Crystalline | |
| LCS 140-61419/14-B | Lab Control Sample | Step 3 | Solid | Non-Crystalline | |
| LCSD 140-61419/15-B | Lab Control Sample Dup | Step 3 | Solid | Non-Crystalline | |
| 140-27231-6 DU | DGWC-121-38-40' | Step 3 | Solid | Non-Crystalline | |



1 2 3 4 5 6 7 8 9 10 11 12 13

## Metals

### Prep Batch: 61466

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 140-27231-1 | B-113D-19-20' | Step 3 | Solid | 3010A | 61419 |
| 140-27231-2 | B-104D-55-56' | Step 3 | Solid | 3010A | 61419 |
| 140-27231-3 | B-115D-75-76' | Step 3 | Solid | 3010A | 61419 |
| 140-27231-4 | B-47-11-12' | Step 3 | Solid | 3010A | 61419 |
| 140-27231-5 | B-48-23-24' | Step 3 | Solid | 3010A | 61419 |
| 140-27231-6 | DGWC-121-38-40' | Step 3 | Solid | 3010A | 61419 |
| 140-27231-7 | DGWC-121-49-50' | Step 3 | Solid | 3010A | 61419 |
| 140-27231-8 | B-122D-39-40' | Step 3 | Solid | 3010A | 61419 |
| 140-27231-9 | B-123D-27-28' | Step 3 | Solid | 3010A | 61419 |
| 140-27231-10 | B-123D-145' | Step 3 | Solid | 3010A | 61419 |
| MB 140-61419/13-B | Method Blank | Step 3 | Solid | 3010A | 61419 |
| LCS 140-61419/14-B | Lab Control Sample | Step 3 | Solid | 3010A | 61419 |
| LCSD 140-61419/15-B | Lab Control Sample Dup | Step 3 | Solid | 3010A | 61419 |
| 140-27231-6 DU | DGWC-121-38-40' | Step 3 | Solid | 3010A | 61419 |

### SEP Batch: 61467

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 140-27231-1 | B-113D-19-20' | Step 4 | Solid | Metal Hydroxide | |
| 140-27231-2 | B-104D-55-56' | Step 4 | Solid | Metal Hydroxide | |
| 140-27231-3 | B-115D-75-76' | Step 4 | Solid | Metal Hydroxide | |
| 140-27231-4 | B-47-11-12' | Step 4 | Solid | Metal Hydroxide | |
| 140-27231-5 | B-48-23-24' | Step 4 | Solid | Metal Hydroxide | |
| 140-27231-6 | DGWC-121-38-40' | Step 4 | Solid | Metal Hydroxide | |
| 140-27231-7 | DGWC-121-49-50' | Step 4 | Solid | Metal Hydroxide | |
| 140-27231-8 | B-122D-39-40' | Step 4 | Solid | Metal Hydroxide | |
| 140-27231-9 | B-123D-27-28' | Step 4 | Solid | Metal Hydroxide | |
| 140-27231-10 | B-123D-145' | Step 4 | Solid | Metal Hydroxide | |
| MB 140-61467/13-B | Method Blank | Step 4 | Solid | Metal Hydroxide | |
| LCS 140-61467/14-B | Lab Control Sample | Step 4 | Solid | Metal Hydroxide | |
| LCSD 140-61467/15-B | Lab Control Sample Dup | Step 4 | Solid | Metal Hydroxide | |
| 140-27231-6 DU | DGWC-121-38-40' | Step 4 | Solid | Metal Hydroxide | |

### Analysis Batch: 61514

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 140-27231-1 | B-113D-19-20' | Step 1 | Solid | 6010B SEP | 61349 |
| 140-27231-1 | B-113D-19-20' | Step 2 | Solid | 6010B SEP | 61418 |
| 140-27231-2 | B-104D-55-56' | Step 1 | Solid | 6010B SEP | 61349 |
| 140-27231-2 | B-104D-55-56' | Step 2 | Solid | 6010B SEP | 61418 |
| 140-27231-3 | B-115D-75-76' | Step 1 | Solid | 6010B SEP | 61349 |
| 140-27231-3 | B-115D-75-76' | Step 2 | Solid | 6010B SEP | 61418 |
| 140-27231-4 | B-47-11-12' | Step 1 | Solid | 6010B SEP | 61349 |
| 140-27231-4 | B-47-11-12' | Step 2 | Solid | 6010B SEP | 61418 |
| 140-27231-5 | B-48-23-24' | Step 1 | Solid | 6010B SEP | 61349 |
| 140-27231-5 | B-48-23-24' | Step 2 | Solid | 6010B SEP | 61418 |
| 140-27231-6 | DGWC-121-38-40' | Step 1 | Solid | 6010B SEP | 61349 |
| 140-27231-6 | DGWC-121-38-40' | Step 2 | Solid | 6010B SEP | 61418 |
| 140-27231-7 | DGWC-121-49-50' | Step 1 | Solid | 6010B SEP | 61349 |
| 140-27231-7 | DGWC-121-49-50' | Step 2 | Solid | 6010B SEP | 61418 |
| 140-27231-8 | B-122D-39-40' | Step 1 | Solid | 6010B SEP | 61349 |
| 140-27231-8 | B-122D-39-40' | Step 2 | Solid | 6010B SEP | 61418 |
| 140-27231-9 | B-123D-27-28' | Step 1 | Solid | 6010B SEP | 61349 |

## Metals (Continued)

### Analysis Batch: 61514 (Continued)

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 140-27231-9 | B-123D-27-28' | Step 2 | Solid | 6010B SEP | 61418 |
| 140-27231-10 | B-123D-145' | Step 1 | Solid | 6010B SEP | 61349 |
| 140-27231-10 | B-123D-145' | Step 2 | Solid | 6010B SEP | 61418 |
| MB 140-61288/13-B ^4 | Method Blank | Step 1 | Solid | 6010B SEP | 61349 |
| MB 140-61360/13-B ^3 | Method Blank | Step 2 | Solid | 6010B SEP | 61418 |
| LCS 140-61288/14-B ^5 | Lab Control Sample | Step 1 | Solid | 6010B SEP | 61349 |
| LCS 140-61360/14-B ^5 | Lab Control Sample | Step 2 | Solid | 6010B SEP | 61418 |
| LCSD 140-61288/15-B ^5 | Lab Control Sample Dup | Step 1 | Solid | 6010B SEP | 61349 |
| LCSD 140-61360/15-B ^5 | Lab Control Sample Dup | Step 2 | Solid | 6010B SEP | 61418 |
| 140-27231-6 DU | DGWC-121-38-40' | Step 1 | Solid | 6010B SEP | 61349 |
| 140-27231-6 DU | DGWC-121-38-40' | Step 2 | Solid | 6010B SEP | 61418 |

### Prep Batch: 61516

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 140-27231-1 | B-113D-19-20' | Step 4 | Solid | 3010A | 61467 |
| 140-27231-2 | B-104D-55-56' | Step 4 | Solid | 3010A | 61467 |
| 140-27231-3 | B-115D-75-76' | Step 4 | Solid | 3010A | 61467 |
| 140-27231-4 | B-47-11-12' | Step 4 | Solid | 3010A | 61467 |
| 140-27231-5 | B-48-23-24' | Step 4 | Solid | 3010A | 61467 |
| 140-27231-6 | DGWC-121-38-40' | Step 4 | Solid | 3010A | 61467 |
| 140-27231-7 | DGWC-121-49-50' | Step 4 | Solid | 3010A | 61467 |
| 140-27231-8 | B-122D-39-40' | Step 4 | Solid | 3010A | 61467 |
| 140-27231-9 | B-123D-27-28' | Step 4 | Solid | 3010A | 61467 |
| 140-27231-10 | B-123D-145' | Step 4 | Solid | 3010A | 61467 |
| MB 140-61467/13-B | Method Blank | Step 4 | Solid | 3010A | 61467 |
| LCS 140-61467/14-B | Lab Control Sample | Step 4 | Solid | 3010A | 61467 |
| LCSD 140-61467/15-B | Lab Control Sample Dup | Step 4 | Solid | 3010A | 61467 |
| 140-27231-6 DU | DGWC-121-38-40' | Step 4 | Solid | 3010A | 61467 |

### SEP Batch: 61517

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 140-27231-1 | B-113D-19-20' | Step 5 | Solid | Organic-Bound | |
| 140-27231-2 | B-104D-55-56' | Step 5 | Solid | Organic-Bound | |
| 140-27231-3 | B-115D-75-76' | Step 5 | Solid | Organic-Bound | |
| 140-27231-4 | B-47-11-12' | Step 5 | Solid | Organic-Bound | |
| 140-27231-5 | B-48-23-24' | Step 5 | Solid | Organic-Bound | |
| 140-27231-6 | DGWC-121-38-40' | Step 5 | Solid | Organic-Bound | |
| 140-27231-7 | DGWC-121-49-50' | Step 5 | Solid | Organic-Bound | |
| 140-27231-8 | B-122D-39-40' | Step 5 | Solid | Organic-Bound | |
| 140-27231-9 | B-123D-27-28' | Step 5 | Solid | Organic-Bound | |
| 140-27231-10 | B-123D-145' | Step 5 | Solid | Organic-Bound | |
| MB 140-61517/13-B ^5 | Method Blank | Step 5 | Solid | Organic-Bound | |
| LCS 140-61517/14-B ^5 | Lab Control Sample | Step 5 | Solid | Organic-Bound | |
| LCSD 140-61517/15-B ^5 | Lab Control Sample Dup | Step 5 | Solid | Organic-Bound | |
| 140-27231-6 DU | DGWC-121-38-40' | Step 5 | Solid | Organic-Bound | |

### Analysis Batch: 61682

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 140-27231-1 | B-113D-19-20' | Step 3 | Solid | 6010B SEP | 61466 |
| 140-27231-1 | B-113D-19-20' | Step 4 | Solid | 6010B SEP | 61516 |
| 140-27231-2 | B-104D-55-56' | Step 3 | Solid | 6010B SEP | 61466 |

## Metals (Continued)

### Analysis Batch: 61682 (Continued)

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 140-27231-2 | B-104D-55-56' | Step 4 | Solid | 6010B SEP | 61516 |
| 140-27231-3 | B-115D-75-76' | Step 3 | Solid | 6010B SEP | 61466 |
| 140-27231-3 | B-115D-75-76' | Step 4 | Solid | 6010B SEP | 61516 |
| 140-27231-4 | B-47-11-12' | Step 3 | Solid | 6010B SEP | 61466 |
| 140-27231-4 | B-47-11-12' | Step 4 | Solid | 6010B SEP | 61516 |
| 140-27231-5 | B-48-23-24' | Step 3 | Solid | 6010B SEP | 61466 |
| 140-27231-5 | B-48-23-24' | Step 4 | Solid | 6010B SEP | 61516 |
| 140-27231-6 | DGWC-121-38-40' | Step 3 | Solid | 6010B SEP | 61466 |
| 140-27231-6 | DGWC-121-38-40' | Step 4 | Solid | 6010B SEP | 61516 |
| 140-27231-7 | DGWC-121-49-50' | Step 3 | Solid | 6010B SEP | 61466 |
| 140-27231-7 | DGWC-121-49-50' | Step 4 | Solid | 6010B SEP | 61516 |
| 140-27231-8 | B-122D-39-40' | Step 3 | Solid | 6010B SEP | 61466 |
| 140-27231-8 | B-122D-39-40' | Step 4 | Solid | 6010B SEP | 61516 |
| 140-27231-9 | B-123D-27-28' | Step 3 | Solid | 6010B SEP | 61466 |
| 140-27231-9 | B-123D-27-28' | Step 4 | Solid | 6010B SEP | 61516 |
| 140-27231-10 | B-123D-145' | Step 3 | Solid | 6010B SEP | 61466 |
| 140-27231-10 | B-123D-145' | Step 4 | Solid | 6010B SEP | 61516 |
| MB 140-61419/13-B | Method Blank | Step 3 | Solid | 6010B SEP | 61466 |
| MB 140-61467/13-B | Method Blank | Step 4 | Solid | 6010B SEP | 61516 |
| LCS 140-61419/14-B | Lab Control Sample | Step 3 | Solid | 6010B SEP | 61466 |
| LCS 140-61467/14-B | Lab Control Sample | Step 4 | Solid | 6010B SEP | 61516 |
| LCSD 140-61419/15-B | Lab Control Sample Dup | Step 3 | Solid | 6010B SEP | 61466 |
| LCSD 140-61467/15-B | Lab Control Sample Dup | Step 4 | Solid | 6010B SEP | 61516 |
| 140-27231-6 DU | DGWC-121-38-40' | Step 3 | Solid | 6010B SEP | 61466 |
| 140-27231-6 DU | DGWC-121-38-40' | Step 4 | Solid | 6010B SEP | 61516 |

### Prep Batch: 61816

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 140-27231-1 | B-113D-19-20' | Step 5 | Solid | 3010A | 61517 |
| 140-27231-2 | B-104D-55-56' | Step 5 | Solid | 3010A | 61517 |
| 140-27231-3 | B-115D-75-76' | Step 5 | Solid | 3010A | 61517 |
| 140-27231-4 | B-47-11-12' | Step 5 | Solid | 3010A | 61517 |
| 140-27231-5 | B-48-23-24' | Step 5 | Solid | 3010A | 61517 |
| 140-27231-6 | DGWC-121-38-40' | Step 5 | Solid | 3010A | 61517 |
| 140-27231-7 | DGWC-121-49-50' | Step 5 | Solid | 3010A | 61517 |
| 140-27231-8 | B-122D-39-40' | Step 5 | Solid | 3010A | 61517 |
| 140-27231-9 | B-123D-27-28' | Step 5 | Solid | 3010A | 61517 |
| 140-27231-10 | B-123D-145' | Step 5 | Solid | 3010A | 61517 |
| MB 140-61517/13-B ^5 | Method Blank | Step 5 | Solid | 3010A | 61517 |
| LCS 140-61517/14-B ^5 | Lab Control Sample | Step 5 | Solid | 3010A | 61517 |
| LCSD 140-61517/15-B ^5 | Lab Control Sample Dup | Step 5 | Solid | 3010A | 61517 |
| 140-27231-6 DU | DGWC-121-38-40' | Step 5 | Solid | 3010A | 61517 |

### SEP Batch: 61884

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 140-27231-1 | B-113D-19-20' | Step 6 | Solid | Acid/Sulfide | |
| 140-27231-2 | B-104D-55-56' | Step 6 | Solid | Acid/Sulfide | |
| 140-27231-3 | B-115D-75-76' | Step 6 | Solid | Acid/Sulfide | |
| 140-27231-4 | B-47-11-12' | Step 6 | Solid | Acid/Sulfide | |
| 140-27231-5 | B-48-23-24' | Step 6 | Solid | Acid/Sulfide | |
| 140-27231-6 | DGWC-121-38-40' | Step 6 | Solid | Acid/Sulfide | |

## Metals (Continued)

### SEP Batch: 61884 (Continued)

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 140-27231-7 | DGWC-121-49-50' | Step 6 | Solid | Acid/Sulfide | |
| 140-27231-8 | B-122D-39-40' | Step 6 | Solid | Acid/Sulfide | |
| 140-27231-9 | B-123D-27-28' | Step 6 | Solid | Acid/Sulfide | |
| 140-27231-10 | B-123D-145' | Step 6 | Solid | Acid/Sulfide | |
| MB 140-61884/13-A | Method Blank | Step 6 | Solid | Acid/Sulfide | |
| LCS 140-61884/14-A | Lab Control Sample | Step 6 | Solid | Acid/Sulfide | |
| LCSD 140-61884/15-A | Lab Control Sample Dup | Step 6 | Solid | Acid/Sulfide | |
| 140-27231-6 DU | DGWC-121-38-40' | Step 6 | Solid | Acid/Sulfide | |

### Prep Batch: 61893

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 140-27231-1 | B-113D-19-20' | Step 7 | Solid | Residual | |
| 140-27231-2 | B-104D-55-56' | Step 7 | Solid | Residual | |
| 140-27231-3 | B-115D-75-76' | Step 7 | Solid | Residual | |
| 140-27231-4 | B-47-11-12' | Step 7 | Solid | Residual | |
| 140-27231-5 | B-48-23-24' | Step 7 | Solid | Residual | |
| 140-27231-6 | DGWC-121-38-40' | Step 7 | Solid | Residual | |
| 140-27231-7 | DGWC-121-49-50' | Step 7 | Solid | Residual | |
| 140-27231-8 | B-122D-39-40' | Step 7 | Solid | Residual | |
| 140-27231-9 | B-123D-27-28' | Step 7 | Solid | Residual | |
| 140-27231-10 | B-123D-145' | Step 7 | Solid | Residual | |
| MB 140-61893/13-A | Method Blank | Step 7 | Solid | Residual | |
| LCS 140-61893/14-A | Lab Control Sample | Step 7 | Solid | Residual | |
| LCSD 140-61893/15-A | Lab Control Sample Dup | Step 7 | Solid | Residual | |
| 140-27231-6 DU | DGWC-121-38-40' | Step 7 | Solid | Residual | |

### Analysis Batch: 61895

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 140-27231-1 | B-113D-19-20' | Step 5 | Solid | 6010B SEP | 61816 |
| 140-27231-2 | B-104D-55-56' | Step 5 | Solid | 6010B SEP | 61816 |
| 140-27231-3 | B-115D-75-76' | Step 5 | Solid | 6010B SEP | 61816 |
| 140-27231-4 | B-47-11-12' | Step 5 | Solid | 6010B SEP | 61816 |
| 140-27231-5 | B-48-23-24' | Step 5 | Solid | 6010B SEP | 61816 |
| 140-27231-6 | DGWC-121-38-40' | Step 5 | Solid | 6010B SEP | 61816 |
| 140-27231-7 | DGWC-121-49-50' | Step 5 | Solid | 6010B SEP | 61816 |
| 140-27231-8 | B-122D-39-40' | Step 5 | Solid | 6010B SEP | 61816 |
| 140-27231-9 | B-123D-27-28' | Step 5 | Solid | 6010B SEP | 61816 |
| 140-27231-10 | B-123D-145' | Step 5 | Solid | 6010B SEP | 61816 |
| MB 140-61517/13-B ^5 | Method Blank | Step 5 | Solid | 6010B SEP | 61816 |
| LCS 140-61517/14-B ^5 | Lab Control Sample | Step 5 | Solid | 6010B SEP | 61816 |
| LCSD 140-61517/15-B ^5 | Lab Control Sample Dup | Step 5 | Solid | 6010B SEP | 61816 |
| 140-27231-6 DU | DGWC-121-38-40' | Step 5 | Solid | 6010B SEP | 61816 |

### Analysis Batch: 61994

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 140-27231-1 | B-113D-19-20' | Step 6 | Solid | 6010B SEP | 61884 |
| 140-27231-1 | B-113D-19-20' | Step 6 | Solid | 6010B SEP | 61884 |
| 140-27231-2 | B-104D-55-56' | Step 6 | Solid | 6010B SEP | 61884 |
| 140-27231-3 | B-115D-75-76' | Step 6 | Solid | 6010B SEP | 61884 |
| 140-27231-4 | B-47-11-12' | Step 6 | Solid | 6010B SEP | 61884 |
| 140-27231-6 | DGWC-121-38-40' | Step 6 | Solid | 6010B SEP | 61884 |

## Metals (Continued)

### Analysis Batch: 61994 (Continued)

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 140-27231-7 | DGWC-121-49-50' | Step 6 | Solid | 6010B SEP | 61884 |
| 140-27231-8 | B-122D-39-40' | Step 6 | Solid | 6010B SEP | 61884 |
| 140-27231-9 | B-123D-27-28' | Step 6 | Solid | 6010B SEP | 61884 |
| 140-27231-10 | B-123D-145' | Step 6 | Solid | 6010B SEP | 61884 |
| MB 140-61884/13-A | Method Blank | Step 6 | Solid | 6010B SEP | 61884 |
| LCS 140-61884/14-A | Lab Control Sample | Step 6 | Solid | 6010B SEP | 61884 |
| LCSD 140-61884/15-A | Lab Control Sample Dup | Step 6 | Solid | 6010B SEP | 61884 |
| 140-27231-6 DU | DGWC-121-38-40' | Step 6 | Solid | 6010B SEP | 61884 |

### Analysis Batch: 61999

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 140-27231-5 | B-48-23-24' | Step 6 | Solid | 6010B SEP | 61884 |
| MB 140-61884/13-A | Method Blank | Step 6 | Solid | 6010B SEP | 61884 |
| LCS 140-61884/14-A | Lab Control Sample | Step 6 | Solid | 6010B SEP | 61884 |
| LCSD 140-61884/15-A | Lab Control Sample Dup | Step 6 | Solid | 6010B SEP | 61884 |

### Analysis Batch: 62067

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 140-27231-1 | B-113D-19-20' | Step 7 | Solid | 6010B SEP | 61893 |
| 140-27231-1 | B-113D-19-20' | Step 7 | Solid | 6010B SEP | 61893 |
| 140-27231-1 | B-113D-19-20' | Step 7 | Solid | 6010B SEP | 61893 |
| 140-27231-2 | B-104D-55-56' | Step 7 | Solid | 6010B SEP | 61893 |
| 140-27231-2 | B-104D-55-56' | Step 7 | Solid | 6010B SEP | 61893 |
| 140-27231-2 | B-104D-55-56' | Step 7 | Solid | 6010B SEP | 61893 |
| 140-27231-3 | B-115D-75-76' | Step 7 | Solid | 6010B SEP | 61893 |
| 140-27231-3 | B-115D-75-76' | Step 7 | Solid | 6010B SEP | 61893 |
| 140-27231-3 | B-115D-75-76' | Step 7 | Solid | 6010B SEP | 61893 |
| 140-27231-4 | B-47-11-12' | Step 7 | Solid | 6010B SEP | 61893 |
| 140-27231-4 | B-47-11-12' | Step 7 | Solid | 6010B SEP | 61893 |
| 140-27231-4 | B-47-11-12' | Step 7 | Solid | 6010B SEP | 61893 |
| 140-27231-5 | B-48-23-24' | Step 7 | Solid | 6010B SEP | 61893 |
| 140-27231-5 | B-48-23-24' | Step 7 | Solid | 6010B SEP | 61893 |
| 140-27231-5 | B-48-23-24' | Step 7 | Solid | 6010B SEP | 61893 |
| 140-27231-6 | DGWC-121-38-40' | Step 7 | Solid | 6010B SEP | 61893 |
| 140-27231-6 | DGWC-121-38-40' | Step 7 | Solid | 6010B SEP | 61893 |
| 140-27231-6 | DGWC-121-38-40' | Step 7 | Solid | 6010B SEP | 61893 |
| 140-27231-7 | DGWC-121-49-50' | Step 7 | Solid | 6010B SEP | 61893 |
| 140-27231-7 | DGWC-121-49-50' | Step 7 | Solid | 6010B SEP | 61893 |
| 140-27231-7 | DGWC-121-49-50' | Step 7 | Solid | 6010B SEP | 61893 |
| 140-27231-8 | B-122D-39-40' | Step 7 | Solid | 6010B SEP | 61893 |
| 140-27231-8 | B-122D-39-40' | Step 7 | Solid | 6010B SEP | 61893 |
| 140-27231-8 | B-122D-39-40' | Step 7 | Solid | 6010B SEP | 61893 |
| 140-27231-9 | B-123D-27-28' | Step 7 | Solid | 6010B SEP | 61893 |
| 140-27231-9 | B-123D-27-28' | Step 7 | Solid | 6010B SEP | 61893 |
| 140-27231-9 | B-123D-27-28' | Step 7 | Solid | 6010B SEP | 61893 |
| 140-27231-10 | B-123D-145' | Step 7 | Solid | 6010B SEP | 61893 |
| 140-27231-10 | B-123D-145' | Step 7 | Solid | 6010B SEP | 61893 |
| 140-27231-10 | B-123D-145' | Step 7 | Solid | 6010B SEP | 61893 |
| MB 140-61893/13-A | Method Blank | Step 7 | Solid | 6010B SEP | 61893 |
| LCS 140-61893/14-A | Lab Control Sample | Step 7 | Solid | 6010B SEP | 61893 |
| LCSD 140-61893/15-A | Lab Control Sample Dup | Step 7 | Solid | 6010B SEP | 61893 |

## Metals (Continued)

### Analysis Batch: 62067 (Continued)

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 140-27231-6 DU | DGWC-121-38-40' | Step 7 | Solid | 6010B SEP | 61893 |
| 140-27231-6 DU | DGWC-121-38-40' | Step 7 | Solid | 6010B SEP | 61893 |
| 140-27231-6 DU | DGWC-121-38-40' | Step 7 | Solid | 6010B SEP | 61893 |

### Analysis Batch: 62091

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 140-27231-1 | B-113D-19-20' | Total/NA | Solid | 6010B | 61285 |
| 140-27231-1 | B-113D-19-20' | Total/NA | Solid | 6010B | 61285 |
| 140-27231-1 | B-113D-19-20' | Total/NA | Solid | 6010B | 61285 |
| 140-27231-2 | B-104D-55-56' | Total/NA | Solid | 6010B | 61285 |
| 140-27231-2 | B-104D-55-56' | Total/NA | Solid | 6010B | 61285 |
| 140-27231-3 | B-115D-75-76' | Total/NA | Solid | 6010B | 61285 |
| 140-27231-3 | B-115D-75-76' | Total/NA | Solid | 6010B | 61285 |
| 140-27231-3 | B-115D-75-76' | Total/NA | Solid | 6010B | 61285 |
| 140-27231-4 | B-47-11-12' | Total/NA | Solid | 6010B | 61285 |
| 140-27231-4 | B-47-11-12' | Total/NA | Solid | 6010B | 61285 |
| 140-27231-4 | B-47-11-12' | Total/NA | Solid | 6010B | 61285 |
| 140-27231-5 | B-48-23-24' | Total/NA | Solid | 6010B | 61285 |
| 140-27231-5 | B-48-23-24' | Total/NA | Solid | 6010B | 61285 |
| 140-27231-6 | DGWC-121-38-40' | Total/NA | Solid | 6010B | 61285 |
| 140-27231-6 | DGWC-121-38-40' | Total/NA | Solid | 6010B | 61285 |
| 140-27231-6 | DGWC-121-38-40' | Total/NA | Solid | 6010B | 61285 |
| 140-27231-7 | DGWC-121-49-50' | Total/NA | Solid | 6010B | 61285 |
| 140-27231-7 | DGWC-121-49-50' | Total/NA | Solid | 6010B | 61285 |
| 140-27231-7 | DGWC-121-49-50' | Total/NA | Solid | 6010B | 61285 |
| 140-27231-8 | B-122D-39-40' | Total/NA | Solid | 6010B | 61285 |
| 140-27231-8 | B-122D-39-40' | Total/NA | Solid | 6010B | 61285 |
| 140-27231-8 | B-122D-39-40' | Total/NA | Solid | 6010B | 61285 |
| 140-27231-9 | B-123D-27-28' | Total/NA | Solid | 6010B | 61285 |
| 140-27231-9 | B-123D-27-28' | Total/NA | Solid | 6010B | 61285 |
| 140-27231-9 | B-123D-27-28' | Total/NA | Solid | 6010B | 61285 |
| 140-27231-10 | B-123D-145' | Total/NA | Solid | 6010B | 61285 |
| 140-27231-10 | B-123D-145' | Total/NA | Solid | 6010B | 61285 |
| 140-27231-10 | B-123D-145' | Total/NA | Solid | 6010B | 61285 |
| MB 140-61285/14-A | Method Blank | Total/NA | Solid | 6010B | 61285 |
| LCS 140-61285/15-A | Lab Control Sample | Total/NA | Solid | 6010B | 61285 |
| LCSD 140-61285/16-A | Lab Control Sample Dup | Total/NA | Solid | 6010B | 61285 |
| 140-27231-6 DU | DGWC-121-38-40' | Total/NA | Solid | 6010B | 61285 |
| 140-27231-6 DU | DGWC-121-38-40' | Total/NA | Solid | 6010B | 61285 |
| 140-27231-6 DU | DGWC-121-38-40' | Total/NA | Solid | 6010B | 61285 |

### Analysis Batch: 62131

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 140-27231-1 | B-113D-19-20' | Sum of Steps 1-7 | Solid | 6010B SEP | |
| 140-27231-2 | B-104D-55-56' | Sum of Steps 1-7 | Solid | 6010B SEP | |
| 140-27231-3 | B-115D-75-76' | Sum of Steps 1-7 | Solid | 6010B SEP | |
| 140-27231-4 | B-47-11-12' | Sum of Steps 1-7 | Solid | 6010B SEP | |
| 140-27231-5 | B-48-23-24' | Sum of Steps 1-7 | Solid | 6010B SEP | |
| 140-27231-6 | DGWC-121-38-40' | Sum of Steps 1-7 | Solid | 6010B SEP | |
| 140-27231-7 | DGWC-121-49-50' | Sum of Steps 1-7 | Solid | 6010B SEP | |
| 140-27231-8 | B-122D-39-40' | Sum of Steps 1-7 | Solid | 6010B SEP | |

## Metals (Continued)

### Analysis Batch: 62131 (Continued)

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 140-27231-9 | B-123D-27-28' | Sum of Steps 1-7 | Solid | 6010B SEP | |
| 140-27231-10 | B-123D-145' | Sum of Steps 1-7 | Solid | 6010B SEP | |

## General Chemistry

### Analysis Batch: 61060

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 140-27231-1 | B-113D-19-20' | Total/NA | Solid | Moisture | |
| 140-27231-4 | B-47-11-12' | Total/NA | Solid | Moisture | |
| 140-27231-5 | B-48-23-24' | Total/NA | Solid | Moisture | |
| 140-27231-6 | DGWC-121-38-40' | Total/NA | Solid | Moisture | |
| 140-27231-8 | B-122D-39-40' | Total/NA | Solid | Moisture | |
| 140-27231-9 | B-123D-27-28' | Total/NA | Solid | Moisture | |

## Organic Prep

### Analysis Batch: 524310

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 140-27231-2 | B-104D-55-56' | Total/NA | Solid | Part Size Red | |
| 140-27231-3 | B-115D-75-76' | Total/NA | Solid | Part Size Red | |
| 140-27231-7 | DGWC-121-49-50' | Total/NA | Solid | Part Size Red | |
| 140-27231-10 | B-123D-145' | Total/NA | Solid | Part Size Red | |

# Lab Chronicle

Client: Golder Associates Inc. Job ID: 140-27231-1

Project/Site: Plant McDonough NES Well Installation

## Client Sample ID: B-113D-19-20' Lab Sample ID: 140-27231-1

**Date Collected: 04/19/22 14:00** **Matrix: Solid**

**Date Received: 04/25/22 09:30**

| 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 | | | 62131 | 05/31/22 15:33 | KNC | TAL KNX |
| | Instrument ID: NOEQUIP | | | | | | | | | |
| Total/NA | Analysis | Moisture | | 1 | | | 61060 | 04/26/22 11:45 | ACW | TAL KNX |
| | Instrument ID: NOEQUIP | | | | | | | | | |

## Client Sample ID: B-113D-19-20' Lab Sample ID: 140-27231-1

**Date Collected: 04/19/22 14:00** **Matrix: Solid**

**Date Received: 04/25/22 09:30** **Percent Solids: 98.7**

| 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 | 61285 | 05/04/22 08:00 | KNC | TAL KNX |
| Total/NA | Analysis | 6010B | | 10 | | | 62091 | 05/27/22 10:23 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Total/NA | Prep | Total | | | 1.000 g | 50 mL | 61285 | 05/04/22 08:00 | KNC | TAL KNX |
| Total/NA | Analysis | 6010B | | 1 | | | 62091 | 05/27/22 12:03 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Total/NA | Prep | Total | | | 1.000 g | 50 mL | 61285 | 05/04/22 08:00 | KNC | TAL KNX |
| Total/NA | Analysis | 6010B | | 5 | | | 62091 | 05/27/22 13:38 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 1 | SEP | Exchangeable | | | 5.000 g | 25 mL | 61288 | 05/04/22 08:00 | KNC | TAL KNX |
| Step 1 | Prep | 3010A | | | 5 mL | 50 mL | 61349 | 05/05/22 08:00 | KNC | TAL KNX |
| Step 1 | Analysis | 6010B SEP | | 4 | | | 61514 | 05/09/22 11:47 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 2 | SEP | Carbonate | | | 5.000 g | 25 mL | 61360 | 05/05/22 08:00 | KNC | TAL KNX |
| Step 2 | Prep | 3010A | | | 5 mL | 50 mL | 61418 | 05/06/22 08:00 | KNC | TAL KNX |
| Step 2 | Analysis | 6010B SEP | | 3 | | | 61514 | 05/09/22 13:01 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 3 | SEP | Non-Crystalline | | | 5.000 g | 25 mL | 61419 | 05/06/22 08:00 | KNC | TAL KNX |
| Step 3 | Prep | 3010A | | | 5 mL | 50 mL | 61466 | 05/09/22 08:00 | KNC | TAL KNX |
| Step 3 | Analysis | 6010B SEP | | 1 | | | 61682 | 05/13/22 11:51 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 4 | SEP | Metal Hydroxide | | | 5.000 g | 25 mL | 61467 | 05/09/22 08:00 | KNC | TAL KNX |
| Step 4 | Prep | 3010A | | | 5 mL | 50 mL | 61516 | 05/11/22 08:00 | KNC | TAL KNX |
| Step 4 | Analysis | 6010B SEP | | 1 | | | 61682 | 05/13/22 13:06 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 5 | SEP | Organic-Bound | | | 5.000 g | 75 mL | 61517 | 05/17/22 08:00 | KNC | TAL KNX |
| Step 5 | Prep | 3010A | | | 5 mL | 50 mL | 61816 | 05/19/22 08:00 | KNC | TAL KNX |
| Step 5 | Analysis | 6010B SEP | | 5 | | | 61895 | 05/20/22 12:28 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 6 | SEP | Acid/Sulfide | | | 5.000 g | 250 mL | 61884 | 05/20/22 10:08 | KNC | TAL KNX |
| Step 6 | Analysis | 6010B SEP | | 1 | | | 61994 | 05/24/22 10:48 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 6 | SEP | Acid/Sulfide | | | 5.000 g | 250 mL | 61884 | 05/20/22 10:08 | KNC | TAL KNX |
| Step 6 | Analysis | 6010B SEP | | 2 | | | 61994 | 05/24/22 14:00 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |

# Lab Chronicle

Client: Golder Associates Inc. Job ID: 140-27231-1
Project/Site: Plant McDonough NES Well Installation

## Client Sample ID: B-113D-19-20' Lab Sample ID: 140-27231-1

**Date Collected: 04/19/22 14:00** **Matrix: Solid**
**Date Received: 04/25/22 09:30** **Percent Solids: 98.7**

| 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 | 61893 | 05/23/22 08:00 | KNC | TAL KNX |
| Step 7 | Analysis | 6010B SEP | | 10 | | | 62067 | 05/26/22 10:46 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 7 | Prep | Residual | | | 1.000 g | 50 mL | 61893 | 05/23/22 08:00 | KNC | TAL KNX |
| Step 7 | Analysis | 6010B SEP | | 1 | | | 62067 | 05/26/22 12:14 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 7 | Prep | Residual | | | 1.000 g | 50 mL | 61893 | 05/23/22 08:00 | KNC | TAL KNX |
| Step 7 | Analysis | 6010B SEP | | 3 | | | 62067 | 05/26/22 13:55 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |

## Client Sample ID: B-104D-55-56' Lab Sample ID: 140-27231-2

**Date Collected: 04/19/22 14:00** **Matrix: Solid**
**Date Received: 04/25/22 09:30**

| 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 | 61285 | 05/04/22 08:00 | KNC | TAL KNX |
| Total/NA | Analysis | 6010B | | 10 | | | 62091 | 05/27/22 11:15 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Total/NA | Prep | Total | | | 1.000 g | 50 mL | 61285 | 05/04/22 08:00 | KNC | TAL KNX |
| Total/NA | Analysis | 6010B | | 3 | | | 62091 | 05/27/22 14:33 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 1 | SEP | Exchangeable | | | 5.000 g | 25 mL | 61288 | 05/04/22 08:00 | KNC | TAL KNX |
| Step 1 | Prep | 3010A | | | 5 mL | 50 mL | 61349 | 05/05/22 08:00 | KNC | TAL KNX |
| Step 1 | Analysis | 6010B SEP | | 4 | | | 61514 | 05/09/22 12:32 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 2 | SEP | Carbonate | | | 5.000 g | 25 mL | 61360 | 05/05/22 08:00 | KNC | TAL KNX |
| Step 2 | Prep | 3010A | | | 5 mL | 50 mL | 61418 | 05/06/22 08:00 | KNC | TAL KNX |
| Step 2 | Analysis | 6010B SEP | | 3 | | | 61514 | 05/09/22 13:56 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 3 | SEP | Non-Crystalline | | | 5.000 g | 25 mL | 61419 | 05/06/22 08:00 | KNC | TAL KNX |
| Step 3 | Prep | 3010A | | | 5 mL | 50 mL | 61466 | 05/09/22 08:00 | KNC | TAL KNX |
| Step 3 | Analysis | 6010B SEP | | 1 | | | 61682 | 05/13/22 12:37 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 4 | SEP | Metal Hydroxide | | | 5.000 g | 25 mL | 61467 | 05/09/22 08:00 | KNC | TAL KNX |
| Step 4 | Prep | 3010A | | | 5 mL | 50 mL | 61516 | 05/11/22 08:00 | KNC | TAL KNX |
| Step 4 | Analysis | 6010B SEP | | 1 | | | 61682 | 05/13/22 14:00 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 5 | SEP | Organic-Bound | | | 5.000 g | 75 mL | 61517 | 05/17/22 08:00 | KNC | TAL KNX |
| Step 5 | Prep | 3010A | | | 5 mL | 50 mL | 61816 | 05/19/22 08:00 | KNC | TAL KNX |
| Step 5 | Analysis | 6010B SEP | | 5 | | | 61895 | 05/20/22 13:23 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 6 | SEP | Acid/Sulfide | | | 5.000 g | 250 mL | 61884 | 05/20/22 10:08 | KNC | TAL KNX |
| Step 6 | Analysis | 6010B SEP | | 1 | | | 61994 | 05/24/22 11:44 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |

**Client Sample ID: B-104D-55-56'** **Lab Sample ID: 140-27231-2**
**Date Collected: 04/19/22 14:00** **Matrix: Solid**
**Date Received: 04/25/22 09:30**

| 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 | 61893 | 05/23/22 08:00 | KNC | TAL KNX |
| Step 7 | Analysis | 6010B SEP | | 10 | | | 62067 | 05/26/22 11:40 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 7 | Prep | Residual | | | 1.000 g | 50 mL | 61893 | 05/23/22 08:00 | KNC | TAL KNX |
| Step 7 | Analysis | 6010B SEP | | 1 | | | 62067 | 05/26/22 13:11 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 7 | Prep | Residual | | | 1.000 g | 50 mL | 61893 | 05/23/22 08:00 | KNC | TAL KNX |
| Step 7 | Analysis | 6010B SEP | | 5 | | | 62067 | 05/26/22 14:48 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Sum of Steps 1-7 | Analysis | 6010B SEP | | 1 | | | 62131 | 05/31/22 15:33 | KNC | TAL KNX |
| | Instrument ID: NOEQUIP | | | | | | | | | |
| Total/NA | Analysis | Part Size Red | | 1 | | | 524310 | 04/28/22 07:25 | POP | TAL CAN |
| | Instrument ID: NOEQUIP | | | | | | | | | |

**Client Sample ID: B-115D-75-76'** **Lab Sample ID: 140-27231-3**
**Date Collected: 04/19/22 14:00** **Matrix: Solid**
**Date Received: 04/25/22 09:30**

| 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 | 61285 | 05/04/22 08:00 | KNC | TAL KNX |
| Total/NA | Analysis | 6010B | | 10 | | | 62091 | 05/27/22 11:20 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Total/NA | Prep | Total | | | 1.000 g | 50 mL | 61285 | 05/04/22 08:00 | KNC | TAL KNX |
| Total/NA | Analysis | 6010B | | 1 | | | 62091 | 05/27/22 13:09 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Total/NA | Prep | Total | | | 1.000 g | 50 mL | 61285 | 05/04/22 08:00 | KNC | TAL KNX |
| Total/NA | Analysis | 6010B | | 5 | | | 62091 | 05/27/22 14:38 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 1 | SEP | Exchangeable | | | 5.000 g | 25 mL | 61288 | 05/04/22 08:00 | KNC | TAL KNX |
| Step 1 | Prep | 3010A | | | 5 mL | 50 mL | 61349 | 05/05/22 08:00 | KNC | TAL KNX |
| Step 1 | Analysis | 6010B SEP | | 4 | | | 61514 | 05/09/22 12:46 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 2 | SEP | Carbonate | | | 5.000 g | 25 mL | 61360 | 05/05/22 08:00 | KNC | TAL KNX |
| Step 2 | Prep | 3010A | | | 5 mL | 50 mL | 61418 | 05/06/22 08:00 | KNC | TAL KNX |
| Step 2 | Analysis | 6010B SEP | | 3 | | | 61514 | 05/09/22 14:04 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 3 | SEP | Non-Crystalline | | | 5.000 g | 25 mL | 61419 | 05/06/22 08:00 | KNC | TAL KNX |
| Step 3 | Prep | 3010A | | | 5 mL | 50 mL | 61466 | 05/09/22 08:00 | KNC | TAL KNX |
| Step 3 | Analysis | 6010B SEP | | 1 | | | 61682 | 05/13/22 12:51 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 4 | SEP | Metal Hydroxide | | | 5.000 g | 25 mL | 61467 | 05/09/22 08:00 | KNC | TAL KNX |
| Step 4 | Prep | 3010A | | | 5 mL | 50 mL | 61516 | 05/11/22 08:00 | KNC | TAL KNX |
| Step 4 | Analysis | 6010B SEP | | 1 | | | 61682 | 05/13/22 14:05 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |



1 2 3 4 5 6 7 8 9 10 11 12 13

**Client Sample ID: B-115D-75-76'** **Lab Sample ID: 140-27231-3**
**Date Collected: 04/19/22 14:00** **Matrix: Solid**
**Date Received: 04/25/22 09:30**

| 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 | 61517 | 05/17/22 08:00 | KNC | TAL KNX |
| Step 5 | Prep | 3010A | | | 5 mL | 50 mL | 61816 | 05/19/22 08:00 | KNC | TAL KNX |
| Step 5 | Analysis | 6010B SEP | | 5 | | | 61895 | 05/20/22 13:28 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 6 | SEP | Acid/Sulfide | | | 5.000 g | 250 mL | 61884 | 05/20/22 10:08 | KNC | TAL KNX |
| Step 6 | Analysis | 6010B SEP | | 1 | | | 61994 | 05/24/22 11:49 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 7 | Prep | Residual | | | 1.000 g | 50 mL | 61893 | 05/23/22 08:00 | KNC | TAL KNX |
| Step 7 | Analysis | 6010B SEP | | 10 | | | 62067 | 05/26/22 11:45 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 7 | Prep | Residual | | | 1.000 g | 50 mL | 61893 | 05/23/22 08:00 | KNC | TAL KNX |
| Step 7 | Analysis | 6010B SEP | | 1 | | | 62067 | 05/26/22 13:16 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 7 | Prep | Residual | | | 1.000 g | 50 mL | 61893 | 05/23/22 08:00 | KNC | TAL KNX |
| Step 7 | Analysis | 6010B SEP | | 5 | | | 62067 | 05/26/22 14:52 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Sum of Steps 1-7 | Analysis | 6010B SEP | | 1 | | | 62131 | 05/31/22 15:33 | KNC | TAL KNX |
| | Instrument ID: NOEQUIP | | | | | | | | | |
| Total/NA | Analysis | Part Size Red | | 1 | | | 524310 | 04/28/22 07:25 | POP | TAL CAN |
| | Instrument ID: NOEQUIP | | | | | | | | | |

**Client Sample ID: B-47-11-12'** **Lab Sample ID: 140-27231-4**
**Date Collected: 04/19/22 14:00** **Matrix: Solid**
**Date Received: 04/25/22 09:30**

| 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 | | | 62131 | 05/31/22 15:33 | KNC | TAL KNX |
| | Instrument ID: NOEQUIP | | | | | | | | | |
| Total/NA | Analysis | Moisture | | 1 | | | 61060 | 04/26/22 11:45 | ACW | TAL KNX |
| | Instrument ID: NOEQUIP | | | | | | | | | |

**Client Sample ID: B-47-11-12'** **Lab Sample ID: 140-27231-4**
**Date Collected: 04/19/22 14:00** **Matrix: Solid**
**Date Received: 04/25/22 09:30** **Percent Solids: 99.2**

| 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 | 61285 | 05/04/22 08:00 | KNC | TAL KNX |
| Total/NA | Analysis | 6010B | | 10 | | | 62091 | 05/27/22 10:27 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Total/NA | Prep | Total | | | 1.000 g | 50 mL | 61285 | 05/04/22 08:00 | KNC | TAL KNX |
| Total/NA | Analysis | 6010B | | 1 | | | 62091 | 05/27/22 12:09 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Total/NA | Prep | Total | | | 1.000 g | 50 mL | 61285 | 05/04/22 08:00 | KNC | TAL KNX |
| Total/NA | Analysis | 6010B | | 5 | | | 62091 | 05/27/22 13:42 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |

# Lab Chronicle

Client: Golder Associates Inc. Job ID: 140-27231-1
Project/Site: Plant McDonough NES Well Installation

## Client Sample ID: B-47-11-12' Lab Sample ID: 140-27231-4

**Date Collected: 04/19/22 14:00** **Matrix: Solid**
**Date Received: 04/25/22 09:30** **Percent Solids: 99.2**

| 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 | 61288 | 05/04/22 08:00 | KNC | TAL KNX |
| Step 1 | Prep | 3010A | | | 5 mL | 50 mL | 61349 | 05/05/22 08:00 | KNC | TAL KNX |
| Step 1 | Analysis | 6010B SEP | | 4 | | | 61514 | 05/09/22 11:52 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 2 | SEP | Carbonate | | | 5.000 g | 25 mL | 61360 | 05/05/22 08:00 | KNC | TAL KNX |
| Step 2 | Prep | 3010A | | | 5 mL | 50 mL | 61418 | 05/06/22 08:00 | KNC | TAL KNX |
| Step 2 | Analysis | 6010B SEP | | 3 | | | 61514 | 05/09/22 13:06 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 3 | SEP | Non-Crystalline | | | 5.000 g | 25 mL | 61419 | 05/06/22 08:00 | KNC | TAL KNX |
| Step 3 | Prep | 3010A | | | 5 mL | 50 mL | 61466 | 05/09/22 08:00 | KNC | TAL KNX |
| Step 3 | Analysis | 6010B SEP | | 1 | | | 61682 | 05/13/22 11:56 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 4 | SEP | Metal Hydroxide | | | 5.000 g | 25 mL | 61467 | 05/09/22 08:00 | KNC | TAL KNX |
| Step 4 | Prep | 3010A | | | 5 mL | 50 mL | 61516 | 05/11/22 08:00 | KNC | TAL KNX |
| Step 4 | Analysis | 6010B SEP | | 1 | | | 61682 | 05/13/22 13:11 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 5 | SEP | Organic-Bound | | | 5.000 g | 75 mL | 61517 | 05/17/22 08:00 | KNC | TAL KNX |
| Step 5 | Prep | 3010A | | | 5 mL | 50 mL | 61816 | 05/19/22 08:00 | KNC | TAL KNX |
| Step 5 | Analysis | 6010B SEP | | 5 | | | 61895 | 05/20/22 12:33 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 6 | SEP | Acid/Sulfide | | | 5.000 g | 250 mL | 61884 | 05/20/22 10:08 | KNC | TAL KNX |
| Step 6 | Analysis | 6010B SEP | | 1 | | | 61994 | 05/24/22 10:53 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 7 | Prep | Residual | | | 1.000 g | 50 mL | 61893 | 05/23/22 08:00 | KNC | TAL KNX |
| Step 7 | Analysis | 6010B SEP | | 10 | | | 62067 | 05/26/22 10:51 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 7 | Prep | Residual | | | 1.000 g | 50 mL | 61893 | 05/23/22 08:00 | KNC | TAL KNX |
| Step 7 | Analysis | 6010B SEP | | 1 | | | 62067 | 05/26/22 12:29 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 7 | Prep | Residual | | | 1.000 g | 50 mL | 61893 | 05/23/22 08:00 | KNC | TAL KNX |
| Step 7 | Analysis | 6010B SEP | | 5 | | | 62067 | 05/26/22 14:00 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |

## Client Sample ID: B-48-23-24' Lab Sample ID: 140-27231-5

**Date Collected: 04/19/22 14:00** **Matrix: Solid**
**Date Received: 04/25/22 09:30**

| 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 | | | 62131 | 05/31/22 15:33 | KNC | TAL KNX |
| | Instrument ID: NOEQUIP | | | | | | | | | |
| Total/NA | Analysis | Moisture | | 1 | | | 61060 | 04/26/22 11:45 | ACW | TAL KNX |
| | Instrument ID: NOEQUIP | | | | | | | | | |

# Lab Chronicle

Client: Golder Associates Inc.

Job ID: 140-27231-1

Project/Site: Plant McDonough NES Well Installation

## Client Sample ID: B-48-23-24'

## Lab Sample ID: 140-27231-5

**Date Collected: 04/19/22 14:00**

**Matrix: Solid**

**Date Received: 04/25/22 09:30**

**Percent Solids: 99.3**

| 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 | 61285 | 05/04/22 08:00 | KNC | TAL KNX |
| Total/NA | Analysis | 6010B | | 10 | | | 62091 | 05/27/22 10:32 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Total/NA | Prep | Total | | | 1.000 g | 50 mL | 61285 | 05/04/22 08:00 | KNC | TAL KNX |
| Total/NA | Analysis | 6010B | | 5 | | | 62091 | 05/27/22 14:58 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 1 | SEP | Exchangeable | | | 5.000 g | 25 mL | 61288 | 05/04/22 08:00 | KNC | TAL KNX |
| Step 1 | Prep | 3010A | | | 5 mL | 50 mL | 61349 | 05/05/22 08:00 | KNC | TAL KNX |
| Step 1 | Analysis | 6010B SEP | | 4 | | | 61514 | 05/09/22 11:57 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 2 | SEP | Carbonate | | | 5.000 g | 25 mL | 61360 | 05/05/22 08:00 | KNC | TAL KNX |
| Step 2 | Prep | 3010A | | | 5 mL | 50 mL | 61418 | 05/06/22 08:00 | KNC | TAL KNX |
| Step 2 | Analysis | 6010B SEP | | 3 | | | 61514 | 05/09/22 13:11 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 3 | SEP | Non-Crystalline | | | 5.000 g | 25 mL | 61419 | 05/06/22 08:00 | KNC | TAL KNX |
| Step 3 | Prep | 3010A | | | 5 mL | 50 mL | 61466 | 05/09/22 08:00 | KNC | TAL KNX |
| Step 3 | Analysis | 6010B SEP | | 1 | | | 61682 | 05/13/22 12:01 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 4 | SEP | Metal Hydroxide | | | 5.000 g | 25 mL | 61467 | 05/09/22 08:00 | KNC | TAL KNX |
| Step 4 | Prep | 3010A | | | 5 mL | 50 mL | 61516 | 05/11/22 08:00 | KNC | TAL KNX |
| Step 4 | Analysis | 6010B SEP | | 1 | | | 61682 | 05/13/22 13:16 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 5 | SEP | Organic-Bound | | | 5.000 g | 75 mL | 61517 | 05/17/22 08:00 | KNC | TAL KNX |
| Step 5 | Prep | 3010A | | | 5 mL | 50 mL | 61816 | 05/19/22 08:00 | KNC | TAL KNX |
| Step 5 | Analysis | 6010B SEP | | 5 | | | 61895 | 05/20/22 12:38 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 6 | SEP | Acid/Sulfide | | | 5.000 g | 250 mL | 61884 | 05/20/22 10:08 | KNC | TAL KNX |
| Step 6 | Analysis | 6010B SEP | | 3 | | | 61999 | 05/24/22 16:12 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 7 | Prep | Residual | | | 1.000 g | 50 mL | 61893 | 05/23/22 08:00 | KNC | TAL KNX |
| Step 7 | Analysis | 6010B SEP | | 10 | | | 62067 | 05/26/22 10:55 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 7 | Prep | Residual | | | 1.000 g | 50 mL | 61893 | 05/23/22 08:00 | KNC | TAL KNX |
| Step 7 | Analysis | 6010B SEP | | 1 | | | 62067 | 05/26/22 12:34 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 7 | Prep | Residual | | | 1.000 g | 50 mL | 61893 | 05/23/22 08:00 | KNC | TAL KNX |
| Step 7 | Analysis | 6010B SEP | | 5 | | | 62067 | 05/26/22 14:04 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |

## Client Sample ID: DGWC-121-38-40'

## Lab Sample ID: 140-27231-6

**Date Collected: 04/19/22 14:00**

**Matrix: Solid**

**Date Received: 04/25/22 09:30**

| 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 | | | 62131 | 05/31/22 15:33 | KNC | TAL KNX |
| | Instrument ID: NOEQUIP | | | | | | | | | |

Eurofins Knoxville

# Lab Chronicle

Client: Golder Associates Inc.　　Job ID: 140-27231-1
Project/Site: Plant McDonough NES Well Installation

**Client Sample ID: DGWC-121-38-40'**　　**Lab Sample ID: 140-27231-6**
**Date Collected: 04/19/22 14:00**　　**Matrix: Solid**
**Date Received: 04/25/22 09:30**

| Prep Type | Batch Type | Batch Method | Run | Dil Factor | Initial Amount | Final Amount | Batch Number | Prepared or Analyzed | Analyst | Lab |
|---|---|---|---|---|---|---|---|---|---|---|
| Total/NA | Analysis | Moisture | | 1 | | | 61060 | 04/26/22 11:45 | ACW | TAL KNX |

**Client Sample ID: DGWC-121-38-40'**　　**Lab Sample ID: 140-27231-6**
**Date Collected: 04/19/22 14:00**　　**Matrix: Solid**
**Date Received: 04/25/22 09:30**　　**Percent Solids: 82.1**

| 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 | 61285 | 05/04/22 08:00 | KNC | TAL KNX |
| Total/NA | Analysis | 6010B | | 10 | | | 62091 | 05/27/22 10:37 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Total/NA | Prep | Total | | | 1.000 g | 50 mL | 61285 | 05/04/22 08:00 | KNC | TAL KNX |
| Total/NA | Analysis | 6010B | | 1 | | | 62091 | 05/27/22 12:20 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Total/NA | Prep | Total | | | 1.000 g | 50 mL | 61285 | 05/04/22 08:00 | KNC | TAL KNX |
| Total/NA | Analysis | 6010B | | 5 | | | 62091 | 05/27/22 13:53 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 1 | SEP | Exchangeable | | | 5.000 g | 25 mL | 61288 | 05/04/22 08:00 | KNC | TAL KNX |
| Step 1 | Prep | 3010A | | | 5 mL | 50 mL | 61349 | 05/05/22 08:00 | KNC | TAL KNX |
| Step 1 | Analysis | 6010B SEP | | 4 | | | 61514 | 05/09/22 12:02 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 2 | SEP | Carbonate | | | 5.000 g | 25 mL | 61360 | 05/05/22 08:00 | KNC | TAL KNX |
| Step 2 | Prep | 3010A | | | 5 mL | 50 mL | 61418 | 05/06/22 08:00 | KNC | TAL KNX |
| Step 2 | Analysis | 6010B SEP | | 3 | | | 61514 | 05/09/22 13:16 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 3 | SEP | Non-Crystalline | | | 5.000 g | 25 mL | 61419 | 05/06/22 08:00 | KNC | TAL KNX |
| Step 3 | Prep | 3010A | | | 5 mL | 50 mL | 61466 | 05/09/22 08:00 | KNC | TAL KNX |
| Step 3 | Analysis | 6010B SEP | | 1 | | | 61682 | 05/13/22 12:06 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 4 | SEP | Metal Hydroxide | | | 5.000 g | 25 mL | 61467 | 05/09/22 08:00 | KNC | TAL KNX |
| Step 4 | Prep | 3010A | | | 5 mL | 50 mL | 61516 | 05/11/22 08:00 | KNC | TAL KNX |
| Step 4 | Analysis | 6010B SEP | | 1 | | | 61682 | 05/13/22 13:21 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 5 | SEP | Organic-Bound | | | 5.000 g | 75 mL | 61517 | 05/17/22 08:00 | KNC | TAL KNX |
| Step 5 | Prep | 3010A | | | 5 mL | 50 mL | 61816 | 05/19/22 08:00 | KNC | TAL KNX |
| Step 5 | Analysis | 6010B SEP | | 5 | | | 61895 | 05/20/22 12:43 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 6 | SEP | Acid/Sulfide | | | 5.000 g | 250 mL | 61884 | 05/20/22 10:08 | KNC | TAL KNX |
| Step 6 | Analysis | 6010B SEP | | 1 | | | 61994 | 05/24/22 11:03 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 7 | Prep | Residual | | | 1.000 g | 50 mL | 61893 | 05/23/22 08:00 | KNC | TAL KNX |
| Step 7 | Analysis | 6010B SEP | | 10 | | | 62067 | 05/26/22 11:00 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 7 | Prep | Residual | | | 1.000 g | 50 mL | 61893 | 05/23/22 08:00 | KNC | TAL KNX |
| Step 7 | Analysis | 6010B SEP | | 1 | | | 62067 | 05/26/22 12:40 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |

# Lab Chronicle

Client: Golder Associates Inc. Job ID: 140-27231-1
Project/Site: Plant McDonough NES Well Installation

**Client Sample ID: DGWC-121-38-40'** **Lab Sample ID: 140-27231-6**
**Date Collected: 04/19/22 14:00** **Matrix: Solid**
**Date Received: 04/25/22 09:30** **Percent Solids: 82.1**

| 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 | 61893 | 05/23/22 08:00 | KNC | TAL KNX |
| Step 7 | Analysis | 6010B SEP | | 5 | | | 62067 | 05/26/22 14:09 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |

**Client Sample ID: DGWC-121-49-50'** **Lab Sample ID: 140-27231-7**
**Date Collected: 04/19/22 14:00** **Matrix: Solid**
**Date Received: 04/25/22 09:30**

| 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 | 61285 | 05/04/22 08:00 | KNC | TAL KNX |
| Total/NA | Analysis | 6010B | | 10 | | | 62091 | 05/27/22 11:24 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Total/NA | Prep | Total | | | 1.000 g | 50 mL | 61285 | 05/04/22 08:00 | KNC | TAL KNX |
| Total/NA | Analysis | 6010B | | 1 | | | 62091 | 05/27/22 13:15 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Total/NA | Prep | Total | | | 1.000 g | 50 mL | 61285 | 05/04/22 08:00 | KNC | TAL KNX |
| Total/NA | Analysis | 6010B | | 5 | | | 62091 | 05/27/22 14:43 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 1 | SEP | Exchangeable | | | 5.000 g | 25 mL | 61288 | 05/04/22 08:00 | KNC | TAL KNX |
| Step 1 | Prep | 3010A | | | 5 mL | 50 mL | 61349 | 05/05/22 08:00 | KNC | TAL KNX |
| Step 1 | Analysis | 6010B SEP | | 4 | | | 61514 | 05/09/22 12:51 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 2 | SEP | Carbonate | | | 5.000 g | 25 mL | 61360 | 05/05/22 08:00 | KNC | TAL KNX |
| Step 2 | Prep | 3010A | | | 5 mL | 50 mL | 61418 | 05/06/22 08:00 | KNC | TAL KNX |
| Step 2 | Analysis | 6010B SEP | | 3 | | | 61514 | 05/09/22 14:09 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 3 | SEP | Non-Crystalline | | | 5.000 g | 25 mL | 61419 | 05/06/22 08:00 | KNC | TAL KNX |
| Step 3 | Prep | 3010A | | | 5 mL | 50 mL | 61466 | 05/09/22 08:00 | KNC | TAL KNX |
| Step 3 | Analysis | 6010B SEP | | 1 | | | 61682 | 05/13/22 12:56 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 4 | SEP | Metal Hydroxide | | | 5.000 g | 25 mL | 61467 | 05/09/22 08:00 | KNC | TAL KNX |
| Step 4 | Prep | 3010A | | | 5 mL | 50 mL | 61516 | 05/11/22 08:00 | KNC | TAL KNX |
| Step 4 | Analysis | 6010B SEP | | 1 | | | 61682 | 05/13/22 14:09 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 5 | SEP | Organic-Bound | | | 5.000 g | 75 mL | 61517 | 05/17/22 08:00 | KNC | TAL KNX |
| Step 5 | Prep | 3010A | | | 5 mL | 50 mL | 61816 | 05/19/22 08:00 | KNC | TAL KNX |
| Step 5 | Analysis | 6010B SEP | | 5 | | | 61895 | 05/20/22 13:33 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 6 | SEP | Acid/Sulfide | | | 5.000 g | 250 mL | 61884 | 05/20/22 10:08 | KNC | TAL KNX |
| Step 6 | Analysis | 6010B SEP | | 1 | | | 61994 | 05/24/22 11:54 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 7 | Prep | Residual | | | 1.000 g | 50 mL | 61893 | 05/23/22 08:00 | KNC | TAL KNX |
| Step 7 | Analysis | 6010B SEP | | 10 | | | 62067 | 05/26/22 11:50 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |

Client: Golder Associates Inc. Job ID: 140-27231-1
Project/Site: Plant McDonough NES Well Installation

## Client Sample ID: DGWC-121-49-50' Lab Sample ID: 140-27231-7
**Date Collected: 04/19/22 14:00** **Matrix: Solid**
**Date Received: 04/25/22 09:30**

| 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 | 61893 | 05/23/22 08:00 | KNC | TAL KNX |
| Step 7 | Analysis | 6010B SEP | | 1 | | | 62067 | 05/26/22 13:32 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 7 | Prep | Residual | | | 1.000 g | 50 mL | 61893 | 05/23/22 08:00 | KNC | TAL KNX |
| Step 7 | Analysis | 6010B SEP | | 5 | | | 62067 | 05/26/22 14:57 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Sum of Steps 1-7 | Analysis | 6010B SEP | | 1 | | | 62131 | 05/31/22 15:33 | KNC | TAL KNX |
| | Instrument ID: NOEQUIP | | | | | | | | | |
| Total/NA | Analysis | Part Size Red | | 1 | | | 524310 | 04/28/22 07:25 | POP | TAL CAN |
| | Instrument ID: NOEQUIP | | | | | | | | | |

## Client Sample ID: B-122D-39-40' Lab Sample ID: 140-27231-8
**Date Collected: 04/19/22 14:00** **Matrix: Solid**
**Date Received: 04/25/22 09:30**

| 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 | | | 62131 | 05/31/22 15:33 | KNC | TAL KNX |
| | Instrument ID: NOEQUIP | | | | | | | | | |
| Total/NA | Analysis | Moisture | | 1 | | | 61060 | 04/26/22 11:45 | ACW | TAL KNX |
| | Instrument ID: NOEQUIP | | | | | | | | | |

## Client Sample ID: B-122D-39-40' Lab Sample ID: 140-27231-8
**Date Collected: 04/19/22 14:00** **Matrix: Solid**
**Date Received: 04/25/22 09:30** **Percent Solids: 74.2**

| 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 | 61285 | 05/04/22 08:00 | KNC | TAL KNX |
| Total/NA | Analysis | 6010B | | 10 | | | 62091 | 05/27/22 11:01 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Total/NA | Prep | Total | | | 1.000 g | 50 mL | 61285 | 05/04/22 08:00 | KNC | TAL KNX |
| Total/NA | Analysis | 6010B | | 1 | | | 62091 | 05/27/22 12:37 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Total/NA | Prep | Total | | | 1.000 g | 50 mL | 61285 | 05/04/22 08:00 | KNC | TAL KNX |
| Total/NA | Analysis | 6010B | | 5 | | | 62091 | 05/27/22 14:17 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 1 | SEP | Exchangeable | | | 5.000 g | 25 mL | 61288 | 05/04/22 08:00 | KNC | TAL KNX |
| Step 1 | Prep | 3010A | | | 5 mL | 50 mL | 61349 | 05/05/22 08:00 | KNC | TAL KNX |
| Step 1 | Analysis | 6010B SEP | | 4 | | | 61514 | 05/09/22 12:17 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 2 | SEP | Carbonate | | | 5.000 g | 25 mL | 61360 | 05/05/22 08:00 | KNC | TAL KNX |
| Step 2 | Prep | 3010A | | | 5 mL | 50 mL | 61418 | 05/06/22 08:00 | KNC | TAL KNX |
| Step 2 | Analysis | 6010B SEP | | 3 | | | 61514 | 05/09/22 13:32 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |

**Client Sample ID: B-122D-39-40'** **Lab Sample ID: 140-27231-8**
**Date Collected: 04/19/22 14:00** **Matrix: Solid**
**Date Received: 04/25/22 09:30** **Percent Solids: 74.2**

| 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 | 61419 | 05/06/22 08:00 | KNC | TAL KNX |
| Step 3 | Prep | 3010A | | | 5 mL | 50 mL | 61466 | 05/09/22 08:00 | KNC | TAL KNX |
| Step 3 | Analysis | 6010B SEP | | 1 | | | 61682 | 05/13/22 12:22 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 4 | SEP | Metal Hydroxide | | | 5.000 g | 25 mL | 61467 | 05/09/22 08:00 | KNC | TAL KNX |
| Step 4 | Prep | 3010A | | | 5 mL | 50 mL | 61516 | 05/11/22 08:00 | KNC | TAL KNX |
| Step 4 | Analysis | 6010B SEP | | 1 | | | 61682 | 05/13/22 13:35 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 5 | SEP | Organic-Bound | | | 5.000 g | 75 mL | 61517 | 05/17/22 08:00 | KNC | TAL KNX |
| Step 5 | Prep | 3010A | | | 5 mL | 50 mL | 61816 | 05/19/22 08:00 | KNC | TAL KNX |
| Step 5 | Analysis | 6010B SEP | | 5 | | | 61895 | 05/20/22 13:08 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 6 | SEP | Acid/Sulfide | | | 5.000 g | 250 mL | 61884 | 05/20/22 10:08 | KNC | TAL KNX |
| Step 6 | Analysis | 6010B SEP | | 1 | | | 61994 | 05/24/22 11:19 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 7 | Prep | Residual | | | 1.000 g | 50 mL | 61893 | 05/23/22 08:00 | KNC | TAL KNX |
| Step 7 | Analysis | 6010B SEP | | 10 | | | 62067 | 05/26/22 11:16 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 7 | Prep | Residual | | | 1.000 g | 50 mL | 61893 | 05/23/22 08:00 | KNC | TAL KNX |
| Step 7 | Analysis | 6010B SEP | | 1 | | | 62067 | 05/26/22 12:55 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 7 | Prep | Residual | | | 1.000 g | 50 mL | 61893 | 05/23/22 08:00 | KNC | TAL KNX |
| Step 7 | Analysis | 6010B SEP | | 5 | | | 62067 | 05/26/22 14:23 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |

**Client Sample ID: B-123D-27-28'** **Lab Sample ID: 140-27231-9**
**Date Collected: 04/19/22 14:00** **Matrix: Solid**
**Date Received: 04/25/22 09:30**

| 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 | | | 62131 | 05/31/22 15:33 | KNC | TAL KNX |
| | Instrument ID: NOEQUIP | | | | | | | | | |
| Total/NA | Analysis | Moisture | | 1 | | | 61060 | 04/26/22 11:45 | ACW | TAL KNX |
| | Instrument ID: NOEQUIP | | | | | | | | | |

**Client Sample ID: B-123D-27-28'** **Lab Sample ID: 140-27231-9**
**Date Collected: 04/19/22 14:00** **Matrix: Solid**
**Date Received: 04/25/22 09:30** **Percent Solids: 96.5**

| 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 | 61285 | 05/04/22 08:00 | KNC | TAL KNX |
| Total/NA | Analysis | 6010B | | 10 | | | 62091 | 05/27/22 11:06 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Total/NA | Prep | Total | | | 1.000 g | 50 mL | 61285 | 05/04/22 08:00 | KNC | TAL KNX |
| Total/NA | Analysis | 6010B | | 1 | | | 62091 | 05/27/22 12:42 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |

# Lab Chronicle

Client: Golder Associates Inc.  Job ID: 140-27231-1
Project/Site: Plant McDonough NES Well Installation

**Client Sample ID: B-123D-27-28'**  **Lab Sample ID: 140-27231-9**
**Date Collected: 04/19/22 14:00**  **Matrix: Solid**
**Date Received: 04/25/22 09:30**  **Percent Solids: 96.5**

| 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 | 61285 | 05/04/22 08:00 | KNC | TAL KNX |
| Total/NA | Analysis | 6010B | | 5 | | | 62091 | 05/27/22 14:21 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 1 | SEP | Exchangeable | | | 5.000 g | 25 mL | 61288 | 05/04/22 08:00 | KNC | TAL KNX |
| Step 1 | Prep | 3010A | | | 5 mL | 50 mL | 61349 | 05/05/22 08:00 | KNC | TAL KNX |
| Step 1 | Analysis | 6010B SEP | | 4 | | | 61514 | 05/09/22 12:22 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 2 | SEP | Carbonate | | | 5.000 g | 25 mL | 61360 | 05/05/22 08:00 | KNC | TAL KNX |
| Step 2 | Prep | 3010A | | | 5 mL | 50 mL | 61418 | 05/06/22 08:00 | KNC | TAL KNX |
| Step 2 | Analysis | 6010B SEP | | 3 | | | 61514 | 05/09/22 13:46 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 3 | SEP | Non-Crystalline | | | 5.000 g | 25 mL | 61419 | 05/06/22 08:00 | KNC | TAL KNX |
| Step 3 | Prep | 3010A | | | 5 mL | 50 mL | 61466 | 05/09/22 08:00 | KNC | TAL KNX |
| Step 3 | Analysis | 6010B SEP | | 1 | | | 61682 | 05/13/22 12:27 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 4 | SEP | Metal Hydroxide | | | 5.000 g | 25 mL | 61467 | 05/09/22 08:00 | KNC | TAL KNX |
| Step 4 | Prep | 3010A | | | 5 mL | 50 mL | 61516 | 05/11/22 08:00 | KNC | TAL KNX |
| Step 4 | Analysis | 6010B SEP | | 1 | | | 61682 | 05/13/22 13:50 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 5 | SEP | Organic-Bound | | | 5.000 g | 75 mL | 61517 | 05/17/22 08:00 | KNC | TAL KNX |
| Step 5 | Prep | 3010A | | | 5 mL | 50 mL | 61816 | 05/19/22 08:00 | KNC | TAL KNX |
| Step 5 | Analysis | 6010B SEP | | 5 | | | 61895 | 05/20/22 13:13 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 6 | SEP | Acid/Sulfide | | | 5.000 g | 250 mL | 61884 | 05/20/22 10:08 | KNC | TAL KNX |
| Step 6 | Analysis | 6010B SEP | | 1 | | | 61994 | 05/24/22 11:34 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 7 | Prep | Residual | | | 1.000 g | 50 mL | 61893 | 05/23/22 08:00 | KNC | TAL KNX |
| Step 7 | Analysis | 6010B SEP | | 10 | | | 62067 | 05/26/22 11:31 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 7 | Prep | Residual | | | 1.000 g | 50 mL | 61893 | 05/23/22 08:00 | KNC | TAL KNX |
| Step 7 | Analysis | 6010B SEP | | 1 | | | 62067 | 05/26/22 13:01 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 7 | Prep | Residual | | | 1.000 g | 50 mL | 61893 | 05/23/22 08:00 | KNC | TAL KNX |
| Step 7 | Analysis | 6010B SEP | | 2 | | | 62067 | 05/26/22 14:28 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |

**Client Sample ID: B-123D-145'**  **Lab Sample ID: 140-27231-10**
**Date Collected: 04/19/22 14:00**  **Matrix: Solid**
**Date Received: 04/25/22 09:30**

| 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 | 61285 | 05/04/22 08:00 | KNC | TAL KNX |
| Total/NA | Analysis | 6010B | | 10 | | | 62091 | 05/27/22 11:29 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |

# Lab Chronicle

Client: Golder Associates Inc. Job ID: 140-27231-1
Project/Site: Plant McDonough NES Well Installation

**Client Sample ID: B-123D-145'** **Lab Sample ID: 140-27231-10**
**Date Collected: 04/19/22 14:00** **Matrix: Solid**
**Date Received: 04/25/22 09:30**

| 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 | 61285 | 05/04/22 08:00 | KNC | TAL KNX |
| Total/NA | Analysis | 6010B | | 1 | | | 62091 | 05/27/22 13:20 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Total/NA | Prep | Total | | | 1.000 g | 50 mL | 61285 | 05/04/22 08:00 | KNC | TAL KNX |
| Total/NA | Analysis | 6010B | | 3 | | | 62091 | 05/27/22 14:48 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 1 | SEP | Exchangeable | | | 5.000 g | 25 mL | 61288 | 05/04/22 08:00 | KNC | TAL KNX |
| Step 1 | Prep | 3010A | | | 5 mL | 50 mL | 61349 | 05/05/22 08:00 | KNC | TAL KNX |
| Step 1 | Analysis | 6010B SEP | | 4 | | | 61514 | 05/09/22 12:56 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 2 | SEP | Carbonate | | | 5.000 g | 25 mL | 61360 | 05/05/22 08:00 | KNC | TAL KNX |
| Step 2 | Prep | 3010A | | | 5 mL | 50 mL | 61418 | 05/06/22 08:00 | KNC | TAL KNX |
| Step 2 | Analysis | 6010B SEP | | 3 | | | 61514 | 05/09/22 14:14 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 3 | SEP | Non-Crystalline | | | 5.000 g | 25 mL | 61419 | 05/06/22 08:00 | KNC | TAL KNX |
| Step 3 | Prep | 3010A | | | 5 mL | 50 mL | 61466 | 05/09/22 08:00 | KNC | TAL KNX |
| Step 3 | Analysis | 6010B SEP | | 1 | | | 61682 | 05/13/22 13:01 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 4 | SEP | Metal Hydroxide | | | 5.000 g | 25 mL | 61467 | 05/09/22 08:00 | KNC | TAL KNX |
| Step 4 | Prep | 3010A | | | 5 mL | 50 mL | 61516 | 05/11/22 08:00 | KNC | TAL KNX |
| Step 4 | Analysis | 6010B SEP | | 1 | | | 61682 | 05/13/22 14:14 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 5 | SEP | Organic-Bound | | | 5.000 g | 75 mL | 61517 | 05/17/22 08:00 | KNC | TAL KNX |
| Step 5 | Prep | 3010A | | | 5 mL | 50 mL | 61816 | 05/19/22 08:00 | KNC | TAL KNX |
| Step 5 | Analysis | 6010B SEP | | 5 | | | 61895 | 05/20/22 13:38 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 6 | SEP | Acid/Sulfide | | | 5.000 g | 250 mL | 61884 | 05/20/22 10:08 | KNC | TAL KNX |
| Step 6 | Analysis | 6010B SEP | | 1 | | | 61994 | 05/24/22 11:59 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 7 | Prep | Residual | | | 1.000 g | 50 mL | 61893 | 05/23/22 08:00 | KNC | TAL KNX |
| Step 7 | Analysis | 6010B SEP | | 10 | | | 62067 | 05/26/22 11:55 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 7 | Prep | Residual | | | 1.000 g | 50 mL | 61893 | 05/23/22 08:00 | KNC | TAL KNX |
| Step 7 | Analysis | 6010B SEP | | 1 | | | 62067 | 05/26/22 13:37 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 7 | Prep | Residual | | | 1.000 g | 50 mL | 61893 | 05/23/22 08:00 | KNC | TAL KNX |
| Step 7 | Analysis | 6010B SEP | | 5 | | | 62067 | 05/26/22 15:02 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Sum of Steps 1-7 | Analysis | 6010B SEP | | 1 | | | 62131 | 05/31/22 15:33 | KNC | TAL KNX |
| | Instrument ID: NOEQUIP | | | | | | | | | |
| Total/NA | Analysis | Part Size Red | | 1 | | | 524310 | 04/28/22 07:25 | POP | TAL CAN |
| | Instrument ID: NOEQUIP | | | | | | | | | |

# Lab Chronicle

Client: Golder Associates Inc. Job ID: 140-27231-1
Project/Site: Plant McDonough NES Well Installation

## Client Sample ID: Method Blank
**Lab Sample ID: MB 140-61285/14-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 | 61285 | 05/04/22 08:00 | KNC | TAL KNX |
| Total/NA | Analysis | 6010B | | 1 | | | 62091 | 05/27/22 11:34 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |

## Client Sample ID: Method Blank
**Lab Sample ID: MB 140-61288/13-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 | 61288 | 05/04/22 08:00 | KNC | TAL KNX |
| Step 1 | Prep | 3010A | | | 5 mL | 50 mL | 61349 | 05/05/22 08:00 | KNC | TAL KNX |
| Step 1 | Analysis | 6010B SEP | | 4 | | | 61514 | 05/09/22 11:03 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |

## Client Sample ID: Method Blank
**Lab Sample ID: MB 140-61360/13-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 | 61360 | 05/05/22 08:00 | KNC | TAL KNX |
| Step 2 | Prep | 3010A | | | 5 mL | 50 mL | 61418 | 05/06/22 08:00 | KNC | TAL KNX |
| Step 2 | Analysis | 6010B SEP | | 3 | | | 61514 | 05/09/22 11:18 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |

## Client Sample ID: Method Blank
**Lab Sample ID: MB 140-61419/13-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 | 61419 | 05/06/22 08:00 | KNC | TAL KNX |
| Step 3 | Prep | 3010A | | | 5 mL | 50 mL | 61466 | 05/09/22 08:00 | KNC | TAL KNX |
| Step 3 | Analysis | 6010B SEP | | 1 | | | 61682 | 05/13/22 11:08 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |

## Client Sample ID: Method Blank
**Lab Sample ID: MB 140-61467/13-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 | 61467 | 05/09/22 08:00 | KNC | TAL KNX |
| Step 4 | Prep | 3010A | | | 5 mL | 50 mL | 61516 | 05/11/22 08:00 | KNC | TAL KNX |
| Step 4 | Analysis | 6010B SEP | | 1 | | | 61682 | 05/13/22 11:22 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |

# Lab Chronicle

Client: Golder Associates Inc.
Job ID: 140-27231-1
Project/Site: Plant McDonough NES Well Installation

## Client Sample ID: Method Blank
**Lab Sample ID: MB 140-61517/13-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 | 61517 | 05/17/22 08:00 | KNC | TAL KNX |
| Step 5 | Prep | 3010A | | | 5 mL | 50 mL | 61816 | 05/19/22 08:00 | KNC | TAL KNX |
| Step 5 | Analysis | 6010B SEP | | 5 | | | 61895 | 05/20/22 12:13 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |

## Client Sample ID: Method Blank
**Lab Sample ID: MB 140-61884/13-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 | 61884 | 05/20/22 10:08 | KNC | TAL KNX |
| Step 6 | Analysis | 6010B SEP | | 1 | | | 61994 | 05/24/22 10:34 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 6 | SEP | Acid/Sulfide | | | 5.000 g | 250 mL | 61884 | 05/20/22 10:08 | KNC | TAL KNX |
| Step 6 | Analysis | 6010B SEP | | 1 | | | 61999 | 05/24/22 15:56 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |

## Client Sample ID: Method Blank
**Lab Sample ID: MB 140-61893/13-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 | 61893 | 05/23/22 08:00 | KNC | TAL KNX |
| Step 7 | Analysis | 6010B SEP | | 1 | | | 62067 | 05/26/22 11:59 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |

## Client Sample ID: Lab Control Sample
**Lab Sample ID: LCS 140-61285/15-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 | 61285 | 05/04/22 08:00 | KNC | TAL KNX |
| Total/NA | Analysis | 6010B | | 1 | | | 62091 | 05/27/22 11:39 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |

## Client Sample ID: Lab Control Sample
**Lab Sample ID: LCS 140-61288/14-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 | 61288 | 05/04/22 08:00 | KNC | TAL KNX |
| Step 1 | Prep | 3010A | | | 5 mL | 50 mL | 61349 | 05/05/22 08:00 | KNC | TAL KNX |
| Step 1 | Analysis | 6010B SEP | | 5 | | | 61514 | 05/09/22 11:08 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |

Client: Golder Associates Inc. Job ID: 140-27231-1
Project/Site: Plant McDonough NES Well Installation

## Client Sample ID: Lab Control Sample — Lab Sample ID: LCS 140-61360/14-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 | 61360 | 05/05/22 08:00 | KNC | TAL KNX |
| Step 2 | Prep | 3010A | | | 5 mL | 50 mL | 61418 | 05/06/22 08:00 | KNC | TAL KNX |
| Step 2 | Analysis | 6010B SEP | | 5 | | | 61514 | 05/09/22 11:23 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |

## Client Sample ID: Lab Control Sample — Lab Sample ID: LCS 140-61419/14-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 | 61419 | 05/06/22 08:00 | KNC | TAL KNX |
| Step 3 | Prep | 3010A | | | 5 mL | 50 mL | 61466 | 05/09/22 08:00 | KNC | TAL KNX |
| Step 3 | Analysis | 6010B SEP | | 1 | | | 61682 | 05/13/22 11:13 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |

## Client Sample ID: Lab Control Sample — Lab Sample ID: LCS 140-61467/14-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 | 61467 | 05/09/22 08:00 | KNC | TAL KNX |
| Step 4 | Prep | 3010A | | | 5 mL | 50 mL | 61516 | 05/11/22 08:00 | KNC | TAL KNX |
| Step 4 | Analysis | 6010B SEP | | 1 | | | 61682 | 05/13/22 11:27 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |

## Client Sample ID: Lab Control Sample — Lab Sample ID: LCS 140-61517/14-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 | 61517 | 05/17/22 08:00 | KNC | TAL KNX |
| Step 5 | Prep | 3010A | | | 5 mL | 50 mL | 61816 | 05/19/22 08:00 | KNC | TAL KNX |
| Step 5 | Analysis | 6010B SEP | | 5 | | | 61895 | 05/20/22 12:18 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |

## Client Sample ID: Lab Control Sample — Lab Sample ID: LCS 140-61884/14-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 | 61884 | 05/20/22 10:08 | KNC | TAL KNX |
| Step 6 | Analysis | 6010B SEP | | 1 | | | 61994 | 05/24/22 10:39 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 6 | SEP | Acid/Sulfide | | | 5.000 g | 250 mL | 61884 | 05/20/22 10:08 | KNC | TAL KNX |
| Step 6 | Analysis | 6010B SEP | | 1 | | | 61999 | 05/24/22 16:03 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |

## Client Sample ID: Lab Control Sample — Lab Sample ID: LCS 140-61893/14-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 | 61893 | 05/23/22 08:00 | KNC | TAL KNX |
| Step 7 | Analysis | 6010B SEP | | 1 | | | 62067 | 05/26/22 12:04 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |

## Client Sample ID: Lab Control Sample Dup — Lab Sample ID: LCSD 140-61285/16-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 | 61285 | 05/04/22 08:00 | KNC | TAL KNX |
| Total/NA | Analysis | 6010B | | 1 | | | 62091 | 05/27/22 11:44 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |

## Client Sample ID: Lab Control Sample Dup — Lab Sample ID: LCSD 140-61288/15-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 | 61288 | 05/04/22 08:00 | KNC | TAL KNX |
| Step 1 | Prep | 3010A | | | 5 mL | 50 mL | 61349 | 05/05/22 08:00 | KNC | TAL KNX |
| Step 1 | Analysis | 6010B SEP | | 5 | | | 61514 | 05/09/22 11:13 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |

## Client Sample ID: Lab Control Sample Dup — Lab Sample ID: LCSD 140-61360/15-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 | 61360 | 05/05/22 08:00 | KNC | TAL KNX |
| Step 2 | Prep | 3010A | | | 5 mL | 50 mL | 61418 | 05/06/22 08:00 | KNC | TAL KNX |
| Step 2 | Analysis | 6010B SEP | | 5 | | | 61514 | 05/09/22 11:28 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |

## Client Sample ID: Lab Control Sample Dup — Lab Sample ID: LCSD 140-61419/15-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 | 61419 | 05/06/22 08:00 | KNC | TAL KNX |
| Step 3 | Prep | 3010A | | | 5 mL | 50 mL | 61466 | 05/09/22 08:00 | KNC | TAL KNX |
| Step 3 | Analysis | 6010B SEP | | 1 | | | 61682 | 05/13/22 11:18 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |

Client: Golder Associates Inc.                                        Job ID: 140-27231-1
Project/Site: Plant McDonough NES Well Installation

**Client Sample ID: Lab Control Sample Dup** — **Lab Sample ID: LCSD 140-61467/15-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 | 61467 | 05/09/22 08:00 | KNC | TAL KNX |
| Step 4 | Prep | 3010A | | | 5 mL | 50 mL | 61516 | 05/11/22 08:00 | KNC | TAL KNX |
| Step 4 | Analysis | 6010B SEP | | 1 | | | 61682 | 05/13/22 11:32 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |

**Client Sample ID: Lab Control Sample Dup** — **Lab Sample ID: LCSD 140-61517/15-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 | 61517 | 05/17/22 08:00 | KNC | TAL KNX |
| Step 5 | Prep | 3010A | | | 5 mL | 50 mL | 61816 | 05/19/22 08:00 | KNC | TAL KNX |
| Step 5 | Analysis | 6010B SEP | | 5 | | | 61895 | 05/20/22 12:23 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |

**Client Sample ID: Lab Control Sample Dup** — **Lab Sample ID: LCSD 140-61884/15-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 | 61884 | 05/20/22 10:08 | KNC | TAL KNX |
| Step 6 | Analysis | 6010B SEP | | 1 | | | 61994 | 05/24/22 10:43 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 6 | SEP | Acid/Sulfide | | | 5.000 g | 250 mL | 61884 | 05/20/22 10:08 | KNC | TAL KNX |
| Step 6 | Analysis | 6010B SEP | | 1 | | | 61999 | 05/24/22 16:08 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |

**Client Sample ID: Lab Control Sample Dup** — **Lab Sample ID: LCSD 140-61893/15-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 | 61893 | 05/23/22 08:00 | KNC | TAL KNX |
| Step 7 | Analysis | 6010B SEP | | 1 | | | 62067 | 05/26/22 12:09 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |

**Client Sample ID: DGWC-121-38-40'** — **Lab Sample ID: 140-27231-6 DU**
**Date Collected: 04/19/22 14:00** — **Matrix: Solid**
**Date Received: 04/25/22 09:30** — **Percent Solids: 82.1**

| 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 | 61285 | 05/04/22 08:00 | KNC | TAL KNX |
| Total/NA | Analysis | 6010B | | 10 | | | 62091 | 05/27/22 10:46 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Total/NA | Prep | Total | | | 1.000 g | 50 mL | 61285 | 05/04/22 08:00 | KNC | TAL KNX |
| Total/NA | Analysis | 6010B | | 1 | | | 62091 | 05/27/22 12:31 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |

# Lab Chronicle

Client: Golder Associates Inc. Job ID: 140-27231-1
Project/Site: Plant McDonough NES Well Installation

**Client Sample ID: DGWC-121-38-40'** **Lab Sample ID: 140-27231-6 DU**
**Date Collected: 04/19/22 14:00** **Matrix: Solid**
**Date Received: 04/25/22 09:30** **Percent Solids: 82.1**

| 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 | 61285 | 05/04/22 08:00 | KNC | TAL KNX |
| Total/NA | Analysis | 6010B | | 5 | | | 62091 | 05/27/22 14:02 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 1 | SEP | Exchangeable | | | 5.000 g | 25 mL | 61288 | 05/04/22 08:00 | KNC | TAL KNX |
| Step 1 | Prep | 3010A | | | 5 mL | 50 mL | 61349 | 05/05/22 08:00 | KNC | TAL KNX |
| Step 1 | Analysis | 6010B SEP | | 4 | | | 61514 | 05/09/22 12:12 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 2 | SEP | Carbonate | | | 5.000 g | 25 mL | 61360 | 05/05/22 08:00 | KNC | TAL KNX |
| Step 2 | Prep | 3010A | | | 5 mL | 50 mL | 61418 | 05/06/22 08:00 | KNC | TAL KNX |
| Step 2 | Analysis | 6010B SEP | | 3 | | | 61514 | 05/09/22 13:27 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 3 | SEP | Non-Crystalline | | | 5.000 g | 25 mL | 61419 | 05/06/22 08:00 | KNC | TAL KNX |
| Step 3 | Prep | 3010A | | | 5 mL | 50 mL | 61466 | 05/09/22 08:00 | KNC | TAL KNX |
| Step 3 | Analysis | 6010B SEP | | 1 | | | 61682 | 05/13/22 12:16 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 4 | SEP | Metal Hydroxide | | | 5.000 g | 25 mL | 61467 | 05/09/22 08:00 | KNC | TAL KNX |
| Step 4 | Prep | 3010A | | | 5 mL | 50 mL | 61516 | 05/11/22 08:00 | KNC | TAL KNX |
| Step 4 | Analysis | 6010B SEP | | 1 | | | 61682 | 05/13/22 13:30 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 5 | SEP | Organic-Bound | | | 5.000 g | 75 mL | 61517 | 05/17/22 08:00 | KNC | TAL KNX |
| Step 5 | Prep | 3010A | | | 5 mL | 50 mL | 61816 | 05/19/22 08:00 | KNC | TAL KNX |
| Step 5 | Analysis | 6010B SEP | | 5 | | | 61895 | 05/20/22 12:53 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 6 | SEP | Acid/Sulfide | | | 5.000 g | 250 mL | 61884 | 05/20/22 10:08 | KNC | TAL KNX |
| Step 6 | Analysis | 6010B SEP | | 1 | | | 61994 | 05/24/22 11:14 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 7 | Prep | Residual | | | 1.000 g | 50 mL | 61893 | 05/23/22 08:00 | KNC | TAL KNX |
| Step 7 | Analysis | 6010B SEP | | 10 | | | 62067 | 05/26/22 11:12 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 7 | Prep | Residual | | | 1.000 g | 50 mL | 61893 | 05/23/22 08:00 | KNC | TAL KNX |
| Step 7 | Analysis | 6010B SEP | | 1 | | | 62067 | 05/26/22 12:50 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |
| Step 7 | Prep | Residual | | | 1.000 g | 50 mL | 61893 | 05/23/22 08:00 | KNC | TAL KNX |
| Step 7 | Analysis | 6010B SEP | | 5 | | | 62067 | 05/26/22 14:19 | JGT | TAL KNX |
| | Instrument ID: DUO | | | | | | | | | |

**Laboratory References:**

TAL CAN = Eurofins Canton, 180 S. Van Buren Avenue, Barberton, OH 44203, TEL (330)497-9396

TAL KNX = Eurofins Knoxville, 5815 Middlebrook Pike, Knoxville, TN 37921, TEL (865)291-3000

# Accreditation/Certification Summary

Client: Golder Associates Inc.
Job ID: 140-27231-1
Project/Site: Plant McDonough NES Well Installation

## Laboratory: Eurofins 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 | 02-13-25 |
| ANAB | Dept. of Energy | L2311.01 | 02-13-25 |
| ANAB | ISO/IEC 17025 | L2311 | 02-13-25 |
| Arkansas DEQ | State | 88-0688 | 06-17-22 |
| California | State | 2423 | 06-30-22 |
| Colorado | State | TN00009 | 02-28-23 |
| Connecticut | State | PH-0223 | 09-30-23 |
| Florida | NELAP | E87177 | 06-30-22 |
| Georgia (DW) | State | 906 | 12-11-22 |
| Hawaii | State | NA | 12-11-22 |
| Kansas | NELAP | E-10349 | 10-31-22 |
| Kentucky (DW) | State | 90101 | 12-31-22 |
| Louisiana | NELAP | 83979 | 06-30-22 |
| Louisiana (DW) | State | LA019 | 12-31-22 |
| Maryland | State | 277 | 03-31-23 |
| Michigan | State | 9933 | 12-11-22 |
| Nevada | State | TN00009 | 07-31-22 |
| New Hampshire | NELAP | 299919 | 01-17-23 |
| New Jersey | NELAP | TN001 | 06-30-22 |
| New York | NELAP | 10781 | 03-31-23 |
| North Carolina (DW) | State | 21705 | 07-31-22 |
| North Carolina (WW/SW) | State | 64 | 12-31-22 |
| Ohio VAP | State | CL0059 | 06-02-23 |
| Oklahoma | State | 9415 | 08-31-22 |
| Oregon | NELAP | TNI0189 | 12-31-22 |
| Pennsylvania | NELAP | 68-00576 | 12-31-22 |
| 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 | 01-19-23 |
| West Virginia (DW) | State | 9955C | 12-31-22 |
| West Virginia DEP | State | 345 | 04-30-23 |
| Wisconsin | State | 998044300 | 08-31-22 |

## Laboratory: Eurofins Canton

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

| Authority | Program | Identification Number | Expiration Date |
|---|---|---|---|
| California | State | 2927 | 02-27-23 |
| Connecticut | State | PH-0590 | 12-31-23 |
| Florida | NELAP | E87225 | 06-30-22 |
| Georgia | State | 4062 | 02-23-22 * |
| Illinois | NELAP | 200004 | 07-31-22 |
| Iowa | State | 421 | 06-01-23 |
| Kansas | NELAP | E-10336 | 04-30-22 |
| Kentucky (WW) | State | KY98016 | 12-31-22 |

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

## Laboratory: Eurofins Canton (Continued)

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

| Authority | Program | Identification Number | Expiration Date |
|---|---|---|---|
| Minnesota | NELAP | 039-999-348 | 12-31-22 |
| Minnesota (Petrofund) | State | 3506 | 08-01-23 |
| New Jersey | NELAP | OH001 | 06-30-22 |
| New York | NELAP | 10975 | 04-01-23 |
| Ohio | State | 8303 | 02-23-23 |
| Ohio VAP | State | CL0024 | 05-24-22 |
| Oregon | NELAP | 4062 | 05-24-22 |
| Pennsylvania | NELAP | 68-00340 | 08-31-22 |
| Texas | NELAP | T104704517-22-16 | 08-31-22 |
| Virginia | NELAP | 11570 | 05-02-22 |
| Washington | State | C971 | 01-12-23 |
| West Virginia DEP | State | 210 | 12-31-22 |

# Method Summary



| 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 |
| Part Size Red | Particle Size Reduction Preparation | None | TAL CAN |
| 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

None = None

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 CAN = Eurofins Canton, 180 S. Van Buren Avenue, Barberton, OH 44203, TEL (330)497-9396

TAL KNX = Eurofins Knoxville, 5815 Middlebrook Pike, Knoxville, TN 37921, TEL (865)291-3000

**Eurofins Knoxville**
5815 Middlebrook Pike
Knoxville, TN 37921
Phone: 865-291-3000 Fax: 865-584-4315

# Chain of Custody Record

eurofins Environment Testing America

| | | | |
|---|---|---|---|
| **Client Information** | Sampler: Connor Mikilitus | Lab PM: Henry, Ryan | Carrier Tracking No(s): |
| Client Contact: Brian Steele | Phone: | E-Mail: williamr.henry@eurofinset.com | State of Origin: |
| Company: Golder Associates Inc. | PWSID: | | COC No: 140-10715-3099.1 |
| Address: 5170 Peachtree Road Building 100, Suite 300 | Due Date Requested: | | Page: Page 1 of 1 |
| City: Atlanta | TAT Requested (days): | | Job #: |
| State, Zip: GA, 30341 | Compliance Project: Δ Yes Δ No | | |
| Phone: | PO #: Purchase Order not required | | |
| Email: Brian_Steele@golder.com , Dawn Prell@Golder.com | WO #: | | |
| Project Name: Plant McDonough NES Well Installation | Project #: 14006633 | | |
| Site: | SSOW#: | | |

**Analysis Requested**

Field Filtered Sample (Yes or No) | Perform MS/MSD (Yes or No) | 6010B_SEP - SEP; Aluminum, Arsenic, Cobalt, Iron, Lithium, Manganese | Total Metals | Total Number of containers

**Preservation Codes:**
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA
M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)
Other:

| Sample Identification | Sample Date | Sample Time | Sample Type (C=comp, G=grab) | Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air) | Field Filtered Sample | Perform MS/MSD | 6010B_SEP - SEP | Total Metals | Total Number of containers | Special Instructions/Note: |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Preservation Code: | | | | N | | | |
| B-113D - 19-20' | 4/19/22 | 1400 | Grab | S | | | X | X | | |
| B-104D - 55-56' | 4/19/22 | 1400 | | | | | X | X | | |
| B-115D - 75-76' | 4/19/22 | 1400 | | | | | X | X | | |
| B-47 - 11-12' | 4/19/22 | 1400 | | | | | X | X | | |
| B-48 - 23-24' | 4/19/22 | 1400 | | | | | X | X | | |
| DGWC-121 - 38-40' | 4/19/22 | 1400 | | | | | X | X | | |
| DGWC-121 - 49-50' | 4/19/22 | 1400 | | | | | X | X | | |
| B-122D - 39-40' | 4/19/22 | 1400 | | | | | X | X | | Rec @ ambient 22.3°C 22.2°C |
| B-123D - 27'-28' | 4/19/22 | 1400 | | | | | X | X | | Custody Seal intact |
| B-123D - 145' | 4/19/22 | 1400 | | | | | X | X | | 1 cooler Rec 04.25.22 |
| | | | | | | | | | | FedEx # 7766 3116 1997 |

140-27231 Chain of Custody

**Possible Hazard Identification**
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

*Sample Disposal ( A fee may be assessed if samples are retained longer than 1 month)*
☐ Return To Client ☐ Disposal By Lab ☐ Archive For ______ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

| | | | |
|---|---|---|---|
| Empty Kit Relinquished by: | Date: | Time: | Method of Shipment: |

| Relinquished by | Date/Time | Company | Received by | Date/Time | Company |
|---|---|---|---|---|---|
| Connor Mikilitus [signature] | 4/19/22 1700 | Golder | [signature] | 04.25.22 9:30 | ETAKNX |
| | | | | | |
| | | | | | |

| | | |
|---|---|---|
| Custody Seals Intact: Δ Yes Δ No | Custody Seal No.: | Cooler Temperature(s) °C and Other Remarks: |

Ver: 06/08/2021

Loc: 140
**27231**

## EUROFINS/TESTAMERICA KNOXVILLE SAMPLE RECEIPT/CONDITION UPON RECEIPT ANOMALY CHECKLIST

**Log In Number:**

| Review Items | Yes | No | NA | If No, what was the problem? | Comments/Actions Taken |
|---|---|---|---|---|---|
| 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<br>☐ NA | |
| 4. Is the cooler temperature within limits? (> freezing temp. of water to 6 °C, VOST: 10°C)<br>Thermometer ID : SC-71<br>Correction factor: -0.0°C | ✓ | | | ☐ **Cooler Out of Temp, Client Contacted, Proceed/Cancel**<br>☐ **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**<br>☐ **COC Incorrect/Incomplete**<br>☐ **COC Not Received** | |
| 8. Were all of the samples listed on the COC received? | ✓ | | | ☐ **Sample Received, Not on COC**<br>☐ **Sample on COC, Not Received** | |
| 9. Is the date/time of sample collection noted? | ✓ | | | ☐ **COC; No Date/Time; Client Contacted** | **Labeling Verified by: Date:** |
| 10. Was the sampler identified on the COC? | ✓ | | | ☐ **Sampler Not Listed on COC** | |
| 11. Is the client and project name/# identified? | ✓ | | | ☐ **COC Incorrect/Incomplete** | **pH test strip lot number:** |
| 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)**<br>☐ **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)<br>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 | |

| | Box 16A: pH Preservation | Box 18A: Residual Chlorine |
|---|---|---|
| Preservative: | | |
| Lot Number: | | |
| Exp Date: | | |
| Analyst: | | |
| Date: | | |
| Time: | | |

Project #: 14006633 PM Instructions:

Sample Receiving Associate: [signature] Date: 04.25.22

QA026R32.doc, 062719

**Eurofins Knoxville**
5815 Middlebrook Pike
Knoxville, TN 37921
Phone: 865-291-3000 Fax: 865-584-4315

14.3/14.3
(ro2o)

# Chain of Custody Record

eurofins Environment Testing America

| | | | | |
|---|---|---|---|---|
| **Client Information (Sub Contract Lab)** | Sampler: | Lab PM: Henry, Ryan | Carrier Tracking No(s): | COC No: 140-11107.1 |
| Client Contact: Shipping/Receiving | Phone: | E-Mail: WilliamR.Henry@et.eurofinsus.com | State of Origin: Georgia | Page: Page 1 of 1 |
| Company: Eurofins Environment Testing North Centr | | Accreditations Required (See note): NELAP - Oregon | | Job #: 140-27231-1 |
| Address: 180 S. Van Buren Avenue, | Due Date Requested: 5/30/2022 | **Analysis Requested** | | **Preservation Codes:** |
| City: Barberton | TAT Requested (days): | | | A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA |
| State, Zip: OH, 44203 | | | | M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify) |
| Phone: 330-497-9396(Tel) 330-497-0772(Fax) | PO #: | | | Other: |
| Email: | WO #: | | | |
| Project Name: Plant McDonough NES Well Installation | Project #: 14006633 | | | |
| Site: | SSOW#: | | | |

| Sample Identification - Client ID (Lab ID) | Sample Date | Sample Time | Sample Type (C=comp, G=grab) | Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air) | Field Filtered Sample (Yes or No) | Perform MS/MSD (Yes or No) | PSR | Total Number of containers | Special Instructions/Note: E011 |
|---|---|---|---|---|---|---|---|---|---|
| | | | Preservation Code: | | | | | | |
| B-104D-55-56' (140-27231-2) | 4/19/22 | 14:00 Eastern | | Solid | | | X | 1 | |
| B-115D-75-76' (140-27231-3) | 4/19/22 | 14:00 Eastern | | Solid | | | X | 1 | |
| DGWC-121-49-50' (140-27231-7) | 4/19/22 | 14:00 Eastern | | Solid | | | X | 1 | |
| B-123D-145' (140-27231-10) | 4/19/22 | 14:00 Eastern | | Solid | | | X | 1 | |

Note: Since laboratory accreditations are subject to change, Eurofins TestAmerica places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the Eurofins TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins TestAmerica attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to Eurofins TestAmerica.

| | | |
|---|---|---|
| ***Possible Hazard Identification*** Unconfirmed | | ***Sample Disposal ( A fee may be assessed if samples are retained longer than 1 month)*** ☐ Return To Client ☐ Disposal By Lab ☐ Archive For ____ Months |
| Deliverable Requested: I, II, III, IV, Other (specify) | Primary Deliverable Rank: 2 | Special Instructions/QC Requirements: |
| Empty Kit Relinquished by: | Date: | Time: / Method of Shipment: |

| Relinquished by | Date/Time | Company | Received by | Date/Time | Company |
|---|---|---|---|---|---|
| [signature] | 4-26-22 09:30 | Env Knox | [signature] | 4-27-22 930 | ETA |
| | | | | | |
| | | | | | |

| | | |
|---|---|---|
| Custody Seals Intact: Δ Yes Δ No | Custody Seal No.: | Cooler Temperature(s) °C and Other Remarks: |

Ver: 06/08/2021

**Eurofins TestAmerica Canton Sample Receipt Form/Narrative** **Login # :**
**Canton Facility**

Client ETA Knoxville Site Name ____ Cooler unpacked by: Justin H

Cooler Received on 4-27-22 Opened on 4-27-22

FedEx: 1st Grd Exp UPS FAS Clipper Client Drop Off TestAmerica Courier Other ____

**Receipt After-hours**: Drop-off Date/Time ____ Storage Location ____

TestAmerica Cooler # TA Foam Box Client Cooler Box Other ____

Packing material used: Bubble Wrap Foam Plastic Bag None Other ____

COOLANT: Wet Ice Blue Ice Dry Ice Water None

1. Cooler temperature upon receipt ☐ See Multiple Cooler Form
   IR GUN# IR-13 (CF **0.0** °C) Observed Cooler Temp. 14.3 °C Corrected Cooler Temp. 14.3 °C
   IR GUN #IR-15 (CF **-0.7**°C) Observed Cooler Temp. ____ °C Corrected Cooler Temp. ____ °C
2. Were tamper/custody seals on the outside of the cooler(s)? If Yes Quantity 1 Yes No
   -Were the seals on the outside of the cooler(s) signed & dated? Yes No NA
   -Were tamper/custody seals on the bottle(s) or bottle kits (LLHg/MeHg)? Yes No
   -Were tamper/custody seals intact and uncompromised? Yes No NA
3. Shippers' packing slip attached to the cooler(s)? Yes No
4. Did custody papers accompany the sample(s)? Yes No
5. Were the custody papers relinquished & signed in the appropriate place? Yes No
6. Was/were the person(s) who collected the samples clearly identified on the COC? Yes No
7. Did all bottles arrive in good condition (Unbroken)? Yes No
8. Could all bottle labels (ID/Date/Time) be reconciled with the COC? Yes No
9. For each sample, does the COC specify preservatives (Y/N), # of containers (Y/N), and sample type of grab/comp(Y/N)?
10. Were correct bottle(s) used for the test(s) indicated? Yes No
11. Sufficient quantity received to perform indicated analyses? Yes No
12. Are these work share samples and all listed on the COC? Yes No
    If yes, Questions 13-17 have been checked at the originating laboratory.
13. Were all preserved sample(s) at the correct pH upon receipt? Yes No NA pH Strip Lot# **HC157842**
14. Were VOAs on the COC? Yes No
15. Were air bubbles >6 mm in any VOA vials? ⬅ Larger than this. Yes No NA
16. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot # ____ Yes No
17. Was a LL Hg or Me Hg trip blank present? ____ Yes No

**Tests that are not checked for pH by Receiving:**

**VOAs**
**Oil and Grease**
**TOC**

Contacted PM ____ Date ____ by ____ via Verbal Voice Mail Other

Concerning ____

**18. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES** ☐ additional next page Samples processed by:

**19. SAMPLE CONDITION**

Sample(s) ____ were received after the recommended holding time had expired.
Sample(s) ____ were received in a broken container.
Sample(s) ____ were received with bubble >6 mm in diameter. (Notify PM)

**20. SAMPLE PRESERVATION**

Sample(s) ____ were further preserved in the laboratory.
Time preserved: ____ Preservative(s) added/Lot number(s): ____

VOA Sample Preservation - Date/Time VOAs Frozen: ____

*WI-NC-099*

**APPENDIX E**

# Treatability Study Results

**APPENDIX D: TREATABILITY STUDIES**

Golder, in collaboration with Terra Systems Inc (TSI), conducted laboratory testing to evaluate various treatment technologies. The bench-scale treatability tests (referred to as Round 1 Jar Tests) were performed to assist in identifying potentially applicable in situ remedial technologies at the Site. Testing completed for AP-2, 3/4 was to evaluate effectiveness of treatment of arsenic, beryllium, cobalt, lithium, and selenium.

The bulk of this evaluation was conducted by TSI at their Clayton, Delaware facility under the direction of Dr. Michael D. Lee, Vice-President Research and Development. The TSI Report is provided in its entirety in Appendix D (TSI Report for Golder/WSP for Coal Combustion Residue Treatment Study Version 3, April 26, 2022).

in February 2022, Golder collected samples of groundwater from two McDonough AP-2, 3/4 Site groundwater monitoring wells which were shipped to TSI for treatment evaluation for the parenthetical parameters:

- AP-234 DGWC-20 (As, Be, Co, Li and Se)
- AP-234 DGWC-48 (As, Be, Co, Li and Se)

The bench-scale treatability study investigated six reagents: potassium bicarbonate, sodium bicarbonate, calcium oxide, iron oxide, ferrous sulfide, and zero valent iron (ZVI), with an understanding that one of the following technologies could potentially be used for in-situ remediation of arsenic and/or cobalt:

- Precipitation at elevated pH
- Oxidation with iron oxide
- Reduction with ferrous sulfide
- Oxidation and precipitation with calcium oxide
- Direct sorption/precipitation onto ZVI.

A summary of the approach and findings of the treatability study is presented in the next sections, making frequent use of verbatim language from the TSI Report.

## Sample Acquisition and Characterization

Groundwater samples were collected in February 2022 from DGWC-20 and DGWC-48 in accordance with § 257.93(a), 391-3-4-.10(6). At the beginning of the bench-scale treatability test, a baseline characterization was performed to verify constituent concentrations in the samples.

## Reagent Screening

The purpose of this step was to select the most appropriate reagent for each of the three groundwater samples. The reagent dosages were determined from the baseline characterization and titrations. The studies were prepared in an anaerobic chamber with a 92% nitrogen, 5% carbon dioxide, and 3% hydrogen atmosphere to maintain the original redox state of the groundwater. The following applications were prepared:

**AP-2 and 3/4**: (Arsenic, Beryllium, Cobalt, Lithium, and Selenium) DGWC-20 and DGWC-48

- Control
- Potassium Bicarbonate: 4 dosages (1, 2, 5, and 10 g/L)
- Sodium Bicarbonate: 4 dosages (1, 2, 5, and 10 g/L)
- ZVI: 3 Dosages (0.5, 1.0, and 1.5 g/L)

The testing containers were mixed and turned periodically for seven days. Groundwater samples (the supernatants in the reactors) were analyzed for:

- Total arsenic, beryllium, cobalt, lithium, and selenium
- Total iron, potassium, manganese, magnesium, and sodium
- Dissolved arsenic, beryllium, cobalt, lithium, and selenium
- DOC
- Sulfate

## Results

Results of the treatment for AP-2, 3/4 testing are summarized in Table 10 of Appendix D. The table summarizes the percent removals from the initial characterization samples or the control day zero for the dissolved metals of concern across the various treatments and groundwaters. Concentrations of compounds highlighted in green were reduced to below the GWPS by the treatments. Concentrations of compounds highlighted in yellow were reduced by more than 50%. Lithium was not detected in the DGWC-20 initial characterization groundwater; the percent removals highlighted in gray were based upon the dissolved lithium detection limit in the initial characterization samples.

- Arsenic: Dissolved arsenic in well DGWC-48 was not detected, dissolved arsenic in well DGWC-20 was reduced to below the GWPS in all potassium and sodium bicarbonate treatments.
- Beryllium: In the DGWC-20 and DGWC-48 groundwaters, all potassium and sodium bicarbonate treatments reduced dissolved beryllium to below the GWPS but the ZVI treatments did not.
- Cobalt: The highest loadings of 10 g/L buffers generally reduced dissolved cobalt by more than 50% with sodium bicarbonate slightly outperforming potassium bicarbonate for dissolved cobalt removal.
- Lithium: None of the treatments were effective for dissolved lithium in the DGWC-48 groundwater. There were only trace levels of dissolved lithium in the DGWC-20 groundwater.
- Selenium: Selenium was not detected in either the DGWC-20 or DGWC-48 initial characterization samples. These groundwaters were spiked with a mixture of sodium selenite ($Se^{4+}$) and sodium selenate ($Se^{6+}$) to concentrations of 0.32 to 0.38 mg/L. None of the treatments reduced dissolved selenium to below the GWPS.

Only the highest (1.5 g/L) ZVI reduced dissolved selenium from the control zero by more than 50% in the DGWC-48 groundwater and no treatment reached the 50% threshold in the DGWC-20 groundwater.

Addition of relatively high dosages of potassium or sodium bicarbonate buffers was generally able to reach the GWPS for arsenic and beryllium and reduce cobalt some. Lithium was not effectively treated in the DGWC-48 groundwater. Only the highest dosage of ZVI appeared to reduce selenium by more than 50% in one of the two groundwaters with selenium and no treatment reduced selenium levels to the GWPS of 0.050 mg/L

## Conclusions

The results of the treatment study can be summarized as follows:

- Arsenic – treated to below MCL of 0.010 mg/l using potassium or sodium bicarbonate, and to a lesser degree of effectiveness with calcium oxide, ferric oxide, and ferrous sulfide
- Beryllium – treated to below the MCL of 0.004 mg/l using potassium or sodium bicarbonate
- Cobalt – over 50% reduction using potassium or sodium bicarbonate, but unable to meet Site GWPS of 0.006 mg/l
- Lithium - not effectively treated[1] (Site GWPS of 0.040 mg/l)
- Selenium – over 50% reduction using zero-valent iron, but unable to meet Site GWPS

[1] 3 of 4 jar tests for lithium and selenium (DGWC- 48 and DGWC-20) had higher final concentrations that initial concentrations, and the 4th test had only a trace amount of lithium present in the initial sample.

Terra Systems INCORPORATED

July 20, 2022

**Todd Rees, PhD, PE**
*Senior Program Leader*

GOLDER MEMBER OF WSP
Golder Associates Inc.
Amherst, MA., Montrose, CO.

**TERRA SYSTEMS, INC. FINAL REPORT FOR GOLDER/WSP FOR COAL COMBUSTION RESIDUE AT PLANT MCDONOUGH ATKINSON ASH POND 1, 2, 3, AND 4 TREATABILITY STUDY VERSION 6**

## 1.0 INTRODUCTION

Coal combustion residue landfill may generate acidic conditions which allow metals such as arsenic (As), beryllium (Be), cobalt (Co), lithium (Li), molybdenum (Mo), and selenium (Se) to accumulate to levels above regulatory limits. This bench-scale treatability evaluated neutralization/precipitation with potassium bicarbonate, sodium bicarbonate, and calcium oxide and precipitation/adsorption with zero valent iron (ZVI), ferrous oxide, and ferrous sulfide for five groundwaters from Georgia Power Company (Georgia Power) Plant McDonough-Atkinson Ash Pond 1 (AP-1) which has arsenic and molybdenum in two groundwaters (DGWC-69 and DGWC-68A) and cobalt in DGWC-40. Plant McDonough-Atkinson Ash Pond 2, Ash Pond 3 and Ash Pond 4 (AP-2 and 3/4) has arsenic, beryllium, cobalt, lithium, and selenium in two groundwaters (DGWC-48 and DGWC-20). The Georgia Groundwater Protection Standards (GA GWPS) is 0.010 mg/L for arsenic, 0.0040 mg/L for beryllium, 0.032 mg/L for cobalt, 0.10 mg/L for lithium, 0.10 mg/L for molybdenum, and 0.050 mg/L for selenium.

## 2.0 BENCH-SCALE STUDY SCOPE

The objective of the bench-scale study is to evaluate the appropriate in situ remediation technology for several metals including arsenic, cobalt, beryllium, lithium, molybdenum, and selenium:

- Identify the feasibility of in-situ remediation.
- Determine the design parameters including reagent dosage and demand.

The bench-scale treatability study will investigate six reagents: potassium bicarbonate, sodium bicarbonate, calcium oxide, iron oxide, ferrous sulfide, and zero valent iron.

### 2.1 Reagent Selection

The bench-scale treatability study assumes that one of the following technologies can be used for in-situ remediation of the metals:

- elevated pH precipitation
- oxidation with iron oxide
- reduction with ferrous sulfide
- oxidation and precipitation with calcium oxide
- direct sorption/precipitation onto the ZVI.

All reagents used for the bench-scale test were commercially available products. The reagent usages and their dosages could be adjusted according to the results of the activities and observations during the execution of the bench-scale treatability study. The following provides more detail on each of the reagents proposed for the bench-scale treatability testing:

- Potassium Bicarbonate: Potassium bicarbonate can increase the pH up to about 8.2 SU. Four loadings of LC Carlsen potassium bicarbonate were evaluated in the tests to determine the precipitation of arsenic and molybdenum in two groundwaters from AP-1 (DGWC-69 and DGWC-68A); four loadings of potassium bicarbonate to address cobalt from one groundwater in AP-1 DGWC-40; and four loadings of potassium bicarbonate to address arsenic, beryllium, cobalt, lithium, and selenium in AP 234 (DGWC-48 and DGWC-20).

- Sodium Bicarbonate: Sodium bicarbonate can increase the pH up to about 8.3 SU. Four loadings of Genesis sodium bicarbonate were evaluated in the tests to determine precipitation of cobalt from one groundwater in AP-1 (DGWC-69 and DGWC-68A); and four loadings of sodium bicarbonate to address arsenic, beryllium, cobalt, lithium, and selenium in AP 234 (DGWC-48 and DGWC-20.

- ZVI: ZVI can enhance precipitation of cobalt and can sorb this metal. A commercially available product of submicron ZVI (Ferox Nanostar) from Hepure (Flemington NJ) and Nanoiron s.r.o (Zudicgivue, Czech Republic) were evaluated. Three loadings of ZVI were evaluated in the tests to determine the precipitation/sorption of arsenic and molybdenum will be evaluated in the groundwater from AP-1 DGWC-69 and DGWC-68A; determine precipitation of cobalt from one groundwater in AP-1 (DGWC-40); and to address arsenic, beryllium, cobalt, lithium, and selenium in AP-234.

- Calcium oxide. Calcium oxide is prepared by heating limestone. In water, it will form calcium hydroxide. Calcium hydroxide has a solubility of about 1.6 g/L and a pH of 12.5 SU. Three loadings of Sigma Aldrich >98% calcium oxide were evaluated for the precipitation of arsenic and molybdenum in two groundwaters from AP-1 (DGWC-69 and DGWC-68A).

- Ferric oxide. Ferric oxide ($Fe_2O_3$) is insoluble in water and has a pH of 6-8. Three loadings of Sigma Aldrich ferric oxide (<5 µm, 96%) were evaluated for the precipitation of arsenic and molybdenum in two groundwaters from AP-1 (DGWC-69 and DGWC-68A).

- Ferrous sulfide. Ferrous sulfide (FeS) is insoluble in water and has a pH of 9.5-12.5. Three loadings of Sigma Aldrich ferrous sulfide technical grade were evaluated for the precipitation of arsenic and molybdenum in two groundwaters from AP-1 (DGWC-69 and DGWC-68A).

### 2.2 Bench-scale Groundwater Collection

Groundwater samples were collected from the five locations. With 1 L reaction vessels for each treatment, about 5 gallons of each of the five groundwaters were required. The samples were delivered to the TSI under a chain of custody. Samples from DGWC-20, DGWC-48, DGWC-68A, DGWC-19, DGWC-47 and DGWC-69 were delivered to TSI on 1/28/22 and stored in refrigerators. The samples from DGWC-20, DGWC-48, and DGWC-69 were transferred to 1.3-

gallon jugs while purging with nitrogen gas. The sample from AP-1 DCWC-68A was received in 1-gallon jugs. Golder/WSP decided not to test the DGWC-19 and DGWC-47 groundwaters. The groundwater sample from AP-1 DGWC-40 was received on 2/10/22.

### 2.3 Baseline characterization

At the beginning of the bench-scale treatability test, the baseline characterization was performed to verify contaminant concentrations in the samples. The groundwater samples were homogenized to the extent possible. The homogenized groundwater samples were analyzed for total cobalt, arsenic, molybdenum, beryllium, lithium, selenium, iron, potassium, manganese, magnesium, and sodium (metals chosen based upon site characteristics); dissolved arsenic, beryllium, cobalt, molybdenum, lithium, and selenium (based upon site characteristics); dissolved organic carbon (DOC), and sulfate, by the Eurofins Lancaster Laboratories and for pH, ORP, dissolved oxygen (DO), bicarbonate alkalinity, total hardness, ferrous iron, and sulfide by TSI using calibrated meters and Hach procedures.

### 2.4 Titration Tests

Alkaline titrations were conducted to determine the potassium bicarbonate and sodium bicarbonate testing dosages. An alkaline titration test was completed to determine the pH resulting from 0, 1, 2, 5, and 10 g/L additions of potassium bicarbonate and sodium bicarbonate reagent dosages. The total suspended solids (TSS) were determined by weighing the 0.2 µm nylon filter before filtering the samples and after filtration and drying in a 105 $^{o}$C oven. The weight of the TSS collected was divided by the volume of groundwater that passed through the filters.

### 2.5 Reagent Screening

The purpose of this step was to select the most appropriate reagent for each of the nine groundwater samples.

The reagent dosages were determined from the baseline characterization and titration. For each sample, a total of 12 to 13 reactors were set up for each site. The studies were prepared in an anerobic chamber with a 92% nitrogen, 5% carbon dioxide, and 3% hydrogen atmosphere to maintain the redox state of the groundwater.

AP-1 (Arsenic and Molybdenum) DGWC-69 and DGWC-68A

- Control
- Potassium Bicarbonate: 3 dosages (2, 5, and 10 g/L)
- Calcium Oxide: 3 dosages (1, 2, and 5 g/L)
- Ferric Oxide: 3 Dosages (0.5, 1.0, and 2.0 g/L)
- Ferrous Sulfide: 3 Dosages (0.5, 1.0, and 2.0 g/L)

AP-1 (Cobalt) DGWC-40

- Control
- Potassium Bicarbonate: 4 dosages (1, 2, 5, and 10 g/L)
- Sodium Bicarbonate: 4 dosages (1, 2, 5, and 10 g/L)
- ZVI: 3 Dosages (0.5, 1.0, and 1.5 g/L)

AP-2 and 3/4 (Arsenic, Beryllium, Cobalt, Lithium, and Selenium) DGWC-48 and DGWC-20

- Control
- Potassium Bicarbonate: 4 dosages (1, 2, 5, and 10 g/L)
- Sodium Bicarbonate: 4 dosages (1, 2, 5, and 10 g/L)
- ZVI: 3 Dosages (0.5, 1.0, and 1.5 g/L)

All containers were mixed and turned periodically for seven days. Groundwater samples (the supernatants in the reactors) were analyzed for:

- total arsenic, beryllium, cobalt, molybdenum, and selenium (based upon contaminants of concern for each site);
- total lithium for DGWC-48 and DGWC-20
- total iron, potassium, manganese, magnesium, and sodium
- dissolved arsenic, beryllium, cobalt, lithium, molybdenum, and selenium (based upon contaminants of concern for each site). The samples were filtered through 0.2 μm nylon filters and the filtrates were divided into bottles for DOC and metals.
- dissolved lithium for DGWC-48 and DGWC-20
- dissolved organic carbon (DOC)
- sulfate

Eurofins Lancaster Laboratories of Lancaster PA conducted the metals, DOC, and sulfate analyses. The pH, ORP, dissolved oxygen (DO), bicarbonate alkalinity, total hardness, ferrous iron, and sulfide were conducted by TSI using calibrated meters and Hach procedures. The estimated sample volumes for the initial characterization, screening, and rebound tests are shown in Table 1. The volumes were adjusted to account for required dilutions and volumes of water available.

## 3.0 AP-1

### 3.1 AP-1 Initial Characterization Results

Table 2 has the results of the field parameters, Hach tests, metals, DOC, and sulfate results for the three groundwater samples in AP-1.

**AP-1 DGWC-69.** The pH ranged from 6.4 to 7.3 with a moderate bicarbonate alkalinity of 60 mg/L CaCO3. There was a positive ORP (167 mV) and moderately high dissolved oxygen (9.8 mg/L). The TSS was 8.4 mg/L with a hardness 40 mg/L, 0.01 mg/L ferrous iron, and no sulfide. The pH increased from 6.4 to 7.8 SU with 1 g/L sodium bicarbonate and increased to 8.3 with 10 g/L. The pH increased from 7.1 to 8.2 SU with 1 g/L potassium bicarbonate and to 8.4 with 10 g/L. This groundwater has low 6 mg/L sulfate and 1.5 mg/L DOC. Total arsenic was 0.022 mg/L and dissolved arsenic was 0.020 mg/L; both exceeded the GA GWPS. Molybdenum was detected but below 0.006 mg/L and was below the GA GWPS. The groundwater contained 0.13 mg/L total iron, 2.3 mg/L total magnesium, 0.027 mg/L total manganese, 2.4 mg/L potassium, and 9.5 mg/L sodium.

**AP-1 DGWC-68A.** The pH ranged from 6.3 to 6.8 with a moderate bicarbonate alkalinity of 200 mg/L CaCO3. There was a positive ORP (224 mV) and moderately high dissolved oxygen (10.8 mg/L). The TSS was 13.8 mg/L with a hardness 120 mg/L, 0.01 mg/L ferrous iron, and no sulfide. The pH increased from 6.8 to 7.5 SU with 1 g/L sodium bicarbonate and increased to 8.2 with 10 g/L. The pH increased from 6.6 to 7.2 SU with 1 g/L potassium bicarbonate and to 8.2 with 10 g/L. This groundwater has moderate 78 mg/L sulfate and 1.1 mg/L DOC. Total arsenic and dissolved arsenic not detected. Molybdenum was relatively high with 0.22 g/L total and 0.20 mg/L dissolved; both exceeded the GA GWPS of 0.10 mg/L. The groundwater contained 0.049 mg/L total iron, 18 mg/L total magnesium, 0.096 mg/L total manganese, 3.8 mg/L potassium, and 11 mg/L sodium.

**AP-1 DGWC-40.** The initial pH was 4.8 with a bicarbonate alkalinity of 5 mg/L CaCO3. There was a positive ORP (226 mV) and moderate dissolved oxygen (5.5 mg/L). The TSS was 0.8 mg/L with a hardness of 240 mg/L, 0.28 mg/L ferrous iron, and no sulfide. The pH increased from 4.8 to 6.9 SU with 1 g/L sodium bicarbonate and increased to 8.0 with 10 g/L. The pH increased from 4.8 to 6.9 SU with 1 g/L potassium bicarbonate and to 7.9 with 10 g/L. This groundwater has moderate 190 mg/L sulfate and no detectable DOC. Total cobalt was detected at 0.039 mg/L and dissolved cobalt at 0.038 mg/L; both were slightly above the GA GWPS of 0.032 mg/L. The groundwater contained 0.039 mg/L total iron, 19 mg/L total magnesium, 3.4 mg/L total manganese, 6.1 mg/L potassium, and 19 mg/L sodium.

### 3.2 AP-1 Testing Results

**Well DGWC-69 Summary.** Table 3 has the field parameters and ELLE results for this groundwater.

On Day 0, the control pH was 6.6 and increased to 7.7 for the 2 g/L loading of potassium bicarbonate. The highest dosage of 10g/L potassium buffers had a pH of 8.5 on Day 0. On Day 7, the pH for the potassium bicarbonate treatments ranged from 7.8 to 8.4, 11.9 to 12.1 for the calcium oxide treatments, from 7.1 to 8.7 for the iron oxide, and from 6.2 to 6.8 for the ferrous sulfide treatments. The ORPS were positive (except for the CaO treatments where the very high pHs caused negative ORPs) and ranged from -76 to 247 mV. DO ranged from 4.4 to 8.0 mg/L. The total suspended solids ranged from 0 to 2,673 mg/L. The treatments with 5 g/L KHCO3, 1-5 g/L CaO, 0.5-2 g/L Fe2O3, and 0.5-2.0 FeS had elevated TSS. Bicarbonate alkalinity was moderate in the control (35 mg/L as CaCO3) and increased with bicarbonate additions. Phenolphthalein alkalinity was very high in the CaO treatments due to the extreme pHs. The hardness ranged from 40 to 1,820 mg/L as CaCO3. Only 1 and 2 g/L FeS treatments had a little ferrous iron. Sulfide was low (0.01 to 0.35 mg/L).

Sulfate ranged from 8.4 to 25 mg/L. Little DOC was detected; the higher dosages of buffer had the most, 2.1 and 4.9 mg/L. Total arsenic ranged from 0.0065 to 0.025 mg/L with the following treatments below the GA GWPS: 1 and 2 g/L FeS. Dissolved arsenic ranged from 0.00074 to 0.024 mg/L with the following treatments below the GA GWSP: 1 g/L CaO, 2 g/L CaO, 5 g/L CaO, 0.5 g/L Fe2O3, 1 g/L Fe2O3, 2 g/L Fe2O3, 0.5 g/L FeS, 1.0 g/L FeS, and 2 g/L FeS. Total molybdenum ranged from 0.0034 to 0.010 mg/L; all were below the GA GWPS. Dissolved molybdenum ranged from 0.00017 to 0.0057 mg/L with dissolved molybdenum below the GA GWPS in all treatments. Iron increased in almost all treatments except for the KHCO3 treatments. Total magnesium did not change much except for the CaO treatments. Total manganese increased in all treatments. Potassium increased with the increasing loadings of potassium bicarbonate. Sodium ranged from 9.1 to 19 mg/L.

The CaO, Fe2O3, and FeS treatments showed significant reductions in dissolved arsenic with all of these treatments reducing dissolved arsenic below the GA GWPS. The Fe2O3 and the highest dosage of FeS reduced the dissolved molybdenum by more 50% and all treatments including the control were below the GA GWPS for molybdenum of 0.10 mg/L.

**Well DGWC-68A Summary.** Table 4 has the field parameters and ELLE results for this groundwater. On Day 0, the control pH was 6.6 and increased to 7.7 for the 2 g/L loading of potassium bicarbonate. The highest dosage of 10g/L potassium buffers had a pH of 8.5 on Day 7. The pH drifted down slightly over the 7-day incubation period. By Day 7, the pHs ranged from 11.6 to 11.9 for the calcium oxide treatments, from 6.7 to 8.1 for the iron oxide, and from 6.4 to 6.5 for the ferrous sulfide treatments. The ORPS were positive (except for the CaO treatments where the very high pHs caused negative ORPs) and ranged from -38 to 277 mV. DO ranged from 3.5 to 9.1 mg/L. The total suspended solids ranged from 0.9 to 2,530 mg/L. The treatments with 1-5 g/L CaO, 0.5-2 g/L Fe2O3, and 0.5-2.0 FeS had elevated TSS. Bicarbonate alkalinity was moderate in the control (180 mg/L as CaCO3) and increased with bicarbonate additions. Phenolphthalein alkalinity was very high in the CaO treatments due to the extreme pHs. The hardness ranged from 120 to 1,700 mg/L as CaCO3. None of the treatments had much ferrous iron. Sulfide was low (0.01 to 0.10 mg/L).

Sulfate ranged from 33 to 54 mg/L. Little DOC was detected; the highest dosage of buffer had the most, 7.8 mg/L. Total arsenic ranged from <0.00068 to 0.0024 mg/L with all treatments below the GA GWPS. Dissolved arsenic was not detected. Total molybdenum ranged from 0.026 to 0.21 mg/L. Dissolved molybdenum ranged from 0.031 to 0.21 mg/L with all measurements higher than the Control Day 0. The following treatments were less than the GA GWPS for dissolved molybdenum on Day 7: 1 g/L Fe2O3, 2 g/L Fe2O3, and 2 g/L FeS. Iron increased in almost all treatments except for the KHCO3 treatments. Total magnesium ranged from 10 to 30 mg/L and was highest in the CaO treatments. Total manganese increased in all treatments. Potassium increased with the increasing loadings of potassium bicarbonate. Sodium ranged from 9.1 to 19 mg/L.

Arsenic was below detection limits except for total arsenic in the 5 g/L CaO and 0.5 to 2.0 g/L Fe2O3 treatments. The higher dosages of Fe2O3 and the highest dosage of FeS reduced the dissolved molybdenum to below the GA GWPS.

**Well DGWC-40 Summary.** Table 5 has the field parameters and ELLE results for this groundwater. The control pH was 4.8 on Day 0 and increased to between 6.8 and 6.9 for the lowest loading of potassium and sodium bicarbonate with the highest dosage of buffers having pHs of 8.0 to 8.1. The pHs were generally slightly lower (-1.1 to 0.5 SU). The pHs in the ZVI treatments ranged from 5.7 to 6.1 SU on Day 7. The ORPS were positive (except for the highest ZVI loading) and ranged from -335 to 256 mV. DO ranged from 1.4 to 5.4 mg/L. There were not much total suspended solids (0 to 8.2 mg/L) except in the treatments with ZVI (likely due to carryover of the ZVI). Bicarbonate alkalinity was low in the control and increased with potassium and sodium bicarbonate additions. The hardness ranged from 180 to 240 mg/L. Only the control (0.14 mg/L) and the ZVI treatments (0.11 to 9.0 mg/L) had much ferrous iron. Sulfide was low (0.02 to 0.17 mg/L).

Sulfate ranged from 210 to 230 mg/L. Little DOC was detected (0.52 to 3.2 mg/L). Total Co ranged from 0.035 to 0.044 mg/L with the GA GWPS of 0.032 mg/L for cobalt. Only the 1.5 g/L ZVI showed 34.2% reduction to below the GA GWPS. Iron increased in almost all treatments from the IC but the most iron was found in the ZVI treatments. Magnesium ranged from 18 to 20 mg/L and manganese from 3.1 to 4.0; neither of these metals were impacted by the bicarbonate or ZVI treatments. Potassium and sodium increased with the increasing loadings of potassium and sodium bicarbonate.

Only the 1.5 g/L ZVI treatment showed removal of dissolved cobalt to below the GA GWPS with a 34.2% reduction.

### 3.3 AP-1 Conclusions

Table 6 summarizes the percent removals from the initial characterization samples or the Control Day 0 for the dissolved metals of concern across the various groundwaters. Compounds highlighted in green were reduced to below the GA GWPS by the treatments.

**Arsenic.** In the AP-1 DGWC-69 all treatments with calcium oxide, ferric oxide, and ferrous sulfide reduced dissolved arsenic to below the GA GWPS but not the potassium bicarbonate treatments. The AP-1 DGWC-68A had no detectable dissolved arsenic.

**Cobalt.** The GA GWPS for cobalt is 0.032 mg/L. Only the 1.5 g/L ZVI treatment reduced dissolved Co in the AP-1 DGWC-40 groundwater to below the GA GWPS.

**Molybdenum.** All of the treatments, including the control, were below the GA GWPS for molybdenum in the DGWC-69 groundwater treatments. Ferrous oxide at 1 and 2 g/L loadings and the highest loading of ferrous sulfide was effective in reducing dissolved Mo in the DGWC-68A groundwater to below the GA GWPS.

