Draft Remedy Selection Report

Plant McManus – Former Ash Pond 1

1 Crispen Island Drive

Brunswick, Georgia

February 28, 2023

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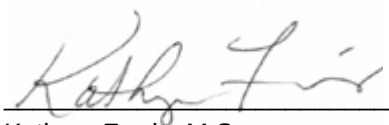

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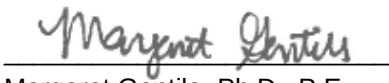

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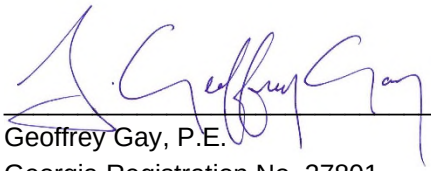

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Certification

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

Geoffrey Gay, P.E. (PE 27801)
Technical Expert (Eng)

2.28.23
Date

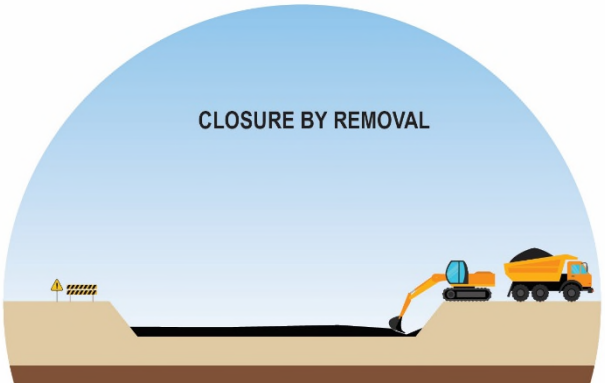
Georgia Power

Executive Summary

Plant McManus, located in Brunswick, Georgia, operated two coal-fired generators. Both of the units were converted from coal to oil by 1972. 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 former Ash Pond 1 (AP-1). The ash pond was designed, installed, and operated to function as a treatment system for power plant wastewaters, and effectively served in this capacity for decades in compliance with the National Pollutant Discharge Elimination System (“NPDES”) permit under which it was regulated. Georgia Power completed removal of CCR from AP-1 in accordance with federal and state regulations between 2016 and 2019. The Georgia Environmental Protection Division (GA EPD) acknowledged the completion of CCR removal on January 10, 2020. The final CCR Permit was issued on June 18, 2021 [063-030D (CCR)]. As part of a comprehensive approach to managing CCR, Georgia Power completed a detailed evaluation of corrective measures to remove arsenic in groundwater above the Groundwater Protection Standard at AP-1 at Plant McManus.

Closure of the CCR Unit

Georgia Power completed the removal of all visible CCR material from AP-1, as well as an additional six or more inches of soil below the limits of ash in 2020. The removed CCR material was disposed of at an off-site, permitted, lined solid waste disposal facility. The closure of AP-1 is regulated by the United States Environmental Protection Agency (USEPA) and the GA EPD. Closure activities are authorized under GA EPD approved closure permit No. 063-030D(CCR). Source control by closure of the CCR unit provides considerable benefits to groundwater and is an important step in managing impacts to groundwater.



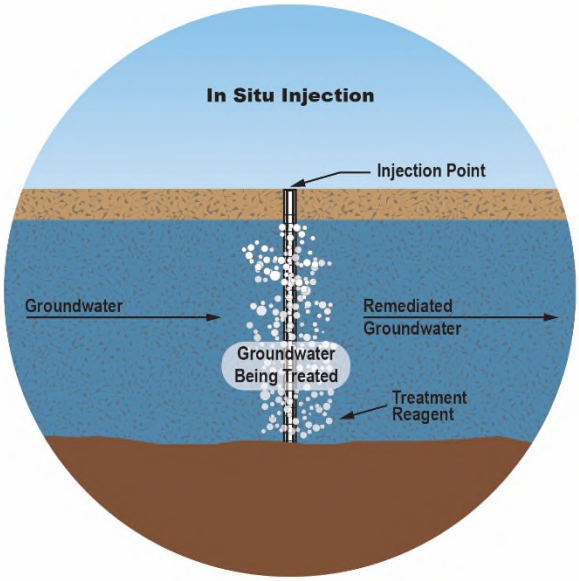
Groundwater Monitoring and Assessment

Georgia Power has performed CCR groundwater monitoring at AP-1 since 2016. Over the period of Georgia Power’s monitoring, concentrations of arsenic were identified above the Groundwater Protection Standard in one compliance well. Extended groundwater and surface water monitoring indicate arsenic above the Groundwater Protection Standard is limited in extent and delineated.

Executive Summary

Risk Evaluation for Human Health and Environment

Georgia Power completed a risk evaluation on arsenic in groundwater at the site. As documented in the Risk Evaluation Report, the arsenic in groundwater at the site is not expected to pose a risk to human health or the environment.



Proposed Corrective Action for Groundwater: In Situ Injection

Georgia Power submitted an assessment of corrective measures report for AP-1 in December 2020. Georgia Power has worked with the GA EPD to adhere to regulations and select a comprehensive and technically sound approach for implementing corrective measures to address arsenic in groundwater. Using the criteria described in the CCR Rule, 40 Code of Federal Regulations (CFR) Part 257.97, In Situ Injection was selected as the proposed remedial approach for the site. In Situ Injection is anticipated to create conditions in the subsurface to effectively remove arsenic from groundwater. Results of laboratory testing with site soil and groundwater demonstrated removal of arsenic 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 AP-1 for at least 3 years after Groundwater Protection Standards are met in accordance with 40 CFR Part 257.98(c)(2).