**Overall Conclusions**. The calcium oxide, ferric oxide, and ferrous sulfide reduced arsenic to below the GA GWPS in the DGWC-69 groundwater. Only the highest loading of ZVI reduced cobalt in the AP-1 DGWC-40 groundwater to below the GA GWPS. The higher dosages of ferric oxide and ferrous sulfide were effective for dissolved molybdenum in the DGWC-68A groundwater. The AP-1 DGWC-69 groundwater did not have dissolved arsenic above the GA GWPS.

## 4.0 AP-2 and 3/4

### 4.1 AP-2 and 3/4 Initial Characterization Results

Table 7 has the results of the field parameters, Hach tests, metals, DOC, and sulfate results for the two groundwater samples in AP-2 and 3/4.

**Well DGWC-48.** The pH ranged from 4.0 to 4.5 with no bicarbonate alkalinity. There was a positive ORP (338 mV) and moderately high dissolved oxygen (11.2 mg/L). The TSS was 0 mg/L with a hardness 20 mg/L, 2.52 mg/L ferrous iron, and no sulfide. The pH increased from 4.5 to 7.5 SU with 1 g/L sodium bicarbonate and increased to 8.2 with 10 g/L. The pH increased from 4.0 to 7.1 SU with 1 g/L potassium bicarbonate and to 8.2 with 10 g/L. This groundwater has high 520 mg/L sulfate and only 0.97 mg/L DOC. Total arsenic and dissolved arsenic were non-detect. Beryllium ranged from 0.0079 to 0.0086 mg/L which were above the GA GWPS. Cobalt was found at 0.33 to 0.35 mg/L above the GA GWPS of 0.032 mg/L. Lithium was found at 0.10 to 0.11 mg/L above the GA GWPS of 0.040 mg/L. No selenium was detected. The groundwater contained 3.9 mg/L total iron, 16 mg/L total magnesium, 13 mg/L total manganese, 14 mg/L potassium, and 23 mg/L sodium.

**Well DGWC-20.** The pH ranged from 4.4 to 5.0 with little bicarbonate alkalinity of <5 mg/L CaCO3. There was a positive ORP (423 mV) and moderately high dissolved oxygen (9.6 mg/L). The TSS was 6.6 mg/L with no hardness, 0.07 mg/L ferrous iron, and no sulfide. The pH increased from 5.0 to 7.3 SU with 1 g/L sodium bicarbonate and increased to 8.1 with 10 g/L. The pH increased from 4.5 to 7.0 SU with 1 g/L potassium bicarbonate and to 8.1 with 10 g/L. This groundwater has moderate 190 mg/L sulfate and no detectable DOC. Total cobalt was detected at 0.039 mg/L and dissolved cobalt at 0.038 mg/L. The groundwater was slightly hard with 0.039 mg/L total iron, 19 mg/L total magnesium, 3.4 mg/L total manganese, 6.1 mg/L potassium, and 19 mg/L sodium. has high 490 mg/L sulfate and only 0.71 mg/L DOC. Total arsenic and dissolved arsenic were 0.014 to 0.016 mg/L; above the GA GWPS. Beryllium ranged from 0.0073 to 0.0083 mg/L ; above the GA GWPS. Cobalt was found at 0.96 to 1.0 mg/L; above the GA GWPS. Lithium and selenium were not detected. The groundwater contained 0.12 mg/L total iron, 26 mg/L total magnesium, 42 mg/L total manganese, 14 mg/L potassium, and 24 mg/L sodium.

### 4.2 AP-2 and 3/4 Testing Results

**Well DGWC-48 Summary.** Table 8 has the field parameters and ELLE results for this groundwater. On Day 0, the control pH was 4.2 and increased to 6.9 for the lowest 1 g/L loading of potassium bicarbonate and to 7.1 for the lowest 1 g/L loading of sodium bicarbonate. The highest dosage of buffers had pHs of 7.9-8.0 on Day 7. The pH in the ZVI treatments on Day 7 ranged 5.0 to 6.4 SU. The ORPS on Day 7 were positive and ranged from 59 to 351 mV. DO ranged from 3.4 to 8.8 mg/L. The total suspended solids ranged from 11 to 150 mg/L. The treatments with 10 g/L KHCO3, 10 g/L NaHCO3 and ZVI had elevated TSS. Bicarbonate alkalinity was low in the control and ZVI treatments (5-10 mg/L CaCO3) and increased with bicarbonate additions. The hardness ranged from <20 to 220 mg/L with higher readings at the higher buffer loadings. Only control, 10 g/L sodium bicarbonate and the ZVI treatments had mor than 0.15 mg/L ferrous iron. Sulfide was low (0.02 to 0.09 mg/L).

Sulfate ranged from 330 to 400 mg/L. Little DOC was detected (0.79 to 11 mg/L); the highest dosage of buffer had the most, 9.0 and 11 mg/L. Total and dissolved arsenic were not detected except total arsenic in in the treatments with ZVI; dissolved As were well below the GA GWPS in all treatments. Total beryllium ranged from 0.0050 to 0.0073 mg/L; all samples were above the GA GWPS of 0.004 mg/L. Dissolved beryllium ranged from 0.00085 to 0.0071 mg/L with only the Control and ZVI treatments exceeding the GA GWPS. Total cobalt was moderate ranging from 0.17 to 0.34 mg/L. The following treatments showed more than 50% reductions in dissolved Co: 10 g/L KHCO3 and 10 g/L NaHCO3 with the no treatments decreasing the cobalt concentrations to below the GA GWPS. Total lithium ranged from 0.11 to 0.12 mg/L and dissolved lithium from 0.099 to 0.13 mg/L. None of the treatments reduced dissolved Li below the GA GWPS. Selenate and selenite were spiked into the AP-2 and 3/4 DGWC-48 groundwater. On Day 7, total Se ranged from 0.17 to 0.52 mg/L and dissolved selenium of 0.14 to 0.46 mg/L. No treatment reached the GA GWPS of 0.050 mg/L. Iron decreased in almost all treatments from the IC except for the ZVI treatments. Total magnesium did not change much ranging from 15 to 16 mg/L. Total manganese ranged from 5.3 to 14 mg/L and was reduced by >50% only in the 10 g/L NaHCO3 treatments. Potassium and sodium increased with the increasing loadings of potassium and sodium bicarbonate.,

The 1-10 g/L of both the potassium and sodium bicarbonate treatments showed significant (>50%) reductions in dissolved beryllium to below the GA GWPS. No treatment resulted in decreases in dissolved cobalt to below the GA GWPS. None of the treatments reduced the dissolved lithium to below the GA GWPS. Only the highest loading of 1.5 g/L ZVI removed more than 50% of the dissolved selenium from the spiked Control, but no treatment reached the GA GWPS for dissolved selenium. Arsenic was below the GA GWPS in all treatments.

**Well DGWC-20 Summary.** Table 9 has the field parameters and ELLE results for this groundwater. The total cobalt, selenium, iron, magnesium, manganese, potassium, and sodium in the 2 g/L KHCO3 treatment are low with the dissolved cobalt and selenium being considerably higher. The 5 and 10 g/L KHCO3 treatments were reanalyzed and the tables have been updated.

The control pH at Day 0 was 4.5 SU and increased to 6.8 for the lowest loading of potassium bicarbonate and to 7.7 for the lowest loading of sodium bicarbonate. The highest dosage of buffers had pHs of 7.6-7.7 on Day 7. The ORPS were positive and ranged from 163 to 297 mV. DO ranged from 6.7 to 7.8 mg/L. The total suspended solids ranged from 2.6 to 460 mg/L. The treatments with 10 g/L KHCO3, 5 g/L NaHCO3, 10 g/L NaHCO3 and 1.5 g/L ZVI had elevated TSS above 100 mg/L. Bicarbonate alkalinity was low in the control and increased with bicarbonate additions. The hardness ranged from <20 to 460 mg/L. Little ferrous iron was detected (0.03 to 0.45 mg/L). Sulfide was low (0 to 0.02 mg/L).

Sulfate ranged from 480 to 600 mg/L. Little DOC was detected; the highest dosage of buffer had the most, 4.8 and 10 mg/L. Total arsenic ranged from <0.00068 to 0.036 mg/L with the 2 g/L KHCO3 treatment having no detectable arsenic. Dissolved arsenic ranged from <0.00070 to 0.019 mg/L with the 1, 2, 5, and 10 g/L KHCO3, and 1 and 2 g/L NaHCO3 treatments having no detectable dissolved arsenic and the 5 and 10 g/L NaHCO3 treatments also having dissolved arsenic below the GA GWPS. Total beryllium ranged from <0.00012 to 0.0011 mg/L; the 2 g/L KHCO3 treatment was below the GA GWPS. Dissolved beryllium ranged from 0.00022 to 0.0099 mg/L with all KHCO3 and NaHCO3 treatments below the GA GWPS. Total cobalt was moderate and ranged from <0.00016 to 1.1 mg/L but none of the treatments reached the GA GWPS. The following treatments showed more than 50% reductions in dissolved Co: 5 g/L KHCO3, 10 g/L KHCO3, 5 g/L NaHCO3, and 10 g/L NaHCO3 but none met the GA GWPS. Total lithium was not detected. Dissolved Li ranged from 0.014 to 0.023 mg/L in the KHCO3 and NaHCO3 treatments and were higher than the control. Lithium was below the GA GWPS in all treatments. Selenate and selenite were spiked into the AP-2 and 3/4 DGWC-20 groundwater. Total Se ranged from <0.00028 to 0.50 mg/L and dissolved Se from 0.22 to 0.49 mg/L. Only the 2 g/L KHCO3 treatment met the GA GWPS for selenium. No treatments reduced the dissolved Se to the GA GWPS however the ZVI treatments did show lower dissolved Se to 0.26 to 0.30 mg/L. Total iron increased in many treatments especially for the ZVI treatments. Total magnesium did not change much except for the 2 g/L KHCO3 treatment. Total manganese was reduced by >50% in the 2 g/L KHCO3, 5 g/L KHCO3, 5 g/L NaHCO3, and 10 g/L NaHCO3 treatments. Potassium and sodium increased with the increasing loadings of potassium and sodium bicarbonate.,

The 1-10 g/L of both the potassium and sodium bicarbonate treatments showed significant reductions in dissolved arsenic and dissolved beryllium. The higher dosages of 5-10 g/L KHCO3 and 5-10 g/L NaHCO3 reduced the dissolved cobalt by more than 50% but not to below the GA GWPS. Total lithium was not detected and dissolved lithium was low. Only the ZVI treatments seemed to impact the dissolved selenium and then by only 25 to 35% reductions with no treatment reaching the GA GWPS.

### 4.3 AP-2 and 3/4 Conclusions

Table 10 summarizes the percent removals from the initial characterization samples or the Control Day 0 for the dissolved metals of concern across the various treatments and groundwaters. Compounds highlighted in green were reduced to below the GA GWPS by the treatments. Compounds highlighted in yellow were reduced by more than 50%. Lithium was not detected in the AP-2 and 3/4 DGWC-20 IC groundwater; the percent removals highlighted in gray were based upon the dissolved lithium detection limit in the IC samples.

**Arsenic.** Dissolved As was not detected in AP-2 and 3/4 well DGWC-48. Dissolved As in well DGWC-20 was reduced to below the GA GWPS in all potassium and sodium bicarbonate treatments.

**Beryllium.** In the AP-2 and 3/4 DGWC-48 and 20 groundwaters, all potassium and sodium bicarbonate levels reduced dissolved Be to below the GA GWPS but the ZVI treatments did not.

**Cobalt.** The GA GWPS for cobalt is 0.032 mg/L. No treatment reduced the dissolved cobalt to below the GA GWPS in either the AP234 DGWC-48 or DGWC-20 groundwaters.

**Lithium.** None of the treatments were effective against dissolved lithium in the AP-2 and 3/4 DGWC-48 groundwater. There were only trace levels of dissolved lithium in the AP-2 and 3/4 DGWC-20 groundwater.

**Selenium.** Selenium was not detected in either the AP-2 and 3/4 DGWC-48 or DGWC-20 initial characterization samples. These groundwaters were spiked with a mixture of sodium selenite ($Se^{4+}$) and sodium selenate ($Se^{6+}$) to concentrations of 0.32 to 0.40. mg/L. None of the treatments reduced dissolved Se to below the GA GWPS. Only the highest (1.5 g/L) ZVI reduced dissolved Se from the Control 0 by more than 50% in the AP-2 and 3/4 DGWC-48 groundwater and no treatment reached the 50% threshold in the AP-2 and 3/4 DGWC-20 groundwater.

**Overall Conclusions**. Addition of relatively high dosages of potassium or sodium bicarbonate buffers were generally able to reach the GA GWPS for arsenic sand beryllium and reduce cobalt. Lithium was not effectively treated in the AP-2 and 3/4 DGWC-48 groundwaters. Only the highest dosage of ZVI appeared to reduce selenium by more than 50% in one of the two groundwaters with selenium and no treatment reached the GA GWPS of 0.050 mg/L.

Please let me know if you have any questions about this final report.

Sincerely,
**TERRA SYSTEMS, INC.**

Michael D Lee, PhD.

Michael D. Lee, Ph.D.
Vice-President Research and Development

**Table 1**
**Estimated Sample Volumes and Preservatives**

| **Analysis** | **Matrix** | **Volume mL per bottle** | **Preservative** |
|---|---|---|---|
| Total As, Be, Co, Mo, Se, Fe, K, Mn, Mg, and Na (metals based upon contaminants at each site) | Aqueous | 200 | $HNO_3$ |
| Total Li (AP 234 only) | Aqueous | 200 | $HNO_3$ |
| Filtered As, Be, Co, Mo, and Se (metals based upon contaminants at each site) | Aqueous | 200 | $HNO_3$ |
| Filtered Li (AP 234 only) | Aqueous | 200 | $HNO_3$ |
| DOC | Aqueous | 45 | $H_3PO_4$ |
| Sulfate | Aqueous | 50 | None |
| | | | |
| Total | | 895 | |

## Table 2
## Plant McDonough AP-1 Initial Characterization Field and Hach Parameters

| Field Parameters | | | | | |
|---|---|---|---|---|---|
| Well | | GA GWPS | AP-1 DGWC-69 | AP-1 DGWC-68A | AP-1 DGWC-40 |
| pH | SU | | 7.3 | 6.3 | |
| ORP | mV | | 167 | 224 | 226 |
| DO | mg/L | | 9.8 | 10.8 | 5.5 |
| TSS | mg/L | | 8.4 | 13.8 | 0.8 |
| Bicarbonate Alkalinity as CaCO3 | mg/L | | 60 | 200 | 5 |
| Hardness as CaCO3 | mg/L | | 40 | 120 | 240 |
| Ferrous Iron | mg/L | | 0.01 | 0.01 | 0.28 |
| Sulfide | mg/L | | 0 | 0 | 0 |
| Sodium Hydroxide Titrations | | | | | |
| g/L NaHCO3 | pH | | | | |
| 0 | | | 6.4 | 6.8 | 4.8 |
| 1 | | | 7.8 | 7.5 | 6.9 |
| 2 | | | 8.1 | 7.8 | 7.3 |
| 5 | | | 8.2 | 8.1 | 7.7 |
| 10 | | | 8.3 | 8.2 | 8.0 |
| Potassium Hydroxide Titrations | | | | | |
| g/L KHCO3 | | | | | |
| 0 | | | 7.1 | 6.6 | 4.8 |
| 1 | | | 8.2 | 7.2 | 6.9 |
| 2 | | | 8.4 | 7.6 | 7.2 |
| 5 | | | 8.4 | 8.0 | 7.7 |
| 10 | | | 8.4 | 8.2 | 7.9 |
| | | | | | |
| Sulfate | mg/L | | 6 | 78 | 190 |
| Dissolved Organic Carbon | mg/L | | 1.5 | 1.1 | <0.5 |
| Total Arsenic | mg/L | 0.010 | **0.022** | <0.00068 | |
| Dissolved Arsenic | mg/L | 0.010 | **0.020** | <0.00068 | |
| Total Cobalt | mg/L | 0.032 | | | **0.039** |
| Dissolved Cobalt | mg/L | 0.032 | | | **0.038** |
| Total Molybdenum | mg/L | 0.10 | 0.0048 | **0.22** | |
| Dissolved Molybdenum | mg/L | 0.10 | 0.0058 | **0.20** | |
| Total Iron | mg/L | | 0.13 | 0.049 J | 0.039 J |
| Total Magnesium | mg/L | | 2.3 | 18 | 19 |
| Total Manganese | mg/L | | 0.027 | 0.096 | 3.4 |
| Total Potassium | mg/L | | 2.4 | 3.8 | 6.1 |
| Total Sodium | mg/L | | 9.5 | 11 | 19 |

0.010 GA GWPS = Georgia Groundwater Performance Standard

## Table 3
## AP-1 DGWC-69 Treatability Results

| | | GA GWPS | IC | Control | 2 g/L KHCO3 | 5 g/L KHCO3 | 10 g/L KHCO3 | 1 g/L CaO | 2 g/L CaO | 5 g/L CaO | 0.5 g/L Fe2O3 | 1.0 g/L Fe2O3 | 2.0 g/L Fe2O3 | 0.5 g/L FeS | 1.0 g/L FeS | 2.0 g/L FeS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Day | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| pH | SU | | | 6.6 | 7.7 | 8.3 | 8.5 | 12.2 | 12.2 | 12.0 | 7.8 | 7.9 | 7.1 | 7.0 | 6.7 | 6.9 |
| Day | | | | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| pH | SU | | 7.3 | 6.8 | 7.8 | 8.1 | 8.4 | 11.9 | 12.0 | 12.1 | 8.7 | 7.7 | 7.1 | 6.8 | 6.5 | 6.2 |
| ORP | mV | | 167 | 191 | 200 | 200 | 206 | -76 | -75 | -60 | 168 | 214 | 233 | 247 | 214 | 108 |
| DO | mg/L | | 9.8 | 7.1 | 7.0 | 5.7 | 6.4 | 7.7 | 6.6 | 5.4 | 6.9 | 8.0 | 6.9 | 4.9 | 5.2 | 4.4 |
| TSS | mg/L | | 8.4 | 0 | 1.7 | 286 | 12 | 330 | 712 | 2673 | 265 | 397 | 945 | 234 | 763 | 1415 |
| Phenolphthalein Alkalinity as CaCO3 | mg/L | | | | | | | 1180 | 9440 | 11800 | | | | | | |
| Bicarbonate Alkalinity as CaCO3 | mg/L | | 60 | 35 | 1180 | 2360 | 4720 | 13580 | 50600 | <5900 | 40 | 200 | 120 | 50 | 60 | 40 |
| Hardness as CaCO3 | mg/L | | 40 | 40 | 40 | 40 | 40 | 200 | 1480 | 1820 | 60 | 80 | 60 | 60 | 40 | 40 |
| Ferrous Iron | mg/L | | 0.01 | <0.01 | <0.01 | <0.01 | <0.01 | 0.05 | 0.04 | <0.01 | <0.02 | <0.05 | <0.05 | <0.02 | 0.35 | 0.90 |
| Sulfide | mg/L | | 0 | 0.03 | 0.03 | 0.03 | 0.05 | 0.03 | 0.01 | 0.06 | 0.04 | 0.05 | 0.02 | 0.12 | 0.35 | 0.15 |
| ELLE Results | | | | | | | | | | | | | | | | |
| Sulfate | mg/L | | 6 | 8.4 | 9.6 | 16 | 18 | 8.6 | 16 | <15 | 9.0 | 9.4 | 10 | 11 | 14 | 25 |
| Dissolved Organic Carbon | mg/L | | 1.5 | 0.68 | 1.4 | 2.1 | 4.9 | 2.6 | 0.73 | 0.79 | 0.66 | 1.3 | 0.93 | 1.2 | 0.88 | 1.4 |
| Total Arsenic | mg/L | 0.010 | **0.022** | **0.023** | **0.024** | **0.025** | **0.021** | **0.018** | **0.023** | **0.016** | **0.020** | **0.023** | **0.021** | **0.013** | 0.0065 | 0.0086 |
| Dissolved Arsenic | mg/L | 0.010 | **0.020** | **0.019** | **0.021** | **0.024** | **0.023** | <0.00070 | <0.00070 | <0.00070 | <0.00070 | 0.0014 | <0.00070 | 0.0018 | 0.00074 | 0.0010 |
| Total Molybdenum | mg/L | 0.10 | 0.0048 | 0.0050 | 0.0050 | 0.0053 | 0.0051 | 0.0053 | 0.0051 | 0.0054 | 0.0080 | 0.0096 | 0.0092 | 0.0043 | 0.0035 | 0.0034 |
| Dissolved Molybdenum | mg/L | 0.10 | 0.0058 | 0.0050 | 0.0049 | 0.0050 | 0.0049 | 0.0057 | 0.0047 | 0.0040 | 0.00025 | 0.0013 | 0.00017 | 0.0045 | 0.0035 | 0.0024 |
| Total Iron | mg/L | | 0.13 | <0.020 | 0.070 | 0.052 | 0.055 | **0.41** | **0.83** | 1.2 | **190** | **280** | **440** | **16** | **18** | **180** |
| Total Magnesium | mg/L | | 2.3 | 2.1 | 2.2 | 2.2 | 2.1 | 3.4 | 6.3 | 12 | 2.2 | 2.4 | 2.3 | 2.2 | 2.1 | 2.8 |
| Total Manganese | mg/L | | 0.027 | 0.0092 | 0.049 | 0.049 | 0.073 | 0.087 | 0.047 | 0.084 | 0.11 | 0.14 | 0.20 | 0.11 | 0.097 | 0.23 |
| Total Potassium | mg/L | | 2.4 | 2.5 | 740 | 2000 | 3800 | 3.7 | 3.7 | 3.9 | 4.4 | 2.6 | 2.6 | 2.7 | 2.2 | 2.3 |
| Total Sodium | mg/L | | 9.5 | 9.1 | 12 | 15 | 19 | 12 | 12 | 10 | 9.4 | 9.9 | 15 | 11 | 9.1 | 11 |

0.010 GA GWPS = Georgia Groundwater Performance Standard

| | |
|---|---|
| 0.039 | J value. Compound detected above method detection limit but below method calibration limit. |
| 28 | Compound detected in blank |

## Table 4
## AP-1 DGWC-68A Treatability Results

| | | GA GWPS | IC | Control | 2 g/L KHCO3 | 5 g/L KHCO3 | 10 g/L KHCO3 | 1 g/L CaO | 2 g/L CaO | 5 g/L CaO | 0.5 g/L Fe2O3 | 1.0 g/L Fe2O3 | 2.0 g/L Fe2O3 | 0.5 g/L FeS | 1.0 g/L FeS | 2.0 g/L FeS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Day | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| pH | SU | | | 6.6 | 7.7 | 8.3 | 8.5 | 12.2 | 12.2 | 12.0 | 7.8 | 7.9 | 7.1 | 7.0 | 6.7 | 6.9 |
| Day | | | | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| pH | SU | | 6.3 | 6.5 | 7.4 | 6.5 | 8.0 | 11.6 | 11.7 | 11.9 | 8.1 | 6.9 | 6.7 | 6.5 | 6.4 | 6.4 |
| ORP | mV | | 224 | 249 | 240 | 268 | 251 | 4 | -8 | -38 | 243 | 258 | 259 | 277 | 266 | 215 |
| DO | mg/L | | 10.8 | 9.1 | 8.4 | 7.7 | 7.9 | 9.0 | 8.6 | 8.2 | 9.1 | 8.5 | 8.6 | 5.8 | 4.2 | 3.5 |
| TSS | mg/L | | 13.8 | 0.9 | 1.8 | 8.3 | 21 | 694 | 758 | 2530 | 133 | 357 | 236 | 152 | 388 | 248 |
| Phenolphthalein Alkalinity as CaCO3 | mg/L | | | | | | | 7080 | 4720 | 11800 | | | | | | |
| Bicarbonate Alkalinity as CaCO3 | mg/L | | 200 | 180 | 940 | 480 | 4240 | <2360 | <4720 | <11800 | 240 | 240 | 240 | 240 | 200 | 160 |
| Hardness as CaCO3 | mg/L | | 120 | 220 | 220 | 220 | 120 | 800 | 1660 | 1700 | 220 | 220 | 220 | 220 | 200 | 200 |
| Ferrous Iron | mg/L | | 0.01 | 0.12 | 0.13 | 0.15 | 0.01 | 0.02 | 0.06 | 0.03 | 0.04 | 0.06 | 0.06 | 0.06 | 0.04 | 0.06 |
| Sulfide | mg/L | | 0 | 0.02 | 0.01 | 0.02 | <0.01 | 0.02 | <0.01 | 0.04 | 0.03 | <0.01 | <0.01 | 0.02 | 0.01 | 0.10 |
| ELLE Results | | | | | | | | | | | | | | | | |
| Sulfate | mg/L | | 78 | 39 | 40 | 37 | 49 | 34 | 34 | 33 | 38 | 38 | 40 | 40 | 45 | 54 |
| Dissolved Organic Carbon | mg/L | | 1.1 | 0.94 | 1.2 | 0.89 | 7.8 | 1.2 | 0.82 | 1.0 | 0.80 | 0.92 | 0.77 | 0.88 | 0.78 | 0.83 |
| Total Arsenic | mg/L | 0.010 | <0.00068 | <0.00068 | <0.00068 | <0.00068 | <0.00068 | <0.00068 | <0.00068 | 0.0012 | 0.0013 | 0.0024 | 0.0023 | <0.00068 | <0.00068 | <0.00068 |
| Dissolved Arsenic | mg/L | 0.010 | <0.00068 | <0.00070 | <0.00070 | <0.00070 | <0.00070 | <0.00070 | <0.00070 | <0.00070 | <0.00070 | <0.00070 | <0.00070 | <0.00070 | <0.00070 | <0.00070 |
| Total Molybdenum | mg/L | 0.10 | 0.0048 | **0.21** | **0.21** | **0.21** | **0.19** | **0.19** | **0.20** | **0.19** | **0.12** | 0.099 | 0.026 | **0.17** | **0.12** | 0.088 |
| Dissolved Molybdenum | mg/L | 0.10 | 0.0058 | **0.21** | **0.20** | **0.20** | **0.20** | **0.19** | **0.18** | **0.17** | **0.11** | 0.079 | 0.031 | **0.17** | **0.12** | 0.097 |
| Total Iron | mg/L | | 0.13 | 0.041 | 0.090 | 0.14 | 0.22 | 0.20 | **0.59** | **1.6** | **44** | **110** | **78** | **44** | **86** | 680 |
| Total Magnesium | mg/L | | 2.3 | 18 | 17 | 18 | 18 | 10 | 21 | 30 | 19 | 19 | 19 | 19 | 19 | 20 |
| Total Manganese | mg/L | | 0.027 | 0.083 | 0.084 | 0.088 | 0.039 | 0.055 | 0.11 | 0.17 | 0.10 | 0.12 | 0.10 | 0.18 | 0.25 | 0.66 |
| Total Potassium | mg/L | | 2.4 | 4.0 | 810 | 4.2 | 3800 | 4.7 | 3.8 | 5.1 | 4.3 | 4.2 | 4.0 | 3.9 | 4.0 | 4.0 |
| Total Sodium | mg/L | | 9.5 | 9.9 | 11 | 10 | 19 | 9.1 | 17 | 10 | 10 | 10 | 9.9 | 9.7 | 9.7 | 9.6 |

0.010 GA GWPS = Georgia Groundwater Performance Standard

0.039 J value. Compound detected above method detection limit but below method calibration limit.

28 Compound detected in blank

## Table 5
## AP-1 DGWC-40 Treatability Results

| | | GA GWPS | IC | Control | 1 g/L $KHCO_3$ | 2 g/L $KHCO_3$ | 5 g/L $KHCO_3$ | 10 g/L $KHCO_3$ | 1 g/L $NaHCO_3$ | 2 g/L $NaHCO_3$ | 5 g/L $NaHCO_3$ | 10 g/L $NaHCO_3$ | 0.5 g/L ZVI | 1.0 g/L ZVI | 1.5 g/L ZVI |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Day | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| pH | SU | | | 4.8 | 6.9 | 7.2 | 7.7 | 8.1 | 6.8 | 6.6 | 7.2 | 8.0 | 5.6 | 6.4 | 5.1 |
| Day | | | | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| pH | SU | | 4.6 | 4.6 | 6.5 | 7.1 | 7.7 | 8.0 | 6.3 | 7.7 | 7.3 | 7.9 | 6.1 | 5.7 | 6.0 |
| ORP | mV | | 226 | 256 | 239 | 230 | 230 | 227 | 183 | 164 | 185 | 175 | 241 | 147 | -335 |
| DO | mg/L | | 5.5 | 4.9 | 4.2 | 4.9 | 4.8 | 4.8 | 5.0 | 5.3 | 4.9 | 4.5 | 5.4 | 4.3 | 1.4 |
| TSS | mg/L | | 0.8 | 2.8 | 1.3 | 6.2 | 7.5 | 4.1 | 0 | 3.6 | 4.2 | 8.2 | 17 | 59 | 102 |
| Bicarbonate Alkalinity as $CaCO_3$ | mg/L | | 5 | 0 | 420 | 600 | 1900 | 4180 | 640 | 2440 | 1140 | 4940 | 5 | 15 | 35 |
| Hardness as $CaCO_3$ | mg/L | | 240 | 240 | 200 | 200 | 220 | 200 | 200 | 200 | 200 | 180 | 200 | 220 | 200 |
| Ferrous Iron | mg/L | | 0.28 | 0.14 | 0.1 | <0.01 | 0.05 | 0.07 | 0.08 | 0.04 | <0.01 | 0.08 | 0.11 | 1.43 | 9.0 |
| Sulfide | mg/L | | 0 | 0.02 | 0.05 | 0.05 | 0.05 | 0.15 | 0.03 | 0.07 | 0.05 | 0.17 | 0.05 | 0.05 | 0.05 |
| ELLE Results | | | | | | | | | | | | | | | |
| Sulfate | mg/L | | 190 | 210 | 210 | 210 | 210 | 210 | 220 | 220 | 210 | 230 | 210 | 220 | 210 |
| DOC | mg/L | | <0.5 | <0.5 | 2.1 | 0.96 | 1.3 | 3.2 | 0.9 | 1.7 | 1.0 | 1.9 | 0.52 | 0.56 | <0.5 |
| Total Cobalt | mg/L | 0.032 | **0.039** | **0.039** | **0.038** | **0.042** | **0.039** | **0.039** | **0.039** | **0.040** | **0.039** | **0.038** | **0.044** | **0.040** | **0.035** |
| Dissolved Cobalt | mg/L | 0.032 | **0.038** | **0.042** | **0.037** | **0.038** | **0.037** | **0.036** | **0.037** | **0.039** | **0.037** | **0.034** | **0.038** | **0.037** | **0.025** |
| Total Iron | mg/L | | 0.039 | <0.023 | 0.2 | 0.096 | 0.086 | 0.25 | 0.14 | 0.059 | 0.15 | 0.44 | 20 | 54 | 100 |
| Total Magnesium | mg/L | | 19 | 19 | 19 | 19 | 20 | 18 | 19 | 20 | 19 | 19 | 20 | 18 | 18 |
| Total Manganese | mg/L | | 3.4 | 3.5 | 3.4 | 3.8 | 3.6 | 3.4 | 3.4 | 3.3 | 3.5 | 3.1 | 4 | 3.6 | 3.5 |
| Total Potassium | mg/L | | 6.1 | 6.0 | 350 | 710 | 1900 | 3700 | 5.9 | 8.0 | 8.2 | 6.9 | 6.4 | 6.2 | 7.3 |
| Total Sodium | mg/L | | 19 | 20 | 22 | 21 | 26 | 28 | 250 | 1400 | 590 | 2900 | 20 | 21 | 19 |

0.010 GA GWPS = Georgia Groundwater Performance Standard

28 Compound detected in blank

# Table 6
## AP-1 Percent Removal from Initial Characterization for Dissolved Metals

| Well | Dis Metal | GA GWPS | IC/Con 0 Conc mg/L | % Rem from | Control | 2 g/L KHCO3 | 5 g/L KHCO3 | 10 g/L KHCO3 | 1 g/L CaO | 2 g/L CaO | 5 g/L CaO | 0.5 g/L Fe2O3 | 1.0 g/L Fe2O3 | 2.0 g/L Fe2O3 | 0.5 g/L FeS | 1.0 g/L FeS | 2.0 g/L FeS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DGWC-69 | As | 0.010 | **0.020** | % Rem from IC | 5.0 | -5.0 | -20.0 | -15.0 | >96.5 | >96.5 | >96.5 | >96.5 | 93.0 | >96.5 | 91.0 | 96.3 | 95 |
| | Mo | 0.10 | 0.0058 | % Rem from IC | 13.8 | 15.5 | 13.8 | 15.5 | 1.7 | 19.0 | 31.0 | 95.7 | 77.6 | 97.1 | 22.4 | 39.7 | 58.6 |
| DGWC-68A | As | 0.010 | <0.00068 | % Rem from IC | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | Mo | 0.10 | 0.0058/0.21 | % Rem from Con 0 | 0.0 | 4.8 | 4.8 | 4.8 | 9.5 | 14.3 | 19.0 | 47.6 | 62.4 | 85.2 | 19.0 | 42.9 | 53.8 |
| **Well** | **Dis Metal** | **GA GWPS** | **IC/Con 0 Conc mg/L** | **% Rem from IC** | **Control** | **1 g/L KHCO3** | **2 g/L KHCO3** | **5 g/L KHCO3** | **10 g/L KHCO3** | **1 g/L NaHCO3** | **2 g/L NaHCO3** | **5 g/L NaHCO3** | **10 g/L NaHCO3** | **0.5 g/L ZVI** | **1.0 g/L ZVI** | **1.5 g/L ZVI** | |
| DGWC-40 | Co | 0.032 | **0.038** | % Rem from IC | -10.5 | 2.6 | 0.0 | 2.6 | 5.3 | 2.6 | -2.6 | 2.6 | 10.5 | 0.0 | 2.6 | 34.2 | |

| | |
|---|---|
| >96.5 | Dissolved metal reduced to below GA GWPS |
| 95.7 | Dissolved metal reduced by more than 50% |

**Table 7**
**Plant McDonough AP-2 and 3/4 Initial Characterization Field and Hach Parameters**

| Well | | GA GWPS | AP-2 and 3/4 DGWC-48 | AP-2 and 3/4 DGWC-20 |
|---|---|---|---|---|
| pH | SU | | 4.0 | 4.4 |
| ORP | mV | | 388 | 423 |
| DO | mg/L | | 11.2 | 9.6 |
| TSS | mg/L | | 0 | 6.6 |
| Bicarbonate Alkalinity as CaCO3 | mg/L | | 0 | <5 |
| Hardness as CaCO3 | mg/L | | 20 | 0 |
| Ferrous Iron | mg/L | | 2.52 | 0.07 |
| Sulfide | mg/L | | 0 | 0 |
| Sodium Hydroxide Titrations | | | | |
| g/L NaHCO3 | pH | | | |
| 0 | | | 4.5 | 5.0 |
| 1 | | | 7.5 | 7.3 |
| 2 | | | 7.8 | 7.7 |
| 5 | | | 8.1 | 8.0 |
| 10 | | | 8.2 | 8.1 |
| Potassium Hydroxide Titrations | | | | |
| g/L KHCO3 | | | | |
| 0 | | | 4.0 | 4.5 |
| 1 | | | 7.1 | 7.0 |
| 2 | | | 7.6 | 7.4 |
| 5 | | | 8.0 | 7.9 |
| 10 | | | 8.2 | 8.1 |
| | | | | |
| Sulfate | mg/L | | 520 | 490 |
| Dissolved Organic Carbon | mg/L | | 0.97 J | 0.71 J |
| Total Arsenic | mg/L | 0.010 | <0.00068 | **0.014** |
| Dissolved Arsenic | mg/L | 0.010 | <0.00068 | **0.016** |
| Total Beryllium | mg/L | 0.004 | **0.0073** | **0.0079** |
| Dissolved Beryllium | mg/L | 0.004 | **0.0083** | **0.0086** |
| Total Cobalt | mg/L | 0.032 | **0.35** | **1.00** |
| Dissolved Cobalt | mg/L | 0.032 | **0.33** | **0.96** |
| Total Lithium | mg/L | 0.040 | **0.11** | <0.055 |
| Dissolved Lithium | mg/L | 0.040 | **0.10** | <0.055 |
| Total Selenium | mg/L | 0.050 | <0.00028 | <0.00028 |
| Dissolved Selenium | mg/L | 0.050 | <0.00028 | <0.00028 |
| Total Iron | mg/L | | 3.9 | 0.12 |
| Total Magnesium | mg/L | | 16 | 26 |
| Total Manganese | mg/L | | 13 | 42 |
| Total Potassium | mg/L | | 14 | 14 |
| Total Sodium | mg/L | | 23 | 24 |

0.010 GA GWPS = Georgia Groundwater Performance Standard

# Table 8
# AP-2 and 3/4 DGWC-48 Treatability Results

| | | GA GWPS | IC | Control | 1 g/L KHCO3 | 2 g/L KHCO3 | 5 g/L KHCO3 | 10 g/L KHCO3 | 1 g/L NaHCO3 | 2 g/L NaHCO3 | 5 g/L NaHCO3 | 10 g/L NaHCO3 | 0.5 g/L ZVI | 1.0 g/L ZVI | 1.5 g/L ZVI |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Day | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| pH | SU | | | 4.2 | 6.9 | 7.3 | 7.8 | 8.1 | 7.1 | 7.4 | 7.8 | 8.0 | 5.6 | 6.5 | 5.4 |
| Day | | | | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| pH | SU | | 4.0 | 5.8 | 6.9 | 7.3 | 7.8 | 8.0 | 7.2 | 7.4 | 7.7 | 7.9 | 6.4 | 5.1 | 5 |
| ORP | mV | | 388 | 351 | 247 | 237 | 213 | 210 | 192 | 166 | 160 | 165 | 160 | 112 | 59 |
| DO | mg/L | | 11.2 | 8.8 | 8.2 | 8.3 | 7.5 | 8.2 | 8.8 | 7.4 | 8.5 | 7.9 | 5.5 | 7.4 | 3.4 |
| TSS | mg/L | | 0 | 97 | 12 | 13 | 12 | 118 | 16 | 11 | 27 | 120 | 22 | 67 | 150 |
| Bicarbonate Alkalinity as CaCO3 | mg/L | | 0 | 5 | 480 | 940 | 2120 | 4340 | 600 | 1180 | 2760 | 5300 | 10 | 5 | 5 |
| Hardness as CaCO3 | mg/L | | 20 | <20 | <20 | <20 | 160 | 220 | <20 | <20 | 220 | 110 | 20 | <20 | 220 |
| Ferrous Iron | mg/L | | 2.52 | 0.32 | 0.12 | 0.04 | <0.02 | 0.02 | 0.04 | <0.02 | 0.02 | 0.10 | 0.15 | <0.10 | 0.75 |
| Sulfide | mg/L | | 0 | 0.01 | 0.04 | 0.05 | 0.03 | 0.03 | 0.04 | 0.07 | 0.02 | 0.02 | 0.04 | 0.06 | 0.09 |
| ELLE Results | | | | | | | | | | | | | | | |
| Sulfate | mg/L | | 520 | 380 | 350 | 350 | 360 | 380 | 350 | 360 | 340 | 330 | 400 | 400 | 370 |
| DOC | mg/L | | 0.97 | 1.1 | 1.1 | 1.4 | 1.8 | 9.0 | 1.2 | 1.5 | 2.4 | 11 | 0.81 | 0.85 | 0.79 |
| Total Arsenic | mg/L | 0.010 | <0.00068 | <0.00068 | <0.00068 | <0.00068 | <0.00068 | <0.00068 | <0.00068 | <0.00068 | <0.00068 | <0.0014 | 0.00085 | 0.0060 | **0.0011** |
| Dissolved Arsenic | mg/L | 0.010 | <0.00068 | <0.00070 | <0.00070 | <0.00070 | <0.00070 | <0.00068 | <0.00070 | <0.00070 | <0.00070 | <0.00068 | <0.00070 | <0.00070 | <0.00070 |
| Total Beryllium | mg/L | 0.0040 | **0.0073** | **0.0073** | **0.0072** | **0.0065** | **0.0073** | **0.0054** | **0.0060** | **0.0064** | **0.0060** | **0.0050** | **0.0067** | **0.0064** | **0.0052** |
| Dissolved Beryllium | mg/L | 0.0040 | **0.0083** | **0.0071** | 0.0012 | 0.0017 | 0.0015 | 0.00085 | 0.0015 | 0.0023 | 0.0023 | 0.0026 | **0.0068** | **0.0057** | **0.0046** |
| Total Cobalt | mg/L | 0.032 | **0.35** | **0.34** | **0.33** | **0.33** | **0.32** | **0.24** | **0.33** | **0.33** | **0.27** | **0.17** | **0.33** | **0.34** | **0.28** |
| Dissolved Cobalt | mg/L | 0.032 | **0.33** | **0.35** | **0.33** | **0.33** | **0.32** | **0.12** | **0.32** | **0.31** | **0.20** | **0.14** | **0.31** | **0.34** | **0.28** |
| Total Lithium | mg/L | 0.040 | **0.11** | **0.11** | **0.12** | **0.12** | **0.12** | **0.12** | **0.11** | **0.11** | **0.11** | **0.11** | **0.11** | **0.11** | **0.12** |
| Dissolved Lithium | mg/L | 0.040 | **0.10** | **0.099** | **0.11** | **0.11** | **0.11** | **0.11** | **0.11** | **0.12** | **0.13** | **0.11** | **0.10** | **0.10** | **0.11** |
| Total Selenium | mg/L | 0.050 | <0.00028 | **0.39** | **0.50** | **0.45** | **0.45** | **0.52** | **0.45** | **0.50** | **0.51** | **0.46** | **0.22** | **0.31** | **0.17** |
| Dissolved Selenium | mg/L | 0.050 | <0.00028 | **0.32** | **0.42** | **0.42** | **0.44** | **0.42** | **0.45** | **0.45** | **0.46** | **0.44** | **0.18** | **0.24** | **0.14** |
| Total Iron | mg/L | | 3.9 | 0.43 | 1.5 | 0.84 | 1.2 | 0.83 | 0.64 | 0.87 | 0.72 | 0.44 | 11 | 120 | 19 |
| Total Magnesium | mg/L | | 16 | 16 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 16 | 16 | 15 |
| Total Manganese | mg/L | | 13 | 13 | 12 | 12 | 12 | 8.7 | 12 | 12 | 8.2 | 5.3 | 14 | 13 | 13 |
| Total Potassium | mg/L | | 14 | 14 | 370 | 760 | 1900 | 4600 | 16 | 15 | 14 | 17 | 14 | 14 | 13 |
| Total Sodium | mg/L | | 23 | 23 | 22 | 24 | 27 | 32 | 280 | 560 | 1200 | 3200 | 23 | 23 | 21 |

**0.010** GA GWPS = Georgia Groundwater Performance Standard

0.039 J value. Compound detected above method detection limit but below method calibration limit.

28 Compound detected in blank

## Table 9
## AP-2 and 3/4 DGWC-20 Treatability Results

| | | GA GWPS | IC | Control | 1 g/L KHCO3 | 2 g/L KHCO3 | 5 g/L KHCO3 | 10 g/L KHCO3 | 1 g/L NaHCO3 | 2 g/L NaHCO3 | 5 g/L NaHCO3 | 10 g/L NaHCO3 | 0.5 g/L ZVI | 1.0 g/L ZVI | 1.5 g/L ZVI |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Day | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| pH | SU | | | 4.5 | 6.8 | 7.3 | 7.8 | 8.0 | 7.7 | 7.3 | 7.7 | 7.9 | 6.4 | 6.3 | 5.2 |
| Day | | | | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| pH | SU | | 4.4 | 5.3 | 6.7 | 7.2 | 7.4 | 7.7 | 6.9 | 7.2 | 7.4 | 7.6 | 6.2 | 4.7 | 4.3 |
| ORP | mV | | 423 | 297 | 290 | 280 | 278 | 269 | 222 | 200 | 205 | 207 | 164 | 163 | 185 |
| DO | mg/L | | 9.6 | 7.8 | 7.2 | 7.3 | 7.2 | 6.9 | 7.0 | 7.1 | 6.7 | 6.8 | 7.5 | 7.3 | 6.8 |
| TSS | mg/L | | 6.6 | 2.6 | 11 | 29 | 94 | 243 | 12 | 5.2 | 384 | 808 | 74 | 116 | 103 |
| Bicarbonate Alkalinity as CaCO3 | mg/L | | <5 | 10 | 400 | 820 | 2120 | 4720 | 590 | 940 | 4720 | 5900 | 5 | 5 | 5 |
| Hardness as CaCO3 | mg/L | | <20 | <20 | <20 | <20 | 220 | 220 | <20 | 340 | 460 | 230 | <20 | <20 | <20 |
| Ferrous Iron | mg/L | | 0.07 | 0.14 | 0.16 | 0.13 | 0.07 | 0.04 | 0.03 | 0.05 | 0.09 | 0.09 | 0.12 | 0.08 | 0.45 |
| Sulfide | mg/L | | 0 | 0 | 0 | 0 | 0 | 0 | 0.01 | 0.02 | 0.01 | 0.02 | 0 | 0 | 0.01 |
| | | | | | | | | | | | | | | | |
| ELLE Results | | | | | | | | | | | | | | | |
| Sulfate | mg/L | | 490 | 480 | 500 | 510 | 510 | 580 | 500 | 510 | 520 | 600 | 510 | 500 | 500 |
| Dissolved Organic Carbon | mg/L | | 0.71 | 0.50 | 1.3 | 1.4 | 2.0 | 4.8 | 1.3 | 1.5 | 3.2 | 10 | 0.91 | 0.81 | 0.71 |
| Total Arsenic | mg/L | 0.010 | **0.014** | **0.016** | **0.023** | <0.00068 | **0.022** | **0.017** | **0.021** | **0.036** | **0.014** | 0.0080 | **0.026** | **0.027** | **0.032** |
| Dissolved Arsenic | mg/L | 0.010 | **0.016** | **0.018** | <0.00070 | <0.00070 | <0.00070 | <0.00070 | <0.00070 | <0.00070 | 0.0011 | 0.00077 | **0.019** | **0.018** | **0.017** |
| Total Beryllium | mg/L | 0.004 | **0.0079** | **0.0071** | **0.0070** | <0.00012 | **0.0073** | **0.0071** | **0.0064** | **0.011** | **0.0048** | **0.0041** | **0.0070** | **0.0070** | **0.0065** |
| Dissolved Beryllium | mg/L | 0.004 | **0.0086** | **0.0080** | 0.00053 | 0.00037 | 0.00026 | 0.00022 | 0.00045 | 0.00022 | 0.00045 | 0.00025 | **0.0072** | **0.0099** | **0.0068** |
| Total Cobalt | mg/L | 0.032 | **1.00** | **1.0** | **1.0** | <0.00016 | **0.69** | **0.69** | **1.0** | **1.1** | **0.51** | **0.43** | **1.0** | **1.0** | **0.98** |
| Dissolved Cobalt | mg/L | 0.032 | **0.96** | **1.1** | **0.96** | **0.90** | **0.44** | **0.24** | **0.92** | **0.90** | **0.38** | **0.23** | **1.1** | **1.0** | **1.0** |
| Total Lithium | mg/L | 0.040 | <0.055 | <0.055 | <0.055 | <0.055 | <0.055 | <0.055 | <0.055 | <0.055 | <0.055 | <0.055 | <0.055 | <0.055 | <0.055 |
| Dissolved Lithium | mg/L | 0.040 | <0.055 | <0.057 | 0.015 | 0.015 | 0.016 | 0.023 | 0.014 | 0.017 | 0.018 | 0.019 | <0.057 | <0.057 | <0.057 |
| Total Selenium | mg/L | 0.050 | <0.00028 | **0.40** | **0.45** | <0.00028 | **0.45** | **0.44** | **0.47** | **0.50** | **0.44** | **0.46** | **0.30** | **0.29** | **0.26** |
| Dissolved Selenium | mg/L | 0.050 | <0.00028 | **0.38** | **0.45** | **0.46** | **0.40** | **0.45** | **0.45** | **0.49** | **0.45** | **0.47** | **0.27** | **0.24** | **0.22** |
| Total Iron | mg/L | | 0.12 | 0.082 | 0.19 | <0.020 | 0.14 | 0.21 | 0.16 | 0.31 | 0.12 | 0.087 | **43** | **90** | **200** |
| Total Magnesium | mg/L | | 26 | 29 | 25 | <0.016 | 27 | 25 | 25 | 26 | 25 | 26 | 25 | 26 | 25 |
| Total Manganese | mg/L | | 42 | 38 | 37 | <0.00095 | 18 | 26 | 37 | 38 | 9.8 | 12 | 37 | 37 | 37 |
| Total Potassium | mg/L | | 14 | 15 | 420 | <0.065 | 2000 | 3800 | 16 | 15 | 16 | 19 | 14 | 14 | 14 |
| Total Sodium | mg/L | | 24 | 24 | 23 | <0.090 | 26 | 33 | 310 | 600 | 1500 | 2700 | 22 | 22 | 22 |

0.010 GA GWPS = Georgia Groundwater Performance Standard

0.039 J value. Compound detected above method detection limit but below method calibration limit.

28 Compound detected in blank

# Table 10
## AP-2 and 3/4 Percent Removal from Initial Characterization for Dissolved Metals

| | | GA GWPS | IC (mg/L) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DGWC-48 | As | 0.010 | <0.00068 | % Rem from IC | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| | Be | 0.0040 | **0.0083** | % Rem from IC | 14.5 | 85.5 | 79.5 | 81.9 | 89.8 | 81.9 | 72.3 | 72.3 | 68.7 | 18.1 | 31.3 | 44.6 | |
| | Co | 0.032 | 0.33 | % Rem from IC | -6.1 | 0.0 | 0.0 | 3.0 | 63.6 | 3.0 | 6.1 | 39.4 | 57.6 | 6.1 | -3.0 | 15.2 | |
| | Li | 0.040 | 0.10 | % Rem from IC | 1.0 | -10.0 | -10.0 | -10.0 | -10.0 | -10.0 | -20.0 | -30.0 | -10.0 | 0.0 | 0.0 | -10.0 | |
| | Se | 0.050 | <0.00028/**0.32** | % Rem from Con 0 | 0.0 | -31.3 | -31.3 | -37.5 | -31.3 | -40.6 | -40.6 | -43.8 | -37.5 | 43.8 | 25.0 | 56.3 | |
| DGWC-20 | As | 0.010 | **0.016** | % Rem from IC | -12.5 | >95.6 | >95.6 | >95.6 | >95.6 | >95.6 | >95.6 | 93.1 | 95.2 | -18.8 | -12.5 | -6.3 | |
| | Be | 0.0040 | **0.0086** | % Rem from IC | 7.0 | 93.8 | 95.7 | 97.0 | 97.4 | 94.8 | 97.4 | 94.8 | 97.1 | 16.3 | -15.1 | 20.9 | |
| | Co | 0.032 | 0.96 | % Rem from IC | -14.6 | 0.0 | 6.2 | 54.2 | 75.0 | 4.2 | 6.2 | 60.4 | 76.0 | -14.6 | -4.2 | -4.2 | |
| | Li | 0.040 | <0.055 | % Rem from IC | | 72.7 | 72.7 | 70.9 | 58.2 | 74.5 | 69.1 | 67.3 | 65.5 | | | | |
| | Se | 0.050 | <0.00028/**0.38** | % Rem from Con 0 | 0.0 | -18.4 | -21.1 | -5.3 | -18.4 | -18.4 | -28.9 | -18.4 | -23.7 | 28.9 | 36.8 | 42.1 | |

| | |
|---|---|
| NA | Not applicable |
| >96.5 | Dissolved metal reduced to below GA GWPS |
| 95.7 | Dissolved metal reduced by more than 50% |
| 72.7 | Percent removal from detection method limit |

Terra Systems INCORPORATED

October 21, 2022

**Todd Rees, PhD, PE**
*Senior Program Leader*

GOLDER MEMBER OF WSP Golder Associates Inc.
Amherst, MA., Montrose, CO.

**TERRA SYSTEMS, INC. DRAFT REPORT FOR GOLDER/WSP FOR COAL COMBUSTION RESIDUE AT PLANT MCDONOUGH ATKINSON ASH POND 1, 2, 3, AND 4 PHASE II TREATABILITY STUDY VERSION 1**

## 1.0 INTRODUCTION

Coal combustion residue landfill may generate acidic conditions which allow metals such as arsenic (As), beryllium (Be), cobalt (Co), lithium (Li), molybdenum (Mo), and selenium (Se) to accumulate to levels above regulatory limits. This bench-scale treatability evaluated neutralization/precipitation with potassium bicarbonate, sodium bicarbonate, ferrous oxide, and ferrous sulfide solution for three groundwaters and soils from Georgia Power Company (Georgia Power) Plant McDonough-Atkinson Ash Pond 1 (AP-1) which has arsenic and molybdenum in two groundwaters (DGWC-69 and DGWC-68A) and cobalt in DGWC-40. Plant McDonough-Atkinson Ash Pond 2, Ash Pond 3 and Ash Pond 4 (AP-2 and 3/4) has arsenic, beryllium, cobalt, lithium, and selenium in two groundwaters (DGWC-48 and DGWC-20). The treatability test from AP-2 and 3/4 used only groundwater. The Georgia Groundwater Protection Standards (GA GWPS) are 0.010 mg/L for arsenic, 0.0040 mg/L for beryllium, 0.032 mg/L for cobalt, 0.10 mg/L for lithium, 0.10 mg/L for molybdenum, and 0.050 mg/L for selenium.

## 2.0 BENCH-SCALE STUDY SCOPE

The objective of the bench-scale study is to evaluate the appropriate in situ remediation technology for several metals including arsenic, cobalt, beryllium, lithium, molybdenum, and selenium:

- Identify the feasibility of in-situ remediation.
- Determine the design parameters including reagent dosage and demand.

The bench-scale treatability study investigated four reagents: potassium bicarbonate, sodium bicarbonate, iron oxide, and Redox Solutions ferrous sulfide solution (Ferroblack H).

### 2.1 Reagent Selection

The bench-scale treatability study assumes that one of the following technologies can be used for in-situ remediation of the metals:

- elevated pH precipitation
- oxidation with iron oxide
- reduction with a ferrous sulfide solution

All reagents used for the bench-scale test were commercially available products. The reagent usages and their dosages could be adjusted according to the results of the activities and observations during the execution of the bench-scale treatability study. The following provides more detail on each of the reagents proposed for the bench-scale treatability testing:

- Potassium Bicarbonate (KHCO3): Potassium bicarbonate can increase the pH up to about 8.2 SU. Three loadings of LC Carlsen potassium bicarbonate were evaluated in the tests to determine the precipitation of arsenic and molybdenum in two groundwaters and associated soils from Plant AP-1 (DGWC-69 and DGWC-68A); three loadings of potassium bicarbonate to address cobalt from one groundwater and associated soil in Plant AP-1 DGWC-40; and three loadings of potassium bicarbonate to address arsenic, beryllium, and cobalt in groundwater from Plant AP 234 (DGWC-48 and DGWC-20).

- Sodium Bicarbonate (NaHCO3): Sodium bicarbonate can increase the pH up to about 8.3 SU. Three loadings of Genesis sodium bicarbonate were evaluated in the tests to determine the precipitation of arsenic and molybdenum in two groundwaters and associated soils from Plant AP-1 (DGWC-69 and DGWC-68A); three loadings of sodium bicarbonate to address cobalt from one groundwater and associated soil in Plant AP-1 DGWC-40; and three loadings of sodium bicarbonate to address arsenic, beryllium, and cobalt in groundwater from Plant AP 234 (DGWC-48 and DGWC-20).

- Ferric oxide. Ferric oxide ($Fe_2O_3$) is insoluble in water and has a pH of 6-8. Three loadings of Sigma Aldrich ferric oxide (<5 µm, 96%) were evaluated for the precipitation of arsenic and molybdenum in two groundwaters and associated soils from Plant AP-1 (DGWC-69 and DGWC-68A); three loadings of ferric oxide to address cobalt from one groundwater and associated soil in Plant AP-1 DGWC-40; and three loadings of ferric oxide to address arsenic, beryllium, and cobalt in groundwater from Plant AP 234 (DGWC-48 and DGWC-20).

- Ferroblack H (FeB). Ferrous sulfide (FeS) is insoluble in water and has a pH of 9.5-12.5. Three loadings of Redox Solutions Ferroblack H ferrous sulfide solution were evaluated for the precipitation of arsenic and molybdenum in two groundwaters and associated soils from Plant AP-1 (DGWC-69 and DGWC-68A); three loadings of FeB to address cobalt from one groundwater and associated soil in Plant AP-1 DGWC-40; and three loadings of FeB to address arsenic, beryllium, and cobalt in groundwater from Plant AP 2 and 3/4 (DGWC-48 and DGWC-20).

## 2.2 Bench-scale Groundwater and Soil Collection

Groundwater samples were collected from the five locations (Plant AP-1 DGWC-69, DGWC-68A, and DGWC-40 and Plant AP234 DGWC-48 and DGWC-20). Soil samples were collected from Plant AP-1 DGWC-69, DGWC-68A, and DGWC-40. With 1 L reaction vessels for each treatment, about 3-5 gallons of each of the five groundwaters were required. The samples were delivered to the TSI under a chain of custody. Groundwater samples from AP-2 and 3/4 DGWC-20 and DGWC-48, AP-1 DGWC-68A, DGWC-69, and DGWC-40 were delivered to TSI on 6/24/22 and stored in refrigerators. The14.4 kg soil sample from AP-1 DGWC-69 was received on 6/28/22. The 14.6-14.8 kg soil samples from AP-1 DGWC-68A and DGWC-40 were initially lost by Federal Express. They were recovered by Terra Systems, Inc. (TSI) on 7/7/22.

## 2.3 Baseline characterization

At the beginning of the bench-scale treatability test, the baseline characterization was performed to verify contaminant concentrations in the samples. The groundwater samples were homogenized to the extent possible. The homogenized groundwater samples were analyzed for total cobalt, arsenic, molybdenum, beryllium, lithium, selenium, iron, potassium, manganese, magnesium, and sodium (metals chosen based upon site characteristics); dissolved arsenic, beryllium, cobalt, molybdenum, lithium, and selenium (based upon site characteristics); dissolved organic carbon (DOC), and sulfate, by the Eurofins Lancaster Laboratories Environmental (ELLE) and for pH, ORP, dissolved oxygen (DO), bicarbonate alkalinity, total hardness, ferrous iron, and sulfide by TSI using calibrated meters and Hach procedures.

## 2.4 Titration Tests

Alkaline titrations were conducted to determine the potassium bicarbonate and sodium bicarbonate testing dosages. An alkaline titration test was completed to determine the pH resulting from 0, 1, 2, 5, and 10 g/L additions of potassium bicarbonate and sodium bicarbonate reagent dosages. The aqueous total suspended solids (TSS) were determined by weighing the 0.2 μm nylon filter before filtering the samples and after filtration and drying in a 105 $^{o}$C oven. The weight of the TSS collected was divided by the volume of groundwater that passed through the filters.

## 2.5 Reagent Screening

The purpose of this step was to select the most appropriate reagent for each of the nine groundwater samples.

The reagent dosages were determined from the baseline characterization and titration. For each sample, a total of 13 reactors were set up for each site.

AP-1 (Arsenic and Molybdenum) DGWC-69 and DGWC-68A with 713-812 g groundwater and 417-580 g soil

- Control
- Potassium Bicarbonate: 3 dosages (2, 5, and 10 g/L)
- Sodium Bicarbonate: 3 dosages (2, 5, and 10 g/L)
- Ferric Oxide: 3 Dosages (0.5, 1.0, and 2.0 g/L)
- Ferroblack H: 3 Dosages (10, 20, and 30 g/L)

Plant AP-1 (Cobalt) DGWC-40 with 580 g soil and 705-781 g groundwater

- Control
- Potassium Bicarbonate: 3 dosages (2, 5, and 10 g/L)
- Sodium Bicarbonate: 3 dosages (2, 5, and 10 g/L)
- Ferric Oxide: 3 Dosages (0.5, 1.0, and 2.0 g/L)
- Ferroblack H: 3 Dosages (10, 20, and 30 g/L)

Plant AP-2 and 3/4 (Arsenic, Beryllium, Cobalt, Lithium, and Selenium) DGWC-49 and DGWC-20 with only 1,032 to 1,069 g groundwater

- Control
- Potassium Bicarbonate: 3 dosages (2, 5, and 10 g/L)
- Sodium Bicarbonate: 3 dosages (2, 5, and 10 g/L)
- Ferric Oxide: 3 Dosages (0.5, 1.0, and 2.0 g/L)

- Ferroblack H: 3 Dosages (10, 20, and 30 g/L)

All containers were mixed and turned periodically for seven days. Groundwater samples (the supernatants in the reactors) were analyzed for:

- total arsenic, beryllium, cobalt, molybdenum, and selenium (based upon contaminants of concern for each site);
- total iron, potassium, manganese, magnesium, and sodium
- dissolved arsenic, beryllium, cobalt, molybdenum, and selenium (based upon contaminants of concern for each site). The aqueous samples were filtered through 0.2 μm nylon filters and the filtrates were divided into bottles for DOC and metals.
- dissolved organic carbon (DOC)
- sulfate

ELLE conducted the metals, DOC, and sulfate analyses. The pH, ORP, dissolved oxygen (DO), bicarbonate alkalinity, total hardness, ferrous iron, and sulfide were conducted by TSI using calibrated meters and Hach procedures. The estimated sample volumes for the initial characterization, and screening tests are shown in Table 1. The volumes were adjusted to account for required dilutions and volumes of water available.

## 3.0 PLANT AP-1

### 3.1 Plant AP-1 Initial Characterization Results

Table 2 has the initial characterization results of the field parameters, Hach tests, metals, DOC, and sulfate results for the three groundwater samples in AP-1.

**3.1.1 AP-1 DGWC-69.** The groundwater pH was 7.4 with a moderate bicarbonate alkalinity of 60 mg/L CaCO3. There was a positive ORP (244 mV) and moderate dissolved oxygen (6.1 mg/L). The TSS was 6.6 mg/L with a hardness 60 mg/L, 0.08 mg/L ferrous iron, and 0.01 mg/L sulfide. With 100 g soil and 150 g of the AP1 DGWC-69 groundwater (40% soil, 60% groundwater), the pH increased from 7.3 to 7.5 SU with 1 g/L sodium bicarbonate and increased to 8.1 with 10 g/L. The pH of 100 g soil and 150 g groundwater increased from 6.3 to 7.3 SU with 1 g/L potassium bicarbonate and to 8.0 with 10 g/L. This groundwater has low 10 mg/L sulfate and 0.59 mg/L DOC. Total arsenic was 0.026 mg/L and dissolved arsenic was 0.052 mg/L; both exceeded the GA GWPS. There is not a clear explanation as to why the dissolved arsenic was higher than the total arsenic. Total and dissolved molybdenum was detected 0.0053 to 0.0055 mg/L and were below the GA GWPS. The groundwater contained <0.2 mg/L total iron, 2.6 mg/L total magnesium, 0.0036 mg/L total manganese, 2.4 mg/L potassium, and 9.7 mg/L sodium. The soil pH was 6.7 with a density of 1.56 g/cm$^3$, field holding capacity of 0.15 g/g, and soil dry weight of 93.0%. The soil contained 3.1 mg/kg total arsenic, 0.68 mg/kg total molybdenum, 9,600 mg/kg total iron, 3,000 mg/kg total magnesium, 250 mg/kg total manganese, 3,900 mg/kg potassium, 96 mg/kg sodium, and a moisture content of 19.7%.

**3.1.2 AP-1 DGWC-68A.** The groundwater pH was 6.8 with a moderate bicarbonate alkalinity of 180 mg/L CaCO3. There was a positive ORP (215 mV) and moderate dissolved oxygen (3.0 mg/L). The TSS was 0 mg/L with a hardness 240 mg/L, 0.01 mg/L ferrous iron, and no sulfide. The pH of 100 g soil and 150 g groundwater increased from 6.8 to 7.5 1U with 1 g/L sodium bicarbonate and increased to 7.8 with 10 g/L. The pH increased from 6.7 to 7.1 SU with 1 g/L potassium bicarbonate and to 7.6 with 10 g/L. This groundwater has moderate 40 mg/L sulfate and 0.71 mg/L DOC. Total arsenic was not detected and dissolved arsenic was 0.014 mg/L; above the

GA GWPS. Molybdenum concentrations were relatively high with 0.20 mg/L total and 0.20 mg/L dissolved; both exceeded the GA GWPS of 0.10 mg/L. The groundwater contained 0.029 mg/L total iron, 18 mg/L total magnesium, 0.072 mg/L total manganese, 3.8 mg/L potassium, and 9.6 mg/L sodium. The soil pH was 7.2 with a density of 1.58 g/cm$^3$, field holding capacity of 0.29 g/g, and soil dry weight of 88.3%. The soil contained 1.0 mg/kg total arsenic, 7.4 mg/kg total molybdenum, 35,000 mg/kg total iron, 11,000 mg/kg total magnesium, 530 mg/kg total manganese, 12,000 mg/kg potassium, 110 mg/kg sodium, and a moisture content of 12.9%.

**3.1.3 AP-1 DGWC-40.** The initial groundwater pH was 5.3 SU with a bicarbonate alkalinity of 20 mg/L CaCO3. There was a positive ORP (240 mV) and moderate dissolved oxygen (4.2 mg/L). The TSS was 4.3 mg/L with a hardness of 20 mg/L, 0.03 mg/L ferrous iron, and 0.01 mg/L sulfide. The pH of 100 g soil and 150 g groundwater increased from 5.2 to 6.4 SU with 1 g/L sodium bicarbonate and increased to 7.4 with 10 g/L. The pH of 100 g soil and 150 g groundwater increased from 4.4 to 5.8 SU with 1 g/L potassium bicarbonate and to 7.3 with 10 g/L. This groundwater has moderate 230 mg/L sulfate and no detectable DOC. Total cobalt was detected at 0.040 mg/L and dissolved cobalt at 0.039 mg/L; both were slightly above the GA GWPS of 0.032 mg/L. The groundwater contained <0.020 mg/L total iron, 19 mg/L total magnesium, 3.3 mg/L total manganese, 5.8 mg/L potassium, and 19 mg/L sodium. The soil pH was 5.6 with a density of 1.69 g/cm$^3$, field holding capacity of 0.23 g/g, and soil dry weight of 84.5%.The soil contained 13 mg/kg total cobalt, 49,000 mg/kg total iron, 9,500 mg/kg total magnesium, 460 mg/kg total manganese, 13,000 mg/kg potassium, 40 mg/kg sodium, and a moisture content of 14.9%.

## 3.2 Plant AP-1 Testing Results

**3.2.1 Well DGWC-69 Summary.** Table 3 has the field parameters and ELLE results for the DGWC-69 groundwater. The control treatment received 417 g soil and 798 g groundwater. Potassium bicarbonate or sodium bicarbonate solutions were prepared with between 796 and 812 g groundwater and 1.6 to 8.0 g of buffer. The 580 g soil were added to the bottles and bottles filled with between 749 to 812 g of the solutions. The bicarbonate concentrations ranged from 2.0 to 9.8 g/L. The ferric oxide was added directly to the bottles and concentrations ranged from 0.5, 0.9. and 2.0 g/L. The Ferroblack H treatments received 8.0 to 22.5 g of the ferrous sulfide suspension resulting in 10.6, 20.3, and 30.1 g/L solutions.

On Day 7, the control pH was 6.5. With 2 g/L potassium bicarbonate, the pH increased to 7.2 and the highest dosage of 10 g/L potassium buffers had a pH of 7.7 on Day 7. On Day 7, the pH for the sodium bicarbonate treatments ranged from 7.4 to 8.0, from 6.4 to 6.7 for the iron oxide, and from 8.0 to 9.6 for the Ferroblack H treatments. The ORPS were positive and ranged from 48 to 198 mV. DO ranged from 1.9 to 6.9 mg/L with lower DO of 1.9 to .4.6 mg/L in the Ferroblack H treatments. Bicarbonate alkalinity was moderate in the control (80 mg/L as CaCO3) and increased with bicarbonate additions to a maximum of 5,200 mg/L as $CaCO_3$. The hardness ranged from 60 to 460 mg/L as CaCO3. Ferrous iron ranged from 0.65 to 3.35 with levels above 1.0 mg/L in the 2 g/L KHCO3, 5 g/L KHCO3, 10 g/L KHCO3, 5 g/L NaHCO3, 10 g/L FeB, 20 g/L FeB, and 30 g/L FeB. Sulfide was low (0.01 to 0.20 mg/L).

Sulfate ranged from 12 to 30 mg/L. Little DOC was detected (2 to 7.7 mg/L); the higher dosages of buffer had the most, 6.8 and 7.7 mg/L. Total arsenic ranged from 0.0042 to 0.084 mg/L with the following treatments below the GA GWPS of 0.010 mg/L: Control, 0.5 g/L Fe2O3, 1.0 g/L Fe2O3, and 2 g/L Fe2O3. Dissolved arsenic ranged from 0.0040 to 0.088 mg/L with the following treatments below the GA GWSP: Control, 0.5 g/L Fe2O3, 1.0 g/L Fe2O3, 2 g/L Fe2O3, and 10 g/L FeB. Total molybdenum ranged from 0.018 to 0.17 mg/L; all were below the GA GWPS except the 20 and 30 g/L FeB treatments. Dissolved molybdenum ranged from 0.019 to 1.8 mg/L with dissolved molybdenum below the GA GWPS in all treatments except the 20 and 30 g/L FeB treatments. Total iron increased in all treatments; possibly as it leached from the soil. Total magnesium increased with the higher magnesium concentrations in the KHCO3 and NaHCO3 treatments. Total manganese increased in all treatments. Potassium increased with the increasing loadings of potassium bicarbonate and were slightly elevated in the other treatments. Sodium ranged from 19 to 2,200 mg/L with the highest levels in the $NaHCO_3$ treatments.

The Control, 0.5 g/L Fe2O3, 1.0 g/L g/L Fe2O3, 2.0 g/L Fe2O3, and the 10 g/L FeB treatments showed significant reductions in dissolved arsenic with all of these treatments reducing dissolved arsenic below the GA GWPS. The dissolved molybdenum concentrations were below the GA GWPS for molybdenum of 0.10 mg/L for all treatments except the 20 and 30 g/L FeB. The higher loadings of FeB may have created a reducing environment where molybdenum leached from the soil .

**3.2.2 Well DGWC-68A Summary.** Table 4 has the field parameters and ELLE results for DGWC-68A groundwater. The control treatment received 580 g soil and 738 g groundwater. Potassium bicarbonate or sodium bicarbonate solutions were prepared with between 792 and 798 g groundwater and 1.6 to 8.0 g of buffer. The 580 g soil were added to the bottles and bottles filled with between 722 to 789 g of the solutions. The bicarbonate concentrations ranged from 2.0 to 10 g/L. The ferric oxide was added directly to the bottles and concentrations ranged from 0.5, 1.1. and 2.0 g/L. The Ferroblack H treatments received 8.0 to 22.5 g of the ferrous sulfide suspension resulting in 10.3, 20.6, and 28.3 g/L solutions.

On Day 7, the control pH was 6.6. With 2 g/L potassium bicarbonate, the pH increased to 6.9 and the highest dosage of 10 g/L potassium buffers had a pH of 7.1 on Day 7. On Day 7, the pH for the sodium bicarbonate treatments was 7.1 in all three loadings, from 6.6 to 6.7 for the iron oxide, and from 7.0 to 8.7 for the Ferroblack H treatments. The ORPS were positive and ranged from 5 to 288 mV with the Ferroblack H treatments being lower. DO ranged from 2.1 to 6.3 mg/L with lower DO of 2.1 to 2.7 mg/L in the Ferroblack H treatments. Bicarbonate alkalinity was moderate in the control (180 mg/L as CaCO3) and increased with bicarbonate additions to a maximum of 4,200 mg/L as $CaCO_3$. The hardness ranged from 200 to 710 mg/L as CaCO3. Ferrous iron ranged from 0.65 to 4.0 with levels above 1.0 mg/L in the 5 g/L KHCO3, 10 g/L KHCO3, 2 g/L NaHCO3, 5 g/L NaHCO3, 10 g/L FeB, 20 g/L FeB, and 30 g/L FeB. Sulfide was low (0 to 0.19 mg/L).

Sulfate ranged from 31 to 44 mg/L. Little DOC was detected (1.6 to 11 mg/L); the higher dosage of FeB had the most, 11 mg/L. Total arsenic ranged from 0.00094 to 0.0064 mg/L with all treatments below the GA GWPS of 0.010 mg/L. Dissolved arsenic ranged from 0.0024 to 0.072 mg/L with the following treatments below the GA GWSP: Control, 5 g/L KHCO3, and 2 g/L NaHCO3. Why the dissolved arsenic is higher than total arsenic is unclear. Total molybdenum ranged from 0.28 to 1.1 mg/L; only the 20 g/L FeB was below the GA GWPS. Dissolved molybdenum ranged from 0.28 to 1.2 mg/L with no treatments below the GA GWPS. Dissolved molybdenum increased from the initial characterization sample presumably as molybdenum dissolved from the soil. The lowest dissolved molybdenum concentrations were in the ferric oxide treatments ( 0.28 to 0.41 mg/L). Total iron increased in all treatments; possibly as it leached from the soil. Total magnesium increased except in the Control and 0.5 g/L to 2 g/L Fe2O3 treatments. Total manganese increased in all treatments. Potassium increased with the increasing loadings of potassium bicarbonate and were slightly elevated in the other treatments. Sodium ranged from 19 to 2,200 mg/L with the highest levels in the $NaHCO_3$ treatments.

The Control, 5 g/L KHCO3, and 2 g/L NaHCO3 treatments showed significant reductions in dissolved arsenic with these treatments reducing dissolved arsenic below the GA GWPS. None of treatments reduced dissolved molybdenum below the GA GWPS with the ferric oxide treatments showing the lowest levels.

**3.2.3 Well DGWC-40 Summary.** Table 5 has the field parameters and ELLE results for the DGWC-40 groundwater. The control treatment received 580 g soil and 780 g groundwater. Potassium bicarbonate or sodium bicarbonate solutions were prepared with between 792 and 798 g groundwater and 1.6 to 8.0 g of buffer. The 580 g soil were added to the bottles and bottles filled with between 705 to 781 g of the solutions. The bicarbonate concentrations ranged from 2.0 to 10 g/L. The ferric oxide was added directly to the bottles and concentrations ranged from 0.5, 1.0, and 2.1 g/L. The Ferroblack H treatments received 7.5 to 22.5 g of the ferrous sulfide suspension resulting in 9.6, 20.8, and 30.6 g/L solutions.

On Day 7, the control pH was 5.5. With 2 g/L potassium bicarbonate, the pH increased to 6.3 and the highest dosage of 10 g/L potassium buffers had a pH of 7.0 on Day 7. On Day 7, the pH for the sodium bicarbonate treatments ranged from 6.5 to 7.2 in all three loadings, from 5.5 to 6.3 for the iron oxide, and from 6.1 to 6.6 for the Ferroblack H treatments. The ORPS were positive and ranged from 5 to 245 mV with the Ferroblack H treatments being lower. DO ranged from 2.7 to 6.6 mg/L with lower DO of 2.7 to 3.1 mg/L in the Ferroblack H treatments. Bicarbonate alkalinity was low in the control (20 mg/L as CaCO3) and increased with bicarbonate additions to a maximum of 420 mg/L as $CaCO_3$. The hardness ranged from <20 to 420 mg/L as CaCO3. Ferrous iron ranged from 0.05 to 6.6 with levels above 1.0 mg/L in the 5 g/L NaHCO3, 10 g/L NaHCO3, 0.5 g/L Fe2O3, 1.0 g/L Fe2O3, 10 g/L FeB, and 20 g/L FeB treatments. Sulfide was low (0.01 to 0.18 mg/L).

Sulfate ranged from 200 to 260 mg/L. Little DOC was detected (1.4 to 3.6 mg/L. Total cobalt ranged from 0.0033 to 0.085 mg/L with the following treatments below the GA GWPS of 0.032 mg/L: 2 g/L NaHCO3, 5 g/L NaHCO3, 10 g/L NaHCO3, 20 g/L FeB, and 30 g/L FeB. Dissolved cobalt ranged from 0.0022 to 0.082 mg/L with the following treatments below the GA GWPS: 2 g/L KHCO3, 5 g/L KHCO3, 10 g/L KHCO3, 2 g/L NaHCO3, 5 g/L NaHCO3, 10 g/L NaHCO3, 10 g/L FeB, 20 g/L FeB, and 30 g/L FeB. Total iron increased in all treatments; possibly as it leached from the soil. Total magnesium increased except in the Control, 2 g/L NaHCO3, 0.5 g/L Fe2O3, 1.0 g/L Fe2O3, and 2 g/L Fe2O3 treatments. Total manganese increased in all treatments except the NaHCO3 treatments. Potassium increased with the increasing loadings of potassium bicarbonate and were slightly elevated in the other treatments. Sodium ranged from 19 to 2,200 mg/L with the highest levels in the $NaHCO_3$ treatments.

The 2 g/L KHCO3, 5 g/L KHCO3, 10 g/L KHCO3, 2 g/L NaHCO3, 5 g/L NaHCO3, 10 g/L NaHCO3, 10 g/L FeB, 20 g/L FeB, and 30 g/L FeB treatments showed significant reductions in dissolved cobalt with these treatments reducing dissolved cobalt below the GA GWPS.

### 3.3 AP-1 Conclusions

Table 6 summarizes the percent removals from the initial characterization samples or the Control Day 0 for the dissolved metals of concern across the various groundwaters. Compounds highlighted in green were reduced to below the GA GWPS by the treatments.

**Arsenic.** In the AP-1 DGWC-69 groundwater and soil, the control, all ferric oxide treatments, and the 10 g/L FeB treatments reduced dissolved arsenic to below the GA GWPS but not the sodium or potassium bicarbonate and high Ferroblack treatments. The AP-1 DGWC-68A treatments with dissolved arsenic below the GA GWPS were Control, 5 g/L KHCO3, 2 g/L NaHCO3, and 20 g/L FeB.

**Cobalt.** The GA GWPS for cobalt is 0.032 mg/L. All of the potassium and sodium bicarbonate treatments plus the Ferroblack treatments reduced dissolved Co in the AP-1 DGWC-40 groundwater and soil to below the GA GWPS.

**Molybdenum.** All of the treatments, including the control, were below the GA GWPS for molybdenum in the DGWC-69 groundwater treatments. None of the treatments reduced dissolved molybdenum below the GA GWPS in DGWC-68A. The ferric oxide treatments had the lowest dissolved molybdenum levels of 0.28 to 0.41 mg/L.

**Overall Conclusions**. The control, 0.5 to 10 g/L ferric oxide, and 10 g/L reduced dissolved arsenic to below the GA GWPS in the DGWC-69 soil groundwater. The control, 5 g/L KHCO3, 2 g/L NaHCO3, and 20 g/L Ferroblack reduced arsenic in the DGWC-68A soil and groundwater below the GA GWPS. All the bicarbonate and Ferroblack treatments reduced dissolved cobalt in the AP-1 DGWC-40 groundwater to below the GA GWPS. The dissolved molybdenum in the DGWC-69 soil and groundwater were below the GA GWPS in all treatments. None of the treatments met the molybdenum GA GWPS in the AP-1 DGWC-68A soil and groundwater treatments although the ferric oxide reduced dissolved molybdenum the most. There was no single treatment that met the GWPS for dissolved arsenic and molybdenum in the DGWC-69 and DGWC-68A groundwater and soils and for cobalt in the DGWC-40.

## 4.0 PLANT AP-2 and 3/4

### 4.1 Plant AP-2 and 3/4 Initial Characterization Results

Table 7 has the initial characterization results of the field parameters, Hach tests, metals, DOC, and sulfate results for the two groundwater samples in AP-2 and 3/4.

**4.1.1 Well DGWC-48.** The control treatment received 1,056 g groundwater. Potassium bicarbonate or sodium bicarbonate solutions were prepared with between 1,047 and 1,059 g groundwater and 2.1 to 10.5 g of buffer. The bicarbonate concentrations ranged from 2.0 to 9.9 g/L. The ferric oxide was added directly to the bottles and concentrations ranged from 0.5, 1.0, and 2.0 g/L. The Ferroblack H treatments received 10.5 to 31.5 g of the ferrous sulfide suspension resulting in 9.9, 19.7, and 29.5 g/L solutions.

The pH ranged from 4.2 to 4.8 with only 20 mg/L bicarbonate alkalinity as CaCO3. There was a positive ORP (265 mV) and moderate dissolved oxygen (4.1 mg/L). The TSS was 5.6 mg/L with a hardness <20 mg/L, 0.56 mg/L ferrous iron, and no sulfide. The pH increased from 4.2 to 7.5 SU with 1 g/L sodium bicarbonate and increased to 7.9 with 10 g/L. The pH increased from 4.3 to 6.6 SU with 1 g/L potassium bicarbonate and to 8.3 with 10 g/L. This groundwater has high 300 mg/L sulfate and <0.5 mg/L DOC. Total arsenic was non-detect and dissolved arsenic was 0.035 mg/L. Total and dissolved Beryllium were 0.0031 mg/L which were below the GA GWPS. Total cobalt was found at 0.040 mg/L and dissolved cobalt at 0.042 mg/L above the GA GWPS of 0.032 mg/L. Lithium was not detected (<0.011 mg/L). No selenium was detected. Lithium and selenium were not monitored in the subsequent testing. The groundwater contained <0.020 mg/L total iron, 19 mg/L total magnesium, 3.3 mg/L total manganese, 5.8 mg/L potassium, and 19 mg/L sodium.

**4.1.2 Well DGWC-20.** The control treatment received 1,064 g groundwater. Potassium bicarbonate or sodium bicarbonate solutions were prepared with between 1,054 and 1,058 g groundwater and 2.1 to 10.5 g of buffer. The bicarbonate concentrations ranged from 2.0 to 9.9 g/L. The ferric oxide was added directly to the bottles and concentrations ranged from 0.5, 1.0, and 2.0 g/L. The Ferroblack H treatments received 10.5 to 31.5 g of the ferrous sulfide suspension resulting in 9.9, 19.8, and 29.6 g/L solutions.

The pH ranged from 4.5 to 6.3 with little bicarbonate alkalinity of 20 mg/L CaCO3. There was a positive ORP (232 mV) and moderate dissolved oxygen (3.8 mg/L). The TSS was 3.0 mg/L with 20 mg/L hardness, 0.06 mg/L ferrous iron, and no sulfide. The pH increased from 5.5 to 6.9 SU with 1 g/L sodium bicarbonate and increased to 8.0 with 10 g/L. The pH increased from 4.5 to 6.8 SU with 1 g/L potassium bicarbonate and to 7.9 with 10 g/L. This groundwater has moderate 560 mg/L sulfate and 3.4 mg/L DOC. Total arsenic was 0.022 mg/L and dissolved arsenic was <0.16 mg/L. Total beryllium was detected at 0.0082 mg/L and dissolved beryllium at <0.010 mg/L; both exceed the GA GWPS of 0.0040. Total cobalt was detected at 1.2 mg/L and dissolved cobalt at 1.0 mg/L, both exceed the GA GWPS of 0.032 mg/L. Total and dissolved lithium and selenium were not detected. Lithium and selenium were not monitored in the subsequent testing. The groundwater was slightly hard with 0.039 mg/L total iron, 27 mg/L total magnesium, 41 mg/L total manganese, 15 mg/L potassium, and 22 mg/L sodium.

## 4.2 Plant AP-2 and 3/4 Testing Results

**4.2.1 Well DGWC-48 Summary.** Table 8 has the field parameters and ELLE results for this groundwater. On Day 0, the control pH was 5.0 and increased to 7.2 for the lowest 2 g/L loading of potassium bicarbonate and to 7.4 for the lowest 2 g/L loading of sodium bicarbonate. The highest dosage of buffers had pHs of 7.9-8.0 on Day 7. The pH in the Fe2O3 treatments on Day 7 ranged 4.8 to 5.1 SU and increased to between 7.0 to 10.7 for the FeB treatments. The ORPS on Day 7 were positive except for the 30 g/L FeB and ranged from -58 to 289 mV. DO ranged from 2.2 to 5.5 mg/L. The total suspended solids ranged from 0 to 86 mg/L with >10 mg/L TSS found in the 5 g/L KHCO3, 1.0 g/L Fe2O3, 2.0 g/L Fe2O3, 10 g/L FeB, and 30 g/L FeB. Bicarbonate alkalinity was low in the control, Fe2O3, and FeB treatments (<20-80 mg/L CaCO3) and increased with bicarbonate additions. The hardness ranged from 20 to 232 mg/L with higher readings at the higher buffer loadings. Only the control, 10 g/L sodium bicarbonate, and the FeB treatments had mor than 0.15 mg/L ferrous iron. Sulfide was low (0.01 to 0.10 mg/L).

Sulfate ranged from 310 to 340 mg/L. Little DOC was detected (0.56 to 19 mg/L); the highest dosage of buffer had the most, 6.3 and 19 mg/L. Total arsenic were not detected except in the treatments with 10 g/L KHCO3, 5 g/L NaHCO3, 1.0 g/L Fe2O3, 2.0 g/L Fe2O3, and the 30 g/L FeB. Total As was below the GA GWPS. Dissolved As were above the GA GWPS except in the 2 g/L NaHCO3, 2 g/L Fe2O3, 10 g/L FeB, and 20 g/L FeB treatments. It is not clear why dissolved arsenic would be higher than total arsenic. Total beryllium ranged from 0.0050 to 0.0072 mg/L; all samples were above the GA GWPS of 0.004 mg/L except the 10 g/L KHC03, 5 g/L NaHCO3, 1- g/L NaHCO3, and all three of the FeB treatments. Dissolved beryllium ranged from <0.00012 to 0.0081 mg/L with 2-10 g/L potassium bicarbonate, 5-10 g/L sodium bicarbonate, and the 10 to 30 g/L FeB treatments below the GA GWPS. Total cobalt was moderate ranging from 0.031 to 0.34 mg/L with only the 30 g/L FeB treatment below the GA GWPS. Dissolved cobalt ranged from 0.00022 to 0.36 mg/L with the 10-30 g/L FeB below the GA GWPS. Total iron ranged from 0.027 to 110 g/L (2 g/L Fe2O3). Total magnesium did not change much ranging from 1.3 to 16 mg/L. Total manganese ranged from 0.38 to 14 mg/L and was reduced by >50% only in the 10 g/L

NaHCO3 treatment. Potassium and sodium increased with the increasing loadings of potassium and sodium bicarbonate.

The only treatments that reduced dissolved arsenic to below the GA GWPS were the 2 g/L NaHCO3, 2.0 g/L Fe2O3, 10 g/L FeB, and 20 g/L FeB. The 2-10 g/L of the potassium bicarbonate, 5-10 g/L sodium bicarbonate, and 10, 20, and 30 g/L FeB treatments reduced dissolved beryllium to below the GA GWPS. Only the 10, 20, and 30 g/L FeB treatments resulted in decreases in dissolved cobalt to below the GA GWPS.

**4.2.2 Well DGWC-20 Summary.** Table 9 has the field parameters and ELLE results for this groundwater.

The control pH at Day 0 was 3.9 SU and increased to 7.1 for the lowest loading of potassium bicarbonate and to 7.0 for the lowest loading of sodium bicarbonate. The highest dosage of buffers had pHs of7.7 on Day 7. The ORPS were positive and ranged from 78 to 410 mV with the lowest ORP in the 30 g/L FeB treatment. DO ranged from 2.6 to 6.3 mg/L. The total suspended solids ranged from 0.8 to 520 mg/L. The treatments with 10 g/L KHCO3, 10 g/L NaHCO3, 2 g/L Fe2O3, 10 g/L FeB, and 30 g/L FeB had elevated TSS above 10 mg/L. Bicarbonate alkalinity was low in the control and increased with bicarbonate additions. The hardness ranged from <20 to 350 mg/L. Little ferrous iron was detected (0.03 to 0.12 mg/L). Sulfide was low (<0.01 to 0.01 mg/L).

Sulfate ranged from 470 to 580 mg/L. Little DOC was detected; the highest dosage of KHCO3 buffer had the most, 6.8 mg/L. Total arsenic ranged from 0.0015 to 0.025 mg/L with the 5 g/L NaHCO3 and 10, 20, and 30 g/L FeB treatment having total arsenic below the GA GWPS. Dissolved arsenic ranged from 0.0014 to 0.044 mg/L with the 2 and 5 g/L KHCO3, 2, 5, and 10 g/L NaHCO3, and the 10, 20, and 30 g/L FeB treatments having dissolved arsenic below the GA GWPS. Total beryllium ranged from 0.00057 to 0.013 mg/L; the 5 g/L NaHCO3 and 10, 20, and 30 g/L FeB treatments were below the GA GWPS. Dissolved beryllium ranged from 0.00023 to 0.0091 mg/L with all KHCO3, NaHCO3, and FeB treatments below the GA GWPS. Total cobalt ranged from 0.12 to 1.2 mg/L but none of the treatments reached the GA GWPS. Dissolved cobalt ranged from <0.00012 to 1.1 mg/L and only the 20 and 30 g/L FeB treatments reached the GA GWPS. Total iron increased in many treatments especially for the Fe2O3 and FeB treatments. Total magnesium ranged from 3.3 to 26.0 mg/L with the FeB treatments having the least magnesium. Total manganese ranged from 4.2 to 45 mg/L. Potassium and sodium increased with the increasing loadings of potassium and sodium bicarbonate.,

The 2-10 g/L of potassium bicarbonate, 2-10 g/L sodium bicarbonate, and 10-30 g/L FeB treatments reduced dissolved arsenic and dissolved beryllium to the GA GWPS. Only the 20 and 30 g/L FeB reduced the dissolved cobalt to below the GA GWPS.

### 4.3 AP-2 and 3/4 Conclusions

Table 10 summarizes the percent removals from the initial characterization samples or the Control Day 0 for the dissolved metals of concern across the various treatments and groundwaters. Compounds highlighted in green were reduced to below the GA GWPS by the treatments.

**Arsenic.** The following treatments reduced dissolved arsenic in AP-2 and 3/4 well DGWC-48 to below the GA GWPS: 2 g/L NaHCO3, 2 g/L Fe2O3, 10 g/L FeB, and 20 g/L FeB. Dissolved As in well DGWC-20 was reduced to below the GA GWPS in all potassium and sodium bicarbonate and Ferroblack treatments.

**Beryllium.** In the AP-2 and 3/4 DGWC-48 and 20 groundwaters, most of the potassium and sodium bicarbonate and the Ferroblack treatments reduced dissolved Be levels to below the GA GWPS but the $Fe_2O_3$ treatments did not.

**Cobalt.** The GA GWPS for cobalt is 0.032 mg/L. The higher Ferroblack treatments reduced cobalt to below the GA GWPS in both wells.

**Overall Conclusions**. Addition of relatively high dosages of potassium or sodium bicarbonate buffers were generally able to reach the GA GWPS for arsenic and beryllium but not cobalt. The Ferroblack treatments were able to reduce the arsenic, beryllium, and cobalt to below the GA GWPS.

Please let me know if you have any questions about this draft report.

Sincerely,
**TERRA SYSTEMS, INC.**

Michael D Lee, PhD.

Michael D. Lee, Ph.D.
Vice-President Research and Development

**Table 1**
**Estimated Sample Volumes and Preservatives**

| Analysis | Matrix | Volume mL per bottle | Preservative |
|---|---|---|---|
| Total As, Be, Co, Mo, Se, Fe, K, Mn, Mg, and Na (metals based upon contaminants at each site) | Aqueous | 200 | $HNO_3$ |
| Total Li (AP 234 only) | Aqueous | 200 | $HNO_3$ |
| Filtered As, Be, Co, Mo, and Se (metals based upon contaminants at each site) | Aqueous | 200 | $HNO_3$ |
| Filtered Li (AP 234 only) | Aqueous | 200 | $HNO_3$ |
| DOC | Aqueous | 45 | $H_3PO_4$ |
| Sulfate | Aqueous | 50 | None |
| | | | |
| Total | | 895 | |

**Table 2**
**Plant McDonough AP-1 Initial Characterization Field and Hach Parameters**

| Well | | GA GWPS | AP-1 DGWC-69 | AP-1 DGWC-68A | AP-1 DGWC-40 |
|---|---|---|---|---|---|
| pH | SU | | 7.4 | 6.8 | 5.3 |
| ORP | mV | | 244 | 215 | 240 |
| DO | mg/L | | 6.1 | 3.0 | 4.2 |
| TSS | mg/L | | 6.6 | 0 | 4.3 |
| Bicarbonate Alkalinity as CaCO3 | mg/L | | 60 | 180 | 20 |
| Hardness as CaCO3 | mg/L | | 60 | 240 | 20 |
| Ferrous Iron | mg/L | | 0.08 | 0.01 | 0.03 |
| Sulfide | mg/L | | 0.01 | 0 | 0.01 |
| | | | | | |
| Soil pH | SU | | 6.7 | 7.2 | 5.6 |
| Soil Density | $g/cm^3$ | | 1.56 | 1.58 | 1.69 |
| Soil Field Holding Capacity | g/g | | 0.15 | 0.29 | 0.23 |
| Soil Dry Weight | % | | 93.0 | 88.3 | 84.5 |
| Sodium Hydroxide Titrations | | | | | |
| Groundwater | g | | 150.1 | 150 | 150.1 |
| Soil | g | | 100 | 100 | 100 |
| g/L NaHCO3 | pH | | | | |
| 0 | | | 7.3 | 6.8 | 5.2 |
| 1 | | | 7.5 | 7.1 | 6.4 |
| 2 | | | 7.7 | 7.3 | 6.8 |
| 5 | | | 7.9 | 7.7 | 7.2 |
| 10 | | | 8.1 | 7.8 | 7.4 |
| Potassium Hydroxide Titrations | | | | | |
| Groundwater | g | | 151.8 | 150 | 153.6 |
| Soil | g | | 100 | 100 | 100 |
| g/L KHCO3 | | | | | |
| 0 | | | 6.3 | 6.7 | 4.4 |
| 1 | | | 7.3 | 7.1 | 5.8 |
| 2 | | | 7.5 | 7.2 | 6.2 |
| 5 | | | 7.7 | 7.4 | 6.8 |
| 10 | | | 8.0 | 7.6 | 7.3 |
| | | | | | |
| Sulfate | mg/L | | 10 | 40 | 230 |
| Dissolved Organic Carbon | mg/L | | 0.59 | 0.71 | <0.5 |
| Total Arsenic | mg/L | 0.010 | **0.026** | <0.00068 | |
| Dissolved Arsenic | mg/L | 0.010 | **0.052** | **0.014** | |
| Total Cobalt | mg/L | 0.032 | | | **0.040** |
| Dissolved Cobalt | mg/L | 0.032 | | | **0.039** |
| Total Molybdenum | mg/L | 0.10 | 0.0055 | **0.20** | |
| Dissolved Molybdenum | mg/L | 0.10 | 0.0053 | **0.20** | |
| Total Iron | mg/L | | <0.020 | 0.029 | <0.020 |
| Total Magnesium | mg/L | | 2.6 | 18 | 19 |
| Total Manganese | mg/L | | 0.0036 | 0.072 | 3.3 |
| Total Potassium | mg/L | | 2.4 | 3.8 | 5.8 |
| Total Sodium | mg/L | | 9.7 | 9.6 | 19 |
| Soils | | | | | |
| Total Arsenic | mg/kg | | 3.1 | 1.0 | |
| Total Cobalt | mg/kg | | | | 13 |
| Total Molybdenum | mg/kg | | 0.68 | 7.4 | |
| Total Iron | mg/kg | | 9600 | 35000 | 49000 |
| Total Magnesium | mg/kg | | 3000 | 11000 | 9500 |
| Total Manganese | mg/kg | | 250 | 530 | 460 |
| Total Potassium | mg/kg | | 3900 | 12000 | 13000 |
| Total Sodium | mg/kg | | 96 | 110 | 40 |
| Moisture | % | | 19.7 | 12.9 | 14.9 |

0.010 GA GWPS = Georgia Groundwater Performance Standard

## Table 3
## AP-1 DGWC-69 Treatability Results

| | | GA GWPS | IC | Control | 2 g/L KHCO3 | 5 g/L KHCO3 | 10 g/L KHCO3 | 2 g/L NaHCO3 | 5 g/L NaHCO3 | 10 g/L NaHCO3 | 0.5 g/L Fe2O3 | 1.0 g/L Fe2O3 | 2.0 g/L Fe2O3 | 10 g/L FeB | 20 g/L FeB | 30 g/L FeB |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Soil | g | | | 417 | 580 | 580 | 580 | 580 | 580 | 580 | 580 | 580 | 580 | 580 | 580 | 580 |
| Groundwater | g | | | 798.4 | 798.4 | 796 | 792 | 798.4 | 796 | 811.7 | | | | | | |
| Product | g | | | 0 | 1.6 | 4.0 | 8 | 1.6 | 4 | 8 | 0.375 | 0.752 | 1.6 | 8 | 15 | 22.5 |
| Solution | g | | | | 750.2 | 749.2 | 766.2 | 750.0 | 754 | 811.7 | 800.6 | 810.4 | 807.1 | 747.7 | 724.5 | 725.3 |
| Product Concentration | g/L | | | 0 | 2.0 | 5.0 | 10.0 | 2.0 | 5.0 | 9.8 | 0.5 | 0.9 | 2.0 | 10.6 | 20.3 | 30.1 |
| Day | | | | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| pH | SU | | 7.4 | 6.5 | 7.2 | 7.5 | 7.7 | 7.4 | 8.0 | 7.8 | 6.6 | 6.4 | 6.7 | 8.0 | 9.4 | 9.6 |
| ORP | mV | | 244 | 194 | 198 | 192 | 175 | 168 | 150 | 181 | 160 | 188 | 191 | 48 | 56 | 113 |
| DO | mg/L | | 6.1 | 6.0 | 6.9 | 6.5 | 4.6 | 6.0 | 6.6 | 6.2 | 6.1 | 6.2 | 6.4 | 1.9 | 2.6 | 4.6 |
| TSS | mg/L | | 6.6 | | | | | | | | | | | | | |
| Bicarbonate Alkalinity as CaCO3 | mg/L | | 60 | 80 | 700 | 2100 | 4100 | 1200 | 4200 | 5200 | 80 | 60 | 60 | 100 | 120 | 120 |
| Hardness as CaCO3 | mg/L | | 60 | 60 | 220 | 460 | 230 | 100 | 230 | 230 | 110 | 110 | 110 | 110 | 60 | 60 |
| Ferrous Iron | mg/L | | 0.08 | 0.75 | 2.75 | 1.5 | 2.05 | 0.65 | 3.35 | 0.95 | 0.9 | 0.85 | 2.3 | 1.65 | 2.0 | 1.5 |
| Sulfide | mg/L | | 0.01 | 0.06 | 0.12 | 0.2 | 0.12 | 0.03 | 0.01 | 0.01 | 0.073 | 0.05 | 0.07 | 0.04 | 0.05 | 0.01 |
| ELLE Results | | | | | | | | | | | | | | | | |
| Sulfate | mg/L | | 10 | 12 | 15 | 15 | 16 | 16 | 16 | 16 | 14 | 16 | 15 | 20 | 22 | 30 |
| Dissolved Organic Carbon | mg/L | | 0.59 | 2.7 | 4.2 | 5.5 | 6.8 | 4.0 | 4.9 | 7.7 | 2.6 | 2.8 | 2.4 | 4.3 | 2.0 | 5.0 |
| Total Arsenic | mg/L | 0.010 | **0.026** | 0.0067 | **0.020** | **0.032** | **0.047** | **0.026** | **0.056** | **0.084** | 0.0058 | 0.0046 | 0.0042 | **0.012** | **0.011** | **0.027** |
| Dissolved Arsenic | mg/L | 0.010 | **0.052** | 0.0061 | **0.015** | **0.035** | **0.047** | **0.036** | **0.055** | **0.088** | 0.0063 | 0.0045 | 0.0040 | 0.0077 | **0.012** | **0.030** |
| Total Molybdenum | mg/L | 0.10 | 0.0055 | 0.037 | 0.070 | 0.084 | 0.089 | 0.079 | 0.087 | 0.092 | 0.030 | 0.026 | 0.018 | 0.091 | **0.13** | **0.17** |
| Dissolved Molybdenum | mg/L | 0.10 | 0.0053 | 0.037 | 0.069 | 0.083 | 0.093 | 0.089 | 0.097 | 0.096 | 0.034 | 0.027 | 0.019 | 0.089 | **0.13** | **0.18** |
| Total Iron | mg/L | | <0.02 | 0.42 | 5.4 | 2.0 | 0.57 | 2.7 | 3.7 | 0.81 | 0.50 | 0.74 | 0.63 | 7.6 | 1.8 | 14 |
| Total Magnesium | mg/L | | 2.6 | 1.2 | 18 | 20 | 20 | 7.7 | 12 | 13 | 3.3 | 3.6 | 3.5 | 7.2 | 3.4 | 4.0 |
| Total Manganese | mg/L | | 0.0036 | 1.2 | 2.6 | 2.0 | 1.2 | 1.2 | 1.5 | 0.83 | 0.94 | 1.0 | 0.98 | 0.87 | 0.17 | 0.40 |
| Total Potassium | mg/L | | 2.4 | 5.8 | 470 | 1700 | 3100 | 9.7 | 12 | 15 | 5.3 | 6.3 | 6.0 | 9.6 | 8.1 | 13 |
| Total Sodium | mg/L | | 9.7 | 19 | 28 | 31 | 34 | 550 | 1100 | 2200 | 19 | 21 | 21 | 400 | 770 | 1400 |

0.010 GA GWPS = Georgia Groundwater Performance Standard

0.039 J value. Compound detected above method detection limit but below method calibration limit.

28 Compound detected in blank

# Table 4
## AP-1 DGWC-68A Treatability Results

| | | GA GWPS | IC | Control | 2 g/L KHCO3 | 5 g/L KHCO3 | 10 g/L KHCO3 | 2 g/L NaHCO3 | 5 g/L NaHCO3 | 10 g/L NaHCO3 | 0.5 g/L Fe2O3 | 1.0 g/L Fe2O3 | 2.0 g/L Fe2O3 | 10 g/L FeS | 20 g/L FeS | 30 g/L FeS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Soil | g | | | 580 | 580 | 580 | 580 | 580 | 580 | 580 | 580 | 580 | 580 | 580 | 580 | 580 |
| Groundwater | g | | | 737.9 | 798.4 | 796 | 792 | 798.4 | 796 | 792 | | | | | | |
| Product | g | | | 0 | 1.6 | 4.0 | 8 | 1.6 | 4 | 8 | 0.375 | 0.8 | 1.5 | 7.5 | 15 | 22.5 |
| Solution | g | | | | 721.9 | 732.4 | 789 | 738.6 | 738.3 | 786.7 | 785.2 | 735.8 | 740.2 | 721.6 | 713.1 | 771.4 |
| Product Concentration | g/L | | | 0 | 2.0 | 5.0 | 10.0 | 2.0 | 5.0 | 10.0 | 0.5 | 1.1 | 2.0 | 10.3 | 20.6 | 28.3 |
| Day | | | | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| pH | SU | | 6.8 | 6.6 | 6.9 | 6.8 | 7.1 | 7.1 | 7.1 | 7.1 | 6.7 | 6.6 | 6.6 | 7.0 | 8.7 | 7.9 |
| ORP | mV | | 215 | 228 | 213 | 219 | 215 | 201 | 169 | 143 | 201 | 185 | 183 | 123 | 5 | 22 |
| DO | mg/L | | 3.0 | 5.9 | 5.4 | 5.1 | 4.9 | 6.0 | 5.9 | 4.6 | 5.3 | 5.6 | 6.3 | 2.3 | 2.7 | 2.1 |
| TSS | mg/L | | 0 | | | | | | | | | | | | | |
| Bicarbonate Alkalinity as CaCO3 | mg/L | | 180 | 180 | 700 | 1600 | 4200 | 930 | 1400 | 4100 | 350 | 230 | 230 | 230 | 350 | 230 |
| Hardness as CaCO3 | mg/L | | 240 | 200 | 570 | 710 | 470 | 340 | 470 | 340 | 230 | 230 | 230 | 340 | 460 | 460 |
| Ferrous Iron | mg/L | | 0.01 | 0.9 | 0.9 | 1.65 | 4.4 | 3.15 | 3.85 | 2.15 | 0.75 | 0.65 | 1.5 | 2.25 | 1.75 | 3.00 |
| Sulfide | mg/L | | 0 | 0.11 | 0.13 | 0.19 | <0.02 | <0.01 | 0.01 | <0.01 | 0 | <0.02 | 0.07 | 0.09 | <0.01 | <0.01 |
| ELLE Results | | | | | | | | | | | | | | | | |
| Sulfate | mg/L | | 40 | 31 | 32 | 35 | 36 | 38 | 41 | 42 | 33 | 35 | 36 | 44 | 44 | 38 |
| Dissolved Organic Carbon | mg/L | | 0.71 | 1.8 | 2.1 | 2.7 | 3.3 | 2.5 | 3.9 | 4.5 | 3.1 | 1.6 | 1.7 | 1.7 | 1.9 | 11 |
| Total Arsenic | mg/L | 0.010 | <0.00068 | 0.0019 | 0.0022 | 0.0032 | 0.0061 | 0.0034 | 0.0045 | 0.0064 | 0.0020 | 0.0020 | 0.0012 | 0.0014 | 0.00094 | 0.0018 |
| Dissolved Arsenic | mg/L | 0.010 | **0.014** | 0.0033 | **0.058** | 0.0024 | **0.072** | 0.0030 | **0.066** | **0.030** | **0.047** | **0.023** | **0.016** | **0.013** | 0.0052 | **0.012** |
| Total Molybdenum | mg/L | 0.10 | **0.20** | **0.40** | **0.66** | **0.65** | **0.67** | **0.85** | **1.0** | **1.1** | **0.38** | **0.34** | **0.28** | **0.62** | **0.85** | **0.88** |
| Dissolved Molybdenum | mg/L | 0.10 | **0.20** | **0.39** | **0.67** | **0.67** | **0.69** | **0.88** | **1.0** | **1.2** | **0.41** | **0.35** | **0.28** | **0.68** | **0.84** | **0.86** |
| Total Iron | mg/L | | 0.029 | 0.69 | 0.59 | 0.57 | 13 | 1.7 | 1.0 | 1.8 | 0.71 | 4.3 | 1.4 | 6.4 | 4.1 | 1.8 |
| Total Magnesium | mg/L | | 18 | 16 | 44 | 55 | 70 | 25 | 34 | 40 | 15 | 16 | 16 | 25 | 35 | 33 |
| Total Manganese | mg/L | | 0.072 | 1.1 | 1.1 | 0.18 | 0.62 | 0.80 | 0.41 | 0.16 | 0.96 | 1.0 | 0.83 | 6.0 | 5.4 | 4.5 |
| Total Potassium | mg/L | | 3.8 | 6.0 | 170 | 1000 | 2800 | 9.4 | 11 | 14 | 6.0 | 7.4 | 5.8 | 9.4 | 10 | 11 |
| Total Sodium | mg/L | | 9.6 | 12 | 17 | 19 | 23 | 380 | 1100 | 16000 | 11 | 11 | 11 | 310 | 640 | 1100 |

0.010 GA GWPS = Georgia Groundwater Performance Standard

0.039 J value. Compound detected above method detection limit but below method calibration limit.

28 Compound detected in blank

## Table 5
## AP-1 DGWC-40 Treatability Results

| | | GA GWPS | IC | Control | 2 g/L KHCO3 | 5 g/L KHCO3 | 10 g/L KHCO3 | 2 g/L NaHCO3 | 5 g/L NaHCO3 | 10 g/L NaHCO3 | 0.5 g/L Fe2O3 | 1.0 g/L Fe2O3 | 2.0 g/L Fe2O3 | 10 g/L FeS | 20 g/L FeS | 30 g/L FeS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Soil | g | | | 580 | 580 | 580 | 580 | 580 | 580 | 580 | 580 | 580 | 580 | 580 | 580 | 580 |
| Groundwater | g | | | 779.5 | 798.4 | 796 | 792 | 798.4 | 796 | 792 | | | | | | |
| Product | g | | | 0 | 1.6 | 4.0 | 8 | 1.6 | 4 | 8 | 0.375 | 0.75 | 1.5 | 7.5 | 15 | 22.5 |
| Solution | g | | | | 713.5 | 781.1 | 779.9 | 719.3 | 722 | 740 | 713.7 | 729.2 | 721.4 | 774 | 705.3 | 713.8 |
| Product Concentration | g/L | | | 0 | 2.0 | 5.0 | 10.0 | 2.0 | 5.0 | 10.0 | 0.5 | 1.0 | 2.1 | 9.6 | 20.8 | 30.6 |
| Day | | | | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| pH | SU | | 5.3 | 5.5 | 6.3 | 6.7 | 7.0 | 6.5 | 6.9 | 7.2 | 6.2 | 6.3 | 5.5 | 6.1 | 6.4 | 6.6 |
| ORP | mV | | 240 | 217 | 232 | 224 | 226 | 161 | 153 | 156 | 164 | 245 | 211 | 56 | 21 | 5 |
| DO | mg/L | | 4.2 | 5.6 | 5.7 | 5.3 | 5.1 | 5.8 | 5.4 | 5.2 | 6.1 | 6.1 | 6.6 | 2.9 | 3.1 | 2.7 |
| TSS | mg/L | | 4.3 | | | | | | | | | | | | | |
| Bicarbonate Alkalinity as CaCO3 | mg/L | | 20 | 20 | 480 | 1200 | 2800 | 700 | 2800 | 4100 | 40 | 20 | 20 | 40 | 60 | 60 |
| Hardness as CaCO3 | mg/L | | 20 | <20 | <20 | 60 | 420 | 200 | 340 | 230 | <20 | 20 | 40 | 20 | <20 | <20 |
| Ferrous Iron | mg/L | | 0.03 | 0.35 | 0.05 | 0.25 | 0.7 | 0.85 | 1.08 | 2.0 | 1.15 | 1.25 | <0.05 | 1.75 | 6.6 | 0.90 |
| Sulfide | mg/L | | 0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | 0.01 | 0.02 | <0.01 | <0.01 | 0.18 | 0.02 |
| ELLE Results | | | | | | | | | | | | | | | | |
| Sulfate | mg/L | | 230 | 200 | 220 | 240 | 250 | 250 | 260 | 250 | 210 | 200 | 200 | 220 | 220 | 230 |
| Dissolved Organic Carbon | mg/L | | <0.5 | 1.4 | 3.6 | 1.9 | 2.4 | 1.6 | 3.5 | 2.3 | 1.6 | 1.4 | 1.4 | 1.6 | 1.5 | 1.7 |
| Total Cobalt | mg/L | 0.032 | **0.040** | **0.085** | 0.018 | 0.011 | 0.012 | 0.0073 | 0.0044 | 0.0033 | **0.073** | **0.070** | **0.074** | 0.013 | 0.0053 | 0.0046 |
| Dissolved Cobalt | mg/L | 0.032 | **0.039** | **0.082** | 0.015 | 0.0092 | 0.0087 | 0.0058 | 0.0029 | 0.0022 | **0.071** | **0.069** | **0.073** | 0.012 | 0.0061 | 0.0041 |
| Total Iron | mg/L | | <0.020 | 1.0 | 2.1 | 0.83 | 3.0 | 1.1 | 1.5 | 1.4 | 3.0 | 1.2 | 1.5 | 3.0 | 3.3 | 3.5 |
| Total Magnesium | mg/L | | 19 | 18 | 37 | 56 | 73 | 18 | 29 | 44 | 19 | 18 | 18 | 25 | 29 | 31 |
| Total Manganese | mg/L | | 3.3 | 4.7 | 5.4 | 5.6 | 4.9 | 2.5 | 2.4 | 2.3 | 4.4 | 4.2 | 4.1 | 9.6 | 8.0 | 6.3 |
| Total Potassium | mg/L | | 5.8 | 13 | 290 | 1100 | 2500 | 12 | 15 | 19 | 13 | 12 | 11 | 13 | 15 | 18 |
| Total Sodium | mg/L | | 19 | 21 | 29 | 27 | 35 | 410 | 980 | 2200 | 20 | 21 | 19 | 320 | 710 | 1100 |

0.010 GA GWPS = Georgia Groundwater Performance Standard

0.039 J value. Compound detected above method detection limit but below method calibration limit.

28 Compound detected in blank

## Table 6
## AP-1 Percent Removal from Initial Characterization for Dissolved Metals

| Soil + GW | Metal | GA GWPS mg/L | | Control | 2 g/L KHCO3 | 5 g/L KHCO3 | 10 g/L KHCO3 | 2 g/L NaHCO3 | 5 g/L NaHCO3 | 10 g/L NaHCO3 | 0.5 g/L Fe2O3 | 1.0 g/L Fe2O3 | 2.0 g/L Fe2O3 | 10 g/L FeS | 20 g/L FeS | 30 g/L FeS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AP1 DGWC-69 | Dis As | 0.010 | % Rem | 88.3 | 71.2 | 32.7 | 9.6 | 30.8 | -5.8 | -69.2 | 87.9 | 91.3 | 92.3 | 85.2 | 76.9 | 42.3 |
| | Dis Mo | 0.10 | % Rem | -598.1 | -1201.9 | -1466.0 | -1654.7 | -1579.2 | -1730.2 | -1711.3 | -541.5 | -409.4 | -258.5 | -1579.2 | -2352.8 | -3296.2 |
| AP1 DGWC-68A | Dis As | 0.010 | % Rem | 76.4 | -314.3 | 82.9 | -414.3 | 78.6 | -371.4 | -114.3 | -235.7 | -64.3 | -14.3 | 7.1 | 62.9 | 14.3 |
| | Dis Mo | 0.10 | % Rem | -95.0 | -235.0 | -235.0 | -245.0 | -340.0 | -235.0 | -500.0 | -90.0 | -75.0 | -40.0 | -240.0 | -320.0 | -330.0 |
| AP1 DGWC-40 | Dis Co | 0.032 | % Rem | -110.3 | 61.5 | 76.4 | 77.7 | 85.1 | 92.6 | 94.4 | -82.1 | -76.9 | -87.2 | 69.2 | 84.4 | 89.5 |

## Table 7
## Plant McDonough AP-2 and 3/4 Initial Characterization Field and Hach Parameters

| Well | | GA GWPS | AP-2 and 3/4 DGWC-48 | AP-2 and 3/4 DGWC-20 |
|---|---|---|---|---|
| GW pH | SU | | 4.8 | 6.3 |
| GW ORP | mV | | 265 | 232 |
| GW DO | mg/L | | 4.1 | 3.8 |
| GW TSS | mg/L | | 5.6 | 3.0 |
| GW Bicarbonate Alkalinity | mg/L | | 20 | 20 |
| GW Hardness as CaCO3 | mg/L | | <20 | 20 |
| GW Ferrous Iron | mg/L | | 0.56 | 0.06 |
| GW Sulfide | mg/L | | 0 | 0 |
| | | | | |
| Sodium Hydroxide Titrations | | | | |
| Groundwater | g | | 100 | 100 |
| g/L NaHCO3 | pH | | | |
| 0 | | | 4.2 | 5.5 |
| 1 | | | 7.1 | 6.9 |
| 2 | | | 7.5 | 7.3 |
| 5 | | | 7.9 | 7.8 |
| 10 | | | 7.9 | 8.0 |
| Potassium Hydroxide Titrations | | | | |
| Groundwater | g | | 100 | 100 |
| g/L KHCO3 | | | | |
| 0 | | | 4.3 | 4.5 |
| 1 | | | 6.6 | 6.8 |
| 2 | | | 7.2 | 7.2 |
| 5 | | | 7.8 | 7.7 |
| 10 | | | 8.3 | 7.9 |
| | | | | |
| ELLE Results | | | | |
| Sulfate | mg/L | | 330 | 560 |
| Dissolved Organic Carbon | mg/L | | <0.5 | 3.4 |
| Total Arsenic | mg/L | 0.010 | <0.00068 | **0.022** |
| Dissolved Arsenic | mg/L | 0.010 | **0.035** | **<0.16** |
| Total Beryllium | mg/L | 0.0040 | 0.0031 | **0.0082** |
| Dissolved Beryllium | mg/L | 0.0040 | 0.0031 | **<0.010** |
| Total Cobalt | mg/L | 0.032 | **0.040** | **1.20** |
| Dissolved Cobalt | mg/L | 0.032 | **0.042** | **1.0** |
| Total Lithium | mg/L | 0.040 | <0.011 | <0.011 |
| Dissolved Lithium | mg/L | 0.040 | <0.011 | <0.011 |
| Total Selenium | mg/L | 0.050 | <0.00028 | <0.00028 |
| Dissolved Selenium | mg/L | 0.050 | <0.016 | <0.16 |
| Total Iron | mg/L | | <0.020 | 0.039 |
| Total Magnesium | mg/L | | 19 | 27 |
| Total Manganese | mg/L | | 3.3 | 41 |
| Total Potassium | mg/L | | 5.8 | 15 |
| Total Sodium | mg/L | | 19 | 22 |

0.010 GA GWPS = Georgia Groundwater Performance Standard

# Table 8
## AP-2 and 3/4 DGWC-48 Treatability Results

| | | GA GWPS | IC | Control | 2 g/L KHCO3 | 5 g/L KHCO3 | 10 g/L KHCO3 | 2 g/L NaHCO3 | 5 g/L NaHCO3 | 10 g/L NaHCO3 | 0.5 g/L Fe2O3 | 1.0 g/L Fe2O3 | 2.0 g/L Fe2O3 | 10 g/L FeB | 20 g/L FeB | 30 g/L FeB |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Groundwater | g | | | 1056.4 | 1052.7 | 1059.4 | 1047.1 | 1058.7 | 1057.4 | 1058.9 | 1056.3 | 1054.6 | 1053.4 | 1047 | 1042.6 | 1034.5 |
| Product | g | | | 0 | 2.1 | 5.25 | 10.5 | 2.1 | 5.25 | 10.5 | 0.525 | 1.05 | 2.1 | 10.5 | 21 | 31.5 |
| Product Concentration | g/L | | | 0 | 2.0 | 4.9 | 9.9 | 2.0 | 4.9 | 9.8 | 0.5 | 1.0 | 2.0 | 9.9 | 19.7 | 29.5 |
| Day | | | | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| pH | SU | | 4.8 | 5.0 | 7.2 | 7.7 | 8.0 | 7.4 | 7.8 | 7.9 | 5.1 | 4.8 | 5.1 | 7.0 | 8.7 | 10.7 |
| ORP | mV | | 265 | 289 | 251 | 241 | 235 | 186 | 158 | 150 | 224 | 259 | 254 | 219 | 15 | -58 |
| DO | mg/L | | 4.1 | 4.4 | 4.8 | 4.8 | 4.9 | 4.7 | 4.8 | 5.5 | 5.0 | 4.8 | 4.7 | 2.2 | 2.8 | 2.9 |
| TSS | mg/L | | 5.6 | 2.8 | 1.9 | 14.1 | 5.9 | 7.2 | 0 | 1.5 | 0 | 22 | 11.8 | 86 | 6.2 | 18.4 |
| Bicarbonate Alkalinity as CaCO3 | mg/L | | 20 | <20 | 1000 | 2700 | 6800 | 1300 | 3200 | 8000 | 20 | 20 | 20 | 80 | 60 | 140 |
| Hardness as CaCO3 | mg/L | | <20 | 20 | 20 | 120 | 232 | <20 | 58 | 120 | 20 | 20 | 20 | 40 | 80 | 40 |
| Ferrous Iron | mg/L | | 0.56 | 0.05 | 0.05 | <0.05 | <0.05 | <0.05 | 0.05 | 0.15 | 0.25 | 0.05 | <0.05 | 0.55 | 1.35 | 1.95 |
| Sulfide | mg/L | | 0 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | 0.01 | 0.1 |
| ELLE Results | | | | | | | | | | | | | | | | |
| Sulfate | mg/L | | 330 | 310 | 330 | 320 | 330 | 330 | 330 | 340 | 330 | 330 | 330 | 330 | 310 | 310 |
| Dissolved Organic Carbon | mg/L | | <0.5 | 1.1 | 2.0 | 2.8 | 19 | 2.1 | 3.8 | 6.3 | 1.5 | 1.3 | 1.7 | 0.56 | 1.7 | 2.3 |
| Total Arsenic | mg/L | 0.010 | <0.00068 | <0.00068 | <0.00068 | <0.00068 | 0.0024 | <0.00068 | 0.00078 | <0.00068 | <0.00068 | 0.0014 | 0.0031 | <0.00068 | <0.00068 | 0.00070 |
| Dissolved Arsenic | mg/L | 0.010 | **0.035** | **0.13** | **0.15** | **0.017** | **0.042** | 0.0088 | **0.047** | **0.025** | **0.042** | **0.030** | 0.0095 | 0.0093 | 0.0079 | **0.014** |
| Total Beryllium | mg/L | 0.0040 | 0.0031 | **0.0069** | **0.0047** | **0.0054** | 0.0024 | **0.0066** | 0.0037 | 0.0014 | **0.0072** | **0.0066** | **0.0052** | 0.0016 | 0.00089 | 0.00050 |
| Dissolved Beryllium | mg/L | 0.0040 | 0.0031 | **0.0077** | 0.0020 | 0.0032 | 0.0017 | **0.0040** | 0.0030 | 0.0012 | **0.0081** | **0.0070** | **0.0059** | <0.00012 | <0.00012 | <0.00012 |
| Total Cobalt | mg/L | 0.032 | **0.040** | **0.34** | **0.32** | **0.31** | **0.17** | **0.34** | **0.30** | **0.059** | **0.33** | **0.34** | **0.34** | **0.081** | **0.053** | 0.031 |
| Dissolved Cobalt | mg/L | 0.032 | **0.042** | **0.36** | **0.31** | **0.30** | **0.16** | **0.33** | **0.28** | **0.058** | **0.35** | **0.34** | **0.33** | 0.0015 | 0.00041 | 0.00022 |
| Total Lithium | mg/L | 0.040 | <0.011 | | | | | | | | | | | | | |
| Dissolved Lithium | mg/L | 0.040 | <0.011 | | | | | | | | | | | | | |
| Total Selenium | mg/L | 0.050 | <0.00028 | | | | | | | | | | | | | |
| Dissolved Selenium | mg/L | 0.050 | <0.016 | | | | | | | | | | | | | |
| Total Iron | mg/L | | <0.020 | 0.19 | 0.17 | 0.19 | 0.10 | 0.15 | 0.15 | 0.027 | 5.1 | 33 | 110 | 87 | 95 | 81 |
| Total Magnesium | mg/L | | 19 | 15 | 15 | 15 | 15 | 15 | 14 | 14 | 15 | 16 | 16 | 13 | 4.3 | 1.3 |
| Total Manganese | mg/L | | 3.3 | 12 | 12 | 10 | 4.1 | 12 | 11 | 0.38 | 12 | 11 | 14 | 5.2 | 2.5 | 1.8 |
| Total Potassium | mg/L | | 5.8 | 14 | 760 | 1900 | 3800 | 14 | 13 | 13 | 14 | 14 | 14 | 14 | 14 | 14 |
| Total Potassium | mg/L | | 5.8 | 14 | 760 | 1900 | 3800 | 14 | 13 | 13 | 14 | 14 | 14 | 14 | 14 | 14 |
| Total Sodium | mg/L | | 19 | 22 | 24 | 27 | 30 | 540 | 1400 | 2600 | 22 | 22 | 24 | 450 | 890 | 1500 |

0.010 GA GWPS = Georgia Groundwater Performance Standard

0.039 J value. Compound detected above method detection limit but below method calibration limit.

## Table 9
## AP-2 and 3/4 DGWC-20 Treatability Results

| | | | IC | Control | 2 g/L KHCO3 | 5 g/L KHCO3 | 10 g/L KHCO3 | 2 g/L NaHCO3 | 5 g/L NaHCO3 | 10 g/L NaHCO3 | 0.5 g/L Fe2O3 | 1.0 g/L Fe2O3 | 2.0 g/L Fe2O3 | 10 g/L FeS | 20 g/L FeS | 30 g/L FeS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Groundwater | g | | | 1064.3 | 1059.3 | 1057.4 | 1058.5 | 1058 | 1054.8 | 1053.5 | 1068.9 | 1061.1 | 1054.7 | 1051.1 | 1040.9 | 1032.3 |
| Product | g | | | 0 | 2.1 | 5.25 | 10.5 | 2.1 | 5.25 | 10.5 | 0.525 | 1.05 | 2.1 | 10.5 | 21 | 31.5 |
| Product Concentration | g/L | GA GWPS | | 0 | 2.0 | 4.9 | 9.8 | 2.0 | 5.0 | 9.9 | 0.5 | 1.0 | 2.0 | 9.9 | 19.8 | 29.6 |
| Day | | | | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| pH | SU | | 6.3 | 3.9 | 7.1 | 7.4 | 7.7 | 7.0 | 7.4 | 7.7 | 5.1 | 3.4 | 2.8 | 5.3 | 7.9 | 8.6 |
| ORP | mV | | 232 | 275 | 215 | 219 | 223 | 189 | 153 | 145 | 210 | 347 | 410 | 204 | 139 | 78 |
| DO | mg/L | | 3.8 | 5.5 | 5.6 | 5.8 | 6.3 | 5.4 | 5.8 | 5.5 | 5.4 | 5.4 | 5.6 | 3.3 | 2.6 | 3.0 |
| TSS | mg/L | | 3.0 | 7.4 | 2.8 | 6.3 | 52 | 0.8 | 4.1 | 14.1 | 13.2 | 6.3 | 21.9 | 13.6 | 6.8 | 14.8 |
| Bicarbonate Alkalinity as CaCO3 | mg/L | | 20 | 20 | 1100 | 2300 | 5700 | 1100 | 3400 | 6800 | 20 | 20 | 20 | 80 | 100 | 80 |
| Hardness as CaCO3 | mg/L | | 20 | <20 | <20 | 350 | 230 | 60 | 350 | 230 | <20 | 20 | 20 | <20 | 20 | 160 |
| Ferrous Iron | mg/L | | 0.06 | 0.08 | <0.03 | <0.03 | 0.12 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | 0.03 | <0.03 |
| Sulfide | mg/L | | 0 | <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 |
| ELLE Results | | | | | | | | | | | | | | | | |
| Sulfate | mg/L | | 560 | 530 | 540 | 540 | 540 | 540 | 550 | 540 | 550 | 470 | 480 | 490 | 520 | 580 |
| Dissolved Organic Carbon | mg/L | | 3.4 | 1.5 | 1.8 | 3.4 | 6.8 | 2.3 | 2.5 | 2.5 | 0.99 | 0.85 | 1.0 | 1.2 | 1.5 | 1.7 |
| Total Arsenic | mg/L | 0.010 | **0.022** | **0.019** | **0.014** | **0.022** | **0.025** | **0.013** | 0.0015 | **0.012** | **0.019** | **0.021** | **0.021** | 0.0057 | 0.0032 | 0.0028 |
| Dissolved Arsenic | mg/L | 0.010 | **<0.16** | **0.044** | 0.0039 | 0.0082 | **0.010** | 0.0038 | 0.0054 | 0.0068 | **0.025** | **0.028** | **0.025** | 0.0038 | 0.0023 | 0.0014 |
| Total Beryllium | mg/L | 0.0040 | **0.0082** | **0.0071** | **0.0043** | **0.013** | **0.010** | **0.0045** | 0.00057 | **0.0048** | **0.0084** | **0.0068** | **0.0071** | 0.0019 | 0.00086 | 0.00059 |
| Dissolved Beryllium | mg/L | 0.0040 | **<0.010** | **0.0080** | 0.00040 | 0.00059 | 0.00034 | 0.00033 | 0.00023 | 0.00035 | **0.0078** | **0.0080** | **0.0091** | <0.00012 | <0.00012 | <0.00012 |
| Total Cobalt | mg/L | 0.032 | **1.20** | **1.0** | **1.0** | **0.56** | **0.60** | **1.0** | **0.36** | **0.32** | **1.1** | **1.2** | **1.2** | **0.26** | **0.15** | **0.12** |
| Dissolved Cobalt | mg/L | 0.032 | **1.0** | **1.1** | **0.94** | **0.49** | **0.27** | **0.97** | **0.36** | **0.25** | **1.1** | **1.0** | **1.1** | **0.039** | 0.0020 | 0.00045 |
| Total Lithium | mg/L | 0.040 | <0.011 | | | | | | | | | | | | | |
| Dissolved Lithium | mg/L | 0.040 | <0.011 | | | | | | | | | | | | | |
| Total Selenium | mg/L | 0.050 | <0.00028 | | | | | | | | | | | | | |
| Dissolved Selenium | mg/L | 0.050 | <0.16 | | | | | | | | | | | | | |
| Total Iron | mg/L | | 0.039 | 0.048 | 0.45 | 0.058 | 1.4 | 0.073 | 0.064 | 0.15 | 0.55 | 15 | 58 | 90 | 85 | 100 |
| Total Magnesium | mg/L | | 27 | 26 | 25 | 25 | 25 | 24 | 24 | 26 | 25 | 25 | 25 | 23 | 15 | 3.3 |
| Total Manganese | mg/L | | 41 | 37 | 39 | 7.7 | 17 | 38 | 4.2 | 4.3 | 40 | 45 | 44 | 31 | 7.3 | 4.5 |
| Total Potassium | mg/L | | 15 | 15 | 770 | 1800 | 3800 | 15 | 15 | 14 | 15 | 15 | 15 | 15 | 15 | 15 |
| Total Sodium | mg/L | | 22 | 22 | 24 | 26 | 29 | 500 | 1200 | 2700 | 22 | 22 | 22 | 460 | 950 | 1500 |

0.010 GA GWPS = Georgia Groundwater Performance Standard
0.039 J value. Compound detected above method detection limit but below method calibration limit.

## Table 10
## AP-2 and 3/4 Percent Removal from Initial Characterization for Dissolved Metals

| GW | Metal | GA GWPS mg/L | | Control | 2 g/L KHCO3 | 5 g/L KHCO3 | 10 g/L KHCO3 | 2 g/L NaHCO3 | 5 g/L NaHCO3 | 10 g/L NaHCO3 | 0.5 g/L Fe2O3 | 1.0 g/L Fe2O3 | 2.0 g/L Fe2O3 | 10 g/L FeS | 20 g/L FeS | 30 g/L FeS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AP234 DGWC-48 | Dis As | 0.010 | % Rem | -271.4 | -328.6 | 51.4 | -20.0 | 74.9 | -34.3 | 28.6 | -20.0 | 14.3 | 72.9 | 73.4 | 77.4 | 60.0 |
| | Dis Be | 0.0040 | % Rem | -148.4 | 35.5 | -3.2 | 45.2 | -29.0 | 3.2 | 61.3 | -161.3 | -125.8 | -90.3 | >96.2 | >96.2 | >96.2 |
| | Dis Co | 0.032 | % Rem | -757.1 | -638.1 | -614.3 | -281.0 | -685.7 | -566.7 | -38.1 | -733.3 | -709.5 | -685.7 | 96.4 | 99.0 | 99.5 |
| AP234 DGWC-20 | Dis As | 0.010 | % Rem | **0.0** | **91.1** | **81.4** | **77.3** | **91.4** | **87.7** | **84.5** | **43.2** | **36.4** | **43.2** | **91.4** | **94.8** | **96.8** |
| | Dis Be | 0.0040 | % Rem | **0.0** | **95.0** | **92.6** | **95.8** | **95.9** | **97.1** | **95.6** | **2.5** | **0.0** | **-13.8** | **>98.5** | **>98.5** | **>98.5** |
| | Dis Co | 0.032 | % Rem | -10.0 | 6.0 | 51.0 | 73.0 | 3.0 | 64.0 | 75.0 | -10.0 | 0.0 | -10.0 | 96.1 | 99.8 | 99.96 |

**APPENDIX F**

# Multivariate Statistical Analyses

**APPENDIX E: MULTIVARIATE STATISTICAL ANALYSIS**

## Groundwater

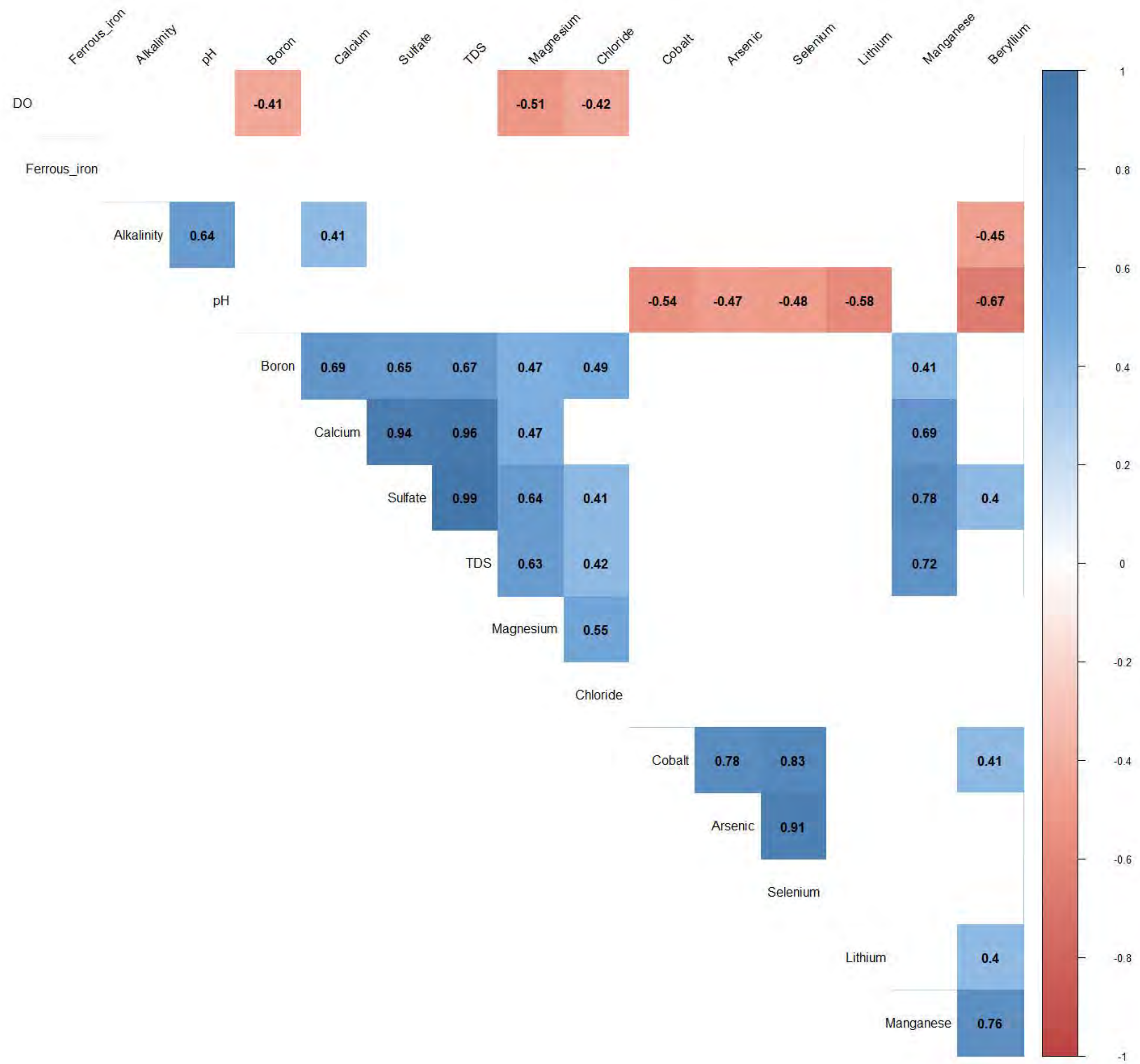
To further evaluate the factors affecting groundwater quality at AP-2, 3/4, correlation analysis of groundwater data was conducted (Figure 50). Results of that evaluation indicate that groundwater concentrations of arsenic, beryllium, cobalt, and selenium show a statistically significant ($p$<0.05) positive relationship (shaded boxes). Groundwater pH shows a strong statistically significant negative correlation with arsenic, beryllium, cobalt, lithium, and selenium, indicating that, as pH decreases, the concentrations of these parameters increase (red shaded boxes). All CCR indicators parameters show a very strong positive correlation with one another (boron, calcium, sulfate, TDS). Only beryllium shows a weak statistically significant positive correlation with a CCR indicator parameter, i.e. sulfate, potentially indicating sulfide mineral oxidation and a reduction in pH rather than CCR involvement, as no correlation with boron exists (non-shaded boxes on Figure 50). This supports the hypothesis presented in this report that pH is likely the controlling factor for groundwater arsenic and selenium concentrations at DGWC-9, and beryllium and cobalt concentrations at some wells in the AP-2, 3/4 well network.