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Acronyms and Abbreviations

ACM	Assessment of Corrective Measures
ADS	alternative source demonstration
AP	Ash Pond
AP-1	Ash Pond 1
Arcadis	Arcadis U.S., Inc.
bgs	below ground surface
CCR	Coal Combustion Residual
CFR	Code of Federal Regulations
CSM	conceptual site model
EPRI	Electric Power Research Institute
GA EPD	Georgia's Environmental Protection Division
GWPS	Groundwater Protection Standard
HPT	hydraulic profiling tool
ISI	In Situ Injection
ISS	In Situ Stabilization/Solidification
K	hydraulic conductivity
mg/L	milligram per liter
MNA	Monitored Natural Attenuation
O&M	operations and maintenance
P&T	Pump & Treat
PDI	pre-design investigation
PRB	Permeable Reactive Barrier
RCRA	Resource Conservation and Recovery Act
SSL	Statistically Significant Level
USEPA	United States Environmental Protection Agency

1 Introduction

Arcadis U.S., Inc. (Arcadis) prepared this Draft Remedy Selection Report on behalf of Georgia Power for Plant McManus Former Ash Pond 1 (AP-1). As documented here, Georgia Power has completed a detailed evaluation of corrective measures to address arsenic in groundwater in one monitoring well 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) Part 257, effective October 19, 2015 (CCR Rule), including subsequent revisions and Georgia Environmental Protection Division's (GA EPD's) Rule for Solid Waste Management Rule 391-3-4-.10 for CCR.

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

2 Background

2.1 Remedy Selection Process

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

The remedy selected for the CCR unit (AP-1) 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 (Arcadis, 2020a) and subsequent updates (Arcadis 2021a, Arcadis 2021b, Arcadis 2022a, Arcadis 2022b) to identify an appropriate groundwater remedy for the unit. Selection of an appropriate groundwater remedy is significantly influenced by CCR constituent chemistry and the characteristics of Appendix IV parameters, which are inorganic trace elements – metals and metalloids that have unique attenuation and remediation characteristics. Common chemical mechanisms of attenuation for CCR constituents include adsorption to, or co-precipitation 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, Electric Power Research Institute [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. A remedy, meeting the criteria of 257.97(b), was proposed based on an evaluation of factors specified in 257.97(c)(1) - (3).

An evaluation of the degree to which community concerns are addressed by a potential remedy, as specified in 257.97(c)(4), is not included in this Draft Remedy Selection Report. Consideration of this criterion will be substantially informed by a forthcoming public meeting following GA EPD preliminary review and comment on this Draft Remedy Selection Report. Following the public meeting, the Remedy Selection Report will be prepared for submission to GA EPD and will include a discussion of the “degree to which community concerns are addressed by a potential remedy.”

2.2 Unit Location and Description

Plant McManus is an electrical power generation plant located on Crispen Island in Glynn County, near Brunswick, Georgia (Figure 1). The physical address of the plant is 1 Crispen Island Drive, Brunswick, GA 31523. It is separated from the mainland to the northeast by tidal marsh and bound to the west and southwest by the Turtle River.

The initial startup and commercial operation of Unit 1 began in 1952. Unit 1 originally operated as an oil-fired generator but was converted to coal in 1960. Unit 2 was declared commercial in 1959 and began operating as a coal-fired generator. Both Unit 1 and Unit 2 were converted to oil in 1971, and the use of coal for production ceased in 1972. Nine diesel-fired combustion turbines were constructed on site in 1972. Georgia Power retired Unit 1 and Unit 2 at Plant McManus prior to April 16, 2015. During operation of the coal-fired units from 1959 until 1972, CCR was placed in an approximately 80-acre surface impoundment (i.e., AP-1) on the Plant McManus site northeast of the plant (site).

AP-1 was formed by the construction of a dike from the northeast corner of Crispen Island to the mainland. This dike formed the northwest side of AP-1, while Crispen Island, the mainland, and a southern roadway and dike (Crispen Boulevard) formed the other sides of AP-1.

2.3 Unit Closure

CCR placement in AP-1 ceased in 1972 after Plant McManus retired its coal units. Prior to unit closure-related construction activities, Georgia Power completed a notification of intent to initiate closure of the former CCR unit on December 7, 2015. Closure construction for AP-1 consisted of closure by removal and included the removal of all visible CCR within the surface impoundment, as well as removal of an additional 6 or more inches of soil below the limits of ash. Removed CCR and soil excavated beneath the CCR was disposed of at an approved solid waste management facility.

Following the completion of closure-related construction activities, the final CCR removal certification report was submitted in November 2019 (Arcadis 2019). GA EPD acknowledged the report and that the removal activities within the identified boundaries of former AP-1 had occurred in a letter dated January 10, 2020 (GA EPD 2020). Closure Permit No. 063-030D(CCR) was issued by GA EPD on June 18, 2021 (GA EPD 2021a). Post-removal monitoring is detailed in the GA EPD-approved Groundwater Monitoring Plan (Resolute 2021a).

2.4 Groundwater Monitoring

The current groundwater monitoring network for the CCR unit includes the background/upgradient and downgradient monitoring wells that serve for detection and assessment monitoring, as summarized in Table 1 and shown on Figure 2**.** CCR groundwater monitoring-related activities have been performed at former AP-1 since 2016 in accordance with the CCR Rule. The following Appendix IV SSL parameter and well is the subject of this Draft Remedy Selection Report (Table 2):

Table 2 – Appendix IV SSL Summary

Appendix IV Parameter[1]	Paired Monitoring Well ID
Arsenic	MCM-06

The recent groundwater assessment data are provided in the 2022 Annual Groundwater Monitoring and Corrective Action Report (Resolute 2022b) and Semiannual Groundwater Monitoring and Corrective Action Report (Resolute 2023). Lithium had previously been identified at concentrations greater than its GWPS (0.040 milligrams per liter [mg/L]) at MCM-06 and DPZ-02. In accordance with 40 CFR §257.95(g)(3), two alternate source demonstrations (ASDs) have been completed to address lithium SSLs at detection well MCM-06 and assessment well DPZ-02. The ASDs showed that concentrations of lithium in groundwater are naturally occurring. GA EPD conditionally approved the MCM-06 and DPZ-02 lithium ASDs on April 22, 2021 and June 17, 2022,

[1] An SSL-related constituent is determined by comparing the confidence intervals developed to either the constituent's maximum contaminant level, if available; the calculated background interwell prediction limit; or for cobalt, molybdenum, lithium, and lead, the promulgated concentrations at 40 CFR §257.95(h)(2).

respectively (GA EPD 2021b, 2022). Consequently, only arsenic is the subject of this Draft Remedy Selection Report.