Additional statistical evaluation was conducted using Principal Component Analysis (PCA) to determine potential patterns in the groundwater data. PCA is a multivariate statical technique used for reducing the dimensionality of large datasets and increasing interpretability, but at the same time minimizing information loss contained in the dataset (Jolliffe and Cadima 2016). By using PCA, the numbers of variables in a dataset, can be reduced to identify those factors showing the most variability in the dataset, and to visualize the data in a format that facilitates data interpretation.

The results of the PCA using major groundwater parameters, select field parameters (pH and DO), AP-2, 3/4 SSLs, and redox metals (iron and manganese) indicate that wells DGWC-4 and DGWC-9 are geochemically different than the other monitoring wells in the AP-2, 3/4 monitoring network in both two-dimensional and three-dimensional space (Figure 51). Additionally, DGWC-14 is most similar to background wells DGWA-53, DGWA-70, and DGWA-71, consistent with their major ion chemistry as described in Section 3.1.1. Constituent groupings can also be visualized on the PCA, indicating a strong relationship between beryllium, cobalt, lithium, and selenium controlling variability in the groundwater dataset. This is also true of the CCR indicators parameter vector arrows that can also be seen grouping together (Figure 51).

## Solids

Further evaluation of site mineralogy using PCA was also conducted to better understand the overburden and bedrock materials in the vicinity of AP-2, 3/4. The results of that analysis are presented in Figure 52. The two and three-dimensional PCAs show some groupings of the different monitoring well locations based on the mineralogical compositions of the major hydrogeologic units. Again, DGWC-47 is geologically much different than the other wells, which likely explains the variability in groundwater composition within the well network of AP-2, 3/4 identified by the groundwater PCA (Figure 51). This inherent geochemical variability due to site geology likely translates to downgradient wells as well.




GEORGIA POWER COMPANY
PLANT MCDONOUGH-ATKINSON

PROJECT
GEOCHEMICAL CONCEPTUAL SITE MODEL

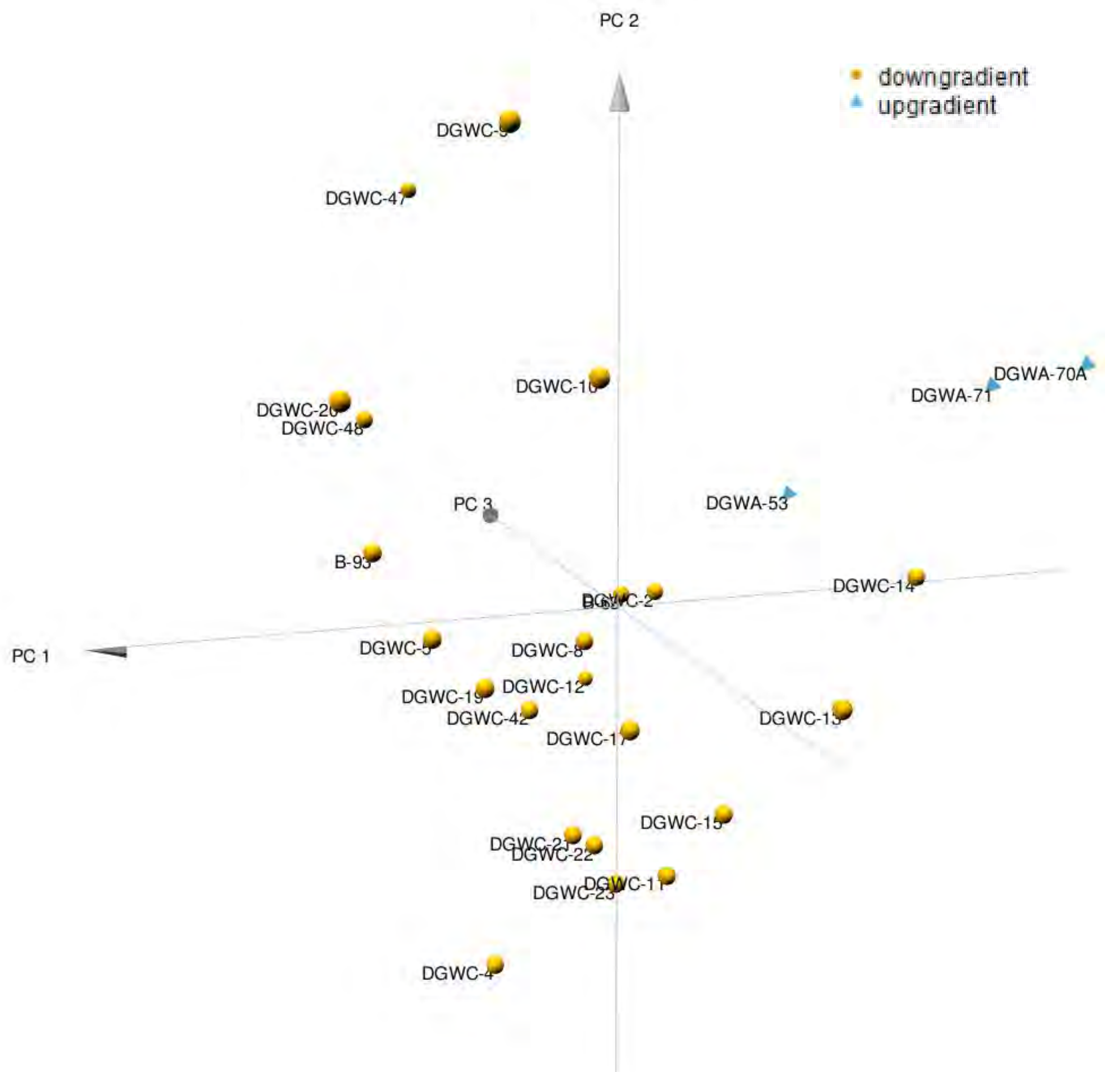
CONSULTANT

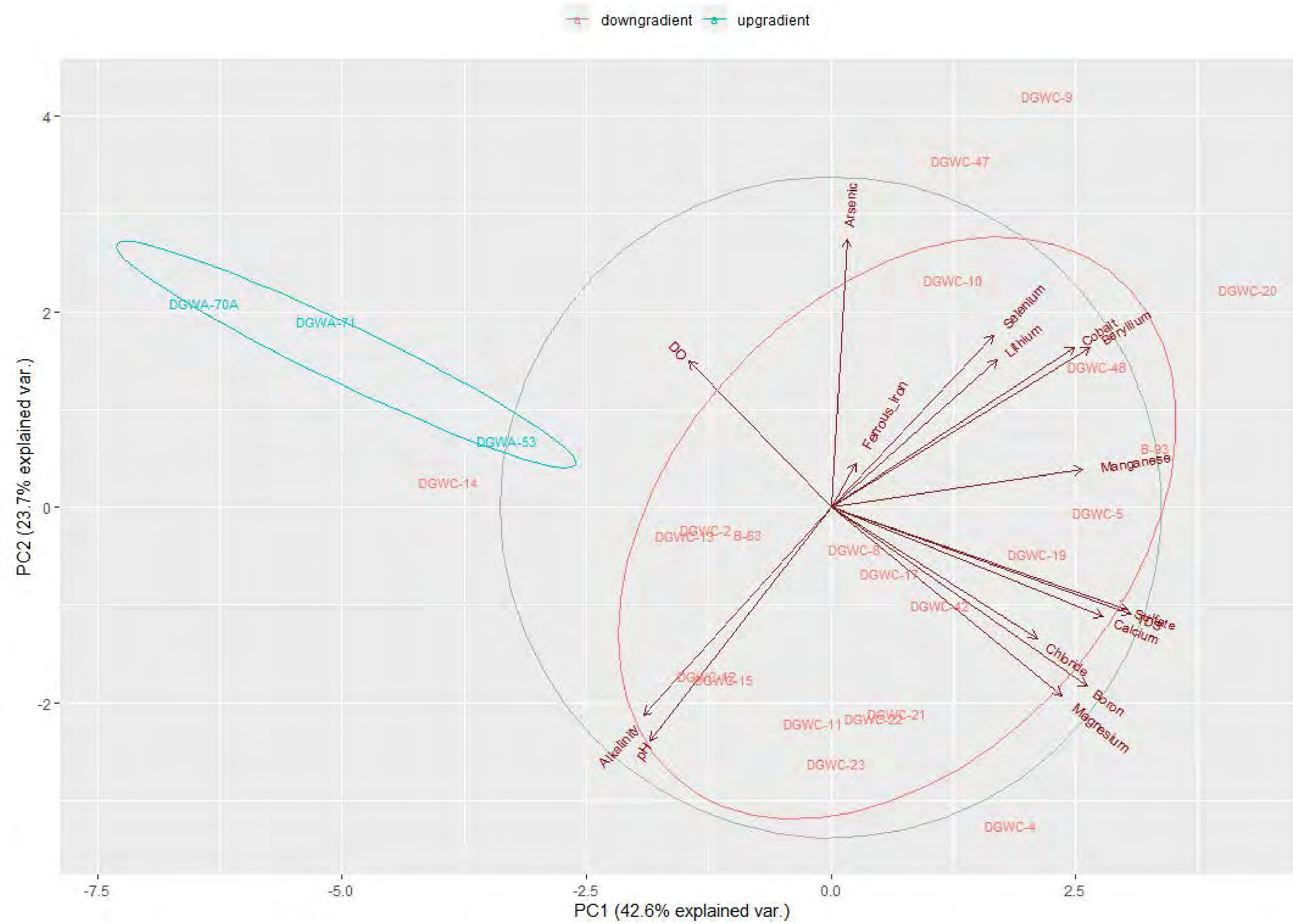
wsp GOLDER

| | |
|---|---|
| YYYY-MM-DD | 2022-09-18 |
| DESIGNED | PJN |
| PREPARED | CM |
| REVIEWED | XXX |
| APPROVED | XXX |

TITLE
**AP-2,3/4 MONITOR WELL NETWORK CORRELATION (where p<0.05)**

| PROJECT NO. | CONTROL | REV. | FIGURE |
|---|---|---|---|
| GL166849621 | | A | 50 |




GEORGIA POWER COMPANY
PLANT MCDONOUGH-ATKINSON

PROJECT
GEOCHEMICAL CONCEPTUAL SITE MODEL

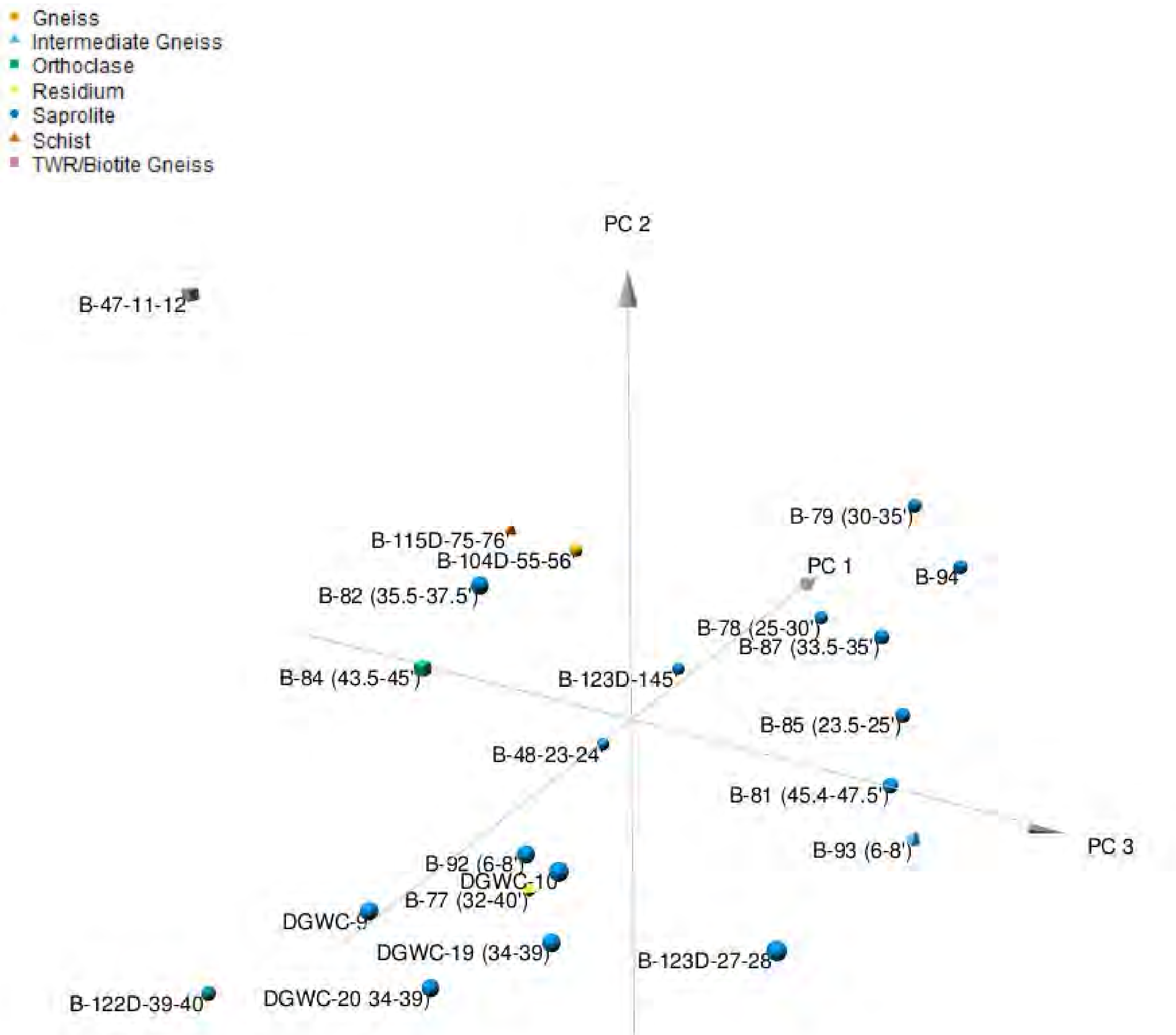
CONSULTANT

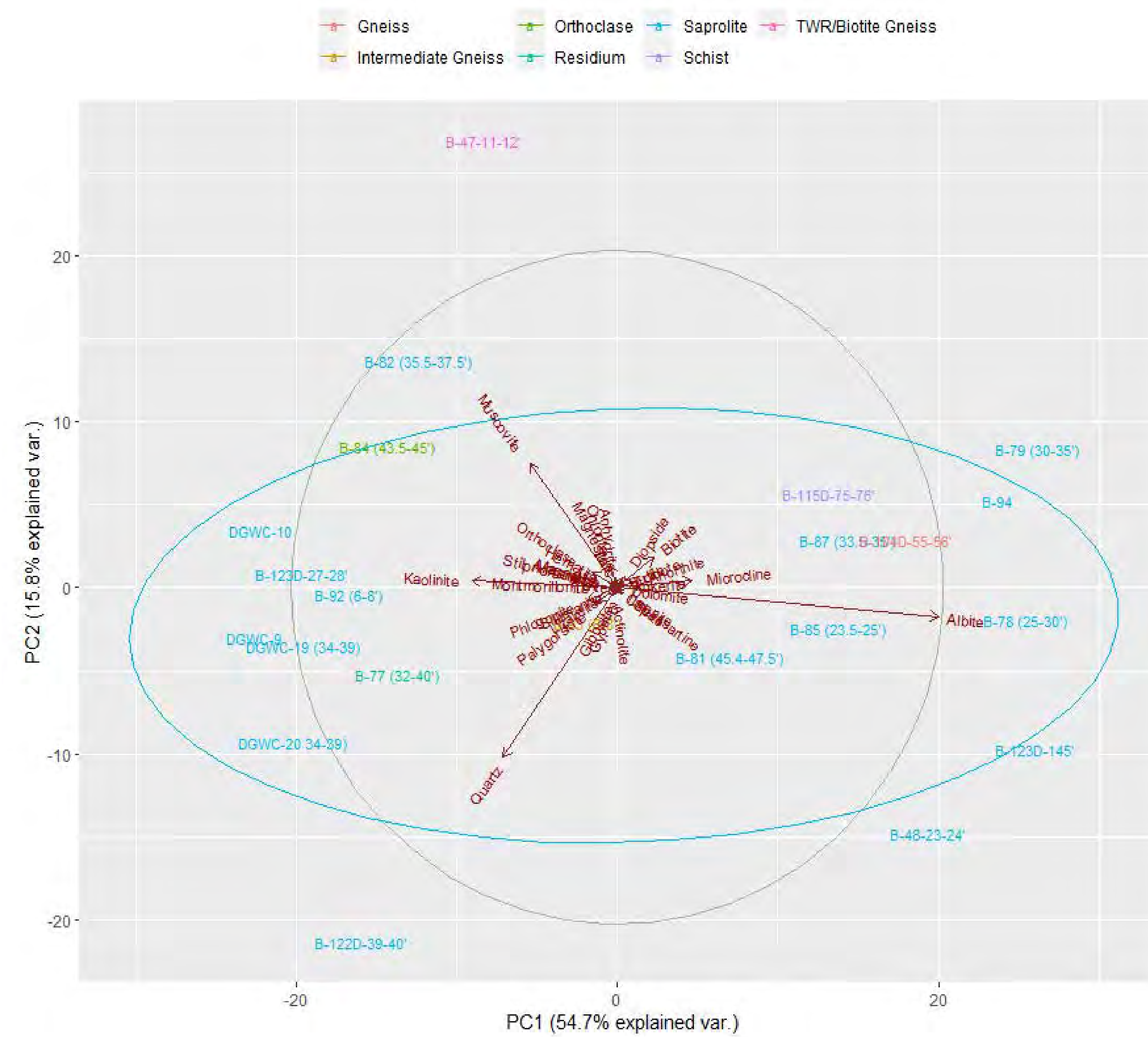
WSP GOLDER

| | |
|---|---|
| YYYY-MM-DD | 2022-09-18 |
| DESIGNED | PJN |
| PREPARED | CM |
| REVIEWED | XXX |
| APPROVED | XXX |

TITLE
**AP-2,3/4 GROUNDWATER MONITORING NETWORK PCA 2D AND 3D**

| PROJECT NO. | CONTROL | REV. | FIGURE |
|---|---|---|---|
| GL166849621 | | A | 51 |




GEORGIA POWER COMPANY
PLANT MCDONOUGH-ATKINSON

PROJECT
GEOCHEMICAL CONCEPTUAL SITE MODEL

CONSULTANT

WSP GOLDER

| | |
|---|---|
| YYYY-MM-DD | 2022-09-18 |
| DESIGNED | PJN |
| PREPARED | CM |
| REVIEWED | XXX |
| APPROVED | XXX |

TITLE
**AP-2,3/4 2D & 3D MINERALOGY PCA EVALUATION**

| PROJECT NO. | CONTROL | REV. | FIGURE |
|---|---|---|---|
| GL166849621 | | A | 52 |

WSP.com

**APPENDIX B**

# Geochemical Model Report

**APPENDIX C**

# Geochemical Modeling

*Plant McDonough-Atkinson Ash Pond 1, and Ash Pond 2 and 3/4*

Submitted to:

Georgia Power

241 Ralph McGill Boulevard
Atlanta, GA, 30341

Submitted by:

**WSP USA Inc**

5170 Peachtree Road Building 100 Suite 300, Atlanta, Georgia, USA 30341
+1 770 496-1893

August 31, 2023

# Table of Contents

**1.0 INTRODUCTION** .......... **1**

**2.0 BACKGROUND INFORMATION** .......... **1**

2.1 Site Description .......... 2

2.2 Geologic and Hydrogeologic Setting .......... 2

2.3 Summary of SSLs .......... 3

**3.0 APPROACH** .......... **3**

3.1 Representative Transects .......... 3

3.2 Groundwater Velocity (Darcy's Law Calculation) .......... 5

3.3 Geochemical Data .......... 7

3.4 Reactive Transport Modeling .......... 9

3.4.1 Reactive Surface Calculations .......... 10

3.4.2 Modeling Assumptions .......... 12

**4.0 RESULTS** .......... **13**

4.1 T1: DGWC-69 (AP-1: Arsenic) .......... 15

4.2 T2: DGWC-40 (AP-1: Cobalt) .......... 15

4.3 T3: DGWC-5, B-92, B-93, and B-98 (AP-2, 3/4: Beryllium, Cobalt) .......... 16

4.4 T4: DGWC-8 (AP-2, 3/4: Cobalt) .......... 16

4.5 T5: DGWC-9 and B-56 (AP-2, 3/4: Arsenic, Beryllium, Cobalt, Selenium) .......... 17

4.6 T6: DGWC-10 (AP-2: Beryllium, Cobalt) .......... 17

4.7 T7: DGWC-19, DGWC-20, and B-63 (AP-2, 3/4: Cobalt) .......... 18

4.8 T8: DGWC-47, DGWC-48, and B-104D, B-115D (AP-2, 3/4: Beryllium, Cobalt, Lithium) .......... 19

**5.0 CLOSING** .......... **20**

**6.0 REFERENCES** .......... **20**

# Tables


| | |
|---|---|
| Table 1 (imbedded) | Appendix IV Constituents Modeled for Evaluation of Corrective Measures |
| Table 2 (imbedded) | Pre-Closure Velocities and Transect Descriptions Based on September 2022 Potentiometric Surface |
| Table 3 (imbedded) | Post Closure Velocities and Transect Descriptions Based on Groundwater Modeling |
| Table 4 (imbedded) | Details of Current Condition Model Setup |
| Table 5 (imbedded) | Site-wide Surface Sites |
| Table 6 (imbedded) | Summary of Reactive Transport Modeling Transects |
| Table 7 (imbedded) | Transect 3 Surface Sites |
| Table 8 (imbedded) | Transect 6 Surface Sites |
| Table 9 (imbedded) | Transect 7 Surface Sites |
| Table 10 (imbedded) | Transect 8 Surface Sites |


# Figures


| | |
|---|---|
| Figure 1a | Transect Locations and Potentiometric Surface Map (September 2022) |
| Figure 1b | (Inset) Transect Locations and Potentiometric Surface Map (September 2022) |
| Figure 2 a-b | Transect 1 |
| Figure 3 a-d | Transect 2 |
| Figure 4 a-c | Transect 3 (initial) |
| Figure 4 d-f | Transect 3 (In-situ Injections) |
| Figure 5 a-d | Transect 4 |
| Figure 6 a-e | Transect 5 (initial) |
| Figure 7 a-e | Transect 5 (MNA) |
| Figure 8 a-c | Transect 6 (Initial) |
| Figure 8 d-f | Transect 6 (MNA) |
| Figure 9 a-d | Transect 7 |
| Figure 10 a-d | Transect 8 (Initial) |
| Figure 11a-d | Transect 8 (In-situ Injections) |


# Appendix


Appendix A: Geochemical Modeling Input and Results Files

# 1.0 INTRODUCTION

In accordance with the United States Environmental Protection Agency (US EPA) coal combustion residuals (CCR) Rule [40 Code of Federal Regulations (CFR) 257 Subpart D] and the Georgia (GA) Environmental Protection Division (EPD) Rules for Solid Waste Management 391-3-4.10, this *Geochemical Modeling Report (GMR) for* McDonough-Atkinson Ash Pond 1, and Ash Pond 2 and AP-3/4 (AP-1, AP-2 and 3/4) was completed as a record of geochemical modeling to simulate various conditions across the site. Data summarized in this report are intended to support remedy selection and modeling was conducted under the auspices of the Georgia EPD Fate and Transport where applicable (GA EPD 2016). The geochemical data used in this report are summarized in the Geochemical Conceptual Site Models (GCSM) that were completed for AP-1 (WSP 2023a) and AP-2 and 3/4 (WSP 2023b). The geochemical data in those reports were obtained as part of the Assessment of Corrective Measures (ACM) for AP-1, and AP-2 and 3/4.

The general approach to geochemical modeling is as follows:

- Develop a model that describes, explains, and accounts for current conditions at which Statistically Significant Level (SSL) of an Appendix IV CCR parameter exists; and
- Evaluate potential corrective measures, their effectiveness, and calculate an estimated time for the constituent concentrations exhibiting SSLs to be reduced to below the Groundwater Protection Standard (GWPS) along the model transects.

The data used in the models were collected at the site from 2016 to September 2022. Any additional groundwater or aquifer solids data collected subsequently is not included in the modeling.

The two potential corrective measures relied on in this report to meet the respective GWPS at each transect is Monitored Natural Attenuation (MNA) or MNA with in-situ chemical injections or ISI. The US EPA describes the objective of MNA as a 4-phased process as follows (US EPA 2007a, 2007b, 2015):

- **Phase I:** Demonstration that the groundwater plume is not expanding.
- **Phase II:** Determination that the mechanism and rate of the attenuation process are sufficient.
- **Phase III:** Determination that the capacity of the aquifer is sufficient to attenuate the mass of contaminant within the plume and the stability of the immobilized contaminant is sufficient to resist remobilization.
- **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.

Using this modeling approach, only tiers I and II and the capacity component of Tier III are evaluated. Additional geochemical modeling for the stability of constituents once immobilized for Tier III will be evaluated concurrent with planned pre-design investigations and incorporated into the *Corrective Action Monitoring Plan (CAMP)*.

# 2.0 BACKGROUND INFORMATION

Plant McDonough-Atkinson (Plant McDonough, Site), formerly a coal-fired power generating facility, was converted to a natural gas combined-cycle power generating facility in 2011. Located approximately seven miles northwest of Atlanta in southeast Cobb County (5551 South Cobb Dr SE, Smyrna, GA 30080), the property comprises approximately 390 acres and is bounded on the southeast by the Chattahoochee River.

## 2.1 Site Description

Four CCR surface impoundments have received CCR at Plant McDonough: Ash Pond 1 (AP-1), Ash Pond 2 (AP-2), Ash Pond 3 (AP-3) and Ash Pond 4 (AP-4). A notification of intent to close AP-1 was certified on December 7, 2015. AP-2 has been certified closed by removal as of March 30, 2020. CCR from AP-2 has been placed within the AP-3 footprint. AP-3 and AP-4 have historically operated together and are being closed as a Combined Unit (AP-3/4). AP-4 has been consolidated within the AP-3 footprint and closed in place. Final closure of AP-3/4 is substantially complete and is anticipated in 2023.

## 2.2 Geologic and Hydrogeologic Setting

Geologic and hydrogeologic conditions for this Site are described in detail in the *Hydrogeological Assessment Report* (HAR; WSP 2023c, 2023d). Key elements of the HAR are summarized on cross sections through the SSL well locations in the site GCSMs (WSP 2023a, 2023b). The geological setting of the site can be described as below:

Residual soils, primarily clayey/sandy silt, sandy silt with clay, and silty sand occur as blankets of variable thickness overlying bedrock across most of the site. Saprolitic soils and/or saprolitic rock also range in thickness across the site but are generally encountered at or near ground surface. Saprolitic rock is considered to include transitionally weathered rock (TWR) or partially weathered rock (PWR). Material overlying the top of the rock surface, including residual soils, saprolite, and TWR or PWR, is collectively referred to as “overburden.”

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

A regional, unconfined aquifer system is present at the site, consisting of regolith, TWR, and shallow bedrock. Preferential groundwater flow is anticipated to take place along lineaments and discontinuities. This unconfined, surficial aquifer system is recharged primarily through precipitation and subsequent infiltration, and flow is generally controlled by topography and surface water drainage and occurs mainly through intergranular pore spaces. The saturated soils in the regolith function as the principal storage reservoir for groundwater in bedrock.

Bedrock groundwater occurs in a fracture network that is largely dependent on rock type, degree of differential weathering, topography, and area of catchment. Groundwater flow in the underlying bedrock takes place primarily along discontinuities such as compositional layering, foliation, joints, and fractures. Fracture porosity is minimal compared to the regolith, and thus, groundwater flow is determined by how well the fractures are inter-connected. Further, fractures within the bedrock at the site are not well connected and the predominant groundwater flow at the site occurs in the overburden and upper bedrock at the site. Based on site-specific examples and supporting data, as presented in the HAR, fractures within the bedrock are limited and decrease in number and groundwater production with depth. Groundwater flow primarily occurs in the overburden, TWR, and PWR. Therefore, bedrock transport has been excluded from the modeling activities summarized below.

## 2.3 Summary of SSLs

Analytical results from routine monitoring events have been statistically analyzed in accordance with the Site's certified statistical analysis method. Statistical analyses at the site have indicated statistically significant levels (SSLs) of varying Appendix IV constituents above the groundwater protection standards (GWPS). Table 1 presents those Appendix IV constituents that have been modeled for evaluation of corrective measures.

**Table 1: Appendix IV Constituents Modeled for Evaluation of Corrective Measures**

| Appendix IV Constituent | SSLs[1] |
|---|---|
| Arsenic | DGWC-9, DGWC-69 |
| Beryllium | DGWC-5, DGWC-9, DGWC-10, DGWC-47, DGWC-48, B-92, B-93 |
| Cobalt | DGWC-8, DGWC-9, DGWC-10, DGWC-19, DGWC-20, DGWC-40, DGWC-47, DGWC-48, B-56, B-63, B-92, B-93, B-104D |
| Lithium | DGWC-47, DGWC-48, B-115D, B-120D |
| Molybdenum[2] | DGWC-68A |
| Selenium[3] | DGWC-9 |
| Radium 226+228[4] | B-104D, B-109D |

Note:

[1] An SSL is determined by comparing the confidence interval to the GWPS. Under current EPD rules, the GWPS is: (i) the MCL or RSL, or (ii) background levels for constituents where the background level is higher than the MCL or RSL.

[2] Molybdenum ASD previously submitted and accepted.

[3] Selenium is no longer an SSL. However, because the upper confidence limit remains above the GWPS, Georgia Power will continue to evaluate corrective measures alternatives.

[4] Radium is not modeled as part of this evaluation because of a pending ASD.

# 3.0 APPROACH

This section presents a description of the approach WSP used to evaluate the fate and transport of respective constituents from Section 2.3 along transects shown in Figure 1. Both the physical and the chemical attributes of the system were parameterized. To assess the physical system, WSP used Darcy’s Law (GA EPD 2016) to calculate groundwater velocity and ultimately, travel times of conservative and attenuated aqueous constituents. To assess the geochemical system, WSP used geochemical modeling techniques to determine the geochemical conditions affecting fate and transport of each constituent in the groundwater system. Details on the specific methodologies are provided in the following sections. Details of groundwater modeling are presented in the site closure groundwater modeling reports (Golder 2020, 2021).

## 3.1 Representative Transects

Transects were developed for each SSL location that extend generally to either the nature and extent well location or the extent of delineation based on groundwater flow direction. The specific location of each transect and length are shown in Figure 1a and Figure 1b and described in Table 2. However, where transects overlap or are in close proximity, a generalized transect was developed that accounted for all of the SSLs at similar locations and are represented by the names of the multiple wells. Where this occurred, a representative maximum value for constituent's SSL was used along the transect. The modeling approach for each transect is be summarized as follows:

**AP-1**

- DGWC-69 (Transect 1): The proposed transect runs from DGWC-69 to the unnamed creek. This model will address the arsenic SSL. Pre-closure (2016), recent conditions and predicted post closure groundwater flow are consistently towards the unnamed tributary at this location.
- DGWC-40 (Transect 2): A single transect runs south from DGWC-40 and terminates at the B-62/B-100 area. This model will address the cobalt SSL. Pre-closure (2016) and predicted post closure groundwater flow are consistently towards the Chattahoochee River at this location.

**AP-2 and 3/4**

- DGWC-5/B-92/B-93 (Transect 3): The proposed transect runs from DGWC-5 through B-92/B-93 to near well B-98 and is generally side gradient. This model addresses the beryllium and cobalt SSLs at wells DGWC-5, B-92 and B-93 since the wells are in close proximity using current condition values that are similar for the three wells. Pre-closure (2016) groundwater flow in this area was outward from AP-3/4 to the northwest along a flow line between DGWC-5 towards B-98. Recent groundwater flow from September 2022, used in the initial condition model, has changed directions, but has not fully reversed toward AP-2 and 3/4. Post closure, the groundwater model predicts that the flow direction will reverse to the southwest, inwards toward the AP-2, 3/4.
- DGWC-8 (Transect 4): The transect runs from DGWC-8 to the site property line. Pre-closure (2016) groundwater flow in this area was outward from AP-3/4 to the northeast along a flow line between DGWC-8 towards the permit boundary. As closure activities have progressed, the groundwater flow direction has reversed towards the AP-3/4. This transect will address the cobalt SSL. Notably, cobalt was below the GWPS (as of the last four sampling events).
- DGWC-9/B-56 (Transect 5): The transect runs from a point in-between DGWC-9 and B-56 outward towards the property boundary. Pre-closure (2016) groundwater flow in this area was outward from AP-3/4 to the northeast towards the permit boundary. As closure activities have progressed, the groundwater flow direction has reversed towards the AP-3/4. This model addresses the arsenic, beryllium, cobalt, and selenium SSLs in this transect.
- DGWC-10 (Transect 6): The transect begins at B-66 and runs west towards DGWC-10. Pre-closure (2016) groundwater flow in this area was outward from AP-3/4 to the northeast towards the permit boundary. B-66 is used as the source of background groundwater for this transect based on the current groundwater flow conditions (2022). This model will address the beryllium and cobalt SSLs in this transect.
- DGWC-19/ 20/ B-63 (Transect 7): The transect runs from a point between DGWC-19 and DGWC-20 south toward DGWC-47, through B-63, and terminate at the B-77 area. Pre-closure (2016) and predicted post closure groundwater flow are consistently towards the Chattahoochee River at this location. This model will address the cobalt SSL in this transect.

- DGWC-47/48/B-104D (Transect 8): The transect runs from between DGWC-47 and DGWC-48, through B-104D south toward the B-76 area. Pre-closure (2016) and predicted post closure groundwater flow are consistently towards the Chattahoochee River at this location. This model will address the beryllium, cobalt, and lithium SSLs in this transect.

## 3.2 Groundwater Velocity (Darcy's Law Calculation)

To estimate the travel time from each SSL well of a constituent along a specific transect (as described in Table 2), Darcy's Law was used to calculate groundwater velocity, using the hydraulic gradient from the groundwater elevation contour map (and groundwater model for post-closure predictions), and hydraulic conductivity for the subsurface geologic materials from site specific data (WSP 2023c, d). The form of Darcy's Law that was used is as follows:

$$V = Ki/\eta$$

where:

$V$ = groundwater velocity (ft/day)

$K$ = hydraulic conductivity (ft/day)

$i$ = hydraulic gradient (ft/ft)

$\eta$ = effective porosity (dimensionless)

For the hydraulic conductivity, a site-specific value, as presented in the HAR, of 7.7E-4 feet per day (cm/sec) was used (WSP, 2023). The representative value from the HAR, as opposed to transect specific values, were used for simplicity, based on data availability, and the comparative analysis objective of the models. The hydraulic gradient (feet per foot [ft/ft]) was dependent on the transect start and ending locations. The resulting hydraulic gradient and groundwater velocity for each transect pre-closure are shown in Table 2. Where gradients show a negative value, it indicates that flow is currently modeled as inward, towards the current well where an SSL was identified (DGWC-8 and DGWC-10) at AP-2, 3/4.

Post-closure changes to gradients, velocities, and in some cases changes to flow direction are described in Table 3. Groundwater modeling of a post-closure condition indicated that in some cases, it is predicted that the current groundwater direction will reverse (Golder, 2020). This is only predicted to occur at one transect, DGWC-5/B-93. In that case, where the gradient reverses, the velocity of groundwater also substantially decreases.

Groundwater velocity was calculated using the following equation based on variables supplied in Table 2 and Table 3:

$$V_s = (K * dh/dl)/n_e$$

where:

$V_s$ = groundwater seepage velocity

$K$=bulk hydraulic conductivity value along transport flow path

$dh/dl$ = average hydraulic gradient along transport flow path

$n_e$ = effective porosity

**Table 2. Pre-Closure Velocities and Transect Descriptions Based on September 2022 Potentiometric Surface**

| Flow Path Start | Groundwater Elevation | Δ h | Δ l | Hydraulic Gradient | Average Hydraulic Conductivity, K | Assumed Effective Porosity | Average Linear Groundwater Velocity | | Transect Termination |
|---|---|---|---|---|---|---|---|---|---|
| | (feet NAVD) | (m) | (m) | Δh/ Δ l | (Centimeter per second) | $n_e$ | (m per day) | (m per year) | |
| **ASH POND 1 (AP-1)** | | | | | | | | | |
| Transect 1: DGWC-69 | 757.45<br>750.002 | 2.27 | 20 | 0.114 | 0.00077 | 0.2 | 0.38 | 138 | Ends at small stream |
| Transect 2: DGWC-40 | 760.17<br>743.661 | 5.03 | 169 | 0.030 | 0.00077 | 0.2 | 0.10 | 36 | Ends at B-100 |
| **ASH POND 2, 3, 4 (AP-2 and 3/4)** | | | | | | | | | |
| Transect 3: DGWC-5 / B-92/ B-93 | 780.26<br>779.87 | 0.12 | 29 | 0.004 | 0.00077 | 0.2 | 0.01 | 5 | Ends near B-98 |
| Transect 4: DGWC-8 | 786.86<br>788.40 | -0.47 | 20 | -0.023 | 0.00077 | 0.2 | -0.08 | -28 | Ends at property line |
| Transect 5: DGWC-9 / B-56 | 794.31<br>795.49 | -0.36 | 10 | -0.036 | 0.00077 | 0.2 | -0.12 | -43 | Ends at property line |
| Transect 6: DGWC-10 | 791.8<br>794.45 | -0.81 | 26 | -0.031 | 0.00077 | 0.2 | -0.10 | -38 | Ends at B-66 |
| Transect 7: DGWC-19 / DGWC-20 / B-63 | 799.23<br>745.99 | 16.23 | 345 | 0.047 | 0.00077 | 0.2 | 0.16 | 57 | Ends at B-77 |
| Transect 8: DGWC-47 / DGWC-48/ B-104D | 773.65<br>744.63 | 8.85 | 233 | 0.038 | 0.00077 | 0.2 | 0.13 | 46 | Ends at B-76 |

Notes:
Δ h Change in potentiometric head
Δ l Change in transect length
($n_e$) Effective porosity (Golder 2020, 2021)
(-) where shown, the groundwater flow direction is reversed, flowing from the transect end to the transect start
Gradients were calculated based on interpolated data from the post closure model.

**Table 3. Post Closure Velocities and Transect Descriptions Based on Groundwater Modeling**

| Flow Path Start | Groundwater Elevation | Δ h | Δ l | Hydraulic Gradient | Average Hydraulic Conductivity, K | Assumed Effective Porosity | Average Linear Groundwater Velocity | | Transect Termination |
|---|---|---|---|---|---|---|---|---|---|
| | (feet NAVD) | (m) | (m) | Δh/ Δ l | (Centimeter per second) | $n_e$ | (m per day) | (m per year) | |
| **ASH POND 1 (AP-1)** | | | | | | | | | |
| Transect 1: DGWC-69 | 757.17<br>756.17 | 0.30 | 20 | 0.015 | 0.00077 | 0.2 | 0.05 | 19 | Ends at small stream |
| Transect 2: DGWC-40 | 758.758<br>746.778 | 3.65 | 169 | 0.022 | 0.00077 | 0.2 | 0.07 | 26 | Ends at B-100 |
| **ASH POND 2, 3, 4 (AP-2 and 3/4)** | | | | | | | | | |
| Transect 3: DGWC-5 / B-92/ B-93 | 781.44<br>781.588 | -0.05 | 29 | -0.002 | 0.00077 | 0.2 | -0.01 | -1.9 | Ends near B-98 |
| Transect 4: DGWC-8 | 790.995<br>792.817 | -0.56 | 20 | -0.028 | 0.00077 | 0.2 | -0.09 | -34 | Ends at property line |
| Transect 5: DGWC-9 / B-56 | 790.344<br>791.189 | -0.26 | 10 | -0.026 | 0.00077 | 0.2 | -0.09 | -31 | Ends at property line |
| Transect 6: DGWC-10 | 784.701<br>787 | -0.70 | 26 | -0.027 | 0.00077 | 0.2 | -0.09 | -33 | Ends at B-66 |
| Transect 7: DGWC-19 / DGWC-20 / B-63 | 797.079<br>747.907 | 14.99 | 345 | 0.043 | 0.00077 | 0.2 | 0.14 | 53 | Ends at B-77 |

| Flow Path Start | Groundwater Elevation | Δ h | Δ l | Hydraulic Gradient | Average Hydraulic Conductivity, K | Assumed Effective Porosity | Average Linear Groundwater Velocity | | Transect Termination |
|---|---|---|---|---|---|---|---|---|---|
| | (feet NAVD) | (m) | (m) | Δh/ Δ l | (Centimeter per second) | $n_e$ | (m per day) | (m per year) | |
| Transect 8: DGWC-47 / DGWC-48/ B-104D | 776.055<br>745.859 | 9.20 | 233 | 0.040 | 0.00077 | 0.2 | 0.13 | 48 | Ends at B-76 |

Notes:
Δ h Change in potentiometric head
Δ l Change in transect length
(ne) Effective porosity (Golder 2020, 2021)
(-) where shown, the groundwater flow direction is reversed, flowing from the transect end to the transect start

## 3.3 Geochemical Data

The data presented in the GCSM prepared for AP-1 (WSP 2023a), and AP-2, 3/4 (WSP 2023b) include groundwater, porewater, and aquifer solids data collected and analyzed between 2016 and 2022. Based on results of solids testing, the subsurface stratigraphy was divided into the following lithologies or hydrostragraphic units:

- Saprolite/Overburden
- Partially Weathered Rock/Transitionally Weathered Rock (used interchangeably as PWR/TWR)
- Gneiss and Biotite Gneiss (collectively referred to as Bedrock)

Based on data presented in the GCSM, each of the constituents exhibiting SSLs can be generally described as follows:

**Arsenic**

- SSLs of arsenic at DGWC-69 have exceeded the GWPS since October 2017. The current trend, though positive (Slope = +0.0019) is not statistically significant. The concentrations of arsenic at DGWC-69 lack correlation with other CCR indicator parameters (WSP 2023c, WSP 2023d). However, the presence of boron, a key CCR indicator is noted. The concentration of arsenic at DGWC-69 is 100 times lower than that of porewater, generally reflecting the attenuation of arsenic at this location, assuming the source of arsenic is AP-1. However, due to the reducing nature of groundwater inflow from AP-1, attenuation at DGWC-69 may not be as effective. Alternatively, and less likely, the arsenic in DGWC-69 may be derived from naturally occurring arsenic present in the subsurface.
- Downgradient of DGWC-69, arsenic is attenuating, likely through sorption by a combination of iron, aluminum, and manganese oxides based on SEP data and other groundwater processes such as mixing, to below the GWPS at downgradient delineation locations.
- The arsenic levels at DGWC-9 have exceeded the GWPS since September 2016 and have been highly variable. The concentration of arsenic at DGWC-9 is 100 times lower than that of porewater, as of September 2022 sampling event. The SSL of arsenic is closely related to the low pH of groundwater at this well with the acidic conditions considered the likely cause for the SSL. The low pH of groundwater could be due to natural processes (e.g., the oxidation of pyrite identified in overburden at AP-2 and 3/4) that may be the result of changes to groundwater flow or infiltration due to the presence of the unit.

Generally, arsenic is attenuating where pH is circumneutral, including locations downgradient from where the acidic conditions are observed.

**Beryllium**

- The beryllium concentrations resulting in SSLs at wells DGWC-5, DGWC-9, DGWC-10, DGWC-47, DWC-48, and B-93 are due to low-pH conditions (pH <5.0 as of September 2022) at these wells, leading to the mobilization of beryllium from aquifer solids into groundwater. Based on the circumneutral (pH 6-9) porewater pH in AP-2 and 3/4, the low beryllium concentration in porewater, and the lack of consistency in CCR indicators in groundwater at these wells, it is unlikely that AP-2 and 3/4 is the cause of the low-pH conditions. At these wells, under the current acidic conditions, beryllium levels are unlikely to decline below the GWPS unless groundwater pH is corrected.
- Downgradient of each of these locations exhibiting a beryllium SSL, beryllium is attenuating. This is evidenced by the geochemical characteristics of aquifer solids as well as the lack of beryllium at downgradient assessment monitoring wells.

**Cobalt**

- The cobalt concentrations resulting in an SSL at DGWC-40 is the result of localized, low pH conditions leading to the mobilization/non-attenuation of cobalt from aquifer solids.
- Downgradient of DGWC-40, cobalt is being attenuated, likely through adsorption on aluminum, iron, or manganese oxides, based on SEP data and geochemical modeling.
- The SSLs of cobalt in the monitoring network at wells DGWC-8, DGWC-9, DGWC-10, DGWC-19, DGWC-20, DGWC-47, DGWC-48, B-56, B-63, B-92, B-93 are also likely due to low pH conditions of groundwater at these wells, causing a lack of attenuation of cobalt (all wells have a pH <5.0, except B-63 had a pH of 5.46 as of September 2022).
- Generally, downgradient of the cobalt SSL locations, cobalt is attenuating, as evidenced by the geochemical characteristics of aquifer solids as well as the absence of GWPS exceedances for cobalt at nature and extent wells.

**Lithium**

- The SSLs of lithium at DGWC-47, DGWC-48, and B-104D are stable or decreasing. The source of lithium at these wells is inconclusive based on the current site data. However, SEP testing confirms that there is a potential natural source of lithium and that its attenuation is occurring (WSP 2023a, WSP 2023b). Lithium levels at these wells are unlikely to decrease to below the GWPS under current conditions. However, downgradient of the locations with SSLs, lithium attenuates.

**Selenium**

- The selenium level at DGWC-9 has been above its GWPS eleven times since September 2016 and is highly variable. The selenium trends appear to be similar to those of arsenic and are closely related to the low pH of groundwater at this well.
- Downgradient of DGWC-9, selenium is attenuating.

## 3.4 Reactive Transport Modeling

The geochemical modeling code PHREEQC V.3.7 was used to support the work presented in this report. PHREEQC V.3.7 is a general-purpose geochemical and reactive transport modeling computer code developed by the US Geological Survey for reactions in water and between water and rocks and sediments (Parkhurst and Appelo 2013). Reactions available for simulation include aqueous equilibria, mineral dissolution and precipitation, ion exchange, surface complexation, solid solutions, gas-water equilibrium, and kinetic biogeochemical reactions. The Minteq v.4 database (2016) was used as a basis for Thermodynamic Database (TDB; Allison et al., 1991).

The potential for mineral precipitation was assessed in PHREEQC using a saturation index (SI) calculated as follows:

$$SI = \log (IAP/Ksp)$$

The saturation index is the ratio of the ion activity product (IAP) of a mineral to the solubility product (Ksp). An SI value greater than zero indicates that the water is supersaturated with respect to a particular mineral phase and, therefore, precipitation of the mineral may occur. An evaluation of precipitation kinetics is then required to determine whether the supersaturated mineral will indeed form. An SI value less than zero indicates the water is undersaturated with respect to a particular mineral phase. An SI value close to zero indicates equilibrium conditions exist between the mineral and the solution. SI values between -0.5 and 0.5 are referred to as ‘at equilibrium’ in this report to account for uncertainties related to the analytical results as well as the thermodynamic database.

1-Dimensional reactive transport using PHREEQC can be completed by setting up transects in which PHREEQC then shifts (moves) water from one cell to the next simulating reactive groundwater transport. Reactive transport in PHREEQC using the TRANSPORT keyword that uses the advective-dispersive transport capabilities of PHREEQC that are derived from a 1-D advective-dispersive transport simulation, presented by Appelo and Postma (2010). The 1-D column is a series of cells each of which has the same pore volume. The length of each cell is defined and the time step of the simulation gives the time necessary for a pore volume of water to pass through each cell to the next. In the cases here, with a known groundwater velocity, transect length, and the number time steps, the cell length and number of cells is calculated. The total number of shifts is based on total simulation time.

For initial condition scenarios to match the current observed groundwater conditions at wells, models are allowed to run varying time frames, ranging from 15 to 50 years. The variation is a result of the following: the timeframe when ash was first added to units, the amount of ash added over time (e.g., the timing ash placement varied across the site), and variations to groundwater flux rates and in some cases complete flow reversal. Therefore, the number of years used to develop the initial conditions does not reflect the true history of the unit or site but is used to achieve measured current conditions.

At each shift, advection is simulated by moving the solution to the next cell in order where it mixes and is exposed to the mineral surfaces in the cell. Also, during the shift, the first cell is also refilled with the initial solution and at the last cell, the solution flows out of the column. When a column is reversed due to a change in groundwater flow direction, the model works in the opposite manner. Here, we used a flux-flux type boundary condition, so the dispersion steps follow the advective shift. After each advective shift and dispersion step the chemical equilibria is calculated in our model. This process is then repeated until the simulation ending time is reached. Modeling using PHREEQC imposes geochemical controls on water quality, reflecting processes such as the attenuation or mobilization of species through precipitation and dissolution of mineral phases or through sorption and desorption to and from mineral surfaces. Both processes are governed predominantly by pH and redox conditions in solution which, in turn, may be affected by equilibrium with atmospheric gases. For this modeling effort, all reactions were assumed to be at equilibrium and reaction kinetics were not considered. A summary of model setup parameters for the initial conditions models is provided in Table 4.

**Table 4. Details of Current Condition Model Setup**

| Transect ID | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| Wells Included | DGWC-69 | DGWC-40 | DGWC-5, B-92, B-93 | DGWC-8 |
| Total Time (years) | 25 | 20 | 50 | 30 |
| Transect Length (m) | 20 | 169 | 29 | 30 |
| Number of Cells | 10 | 17 | 15 | 10 |
| Cell Size (m) | 2 | 10 | 2 | 2 |
| Number of Shifts | 1725 | 72 | 125 | 420 |

| Transect ID | 5 | 6 | 7 | 8 |
|---|---|---|---|---|
| Wells Included | B-56, DGWC-9 | DGWC-10 | DGWC-19, DGWC-20, B-63 | DGWC-47, DGWC-48, B-104D, |
| Total Time (years) | 40 | 20 | 15 | 138 |
| Transect Length (m) | 10 | 26 | 345 | 233 |
| Number of Cells | 20 | 26 | 43 | 23 |
| Cell Size (m) | 0.5 | 1 | 8 | 10 |
| Number of Shifts | 3440 | 760 | 107 | 2 |

### 3.4.1 Reactive Surface Calculations

Surface complexation can be described using a mechanistic model to account for adsorption onto metal oxide surfaces. The theory is based on Dzombak and Morel (1990) and Karamalidis and Dzombak (2010) utilizing iron (hydrous ferric oxide [Hfo]) as ferrihydrite $Fe(OH)_3$ and aluminum (hydrous aluminum oxide [Hao]) as gibbsite $Al(OH)_{3(am)}$ as adsorbing surfaces based on their concentrations measured in representative solids. Surface site densities are then calculated from these values using formulas for Hfo and Hao, based on Dzombak and Morel (1990) and Karamalidis and Dzombak (2010), respectively. Surface sites are allowed and assumed to obtain equilibrium with ambient groundwater to establish a pre-loaded background condition. The surface complexation model for ferrihydrite includes both strong sites (Hfo_strong) and weak sites (Hfo_weak), which are treated as different surface site in PHREEQC based on the Dzombak and Morel (1990) model. For in-situ injection modeling, additional “clean” or newly created ferrihydrite or gibbsite are allowed to precipitate in the model cells that the injections occur using an equilibrium phase block.

To determine adsorption sites for surface complexation, the mass of iron and aluminum in sediment/soil samples can be converted using methods described by Dzombak and Morel (1990) and Karamalidis and Dzombak (2010). This is used in combination with the calculation methodology of Appelo and Postma (2010) to determine the specific quantity of sites on each mineral surface type as well as the amount of each mineral available to participate in the reactions. Briefly, the methodology assumes the number of surface sites (sites) equals the product of the moles of iron ([Fe]) and moles of surface sites per moles of iron ([sites]/[Fe]) (i.e., sites = [Fe] x [sites]/[Fe] or $5.5 \times 10^{-4}$ mol = $2.75 \times 10^{-3}$ mol iron x 0.2 mol sites/mol iron). For the amount of ferrihydrite available for sorption, the Appelo and Postma methodology assumes the mass of ferrihydrite ($M_{HFO}$) in grams (g) available equals the product of [Fe] and the molecular weight of ferrihydrite ($MW_{HFO}$) (i.e., $M_{HFO}$ = [Fe] x $MW_{HFO}$; or 0.24 g = $2.75 \times 10^{-3}$ mol x 88.85 g/mol). The same approach was used for aluminum also. Aluminum, based on Karamalidis and Dzombak (2010) only has a single adsorption site type, at 0.41 mol sites/mol aluminum and a molecular weight of 78 g/mol of $Al(OH)_3$.

Because the quantity of reactive surface sites is dependent on the amount of total iron and aluminum in the soil, the amount of Hfo and Hao present is important to the model. The values for ferrihydrite and gibbsite used for the calculations are based on data presented in the appropriate GCSM (WSP 2023a, b), where Step 3 and 4 of Sequential Extraction Procedure (SEP). To represent the range of concentrations at the site, the minimum, maximum, and geometric mean of iron in the 3rd and 4th fraction of SEP was used to represent iron and aluminum available for attenuation. Current conditions modeling which was used for model calibration determined the density of surface sites for each transect (Table 5).

The geochemical thermodynamic database Minteq v.4 is a widely accepted database compiled from numerous sources by the United States Environmental Protection Agency (USEPA). However, the Minteq v.4 database does not include partitioning coefficients for metals on gibbsite developed by Karamalidis and Dzombak (2010), iron adsorption constants on carbonate (Van Green et al., 1994), or weak site iron constants (Liger et al., 1999). Due to the need for these constants to model the attenuation of SSLs on gibbsite surfaces, they were included at the beginning of each model simulation to supplement the standard Minteq v.4 database.

**Table 5. Site-wide Surface Sites**

| Site | Moles of Adsorption Sites | Mass (g/kg soil) |
|---|---|---|
| **Minimum Surfaces** | | |
| Hfo_Weak Sites | 3.90E-03 | 1.73E+00 |
| Hfo_Strong Sites | 9.76E-05 | 1.73E+00 |
| Hao | 9.16E-03 | 1.74E+00 |
| **Geomean Surfaces** | | |
| Hfo_Weak Sites | 1.54E-02 | 6.85E+00 |
| Hfo_Strong Sites | 3.86E-04 | 6.85E+00 |
| Hao | 2.39E-02 | 4.55E+00 |
| **Maximum Surfaces** | | |
| Hfo_Weak Sites | 6.8E-02 | 2.88E+01 |
| Hfo_Strong Sites | 1.62E-03 | 2.88E+01 |
| Hao | 1.13E-01 | 2.15E+01 |
| **SEP Total Concentrations (m/kg)** | | |
| | Fe | Al |
| Min | 1090 | 603 |

| Site | Moles of Adsorption Sites | Mass (g/kg soil) |
|---|---|---|
| Geomean | 4306.24 | 1575.32 |
| Max | 18100 | 7420 |

### 3.4.2 Modeling Assumptions

The following assumptions were made in describing the geochemical system:

- Groundwater SSLs concentrations from the September 2022 sampling events were used to evaluate time to compliance.  Where more than one well is included in a transect, the highest values of the constituent of interest across the transect was used.
- Groundwater “total” values were used rather than dissolved due to the lack of dissolved data for the site. Sample results used in the model had turbidity values less than 10 NTU.
- Where groundwater acidification was needed to match current conditions, oxygenated groundwater was equilibrated with pyrite as a proxy to drop groundwater pH.  While pyrite was identified at the site, it is understood that the pyrite is just a proxy mechanism and other processes causing groundwater acidification that are not known are likely.
- Model calibration and sensitivity analysis occurs during the current conditions model design phase. Calibration evaluated the concentration of the respective SSL at the start and end of the transect.
- Time step is based on groundwater velocity and transect lengths.
- All reactions occur at thermodynamic equilibrium (i.e., no kinetics or other time-dependent expressions are necessary to describe the chemical reactions).
- All sorption reactions occur on Hfo and Hao, in naturally occurring in the form of metal (hydr)oxide minerals. Where ISI is described, additional Hfo and Hao is formed in those cells by allowing precipitation of additional mineral surfaces. In addition, other aquifer materials such as clays may play a role in metal attenuation but are not included in this modelling effort.
- The attenuation modeling accounts for competitive adsorption from major cations, anions (specifically including sulfate and carbonate), and metal species where thermodynamic data were available from Dzombak and Morel (1990) and Karamalidis and Dzombak (2010).
- All chemical reactions in the system are described using the equilibrium constants published by the USEPA Minteq v.4 thermodynamic database (Allison et al. 1991) as well as the additional thermodynamic data included in files from Karamalidis and Dzombak (2010).
- Dispersivity was set to maintain a Peclet number of <2.0 and generally set to between one half to one cell length.

# 4.0 RESULTS

The section presents the results of predictive modeling and modeling of observed current aquifer conditions, the potential success of MNA, and in some cases, ISI when MNA was identified to potentially take longer to bring SSL's to below the respective GWPS in a reasonable timeframe. Results of modeling are summarized in Table 6. Specific details of each model and transect are summarized in Sections 4.1 through 4.8.

Phase 1 (Current conditions Models/ Model Calibration): Geochemical models are not calibrated using methods consistent with groundwater flow models. Instead, geochemical models typically use site-specific groundwater and aquifer solids data as the input condition, and calibration other than adsorptive surfaces is not needed. These model results are speciation of measured data, or a calculated saturation index of measured data. In other cases, models created a current condition for the pH and levels of constituents and are within 10% of actual measured groundwater data. Thus, the result of a geochemical model reflects the state of the geochemical system relative to the equilibrium conditions at the site, dependent on underlying thermodynamic data included in the TDB. Current conditions models were developed using either a mixture of porewater and background water as the source for the SSL at the well (DGWC-69), or equilibration of groundwater with various measured geological materials (described in detail in Section 4.1). Where transects account for multiple wells at the starting locations, groundwater from the different wells was mixed to create a representative groundwater chemistry. Current condition modeling approach was chosen based on flow conditions in each modeled area. The current conditions modeling generally reproduced the observed groundwater values measured on site. These models consider a range of surface complexation (SCM; Section 3.3.1) based on site-specific measured values and identified mineralogy (WSP 2023).

To generate initial conditions, a mixing and mineral equilibrium approach for model calibration and sensitivity analysis was applied to recreate current conditions rather than by inputting measured groundwater data. This approach ensures we fully understand the fundamental geochemical processes controlling groundwater quality at each transect prior to running any predictive models**.** Background groundwater was oxidized and allowed to equilibrate with a set amount of pyrite to reach observed groundwater pH's. The acidified groundwater is then allowed to equilibrate with adsorptive surfaces that are preloaded with metals (equilibrated with background groundwater) allowing the desorption of those metals into the dissolved phase. This approach mimics natural acidification of groundwater, releasing attenuated metals into solution.

Phase 2 or 3 Models (MNA or ISI): Phase 2 or 3 models simulate changes to the transect based on the closure condition and in many cases the potential application of ISI at various locations along the transects. Changes to transect groundwater velocity and in some cases flow directions are included in the phase 2 and 3 models (Tables 2 and 3). Where a phase 2 model that simulated MNA did not predict the SSL to decrease to below the respective GWPS within 8 years, an ISI approach was developed in a phase 3 model. These models simulated the minimal amount of ISI to decrease the groundwater SSL concentrations to below the GWPS in 8 years or less. Materials used for ISI included the simulated injection of potassium bicarbonate (where pH was acidic leading to low metal attenuation), or additions of attenuation materials, including iron oxides and aluminum oxides. When the injection of metal attenuation surfaces was simulated, they were allowed to precipitate in the cells in which they were injected as new surfaces. The addition of potassium bicarbonate was simulated in the model by setting up a "reaction" block in the model and the groundwater at the upgradient location, or solution to be injected, was reacted with a set amount (specified for each application below) of potassium bicarbonate. In-situ Injection was modeled for a conceptual understanding only and the next phase of remedy application will be to evaluate the practical approach to field injections at the site.

For models where in-situ injection was simulated, new adsorption surfaces are added using an equilibrium phase block. By only setting new surfaces in the specific blocks where injection occurs, the preloaded surfaces from the current condition models are not overwritten in the rest of the transect. ISI simulations are in a 1D geochemical model and cannot account for chemical loading, rate of injection, or injection rates run for the duration of the model simulation.

Timeframes specified are based on the proposed remedy and completion of site closure. For instance, as summarized in Table 6, the MNA timeframe starts when closure is complete and groundwater velocity has changed, or in some cases reversed. For DGWC-69, the MNA timeframe starts following installation of the subsurface barrier wall. For DGWC-40, and all other models impacted by AP-2,3/4 closure activities, The model begins once water levels drop below the bottom of CCR. The timeframe for ISI construction and implementation was not included. In some case, ISI was modeled to be needed in multiple zones along the transect mostly due to the length of the transect (DGWC-47/48, DGWC-19/20), or due to slow groundwater velocity during the post closure condition (DGWC-5/B-92/B-93).

**Table 6. Summary of Reactive Transport Modeling Transects**

| Transect Number | Wells | Corrective Measures Alternative 1 [MNA] Timeframe | Corrective Measures Alternative 1 MNA Model | Corrective Measures Alternative 2 | Corrective Measures Alternative 2 Model | Corrective Measures Alternative 2 Timeframe |
|---|---|---|---|---|---|---|
| 1 | DGWC-69 (AP-1) | 50 years | -- | ISI | DGWC-69 P3 | <5 years |
| 2 | DGWC-40 (AP-1) | -- | -- | ISI | DGWC-40 P3 | <5 years |
| 3 | DGWC-5/B-92/B-93 (AP-2 and 3/4) | 6 years | -- | ISI | DGWC-5 P3 | <5 years |
| 4 | DGWC-8 (AP-2 and 3/4) | 0 years* | DGWC-8 P2 | -- | -- | -- |
| 5 | DGWC-9/B-56 (AP-2 and 3/4) | <5 years | DGWC-9 P2 | -- | -- | -- |
| 6 | DGWC-10 (AP-2 and 3/4) | <5 years | DGWC-10 P2 | -- | -- | -- |
| 7 | DGWC-19/20/B-63 (AP-2 and 3/4) | >10 years | -- | ISI | DGWC-19 P3 | <8 years |
| 8 | DGWC-47/48/B-104D/B-115D (AP-2 and 3/4) | >10 years | -- | ISI | DGWC-48 P3 | <6 years |

Note: "--" Where no information is presented, that transect does not included a model for the case specified (e.g., where MNA or ISI was not applicable or is not appropriate, the model is not included).
*: Indicates currently below GWPS for SSL of cobalt at this well.

## 4.1 T1: DGWC-69 (AP-1: Arsenic)

Phase 1 Model Current Conditions: This transect begins at well DGWC-69 and terminates at the un-named creek to the southwest (Figure 1). To create the initial conditions measured on site, the 20-meter transect was divided into 10 cells measuring 2-meters each. The initial groundwater velocity was calculated to be 138-meters per year and the model was run for a total of 25 years. As this is the current conditions model, no closure enhancement technologies were applied (e.g., subsurface barrier wall).

Porewater from AP-1 (AP-1B-3) was mixed with the background water (DGWA-70A; nearest background well) at a ratio of 1% porewater 99% background to match the current conditions at the well. After mixing, ferrihydrite, gypsum, and calcite were allowed to precipitate out of solution to obtain equilibrium. Adsorption sites of ferrihydrite and gibbsite were allocated based on the sitewide geometric mean of SEP results (Table 5).

The target concentration for the SSL of arsenic at well DGWC-69 was 0.024 mg/L and the resulting initial concentration achieved was 0.023 mg/L (Figure 2a).

Phase 3 Model: In-situ Injection Results: In addition to barrier wall emplacement, groundwater was reacted with 1 millimole (mmol) of iron oxide ($Fe_2O_3$) before allowing the precipitation of ferrihydrite, gypsum, and calcite. One mmol/L of iron oxide was injected in the first 3 cells (6m) of the transect to simulate the precipitation of additional iron adsorption surfaces, enhancing the adsorption of arsenic.

Based on this simulation, arsenic concentrations should decrease to below the GWPS within 5 years when employing In-Situ Injections (Figure 2b).

## 4.2 T2: DGWC-40 (AP-1: Cobalt)

Phase 1 Model (Current Conditions): This transect begins at well DGWC-40 and terminates at well B-100 to the southeast (Figure 1). To create the initial conditions measured on site, the 169-meter transect was divided into 17 cells measuring 10-meters each. The initial groundwater velocity was calculated to be 36-meters per year and the model was run for a total of 20 years. Background groundwater (DGWC-53; nearest background well) was exposed to 0.7 mmol/L pyrite, oxygen, and 0.0003 mmol/L cobalt sulfide [CoS (alpha)] to achieve the proper levels of acidification observed at DGWC-40. The acidified source water was then transported down the transect. Precipitation of ferrihydrite, gypsum, and calcite were allowed. Adsorption sites of ferrihydrite and gibbsite were allocated based on the sitewide geometric mean of SEP results (Table 5).

A target pH of 4.4 was achieved (Figure 3a) and a target concentration of cobalt at well DGWC-40 was 0.037 mg/L and the resulting initial concentration achieved was 0.031 mg/L (Figure 3b).

Phase 3 Model (In-situ Injection Results): To model ISI after closure at well DGWC-40, a post closure groundwater velocity was calculated to be 26-meters per year. Post-closure conditions assume that groundwater levels in AP-3/4 have dropped below the base of CCR, as predicted by groundwater flow modeling. An injection of 5 mmol/L of potassium bicarbonate ($KHCO_3$) was added to the source groundwater to simulate source zone treatment and an injection of 5 mmol/L of potassium bicarbonate is simulated in the first cell of the transect (10-meter). This led to a pH correction to a circumneutral range at the well and in the transect (Figure 3c) and decreasing cobalt concentrations (Figure 3d).

Based on this simulation, cobalt concentrations should decrease below the GWPS within 5 years with ISI.

## 4.3 T3: DGWC-5, B-92, B-93, and B-98 (AP-2, 3/4: Beryllium, Cobalt)

Phase 1 (Current Conditions): This transect begins at well DGWC-5 and terminates at well B-98 (Figure 1). To create the initial conditions measured on site, the 29-meter transect was divided into 15 cells measuring 2-meters each. The initial groundwater velocity was calculated to be 5-meters per year and the model was run for a total of 50 years. The source groundwater (B-92) was transported downgradient, allowing ferrihydrite, gypsum, and calcite to precipitate. Adsorption sites of ferrihydrite and gibbsite were allocated based on the minimum of SEP results specific to well B-93 to calibrate current conditions (Table 7).

The target concentration for the SSL of beryllium at wells DGWC-5/B-92/B-93 was 0.012 – 0.017 mg/L and the resulting initial concentration achieved was 0.018 mg/L (Figure 4a) while the target concentration for the SSL of cobalt was 0.063-0.073 mg/L and the resulting initial concentration achieved was 0.073 mg/L (Figure 4c)

Phase 3 (In-Situ Injection Results): To model ISI after closure at well DGWC-5, a post closure groundwater velocity was modeled to be 1.9-meters per year in the opposite direction. Post-closure conditions assume that groundwater levels in AP-2, 3/4 have dropped below the base of CCR, as predicted by groundwater flow modeling. The source water was switched to groundwater from well B-98 given the change of gradient direction. The groundwater is then reacted with 5 mmol/L of potassium bicarbonate ($KHCO_3$) to simulate upgradient source zone treatment with an injection of 5 mmol/L of potassium bicarbonate is simulated in the first 5 cells of the transect (10-meter) as well as cells 8-11 (8-meter).

Based on this simulation, beryllium and cobalt concentrations should decrease below the GWPS within 4 years (Figure 4e and 4f).

**Table 7. Transect 3 Surface Sites**

| Site | Moles of Adsorption Sites | Mass (g) |
|---|---|---|
| Hfo_wOH | 6.30E-03 | 2.80E+00 |
| Hao_sOH | 1.58E-04 | 2.80E+00 |
| SEP Total Concentrations (mg/kg) | | |
| Fe | 1760 | |
| Al | 2140 | |

## 4.4 T4: DGWC-8 (AP-2, 3/4: Cobalt)

Phase 1 (Current Conditions): This transect begins at well DGWC-8 and terminates at the property line to the northeast (Figure 1). To create the initial conditions, the 20-meter transect was divided into 10 cells measuring 2-meters each. The initial groundwater velocity was modeled to be 28-meters per year and the model was run for a total of 30 years. Background groundwater (DGWA-53) was used and allowed to equilibrate with additional iron and aluminum adsorption surfaces. Then, source water (B-66) was exposed to 1.35 mmol pyrite per one L solution and equilibrated with atmospheric oxygen to achieve the proper levels of acidification and cobalt at the target well. Ferrihydrite, gypsum, and calcite were allowed to precipitate along the transect. The acidified source water was then transported down the transect. Adsorption sites of ferrihydrite were allocated based on the sitewide geometric mean of SEP results (Table 5). The target pH at well DGWC-8 was 5.2 and a concentration for the SSL of cobalt at well DGWC-8 was 0.0046 mg/L. The resulting initial pH achieved was 5.15 and the initial cobalt concentration achieved was 0.0065 mg/L (Figure 5a and b, respectively).

Phase 2 (MNA Results): To model natural attenuation after closure at well DGWC-8, a post closure groundwater velocity was calculated to be 34-meters per year and groundwater was transported down the transect (Figure 5c and d). Post-closure conditions assume that groundwater levels in AP-3/4 have dropped below the base of CCR, as predicted by groundwater flow modeling.

Cobalt concentrations at this well are below the GWPS as of September 2022.

## 4.5 T5: DGWC-9 and B-56 (AP-2, 3/4: Arsenic, Beryllium, Cobalt, Selenium)

Phase 1 (Current Conditions): This transect begins between well DGWC-9 and B-56 and terminates at the property line to the northeast (Figure 1). To create the initial conditions for this transect, the 10-meter transect was divided into 20 cells measuring 0.5-meters each. The initial groundwater velocity was calculated to be 43-meters per year and the model was run for a total of 40 years. Ferrihydrite, gypsum, and calcite were allowed to precipitate along the transect. Groundwater DGWC-9 was transported down the transect and adsorption sites of ferrihydrite and gibbsite were allocated based on the sitewide geometric mean of SEP results (Table 5).

The initial concentrations for the SSLs of arsenic, beryllium, cobalt, and selenium at transect 5 matched those at DGWC-9 of 0.016 mg/L, 0.0047 mg/L, 0.25 mg/L, and 0.048 mg/L, respectively (Figure 6a-e).

Phase 2 (MNA Results): To model natural attenuation after closure of AP-2 and 3/4 at wells DGWC-9 and B-56, a post closure groundwater velocity was calculated to be 31-meters per year.

All SSLs are predicted to decrease to below their respective GWPS within 5 years (Figure 7a through 7e).

## 4.6 T6: DGWC-10 (AP-2: Beryllium, Cobalt)

Phase 1 (Current Conditions): This transect begins at well DGWC-10 and terminates at well B-66 (Figure 1). To create the initial conditions measured on site, the 26-meter transect was divided into 26 cells measuring 1-meter each. The initial groundwater velocity was modeled to be 38-meters per year and the model was run for a total of 20 years. Background groundwater (B-66) was exposed to 0.04 mmol/L pyrite, oxygen, and 7.1 mmol/L beryllium sulfide (BeS) to achieve the proper levels of acidification, beryllium, and cobalt seen at site. The acidified source water was then transported down the transect. Ferrihydrite, gypsum, and calcite were allowed to precipitate along the transect. Adsorption sites of ferrihydrite were allocated based on the based on the minimum of SEP results specific to area well B-82 to calibrate current conditions (Table 8). The target pH of 5.2 was achieved, and concentrations for the SSLs of beryllium and cobalt at well DGWC-10 were 0.0066 mg/L and 0.055 mg/L respectively while the resulting initial concentrations achieved were 0.006 mg/L and 0.1688 mg/L (Figure 8a through c).

Phase 2 (MNA Results): To model natural attenuation after closure at well DGWC-10, a post closure groundwater velocity was calculated to decrease to 33-meters per year. Post-closure conditions assume that groundwater levels in AP-3/4 have dropped below the base of CCR, as predicted by groundwater flow modeling.

All SSLs fall below their respective GWPS within 5 years (Figures 8d through f).

**Table 8. Transect 6 Surface Sites**

| Site | Moles of Adsorption Sites | Mass (g) |
|---|---|---|
| Hfo_wOH | 2.27E-02 | 1.01E+01 |
| Hfo_sOH | 5.68E-04 | 1.01E+01 |
| Hao_sOH | 2.10E-02 | 3.99E+00 |
| SEP Total Concentrations (mg/kg) | | |
| Fe | 6340 | |
| Al | 1380 | |

## 4.7 T7: DGWC-19, DGWC-20, and B-63 (AP-2, 3/4: Cobalt)

Phase 1 (Current Conditions): This transect begins between wells DGWC-19 and DGWC-20 and terminates at well B-77 and considers B-122D (Figure 1). To create the initial conditions measured on site, the 345-meter transect was divided into 43 cells measuring 8-meters each. The initial groundwater velocity was calculated to be 57-meters per year and the model was run for a total of 15 years. Groundwater from DGWC-20 was mixed with groundwater from DGWC-19 at a ratio of 40%:60%, then that mixture was mixed with background water (DGWA-71) again at a ratio of 40%:60%. Ferrihydrite, gypsum, and calcite were allowed to precipitate along the transect. Adsorption sites of ferrihydrite were allocated based on the minimum of SEP results specific to nearby well B-122D (Table 9).

A pH of 5.4 was obtained at the beginning of the transect (target pH range of 4.6-4.8) while the rest of the transect obtained a value pH 6.3 (target value 6.1), and the concentration for the SSL of cobalt at wells DGWC-19, 20 and B-63 ranged from 0.05-0.75 mg/L. Based on a mix of DGWC-19 and DGWC-20, the resulting initial concentration achieved was 0.30 mg/L (Figures 9a and 9b).

Phase 3 (In-situ Injection Results): To model ISI after closure at well DGWC-19, 20, and B-63, a post-closure groundwater velocity was calculated to be 53-meters per year and the source water becomes groundwater from well DGWC-71 as porewater mixing no longer occurs following the completion of closure activities. Post-closure conditions assume that groundwater levels in AP-3/4 have dropped below the base of CCR, as predicted by groundwater flow modeling. The DGWA-71 groundwater is then reacted with 1 mmol/L aluminum hydroxide ($Al(OH)_2^+$), 0.001 mmol/L of iron oxide ($Fe_2O_3$), and 5 mmol/L potassium bicarbonate ($KHCO_3$), before allowing ferrihydrite and gibbsite to precipitate. There is also an injection of 1 mmol/L aluminum hydroxide ($Al(OH)_2^+$), 0.001 mmol/L of iron oxide ($Fe_2O_3$), and 5 mmol/L potassium bicarbonate ($KHCO_3$) in the first 6 cells (48-meters) of the transect to allow the precipitation of additional iron and aluminum adsorption surfaces, enhancing the adsorption of cobalt.

Results of this simulation include groundwater pH being corrected to circumneutral and cobalt is reduced below the GWPS after 7 years (Figures 9c and 9d).

**Table 9. Transect 7 Surface Sites**

| Site | Moles of Adsorption Sites | Mass (g) |
|---|---|---|
| Hfo_wOH | 6.48E-02 | 2.88E+01 |
| Hao_sOH | 1.62E-03 | 2.88E+01 |

| Site | Moles of Adsorption Sites | Mass (g) |
|---|---|---|
| SEP Total Concentrations (mg/kg) | | |
| Fe | 18100 | |
| Al | 7420 | |

## 4.8 T8: DGWC-47, DGWC-48, and B-104D, B-115D (AP-2, 3/4: Beryllium, Cobalt, Lithium)

Phase 1 (Current Conditions): This transect begins between wells DGWC-47 and DGWC-48 and terminates at well B-76 (Figure 1). To create the initial conditions measured on site, the 233-meter transect was divided into 23 cells measuring 10-meters each. The initial groundwater velocity was calculated to be 46-meters per year and the model was run for a total of 30 years. Groundwater from well DGWC-48 was transported down the transect and equilibrated with 1.5 mmol/L beryllium sulfide (BeS) and ferrihydrite, gypsum, and calcite were allowed to precipitate. Adsorption sites of ferrihydrite and gibbsite were then allocated based on the minimum of SEP results specific to B-104D (Table 10).

The target pH of 4.3 was obtained and target concentrations for the SSLs of beryllium, cobalt, and lithium at wells DGWC-47, DGWC-48, B-104D, and B-115D ranged from 0.007-0.009 mg/L (beryllium), 0.21-0.31 mg/L (cobalt), and 0.04-0.099 mg/L (lithium) and the resulting initial concentrations achieved were 0.09 mg/L, 0.31 mg/L, and 0.099 mg/L (Figures 10a through 10d). In the model, beryllium levels were higher than observed because, in order to achieve the correct cobalt concentration at the site measured pH, excess beryllium was released in the model.

Phase 3 (In-situ Injection Results): Due to the proximity of this transect to that of wells DGWC-19, 20, and B-63, the ISI at that transect is anticipated to affect this transect. To properly simulate that interaction, the resulting groundwater from transect DGWC-19, 20, and B-63 was used as the source water after closure of the ash pond in the injection scenario. Therefore, this transect uses a sequential treatment approach in the phase 3 model.

The difference between the initial conditions for the Phase 1 and Phase 3 models of this transect come from the sequential treatment approach which addresses the potential for downgradient effects from remediation of upgradient transects. This leads to a differing initial condition for the Phase 3 model for transect 8 due to the effects of treatment at transect 7.

After closure, a post closure groundwater velocity was calculated to be 48-meters per year and the source water was changed to the resulting groundwater of the transect from DGWC-19/20. Post-closure conditions assume that groundwater levels in AP-3/4 have dropped below the base of CCR, as predicted by groundwater flow modeling. The groundwater is then further reacted with 1 mmol/L aluminum hydroxide ($Al(OH)_2^+$), 1 mmol/L of iron oxide ($Fe_2O_3$), and 1 mmol/L potassium carbonate ($KHCO_3$),to simulate source zone treatment, before allowing ferrihydrite and gibbsite to precipitate. There is then an injection of 1 mmol/L aluminum hydroxide ($Al(OH)_2^+$), 0.001 mmol/L of iron oxide ($Fe_2O_3$), and 5 mmol/L potassium bicarbonate ($KHCO_3$) in the first 4 cells (40-meters) of the transect, cells 9-12 (40-meters), as well as cells 19-22 (40-meters) to enhance the precipitation by adding additional iron and aluminum adsorption surfaces downgradient. These downgradient injections are needed because of the length of the transect to bolster adsorption processes for beryllium, cobalt, and lithium in order to meet the GWPS within the desired timeframe.

Based on this simulation, all SSLs are reduced below their respective GWPS within 6 years (Figure 11a-d).

**Table 10. Transect 8 Surface Sites**

| Site | Moles of Adsorption Sites | Mass (g) |
|---|---|---|
| Hfo_wOH | 7.09E-03 | 3.15E+00 |
| Hfo_sOH | 1.77E-04 | 3.15E+00 |
| Hao_sOH | 1.31E-02 | 2.49E+00 |
| SEP Total Concentrations (mg/kg) | | |
| Fe | 1980 | |
| Al | 860 | |

The SSL for lithium at well B-120D was not addressed in this report due to lack of data at this location as well as the recency of notification of an SSL at the well. In order to adequately model remediation of lithium at this location it would require the creation of a new model transect and additional aquifer material characterization.

# 5.0 CLOSING

Based on the results of modeling described in Section 4.1 through 4.8 and summarized in Table 6, it is concluded that a combination of MNA and ISI is effective to meet GWPS's for each constituent within the timeframes specified in Table 6. However, it should be noted that the timeframes specified in Table 6 are based on closure being complete and implementation of ISI. Time for pre-design investigation, permitting of ISI and time until implementation has not been included.

Generally, where model transects have groundwater with circumneutral pH, except at DGWC-69, MNA is predicted to be successful within 5 years. At DGWC-69, even with circumneutral pH, modeling predicts that sorption capacity for arsenic is exceeded, and additional capacity is needed in the form of ISI. Where transects are currently acidic and the change in groundwater flow direction or velocity is not able to correct the pH along the transect, ISI can be successful and is predicted to decrease the time to achieve the GWPS.

# 6.0 REFERENCES

Allison, J.D., D.S. Brown, and K.J Novo-Gradac. 1991. MINTEQA2/PRODEFA2, A Geochemical Assessment Model for Environmental Systems: Version 3.0 User's Manual. EPA/600/3-91/021.

Appelo, C.A.J., and D. Postma. 2010. Geochemistry, Groundwater, and Pollution. 2nd Edition. Boca Raton, FL.

Darcy, H. 1856. Les Fontaines Publiques de la Ville de Dijon, Dalmont, Paris

Dzombak, D. and Morel, F., 1990. Surface complexation modeling: hydrous ferric oxide. John Wiley & Sons.

Georgia Environmental Protection Division (GA EPD), 2016. Groundwater Contaminant Fate and Transport Modeling.

Golder 2020. Three-Dimensional Numerical Groundwater Modeling Summary Report, Georgia Power – Plant McDonough, Cobb County, Georgia, Golder Associates Inc., October 2020.

Golder 2021. Three-Dimensional Numerical Groundwater Modeling Summary Report Addendum, Georgia Power – Plant McDonough, Cobb County, Georgia, Golder Associates Inc., November 22, 2021.

Karamalidis, A., and Dzombak, D., 2010. Surface Complexation Modeling: Gibbsite. John Wiley and Sons, New Jersey.

Liger, E., Charlet, L., & Van Cappellen, P., 1999. Surface catalysis of uranium (VI) reduction by iron (II). Geochimica et Cosmochimica Acta, 63(19-20), 2939-2955.

Parkhurst, D. and Appelo, C., 2013. Description of input and examples for PHREEQC version 3: a computer program for speciation, batch-reaction, one-dimensional transport, and inverse geochemical calculations (No. 6-A43). US Geological Survey.

US EPA, 2007a. *Monitored Natural Attenuation for Inorganic Contaminants in Ground Water. Volume 1 – Technical Basis for Assessment.* National Risk Management Laboratory. EPA/600/R-07/139.

US EPA, 2007b. *Monitored Natural Attenuation of Inorganic Contaminants in Ground Water. Volume 2. Assessment for Non-Radionuclides Including Arsenic, Cadmium, Chromium, Copper, Lead, Nickel, Nitrate, Perchlorate, and Selenium.* EPA/600/R-07/140.

US EPA, 2015. *Use of Monitored Natural Attenuation for Inorganic Contaminants in Groundwater at Superfund Sites.* U.S. Environmental Protection Agency Office of Solid Waste and Emergency Response Directive.

WSP, 2023a. Geochemical Conceptual Site Model Plant McDonough Atkinson Ash Pond 1 (AP-1), WSP USA Inc., August 31, 2023.

WSP, 2023b. Geochemical Conceptual Site Model Plant McDonough Atkinson Ash Ponds 2 and 3/4 (AP-2 and 3/4), WSP USA Inc., August 31, 2023.

WSP, 2023c. Hydrogeological Assessment Report, Plant McDonough Atkinson Ash Pond 1. WSP USA Inc., March, 2023.

WSP, 2023d. Hydrogeological Assessment Report, Plant McDonough Atkinson Ash Ponds 2 and 3/4 (AP-2 and 3/4), WSP USA Inc., May, 2023.

Van Geen A, Robertson AP, Leckie JO., 1994. Complexation of carbonate species at the goethite surface: Implications for adsorption of metal ions in natural waters. Geochim Cosmochim Acta 58:2073-2086.

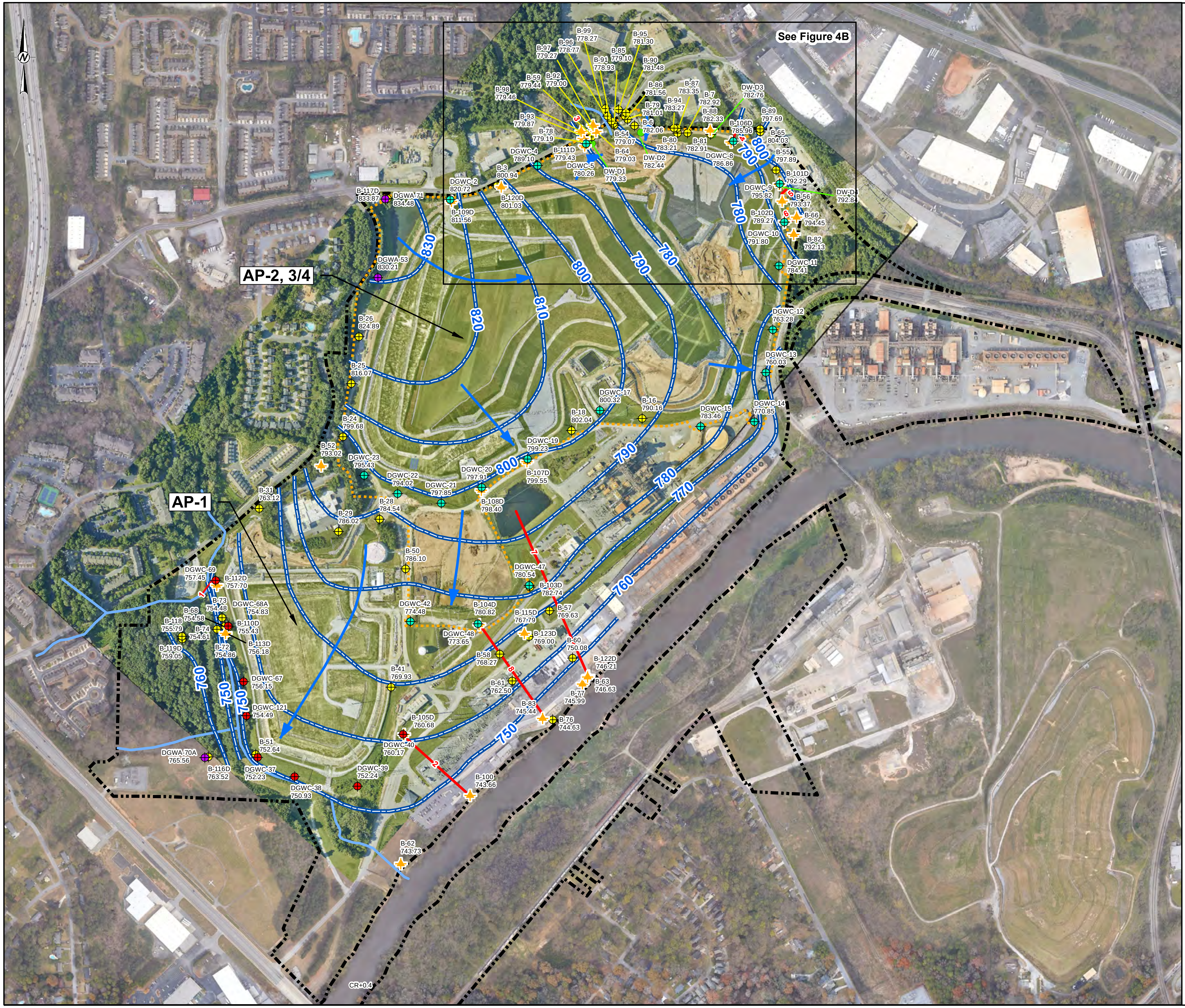
# Signature Page

**WSP USA Inc**

Cole Mayer
*Assistant Consultant, Geochemist*

PJ Nolan, Ph.D.
*Technical Principal, Geochemist*

# Figures




LEGEND

- AP-1 MONITORING WELL
- AP-2,3/4 MONITORING WELL
- UPGRADIENT WELL
- ASSESSMENT MONITORING WELLS
- PIEZOMETER
- DEWATERING WELL
- TRANSECTS
- APPROXIMATE GROUNDWATER FLOW DIRECTION
- GROUNDWATER SURFACE CONTOUR (FT-NAVD88)
- SURFACE WATER STREAM
- PERMIT BOUNDARY
- PROPERTY BOUNDARY
- EXISTING TOPOGRAPHY 10-FOOT CONTOUR
- EXISTING TOPOGRAPHY 2-FOOT CONTOUR

NOTES

1. ALL LOCATIONS AND BOUNDARIES ARE APPROXIMATE.
2. GROUNDWATER ELEVATION MEASUREMENTS OBTAINED SEPTEMBER 6, 2022 BY WSP GOLDER.
3. GROUNDWATER ELEVATIONS DISPLAYED IN FEET REFERENCED TO NORTH AMERICAN VERTICAL DATUM (FT NAVD88).
4. WELLS AND PIEZOMETERS THAT CONTAIN A "D" DESIGNATION FOLLOWING THE NUMBER ARE DEEP WELLS AND ELEVATIONS ARE NOT USED FOR CONTOURING.
5. NM = NOT MEASURED.

REFERENCE

1. AERIAL IMAGE DATED NOVEMBER 2019 FROM GOOGLE EARTH AND AUGUST 31, 2022 PROVIDED BY GPC.
2. COORDINATE SYSTEM: NAD 1983 STATE PLANE GEORGIA WEST (U.S. FEET).
3. MONITORING WELL/PIEZOMETER LOCATIONS AND ELEVATIONS SURVEYED BY METRO ENGINEERING AND SURVEYING COMPANY IN AUGUST 2020 WITH ADDITIONAL SURVEY PROVIDED IN JANUARY 2021 AND MAY 2021.

0 600 1,200
1 IN= 600 FT

CLIENT
GEORGIA POWER COMPANY PLANT MCDONOUGH-ATKINSON

Georgia Power

PROJECT
GEOCHEMICAL MODELING REPORT

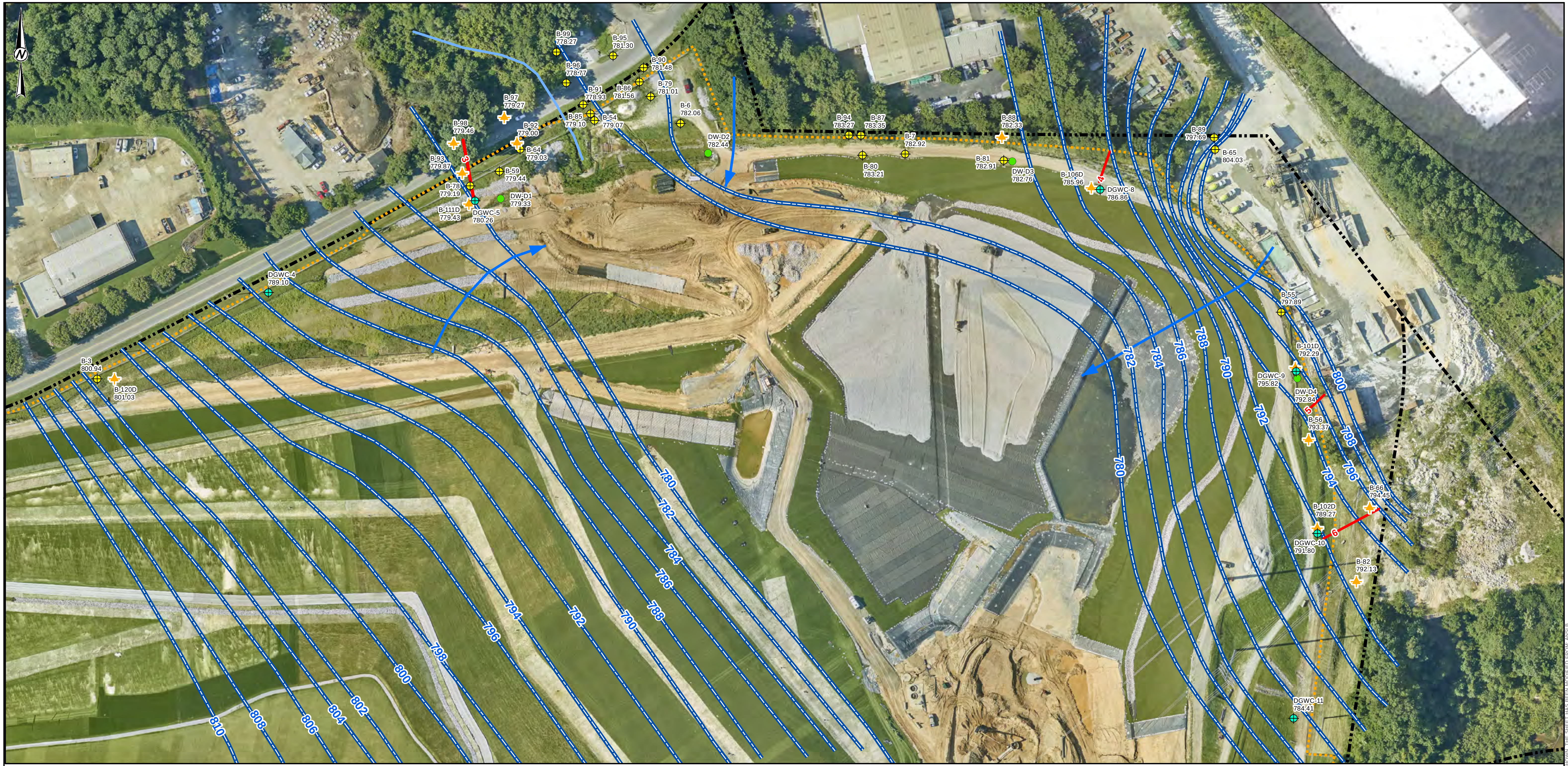
TITLE
**TRANSECT LOCATIONS AND POTENTIOMETRIC SURFACE MAP (SEPTEMBER 2022)**

CONSULTANT

| | |
|---|---|
| YYYY-MM-DD | 2022-10-07 |
| PREPARED | SEB |
| DESIGN | SEB |
| CHECKED | DLP |
| REVIEWED/APPROVED | RPK |

PROJECT No. 166849622 Rev. 0 FIGURE **1a**

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




LEGEND

- AP-1 MONITORING WELL
- AP-2,3/4 MONITORING WELL
- UPGRADIENT WELL
- ASSESSMENT MONITORING WELLS
- PIEZOMETER
- DEWATERING WELL
- TRANSECTS
- GROUNDWATER SURFACE CONTOUR (FT-NAVD88)
- APPROXIMATE GROUNDWATER FLOW DIRECTION
- SURFACE WATER STREAM
- PERMIT BOUNDARY
- PROPERTY BOUNDARY
- EXISTING TOPOGRAPHY 10-FOOT CONTOUR
- EXISTING TOPOGRAPHY 2-FOOT CONTOUR

NOTES

1. ALL LOCATIONS AND BOUNDARIES ARE APPROXIMATE.

2. GROUNDWATER ELEVATION MEAUSREMENTS OBTAINED SEPTEMBER 6, 2022 BY WSP GOLDER.

3. GROUNDWATER ELEVATIONS DISPLAYED IN FEET REFERENCED TO NORTH AMERICAN VERTICAL DATUM (FT NAVD88).

4. WELLS AND PIEZOMETERS THAT CONTAIN A "D" DESIGNATION FOLLOWING THE NUMBER ARE DEEP WELLS AND ELEVATIONS ARE NOT USED FOR CONTOURING.

REFERENCE

1. AERIAL IMAGE DATED NOVEMBER 2019 FROM GOOGLE EARTH AND AUGUST 31, 2022 PROVIDED BY GPC.

2. COORDINATE SYSTEM: NAD 1983 STATE PLANE GEORGIA WEST (U.S. FEET).

3. MONITORING WELL/PIEZOMETER LOCATIONS AND ELEVATIONS SURVEYED BY METRO ENGINEERING AND SURVEYING COMPANY IN AUGUST 2020 WITH ADDITIONAL SURVEY PROVIDED IN JANUARY 2021 AND MAY 2021.

0 140 280

1"=140 FT FEET

CLIENT
GEORGIA POWER COMPANY PLANT MCDONOUGH-ATKINSON

Georgia Power

PROJECT
GEOCHEMICAL MODELING REPORT

TITLE
**(INSET) TRANSECT LOCATIONS AND POTENTIOMETRIC SURFACE MAP (SEPTEMBER 2022)**

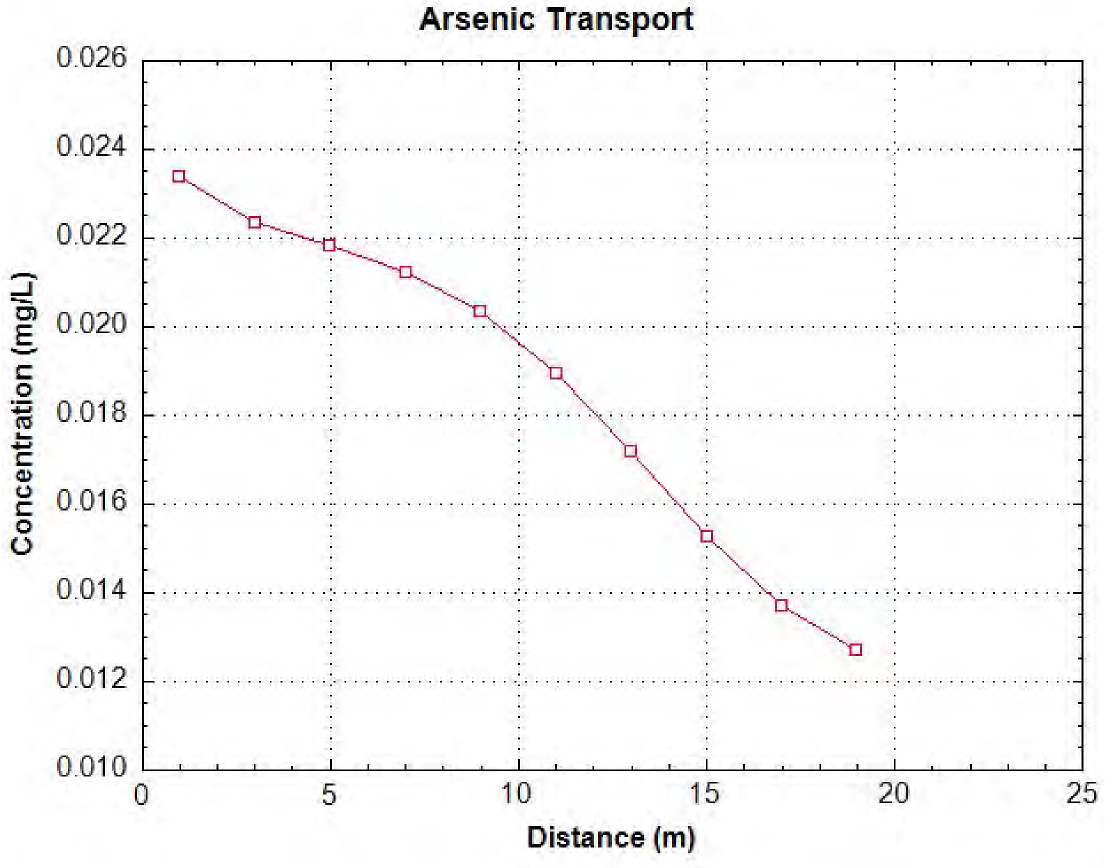
CONSULTANT

wsp

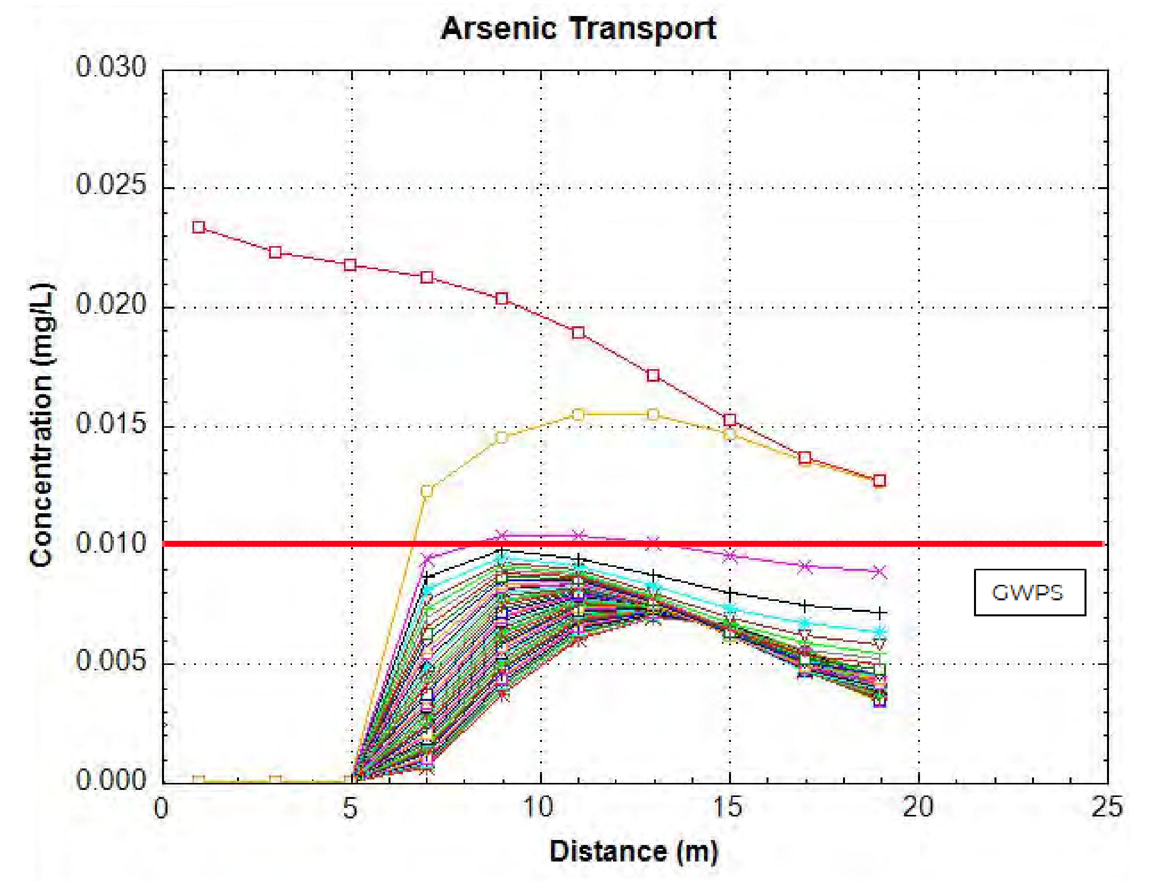
| | |
|---|---|
| YYYY-MM-DD | 2022-10-25 |
| PREPARED | SEB |
| DESIGN | SEB |
| CHECKED | DLP |
| REVIEW/APPROVED | RPK |

| PROJECT NO. | CONTROL | REV. | FIGURE |
|---|---|---|---|
| 166849622 | | 0 | 1B |

A) Initial Conditions




B) In-situ Injections




| | | | |
|---|---|---|---|
| Red (□'s) | Initial Conditions | Brown (▿'s) | 6 years |
| Blue (▵'s) | 1 year | Green | 7 years |
| Gold (□'s) | 2 years | Gray (I's) | 8 years |
| Pink (X's) | 3 years | Red | 9 years |
| Black (+'s) | 4 years | Green (□'s) | 10 years |
| Sky Blue (*'s) | 5 years | Blue (◇'s) | 11 years |

GEORGIA POWER COMPANY
PLANT MCDONOUGH-ATKINSON

PROJECT
GEOCHEMICAL MODELING

CONSULTANT

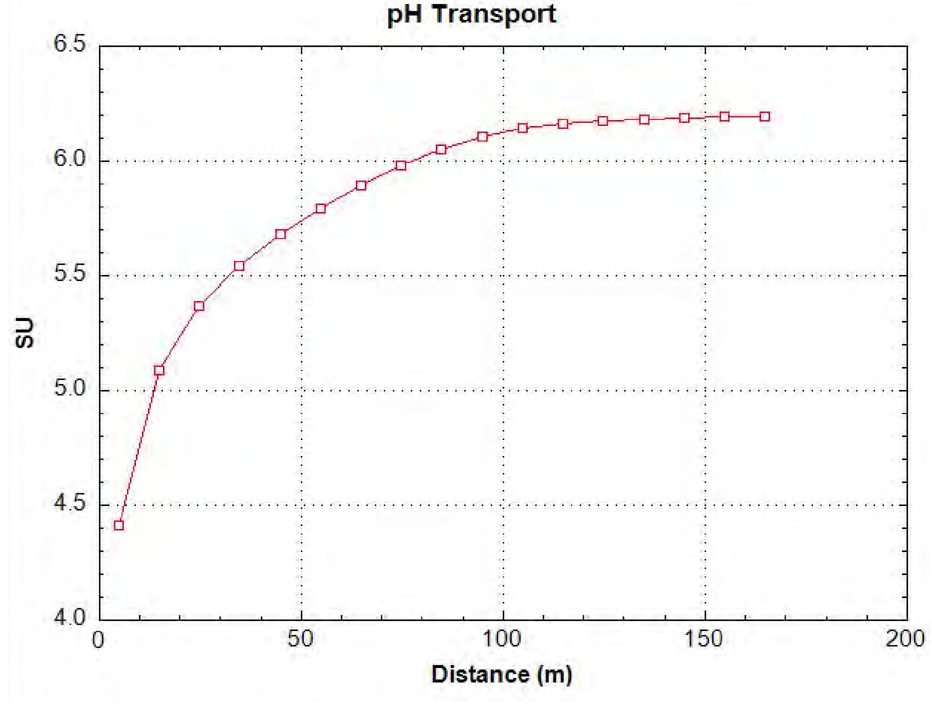
| | |
|---|---|
| YYYY-MM-DD | 2023-03-17 |
| DESIGNED | CM |
| PREPARED | CM |
| REVIEWED | PJN |
| APPROVED | XXX |

TITLE
**TRANSECT 1**

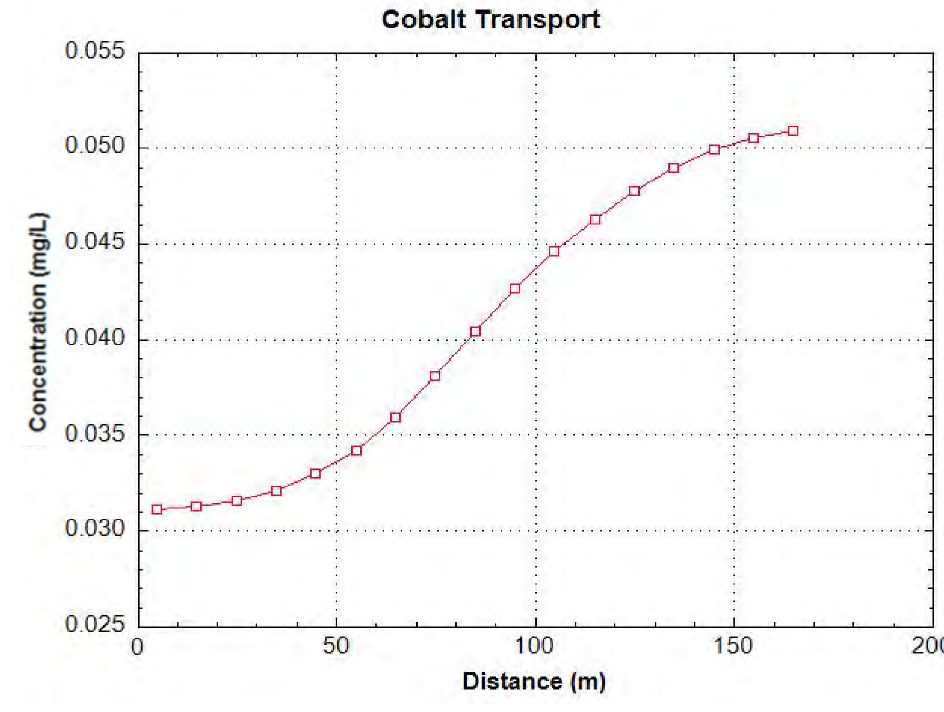
| PROJECT NO. | CONTROL | REV. | FIGURE |
|---|---|---|---|
| GL166849621 | | A | 2 |

**DRAFT- ATTORNEY-CLIENT PRIVILEGED**

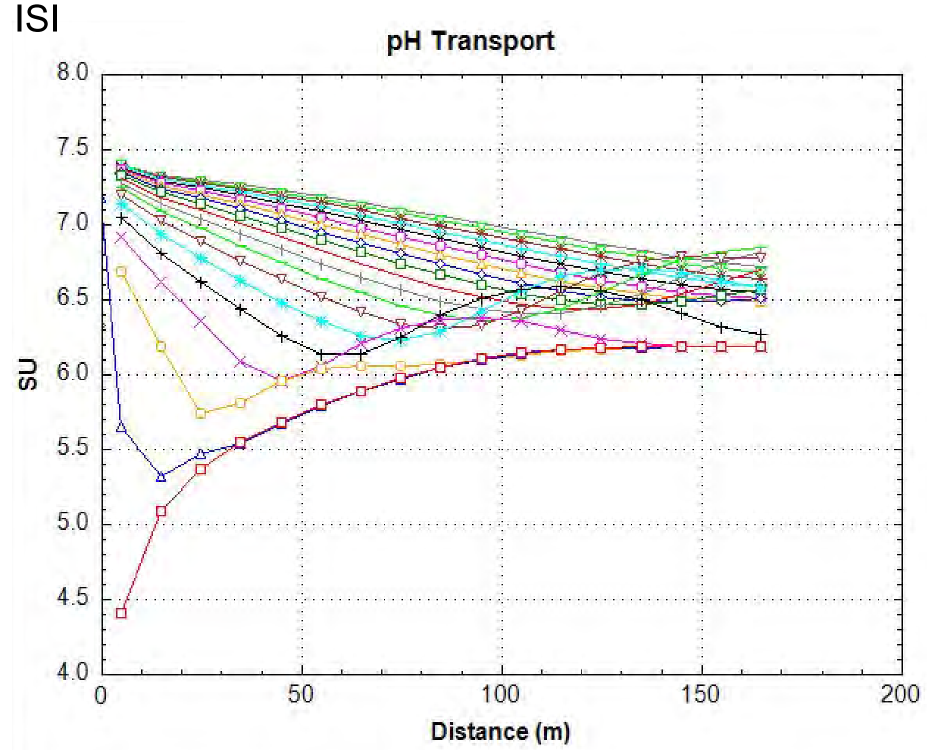
A) Initial Conditions




B) Initial Conditions

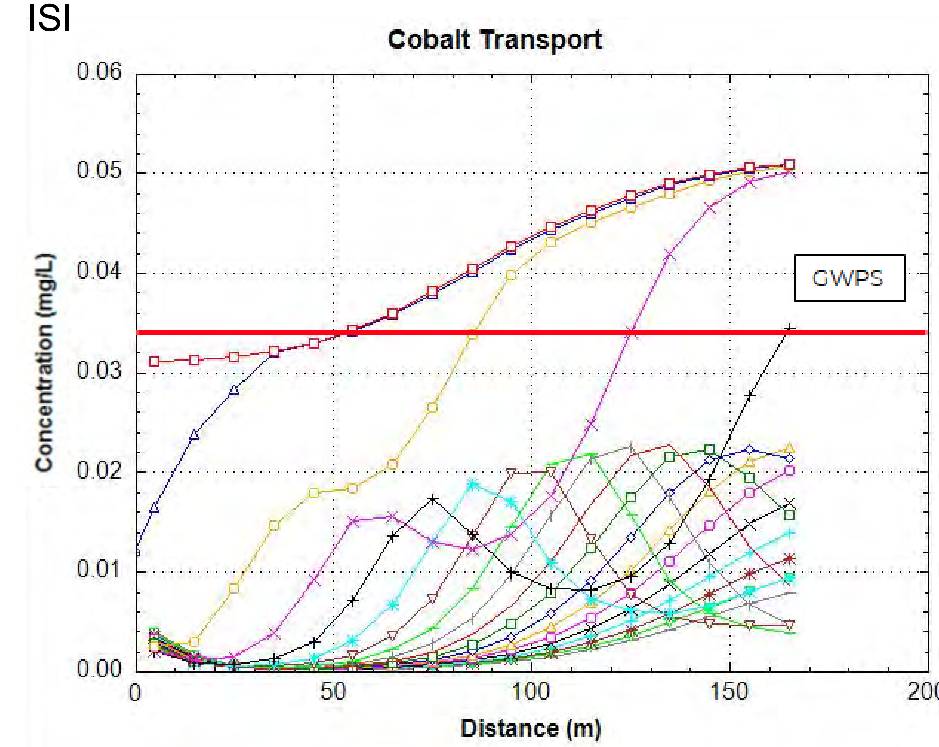



C) ISI




| | |
|---|---|
| Red (□'s) | Initial Conditions |
| Blue (△'s) | 1 year |
| Gold (□'s) | 2 years |
| Pink (X's) | 3 years |
| Black (+'s) | 4 years |
| Sky Blue (*'s) | 5 years |
| Brown (▽'s) | 6 years |
| Green | 7 years |
| Gray (I's) | 8 years |
| Red | 9 years |
| Green (□'s) | 10 years |
| Blue (◇'s) | 11 years |

D) ISI




GEORGIA POWER COMPANY
PLANT MCDONOUGH-ATKINSON

PROJECT
GEOCHEMICAL MODELING

CONSULTANT

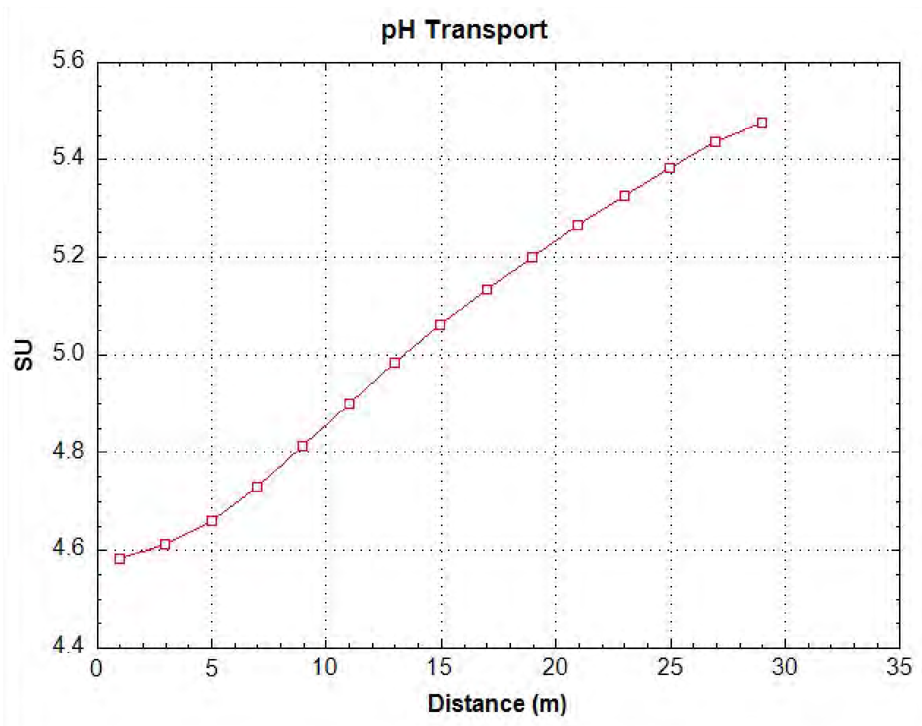
| | |
|---|---|
| YYYY-MM-DD | 2023-03-17 |
| DESIGNED | CM |
| PREPARED | CM |
| REVIEWED | PJN |
| APPROVED | XXX |

TITLE
TRANSECT 2

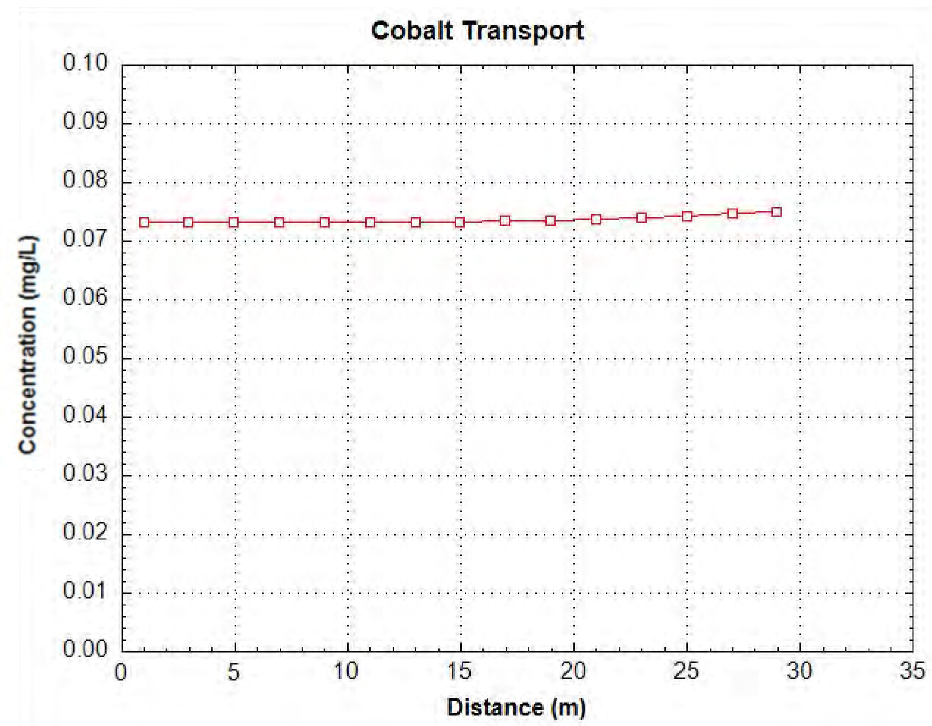
| PROJECT NO. | CONTROL | REV. | FIGURE |
|---|---|---|---|
| GL166849621 | | A | 3 |

**DRAFT- ATTORNEY-CLIENT PRIVILEGED**

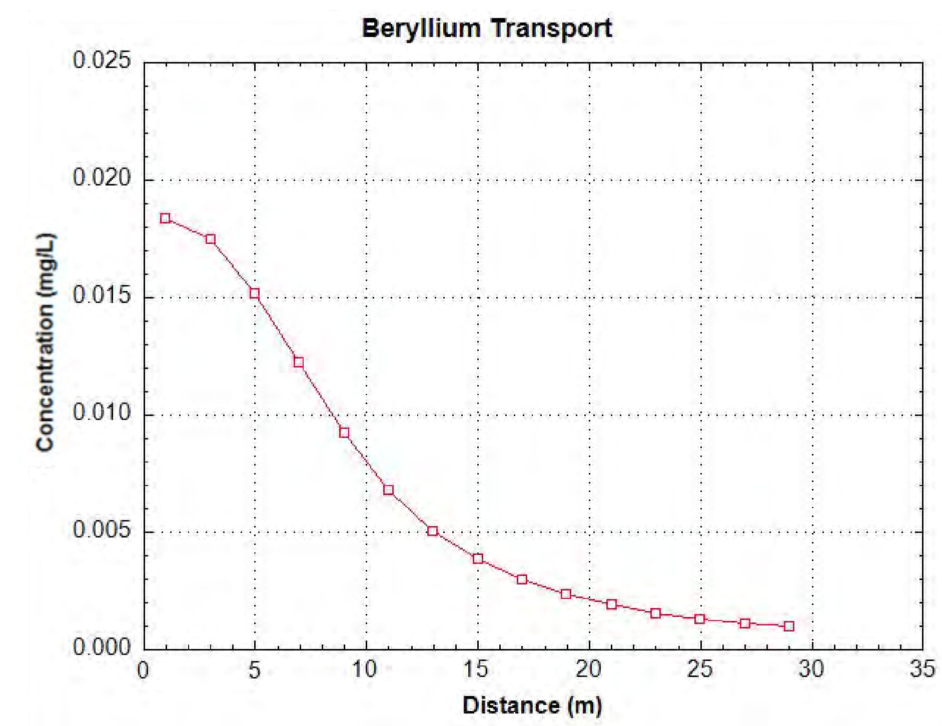
A)




B)




C)




| | | | |
|---|---|---|---|
| Red (□'s) | Initial Conditions | Brown (▿'s) | 6 years |
| Blue (▵'s) | 1 year | Green | 7 years |
| Gold (□'s) | 2 years | Gray (I's) | 8 years |
| Pink (X's) | 3 years | Red | 9 years |
| Black (+'s) | 4 years | Green (□'s) | 10 years |
| Sky Blue (*'s) | 5 years | Blue (◇'s) | 11 years |

GEORGIA POWER COMPANY
PLANT MCDONOUGH-ATKINSON

PROJECT
GEOCHEMICAL MODELING

CONSULTANT

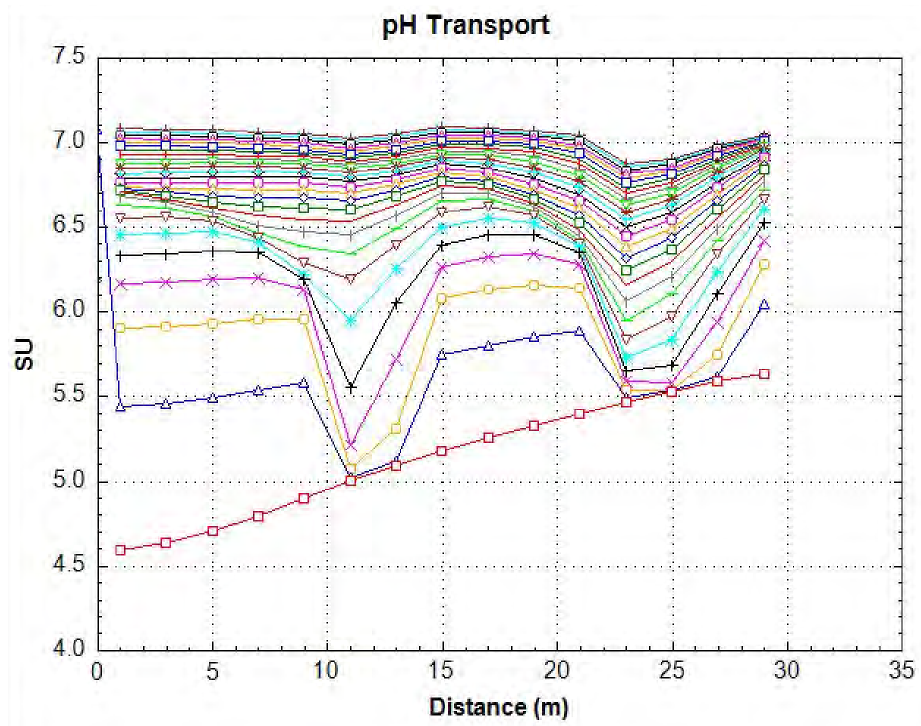
| | |
|---|---|
| YYYY-MM-DD | 2023-03-17 |
| DESIGNED | CM |
| PREPARED | CM |
| REVIEWED | PJN |
| APPROVED | XXX |

TITLE
**TRANSECT 3 (INITIAL)**

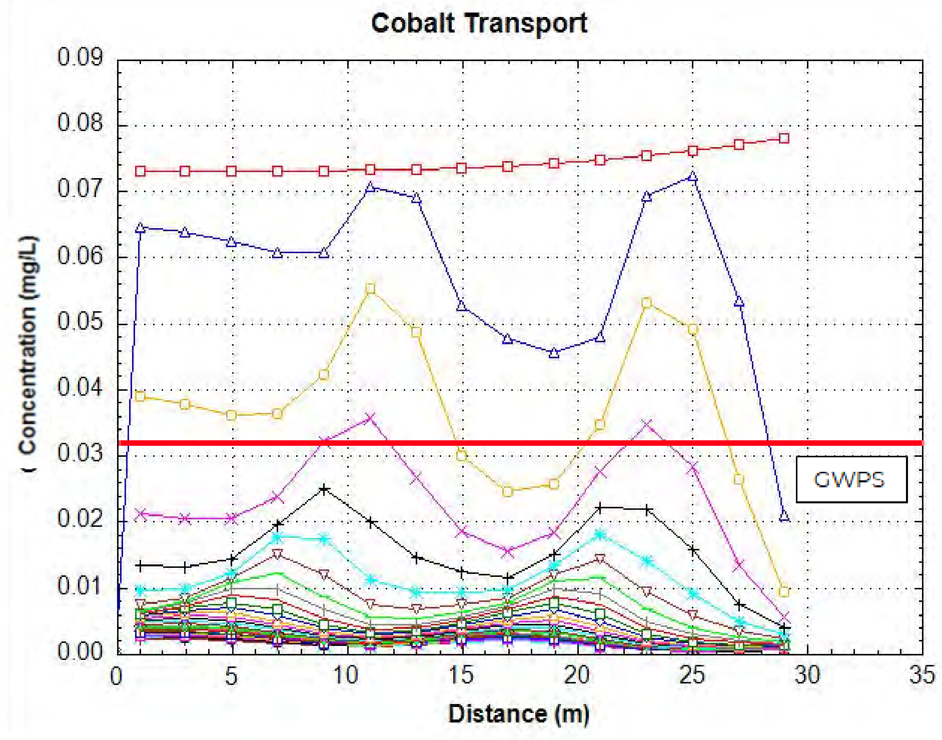
| PROJECT NO. | CONTROL | REV. | FIGURE |
|---|---|---|---|
| GL166849621 | | A | 4 a-c |

**DRAFT- ATTORNEY-CLIENT PRIVILEGED**

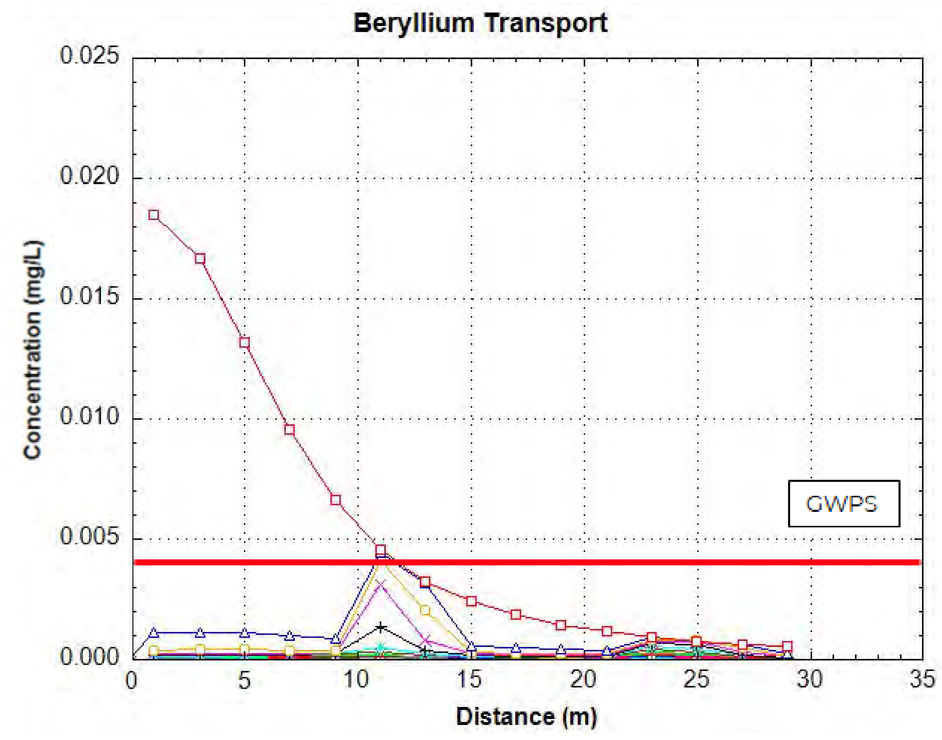
D)




E)




F)




| | | | |
|---|---|---|---|
| Red (□'s) | Initial Conditions | Brown (▿'s) | 6 years |
| Blue (▵'s) | 1 year | Green | 7 years |
| Gold (□'s) | 2 years | Gray (I's) | 8 years |
| Pink (X's) | 3 years | Red | 9 years |
| Black (+'s) | 4 years | Green (□'s) | 10 years |
| Sky Blue (*'s) | 5 years | Blue (◇'s) | 11 years |

GEORGIA POWER COMPANY
PLANT MCDONOUGH-ATKINSON

PROJECT
GEOCHEMICAL MODELING

CONSULTANT

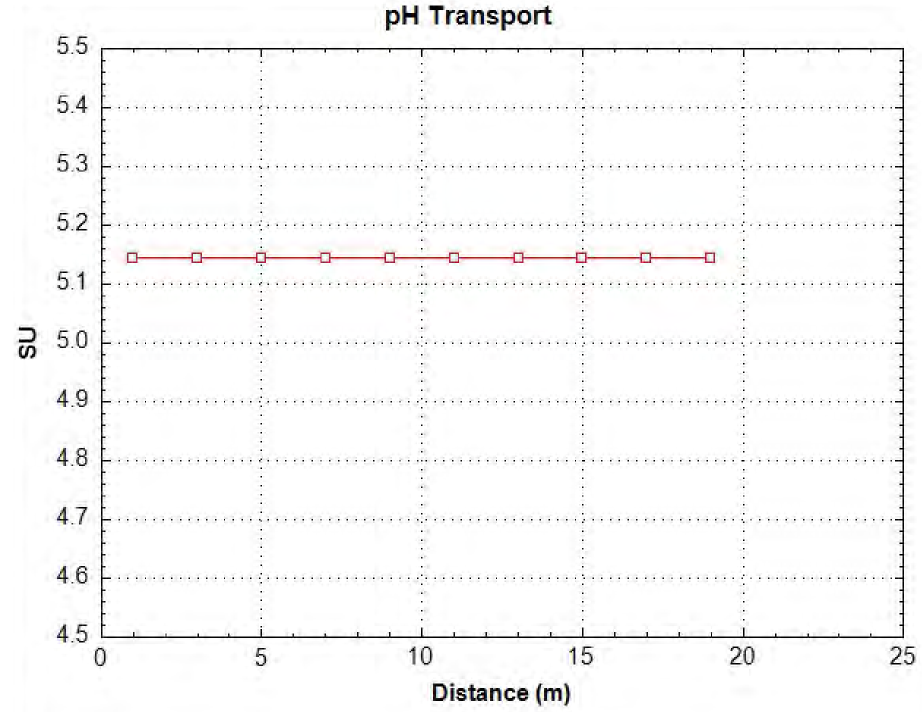
| | |
|---|---|
| YYYY-MM-DD | 2023-03-17 |
| DESIGNED | CM |
| PREPARED | CM |
| REVIEWED | PJN |
| APPROVED | XXX |

TITLE
TRANSCECT 3 (IN-SITU INJECTIONS)

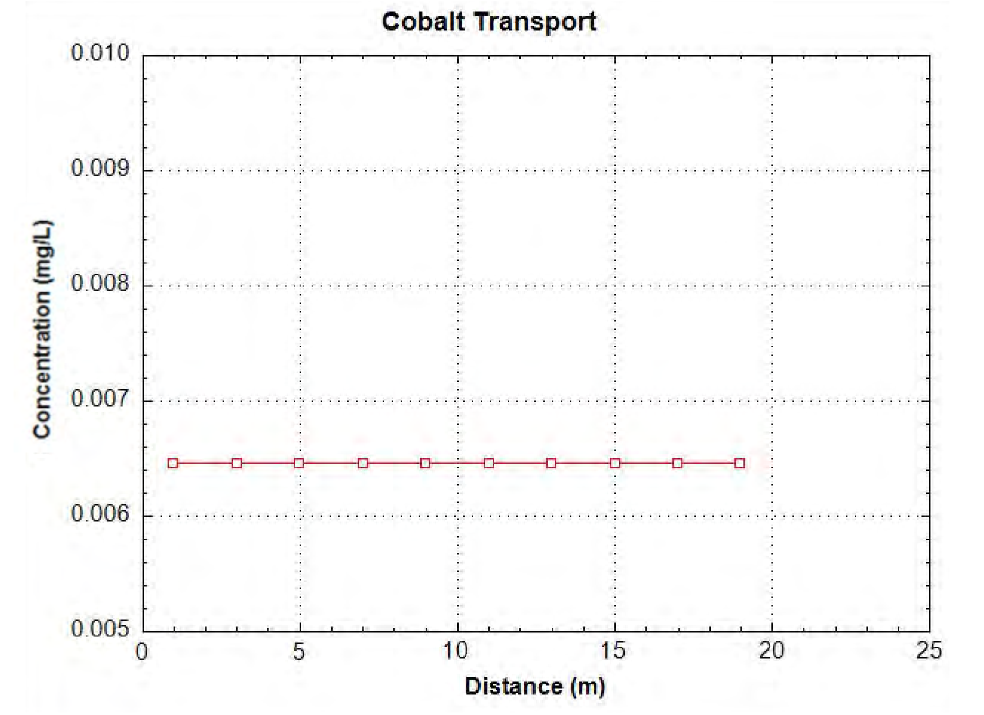
| PROJECT NO. | CONTROL | REV. | FIGURE |
|---|---|---|---|
| GL166849621 | | A | 4 d-f |

**DRAFT- ATTORNEY-CLIENT PRIVILEGED**

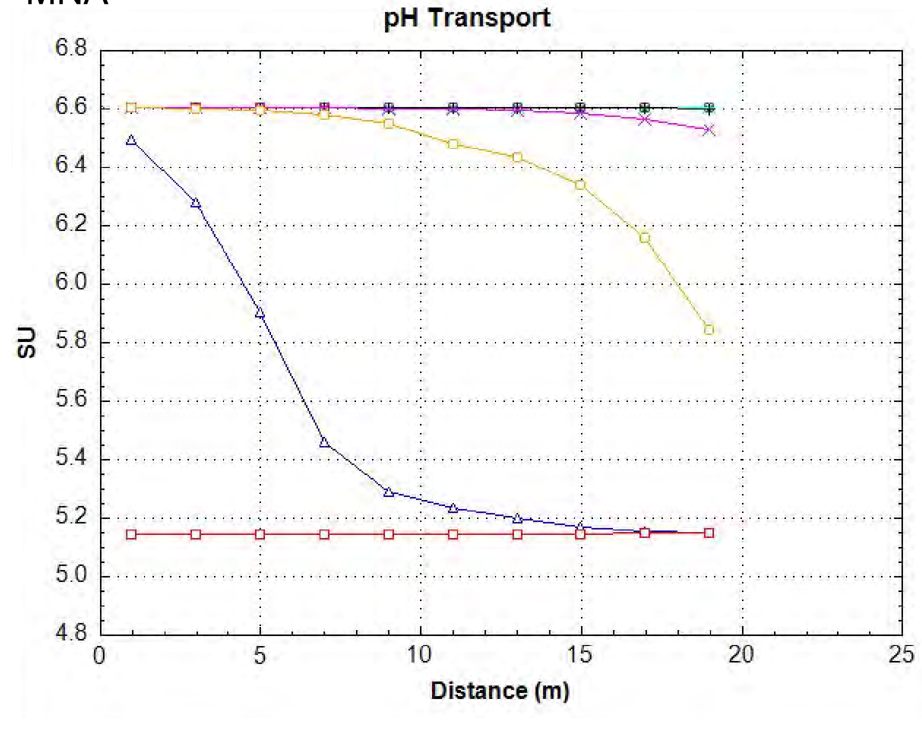
A) Initial Conditions




B) Initial Conditions

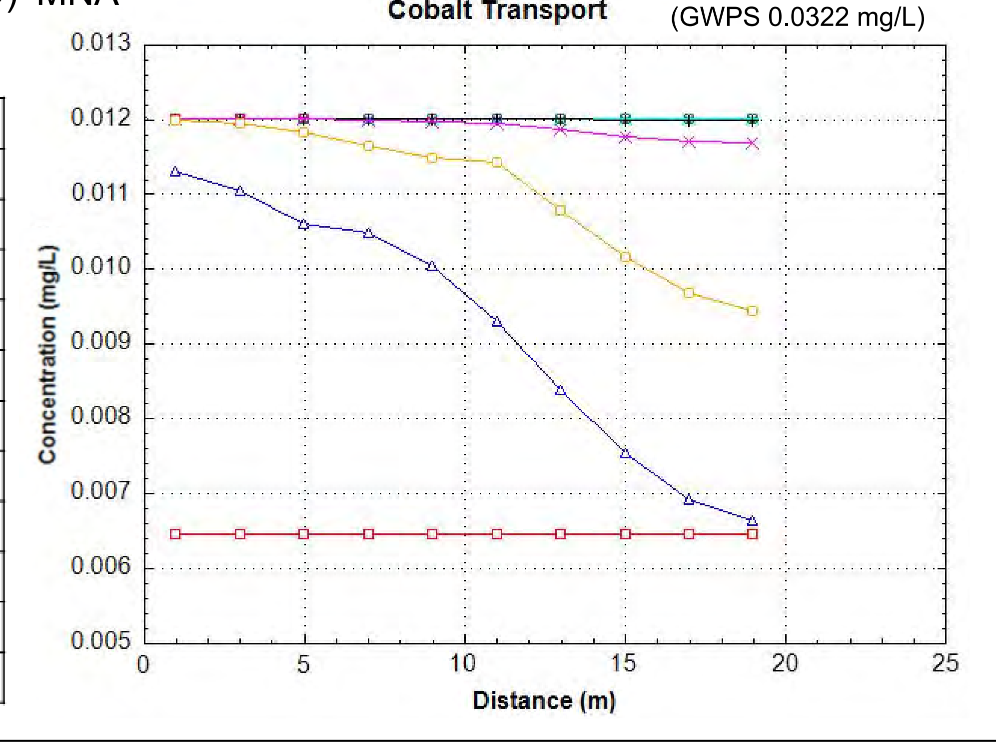



C) MNA




| | |
|---|---|
| Red (▫'s) | Initial Conditions |
| Blue (▵'s) | 1 year |
| Gold (▫'s) | 2 years |
| Pink (X's) | 3 years |
| Black (+'s) | 4 years |
| Sky Blue (*'s) | 5 years |
| Brown (▿'s) | 6 years |
| Green | 7 years |
| Gray (I's) | 8 years |
| Red | 9 years |
| Green (▫'s) | 10 years |
| Blue (◇'s) | 11 years |

D) MNA




GEORGIA POWER COMPANY
PLANT MCDONOUGH-ATKINSON

PROJECT
GEOCHEMICAL MODELING

CONSULTANT

wsp

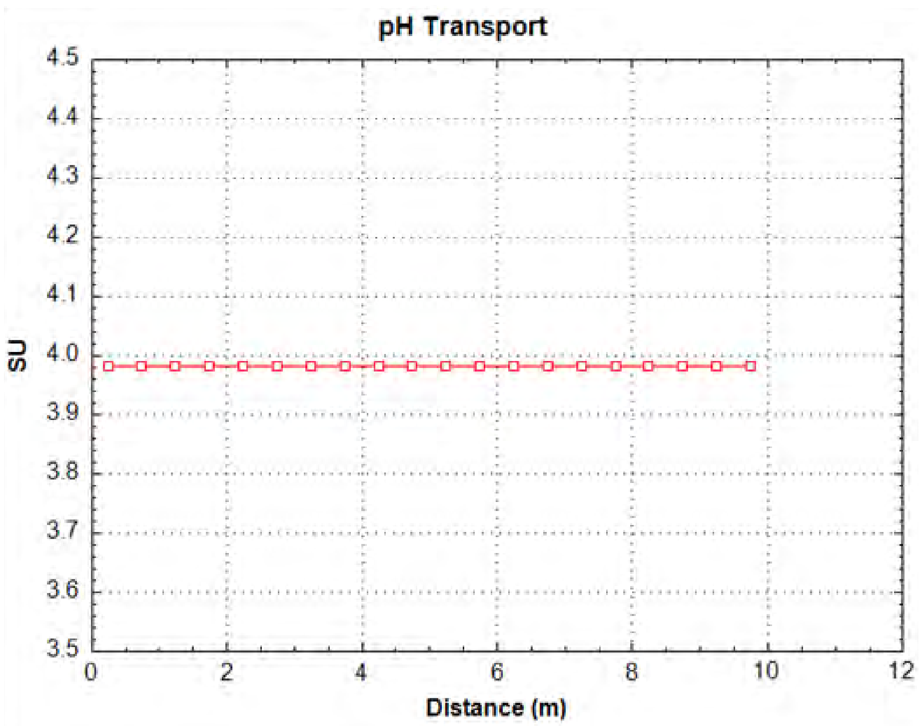
| | |
|---|---|
| YYYY-MM-DD | 2023-03-17 |
| DESIGNED | CM |
| PREPARED | CM |
| REVIEWED | PJN |
| APPROVED | XXX |

TITLE
TRANSECT 4

| PROJECT NO. | CONTROL | REV. | FIGURE |
|---|---|---|---|
| GL166849621 | | A | 5 |

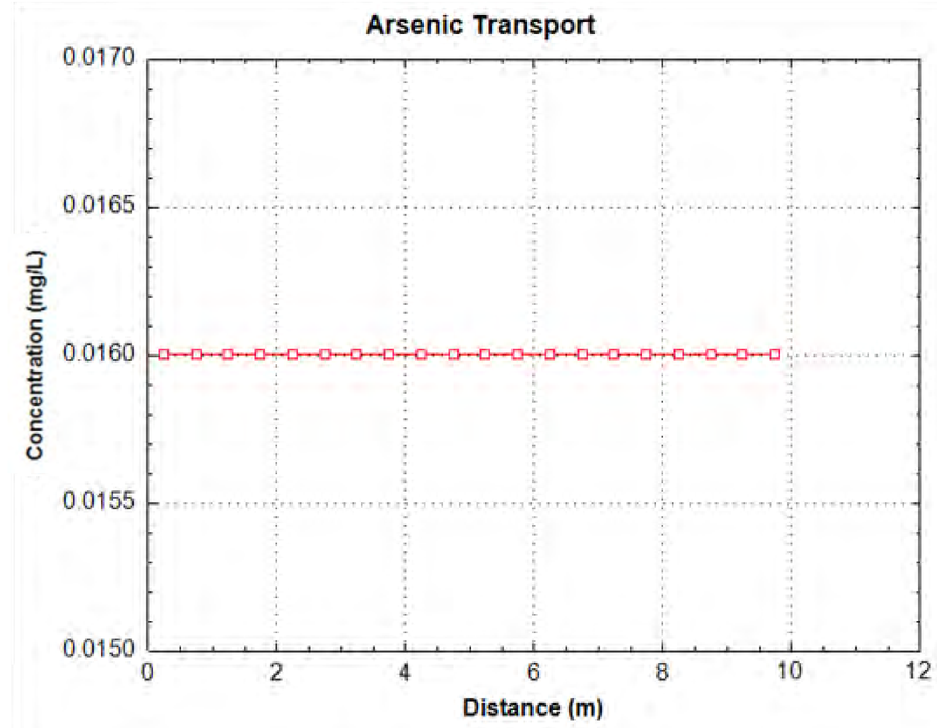
**DRAFT- ATTORNEY-CLIENT PRIVILEGED**

A)

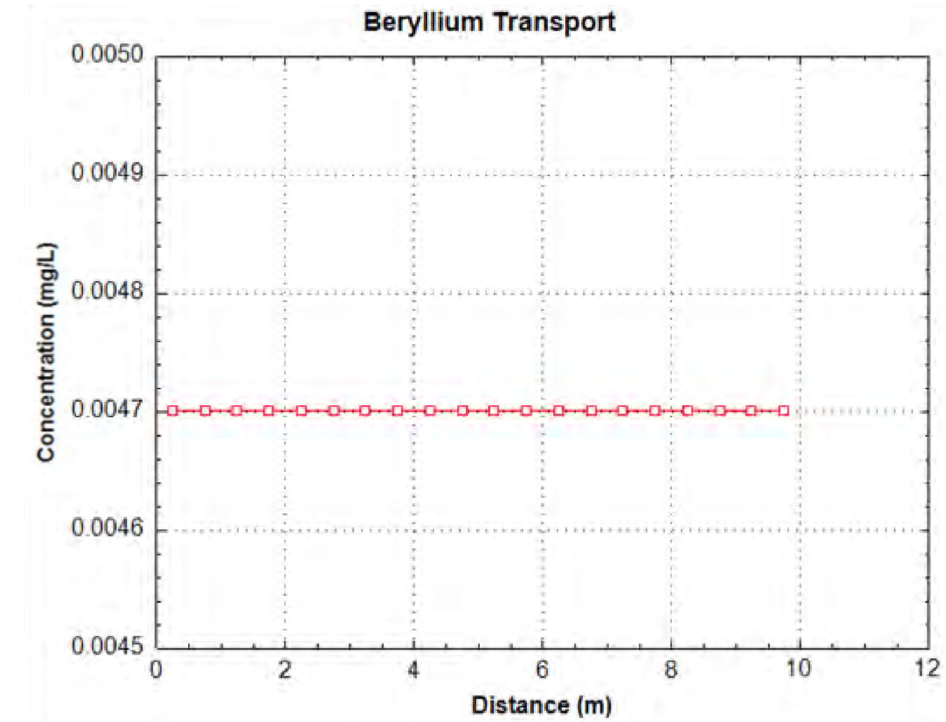



| | | | |
|---|---|---|---|
| Red (▫'s) | Initial Conditions | Brown (▿'s) | 6 years |
| Blue (▵'s) | 1 year | Green | 7 years |
| Gold (▫'s) | 2 years | Gray (I's) | 8 years |
| Pink (X's) | 3 years | Red | 9 years |
| Black (+'s) | 4 years | Green (▫'s) | 10 years |
| Sky Blue (*'s) | 5 years | Blue (◇'s) | 11 years |

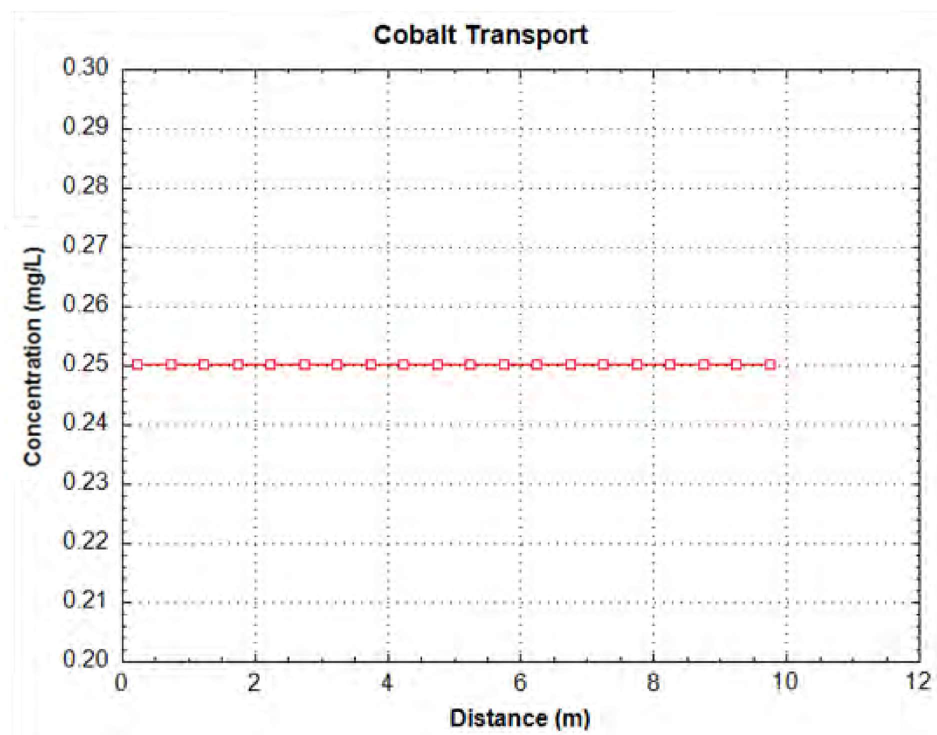
B)



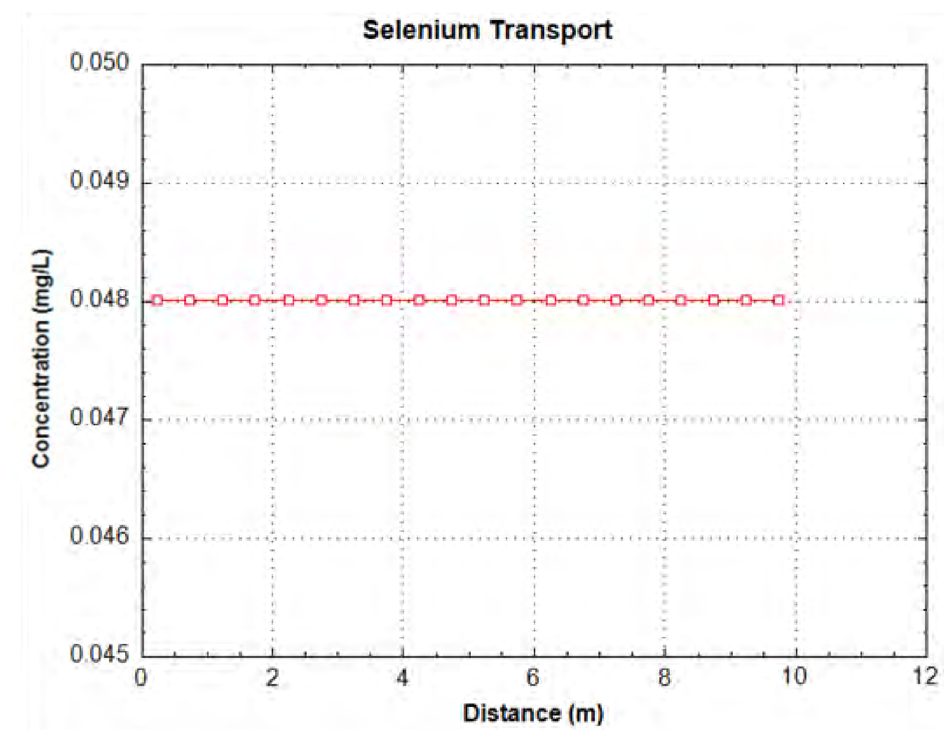

C)




D)




E)




**DRAFT- ATTORNEY-CLIENT PRIVILEGED**

GEORGIA POWER COMPANY
PLANT MCDONOUGH-ATKINSON

PROJECT
GEOCHEMICAL MODELING

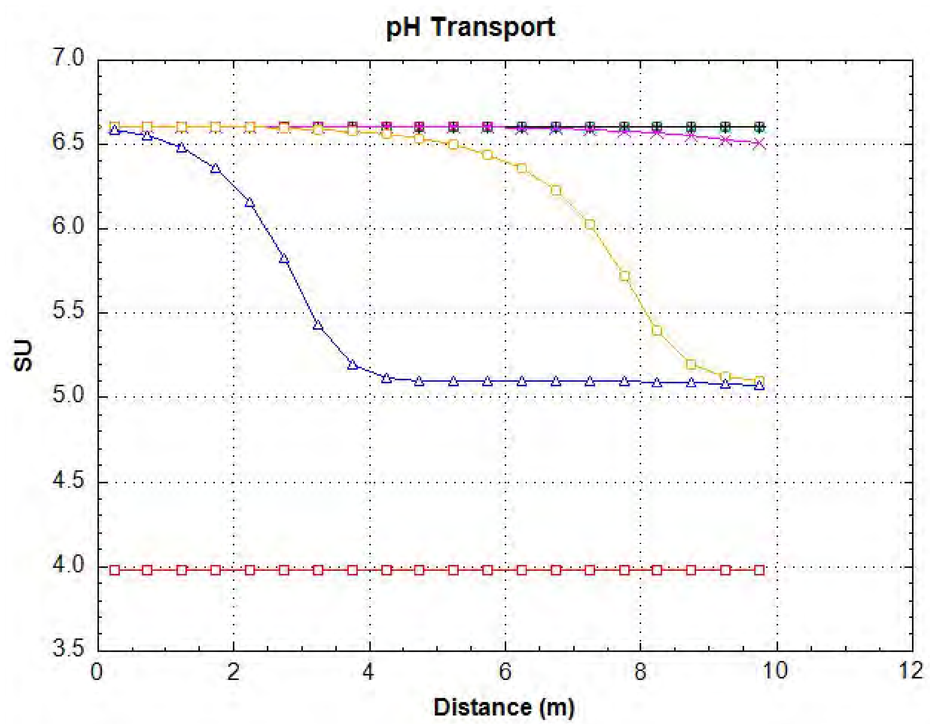
CONSULTANT

| | |
|---|---|
| YYYY-MM-DD | 2023-03-17 |
| DESIGNED | CM |
| PREPARED | CM |
| REVIEWED | PJN |
| APPROVED | XXX |

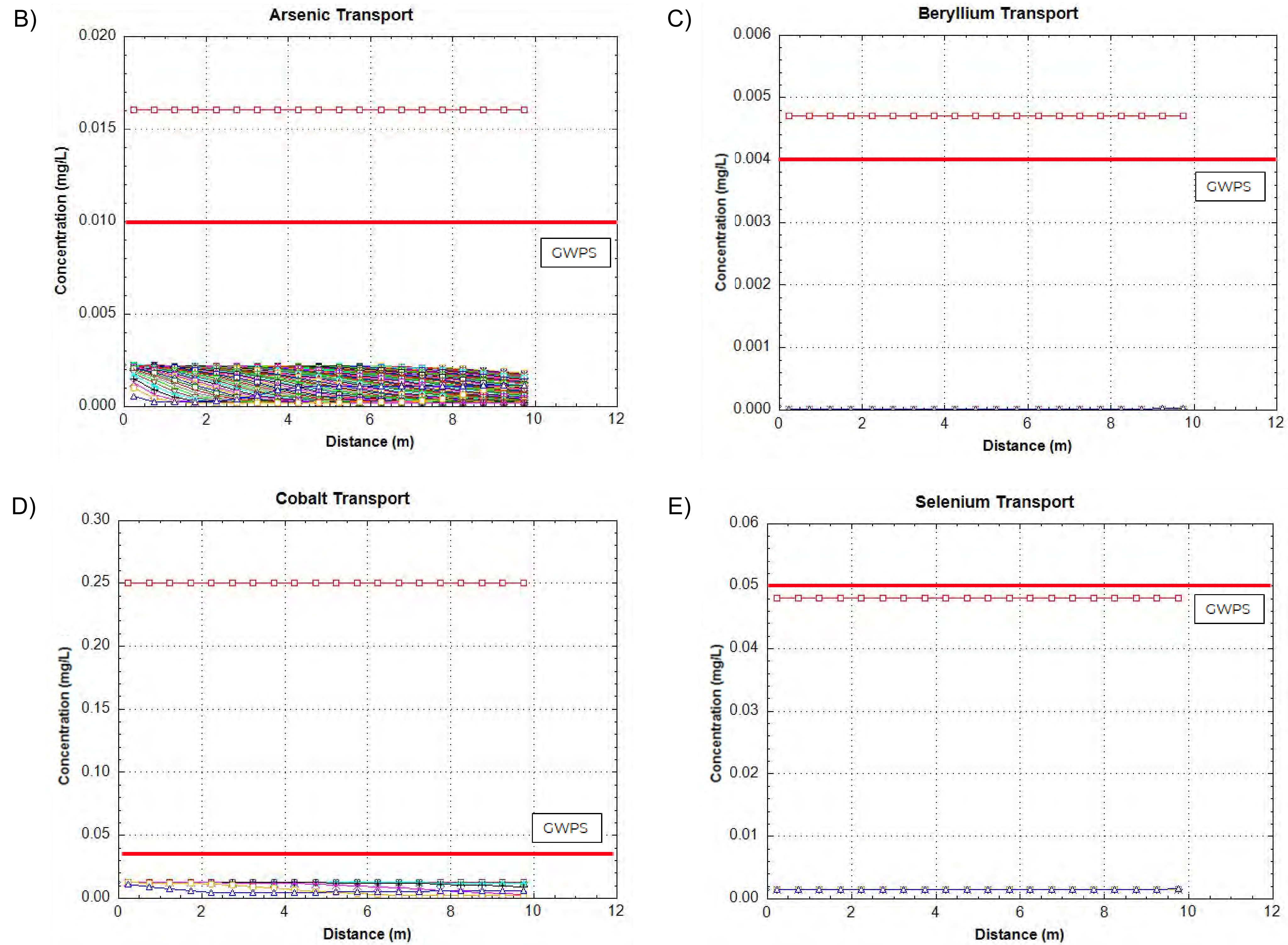
TITLE
TRANSECT 5 (INITIAL)

| PROJECT NO. | CONTROL | REV. | FIGURE |
|---|---|---|---|
| GL166849621 | | A | 6 |

A)




| | | | |
|---|---|---|---|
| Red (□'s) | Initial Conditions | Brown (▽'s) | 6 years |
| Blue (△'s) | 1 year | Green | 7 years |
| Gold (□'s) | 2 years | Gray (I's) | 8 years |
| Pink (X's) | 3 years | Red | 9 years |
| Black (+'s) | 4 years | Green (□'s) | 10 years |
| Sky Blue (*'s) | 5 years | Blue (◇'s) | 11 years |




**DRAFT- ATTORNEY-CLIENT PRIVILEGED**

GEORGIA POWER COMPANY
PLANT MCDONOUGH-ATKINSON

PROJECT
GEOCHEMICAL MODELING

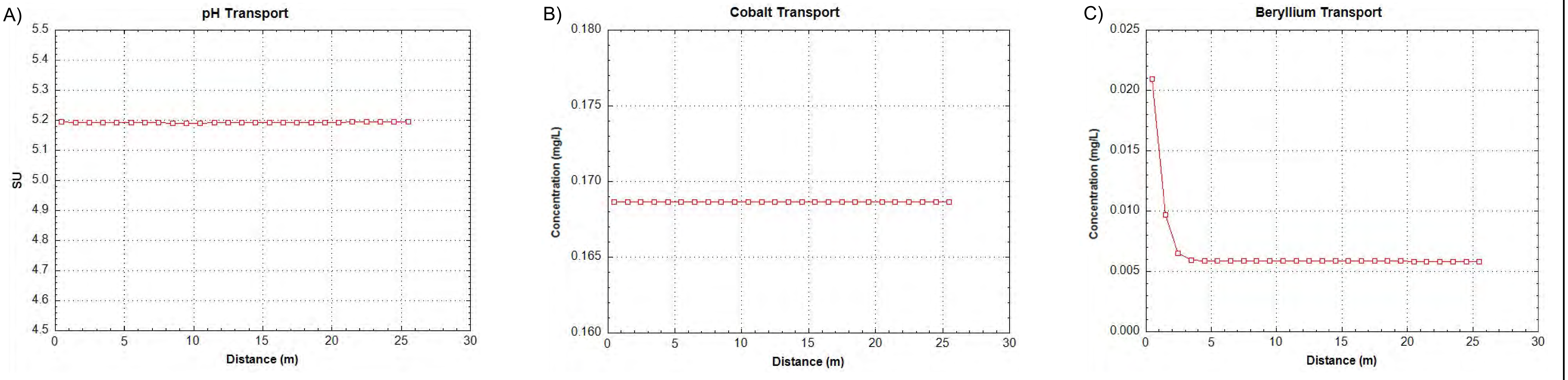
CONSULTANT

wsp

| | |
|---|---|
| YYYY-MM-DD | 2023-03-17 |
| DESIGNED | CM |
| PREPARED | CM |
| REVIEWED | PJN |
| APPROVED | XXX |

TITLE
**TRANSECT 5 (MNA)**

| PROJECT NO. | CONTROL | REV. | FIGURE |
|---|---|---|---|
| GL166849621 | | A | 7 |




| | | | |
|---|---|---|---|
| Red (□'s) | Initial Conditions | Brown (▿'s) | 6 years |
| Blue (▵'s) | 1 year | Green | 7 years |
| Gold (□'s) | 2 years | Gray (I's) | 8 years |
| Pink (X's) | 3 years | Red | 9 years |
| Black (+'s) | 4 years | Green (□'s) | 10 years |
| Sky Blue (*'s) | 5 years | Blue (◇'s) | 11 years |

GEORGIA POWER COMPANY
PLANT MCDONOUGH-ATKINSON

PROJECT
GEOCHEMICAL MODELING

CONSULTANT

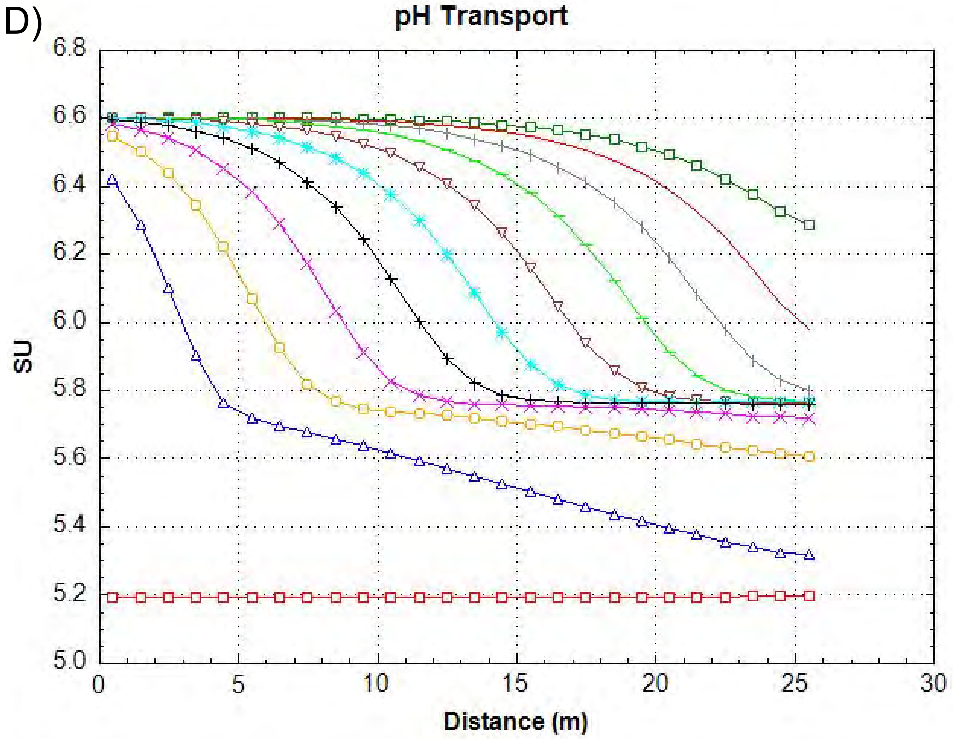
| | |
|---|---|
| YYYY-MM-DD | 2023-03-17 |
| DESIGNED | CM |
| PREPARED | CM |
| REVIEWED | PJN |
| APPROVED | XXX |

TITLE
**TRANSECT 6 (INITIAL)**

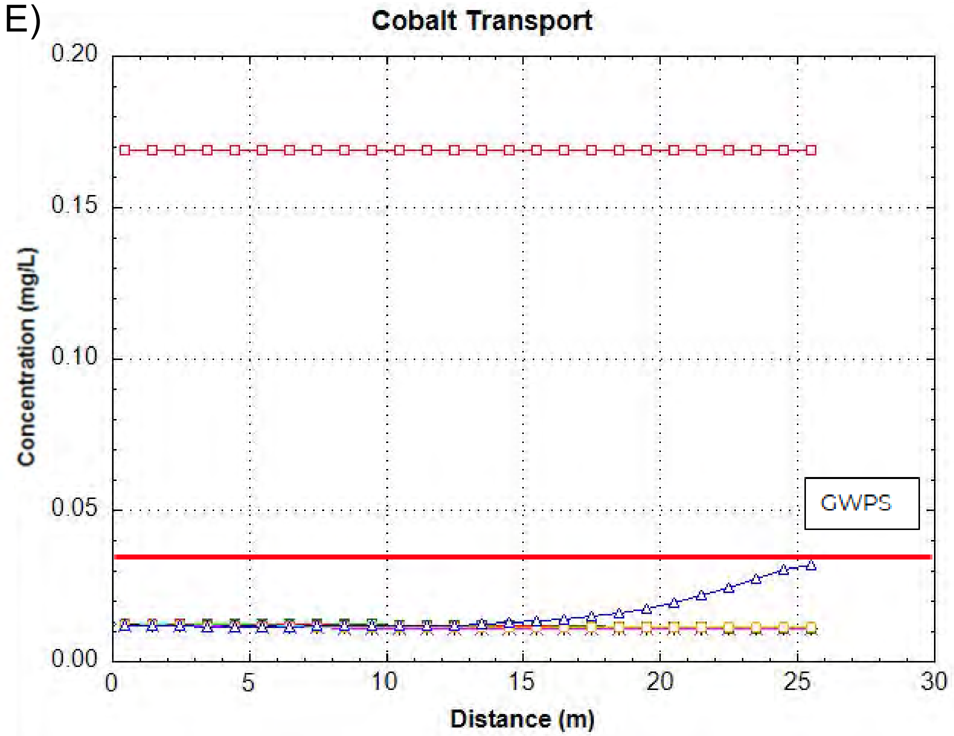
PROJECT NO. GL166849621 CONTROL REV. A FIGURE 8 a-c

**DRAFT- ATTORNEY-CLIENT PRIVILEGED**

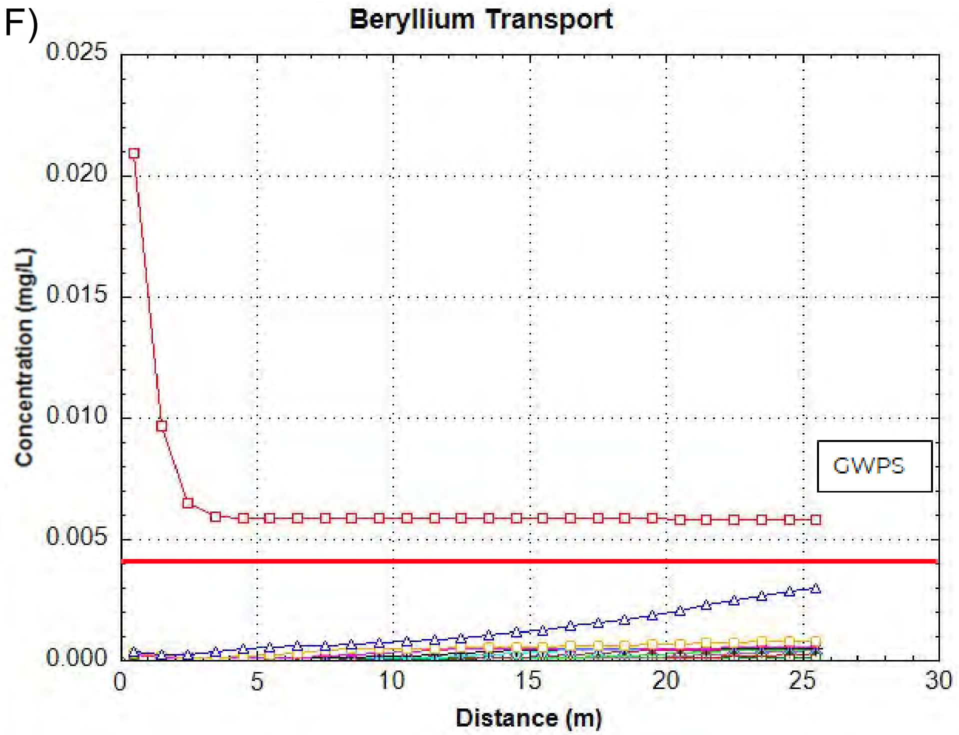
D)




E)




F)




| | | | |
|---|---|---|---|
| Red (▫'s) | Initial Conditions | Brown (▿'s) | 6 years |
| Blue (▵'s) | 1 year | Green | 7 years |
| Gold (▫'s) | 2 years | Gray (l's) | 8 years |
| Pink (X's) | 3 years | Red | 9 years |
| Black (+'s) | 4 years | Green (▫'s) | 10 years |
| Sky Blue (*'s) | 5 years | Blue (◇'s) | 11 years |

**DRAFT- ATTORNEY-CLIENT PRIVILEGED**

GEORGIA POWER COMPANY
PLANT MCDONOUGH-ATKINSON

PROJECT
GEOCHEMICAL MODELING

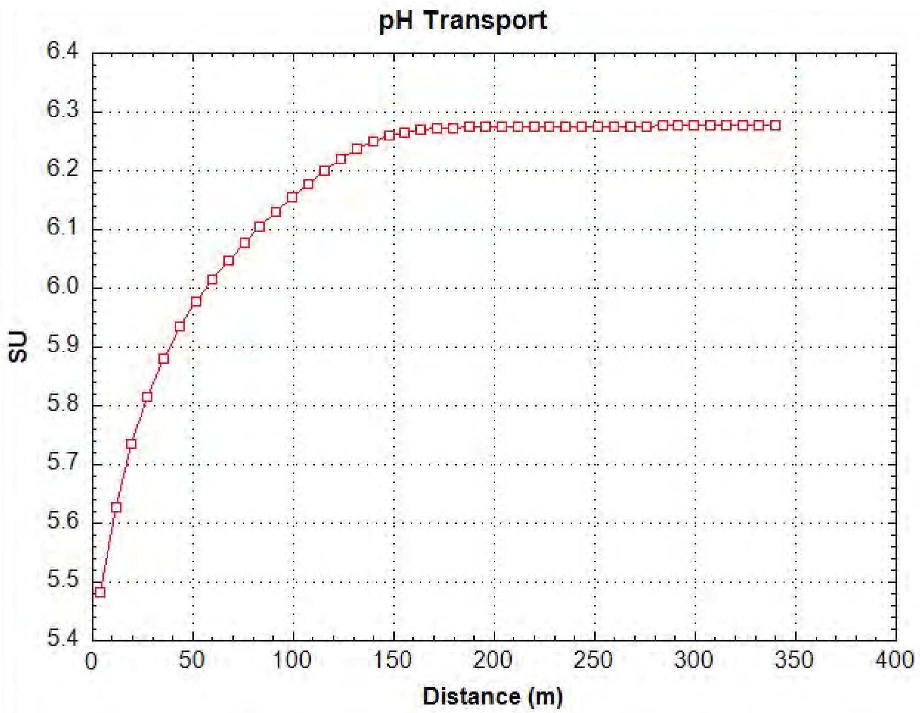
CONSULTANT

| | |
|---|---|
| YYYY-MM-DD | 2023-03-17 |
| DESIGNED | CM |
| PREPARED | CM |
| REVIEWED | PJN |
| APPROVED | XXX |

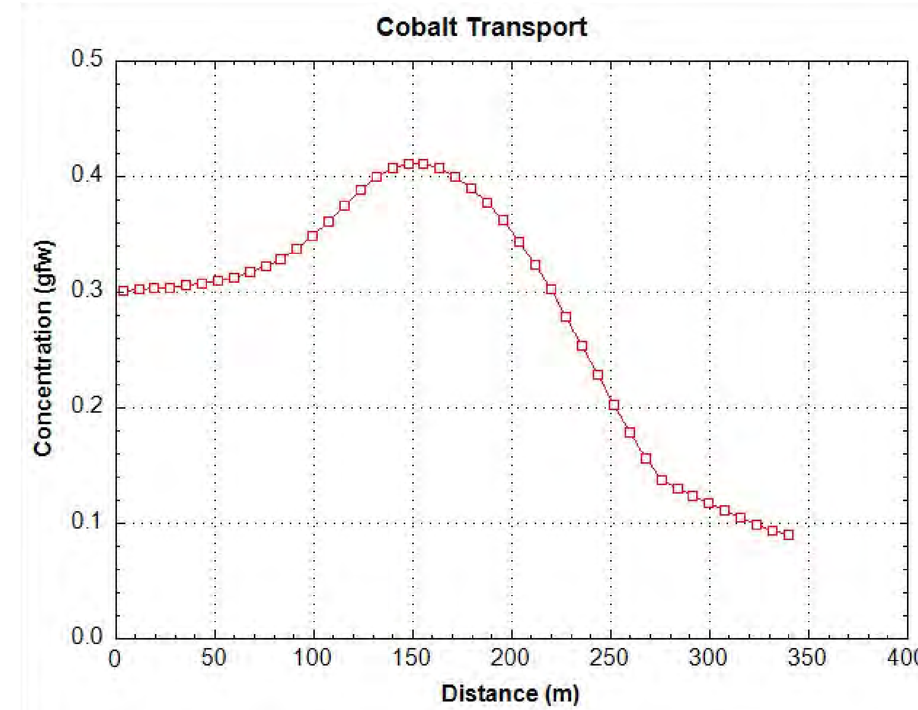
TITLE
**TRANSECT 6 (MNA)**

| PROJECT NO. | CONTROL | REV. | FIGURE |
|---|---|---|---|
| GL166849621 | | A | 8 d-f |

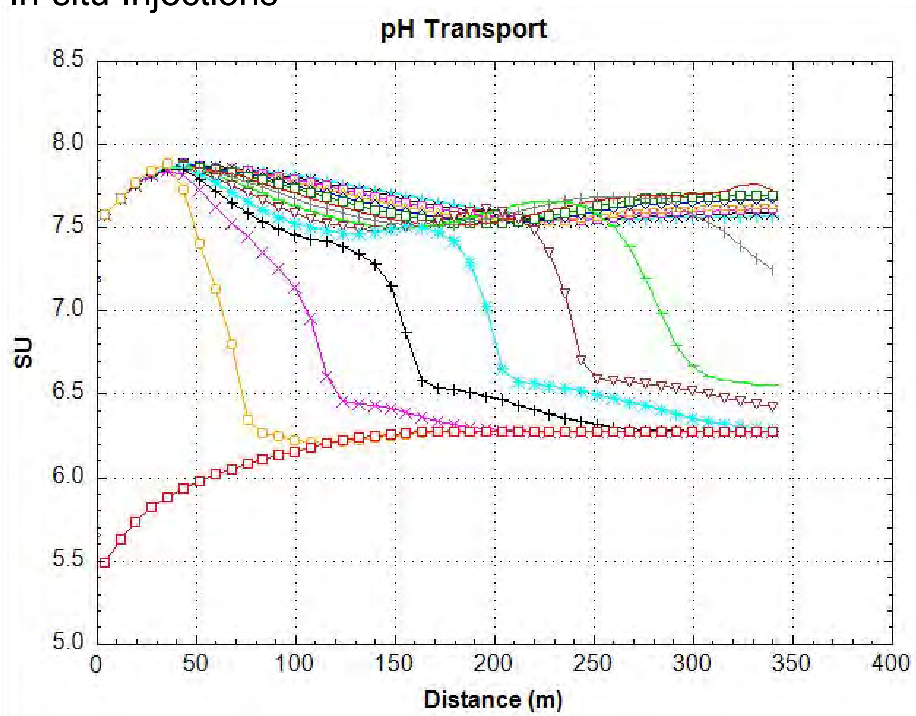
A) Initial Conditions




B) Initial Conditions

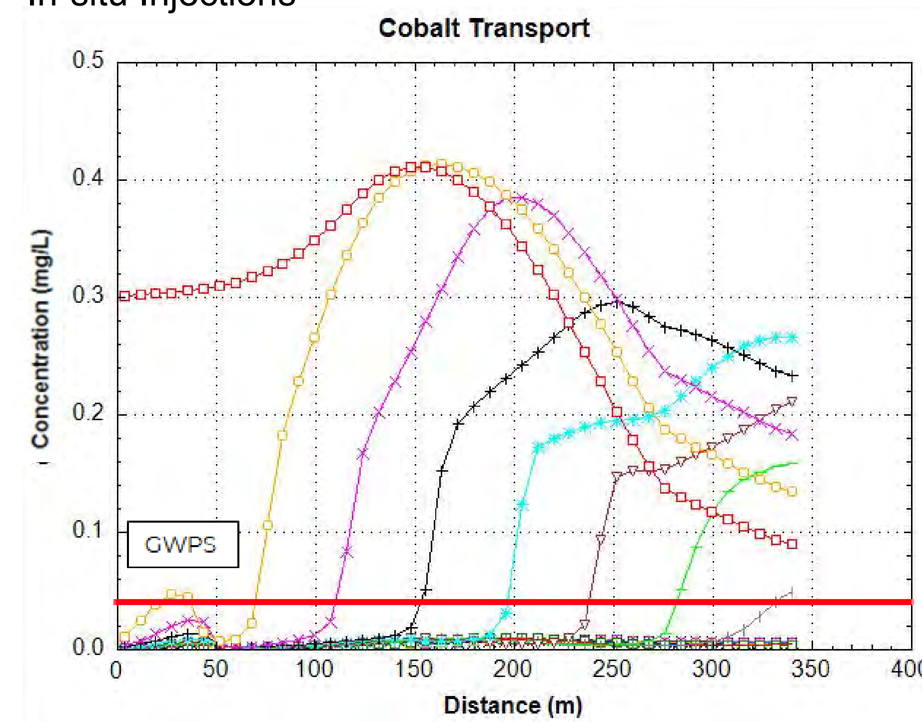



C) In-situ Injections




| | |
|---|---|
| Red (□'s) | Initial Conditions |
| Blue (△'s) | 1 year |
| Gold (□'s) | 2 years |
| Pink (X's) | 3 years |
| Black (+'s) | 4 years |
| Sky Blue (*'s) | 5 years |
| Brown (▿'s) | 6 years |
| Green | 7 years |
| Gray (I's) | 8 years |
| Red | 9 years |
| Green (□'s) | 10 years |
| Blue (◇'s) | 11 years |

D) In-situ Injections




GEORGIA POWER COMPANY
PLANT MCDONOUGH-ATKINSON

PROJECT
GEOCHEMICAL MODELING

CONSULTANT

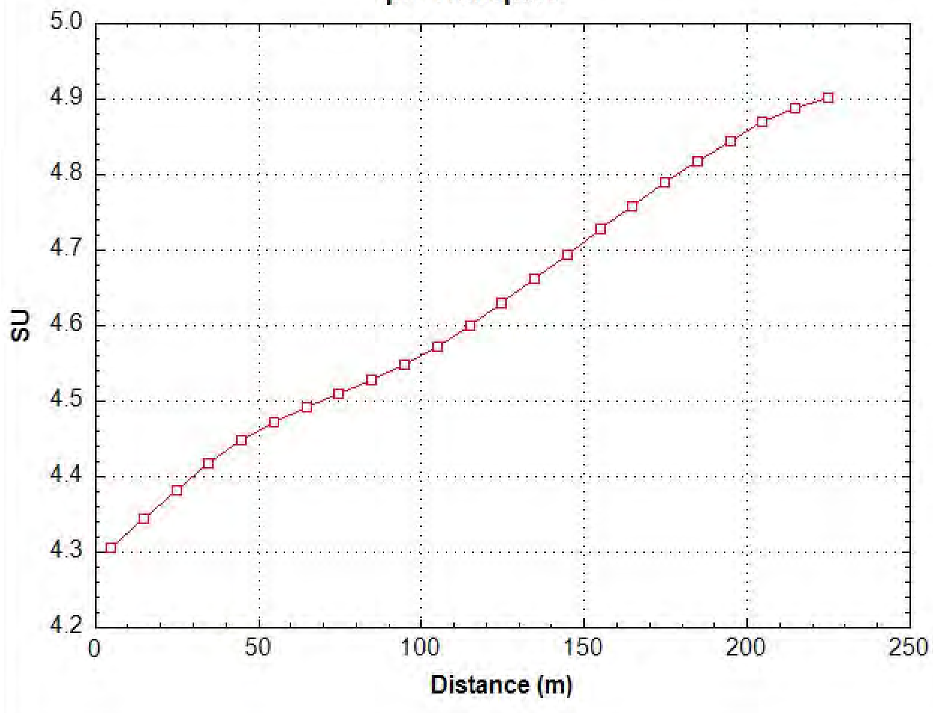
| | |
|---|---|
| YYYY-MM-DD | 2023-03-17 |
| DESIGNED | CM |
| PREPARED | CM |
| REVIEWED | PJN |
| APPROVED | XXX |

TITLE
TRANSECT 7

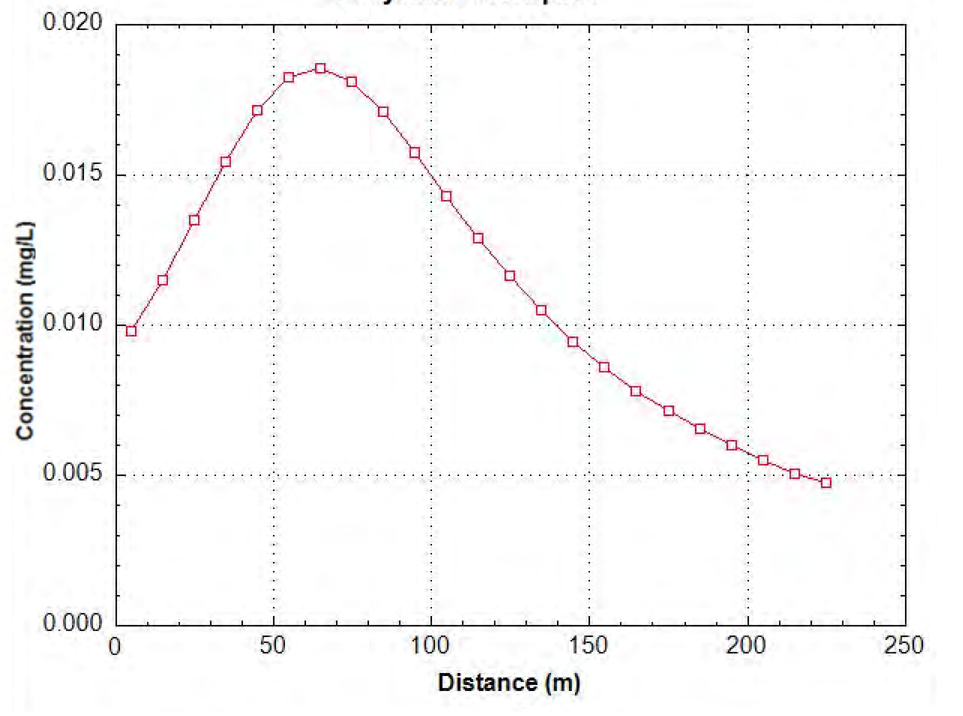
| PROJECT NO. | CONTROL | REV. | FIGURE |
|---|---|---|---|
| GL166849621 | | A | 9 |

**DRAFT- ATTORNEY-CLIENT PRIVILEGED**

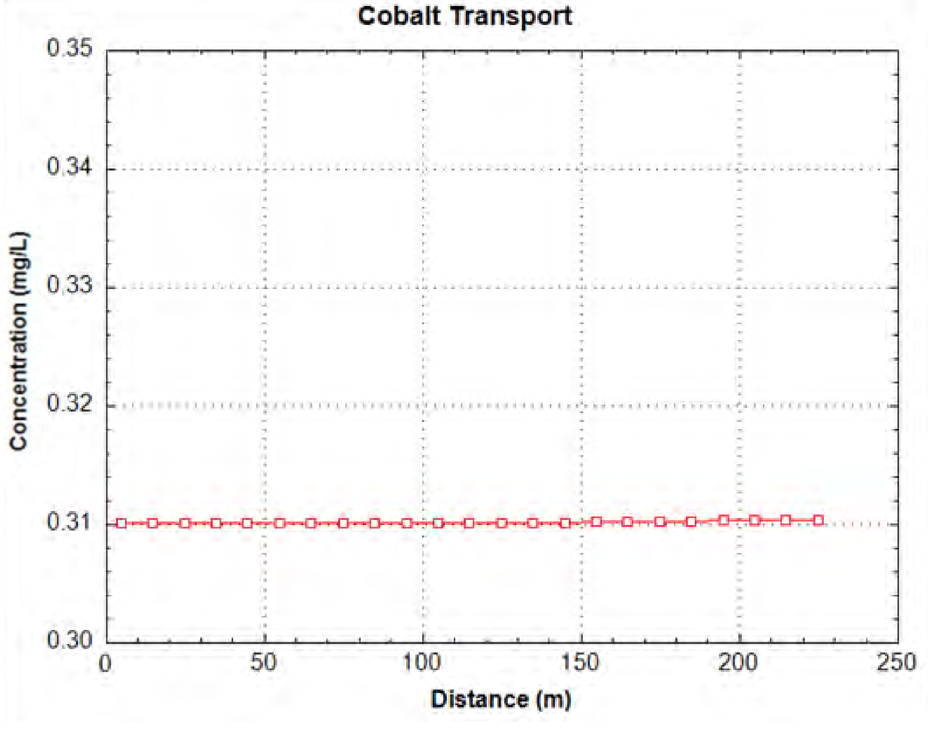
A)




B)

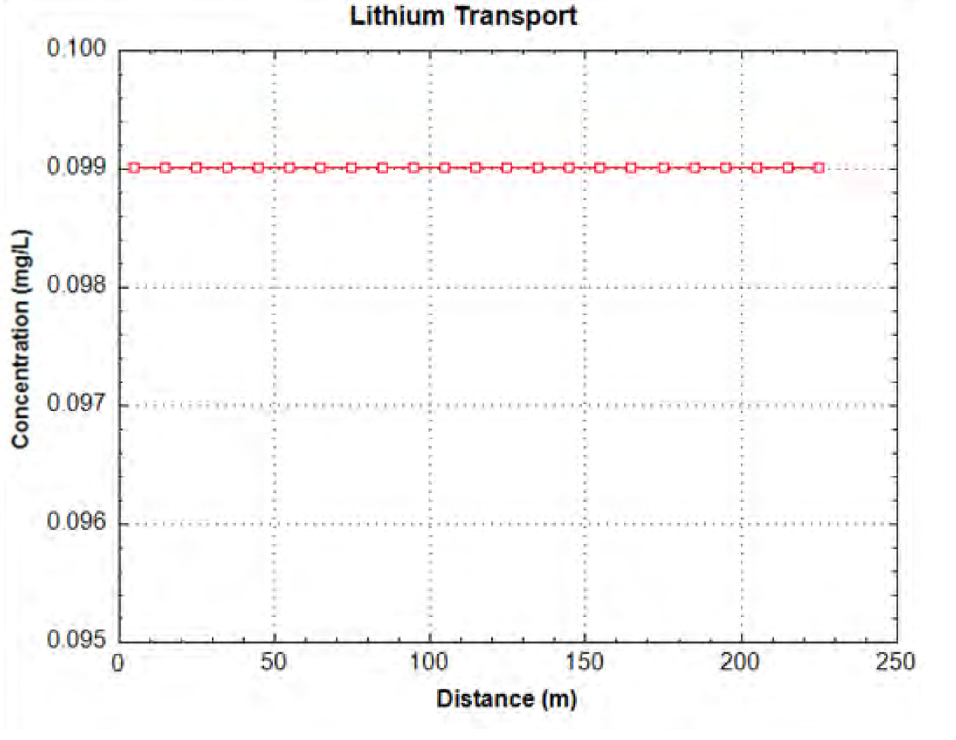



C)




| | |
|---|---|
| Red (□'s) | Initial Conditions |
| Blue (△'s) | 1 year |
| Gold (□'s) | 2 years |
| Pink (X's) | 3 years |
| Black (+'s) | 4 years |
| Sky Blue (*'s) | 5 years |
| Brown (▽'s) | 6 years |
| Green | 7 years |
| Gray (I's) | 8 years |
| Red | 9 years |
| Green (□'s) | 10 years |
| Blue (◇'s) | 11 years |

D)




GEORGIA POWER COMPANY
PLANT MCDONOUGH-ATKINSON

PROJECT
GEOCHEMICAL MODELING

CONSULTANT

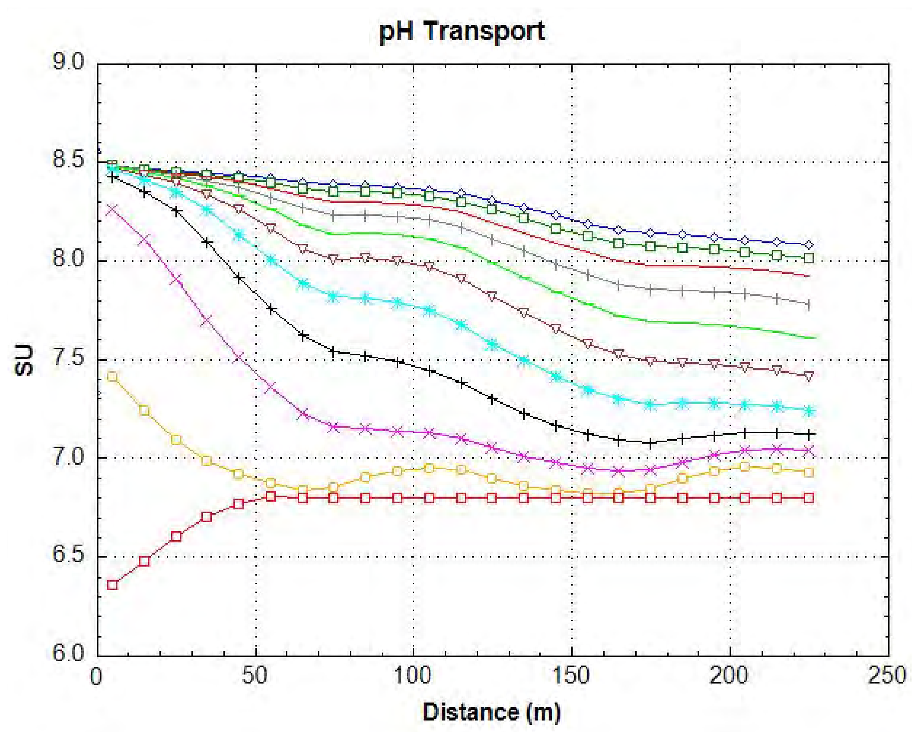
| | |
|---|---|
| YYYY-MM-DD | 2023-03-17 |
| DESIGNED | CM |
| PREPARED | CM |
| REVIEWED | PJN |
| APPROVED | XXX |

TITLE
TRANSECT 8 (INITIAL)

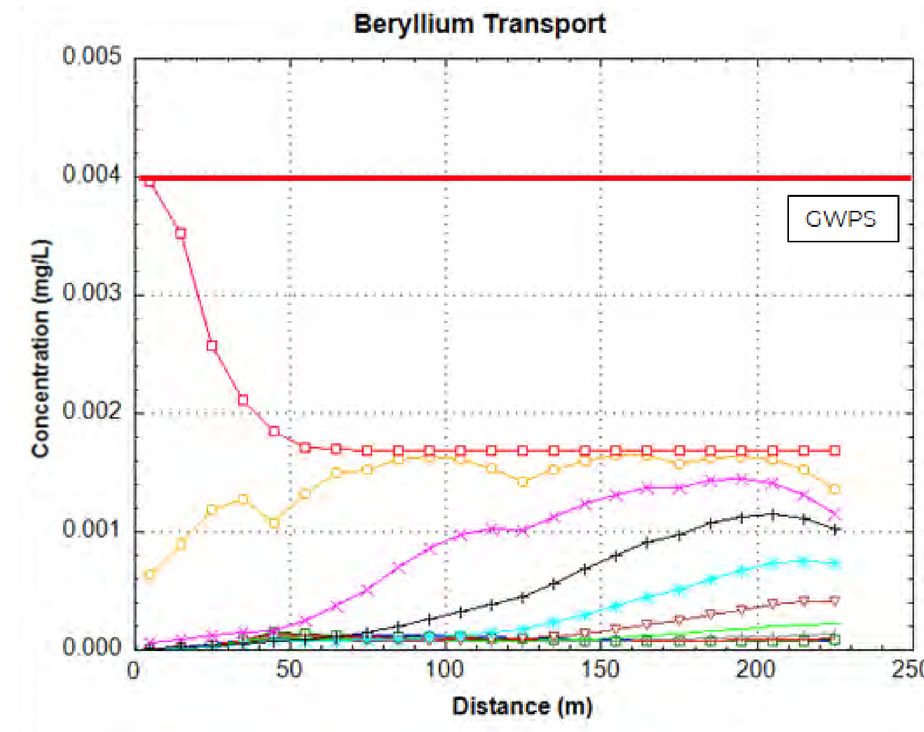
| PROJECT NO. | CONTROL | REV. | FIGURE |
|---|---|---|---|
| GL166849621 | | A | 10 |

**DRAFT- ATTORNEY-CLIENT PRIVILEGED**

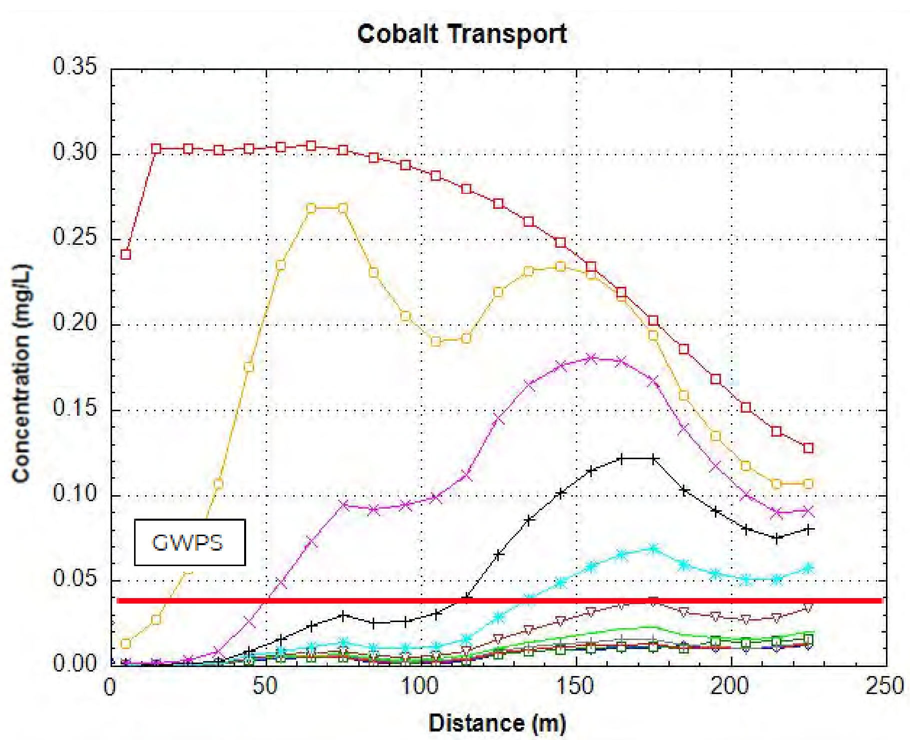
A)




B)

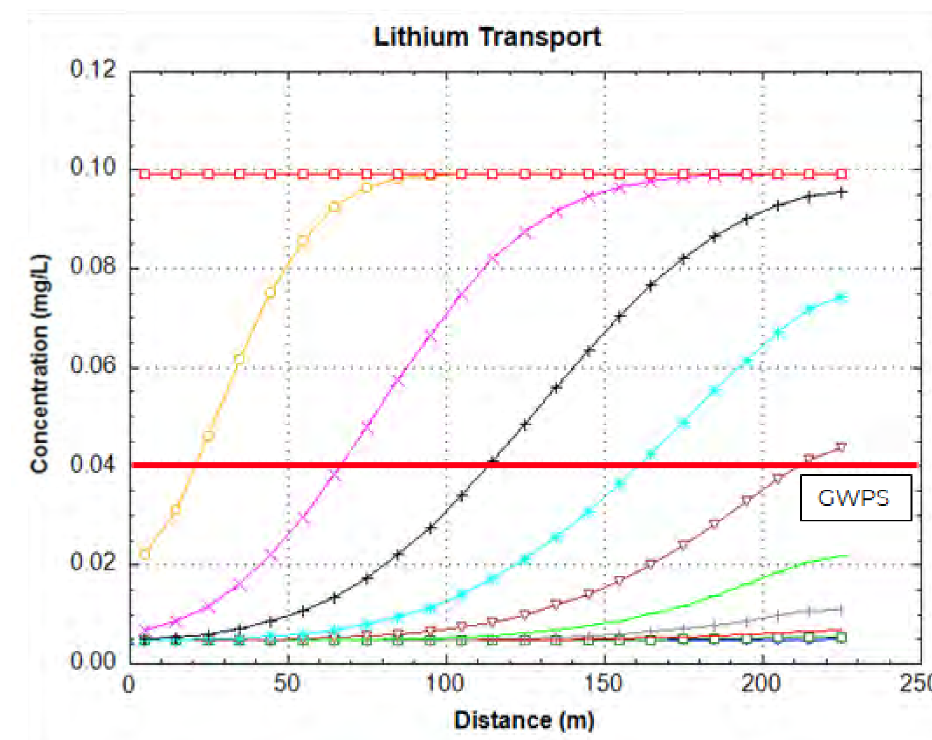



C)




| | |
|---|---|
| Red (□'s) | Initial Conditions |
| Blue (△'s) | 1 year |
| Gold (□'s) | 2 years |
| Pink (X's) | 3 years |
| Black (+'s) | 4 years |
| Sky Blue (*'s) | 5 years |
| Brown (▽'s) | 6 years |
| Green | 7 years |
| Gray (I's) | 8 years |
| Red | 9 years |
| Green (□'s) | 10 years |
| Blue (◇'s) | 11 years |

D)




GEORGIA POWER COMPANY
PLANT MCDONOUGH-ATKINSON

PROJECT
GEOCHEMICAL MODELING

CONSULTANT

| | |
|---|---|
| YYYY-MM-DD | 2023-03-17 |
| DESIGNED | CM |
| PREPARED | CM |
| REVIEWED | PJN |
| APPROVED | XXX |

TITLE
**TRANSCT 8 (IN-SITU INJECTIONS)**

PROJECT NO. GL166849621 CONTROL REV. A FIGURE 11

**DRAFT- ATTORNEY-CLIENT PRIVILEGED**

**APPENDIX A**

# Geochemical Modeling Input and Results Files

Model files will be provided to GA EPD in separate submission on or before October 31, 2023.

wsp.com

**APPENDIX C**

# Risk Evaluation Report

# RISK EVALUATION REPORT

## PLANT MCDONOUGH
## ASH PONDS 2 AND 3/4
## COBB COUNTY, GEORGIA

*Prepared for*

**Georgia Power**
241 Ralph McGill Boulevard
Atlanta, Georgia 30308

*Prepared by*

**WSP USA Environment & Infrastructure Inc.**
1075 Big Shanty Road NW, #100
Kennesaw, Georgia 30144

August 31, 2023

## TABLE OF CONTENTS


EXECUTIVE SUMMARY ........ v

1 Introduction........ 1

2 Basis And Background For The Development Of The Conceptual Exposure Model ........ 3
- 2.1 Site Description ........ 3
  - 2.1.1 Topography and Surface Hydrology ........ 4
  - 2.1.2 Geology and Hydrogeology ........ 5
- 2.2 Potential Transport Pathways ........ 6
  - 2.2.1 Groundwater ........ 6
  - 2.2.2 Surface Water ........ 7
- 2.3 Potential Exposure Pathways and Receptors ........ 7

3 Risk Evaluation Screening ........ 10
- 3.1 Data Used in Risk Evaluation Screening ........ 10
  - 3.1.1 Groundwater Data ........ 10
  - 3.1.2 Background Groundwater Quality ........ 11
- 3.2 Groundwater Screening Evaluation ........ 12
- 3.3 Alternate Source Demonstration ........ 13

4 REFINED RISK EVALUATION ........ 15
- 4.1 Refined Groundwater Risk Evaluation ........ 15
  - 4.1.1 Groundwater Exposure Point Calculation ........ 16
  - 4.1.2 COPI Concentration Trend Analysis ........ 17
  - 4.1.3 Refined Groundwater Risk Evaluation Results ........ 18
- 4.2 Surface Water Risk Evaluation ........ 22
  - 4.2.1 Surface Water Data ........ 23
  - 4.2.2 Human Health Screening ........ 23
  - 4.2.3 Ecological Screening ........ 24
  - 4.2.4 Refined Groundwater and Surface Water Risk Evaluation Summary and Conclusions ........ 24

5 Uncertainty Assessment ........ 26

## TABLE OF CONTENTS (Continued)

6 Conclusions........................................................................................................ 29

7 References.......................................................................................................... 30

## LIST OF TABLES

Table 1 SSL-Related Constituent Groundwater Screening
Table 2 Groundwater Exposure Point Concentration Summary
Table 3 Downgradient Groundwater Refined Screening
Table 4 Human Health Surface Water Screening
Table 5 Ecological Surface Water Screening

## LIST OF FIGURES

Figure 1 Site Location
Figure 2 Site Layout and Monitoring Well Network
Figure 3 Potentiometric Surface Elevation Contours (January 2023)
Figure 4 Conceptual Exposure Model
Figure 5 Off-Site Well Survey Results
Figure 6 Groundwater Risk Screening Approach for AP-2 and AP-3/4
Figure 7 Refined Groundwater Risk Evaluation Approach for AP-2 and AP-3/4
Figure 8 Surface Water Risk Screening Approach for AP-2 and AP-3/4
Figure 9 Surface Water Sample Locations

## LIST OF APPENDICES

Appendix A Plant McDonough Well Survey (Off-Site)
Appendix B Data Used in Risk Evaluation
  Appendix B-1 Groundwater Data
  Appendix B-2 Surface Water Data
Appendix C USEPA RSL Calculator Generated Residential Screening Levels
Appendix D Support for Refined Risk Evaluation
  Appendix D-1 Exposure Point Concentration Calculation Results

**TABLE OF CONTENTS (Continued)**

Appendix D-2 Exposure Point Concentration Figures
Appendix D-3 ProUCL Input / Output Files
Appendix D-4 Groundwater Trend Graphs

# LIST OF ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| AP | Ash Pond |
| ASD | Alternate Source Demonstration |
| Bgs | below ground surface |
| CCR | Coal Combustion Residual |
| CEM | Conceptual Exposure Model |
| CFR | Code of Federal Regulations |
| cm/s | centimeters per second |
| COI | Constituent of Interest |
| COPI | Constituent of Potential Interest |
| EPC | Exposure Point Concentration |
| EPD | [Georgia] Environmental Protection Division |
| ft | feet |
| ft/day | feet per day |
| GWPS | Groundwater Protection Standard |
| HSRA | Hazardous Site Response Act |
| IRIS | Integrated Risk Information System |
| mg/L | Milligrams per liter |
| msl | mean sea level |
| MDL | method detection limit |
| ProUCL | ProUCL software version 5.2 |
| PWR | partially weathered rock |
| PZ | Piezometer |
| RME | Reasonable Maximum Exposure |
| RRS | Risk Reduction Standards |
| RSL | Regional Screening Level |
| SPT | Standard Penetration Test |
| 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 McDonough-Atkinson (Plant McDonough) (site) is a former coal-fired, electric-generating facility located in southeast Cobb County, Georgia, approximately seven miles northwest of Atlanta. The site occupies approximately 390 acres and is bounded on the southeast by the Chattahoochee River. Georgia Power retired its coal-fired units at Plant McDonough in 2011 and began commercial operation of three natural gas combined cycle units in 2012. In compliance with applicable regulations, coal combustion residual (CCR) material resulting from power generation has historically been stored at the site in four surface impoundments: ash ponds (AP) AP-1, AP-2, AP-3, and AP-4. This report focuses on AP-2 and AP-3/4. AP-1 is addressed under separate cover.

Georgia Power is currently in the permitting process for AP-2 and AP-3/4. AP-2 was closed by removal and AP-3/4 is in the process of being closed in place by consolidation as a combined unit AP-3/4 with an engineered cover system, in accordance with the Federal CCR Rule, 40 Code of Federal Regulations (CFR) Part 257 Subpart D - Standards for the Disposal of Coal Combustion Residuals in Landfills and Surface Impoundments[1] and the State CCR Rule, Georgia Environmental Protection Division (EPD) Coal Combustion Residuals Rule 391-3-4-.10. In addition to the engineered cover system, the AP-3/4 closure includes an under-slope drainage system and additional temporary advanced engineering wells to accelerate the pace at which the groundwater table will lower to the expected long-term post-closure level below the base of AP-3/4 (Golder, 2021). Post closure care including semiannual groundwater monitoring and reporting is required for at least 30 years following closure in place.

This report focuses on AP-2, AP-3, and AP-4 (collectively referred to as AP-2 and AP-3/4) and presents the results of a human health risk evaluation for CCR constituents[2] that exhibit statistically significant levels (SSLs) in groundwater at the site and the supporting

---

[1] The full citation for the Federal CCR Rule is: 40 C.F.R. § 257, Subpart D – *Standards for the Disposal of Coal Combustion Residuals in Landfills and Surface Impoundments*. The rule was finalized with an effective date of October 14, 2015 and last amended August 28, 2020 with an effective date of September 28, 2020 (USEPA, 2020).

[2] The constituents included in the risk evaluation also occur naturally in the site geologic setting. An alternate source demonstration (ASD) was prepared for radium 226/228 combined, one of the SSL-related constituents identified at AP-2 and AP-3/4, in accordance with 40 CFR §257.94 and approved by Georgia EPD. The ASD demonstrates that concentrations of radium 226/228 combined in groundwater wells B-104D and B-109D are due to natural occurrence of radionuclides in the subsurface. Therefore, radium 226/228 combined was not included in the risk evaluation.

human health and ecological risk evaluation for the adjacent downgradient surface water body, the Chattahoochee River. 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. Using the groundwater protection standards (GWPS) established for AP-2 and AP-3/4 according to the Federal and State CCR Rules, arsenic, beryllium, cobalt, and lithium were previously identified as SSL constituents (WSP, 2023a). The risk evaluation relies on groundwater data collected from 2016 through February 2023 by Georgia Power in compliance with the Federal and State CCR Rules.

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-2 and AP-3/4.
2. Initial groundwater risk screening: Comparison of groundwater concentrations for SSL-related constituents (arsenic, beryllium, cobalt, and lithium) to conservative, health-protective criteria and/or background concentrations to assess whether constituents pose a risk to human health.
3. Refined groundwater risk evaluation: Performance of a more refined analysis for Constituents of Potential Interest (COPIs) that were retained in the initial risk screening in order to evaluate the potential risks for hypothetical off-site residential receptors exposed to groundwater.
4. Surface water screening: Comparison of surface water concentrations for those constituents identified as groundwater constituents of interest (COIs) to conservative, health-protective criteria to assess whether those constituents pose a risk to human health and/or the environment as an additional line of evidence.
5. Development of risk conclusions and identification of associated uncertainties.

Using this approach that includes multiple conservative assumptions, SSL-related constituents (arsenic, beryllium, cobalt, and lithium) are not expected to pose a risk to human health or the environment. Therefore, no further risk evaluation of groundwater and surface water is warranted. Compliance monitoring for AP-2 and AP-3/4 under the Federal and State CCR Rules will continue with additional surface water monitoring as discussed herein. Georgia Power will proactively evaluate the data and update this evaluation, if necessary.

# 1 INTRODUCTION

This report summarizes a risk evaluation of AP-2 and AP-3/4, located at Georgia Power Plant McDonough in Cobb County, Georgia (**Figure 1**). Georgia Power is currently in the permitting process for AP-2 and AP-3/4 in accordance with the Federal CCR Rule (USEPA, 2020) and the State CCR Rule (EPD, 2022a). Georgia Power submitted one permit application for the closures of AP-2 and AP-3/4 on November 20, 2018 as a combined multi-unit application. CCR removal from AP-2 was substantially completed in 2016 and the remaining CCR removal from AP-2 was completed in 2019. A closure certification report was submitted to the Georgia EPD on March 30, 2020 and acknowledged by EPD on October 14, 2020 (WSP, 2023a).

AP-3 and the adjacent AP-4 are in the process of being consolidated and closed in place as a combined unit AP-3/4 with an engineered cover system. In addition to the engineered cover system, the AP-3/4 closure includes an under-slope drainage system and additional temporary advanced engineering wells to accelerate the pace at which the groundwater table will lower to the expected long-term post-closure level below the base of AP-3/4 (Golder, 2021).

This risk evaluation provides additional technical review of the human health and environmental protectiveness associated with the closure of AP-2 and AP-3/4 with respect to constituent concentrations in groundwater identified at SSLs above GWPS. The 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, OCGA §12-8-100; EPD, 2009) and USEPA Regional Screening Levels (RSLs) User's Guide (USEPA, 2022a). This evaluation also incorporated 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 the identified SSL-related constituents for the former AP-2 and AP-3/4 above GWPS. Arsenic, beryllium, cobalt, and lithium were previously identified as SSL-related constituents in certain wells (**Figure 2**) using the GWPS established for AP-2 and AP-3/4 according to the Federal and State CCR Rules (WSP, 2023a). Based on the results of the risk evaluation for these SSL-related constituents, a site-specific recommended path forward is provided.

Radium 226/228 combined was also identified as a SSL-related constituent in wells B-104D and B-109D. In accordance with 40 CFR §257.94, a supplemental ASD for radium

226/228 combined was prepared (WSP, 2023c) which builds upon a previously submitted ASD (WSP Golder, 2022), and Georgia EPD approved the supplemental ASD on June 15, 2023. The supplemental ASD demonstrates that concentrations of radium 226/228 combined in wells B-104D and B-109D are not associated with a release from the CCR unit but are instead due to natural occurrences of radionuclides in the subsurface. Accordingly, radium 226/228 combined 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, 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 risk screening process for the groundwater COPIs, including calculation of exposure point concentrations (EPCs) and analysis of concentration trends over time, as well as the risk screening process for those constituents evaluated in surface water in the adjacent downgradient surface water body.
- ***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 Plant McDonough AP-2 and AP-3/4 documents, including the *2022 Semi-Annual Groundwater Monitoring and Corrective Action Report* (WSP, 2023a) and the *Hydrogeological Assessment Report – Plant McDonough-Atkinson. Ash Pond 2 and 3/4.* (WSP, 2023b). The CEM includes a conservative evaluation of potential exposure pathways, and potential human and ecological receptors.

### 2.1 Site Description

Plant McDonough is located approximately seven miles northwest of Atlanta in southeast Cobb County. The site occupies approximately 390 acres and is bounded on the southeast by the Chattahoochee River (**Figure 1**). Plant McDonough was once a coal-fired power generating facility but was converted to natural gas combined-cycle power generating facility in 2011. Four CCR surface impoundments are located at Plant McDonough AP-1, AP-2, AP-3, and AP-4. This report focuses on AP-2 and AP-3/4. AP-1 is addressed under separate cover.

The units included in this report are described below (Golder, 2018a; WSP, 2023b):

- AP-2 was closed by removal with CCR removal being substantially completed in 2016 and the remainder removed in 2019. A closure certification report was submitted to the Georgia EPD on March 30, 2020 and acknowledged by EPD on October 14, 2020 (WSP, 2023a).
- AP-3/4 are in the process of being closed by a combination of removal and consolidation in place; specifically AP-3 and AP-4 are being combined into one unit with an engineered final cover system in compliance with the Federal CCR Rule. In addition to the engineered cover system, the AP-3/4 closure includes an under-slope drainage system and additional temporary advanced engineering wells to accelerate the pace at which the groundwater table will lower to the expected long-term post-closure level below the base of AP-3/4 (Golder, 2021).

Construction in the AP-3/4 area is substantially complete pending construction certification (WSP, 2023a).

Semi-annual groundwater monitoring and reporting for AP-2 and AP-3/4 is performed in accordance with the monitoring program requirements of the Federal CCR Rule and Georgia EPD Solid Waste Management Program. In accordance with 40 CFR §257.91, the site is monitored using a comprehensive groundwater monitoring network that was installed at AP-2 and AP-3/4 in the uppermost aquifer to monitor groundwater quality both upgradient and downgradient of AP-2 and AP-3/4. Additionally, piezometers were installed for water level measurements and/or non-routine sample collection. The locations of the certified compliance well network and the piezometers are provided on **Figure 2**.

### 2.1.1 Topography and Surface Hydrology

The site is located within the Piedmont Physiographic Province of central Georgia, which is characterized by gently rolling hills and narrow valleys, with locally pronounced linear ridges. Overall, the site slopes gently south towards the Chattahoochee River (WSP, 2023b).

AP-2 and AP-3/4 are located within the Proctor Creek-Chattahoochee River Watershed (HUC-12-031300020101). The watershed encompasses 15,229 acres and is part of the larger Middle Chattahoochee – Lake Harding Watershed (HUC 12 – 0313002). The drainage area for AP-2 totals 8.3 acres, whereas the combined drainage area for AP-3/4 is 83.6 acres (Golder, 2018b). The Chattahoochee River abuts the site to the southeast.

AP-2 is located east of AP-1 and south of AP-3 in the center of the eastern half of the site. The additional over excavation of CCR material at AP-2 into the underlying soils created a topographic low point and low hydraulic gradient. AP-3/4 is on a topographic high, creating radial flow around the ponds, with the exception of the one upland high upgradient of AP-3/4 to the northwest. Dewatering at AP-4 is creating an inward gradient, restoring the pre-impoundment southward groundwater flow in the northeast of AP-3/4 that is expected to continue in the future, corresponding to the higher topographic elevations in that area following closure (WSP, 2023a).

A small creek flows south under Plant Atkinson Road into a corrugated metal pipe slip lined with a fiberglass reinforced plastic stream diversion culvert, which inlets north of AP-3/4 and outlets southeast of AP-3/4.

Topography near the site ranges from less than 750 feet (ft) above mean sea level (msl) near the tributaries and river to greater than 840 ft above msl near the center of the site (WSP, 2023b).

### 2.1.2 Geology and Hydrogeology

The geologic and hydrogeologic characteristics of the site have been extensively evaluated and compiled in previous reports. The following presents a brief summary of this information from the *2022 Semi-Annual Groundwater Monitoring and Corrective Action Report* (WSP, 2023a):

> *The site is located in the Piedmont/Blue Ridge geologic province, which contains some of the oldest rock formations in the southeastern United States. These late Precambrian to late Paleozoic rocks have undergone repeated cycles of igneous intrusions and extrusions, metamorphism, folding, faulting, shearing, and silicification. Rock outcrops near the site consist of biotite gneiss, porphyritic gneiss, mica schist, and quartzite.*
>
> *Residual soils, primarily clayey/sandy silt, sandy silt with clay, and silty sand, occur as a variably-thick blanket overlying bedrock across most of the site. These residual saprolitic soils along with saprolitic transitionally or partially weathered rock, collectively the overburden, range between approximately 9 to 61 feet in thickness across the site, with an average thickness of approximately 38 feet. Saprolitic rock is considered to be transitionally weathered rock (TWR) or partially weathered rock (PWR). Where TWR is a qualitative description based on visual observations, PWR is defined by Standard Penetration Test (SPT) blow counts that exceed 50 blows/six inches.*
>
> *A regional, unconfined surficial aquifer system is present at the site, existing within the overburden and weathered and fractured upper bedrock (e.g., approximately the first 30 feet), depending on topographic location. Recharge primarily occurs through precipitation and subsequent infiltration. Generally, groundwater flow occurs through intergranular pore spaces in the overburden and is controlled by topography and top of rock variations. However, a relatively higher transmissive zone is interpreted to occur at the base of the overburden, at the interface of weathered bedrock and competent bedrock and is believed to be the primary groundwater flow path. The overburden has an average horizontal hydraulic conductivity of $10^{-4}$ centimeters per second (cm/s) and is interpreted to flow south-southeast.*

*A limited and localized bedrock aquifer system also occurs beneath the site. The upper bedrock is fractured and weathered, connected hydraulically with the overburden groundwater, and is considered part of the uppermost aquifer. The overlying silt/clay-rich overburden may act to retard recharge into the bedrock aquifer system. However, deeper bedrock (i.e., approximately greater than 30 feet into the bedrock) is unweathered with few discontinuities (e.g., fractures) available to store groundwater.*

The potentiometric surface elevation contours for January 2023 are presented in **Figure 3**. Localized groundwater flow directions in the site aquifer are influenced by topographic and top of rock variations as well as recent closure activities, including localized dewatering as described above in Section 2.1.1.

## 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 potential transport pathways is shown on the CEM in **Figure 4.**

### 2.2.1 Groundwater

Pertinent information regarding groundwater transport from the *Hydrogeologic Assessment Report– Plant McDonough-Atkinson Ash Pond 2 and 3/4* (WSP, 2023b) is presented below and is largely consistent with historical observations from 2015 through 2022:

*The potentiometric surface for the uppermost aquifer indicates groundwater flows generally southeast to south. AP-3/4 is on a topographic high, creating semi-radial flow around the ponds. With initiation of the dewatering system at AP-3/4, the groundwater flow direction is generally inward toward the pond. Following completion of closure activities, it is anticipated that groundwater flow will return to the historical regional groundwater flow pattern, which corresponds with pre-construction regional topography.*

Current information based on the January 2023 groundwater elevation data indicates groundwater flow is south and east.

### 2.2.2 Surface Water

The Chattahoochee River abuts the site to the southeast and the river flows in a south/southwest direction (**Figure 2**). Based on available potentiometric data, groundwater was assumed to flow toward the downgradient surface water bodies. In further support of this assumption, the Chattahoochee River is assumed to represent a regional hydraulic discharge boundary for groundwater flow in the upper aquifer from the nearby region for the purposes of this evaluation.

## 2.3 Potential Exposure Pathways and Receptors

The exposure pathways for groundwater and surface water were assumed to be complete as a conservative measure for the purposes of this risk evaluation and were used to identify potential receptors and estimate potential risk. The CEM (**Figure 4)** depicts the assumed 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 the on-site resident was considered incomplete because there is no residential use on-site under current site conditions and future residential use of the site is considered unlikely. Property in the vicinity of the site is predominantly zoned Residential with the exception of some Light Industrial and General Commercial zoning adjacent to the north and east of the site (Cobb County, 2023a). Beyond the Chattahoochee River to the southeast, land use is predominantly zoned Industrial with some Residential land use beyond (Fulton County, 2023).

- Off-site industrial/construction worker: The potential for off-site worker exposure through direct contact with groundwater was addressed 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 assumed potentially complete. A well survey of potential groundwater wells within a three-mile radius of AP-2 and AP-3/4 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). Results of the survey are presented on **Figure 5**. The well survey is included as **Appendix A**. Combining well information from all sources with parcel data, 48 possible wells were identified; 18 may be active or former drinking water wells. None of these wells are located downgradient of the site as the Chattahoochee River is assumed to represent a regional hydraulic discharge boundary for groundwater flow in the upper aquifer from the nearby region. The Code of Ordinances for Cobb County, Georgia indicates that "the water distribution system of any building in which plumbing fixtures are installed shall be connected to a public water supply, if public water is available" (Cobb County, 2023b); therefore, the wells identified during the water well survey are not considered likely to be active drinking water wells.

  No public wells were identified within the three-mile radius. Municipal water is available throughout the area. The surface water intake for the City of Atlanta is located upstream and across the Chattahoochee River, 0.85 miles to the east of Plant McDonough. Use of surface water downgradient of the site as a source of potable drinking water is an incomplete exposure pathway; therefore, drinking water exposure assumptions for surface water do not apply.

  A potable water well survey within a two-mile radius of AP-2 and AP-3/4 was conducted in January 2023 with the results provided and discussed in the 2022 *Semi-Annual Remedy Selection and Design Progress Report* included as Appendix E in the *2022 Semi-Annual Groundwater Monitoring and Corrective Action Report* (WSP, 2023a). The survey incorporated records from federal, state, and county sources. Cobb County Environmental Health Department responded that they did not have records of approved water wells within a two-mile radius of AP-2 and AP-3/4. The findings from the other sources are consistent with the 2020 well survey in that no downgradient potable water wells or surface water intakes were identified within two-miles of AP-2 and AP-3/4.

  As a conservative measure, potential off-site residential exposure to SSL-related constituents was evaluated using on-site groundwater wells around the perimeter and downgradient of AP-2 and AP-3/4. 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. The risk evaluation screening conservatively assumed that hypothetical off-site residential receptors could be exposed to the concentrations of SSL-related constituents in groundwater through its use as a potable water supply by ingestion and dermal contact with groundwater.

- Off-site recreational surface water receptors: The surface water exposure pathway for recreational receptors was assumed potentially complete. Routes of exposure include ingestion of aquatic organisms (mainly fish) and potential incidental ingestion and dermal contact with surface water by adult and child recreational receptors. Evaluation of SSL-related constituents in on-site groundwater monitoring wells indicates arsenic, beryllium, and lithium were delineated on-site below their groundwater human health screening values. Cobalt was evaluated for the off-site recreational surface water receptor and was delineated in groundwater through the use of site surface water data.

- Off-site ecological surface water receptors: The surface water exposure pathway for potential off-site ecological receptors was assumed complete. Potential routes of exposure include direct contact to surface water by aquatic receptors as well as ingestion.

# 3 RISK EVALUATION SCREENING

The CEM developed in Section 2 was used to identify the potentially complete exposure pathways to human and ecological receptors that should be considered in the risk evaluation. The initial step in the risk evaluation is the comparison of SSL-related constituent concentrations in groundwater to health-protective levels for potentially complete exposure pathways. 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 Georgia EPD allows for the site-specific evaluation of risk in programs such as the Voluntary Remediation Program (EPD, 2009).

The initial risk evaluation screening was performed for the potential groundwater exposure pathway by comparing the constituent concentrations of on-site groundwater wells determined to have SSL-related constituents to appropriate health-protective screening criteria or background. These criteria included the risk reduction standards (RRS) established in accordance with the Hazardous Site Response Act (HSRA) for drinking water and site-specific background 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 in **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 August 2016 and February 2023 from the on-site wells that were identified to have constituents with SSLs were used in the risk screening evaluation for hypothetical off-site residential exposure. The wells that were previously identified to have SSL-related constituents under the Federal and State CCR Rules are listed below:

| Appendix IV Parameter | AP-2 and AP-3/4 Monitoring Well |
|---|---|
| Arsenic | DGWC-9 |
| Beryllium | DGWC-5, DGWC-9, DGWC-10, DGWC-47, DGWC-48, B-92, B-93, B-115D |
| Cobalt | DGWC-8, DGWC-9, DGWC-10, DGWC-19, DGWC-20, DGWC-47, DGWC-48, B-56, B-63, B-92, B-93, B-104D, B-115D |
| Lithium | DGWC-47, DGWC-48, B-115D, B-120D |

Data for these SSL-related constituents from the wells listed above were screened against relevant health-protective screening criteria.

The wells with SSL-related constituents are depicted on **Figure 2** and 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 is performed at Plant McDonough pursuant to §257.93-95 following the professional engineer (PE)-certified Statistical Analysis Method Certification (Rev 01, amended January 2020) (Golder, 2020) and the Unified Guidance (USEPA, 2009) for AP-2 and AP-3/4; background values are routinely updated under the program. Three monitoring wells in the certified monitoring well network are designated as upgradient or background locations, including DGWA-53, DGWA-70A, and DGWA-71. Statistical analyses were performed on the groundwater data using Sanitas groundwater statistical software, as described in the *2022 Semi-Annual Groundwater Monitoring & Corrective Action Report* (WSP, 2023a), as presented below:

> *Statistical analyses while in assessment monitoring are performed through the use of confidence intervals compared to the groundwater protection standards (GWPS). Parametric tolerance limits were used to calculate Site specific background limits from pooled upgradient well data for Appendix IV parameters with a target of 95% confidence and 95% coverage. The confidence and coverage levels for nonparametric tolerance limits are dependent upon the number of background samples. The background limits*

*were then used when determining the GWPS under 40 CFR § 257.95(h) and GA EPD Rule 391-3-4-.10(6)(a).*

Naturally occurring or site-specific background concentrations can exceed health-protective screening criteria. Therefore, site-specific background values were used as the groundwater screening values if background concentrations were identified as greater than the groundwater screening values (i.e., cobalt), as further described in Section 3.2.

## 3.2 Groundwater Screening Evaluation

The process of screening SSL-related constituents in groundwater against human health screening levels for groundwater is discussed below and presented in **Figure 6**. The HSRA RRS evaluated under the VRP approach presented herein included Type 1 and Type 2 standards 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 standard practice 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 and Type 2 RRS for hypothetical off-site residential exposures, which are considered protective of human health for those constituents regulated under HSRA (i.e., arsenic and beryllium).

- The Type 1 RRS was used for arsenic, which is the Georgia drinking water criterion presented in Appendix III, Table 1 of the HSRA rule (EPD, 2018).

- The Type 2 RRS was used for beryllium, which is the lower of the calculated carcinogenic and non-carcinogenic values derived using the default exposure factors for residential receptors and the methodology found in Appendix III of the HSRA rule (EPD, 2018). Toxicity values for beryllium used for the Type 2 RRS calculations were identified in the Integrated Risk Information System (IRIS) (USEPA, 2023). The risk-based Type 2 RRS were calculated using USEPA's RSL calculator (USEPA, 2022a) assuming a target cancer risk of $1\times10^{-5}$ and a target hazard quotient of 1, consistent with Georgia EPD guidance (EPD, 2018). The calculations of the Type 2 RRS values for the SSL-related constituents are presented in **Appendix C**.

- A site-specific screening level was used for lithium. Site-specific screening levels are calculated for those chemical constituents like lithium that do not have RRS under HSRA using residential exposure assumptions consistent with the HSRA rules (EPD, 2018) and are equivalent to the USEPA tapwater RSLs. The screening level for lithium is essentially a Type 2 RRS calculated at a target hazard quotient of 1, consistent with Georgia EPD guidance, and has been adopted by USEPA in the Federal CCR Rule (USEPA, 2020).

- As the background concentration for cobalt is higher at the site than applicable screening criteria, the background value was used as the screening level for this evaluation in accordance with the CCR methodology for development of groundwater protection standards (USEPA, 2020).

Groundwater data collected from the wells identified to have SSL-related constituents were compared to residential screening criteria in order to protect hypothetical off-site receptors. Concentrations of SSL-related constituents were compared to the higher of the HSRA Type 1 RRS, Type 2 RRS, site-specific, and background values for groundwater pursuant to standard practice for risk assessment within the State of Georgia.

**Table 1** presents the maximum detected concentration of each SSL-related constituent, which was used to represent potential off-site groundwater quality for comparison to the selected screening levels for hypothetical off-site residential receptors (health- or background-based). As noted in **Table 1**, arsenic, cobalt, and lithium were detected at concentrations that exceeded their respective screening levels, were identified as COPIs, and were retained for further evaluation in the refined risk evaluation. Concentrations of beryllium did not exceed its screening level, and therefore, evaluation of beryllium in the refined risk evaluation was not necessary.

### 3.3 Alternate Source Demonstration

In accordance with 40 CFR §257.94, a supplemental ASD for radium 226/228 combined for groundwater monitoring wells DGWA-53, B-104D, B-105D, B-109D, B-111D, B-115D, and B-122D was submitted to Georgia EPD on May 24, 2023 (WSP, 2023c); which builds upon a previously submitted ASD (WSP Golder, 2022). On June 15, 2023, Georgia EPD approved the supplemental ASD for radium 226/228 combined due to natural occurrence in wells B-104D and B-109D only[3]. There are multiple lines of evidence that support the conclusion that the SSLs of radium 226/228 combined in monitoring wells B-104D and B-109D are the result of natural occurrences of radionuclides in the subsurface and not CCR storage or a release from the CCR Unit. Accordingly, radium 226/228 combined was determined to not be a risk related to AP-2 and AP 3/4 and need not be carried forward through the remainder of the assessment.

[3] Wells B-104D and B-109D are the only subject wells that had an SSL for radium 226/228 combined.

# 4 REFINED RISK EVALUATION

A refined risk evaluation was conducted for the groundwater COPIs (i.e., arsenic, cobalt, and lithium) that were detected at concentrations that exceeded the health-protective screening criteria or background. Beryllium was not evaluated as concentrations of beryllium in its associate SSL wells did not exceed its health-protective screening criteria. The refined risk evaluation identified EPCs for these constituents in groundwater for the purpose of characterizing potential risk to human receptors. Those constituents identified as groundwater COIs (i.e., cobalt) in the refined groundwater risk evaluation were then evaluated for surface water in the nearest downgradient surface water body (i.e., Chattahoochee River).

## 4.1 Refined Groundwater Risk Evaluation

Potential risk associated with exposure to arsenic, cobalt, and lithium by hypothetical off-site residential receptors was refined using the methodology described in the HSRA and VRP guidance (EPD, 2018; EPD, 2009) and is presented in the following section and on **Figure 7**.

For the refined risk evaluation, groundwater data from samples collected between August 2016 and February 2023 from the on-site wells that were identified to have SSL-related constituents and downgradient monitoring wells/piezometers that represent groundwater flow in the same hydraulically downgradient direction were used to evaluate hypothetical off-site residential exposure.

The downgradient groundwater monitoring wells and piezometers included in the refined risk evaluation are depicted with yellow well labels on **Figure 2**. The following list of wells used to assess hypothetical off-site residential exposure include those wells with SSL-related constituents along with the wells and piezometers downgradient of the wells exhibiting SSLs:

| | | |
|---|---|---|
| DGWC-4 | B-56 (SSL) | B-92 (SSL) |
| DGWC-5 (SSL) | B-57 | B-93 (SSL) |
| DGWC-8 (SSL) | B-60 | B-101D |
| DGWC-9 (SSL) | B-61 | B-102D |
| DGWC-10 (SSL) | B-63 (SSL) | B-104D (SSL) |
| DGWC-12 | B-64 | B-106D |
| DGWC-19 (SSL) | B-76 | B-111D |
| DGWC-20 (SSL) | B-77 | B-115D (SSL) |
| DGWC-47 (SSL) | B-78 | B-120D (SSL) |
| DGWC-48 (SSL) | B-83 | |

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 the groundwater COPIs (arsenic, cobalt, and lithium) includes the development of EPCs. The EPC is a conservative estimate of potential exposure to a receptor. The EPC is based on the 95 percent upper confidence limit of the arithmetic mean (UCL) and accounts for uncertainty and variability in the dataset (USEPA, 2002). Consistent with USEPA guidance for developing groundwater EPCs (USEPA, 2014), UCLs were calculated using USEPA ProUCL 5.2 software (ProUCL) (USEPA, 2022b) and user's guide (USEPA, 2022c). For the refined risk evaluation, the UCLs for the COPIs in groundwater were calculated for the following specific datasets:

- UCLs for the individual well(s) with an SSL-related constituent;
- UCLs 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

- UCLs based on the combined data from the farthest downgradient well(s)/piezometer(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 that was selected as the EPC. If there were multiple UCLs recommended by ProUCL, the maximum UCL value was selected. **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/piezometers used in the calculation of the EPCs for each groundwater COPI. **Appendix D-3** provides the input and output files associated with the ProUCL software.

**Table 2** summarizes the groundwater EPCs selected for the COPIs of arsenic, cobalt, and lithium. This table shows the number of samples, the maximum detected concentration, the UCL recommended by ProUCL software, and the selected EPC.

### 4.1.2 COPI Concentration Trend Analysis

Concentration trends over time were evaluated as one line of evidence in the refined risk evaluation. 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 the wells exhibiting SSLs for arsenic, cobalt, and lithium to evaluate the trends in concentrations over time. The tests were conducted using the USEPA ProUCL 5.2 software (USEPA, 2022b).

The Mann-Kendall and Theil-Sen test results are presented on time series graphs in **Appendix D-4** and indicated:

- There is no trend in arsenic concentrations over time at DGWC-9, cobalt concentrations at DGWC-19, B-63, B-93, B-104D, and B-115D, or lithium concentrations at B-115D;

    - In B-63, the most recent detected cobalt concentration of 0.027 mg/L was below the screening level of 0.032 mg/L.

- Statistically significant decreasing trends in cobalt in DGWC-8, DGWC-10, DGWC-47, and DGWC-48;
- Statistically significant decreasing trends in lithium at DGWC-47, DGWC-48, and B-120D; and
- Statistically significant increasing trends in cobalt in DGWC-9, DGWC-20, B-56, and B-92.

### 4.1.3 Refined Groundwater Risk Evaluation Results

In the refined risk evaluation, comparison of the calculated EPCs to the screening levels was used to identify COIs that may pose a potential risk to hypothetical off-site residential receptors exposed through the use of groundwater as potable water. If the EPC from the farthest downgradient well(s)/piezometer(s) 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 Arsenic*

Arsenic was detected in 17 out of 18 groundwater samples in well DGWC-9 at concentrations that exceeded the groundwater screening level for residential receptors. A groundwater flow exposure unit was identified for use in the calculation of arsenic EPCs in the refined risk evaluation due to groundwater flow away from AP-2 and AP-3/4. For the refined risk evaluation, the following EPCs were calculated for arsenic in the east exposure unit using the monitoring wells shown in **Appendices D-1** and **D-2**:

<u>Arsenic East Exposure Unit (**Figure D-2a**)</u>

- Data from DGWC-9 were used to determine if the UCL complied with the screening level (EPC Step 1 in **Appendix D-1**).
- Data from DGWC-9 and the downgradient well DGWC-12 were combined to represent groundwater exposure in the same hydraulically downgradient direction (EPC Step 2 in **Appendix D-1**).

- Data from DGWC-12 were used to represent groundwater exposure using the well that is the farthest hydraulically downgradient of well DGWC-9 (EPC Step 3 in **Appendix D-1**).

The UCL/maximum value for the dataset for DGWC-12 (EPC of Step 3) was 0.0006 mg/L, which is much less than the groundwater screening level of 0.01 mg/L.

**Table 3** presents the results of the refined screening comparing the farthest hydraulically downgradient EPC to the screening criterion. Arsenic was not identified in the east exposure unit as a groundwater COI for hypothetical off-site residential receptors and is not expected to pose a risk to human health.

#### *4.1.3.2 Cobalt*

Groundwater flow exposure units were identified for use in the calculation of cobalt EPCs in the refined risk evaluation due to groundwater flow away from AP-2 and AP-3/4. EPCs were calculated for exposure units separately (i.e., east, north, south – a, and south – b). For the refined risk evaluation, the following EPCs were calculated for cobalt using the monitoring wells/piezometers shown in **Appendices D-1** and **D-2:**

<u>Cobalt East Exposure Unit (**Figure D-2b**)</u>

- Data from DGWC-8, DGWC-9, DGWC-10, and B-56 were used to determine if the UCL complied with the screening level (EPC Step 1 in **Appendix D-1**).

- Data from DGWC-8, DGWC-9, DGWC-10, and B-56, and the downgradient wells and piezometers B-101D, B-102D, B-106D, and DGWC-12 were combined to represent groundwater exposure in the same hydraulically downgradient direction (EPC Step 2 in **Appendix D-1**).

- Data from DGWC-12 were used to represent groundwater exposure using the wells that are the farthest hydraulically downgradient of well DGWC-9 (EPC Step 3 in **Appendix D-1**).

The UCL for DGWC-12 (EPC Step 3) of 0.016 mg/L is below the background value of 0.032 mg/L.

<u>Cobalt North Exposure Unit (**Figure D-2c**)</u>

- Data from B-92 and B-93 were used to determine if the UCL complied with the screening level (EPC Step 1 in **Appendix D-1**).

- Data from B-92 and B-93 and the downgradient piezometers and wells B-64, and DGWC-12 were combined to represent groundwater exposure in the same hydraulically downgradient direction (EPC Step 2 in **Appendix D-1**).

- Data from DGWC-12 were used to represent groundwater exposure using the well that is the farthest hydraulically downgradient of well B-92 and B-93 (EPC Step 3 in **Appendix D-1**).

The UCL for DGWC-12 (EPC Step 3) of 0.016 mg/L is below the background value of 0.032 mg/L.

<u>Cobalt South – a Exposure Unit (**Figure D-2d**)</u>

- Data from DGWC-19, DGWC-20, DGWC-47, DGWC-48, B-115D, and B-104D were combined to determine if the UCL complied with the screening level (EPC Step 1 in **Appendix D-1**).

- Data from DGWC-19, DGWC-20, DGWC-47, DGWC-48, B-115D, and B-104D, and the downgradient wells and piezometers B-57, B-60, B-61, B-63, B-76, B-77, and B-83were combined to represent groundwater exposure in the same hydraulically downgradient direction (EPC Step 2 in **Appendix D-1**).

- Data from B-63, B-76, and B-77 were used to represent groundwater exposure using the wells that are the farthest hydraulically downgradient of wells DGWC-19, DGWC-20, DGWC-47, DGWC-48, B-115D, and B-104D (EPC Step 3 in **Appendix D-1**).

The UCL for the combined dataset from B-63, B-76, and B-77 (EPC Step 3) of 0.19 mg/L exceeded the background value of 0.032 mg/L.

Cobalt South – b Exposure Unit <u>(**Figure D-2e**)</u>

- Data from B-63 were used to determine if the UCL complied with the screening level (EPC Step 1 in **Appendix D-1**).

- Only data from B-63 were used due to the absence of downgradient piezometers that represent groundwater exposure in the same hydraulically downgradient direction (EPC Steps 2 and 3 in Appendix D-1).

The UCL for the combined dataset B-63 (EPC Steps 2 and 3) of 0.049 mg/L exceeded the background value of 0.032 mg/L. The Chattahoochee River is immediately downgradient from B-63.

**Table 3** presents the results of the refined screening comparing the farthest hydraulically downgradient EPC for each groundwater flow exposure unit to the screening level of 0.032 mg/L. Cobalt was not identified as a groundwater COI for hypothetical off-site residential receptors in the north or east exposure units and is not expected to pose a risk to human health in those directions. Cobalt was identified as a groundwater COI for hypothetical off-site residential receptors in the south – a and south – b exposure units, and therefore, cobalt is further evaluated in the surface water risk evaluation below (**Section 4.2**).

#### *4.1.3.3 Lithium*

Groundwater flow exposure units were identified for use in the calculation of lithium EPCs in the refined risk evaluation due to groundwater flow away from AP-2 and AP-3/4. EPCs were calculated for exposure units separately (i.e., south and west). For the refined risk evaluation, the following EPCs were calculated for lithium using the monitoring wells/piezometers shown in **Appendices D-1** and **D-2:**

<u>Lithium South Exposure Unit (**Figure D-2f**)</u>

- Data from DGWC-47, DGWC-48, and B-115D were combined to determine if the UCL complied with the screening level (EPC Step 1 in **Appendix D-1**).
- Data from DGWC-47, DGWC-48, and B-115D and the downgradient wells and piezometers B-57, B-60, B-61, B-63, B-76, B-77, and B-83, were combined to represent groundwater exposure in the same hydraulically downgradient direction (EPC Step 2 in **Appendix D-1**).
- Data B-63, B-76, and B-77 were used to represent groundwater exposure using the wells that are the farthest hydraulically downgradient of wells DGWC-47, DGWC-48, and B-115D (EPC Step 3 in **Appendix D-1**).

The UCL for the combined dataset from B-63, B-76, and B-77 (EPC Step 3) of 0.015 mg/L was less than the site-specific screening level of 0.04 mg/L.

Lithium West Exposure Unit (**Figure D-2g**)

- Data from B-120D were used to determine if the UCL complied with the screening level (EPC Step 1 in Appendix D-1).
- Data from B-120D, and the downgradient wells and piezometers B-64, B-78, DGWC-4, DGWC-5, B-111D, B-92, and DGWC-12 were combined to represent groundwater exposure in the same hydraulically downgradient direction (EPC Step 2 in Appendix D-1).
- Data from DGWC-12 were used to represent groundwater exposure using the wells that are the farthest hydraulically downgradient of piezometer B-120D (EPC Step 3 in Appendix D-1).

The UCL from the combined dataset from DGWC-12 (EPC Step 3) of 0.001 mg/L did not exceed the site-specific screening level of 0.04 mg/L.

**Table 3** presents the results of the refined screening comparing the farthest hydraulically downgradient EPC to the screening criterion. Lithium was not identified as a groundwater COI for hypothetical off-site residential receptors in either the south or west exposure units and is not expected to pose a risk to human health.

## 4.2 Surface Water Risk Evaluation

A surface water screening evaluation was conducted for the Chattahoochee River for the groundwater COI cobalt which was identified in the downgradient groundwater risk evaluation for hypothetical off-site residential receptors.

Both human and ecological receptors have the potential to come into contact with surface water. Routes of exposure include ingestion of aquatic organisms (mainly fish) and potential incidental ingestion and dermal contact with surface water by adult and child recreational receptors. Potential routes of exposure for ecological receptors include direct contact to surface water and ingestion.

Surface water screening was performed using surface water data for the constituent identified as a groundwater COI. The surface water screening process for the COI identified in groundwater (cobalt) is discussed below and presented in **Figure 8**.

### 4.2.1 Surface Water Data

Surface water data were compiled for the COI identified in the refined groundwater risk evaluation (cobalt). Surface water data for cobalt includes seven sampling events for Plant McDonough from 2020 to 2023 at six locations in the Chattahoochee River. The upstream locations (CR-0.5, and CR-0.8) were used as background surface water locations. The surface water sampling locations are shown on **Figure 9**. The surface water dataset used in the risk evaluation is presented in **Appendix B-2**.

### 4.2.2 Human Health Screening

Surface water human health screening values for the groundwater COIs were selected from the following order of hierarchy:

- Georgia ISWQC for human health (EPD, 2022b), when available.
- National ambient water quality criteria (USEPA, 2015) for human health protective through ingestion of water and organisms. When there is no numerical value for a constituent in surface water, USEPA (2015) states that EPA has issued an MCL which may be more stringent than the NAWQC for these constituents suggesting the use of the MCL for surface water screening. This is a conservative approach.
- In accordance with standard practice using methodologies approved by the Georgia EPD, the higher of the residential groundwater screening levels described in Section 3.2.2 was used for the remaining constituents due to lack of human health surface water screening levels for these constituents, which is a conservative approach.
- Maximum detected upstream (i.e., background) concentration if the maximum upstream surface water concentration is greater than the surface water screening value.

For cobalt, the higher of the residential groundwater screening levels described in Section 3.2 was used because of the lack of human health surface water screening levels for Georgia ISWQC (EPD, 2022b) and national ambient water quality criteria (USEPA, 2015). The Type 2 RRS was used as a screening value for cobalt. The use of drinking water screening levels for surface water exposure is a conservative approach likely to overestimate risk as use of Chattahoochee River surface water downgradient of the site as a source of potable drinking water is an incomplete exposure pathway.

The surface water human health screening level was compared to the maximum detected concentration for cobalt in surface water, as shown in **Table 4**. Cobalt was not detected above the reporting limit, which was lower than the screening level, in any of the 34 surface water samples collected. Therefore, cobalt was not retained as human health COPI in surface water for further evaluation and is not expected to pose a risk to human health.

### 4.2.3 Ecological Screening

Surface water screening values for aquatic ecological receptors were selected from the following order of hierarchy for the COPIs:

- Chronic freshwater Georgia ISWQC (EPD, 2022b), when available.
- USEPA Region 4 chronic freshwater screening levels (USEPA, 2018).
- Maximum detected upstream (i.e., background) concentration if the maximum upstream surface water concentration is greater than the surface water screening value.

Because cobalt does not have chronic freshwater Georgia ISWQC for ecological receptors (EPD, 2022b), the USEPA Region 4 chronic freshwater screening level for total concentrations (USEPA, 2018) was used in the surface water ecological screening for aquatic ecological receptors.

The ecological surface water screening levels were compared to the maximum detected concentrations of cobalt in surface water, as shown in **Table 5**. Cobalt was not detected above the reporting limit, which was lower than the screening level, in any of the 34 surface water samples collected. Therefore, cobalt was not retained as a COPI in surface water for further evaluation and is not expected to pose a risk to ecological receptors.

### 4.2.4 Refined Groundwater and Surface Water Risk Evaluation Summary and Conclusions

Detections of arsenic, cobalt, and lithium were reported at concentrations above the corresponding groundwater screening values. The results of the refined groundwater and surface water risk evaluations indicate the following:

- Arsenic was not identified as a groundwater COI for hypothetical off-site residential receptors in the east exposure unit and is not expected to pose a risk to human health.

- Lithium was not identified as a groundwater COI for hypothetical off-site residential receptors in the south or west exposure units and is not expected to pose a risk to human health.

- Cobalt was not identified as a groundwater COI for hypothetical off-site residential receptors in the north or east exposure units and is not expected to pose a risk to human health.

- Cobalt was identified as a groundwater COI for hypothetical off-site residential receptors in the south – a and south – b exposure units and was evaluated further in the nearest downgradient surface water body (Chattahoochee River) for potential exposure of human and ecological receptors. It is worth noting again that no public wells were identified within a three-mile radius of the site. Municipal water is available throughout the area.

- Chattahoochee River surface water concentrations of cobalt were below health-protective surface water screening criteria for human and ecological receptors. Therefore, cobalt was not retained as a COPI in surface water for further evaluation and is not expected to pose a risk to human health or ecological receptors.

Based on the multiple lines of evidence and various conservative assumptions, further risk evaluation for groundwater and surface water is not warranted. Compliance monitoring under the Federal and State CCR Rules will continue.

## 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 practice and methodologies approved by the Georgia EPD, the higher of the Type 1 or Type 2 standard was selected for screening criteria. Selection of the screening criteria per standard practice is considered appropriate for risk quantification for AP-2 and AP-3/4. 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*". Thus, this approach is likely to overestimate risks for hypothetical off-site receptors.

- Screening criteria based on RRSs, including arsenic, beryllium, and lithium, represent the reasonable maximum exposure (RME). The RME is defined 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). USEPA (1989) 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), and therefore, potential exposures are likely overestimated.

- In the surface water screening, the higher of the residential groundwater screening levels was used for cobalt because of the lack of human health surface water screening levels within the Georgia ISWQC for human health (EPD, 2022b) and national ambient water quality criteria (USEPA, 2015). The use of drinking water screening levels for surface water screening is a conservative approach likely to overestimate exposure as use of downgradient Chattahoochee River surface water as a source of potable drinking water is an incomplete exposure pathway.

**Exposure Uncertainties:**

- The maximum detected concentrations of AP-2 and AP-3/4 SSL-related constituents were compared to conservative 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 occur naturally in the site geologic setting. Although background concentrations were evaluated and used in the screening process, contributions to exposure and risk were assumed to be entirely CCR-related and natural background sources were not quantified. Thus, SSL-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-2 and AP-3/4. 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 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 Plant McDonough was conducted by NewFields in 2020 and consisted of reviewing publicly available federal, state, and county records as well as a windshield survey of the area (**Appendix A)**. WSP relied on the data collected by NewFields.

  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 change the conclusions of the risk evaluation because concentrations of SSL-related constituents have been delineated on-site to concentrations not exceeding health-protective screening criteria or background or were not detected above health-protective screening criteria in the adjacent downgradient surface water body (i.e., Chattahoochee River).

**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. Therefore, a screening level exceedance does not necessarily equate to an adverse effect.

# 6 CONCLUSIONS

This human health and ecological risk evaluation for SSL-related constituents in groundwater at the site, along with a surface water risk evaluation for the downgradient Chattahoochee River, was conducted using methods consistent with Georgia EPD and USEPA guidance and included multiple conservative assumptions. Based on this evaluation, constituents evaluated from AP-2 and AP-3/4 (arsenic, beryllium, cobalt, and lithium) are not expected to pose a risk to human health or the environment.

Accordingly, no further risk evaluation of groundwater and surface water is recommended. Compliance monitoring for AP-2 and AP-3/4 under the Federal and State CCR Rules will continue as will surface water monitoring on the Chattahoochee River for cobalt. Georgia Power will proactively evaluate the data and update this evaluation, if necessary.

# 7 REFERENCES

Cobb County, 2023a. Cobb County Zoning Division. Located at https://www.cobbcounty.org/community-development/zoning

Cobb County, 2023b. Code of Ordinances, Chapter 122 Utilities, Division 7 Private Water Supply Facilities, current as of January 20, 2023.EPD, 2009. Georgia Voluntary Remediation Act, OCGA 12-8-100, June 1, 2009.

EPD, 2018. Hazardous Site Response Act, Georgia Department of Natural Resources, Environmental Protection Division, Chapter 391-3-19-0.07. Revised September 25, 2018.

EPD, 2022a. Coal Combustion Residuals, 391-3-4-.10, amended March 22, 2022; effective April 11, 2022.

EPD, 2022b. Water Use Classification and Water Quality Standards, 391-3-6-.03, effective February 27, 2022. Georgia Instream Water Quality Criteria. Available at:https://epd.georgia.gov/watershed-protection-branch/georgia-water-quality-standards

Fulton County, 2023. Fulton County Zoning and Land Use Map Viewer. Available at https://gis.fultoncountyga.gov/Apps/PropertyMapViewer/

Golder, 2018a. Plant McDonough-Atkinson CCR Surface Impoundments (CCR Unit AP-2, Combined CCR Unit AP-3/4), Cobb County, Georgia Part B Section 2 – Engineering Report. November.

Golder, 2018b. History of Construction, Plant McDonough-Atkinson Ash Pond 3 (AP-3) and Ash Pond 4 (AP-4).

Golder, 2020. Statistical Analysis Method Certification (Rev 01), Georgia Rule 391-3-4-.10(6) and 40 CFR §257.93(f), Ash Pond 2 (AP-2), Ash Pond 3 (AP-3), and Ash Pond 4 (AP-4), Plant McDonough, Georgia Power Company. January 9.

Golder, 2021. Compliance with the Closure Performance Standards Required by Coal Combustion Residuals (CCR) Rule, Plant McDonough CCR Surface Impoundments Ash Pond 3 and 4 (AP-3 and AP-4) (Combined CCR Unit AP-3/4), April 2.

NewFields, 2020. Well Survey, Plant McDonough Ash Pond 1, Ash Pond 2, and Ash Ponds 3/4, Cobb County, GA. Prepared for Georgia Power Company March 5.

USEPA, 1989. Risk Assessment Guidance for Superfund Volume 1 Human Health Evaluation Manual (Part A). EPA/540/1-89/002.

USEPA, 2002. Supplemental Guidance to Risk Assessment for Superfund: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. Publication Number 9285 .6-10. Office of Solid Waste and Emergency Response. December.

USEPA, 2009. Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance. Office of Resource Conservation and Recovery – Program Implementation and Information Division. March.

USEPA, 2014. Memorandum for Determining Groundwater Exposure Point Concentrations, Supplemental Guidance. OSWER Directive 9283.1-42, February. Available at: https://cfpub.epa.gov/ncea/risk/recordisplay.cfm?deid=236917.

USEPA, 2015. National Ambient Water Quality Criteria, June. Available at: https://www.epa.gov/wqc/2015-epa-updated-ambient-water-quality-criteria-protection-human-health

USEPA, 2018. Region 4 Ecological Risk Assessment Supplemental Guidance, March. Available at: https://www.epa.gov/risk/regional-ecological-risk-assessment-era-supplemental-guidance

USEPA, 2020. Disposal of Coal Combustion Residuals from Electric Utilities; Final Rule. 40 CFR Part 257. Effective Date October 14, 2015. Last amended August 28, 2020 with a final Effective Date of September 28, 2020.

USEPA, 2022a. USEPA Regional Screening Levels. Revised November 2022. Available at: www.epa.gov/risk/regional-screening-levels-rsls-generic-tables.

USEPA, 2022b. Statistical Software ProUCL 5.2 for Environmental Applications for Data Sets with and without Nondetect Observations, last updated June 14, 2022.

USEPA, 2022c. ProUCL Version 5.2 User Guide. Statistical Software for Environmental Applications for Data Sets with and without Nondetect Observations, Office of Research and Development, EPA/600/R-07/041, June 14, 2022.

USEPA, 2023. Integrated Risk Information System (IRIS). Accessed April 2023. Located Available at https://www.epa.gov/iris.

Water Quality Portal, 2023. Water Quality Portal – Cooperative Service Sponsored by United States Geological Survey, USEPA, and National Water Quality Monitoring Council. Accessed on March 2023. Available at https://www.waterqualitydata.us/portal/

WSP, 2023a. 2022 Semi-Annual Groundwater Monitoring & Corrective Action Report. Georgia Power Company – Plant McDonough-Atkinson. Ash Pond 2 and 3/4. February 28.

WSP, 2023b. Hydrogeological Assessment Report – Plant McDonough-Atkinson. Ash Pond 2 and 3/4. March 2023.

WSP, 2023c. Supplemental Alternate Source Demonstration Combined Radium – Plant McDonough-Atkinson. Ash Pond 1 and Ash Pond 2 and 3/4. May 22, 2023.

WSP Golder, 2022. Alternate Source Demonstration for Combined Radium – Plant McDonough-Atkinson Ash Pond 2 and 3/4, WSP Golder USA Inc., April 29, 2022, Revision 1: July 26, 2022.

# TABLES

**Table 1**
**SSL-Related Constituent Groundwater Screening**
**McDonough AP-2, 3/4 Risk Evaluation Report**
**Plant McDonough, Cobb County, GA**

| CCR Rule Designation | Constituent | CAS No. | UOM | Detection Frequency[1] | Exceedance Frequency[2] | Maximum Concentration (mg/L) | Screening Level (mg/L) | Source | Site-Specific Background (mg/L) | COPI? (Y/N) | Rationale[3] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Appendix IV | Arsenic | 7440-38-2 | mg/L | 17 / 18 | 17 / 18 | 0.04 | 0.010 | Type 1 RRS | 0.005 | Y | ASL |
| | Beryllium | 7440-41-7 | mg/L | 101 / 101 | 0 / 101 | 0.023 | 0.025 | Type 2 RRS[4] | 0.0009 | N | BSL |
| | Cobalt | 7440-48-4 | mg/L | 161 / 161 | 156 / 161 | 1.0 | 0.032 | Background[5] | 0.032 | Y | ASL |
| | Lithium | 7439-93-2 | mg/L | 46 / 46 | 46 / 46 | 0.14 | 0.040 | Site-Specific[4] | 0.03 | Y | ASL |

***Notes:***

[1] Evaluation includes 2016 - February 2023 groundwater analytical data from wells DGWC-9 for arsenic; DGWC-5, DGWC-9, DGWC-10, DGWC-47, DGWC-48, B-92, B-93, and B-115D for beryllium; DGWC-8, DGWC-9, DGWC-10, DGWC-19, DGWC-20, DGWC-47, DGWC-48, B-56, B-92, B-93,B-63, B-104D, and B-115D for cobalt; DGWC-47, DGWC-48, B-115D, B-120D for lithium.

[2] Exceedance frequency is for the specific constituent that exceeds the first screening value in the hierarchy of screening values.

[3] Rationale for classification of constituent as a COPI or exclusion as a COPI:

ASL = Above respective screening level

BSL = Below respective screening level

[4] The Type 2 RRS and Site-Specific values were calculated by the EPA RSL calculator using residential exposure factor inputs from HSRA Appendix III, Table 3.

[5] For sites with site-specific background concentrations greater than applicable screening values, the site-specific background value was used as the screening value.

***Definitions:***

CAS = Chemical Abstract Service
CCR = Coal Combustion Residuals
COPI = Constituent of Potential Interest
MCL = Maximum Contaminant Level
RRS = Risk Reduction Standard
UOM = Unit of Measurement
mg/L = milligrams per Liter

Prepared by/Date: JHG 05/09/23
Checked by/Date: IMR 05/09/23

**Table 2**
**Groundwater Exposure Point Concentration Summary**
**McDonough AP-2, 3/4 Risk Evaluation Report**
**Plant McDonough, Cobb County, GA**

| Exposure Unit | CCR Rule Designation | Constituent | CAS No. | Detection Frequency | UOM | Maximum Concentration | 95% UCL | Recommended UCL Method | Selected EPC[1] |
|---|---|---|---|---|---|---|---|---|---|
| AP-2,3/4 | Appendix IV | Arsenic (East) | 7440-38-2 | 1 / 19 | mg/L | 0.0006 | NA | NA | 0.0006 |
| | | Cobalt (North) | 7440-48-4 | 18 / 18 | mg/L | 0.034 | 0.016 | 95% Adjusted Gamma UCL | 0.016 |
| | | Cobalt (South - a) | 7440-48-4 | 14 / 18 | mg/L | 0.47 | 0.19 | 95% KM Adjusted Gamma UCL | 0.19 |
| | | Cobalt (South - b) | 7440-48-4 | 11 / 11 | mg/L | 0.47 | 0.19 | 95% Student's-t UCL | 0.19 |
| | | Cobalt (East) | 7440-48-4 | 18 / 18 | mg/L | 0.034 | 0.016 | 95% Adjusted Gamma UCL | 0.016 |
| | | Lithium (South) | 7439-93-2 | 14 / 18 | mg/L | 0.045 | 0.015 | 95% H-UCL (KM -Log) | 0.015 |
| | | Lithium (West) | 7439-93-2 | 5 / 18 | mg/L | 0.0011 | 0.0010 | 95% KM (t) UCL | 0.0010 |

***Notes:***
[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. For further detail on the selected EPC, refer to Appendix D.
[2] NA = Not available. 95% UCL not calculated because dataset had fewer than 5 values or all samples were non-detect.

***Definitions:***
CAS = Chemical Abstract Service
CCR = Coal Combustion Residuals
mg/L = milligrams per liter
95% UCL = 95 percent upper confidence limit
EPC = Exposure Point Concentration
J = Estimated value less than the practical quantitation limit but greater than the method detection limit

Prepared by/Date: JHG 05/09/23
Checked by/Date: IMR 05/09/23

**Table 3**
**Downgradient Groundwater Refined Screening**
**McDonough AP-2, 3/4 Risk Evaluation Report**
**Plant McDonough, Cobb County, GA**

| Exposure Unit | CCR Rule Designation | Constituent | CAS No. | Detection Frequency | Exceedance Frequency[1] | UOM | Selected EPC[2] | Screening Level (mg/L) | Source | Site-Specific Background | COI? (Y/N) | Rationale[3] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AP-2,3/4 | Appendix IV | Arsenic (East) | 7440-38-2 | 1 / 19 | 0 / 19 | mg/L | 0.0006 | 0.010 | Type 1 RRS | 0.005 | N | BSL |
| | | Cobalt (North) | 7440-48-4 | 18 / 18 | 1 / 18 | mg/L | 0.016 | 0.032 | Background [4] | 0.032 | N | BSL |
| | | Cobalt (South - a) | 7440-48-4 | 14 / 18 | 9 / 18 | mg/L | 0.19 | 0.032 | Background | 0.032 | Y | ASL |
| | | Cobalt (South - b) | 7440-48-4 | 7 / 7 | 5 / 7 | mg/L | 0.049 | 0.032 | Background | 0.032 | Y | ASL |
| | | Cobalt (East) | 7440-48-4 | 18 / 18 | 1 / 18 | mg/L | 0.016 | 0.032 | Background | 0.032 | N | BSL |
| | | Lithium (South) | 7439-93-2 | 14 / 18 | 1 / 18 | mg/L | 0.015 | 0.040 | Site-Specific[5] | 0.03 | N | BSL |
| | | Lithium (West) | 7439-93-2 | 5 / 18 | 0 / 18 | mg/L | 0.0010 | 0.040 | Site-Specific | 0.03 | N | BSL |

***Notes:***

[1] The exceedance frequency is based on the number of samples with detected concentrations that exceed the identified screening level.
[2] 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. For further detail on the selected EPC, refer to Appendix D.
[3] Rationale for classification of constituent as a COI or exclusion as a COI:
ASL = Above respective screening level
BSL = Below respective screening level
ND = Not detected (maximum practical quantitation limit [PQL])
[4] For sites with site-specific background concentrations greater than applicable screening values, the site-specific background value was used as the screening value.
[5] Site-Specific values were calculated by the EPA RSL calculator using residential exposure factor inputs from HSRA Appendix III, Table 3.

***Definitions:***

CAS = Chemical Abstract Service
CCR = Coal Combustion Residuals
COI = Constituent of Interest
MCL = Maximum Contaminant Level
mg/L = milligrams per liter
EPC = Exposure Point Concentration
J = Estimated value less than the practical quantitation limit but greater than the method detection limit

Prepared by/Date: JHG 05/09/23
Checked by/Date: IMR 05/09/23

**Table 4**
**Human Health Surface Water Screening - Chattahoochee River[1]**
**McDonough AP-2, 3/4 Risk Evaluation Report**
**Plant McDonough, Cobb County, GA**

| CCR Rule Designation | Constituents (Total Recoverable Fractions) | CAS No. | Detection Frequency | Exceedance Frequency[2] | Maximum Concentration (mg/L) | Screening Level (mg/L) | Source[3, 4] | Site-Specific Background (mg/L) | COPI? (Y/N) | Rationale[5] |
|---|---|---|---|---|---|---|---|---|---|---|
| Appendix IV | Cobalt | 7440-48-4 | 0 / 34 | 0 / 34 | 0.005 U | 0.006 | Type 2 RRS | ND (0.005) | N | BSL |

***Notes:***

[1] Cobalt surface water data includes 2020-2023 data form CR+0.2, CR+0.4, CR-0.1, CR-0.2, DW_DS, DW_US. Upstream or background locations are represented by data from 2020-2023 from surface water sampling locations CR-0.5 and CR-0.8.
[2] Exceedance frequency is for the specific constituent that exceeds the first screening value in the hierarchy of screening values.
- The hierarchy of screening values is GA ISWQC > NRWQC > Selected residential groundwater screening level if no surface water screening level available
- For sites with site-specific background concentrations greater than all applicable screening values, the site-specific background value was used as the screening value.

[3] The Type 2 RRS and Site-Specific value were calculated by the EPA RSL calculator using residential exposure factor inputs from HSRA Appendix III, Table 3.
[4] These residential groundwater screening levels were used because no human health surface water screening levels were available. The use of drinking water screening levels for surface water exposure is a conservative approach as domestic use of Chattahoochee surface water for human receptors is an incomplete exposure pathway.
[5] 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 ISWQC = Georgia Instream Water Quality Criteria
NRWQC = National Recommended Water Quality Criteria
RRS = Risk Reduction Standard
mg/L = milligrams per Liter

Prepared by/Date: JHG 05/10/23
Checked by/Date: IMR 05/10/23

**Table 5**
**Ecological Health Surface Water Screening[1]**
**McDonough AP-2, 3/4 Risk Evaluation Report**
**Plant McDonough, Cobb County, GA**

| CCR Rule Designation | Constituents (Total Recoverable Fractions) | CAS No. | Detection Frequency | Exceedance Frequency[2] | Maximum Concentration (mg/L) | Screening Value (mg/L) (Total) | Hardness Dependent? (Y/N) | Source[3] | Site-Specific Background (mg/L) | COPI (Y/N) | Rationale[4] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Appendix IV | Cobalt | 7440-48-4 | 0 / 34 | 0 / 34 | ND (0.005) | 0.019 | N | EPA Reg. 4 | ND (0.005) | N | BSL |

***Notes:***

[1] Cobalt surface water data 2020-2023 data form CR+0.2, CR+0.4, CR-0.1, CR-0.2, DW_DS, DW_US. Upstream or background locations represented by data from 2020-2023 from surface water sampling locations CR-0.5 and CR-0.8.

[2] Exceedance frequency is for the specific constituent that exceeds the first screening value in the hierarchy of screening values.

- The hierarchy of screening value sources is GA ISWQC > EPA Region 4
- For sites with site-specific background concentrations greater than all applicable screening values, the site-specific background value was used as the screening value

[3] Screening values from GA ISWQC were not available from GA Administrative Code 391-3-6-.0 (5)(e)(iii; values selected from Table 1a of the Region 4 Ecological Risk Assessment Supplemental Guidance (EPA, 2018).