Additional details regarding the statistical analyses are provided in the annual and semiannual Groundwater and Corrective Action Monitoring Reports submitted to GA EPD and posted on Georgia Power's website (Resolute 2019, 2020a, 2020b, 2021b, 2021c, 2022a, 2022b).

3 Groundwater Conceptual Site Model

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

3.1 Regional Geology

The Brunswick area is located in the Coastal Plain Province of Georgia. It is underlain by three regional aquifer systems that extend to depths exceeding 1,100 feet. The surficial aquifer is the uppermost aquifer system. It overlies the Hawthorn Formation and extends to approximately 185 feet below ground surface (bgs) in the Brunswick area (Clark et al. 1990, ATC Associates Inc. 1997) and is composed of three geologic formations: the Satilla Formation, the Cypresshead Formation, and the Ebenezer Formation (Resolute 2020c).

The Satilla Formation, discussed separately as the Upper and Lower Satilla Formations below, overlies the Cypresshead Formation. In the Brunswick area, the transition between them is uncertain but is regionally thought to occur at approximately 28 feet bgs. The Cypresshead Formation extends to approximately 50 feet bgs. The Ebenezer Formation is below the Cypresshead Formation and is composed of four alternating units: an upper confining unit from approximately 50 to 75 feet bgs, followed by a water-bearing zone from approximately 75 to 110 feet bgs, another confining unit from approximately 110 to 150 feet bgs, and another water-bearing zone from approximately 150 to 185 feet bgs (Weems and Edwards 2001).

3.2 Site Geology

Former AP-1 is surrounded by tidal marsh, and the surface is covered by silt and vegetation, except where scoured by tidal creeks containing fine sands. In addition to current and historically recent (pre-ash pond construction) tidal channels, the marsh is also likely to have paleo (pre-historic) tidal channels present throughout the upper portion of the aquifer in the marsh area. The surficial aquifer below the site formed in a depositional environment similar to the tidal marsh at the surface, with discontinuous layers or channels of fine sand or clay. This unit is interpreted to be the Upper Satilla Formation (ATC Associates Inc. 1997) and is where most of the monitoring wells, dewatering wells, and piezometers are screened. The monitoring well network for the site is provided on Figure 2.

The soils in the Upper Satilla Formation are composed of fine sands containing varying amounts of silt and clay interspersed with discontinuous clay and/or silty clay layers. On site, these soil sequences are interpreted to extend to between 33 and 43 feet bgs (Resolute 2020c); however, the exact transition between the Upper and Lower Satilla Formations is location specific and subject to interpretation. The paleo tidal channels have a higher composition of fine sands and, as a result, represent zones of higher hydraulic conductivity (K) and enhanced groundwater flow (Resolute 2020c). The surficial aquifer in this area is generally unconfined, but there may be localized layers of lower permeability soils, resulting in a semi-confined condition at some locations.

Onsite, the aquifer fines downward to a silty fine sand. These siltier sands have been interpreted as the Lower Satilla (ATC Associates Inc. 1997) but may also correspond to the Cypresshead Formation (Huddleston 1988).

Together, these sequences may serve as a lower aquitard, limiting downward vertical groundwater flow beneath the site.

A hydraulic profiling tool (HPT) was utilized during the 2021 high resolution investigation along the dike to provide greater characterization of the aquifer. The HPT provides direct measurements of K at a high resolution. The distribution of Ks along the northern dike, as logged by the HPT, is provided in Cross section AA' on Figures 3 and 4. Consistent with the CSM (Resolute 2020c), the surficial aquifer below the northern dike is highly heterogeneous with different depositional processes in a marine-tidal depositional environment. The estimated K of the surficial aquifer below the dike is relatively high, as expected with sandy sediment.

3.3 Site Hydrogeologic Conditions

A groundwater monitoring network (Figure 2) has been established within the surficial aquifer around former AP-1 pursuant to §257.91. This monitoring well network includes upgradient and downgradient monitoring points that serve for detection and assessment monitoring. Potentiometric surface maps that were developed from data collected at low and high tides in February and March 2022 and in September 2022 are provided on Figures 5 and 6, respectively.

The potentiometric surface maps illustrate two components of groundwater flow within the Upper Satilla Formation. The first component is toward former AP-1 from the mainland (on the northeast side) and from Crispen Island (on the southwest side). The groundwater elevations in the monitoring wells and piezometers on both the mainland (MCM-01, -02, -15, and -16) and Crispen Island (MCM-08 and 11) are higher than the surface water elevation in former AP-1 and the monitoring wells along both dikes at both high and low tide. This indicates that groundwater flows consistently toward former AP-1 from Crispen Island and the mainland.

The second component of groundwater flow is between former AP-1 and the tidal marsh, to the northwest and southeast. This component of groundwater flow is highly influenced by the tides and is observed primarily in the wells on the northern dike and along Crispen Drive. Groundwater elevations in these wells fluctuate with the tide, lagging it slightly and subdued in magnitude. As a result, the gradient can change direction between high and low tide: toward the marsh at low tide and toward former AP-1 at high tide, as seen on the March 2022 potentiometric surface maps (Figure 5). The tide cycles approximately every 5.5 to 6 hours, meaning that the available time for groundwater movement at each tide is approximately 2.75 to 3 hours, with very low to no hydraulic gradient during the balance of time at each cycle, and correspondingly very low to no flow as the direction reverses. The short amount of time for groundwater movement in each direction prior to the tide reversal likely creates a stagnation of groundwater within the dike, resulting in very low net flow (Resolute 2020c).

3.4 Nature and Extent of Groundwater above the GWPS

Based on statistical analysis of Appendix IV groundwater data, the arsenic SSL identified in detection well MCM-06 is horizontally and vertically delineated to levels below GWPS. The arsenic SSL at MCM-06 is vertically delineated by assessment well DPZ-02 (Figure 7). Based on arsenic results from surface water samples collected in the tidal salt marsh to date, horizontal delineation is complete. Recent groundwater data collected from piezometers north of MCM-06 (PT-01, PT-02, and PT-03), installed in May 2022, have shown order-of-magnitude decreases in arsenic concentrations over the short distance between MCM-06 and PT-01, PT-02, and PT-03 to concentrations less than or slightly greater than the GWPS. These results provide support that arsenic concentrations in groundwater at MCM-06 do not extend to the north. Additional data collection will be completed

to confirm. The most recent isoconcentration map for arsenic is presented on Figure 7**;** Table 3 summarizes sampling locations with concentrations greater than the GWPS in addition to pertinent horizontal and vertical delineation points. The extent of arsenic greater than the GWPS presented on Figure 7 was developed using the analytical results from the September 2022 monitoring event and the extent identified in the 2021 high-resolution investigation (Arcadis 2021b). This extent was used to define the treatment area for the corrective measures evaluation.

Table 3 – Arsenic Delineation Summary (September 2022)

Detected Constituent	GWPS (mg/L)	Location ID	Concentration (mg/L) September 2022
Arsenic	0.032	Monitoring Locations with Arsenic Concentrations Greater than GWPS	
		MCM-06	0.180*
		DR-02	0.036
		PT-03	0.047
		PT-01	0.035
		Vertical Delineation Location	
		DPZ-02	0.028 J
		Horizontal Delineation Locations	
		T2-1HT	0.0027
		T2-2HT	0.0025
		T2-2HTS	0.0028
		T2-3HT	0.0030
		T2-3HTS	0.0024
		T2-4HT	0.0027
		T2-4HTS	0.0025
		T2-4LT	<0.0060

Notes:

ID = identification
mg/L = milligrams per liter
< = not detected above method detection limit listed
* = SSL for arsenic
J = estimated concentrations
September 2022 analytical reports provided in the 2022 Semiannual Groundwater Monitoring and Corrective Action Report (Resolute 2023)

4 Assessment of Corrective Measures Summary

An ACM Report was completed on December 4, 2020 (Arcadis 2020a) in accordance with 40 CFR §257.96 and identified the following corrective measures as potentially applicable to remediate groundwater at the site:

- Geochemical Manipulation via In Situ Injection (ISI);
- In Situ Stabilization/Solidification (ISS);
- Hydraulic Containment (Pump and Treat [P&T]);
- Monitored Natural Attenuation (MNA);
- Permeable Reactive Barrier (PRB);
- Phytoremediation; and,
- Subsurface Barrier Walls.

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

Further evaluation and refinement of the groundwater corrective measures were presented in Semiannual Remedy Selection and Design Progress Reports (Arcadis 2021a, Arcadis 2021b, Arcadis 2022a, Arcadis 2022b) submitted following the 2020 ACM Report (Arcadis 2020a). The corrective measures identified for the CCR unit in the ACM Reports have been further evaluated using the criteria outlined in 40 CFR §257.96(c) and GA EPD's Rule for Solid Waste Management Rule 391-3-4.10(6)(a). The screening of the corrective measures, as presented in the Semiannual Remedy Selection and Design Progress Reports, is summarized in Table 4. Phytoremediation, ISS, and subsurface vertical barrier walls were screened out during previous Remedy Selection and Design Progress Reports, as summarized in Table 4.

The corrective measures retained for further evaluation under the 40 CFR §257.97 remedy selection criteria in this Draft Remedy Section Report include the following:

- **Geochemical Manipulation via In Situ Injection (ISI)** – ISI is the application of reagents in the subsurface to influence the solubility, mobility, and/or toxicity of inorganic constituents. The intent of injecting chemical/s or organic substrate/s is to alter geochemical conditions to those more favorable for stabilization of arsenic.
- **Monitored Natural Attenuation (MNA)** – MNA is defined as the reliance on natural attenuation processes (within the context of a carefully controlled and monitored site remedial approach) to achieve site-specific objectives – in this case, GWPS at the compliance boundary (former waste boundary) – within a timeframe that is reasonable compared to that offered by other, more active methods (USEPA 2007, 2015). MNA is a remedial solution that takes advantage of natural attenuation processes to reduce constituent concentrations in groundwater.
- **Hydraulic Containment (Pump & Treat [P&T])** – P&T uses groundwater extraction to establish a hydraulic gradient to capture and control the migration of groundwater that is impacted by a constituent of concern. The

remedy combines a groundwater extraction system with a treatment system to remove target analytes from the subsurface and/or to control/prevent constituent migration.

- **Permeable Reactive Barrier (PRB)** – PRBs consist of in situ permeable treatment zones designed to intercept and remediate a contaminant plume (Interstate Technology & Regulatory Council [ITRC 2011]). The PRB system is designed to passively allow groundwater and constituents of concern to flow through a reactive barrier, filled with treatment media such as zero-valent iron or activated alumina, to remove arsenic.

Conceptual remedy design drawings of the four corrective measures are shown on Figures 8 through 11. Because the layouts are considered conceptual, the configuration of the implemented remedy may vary.

Alternative 1: Geochemical Manipulation via In Situ Injection (ISI)

Alternative 1 (ISI) relies on stabilizing arsenic by altering geochemical conditions in groundwater using in situ injections. In situ immobilization of arsenic could be achieved through the addition of various in situ reagents. For example, the application of amendments such as iron can remove arsenic from groundwater through several processes. The addition of iron can decrease the amount of sulfide in groundwater through precipitation of reduced iron sulfide minerals that then can disintegrate soluble thioarsenic species currently present in groundwater, reducing the solubility of arsenic. Additional treatment mechanisms include co-precipitation of arsenic with iron and sulfide and sorption onto mineral phases such as iron (oxy)hydroxides or pyrite. Bench-scale studies completed for injection reagents demonstrated rapid decrease in arsenic concentrations in groundwater treated with injectable amendments such as zero-valent iron and ferrihydrite (Appendix A – Attachment 6).