[4] Rationale for classification of constituent as a COPI or exclusion as a COPI:

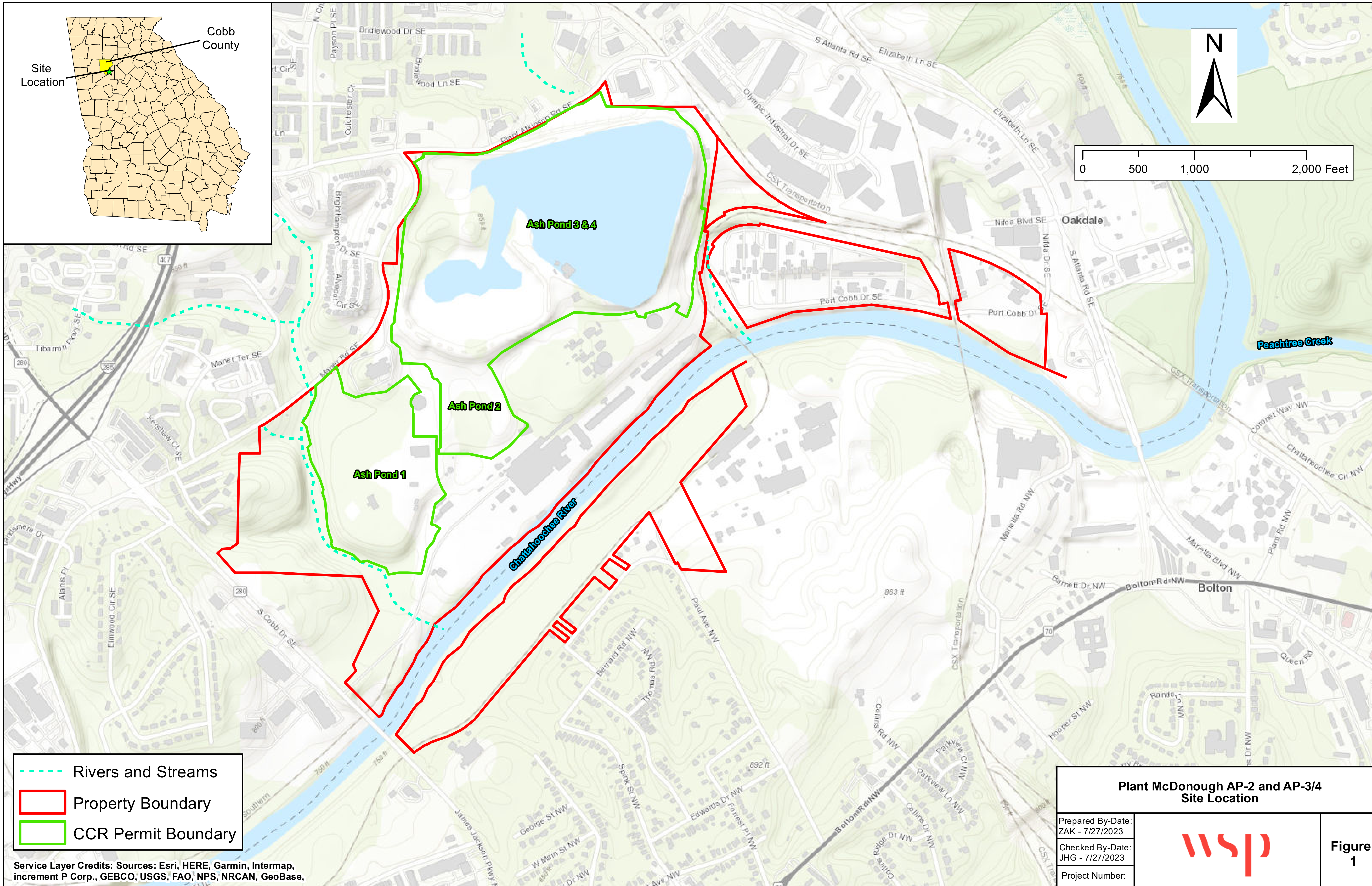
ASL = Above respective screening level
BSL = Below respective screening level

***Definitions:***

CAS = Chemical Abstract Service
CCR = Coal Combustion Residuals
COPI = Constituent of Potential Interest
EPA = United States Environmental Protection Agency
GA DNR EPD = Georgia Department of Natural Resources Environmental Protection Division
GA ISWQC = Georgia Instream Water Quality Criteria
mg/L = milligrams per Liter

Prepared by/Date: JHG 05/09/23
Checked by/Date: IMR 05/10/23

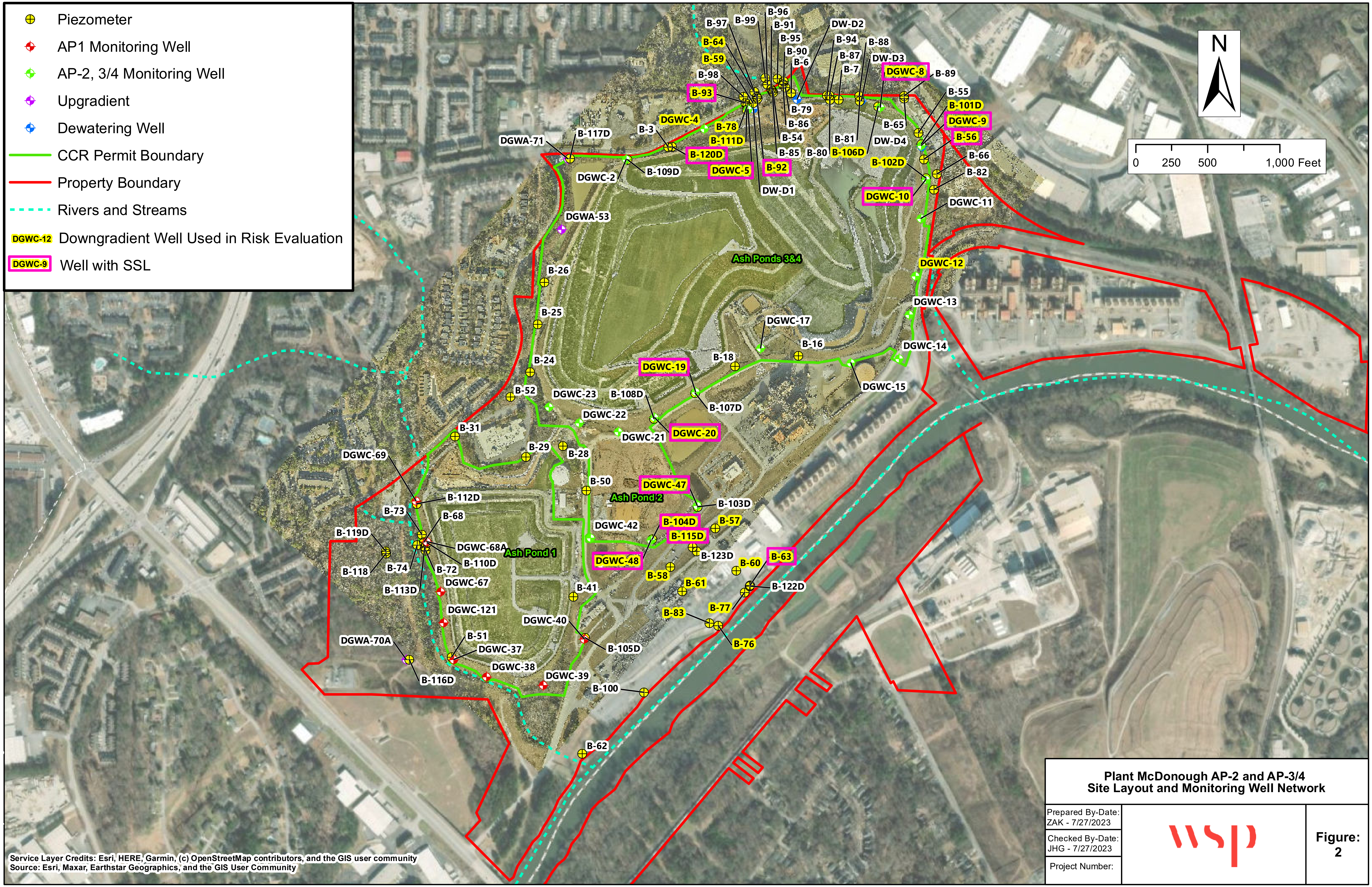
# FIGURES




Service Layer Credits: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase,

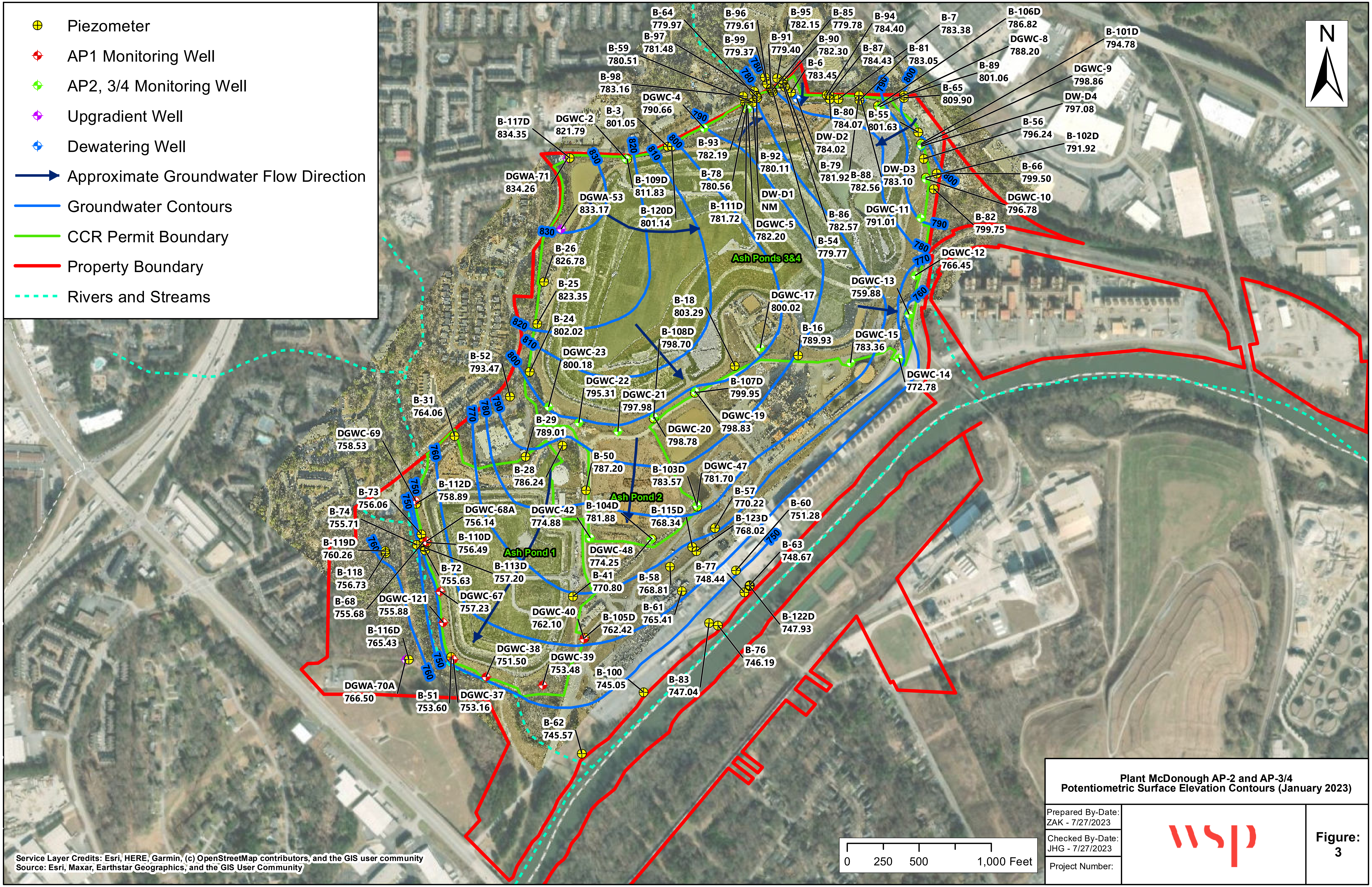
**Plant McDonough AP-2 and AP-3/4**
**Site Location**

| | | |
|---|---|---|
| Prepared By-Date: ZAK - 7/27/2023 | wsp | Figure: 1 |
| Checked By-Date: JHG - 7/27/2023 | | |
| Project Number: | | |



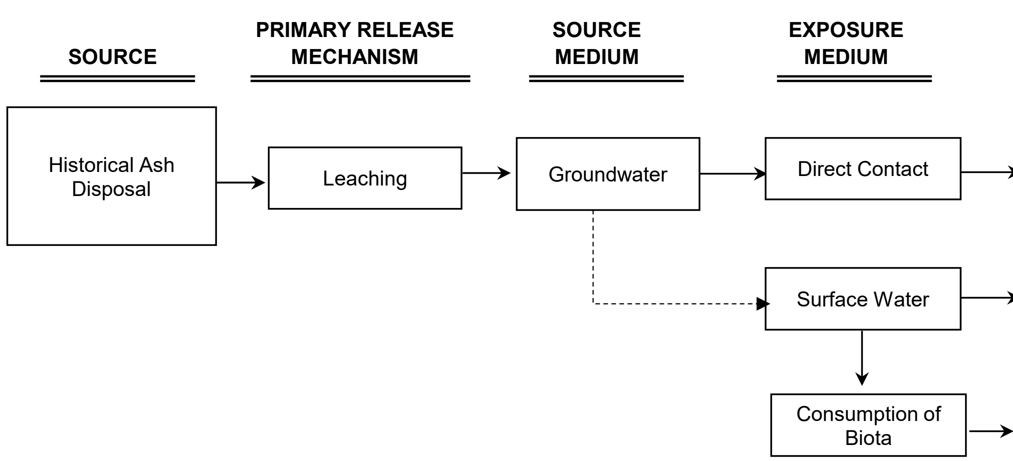

Plant McDonough AP-2 and AP-3/4
Site Layout and Monitoring Well Network

Figure: 2




Plant McDonough AP-2 and AP-3/4
Potentiometric Surface Elevation Contours (January 2023)

| | | |
|---|---|---|
| Prepared By-Date: ZAK - 7/27/2023 | wsp | Figure: 3 |
| Checked By-Date: JHG - 7/27/2023 | | |
| Project Number: | | |




| EXPOSURE MEDIUM | EXPOSURE ROUTE | HUMAN – Current – On-Site – Worker[1] | HUMAN – Current – Off-Site – Worker[2] | HUMAN – Current – Off-Site – Child and Adult Resident | HUMAN – Current – Off-Site – Child and Adult Recreational | HUMAN – Future – On-Site – Worker[1] | HUMAN – Future – On-Site – Child and Adult Resident | HUMAN – Future – Off-Site – Worker[2] | HUMAN – Future – Off-Site – Child and Adult Resident | HUMAN – Future – Off-Site – Child and Adult Recreational | ECOLOGICAL – Current / Future – Off-Site – Aquatic Receptors[3] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Direct Contact | Ingestion | | ○ | ● | | | | ○ | ● | | |
| Direct Contact | Dermal Contact | | ○ | ● | | | | ○ | ● | | |
| Surface Water | Ingestion | | | | ● | | | | | ● | ● |
| Surface Water | Dermal Contact | | | | ● | | | | | ● | ● |
| Consumption of Biota | Ingestion | | | | ● | | | | | ● | |

HUMAN HEALTH AND ECOLOGICAL RISK EVALUATION RECEPTORS

**Legend**

- - - -▶ A conservative assumption for this assessment was made that groundwater from the site flows to the downgradient surface water.

● Indicates potentially complete pathway, which is evaluated quantitatively.

○ Indicates potentially complete pathway, which is evaluated qualitatively.

**Footnotes**

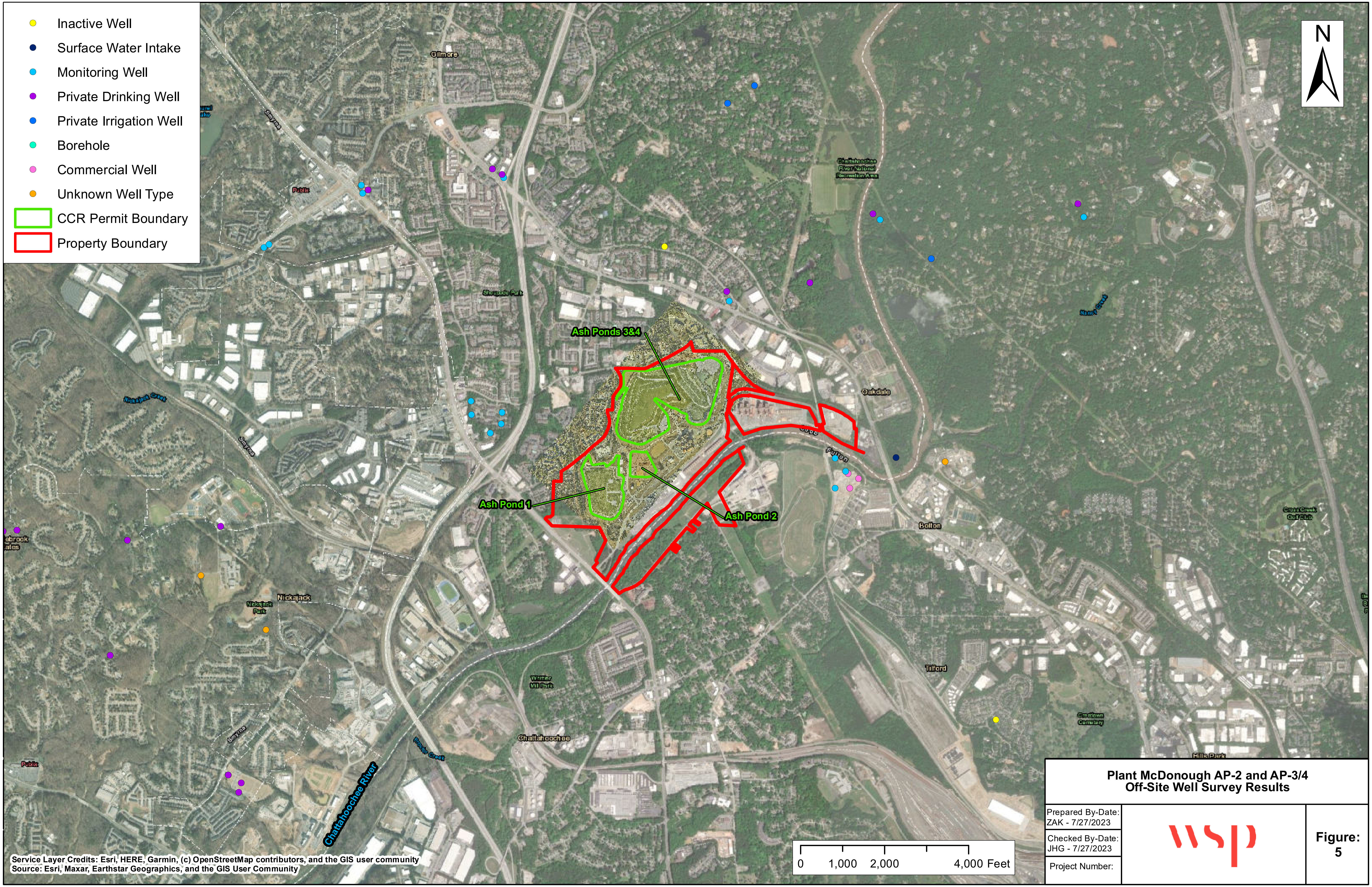
1. Industrial worker was considered incomplete because there are no wells on-site that are classified for use as potable wells. On-site construction workers would be expected to have little to no direct contact with on-site groundwater due to safety procedures outlined in their site-specific health and 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.

**Plant McDonough AP-2 and AP-3/4**
**Conceptual Exposure Model**

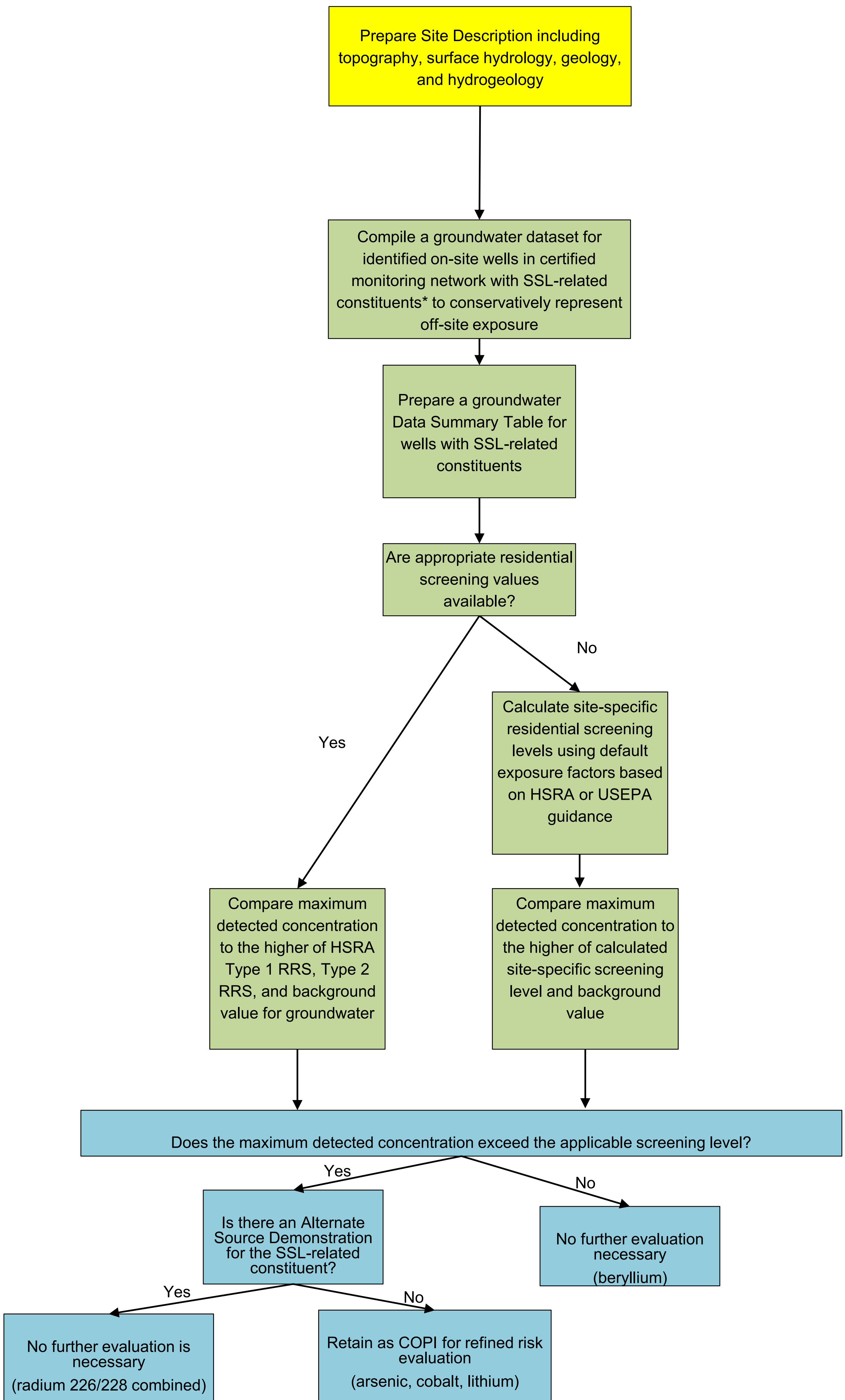
**Figure 4**

Project Number

Prepared by/Date: JHG 04/25/23
Checked by/Date: IMR 04/26/23


Inactive Well
Surface Water Intake
Monitoring Well
Private Drinking Well
Private Irrigation Well
Borehole
Commercial Well
Unknown Well Type
CCR Permit Boundary
Property Boundary
N
Ash Ponds 3&4
Ash Pond 1
Ash Pond 2
Chattahoochee River
Nickajack
Oakdale
Bolton
Tilford
Chattahoochee
Gilmore
0 1,000 2,000 4,000 Feet
Service Layer Credits: Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community
Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community
Plant McDonough AP-2 and AP-3/4
Off-Site Well Survey Results
Prepared By-Date:
ZAK - 7/27/2023
Checked By-Date:
JHG - 7/27/2023
Project Number:
wsp
Figure:
5

# Groundwater Risk Screening Approach for AP-2 and AP-3/4




Notes:

- Initial screen evaluates wells at AP-2 and AP-3/4 with SSLs: arsenic (DGWC-9); beryllium (DGWC-5, DGWC-9, DGWC-10, DGWC-47, DGWC-48, B-92, B-93, B-115D); cobalt (DGWC-8, DGWC-9, DGWC-10, DGWC-19, DGWC-20, DGWC-47, DGWC-48, B-56, B-63, B-93, B-104D, B-115D); lithium (DGWC-47, DGWC-48, B-115D, B-120D).

SSL = Statistically Significant Level
COPI = Constituent of Potential Interest
HSRA = Hazardous Site Response Act
RRS = Risk Reduction Standard
USEPA = United States Environmental Protection Agency

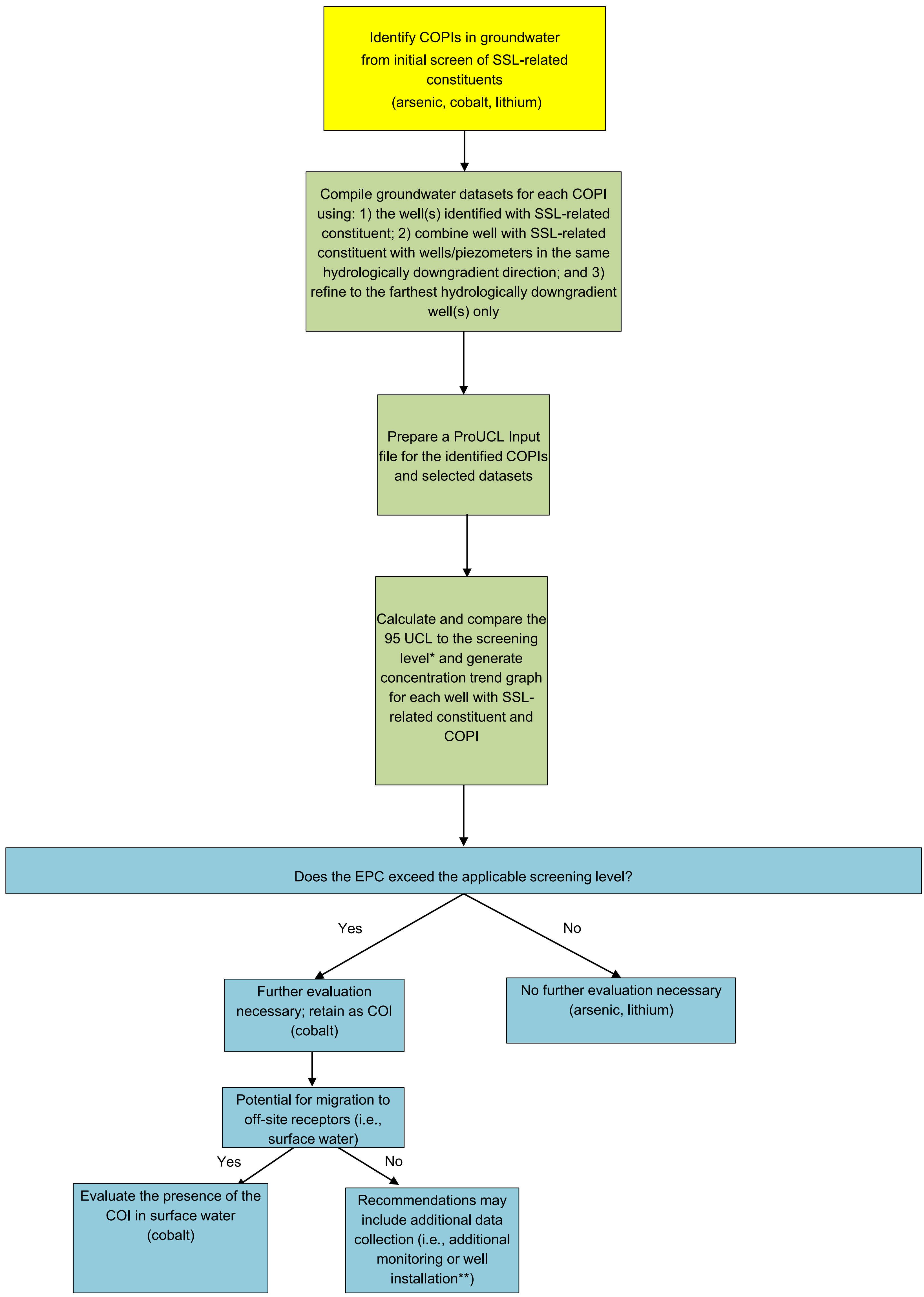
**Plant McDonough AP-2 and AP-3/4**
**Groundwater Risk Screening Approach**

**Figure 6**

Project Number

Prepared by/Date: JHG 04/25/23
Checked by/Date: IMR 04/26/23

# Refined Groundwater Risk Evaluation Approach for AP-2 and AP-3/4



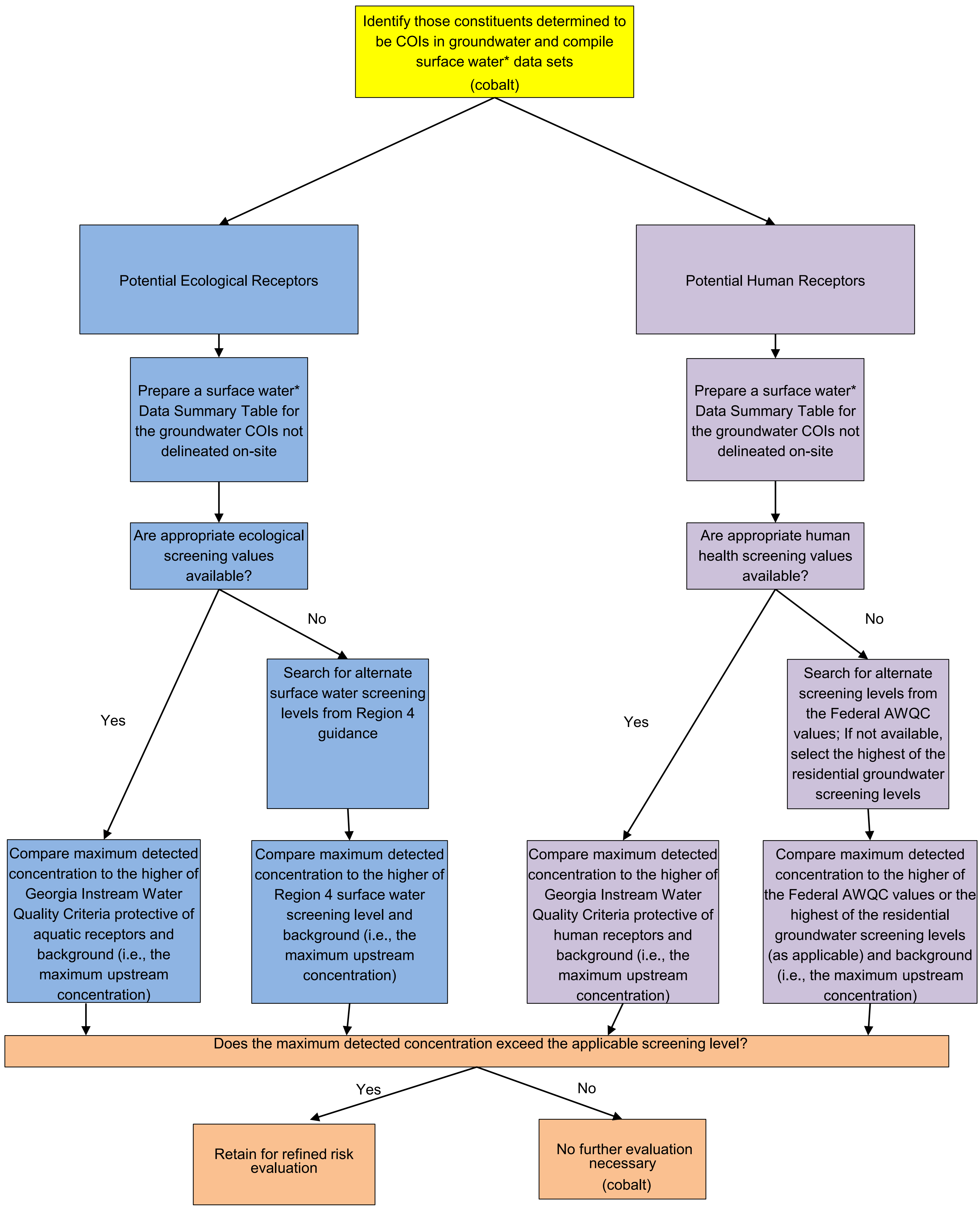

Notes:
*If the 95 UCL exceeds the maximum concentration, use the maximum as the EPC.
**This step is not necessary for McDonough AP-2 and AP-3/4.
SSL = Statistically Significant Level
COPI = Constituent of Potential Interest
EPC = Exposure Point Concentration
UCL = Upper Confidence Limit
COI = Constituent of Interest

**Plant McDonough AP-2 and AP-3/4**
**Refined Groundwater Risk Evaluation Approach**

**Figure 7**

| Project Number | Prepared by/Date: JHG 04/25/23<br>Checked by/Date: IMR 04/26/23 |
|---|---|

## Surface Water Risk Screening Approach for AP-2 and AP-3/4

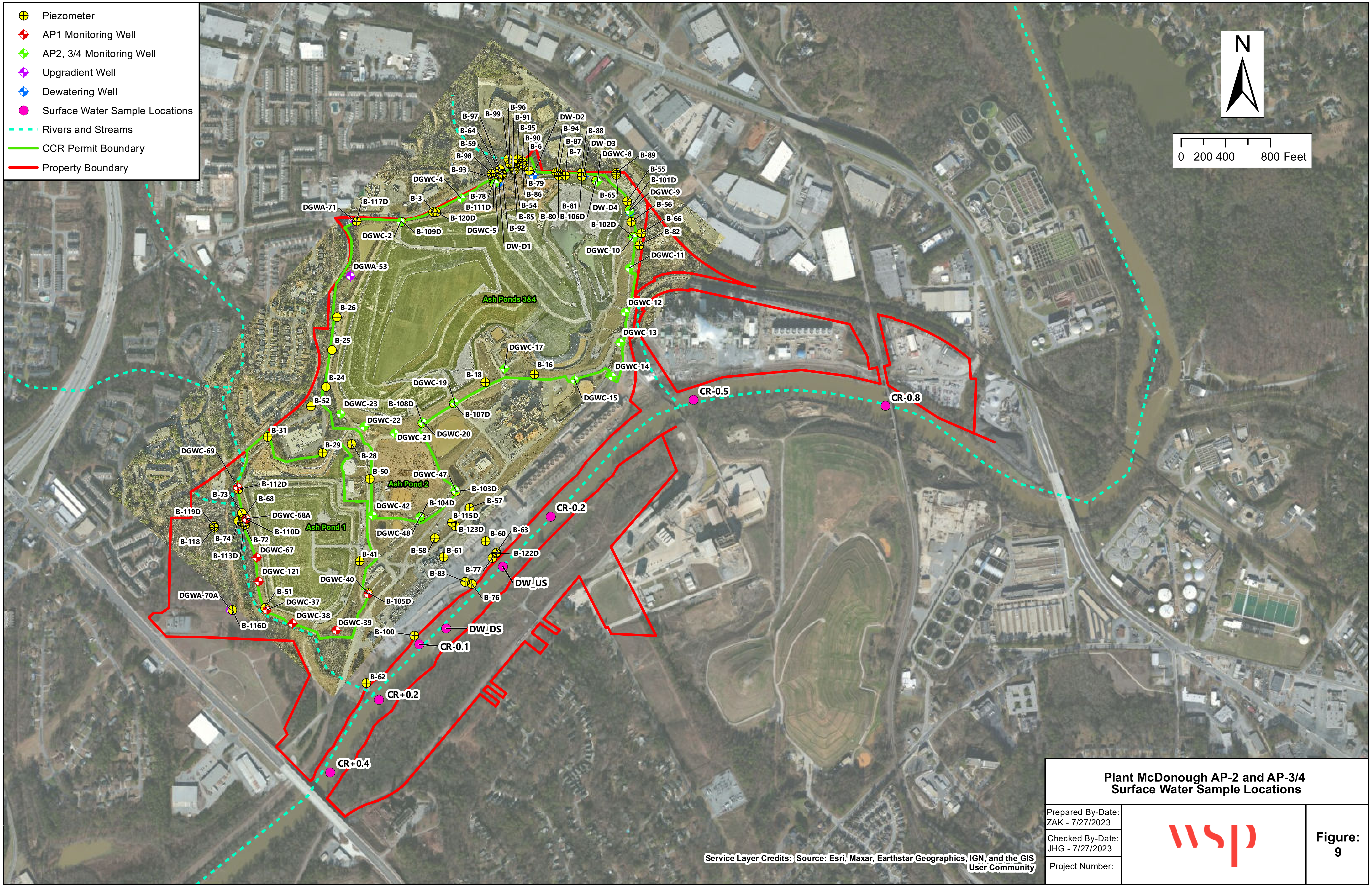



*Surface water data collected from the Chattahoochee River and includes two site-related locations, an upstream background location, and a downstream location.
SSL = Statistically Significant Level
AWQC = Ambient Water Quality Criteria
COI = Constituent of Interest
COPI = Constituent of Potential Interest

**Plant McDonough AP-2 and AP-3/4**
**Surface Water Risk Screening Approach**

**Figure 8**

| | |
|---|---|
| Project Number | Prepared by/Date: JHG 04/25/23<br>Checked by/Date: IMR 04/26/23 |




**Plant McDonough AP-2 and AP-3/4**
**Surface Water Sample Locations**

| | | |
|---|---|---|
| Prepared By-Date: ZAK - 7/27/2023 | wsp | Figure: 9 |
| Checked By-Date: JHG - 7/27/2023 | | |
| Project Number: | | |

# APPENDIX A

## Plant McDonough Well Survey (Off-Site)

NewFields

# Well Survey

## Plant McDonough

## Ash Pond 1, Ash Pond 2, and Ash Ponds 3/4

## Cobb County, 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 McDonough is located at 5551 South Cobb Dr. in southeast Cobb County.

Newfields conducted a well survey of potential drinking water wells within a three-mile radius of the Coal Combustion Residual (CCR) facilities at Plant McDonough: Ash Pond 1, Ash Pond 2, and Ash Ponds 3/4 ("Investigated Area"). This area is referred to in this report as the Investigated Area, and is shown on Figure 1.

As part of this survey, NewFields accessed and reviewed information from a number of Federal, State, and County records and online sources, as well as a windshield survey 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 for identifying 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 ground-water 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.' One spring in the Investigated Area is identified 1.9 miles southeast of the Ash Ponds in this database. Many of the monitoring wells appear to be co-located with drinking water wells and may be private drinking water wells utilized for monitoring purposes by USGS. Some listings in this database are over 50 years old and may be inactive.

       In addition, the USGS data contains information about major surface water intakes, including both industrial and municipal drinking water intakes. Specific information about the operator and use of the water is not included, but can be determined using parcel data, aerial photography, and visual identification during the windshield survey discussed in section 4.

    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. Water in the area is supplied by the Cobb County Water System or the City of Atlanta.

[1] http://waterdata.usgs.gov/ga/nwis/inventory?introduction

2. State Sources
   a. **Georgia Environmental Protection Division (EPD)**
      i. **Drinking Water Branch.** EPD 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 requesting information about wells in the Investigated Area. Mr. Gillis confirmed that there were no public wells in the Investigated Area.

      ii. **Hazardous Site Inventory (HSI) files.** EPD maintains HSI files for site which are undergoing state-led corrective action. These files usually contain groundwater data and well surveys. There is one HSI site within the Investigated Area, the Southern States Landfill across the Chattahoochee River from Plant McDonough Ash Ponds. There are several monitoring wells at this landfill.

      iii. **Hazardous Site Response Act (HSRA) notifications.** EPD maintains non-HSI HRSA notification reports (i.e., notifications submitted after releases of reportable substances). Reports associated with sites in Cobb and Fulton counties were reviewed and well surveys for sites within a 5-mile radius of Plant McDonough were retrieved. A large number of well surveys have been conducted in the Investigated Area. Wells identified on these surveys were added to the database.

   b. **Agricultural and Environmental Services Laboratory (AESL) records.** The University of Georgia's AESL Laboratory tests drinking water samples submitted by private individuals to their local county extension service. Maps of these sampling results can be viewed online.[2] Precise coordinates are not available, but NewFields was able to use online images to find approximate locations.

3. County Sources
   a. **Health Department Records.** County health departments (DOH) maintain records of the permits for "on-site sewage management systems" (septic tanks). However, in Fulton and Cobb counties, these files are not managed in a way that is feasible to search geographically.

   b. **Tax Assessor Records.** NewFields attempted to acquire parcel shape and improvement data from the Cobb County and Fulton County Tax Assessors' offices. Because of the density of parcels in this area, acquiring this information was not feasible. Parcel data was obtained for just the area within a half-mile of the Ash Ponds.

4. Windshield Survey
   a. A windshield survey of the Investigated Area was conducted on November 5, 2019. Six wells were identified during the windshield survey. One well location was a clearly decorative well in front of a church. Three wells were identified for apparent irrigation use on lawns or a

[2] http://aesl.ces.uga.edu/water/map/

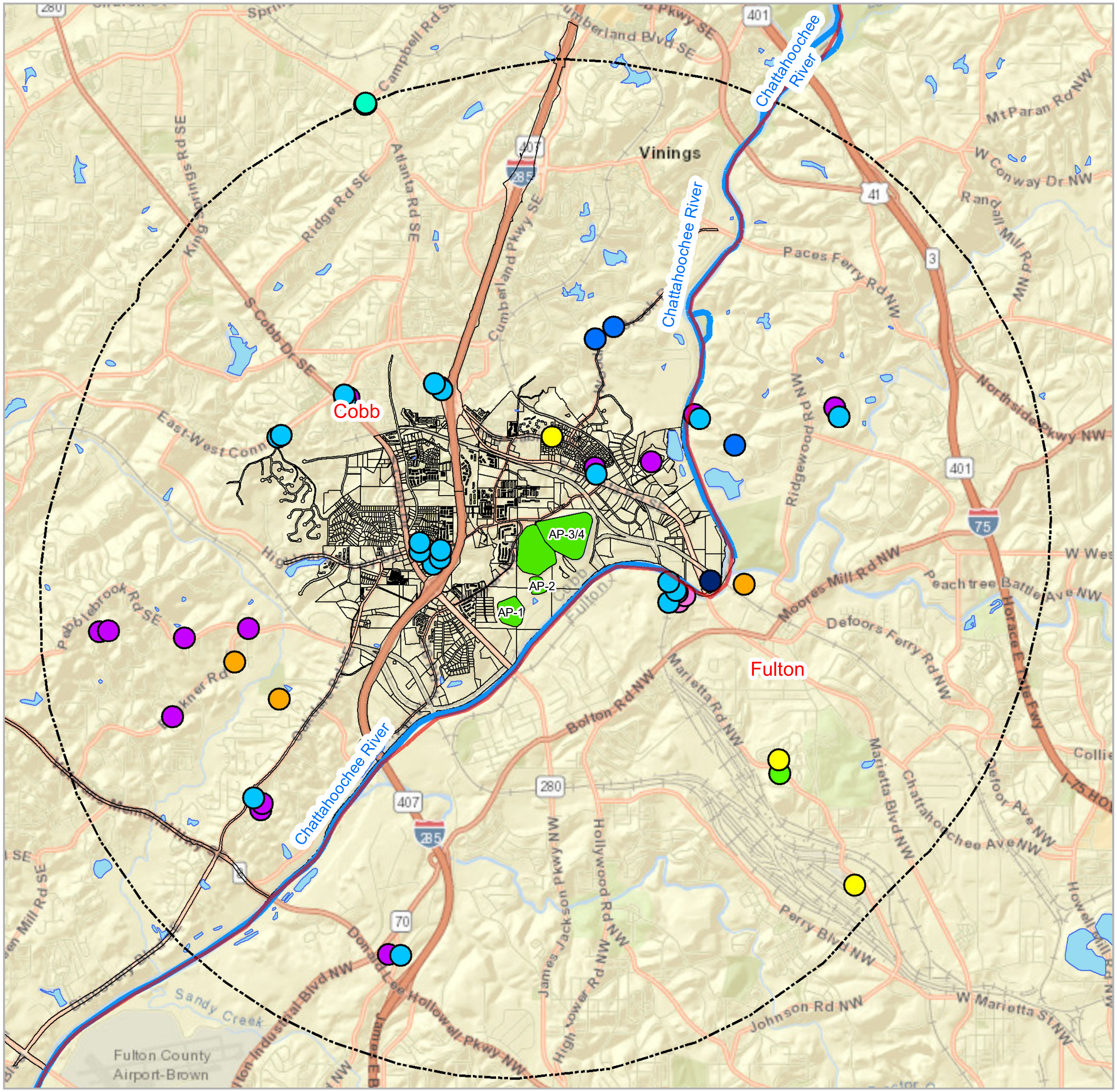
greenhouse. NewFields personnel were unable to locate most of the USGS monitoring wells at the locations listed in the database. NewFields also visited the location of the USGS-identified surface water intake, which is the drinking water treatment plant for the City of Atlanta. Identified wells and the surface water intake were compiled into the GIS database.

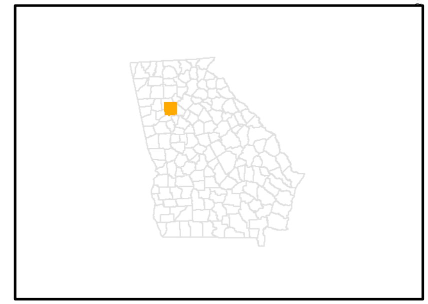
## Summary

Municipal water is available throughout the surveyed area. The surface water intake for the City of Atlanta is located upstream and across the Chattahoochee River, 0.85 miles to the east of Plant McDonough.

NewFields identified 48 possible wells. The majority of these are boreholes or monitoring wells associated with nearby industrial sites, and several are inactive. Eighteen of these wells may be active or former drinking water wells.

Figure 1 shows points for identified wells. It also shows the surface water intake for the City of Atlanta. 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

- Unknown Well Type
- Inactive Well
- Spring
- Borehole
- Monitoring Well
- Irrigation Well
- Private Drinking Well
- Commercial Well
- Surface Water Intake
- 3-Mile Radius
- Ash Ponds
- Major Waterways
- Lakes and Ponds
- Parcels
- County Line

0 2,350 4,700 9,400 Feet

| | |
|---|---|
| Title | Plant McDonough<br>AP-1, AP-2, & AP-3/4 |
| Project | GPC Plants<br>Georgia |
| NewFields | Two Midtown Plaza<br>1349 W. Peachtree St, #2000<br>Atlanta, Georgia 30309<br>Tel: 404-347-9050 |
| Date 1/2/2019 | Rev. No. 0 |
| MXD gpc_ccr_2019/agis | Figure No. 1 |

# APPENDIX B
## Data Used in Risk Evaluation

**Appendix B-1**
**Site Groundwater Data (2016-2023) for Evaluation of SSLs[1]**
**McDonough AP-2, 3/4 Risk Evaluation Report**
**McDonough AP-2, 3/4**
**Plant McDonough, Cobb County, GA**

| Well | Date | CAS | Constituent | Units | Obs | Flags | RL |
|---|---|---|---|---|---|---|---|
| DGWC-12 | 09/01/16 | 7440-38-2 | Arsenic | mg/L | | U | 0.0050 |
| DGWC-12 | 12/07/16 | 7440-38-2 | Arsenic | mg/L | | U | 0.0050 |
| DGWC-12 | 03/29/17 | 7440-38-2 | Arsenic | mg/L | | U | 0.0050 |
| DGWC-12 | 07/12/17 | 7440-38-2 | Arsenic | mg/L | | U | 0.0050 |
| DGWC-12 | 10/25/17 | 7440-38-2 | Arsenic | mg/L | 0.00060 | J | |
| DGWC-12 | 02/27/18 | 7440-38-2 | Arsenic | mg/L | | U | 0.0050 |
| DGWC-12 | 07/11/18 | 7440-38-2 | Arsenic | mg/L | | U | 0.0050 |
| DGWC-12 | 11/07/18 | 7440-38-2 | Arsenic | mg/L | | U | 0.0050 |
| DGWC-12 | 08/27/19 | 7440-38-2 | Arsenic | mg/L | | U | 0.0050 |
| DGWC-12 | 09/17/19 | 7440-38-2 | Arsenic | mg/L | | U | 0.0050 |
| DGWC-12 | 10/15/19 | 7440-38-2 | Arsenic | mg/L | | U | 0.0050 |
| DGWC-12 | 03/02/20 | 7440-38-2 | Arsenic | mg/L | | U | 0.0050 |
| DGWC-12 | 08/11/20 | 7440-38-2 | Arsenic | mg/L | | U | 0.00078 |
| DGWC-12 | 09/22/20 | 7440-38-2 | Arsenic | mg/L | | U | 0.00078 |
| DGWC-12 | 03/03/21 | 7440-38-2 | Arsenic | mg/L | | U | 0.00078 |
| DGWC-12 | 09/09/21 | 7440-38-2 | Arsenic | mg/L | | U | 0.0011 |
| DGWC-12 | 01/25/22 | 7440-38-2 | Arsenic | mg/L | | U | 0.0050 |
| DGWC-12 | 09/15/22 | 7440-38-2 | Arsenic | mg/L | | U | 0.0050 |
| DGWC-12 | 02/06/23 | 7440-38-2 | Arsenic | mg/L | | U | 0.0050 |
| DGWC-9 | 08/30/16 | 7440-38-2 | Arsenic | mg/L | 0.024 | | |
| DGWC-9 | 12/06/16 | 7440-38-2 | Arsenic | mg/L | | U | 0.0050 |
| DGWC-9 | 03/28/17 | 7440-38-2 | Arsenic | mg/L | 0.024 | | |
| DGWC-9 | 07/11/17 | 7440-38-2 | Arsenic | mg/L | 0.019 | | |
| DGWC-9 | 10/24/17 | 7440-38-2 | Arsenic | mg/L | 0.025 | | |
| DGWC-9 | 02/27/18 | 7440-38-2 | Arsenic | mg/L | 0.040 | | |
| DGWC-9 | 07/11/18 | 7440-38-2 | Arsenic | mg/L | 0.016 | | |
| DGWC-9 | 11/06/18 | 7440-38-2 | Arsenic | mg/L | 0.017 | | |
| DGWC-9 | 08/27/19 | 7440-38-2 | Arsenic | mg/L | 0.021 | | |
| DGWC-9 | 10/17/19 | 7440-38-2 | Arsenic | mg/L | 0.033 | | |
| DGWC-9 | 03/03/20 | 7440-38-2 | Arsenic | mg/L | 0.015 | | |
| DGWC-9 | 08/11/20 | 7440-38-2 | Arsenic | mg/L | 0.022 | | |
| DGWC-9 | 09/22/20 | 7440-38-2 | Arsenic | mg/L | 0.040 | | |
| DGWC-9 | 03/02/21 | 7440-38-2 | Arsenic | mg/L | 0.021 | | |
| DGWC-9 | 09/10/21 | 7440-38-2 | Arsenic | mg/L | 0.031 | | |
| DGWC-9 | 01/26/22 | 7440-38-2 | Arsenic | mg/L | 0.012 | | |
| DGWC-9 | 09/19/22 | 7440-38-2 | Arsenic | mg/L | 0.016 | | |
| DGWC-9 | 02/03/23 | 7440-38-2 | Arsenic | mg/L | 0.014 | | |
| B-115D | 04/14/21 | 7440-41-7 | Beryllium | mg/L | 0.012 | | |
| B-115D | 09/14/21 | 7440-41-7 | Beryllium | mg/L | 0.011 | | |
| B-115D | 01/20/22 | 7440-41-7 | Beryllium | mg/L | 0.011 | | |
| B-115D | 09/14/22 | 7440-41-7 | Beryllium | mg/L | 0.010 | | |
| B-115D | 02/06/23 | 7440-41-7 | Beryllium | mg/L | 0.011 | | |
| B-92 | 01/02/20 | 7440-41-7 | Beryllium | mg/L | 0.023 | | |
| B-92 | 03/09/21 | 7440-41-7 | Beryllium | mg/L | 0.017 | | |
| B-92 | 09/15/21 | 7440-41-7 | Beryllium | mg/L | 0.014 | | |

Prepared by/Date: JHG 05/09/23
Checked by/Date: LO 05/09/23

**Appendix B-1**

**Site Groundwater Data (2016-2023) for Evaluation of SSLs[1]**

**McDonough AP-2, 3/4 Risk Evaluation Report**

**McDonough AP-2, 3/4**

**Plant McDonough, Cobb County, GA**

| Well | Date | CAS | Constituent | Units | Obs | Flags | RL |
|---|---|---|---|---|---|---|---|
| B-92 | 01/26/22 | 7440-41-7 | Beryllium | mg/L | 0.018 | | |
| B-92 | 09/12/22 | 7440-41-7 | Beryllium | mg/L | 0.017 | | |
| B-92 | 01/31/23 | 7440-41-7 | Beryllium | mg/L | 0.017 | | |
| B-93 | 12/19/19 | 7440-41-7 | Beryllium | mg/L | 0.0069 | | |
| B-93 | 08/19/20 | 7440-41-7 | Beryllium | mg/L | 0.015 | | |
| B-93 | 09/28/20 | 7440-41-7 | Beryllium | mg/L | 0.015 | | |
| B-93 | 03/09/21 | 7440-41-7 | Beryllium | mg/L | 0.017 | | |
| B-93 | 09/15/21 | 7440-41-7 | Beryllium | mg/L | 0.015 | | |
| B-93 | 01/26/22 | 7440-41-7 | Beryllium | mg/L | 0.017 | | |
| B-93 | 09/12/22 | 7440-41-7 | Beryllium | mg/L | 0.017 | | |
| B-93 | 01/31/23 | 7440-41-7 | Beryllium | mg/L | 0.016 | | |
| DGWC-10 | 08/31/16 | 7440-41-7 | Beryllium | mg/L | 0.0046 | | |
| DGWC-10 | 12/06/16 | 7440-41-7 | Beryllium | mg/L | 0.0048 | | |
| DGWC-10 | 03/29/17 | 7440-41-7 | Beryllium | mg/L | 0.0048 | | |
| DGWC-10 | 07/12/17 | 7440-41-7 | Beryllium | mg/L | 0.0046 | | |
| DGWC-10 | 10/24/17 | 7440-41-7 | Beryllium | mg/L | 0.0048 | | |
| DGWC-10 | 02/27/18 | 7440-41-7 | Beryllium | mg/L | 0.011 | | |
| DGWC-10 | 07/10/18 | 7440-41-7 | Beryllium | mg/L | 0.012 | | |
| DGWC-10 | 11/06/18 | 7440-41-7 | Beryllium | mg/L | 0.012 | | |
| DGWC-10 | 08/27/19 | 7440-41-7 | Beryllium | mg/L | 0.0092 | | |
| DGWC-10 | 10/15/19 | 7440-41-7 | Beryllium | mg/L | 0.010 | | |
| DGWC-10 | 03/03/20 | 7440-41-7 | Beryllium | mg/L | 0.0085 | | |
| DGWC-10 | 08/11/20 | 7440-41-7 | Beryllium | mg/L | 0.0066 | | |
| DGWC-10 | 09/24/20 | 7440-41-7 | Beryllium | mg/L | 0.0077 | | |
| DGWC-10 | 03/04/21 | 7440-41-7 | Beryllium | mg/L | 0.0086 | | |
| DGWC-10 | 09/10/21 | 7440-41-7 | Beryllium | mg/L | 0.0074 | | |
| DGWC-10 | 01/26/22 | 7440-41-7 | Beryllium | mg/L | 0.0091 | | |
| DGWC-10 | 09/15/22 | 7440-41-7 | Beryllium | mg/L | 0.0063 | | |
| DGWC-10 | 02/02/23 | 7440-41-7 | Beryllium | mg/L | 0.0066 | | |
| DGWC-47 | 09/01/16 | 7440-41-7 | Beryllium | mg/L | 0.017 | | |
| DGWC-47 | 12/08/16 | 7440-41-7 | Beryllium | mg/L | 0.012 | | |
| DGWC-47 | 03/31/17 | 7440-41-7 | Beryllium | mg/L | 0.011 | | |
| DGWC-47 | 07/13/17 | 7440-41-7 | Beryllium | mg/L | 0.0098 | | |
| DGWC-47 | 10/26/17 | 7440-41-7 | Beryllium | mg/L | 0.012 | | |
| DGWC-47 | 03/01/18 | 7440-41-7 | Beryllium | mg/L | 0.015 | | |
| DGWC-47 | 07/12/18 | 7440-41-7 | Beryllium | mg/L | 0.013 | | |
| DGWC-47 | 11/07/18 | 7440-41-7 | Beryllium | mg/L | 0.014 | | |
| DGWC-47 | 08/29/19 | 7440-41-7 | Beryllium | mg/L | 0.011 | | |
| DGWC-47 | 10/17/19 | 7440-41-7 | Beryllium | mg/L | 0.0093 | | |
| DGWC-47 | 03/04/20 | 7440-41-7 | Beryllium | mg/L | 0.010 | | |
| DGWC-47 | 08/12/20 | 7440-41-7 | Beryllium | mg/L | 0.0068 | | |
| DGWC-47 | 09/23/20 | 7440-41-7 | Beryllium | mg/L | 0.0069 | | |
| DGWC-47 | 03/03/21 | 7440-41-7 | Beryllium | mg/L | 0.0081 | | |
| DGWC-47 | 09/10/21 | 7440-41-7 | Beryllium | mg/L | 0.0090 | | |
| DGWC-47 | 01/21/22 | 7440-41-7 | Beryllium | mg/L | 0.010 | | |

Prepared by/Date: JHG 05/09/23
Checked by/Date: LO 05/09/23

**Appendix B-1**
**Site Groundwater Data (2016-2023) for Evaluation of SSLs[1]**
**McDonough AP-2, 3/4 Risk Evaluation Report**
**McDonough AP-2, 3/4**
**Plant McDonough, Cobb County, GA**

| Well | Date | CAS | Constituent | Units | Obs | Flags | RL |
|---|---|---|---|---|---|---|---|
| DGWC-47 | 09/13/22 | 7440-41-7 | Beryllium | mg/L | 0.0094 | | |
| DGWC-47 | 02/03/23 | 7440-41-7 | Beryllium | mg/L | 0.0087 | | |
| DGWC-48 | 09/01/16 | 7440-41-7 | Beryllium | mg/L | 0.0080 | | |
| DGWC-48 | 12/08/16 | 7440-41-7 | Beryllium | mg/L | 0.0086 | | |
| DGWC-48 | 03/30/17 | 7440-41-7 | Beryllium | mg/L | 0.011 | | |
| DGWC-48 | 07/13/17 | 7440-41-7 | Beryllium | mg/L | 0.011 | | |
| DGWC-48 | 10/26/17 | 7440-41-7 | Beryllium | mg/L | 0.0078 | | |
| DGWC-48 | 03/02/18 | 7440-41-7 | Beryllium | mg/L | 0.0096 | | |
| DGWC-48 | 07/12/18 | 7440-41-7 | Beryllium | mg/L | 0.0086 | | |
| DGWC-48 | 11/07/18 | 7440-41-7 | Beryllium | mg/L | 0.0078 | | |
| DGWC-48 | 08/29/19 | 7440-41-7 | Beryllium | mg/L | 0.0081 | | |
| DGWC-48 | 10/18/19 | 7440-41-7 | Beryllium | mg/L | 0.0099 | | |
| DGWC-48 | 03/04/20 | 7440-41-7 | Beryllium | mg/L | 0.0080 | | |
| DGWC-48 | 08/13/20 | 7440-41-7 | Beryllium | mg/L | 0.0071 | | |
| DGWC-48 | 09/23/20 | 7440-41-7 | Beryllium | mg/L | 0.0072 | | |
| DGWC-48 | 03/03/21 | 7440-41-7 | Beryllium | mg/L | 0.0068 | | |
| DGWC-48 | 09/10/21 | 7440-41-7 | Beryllium | mg/L | 0.0070 | | |
| DGWC-48 | 01/24/22 | 7440-41-7 | Beryllium | mg/L | 0.0069 | | |
| DGWC-48 | 09/13/22 | 7440-41-7 | Beryllium | mg/L | 0.0071 | | |
| DGWC-48 | 02/03/23 | 7440-41-7 | Beryllium | mg/L | 0.0062 | | |
| DGWC-5 | 08/31/16 | 7440-41-7 | Beryllium | mg/L | 0.0054 | | |
| DGWC-5 | 12/06/16 | 7440-41-7 | Beryllium | mg/L | 0.0064 | | |
| DGWC-5 | 03/28/17 | 7440-41-7 | Beryllium | mg/L | 0.0049 | | |
| DGWC-5 | 07/11/17 | 7440-41-7 | Beryllium | mg/L | 0.0050 | | |
| DGWC-5 | 10/25/17 | 7440-41-7 | Beryllium | mg/L | 0.0069 | | |
| DGWC-5 | 02/27/18 | 7440-41-7 | Beryllium | mg/L | 0.0086 | | |
| DGWC-5 | 07/10/18 | 7440-41-7 | Beryllium | mg/L | 0.0048 | | |
| DGWC-5 | 11/06/18 | 7440-41-7 | Beryllium | mg/L | 0.010 | | |
| DGWC-5 | 08/27/19 | 7440-41-7 | Beryllium | mg/L | 0.010 | | |
| DGWC-5 | 10/16/19 | 7440-41-7 | Beryllium | mg/L | 0.0072 | | |
| DGWC-5 | 03/02/20 | 7440-41-7 | Beryllium | mg/L | 0.0098 | | |
| DGWC-5 | 08/12/20 | 7440-41-7 | Beryllium | mg/L | 0.0081 | | |
| DGWC-5 | 09/22/20 | 7440-41-7 | Beryllium | mg/L | 0.0081 | | |
| DGWC-5 | 03/02/21 | 7440-41-7 | Beryllium | mg/L | 0.0063 | | |
| DGWC-5 | 09/10/21 | 7440-41-7 | Beryllium | mg/L | 0.0075 | | |
| DGWC-5 | 01/24/22 | 7440-41-7 | Beryllium | mg/L | 0.0084 | | |
| DGWC-5 | 09/14/22 | 7440-41-7 | Beryllium | mg/L | 0.010 | | |
| DGWC-5 | 02/07/23 | 7440-41-7 | Beryllium | mg/L | 0.0083 | | |
| DGWC-9 | 08/30/16 | 7440-41-7 | Beryllium | mg/L | 0.0045 | | |
| DGWC-9 | 12/06/16 | 7440-41-7 | Beryllium | mg/L | 0.0050 | | |
| DGWC-9 | 03/28/17 | 7440-41-7 | Beryllium | mg/L | 0.0052 | | |
| DGWC-9 | 07/11/17 | 7440-41-7 | Beryllium | mg/L | 0.0048 | | |
| DGWC-9 | 10/24/17 | 7440-41-7 | Beryllium | mg/L | 0.0051 | | |
| DGWC-9 | 02/27/18 | 7440-41-7 | Beryllium | mg/L | 0.0057 | | |
| DGWC-9 | 07/11/18 | 7440-41-7 | Beryllium | mg/L | 0.0058 | | |

Prepared by/Date: JHG 05/09/23
Checked by/Date: LO 05/09/23

**Appendix B-1**
**Site Groundwater Data (2016-2023) for Evaluation of SSLs[1]**
**McDonough AP-2, 3/4 Risk Evaluation Report**
**McDonough AP-2, 3/4**
**Plant McDonough, Cobb County, GA**

| Well | Date | CAS | Constituent | Units | Obs | Flags | RL |
|---|---|---|---|---|---|---|---|
| DGWC-9 | 11/06/18 | 7440-41-7 | Beryllium | mg/L | 0.0060 | | |
| DGWC-9 | 08/27/19 | 7440-41-7 | Beryllium | mg/L | 0.0070 | | |
| DGWC-9 | 10/17/19 | 7440-41-7 | Beryllium | mg/L | 0.0063 | | |
| DGWC-9 | 03/03/20 | 7440-41-7 | Beryllium | mg/L | 0.0048 | | |
| DGWC-9 | 08/11/20 | 7440-41-7 | Beryllium | mg/L | 0.0062 | | |
| DGWC-9 | 09/22/20 | 7440-41-7 | Beryllium | mg/L | 0.0049 | | |
| DGWC-9 | 03/02/21 | 7440-41-7 | Beryllium | mg/L | 0.0050 | | |
| DGWC-9 | 09/10/21 | 7440-41-7 | Beryllium | mg/L | 0.0049 | | |
| DGWC-9 | 01/26/22 | 7440-41-7 | Beryllium | mg/L | 0.0054 | | |
| DGWC-9 | 09/19/22 | 7440-41-7 | Beryllium | mg/L | 0.0047 | | |
| DGWC-9 | 02/03/23 | 7440-41-7 | Beryllium | mg/L | 0.0046 | | |
| B-101D | 01/12/21 | 7440-48-4 | Cobalt | mg/L | 0.0034 | | |
| B-101D | 03/05/21 | 7440-48-4 | Cobalt | mg/L | 0.0023 | | |
| B-101D | 09/13/21 | 7440-48-4 | Cobalt | mg/L | 0.0030 | | |
| B-101D | 01/26/22 | 7440-48-4 | Cobalt | mg/L | 0.0028 | | |
| B-101D | 09/16/22 | 7440-48-4 | Cobalt | mg/L | 0.0035 | | |
| B-101D | 02/03/23 | 7440-48-4 | Cobalt | mg/L | 0.0022 | | |
| B-102D | 12/17/20 | 7440-48-4 | Cobalt | mg/L | 0.014 | | |
| B-102D | 01/11/21 | 7440-48-4 | Cobalt | mg/L | 0.015 | | |
| B-102D | 03/04/21 | 7440-48-4 | Cobalt | mg/L | 0.014 | | |
| B-102D | 09/10/21 | 7440-48-4 | Cobalt | mg/L | 0.013 | | |
| B-102D | 01/27/22 | 7440-48-4 | Cobalt | mg/L | 0.014 | | |
| B-102D | 09/15/22 | 7440-48-4 | Cobalt | mg/L | 0.012 | | |
| B-102D | 02/02/23 | 7440-48-4 | Cobalt | mg/L | 0.011 | | |
| B-104D | 12/09/20 | 7440-48-4 | Cobalt | mg/L | 0.17 | | |
| B-104D | 01/12/21 | 7440-48-4 | Cobalt | mg/L | 0.19 | | |
| B-104D | 03/04/21 | 7440-48-4 | Cobalt | mg/L | 0.19 | | |
| B-104D | 09/14/21 | 7440-48-4 | Cobalt | mg/L | 0.10 | | |
| B-104D | 01/24/22 | 7440-48-4 | Cobalt | mg/L | 0.10 | | |
| B-104D | 09/13/22 | 7440-48-4 | Cobalt | mg/L | 0.14 | | |
| B-104D | 02/03/23 | 7440-48-4 | Cobalt | mg/L | 0.17 | | |
| B-106D | 12/17/20 | 7440-48-4 | Cobalt | mg/L | 0.00087 | | |
| B-106D | 03/04/21 | 7440-48-4 | Cobalt | mg/L | 0.00070 | | |
| B-106D | 09/13/21 | 7440-48-4 | Cobalt | mg/L | 0.00056 | | |
| B-106D | 01/25/22 | 7440-48-4 | Cobalt | mg/L | | U | 0.0050 |
| B-106D | 09/16/22 | 7440-48-4 | Cobalt | mg/L | | U | 0.0050 |
| B-106D | 02/07/23 | 7440-48-4 | Cobalt | mg/L | | U | 0.0050 |
| B-115D | 04/14/21 | 7440-48-4 | Cobalt | mg/L | 0.30 | | |
| B-115D | 09/14/21 | 7440-48-4 | Cobalt | mg/L | 0.28 | | |
| B-115D | 01/20/22 | 7440-48-4 | Cobalt | mg/L | 0.24 | | |
| B-115D | 09/14/22 | 7440-48-4 | Cobalt | mg/L | 0.23 | | |
| B-115D | 02/06/23 | 7440-48-4 | Cobalt | mg/L | 0.27 | | |
| B-56 | 08/17/20 | 7440-48-4 | Cobalt | mg/L | 0.042 | | |
| B-56 | 09/28/20 | 7440-48-4 | Cobalt | mg/L | 0.042 | | |
| B-56 | 03/03/21 | 7440-48-4 | Cobalt | mg/L | 0.050 | | |



Prepared by/Date: JHG 05/09/23
Checked by/Date: LO 05/09/23

**Appendix B-1**
**Site Groundwater Data (2016-2023) for Evaluation of SSLs[1]**
**McDonough AP-2, 3/4 Risk Evaluation Report**
**McDonough AP-2, 3/4**
**Plant McDonough, Cobb County, GA**

| Well | Date | CAS | Constituent | Units | Obs | Flags | RL |
|---|---|---|---|---|---|---|---|
| B-56 | 09/13/21 | 7440-48-4 | Cobalt | mg/L | 0.047 | | |
| B-56 | 01/27/22 | 7440-48-4 | Cobalt | mg/L | 0.052 | | |
| B-56 | 09/16/22 | 7440-48-4 | Cobalt | mg/L | 0.051 | | |
| B-56 | 02/07/23 | 7440-48-4 | Cobalt | mg/L | 0.059 | | |
| B-57 | 01/15/21 | 7440-48-4 | Cobalt | mg/L | 0.47 | | |
| B-60 | 10/21/19 | 7440-48-4 | Cobalt | mg/L | 0.29 | | |
| B-61 | 01/28/19 | 7440-48-4 | Cobalt | mg/L | 0.078 | | |
| B-61 | 10/22/19 | 7440-48-4 | Cobalt | mg/L | 0.073 | | |
| B-63 | 01/28/19 | 7440-48-4 | Cobalt | mg/L | 0.053 | | |
| B-63 | 10/22/19 | 7440-48-4 | Cobalt | mg/L | 0.046 | | |
| B-63 | 03/12/21 | 7440-48-4 | Cobalt | mg/L | 0.046 | | |
| B-63 | 09/14/21 | 7440-48-4 | Cobalt | mg/L | 0.037 | | |
| B-63 | 01/20/22 | 7440-48-4 | Cobalt | mg/L | 0.039 | | |
| B-63 | 09/14/22 | 7440-48-4 | Cobalt | mg/L | 0.050 | | |
| B-63 | 02/02/23 | 7440-48-4 | Cobalt | mg/L | 0.027 | | |
| B-64 | 01/28/19 | 7440-48-4 | Cobalt | mg/L | | U | 0.010 |
| B-64 | 10/21/19 | 7440-48-4 | Cobalt | mg/L | 0.0043 | J | |
| B-76 | 10/22/19 | 7440-48-4 | Cobalt | mg/L | 0.47 | | |
| B-76 | 03/12/21 | 7440-48-4 | Cobalt | mg/L | 0.35 | | |
| B-76 | 09/13/22 | 7440-48-4 | Cobalt | mg/L | 0.21 | | |
| B-77 | 10/24/19 | 7440-48-4 | Cobalt | mg/L | 0.0021 | J | |
| B-77 | 08/13/20 | 7440-48-4 | Cobalt | mg/L | 0.0011 | | |
| B-77 | 09/24/20 | 7440-48-4 | Cobalt | mg/L | 0.00040 | | |
| B-77 | 03/04/21 | 7440-48-4 | Cobalt | mg/L | 0.0017 | | |
| B-77 | 09/14/21 | 7440-48-4 | Cobalt | mg/L | | U | 0.00039 |
| B-77 | 01/20/22 | 7440-48-4 | Cobalt | mg/L | | U | 0.0050 |
| B-77 | 09/13/22 | 7440-48-4 | Cobalt | mg/L | | U | 0.0050 |
| B-77 | 02/06/23 | 7440-48-4 | Cobalt | mg/L | | U | 0.0050 |
| B-83 | 10/21/19 | 7440-48-4 | Cobalt | mg/L | 0.018 | | |
| B-83 | 08/14/20 | 7440-48-4 | Cobalt | mg/L | 0.021 | | |
| B-83 | 09/25/20 | 7440-48-4 | Cobalt | mg/L | 0.0073 | | |
| B-83 | 03/04/21 | 7440-48-4 | Cobalt | mg/L | 0.0099 | | |
| B-83 | 09/16/21 | 7440-48-4 | Cobalt | mg/L | 0.011 | | |
| B-83 | 01/21/22 | 7440-48-4 | Cobalt | mg/L | 0.011 | | |
| B-83 | 09/13/22 | 7440-48-4 | Cobalt | mg/L | 0.012 | | |
| B-83 | 02/03/23 | 7440-48-4 | Cobalt | mg/L | 0.012 | | |
| B-92 | 09/15/21 | 7440-48-4 | Cobalt | mg/L | 0.063 | | |
| B-92 | 01/26/22 | 7440-48-4 | Cobalt | mg/L | 0.071 | | |
| B-92 | 09/12/22 | 7440-48-4 | Cobalt | mg/L | 0.073 | | |
| B-92 | 01/31/23 | 7440-48-4 | Cobalt | mg/L | 0.080 | | |
| B-93 | 12/19/19 | 7440-48-4 | Cobalt | mg/L | 0.066 | | |
| B-93 | 08/19/20 | 7440-48-4 | Cobalt | mg/L | 0.068 | | |
| B-93 | 09/28/20 | 7440-48-4 | Cobalt | mg/L | 0.064 | | |
| B-93 | 03/09/21 | 7440-48-4 | Cobalt | mg/L | 0.061 | | |
| B-93 | 09/15/21 | 7440-48-4 | Cobalt | mg/L | 0.062 | | |

Prepared by/Date: JHG 05/09/23
Checked by/Date: LO 05/09/23

**Appendix B-1**
**Site Groundwater Data (2016-2023) for Evaluation of SSLs[1]**
**McDonough AP-2, 3/4 Risk Evaluation Report**
**McDonough AP-2, 3/4**
**Plant McDonough, Cobb County, GA**

| Well | Date | CAS | Constituent | Units | Obs | Flags | RL |
|---|---|---|---|---|---|---|---|
| B-93 | 01/26/22 | 7440-48-4 | Cobalt | mg/L | 0.064 | | |
| B-93 | 09/12/22 | 7440-48-4 | Cobalt | mg/L | 0.057 | | |
| B-93 | 01/31/23 | 7440-48-4 | Cobalt | mg/L | 0.067 | | |
| DGWC-10 | 08/31/16 | 7440-48-4 | Cobalt | mg/L | 0.19 | | |
| DGWC-10 | 12/06/16 | 7440-48-4 | Cobalt | mg/L | 0.20 | | |
| DGWC-10 | 03/29/17 | 7440-48-4 | Cobalt | mg/L | 0.18 | | |
| DGWC-10 | 07/12/17 | 7440-48-4 | Cobalt | mg/L | 0.18 | | |
| DGWC-10 | 10/24/17 | 7440-48-4 | Cobalt | mg/L | 0.18 | | |
| DGWC-10 | 02/27/18 | 7440-48-4 | Cobalt | mg/L | 0.20 | | |
| DGWC-10 | 07/10/18 | 7440-48-4 | Cobalt | mg/L | 0.20 | | |
| DGWC-10 | 11/06/18 | 7440-48-4 | Cobalt | mg/L | 0.20 | | |
| DGWC-10 | 08/27/19 | 7440-48-4 | Cobalt | mg/L | 0.13 | | |
| DGWC-10 | 10/15/19 | 7440-48-4 | Cobalt | mg/L | 0.17 | | |
| DGWC-10 | 03/03/20 | 7440-48-4 | Cobalt | mg/L | 0.18 | | |
| DGWC-10 | 08/11/20 | 7440-48-4 | Cobalt | mg/L | 0.11 | | |
| DGWC-10 | 09/24/20 | 7440-48-4 | Cobalt | mg/L | 0.086 | | |
| DGWC-10 | 03/04/21 | 7440-48-4 | Cobalt | mg/L | 0.071 | | |
| DGWC-10 | 09/10/21 | 7440-48-4 | Cobalt | mg/L | 0.076 | | |
| DGWC-10 | 01/26/22 | 7440-48-4 | Cobalt | mg/L | 0.099 | | |
| DGWC-10 | 09/15/22 | 7440-48-4 | Cobalt | mg/L | 0.055 | | |
| DGWC-10 | 02/02/23 | 7440-48-4 | Cobalt | mg/L | 0.11 | | |
| DGWC-12 | 09/01/16 | 7440-48-4 | Cobalt | mg/L | 0.0021 | J | |
| DGWC-12 | 12/07/16 | 7440-48-4 | Cobalt | mg/L | 0.0026 | J | |
| DGWC-12 | 03/29/17 | 7440-48-4 | Cobalt | mg/L | 0.0026 | J | |
| DGWC-12 | 07/12/17 | 7440-48-4 | Cobalt | mg/L | 0.0033 | J | |
| DGWC-12 | 10/25/17 | 7440-48-4 | Cobalt | mg/L | 0.0021 | J | |
| DGWC-12 | 02/27/18 | 7440-48-4 | Cobalt | mg/L | 0.0021 | J | |
| DGWC-12 | 07/11/18 | 7440-48-4 | Cobalt | mg/L | 0.0020 | J | |
| DGWC-12 | 11/07/18 | 7440-48-4 | Cobalt | mg/L | 0.0057 | J | |
| DGWC-12 | 08/27/19 | 7440-48-4 | Cobalt | mg/L | 0.0021 | J | |
| DGWC-12 | 10/15/19 | 7440-48-4 | Cobalt | mg/L | 0.0058 | | |
| DGWC-12 | 03/02/20 | 7440-48-4 | Cobalt | mg/L | 0.029 | | |
| DGWC-12 | 08/11/20 | 7440-48-4 | Cobalt | mg/L | 0.0060 | | |
| DGWC-12 | 09/22/20 | 7440-48-4 | Cobalt | mg/L | 0.013 | | |
| DGWC-12 | 03/03/21 | 7440-48-4 | Cobalt | mg/L | 0.010 | | |
| DGWC-12 | 09/09/21 | 7440-48-4 | Cobalt | mg/L | 0.034 | | |
| DGWC-12 | 01/25/22 | 7440-48-4 | Cobalt | mg/L | 0.018 | | |
| DGWC-12 | 09/15/22 | 7440-48-4 | Cobalt | mg/L | 0.025 | | |
| DGWC-12 | 02/06/23 | 7440-48-4 | Cobalt | mg/L | 0.016 | | |
| DGWC-19 | 09/01/16 | 7440-48-4 | Cobalt | mg/L | 0.055 | | |
| DGWC-19 | 12/07/16 | 7440-48-4 | Cobalt | mg/L | 0.056 | | |
| DGWC-19 | 03/29/17 | 7440-48-4 | Cobalt | mg/L | 0.053 | | |
| DGWC-19 | 07/12/17 | 7440-48-4 | Cobalt | mg/L | 0.049 | | |
| DGWC-19 | 10/25/17 | 7440-48-4 | Cobalt | mg/L | 0.051 | | |
| DGWC-19 | 02/28/18 | 7440-48-4 | Cobalt | mg/L | 0.051 | | |

Prepared by/Date: JHG 05/09/23
Checked by/Date: LO 05/09/23

**Appendix B-1**
**Site Groundwater Data (2016-2023) for Evaluation of SSLs[1]**
**McDonough AP-2, 3/4 Risk Evaluation Report**
**McDonough AP-2, 3/4**
**Plant McDonough, Cobb County, GA**

| Well | Date | CAS | Constituent | Units | Obs | Flags | RL |
|---|---|---|---|---|---|---|---|
| DGWC-19 | 07/11/18 | 7440-48-4 | Cobalt | mg/L | 0.051 | | |
| DGWC-19 | 11/07/18 | 7440-48-4 | Cobalt | mg/L | 0.048 | | |
| DGWC-19 | 08/28/19 | 7440-48-4 | Cobalt | mg/L | 0.048 | | |
| DGWC-19 | 10/16/19 | 7440-48-4 | Cobalt | mg/L | 0.046 | | |
| DGWC-19 | 03/03/20 | 7440-48-4 | Cobalt | mg/L | 0.054 | | |
| DGWC-19 | 08/11/20 | 7440-48-4 | Cobalt | mg/L | 0.049 | | |
| DGWC-19 | 09/22/20 | 7440-48-4 | Cobalt | mg/L | 0.051 | | |
| DGWC-19 | 03/02/21 | 7440-48-4 | Cobalt | mg/L | 0.051 | | |
| DGWC-19 | 09/09/21 | 7440-48-4 | Cobalt | mg/L | 0.055 | | |
| DGWC-19 | 01/25/22 | 7440-48-4 | Cobalt | mg/L | 0.054 | | |
| DGWC-19 | 09/14/22 | 7440-48-4 | Cobalt | mg/L | 0.052 | | |
| DGWC-19 | 02/06/23 | 7440-48-4 | Cobalt | mg/L | 0.055 | | |
| DGWC-20 | 09/02/16 | 7440-48-4 | Cobalt | mg/L | 0.50 | | |
| DGWC-20 | 12/07/16 | 7440-48-4 | Cobalt | mg/L | 0.61 | | |
| DGWC-20 | 03/29/17 | 7440-48-4 | Cobalt | mg/L | 0.44 | | |
| DGWC-20 | 07/12/17 | 7440-48-4 | Cobalt | mg/L | 0.54 | | |
| DGWC-20 | 10/25/17 | 7440-48-4 | Cobalt | mg/L | 0.43 | | |
| DGWC-20 | 02/28/18 | 7440-48-4 | Cobalt | mg/L | 0.46 | | |
| DGWC-20 | 07/11/18 | 7440-48-4 | Cobalt | mg/L | 0.47 | | |
| DGWC-20 | 11/07/18 | 7440-48-4 | Cobalt | mg/L | 0.42 | | |
| DGWC-20 | 08/29/19 | 7440-48-4 | Cobalt | mg/L | 0.66 | | |
| DGWC-20 | 10/17/19 | 7440-48-4 | Cobalt | mg/L | 0.57 | | |
| DGWC-20 | 03/04/20 | 7440-48-4 | Cobalt | mg/L | 0.84 | | |
| DGWC-20 | 08/13/20 | 7440-48-4 | Cobalt | mg/L | 0.73 | | |
| DGWC-20 | 09/22/20 | 7440-48-4 | Cobalt | mg/L | 0.47 | | |
| DGWC-20 | 03/02/21 | 7440-48-4 | Cobalt | mg/L | 0.77 | | |
| DGWC-20 | 09/10/21 | 7440-48-4 | Cobalt | mg/L | 0.45 | | |
| DGWC-20 | 01/21/22 | 7440-48-4 | Cobalt | mg/L | 0.95 | | |
| DGWC-20 | 09/15/22 | 7440-48-4 | Cobalt | mg/L | 0.75 | | |
| DGWC-20 | 02/07/23 | 7440-48-4 | Cobalt | mg/L | 1.0 | | |
| DGWC-47 | 09/01/16 | 7440-48-4 | Cobalt | mg/L | 0.54 | | |
| DGWC-47 | 12/08/16 | 7440-48-4 | Cobalt | mg/L | 0.38 | | |
| DGWC-47 | 03/31/17 | 7440-48-4 | Cobalt | mg/L | 0.35 | | |
| DGWC-47 | 07/13/17 | 7440-48-4 | Cobalt | mg/L | 0.40 | | |
| DGWC-47 | 10/26/17 | 7440-48-4 | Cobalt | mg/L | 0.38 | | |
| DGWC-47 | 03/01/18 | 7440-48-4 | Cobalt | mg/L | 0.40 | | |
| DGWC-47 | 07/12/18 | 7440-48-4 | Cobalt | mg/L | 0.36 | | |
| DGWC-47 | 11/07/18 | 7440-48-4 | Cobalt | mg/L | 0.35 | | |
| DGWC-47 | 08/29/19 | 7440-48-4 | Cobalt | mg/L | 0.28 | | |
| DGWC-47 | 10/17/19 | 7440-48-4 | Cobalt | mg/L | 0.26 | | |
| DGWC-47 | 03/04/20 | 7440-48-4 | Cobalt | mg/L | 0.28 | | |
| DGWC-47 | 08/12/20 | 7440-48-4 | Cobalt | mg/L | 0.21 | | |
| DGWC-47 | 09/23/20 | 7440-48-4 | Cobalt | mg/L | 0.17 | | |
| DGWC-47 | 03/03/21 | 7440-48-4 | Cobalt | mg/L | 0.20 | | |
| DGWC-47 | 09/10/21 | 7440-48-4 | Cobalt | mg/L | 0.23 | | |

Prepared by/Date: JHG 05/09/23
Checked by/Date: LO 05/09/23

**Appendix B-1**
**Site Groundwater Data (2016-2023) for Evaluation of SSLs[1]**
**McDonough AP-2, 3/4 Risk Evaluation Report**
**McDonough AP-2, 3/4**
**Plant McDonough, Cobb County, GA**

| Well | Date | CAS | Constituent | Units | Obs | Flags | RL |
|---|---|---|---|---|---|---|---|
| DGWC-47 | 01/21/22 | 7440-48-4 | Cobalt | mg/L | 0.24 | | |
| DGWC-47 | 09/13/22 | 7440-48-4 | Cobalt | mg/L | 0.21 | | |
| DGWC-47 | 02/03/23 | 7440-48-4 | Cobalt | mg/L | 0.21 | | |
| DGWC-48 | 09/01/16 | 7440-48-4 | Cobalt | mg/L | 0.54 | | |
| DGWC-48 | 12/08/16 | 7440-48-4 | Cobalt | mg/L | 0.58 | | |
| DGWC-48 | 03/30/17 | 7440-48-4 | Cobalt | mg/L | 0.57 | | |
| DGWC-48 | 07/13/17 | 7440-48-4 | Cobalt | mg/L | 0.53 | | |
| DGWC-48 | 10/26/17 | 7440-48-4 | Cobalt | mg/L | 0.48 | | |
| DGWC-48 | 03/02/18 | 7440-48-4 | Cobalt | mg/L | 0.49 | | |
| DGWC-48 | 07/12/18 | 7440-48-4 | Cobalt | mg/L | 0.46 | | |
| DGWC-48 | 11/07/18 | 7440-48-4 | Cobalt | mg/L | 0.48 | | |
| DGWC-48 | 08/29/19 | 7440-48-4 | Cobalt | mg/L | 0.42 | | |
| DGWC-48 | 10/18/19 | 7440-48-4 | Cobalt | mg/L | 0.41 | | |
| DGWC-48 | 03/04/20 | 7440-48-4 | Cobalt | mg/L | 0.42 | | |
| DGWC-48 | 08/13/20 | 7440-48-4 | Cobalt | mg/L | 0.35 | | |
| DGWC-48 | 09/23/20 | 7440-48-4 | Cobalt | mg/L | 0.37 | | |
| DGWC-48 | 03/03/21 | 7440-48-4 | Cobalt | mg/L | 0.36 | | |
| DGWC-48 | 09/10/21 | 7440-48-4 | Cobalt | mg/L | 0.36 | | |
| DGWC-48 | 01/24/22 | 7440-48-4 | Cobalt | mg/L | 0.34 | | |
| DGWC-48 | 09/13/22 | 7440-48-4 | Cobalt | mg/L | 0.31 | | |
| DGWC-48 | 02/03/23 | 7440-48-4 | Cobalt | mg/L | 0.31 | | |
| DGWC-8 | 08/30/16 | 7440-48-4 | Cobalt | mg/L | 0.057 | | |
| DGWC-8 | 12/06/16 | 7440-48-4 | Cobalt | mg/L | 0.087 | | |
| DGWC-8 | 03/29/17 | 7440-48-4 | Cobalt | mg/L | 0.090 | | |
| DGWC-8 | 07/11/17 | 7440-48-4 | Cobalt | mg/L | 0.060 | | |
| DGWC-8 | 10/24/17 | 7440-48-4 | Cobalt | mg/L | 0.12 | | |
| DGWC-8 | 02/27/18 | 7440-48-4 | Cobalt | mg/L | 0.13 | | |
| DGWC-8 | 07/10/18 | 7440-48-4 | Cobalt | mg/L | 0.072 | | |
| DGWC-8 | 11/06/18 | 7440-48-4 | Cobalt | mg/L | 0.077 | | |
| DGWC-8 | 03/12/19 | 7440-48-4 | Cobalt | mg/L | 0.062 | | |
| DGWC-8 | 08/28/19 | 7440-48-4 | Cobalt | mg/L | 0.051 | | |
| DGWC-8 | 10/16/19 | 7440-48-4 | Cobalt | mg/L | 0.054 | | |
| DGWC-8 | 03/03/20 | 7440-48-4 | Cobalt | mg/L | 0.044 | | |
| DGWC-8 | 08/12/20 | 7440-48-4 | Cobalt | mg/L | 0.053 | | |
| DGWC-8 | 09/23/20 | 7440-48-4 | Cobalt | mg/L | 0.040 | | |
| DGWC-8 | 03/02/21 | 7440-48-4 | Cobalt | mg/L | 0.033 | | |
| DGWC-8 | 09/13/21 | 7440-48-4 | Cobalt | mg/L | 0.028 | | |
| DGWC-8 | 01/25/22 | 7440-48-4 | Cobalt | mg/L | 0.019 | | |
| DGWC-8 | 09/15/22 | 7440-48-4 | Cobalt | mg/L | 0.0046 | J | |
| DGWC-8 | 02/07/23 | 7440-48-4 | Cobalt | mg/L | 0.0018 | J | |
| DGWC-9 | 08/30/16 | 7440-48-4 | Cobalt | mg/L | 0.090 | | |
| DGWC-9 | 12/06/16 | 7440-48-4 | Cobalt | mg/L | 0.12 | | |
| DGWC-9 | 03/28/17 | 7440-48-4 | Cobalt | mg/L | 0.12 | | |
| DGWC-9 | 07/11/17 | 7440-48-4 | Cobalt | mg/L | 0.14 | | |
| DGWC-9 | 10/24/17 | 7440-48-4 | Cobalt | mg/L | 0.15 | | |

Prepared by/Date: JHG 05/09/23
Checked by/Date: LO 05/09/23

**Appendix B-1**
**Site Groundwater Data (2016-2023) for Evaluation of SSLs[1]**
**McDonough AP-2, 3/4 Risk Evaluation Report**
**McDonough AP-2, 3/4**
**Plant McDonough, Cobb County, GA**

| Well | Date | CAS | Constituent | Units | Obs | Flags | RL |
|---|---|---|---|---|---|---|---|
| DGWC-9 | 02/27/18 | 7440-48-4 | Cobalt | mg/L | 0.16 | | |
| DGWC-9 | 07/11/18 | 7440-48-4 | Cobalt | mg/L | 0.18 | | |
| DGWC-9 | 11/06/18 | 7440-48-4 | Cobalt | mg/L | 0.20 | | |
| DGWC-9 | 08/27/19 | 7440-48-4 | Cobalt | mg/L | 0.24 | | |
| DGWC-9 | 10/17/19 | 7440-48-4 | Cobalt | mg/L | 0.21 | | |
| DGWC-9 | 03/03/20 | 7440-48-4 | Cobalt | mg/L | 0.20 | | |
| DGWC-9 | 08/11/20 | 7440-48-4 | Cobalt | mg/L | 0.22 | | |
| DGWC-9 | 09/22/20 | 7440-48-4 | Cobalt | mg/L | 0.16 | | |
| DGWC-9 | 03/02/21 | 7440-48-4 | Cobalt | mg/L | 0.18 | | |
| DGWC-9 | 09/10/21 | 7440-48-4 | Cobalt | mg/L | 0.21 | | |
| DGWC-9 | 01/26/22 | 7440-48-4 | Cobalt | mg/L | 0.22 | | |
| DGWC-9 | 09/19/22 | 7440-48-4 | Cobalt | mg/L | 0.25 | | |
| DGWC-9 | 02/03/23 | 7440-48-4 | Cobalt | mg/L | 0.21 | | |
| B-111D | 12/09/20 | 7439-93-2 | Lithium | mg/L | 0.021 | | |
| B-111D | 01/12/21 | 7439-93-2 | Lithium | mg/L | 0.021 | | |
| B-111D | 03/05/21 | 7439-93-2 | Lithium | mg/L | 0.028 | | |
| B-111D | 09/14/21 | 7439-93-2 | Lithium | mg/L | 0.029 | | |
| B-111D | 01/24/22 | 7439-93-2 | Lithium | mg/L | 0.026 | J | |
| B-111D | 09/14/22 | 7439-93-2 | Lithium | mg/L | 0.020 | J | |
| B-111D | 02/07/23 | 7439-93-2 | Lithium | mg/L | 0.018 | J | |
| B-115D | 04/14/21 | 7439-93-2 | Lithium | mg/L | 0.089 | | |
| B-115D | 09/14/21 | 7439-93-2 | Lithium | mg/L | 0.085 | | |
| B-115D | 01/20/22 | 7439-93-2 | Lithium | mg/L | 0.081 | | |
| B-115D | 09/14/22 | 7439-93-2 | Lithium | mg/L | 0.082 | | |
| B-115D | 02/06/23 | 7439-93-2 | Lithium | mg/L | 0.082 | | |
| B-120D | 04/15/21 | 7439-93-2 | Lithium | mg/L | 0.088 | | |
| B-120D | 09/14/21 | 7439-93-2 | Lithium | mg/L | 0.077 | | |
| B-120D | 01/20/22 | 7439-93-2 | Lithium | mg/L | 0.079 | | |
| B-120D | 09/19/22 | 7439-93-2 | Lithium | mg/L | 0.076 | | |
| B-120D | 02/03/23 | 7439-93-2 | Lithium | mg/L | 0.068 | | |
| B-57 | 01/15/21 | 7439-93-2 | Lithium | mg/L | 0.11 | | |
| B-60 | 10/21/19 | 7439-93-2 | Lithium | mg/L | 0.028 | J | |
| B-61 | 01/28/19 | 7439-93-2 | Lithium | mg/L | | U | 0.050 |
| B-61 | 10/22/19 | 7439-93-2 | Lithium | mg/L | 0.0015 | J | |
| B-63 | 01/28/19 | 7439-93-2 | Lithium | mg/L | | U | 0.050 |
| B-63 | 10/22/19 | 7439-93-2 | Lithium | mg/L | 0.0062 | J | |
| B-63 | 03/12/21 | 7439-93-2 | Lithium | mg/L | 0.0066 | | |
| B-63 | 09/14/21 | 7439-93-2 | Lithium | mg/L | 0.0064 | | |
| B-63 | 01/20/22 | 7439-93-2 | Lithium | mg/L | 0.0062 | J | |
| B-63 | 09/14/22 | 7439-93-2 | Lithium | mg/L | 0.0072 | J | |
| B-63 | 02/02/23 | 7439-93-2 | Lithium | mg/L | 0.0045 | J | |
| B-64 | 01/28/19 | 7439-93-2 | Lithium | mg/L | | U | 0.050 |
| B-64 | 10/21/19 | 7439-93-2 | Lithium | mg/L | 0.011 | J | |
| B-64 | 03/10/21 | 7439-93-2 | Lithium | mg/L | 0.011 | | |
| B-64 | 09/13/22 | 7439-93-2 | Lithium | mg/L | 0.013 | J | |



Prepared by/Date: JHG 05/09/23
Checked by/Date: LO 05/09/23

**Appendix B-1**
**Site Groundwater Data (2016-2023) for Evaluation of SSLs[1]**
**McDonough AP-2, 3/4 Risk Evaluation Report**
**McDonough AP-2, 3/4**
**Plant McDonough, Cobb County, GA**

| Well | Date | CAS | Constituent | Units | Obs | Flags | RL |
|---|---|---|---|---|---|---|---|
| B-76 | 10/22/19 | 7439-93-2 | Lithium | mg/L | 0.045 | | |
| B-76 | 03/12/21 | 7439-93-2 | Lithium | mg/L | 0.019 | | |
| B-76 | 09/13/22 | 7439-93-2 | Lithium | mg/L | 0.0067 | J | |
| B-77 | 10/24/19 | 7439-93-2 | Lithium | mg/L | 0.0036 | J | |
| B-77 | 08/13/20 | 7439-93-2 | Lithium | mg/L | 0.0018 | | |
| B-77 | 09/24/20 | 7439-93-2 | Lithium | mg/L | 0.00095 | | |
| B-77 | 03/04/21 | 7439-93-2 | Lithium | mg/L | 0.0011 | | |
| B-77 | 09/14/21 | 7439-93-2 | Lithium | mg/L | | U | 0.00073 |
| B-77 | 01/20/22 | 7439-93-2 | Lithium | mg/L | | U | 0.030 |
| B-77 | 09/13/22 | 7439-93-2 | Lithium | mg/L | 0.0022 | J | |
| B-77 | 02/06/23 | 7439-93-2 | Lithium | mg/L | | U | 0.030 |
| B-78 | 10/22/19 | 7439-93-2 | Lithium | mg/L | 0.0071 | J | |
| B-78 | 03/12/21 | 7439-93-2 | Lithium | mg/L | 0.010 | | |
| B-78 | 09/13/22 | 7439-93-2 | Lithium | mg/L | 0.011 | J | |
| B-83 | 10/21/19 | 7439-93-2 | Lithium | mg/L | 0.0030 | J | |
| B-83 | 08/14/20 | 7439-93-2 | Lithium | mg/L | 0.0045 | | |
| B-83 | 09/25/20 | 7439-93-2 | Lithium | mg/L | 0.0018 | | |
| B-83 | 03/04/21 | 7439-93-2 | Lithium | mg/L | 0.0024 | | |
| B-83 | 09/16/21 | 7439-93-2 | Lithium | mg/L | 0.0021 | | |
| B-83 | 01/21/22 | 7439-93-2 | Lithium | mg/L | 0.0022 | J | |
| B-83 | 09/13/22 | 7439-93-2 | Lithium | mg/L | 0.0027 | J | |
| B-83 | 02/03/23 | 7439-93-2 | Lithium | mg/L | 0.0025 | J | |
| B-92 | 09/15/21 | 7439-93-2 | Lithium | mg/L | 0.012 | | |
| B-92 | 01/26/22 | 7439-93-2 | Lithium | mg/L | 0.015 | J | |
| B-92 | 09/12/22 | 7439-93-2 | Lithium | mg/L | 0.015 | J | |
| B-92 | 01/31/23 | 7439-93-2 | Lithium | mg/L | 0.014 | J | |
| DGWC-12 | 09/01/16 | 7439-93-2 | Lithium | mg/L | | U | 0.050 |
| DGWC-12 | 12/07/16 | 7439-93-2 | Lithium | mg/L | | U | 0.050 |
| DGWC-12 | 03/29/17 | 7439-93-2 | Lithium | mg/L | | U | 0.050 |
| DGWC-12 | 07/12/17 | 7439-93-2 | Lithium | mg/L | | U | 0.050 |
| DGWC-12 | 10/25/17 | 7439-93-2 | Lithium | mg/L | | U | 0.050 |
| DGWC-12 | 02/27/18 | 7439-93-2 | Lithium | mg/L | 0.00097 | J | |
| DGWC-12 | 07/11/18 | 7439-93-2 | Lithium | mg/L | | U | 0.050 |
| DGWC-12 | 11/07/18 | 7439-93-2 | Lithium | mg/L | | U | 0.050 |
| DGWC-12 | 08/27/19 | 7439-93-2 | Lithium | mg/L | 0.0011 | J | |
| DGWC-12 | 10/15/19 | 7439-93-2 | Lithium | mg/L | 0.00091 | J | |
| DGWC-12 | 03/02/20 | 7439-93-2 | Lithium | mg/L | | U | 0.030 |
| DGWC-12 | 08/11/20 | 7439-93-2 | Lithium | mg/L | 0.0011 | J | |
| DGWC-12 | 09/22/20 | 7439-93-2 | Lithium | mg/L | | U | 0.00081 |
| DGWC-12 | 03/03/21 | 7439-93-2 | Lithium | mg/L | | U | 0.00081 |
| DGWC-12 | 09/09/21 | 7439-93-2 | Lithium | mg/L | | U | 0.00073 |
| DGWC-12 | 01/25/22 | 7439-93-2 | Lithium | mg/L | | U | 0.030 |
| DGWC-12 | 09/15/22 | 7439-93-2 | Lithium | mg/L | 0.00088 | J | |
| DGWC-12 | 02/06/23 | 7439-93-2 | Lithium | mg/L | | U | 0.030 |
| DGWC-4 | 03/28/17 | 7439-93-2 | Lithium | mg/L | 0.0031 | J | |

Prepared by/Date: JHG 05/09/23
Checked by/Date: LO 05/09/23

**Appendix B-1**
**Site Groundwater Data (2016-2023) for Evaluation of SSLs[1]**
**McDonough AP-2, 3/4 Risk Evaluation Report**
**McDonough AP-2, 3/4**
**Plant McDonough, Cobb County, GA**

| Well | Date | CAS | Constituent | Units | Obs | Flags | RL |
|---|---|---|---|---|---|---|---|
| DGWC-4 | 05/12/17 | 7439-93-2 | Lithium | mg/L | 0.0027 | J | |
| DGWC-4 | 06/15/17 | 7439-93-2 | Lithium | mg/L | 0.0025 | J | |
| DGWC-4 | 07/11/17 | 7439-93-2 | Lithium | mg/L | 0.0022 | J | |
| DGWC-4 | 10/24/17 | 7439-93-2 | Lithium | mg/L | 0.0024 | J | |
| DGWC-4 | 02/27/18 | 7439-93-2 | Lithium | mg/L | 0.0027 | J | |
| DGWC-4 | 07/10/18 | 7439-93-2 | Lithium | mg/L | 0.0030 | J | |
| DGWC-4 | 11/06/18 | 7439-93-2 | Lithium | mg/L | 0.0029 | J | |
| DGWC-4 | 08/27/19 | 7439-93-2 | Lithium | mg/L | 0.0033 | J | |
| DGWC-4 | 10/15/19 | 7439-93-2 | Lithium | mg/L | 0.0029 | J | |
| DGWC-4 | 03/02/20 | 7439-93-2 | Lithium | mg/L | 0.0035 | J | |
| DGWC-4 | 08/12/20 | 7439-93-2 | Lithium | mg/L | 0.0031 | | |
| DGWC-4 | 09/22/20 | 7439-93-2 | Lithium | mg/L | 0.0026 | | |
| DGWC-4 | 03/01/21 | 7439-93-2 | Lithium | mg/L | 0.0035 | | |
| DGWC-4 | 09/10/21 | 7439-93-2 | Lithium | mg/L | 0.0035 | | |
| DGWC-4 | 01/24/22 | 7439-93-2 | Lithium | mg/L | 0.0038 | J | |
| DGWC-4 | 09/19/22 | 7439-93-2 | Lithium | mg/L | 0.0037 | J | |
| DGWC-4 | 02/03/23 | 7439-93-2 | Lithium | mg/L | 0.0036 | J | |
| DGWC-47 | 09/01/16 | 7439-93-2 | Lithium | mg/L | 0.085 | | |
| DGWC-47 | 12/08/16 | 7439-93-2 | Lithium | mg/L | 0.067 | | |
| DGWC-47 | 03/31/17 | 7439-93-2 | Lithium | mg/L | 0.077 | | |
| DGWC-47 | 07/13/17 | 7439-93-2 | Lithium | mg/L | 0.074 | | |
| DGWC-47 | 10/26/17 | 7439-93-2 | Lithium | mg/L | 0.071 | | |
| DGWC-47 | 03/01/18 | 7439-93-2 | Lithium | mg/L | 0.077 | | |
| DGWC-47 | 07/12/18 | 7439-93-2 | Lithium | mg/L | 0.073 | | |
| DGWC-47 | 11/07/18 | 7439-93-2 | Lithium | mg/L | 0.082 | | |
| DGWC-47 | 08/29/19 | 7439-93-2 | Lithium | mg/L | 0.056 | | |
| DGWC-47 | 10/17/19 | 7439-93-2 | Lithium | mg/L | 0.066 | | |
| DGWC-47 | 03/04/20 | 7439-93-2 | Lithium | mg/L | 0.063 | | |
| DGWC-47 | 08/12/20 | 7439-93-2 | Lithium | mg/L | 0.054 | | |
| DGWC-47 | 09/23/20 | 7439-93-2 | Lithium | mg/L | 0.046 | | |
| DGWC-47 | 03/03/21 | 7439-93-2 | Lithium | mg/L | 0.049 | | |
| DGWC-47 | 09/10/21 | 7439-93-2 | Lithium | mg/L | 0.053 | | |
| DGWC-47 | 01/21/22 | 7439-93-2 | Lithium | mg/L | 0.055 | | |
| DGWC-47 | 09/13/22 | 7439-93-2 | Lithium | mg/L | 0.050 | | |
| DGWC-47 | 02/03/23 | 7439-93-2 | Lithium | mg/L | 0.048 | | |
| DGWC-48 | 09/01/16 | 7439-93-2 | Lithium | mg/L | 0.13 | | |
| DGWC-48 | 12/08/16 | 7439-93-2 | Lithium | mg/L | 0.12 | | |
| DGWC-48 | 03/30/17 | 7439-93-2 | Lithium | mg/L | 0.14 | | |
| DGWC-48 | 07/13/17 | 7439-93-2 | Lithium | mg/L | 0.14 | | |
| DGWC-48 | 10/26/17 | 7439-93-2 | Lithium | mg/L | 0.12 | | |
| DGWC-48 | 03/02/18 | 7439-93-2 | Lithium | mg/L | 0.13 | | |
| DGWC-48 | 07/12/18 | 7439-93-2 | Lithium | mg/L | 0.12 | | |
| DGWC-48 | 11/07/18 | 7439-93-2 | Lithium | mg/L | 0.12 | | |
| DGWC-48 | 08/29/19 | 7439-93-2 | Lithium | mg/L | 0.11 | | |
| DGWC-48 | 10/18/19 | 7439-93-2 | Lithium | mg/L | 0.11 | | |

**Appendix B-1**
**Site Groundwater Data (2016-2023) for Evaluation of SSLs[1]**
**McDonough AP-2, 3/4 Risk Evaluation Report**
**McDonough AP-2, 3/4**
**Plant McDonough, Cobb County, GA**

| Well | Date | CAS | Constituent | Units | Obs | Flags | RL |
|---|---|---|---|---|---|---|---|
| DGWC-48 | 03/04/20 | 7439-93-2 | Lithium | mg/L | 0.12 | | |
| DGWC-48 | 08/13/20 | 7439-93-2 | Lithium | mg/L | 0.098 | | |
| DGWC-48 | 09/23/20 | 7439-93-2 | Lithium | mg/L | 0.10 | | |
| DGWC-48 | 03/03/21 | 7439-93-2 | Lithium | mg/L | 0.096 | | |
| DGWC-48 | 09/10/21 | 7439-93-2 | Lithium | mg/L | 0.095 | | |
| DGWC-48 | 01/24/22 | 7439-93-2 | Lithium | mg/L | 0.11 | | |
| DGWC-48 | 09/13/22 | 7439-93-2 | Lithium | mg/L | 0.099 | | |
| DGWC-48 | 02/03/23 | 7439-93-2 | Lithium | mg/L | 0.089 | | |
| DGWC-5 | 08/31/16 | 7439-93-2 | Lithium | mg/L | 0.0026 | J | |
| DGWC-5 | 12/06/16 | 7439-93-2 | Lithium | mg/L | 0.0046 | J | |
| DGWC-5 | 03/28/17 | 7439-93-2 | Lithium | mg/L | 0.0028 | J | |
| DGWC-5 | 07/11/17 | 7439-93-2 | Lithium | mg/L | 0.0031 | J | |
| DGWC-5 | 10/25/17 | 7439-93-2 | Lithium | mg/L | 0.0055 | J | |
| DGWC-5 | 02/27/18 | 7439-93-2 | Lithium | mg/L | 0.0066 | J | |
| DGWC-5 | 07/10/18 | 7439-93-2 | Lithium | mg/L | 0.0034 | J | |
| DGWC-5 | 11/06/18 | 7439-93-2 | Lithium | mg/L | 0.0082 | J | |
| DGWC-5 | 08/27/19 | 7439-93-2 | Lithium | mg/L | 0.0080 | J | |
| DGWC-5 | 10/16/19 | 7439-93-2 | Lithium | mg/L | 0.0060 | J | |
| DGWC-5 | 03/02/20 | 7439-93-2 | Lithium | mg/L | 0.0079 | J | |
| DGWC-5 | 08/12/20 | 7439-93-2 | Lithium | mg/L | 0.0067 | | |
| DGWC-5 | 09/22/20 | 7439-93-2 | Lithium | mg/L | 0.0065 | | |
| DGWC-5 | 03/02/21 | 7439-93-2 | Lithium | mg/L | 0.0064 | | |
| DGWC-5 | 09/10/21 | 7439-93-2 | Lithium | mg/L | 0.0071 | | |
| DGWC-5 | 01/24/22 | 7439-93-2 | Lithium | mg/L | 0.0068 | J | |
| DGWC-5 | 09/14/22 | 7439-93-2 | Lithium | mg/L | 0.0081 | J | |
| DGWC-5 | 02/07/23 | 7439-93-2 | Lithium | mg/L | 0.0072 | J | |

1) Highlighted rows indicate constituent identified in the well at a statistically significant level (SSL).

J - indicates an estimated value; the substance was detected between the laboratory MDL and RL.
RL - reporting limit
mg/L - milligrams per liter
MDL - method detection limit
U - not detected above the laboratory MDL

Prepared by/Date: JHG 05/09/23
Checked by/Date: LO 05/09/23

**Appendix B-2**
**Surface Water Data (2020-2023)**
**McDonough AP-2, 3/4 Risk Evaluation Report**
**McDonough AP-2, 3/4**
**Plant McDonough, Cobb County, GA**

| Location Name | Sample Designation | Date | CAS | Constituent | Units | Obs | Flags | RL |
|---|---|---|---|---|---|---|---|---|
| CR-0.5 | Upgradient | 11/10/20 | 7440-48-4 | Cobalt | mg/L | | ND | 0.005 |
| CR-0.5 | Upgradient | 02/02/21 | 7440-48-4 | Cobalt | mg/L | | ND | 0.005 |
| CR-0.5 | Upgradient | 03/09/21 | 7440-48-4 | Cobalt | mg/L | | ND | 0.005 |
| CR-0.5 | Upgradient | 09/07/21 | 7440-48-4 | Cobalt | mg/L | | ND | 0.005 |
| CR-0.5 | Upgradient | 01/25/22 | 7440-48-4 | Cobalt | mg/L | | ND | 0.005 |
| CR-0.5 | Upgradient | 10/27/22 | 7440-48-4 | Cobalt | mg/L | | ND | 0.005 |
| CR-0.5 | Upgradient | 02/07/23 | 7440-48-4 | Cobalt | mg/L | | ND | 0.005 |
| CR-0.8 | Upgradient | 11/10/20 | 7440-48-4 | Cobalt | mg/L | | ND | 0.005 |
| CR-0.8 | Upgradient | 02/02/21 | 7440-48-4 | Cobalt | mg/L | | ND | 0.005 |
| CR-0.8 | Upgradient | 03/09/21 | 7440-48-4 | Cobalt | mg/L | | ND | 0.005 |
| CR-0.8 | Upgradient | 01/25/22 | 7440-48-4 | Cobalt | mg/L | | ND | 0.005 |
| CR-0.2 | Downgradient | 11/10/20 | 7440-48-4 | Cobalt | mg/L | | ND | 0.005 |
| CR-0.2 | Downgradient | 02/02/21 | 7440-48-4 | Cobalt | mg/L | | ND | 0.005 |
| CR-0.2 | Downgradient | 03/09/21 | 7440-48-4 | Cobalt | mg/L | | ND | 0.005 |
| CR-0.2 | Downgradient | 09/07/21 | 7440-48-4 | Cobalt | mg/L | | ND | 0.005 |
| CR-0.2 | Downgradient | 01/25/22 | 7440-48-4 | Cobalt | mg/L | | ND | 0.005 |
| CR-0.2 | Downgradient | 10/27/22 | 7440-48-4 | Cobalt | mg/L | | ND | 0.005 |
| CR-0.2 | Downgradient | 02/07/23 | 7440-48-4 | Cobalt | mg/L | | ND | 0.005 |
| CR-0.2 | Downgradient | 02/21/23 | 7440-48-4 | Cobalt | mg/L | | ND | 0.005 |
| CR+0.2 | Downgradient | 02/02/21 | 7440-48-4 | Cobalt | mg/L | | ND | 0.005 |
| CR+0.2 | Downgradient | 03/09/21 | 7440-48-4 | Cobalt | mg/L | | ND | 0.005 |
| CR+0.2 | Downgradient | 10/27/22 | 7440-48-4 | Cobalt | mg/L | | ND | 0.005 |
| CR+0.2 | Downgradient | 02/07/23 | 7440-48-4 | Cobalt | mg/L | | ND | 0.005 |
| CR+0.2 | Downgradient | 11/10/20 | 7440-48-4 | Cobalt | mg/L | | ND | 0.005 |
| CR+0.4 | Downgradient | 11/10/20 | 7440-48-4 | Cobalt | mg/L | | ND | 0.005 |
| CR+0.4 | Downgradient | 02/02/21 | 7440-48-4 | Cobalt | mg/L | | ND | 0.005 |
| CR+0.4 | Downgradient | 03/09/21 | 7440-48-4 | Cobalt | mg/L | | ND | 0.005 |
| CR+0.4 | Downgradient | 10/27/22 | 7440-48-4 | Cobalt | mg/L | | ND | 0.005 |
| CR+0.4 | Downgradient | 02/07/23 | 7440-48-4 | Cobalt | mg/L | | ND | 0.005 |
| CR-0.1 | Downgradient | 02/02/21 | 7440-48-4 | Cobalt | mg/L | | ND | 0.005 |
| CR-0.1 | Downgradient | 03/09/21 | 7440-48-4 | Cobalt | mg/L | | ND | 0.005 |
| CR-0.1 | Downgradient | 09/07/21 | 7440-48-4 | Cobalt | mg/L | | ND | 0.005 |
| CR-0.1 | Downgradient | 01/25/22 | 7440-48-4 | Cobalt | mg/L | | ND | 0.005 |
| CR-0.1 | Downgradient | 10/27/22 | 7440-48-4 | Cobalt | mg/L | | ND | 0.005 |
| CR-0.1 | Downgradient | 02/07/23 | 7440-48-4 | Cobalt | mg/L | | ND | 0.005 |
| DW_DS | Downgradient | 02/02/21 | 7440-48-4 | Cobalt | mg/L | | ND | 0.005 |
| DW_DS | Downgradient | 09/07/21 | 7440-48-4 | Cobalt | mg/L | | ND | 0.005 |
| DW_DS | Downgradient | 01/25/22 | 7440-48-4 | Cobalt | mg/L | | ND | 0.005 |
| DW_DS | Downgradient | 10/27/22 | 7440-48-4 | Cobalt | mg/L | | ND | 0.005 |
| DW_DS | Downgradient | 02/07/23 | 7440-48-4 | Cobalt | mg/L | | ND | 0.005 |
| DW_US | Downgradient | 02/02/21 | 7440-48-4 | Cobalt | mg/L | | ND | 0.005 |
| DW_US | Downgradient | 09/07/21 | 7440-48-4 | Cobalt | mg/L | | ND | 0.005 |
| DW_US | Downgradient | 01/25/22 | 7440-48-4 | Cobalt | mg/L | | ND | 0.005 |
| DW_US | Downgradient | 10/27/22 | 7440-48-4 | Cobalt | mg/L | | ND | 0.005 |
| DW_US | Downgradient | 02/07/23 | 7440-48-4 | Cobalt | mg/L | | ND | 0.005 |

Notes:
mg/L - milligrams per liter
ND - not detected above the laboratory MDL
RL - reporting limit

Prepared by/Date: JHG 05/10/23
Checked by/Date: IMR 05/10/23

# APPENDIX C

## USEPA RSL Calculator Generated Residential Screening Levels

# Appendix C-1
# McDonough AP-2 and AP-3/4
# Plant Mcdonough, Cobb County, GA

| Variable | Resident Tap Water Default Value | Site-Specific Value |
|---|---|---|
| $BW_{0-2}$ (mutagenic body weight) kg | 15 | 15 |
| $BW_{2-6}$ (mutagenic body weight) kg | 15 | 15 |
| $BW_{6-16}$ (mutagenic body weight) kg | 80 | 80 |
| $BW_{16-26}$ (mutagenic body weight) kg | 80 | 80 |
| $BW_{res-a}$ (body weight - adult) kg | 80 | 80 |
| $BW_{res-c}$ (body weight - child) kg | 15 | 15 |
| $DFW_{res-adj}$ (age-adjusted dermal factor) cm$^2$-event/kg | 2610650 | 2610650 |
| $DFWM_{res-adj}$ (mutagenic age-adjusted dermal factor) cm$^2$-event/kg | 8191633 | 8191633 |
| $ED_{res}$ (exposure duration - resident) year | 26 | 26 |
| $ED_{0-2}$ (mutagenic exposure duration first phase) year | 2 | 2 |
| $ED_{2-6}$ (mutagenic exposure duration second phase) year | 4 | 4 |
| $ED_{6-16}$ (mutagenic exposure duration third phase) year | 10 | 10 |
| $ED_{16-26}$ (mutagenic exposure duration fourth phase) year | 10 | 10 |
| $ED_{res-a}$ (exposure duration - adult) years | 20 | 20 |
| $ED_{res-c}$ (exposure duration - child) years | 6 | 6 |
| $EF_{res}$ (exposure frequency) days/yea | 350 | 350 |
| $EF_{0-2}$ (mutagenic exposure frequency first phase) days/yea | 350 | 350 |
| $EF_{2-6}$ (mutagenic exposure frequency second phase) days/yea | 350 | 350 |
| $EF_{6-16}$ (mutagenic exposure frequency third phase) days/yea | 350 | 350 |
| $EF_{16-26}$ (mutagenic exposure frequency fourth phase) days/yea | 350 | 350 |
| $EF_{res-a}$ (exposure frequency - adult) days/yea | 350 | 350 |
| $EF_{res-c}$ (exposure frequency - child) days/yea | 350 | 350 |
| $ET_{res}$ (exposure time) hours/day | 24 | 24 |
| $ET_{event-res-adj}$ (age-adjusted exposure time) hours/even | 0.67077 | 0.67077 |
| $ET_{event-res-madj}$ (mutagenic age-adjusted exposure time) hours/ever | 0.67077 | 0.67077 |
| $ET_{0-2}$ (mutagenic dermal exposure time first phase) hours/ever | 0.54 | 0.54 |
| $ET_{2-6}$ (mutagenic dermal exposure time second phase) hours/ever | 0.54 | 0.54 |
| $ET_{6-16}$ (mutagenic dermal exposure time third phase) hours/ever | 0.71 | 0.71 |
| $ET_{16-26}$ (mutagenic dermal exposure time fourth phase) hours/ever | 0.71 | 0.71 |
| $ET_{res-a}$ (dermal exposure time - adult) hours/ever | 0.71 | 0.71 |
| $ET_{res-c}$ (dermal exposure time - child) hours/ever | 0.54 | 0.54 |
| $ET_{0-2}$ (mutagenic inhalation exposure time first phase) hours/da | 24 | 24 |
| $ET_{2-6}$ (mutagenic inhalation exposure time second phase) hours/da | 24 | 24 |
| $ET_{6-16}$ (mutagenic inhalation exposure time third phase) hours/da | 24 | 24 |
| $ET_{16-26}$ (mutagenic inhalation exposure time fourth phase) hours/da | 24 | 24 |
| $ET_{res-a}$ (inhalation exposure time - adult) hours/da | 24 | 24 |

Prepared by/Date: JHG 04/17/23
Checked by/Date: IMR 04/26/23

**Appendix C-1**
**McDonough AP-2, 3/4 Risk Evaluation Report**
**McDonough AP-2, 3/4**
**Plant McDonough, Cobb County, GA**

| | | |
|---|---|---|
| $ET_{res-c}$ (inhalation exposure time - child) hours/da | 24 | 24 |
| $EV_{0-2}$ (mutagenic events) per da) | 1 | 1 |
| $EV_{2-6}$ (mutagenic events) per da) | 1 | 1 |
| $EV_{6-16}$ (mutagenic events) per da) | 1 | 1 |
| $EV_{16-26}$ (mutagenic events) per da) | 1 | 1 |
| $EV_{res-a}$ (events - adult) per da) | 1 | 1 |
| $EV_{res-c}$ (events - child) per da) | 1 | 1 |
| THQ (target hazard quotient) unitless | 0.1 | 1 |
| $IFW_{res-adj}$ (adjusted intake factor) L/kç | 327.95 | 327.95 |
| $IFWM_{res-adj}$ (mutagenic adjusted intake factor) L/kç | 1019.9 | 1019.9 |
| $IRW_{0-2}$ (mutagenic water intake rate) L/da) | 0.78 | 0.78 |
| $IRW_{2-6}$ (mutagenic water intake rate) L/da) | 0.78 | 0.78 |
| $IRW_{6-16}$ (mutagenic water intake rate) L/da) | 2.5 | 2.5 |
| $IRW_{16-26}$ (mutagenic water intake rate) L/da) | 2.5 | 2.5 |
| $IRW_{res-a}$ (water intake rate - adult) L/da) | 2.5 | 2.5 |
| $IRW_{res-c}$ (water intake rate - child) L/da) | 0.78 | 0.78 |
| K (volatilization factor of Andelman) $L/m^3$ | 0.5 | 0.5 |
| LT (lifetime) years | 70 | 70 |
| $SA_{0-2}$ (mutagenic skin surface area) $cm^2$ | 6365 | 6365 |
| $SA_{2-6}$ (mutagenic skin surface area) $cm^2$ | 6365 | 6365 |
| $SA_{6-16}$ (mutagenic skin surface area) $cm^2$ | 19652 | 19652 |
| $SA_{16-26}$ (mutagenic skin surface area) $cm^2$ | 19652 | 19652 |
| $SA_{res-a}$ (skin surface area - adult) $cm^2$ | 19652 | 19652 |
| $SA_{res-c}$ (skin surface area - child) $cm^2$ | 6365 | 6365 |
| $l_{sc}$ (apparent thickness of stratum corneum) cn | 0.001 | 0.001 |
| TR (target risk) unitless | 0.000001 | 0.00001 |

Output generated 17APR2023:10:50:56



Prepared by/Date: JHG 04/17/23
Checked by/Date: IMR 04/26/23

# Appendix C-2
## Site-specific
## Based

**Key: I = IRIS; P = PPRTV; O = OPP; A = ATSDR; C = Cal EPA; X = PPRTV Screening Level; H = HEAST; D = OW; W = TEF applied; E = RPF applied; G = see user guide; U = user provided;**
**ca = cancer; nc = noncancer; * = where: nc SL < 100X ca SL; ** = where nc SL < 10X ca SL;**

| Chemical | CAS Number | Mutagen? | Volatile? | Chemical Type | $SF_o$(mg/kg-day)$^{-1}$ | $SF_o$Ref | IUR (ug/m$^3$)$^{-1}$ | IUR Ref | RfD (mg/kg-day) | RfD Ref | RfC (mg/m$^3$) | RfC Ref | GIABS | $K_p$ (cm/hr) | MW | B (unitless) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Beryllium and compounds | 7440-41-7 | No | No | Inorganics | - | | 2.40E-03 | I | 2.00E-03 | I | 2.00E-05 | I | 7.00E-03 | 1.00E-03 | 9.01E+00 | 1.15E-03 |
| Cobalt | 7440-48-4 | No | No | Inorganics | - | | 9.00E-03 | P | 3.00E-04 | P | 6.00E-06 | P | 1.00E+00 | 4.00E-04 | 5.89E+01 | 1.18E-03 |
| Lithium | 7439-93-2 | No | No | Inorganics | - | | - | | 2.00E-03 | P | - | | 1.00E+00 | 1.00E-03 | 6.94E+00 | 1.01E-03 |

Output generated 17APR2023:10:50:56



Prepared by/Date: JHG 04/17/23
Checked by/Date: IMR 04/26/23

# Appendix C-2
# Site-specific
# Based

**Key: I = IRIS; P = PPRTV; O = OPP; A = ATSDR; C = Cal EPA; X = PPRTV Screening Level; H = HEAST; D = OW; W = TEF applied; E = RPF applied; G = see user guide; U = user provided;**
**ca = cancer; nc = noncancer; * = where: nc SL < 100X ca SL; ** = where nc SL < 10X ca SL;**

| Chemical | CAS Number | Mutagen? | Volatile? | Chemical Type | $t^*$(hr) | $\tau_{event}$(hr/event) | FA (unitless) | In EPD? | $DA_{event\ (ca)}$ | $DA_{event\ (nc\ child)}$ | $DA_{event\ (nc\ adult)}$ | MCL (ug/L) | Ingestion SL TR=1E-05 (ug/L) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Beryllium and compounds | 7440-41-7 | No | No | Inorganics | 2.83E-01 | 1.18E-01 | 1.00E+00 | Yes | - | 3.44E-05 | 5.94E-05 | 4.00E+00 | - |
| Cobalt | 7440-48-4 | No | No | Inorganics | 5.40E-01 | 2.25E-01 | 1.00E+00 | Yes | - | 7.37E-04 | 1.27E-03 | - | - |
| Lithium | 7439-93-2 | No | No | Inorganics | 2.76E-01 | 1.15E-01 | 1.00E+00 | Yes | - | 4.92E-03 | 8.49E-03 | - | - |

Output generated 17APR2023:10:50:56



Prepared by/Date: JHG 04/17/23
Checked by/Date: IMR 04/26/23

# Appendix C-2
## Site-specific
## Based

**Key: I = IRIS; P = PPRTV; O = OPP; A = ATSDR; C = Cal EPA; X = PPRTV Screening Level; H = HEAST; D = OW; W = TEF applied; E = RPF applied; G = see user guide; U = user provided;**
**ca = cancer; nc = noncancer; * = where: nc SL < 100X ca SL; ** = where nc SL < 10X ca SL;**

| Chemical | CAS Number | Mutagen? | Volatile? | Chemical Type | Dermal SL TR=1E-05 (ug/L) | Inhalation SL TR=1E-05 (ug/L) | Carcinogenic SL TR=1E-05 (ug/L) | Ingestion SL Child THQ=1 (ug/L) | Dermal SL Child THQ=1 (ug/L) | Inhalation SL Child THQ=1 (ug/L) | Noncarcinogenic SL Child THI=1 (ug/L) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Beryllium and compounds | 7440-41-7 | No | No | Inorganics | - | - | - | 4.01E+01 | 6.37E+01 | - | 2.46E+01 |
| Cobalt | 7440-48-4 | No | No | Inorganics | - | - | - | 6.02E+00 | 3.41E+03 | - | 6.01E+00 |
| Lithium | 7439-93-2 | No | No | Inorganics | - | - | - | 4.01E+01 | 9.10E+03 | - | 3.99E+01 |

Output generated 17APR2023:10:50:56



Prepared by/Date: JHG 04/17/23
Checked by/Date: IMR 04/26/23

# Appendix C-2
## Site-specific
## Based

**Key: I = IRIS; P = PPRTV; O = OPP; A = ATSDR; C = Cal EPA; X = PPRTV Screening Level; H = HEAST; D = OW; W = TEF applied; E = RPF applied; G = see user guide; U = user provided;**
**ca = cancer; nc = noncancer; * = where: nc SL < 100X ca SL; ** = where nc SL < 10X ca SL;**

| Chemical | CAS Number | Mutagen? | Volatile? | Chemical Type | Ingestion SL Adult THQ=1 (ug/L) | Dermal SL Adult THQ=1 (ug/L) | Inhalation SL Adult THQ=1 (ug/L) | Noncarcinogenic SL Adult THI=1 (ug/L) | Screening Level (ug/L) |
|---|---|---|---|---|---|---|---|---|---|
| Beryllium and compounds | 7440-41-7 | No | No | Inorganics | 6.67E+01 | 8.37E+01 | - | 3.71E+01 | 2.46E+01 nc |
| Cobalt | 7440-48-4 | No | No | Inorganics | 1.00E+01 | 4.48E+03 | - | 9.99E+00 | 6.01E+00 nc |
| Lithium | 7439-93-2 | No | No | Inorganics | 6.67E+01 | 1.20E+04 | - | 6.64E+01 | 3.99E+01 nc |

Output generated 17APR2023:10:50:56



Prepared by/Date: JHG 04/17/23
Checked by/Date: IMR 04/26/23

# APPENDIX D

## Support for Refined Risk Evaluation

# Appendix D-1

## Exposure Point Concentration Calculation Results

**Appendix D-1**
**Exposure Point Concentration Calculation Results[1]**
**McDonough AP-2,3/4 Risk Evaluation Report**
**Plant McDonough, Cobb County, GA**

| Constituent | Well IDs Included | UOM | Maximum Concentration | Detection Frequency | Exceedance Frequency | EPC Step 1<br>Individual Target Well(s) 2016-2023 | EPC Step 2<br>Target Well(s) + Flowpath Well(s) 2016-2023 | EPC Step 3<br>Farthest Downgradient Well(s) 2016-2023 |
|---|---|---|---|---|---|---|---|---|
| Arsenic East | DGWC-9 | mg/L | 0.04 | 17 / 18 | 17 / 18 | 0.026 | | |
| | DGWC-9<br>DGWC-12 | mg/L | 0.04 | 18 / 37 | 17 / 37 | | 0.015 | |
| | DGWC-12 | mg/L | 0.0006 | 1 / 19 | 0 / 19 | | | 0.0006 |
| Cobalt East | DGWC-8<br>DGWC-9<br>DGWC-10<br>B-56 | mg/L | 0.25 | 62 / 62 | 58 / 62 | 0.13 | | |
| | DGWC-8<br>DGWC-9<br>DGWC-10<br>B-56<br>B-101D<br>B-102D<br>B-106D<br>DGWC-12 | mg/L | 0.25 | 96 / 99 | 59 / 99 | | 0.091 | |
| | DGWC-12 | mg/L | 0.034 | 18 / 18 | 1 / 18 | | | 0.016 |
| Cobalt North | B-92<br>B-93 | mg/L | 0.08 | 12 / 12 | 12 / 12 | 0.070 | | |
| | B-93<br>B-92<br>B-64<br>DGWC-12 | mg/L | 0.08 | 31 / 32 | 17 / 32 | | 0.040 | |
| | DGWC-12 | mg/L | 0.034 | 18 / 18 | 1 / 18 | | | 0.016 |
| Cobalt South - a | DGWC-19<br>DGWC-20<br>DGWC-47<br>DGWC-48<br>B-115D<br>B-104D | mg/L | 1 | 84 / 84 | 84 / 84 | 0.37 | | |
| | DGWC-19<br>DGWC-20<br>DGWC-47<br>DGWC-48<br>B-115D<br>B-104D<br>B-60<br>B-61<br>B-63<br>B-76<br>B-77<br>B-83<br>B-57 | mg/L | 1 | 110 / 114 | 97 / 114 | | 0.30 | |
| | B-63<br>B-76<br>B-77 | mg/L | 0.47 | 14 / 18 | 9 / 18 | | | 0.19 |
| Cobalt South - b | B-63 | mg/L | 0.053 | 7 / 7 | 5 / 7 | 0.049 | | |
| | B-63 | mg/L | 0.053 | 7 / 7 | 5 / 7 | | 0.049 | |
| | B-63 | mg/L | 0.053 | 7 / 7 | 5 / 7 | | | 0.049 |

**Appendix D-1**
**Exposure Point Concentration Calculation Results[1]**
**McDonough AP-2,3/4 Risk Evaluation Report**
**Plant McDonough, Cobb County, GA**

| Constituent | Well IDs Included | UOM | Maximum Concentration | Detection Frequency | Exceedance Frequency | EPC Step 1<br>Individual Target Well(s) 2016-2023 | EPC Step 2<br>Target Well(s) + Flowpath Well(s) 2016-2023 | EPC Step 3<br>Farthest Downgradient Well(s) 2016-2023 |
|---|---|---|---|---|---|---|---|---|
| Lithium South | DGWC-47<br>DGWC-48<br>B-115D | mg/L | 0.14 | 41 / 41 | 41 / 41 | 0.095 | | |
| | DGWC-47<br>DGWC-48<br>B-115D<br>B-60<br>B-61<br>B-83<br>B-57<br>B-63<br>B-76<br>B-77 | mg/L | 0.14 | 66 / 71 | 43 / 71 | | 0.064 | |
| | B-76<br>B-77<br>B-63 | mg/L | 0.045 | 14 / 18 | 1 / 18 | | | 0.015 |
| Lithium West | B-120D | mg/L | 0.088 | 5 / 5 | 5 / 5 | 0.084 | | |
| | B-120D<br>B-64<br>B-78<br>DGWC-4<br>DGWC-5<br>B-111D<br>B-92<br>DGWC-12 | mg/L | 0.088 | 63 / 77 | 5 / 77 | | 0.016 | |
| | DGWC-12 | mg/L | 0.0011 | 5 / 18 | 0 / 18 | | | 0.0010 |

***Notes:***
Highlighted value is the EPC selected for the refined screening.
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

***Definitions:***
EPC = Exposure Point Concentration
mg/L = milligrams per liter

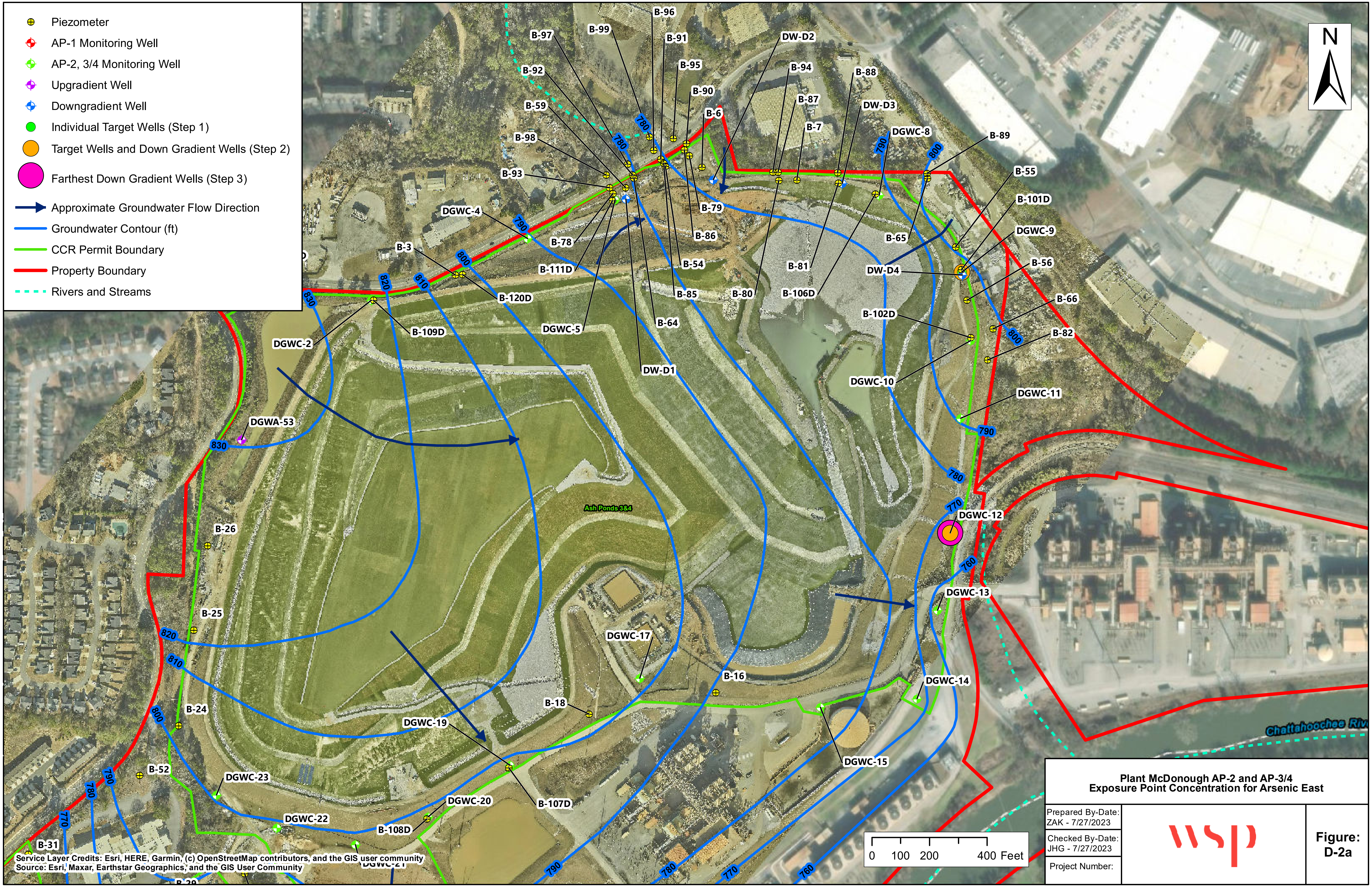
Prepared by/Date: JHG 05/11/23
Checked by/Date: IMR 05/11/23

# Appendix D-2

## Exposure Point Concentration Figures

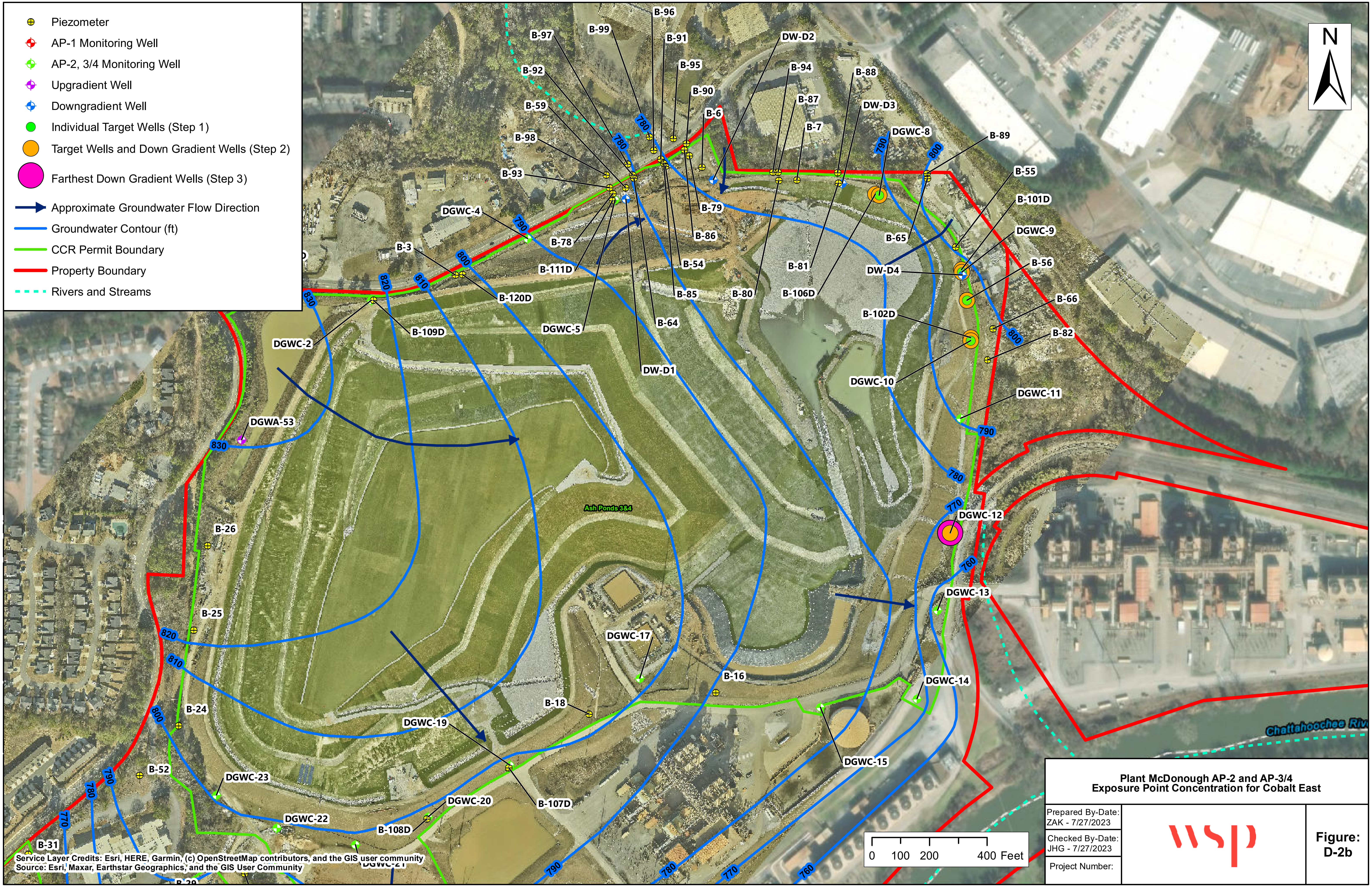
## LIST OF APPENDIX D-2 FIGURES


| | |
|---|---|
| Figure D-2a | Exposure Point Concentration for Arsenic East |
| Figure D-2b | Exposure Point Concentration for Cobalt East |
| Figure D-2c | Exposure Point Concentration for Cobalt North |
| Figure D-2d | Exposure Point Concentration for Cobalt South-a |
| Figure D-2e | Exposure Point Concentration for Cobalt South-b |
| Figure D-2f | Exposure Point Concentration for Lithium South |
| Figure D-2g | Exposure Point Concentration for Lithium West |



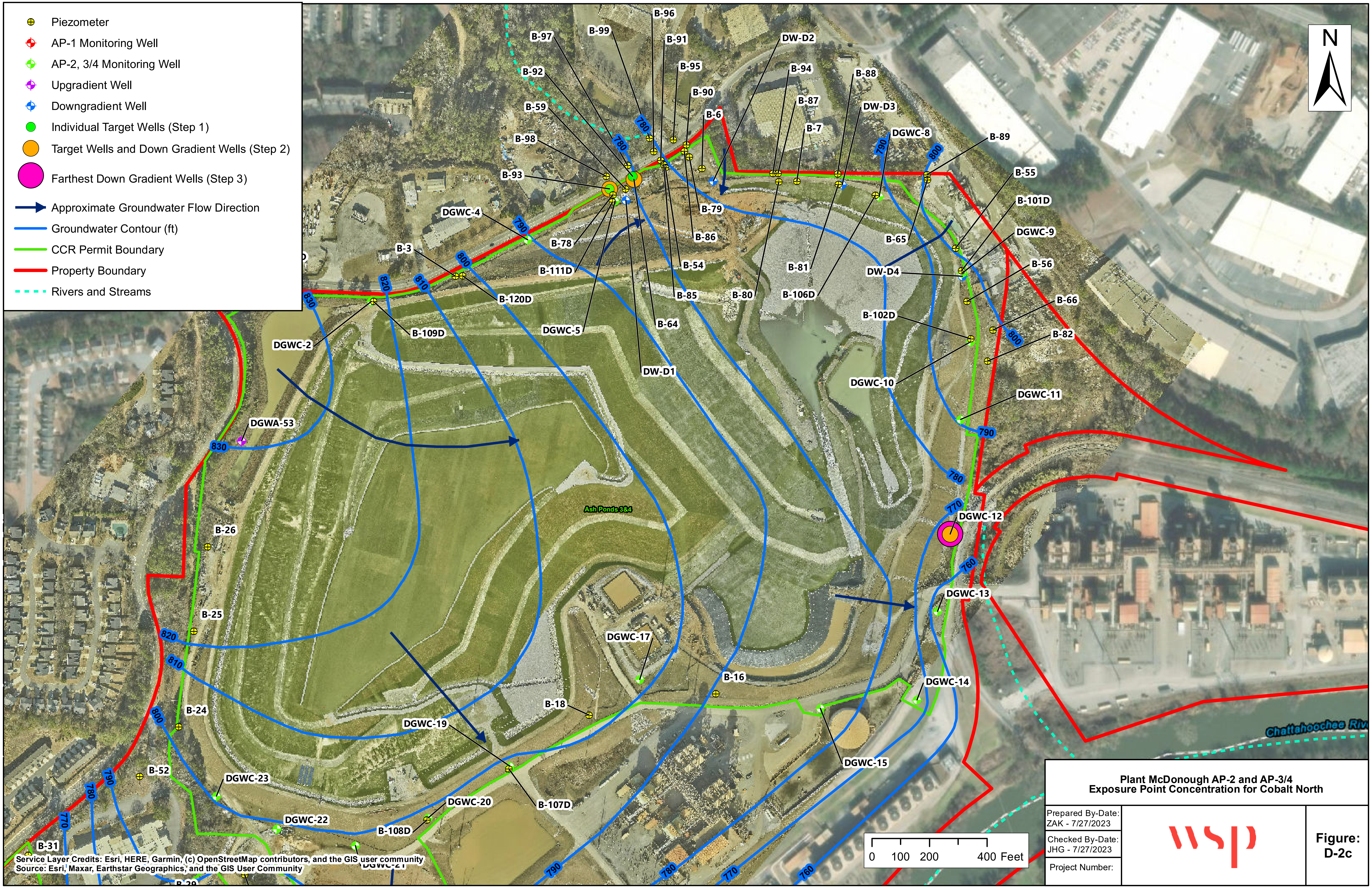

Plant McDonough AP-2 and AP-3/4
Exposure Point Concentration for Arsenic East

| | | |
|---|---|---|
| Prepared By-Date: ZAK - 7/27/2023 | wsp | Figure: D-2a |
| Checked By-Date: JHG - 7/27/2023 | | |
| Project Number: | | |



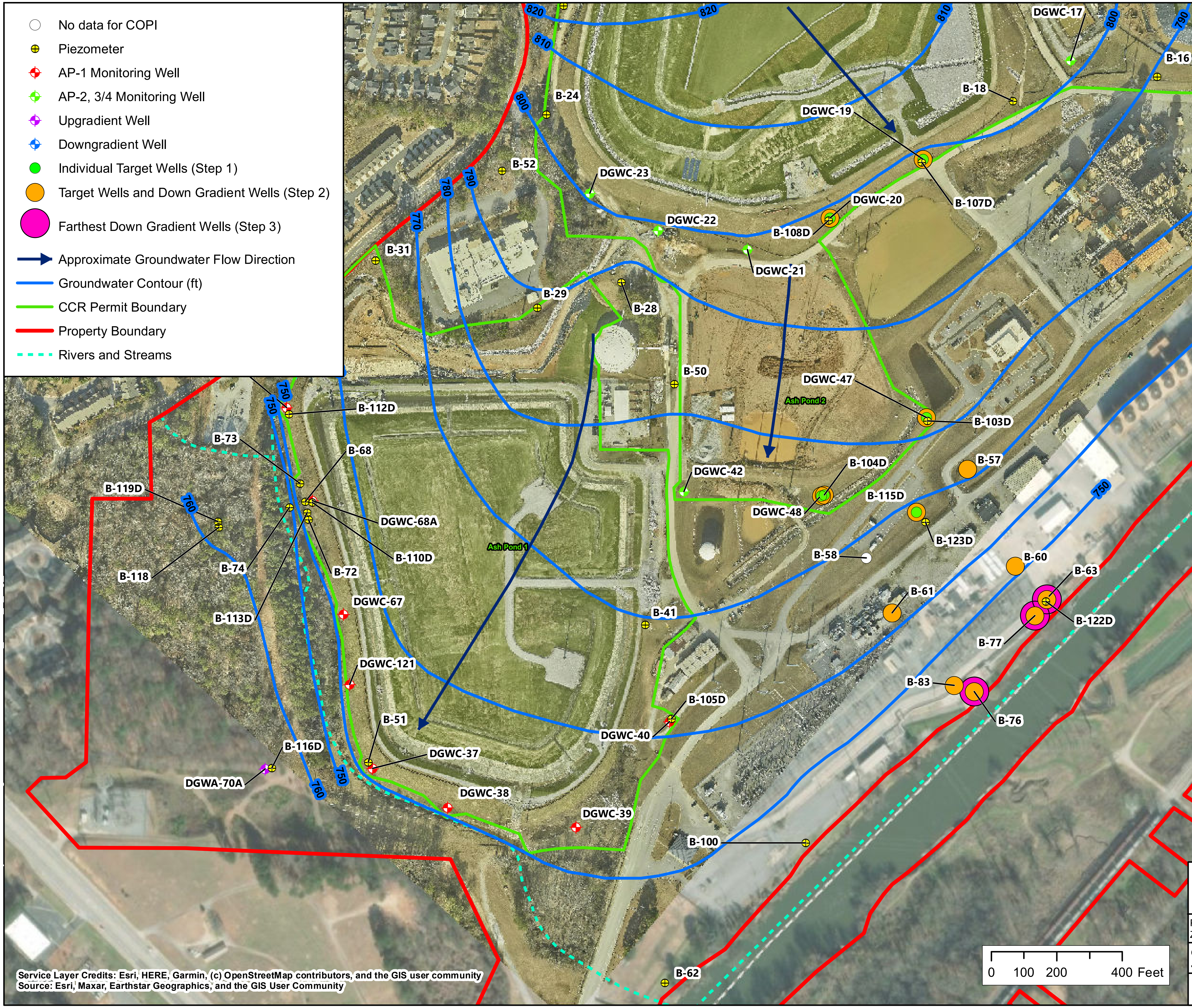

Plant McDonough AP-2 and AP-3/4
Exposure Point Concentration for Cobalt East

| | | |
|---|---|---|
| Prepared By-Date: ZAK - 7/27/2023 | wsp | Figure: D-2b |
| Checked By-Date: JHG - 7/27/2023 | | |
| Project Number: | | |



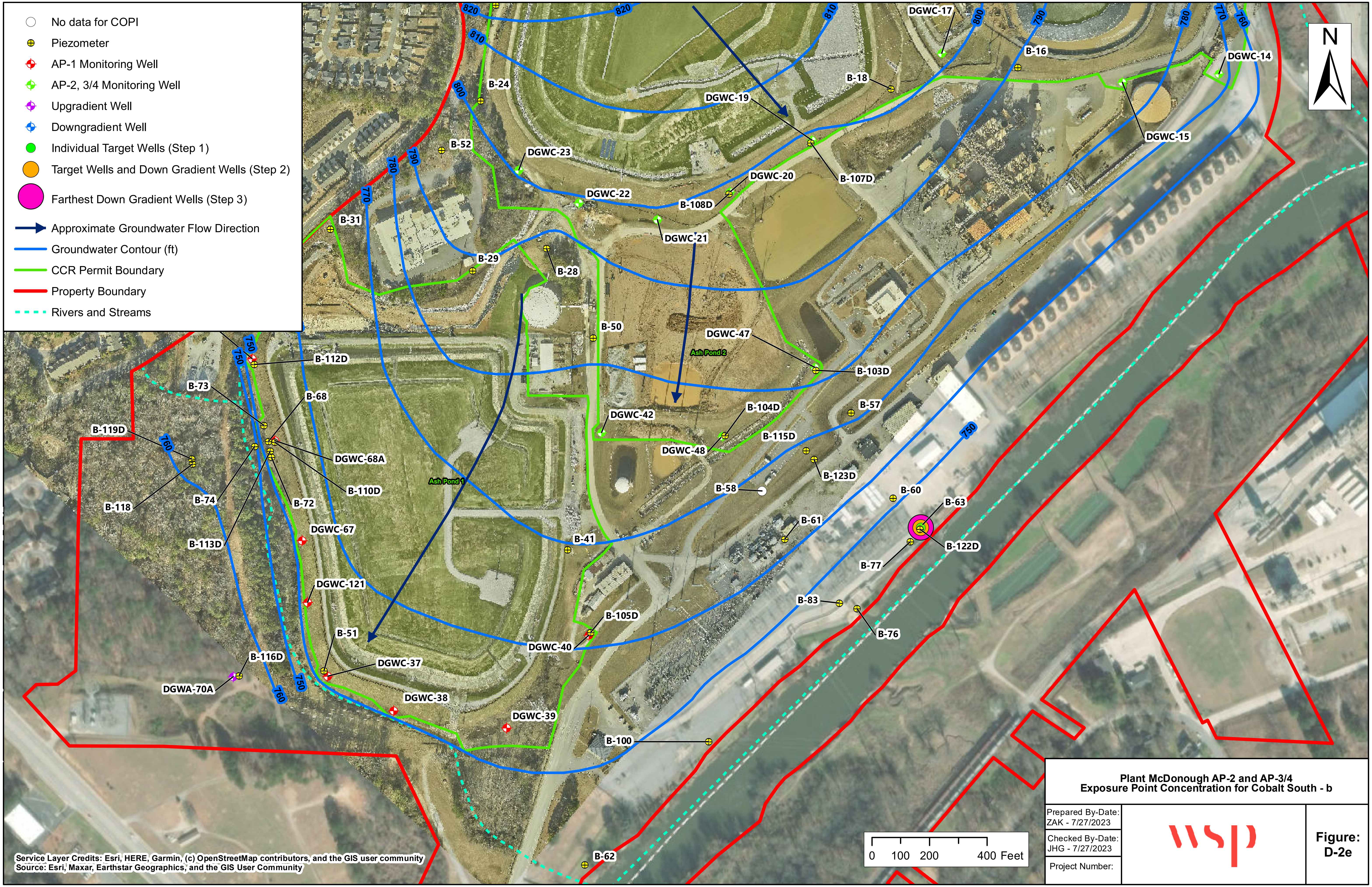

**Plant McDonough AP-2 and AP-3/4**
**Exposure Point Concentration for Cobalt North**

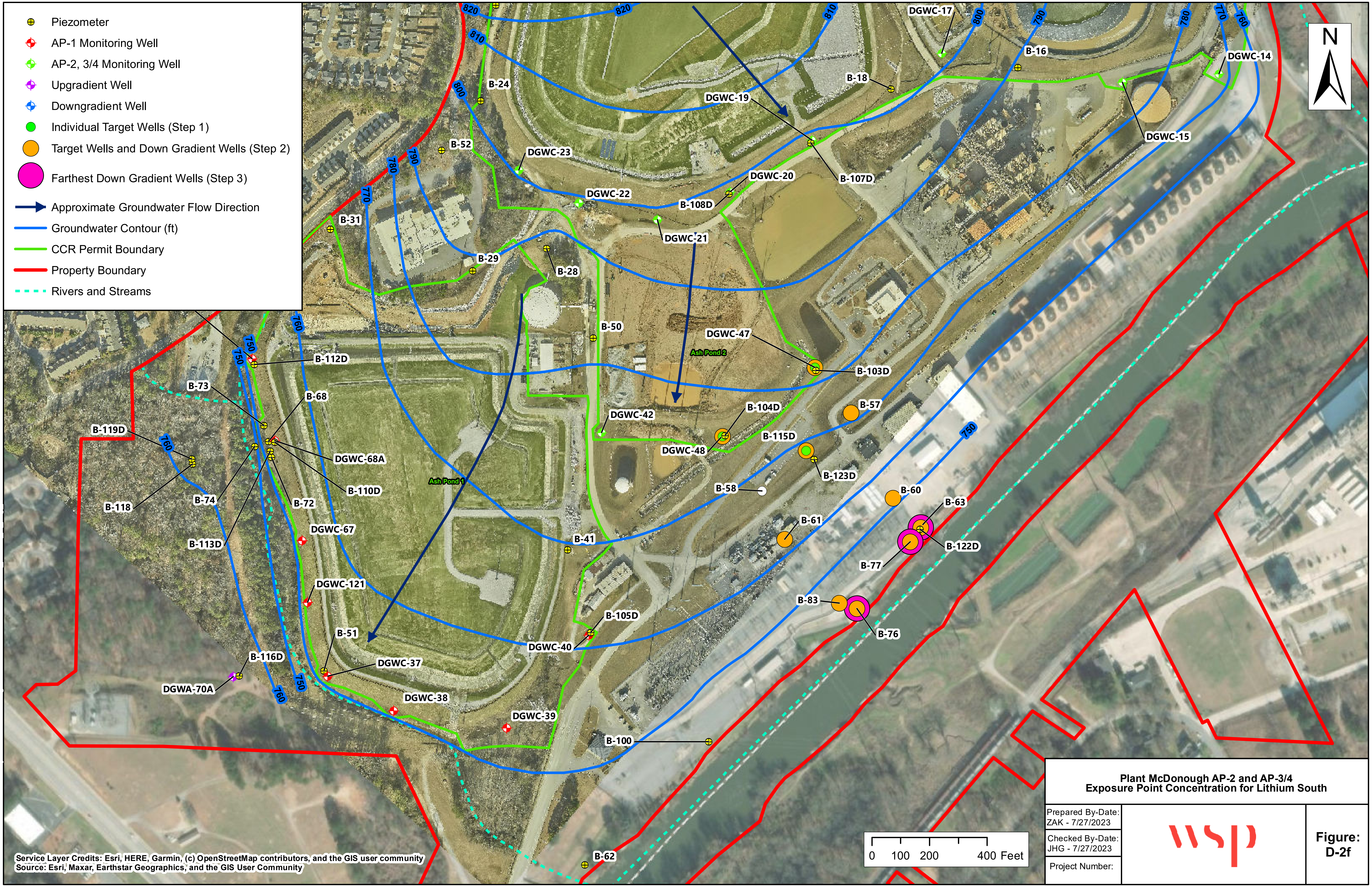
| | | |
|---|---|---|
| Prepared By-Date: ZAK - 7/27/2023 | wsp | Figure: D-2c |
| Checked By-Date: JHG - 7/27/2023 | | |
| Project Number: | | |




**Plant McDonough AP-2 and AP-3/4**
**Exposure Point Concentration for Cobalt South - a**

| | | |
|---|---|---|
| Prepared By-Date: ZAK - 7/27/2023 | wsp | Figure: D-2d |
| Checked By-Date: JHG - 7/27/2023 | | |
| Project Number: | | |


No data for COPI
Piezometer
AP-1 Monitoring Well
AP-2, 3/4 Monitoring Well
Upgradient Well
Downgradient Well
Individual Target Wells (Step 1)
Target Wells and Down Gradient Wells (Step 2)
Farthest Down Gradient Wells (Step 3)
Approximate Groundwater Flow Direction
Groundwater Contour (ft)
CCR Permit Boundary
Property Boundary
Rivers and Streams
N
DGWC-17
B-16
DGWC-14
B-18
DGWC-19
DGWC-15
B-24
B-107D
B-52
DGWC-23
DGWC-20
DGWC-22
B-108D
B-31
DGWC-21
B-29
B-28
B-50
DGWC-47
Ash Pond 2
B-112D
B-103D
B-73
B-68
B-104D
B-57
DGWC-42
B-119D
B-115D
DGWC-68A
DGWC-48
B-123D
B-110D
Ash Pond 1
B-58
B-60
B-118
B-74
B-72
B-63
B-61
DGWC-67
B-41
B-122D
B-113D
B-77
DGWC-121
B-83
B-105D
B-76
B-51
DGWC-40
B-116D
DGWC-37
DGWA-70A
DGWC-38
DGWC-39
B-100
B-62
820
810
800
790
780
770
760
750
Service Layer Credits: Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community
Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community
0 100 200 400 Feet
Plant McDonough AP-2 and AP-3/4
Exposure Point Concentration for Cobalt South - b
Prepared By-Date:
ZAK - 7/27/2023
Checked By-Date:
JHG - 7/27/2023
Project Number:
wsp
Figure:
D-2e




**Plant McDonough AP-2 and AP-3/4**
**Exposure Point Concentration for Lithium South**

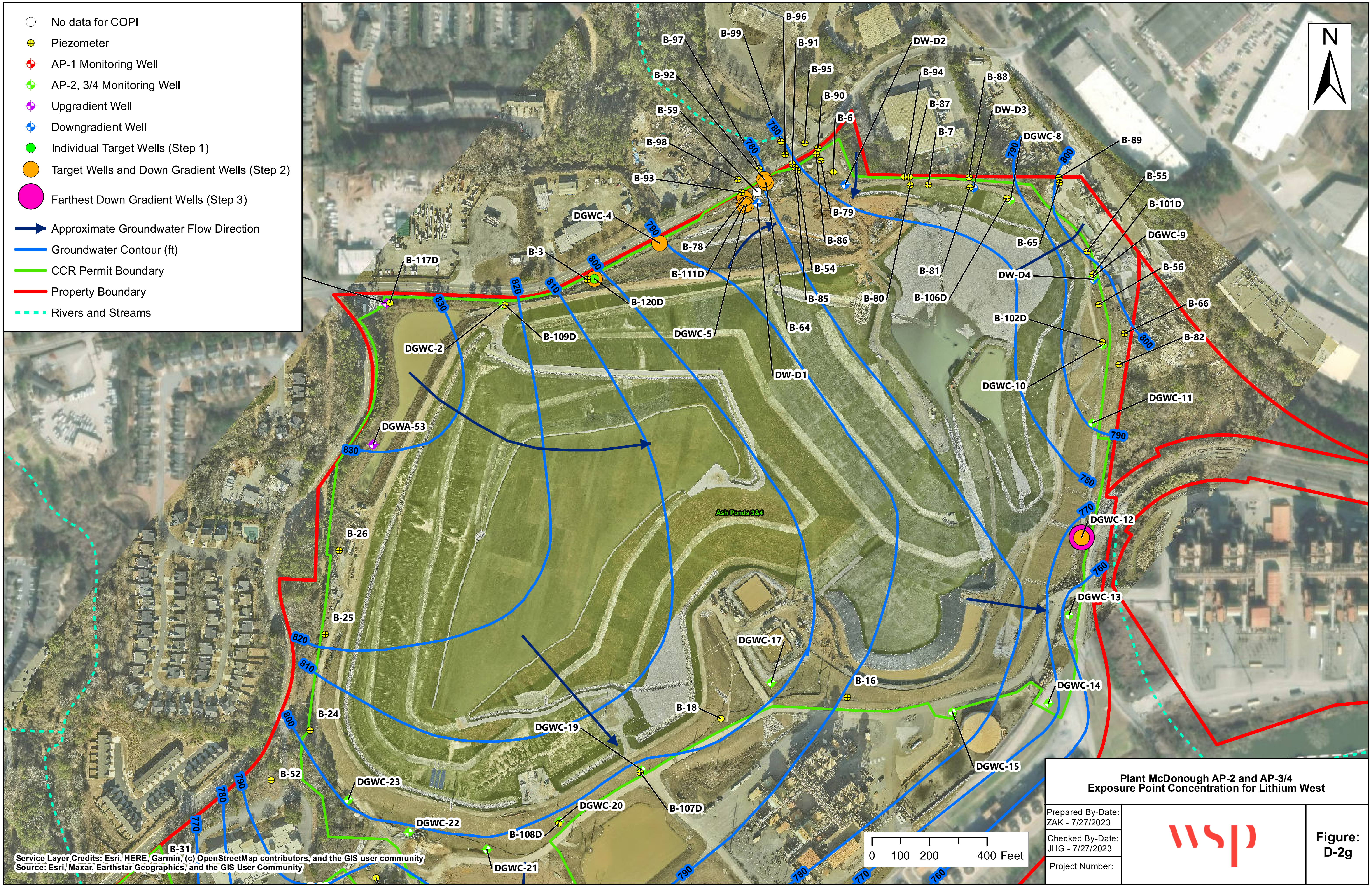
Prepared By-Date: ZAK - 7/27/2023

Checked By-Date: JHG - 7/27/2023

Project Number:

wsp

**Figure: D-2f**




Plant McDonough AP-2 and AP-3/4
Exposure Point Concentration for Lithium West

Prepared By-Date:
ZAK - 7/27/2023

Checked By-Date:
JHG - 7/27/2023

Project Number:

wsp

Figure:
D-2g

# Appendix D-3

## ProUCL Input/Output Files

**Appendix D-3a**
**Groundwater ProUCL Input - Arsenic**
**McDonough AP-2,3/4 Risk Evaluation Report**
**McDonough AP-2, 3/4**
**Plant McDonough, Cobb County, GA**

**East**

**Step 1**

| Well(1) | Date (1) | As_Step1 | d_As_Step1 |
|---|---|---|---|
| DGWC-9 | 08/30/16 | 0.0241 | 1 |
| DGWC-9 | 12/06/16 | 0.005 | 0 |
| DGWC-9 | 03/28/17 | 0.0243 | 1 |
| DGWC-9 | 07/11/17 | 0.0194 | 1 |
| DGWC-9 | 10/24/17 | 0.0249 | 1 |
| DGWC-9 | 02/27/18 | 0.04 | 1 |
| DGWC-9 | 07/11/18 | 0.016 | 1 |
| DGWC-9 | 11/06/18 | 0.017 | 1 |
| DGWC-9 | 08/27/19 | 0.021 | 1 |
| DGWC-9 | 10/17/19 | 0.033 | 1 |
| DGWC-9 | 03/03/20 | 0.015 | 1 |
| DGWC-9 | 08/11/20 | 0.022 | 1 |
| DGWC-9 | 09/22/20 | 0.04 | 1 |
| DGWC-9 | 03/02/21 | 0.021 | 1 |
| DGWC-9 | 09/10/21 | 0.031 | 1 |
| DGWC-9 | 01/26/22 | 0.012 | 1 |
| DGWC-9 | 09/19/22 | 0.016 | 1 |
| DGWC-9 | 02/03/23 | 0.014 | 1 |

**Step 2**

| Well (2) | Date (2) | As_Step2 | d_As_Step2 |
|---|---|---|---|
| DGWC-12 | 09/01/16 | 0.005 | 0 |
| DGWC-12 | 12/07/16 | 0.005 | 0 |
| DGWC-12 | 03/29/17 | 0.005 | 0 |
| DGWC-12 | 07/12/17 | 0.005 | 0 |
| DGWC-12 | 10/25/17 | 0.0006 | 1 |
| DGWC-12 | 02/27/18 | 0.005 | 0 |
| DGWC-12 | 07/11/18 | 0.005 | 0 |
| DGWC-12 | 11/07/18 | 0.005 | 0 |
| DGWC-12 | 08/27/19 | 0.005 | 0 |
| DGWC-12 | 09/17/19 | 0.005 | 0 |
| DGWC-12 | 10/15/19 | 0.005 | 0 |
| DGWC-12 | 03/02/20 | 0.005 | 0 |
| DGWC-12 | 08/11/20 | 0.00078 | 0 |
| DGWC-12 | 09/22/20 | 0.00078 | 0 |
| DGWC-12 | 03/03/21 | 0.00078 | 0 |
| DGWC-12 | 09/09/21 | 0.0011 | 0 |
| DGWC-12 | 01/25/22 | 0.005 | 0 |
| DGWC-12 | 09/15/22 | 0.005 | 0 |
| DGWC-12 | 02/06/23 | 0.005 | 0 |
| DGWC-9 | 08/30/16 | 0.0241 | 1 |
| DGWC-9 | 12/06/16 | 0.005 | 0 |
| DGWC-9 | 03/28/17 | 0.0243 | 1 |
| DGWC-9 | 07/11/17 | 0.0194 | 1 |
| DGWC-9 | 10/24/17 | 0.0249 | 1 |
| DGWC-9 | 02/27/18 | 0.04 | 1 |
| DGWC-9 | 07/11/18 | 0.016 | 1 |
| DGWC-9 | 11/06/18 | 0.017 | 1 |
| DGWC-9 | 08/27/19 | 0.021 | 1 |
| DGWC-9 | 10/17/19 | 0.033 | 1 |
| DGWC-9 | 03/03/20 | 0.015 | 1 |
| DGWC-9 | 08/11/20 | 0.022 | 1 |
| DGWC-9 | 09/22/20 | 0.04 | 1 |
| DGWC-9 | 03/02/21 | 0.021 | 1 |
| DGWC-9 | 09/10/21 | 0.031 | 1 |
| DGWC-9 | 01/26/22 | 0.012 | 1 |
| DGWC-9 | 09/19/22 | 0.016 | 1 |
| DGWC-9 | 02/03/23 | 0.014 | 1 |

**Step 3**

| Well (3) | Date (3) | As_Step3 | d_As_Step3 |
|---|---|---|---|
| DGWC-12 | 09/01/16 | 0.005 | 0 |
| DGWC-12 | 12/07/16 | 0.005 | 0 |
| DGWC-12 | 03/29/17 | 0.005 | 0 |
| DGWC-12 | 07/12/17 | 0.005 | 0 |
| DGWC-12 | 10/25/17 | 0.0006 | 1 |
| DGWC-12 | 02/27/18 | 0.005 | 0 |
| DGWC-12 | 07/11/18 | 0.005 | 0 |
| DGWC-12 | 11/07/18 | 0.005 | 0 |
| DGWC-12 | 08/27/19 | 0.005 | 0 |
| DGWC-12 | 09/17/19 | 0.005 | 0 |
| DGWC-12 | 10/15/19 | 0.005 | 0 |
| DGWC-12 | 03/02/20 | 0.005 | 0 |
| DGWC-12 | 08/11/20 | 0.00078 | 0 |
| DGWC-12 | 09/22/20 | 0.00078 | 0 |
| DGWC-12 | 03/03/21 | 0.00078 | 0 |
| DGWC-12 | 09/09/21 | 0.0011 | 0 |
| DGWC-12 | 01/25/22 | 0.005 | 0 |
| DGWC-12 | 09/15/22 | 0.005 | 0 |
| DGWC-12 | 02/06/23 | 0.005 | 0 |

Prepared by/Date: JHG 04/26/23
Checked by/Date: IMR 04/26/23

**Notes:**
1) Concentrations in units of mg/L.

**Appendix D-3b**
**Groundwater ProUCL Input - Cobalt**
**McDonough AP-2,3/4 Risk Evaluation Report**
**McDonough AP-2, 3/4**
**Plant McDonough, Cobb County, GA**

East

Step 1

| Well (1) | Date (1) | CobaltE_step1 | d_CobaltE_step1 |
|---|---|---|---|
| B-56 | 08/17/20 | 0.042 | 1 |
| B-56 | 09/28/20 | 0.042 | 1 |
| B-56 | 03/03/21 | 0.05 | 1 |
| B-56 | 09/13/21 | 0.047 | 1 |
| B-56 | 01/27/22 | 0.052 | 1 |
| B-56 | 09/16/22 | 0.051 | 1 |
| B-56 | 02/07/23 | 0.059 | 1 |
| DGWC-10 | 08/31/16 | 0.193 | 1 |
| DGWC-10 | 12/06/16 | 0.2 | 1 |
| DGWC-10 | 03/29/17 | 0.184 | 1 |
| DGWC-10 | 07/12/17 | 0.177 | 1 |
| DGWC-10 | 10/24/17 | 0.175 | 1 |
| DGWC-10 | 02/27/18 | 0.2 | 1 |
| DGWC-10 | 07/10/18 | 0.2 | 1 |
| DGWC-10 | 11/06/18 | 0.2 | 1 |
| DGWC-10 | 08/27/19 | 0.13 | 1 |
| DGWC-10 | 10/15/19 | 0.17 | 1 |
| DGWC-10 | 03/03/20 | 0.18 | 1 |
| DGWC-10 | 08/11/20 | 0.11 | 1 |
| DGWC-10 | 09/24/20 | 0.086 | 1 |
| DGWC-10 | 03/04/21 | 0.071 | 1 |
| DGWC-10 | 09/10/21 | 0.076 | 1 |
| DGWC-10 | 01/26/22 | 0.099 | 1 |
| DGWC-10 | 09/15/22 | 0.055 | 1 |
| DGWC-10 | 02/02/23 | 0.11 | 1 |
| DGWC-8 | 08/30/16 | 0.0568 | 1 |
| DGWC-8 | 12/06/16 | 0.0873 | 1 |
| DGWC-8 | 03/29/17 | 0.0902 | 1 |
| DGWC-8 | 07/11/17 | 0.0601 | 1 |
| DGWC-8 | 10/24/17 | 0.123 | 1 |
| DGWC-8 | 02/27/18 | 0.13 | 1 |
| DGWC-8 | 07/10/18 | 0.072 | 1 |
| DGWC-8 | 11/06/18 | 0.077 | 1 |
| DGWC-8 | 03/12/19 | 0.062 | 1 |
| DGWC-8 | 08/28/19 | 0.051 | 1 |
| DGWC-8 | 10/16/19 | 0.054 | 1 |
| DGWC-8 | 03/03/20 | 0.044 | 1 |
| DGWC-8 | 08/12/20 | 0.053 | 1 |
| DGWC-8 | 09/23/20 | 0.04 | 1 |
| DGWC-8 | 03/02/21 | 0.033 | 1 |
| DGWC-8 | 09/13/21 | 0.028 | 1 |
| DGWC-8 | 01/25/22 | 0.019 | 1 |
| DGWC-8 | 09/15/22 | 0.0046 | 1 |
| DGWC-8 | 02/07/23 | 0.0018 | 1 |
| DGWC-9 | 08/30/16 | 0.0896 | 1 |
| DGWC-9 | 12/06/16 | 0.122 | 1 |
| DGWC-9 | 03/28/17 | 0.124 | 1 |
| DGWC-9 | 07/11/17 | 0.136 | 1 |
| DGWC-9 | 10/24/17 | 0.151 | 1 |
| DGWC-9 | 02/27/18 | 0.16 | 1 |
| DGWC-9 | 07/11/18 | 0.18 | 1 |
| DGWC-9 | 11/06/18 | 0.2 | 1 |
| DGWC-9 | 08/27/19 | 0.24 | 1 |
| DGWC-9 | 10/17/19 | 0.21 | 1 |
| DGWC-9 | 03/03/20 | 0.2 | 1 |
| DGWC-9 | 08/11/20 | 0.22 | 1 |
| DGWC-9 | 09/22/20 | 0.16 | 1 |
| DGWC-9 | 03/02/21 | 0.18 | 1 |
| DGWC-9 | 09/10/21 | 0.21 | 1 |
| DGWC-9 | 01/26/22 | 0.22 | 1 |
| DGWC-9 | 09/19/22 | 0.25 | 1 |
| DGWC-9 | 02/03/23 | 0.21 | 1 |

Step 2

| Well (2) | Date (2) | CobaltE_step2 | d_CobaltE-step2 |
|---|---|---|---|
| B-101D | 01/12/21 | 0.0034 | 1 |
| B-101D | 03/05/21 | 0.0023 | 1 |
| B-101D | 09/13/21 | 0.003 | 1 |
| B-101D | 01/26/22 | 0.0028 | 1 |
| B-101D | 09/16/22 | 0.0035 | 1 |
| B-101D | 02/03/23 | 0.0022 | 1 |
| B-102D | 12/17/20 | 0.014 | 1 |
| B-102D | 01/11/21 | 0.015 | 1 |
| B-102D | 03/04/21 | 0.014 | 1 |
| B-102D | 09/10/21 | 0.013 | 1 |
| B-102D | 01/27/22 | 0.014 | 1 |
| B-102D | 09/15/22 | 0.012 | 1 |
| B-102D | 02/02/23 | 0.011 | 1 |
| B-106D | 12/17/20 | 0.00087 | 1 |
| B-106D | 03/04/21 | 0.0007 | 1 |
| B-106D | 09/13/21 | 0.00056 | 1 |
| B-106D | 01/25/22 | 0.005 | 0 |
| B-106D | 09/16/22 | 0.005 | 0 |
| B-106D | 02/07/23 | 0.005 | 0 |
| B-56 | 08/17/20 | 0.042 | 1 |
| B-56 | 09/28/20 | 0.042 | 1 |
| B-56 | 03/03/21 | 0.05 | 1 |
| B-56 | 09/13/21 | 0.047 | 1 |
| B-56 | 01/27/22 | 0.052 | 1 |
| B-56 | 09/16/22 | 0.051 | 1 |
| B-56 | 02/07/23 | 0.059 | 1 |
| DGWC-10 | 08/31/16 | 0.193 | 1 |
| DGWC-10 | 12/06/16 | 0.2 | 1 |
| DGWC-10 | 03/29/17 | 0.184 | 1 |
| DGWC-10 | 07/12/17 | 0.177 | 1 |
| DGWC-10 | 10/24/17 | 0.175 | 1 |
| DGWC-10 | 02/27/18 | 0.2 | 1 |
| DGWC-10 | 07/10/18 | 0.2 | 1 |
| DGWC-10 | 11/06/18 | 0.2 | 1 |
| DGWC-10 | 08/27/19 | 0.13 | 1 |
| DGWC-10 | 10/15/19 | 0.17 | 1 |
| DGWC-10 | 03/03/20 | 0.18 | 1 |
| DGWC-10 | 08/11/20 | 0.11 | 1 |
| DGWC-10 | 09/24/20 | 0.086 | 1 |
| DGWC-10 | 03/04/21 | 0.071 | 1 |
| DGWC-10 | 09/10/21 | 0.076 | 1 |
| DGWC-10 | 01/26/22 | 0.099 | 1 |
| DGWC-10 | 09/15/22 | 0.055 | 1 |
| DGWC-10 | 02/02/23 | 0.11 | 1 |
| DGWC-12 | 09/01/16 | 0.0021 | 1 |
| DGWC-12 | 12/07/16 | 0.0026 | 1 |
| DGWC-12 | 03/29/17 | 0.0026 | 1 |
| DGWC-12 | 07/12/17 | 0.0033 | 1 |
| DGWC-12 | 10/25/17 | 0.0021 | 1 |
| DGWC-12 | 02/27/18 | 0.0021 | 1 |
| DGWC-12 | 07/11/18 | 0.002 | 1 |
| DGWC-12 | 11/07/18 | 0.0057 | 1 |
| DGWC-12 | 08/27/19 | 0.0021 | 1 |
| DGWC-12 | 10/15/19 | 0.0058 | 1 |
| DGWC-12 | 03/02/20 | 0.029 | 1 |
| DGWC-12 | 08/11/20 | 0.006 | 1 |
| DGWC-12 | 09/22/20 | 0.013 | 1 |
| DGWC-12 | 03/03/21 | 0.01 | 1 |
| DGWC-12 | 09/09/21 | 0.034 | 1 |
| DGWC-12 | 01/25/22 | 0.018 | 1 |
| DGWC-12 | 09/15/22 | 0.025 | 1 |
| DGWC-12 | 02/06/23 | 0.016 | 1 |
| DGWC-8 | 08/30/16 | 0.0568 | 1 |
| DGWC-8 | 12/06/16 | 0.0873 | 1 |
| DGWC-8 | 03/29/17 | 0.0902 | 1 |
| DGWC-8 | 07/11/17 | 0.0601 | 1 |
| DGWC-8 | 10/24/17 | 0.123 | 1 |
| DGWC-8 | 02/27/18 | 0.13 | 1 |
| DGWC-8 | 07/10/18 | 0.072 | 1 |
| DGWC-8 | 11/06/18 | 0.077 | 1 |
| DGWC-8 | 03/12/19 | 0.062 | 1 |
| DGWC-8 | 08/28/19 | 0.051 | 1 |
| DGWC-8 | 10/16/19 | 0.054 | 1 |
| DGWC-8 | 03/03/20 | 0.044 | 1 |
| DGWC-8 | 08/12/20 | 0.053 | 1 |
| DGWC-8 | 09/23/20 | 0.04 | 1 |
| DGWC-8 | 03/02/21 | 0.033 | 1 |
| DGWC-8 | 09/13/21 | 0.028 | 1 |
| DGWC-8 | 01/25/22 | 0.019 | 1 |
| DGWC-8 | 09/15/22 | 0.0046 | 1 |
| DGWC-8 | 02/07/23 | 0.0018 | 1 |
| DGWC-9 | 08/30/16 | 0.0896 | 1 |
| DGWC-9 | 12/06/16 | 0.122 | 1 |
| DGWC-9 | 03/28/17 | 0.124 | 1 |
| DGWC-9 | 07/11/17 | 0.136 | 1 |
| DGWC-9 | 10/24/17 | 0.151 | 1 |
| DGWC-9 | 02/27/18 | 0.16 | 1 |
| DGWC-9 | 07/11/18 | 0.18 | 1 |
| DGWC-9 | 11/06/18 | 0.2 | 1 |
| DGWC-9 | 08/27/19 | 0.24 | 1 |
| DGWC-9 | 10/17/19 | 0.21 | 1 |
| DGWC-9 | 03/03/20 | 0.2 | 1 |
| DGWC-9 | 08/11/20 | 0.22 | 1 |
| DGWC-9 | 09/22/20 | 0.16 | 1 |
| DGWC-9 | 03/02/21 | 0.18 | 1 |
| DGWC-9 | 09/10/21 | 0.21 | 1 |
| DGWC-9 | 01/26/22 | 0.22 | 1 |
| DGWC-9 | 09/19/22 | 0.25 | 1 |
| DGWC-9 | 02/03/23 | 0.21 | 1 |

Step 3

| Well (3) | Date (3) | CobaltE-step3 | d_CobaltE-step3 |
|---|---|---|---|
| DGWC-12 | 09/01/16 | 0.0021 | 1 |
| DGWC-12 | 12/07/16 | 0.0026 | 1 |
| DGWC-12 | 03/29/17 | 0.0026 | 1 |
| DGWC-12 | 07/12/17 | 0.0033 | 1 |
| DGWC-12 | 10/25/17 | 0.0021 | 1 |
| DGWC-12 | 02/27/18 | 0.0021 | 1 |
| DGWC-12 | 07/11/18 | 0.002 | 1 |
| DGWC-12 | 11/07/18 | 0.0057 | 1 |
| DGWC-12 | 08/27/19 | 0.0021 | 1 |
| DGWC-12 | 10/15/19 | 0.0058 | 1 |
| DGWC-12 | 03/02/20 | 0.029 | 1 |
| DGWC-12 | 08/11/20 | 0.006 | 1 |
| DGWC-12 | 09/22/20 | 0.013 | 1 |
| DGWC-12 | 03/03/21 | 0.01 | 1 |
| DGWC-12 | 09/09/21 | 0.034 | 1 |
| DGWC-12 | 01/25/22 | 0.018 | 1 |
| DGWC-12 | 09/15/22 | 0.025 | 1 |
| DGWC-12 | 02/06/23 | 0.016 | 1 |

**Appendix D-3b**
**Groundwater ProUCL Input - Cobalt**
**McDonough AP-2,3/4 Risk Evaluation Report**
**McDonough AP-2, 3/4**
**Plant McDonough, Cobb County, GA**

**North**

**Step 1**

| Well (1) | Date (1) | CobaltN_step1 | d_CobaltN_step1 |
|---|---|---|---|
| B-93 | 12/19/19 | 0.066 | 1 |
| B-93 | 08/19/20 | 0.068 | 1 |
| B-93 | 09/28/20 | 0.064 | 1 |
| B-93 | 03/09/21 | 0.061 | 1 |
| B-93 | 09/15/21 | 0.062 | 1 |
| B-93 | 01/26/22 | 0.064 | 1 |
| B-93 | 09/12/22 | 0.057 | 1 |
| B-93 | 01/31/23 | 0.067 | 1 |
| B-92 | 09/15/21 | 0.063 | 1 |
| B-92 | 01/26/22 | 0.071 | 1 |
| B-92 | 09/12/22 | 0.073 | 1 |
| B-92 | 01/31/23 | 0.08 | 1 |

**Step 2**

| Well (2) | Date (2) | CobaltN_step2 | d_CobaltN_step2 |
|---|---|---|---|
| B-64 | 01/28/19 | 0.01 | 0 |
| B-64 | 10/21/19 | 0.0043 | 1 |
| B-92 | 09/15/21 | 0.063 | 1 |
| B-92 | 01/26/22 | 0.071 | 1 |
| B-92 | 09/12/22 | 0.073 | 1 |
| B-92 | 01/31/23 | 0.08 | 1 |
| B-93 | 12/19/19 | 0.066 | 1 |
| B-93 | 08/19/20 | 0.068 | 1 |
| B-93 | 09/28/20 | 0.064 | 1 |
| B-93 | 03/09/21 | 0.061 | 1 |
| B-93 | 09/15/21 | 0.062 | 1 |
| B-93 | 01/26/22 | 0.064 | 1 |
| B-93 | 09/12/22 | 0.057 | 1 |
| B-93 | 01/31/23 | 0.067 | 1 |
| DGWC-12 | 09/01/16 | 0.0021 | 1 |
| DGWC-12 | 12/07/16 | 0.0026 | 1 |
| DGWC-12 | 03/29/17 | 0.0026 | 1 |
| DGWC-12 | 07/12/17 | 0.0033 | 1 |
| DGWC-12 | 10/25/17 | 0.0021 | 1 |
| DGWC-12 | 02/27/18 | 0.0021 | 1 |
| DGWC-12 | 07/11/18 | 0.002 | 1 |
| DGWC-12 | 11/07/18 | 0.0057 | 1 |
| DGWC-12 | 08/27/19 | 0.0021 | 1 |
| DGWC-12 | 10/15/19 | 0.0058 | 1 |
| DGWC-12 | 03/02/20 | 0.029 | 1 |
| DGWC-12 | 08/11/20 | 0.006 | 1 |
| DGWC-12 | 09/22/20 | 0.013 | 1 |
| DGWC-12 | 03/03/21 | 0.01 | 1 |
| DGWC-12 | 09/09/21 | 0.034 | 1 |
| DGWC-12 | 01/25/22 | 0.018 | 1 |
| DGWC-12 | 09/15/22 | 0.025 | 1 |
| DGWC-12 | 02/06/23 | 0.016 | 1 |

**Step 3**

| Well (3) | Date (3) | CobaltN_step3 | d_CobaltN_step3 |
|---|---|---|---|
| DGWC-12 | 09/01/16 | 0.0021 | 1 |
| DGWC-12 | 12/07/16 | 0.0026 | 1 |
| DGWC-12 | 03/29/17 | 0.0026 | 1 |
| DGWC-12 | 07/12/17 | 0.0033 | 1 |
| DGWC-12 | 10/25/17 | 0.0021 | 1 |
| DGWC-12 | 02/27/18 | 0.0021 | 1 |
| DGWC-12 | 07/11/18 | 0.002 | 1 |
| DGWC-12 | 11/07/18 | 0.0057 | 1 |
| DGWC-12 | 08/27/19 | 0.0021 | 1 |
| DGWC-12 | 10/15/19 | 0.0058 | 1 |
| DGWC-12 | 03/02/20 | 0.029 | 1 |
| DGWC-12 | 08/11/20 | 0.006 | 1 |
| DGWC-12 | 09/22/20 | 0.013 | 1 |
| DGWC-12 | 03/03/21 | 0.01 | 1 |
| DGWC-12 | 09/09/21 | 0.034 | 1 |
| DGWC-12 | 01/25/22 | 0.018 | 1 |
| DGWC-12 | 09/15/22 | 0.025 | 1 |
| DGWC-12 | 02/06/23 | 0.016 | 1 |

**Appendix D-3b**
**Groundwater ProUCL Input - Cobalt**
**McDonough AP-2,3/4 Risk Evaluation Report**
**McDonough AP-2, 3/4**
**Plant McDonough, Cobb County, GA**

**South - a**

**Step 1**

| Well (1) | Date (1) | CobaltS_a_step1 | d_CobaltS_a_step1 |
|---|---|---|---|
| DGWC-19 | 09/01/16 | 0.0553 | 1 |
| DGWC-19 | 12/07/16 | 0.0561 | 1 |
| DGWC-19 | 03/29/17 | 0.0534 | 1 |
| DGWC-19 | 07/12/17 | 0.0489 | 1 |
| DGWC-19 | 10/25/17 | 0.0514 | 1 |
| DGWC-19 | 02/28/18 | 0.051 | 1 |
| DGWC-19 | 07/11/18 | 0.051 | 1 |
| DGWC-19 | 11/07/18 | 0.048 | 1 |
| DGWC-19 | 08/28/19 | 0.048 | 1 |
| DGWC-19 | 10/16/19 | 0.046 | 1 |
| DGWC-19 | 03/03/20 | 0.054 | 1 |
| DGWC-19 | 08/11/20 | 0.049 | 1 |
| DGWC-19 | 09/22/20 | 0.051 | 1 |
| DGWC-19 | 03/02/21 | 0.051 | 1 |
| DGWC-19 | 09/09/21 | 0.055 | 1 |
| DGWC-19 | 01/25/22 | 0.054 | 1 |
| DGWC-19 | 09/14/22 | 0.052 | 1 |
| DGWC-19 | 02/06/23 | 0.055 | 1 |
| DGWC-20 | 09/02/16 | 0.497 | 1 |
| DGWC-20 | 12/07/16 | 0.614 | 1 |
| DGWC-20 | 03/29/17 | 0.443 | 1 |
| DGWC-20 | 07/12/17 | 0.538 | 1 |
| DGWC-20 | 10/25/17 | 0.432 | 1 |
| DGWC-20 | 02/28/18 | 0.46 | 1 |
| DGWC-20 | 07/11/18 | 0.47 | 1 |
| DGWC-20 | 11/07/18 | 0.42 | 1 |
| DGWC-20 | 08/29/19 | 0.66 | 1 |
| DGWC-20 | 10/17/19 | 0.57 | 1 |
| DGWC-20 | 03/04/20 | 0.84 | 1 |
| DGWC-20 | 08/13/20 | 0.73 | 1 |
| DGWC-20 | 09/22/20 | 0.47 | 1 |
| DGWC-20 | 03/02/21 | 0.77 | 1 |
| DGWC-20 | 09/10/21 | 0.45 | 1 |
| DGWC-20 | 01/21/22 | 0.95 | 1 |
| DGWC-20 | 09/15/22 | 0.75 | 1 |
| DGWC-20 | 02/07/23 | 1 | 1 |
| DGWC-47 | 09/01/16 | 0.536 | 1 |
| DGWC-47 | 12/08/16 | 0.381 | 1 |
| DGWC-47 | 03/31/17 | 0.354 | 1 |
| DGWC-47 | 07/13/17 | 0.396 | 1 |
| DGWC-47 | 10/26/17 | 0.383 | 1 |
| DGWC-47 | 03/01/18 | 0.401 | 1 |
| DGWC-47 | 07/12/18 | 0.36 | 1 |
| DGWC-47 | 11/07/18 | 0.35 | 1 |
| DGWC-47 | 08/29/19 | 0.28 | 1 |
| DGWC-47 | 10/17/19 | 0.26 | 1 |
| DGWC-47 | 03/04/20 | 0.28 | 1 |
| DGWC-47 | 08/12/20 | 0.21 | 1 |
| DGWC-47 | 09/23/20 | 0.17 | 1 |
| DGWC-47 | 03/03/21 | 0.2 | 1 |
| DGWC-47 | 09/10/21 | 0.23 | 1 |
| DGWC-47 | 01/21/22 | 0.24 | 1 |
| DGWC-47 | 09/13/22 | 0.21 | 1 |
| DGWC-47 | 02/03/23 | 0.21 | 1 |
| DGWC-48 | 09/01/16 | 0.539 | 1 |
| DGWC-48 | 12/08/16 | 0.575 | 1 |
| DGWC-48 | 03/30/17 | 0.573 | 1 |
| DGWC-48 | 07/13/17 | 0.531 | 1 |
| DGWC-48 | 10/26/17 | 0.482 | 1 |
| DGWC-48 | 03/02/18 | 0.49 | 1 |
| DGWC-48 | 07/12/18 | 0.46 | 1 |
| DGWC-48 | 11/07/18 | 0.48 | 1 |
| DGWC-48 | 08/29/19 | 0.42 | 1 |
| DGWC-48 | 10/18/19 | 0.41 | 1 |
| DGWC-48 | 03/04/20 | 0.42 | 1 |
| DGWC-48 | 08/13/20 | 0.35 | 1 |
| DGWC-48 | 09/23/20 | 0.37 | 1 |
| DGWC-48 | 03/03/21 | 0.36 | 1 |
| DGWC-48 | 09/10/21 | 0.36 | 1 |
| DGWC-48 | 01/24/22 | 0.34 | 1 |
| DGWC-48 | 09/13/22 | 0.31 | 1 |
| DGWC-48 | 02/03/23 | 0.31 | 1 |
| B-104D | 12/09/20 | 0.17 | 1 |
| B-104D | 01/12/21 | 0.19 | 1 |
| B-104D | 03/04/21 | 0.19 | 1 |
| B-104D | 09/14/21 | 0.1 | 1 |
| B-104D | 01/24/22 | 0.1 | 1 |
| B-104D | 09/13/22 | 0.14 | 1 |
| B-104D | 02/03/23 | 0.17 | 1 |
| B-115D | 04/14/21 | 0.3 | 1 |
| B-115D | 09/14/21 | 0.28 | 1 |
| B-115D | 01/20/22 | 0.24 | 1 |
| B-115D | 09/14/22 | 0.23 | 1 |
| B-115D | 02/06/23 | 0.27 | 1 |

**Step 2**

| Well (2) | Date (2) | CobaltS_a_step2 | d_CobaltS_a_step2 |
|---|---|---|---|
| B-104D | 12/09/20 | 0.17 | 1 |
| B-104D | 01/12/21 | 0.19 | 1 |
| B-104D | 03/04/21 | 0.19 | 1 |
| B-104D | 09/14/21 | 0.1 | 1 |
| B-104D | 01/24/22 | 0.1 | 1 |
| B-104D | 09/13/22 | 0.14 | 1 |
| B-104D | 02/03/23 | 0.17 | 1 |
| B-115D | 04/14/21 | 0.3 | 1 |
| B-115D | 09/14/21 | 0.28 | 1 |
| B-115D | 01/20/22 | 0.24 | 1 |
| B-115D | 09/14/22 | 0.23 | 1 |
| B-115D | 02/06/23 | 0.27 | 1 |
| B-57 | 01/15/21 | 0.47 | 1 |
| B-60 | 10/21/19 | 0.29 | 1 |
| B-61 | 01/28/19 | 0.078 | 1 |
| B-61 | 10/22/19 | 0.073 | 1 |
| B-63 | 01/28/19 | 0.053 | 1 |
| B-63 | 10/22/19 | 0.046 | 1 |
| B-63 | 03/12/21 | 0.046 | 1 |
| B-63 | 09/14/21 | 0.037 | 1 |
| B-63 | 01/20/22 | 0.039 | 1 |
| B-63 | 09/14/22 | 0.05 | 1 |
| B-63 | 02/02/23 | 0.027 | 1 |
| B-76 | 10/22/19 | 0.47 | 1 |
| B-76 | 03/12/21 | 0.35 | 1 |
| B-76 | 09/13/22 | 0.21 | 1 |
| B-77 | 10/24/19 | 0.0021 | 1 |
| B-77 | 08/13/20 | 0.0011 | 1 |
| B-77 | 09/24/20 | 0.0004 | 1 |
| B-77 | 03/04/21 | 0.0017 | 1 |
| B-77 | 09/14/21 | 0.00039 | 0 |
| B-77 | 01/20/22 | 0.005 | 0 |
| B-77 | 09/13/22 | 0.005 | 0 |
| B-77 | 02/06/23 | 0.005 | 0 |
| B-83 | 10/21/19 | 0.018 | 1 |
| B-83 | 08/14/20 | 0.021 | 1 |
| B-83 | 09/25/20 | 0.0073 | 1 |
| B-83 | 03/04/21 | 0.0099 | 1 |
| B-83 | 09/16/21 | 0.011 | 1 |
| B-83 | 01/21/22 | 0.011 | 1 |
| B-83 | 09/13/22 | 0.012 | 1 |
| B-83 | 02/03/23 | 0.012 | 1 |
| DGWC-19 | 09/01/16 | 0.0553 | 1 |
| DGWC-19 | 12/07/16 | 0.0561 | 1 |
| DGWC-19 | 03/29/17 | 0.0534 | 1 |
| DGWC-19 | 07/12/17 | 0.0489 | 1 |
| DGWC-19 | 10/25/17 | 0.0514 | 1 |
| DGWC-19 | 02/28/18 | 0.051 | 1 |
| DGWC-19 | 07/11/18 | 0.051 | 1 |
| DGWC-19 | 11/07/18 | 0.048 | 1 |
| DGWC-19 | 08/28/19 | 0.048 | 1 |
| DGWC-19 | 10/16/19 | 0.046 | 1 |
| DGWC-19 | 03/03/20 | 0.054 | 1 |
| DGWC-19 | 08/11/20 | 0.049 | 1 |
| DGWC-19 | 09/22/20 | 0.051 | 1 |
| DGWC-19 | 03/02/21 | 0.051 | 1 |
| DGWC-19 | 09/09/21 | 0.055 | 1 |
| DGWC-19 | 01/25/22 | 0.054 | 1 |
| DGWC-19 | 09/14/22 | 0.052 | 1 |
| DGWC-19 | 02/06/23 | 0.055 | 1 |
| DGWC-20 | 09/02/16 | 0.497 | 1 |
| DGWC-20 | 12/07/16 | 0.614 | 1 |
| DGWC-20 | 03/29/17 | 0.443 | 1 |
| DGWC-20 | 07/12/17 | 0.538 | 1 |
| DGWC-20 | 10/25/17 | 0.432 | 1 |
| DGWC-20 | 02/28/18 | 0.46 | 1 |
| DGWC-20 | 07/11/18 | 0.47 | 1 |
| DGWC-20 | 11/07/18 | 0.42 | 1 |
| DGWC-20 | 08/29/19 | 0.66 | 1 |
| DGWC-20 | 10/17/19 | 0.57 | 1 |
| DGWC-20 | 03/04/20 | 0.84 | 1 |
| DGWC-20 | 08/13/20 | 0.73 | 1 |
| DGWC-20 | 09/22/20 | 0.47 | 1 |
| DGWC-20 | 03/02/21 | 0.77 | 1 |
| DGWC-20 | 09/10/21 | 0.45 | 1 |
| DGWC-20 | 01/21/22 | 0.95 | 1 |
| DGWC-20 | 09/15/22 | 0.75 | 1 |
| DGWC-20 | 02/07/23 | 1 | 1 |
| DGWC-47 | 09/01/16 | 0.536 | 1 |
| DGWC-47 | 12/08/16 | 0.381 | 1 |
| DGWC-47 | 03/31/17 | 0.354 | 1 |
| DGWC-47 | 07/13/17 | 0.396 | 1 |
| DGWC-47 | 10/26/17 | 0.383 | 1 |
| DGWC-47 | 03/01/18 | 0.401 | 1 |
| DGWC-47 | 07/12/18 | 0.36 | 1 |
| DGWC-47 | 11/07/18 | 0.35 | 1 |
| DGWC-47 | 08/29/19 | 0.28 | 1 |
| DGWC-47 | 10/17/19 | 0.26 | 1 |
| DGWC-47 | 03/04/20 | 0.28 | 1 |
| DGWC-47 | 08/12/20 | 0.21 | 1 |
| DGWC-47 | 09/23/20 | 0.17 | 1 |
| DGWC-47 | 03/03/21 | 0.2 | 1 |
| DGWC-47 | 09/10/21 | 0.23 | 1 |
| DGWC-47 | 01/21/22 | 0.24 | 1 |
| DGWC-47 | 09/13/22 | 0.21 | 1 |
| DGWC-47 | 02/03/23 | 0.21 | 1 |
| DGWC-48 | 09/01/16 | 0.539 | 1 |
| DGWC-48 | 12/08/16 | 0.575 | 1 |
| DGWC-48 | 03/30/17 | 0.573 | 1 |
| DGWC-48 | 07/13/17 | 0.531 | 1 |
| DGWC-48 | 10/26/17 | 0.482 | 1 |
| DGWC-48 | 03/02/18 | 0.49 | 1 |
| DGWC-48 | 07/12/18 | 0.46 | 1 |
| DGWC-48 | 11/07/18 | 0.48 | 1 |
| DGWC-48 | 08/29/19 | 0.42 | 1 |
| DGWC-48 | 10/18/19 | 0.41 | 1 |
| DGWC-48 | 03/04/20 | 0.42 | 1 |
| DGWC-48 | 08/13/20 | 0.35 | 1 |
| DGWC-48 | 09/23/20 | 0.37 | 1 |
| DGWC-48 | 03/03/21 | 0.36 | 1 |
| DGWC-48 | 09/10/21 | 0.36 | 1 |
| DGWC-48 | 01/24/22 | 0.34 | 1 |
| DGWC-48 | 09/13/22 | 0.31 | 1 |
| DGWC-48 | 02/03/23 | 0.31 | 1 |

**Step 3**

| Well (3) | Date (3) | CobaltS_a_step3 | d_CobaltS_a_step3 |
|---|---|---|---|
| B-63 | 01/28/19 | 0.053 | 1 |
| B-63 | 10/22/19 | 0.046 | 1 |
| B-63 | 03/12/21 | 0.046 | 1 |
| B-63 | 09/14/21 | 0.037 | 1 |
| B-63 | 01/20/22 | 0.039 | 1 |
| B-63 | 09/14/22 | 0.05 | 1 |
| B-63 | 02/02/23 | 0.027 | 1 |
| B-76 | 10/22/19 | 0.47 | 1 |
| B-76 | 03/12/21 | 0.35 | 1 |
| B-76 | 09/13/22 | 0.21 | 1 |
| B-77 | 10/24/19 | 0.0021 | 1 |
| B-77 | 08/13/20 | 0.0011 | 1 |
| B-77 | 09/24/20 | 0.0004 | 1 |
| B-77 | 03/04/21 | 0.0017 | 1 |
| B-77 | 09/14/21 | 0.00039 | 0 |
| B-77 | 01/20/22 | 0.005 | 0 |
| B-77 | 09/13/22 | 0.005 | 0 |
| B-77 | 02/06/23 | 0.005 | 0 |

**Appendix D-3b**
**Groundwater ProUCL Input - Cobalt**
**McDonough AP-2,3/4 Risk Evaluation Report**
**McDonough AP-2, 3/4**
**Plant McDonough, Cobb County, GA**

**South - b**
**Step 1,2, & 3**

| Well (1,2,& 3) | Date (1,2,& 3) | CobaltS_D_step123 | d_CobaltS_D_step123 |
|---|---|---|---|
| B-63 | 01/28/19 | 0.053 | 1 |
| B-63 | 10/22/19 | 0.046 | 1 |
| B-63 | 03/12/21 | 0.046 | 1 |
| B-63 | 09/14/21 | 0.037 | 1 |
| B-63 | 01/20/22 | 0.039 | 1 |
| B-63 | 09/14/22 | 0.05 | 1 |
| B-63 | 02/02/23 | 0.027 | 1 |

Prepared by/Date: JHG 05/11/23
Checked by/Date: IMR 05/11/23

**Notes:**
1) Concentrations in units of mg/L.

**Appendix D-3c**
**Groundwater ProUCL Input - Lithium**
**McDonough AP-2,3/4 Risk Evaluation Report**
**McDonough AP-2, 3/4**
**Plant McDonough, Cobb County, GA**

**South - a**

**Step 1**

| Well (1) | Date (1) | LithiumS_a_step1 | d_LithiumS_a_step1 |
|---|---|---|---|
| B-115D | 04/14/21 | 0.089 | 1 |
| B-115D | 09/14/21 | 0.085 | 1 |
| B-115D | 01/20/22 | 0.081 | 1 |
| B-115D | 09/14/22 | 0.082 | 1 |
| B-115D | 02/06/23 | 0.082 | 1 |
| DGWC-47 | 09/01/16 | 0.0854 | 1 |
| DGWC-47 | 12/08/16 | 0.0667 | 1 |
| DGWC-47 | 03/31/17 | 0.0767 | 1 |
| DGWC-47 | 07/13/17 | 0.0743 | 1 |
| DGWC-47 | 10/26/17 | 0.071 | 1 |
| DGWC-47 | 03/01/18 | 0.0772 | 1 |
| DGWC-47 | 07/12/18 | 0.073 | 1 |
| DGWC-47 | 11/07/18 | 0.082 | 1 |
| DGWC-47 | 08/29/19 | 0.056 | 1 |
| DGWC-47 | 10/17/19 | 0.066 | 1 |
| DGWC-47 | 03/04/20 | 0.063 | 1 |
| DGWC-47 | 08/12/20 | 0.054 | 1 |
| DGWC-47 | 09/23/20 | 0.046 | 1 |
| DGWC-47 | 03/03/21 | 0.049 | 1 |
| DGWC-47 | 09/10/21 | 0.053 | 1 |
| DGWC-47 | 01/21/22 | 0.055 | 1 |
| DGWC-47 | 09/13/22 | 0.05 | 1 |
| DGWC-47 | 02/03/23 | 0.048 | 1 |
| DGWC-48 | 09/01/16 | 0.125 | 1 |
| DGWC-48 | 12/08/16 | 0.122 | 1 |
| DGWC-48 | 03/30/17 | 0.144 | 1 |
| DGWC-48 | 07/13/17 | 0.143 | 1 |
| DGWC-48 | 10/26/17 | 0.115 | 1 |
| DGWC-48 | 03/02/18 | 0.129 | 1 |
| DGWC-48 | 07/12/18 | 0.12 | 1 |
| DGWC-48 | 11/07/18 | 0.12 | 1 |
| DGWC-48 | 08/29/19 | 0.11 | 1 |
| DGWC-48 | 10/18/19 | 0.11 | 1 |
| DGWC-48 | 03/04/20 | 0.12 | 1 |
| DGWC-48 | 08/13/20 | 0.098 | 1 |
| DGWC-48 | 09/23/20 | 0.1 | 1 |
| DGWC-48 | 44258.42 | 0.096 | 1 |
| DGWC-48 | 44449.46 | 0.095 | 1 |
| DGWC-48 | 44585.42 | 0.11 | 1 |
| DGWC-48 | 44817.5 | 0.099 | 1 |
| DGWC-48 | 44960.41 | 0.089 | 1 |

**Step 2**

| Well (2) | Date (2) | LithiumS_a_step2 | d_LithiumS_a_step2 |
|---|---|---|---|
| B-115D | 04/14/21 | 0.089 | 1 |
| B-115D | 09/14/21 | 0.085 | 1 |
| B-115D | 01/20/22 | 0.081 | 1 |
| B-115D | 09/14/22 | 0.082 | 1 |
| B-115D | 02/06/23 | 0.082 | 1 |
| B-57 | 01/15/21 | 0.11 | 1 |
| B-60 | 10/21/19 | 0.028 | 1 |
| B-61 | 01/28/19 | 0.05 | 0 |
| B-61 | 10/22/19 | 0.0015 | 1 |
| B-63 | 01/28/19 | 0.05 | 0 |
| B-63 | 10/22/19 | 0.0062 | 1 |
| B-63 | 03/12/21 | 0.0066 | 1 |
| B-63 | 09/14/21 | 0.0064 | 1 |
| B-63 | 01/20/22 | 0.0062 | 1 |
| B-63 | 09/14/22 | 0.0072 | 1 |
| B-63 | 02/02/23 | 0.0045 | 1 |
| B-76 | 10/22/19 | 0.045 | 1 |
| B-76 | 03/12/21 | 0.019 | 1 |
| B-76 | 09/13/22 | 0.0067 | 1 |
| B-77 | 10/24/19 | 0.0036 | 1 |
| B-77 | 08/13/20 | 0.0018 | 1 |
| B-77 | 09/24/20 | 0.00095 | 1 |
| B-77 | 03/04/21 | 0.0011 | 1 |
| B-77 | 09/14/21 | 0.00073 | 0 |
| B-77 | 01/20/22 | 0.03 | 0 |
| B-77 | 09/13/22 | 0.0022 | 1 |
| B-77 | 02/06/23 | 0.03 | 0 |
| B-83 | 10/21/19 | 0.003 | 1 |
| B-83 | 08/14/20 | 0.0045 | 1 |
| B-83 | 09/25/20 | 0.0018 | 1 |
| B-83 | 03/04/21 | 0.0024 | 1 |
| B-83 | 09/16/21 | 0.0021 | 1 |
| B-83 | 01/21/22 | 0.0022 | 1 |
| B-83 | 09/13/22 | 0.0027 | 1 |
| B-83 | 02/03/23 | 0.0025 | 1 |
| DGWC-47 | 09/01/16 | 0.0854 | 1 |
| DGWC-47 | 12/08/16 | 0.0667 | 1 |
| DGWC-47 | 03/31/17 | 0.0767 | 1 |
| DGWC-47 | 07/13/17 | 0.0743 | 1 |
| DGWC-47 | 10/26/17 | 0.071 | 1 |
| DGWC-47 | 03/01/18 | 0.0772 | 1 |
| DGWC-47 | 07/12/18 | 0.073 | 1 |
| DGWC-47 | 11/07/18 | 0.082 | 1 |
| DGWC-47 | 08/29/19 | 0.056 | 1 |
| DGWC-47 | 10/17/19 | 0.066 | 1 |
| DGWC-47 | 03/04/20 | 0.063 | 1 |
| DGWC-47 | 08/12/20 | 0.054 | 1 |
| DGWC-47 | 09/23/20 | 0.046 | 1 |
| DGWC-47 | 03/03/21 | 0.049 | 1 |
| DGWC-47 | 09/10/21 | 0.053 | 1 |
| DGWC-47 | 01/21/22 | 0.055 | 1 |
| DGWC-47 | 09/13/22 | 0.05 | 1 |
| DGWC-47 | 02/03/23 | 0.048 | 1 |
| DGWC-48 | 09/01/16 | 0.125 | 1 |
| DGWC-48 | 12/08/16 | 0.122 | 1 |
| DGWC-48 | 03/30/17 | 0.144 | 1 |
| DGWC-48 | 07/13/17 | 0.143 | 1 |
| DGWC-48 | 10/26/17 | 0.115 | 1 |
| DGWC-48 | 03/02/18 | 0.129 | 1 |
| DGWC-48 | 07/12/18 | 0.12 | 1 |
| DGWC-48 | 11/07/18 | 0.12 | 1 |
| DGWC-48 | 08/29/19 | 0.11 | 1 |
| DGWC-48 | 10/18/19 | 0.11 | 1 |
| DGWC-48 | 03/04/20 | 0.12 | 1 |
| DGWC-48 | 08/13/20 | 0.098 | 1 |
| DGWC-48 | 09/23/20 | 0.1 | 1 |
| DGWC-48 | 03/03/21 | 0.096 | 1 |
| DGWC-48 | 09/10/21 | 0.095 | 1 |
| DGWC-48 | 01/24/22 | 0.11 | 1 |
| DGWC-48 | 09/13/22 | 0.099 | 1 |
| DGWC-48 | 02/03/23 | 0.089 | 1 |

**Step 3**

| Well (3) | Date (3) | LithiumS_a_step3 | d_LithiumS_a_step3 |
|---|---|---|---|
| B-63 | 1/28/19 | 0.05 | 0 |
| B-63 | 10/22/19 | 0.0062 | 1 |
| B-63 | 3/12/21 | 0.0066 | 1 |
| B-63 | 9/14/21 | 0.0064 | 1 |
| B-63 | 1/20/22 | 0.0062 | 1 |
| B-63 | 9/14/22 | 0.0072 | 1 |
| B-63 | 2/2/23 | 0.0045 | 1 |
| B-76 | 10/22/19 | 0.045 | 1 |
| B-76 | 3/12/21 | 0.019 | 1 |
| B-76 | 9/13/22 | 0.0067 | 1 |
| B-77 | 10/24/19 | 0.0036 | 1 |
| B-77 | 8/13/20 | 0.0018 | 1 |
| B-77 | 9/24/20 | 0.00095 | 1 |
| B-77 | 3/4/21 | 0.0011 | 1 |
| B-77 | 9/14/21 | 0.00073 | 0 |
| B-77 | 1/20/22 | 0.03 | 0 |
| B-77 | 9/13/22 | 0.0022 | 1 |
| B-77 | 2/6/23 | 0.03 | 0 |

**West**

**Step 1**

| Well (1) | Date (1) | LithiumW_step1 | d_LithiumW_step1 |
|---|---|---|---|
| B-120D | 04/15/21 | 0.088 | 1 |
| B-120D | 09/14/21 | 0.077 | 1 |
| B-120D | 01/20/22 | 0.079 | 1 |
| B-120D | 09/19/22 | 0.076 | 1 |
| B-120D | 02/03/23 | 0.068 | 1 |

**Step 2**

| Well (2) | Date (2) | LithiumW_step2 | d_LithiumW_step2 |
|---|---|---|---|
| B-111D | 12/09/20 | 0.021 | 1 |
| B-111D | 01/12/21 | 0.021 | 1 |
| B-111D | 03/05/21 | 0.028 | 1 |
| B-111D | 09/14/21 | 0.029 | 1 |
| B-111D | 01/24/22 | 0.026 | 1 |
| B-111D | 09/14/22 | 0.02 | 1 |
| B-111D | 02/07/23 | 0.018 | 1 |
| B-120D | 04/15/21 | 0.088 | 1 |
| B-120D | 09/14/21 | 0.077 | 1 |
| B-120D | 01/20/22 | 0.079 | 1 |
| B-120D | 09/19/22 | 0.076 | 1 |
| B-120D | 02/03/23 | 0.068 | 1 |
| B-64 | 01/28/19 | 0.05 | 0 |
| B-64 | 10/21/19 | 0.011 | 1 |
| B-64 | 03/10/21 | 0.011 | 1 |
| B-64 | 09/13/22 | 0.013 | 1 |
| B-78 | 10/22/19 | 0.0071 | 1 |
| B-78 | 03/12/21 | 0.01 | 1 |
| B-78 | 09/13/22 | 0.011 | 1 |
| B-92 | 09/15/21 | 0.012 | 1 |
| B-92 | 01/26/22 | 0.015 | 1 |
| B-92 | 09/12/22 | 0.015 | 1 |
| B-92 | 01/31/23 | 0.014 | 1 |
| DGWC-12 | 09/01/16 | 0.05 | 0 |
| DGWC-12 | 12/07/16 | 0.05 | 0 |
| DGWC-12 | 03/29/17 | 0.05 | 0 |
| DGWC-12 | 07/12/17 | 0.05 | 0 |
| DGWC-12 | 10/25/17 | 0.05 | 0 |
| DGWC-12 | 02/27/18 | 0.00097 | 1 |
| DGWC-12 | 07/11/18 | 0.05 | 0 |
| DGWC-12 | 11/07/18 | 0.05 | 0 |
| DGWC-12 | 08/27/19 | 0.0011 | 1 |
| DGWC-12 | 10/15/19 | 0.00091 | 1 |
| DGWC-12 | 03/02/20 | 0.03 | 0 |
| DGWC-12 | 08/11/20 | 0.0011 | 1 |
| DGWC-12 | 09/22/20 | 0.00081 | 0 |
| DGWC-12 | 03/03/21 | 0.00081 | 0 |
| DGWC-12 | 09/09/21 | 0.00073 | 0 |
| DGWC-12 | 01/25/22 | 0.03 | 0 |
| DGWC-12 | 09/15/22 | 0.00088 | 1 |
| DGWC-12 | 02/06/23 | 0.03 | 0 |
| DGWC-4 | 03/28/17 | 0.0031 | 1 |
| DGWC-4 | 05/12/17 | 0.0027 | 1 |
| DGWC-4 | 06/15/17 | 0.0025 | 1 |
| DGWC-4 | 07/11/17 | 0.0022 | 1 |
| DGWC-4 | 10/24/17 | 0.0024 | 1 |
| DGWC-4 | 02/27/18 | 0.0027 | 1 |
| DGWC-4 | 07/10/18 | 0.003 | 1 |
| DGWC-4 | 11/06/18 | 0.0029 | 1 |
| DGWC-4 | 08/27/19 | 0.0033 | 1 |
| DGWC-4 | 10/15/19 | 0.0029 | 1 |
| DGWC-4 | 03/02/20 | 0.0035 | 1 |
| DGWC-4 | 08/12/20 | 0.0031 | 1 |
| DGWC-4 | 09/22/20 | 0.0026 | 1 |
| DGWC-4 | 03/01/21 | 0.0035 | 1 |
| DGWC-4 | 09/10/21 | 0.0035 | 1 |
| DGWC-4 | 01/24/22 | 0.0038 | 1 |
| DGWC-4 | 09/19/22 | 0.0037 | 1 |
| DGWC-4 | 02/03/23 | 0.0036 | 1 |
| DGWC-5 | 08/31/16 | 0.0026 | 1 |
| DGWC-5 | 12/06/16 | 0.0046 | 1 |
| DGWC-5 | 03/28/17 | 0.0028 | 1 |
| DGWC-5 | 07/11/17 | 0.0031 | 1 |
| DGWC-5 | 10/25/17 | 0.0055 | 1 |
| DGWC-5 | 02/27/18 | 0.0066 | 1 |
| DGWC-5 | 07/10/18 | 0.0034 | 1 |
| DGWC-5 | 11/06/18 | 0.0082 | 1 |
| DGWC-5 | 08/27/19 | 0.008 | 1 |
| DGWC-5 | 10/16/19 | 0.006 | 1 |
| DGWC-5 | 03/02/20 | 0.0079 | 1 |
| DGWC-5 | 08/12/20 | 0.0067 | 1 |
| DGWC-5 | 09/22/20 | 0.0065 | 1 |
| DGWC-5 | 03/02/21 | 0.0064 | 1 |
| DGWC-5 | 09/10/21 | 0.0071 | 1 |
| DGWC-5 | 01/24/22 | 0.0068 | 1 |
| DGWC-5 | 09/14/22 | 0.0081 | 1 |
| DGWC-5 | 02/07/23 | 0.0072 | 1 |

**Step 3**

| Well (3) | Date (3) | LithiumW_step3 | d_LithiumW_step3 |
|---|---|---|---|
| DGWC-12 | 09/01/16 | 0.05 | 0 |
| DGWC-12 | 12/07/16 | 0.05 | 0 |
| DGWC-12 | 03/29/17 | 0.05 | 0 |
| DGWC-12 | 07/12/17 | 0.05 | 0 |
| DGWC-12 | 10/25/17 | 0.05 | 0 |
| DGWC-12 | 02/27/18 | 0.00097 | 1 |
| DGWC-12 | 07/11/18 | 0.05 | 0 |
| DGWC-12 | 11/07/18 | 0.05 | 0 |
| DGWC-12 | 08/27/19 | 0.0011 | 1 |
| DGWC-12 | 10/15/19 | 0.00091 | 1 |
| DGWC-12 | 03/02/20 | 0.03 | 0 |
| DGWC-12 | 08/11/20 | 0.0011 | 1 |
| DGWC-12 | 09/22/20 | 0.00081 | 0 |
| DGWC-12 | 03/03/21 | 0.00081 | 0 |
| DGWC-12 | 09/09/21 | 0.00073 | 0 |
| DGWC-12 | 01/25/22 | 0.03 | 0 |
| DGWC-12 | 09/15/22 | 0.00088 | 1 |
| DGWC-12 | 02/06/23 | 0.03 | 0 |

**Notes:**
1) Concentrations in units of mg/L.

Prepared by/Date: JHG 04/26/23
Checked by/Date: IMR 04/26/23

# Appendix D-3d
# Groundwater ProUCL Outputs - Arsenic
# McDonough AP-2, 3/4 Risk Evaluation Report
# Mcdonough AP-2, 3/4
# Plant McDonough, Cobb County, GA

## UCL Statistics for Data Sets with Non-Detects

| | |
|---|---|
| User Selected Options | |
| Date/Time of Computation | ProUCL 5.2 4/20/2023 12:35:00 PM |
| From File | 20230420 McD234_SSL ProUCL Input.xls |
| Full Precision | OFF |
| Confidence Coefficient | 95% |
| Number of Bootstrap Operations | 2000 |

As_Step1

### General Statistics

| | | | |
|---|---|---|---|
| Total Number of Observations | 18 | Number of Distinct Observations | 15 |
| Number of Detects | 17 | Number of Non-Detects | 1 |
| Number of Distinct Detects | 14 | Number of Distinct Non-Detects | 1 |
| Minimum Detect | 0.012 | Minimum Non-Detect | 0.005 |
| Maximum Detect | 0.04 | Maximum Non-Detect | 0.005 |
| Variance Detects | 7.3154E-5 | Percent Non-Detects | 5.556% |
| Mean Detects | 0.023 | SD Detects | 0.00855 |
| Median Detects | 0.021 | CV Detects | 0.372 |
| Skewness Detects | 0.891 | Kurtosis Detects | -0.0271 |
| Mean of Logged Detects | -3.834 | SD of Logged Detects | 0.356 |

### Normal GOF Test on Detects Only

| | | |
|---|---|---|
| Shapiro Wilk Test Statistic | 0.903 | **Shapiro Wilk GOF Test** |
| 1% Shapiro Wilk Critical Value | 0.851 | Detected Data appear Normal at 1% Significance Level |
| Lilliefors Test Statistic | 0.176 | **Lilliefors GOF Test** |
| 1% Lilliefors Critical Value | 0.241 | 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 | 0.022 | KM Standard Error of Mean | 0.0022 |
| 90KM SD | 0.00905 | 95% KM (BCA) UCL | 0.0258 |
| 95% KM (t) UCL | 0.0258 | 95% KM (Percentile Bootstrap) UCL | 0.0257 |
| 95% KM (z) UCL | 0.0256 | 95% KM Bootstrap t UCL | 0.0261 |
| 90% KM Chebyshev UCL | 0.0286 | 95% KM Chebyshev UCL | 0.0316 |
| 97.5% KM Chebyshev UCL | 0.0357 | 99% KM Chebyshev UCL | 0.0439 |

### Gamma GOF Tests on Detected Observations Only

| | | |
|---|---|---|
| A-D Test Statistic | 0.347 | **Anderson-Darling GOF Test** |
| 5% A-D Critical Value | 0.74 | Detected data appear Gamma Distributed at 5% Significance Level |
| K-S Test Statistic | 0.128 | **Kolmogorov-Smirnov GOF** |
| 5% K-S Critical Value | 0.209 | Detected data appear Gamma Distributed at 5% Significance Level |

**Detected data appear Gamma Distributed at 5% Significance Level**



Prepared by/Date: LO 04/20/23
Checked by/Date: JHG 04/20/23

**Gamma Statistics on Detected Data Only**

| | | | |
|---|---|---|---|
| k hat (MLE) | 8.346 | k star (bias corrected MLE) | 6.912 |
| Theta hat (MLE) | 0.00275 | Theta star (bias corrected MLE) | 0.00332 |
| nu hat (MLE) | 283.8 | nu star (bias corrected) | 235 |
| Mean (detects) | 0.023 | | |

**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 | 0.01 | Mean | 0.0223 |
| Maximum | 0.04 | Median | 0.021 |
| SD | 0.00884 | CV | 0.397 |
| k hat (MLE) | 7.102 | k star (bias corrected MLE) | 5.955 |
| Theta hat (MLE) | 0.00313 | Theta star (bias corrected MLE) | 0.00374 |
| nu hat (MLE) | 255.7 | nu star (bias corrected) | 214.4 |
| Adjusted Level of Significance (β) | 0.0357 | | |
| Approximate Chi Square Value (214.38, α) | 181.5 | Adjusted Chi Square Value (214.38, β) | 178.6 |
| 95% Gamma Approximate UCL | 0.0263 | 95% Gamma Adjusted UCL | 0.0267 |

**Estimates of Gamma Parameters using KM Estimates**

| | | | |
|---|---|---|---|
| Mean (KM) | 0.022 | SD (KM) | 0.00905 |
| Variance (KM) | 8.1993E-5 | SE of Mean (KM) | 0.0022 |
| k hat (KM) | 5.894 | k star (KM) | 4.949 |
| nu hat (KM) | 212.2 | nu star (KM) | 178.2 |
| theta hat (KM) | 0.00373 | theta star (KM) | 0.00444 |
| 80% gamma percentile (KM) | 0.0296 | 90% gamma percentile (KM) | 0.0352 |
| 95% gamma percentile (KM) | 0.0403 | 99% gamma percentile (KM) | 0.0512 |

**Gamma Kaplan-Meier (KM) Statistics**

| | | | |
|---|---|---|---|
| Approximate Chi Square Value (178.15, α) | 148.3 | Adjusted Chi Square Value (178.15, β) | 145.7 |
| 95% KM Approximate Gamma UCL | 0.0264 | 95% KM Adjusted Gamma UCL | 0.0269 |

**Lognormal GOF Test on Detected Observations Only**

| | | |
|---|---|---|
| Shapiro Wilk Test Statistic | 0.961 | **Shapiro Wilk GOF Test** |
| 10% Shapiro Wilk Critical Value | 0.91 | Detected Data appear Lognormal at 10% Significance Level |
| Lilliefors Test Statistic | 0.111 | **Lilliefors GOF Test** |
| 10% Lilliefors Critical Value | 0.19 | Detected Data appear Lognormal at 10% Significance Level |

**Detected Data appear Lognormal at 10% Significance Level**



Prepared by/Date: LO 04/20/23
Checked by/Date: JHG 04/20/23

Lognormal ROS Statistics Using Imputed Non-Detects

| | | | |
|---|---|---|---|
| Mean in Original Scale | 0.0222 | Mean in Log Scale | -3.883 |
| SD in Original Scale | 0.00893 | SD in Log Scale | 0.403 |
| 95% t UCL (assumes normality of ROS data) | 0.0259 | 95% Percentile Bootstrap UCL | 0.0256 |
| 95% BCA Bootstrap UCL | 0.026 | 95% Bootstrap t UCL | 0.0264 |
| 95% H-UCL (Log ROS) | 0.027 | | |

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

| | | | |
|---|---|---|---|
| KM Mean (logged) | -3.915 | KM Geo Mean | 0.0199 |
| KM SD (logged) | 0.475 | 95% Critical H Value (KM-Log) | 1.997 |
| KM Standard Error of Mean (logged) | 0.115 | 95% H-UCL (KM -Log) | 0.0281 |
| KM SD (logged) | 0.475 | 95% Critical H Value (KM-Log) | 1.997 |
| KM Standard Error of Mean (logged) | 0.115 | | |

DL/2 Statistics

| DL/2 Normal | | DL/2 Log-Transformed | |
|---|---|---|---|
| Mean in Original Scale | 0.0218 | Mean in Log Scale | -3.954 |
| SD in Original Scale | 0.0096 | SD in Log Scale | 0.615 |
| 95% t UCL (Assumes normality) | 0.0258 | 95% H-Stat UCL | 0.0319 |

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 0.0258

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.

As_Step2

General Statistics

| | | | |
|---|---|---|---|
| Total Number of Observations | 37 | Number of Distinct Observations | 18 |
| Number of Detects | 18 | Number of Non-Detects | 19 |
| Number of Distinct Detects | 15 | Number of Distinct Non-Detects | 3 |
| Minimum Detect | 6.0000E-4 | Minimum Non-Detect | 7.8000E-4 |
| Maximum Detect | 0.04 | Maximum Non-Detect | 0.005 |
| Variance Detects | 9.6683E-5 | Percent Non-Detects | 51.35% |
| Mean Detects | 0.0217 | SD Detects | 0.00983 |
| Median Detects | 0.021 | CV Detects | 0.452 |
| Skewness Detects | 0.197 | Kurtosis Detects | 0.54 |
| Mean of Logged Detects | -4.033 | SD of Logged Detects | 0.913 |



Prepared by/Date: LO 04/20/23
Checked by/Date: JHG 04/20/23

Normal GOF Test on Detects Only

| | | | |
|---|---|---|---|
| Shapiro Wilk Test Statistic | 0.953 | **Shapiro Wilk GOF Test** | |
| 1% Shapiro Wilk Critical Value | 0.858 | Detected Data appear Normal at 1% Significance Level | |
| Lilliefors Test Statistic | 0.152 | **Lilliefors GOF Test** | |
| 1% Lilliefors Critical Value | 0.235 | 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 | 0.0109 | KM Standard Error of Mean | 0.00211 |
| 90KM SD | 0.0125 | 95% KM (BCA) UCL | 0.0145 |
| 95% KM (t) UCL | 0.0145 | 95% KM (Percentile Bootstrap) UCL | 0.0143 |
| 95% KM (z) UCL | 0.0144 | 95% KM Bootstrap t UCL | 0.0147 |
| 90% KM Chebyshev UCL | 0.0172 | 95% KM Chebyshev UCL | 0.0201 |
| 97.5% KM Chebyshev UCL | 0.0241 | 99% KM Chebyshev UCL | 0.0319 |

Gamma GOF Tests on Detected Observations Only

| | | | |
|---|---|---|---|
| A-D Test Statistic | 1.133 | **Anderson-Darling GOF Test** | |
| 5% A-D Critical Value | 0.749 | Detected Data Not Gamma Distributed at 5% Significance Level | |
| K-S Test Statistic | 0.217 | **Kolmogorov-Smirnov GOF** | |
| 5% K-S Critical Value | 0.206 | 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) | 2.598 | k star (bias corrected MLE) | 2.202 |
| Theta hat (MLE) | 0.00837 | Theta star (bias corrected MLE) | 0.00987 |
| nu hat (MLE) | 93.53 | nu star (bias corrected) | 79.28 |
| Mean (detects) | 0.0217 | | |

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 | 6.0000E-4 | Mean | 0.0157 |
| Maximum | 0.04 | Median | 0.01 |
| SD | 0.00899 | CV | 0.572 |
| k hat (MLE) | 3.048 | k star (bias corrected MLE) | 2.818 |
| Theta hat (MLE) | 0.00516 | Theta star (bias corrected MLE) | 0.00558 |
| nu hat (MLE) | 225.5 | nu star (bias corrected) | 208.6 |
| Adjusted Level of Significance (β) | 0.0431 | | |
| Approximate Chi Square Value (208.57, α) | 176.1 | Adjusted Chi Square Value (208.57, β) | 174.9 |
| 95% Gamma Approximate UCL | 0.0186 | 95% Gamma Adjusted UCL | 0.0188 |

**Estimates of Gamma Parameters using KM Estimates**

| | | | |
|---|---|---|---|
| Mean (KM) | 0.0109 | SD (KM) | 0.0125 |
| Variance (KM) | 1.5605E-4 | SE of Mean (KM) | 0.00211 |
| k hat (KM) | 0.759 | k star (KM) | 0.716 |
| nu hat (KM) | 56.17 | nu star (KM) | 52.95 |
| theta hat (KM) | 0.0143 | theta star (KM) | 0.0152 |
| 80% gamma percentile (KM) | 0.0179 | 90% gamma percentile (KM) | 0.0272 |
| 95% gamma percentile (KM) | 0.0368 | 99% gamma percentile (KM) | 0.0596 |

**Gamma Kaplan-Meier (KM) Statistics**

| | | | |
|---|---|---|---|
| Approximate Chi Square Value (52.95, α) | 37.23 | Adjusted Chi Square Value (52.95, β) | 36.66 |
| 95% KM Approximate Gamma UCL | 0.0155 | 95% KM Adjusted Gamma UCL | 0.0157 |

**Lognormal GOF Test on Detected Observations Only**

| | | |
|---|---|---|
| Shapiro Wilk Test Statistic | 0.621 | **Shapiro Wilk GOF Test** |
| 10% Shapiro Wilk Critical Value | 0.914 | Detected Data Not Lognormal at 10% Significance Level |
| Lilliefors Test Statistic | 0.287 | **Lilliefors GOF Test** |
| 10% Lilliefors Critical Value | 0.185 | 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 | 0.0123 | Mean in Log Scale | -4.959 |
| SD in Original Scale | 0.0115 | SD in Log Scale | 1.194 |
| 95% t UCL (assumes normality of ROS data) | 0.0155 | 95% Percentile Bootstrap UCL | 0.0154 |
| 95% BCA Bootstrap UCL | 0.0156 | 95% Bootstrap t UCL | 0.016 |
| 95% H-UCL (Log ROS) | 0.0241 | | |

**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**

| | | | |
|---|---|---|---|
| KM Mean (logged) | -5.772 | KM Geo Mean | 0.00311 |
| KM SD (logged) | 1.802 | 95% Critical H Value (KM-Log) | 3.441 |
| KM Standard Error of Mean (logged) | 0.305 | 95% H-UCL (KM -Log) | 0.0444 |
| KM SD (logged) | 1.802 | 95% Critical H Value (KM-Log) | 3.441 |
| KM Standard Error of Mean (logged) | 0.305 | | |

**DL/2 Statistics**

| **DL/2 Normal** | | **DL/2 Log-Transformed** | |
|---|---|---|---|
| Mean in Original Scale | 0.0116 | Mean in Log Scale | -5.23 |
| SD in Original Scale | 0.0121 | SD in Log Scale | 1.438 |
| 95% t UCL (Assumes normality) | 0.015 | 95% H-Stat UCL | 0.0304 |

**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 0.0145

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.

As_Step3

General Statistics

| | | | |
|---|---|---|---|
| Total Number of Observations | 19 | Number of Distinct Observations | 4 |
| Number of Detects | 1 | Number of Non-Detects | 18 |
| Number of Distinct Detects | 1 | Number of Distinct Non-Detects | 3 |

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!
It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable As_Step3 was not processed!



Prepared by/Date: LO 04/20/23
Checked by/Date: JHG 04/20/23

**Appendix D-3e**
**Groundwater ProUCL Outputs - Cobalt**
**McDonough AP-2, 3/4 Risk Evaluation Report**
**Mcdonough AP-2, 3/4**
**Plant McDonough, Cobb County, GA**

UCL Statistics for Data Sets with Non-Detects

| | |
|---|---|
| User Selected Options | |
| Date/Time of Computation | ProUCL 5.2 4/20/2023 12:35:00 PM |
| From File | 20230420 McD234_SSL ProUCL Input.xls |
| Full Precision | OFF |
| Confidence Coefficient | 95% |
| Number of Bootstrap Operations | 2000 |

CobaltE_step1

General Statistics

| | | | |
|---|---|---|---|
| Total Number of Observations | 62 | Number of Distinct Observations | 47 |
| | | Number of Missing Observations | 0 |
| Minimum | 0.0018 | Mean | 0.118 |
| Maximum | 0.25 | Median | 0.11 |
| SD | 0.069 | Std. Error of Mean | 0.00876 |
| Coefficient of Variation | 0.585 | Skewness | 0.177 |

Normal GOF Test

| | | |
|---|---|---|
| Shapiro Wilk Test Statistic | 0.916 | **Shapiro Wilk GOF Test** |
| 1% Shapiro Wilk P Value | 2.7671E-4 | Data Not Normal at 1% Significance Level |
| Lilliefors Test Statistic | 0.13 | **Lilliefors GOF Test** |
| 1% Lilliefors Critical Value | 0.13 | Data appear Normal at 1% Significance Level |

Data appear Approximate Normal at 1% Significance Level

Assuming Normal Distribution

| | | | |
|---|---|---|---|
| **95% Normal UCL** | | **95% UCLs (Adjusted for Skewness)** | |
| 95% Student's-t UCL | 0.133 | 95% Adjusted-CLT UCL (Chen-1995) | 0.133 |
| | | 95% Modified-t UCL (Johnson-1978) | 0.133 |

Gamma GOF Test

| | | |
|---|---|---|
| A-D Test Statistic | 1.314 | **Anderson-Darling Gamma GOF Test** |
| 5% A-D Critical Value | 0.763 | Data Not Gamma Distributed at 5% Significance Level |
| K-S Test Statistic | 0.126 | **Kolmogorov-Smirnov Gamma GOF Test** |
| 5% K-S Critical Value | 0.114 | Data Not Gamma Distributed at 5% Significance Level |

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

| | | | |
|---|---|---|---|
| k hat (MLE) | 2.034 | k star (bias corrected MLE) | 1.946 |
| Theta hat (MLE) | 0.058 | Theta star (bias corrected MLE) | 0.0606 |
| nu hat (MLE) | 252.2 | nu star (bias corrected) | 241.4 |
| MLE Mean (bias corrected) | 0.118 | MLE Sd (bias corrected) | 0.0845 |
| | | Approximate Chi Square Value (0.05) | 206.4 |
| Adjusted Level of Significance | 0.0461 | Adjusted Chi Square Value | 205.6 |

Assuming Gamma Distribution

| | | | |
|---|---|---|---|
| 95% Approximate Gamma UCL | 0.138 | 95% Adjusted Gamma UCL | 0.138 |

Lognormal GOF Test

| | | |
|---|---|---|
| Shapiro Wilk Test Statistic | 0.828 | **Shapiro Wilk Lognormal GOF Test** |
| 10% Shapiro Wilk P Value | 1.4113E-9 | Data Not Lognormal at 10% Significance Level |
| Lilliefors Test Statistic | 0.13 | **Lilliefors Lognormal GOF Test** |

| | | | |
|---|---|---|---|
| 10% Lilliefors Critical Value | 0.103 | Data Not Lognormal at 10% Significance Level | |

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

| | | | |
|---|---|---|---|
| Minimum of Logged Data | -6.32 | Mean of logged Data | -2.404 |
| Maximum of Logged Data | -1.386 | SD of logged Data | 0.903 |

Assuming Lognormal Distribution

| | | | |
|---|---|---|---|
| 95% H-UCL | 0.175 | 90% Chebyshev (MVUE) UCL | 0.188 |
| 95% Chebyshev (MVUE) UCL | 0.213 | 97.5% Chebyshev (MVUE) UCL | 0.246 |
| 99% Chebyshev (MVUE) UCL | 0.312 | | |

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

| | | | |
|---|---|---|---|
| 95% CLT UCL | 0.132 | 95% BCA Bootstrap UCL | 0.132 |
| 95% Standard Bootstrap UCL | 0.132 | 95% Bootstrap-t UCL | 0.133 |
| 95% Hall's Bootstrap UCL | 0.133 | 95% Percentile Bootstrap UCL | 0.132 |
| 90% Chebyshev(Mean, Sd) UCL | 0.144 | 95% Chebyshev(Mean, Sd) UCL | 0.156 |
| 97.5% Chebyshev(Mean, Sd) UCL | 0.173 | 99% Chebyshev(Mean, Sd) UCL | 0.205 |

Suggested UCL to Use

| | |
|---|---|
| 95% Student's-t UCL | 0.133 |

When a data set follows an approximate distribution passing only one of the GOF tests,
it is suggested to use a UCL based upon a distribution passing both GOF tests in ProUCL

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.

CobaltE_step2

General Statistics

| | | | |
|---|---|---|---|
| Total Number of Observations | 99 | Number of Distinct Observations | 75 |
| Number of Detects | 96 | Number of Non-Detects | 3 |
| Number of Distinct Detects | 74 | Number of Distinct Non-Detects | 1 |
| Minimum Detect | 5.6000E-4 | Minimum Non-Detect | 0.005 |
| Maximum Detect | 0.25 | Maximum Non-Detect | 0.005 |
| Variance Detects | 0.00584 | Percent Non-Detects | 3.03% |
| Mean Detects | 0.0792 | SD Detects | 0.0764 |
| Median Detects | 0.0525 | CV Detects | 0.965 |
| Skewness Detects | 0.682 | Kurtosis Detects | -0.973 |
| Mean of Logged Detects | -3.416 | SD of Logged Detects | 1.681 |

Normal GOF Test on Detects Only

| | | |
|---|---|---|
| Shapiro Wilk Test Statistic | 0.841 | Normal GOF Test on Detected Observations Only |
| 1% Shapiro Wilk P Value | 3.886E-15 | Detected Data Not Normal at 1% Significance Level |
| Lilliefors Test Statistic | 0.162 | Lilliefors GOF Test |
| 1% Lilliefors Critical Value | 0.105 | 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



Prepared by/Date: LO 04/20/23
Checked by/Date: JHG 04/20/23

| | | | |
|---|---|---|---|
| KM Mean | 0.0769 | KM Standard Error of Mean | 0.00768 |
| 90KM SD | 0.076 | 95% KM (BCA) UCL | 0.0902 |
| 95% KM (t) UCL | 0.0896 | 95% KM (Percentile Bootstrap) UCL | 0.0892 |
| 95% KM (z) UCL | 0.0895 | 95% KM Bootstrap t UCL | 0.0897 |
| 90% KM Chebyshev UCL | 0.0999 | 95% KM Chebyshev UCL | 0.11 |
| 97.5% KM Chebyshev UCL | 0.125 | 99% KM Chebyshev UCL | 0.153 |

### Gamma GOF Tests on Detected Observations Only

| | | |
|---|---|---|
| A-D Test Statistic | 1.847 | **Anderson-Darling GOF Test** |
| 5% A-D Critical Value | 0.8 | Detected Data Not Gamma Distributed at 5% Significance Level |
| K-S Test Statistic | 0.0948 | **Kolmogorov-Smirnov GOF** |
| 5% K-S Critical Value | 0.0953 | Detected data appear Gamma Distributed at 5% Significance Level |

Detected data follow Appr. Gamma Distribution at 5% Significance Level

### Gamma Statistics on Detected Data Only

| | | | |
|---|---|---|---|
| k hat (MLE) | 0.688 | k star (bias corrected MLE) | 0.674 |
| Theta hat (MLE) | 0.115 | Theta star (bias corrected MLE) | 0.118 |
| nu hat (MLE) | 132.1 | nu star (bias corrected) | 129.3 |
| Mean (detects) | 0.0792 | | |

### 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 | 5.6000E-4 | Mean | 0.0774 |
| Maximum | 0.25 | Median | 0.051 |
| SD | 0.076 | CV | 0.982 |
| k hat (MLE) | 0.692 | k star (bias corrected MLE) | 0.678 |
| Theta hat (MLE) | 0.112 | Theta star (bias corrected MLE) | 0.114 |
| nu hat (MLE) | 137.1 | nu star (bias corrected) | 134.3 |
| Adjusted Level of Significance (β) | 0.0476 | | |
| Approximate Chi Square Value (134.26, α) | 108.5 | Adjusted Chi Square Value (134.26, β) | 108.2 |
| 95% Gamma Approximate UCL | 0.0957 | 95% Gamma Adjusted UCL | 0.096 |

### Estimates of Gamma Parameters using KM Estimates

| | | | |
|---|---|---|---|
| Mean (KM) | 0.0769 | SD (KM) | 0.076 |
| Variance (KM) | 0.00578 | SE of Mean (KM) | 0.00768 |
| k hat (KM) | 1.022 | k star (KM) | 0.998 |
| nu hat (KM) | 202.4 | nu star (KM) | 197.6 |
| theta hat (KM) | 0.0752 | theta star (KM) | 0.077 |
| 80% gamma percentile (KM) | 0.124 | 90% gamma percentile (KM) | 0.177 |
| 95% gamma percentile (KM) | 0.23 | 99% gamma percentile (KM) | 0.354 |

### Gamma Kaplan-Meier (KM) Statistics

| | | | |
|---|---|---|---|
| Approximate Chi Square Value (197.61, α) | 166.1 | Adjusted Chi Square Value (197.61, β) | 165.7 |
| 95% KM Approximate Gamma UCL | 0.0914 | 95% KM Adjusted Gamma UCL | 0.0917 |

### Lognormal GOF Test on Detected Observations Only

| | | |
|---|---|---|
| Shapiro Wilk Approximate Test Statistic | 0.881 | **Shapiro Wilk GOF Test** |
| 10% Shapiro Wilk P Value | 1.176E-10 | Detected Data Not Lognormal at 10% Significance Level |
| Lilliefors Test Statistic | 0.142 | **Lilliefors GOF Test** |
| 10% Lilliefors Critical Value | 0.083 | Detected Data Not Lognormal at 10% Significance Level |

Prepared by/Date: LO 04/20/23
Checked by/Date: JHG 04/20/23

Detected Data Not Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

| | | | |
|---|---|---|---|
| Mean in Original Scale | 0.0769 | Mean in Log Scale | -3.483 |
| SD in Original Scale | 0.0764 | SD in Log Scale | 1.699 |
| 95% t UCL (assumes normality of ROS data) | 0.0897 | 95% Percentile Bootstrap UCL | 0.0892 |
| 95% BCA Bootstrap UCL | 0.0896 | 95% Bootstrap t UCL | 0.0903 |
| 95% H-UCL (Log ROS) | 0.219 | | |

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

| | | | |
|---|---|---|---|
| KM Mean (logged) | -3.5 | KM Geo Mean | 0.0302 |
| KM SD (logged) | 1.716 | 95% Critical H Value (KM-Log) | 3.059 |
| KM Standard Error of Mean (logged) | 0.174 | 95% H-UCL (KM -Log) | 0.224 |
| KM SD (logged) | 1.716 | 95% Critical H Value (KM-Log) | 3.059 |
| KM Standard Error of Mean (logged) | 0.174 | | |

DL/2 Statistics

| DL/2 Normal | | DL/2 Log-Transformed | |
|---|---|---|---|
| Mean in Original Scale | 0.0769 | Mean in Log Scale | -3.494 |
| SD in Original Scale | 0.0764 | SD in Log Scale | 1.714 |
| 95% t UCL (Assumes normality) | 0.0896 | 95% H-Stat UCL | 0.224 |

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Gamma Distributed at 5% Significance Level

Suggested UCL to Use

| | |
|---|---|
| 95% KM Approximate Gamma UCL | 0.0914 |

When a data set follows an approximate distribution passing only one of the GOF tests,
it is suggested to use a UCL based upon a distribution passing both GOF tests in ProUCL

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.

CobaltE_step3

General Statistics

| | | | |
|---|---|---|---|
| Total Number of Observations | 18 | Number of Distinct Observations | 14 |
| | | Number of Missing Observations | 0 |
| Minimum | 0.002 | Mean | 0.0101 |
| Maximum | 0.034 | Median | 0.00575 |
| SD | 0.0103 | Std. Error of Mean | 0.00242 |
| Coefficient of Variation | 1.019 | Skewness | 1.259 |

Normal GOF Test

| | | |
|---|---|---|
| Shapiro Wilk Test Statistic | 0.792 | **Shapiro Wilk GOF Test** |
| 1% Shapiro Wilk Critical Value | 0.858 | Data Not Normal at 1% Significance Level |
| Lilliefors Test Statistic | 0.266 | **Lilliefors GOF Test** |
| 1% Lilliefors Critical Value | 0.235 | Data Not Normal at 1% Significance Level |

Data Not Normal at 1% Significance Level



Prepared by/Date: LO 04/20/23
Checked by/Date: JHG 04/20/23

## Appendix D-3e
## Groundwater ProUCL Outputs - Cobalt
## McDonough AP-2, 3/4 Risk Evaluation Report
## Mcdonough AP-2, 3/4
## Plant McDonough, Cobb County, GA

**Assuming Normal Distribution**

| 95% Normal UCL | | 95% UCLs (Adjusted for Skewness) | |
|---|---|---|---|
| 95% Student's-t UCL | 0.0143 | 95% Adjusted-CLT UCL (Chen-1995) | 0.0148 |
| | | 95% Modified-t UCL (Johnson-1978) | 0.0144 |

**Gamma GOF Test**

| | | |
|---|---|---|
| A-D Test Statistic | 0.946 | **Anderson-Darling Gamma GOF Test** |
| 5% A-D Critical Value | 0.763 | Data Not Gamma Distributed at 5% Significance Level |
| K-S Test Statistic | 0.195 | **Kolmogorov-Smirnov Gamma GOF Test** |
| 5% K-S Critical Value | 0.209 | Detected data appear Gamma Distributed at 5% Significance Level |

Detected data follow Appr. Gamma Distribution at 5% Significance Level

**Gamma Statistics**

| | | | |
|---|---|---|---|
| k hat (MLE) | 1.151 | k star (bias corrected MLE) | 0.996 |
| Theta hat (MLE) | 0.00876 | Theta star (bias corrected MLE) | 0.0101 |
| nu hat (MLE) | 41.43 | nu star (bias corrected) | 35.86 |
| MLE Mean (bias corrected) | 0.0101 | MLE Sd (bias corrected) | 0.0101 |
| | | Approximate Chi Square Value (0.05) | 23.15 |
| Adjusted Level of Significance | 0.0357 | Adjusted Chi Square Value | 22.17 |

**Assuming Gamma Distribution**

| | | | |
|---|---|---|---|
| 95% Approximate Gamma UCL | 0.0156 | 95% Adjusted Gamma UCL | 0.0163 |

**Lognormal GOF Test**

| | | |
|---|---|---|
| Shapiro Wilk Test Statistic | 0.877 | **Shapiro Wilk Lognormal GOF Test** |
| 10% Shapiro Wilk Critical Value | 0.914 | Data Not Lognormal at 10% Significance Level |
| Lilliefors Test Statistic | 0.188 | **Lilliefors Lognormal GOF Test** |
| 10% Lilliefors Critical Value | 0.185 | Data Not Lognormal at 10% Significance Level |

Data Not Lognormal at 10% Significance Level

**Lognormal Statistics**

| | | | |
|---|---|---|---|
| Minimum of Logged Data | -6.215 | Mean of logged Data | -5.091 |
| Maximum of Logged Data | -3.381 | SD of logged Data | 1.027 |

**Assuming Lognormal Distribution**

| | | | |
|---|---|---|---|
| 95% H-UCL | 0.0203 | 90% Chebyshev (MVUE) UCL | 0.0181 |
| 95% Chebyshev (MVUE) UCL | 0.0217 | 97.5% Chebyshev (MVUE) UCL | 0.0268 |
| 99% Chebyshev (MVUE) UCL | 0.0368 | | |

**Nonparametric Distribution Free UCL Statistics**

Data appear to follow a Discernible Distribution

**Nonparametric Distribution Free UCLs**

| | | | |
|---|---|---|---|
| 95% CLT UCL | 0.0141 | 95% BCA Bootstrap UCL | 0.0145 |
| 95% Standard Bootstrap UCL | 0.0139 | 95% Bootstrap-t UCL | 0.0156 |
| 95% Hall's Bootstrap UCL | 0.0145 | 95% Percentile Bootstrap UCL | 0.0141 |
| 90% Chebyshev(Mean, Sd) UCL | 0.0173 | 95% Chebyshev(Mean, Sd) UCL | 0.0206 |
| 97.5% Chebyshev(Mean, Sd) UCL | 0.0252 | 99% Chebyshev(Mean, Sd) UCL | 0.0341 |

**Suggested UCL to Use**

| | |
|---|---|
| 95% Adjusted Gamma UCL | 0.0163 |

CobaltN_step1

Prepared by/Date: LO 04/20/23
Checked by/Date: JHG 04/20/23

# Appendix D-3e
# Groundwater ProUCL Outputs - Cobalt
# McDonough AP-2, 3/4 Risk Evaluation Report
# Mcdonough AP-2, 3/4
# Plant McDonough, Cobb County, GA

### General Statistics

| | | | |
|---|---|---|---|
| Total Number of Observations | 12 | Number of Distinct Observations | 11 |
| | | Number of Missing Observations | 0 |
| Minimum | 0.057 | Mean | 0.0663 |
| Maximum | 0.08 | Median | 0.065 |
| SD | 0.00612 | Std. Error of Mean | 0.00177 |
| Coefficient of Variation | 0.0923 | Skewness | 0.877 |

### Normal GOF Test

| | | |
|---|---|---|
| Shapiro Wilk Test Statistic | 0.952 | **Shapiro Wilk GOF Test** |
| 1% Shapiro Wilk Critical Value | 0.805 | Data appear Normal at 1% Significance Level |
| Lilliefors Test Statistic | 0.148 | **Lilliefors GOF Test** |
| 1% Lilliefors Critical Value | 0.281 | 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 | 0.0695 | 95% Adjusted-CLT UCL (Chen-1995) | 0.0697 |
| | | 95% Modified-t UCL (Johnson-1978) | 0.0696 |

### Gamma GOF Test

| | | |
|---|---|---|
| A-D Test Statistic | 0.248 | **Anderson-Darling Gamma GOF Test** |
| 5% A-D Critical Value | 0.731 | Detected data appear Gamma Distributed at 5% Significance Level |
| K-S Test Statistic | 0.148 | **Kolmogorov-Smirnov Gamma GOF Test** |
| 5% K-S Critical Value | 0.245 | Detected data appear Gamma Distributed at 5% Significance Level |

Detected data appear Gamma Distributed at 5% Significance Level

### Gamma Statistics

| | | | |
|---|---|---|---|
| k hat (MLE) | 132.5 | k star (bias corrected MLE) | 99.45 |
| Theta hat (MLE) | 5.0051E-4 | Theta star (bias corrected MLE) | 6.6697E-4 |
| nu hat (MLE) | 3181 | nu star (bias corrected) | 2387 |
| MLE Mean (bias corrected) | 0.0663 | MLE Sd (bias corrected) | 0.00665 |
| | | Approximate Chi Square Value (0.05) | 2274 |
| Adjusted Level of Significance | 0.029 | Adjusted Chi Square Value | 2258 |

### Assuming Gamma Distribution

| | | | |
|---|---|---|---|
| 95% Approximate Gamma UCL | 0.0696 | 95% Adjusted Gamma UCL | 0.0701 |

### Lognormal GOF Test

| | | |
|---|---|---|
| Shapiro Wilk Test Statistic | 0.971 | **Shapiro Wilk Lognormal GOF Test** |
| 10% Shapiro Wilk Critical Value | 0.883 | Data appear Lognormal at 10% Significance Level |
| Lilliefors Test Statistic | 0.139 | **Lilliefors Lognormal GOF Test** |
| 10% Lilliefors Critical Value | 0.223 | Data appear Lognormal at 10% Significance Level |

Data appear Lognormal at 10% Significance Level

### Lognormal Statistics

| | | | |
|---|---|---|---|
| Minimum of Logged Data | -2.865 | Mean of logged Data | -2.717 |
| Maximum of Logged Data | -2.526 | SD of logged Data | 0.0901 |

### Assuming Lognormal Distribution

| | | | |
|---|---|---|---|
| 95% H-UCL | N/A | 90% Chebyshev (MVUE) UCL | 0.0715 |
| 95% Chebyshev (MVUE) UCL | 0.0739 | 97.5% Chebyshev (MVUE) UCL | 0.0771 |
| 99% Chebyshev (MVUE) UCL | 0.0835 | | |

Prepared by/Date: LO 04/20/23
Checked by/Date: JHG 04/20/23

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

| | | | |
|---|---|---|---|
| 95% CLT UCL | 0.0692 | 95% BCA Bootstrap UCL | 0.0698 |
| 95% Standard Bootstrap UCL | 0.0691 | 95% Bootstrap-t UCL | 0.0704 |
| 95% Hall's Bootstrap UCL | 0.0712 | 95% Percentile Bootstrap UCL | 0.0693 |
| 90% Chebyshev(Mean, Sd) UCL | 0.0716 | 95% Chebyshev(Mean, Sd) UCL | 0.074 |
| 97.5% Chebyshev(Mean, Sd) UCL | 0.0774 | 99% Chebyshev(Mean, Sd) UCL | 0.0839 |

Suggested UCL to Use

| | |
|---|---|
| 95% Student's-t UCL | 0.0695 |

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.

CobaltN_step2

General Statistics

| | | | |
|---|---|---|---|
| Total Number of Observations | 32 | Number of Distinct Observations | 26 |
| Number of Detects | 31 | Number of Non-Detects | 1 |
| Number of Distinct Detects | 26 | Number of Distinct Non-Detects | 1 |
| Minimum Detect | 0.002 | Minimum Non-Detect | 0.01 |
| Maximum Detect | 0.08 | Maximum Non-Detect | 0.01 |
| Variance Detects | 8.5878E-4 | Percent Non-Detects | 3.125% |
| Mean Detects | 0.0317 | SD Detects | 0.0293 |
| Median Detects | 0.018 | CV Detects | 0.925 |
| Skewness Detects | 0.351 | Kurtosis Detects | -1.732 |
| Mean of Logged Detects | -4.184 | SD of Logged Detects | 1.417 |

Normal GOF Test on Detects Only

| | | |
|---|---|---|
| Shapiro Wilk Test Statistic | 0.802 | Shapiro Wilk GOF Test |
| 1% Shapiro Wilk Critical Value | 0.902 | Detected Data Not Normal at 1% Significance Level |
| Lilliefors Test Statistic | 0.197 | Lilliefors GOF Test |
| 1% Lilliefors Critical Value | 0.182 | 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 | 0.0308 | KM Standard Error of Mean | 0.00518 |
| 90KM SD | 0.0288 | 95% KM (BCA) UCL | 0.04 |

Prepared by/Date: LO 04/20/23
Checked by/Date: JHG 04/20/23

**Appendix D-3e**
**Groundwater ProUCL Outputs - Cobalt**
**McDonough AP-2, 3/4 Risk Evaluation Report**
**Mcdonough AP-2, 3/4**
**Plant McDonough, Cobb County, GA**

| | | | |
|---|---|---|---|
| 95% KM (t) UCL | 0.0396 | 95% KM (Percentile Bootstrap) UCL | 0.0397 |
| 95% KM (z) UCL | 0.0393 | 95% KM Bootstrap t UCL | 0.04 |
| 90% KM Chebyshev UCL | 0.0463 | 95% KM Chebyshev UCL | 0.0533 |
| 97.5% KM Chebyshev UCL | 0.0631 | 99% KM Chebyshev UCL | 0.0823 |

Gamma GOF Tests on Detected Observations Only

| | | |
|---|---|---|
| A-D Test Statistic | 1.771 | **Anderson-Darling GOF Test** |
| 5% A-D Critical Value | 0.785 | Detected Data Not Gamma Distributed at 5% Significance Level |
| K-S Test Statistic | 0.215 | **Kolmogorov-Smirnov GOF** |
| 5% K-S Critical Value | 0.164 | 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) | 0.81 | k star (bias corrected MLE) | 0.753 |
| Theta hat (MLE) | 0.0391 | Theta star (bias corrected MLE) | 0.042 |
| nu hat (MLE) | 50.24 | nu star (bias corrected) | 46.71 |
| Mean (detects) | 0.0317 | | |

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 | 0.002 | Mean | 0.031 |
| Maximum | 0.08 | Median | 0.017 |
| SD | 0.0291 | CV | 0.938 |
| k hat (MLE) | 0.819 | k star (bias corrected MLE) | 0.763 |
| Theta hat (MLE) | 0.0379 | Theta star (bias corrected MLE) | 0.0406 |
| nu hat (MLE) | 52.4 | nu star (bias corrected) | 48.82 |
| Adjusted Level of Significance (β) | 0.0416 | | |
| Approximate Chi Square Value (48.82, α) | 33.78 | Adjusted Chi Square Value (48.82, β) | 33.11 |
| 95% Gamma Approximate UCL | 0.0448 | 95% Gamma Adjusted UCL | 0.0457 |

Estimates of Gamma Parameters using KM Estimates

| | | | |
|---|---|---|---|
| Mean (KM) | 0.0308 | SD (KM) | 0.0288 |
| Variance (KM) | 8.2939E-4 | SE of Mean (KM) | 0.00518 |
| k hat (KM) | 1.143 | k star (KM) | 1.056 |
| nu hat (KM) | 73.13 | nu star (KM) | 67.6 |
| theta hat (KM) | 0.0269 | theta star (KM) | 0.0291 |
| 80% gamma percentile (KM) | 0.0493 | 90% gamma percentile (KM) | 0.0699 |
| 95% gamma percentile (KM) | 0.0905 | 99% gamma percentile (KM) | 0.138 |

Gamma Kaplan-Meier (KM) Statistics

| | | | |
|---|---|---|---|
| Approximate Chi Square Value (67.60, α) | 49.68 | Adjusted Chi Square Value (67.60, β) | 48.86 |
| 95% KM Approximate Gamma UCL | 0.0419 | 95% KM Adjusted Gamma UCL | 0.0426 |

Lognormal GOF Test on Detected Observations Only

| | | |
|---|---|---|
| Shapiro Wilk Test Statistic | 0.838 | **Shapiro Wilk GOF Test** |
| 10% Shapiro Wilk Critical Value | 0.94 | Detected Data Not Lognormal at 10% Significance Level |
| Lilliefors Test Statistic | 0.211 | **Lilliefors GOF Test** |
| 10% Lilliefors Critical Value | 0.143 | Detected Data Not Lognormal at 10% Significance Level |

Detected Data Not Lognormal at 10% Significance Level

Prepared by/Date: LO 04/20/23
Checked by/Date: JHG 04/20/23

Lognormal ROS Statistics Using Imputed Non-Detects

| | | | |
|---|---|---|---|
| Mean in Original Scale | 0.0308 | Mean in Log Scale | -4.222 |
| SD in Original Scale | 0.0292 | SD in Log Scale | 1.411 |
| 95% t UCL (assumes normality of ROS data) | 0.0396 | 95% Percentile Bootstrap UCL | 0.039 |
| 95% BCA Bootstrap UCL | 0.0393 | 95% Bootstrap t UCL | 0.0405 |
| 95% H-UCL (Log ROS) | 0.0842 | | |

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

| | | | |
|---|---|---|---|
| KM Mean (logged) | -4.234 | KM Geo Mean | 0.0145 |
| KM SD (logged) | 1.402 | 95% Critical H Value (KM-Log) | 2.953 |
| KM Standard Error of Mean (logged) | 0.252 | 95% H-UCL (KM -Log) | 0.0815 |
| KM SD (logged) | 1.402 | 95% Critical H Value (KM-Log) | 2.953 |
| KM Standard Error of Mean (logged) | 0.252 | | |

DL/2 Statistics

| DL/2 Normal | | DL/2 Log-Transformed | |
|---|---|---|---|
| Mean in Original Scale | 0.0308 | Mean in Log Scale | -4.218 |
| SD in Original Scale | 0.0292 | SD in Log Scale | 1.408 |
| 95% t UCL (Assumes normality) | 0.0396 | 95% H-Stat UCL | 0.0839 |

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 | 0.0396 |

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.

CobaltN_step3

General Statistics

| | | | |
|---|---|---|---|
| Total Number of Observations | 18 | Number of Distinct Observations | 14 |
| | | Number of Missing Observations | 0 |
| Minimum | 0.002 | Mean | 0.0101 |
| Maximum | 0.034 | Median | 0.00575 |
| SD | 0.0103 | Std. Error of Mean | 0.00242 |
| Coefficient of Variation | 1.019 | Skewness | 1.259 |

Normal GOF Test

| | | |
|---|---|---|
| Shapiro Wilk Test Statistic | 0.792 | Shapiro Wilk GOF Test |
| 1% Shapiro Wilk Critical Value | 0.858 | Data Not Normal at 1% Significance Level |
| Lilliefors Test Statistic | 0.266 | Lilliefors GOF Test |
| 1% Lilliefors Critical Value | 0.235 | Data Not Normal at 1% Significance Level |

Data Not Normal at 1% Significance Level

Assuming Normal Distribution

| 95% Normal UCL | | 95% UCLs (Adjusted for Skewness) | |
|---|---|---|---|
| 95% Student's-t UCL | 0.0143 | 95% Adjusted-CLT UCL (Chen-1995) | 0.0148 |
| | | 95% Modified-t UCL (Johnson-1978) | 0.0144 |



Prepared by/Date: LO 04/20/23
Checked by/Date: JHG 04/20/23

Gamma GOF Test

| | | |
|---|---|---|
| A-D Test Statistic | 0.946 | **Anderson-Darling Gamma GOF Test** |
| 5% A-D Critical Value | 0.763 | Data Not Gamma Distributed at 5% Significance Level |
| K-S Test Statistic | 0.195 | **Kolmogorov-Smirnov Gamma GOF Test** |
| 5% K-S Critical Value | 0.209 | Detected data appear Gamma Distributed at 5% Significance Level |

Detected data follow Appr. Gamma Distribution at 5% Significance Level

Gamma Statistics

| | | | |
|---|---|---|---|
| k hat (MLE) | 1.151 | k star (bias corrected MLE) | 0.996 |
| Theta hat (MLE) | 0.00876 | Theta star (bias corrected MLE) | 0.0101 |
| nu hat (MLE) | 41.43 | nu star (bias corrected) | 35.86 |
| MLE Mean (bias corrected) | 0.0101 | MLE Sd (bias corrected) | 0.0101 |
| | | Approximate Chi Square Value (0.05) | 23.15 |
| Adjusted Level of Significance | 0.0357 | Adjusted Chi Square Value | 22.17 |

Assuming Gamma Distribution

| | | | |
|---|---|---|---|
| 95% Approximate Gamma UCL | 0.0156 | 95% Adjusted Gamma UCL | 0.0163 |

Lognormal GOF Test

| | | |
|---|---|---|
| Shapiro Wilk Test Statistic | 0.877 | **Shapiro Wilk Lognormal GOF Test** |
| 10% Shapiro Wilk Critical Value | 0.914 | Data Not Lognormal at 10% Significance Level |
| Lilliefors Test Statistic | 0.188 | **Lilliefors Lognormal GOF Test** |
| 10% Lilliefors Critical Value | 0.185 | Data Not Lognormal at 10% Significance Level |

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

| | | | |
|---|---|---|---|
| Minimum of Logged Data | -6.215 | Mean of logged Data | -5.091 |
| Maximum of Logged Data | -3.381 | SD of logged Data | 1.027 |

Assuming Lognormal Distribution

| | | | |
|---|---|---|---|
| 95% H-UCL | 0.0203 | 90% Chebyshev (MVUE) UCL | 0.0181 |
| 95% Chebyshev (MVUE) UCL | 0.0217 | 97.5% Chebyshev (MVUE) UCL | 0.0268 |
| 99% Chebyshev (MVUE) UCL | 0.0368 | | |

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

| | | | |
|---|---|---|---|
| 95% CLT UCL | 0.0141 | 95% BCA Bootstrap UCL | 0.0145 |
| 95% Standard Bootstrap UCL | 0.0139 | 95% Bootstrap-t UCL | 0.0156 |
| 95% Hall's Bootstrap UCL | 0.0145 | 95% Percentile Bootstrap UCL | 0.0141 |
| 90% Chebyshev(Mean, Sd) UCL | 0.0173 | 95% Chebyshev(Mean, Sd) UCL | 0.0206 |
| 97.5% Chebyshev(Mean, Sd) UCL | 0.0252 | 99% Chebyshev(Mean, Sd) UCL | 0.0341 |

Suggested UCL to Use

| | |
|---|---|
| 95% Adjusted Gamma UCL | 0.0163 |

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.

When a data set follows an approximate distribution passing only one of the GOF tests,
it is suggested to use a UCL based upon a distribution passing both GOF tests in ProUCL

**Appendix D-3e**
**Groundwater ProUCL Outputs - Cobalt**
**McDonough AP-2, 3/4 Risk Evaluation Report**
**Mcdonough AP-2, 3/4**
**Plant McDonough, Cobb County, GA**

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.

CobaltS_a_step1

**General Statistics**

| | | | |
|---|---|---|---|
| Total Number of Observations | 84 | Number of Distinct Observations | 60 |
| | | Number of Missing Observations | 0 |
| Minimum | 0.046 | Mean | 0.329 |
| Maximum | 1 | Median | 0.325 |
| SD | 0.225 | Std. Error of Mean | 0.0245 |
| Coefficient of Variation | 0.683 | Skewness | 0.69 |

**Normal GOF Test**

| | | |
|---|---|---|
| Shapiro Wilk Test Statistic | 0.921 | **Shapiro Wilk GOF Test** |
| 1% Shapiro Wilk P Value | 2.5790E-5 | Data Not Normal at 1% Significance Level |
| Lilliefors Test Statistic | 0.104 | **Lilliefors GOF Test** |
| 1% Lilliefors Critical Value | 0.112 | Data appear Normal at 1% Significance Level |

**Data appear Approximate Normal at 1% Significance Level**

**Assuming Normal Distribution**

| | | | |
|---|---|---|---|
| **95% Normal UCL** | | **95% UCLs (Adjusted for Skewness)** | |
| 95% Student's-t UCL | 0.369 | 95% Adjusted-CLT UCL (Chen-1995) | 0.371 |
| | | 95% Modified-t UCL (Johnson-1978) | 0.37 |

**Gamma GOF Test**

| | | |
|---|---|---|
| A-D Test Statistic | 2.282 | **Anderson-Darling Gamma GOF Test** |
| 5% A-D Critical Value | 0.768 | Data Not Gamma Distributed at 5% Significance Level |
| K-S Test Statistic | 0.147 | **Kolmogorov-Smirnov Gamma GOF Test** |
| 5% K-S Critical Value | 0.0991 | Data Not Gamma Distributed at 5% Significance Level |

**Data Not Gamma Distributed at 5% Significance Level**

**Gamma Statistics**

| | | | |
|---|---|---|---|
| k hat (MLE) | 1.687 | k star (bias corrected MLE) | 1.635 |
| Theta hat (MLE) | 0.195 | Theta star (bias corrected MLE) | 0.201 |
| nu hat (MLE) | 283.4 | nu star (bias corrected) | 274.6 |
| MLE Mean (bias corrected) | 0.329 | MLE Sd (bias corrected) | 0.257 |
| | | Approximate Chi Square Value (0.05) | 237.2 |
| Adjusted Level of Significance | 0.0471 | Adjusted Chi Square Value | 236.6 |

**Assuming Gamma Distribution**

| | | | |
|---|---|---|---|
| 95% Approximate Gamma UCL | 0.38 | 95% Adjusted Gamma UCL | 0.381 |

**Lognormal GOF Test**

| | | |
|---|---|---|
| Shapiro Wilk Test Statistic | 0.858 | **Shapiro Wilk Lognormal GOF Test** |
| 10% Shapiro Wilk P Value | 3.622E-11 | Data Not Lognormal at 10% Significance Level |
| Lilliefors Test Statistic | 0.157 | **Lilliefors Lognormal GOF Test** |
| 10% Lilliefors Critical Value | 0.0886 | Data Not Lognormal at 10% Significance Level |

**Data Not Lognormal at 10% Significance Level**

**Lognormal Statistics**

Prepared by/Date: LO 04/20/23
Checked by/Date: JHG 04/20/23

| | | | |
|---|---|---|---|
| Minimum of Logged Data | -3.079 | Mean of logged Data | -1.438 |
| Maximum of Logged Data | 0 | SD of logged Data | 0.916 |

**Assuming Lognormal Distribution**

| | | | |
|---|---|---|---|
| 95% H-UCL | 0.449 | 90% Chebyshev (MVUE) UCL | 0.484 |
| 95% Chebyshev (MVUE) UCL | 0.541 | 97.5% Chebyshev (MVUE) UCL | 0.62 |
| 99% Chebyshev (MVUE) UCL | 0.775 | | |

**Nonparametric Distribution Free UCL Statistics**

Data appear to follow a Discernible Distribution

**Nonparametric Distribution Free UCLs**

| | | | |
|---|---|---|---|
| 95% CLT UCL | 0.369 | 95% BCA Bootstrap UCL | 0.37 |
| 95% Standard Bootstrap UCL | 0.37 | 95% Bootstrap-t UCL | 0.373 |
| 95% Hall's Bootstrap UCL | 0.373 | 95% Percentile Bootstrap UCL | 0.37 |
| 90% Chebyshev(Mean, Sd) UCL | 0.402 | 95% Chebyshev(Mean, Sd) UCL | 0.435 |
| 97.5% Chebyshev(Mean, Sd) UCL | 0.482 | 99% Chebyshev(Mean, Sd) UCL | 0.572 |

**Suggested UCL to Use**

| | |
|---|---|
| 95% Student's-t UCL | 0.369 |

When a data set follows an approximate distribution passing only one of the GOF tests,
it is suggested to use a UCL based upon a distribution passing both GOF tests in ProUCL

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.