For the purpose of evaluating ISI against the remedy selection criteria, a conceptual design, shown on Figure 8, was used. In the conceptual design, the injections will use iron reagents to immobilize arsenic through co-precipitation and adsorption. To evaluate this alternative, hypothetical injection points are conceptualized in one transect across the treatment area to create an in situ reactive zone; as groundwater passes through the zone, arsenic is immobilized. In the conceptual design, the transect consists of a row of injection points, shown on Figure 8 as orange points, spaced approximately 5 feet apart, with the injection screened intervals based on the depths delineated by assessment well DPZ-02 and the 2021 high-resolution investigation results (Arcadis 2021b). Based on professional judgment regarding ISI reagents and planned injection pressures, injected reagents are anticipated to migrate only short distances and likely will not travel beyond the dike area. The actual radius of influence of the injections will be determined during pilot testing. In order to advance these injection points, it would be necessary to construct a small drill pad, which will require modest reworking of the existing slope to the south of MCM-06 to allow for drill rig access and obtaining the required permits to do so.

Alternative 2: Monitored Natural Attenuation (MNA)

Alternative 2 relies on natural attenuation processes to achieve reductions in arsenic concentrations. Natural attenuation processes for arsenic at the site include sequestration into reduced iron- and sulfide-containing minerals as well as iron (oxy)hydroxide minerals, as detailed in the Geochemical CSM Report (Appendix A). The conceptual remedy design for Alternative 2 is shown on Figure 9. Plume attenuation over time would be evaluated through routine sampling of the monitoring well network, as well as newly installed piezometers to the north of MCM-06.

Alternative 3: Hydraulic Containment (Pump and Treat [P&T])

P&T relies on groundwater extraction to establish a hydraulic gradient to capture and control the migration of groundwater that is impacted by a constituent of concern. For the purpose of evaluating P&T against the remedy selection criteria, a conceptual design, shown on Figure 10, was considered. The conceptual design includes the installation of an extraction well upgradient of MCM-06. Installation of the extraction well would require reworking and regrading of the existing slope to the south of MCM-06 to allow for drill rig access and obtaining the required permits to do so. Groundwater would be extracted and managed in accordance with applicable requirements.

Alternative 4: Permeable Reactive Barrier (PRB)

PRBs rely on passive groundwater flow through a reactive barrier for treatment of impacted groundwater. A bench-scale study completed for PRB reagents has demonstrated that effective reduction of arsenic in groundwater is possible when treated with iron amendments such as zero-valent iron and granular ferric hydroxide (Appendix A – Attachment 6). For the purpose of evaluating PRB against the remedy selection criteria, a conceptual design, shown on Figure 11, was considered. The conceptual design includes the installation of a PRB (shown on Figure 11 in blue) across the known arsenic impacts. Installation of the PRB would require expansion of the dike road to allow access for construction equipment for PRB installation and would be keyed into a lower permeability layer approximately 35 feet bgs. In addition, perimeter sheet pile would be installed to allow for safe trenching and to reduce the risk for flowing sands.

5 Corrective Measures Evaluation

The purpose of this section is to evaluate the four corrective measure alternatives using the required criteria described in 40 CFR §257.97(b) and to rank them using 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.

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

CCR is classified as a non-hazardous Resource Conservation and Recovery Act (RCRA) solid waste, a determination confirmed in 40 CFR §257 Preamble Part III.A. Nevertheless, Georgia Power conservatively and protectively conducted a risk evaluation. A groundwater Risk Evaluation Report (Wood 2020) was completed for Plant McManus former AP-1 and included as an appendix to the ACM Report (Arcadis 2020a) submitted to GA EPD on December 4, 2020. The Risk Evaluation Report has subsequently been updated to include groundwater monitoring data collected through September 2022 and is included as Appendix B (WSP USA Environment & Infrastructure Inc. 2023). The evaluation is one of many lines of evidence evaluated herein and factored into the remedy selection process. The risk evaluation for the SSL-related constituents in groundwater at former AP-1 was conducted using methods consistent with GA EPD and USEPA guidance and included multiple conservative assumptions. Based on the results of the evaluation, arsenic observed in groundwater at former AP-1 is 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, and human health and the environment will be protected in connection with the implementation of any of the remedies being evaluated.

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

The proposed remedies are expected to attain the GWPS at the compliance boundary and throughout the area of groundwater SSL exceedances. Attainment of the GWPS is expected based on geochemical modeling, trend

evaluation, and bench-scale evaluations reported in Appendices A and B and previously submitted reports (Arcadis 2021b, Arcadis 2022a), discussed in further detail below.

Alternative 1 (ISI): ISI is anticipated to attain the GWPS if sufficient reagent distribution is achieved by the injections. The application of amendments such as iron can decrease the soluble concentrations of sulfide, which geochemical modeling has identified as an important component for the formation of the highly soluble thioarsenic species identified on site (Appendix A). Iron is also an important component of sorptive mineral phases such as iron (oxy)hydroxides and pyrite. Bench-scale studies completed for injection reagents demonstrated rapid reduction of arsenic in groundwater treated with injectable amendments such as zero-valent iron and ferrihydrite (Appendix A – Attachment 6).

Alternative 2 (MNA): MNA was evaluated for ability to reach the GWPS using USEPA-issued MNA technical guidance specific to inorganic constituents (USEPA 2007) that contained four "tiers," which were later described as "phases" (USEPA 2015). These phases include evaluation of plume expansion, identification of attenuation mechanism and rate, and the capacity and stability of aquifer solids. Based on an evaluation of surface water, and recently collected groundwater data from wells installed directly downgradient of MCM-06, the arsenic plume appears to be stable. Recent decreases in arsenic concentrations at MCM-06 suggest that further attenuation is occurring. Compared to arsenic concentrations measured during pond closure construction, which ranged from 0.30 to 0.51 mg/L, arsenic concentrations at MCM-06 during the March and September 2022 sampling events (0.24 and 0.18 mg/L, respectively) are less than half of the historical maximum. As discussed in the Geochemical CSM Report (Appendix A), mineralogy, metals, and acid volatile sulfide/simultaneously extracted metals analyses indicate the presence of coprecipitated or sorptive mineral phases that are removing arsenic from groundwater. Although evaluation of these phases indicates potential for attenuation and reduction in arsenic concentrations, concentrations may level off above the GWPS for some period of time given the solubility of the thiospecies before declining to less than GWPS. Therefore, there is some uncertainty in how long it would take arsenic concentrations to reach GWPS under this alternative.

Alternative 3 (P&T): The conceptual layout for this option includes extraction of groundwater and removal of arsenic through aboveground treatment, which will reduce arsenic concentrations in groundwater to less than GWPS at MCM-06.

Alternative 4 (PRB): Bench-scale studies completed for PRB media demonstrated successful reduction of arsenic using zero-valent iron, indicating that arsenic can be removed to less than GWPS by the PRB (Appendix A – Attachment 6).

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. The following section describes how each potential remedy would control the source of release.

CCR removal has been completed safely, in compliance with applicable federal and state regulations, and is protective of public health and the environment. Removal included excavation of the CCR material and removal from AP-1. Physical removal of the CCR will, over time, be supportive of the decline of concentrations of arsenic in MCM-06.

The control provided by the CCR removal ensures that, for the purpose of remedy selection, the control requirement is met for all corrective measures being evaluated. None of the remedies being evaluated will

interfere with the control provided by the CCR removal in 40 CFR §257.102. In addition, Appendix IV constituents beyond the compliance boundary that are present above GWPS will be controlled by the groundwater remedy.

Alternative 1 (ISI): Arsenic can be precipitated and/or immobilized under different combinations of pH and redox conditions. A variety of geochemical condition-altering technologies are available. These processes chemically immobilize constituents in groundwater through precipitation and sorption, which effectively remove these constituents from groundwater, thereby controlling contaminant release/movement. Results from site-specific bench-scale testing identified injectable reagents that could be used to successfully treat arsenic in site groundwater to concentrations below GWPS (Appendix A).

Alternative 2 (MNA): The natural attenuation processes that are at work in such a remediation 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, and/or concentration of constituents in groundwater. These in situ processes, applicable to inorganic constituents found in CCR, effectively attenuate the movement of inorganic CCR constituents in groundwater, thereby controlling contaminant release/movement. As presented in the Geochemical CSM Report (Appendix A), there is evidence that arsenic can attenuate via sorption onto aquifer solids and precipitation or coprecipitation of arsenic with sulfide and iron sulfide minerals. Since 2020, horizontal delineation of arsenic has been evaluated by sampling surface water in the tidal salt marsh. The March and September 2022 results, reported in the 2022 Annual Groundwater Monitoring and Corrective Action Report (Resolute 2022b) and 2022 Groundwater Monitoring and Corrective Action Semiannual Report (Resolute 2023) respectively, were less than the laboratory reporting limit of 0.0026 mg/L in surface water samples. All historical surface water arsenic data collected from the adjacent tidal march since 2020 have been less than the Georgia instream water quality standard for marine estuary environments (0.036 mg/L) and generally less than the laboratory's reporting limits. Based on these results, no impacts to surface water have been detected, and horizontal delineation is complete.

Alternative 3 (P&T): Hydraulic containment (or control) refers to the use of pumping (extraction) to create a hydraulic gradient to capture or control the downgradient migration of impacted groundwater. Hydraulic containment would thereby limit potential contaminant release/movement beyond the capture zone.

Alternative 4 (PRB): A PRB is composed of reactive material below the water table that intercepts and treats groundwater flowing through the barrier. PRBs have proven to be effective in passively treating several inorganic constituents found at CCR sites, including arsenic (ITRC 2011). These processes can essentially immobilize and/or precipitate such inorganic constituents, thereby controlling contaminant release/movement. Results from site-specific bench-scale testing identified media that could be used to successfully treat arsenic in site groundwater to concentrations below GWPS (Appendix A – Attachment 6).

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

The remedial alternatives retained for further consideration would be effective at removing arsenic from groundwater, either through processes of physical removal, immobilization, or chemical attenuation in groundwater, as provided below:

Alternative 1 (ISI): ISI involves the application of amendments that allow for arsenic to be precipitated and/or immobilized under different combinations of pH and redox conditions. The injections remove contamination from the environment by reducing the presence of contaminants in groundwater through immobilization and/or

precipitation. Reactive media that have been specifically evaluated for site application include iron-containing amendments (Arcadis 2022a).

Alternative 2 (MNA): The natural attenuation processes that are at work in such a remediation 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. These processes remove contamination from the environment by reducing the presence of contaminants in groundwater.

Alternative 3 (P&T): Hydraulic containment (or control) refers to the use of groundwater extraction to artificially induce a hydraulic gradient and capture or control the migration of impacted groundwater. This remedy would remove contamination from the environment by reducing the presence of contaminants in groundwater through withdrawal within the capture zone.

Alternative 4 (PRB): PRBs have proven to be effective in passively treating several inorganic constituents found at CCR sites, including arsenic (e.g., ITRC 2011). PRBs rely on physical and chemical processes such as sorption, reduction, or oxidation. These processes remove contamination from the environment by reducing the presence of contaminants in groundwater through immobilization and/or precipitation. Media that have been specifically evaluated for site application include iron- and aluminum-containing agents (Appendix A- Attachment 6).

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 any applicable requirements of RCRA and the Georgia Comprehensive Solid Waste Management Act.