CobaltS_a_step2

**General Statistics**

| | | | |
|---|---|---|---|
| Total Number of Observations | 114 | Number of Distinct Observations | 80 |
| Number of Detects | 110 | Number of Non-Detects | 4 |
| Number of Distinct Detects | 78 | Number of Distinct Non-Detects | 2 |
| Minimum Detect | 4.0000E-4 | Minimum Non-Detect | 3.9000E-4 |
| Maximum Detect | 1 | Maximum Non-Detect | 0.005 |
| Variance Detects | 0.0534 | Percent Non-Detects | 3.509% |
| Mean Detects | 0.272 | SD Detects | 0.231 |
| Median Detects | 0.24 | CV Detects | 0.849 |
| Skewness Detects | 0.796 | Kurtosis Detects | 0.25 |
| Mean of Logged Detects | -1.964 | SD of Logged Detects | 1.522 |

**Normal GOF Test on Detects Only**

| | | |
|---|---|---|
| Shapiro Wilk Test Statistic | 0.896 | **Normal GOF Test on Detected Observations Only** |
| 1% Shapiro Wilk P Value | 1.527E-10 | Detected Data Not Normal at 1% Significance Level |
| Lilliefors Test Statistic | 0.162 | **Lilliefors GOF Test** |
| 1% Lilliefors Critical Value | 0.098 | 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 | 0.263 | KM Standard Error of Mean | 0.0218 |
| 90KM SD | 0.231 | 95% KM (BCA) UCL | 0.3 |
| 95% KM (t) UCL | 0.299 | 95% KM (Percentile Bootstrap) UCL | 0.299 |


Prepared by/Date: LO 04/20/23
Checked by/Date: JHG 04/20/23

| | | | |
|---|---|---|---|
| 95% KM (z) UCL | 0.299 | 95% KM Bootstrap t UCL | 0.3 |
| 90% KM Chebyshev UCL | 0.328 | 95% KM Chebyshev UCL | 0.358 |
| 97.5% KM Chebyshev UCL | 0.399 | 99% KM Chebyshev UCL | 0.479 |

**Gamma GOF Tests on Detected Observations Only**

| | | |
|---|---|---|
| A-D Test Statistic | 2.498 | **Anderson-Darling GOF Test** |
| 5% A-D Critical Value | 0.789 | Detected Data Not Gamma Distributed at 5% Significance Level |
| K-S Test Statistic | 0.125 | **Kolmogorov-Smirnov GOF** |
| 5% K-S Critical Value | 0.0898 | 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) | 0.884 | k star (bias corrected MLE) | 0.866 |
| Theta hat (MLE) | 0.308 | Theta star (bias corrected MLE) | 0.314 |
| nu hat (MLE) | 194.5 | nu star (bias corrected) | 190.5 |
| Mean (detects) | 0.272 | | |

**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 | 0.264 |
| Maximum | 1 | Median | 0.23 |
| SD | 0.231 | CV | 0.873 |
| k hat (MLE) | 0.874 | k star (bias corrected MLE) | 0.857 |
| Theta hat (MLE) | 0.302 | Theta star (bias corrected MLE) | 0.309 |
| nu hat (MLE) | 199.3 | nu star (bias corrected) | 195.4 |
| Adjusted Level of Significance (β) | 0.0479 | | |
| Approximate Chi Square Value (195.41, α) | 164.1 | Adjusted Chi Square Value (195.41, β) | 163.7 |
| 95% Gamma Approximate UCL | 0.315 | 95% Gamma Adjusted UCL | 0.316 |

**Estimates of Gamma Parameters using KM Estimates**

| | | | |
|---|---|---|---|
| Mean (KM) | 0.263 | SD (KM) | 0.231 |
| Variance (KM) | 0.0536 | SE of Mean (KM) | 0.0218 |
| k hat (KM) | 1.289 | k star (KM) | 1.261 |
| nu hat (KM) | 293.9 | nu star (KM) | 287.5 |
| theta hat (KM) | 0.204 | theta star (KM) | 0.208 |
| 80% gamma percentile (KM) | 0.414 | 90% gamma percentile (KM) | 0.571 |
| 95% gamma percentile (KM) | 0.726 | 99% gamma percentile (KM) | 1.079 |

**Gamma Kaplan-Meier (KM) Statistics**

| | | | |
|---|---|---|---|
| Approximate Chi Square Value (287.52, α) | 249.2 | Adjusted Chi Square Value (287.52, β) | 248.8 |
| 95% KM Approximate Gamma UCL | 0.303 | 95% KM Adjusted Gamma UCL | 0.304 |

**Lognormal GOF Test on Detected Observations Only**

| | | |
|---|---|---|
| Shapiro Wilk Approximate Test Statistic | 0.859 | **Shapiro Wilk GOF Test** |
| 10% Shapiro Wilk P Value | 7.772E-16 | Detected Data Not Lognormal at 10% Significance Level |
| Lilliefors Test Statistic | 0.17 | **Lilliefors GOF Test** |
| 10% Lilliefors Critical Value | 0.0776 | Detected Data Not Lognormal at 10% Significance Level |

Detected Data Not Lognormal at 10% Significance Level

**Lognormal ROS Statistics Using Imputed Non-Detects**



Prepared by/Date: LO 04/20/23
Checked by/Date: JHG 04/20/23

| | | | |
|---|---|---|---|
| Mean in Original Scale | 0.263 | Mean in Log Scale | -2.074 |
| SD in Original Scale | 0.232 | SD in Log Scale | 1.607 |
| 95% t UCL (assumes normality of ROS data) | 0.299 | 95% Percentile Bootstrap UCL | 0.3 |
| 95% BCA Bootstrap UCL | 0.302 | 95% Bootstrap t UCL | 0.303 |
| 95% H-UCL (Log ROS) | 0.704 | | |

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

| | | | |
|---|---|---|---|
| KM Mean (logged) | -2.148 | KM Geo Mean | 0.117 |
| KM SD (logged) | 1.779 | 95% Critical H Value (KM-Log) | 3.057 |
| KM Standard Error of Mean (logged) | 0.168 | 95% H-UCL (KM -Log) | 0.948 |
| KM SD (logged) | 1.779 | 95% Critical H Value (KM-Log) | 3.057 |
| KM Standard Error of Mean (logged) | 0.168 | | |

DL/2 Statistics

| DL/2 Normal | | DL/2 Log-Transformed | |
|---|---|---|---|
| Mean in Original Scale | 0.263 | Mean in Log Scale | -2.127 |
| SD in Original Scale | 0.232 | SD in Log Scale | 1.738 |
| 95% t UCL (Assumes normality) | 0.299 | 95% H-Stat UCL | 0.882 |

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 0.299

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.

CobaltS_a_step3

General Statistics

| | | | |
|---|---|---|---|
| Total Number of Observations | 18 | Number of Distinct Observations | 15 |
| Number of Detects | 14 | Number of Non-Detects | 4 |
| Number of Distinct Detects | 13 | Number of Distinct Non-Detects | 2 |
| Minimum Detect | 4.0000E-4 | Minimum Non-Detect | 3.9000E-4 |
| Maximum Detect | 0.47 | Maximum Non-Detect | 0.005 |
| Variance Detects | 0.0211 | Percent Non-Detects | 22.22% |
| Mean Detects | 0.0952 | SD Detects | 0.145 |
| Median Detects | 0.0425 | CV Detects | 1.524 |
| Skewness Detects | 1.947 | Kurtosis Detects | 2.92 |
| Mean of Logged Detects | -3.771 | SD of Logged Detects | 2.19 |

Normal GOF Test on Detects Only

| | | |
|---|---|---|
| Shapiro Wilk Test Statistic | 0.664 | Shapiro Wilk GOF Test |
| 1% Shapiro Wilk Critical Value | 0.825 | Detected Data Not Normal at 1% Significance Level |
| Lilliefors Test Statistic | 0.4 | Lilliefors GOF Test |
| 1% Lilliefors Critical Value | 0.263 | 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 | 0.0743 | KM Standard Error of Mean | 0.0316 |
| 90KM SD | 0.129 | 95% KM (BCA) UCL | 0.129 |

Prepared by/Date: LO 04/20/23
Checked by/Date: JHG 04/20/23

| | | | |
|---|---|---|---|
| 95% KM (t) UCL | 0.129 | 95% KM (Percentile Bootstrap) UCL | 0.129 |
| 95% KM (z) UCL | 0.126 | 95% KM Bootstrap t UCL | 0.199 |
| 90% KM Chebyshev UCL | 0.169 | 95% KM Chebyshev UCL | 0.212 |
| 97.5% KM Chebyshev UCL | 0.272 | 99% KM Chebyshev UCL | 0.389 |

Gamma GOF Tests on Detected Observations Only

| | | |
|---|---|---|
| A-D Test Statistic | 0.57 | **Anderson-Darling GOF Test** |
| 5% A-D Critical Value | 0.802 | Detected data appear Gamma Distributed at 5% Significance Level |
| K-S Test Statistic | 0.226 | **Kolmogorov-Smirnov GOF** |
| 5% K-S Critical Value | 0.243 | 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) | 0.454 | k star (bias corrected MLE) | 0.405 |
| Theta hat (MLE) | 0.21 | Theta star (bias corrected MLE) | 0.235 |
| nu hat (MLE) | 12.72 | nu star (bias corrected) | 11.33 |
| Mean (detects) | 0.0952 | | |

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 | 0.0763 |
| Maximum | 0.47 | Median | 0.032 |
| SD | 0.132 | CV | 1.73 |
| k hat (MLE) | 0.465 | k star (bias corrected MLE) | 0.424 |
| Theta hat (MLE) | 0.164 | Theta star (bias corrected MLE) | 0.18 |
| nu hat (MLE) | 16.73 | nu star (bias corrected) | 15.27 |
| Adjusted Level of Significance (β) | 0.0357 | | |
| Approximate Chi Square Value (15.27, α) | 7.451 | Adjusted Chi Square Value (15.27, β) | 6.931 |
| 95% Gamma Approximate UCL | 0.156 | 95% Gamma Adjusted UCL | 0.168 |

Estimates of Gamma Parameters using KM Estimates

| | | | |
|---|---|---|---|
| Mean (KM) | 0.0743 | SD (KM) | 0.129 |
| Variance (KM) | 0.0167 | SE of Mean (KM) | 0.0316 |
| k hat (KM) | 0.33 | k star (KM) | 0.312 |
| nu hat (KM) | 11.87 | nu star (KM) | 11.22 |
| theta hat (KM) | 0.225 | theta star (KM) | 0.238 |
| 80% gamma percentile (KM) | 0.115 | 90% gamma percentile (KM) | 0.218 |
| 95% gamma percentile (KM) | 0.336 | 99% gamma percentile (KM) | 0.64 |

Gamma Kaplan-Meier (KM) Statistics

| | | | |
|---|---|---|---|
| Approximate Chi Square Value (11.22, α) | 4.719 | Adjusted Chi Square Value (11.22, β) | 4.32 |
| 95% KM Approximate Gamma UCL | 0.177 | 95% KM Adjusted Gamma UCL | 0.193 |

Lognormal GOF Test on Detected Observations Only

| | | |
|---|---|---|
| Shapiro Wilk Test Statistic | 0.899 | **Shapiro Wilk GOF Test** |
| 10% Shapiro Wilk Critical Value | 0.895 | Detected Data appear Lognormal at 10% Significance Level |
| Lilliefors Test Statistic | 0.243 | **Lilliefors GOF Test** |
| 10% Lilliefors Critical Value | 0.208 | Detected Data Not Lognormal at 10% Significance Level |

Detected Data appear Approximate Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

| | | | |
|---|---|---|---|
| Mean in Original Scale | 0.0743 | Mean in Log Scale | -4.577 |
| SD in Original Scale | 0.133 | SD in Log Scale | 2.546 |
| 95% t UCL (assumes normality of ROS data) | 0.129 | 95% Percentile Bootstrap UCL | 0.128 |
| 95% BCA Bootstrap UCL | 0.147 | 95% Bootstrap t UCL | 0.2 |
| 95% H-UCL (Log ROS) | 7.037 | | |

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

| | | | |
|---|---|---|---|
| KM Mean (logged) | -4.536 | KM Geo Mean | 0.0107 |
| KM SD (logged) | 2.373 | 95% Critical H Value (KM-Log) | 4.998 |
| KM Standard Error of Mean (logged) | 0.587 | 95% H-UCL (KM -Log) | 3.177 |
| KM SD (logged) | 2.373 | 95% Critical H Value (KM-Log) | 4.998 |
| KM Standard Error of Mean (logged) | 0.587 | | |

DL/2 Statistics

| DL/2 Normal | | DL/2 Log-Transformed | |
|---|---|---|---|
| Mean in Original Scale | 0.0745 | Mean in Log Scale | -4.406 |
| SD in Original Scale | 0.133 | SD in Log Scale | 2.335 |
| 95% t UCL (Assumes normality) | 0.129 | 95% H-Stat UCL | 3.035 |

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

| | |
|---|---|
| 95% KM Adjusted Gamma UCL | 0.193 |

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.

CobaltS_B_step123

General Statistics

| | | | |
|---|---|---|---|
| Total Number of Observations | 7 | Number of Distinct Observations | 6 |
| | | Number of Missing Observations | 0 |
| Minimum | 0.027 | Mean | 0.0426 |
| Maximum | 0.053 | Median | 0.046 |
| SD | 0.00889 | Std. Error of Mean | 0.00336 |
| Coefficient of Variation | 0.209 | Skewness | -0.788 |

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 | 0.942 | Shapiro Wilk GOF Test | |

| | | | |
|---|---|---|---|
| 1% Shapiro Wilk Critical Value | 0.73 | Data appear Normal at 1% Significance Level | |
| Lilliefors Test Statistic | 0.222 | **Lilliefors GOF Test** | |
| 1% Lilliefors Critical Value | 0.35 | 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 | 0.0491 | 95% Adjusted-CLT UCL (Chen-1995) | 0.047 |
| | | 95% Modified-t UCL (Johnson-1978) | 0.0489 |

**Gamma GOF Test**

| | | | |
|---|---|---|---|
| A-D Test Statistic | 0.349 | **Anderson-Darling Gamma GOF Test** | |
| 5% A-D Critical Value | 0.707 | Detected data appear Gamma Distributed at 5% Significance Level | |
| K-S Test Statistic | 0.245 | **Kolmogorov-Smirnov Gamma GOF Test** | |
| 5% K-S Critical Value | 0.311 | 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) | 23.76 | k star (bias corrected MLE) | 13.67 |
| Theta hat (MLE) | 0.00179 | Theta star (bias corrected MLE) | 0.00311 |
| nu hat (MLE) | 332.6 | nu star (bias corrected) | 191.4 |
| MLE Mean (bias corrected) | 0.0426 | MLE Sd (bias corrected) | 0.0115 |
| | | Approximate Chi Square Value (0.05) | 160.4 |
| Adjusted Level of Significance | 0.0158 | Adjusted Chi Square Value | 151.8 |

**Assuming Gamma Distribution**

| | | | |
|---|---|---|---|
| 95% Approximate Gamma UCL | 0.0508 | 95% Adjusted Gamma UCL | 0.0537 |

**Lognormal GOF Test**

| | | | |
|---|---|---|---|
| Shapiro Wilk Test Statistic | 0.901 | **Shapiro Wilk Lognormal GOF Test** | |
| 10% Shapiro Wilk Critical Value | 0.838 | Data appear Lognormal at 10% Significance Level | |
| Lilliefors Test Statistic | 0.237 | **Lilliefors Lognormal GOF Test** | |
| 10% Lilliefors Critical Value | 0.28 | 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 | -3.612 | Mean of logged Data | -3.178 |
| Maximum of Logged Data | -2.937 | SD of logged Data | 0.23 |

**Assuming Lognormal Distribution**

| | | | |
|---|---|---|---|
| 95% H-UCL | 0.0519 | 90% Chebyshev (MVUE) UCL | 0.0538 |
| 95% Chebyshev (MVUE) UCL | 0.0588 | 97.5% Chebyshev (MVUE) UCL | 0.0658 |
| 99% Chebyshev (MVUE) UCL | 0.0796 | | |

**Nonparametric Distribution Free UCL Statistics**

Data appear to follow a Discernible Distribution

**Nonparametric Distribution Free UCLs**

| | | | |
|---|---|---|---|
| 95% CLT UCL | 0.0481 | 95% BCA Bootstrap UCL | 0.047 |
| 95% Standard Bootstrap UCL | 0.0477 | 95% Bootstrap-t UCL | 0.0479 |
| 95% Hall's Bootstrap UCL | 0.0469 | 95% Percentile Bootstrap UCL | 0.0476 |

Prepared by/Date: LO 04/20/23
Checked by/Date: JHG 04/20/23

| | | | |
|---|---|---|---|
| 90% Chebyshev(Mean, Sd) UCL | 0.0526 | 95% Chebyshev(Mean, Sd) UCL | 0.0572 |
| 97.5% Chebyshev(Mean, Sd) UCL | 0.0635 | 99% Chebyshev(Mean, Sd) UCL | 0.076 |

Suggested UCL to Use

| | |
|---|---|
| 95% Student's-t UCL | 0.0491 |

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.

Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.


Prepared by/Date: LO 04/20/23
Checked by/Date: JHG 04/20/23

# Appendix D-3f
# Groundwater ProUCL Outputs - Lithium
# McDonough AP-2, 3/4 Risk Evaluation Report
# Mcdonough AP-2, 3/4
# Plant McDonough, Cobb County, GA

## UCL Statistics for Data Sets with Non-Detects

| | |
|---|---|
| User Selected Options | |
| Date/Time of Computation | ProUCL 5.2 4/20/2023 12:35:00 PM |
| From File | 20230420 McD234_SSL ProUCL Input.xls |
| Full Precision | OFF |
| Confidence Coefficient | 95% |
| Number of Bootstrap Operations | 2000 |

**LithiumS_step1**

### General Statistics

| | | | |
|---|---|---|---|
| Total Number of Observations | 41 | Number of Distinct Observations | 34 |
| | | Number of Missing Observations | 0 |
| Minimum | 0.046 | Mean | 0.0881 |
| Maximum | 0.144 | Median | 0.085 |
| SD | 0.0272 | Std. Error of Mean | 0.00425 |
| Coefficient of Variation | 0.309 | Skewness | 0.257 |

### Normal GOF Test

| | | |
|---|---|---|
| Shapiro Wilk Test Statistic | 0.953 | **Shapiro Wilk GOF Test** |
| 1% Shapiro Wilk Critical Value | 0.92 | Data appear Normal at 1% Significance Level |
| Lilliefors Test Statistic | 0.0827 | **Lilliefors GOF Test** |
| 1% Lilliefors Critical Value | 0.16 | 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 | 0.0952 | 95% Adjusted-CLT UCL (Chen-1995) | 0.0952 |
| | | 95% Modified-t UCL (Johnson-1978) | 0.0952 |

### Gamma GOF Test

| | | |
|---|---|---|
| A-D Test Statistic | 0.374 | **Anderson-Darling Gamma GOF Test** |
| 5% A-D Critical Value | 0.748 | Detected data appear Gamma Distributed at 5% Significance Level |
| K-S Test Statistic | 0.0942 | **Kolmogorov-Smirnov Gamma GOF Test** |
| 5% K-S Critical Value | 0.138 | Detected data appear Gamma Distributed at 5% Significance Level |

Detected data appear Gamma Distributed at 5% Significance Level

### Gamma Statistics

| | | | |
|---|---|---|---|
| k hat (MLE) | 10.41 | k star (bias corrected MLE) | 9.66 |
| Theta hat (MLE) | 0.00846 | Theta star (bias corrected MLE) | 0.00912 |
| nu hat (MLE) | 853.2 | nu star (bias corrected) | 792.1 |
| MLE Mean (bias corrected) | 0.0881 | MLE Sd (bias corrected) | 0.0283 |
| | | Approximate Chi Square Value (0.05) | 727.8 |
| Adjusted Level of Significance | 0.0441 | Adjusted Chi Square Value | 725.6 |

### Assuming Gamma Distribution

| | | | |
|---|---|---|---|
| 95% Approximate Gamma UCL | 0.0958 | 95% Adjusted Gamma UCL | 0.0961 |

### Lognormal GOF Test

| | | |
|---|---|---|
| Shapiro Wilk Test Statistic | 0.951 | **Shapiro Wilk Lognormal GOF Test** |
| 10% Shapiro Wilk Critical Value | 0.95 | Data appear Lognormal at 10% Significance Level |

Prepared by/Date: LO 04/20/23
Checked by/Date: JHG 04/20/23

| | | | | |
|---|---|---|---|---|
| Lilliefors Test Statistic | 0.0933 | | **Lilliefors Lognormal GOF Test** | |
| 10% Lilliefors Critical Value | 0.126 | | Data appear Lognormal at 10% Significance Level | |

Data appear Lognormal at 10% Significance Level

**Lognormal Statistics**

| | | | |
|---|---|---|---|
| Minimum of Logged Data | -3.079 | Mean of logged Data | -2.479 |
| Maximum of Logged Data | -1.938 | SD of logged Data | 0.322 |

**Assuming Lognormal Distribution**

| | | | |
|---|---|---|---|
| 95% H-UCL | 0.0967 | 90% Chebyshev (MVUE) UCL | 0.102 |
| 95% Chebyshev (MVUE) UCL | 0.108 | 97.5% Chebyshev (MVUE) UCL | 0.116 |
| 99% Chebyshev (MVUE) UCL | 0.133 | | |

**Nonparametric Distribution Free UCL Statistics**

Data appear to follow a Discernible Distribution

**Nonparametric Distribution Free UCLs**

| | | | |
|---|---|---|---|
| 95% CLT UCL | 0.095 | 95% BCA Bootstrap UCL | 0.0947 |
| 95% Standard Bootstrap UCL | 0.0949 | 95% Bootstrap-t UCL | 0.0956 |
| 95% Hall's Bootstrap UCL | 0.0953 | 95% Percentile Bootstrap UCL | 0.0947 |
| 90% Chebyshev(Mean, Sd) UCL | 0.101 | 95% Chebyshev(Mean, Sd) UCL | 0.107 |
| 97.5% Chebyshev(Mean, Sd) UCL | 0.115 | 99% Chebyshev(Mean, Sd) UCL | 0.13 |

**Suggested UCL to Use**

| | |
|---|---|
| 95% Student's-t UCL | 0.0952 |

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.

LithiumS_step2

**General Statistics**

| | | | |
|---|---|---|---|
| Total Number of Observations | 71 | Number of Distinct Observations | 56 |
| Number of Detects | 66 | Number of Non-Detects | 5 |
| Number of Distinct Detects | 54 | Number of Distinct Non-Detects | 3 |
| Minimum Detect | 9.5000E-4 | Minimum Non-Detect | 7.3000E-4 |
| Maximum Detect | 0.144 | Maximum Non-Detect | 0.05 |
| Variance Detects | 0.00206 | Percent Non-Detects | 7.042% |
| Mean Detects | 0.0589 | SD Detects | 0.0454 |
| Median Detects | 0.0645 | CV Detects | 0.771 |
| Skewness Detects | 0.0463 | Kurtosis Detects | -1.33 |
| Mean of Logged Detects | -3.578 | SD of Logged Detects | 1.602 |

**Normal GOF Test on Detects Only**

| | | |
|---|---|---|
| Shapiro Wilk Test Statistic | 0.884 | **Normal GOF Test on Detected Observations Only** |
| 1% Shapiro Wilk P Value | 1.0907E-6 | Detected Data Not Normal at 1% Significance Level |
| Lilliefors Test Statistic | 0.191 | **Lilliefors GOF Test** |
| 1% Lilliefors Critical Value | 0.126 | 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 | 0.0552 | KM Standard Error of Mean | 0.00546 |

Prepared by/Date: LO 04/20/23
Checked by/Date: JHG 04/20/23

| | | | |
|---|---|---|---|
| 90KM SD | 0.0456 | 95% KM (BCA) UCL | 0.0639 |
| 95% KM (t) UCL | 0.0643 | 95% KM (Percentile Bootstrap) UCL | 0.0639 |
| 95% KM (z) UCL | 0.0642 | 95% KM Bootstrap t UCL | 0.0641 |
| 90% KM Chebyshev UCL | 0.0716 | 95% KM Chebyshev UCL | 0.079 |
| 97.5% KM Chebyshev UCL | 0.0893 | 99% KM Chebyshev UCL | 0.11 |

Gamma GOF Tests on Detected Observations Only

| | | |
|---|---|---|
| A-D Test Statistic | 4.353 | **Anderson-Darling GOF Test** |
| 5% A-D Critical Value | 0.79 | Detected Data Not Gamma Distributed at 5% Significance Level |
| K-S Test Statistic | 0.213 | **Kolmogorov-Smirnov GOF** |
| 5% K-S Critical Value | 0.114 | 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) | 0.796 | k star (bias corrected MLE) | 0.77 |
| Theta hat (MLE) | 0.074 | Theta star (bias corrected MLE) | 0.0765 |
| nu hat (MLE) | 105 | nu star (bias corrected) | 101.6 |
| Mean (detects) | 0.0589 | | |

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 | 9.5000E-4 | Mean | 0.0564 |
| Maximum | 0.144 | Median | 0.055 |
| SD | 0.0447 | CV | 0.792 |
| k hat (MLE) | 0.826 | k star (bias corrected MLE) | 0.8 |
| Theta hat (MLE) | 0.0683 | Theta star (bias corrected MLE) | 0.0705 |
| nu hat (MLE) | 117.3 | nu star (bias corrected) | 113.7 |
| Adjusted Level of Significance (β) | 0.0466 | | |
| Approximate Chi Square Value (113.65, α) | 90.04 | Adjusted Chi Square Value (113.65, β) | 89.61 |
| 95% Gamma Approximate UCL | 0.0713 | 95% Gamma Adjusted UCL | 0.0716 |

Estimates of Gamma Parameters using KM Estimates

| | | | |
|---|---|---|---|
| Mean (KM) | 0.0552 | SD (KM) | 0.0456 |
| Variance (KM) | 0.00208 | SE of Mean (KM) | 0.00546 |
| k hat (KM) | 1.469 | k star (KM) | 1.416 |
| nu hat (KM) | 208.6 | nu star (KM) | 201.1 |
| theta hat (KM) | 0.0376 | theta star (KM) | 0.039 |
| 80% gamma percentile (KM) | 0.086 | 90% gamma percentile (KM) | 0.117 |
| 95% gamma percentile (KM) | 0.147 | 99% gamma percentile (KM) | 0.215 |

Gamma Kaplan-Meier (KM) Statistics

| | | | |
|---|---|---|---|
| Approximate Chi Square Value (201.07, α) | 169.3 | Adjusted Chi Square Value (201.07, β) | 168.7 |
| 95% KM Approximate Gamma UCL | 0.0656 | 95% KM Adjusted Gamma UCL | 0.0658 |

Lognormal GOF Test on Detected Observations Only

| | | |
|---|---|---|
| Shapiro Wilk Approximate Test Statistic | 0.792 | **Shapiro Wilk GOF Test** |
| 10% Shapiro Wilk P Value | 1.545E-12 | Detected Data Not Lognormal at 10% Significance Level |
| Lilliefors Test Statistic | 0.269 | **Lilliefors GOF Test** |
| 10% Lilliefors Critical Value | 0.0997 | Detected Data Not Lognormal at 10% Significance Level |



Prepared by/Date: LO 04/20/23
Checked by/Date: JHG 04/20/23

Detected Data Not Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

| | | | |
|---|---|---|---|
| Mean in Original Scale | 0.0552 | Mean in Log Scale | -3.716 |
| SD in Original Scale | 0.0459 | SD in Log Scale | 1.648 |
| 95% t UCL (assumes normality of ROS data) | 0.0642 | 95% Percentile Bootstrap UCL | 0.0637 |
| 95% BCA Bootstrap UCL | 0.0637 | 95% Bootstrap t UCL | 0.0642 |
| 95% H-UCL (Log ROS) | 0.17 | | |

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

| | | | |
|---|---|---|---|
| KM Mean (logged) | -3.738 | KM Geo Mean | 0.0238 |
| KM SD (logged) | 1.669 | 95% Critical H Value (KM-Log) | 2.99 |
| KM Standard Error of Mean (logged) | 0.202 | 95% H-UCL (KM -Log) | 0.174 |
| KM SD (logged) | 1.669 | 95% Critical H Value (KM-Log) | 2.99 |
| KM Standard Error of Mean (logged) | 0.202 | | |

DL/2 Statistics

| DL/2 Normal | | DL/2 Log-Transformed | |
|---|---|---|---|
| Mean in Original Scale | 0.0559 | Mean in Log Scale | -3.66 |
| SD in Original Scale | 0.0452 | SD in Log Scale | 1.63 |
| 95% t UCL (Assumes normality) | 0.0648 | 95% H-Stat UCL | 0.172 |

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 0.0643

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.

LithiumS_step3

General Statistics

| | | | |
|---|---|---|---|
| Total Number of Observations | 18 | Number of Distinct Observations | 16 |
| Number of Detects | 14 | Number of Non-Detects | 4 |
| Number of Distinct Detects | 13 | Number of Distinct Non-Detects | 3 |
| Minimum Detect | 9.5000E-4 | Minimum Non-Detect | 7.3000E-4 |
| Maximum Detect | 0.045 | Maximum Non-Detect | 0.05 |
| Variance Detects | 1.3094E-4 | Percent Non-Detects | 22.22% |
| Mean Detects | 0.00839 | SD Detects | 0.0114 |
| Median Detects | 0.0062 | CV Detects | 1.364 |
| Skewness Detects | 2.919 | Kurtosis Detects | 9.145 |
| Mean of Logged Detects | -5.32 | SD of Logged Detects | 1.036 |

Normal GOF Test on Detects Only

| | | |
|---|---|---|
| Shapiro Wilk Test Statistic | 0.591 | Shapiro Wilk GOF Test |
| 1% Shapiro Wilk Critical Value | 0.825 | Detected Data Not Normal at 1% Significance Level |
| Lilliefors Test Statistic | 0.399 | Lilliefors GOF Test |
| 1% Lilliefors Critical Value | 0.263 | Detected Data Not Normal at 1% Significance Level |

Detected Data Not Normal at 1% Significance Level



Prepared by/Date: LO 04/20/23
Checked by/Date: JHG 04/20/23

### Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

| | | | |
|---|---|---|---|
| KM Mean | 0.00757 | KM Standard Error of Mean | 0.00263 |
| 90KM SD | 0.0103 | 95% KM (BCA) UCL | 0.0123 |
| 95% KM (t) UCL | 0.0121 | 95% KM (Percentile Bootstrap) UCL | 0.0123 |
| 95% KM (z) UCL | 0.0119 | 95% KM Bootstrap t UCL | 0.022 |
| 90% KM Chebyshev UCL | 0.0155 | 95% KM Chebyshev UCL | 0.019 |
| 97.5% KM Chebyshev UCL | 0.024 | 99% KM Chebyshev UCL | 0.0337 |

### Gamma GOF Tests on Detected Observations Only

| | | |
|---|---|---|
| A-D Test Statistic | 0.806 | **Anderson-Darling GOF Test** |
| 5% A-D Critical Value | 0.759 | Detected Data Not Gamma Distributed at 5% Significance Level |
| K-S Test Statistic | 0.287 | **Kolmogorov-Smirnov GOF** |
| 5% K-S Critical Value | 0.235 | 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) | 1.063 | k star (bias corrected MLE) | 0.882 |
| Theta hat (MLE) | 0.0079 | Theta star (bias corrected MLE) | 0.00951 |
| nu hat (MLE) | 29.75 | nu star (bias corrected) | 24.71 |
| Mean (detects) | 0.00839 | | |

### 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 | 9.5000E-4 | Mean | 0.00875 |
| Maximum | 0.045 | Median | 0.0065 |
| SD | 0.01 | CV | 1.147 |
| k hat (MLE) | 1.326 | k star (bias corrected MLE) | 1.142 |
| Theta hat (MLE) | 0.0066 | Theta star (bias corrected MLE) | 0.00766 |
| nu hat (MLE) | 47.73 | nu star (bias corrected) | 41.11 |
| Adjusted Level of Significance (β) | 0.0357 | | |
| Approximate Chi Square Value (41.11, α) | 27.41 | Adjusted Chi Square Value (41.11, β) | 26.34 |
| 95% Gamma Approximate UCL | 0.0131 | 95% Gamma Adjusted UCL | 0.0137 |

### Estimates of Gamma Parameters using KM Estimates

| | | | |
|---|---|---|---|
| Mean (KM) | 0.00757 | SD (KM) | 0.0103 |
| Variance (KM) | 1.0644E-4 | SE of Mean (KM) | 0.00263 |
| k hat (KM) | 0.538 | k star (KM) | 0.485 |
| nu hat (KM) | 19.37 | nu star (KM) | 17.47 |
| theta hat (KM) | 0.0141 | theta star (KM) | 0.0156 |
| 80% gamma percentile (KM) | 0.0124 | 90% gamma percentile (KM) | 0.0206 |
| 95% gamma percentile (KM) | 0.0294 | 99% gamma percentile (KM) | 0.051 |

### Gamma Kaplan-Meier (KM) Statistics

| | | | |
|---|---|---|---|
| Approximate Chi Square Value (17.47, α) | 9.01 | Adjusted Chi Square Value (17.47, β) | 8.43 |
| 95% KM Approximate Gamma UCL | 0.0147 | 95% KM Adjusted Gamma UCL | 0.0157 |

### Lognormal GOF Test on Detected Observations Only

| | | |
|---|---|---|
| Shapiro Wilk Test Statistic | 0.937 | **Shapiro Wilk GOF Test** |


Prepared by/Date: LO 04/20/23
Checked by/Date: JHG 04/20/23

| | | | | |
|---|---|---|---|---|
| 10% Shapiro Wilk Critical Value | 0.895 | Detected Data appear Lognormal at 10% Significance Level | | |
| Lilliefors Test Statistic | 0.212 | **Lilliefors GOF Test** | | |
| 10% Lilliefors Critical Value | 0.208 | Detected Data Not Lognormal at 10% Significance Level | | |

Detected Data appear Approximate Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

| | | | |
|---|---|---|---|
| Mean in Original Scale | 0.00724 | Mean in Log Scale | -5.492 |
| SD in Original Scale | 0.0103 | SD in Log Scale | 1.076 |
| 95% t UCL (assumes normality of ROS data) | 0.0115 | 95% Percentile Bootstrap UCL | 0.0115 |
| 95% BCA Bootstrap UCL | 0.0142 | 95% Bootstrap t UCL | 0.0213 |
| 95% H-UCL (Log ROS) | 0.0151 | | |

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

| | | | |
|---|---|---|---|
| KM Mean (logged) | -5.467 | KM Geo Mean | 0.00422 |
| KM SD (logged) | 1.057 | 95% Critical H Value (KM-Log) | 2.722 |
| KM Standard Error of Mean (logged) | 0.279 | 95% H-UCL (KM -Log) | 0.0148 |
| KM SD (logged) | 1.057 | 95% Critical H Value (KM-Log) | 2.722 |
| KM Standard Error of Mean (logged) | 0.279 | | |

DL/2 Statistics

| DL/2 Normal | | DL/2 Log-Transformed | |
|---|---|---|---|
| Mean in Original Scale | 0.0096 | Mean in Log Scale | -5.249 |
| SD in Original Scale | 0.0111 | SD in Log Scale | 1.231 |
| 95% t UCL (Assumes normality) | 0.0142 | 95% H-Stat UCL | 0.0274 |

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Lognormal Distributed at 10% Significance Level

Suggested UCL to Use

| | |
|---|---|
| KM H-UCL | 0.0148 |

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.

LithiumW_step1

General Statistics

| | | | |
|---|---|---|---|
| Total Number of Observations | 5 | Number of Distinct Observations | 5 |
| | | Number of Missing Observations | 0 |
| Minimum | 0.068 | Mean | 0.0776 |
| Maximum | 0.088 | Median | 0.077 |
| SD | 0.00716 | Std. Error of Mean | 0.0032 |
| Coefficient of Variation | 0.0923 | Skewness | 0.271 |

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 | 0.957 | **Shapiro Wilk GOF Test** |
| 1% Shapiro Wilk Critical Value | 0.686 | Data appear Normal at 1% Significance Level |
| Lilliefors Test Statistic | 0.223 | **Lilliefors GOF Test** |
| 1% Lilliefors Critical Value | 0.396 | 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 | 0.0844 | 95% Adjusted-CLT UCL (Chen-1995) | 0.0833 |
| | | 95% Modified-t UCL (Johnson-1978) | 0.0845 |

Gamma GOF Test

| | | |
|---|---|---|
| A-D Test Statistic | 0.283 | **Anderson-Darling Gamma GOF Test** |
| 5% A-D Critical Value | 0.678 | Detected data appear Gamma Distributed at 5% Significance Level |
| K-S Test Statistic | 0.211 | **Kolmogorov-Smirnov Gamma GOF Test** |
| 5% K-S Critical Value | 0.357 | 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) | 147.2 | k star (bias corrected MLE) | 59 |
| Theta hat (MLE) | 5.2727E-4 | Theta star (bias corrected MLE) | 0.00132 |
| nu hat (MLE) | 1472 | nu star (bias corrected) | 590 |
| MLE Mean (bias corrected) | 0.0776 | MLE Sd (bias corrected) | 0.0101 |
| | | Approximate Chi Square Value (0.05) | 534.7 |
| Adjusted Level of Significance | 0.0086 | Adjusted Chi Square Value | 511.3 |

Assuming Gamma Distribution

| | | | |
|---|---|---|---|
| 95% Approximate Gamma UCL | 0.0856 | 95% Adjusted Gamma UCL | 0.0895 |

Lognormal GOF Test

| | | |
|---|---|---|
| Shapiro Wilk Test Statistic | 0.96 | **Shapiro Wilk Lognormal GOF Test** |
| 10% Shapiro Wilk Critical Value | 0.806 | Data appear Lognormal at 10% Significance Level |
| Lilliefors Test Statistic | 0.225 | **Lilliefors Lognormal GOF Test** |
| 10% Lilliefors Critical Value | 0.319 | 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 | -2.688 | Mean of logged Data | -2.56 |
| Maximum of Logged Data | -2.43 | SD of logged Data | 0.0922 |

Assuming Lognormal Distribution

| | | | |
|---|---|---|---|
| 95% H-UCL | N/A | 90% Chebyshev (MVUE) UCL | 0.0872 |
| 95% Chebyshev (MVUE) UCL | 0.0915 | 97.5% Chebyshev (MVUE) UCL | 0.0976 |
| 99% Chebyshev (MVUE) UCL | 0.109 | | |



Prepared by/Date: LO 04/20/23
Checked by/Date: JHG 04/20/23

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

| | | | |
|---|---|---|---|
| 95% CLT UCL | 0.0829 | 95% BCA Bootstrap UCL | 0.0822 |
| 95% Standard Bootstrap UCL | 0.0823 | 95% Bootstrap-t UCL | 0.0848 |
| 95% Hall's Bootstrap UCL | 0.0867 | 95% Percentile Bootstrap UCL | 0.0822 |
| 90% Chebyshev(Mean, Sd) UCL | 0.0872 | 95% Chebyshev(Mean, Sd) UCL | 0.0916 |
| 97.5% Chebyshev(Mean, Sd) UCL | 0.0976 | 99% Chebyshev(Mean, Sd) UCL | 0.109 |

Suggested UCL to Use

| | |
|---|---|
| 95% Student's-t UCL | 0.0844 |

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.

LithiumW_step2

General Statistics

| | | | |
|---|---|---|---|
| Total Number of Observations | 77 | Number of Distinct Observations | 54 |
| Number of Detects | 63 | Number of Non-Detects | 14 |
| Number of Distinct Detects | 50 | Number of Distinct Non-Detects | 4 |
| Minimum Detect | 8.8000E-4 | Minimum Non-Detect | 7.3000E-4 |
| Maximum Detect | 0.088 | Maximum Non-Detect | 0.05 |
| Variance Detects | 4.1029E-4 | Percent Non-Detects | 18.18% |
| Mean Detects | 0.0133 | SD Detects | 0.0203 |
| Median Detects | 0.0065 | CV Detects | 1.524 |
| Skewness Detects | 2.691 | Kurtosis Detects | 6.476 |
| Mean of Logged Detects | -5.017 | SD of Logged Detects | 1.119 |

Normal GOF Test on Detects Only

| | | |
|---|---|---|
| Shapiro Wilk Test Statistic | 0.574 | Normal GOF Test on Detected Observations Only |
| 1% Shapiro Wilk P Value | 0 | Detected Data Not Normal at 1% Significance Level |
| Lilliefors Test Statistic | 0.276 | Lilliefors GOF Test |
| 1% Lilliefors Critical Value | 0.129 | 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 | 0.012 | KM Standard Error of Mean | 0.00216 |
| 90KM SD | 0.0186 | 95% KM (BCA) UCL | 0.0156 |
| 95% KM (t) UCL | 0.0156 | 95% KM (Percentile Bootstrap) UCL | 0.0157 |
| 95% KM (z) UCL | 0.0155 | 95% KM Bootstrap t UCL | 0.0168 |
| 90% KM Chebyshev UCL | 0.0185 | 95% KM Chebyshev UCL | 0.0214 |
| 97.5% KM Chebyshev UCL | 0.0255 | 99% KM Chebyshev UCL | 0.0335 |

Gamma GOF Tests on Detected Observations Only

| | | |
|---|---|---|
| A-D Test Statistic | 3.105 | Anderson-Darling GOF Test |
| 5% A-D Critical Value | 0.787 | Detected Data Not Gamma Distributed at 5% Significance Level |
| K-S Test Statistic | 0.18 | Kolmogorov-Smirnov GOF |
| 5% K-S Critical Value | 0.116 | Detected Data Not Gamma Distributed at 5% Significance Level |

Detected Data Not Gamma Distributed at 5% Significance Level

Prepared by/Date: LO 04/20/23
Checked by/Date: JHG 04/20/23

### Gamma Statistics on Detected Data Only

| | | | |
|---|---|---|---|
| k hat (MLE) | 0.846 | k star (bias corrected MLE) | 0.816 |
| Theta hat (MLE) | 0.0157 | Theta star (bias corrected MLE) | 0.0163 |
| nu hat (MLE) | 106.6 | nu star (bias corrected) | 102.9 |
| Mean (detects) | 0.0133 | | |

### 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 | 8.8000E-4 | Mean | 0.0131 |
| Maximum | 0.088 | Median | 0.0079 |
| SD | 0.0184 | CV | 1.405 |
| k hat (MLE) | 0.997 | k star (bias corrected MLE) | 0.966 |
| Theta hat (MLE) | 0.0131 | Theta star (bias corrected MLE) | 0.0136 |
| nu hat (MLE) | 153.5 | nu star (bias corrected) | 148.8 |
| Adjusted Level of Significance (β) | 0.0469 | | |
| Approximate Chi Square Value (148.84, α) | 121.6 | Adjusted Chi Square Value (148.84, β) | 121.2 |
| 95% Gamma Approximate UCL | 0.016 | 95% Gamma Adjusted UCL | 0.0161 |

### Estimates of Gamma Parameters using KM Estimates

| | | | |
|---|---|---|---|
| Mean (KM) | 0.012 | SD (KM) | 0.0186 |
| Variance (KM) | 3.4652E-4 | SE of Mean (KM) | 0.00216 |
| k hat (KM) | 0.413 | k star (KM) | 0.406 |
| nu hat (KM) | 63.61 | nu star (KM) | 62.47 |
| theta hat (KM) | 0.029 | theta star (KM) | 0.0295 |
| 80% gamma percentile (KM) | 0.0193 | 90% gamma percentile (KM) | 0.0337 |
| 95% gamma percentile (KM) | 0.0495 | 99% gamma percentile (KM) | 0.089 |

### Gamma Kaplan-Meier (KM) Statistics

| | | | |
|---|---|---|---|
| Approximate Chi Square Value (62.47, α) | 45.29 | Adjusted Chi Square Value (62.47, β) | 45.01 |
| 95% KM Approximate Gamma UCL | 0.0165 | 95% KM Adjusted Gamma UCL | 0.0166 |

### Lognormal GOF Test on Detected Observations Only

| | | |
|---|---|---|
| Shapiro Wilk Approximate Test Statistic | 0.943 | **Shapiro Wilk GOF Test** |
| 10% Shapiro Wilk P Value | 0.00953 | Detected Data Not Lognormal at 10% Significance Level |
| Lilliefors Test Statistic | 0.119 | **Lilliefors GOF Test** |
| 10% Lilliefors Critical Value | 0.102 | 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 | 0.0119 | Mean in Log Scale | -5.157 |
| SD in Original Scale | 0.0187 | SD in Log Scale | 1.171 |
| 95% t UCL (assumes normality of ROS data) | 0.0154 | 95% Percentile Bootstrap UCL | 0.0154 |
| 95% BCA Bootstrap UCL | 0.0159 | 95% Bootstrap t UCL | 0.0164 |
| 95% H-UCL (Log ROS) | 0.0159 | | |

### Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

| | | | |
|---|---|---|---|
| KM Mean (logged) | -5.147 | KM Geo Mean | 0.00582 |
| KM SD (logged) | 1.151 | 95% Critical H Value (KM-Log) | 2.416 |
| KM Standard Error of Mean (logged) | 0.14 | 95% H-UCL (KM -Log) | 0.0155 |

Prepared by/Date: LO 04/20/23
Checked by/Date: JHG 04/20/23

| | | | |
|---|---|---|---|
| KM SD (logged) | 1.151 | 95% Critical H Value (KM-Log) | 2.416 |
| KM Standard Error of Mean (logged) | 0.14 | | |

DL/2 Statistics

| DL/2 Normal | | DL/2 Log-Transformed | |
|---|---|---|---|
| Mean in Original Scale | 0.0141 | Mean in Log Scale | -4.957 |
| SD in Original Scale | 0.0188 | SD in Log Scale | 1.243 |
| 95% t UCL (Assumes normality) | 0.0177 | 95% H-Stat UCL | 0.0218 |

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 0.0156

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.

LithiumW_step3

General Statistics

| | | | |
|---|---|---|---|
| Total Number of Observations | 18 | Number of Distinct Observations | 8 |
| Number of Detects | 5 | Number of Non-Detects | 13 |
| Number of Distinct Detects | 4 | Number of Distinct Non-Detects | 4 |
| Minimum Detect | 8.8000E-4 | Minimum Non-Detect | 7.3000E-4 |
| Maximum Detect | 0.0011 | Maximum Non-Detect | 0.05 |
| Variance Detects | 1.0770E-8 | Percent Non-Detects | 72.22% |
| Mean Detects | 9.9200E-4 | SD Detects | 1.0378E-4 |
| Median Detects | 9.7000E-4 | CV Detects | 0.105 |
| Skewness Detects | 0.206 | Kurtosis Detects | -2.882 |
| Mean of Logged Detects | -6.92 | SD of Logged Detects | 0.104 |

Normal GOF Test on Detects Only

| | | |
|---|---|---|
| Shapiro Wilk Test Statistic | 0.856 | Shapiro Wilk GOF Test |
| 1% Shapiro Wilk Critical Value | 0.686 | Detected Data appear Normal at 1% Significance Level |
| Lilliefors Test Statistic | 0.251 | Lilliefors GOF Test |
| 1% Lilliefors Critical Value | 0.396 | Detected Data appear Normal at 1% Significance Level |

Detected Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

| | | | |
|---|---|---|---|
| KM Mean | 8.9375E-4 | KM Standard Error of Mean | 5.7924E-5 |
| 90KM SD | 1.4654E-4 | 95% KM (BCA) UCL | N/A |
| 95% KM (t) UCL | 9.9452E-4 | 95% KM (Percentile Bootstrap) UCL | N/A |
| 95% KM (z) UCL | 9.8903E-4 | 95% KM Bootstrap t UCL | N/A |
| 90% KM Chebyshev UCL | 0.00107 | 95% KM Chebyshev UCL | 0.00115 |

Prepared by/Date: LO 04/20/23
Checked by/Date: JHG 04/20/23

| | | | |
|---|---|---|---|
| 97.5% KM Chebyshev UCL | 0.00126 | 99% KM Chebyshev UCL | 0.00147 |

### Gamma GOF Tests on Detected Observations Only

| | | |
|---|---|---|
| A-D Test Statistic | 0.452 | **Anderson-Darling GOF Test** |
| 5% A-D Critical Value | 0.678 | Detected data appear Gamma Distributed at 5% Significance Level |
| K-S Test Statistic | 0.276 | **Kolmogorov-Smirnov GOF** |
| 5% K-S Critical Value | 0.357 | 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 on Detected Data Only

| | | | |
|---|---|---|---|
| k hat (MLE) | 114.7 | k star (bias corrected MLE) | 46.03 |
| Theta hat (MLE) | 8.6464E-6 | Theta star (bias corrected MLE) | 2.1553E-5 |
| nu hat (MLE) | 1147 | nu star (bias corrected) | 460.3 |
| Mean (detects) | 9.9200E-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 | 8.8000E-4 | Mean | 0.0075 |
| Maximum | 0.01 | Median | 0.01 |
| SD | 0.00415 | CV | 0.554 |
| k hat (MLE) | 1.554 | k star (bias corrected MLE) | 1.332 |
| Theta hat (MLE) | 0.00483 | Theta star (bias corrected MLE) | 0.00563 |
| nu hat (MLE) | 55.94 | nu star (bias corrected) | 47.95 |
| Adjusted Level of Significance (β) | 0.0357 | | |
| Approximate Chi Square Value (47.95, α) | 33.06 | Adjusted Chi Square Value (47.95, β) | 31.87 |
| 95% Gamma Approximate UCL | 0.0109 | 95% Gamma Adjusted UCL | 0.0113 |

### Estimates of Gamma Parameters using KM Estimates

| | | | |
|---|---|---|---|
| Mean (KM) | 8.9375E-4 | SD (KM) | 1.4654E-4 |
| Variance (KM) | 2.1473E-8 | SE of Mean (KM) | 5.7924E-5 |
| k hat (KM) | 37.2 | k star (KM) | 31.04 |
| nu hat (KM) | 1339 | nu star (KM) | 1117 |
| theta hat (KM) | 2.4026E-5 | theta star (KM) | 2.8797E-5 |
| 80% gamma percentile (KM) | 0.00103 | 90% gamma percentile (KM) | 0.0011 |
| 95% gamma percentile (KM) | 0.00117 | 99% gamma percentile (KM) | 0.00131 |

### Gamma Kaplan-Meier (KM) Statistics

| | | | |
|---|---|---|---|
| Approximate Chi Square Value (N/A, α) | 1041 | Adjusted Chi Square Value (N/A, β) | 1034 |
| 95% KM Approximate Gamma UCL | 9.5953E-4 | 95% KM Adjusted Gamma UCL | 9.6611E-4 |

### Lognormal GOF Test on Detected Observations Only

| | | |
|---|---|---|
| Shapiro Wilk Test Statistic | 0.864 | **Shapiro Wilk GOF Test** |
| 10% Shapiro Wilk Critical Value | 0.806 | Detected Data appear Lognormal at 10% Significance Level |
| Lilliefors Test Statistic | 0.249 | **Lilliefors GOF Test** |
| 10% Lilliefors Critical Value | 0.319 | Detected Data appear Lognormal at 10% Significance Level |

Detected Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes



Prepared by/Date: LO 04/20/23
Checked by/Date: JHG 04/20/23

Lognormal ROS Statistics Using Imputed Non-Detects

| | | | |
|---|---|---|---|
| Mean in Original Scale | 8.9853E-4 | Mean in Log Scale | -7.025 |
| SD in Original Scale | 1.3224E-4 | SD in Log Scale | 0.147 |
| 95% t UCL (assumes normality of ROS data) | 9.5275E-4 | 95% Percentile Bootstrap UCL | 9.5019E-4 |
| 95% BCA Bootstrap UCL | 9.4886E-4 | 95% Bootstrap t UCL | 9.5532E-4 |
| 95% H-UCL (Log ROS) | 9.5724E-4 | | |

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

| | | | |
|---|---|---|---|
| KM Mean (logged) | -7.034 | KM Geo Mean | 8.8182E-4 |
| KM SD (logged) | 0.164 | 95% Critical H Value (KM-Log) | 1.766 |
| KM Standard Error of Mean (logged) | 0.0648 | 95% H-UCL (KM -Log) | 9.5875E-4 |
| KM SD (logged) | 0.164 | 95% Critical H Value (KM-Log) | 1.766 |
| KM Standard Error of Mean (logged) | 0.0648 | | |

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

DL/2 Statistics

| DL/2 Normal | | DL/2 Log-Transformed | |
|---|---|---|---|
| Mean in Original Scale | 0.0126 | Mean in Log Scale | -5.364 |
| SD in Original Scale | 0.0114 | SD in Log Scale | 1.788 |
| 95% t UCL (Assumes normality) | 0.0172 | 95% H-Stat UCL | 0.127 |

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 9.9452E-4

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.

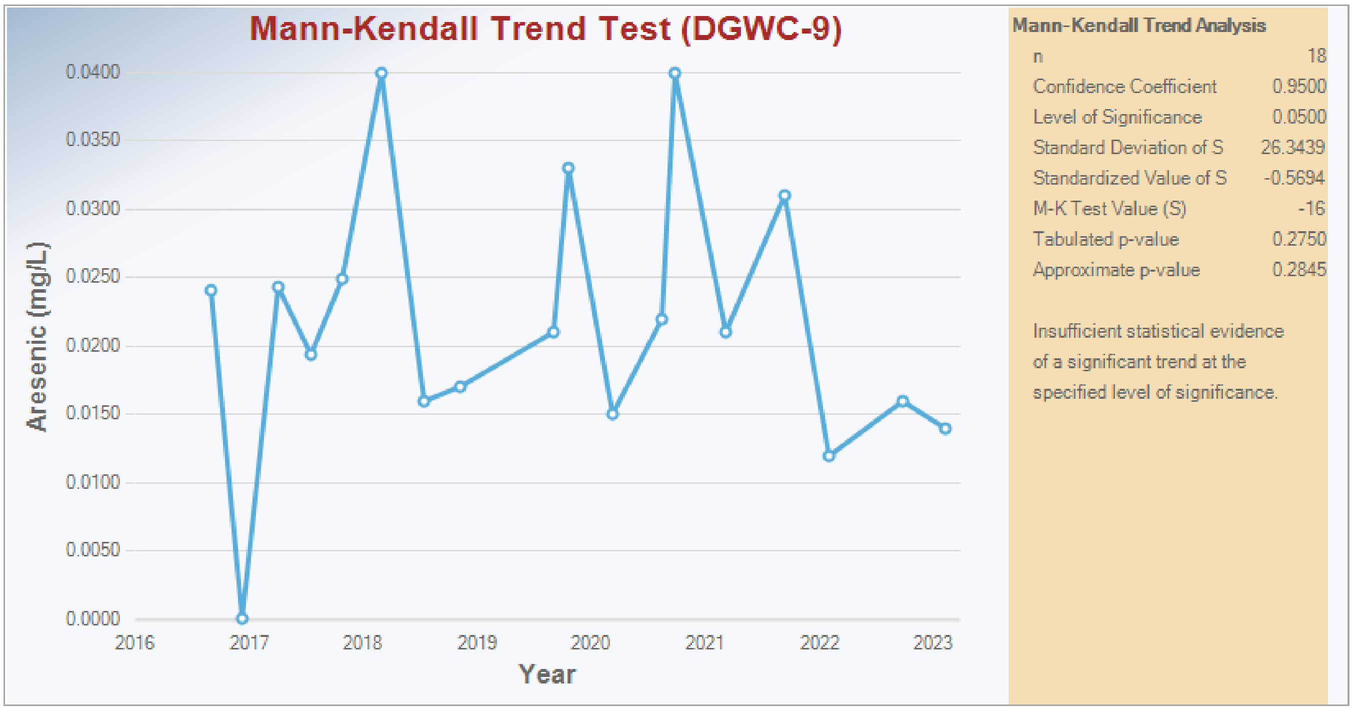


Prepared by/Date: LO 04/20/23
Checked by/Date: JHG 04/20/23

# Appendix D-4

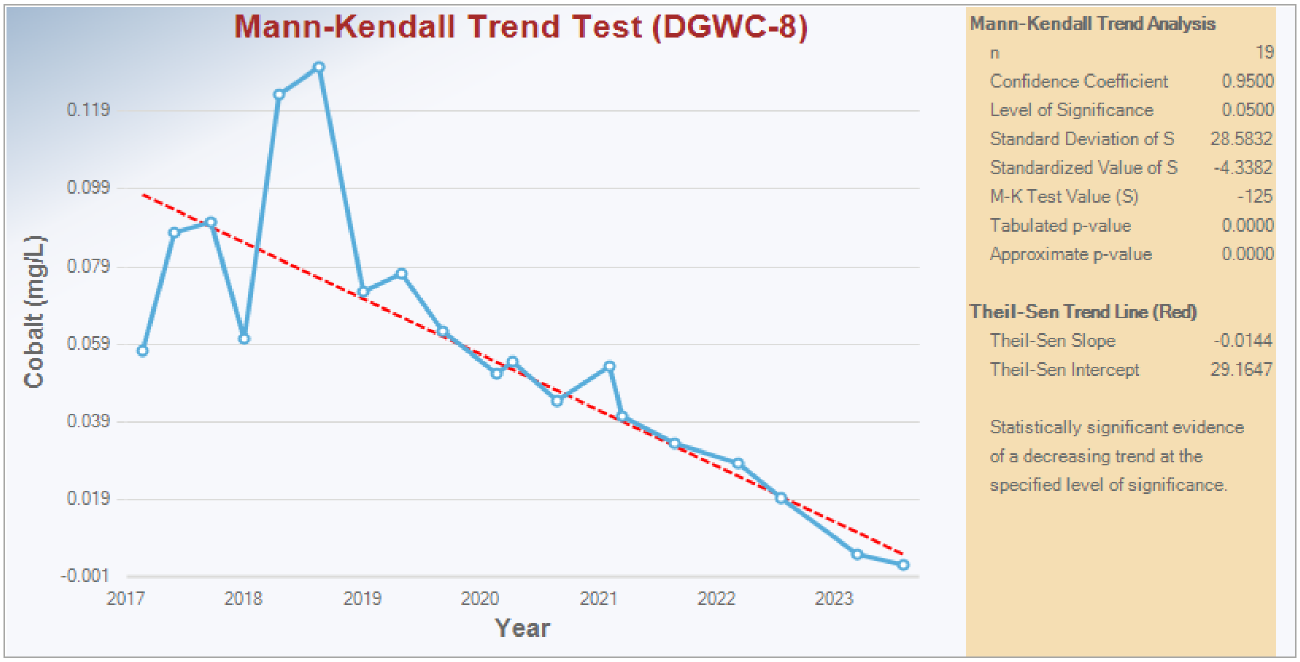
## Groundwater Trend Graphs

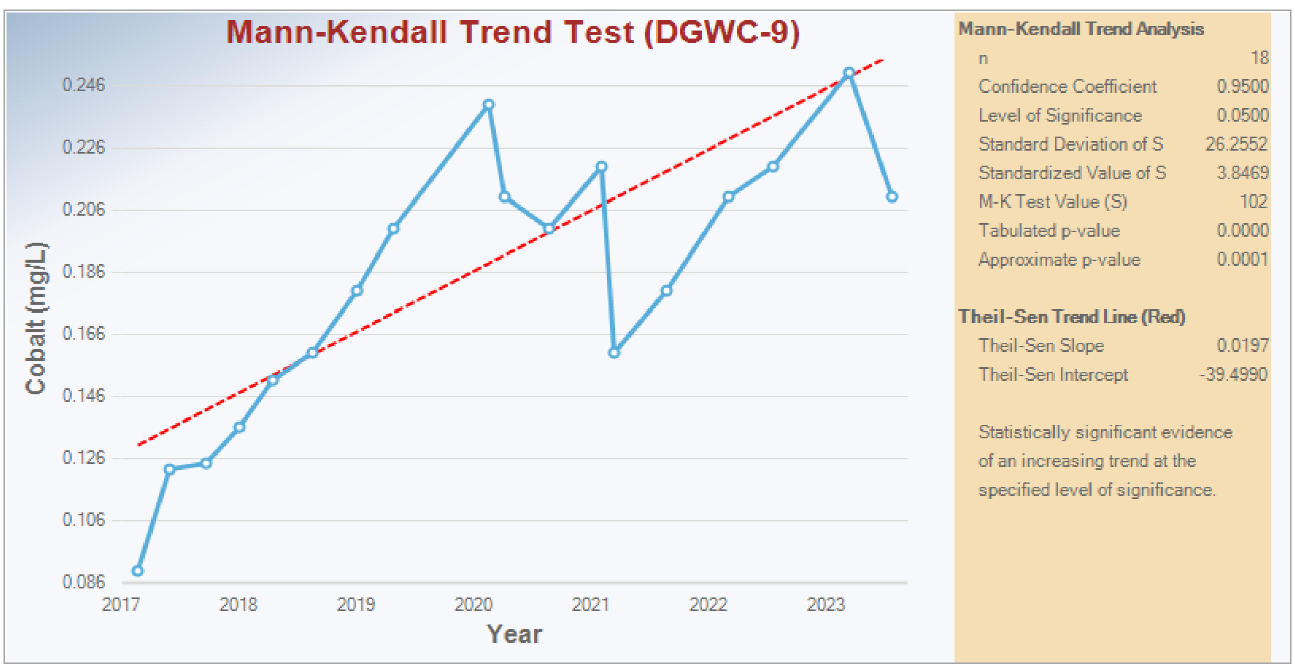
# Appendix D-4
# Groundwater Mann-Kendall Trend Graphs - Arsenic
# McDonough AP-2, 3/4 Risk Evaluation Report
# McDonough AP-2, 3/4
# Plant McDonough, Cobb County, GA



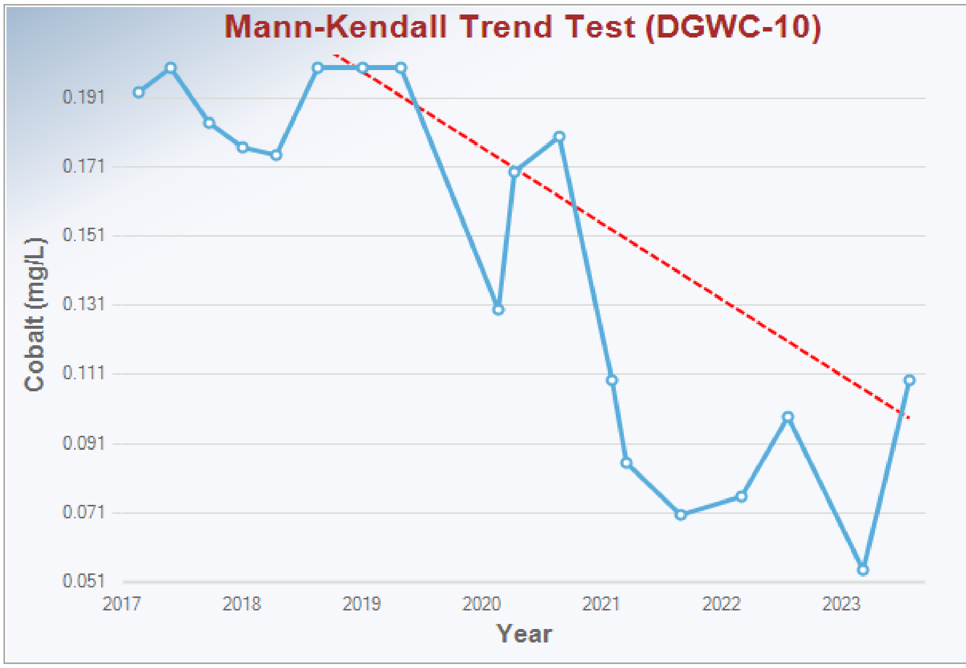

Prepared by/Date: JWS 4/27/23
Checked by/Date: LO 4/27/23

# Appendix D-4
## Groundwater Mann-Kendall Trend Graphs - Cobalt
## McDonough AP-2, 3/4 Risk Evaluation Report
## McDonough AP-2, 3/4
## Plant McDonough, Cobb County, GA



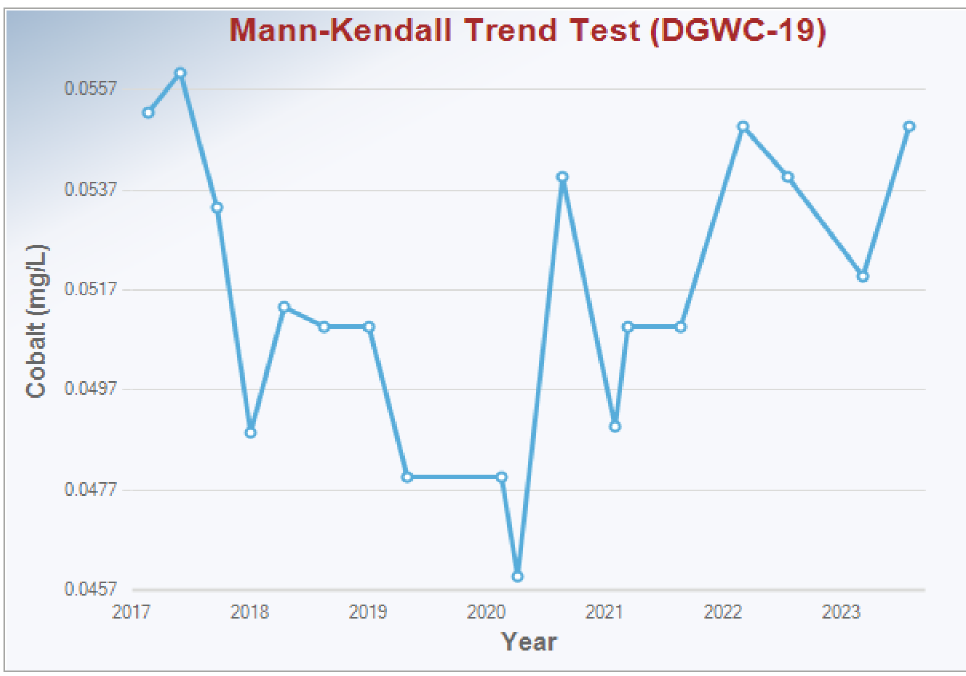



**Appendix D-4**
**Groundwater Mann-Kendall Trend Graphs - Cobalt**
**McDonough AP-2, 3/4 Risk Evaluation Report**
**McDonough AP-2, 3/4**
**Plant McDonough, Cobb County, GA**




| Mann-Kendall Trend Analysis | |
|---|---|
| n | 18 |
| Confidence Coefficient | 0.9500 |
| Level of Significance | 0.0500 |
| Standard Deviation of S | 26.2170 |
| Standardized Value of S | -3.4710 |
| M-K Test Value (S) | -92 |
| Tabulated p-value | 0.0000 |
| Approximate p-value | 0.0003 |
| **Theil-Sen Trend Line (Red)** | |
| Theil-Sen Slope | -0.0220 |
| Theil-Sen Intercept | 44.5665 |

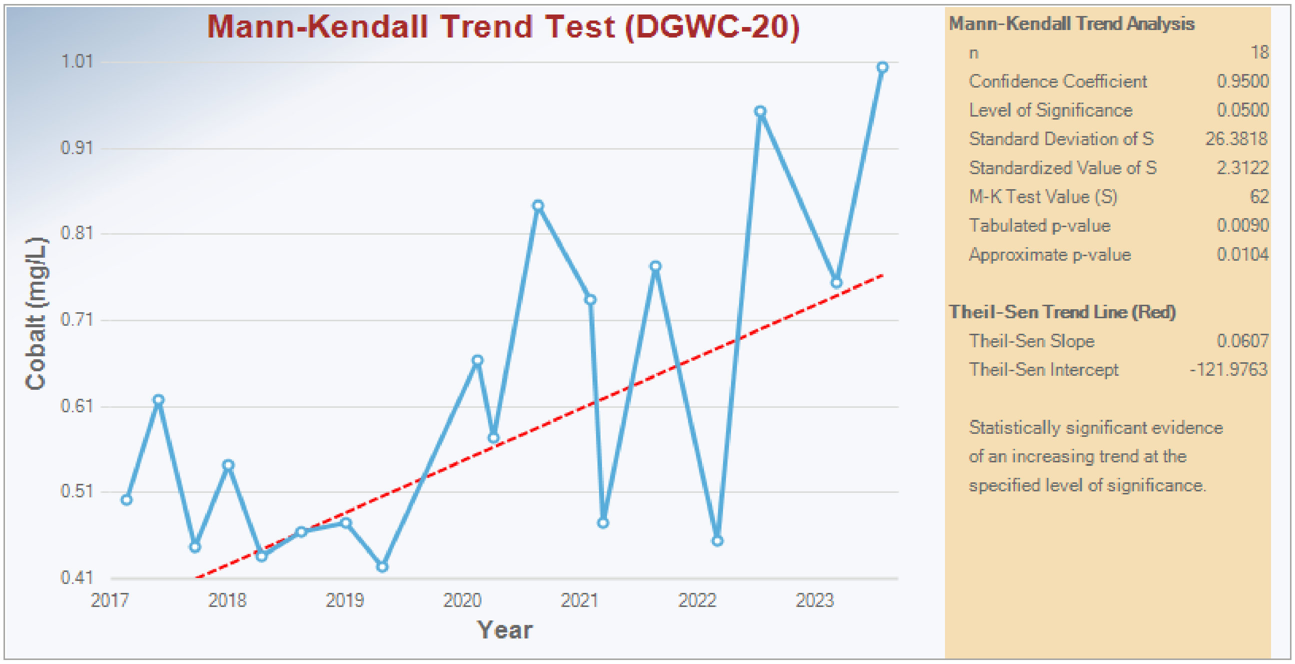
Statistically significant evidence of a decreasing trend at the specified level of significance.

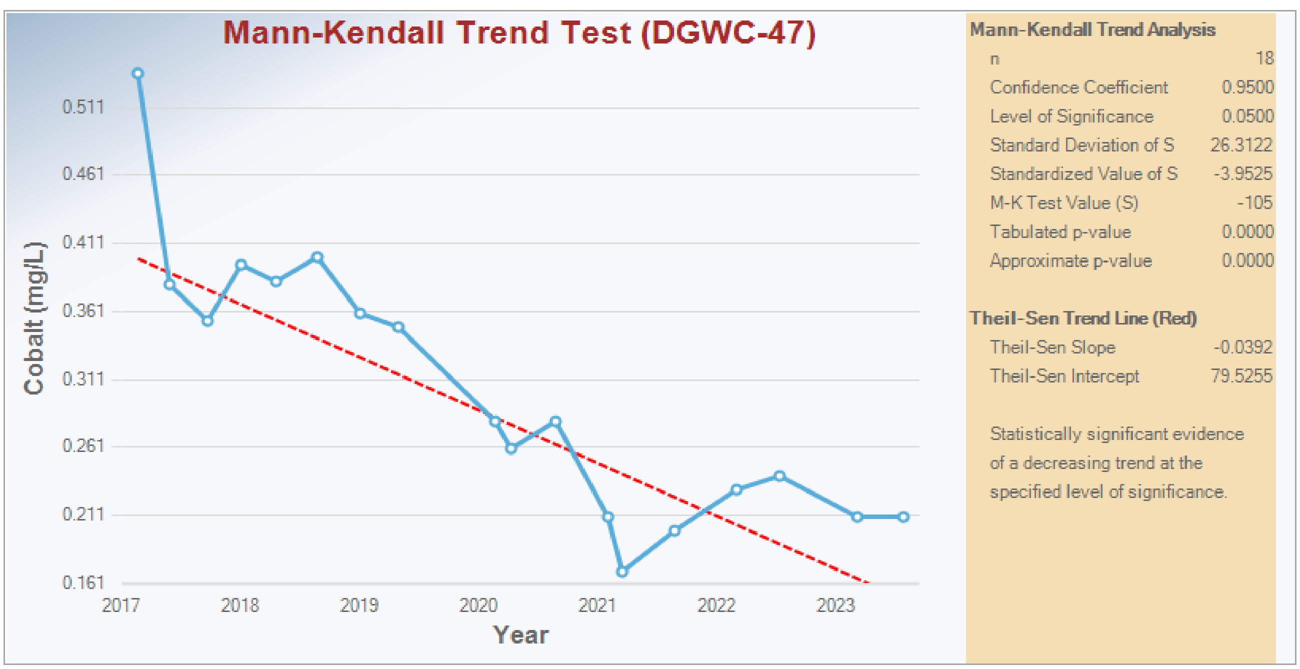



| Mann-Kendall Trend Analysis | |
|---|---|
| n | 18 |
| Confidence Coefficient | 0.9500 |
| Level of Significance | 0.0500 |
| Standard Deviation of S | 26.1789 |
| Standardized Value of S | 0.0382 |
| M-K Test Value (S) | 2 |
| Tabulated p-value | 0.4700 |
| Approximate p-value | 0.4848 |

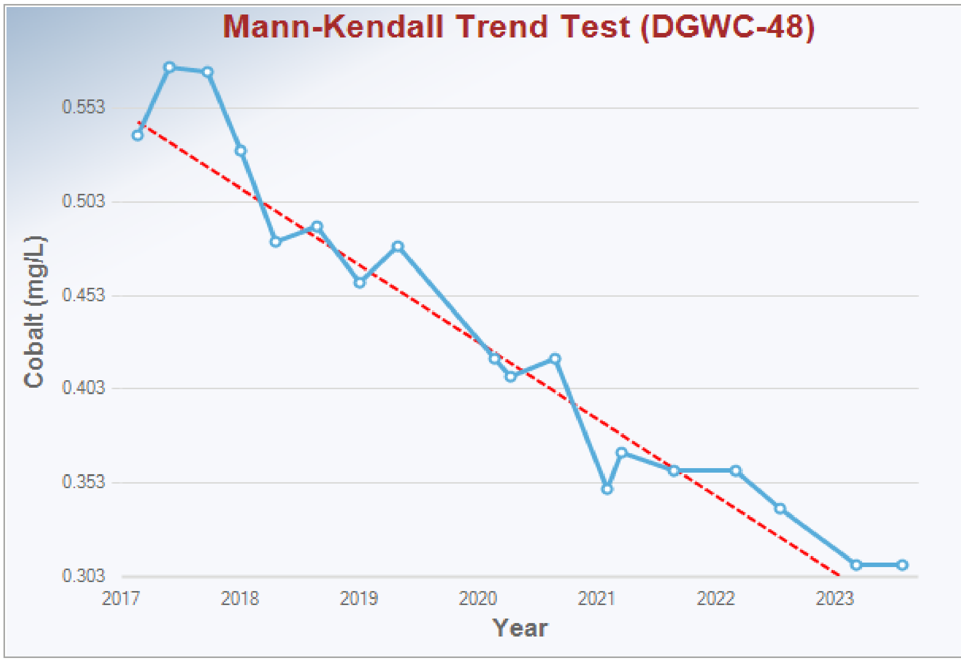
Insufficient statistical evidence of a significant trend at the specified level of significance.

**Appendix D-4**
**Groundwater Mann-Kendall Trend Graphs - Cobalt**
**McDonough AP-2, 3/4 Risk Evaluation Report**
**McDonough AP-2, 3/4**
**Plant McDonough, Cobb County, GA**



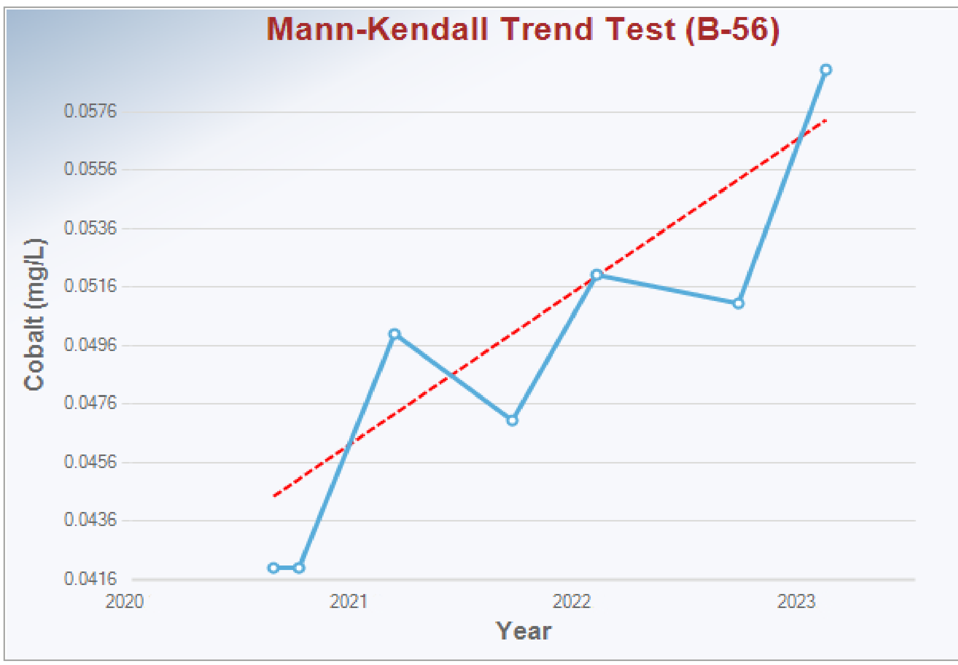
**Appendix D-4**
**Groundwater Mann-Kendall Trend Graphs - Cobalt**
**McDonough AP-2, 3/4 Risk Evaluation Report**
**McDonough AP-2, 3/4**
**Plant McDonough, Cobb County, GA**




| Mann-Kendall Trend Analysis | |
|---|---|
| n | 18 |
| Confidence Coefficient | 0.9500 |
| Level of Significance | 0.0500 |
| Standard Deviation of S | 26.3439 |
| Standardized Value of S | -5.0486 |
| M-K Test Value (S) | -134 |
| Tabulated p-value | 0.0000 |
| Approximate p-value | 0.0000 |

| Theil-Sen Trend Line (Red) | |
|---|---|
| Theil-Sen Slope | -0.0411 |
| Theil-Sen Intercept | 83.4759 |

Statistically significant evidence of a decreasing trend at the specified level of significance.

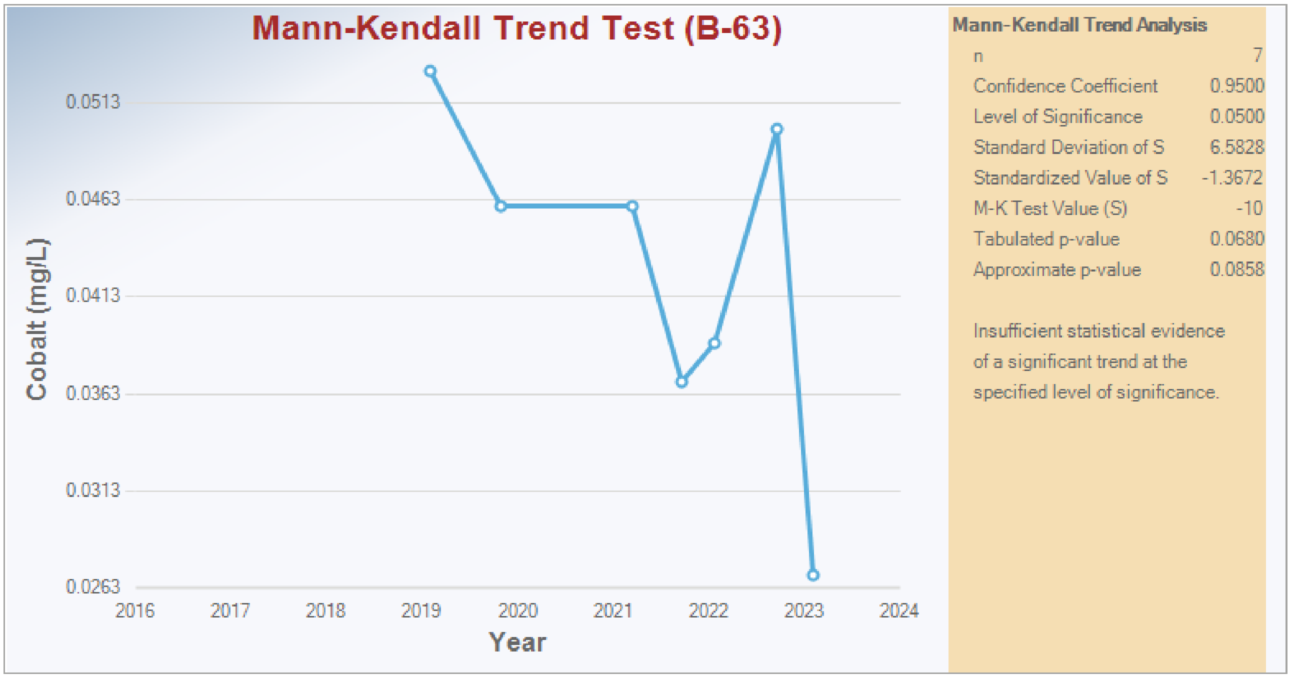


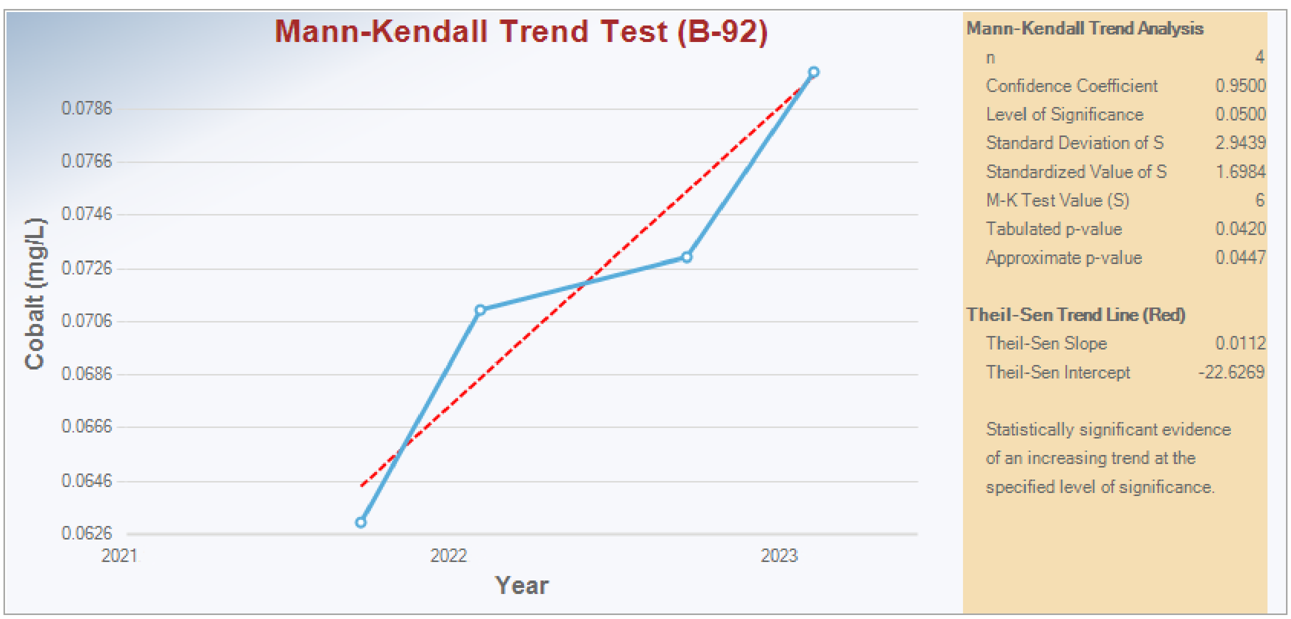

| Mann-Kendall Trend Analysis | |
|---|---|
| n | 7 |
| Confidence Coefficient | 0.9500 |
| Level of Significance | 0.0500 |
| Standard Deviation of S | 6.5828 |
| Standardized Value of S | 2.2787 |
| M-K Test Value (S) | 16 |
| Tabulated p-value | 0.0050 |
| Approximate p-value | 0.0113 |

| Theil-Sen Trend Line (Red) | |
|---|---|
| Theil-Sen Slope | 0.0052 |
| Theil-Sen Intercept | -10.4980 |

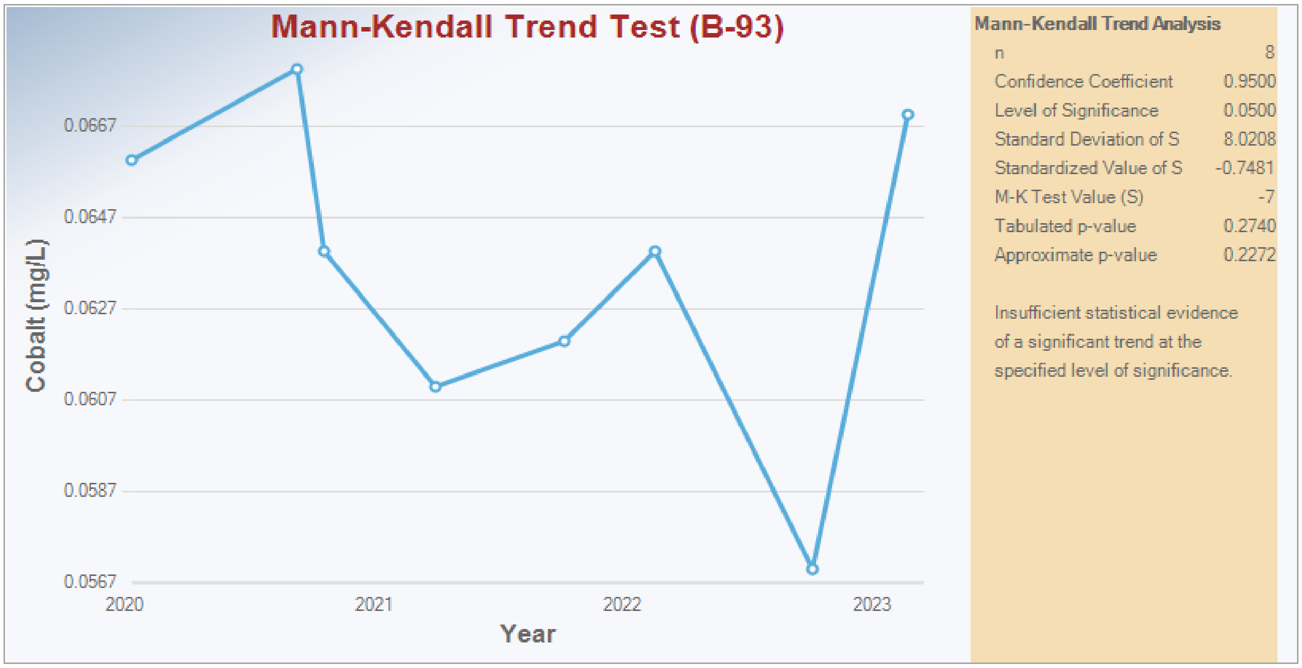
Statistically significant evidence of an increasing trend at the specified level of significance.

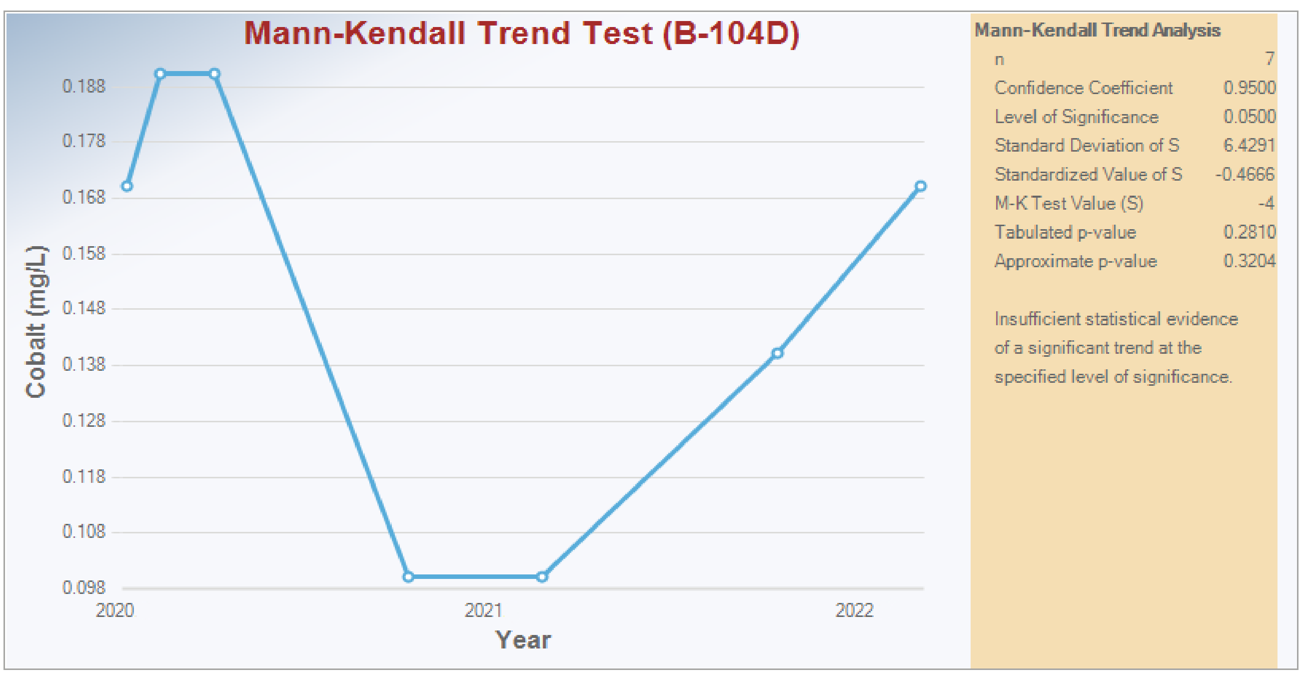
**Appendix D-4**
**Groundwater Mann-Kendall Trend Graphs - Cobalt**
**McDonough AP-2, 3/4 Risk Evaluation Report**
**McDonough AP-2, 3/4**
**Plant McDonough, Cobb County, GA**



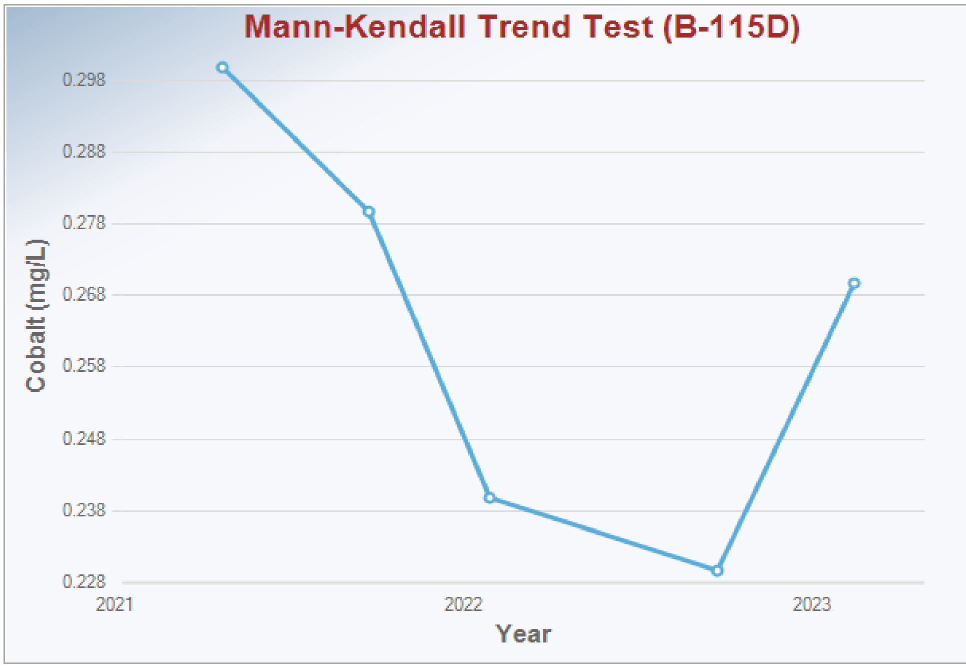



**Appendix D-4**
**Groundwater Mann-Kendall Trend Graphs - Cobalt**
**McDonough AP-2, 3/4 Risk Evaluation Report**
**McDonough AP-2, 3/4**
**Plant McDonough, Cobb County, GA**



# Appendix D-4
## Groundwater Mann-Kendall Trend Graphs - Cobalt
## McDonough AP-2, 3/4 Risk Evaluation Report
## McDonough AP-2, 3/4
## Plant McDonough, Cobb County, GA



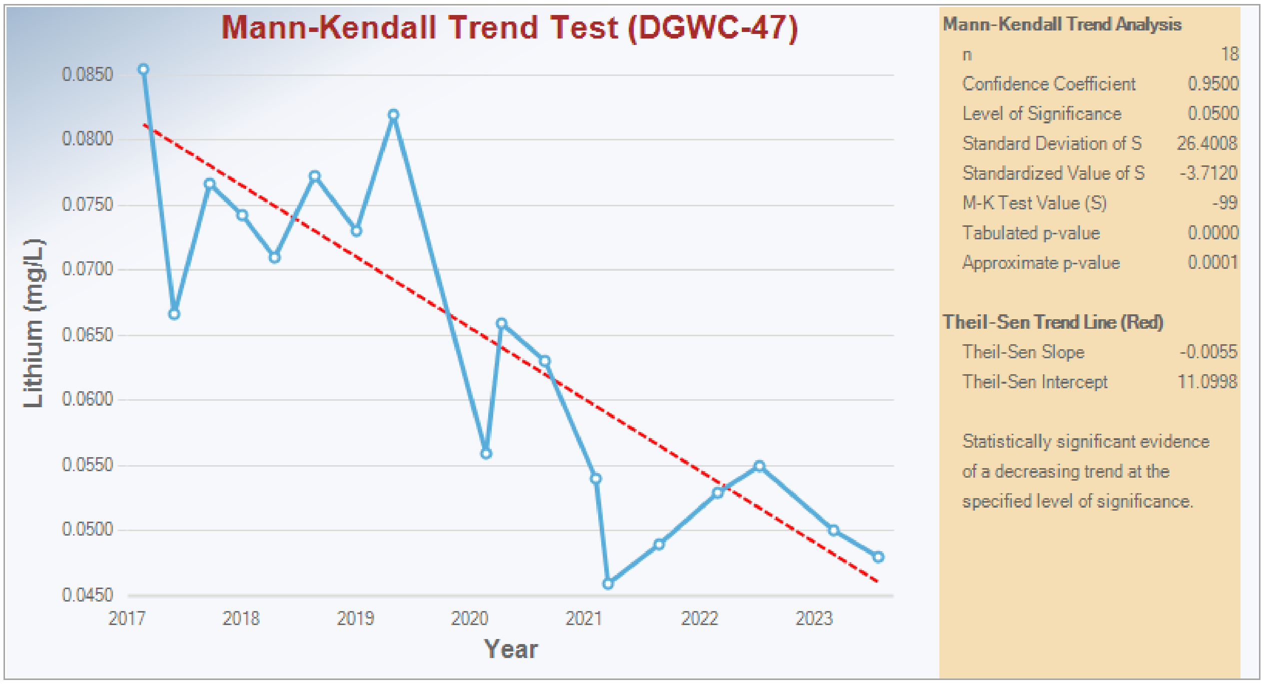

**Mann-Kendall Trend Analysis**

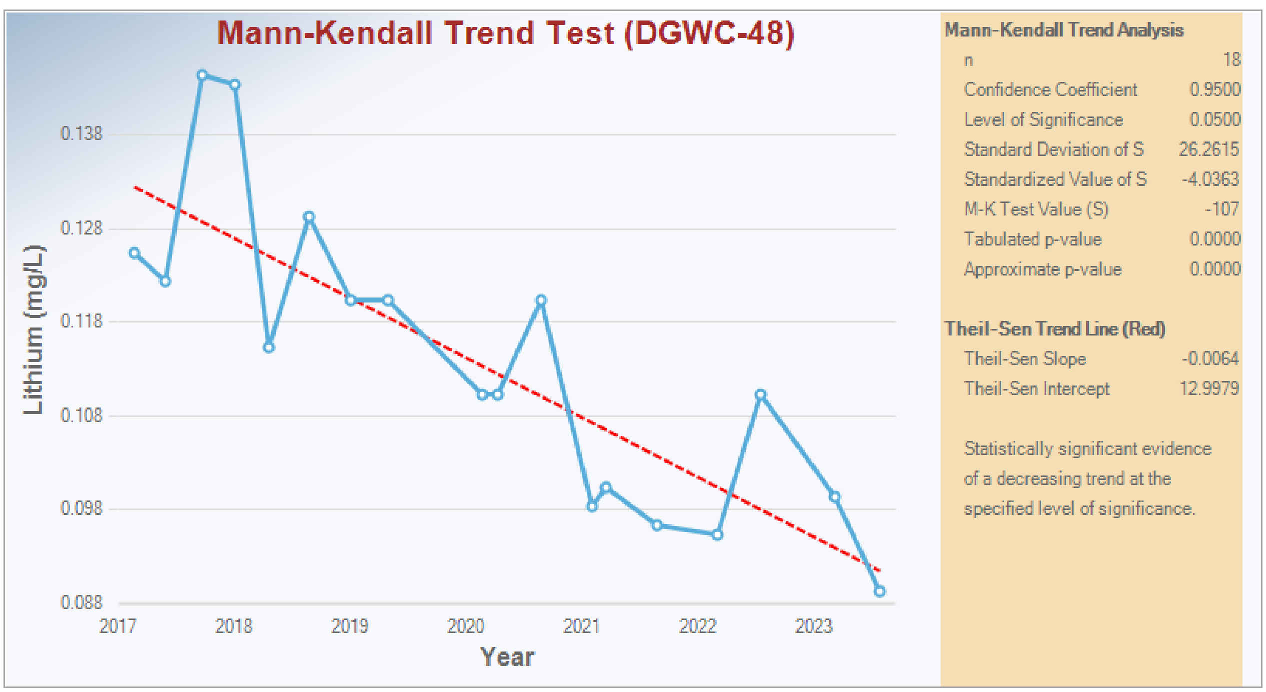
| | |
|---|---|
| n | 5 |
| Confidence Coefficient | 0.9500 |
| Level of Significance | 0.0500 |
| Standard Deviation of S | 4.0825 |
| Standardized Value of S | -1.2247 |
| M-K Test Value (S) | -6 |
| Tabulated p-value | 0.1170 |
| Approximate p-value | 0.1103 |

Insufficient statistical evidence of a significant trend at the specified level of significance.

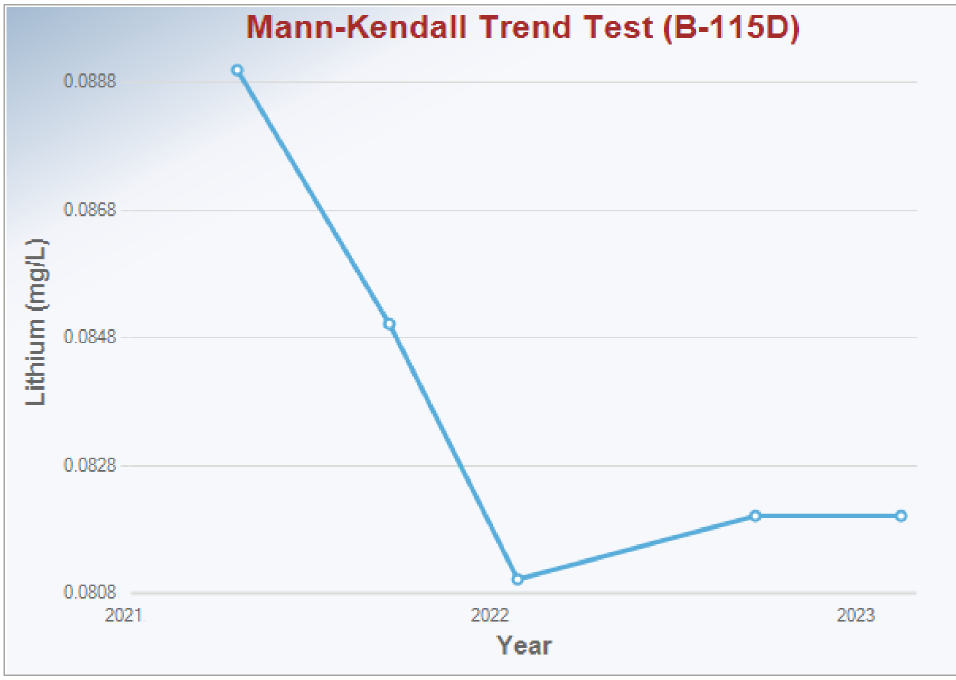
Prepared by/Date: JWS 4/27/23
Checked by/Date: LO 4/27/23

**Appendix D-4**
**Groundwater Mann-Kendall Trend Graphs - Lithium**
**McDonough AP-2, 3/4 Risk Evaluation Report**
**McDonough AP-2, 3/4**
**Plant McDonough, Cobb County, GA**



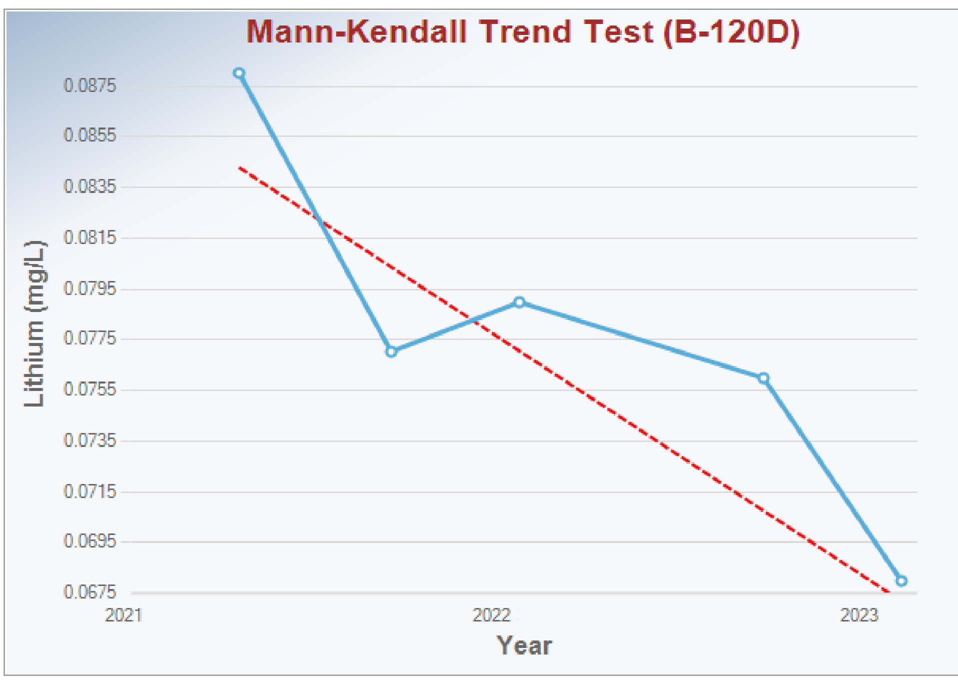
**Appendix D-4**
**Groundwater Mann-Kendall Trend Graphs - Lithium**
**McDonough AP-2, 3/4 Risk Evaluation Report**
**McDonough AP-2, 3/4**
**Plant McDonough, Cobb County, GA**




**Mann-Kendall Trend Analysis**

| | |
|---|---|
| n | 5 |
| Confidence Coefficient | 0.9500 |
| Level of Significance | 0.0500 |
| Standard Deviation of S | 3.9581 |
| Standardized Value of S | -1.0106 |
| M-K Test Value (S) | -5 |
| Tabulated p-value | 0.2420 |
| Approximate p-value | 0.1561 |

Insufficient statistical evidence of a significant trend at the specified level of significance.




**Mann-Kendall Trend Analysis**

| | |
|---|---|
| n | 5 |
| Confidence Coefficient | 0.9500 |
| Level of Significance | 0.0500 |
| Standard Deviation of S | 4.0825 |
| Standardized Value of S | -1.7146 |
| M-K Test Value (S) | -8 |
| Tabulated p-value | 0.0420 |
| Approximate p-value | 0.0432 |

**Theil-Sen Trend Line (Red)**

| | |
|---|---|
| Theil-Sen Slope | -0.0095 |
| Theil-Sen Intercept | 19.3081 |

Statistically significant evidence of a decreasing trend at the specified level of significance.

Prepared by/Date: JWS 4/27/23
Checked by/Date: LO 4/27/23

**APPENDIX D**

# Site-Specific Demonstration of Natural Attenuation (MNA Feasibility)

This appendix provides the supporting technical information to demonstrate the progressive evaluation of Monitored Natural Attenuation (MNA) at Plant McDonough AP-2 and 3/4 CCR Unit, using the framework established by the U.S. Environmental Protection Agency (USEPA) guidelines for MNA (USEPA 2007a, 2007b, 2015). In 2007, the USEPA issued MNA technical guidance specific to inorganic constituents (USEPA 2007a, b) that contained four "tiers." The 2015 MNA guidance retains these four "tiers," but describes them as "phases" as described below (USEPA 2015). Characterization activities were completed to evaluate the existing and long-term effectiveness of attenuation processes in the aquifer and reduce uncertainty for decision making at each of the following screening steps (i.e., phase):

- **Phase I:** Demonstration that the groundwater plume is not expanding.
- **Phase II:** Determination that the mechanism and rate of the attenuation process are sufficient.
- **Phase III:** Determination that the capacity of the aquifer is sufficient to attenuate the mass of contaminant within the plume and the stability of the immobilized contaminant is sufficient to resist remobilization.
- **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.

Each phase of the MNA analysis for the site is discussed further below. Supporting data and interpretations from the *Geochemical Conceptual Site Model* (RSR; Appendix B) are incorporated to demonstrate the site-specific conditions that favor the attenuation of arsenic, beryllium, and cobalt in groundwater at AP-2 and 3/4. Lithium is not addressed in this MNA feasibility because concentrations of lithium at DGWC-9 no longer are observed at SSLs More specifically, MNA is the proposed remedy for the following well/constituent pairs and the predicted timeframe to achieve groundwater quality to below the groundwater protection standard (GWPS) following completion of closure is also noted.

| Well ID / Model Transect | Constituents | MNA Timeframe |
|---|---|---|
| DGWC-5 / Transect 3 | Beryllium | 6 years |
| DGWC-8 / Transect 4 | Cobalt | 0 years |
| DGWC-9 / Transect 5 | Arsenic, Beryllium, Cobalt | < 5 years |
| DGWC-10 / Transect 6 | Beryllium, Cobalt | < 5 years |

Note: Transect locations are shown on Figures 1a and 1b of Appendix C, Geochemical Modeling

For each phase of the MNA analysis, the closure plan for AP-2 and 3/4 assumes that ash will be dry within 5 to 10 years following completion of closure activities[1]. MNA feasibility modeling 'starts' with a dry ash condition (no saturated waste in contact with groundwater) and therefore the estimated times to achieve the GWPS at the detection monitoring wells also begins at a dry ash condition.

Additionally, for each phase of the MNA analysis, the extent of groundwater with arsenic, beryllium, and cobalt concentrations above the GWPS has been delineated vertically and horizontally.

[1] WSP 2023. Advanced Engineering Methods Feasibility Report, Plant McDonough Ash Pond 3 and Ash Pond 4 (AP-3/4), WSP USA Inc., May 2023.

## Phase I: Stable and Decreasing Concentrations

Phase I of the evaluation of MNA as a viable remedy for the site includes the demonstration of groundwater plume stability. Where a groundwater plume is stable and/or decreasing, MNA may be retained as a viable remedy. Historical and recent groundwater quality (through September 2022) have been evaluated for temporal trends and to determine whether the observed concentrations are statistically significant, a Mann-Kendall trend analysis was completed for monitoring wells DGWC-5, DGWC-8, DGWC-9, and DGWC-10 for the Appendix III inorganic indicators and select Appendix IV constituents (arsenic, beryllium, and cobalt) where SSLs have been observed.

The stability of the delineated areas is demonstrated through the trend analysis for Appendix IV constituents (Attachment D-1). At AP-2 and 3/4 where MNA is the selected remedy, decreasing trends are noted in Appendix III indicator constituents (boron, calcium, chloride, fluoride, pH, sulfate, and total dissolved solids) (Attachment D-2) with few exceptions (beryllium at DGWC-5 and cobalt at DGWC-9). However once closure is complete and ash is no longer in contact with groundwater, models predict SSLs at DWGC-5 and DGWC-9 will stabilize to show a decrease in concentration.

The observed statistically significant decreasing trends observed at the Site (Appendix D-1 and D-2) are further supported by the geochemical transport model simulations which predict declines in concentrations to below the GWPS (Appendix C). It is not uncommon for short-term disruptions in groundwater flow and geochemistry to occur during closure which may cause temporary increases in constituent concentrations at varying locations.

## Phase II: Mechanism and Rate of Attenuation

Phase II of the MNA evaluation is a determination that the mechanism and rate of the attenuation process are sufficient. Primary mechanisms accounting for the attenuation of arsenic, beryllium, cobalt, lithium at the site include sorption, dilution, and dispersion. Geochemical data also indicates arsenic, beryllium and cobalt precipitation may be a potential mechanism in some portions of the site (Appendix B). Under Phase II of the phased MNA evaluation, sufficient attenuation rates to meet the GWPS within a reasonable timeframe must be demonstrated based on site geochemical conditions (USEPA 2007a, b).

The attenuation mechanism of arsenic, beryllium and cobalt (including primarily chemical adsorption) was evaluated and demonstrated through speciation analysis, general chemical analysis, mineralogical analysis, and sorption studies as detailed in the Geochemical CSM, Appendix B. Adsorption modeling in PHREEQC based on aluminum and iron surface site densities (calculated from sequential extraction (SEP) data in the GCSM) revealed adequate capacity to attenuate arsenic, beryllium, and cobalt based on current levels measured in downgradient monitoring wells. The term “adequate”, as used in this document, refers to the capacity needed to attenuate constituents in groundwater to a level that meets the site-specific GWPS (ITRC 2010). Specifics for each SSL are as follows:

**DGWC-5:** The beryllium at DGWC-5 is the result of slightly lower pH (4.75 in September 2022) at the well leading to the lack of attenuation of beryllium. Based on the PHREEQC modeling of MNA, it is predicted that levels will drop below the GWPS in around 6 years after closure. Closure assumes complete cut-off of any source water causing pH at the well to return to circumneutral (6-7). Current groundwater flow is inward towards the former ash pond, which is supported by the closure groundwater models. The model uses aluminum and iron surface site densities, calculated using the results of site-specific SEP testing (Appendix C), beryllium attenuation will be enhanced once the pH returns to circumneutral (6-7 S.U.). Beryllium is ten times less mobile at a neutral pH range (5 to 9 S.U.) than at higher or lower pH (Strenge and Peterson 1989) and is known to co-precipitate with iron hydroxides [$Fe(OH)_3$] under semi-alkaline conditions (Smith 1999). Thus, the mechanism of attenuation of beryllium can be identified and the rate is adequate based on geochemical modeling.

**DGWC-8:** Based on the four most recent sampling events (since September 2021), cobalt levels at DGWC-8 are below the GWPS. Cobalt levels at DGWC-8 have been steadily decreasing for multiple years and therefore both the attenuation rate and capacity are adequate for MNA. Based on what we know about groundwater flow, the geochemical characteristics of the site, and the closure plan, cobalt levels are expected to remain below the GWPS, as the gradient at DGWC-8 is already inward towards the ash pond based on groundwater modeling.

**DGWC-9:** Arsenic, beryllium, and cobalt at DGWC-9 are predicted to attenuate to below the GWPS (< 5 years) primarily due to the groundwater flow reversal and anticipated pH increase expected based on groundwater flow and geochemical modeling. As of September 2022, the pH of groundwater at DGWC-9 was 3.98 S.U. and the pH of groundwater at that well has been historically low. At low pH (<5 S.U.), arsenic, beryllium, and cobalt will desorb, becoming mobile in groundwater when sorbents such as ferrihydrite are dissolved (Nordstrom et al. 2014; Hem 1985). The sorption of arsenic, beryllium, and cobalt onto ferrihydrite (Dzombak and Morel 1990; Schwertmann 1988) and gibbsite (Karamalidis and Dzombak 2010) under varying pH and redox conditions has been well studied, as has arsenic adsorption onto clay minerals (Manning and Goldberg 1996). Based on the geochemical modeling in PHREEQC, site specific soils data (SEP) and an abundant amount of scientific research (referenced above), as pH increases following the influx of background groundwater, levels are predicted to drop to below the GWPS.

**DGWC-10:** Concentrations of beryllium and cobalt are predicted to drop below their respective GWPS in less than 5 years after closure based on modeling of the current conditions and cessation of porewater into the aquifer. The pH at DGWC-10 has consistently been below 5.5 S. U, but above 4.5 S.U. since 2016. The levels of beryllium and cobalt at that well are a result of the lack of attenuation due to the low pH of groundwater. Upon closure it is predicted that pH will increase to circumneutral and sorption will remove the beryllium and cobalt from groundwater as clean groundwater enters the area of the well from offsite.

## Phase III: Capacity and Stability of Aquifer Solids

The determination of sufficient attenuation capacity to immobilize the mass of arsenic, beryllium, and cobalt required to achieve their respective GWPS within a reasonable timeframe is the primary goal of the evaluation under Phase III (USEPA 2007a). Assessments of the sorption capacity and stability of the aquifer matrix to attenuate arsenic, beryllium, and cobalt in groundwater, aquifer matrix composition analyses were conducted. Attenuation capacity is supported by results from site-specific SEP testing confirming the presence of abundant aluminum, iron, and manganese adsorptive surfaces sites in overburden, PWR/TWR, and bedrock, as well as a mineralogical investigation at the site (Details of this investigation are provided in Appendix B and are summarized as they relate to Phase III below).

Iron was present in all of the overburden samples analyzed, ranging from 4,800 to 69,000 mg/kg using the hydrofluoric acid digestion used for SEP. In both overburden and bedrock, smaller proportions of iron also resided in the metal hydroxide and amorphous fractions. These phases, part of the labile fraction in steps 1 through 5, can generally be considered representative of the amount of iron in soil that may be available as a sorbing medium and can, therefore, be important for attenuation of metals.

Manganese in overburden ranged from 180 to 2,800 mg/kg while the environmentally available fraction ranged from 19.8 mg/kg to 2,499 mg/kg, representing from 11% to 90% of total manganese. The majority of manganese in overburden samples was present in amorphous and metal hydroxide fractions, indicating the presence of a sorbent available for attenuating Constituents of Interest (COI)s.

Aluminum has been well studied as a potential sorbing medium in soils (e.g., Karamalidis and Dzombak 2010). Total aluminum in overburden ranged from 37,000 to 88,000 mg/kg. Up to 99% of total aluminum resided in the residual or silicate fraction, consistent with the presence of aluminum silicate minerals. Clays can represent an important sorptive reservoir for numerous trace metals and metalloids, including the constituents at this site (Uddin 2017).

The mineralogical investigation revealed that there is a progressive increase in micas and clays from the bedrock, consisting of biotite gneiss, to the PWR and overburden, as noted in the increased amounts of biotite, muscovite, kaolinite, etc., and increased amounts of iron oxide minerals. Overall, the mineralogical compositions in the overburden and PWR reflect weathered biotite gneiss. Clays, present in overburden and to a lesser degree bedrock, can represent an important sorptive reservoir for numerous trace metals and metalloids, including the COI at this site (Uddin 2017). Some overburden samples reported gibbsite and hematite, which are minerals that are also known to enhance metal attenuation in the soil matrix, in agreement with SEP results.

The long-term stability of arsenic, beryllium, and cobalt can be summarized as follows:

- **Arsenic:** For the range of pH and Eh values predicted at the site in the 50 years after closure and source control, arsenic levels are predicted to remain stable. It is not anticipated that attenuated arsenic will re-mobilize and exceed the GWPS in the future once compliance is achieved. For the anticipated pH range of groundwater at the site after closure, Stenge and Peterson (1989) list a partitioning coefficient of 5.86 to 19.4 L/kg for arsenic. At the pH and redox predicted at the wells during modeling, sorptive surfaces should also remain stable. Thus, with source control and stable pH and Eh, long-term stability of arsenic is expected.
- **Beryllium:** For the range of pH and Eh values predicted at the site in the 50 years after closure and source control, beryllium levels are predicted to remain stable. It is not anticipated that attenuated beryllium will re-mobilize and exceed the GWPS in the future once compliance is achieved. For the anticipated pH range of the site, Stenge and Peterson (1989) list a partitioning coefficient of 530 to 16,000 L/kg for beryllium. At the pH and redox predicted at the wells during modeling, sorptive surfaces should also remain stable. Thus, with source control and stable pH and Eh, long-term stability of beryllium is expected.
- **Cobalt:** For the range of pH and Eh values predicted at the site in the 50 years after closure and source control, cobalt levels are predicted to remain stable. It is not anticipated that attenuated cobalt will re-mobilize and exceed the GWPS in the future once compliance is achieved. For the anticipated pH range of the site, Stenge and Peterson (1989) list a partitioning coefficient of 1.9 to 200 L/kg for cobalt. At the pH and redox predicted at the wells during modeling, sorptive surfaces should also remain stable. Additionally, the stability of ferrihydrite will also ensure any co-precipitated cobalt will remain sequestered. Thus, with source control and stable pH and Eh, long-term stability of cobalt is anticipated.

## Phase IV: Performance Monitoring Program

The final phase of the MNA evaluation is the assessment of the long-term performance of the remedy through the development of a performance monitoring program and potential alternatives required to attain GWPS (USEPA 2015). A conceptual layout of the source control measures with the MNA groundwater remedy is provided on Figure 9 of the *Draft Remedy Selection Report*. The performance monitoring network locations selected will represent adequate spatial (aerial and vertical) distribution of wells to monitor the area(s) impacted by CCR as well as areas in which arsenic, beryllium, and cobalt attenuation is occurring.

Pursuant to § 257.98, a *Corrective Action Monitoring Plan* will be established within 90 days of GA EPD approval and selection of the groundwater remedy. Following the requirements of the Rule, the Corrective Action Program (CAP; § 257.98(1)) must do the following:

1) At minimum, meets the requirements of an Assessment Monitoring Program under §257.95

2) Documents the effectiveness of the Corrective Action Remedy; and

3) Demonstrates Compliance with the Groundwater Protection Standards

The *Corrective Action Groundwater Monitoring Plan* will outline steps to ensure that these key objectives are met. Specifically, the plan will ensure the monitoring well data, site conditions, and statistical analysis is routinely evaluated. Should these data, as a whole, call the efficacy of the proposed remedy (ISI with MNA) into question, Georgia Power will reassess alternative technologies.

## Summary

The site-specific demonstration of natural attenuation at Plant McDonough AP-2 and 3/4 follows USEPA guidance to evaluate and demonstrate the long-term stability and effectiveness of MNA at the site. Using the phased approach, the following conditions were observed:

- Statistical trends are decreasing, stable, or predicted to decrease once closure is complete and ash is no longer in contract with groundwater (Phase I).
- The site-specific aquifer materials testing, supported by geochemical and groundwater modeling, indicate that attenuation to below the respective GWPS for arsenic, beryllium, and cobalt will likely occur within approximately 6 years after ash pond closure is complete, and there are no longer contributions from the ash pond to the aquifer (Phase II).
- Capacity for attenuation (Phase III) was demonstrated through detailed site-specific aquifer materials analyses and a mineralogical investigation. These studies demonstrated that adequate metal sorption surfaces (aluminum, iron, and manganese) exist at the site, and that chemical sorption capacity will increase once the pH of groundwater returns to circumneutral levels. Further, clay mineral phases were identified in aquifer materials and sorptive minerals gibbsite and hematite were also present. Geochemical modeling has indicated that given the expected range of pH and Eh of groundwater long term at the site, re-mobilization of the constituents once the GWPS is achieved is not likely.
- The development of a performance monitoring program is forthcoming upon approval of the Final Remedy Selection Report (Phase IV).

## References

Dzombak, D. and Morel, F., 1990. Surface complexation modeling: hydrous ferric oxide. John Wiley & Sons.

Hem, J., 1985. Study and interpretation of the chemical characteristics of natural water (Vol. 2254). US Geological Survey.

Karamalidis, A., and Dzombak, D., 2010. Surface Complexation Modeling: Gibbsite. John Wiley and Sons, New Jersey.

ITRC, 2010. A Decision Framework for Applying Monitored Natural Attenuation Processes to Metals and Radionuclides in Groundwater. Technical/Regulatory Guidance.

Manning, B.A. and Goldberg, S., 1996. Modeling arsenate competitive adsorption on kaolinite, montmorillonite and illite. Clays and clay minerals, 44(5), pp.609-623.

Nordstrom, K., Majzlan, J. and Königsberger, E., 2014. Thermodynamic properties for arsenic minerals and aqueous species. Reviews in Mineralogy and Geochemistry, 79(1), pp.217-255.

Smith, K., 1999. Metal sorption on mineral surfaces: an overview with examples relating to mineral deposits.

Strenge, D. and Peterson, S. 1989. Chemical Data Bases for the Multimedia Environmental Pollutant Assessment System (MEPAS) (No. PNL-7145). Pacific Northwest Lab., Richland, WA.

Uddin, M. 2017. A review on the adsorption of heavy metals by clay minerals, with special focus on the past decade. Chemical Engineering Journal, 308, pp.438-462.

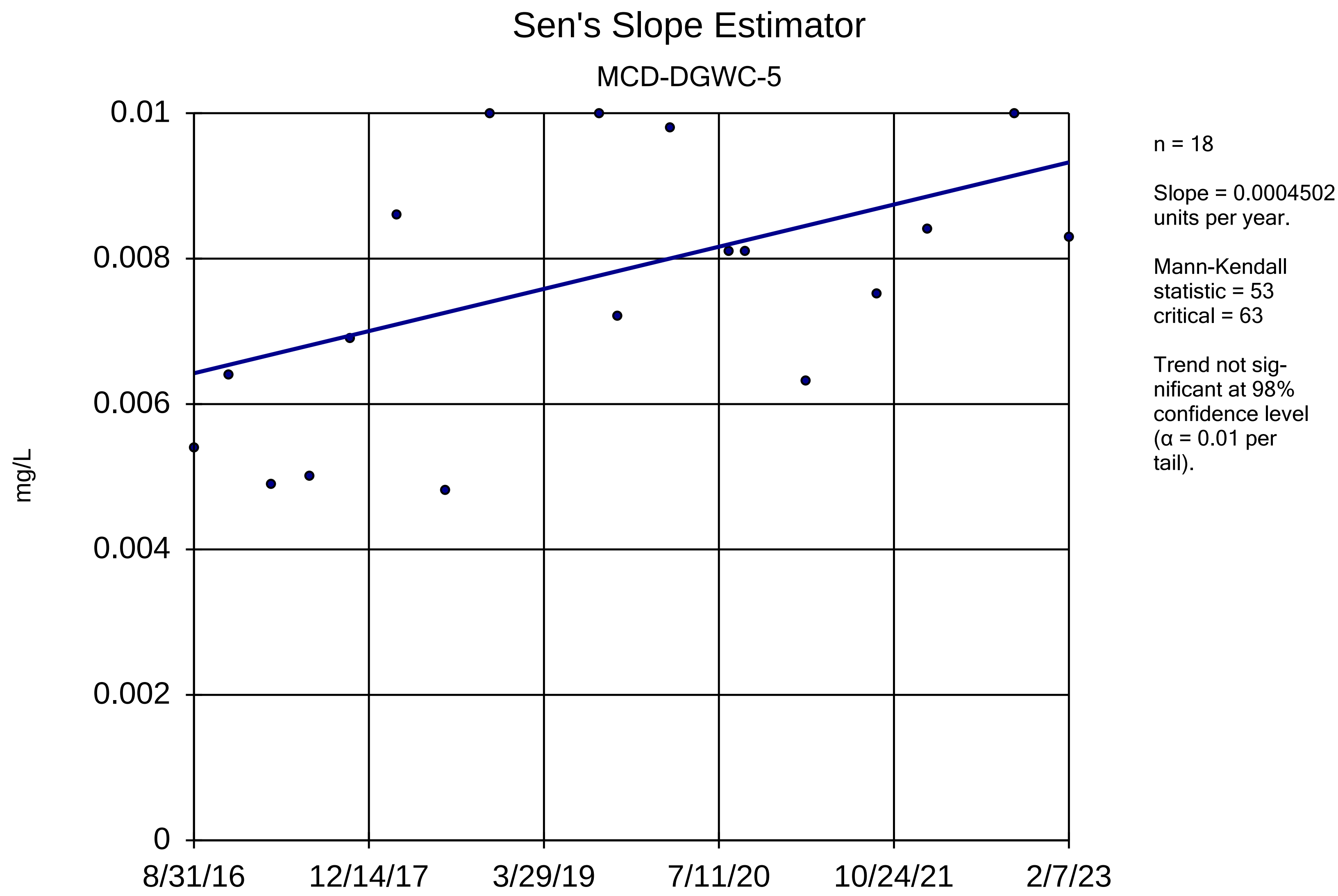
USEPA. 2007a. Monitored Natural Attenuation of Inorganic Contaminants in Ground Water Volume 1 – Technical Basis for Assessment. U.S. Environmental Protection Agency, Washington, DC, EPA/600/R-07/139, 2008.

USEPA, 2007b. Monitored Natural Attenuation of Inorganic Contaminants in Ground Water. Volume 2. Assessment for Non-Radionuclides Including Arsenic, Cadmium, Chromium, Copper, Lead, Nickel, Nitrate, Perchlorate, and Selenium. EPA/600/R-07/140.

USEPA. 2015. Use of Monitored Natural Attenuation for Inorganic Contaminants in Groundwater at Superfund Sites. USEPA Office of Solid Waste and Emergency Response. Directive 9283.1-36. August.

**APPENDIX D-1**

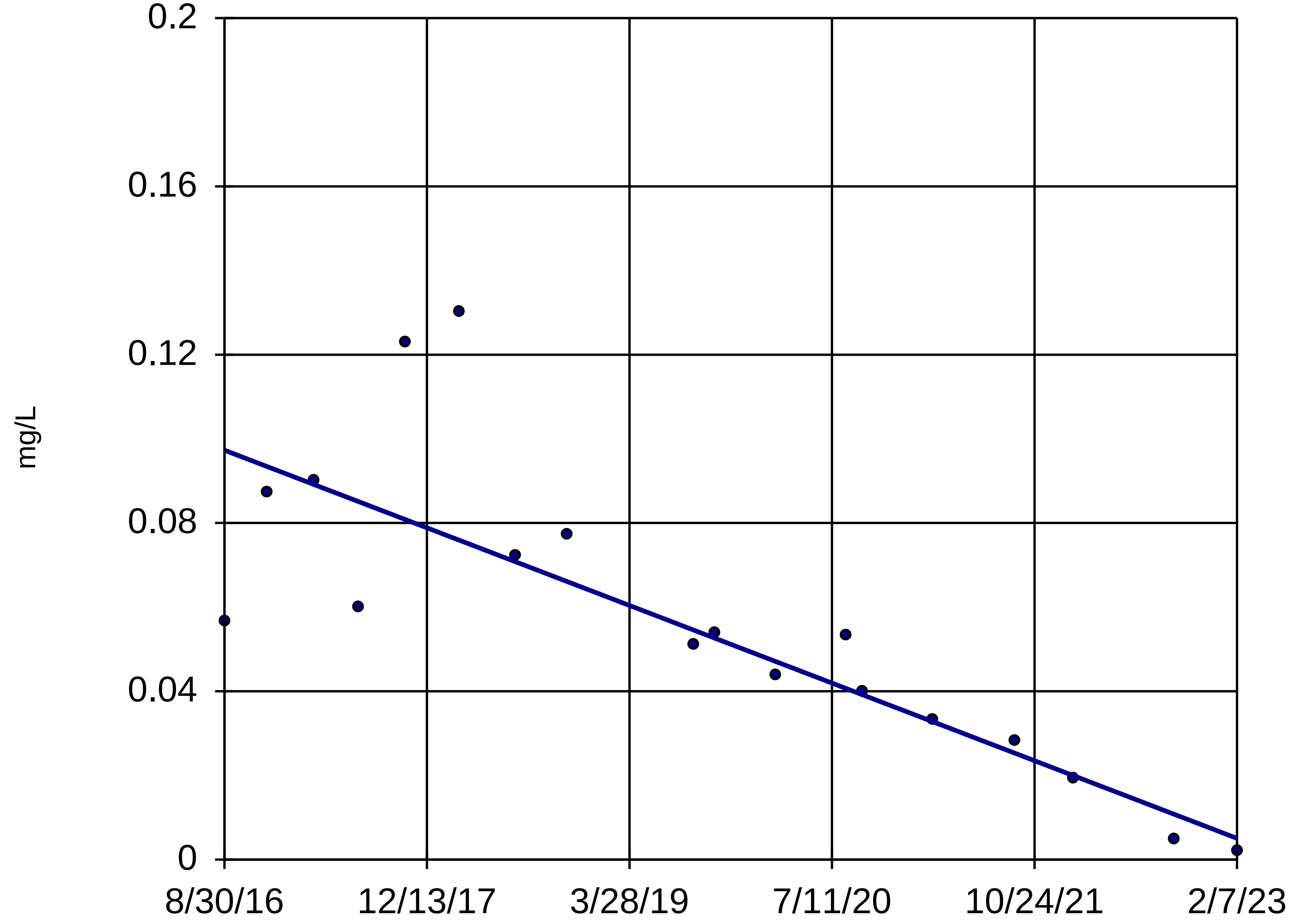
# Appendix IV Trends




Constituent: Beryllium  Analysis Run 4/3/2023 5:40 PM  View: APPIV_AP234
McDonough  Client: WSP  Data: McDonough Ash Pond

# Sen's Slope Estimator

MCD-DGWC-8




n = 18

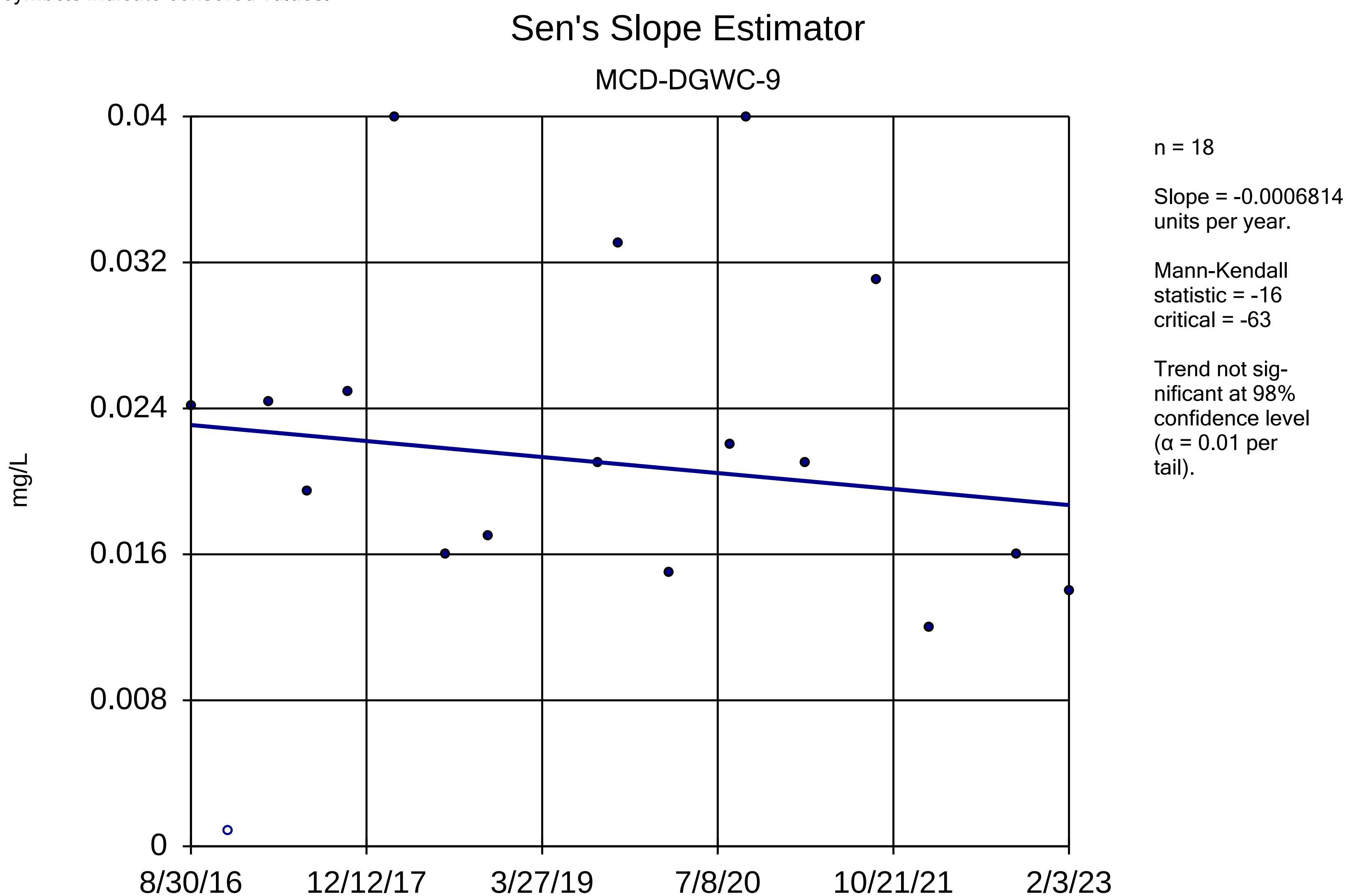
Slope = -0.01431
units per year.

Mann-Kendall
statistic = -111
critical = -63

Decreasing trend
significant at 98%
confidence level
(α = 0.01 per
tail).

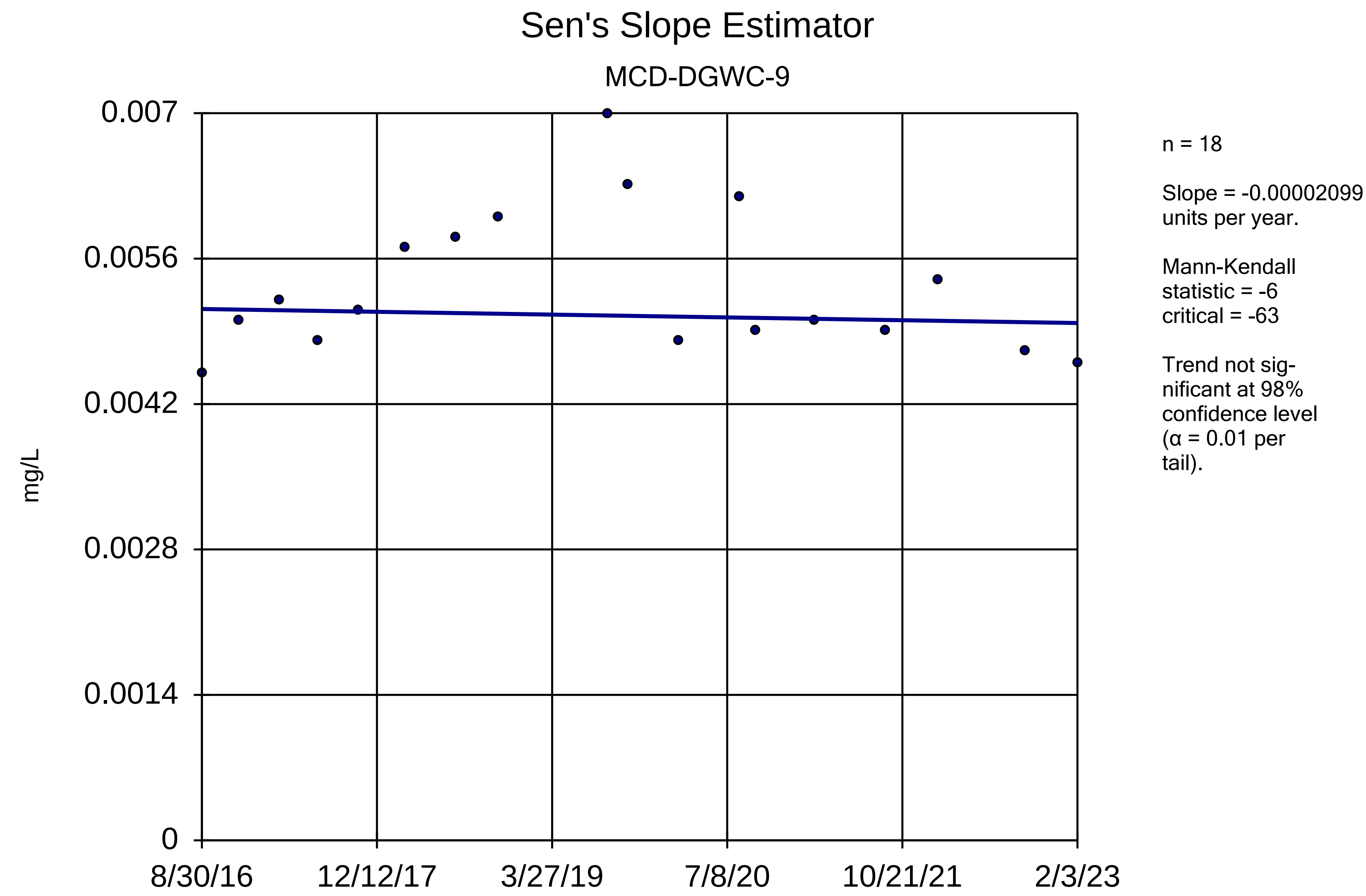
Constituent: Cobalt  Analysis Run 4/3/2023 5:40 PM  View: APPIV_AP234
McDonough  Client: WSP  Data: McDonough Ash Pond

Sanitas™ v.9.6.37 Software licensed to WSP. UG
Hollow symbols indicate censored values.



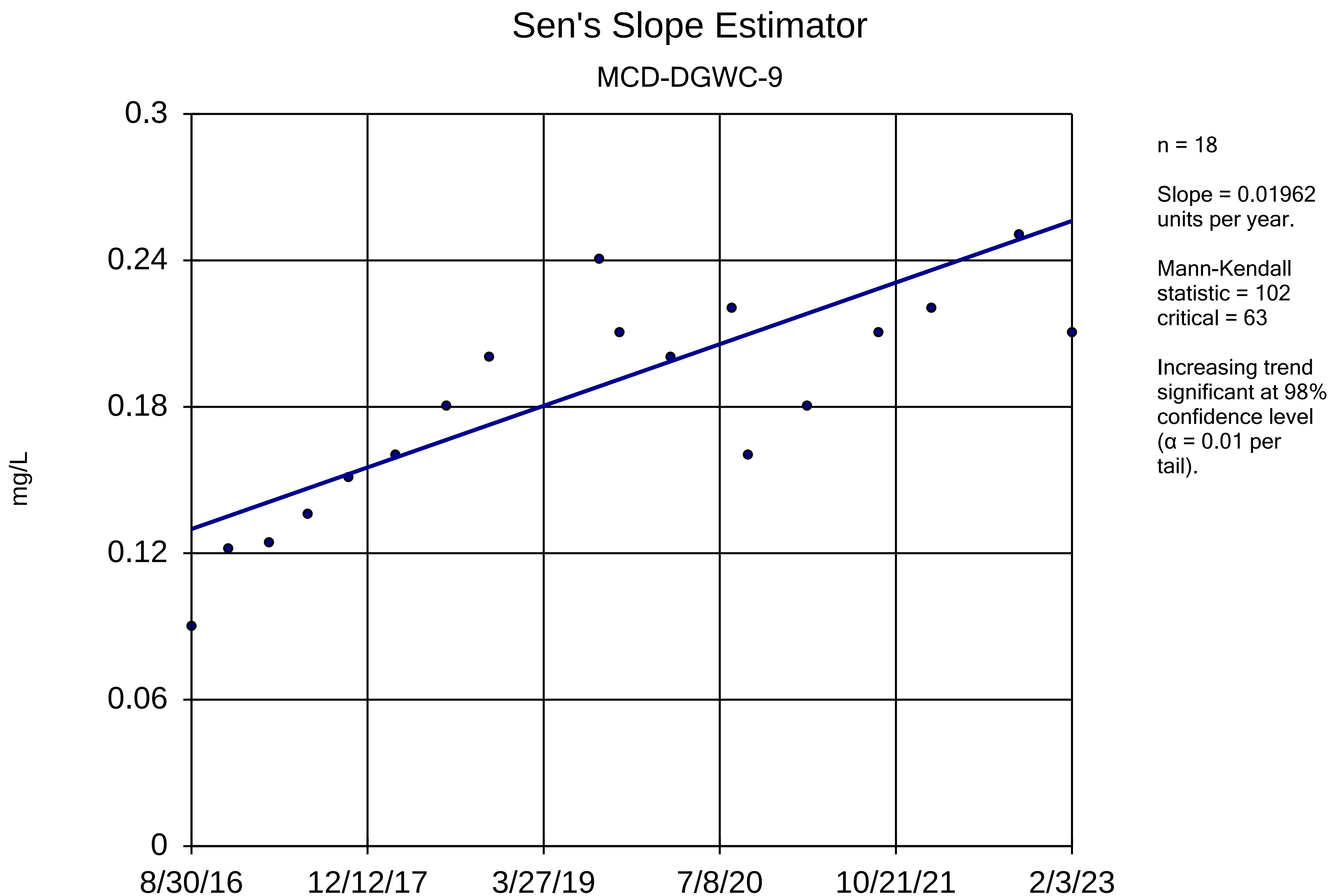

Constituent: Arsenic  Analysis Run 4/3/2023 5:40 PM  View: APPIV_AP234
McDonough  Client: WSP  Data: McDonough Ash Pond

Sanitas™ v.9.6.37 Software licensed to WSP. UG



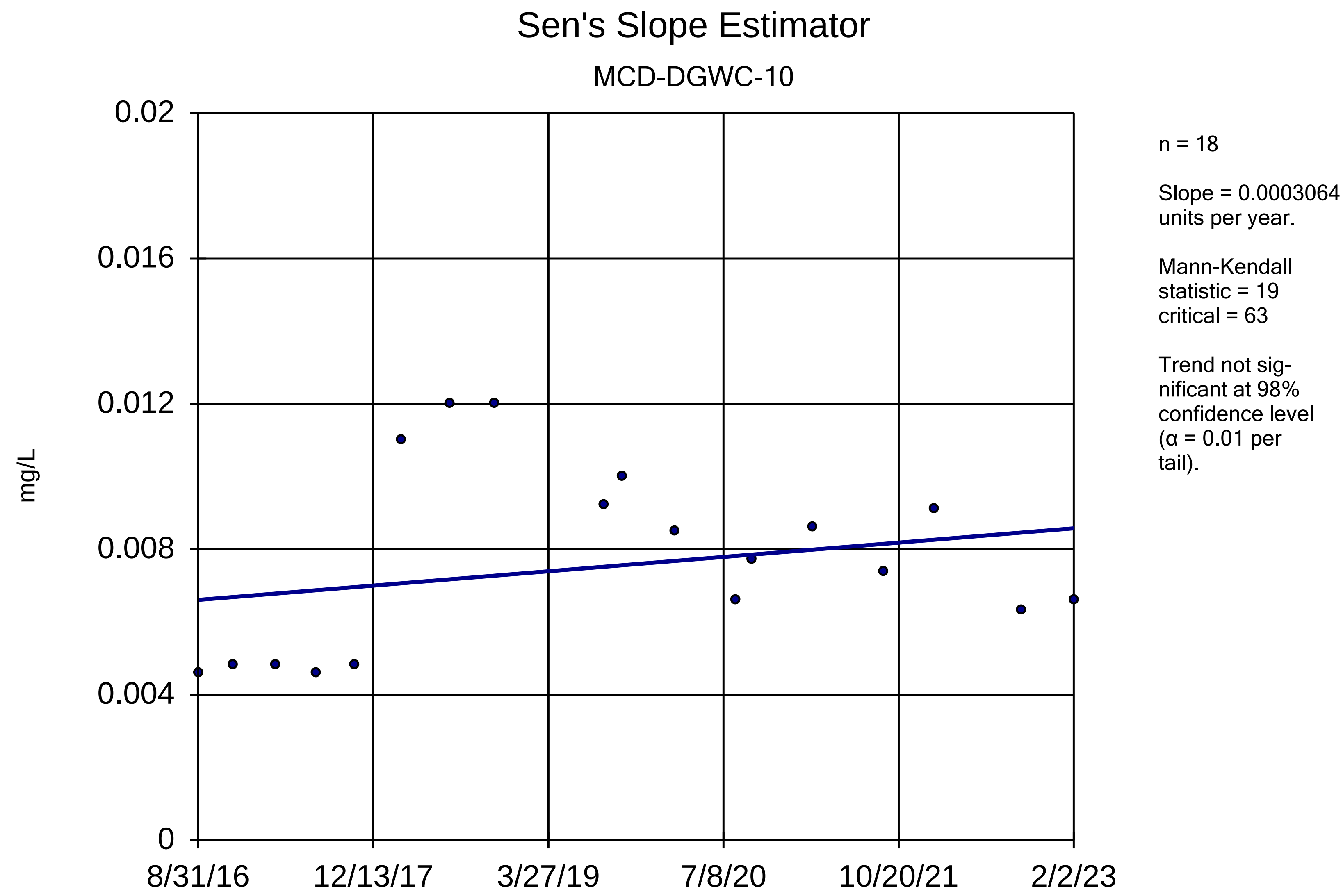

Constituent: Beryllium Analysis Run 4/3/2023 5:40 PM View: APPIV_AP234
McDonough Client: WSP Data: McDonough Ash Pond

Sanitas™ v.9.6.37 Software licensed to WSP. UG




Constituent: Cobalt Analysis Run 4/3/2023 5:40 PM View: APPIV_AP234
McDonough Client: WSP Data: McDonough Ash Pond

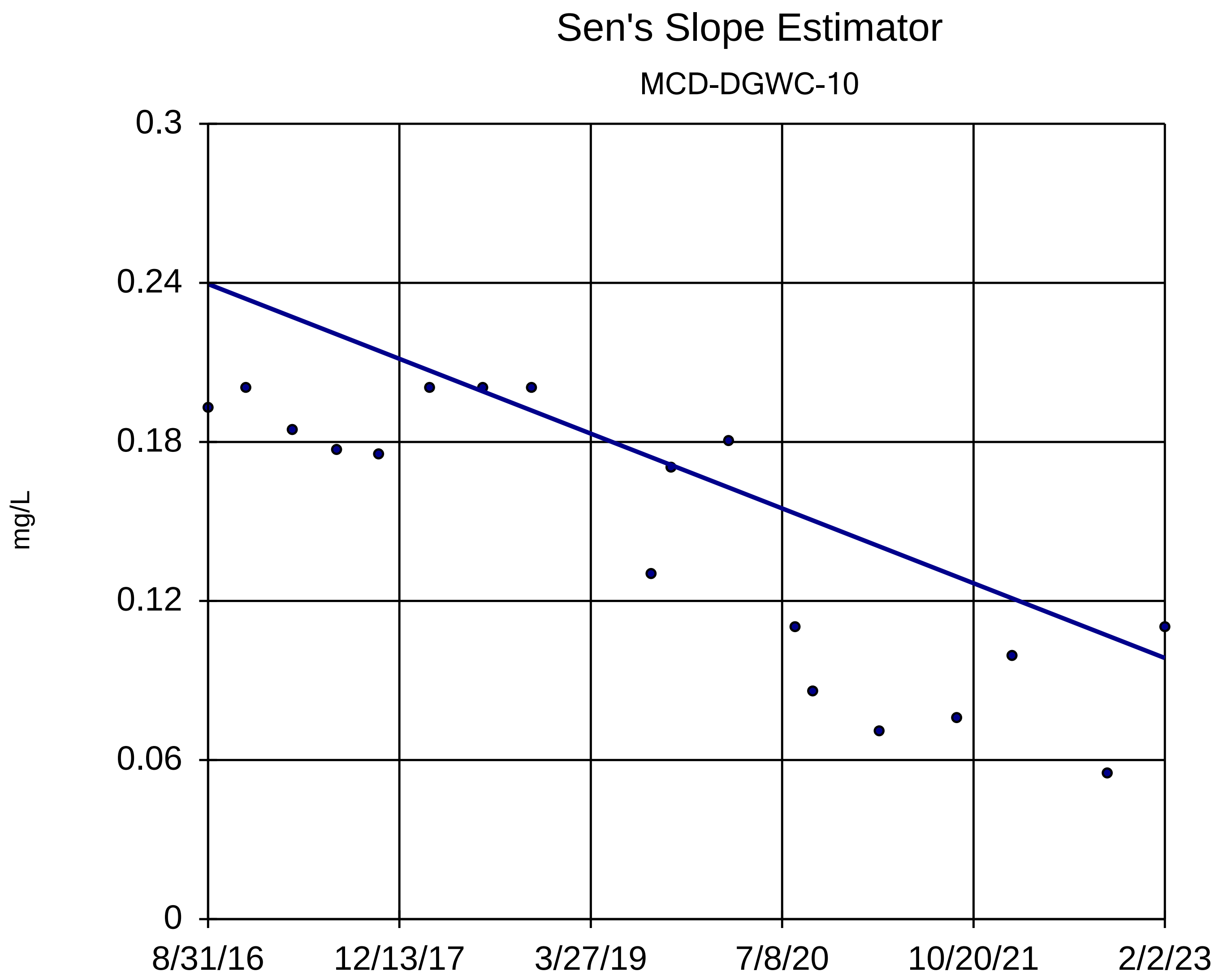
Sanitas™ v.9.6.37 Software licensed to WSP. UG




Constituent: Beryllium  Analysis Run 4/3/2023 5:40 PM  View: APPIV_AP234

McDonough  Client: WSP  Data: McDonough Ash Pond

Sanitas™ v.9.6.37 Software licensed to WSP. UG




n = 18

Slope = -0.02194 units per year.

Mann-Kendall statistic = -92 critical = -63

Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

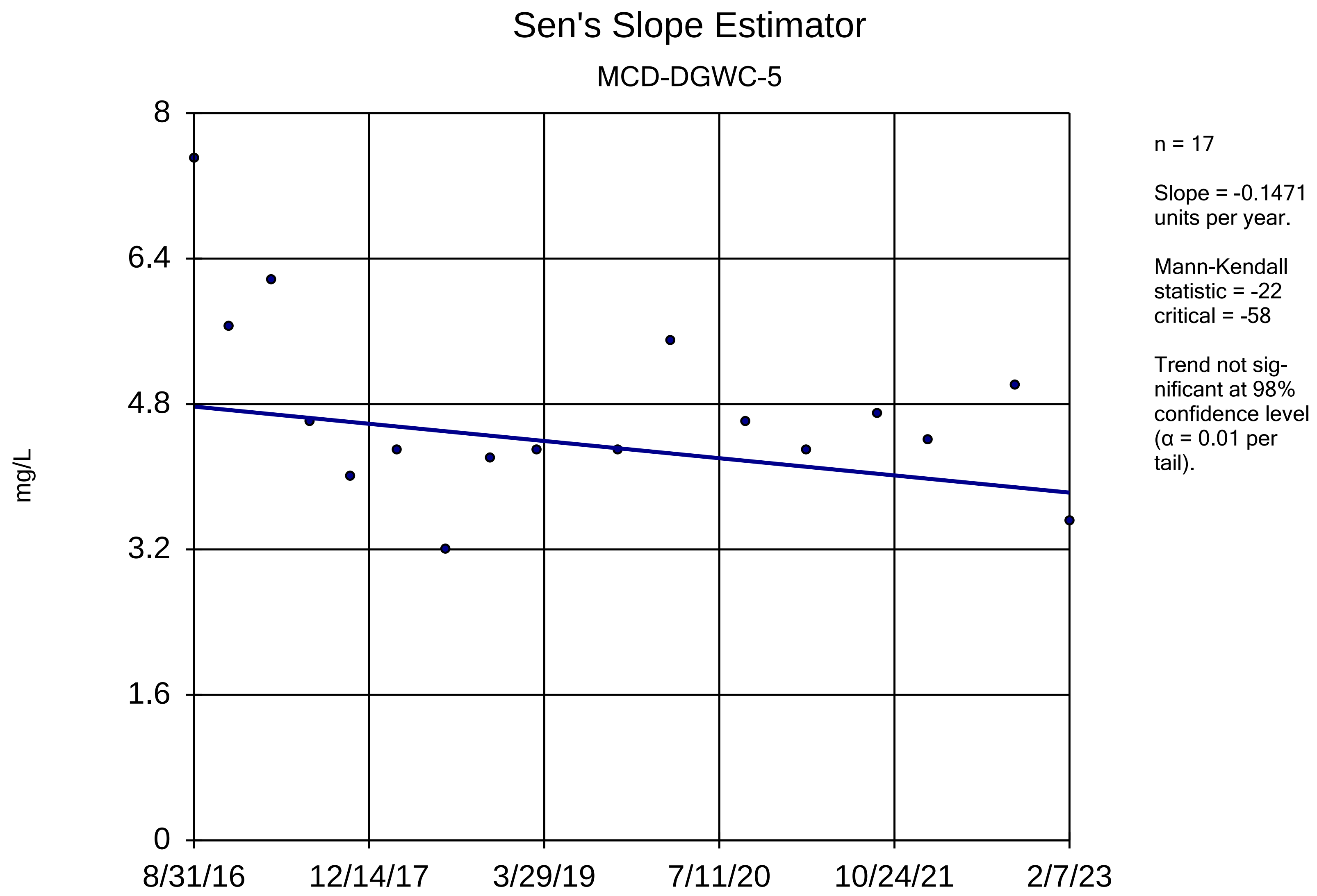
Constituent: Cobalt Analysis Run 4/3/2023 5:40 PM View: APPIV_AP234

McDonough Client: WSP Data: McDonough Ash Pond

**APPENDIX D-2**

# Appendix III Trends

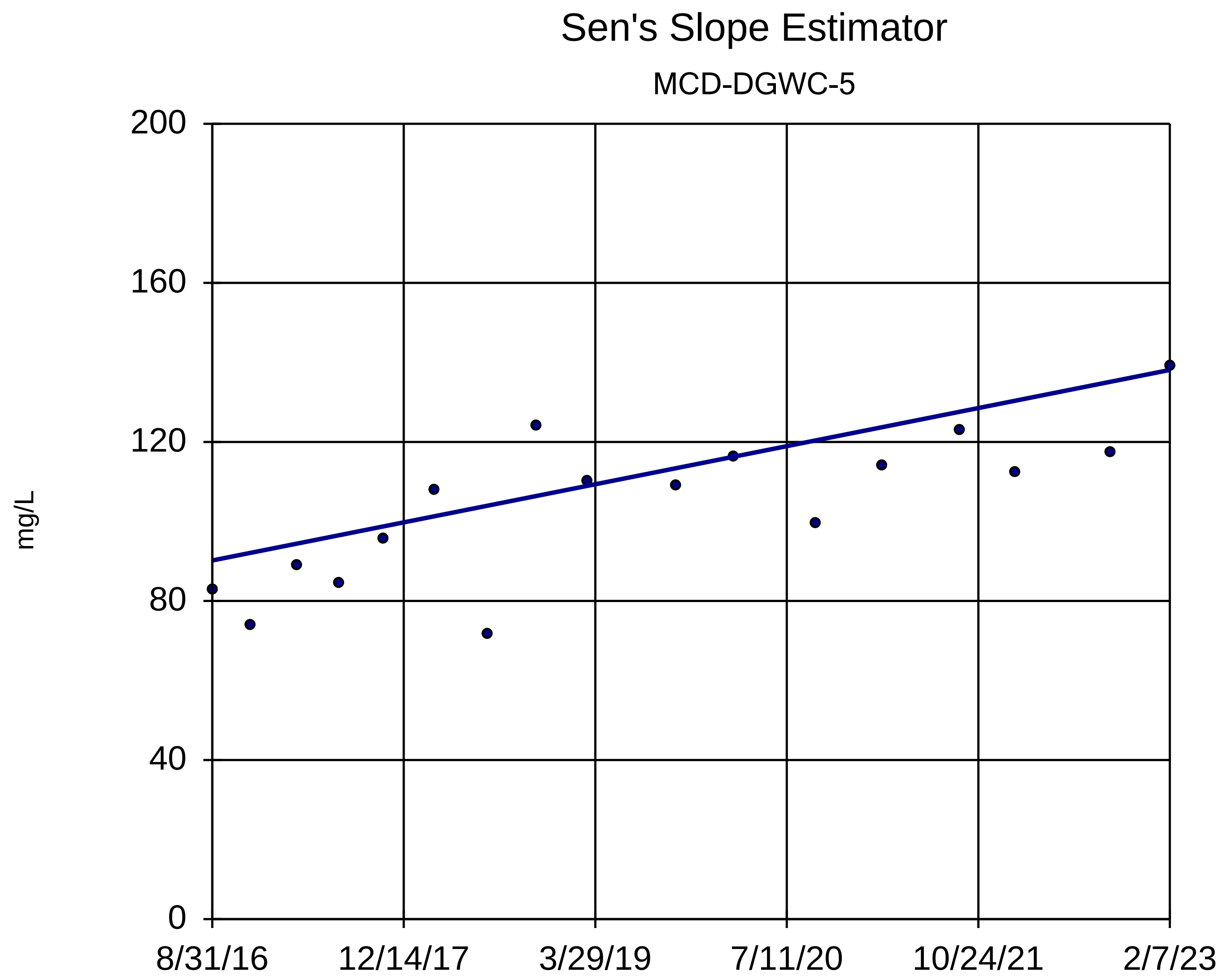
Sanitas™ v.9.6.37 Software licensed to WSP. UG




Constituent: Boron   Analysis Run 4/3/2023 5:45 PM   View: APPIV_AP234

McDonough   Client: WSP   Data: McDonough Ash Pond

Sanitas™ v.9.6.37 Software licensed to WSP. UG




n = 17

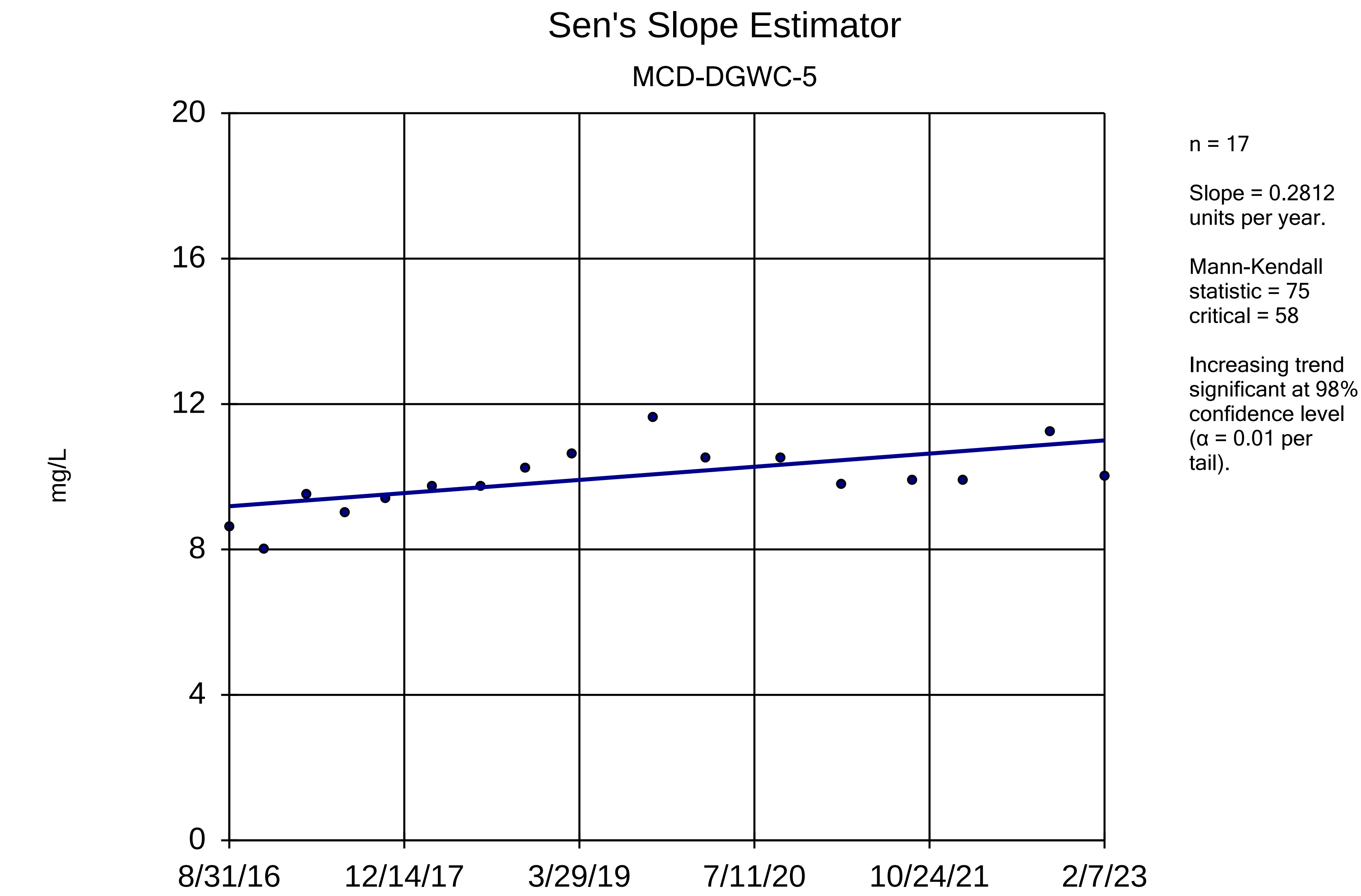
Slope = 7.44
units per year.

Mann-Kendall
statistic = 84
critical = 58

Increasing trend
significant at 98%
confidence level
(α = 0.01 per
tail).

Constituent: Calcium    Analysis Run 4/3/2023 5:45 PM    View: APPIV_AP234
McDonough    Client: WSP    Data: McDonough Ash Pond

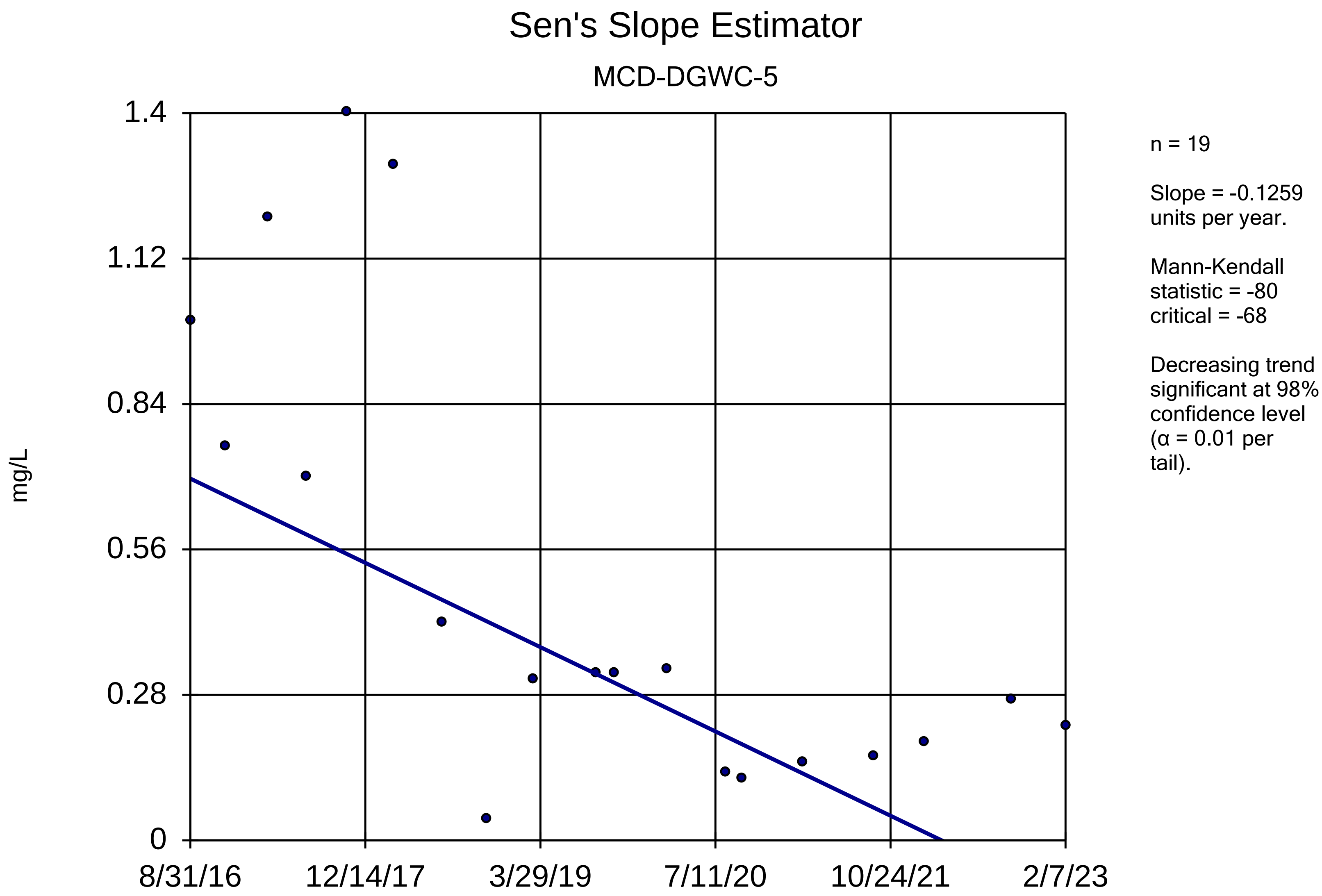
Sanitas™ v.9.6.37 Software licensed to WSP. UG




Constituent: Chloride    Analysis Run 4/3/2023 5:45 PM    View: APPIV_AP234

McDonough    Client: WSP    Data: McDonough Ash Pond

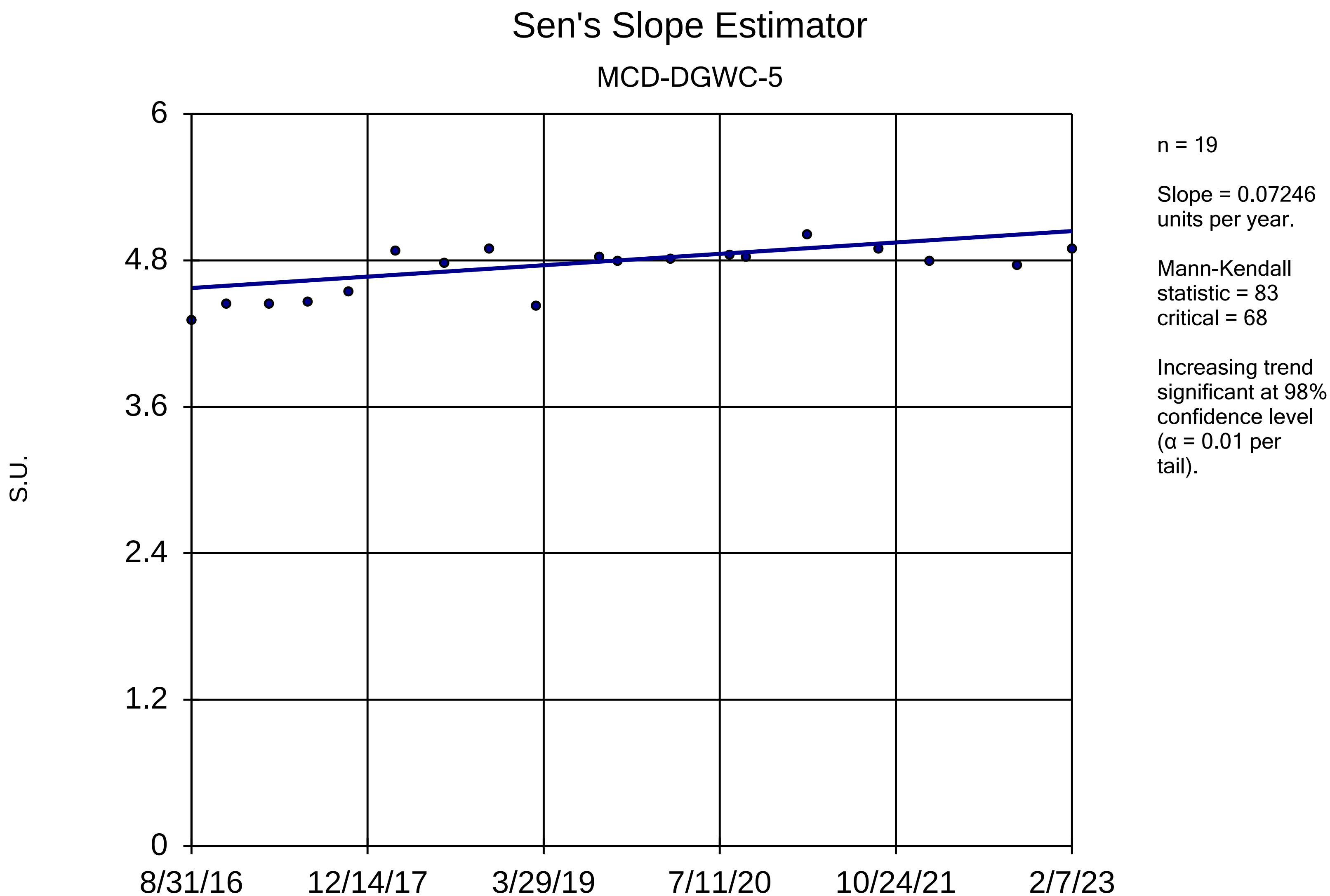
Sanitas™ v.9.6.37 Software licensed to WSP. UG



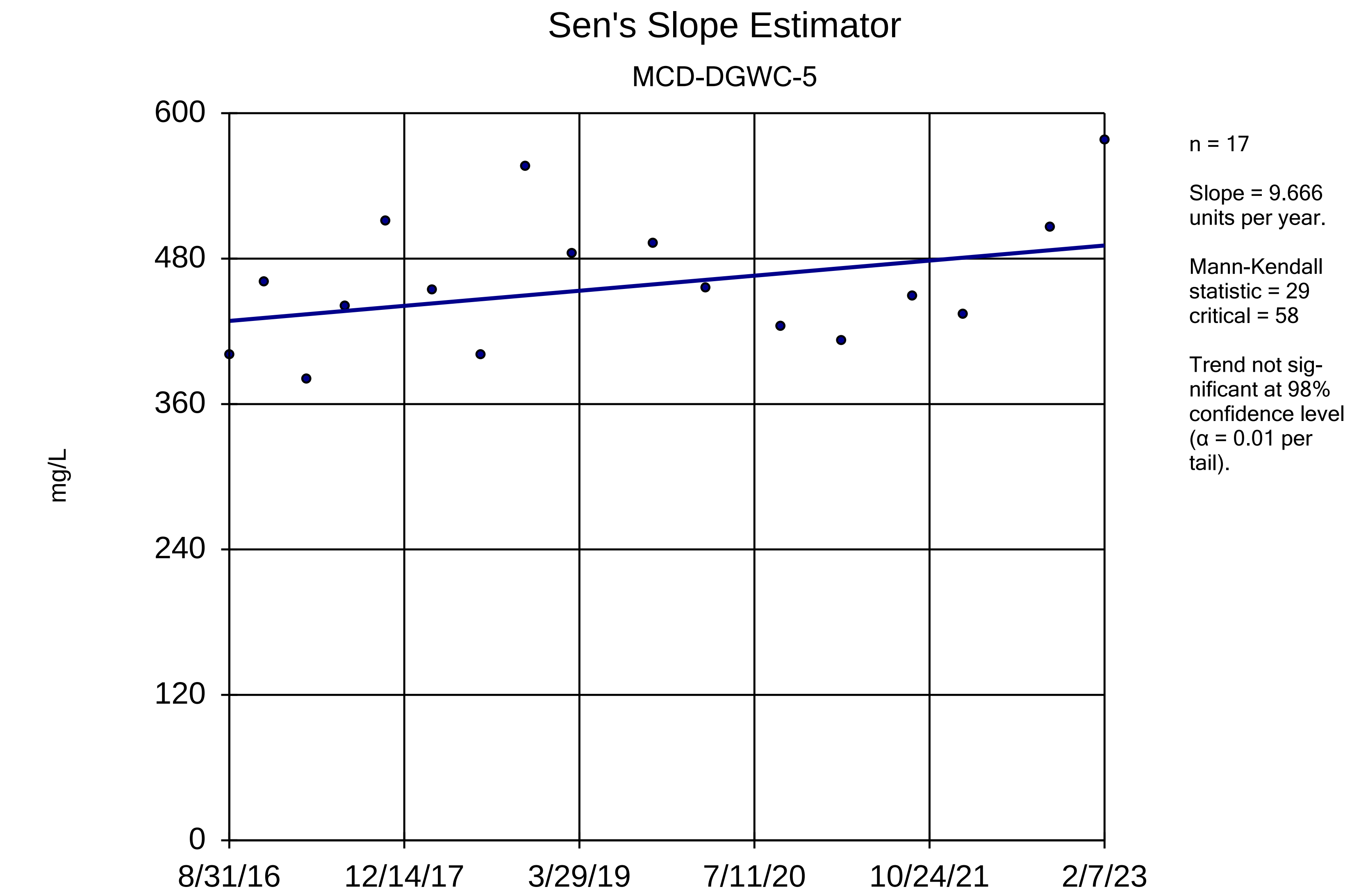

Constituent: Fluoride    Analysis Run 4/3/2023 5:45 PM    View: APPIV_AP234

McDonough    Client: WSP    Data: McDonough Ash Pond

Sanitas™ v.9.6.37 Software licensed to WSP. UG

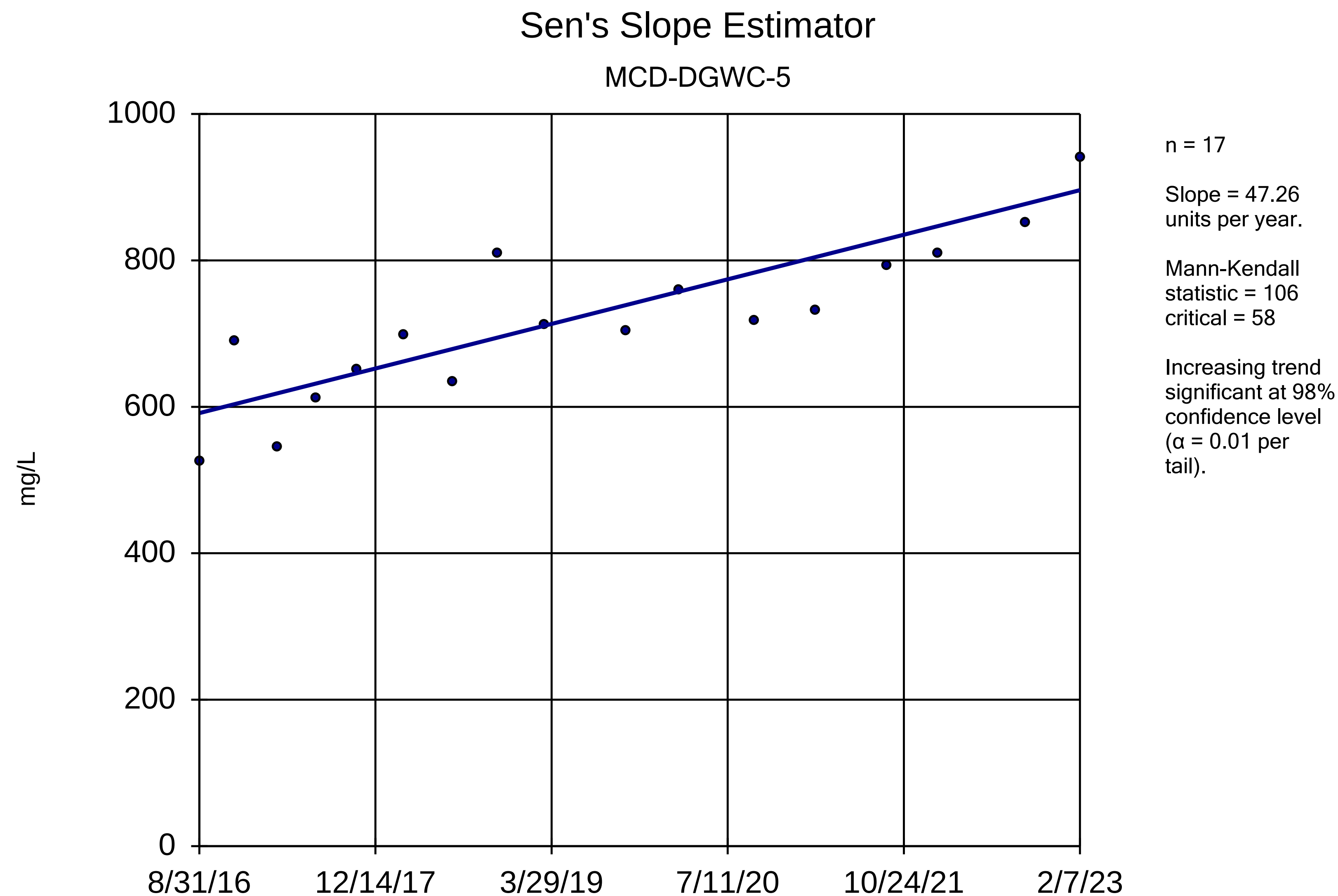



Constituent: pH [field] Analysis Run 4/3/2023 5:45 PM View: APPIV_AP234
McDonough Client: WSP Data: McDonough Ash Pond



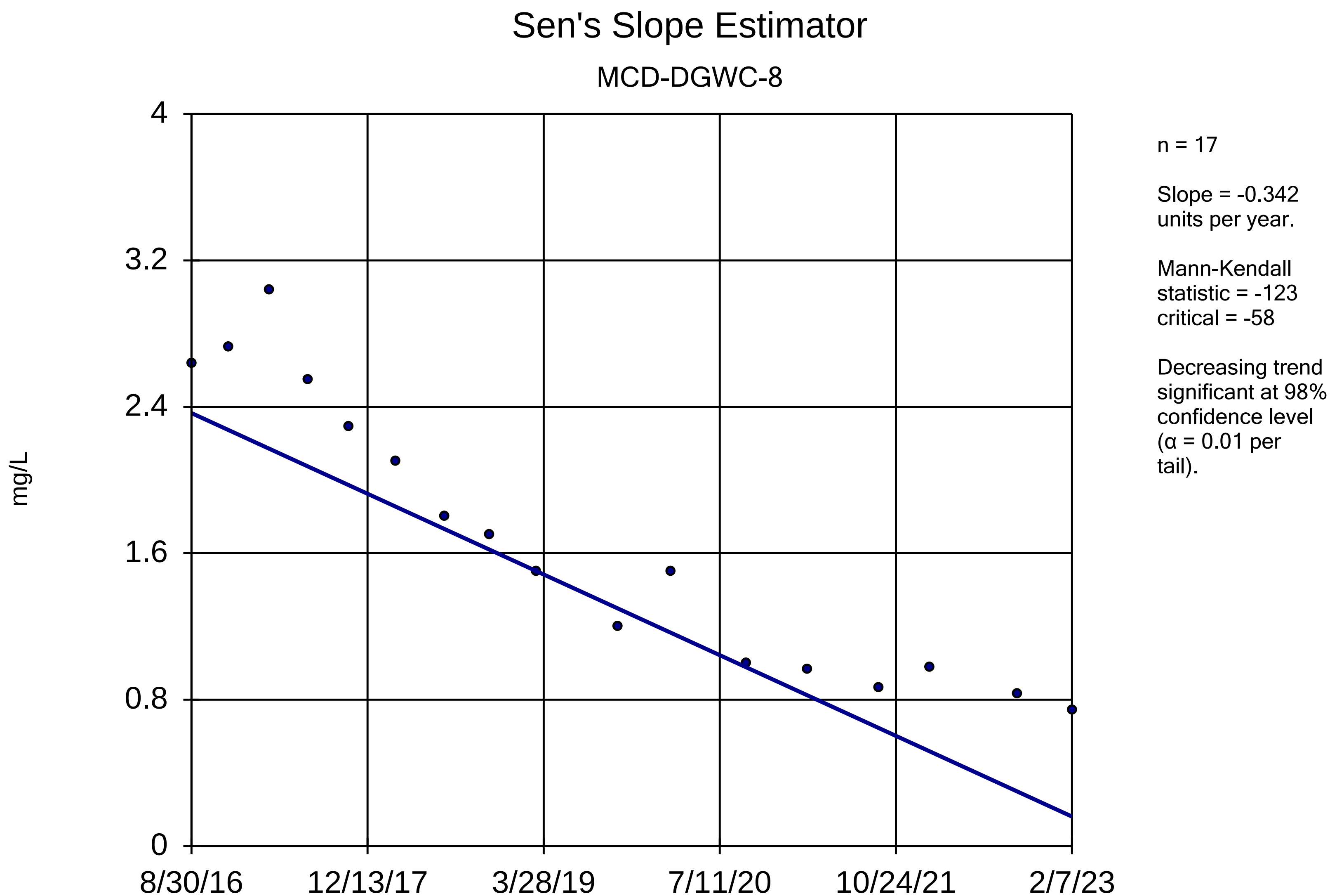

Constituent: Sulfate Analysis Run 4/3/2023 5:45 PM View: APPIV_AP234

McDonough Client: WSP Data: McDonough Ash Pond




Constituent: TDS    Analysis Run 4/3/2023 5:45 PM    View: APPIV_AP234
McDonough    Client: WSP    Data: McDonough Ash Pond

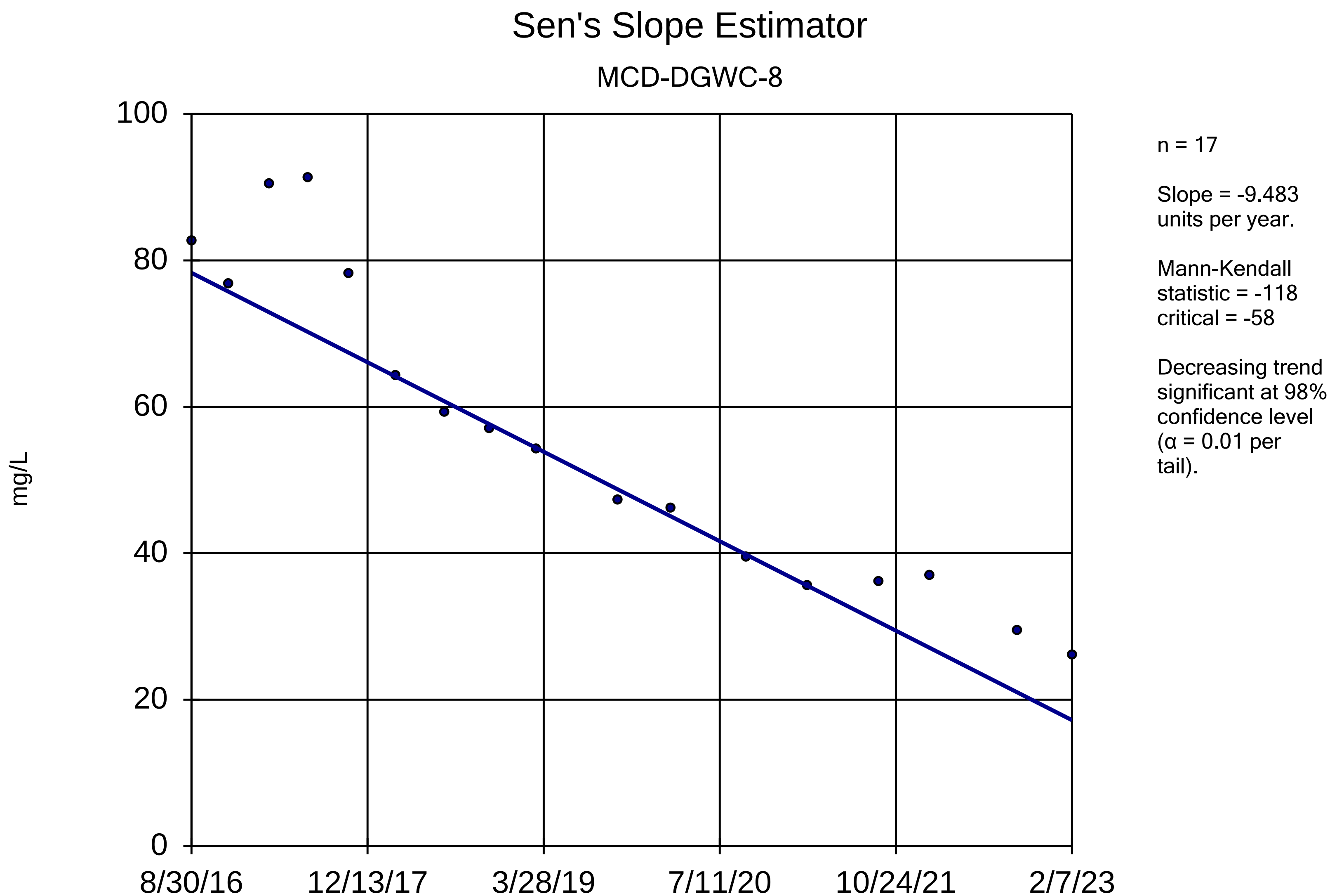
Sanitas™ v.9.6.37 Software licensed to WSP. UG




Constituent: Boron    Analysis Run 4/3/2023 5:45 PM    View: APPIV_AP234

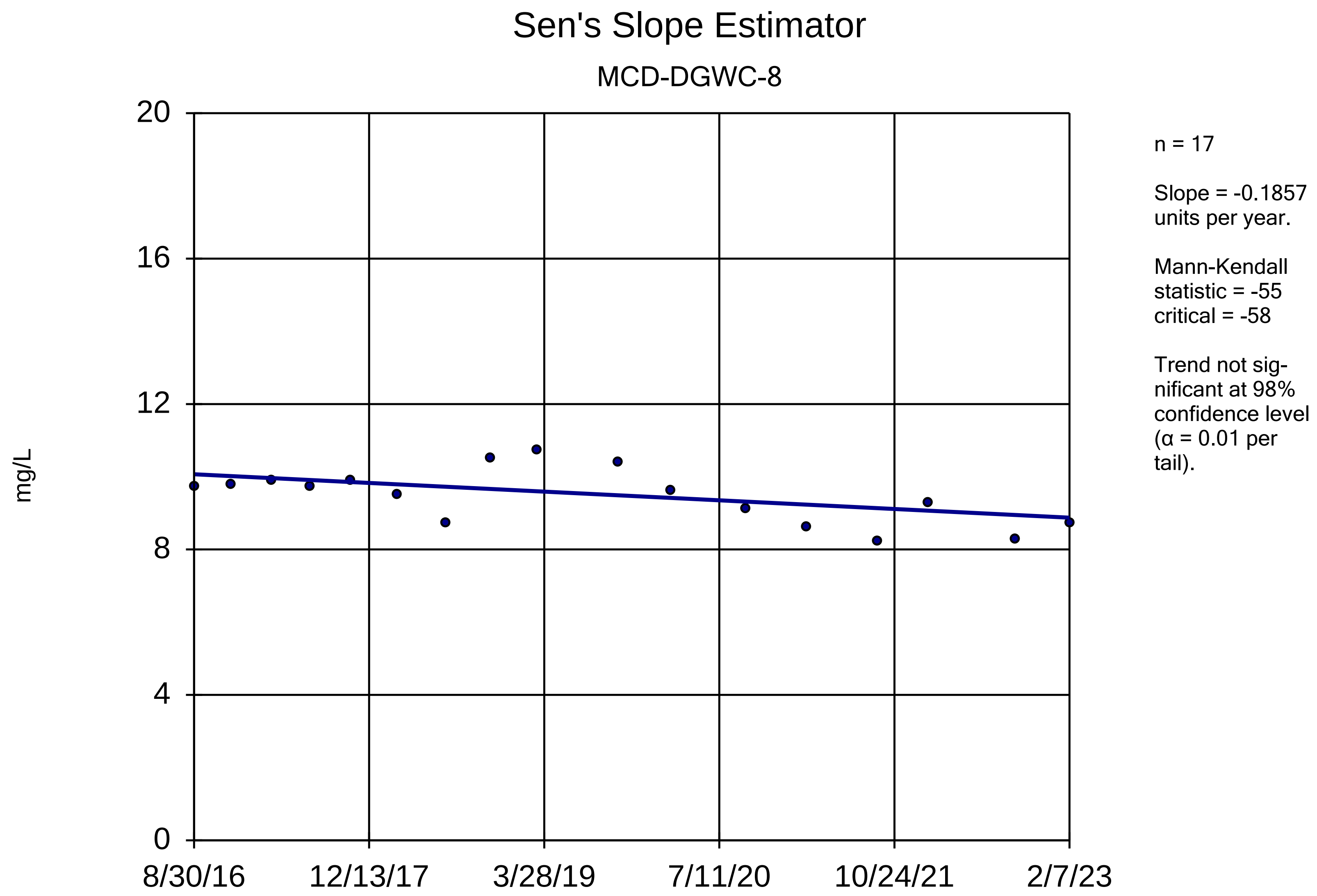
McDonough    Client: WSP    Data: McDonough Ash Pond

Sanitas™ v.9.6.37 Software licensed to WSP. UG




Constituent: Calcium    Analysis Run 4/3/2023 5:45 PM    View: APPIV_AP234
McDonough    Client: WSP    Data: McDonough Ash Pond

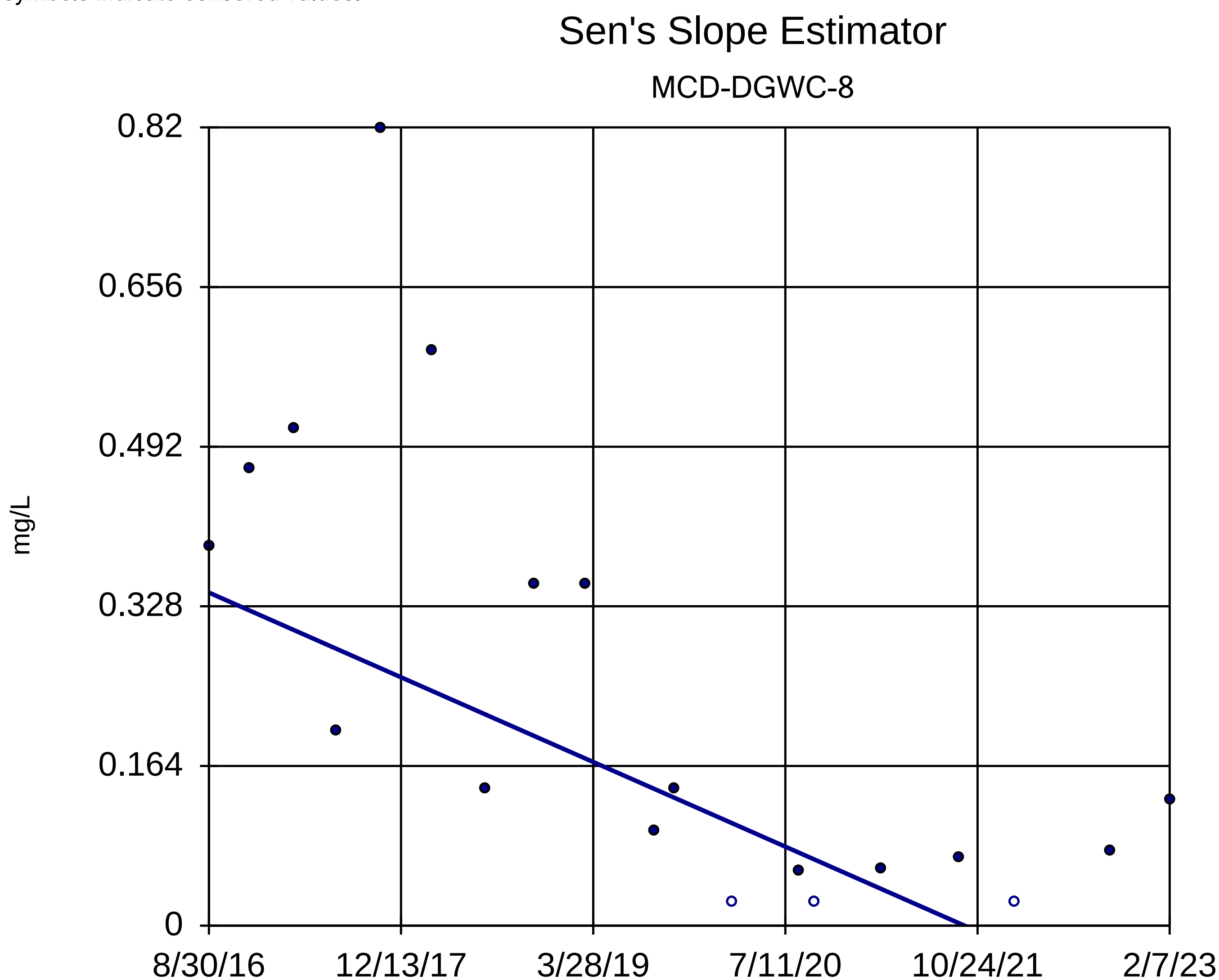
Sanitas™ v.9.6.37 Software licensed to WSP. UG




Constituent: Chloride    Analysis Run 4/3/2023 5:45 PM    View: APPIV_AP234

McDonough    Client: WSP    Data: McDonough Ash Pond

Sanitas™ v.9.6.37 Software licensed to WSP. UG
Hollow symbols indicate censored values.




n = 19

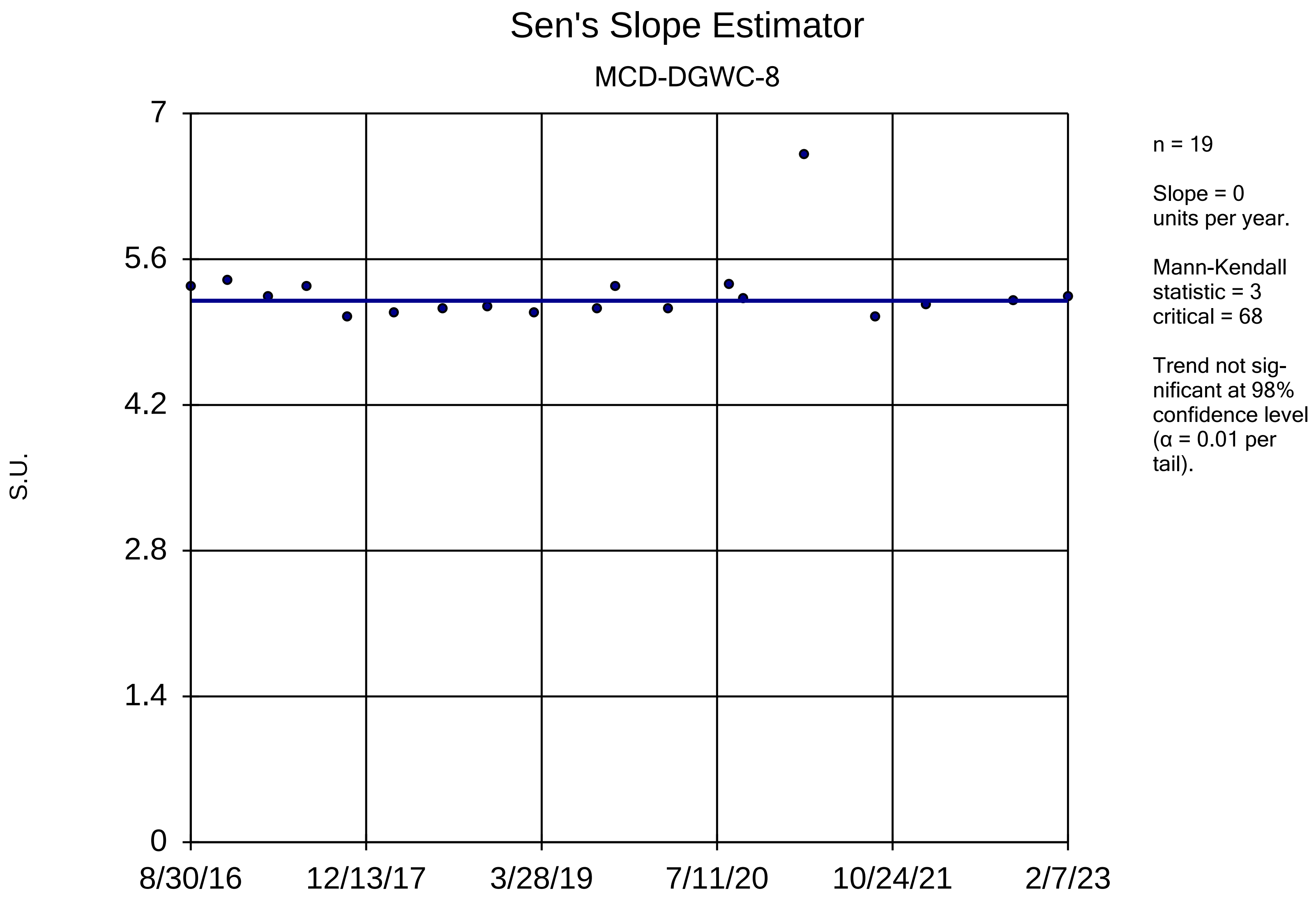
Slope = -0.06749 units per year.

Mann-Kendall statistic = -90 critical = -68

Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: Fluoride Analysis Run 4/3/2023 5:45 PM View: APPIV_AP234
McDonough Client: WSP Data: McDonough Ash Pond

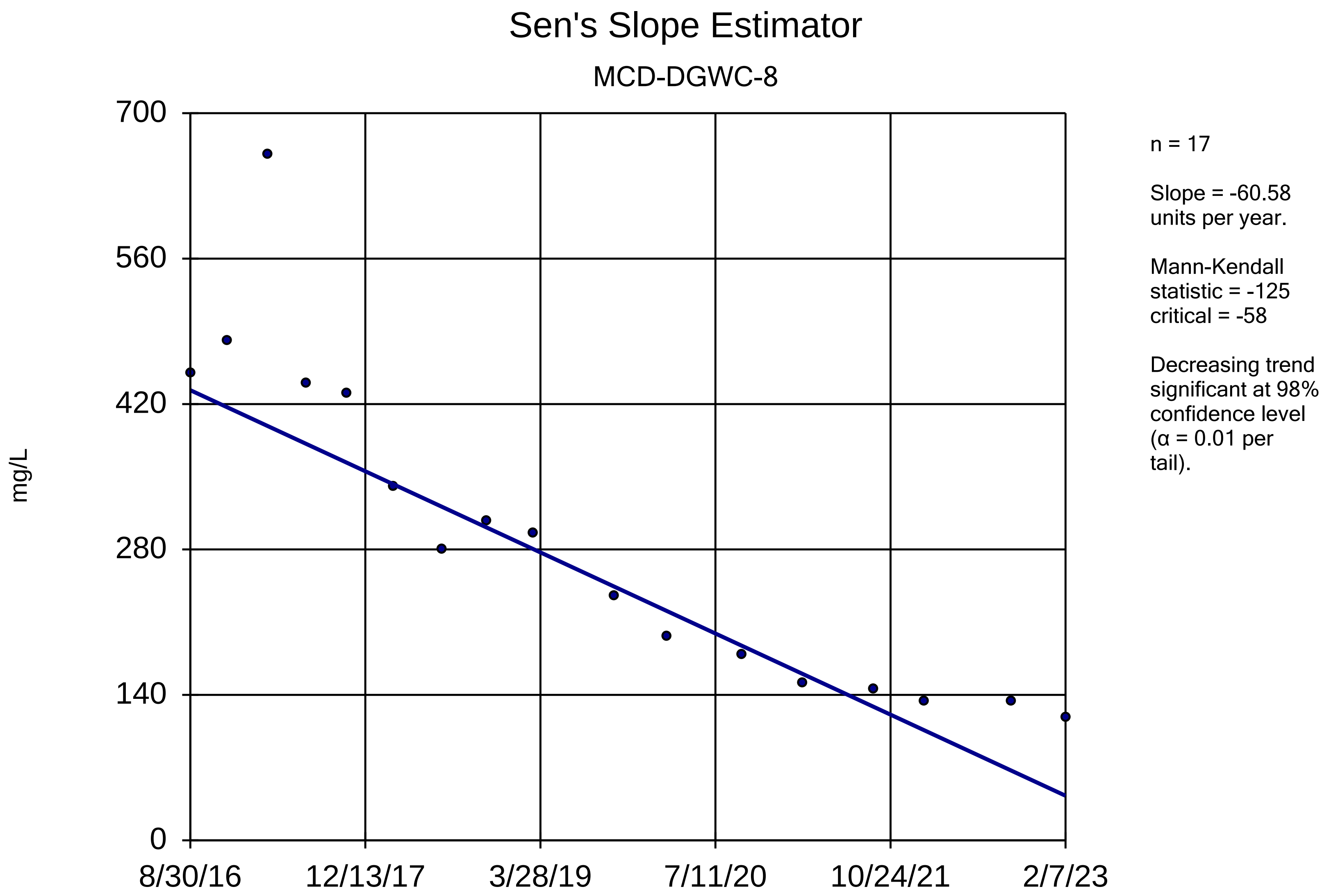
Sanitas™ v.9.6.37 Software licensed to WSP. UG




Constituent: pH [field]    Analysis Run 4/3/2023 5:45 PM    View: APPIV_AP234

McDonough    Client: WSP    Data: McDonough Ash Pond

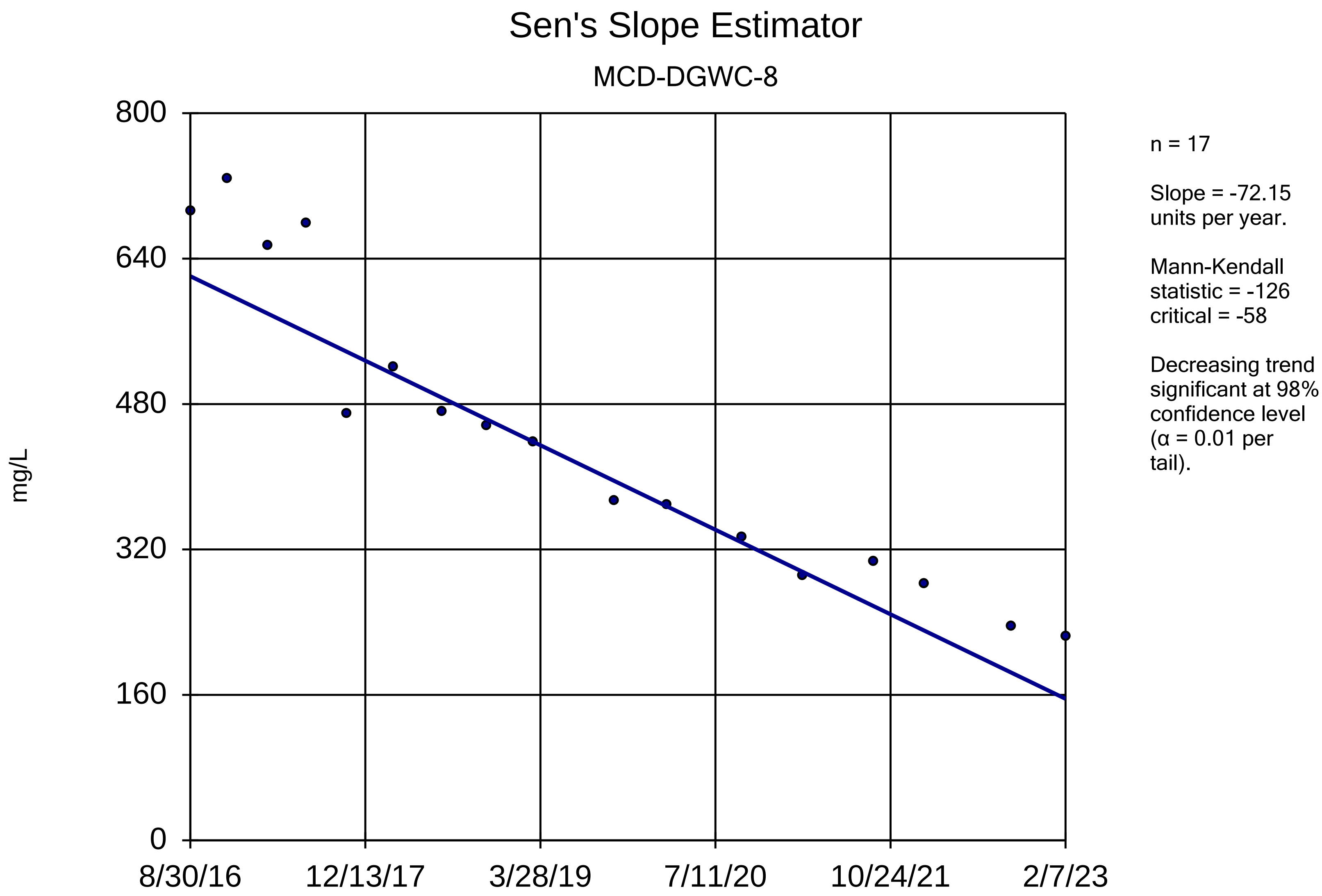
Sanitas™ v.9.6.37 Software licensed to WSP. UG




Constituent: Sulfate Analysis Run 4/3/2023 5:45 PM View: APPIV_AP234

McDonough Client: WSP Data: McDonough Ash Pond

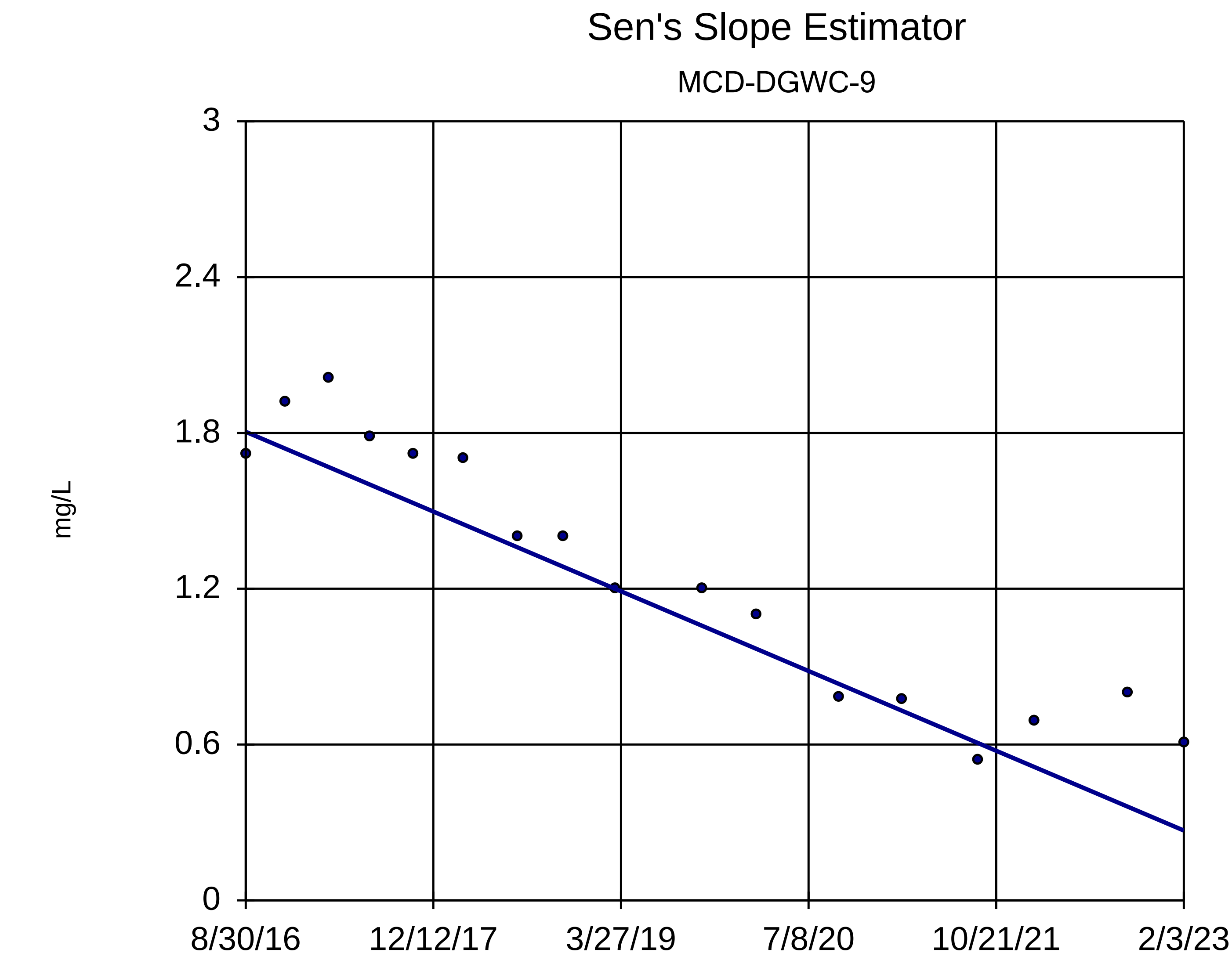
Sanitas™ v.9.6.37 Software licensed to WSP. UG




Constituent: TDS    Analysis Run 4/3/2023 5:45 PM    View: APPIV_AP234

McDonough    Client: WSP    Data: McDonough Ash Pond

Sanitas™ v.9.6.37 Software licensed to WSP. UG




n = 17

Slope = -0.2386
units per year.

Mann-Kendall
statistic = -113
critical = -58

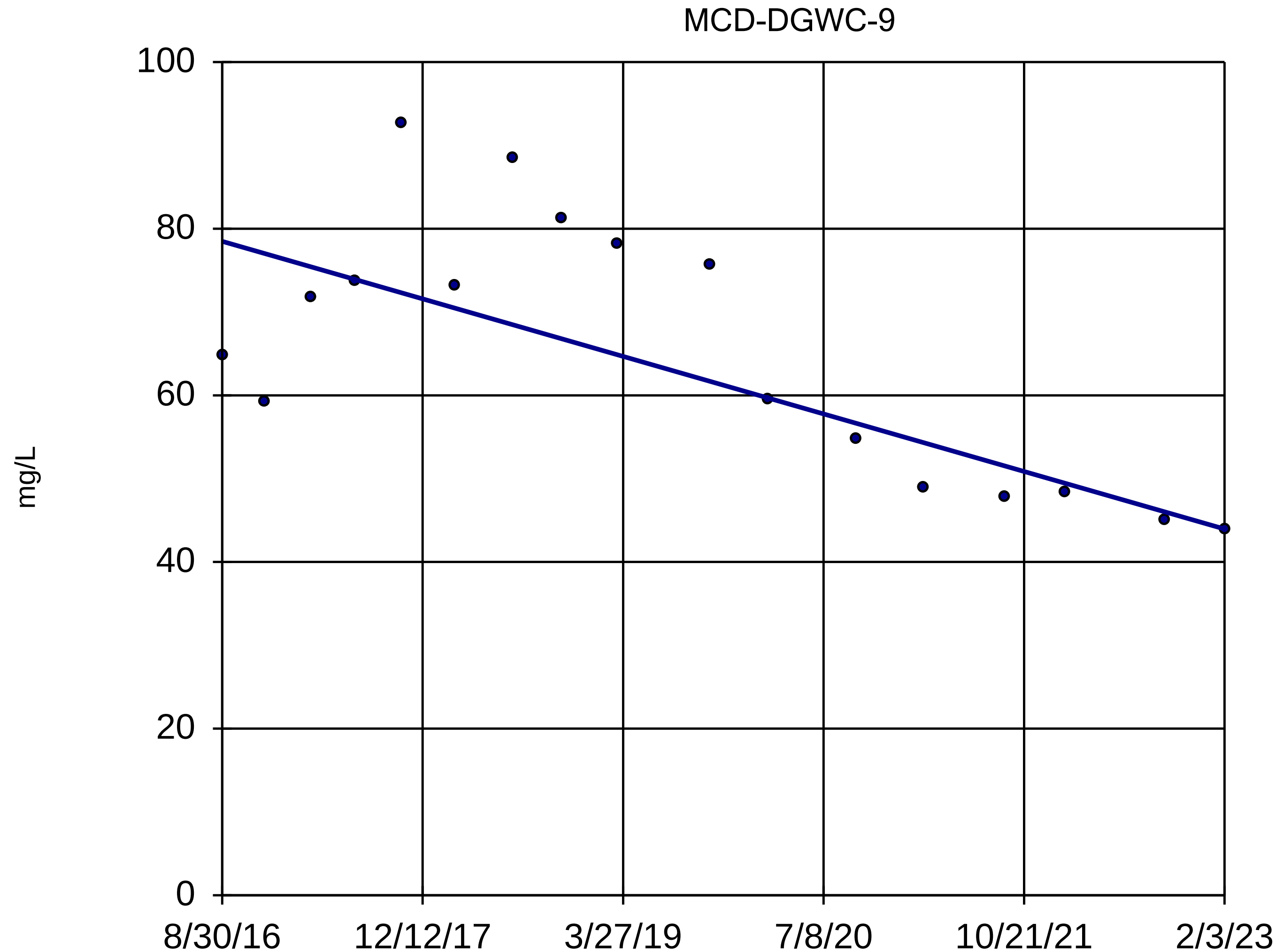
Decreasing trend
significant at 98%
confidence level
(α = 0.01 per
tail).

Constituent: Boron    Analysis Run 4/3/2023 5:45 PM    View: APPIV_AP234

McDonough    Client: WSP    Data: McDonough Ash Pond

Sanitas™ v.9.6.37 Software licensed to WSP. UG

# Sen's Slope Estimator




n = 17

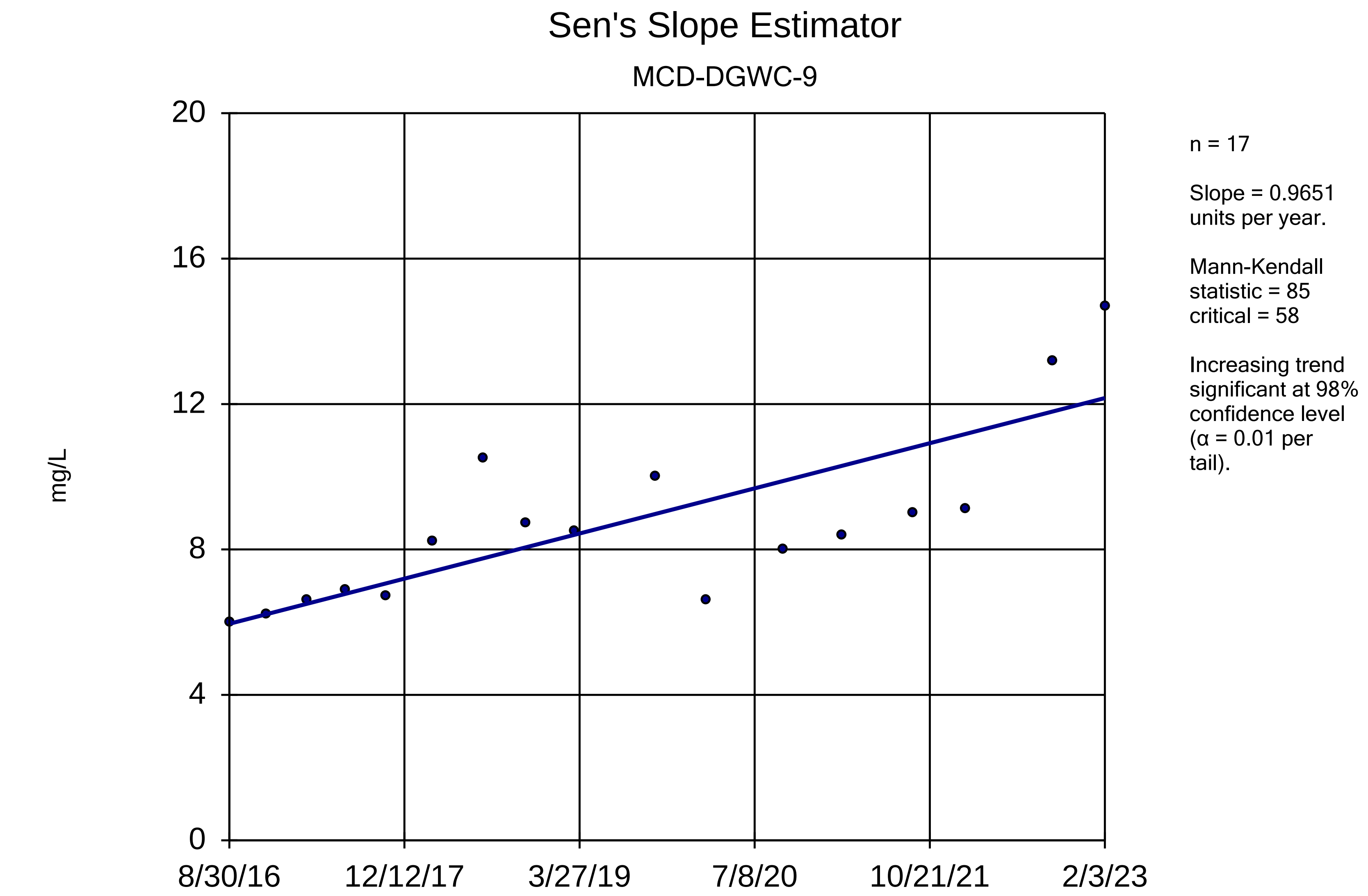
Slope = -5.367
units per year.

Mann-Kendall
statistic = -68
critical = -58

Decreasing trend
significant at 98%
confidence level
(α = 0.01 per
tail).

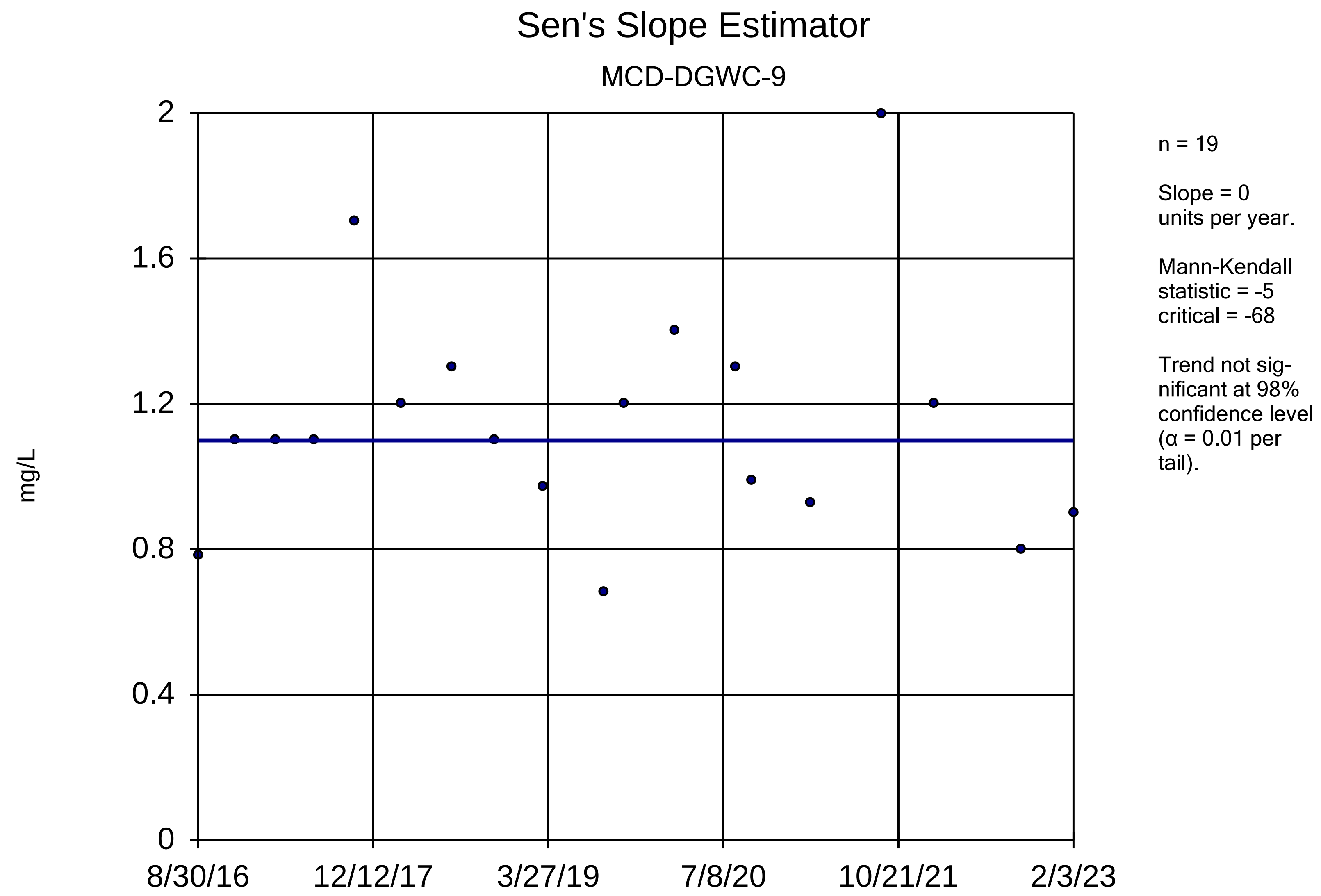
Constituent: Calcium    Analysis Run 4/3/2023 5:45 PM    View: APPIV_AP234
McDonough    Client: WSP    Data: McDonough Ash Pond

Sanitas™ v.9.6.37 Software licensed to WSP. UG



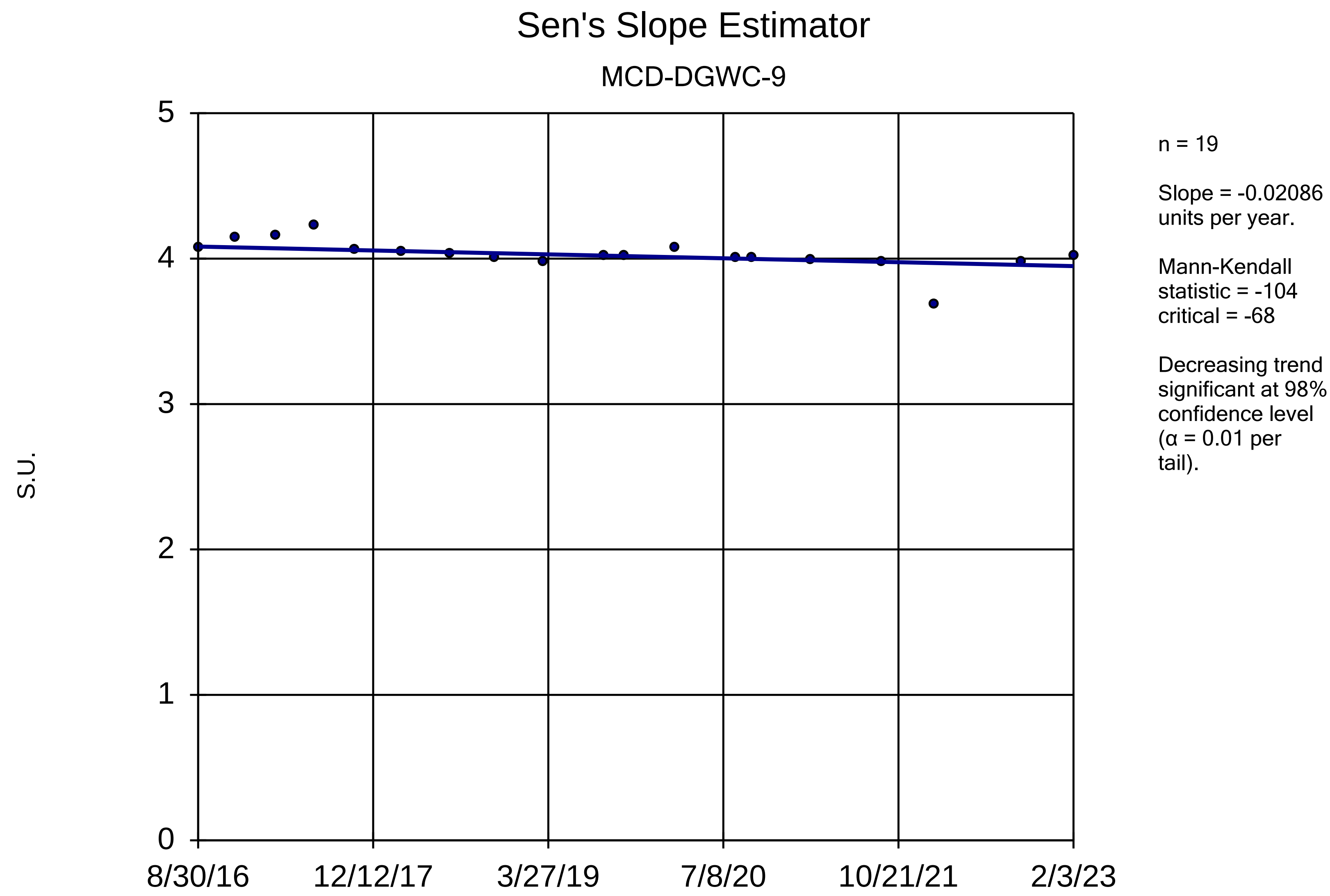

Constituent: Chloride    Analysis Run 4/3/2023 5:45 PM    View: APPIV_AP234
McDonough    Client: WSP    Data: McDonough Ash Pond

Sanitas™ v.9.6.37 Software licensed to WSP. UG




Constituent: Fluoride    Analysis Run 4/3/2023 5:45 PM    View: APPIV_AP234

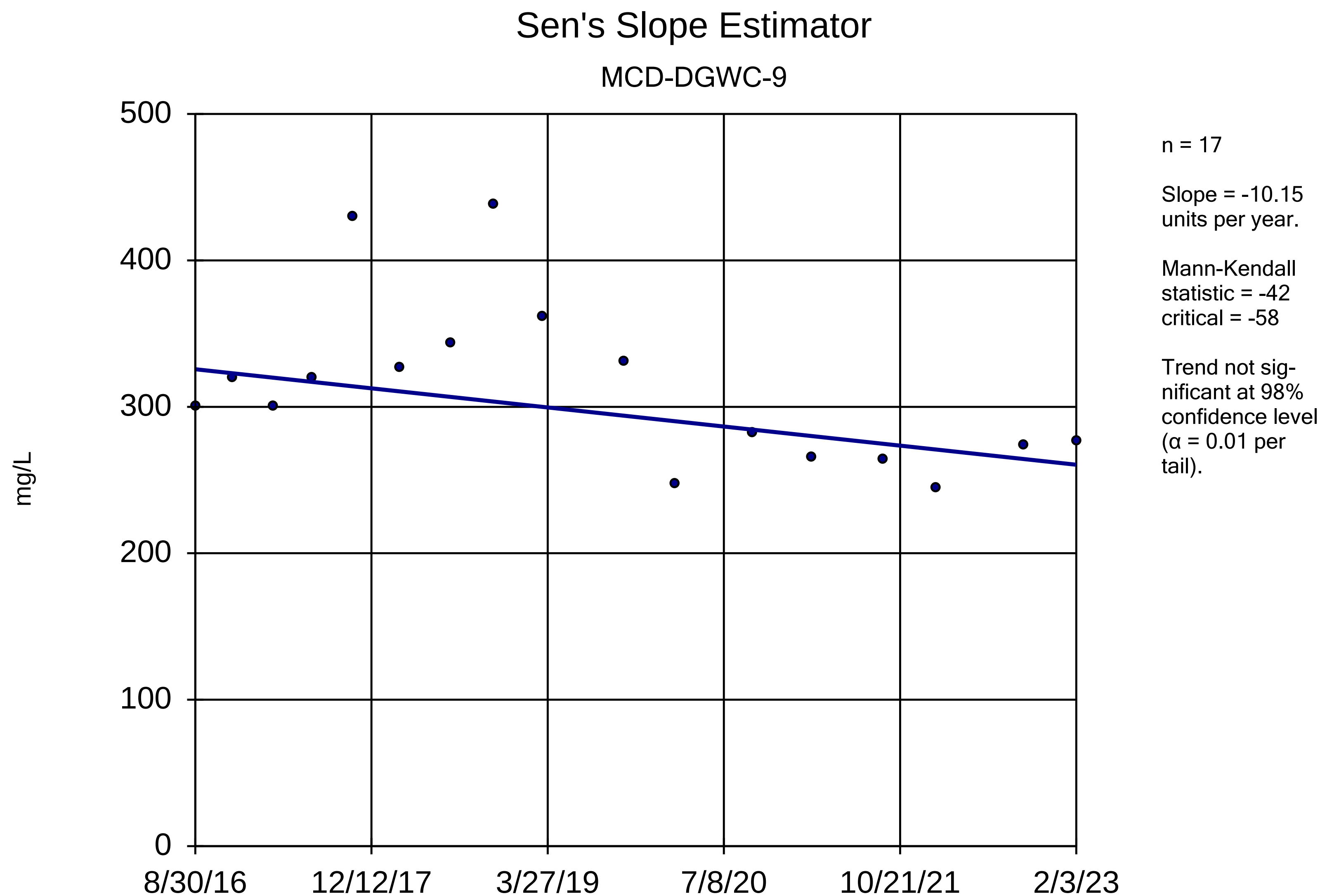
McDonough    Client: WSP    Data: McDonough Ash Pond




Constituent: pH [field]    Analysis Run 4/3/2023 5:45 PM    View: APPIV_AP234

McDonough    Client: WSP    Data: McDonough Ash Pond

Sanitas™ v.9.6.37 Software licensed to WSP. UG

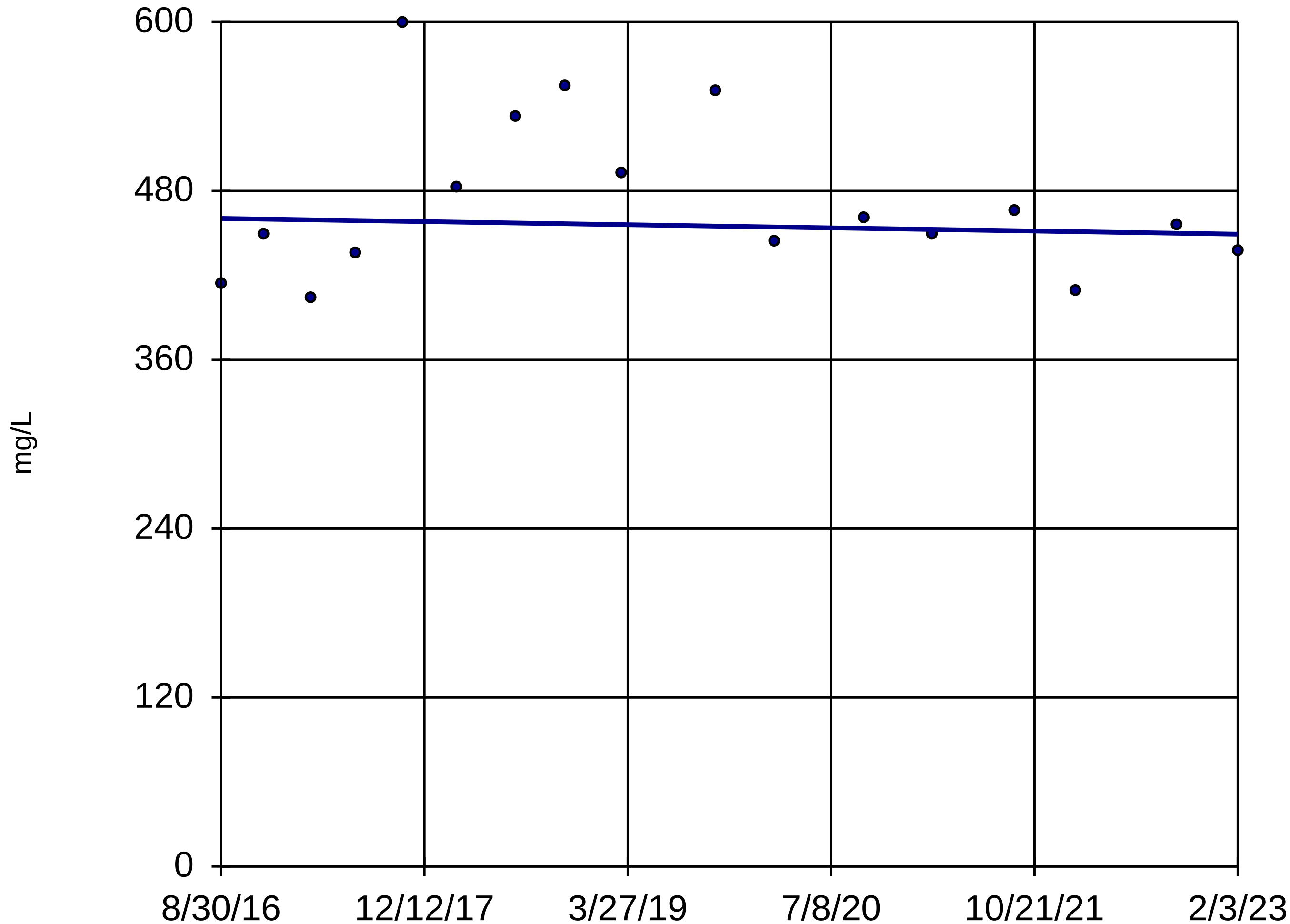



Constituent: Sulfate    Analysis Run 4/3/2023 5:45 PM    View: APPIV_AP234
McDonough    Client: WSP    Data: McDonough Ash Pond

Sanitas™ v.9.6.37 Software licensed to WSP. UG

# Sen's Slope Estimator

MCD-DGWC-9




n = 17

Slope = -1.745 units per year.

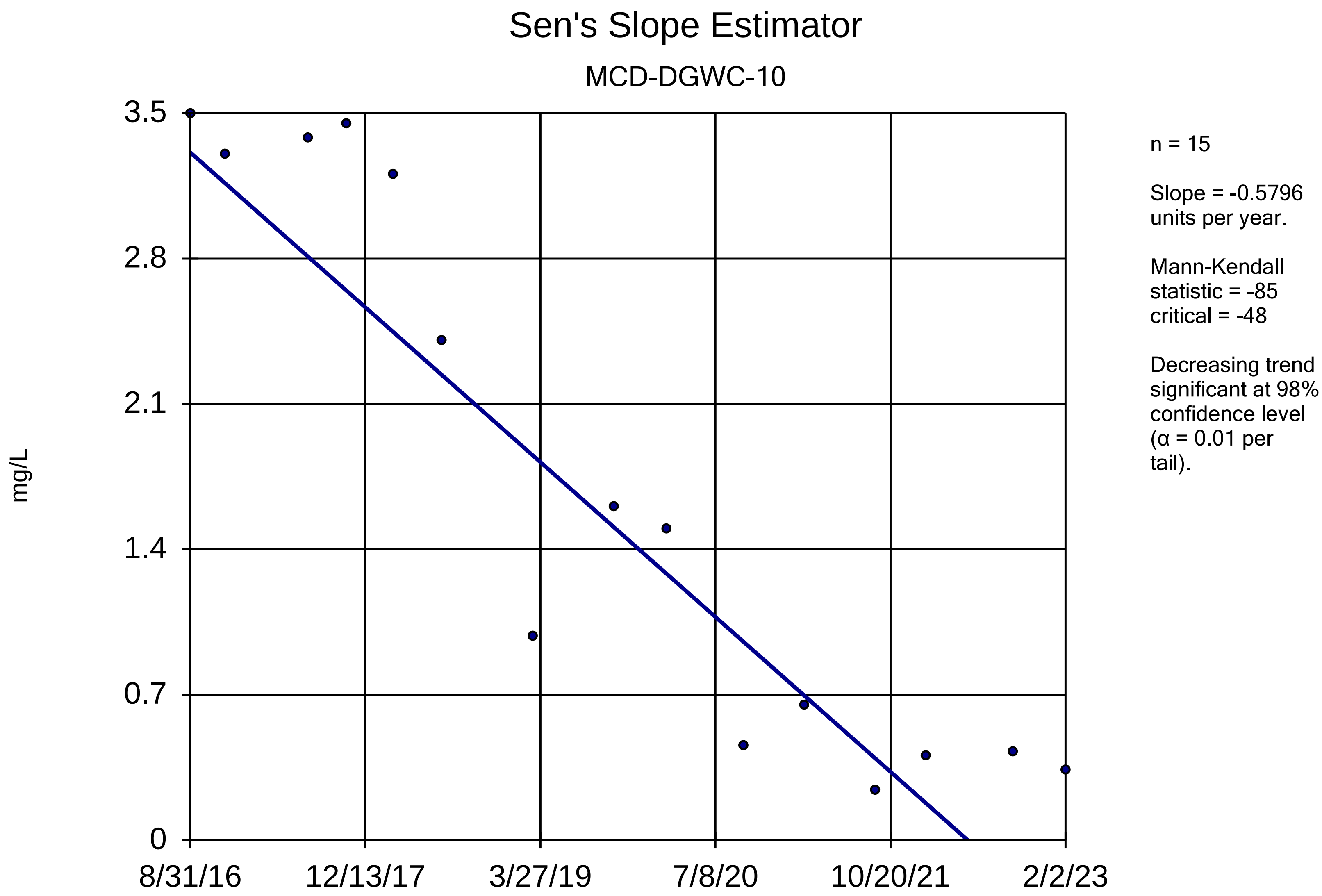
Mann-Kendall statistic = -5 critical = -58

Trend not significant at 98% confidence level (α = 0.01 per tail).

Constituent: TDS  Analysis Run 4/3/2023 5:45 PM  View: APPIV_AP234

McDonough  Client: WSP  Data: McDonough Ash Pond

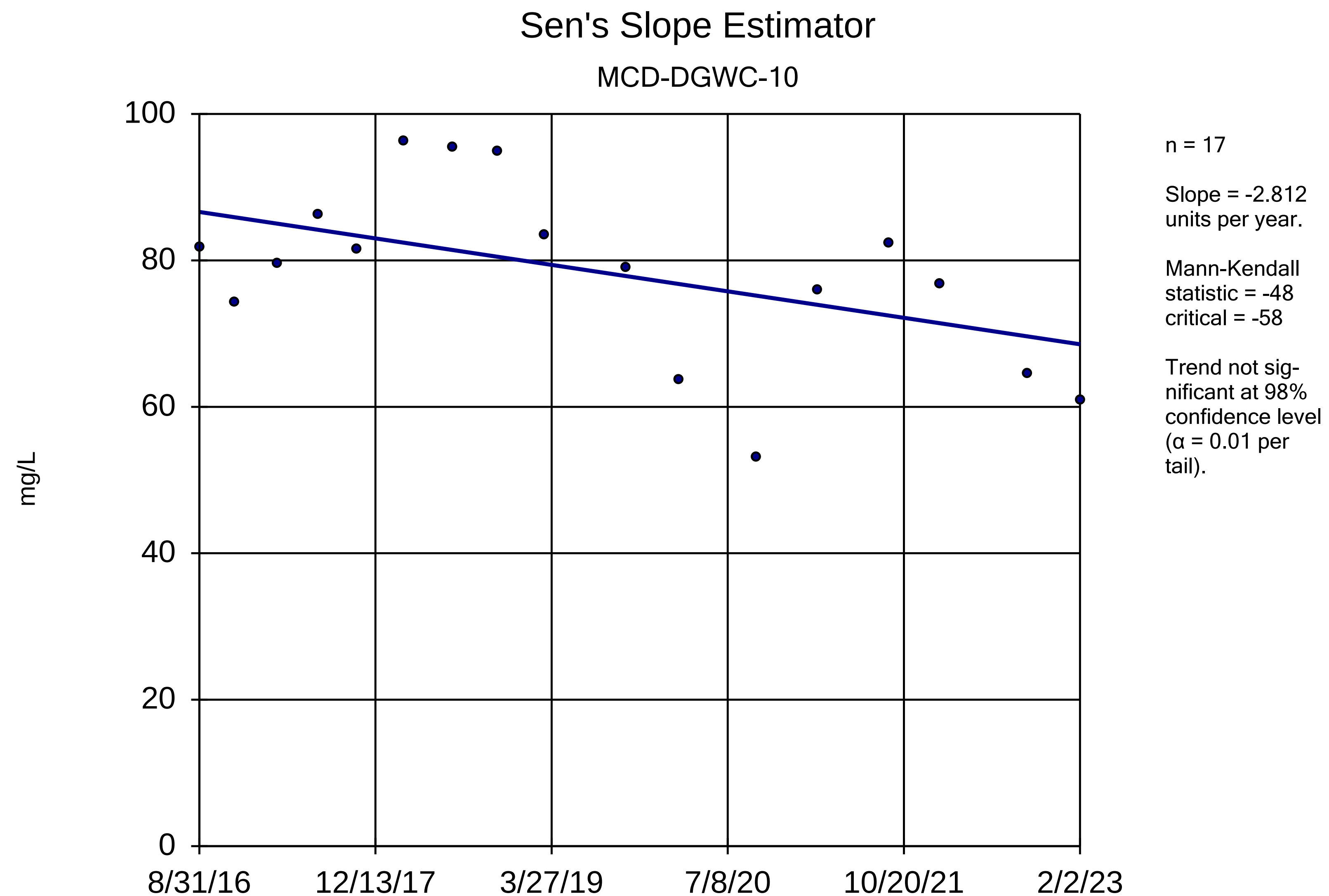
Sanitas™ v.9.6.37 Software licensed to WSP. UG




Constituent: Boron    Analysis Run 4/3/2023 5:45 PM    View: APPIV_AP234

McDonough    Client: WSP    Data: McDonough Ash Pond

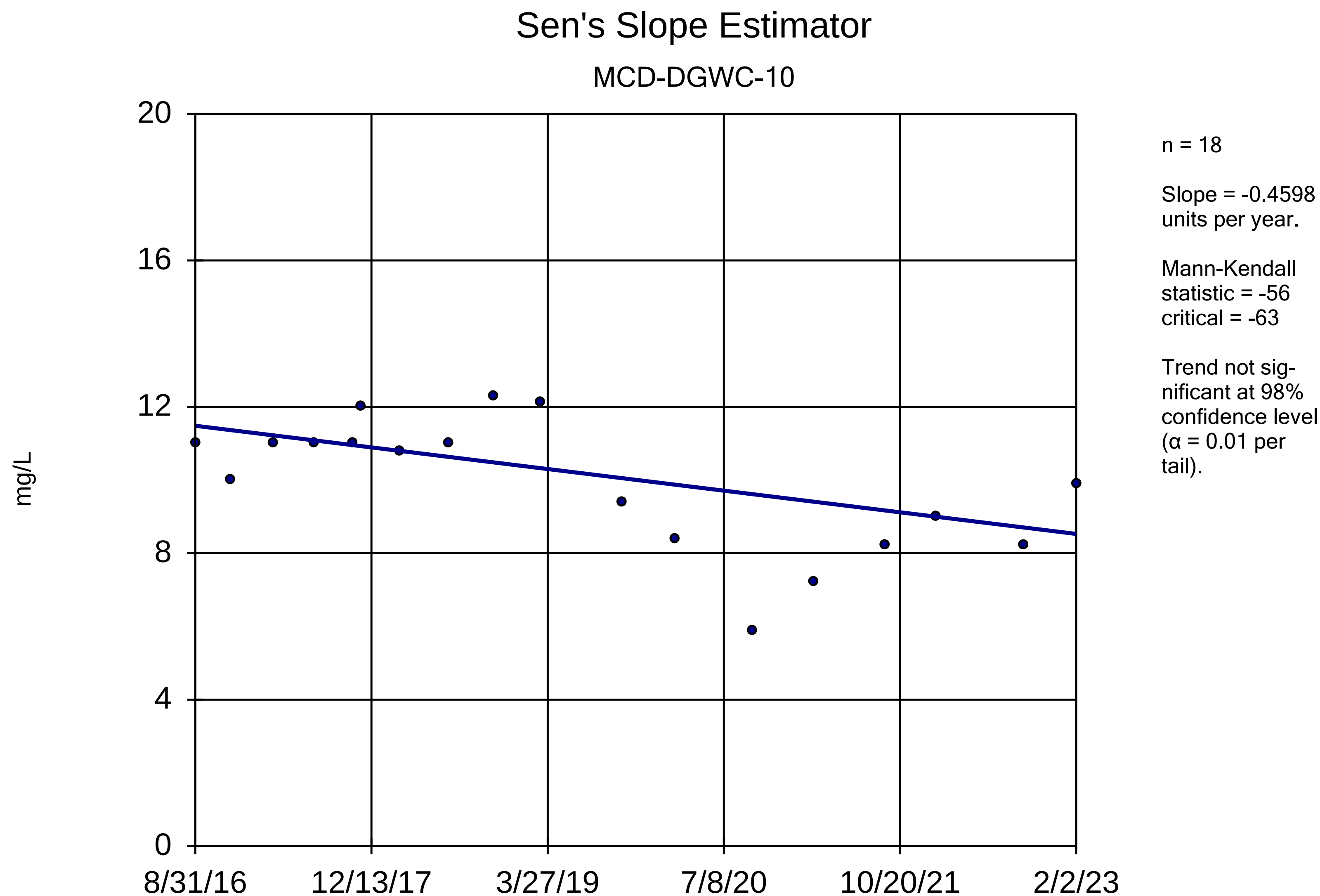
Sanitas™ v.9.6.37 Software licensed to WSP. UG




Constituent: Calcium    Analysis Run 4/3/2023 5:45 PM    View: APPIV_AP234

McDonough    Client: WSP    Data: McDonough Ash Pond

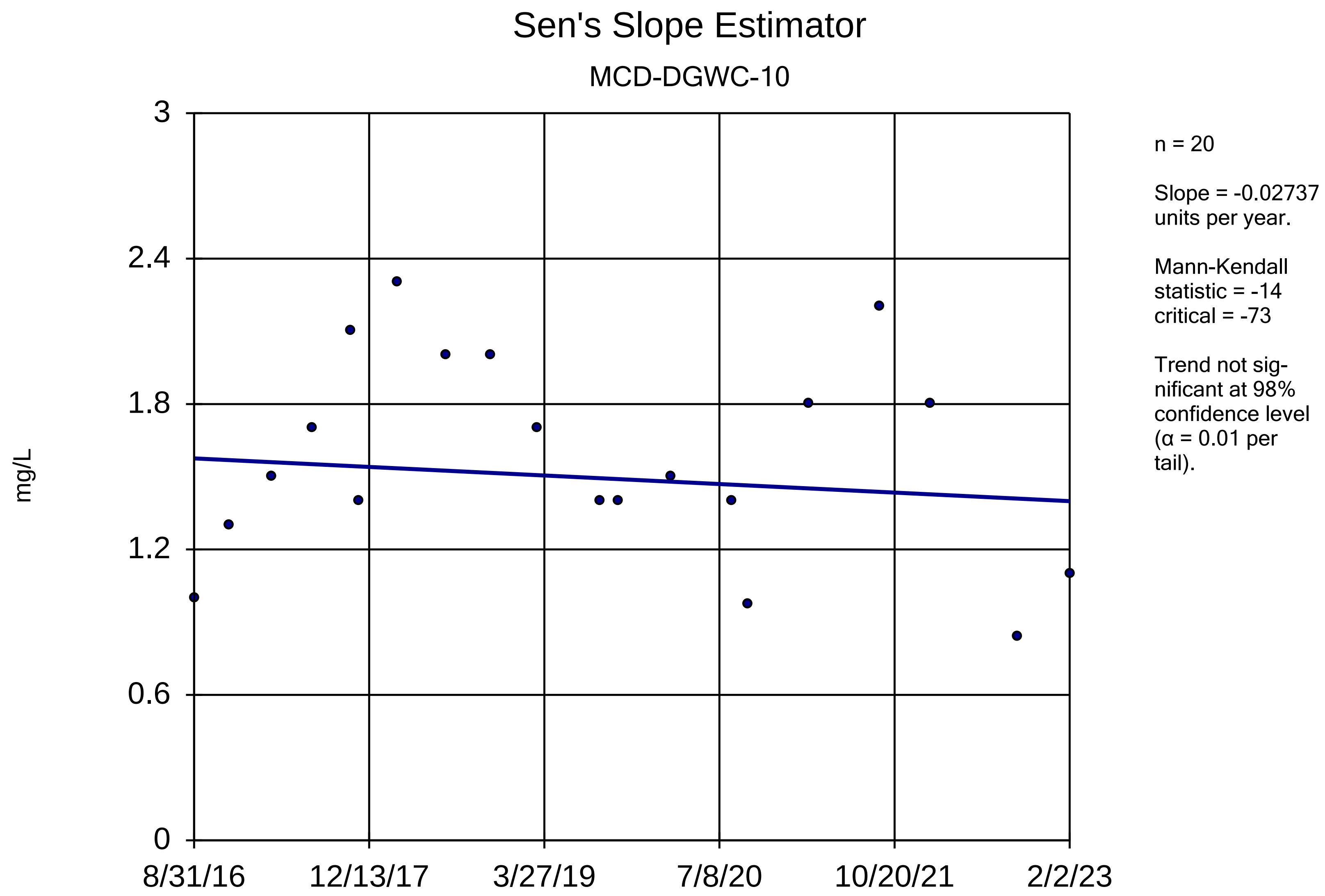
Sanitas™ v.9.6.37 Software licensed to WSP. UG




Constituent: Chloride    Analysis Run 4/3/2023 5:45 PM    View: APPIV_AP234

McDonough    Client: WSP    Data: McDonough Ash Pond

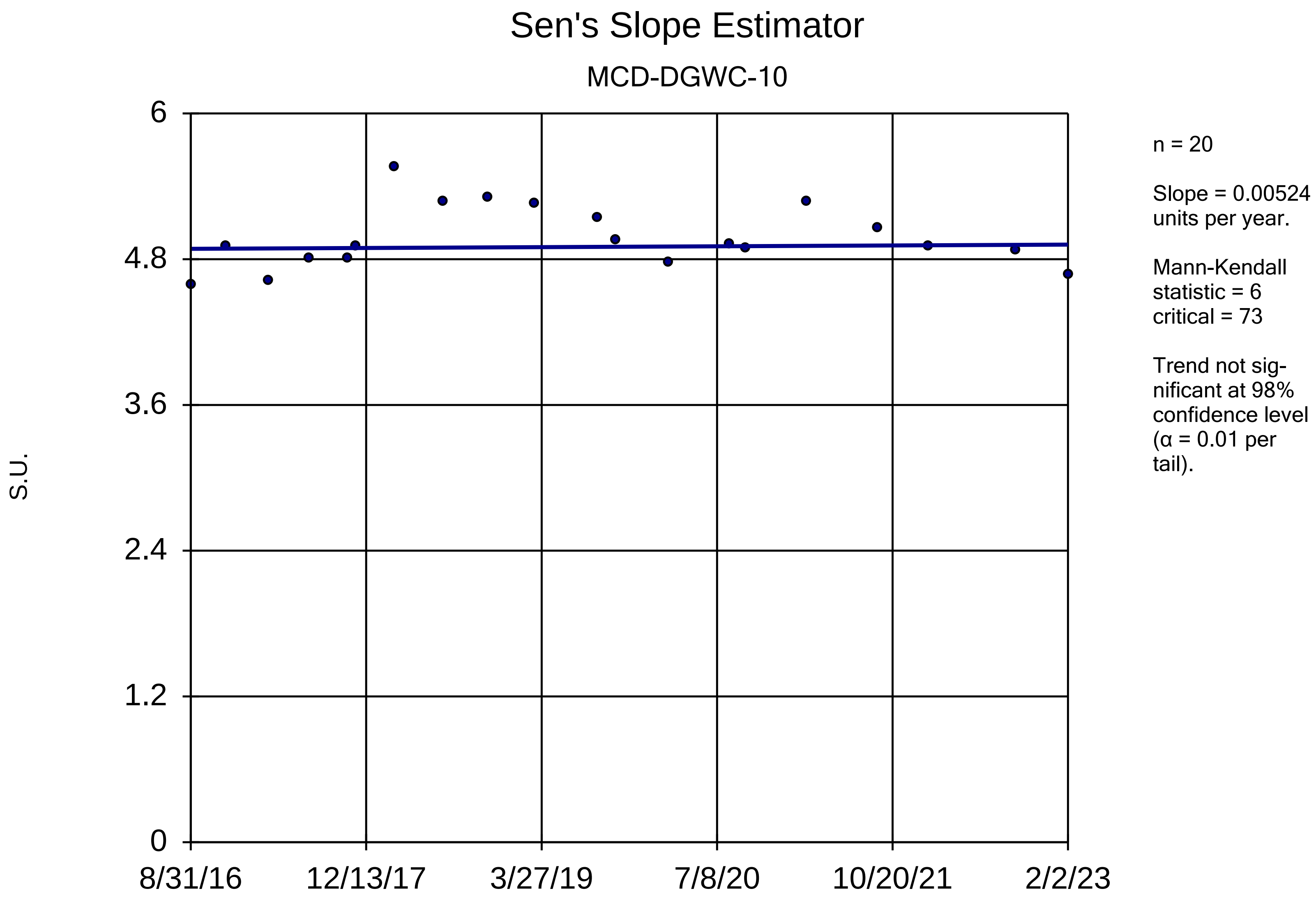
Sanitas™ v.9.6.37 Software licensed to WSP. UG




Constituent: Fluoride    Analysis Run 4/3/2023 5:45 PM    View: APPIV_AP234

McDonough    Client: WSP    Data: McDonough Ash Pond

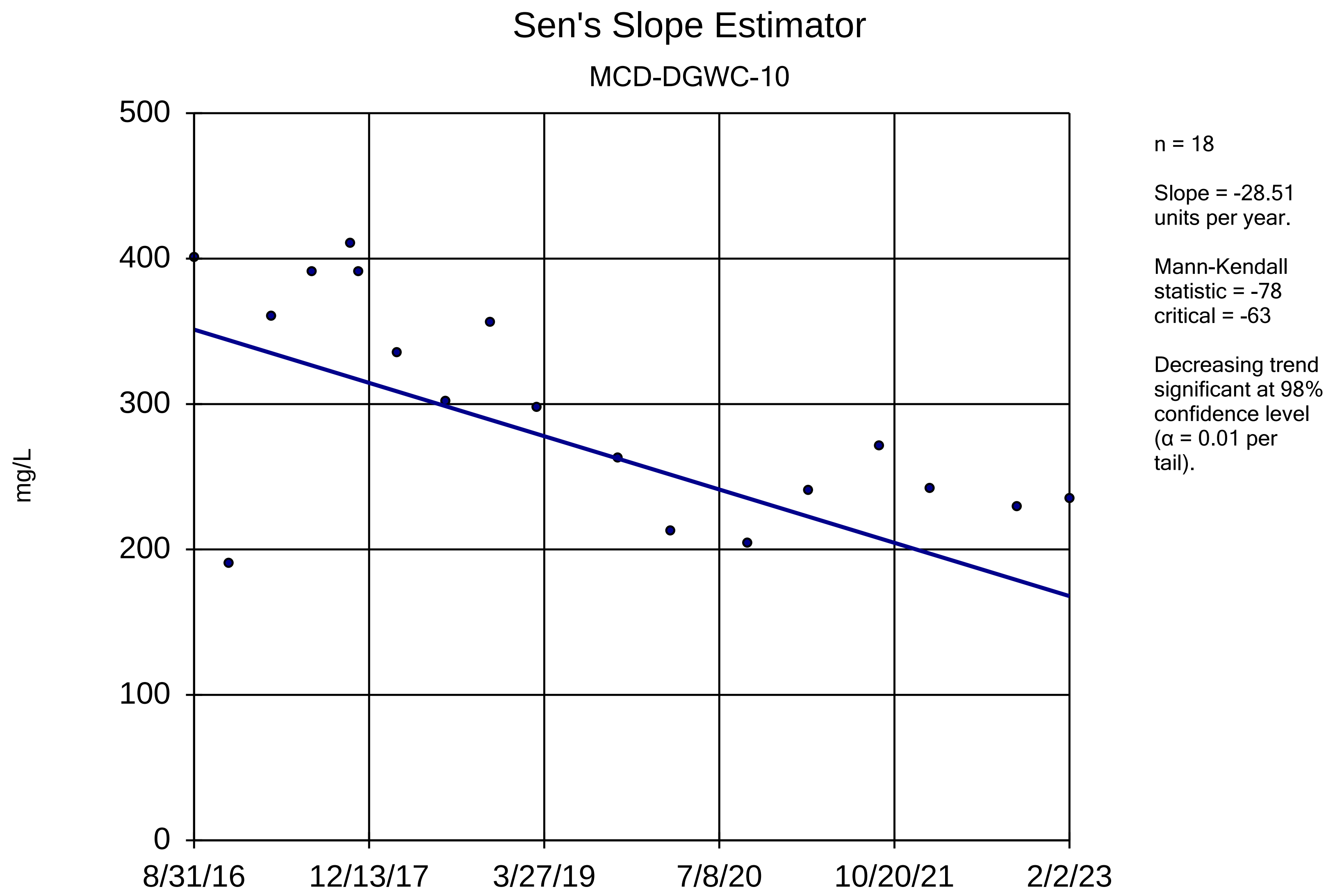
Sanitas™ v.9.6.37 Software licensed to WSP. UG




Constituent: pH [field]    Analysis Run 4/3/2023 5:45 PM    View: APPIV_AP234

McDonough    Client: WSP    Data: McDonough Ash Pond

Sanitas™ v.9.6.37 Software licensed to WSP. UG

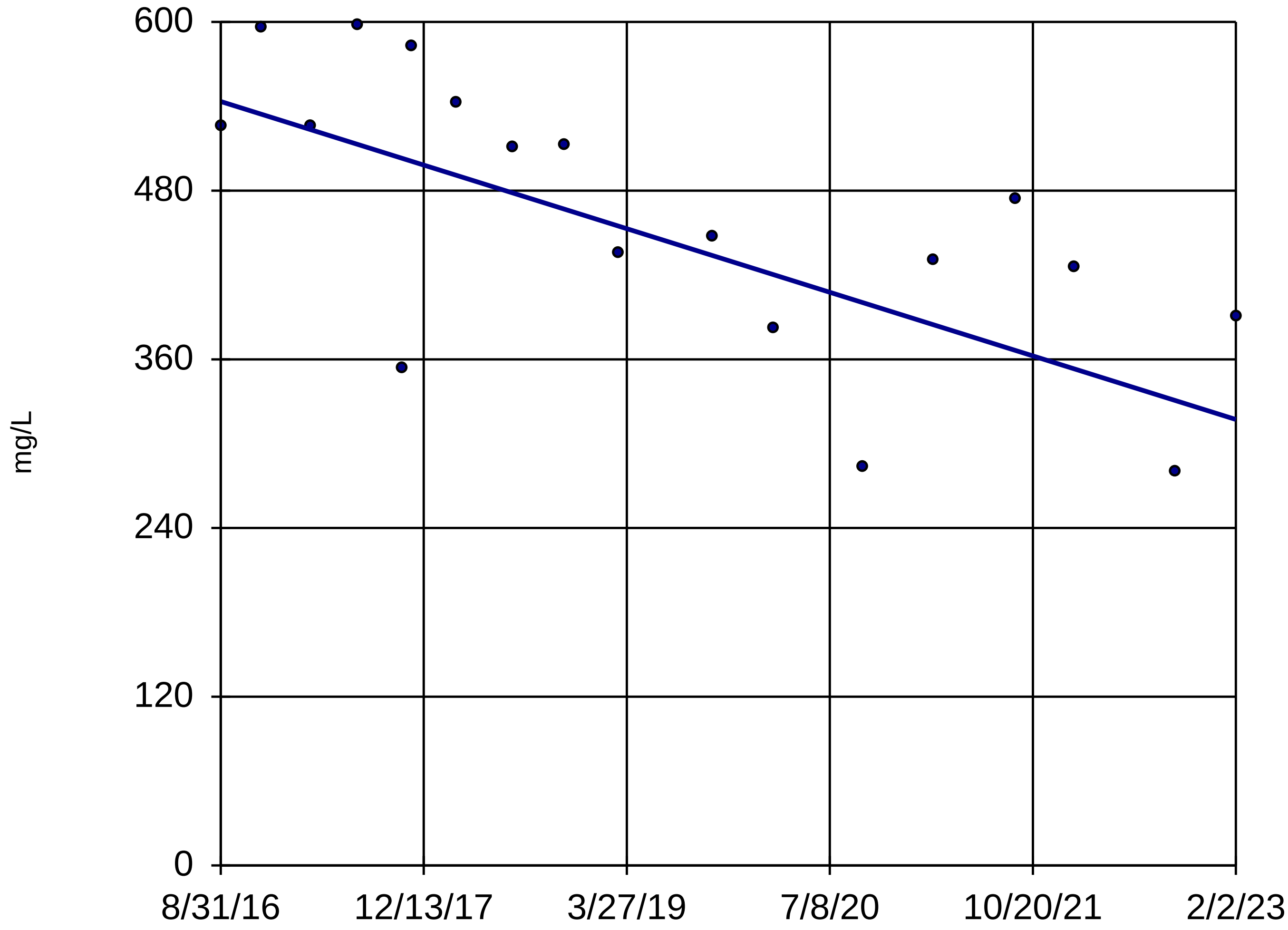



Constituent: Sulfate Analysis Run 4/3/2023 5:45 PM View: APPIV_AP234

McDonough Client: WSP Data: McDonough Ash Pond

# Sen's Slope Estimator

MCD-DGWC-10




n = 18

Slope = -35.2 units per year.

Mann-Kendall statistic = -86 critical = -63

Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: TDS    Analysis Run 4/3/2023 5:45 PM    View: APPIV_AP234

McDonough    Client: WSP    Data: McDonough Ash Pond

# Trend Test

McDonough     Client: WSP     Data: McDonough Ash Pond     Printed 4/3/2023, 5:52 PM

| Constituent | Well | Slope | Calc. | Critical | Sig. | N | %NDs | Normality | Xform | Alpha | Method |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Boron (mg/L)** | **MCD-DGWC-10** | **-0.5796** | **-85** | **-48** | **Yes** | **15** | **0** | **n/a** | **n/a** | **0.02** | **NP** |
| Boron (mg/L) | MCD-DGWC-5 | -0.1471 | -22 | -58 | No | 17 | 0 | n/a | n/a | 0.02 | NP |
| **Boron (mg/L)** | **MCD-DGWC-8** | **-0.342** | **-123** | **-58** | **Yes** | **17** | **0** | **n/a** | **n/a** | **0.02** | **NP** |
| **Boron (mg/L)** | **MCD-DGWC-9** | **-0.2386** | **-113** | **-58** | **Yes** | **17** | **0** | **n/a** | **n/a** | **0.02** | **NP** |
| Calcium (mg/L) | MCD-DGWC-10 | -2.812 | -48 | -58 | No | 17 | 0 | n/a | n/a | 0.02 | NP |
| **Calcium (mg/L)** | **MCD-DGWC-5** | **7.44** | **84** | **58** | **Yes** | **17** | **0** | **n/a** | **n/a** | **0.02** | **NP** |
| **Calcium (mg/L)** | **MCD-DGWC-8** | **-9.483** | **-118** | **-58** | **Yes** | **17** | **0** | **n/a** | **n/a** | **0.02** | **NP** |
| **Calcium (mg/L)** | **MCD-DGWC-9** | **-5.367** | **-68** | **-58** | **Yes** | **17** | **0** | **n/a** | **n/a** | **0.02** | **NP** |
| Chloride (mg/L) | MCD-DGWC-10 | -0.4598 | -56 | -63 | No | 18 | 0 | n/a | n/a | 0.02 | NP |
| **Chloride (mg/L)** | **MCD-DGWC-5** | **0.2812** | **75** | **58** | **Yes** | **17** | **0** | **n/a** | **n/a** | **0.02** | **NP** |
| Chloride (mg/L) | MCD-DGWC-8 | -0.1857 | -55 | -58 | No | 17 | 0 | n/a | n/a | 0.02 | NP |
| **Chloride (mg/L)** | **MCD-DGWC-9** | **0.9651** | **85** | **58** | **Yes** | **17** | **0** | **n/a** | **n/a** | **0.02** | **NP** |
| Fluoride (mg/L) | MCD-DGWC-10 | -0.02737 | -14 | -73 | No | 20 | 0 | n/a | n/a | 0.02 | NP |
| **Fluoride (mg/L)** | **MCD-DGWC-5** | **-0.1259** | **-80** | **-68** | **Yes** | **19** | **0** | **n/a** | **n/a** | **0.02** | **NP** |
| **Fluoride (mg/L)** | **MCD-DGWC-8** | **-0.06749** | **-90** | **-68** | **Yes** | **19** | **15.79** | **n/a** | **n/a** | **0.02** | **NP** |
| Fluoride (mg/L) | MCD-DGWC-9 | 0 | -5 | -68 | No | 19 | 0 | n/a | n/a | 0.02 | NP |
| pH [field] (S.U.) | MCD-DGWC-10 | 0.00524 | 6 | 73 | No | 20 | 0 | n/a | n/a | 0.02 | NP |
| **pH [field] (S.U.)** | **MCD-DGWC-5** | **0.07246** | **83** | **68** | **Yes** | **19** | **0** | **n/a** | **n/a** | **0.02** | **NP** |
| pH [field] (S.U.) | MCD-DGWC-8 | 0 | 3 | 68 | No | 19 | 0 | n/a | n/a | 0.02 | NP |
| **pH [field] (S.U.)** | **MCD-DGWC-9** | **-0.02086** | **-104** | **-68** | **Yes** | **19** | **0** | **n/a** | **n/a** | **0.02** | **NP** |
| **Sulfate (mg/L)** | **MCD-DGWC-10** | **-28.51** | **-78** | **-63** | **Yes** | **18** | **0** | **n/a** | **n/a** | **0.02** | **NP** |
| Sulfate (mg/L) | MCD-DGWC-5 | 9.666 | 29 | 58 | No | 17 | 0 | n/a | n/a | 0.02 | NP |
| **Sulfate (mg/L)** | **MCD-DGWC-8** | **-60.58** | **-125** | **-58** | **Yes** | **17** | **0** | **n/a** | **n/a** | **0.02** | **NP** |
| Sulfate (mg/L) | MCD-DGWC-9 | -10.15 | -42 | -58 | No | 17 | 0 | n/a | n/a | 0.02 | NP |
| **TDS (mg/L)** | **MCD-DGWC-10** | **-35.2** | **-86** | **-63** | **Yes** | **18** | **0** | **n/a** | **n/a** | **0.02** | **NP** |
| **TDS (mg/L)** | **MCD-DGWC-5** | **47.26** | **106** | **58** | **Yes** | **17** | **0** | **n/a** | **n/a** | **0.02** | **NP** |
| **TDS (mg/L)** | **MCD-DGWC-8** | **-72.15** | **-126** | **-58** | **Yes** | **17** | **0** | **n/a** | **n/a** | **0.02** | **NP** |
| TDS (mg/L) | MCD-DGWC-9 | -1.745 | -5 | -58 | No | 17 | 0 | n/a | n/a | 0.02 | NP |

wsp.com