5.1.6 Evaluation of Required Criteria

The results of the required criteria evaluation are summarized in Table 5.

Table 5 – Summary of Required Criteria

Required Criteria	Alternative 1 (ISI)	Alternative 2 (MNA)	Alternative 3 (P&T)	Alternative 4 (PRB)
Be protective of human health and the environment	✓	✓	✓	✓
Attain the groundwater protection standards	✓	✓	✓	✓
Control the source of releases so as to reduce or eliminate, to the maximum extent feasible, further releases of Appendix IV constituents into the environment	✓	✓	✓	✓

Required Criteria	Alternative 1 (ISI)	Alternative 2 (MNA)	Alternative 3 (P&T)	Alternative 4 (PRB)
Remove from the environment as much of the contaminated material that was released from the CCR unit as is feasible, taking into account factors such as avoiding inappropriate disturbance of sensitive ecosystems	✓	✓	✓	✓
Management of waste to comply with all applicable RCRA requirements	✓	✓	✓	✓

5.2 Comparative Criteria (§257.97(c))

This section compares the alternatives using the comparative criteria listed in 40 CFR §257.97(c). Each of the comparative criteria consists of several sub-criteria listed in the CCR Rule, which are considered in this remedy selection below. The goal of this analysis is to further evaluate the 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 for each category of comparative criteria to visually depict 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 performs *highly favorably* under this criterion

Option performs *favorably* under this criterion

Option performs *less favorably* under this criterion

5.2.1 Long- and Short-Term Effectiveness and Protectiveness

This comparative criterion takes into consideration the following sub-criteria relative to the long-term and short-term effectiveness of each remedy. Long-term effectiveness means that the remedy will protect human health and the environment after the GWPS 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 GWPS are also considered.

5.2.1.1 Magnitude of reduction of existing risks

As indicated by the nature and extent evaluation, the most recent groundwater sampling results, and the Risk Evaluation Report summarized in Section 5.1.1, arsenic in groundwater from former AP-1 is not expected to pose a risk to human health or the environment. Therefore, this sub-criterion is considered highly favorable for all remedial alternatives.

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

CCR removal provides effective source control, as described in Section 2.3, above. Consequently, all remedies being evaluated perform similarly for purposes of this criterion and, therefore, this sub-criterion is considered favorable for all remedies being evaluated.

5.2.1.3 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.

Alternative 2 (MNA) is the only alternative that is highly favorable because it requires the least amount of long-term management and involves no mechanical systems as part of the remedy. Alternatives 1 (ISI) and 4 (PRB) are considered favorable because there is the potential for additional applications of amendment or media. Because it is anticipated that, apart from additional applications of reagent or media, no permanent treatment system requiring long-term maintenance would be needed, ISI and PRB are favorable. Alternative 3 (P&T) requires longer-term operations and maintenance (O&M) of the pumping and ex situ treatment system, and potential reinstallation of fouled wells. This alternative is the only alternative considered less favorable.

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

In accordance with 40 CFR §257.97(c)(1)(iv), this sub-criterion relates to the potential for short-term risks to human health (including, without limitation, worker safety and the community) and the environment associated with remedy implementation. Community impacts include general impacts to the community, such as increased truck traffic on public roads during construction of the remedies, as well as increased vehicle emissions, resource consumption, and noise.

Alternative 4 (PRB) is considered less favorably, because the implementation would require increased truck traffic for construction and include advancing sheet piling during trenching activities, beyond what is anticipated for Alternatives 1 (ISI), 2 (MNA), and 3 (P&T). Installation of a PRB will also require dike widening for construction, which would include hauling a large quantity of fill material over local roadways, as well as hauling for off-site disposal of excavated soils removed for PRB installation (Figure 11). For Alternative 3 (P&T), the drilling and construction of the extraction well infrastructure, upgradient of MCM-06, may require additional imported material (Figure 10). Similarly, Alternative 1 (ISI) was considered under this sub-criterion with regard to drilling and construction. ISI may require some limited ground reworking and dike expansion near the injection points to provide a stable base for injection equipment (Figure 8) and is rated comparably to P&T. Therefore, Alternatives 1 and 3 are considered favorable. No additional risk is anticipated due to changes to groundwater because the area of influence is anticipated to be limited beyond the extent of the injection itself. Minimal disturbance is anticipated with Alternative 2 (MNA); therefore, it is considered highly favorable with respect to this sub-criterion. For all alternatives, remedial activities will take place on Georgia Power property.

5.2.1.5 Time until full protection is achieved

Receptors are already protected because Appendix IV constituents in groundwater at former AP-1 are not expected to pose a risk to human health or the environment. However, in accordance with §257.98(c)(1) and (2), a remedy is considered complete when the GWPS is achieved at all points within the plume at and beyond the compliance boundary for 3 consecutive years. The time until the GWPS is achieved for a period of 3 years is described below. Remedial alternatives that require less time to meet the GWPS at the compliance boundary would be considered more favorably under this metric.

The timeframes to achieve GWPS at the compliance boundary were evaluated based on the results of bench-scale testing and the Geochemical CSM Report (Appendix A). Assuming successful reagent delivery, Alternative 1 (ISI) is anticipated to achieve the GWPS in the shortest amount of time and is considered highly favorable. This is based on the rapid reactivity observed during bench-scale testing (Arcadis 2022a). Alternative 3 (P&T) is expected to take longer than Alternative 1 to allow time for the plume to contract toward the extraction well during operation. It is also possible that timeframes for P&T could be longer due to reaching asymptotic conditions under flow conditions associated with pumping. Alternative 4 (PRB) uses passive flow through a reactive barrier to treat groundwater. Due to the tidal influences, the net groundwater flux through the PRB in a given period of time is expected to be lower than in non-tidally influenced areas with similar hydraulic gradients. This would result in a longer treatment time to meet GWPS than Alternative 1 (ISI). Alternative 2 (MNA) is also anticipated to take longer than ISI, PRB, and P&T, with uncertainty in the potential timeframe for attainment. Due to the dynamic nature of the current system, the magnitude and timing for reduction to less than the GWPS by MNA will likely take the longest of the evaluated alternatives and is considered less favorably. Because Alternative 3 (P&T) and Alternative 4 (PRB) are expected to take longer to reach GWPS than Alternative 1 (ISI), but less time than Alternative 2 (MNA), they were rated favorably.

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

In accordance with 40 CFR §257.97(c)(1)(vi), this sub-criterion considers elements such as CCR outside the unit boundary, if any, or the handling of impacted groundwater encountered during construction and operation of the remedy.

Alternative 1 (ISI) and Alternative 2 (MNA) are considered highly favorable because potential exposure through contact with CCR or groundwater is minimal. Alternative 3 (P&T) will require ongoing management of the treatment process (i.e., extracted groundwater, spent treatment system components, and treatment residuals). Alternative 4 (PRB) requires excavation of soils and impacted groundwater during emplacement of the PRB. Therefore, Alternatives 3 (P&T) and 4 (PRB) are rated as favorable.

5.2.1.7 Long-term reliability of the engineering and institutional controls

The following describes the overall long-term reliability for each of the proposed groundwater 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.

Alternatives 1 (ISI), 3 (P&T), and 4 (PRB) are considered highly favorable with respect to this sub-criterion. These are considered proven technologies that would have high long-term reliability. Alternative 2 (MNA) is considered favorable because this remedy is uncertain under current geochemical conditions and most sensitive to changes in geochemistry.

5.2.1.8 Potential need for replacement of the remedy

Any need to replace a remedy would be based on a systematic site review during the remedy implementation process, if warranted to improve remedy protectiveness or effectiveness or to 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 2 (MNA) is considered the remedy with the highest likelihood of requiring implementation of supplemental remedy due to the geochemical conditions and presence of soluble thioarsenic species and is scored as less favorable. ISI (Alternative 1), PRB (Alternative 4) and P&T (Alternative 3) are ranked as favorable as these remedies could be designed to minimize frequency for maintenance and media and well replacement. While continued pumping, additional injections, or media replacement may be required, a shift to a different supplemental remedy would be unlikely. During the implementation process, all remedies will be evaluated for effectiveness and modified if remedial objectives are not being met, in accordance with adaptive site management practices and 40 CFR §257.98(b).

5.2.1.9 Long- and short-term effectiveness summary

This sub-section provides a summary of the eight 40 CFR §257.97(c)(1) sub-criteria relative to long- and short-term effectiveness that are discussed in this section.

As summarized in Table 6, Alternative 1 (ISI) is highly favorable for both long- and short-term effectiveness and protectiveness, although additional injections may be needed. Alternatives 3 (P&T) and 4 (PRB) ranked the lowest in terms of the type and degree of management necessary due to higher amounts of system maintenance and monitoring required. MNA ranked less favorably with respect to time to reach full protection, as well as long-term reliability and potential need for a replacement remedy, but it is highly favorable for a number of other sub-criteria, including magnitude of reduction of risks and short-term risk to community.

Table 6. Category 1 – Long- and Short-Term Effectiveness, Protectiveness, and Certainty of Success Summary

	Alternative 1 (ISI)	**Alternative 2 (MNA)**	**Alternative 3 (P&T)**	**Alternative 4 (PRB)**
Sub-criterion i Magnitude of reduction of existing risks				
Sub-criterion ii Magnitude of residual risk in terms of likelihood of further release				

	Alternative 1 (ISI)	Alternative 2 (MNA)	Alternative 3 (P&T)	Alternative 4 (PRB)
Sub-criterion iii Type and degree of long-term management required				
Sub-criterion iv Limiting short term risk to community or environment during implementation				
Sub-criterion v Time until full protection is achieved				
Sub-criterion vi Potential for exposure of humans and environmental receptors to remaining wastes				
Sub-criterion vii Long-term reliability of engineering and institutional controls				
Sub-criterion viii Potential need for replacement of the remedy				
Category 1 Summary				

Color Legend:

Option performs *highly favorably* under this criterion

Option performs *favorably* under this criterion

Option performs *less favorably* under this criterion

5.2.2 Source Control Effectiveness

This comparative criterion takes into consideration the ability of the remedy to control a future release, and the extent to which treatment technologies will be used. As described in Section 2.3, closure-related construction activities were completed safely, in compliance with applicable federal and state regulations, and are protective of human health and the environment. None of the corrective measures under consideration would interfere with or diminish the anticipated benefits of the closure method.

5.2.2.1 The extent to which containment practices will reduce further releases

CCR material has been removed from former AP-1. Because the source material was removed, there is no further potential for release from the unit. Arsenic present in groundwater at or currently beyond the compliance boundary will be controlled by the groundwater remedy. Therefore, all groundwater remedy alternatives are considered favorable for this sub-criterion.

5.2.2.2 The extent to which treatment technologies may be used

In accordance with 40 CFR §257.97(c)(2)(ii), 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.

No treatment technologies are under consideration for the source material because it was removed. Therefore, all groundwater remedy alternatives are considered equally favorable for this sub-criterion.

5.2.2.3 Source control effectiveness summary

This sub-section provides a summary of the two 40 CFR §257.97(c)(2) sub-criteria relative to effectiveness that are discussed in this section. Overall, all alternatives are favorable for the category of source control. Adaptive site management strategies will be implemented to ensure the remedy achieves site goals.

Table 7. Category 2 – Source Control Effectiveness Summary

	Alternative 1 (ISI)	**Alternative 2 (MNA)**	**Alternative 3 (P&T)**	**Alternative 4 (PRB)**
Sub-criterion i Extent to which containment practices will reduce further releases				
Sub-criterion ii Extent to which treatment technologies may be used				
Category 2 Summary				

Color Legend:

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

5.2.3 Ease of Implementation

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

5.2.3.1 Degree of difficulty associated with constructing the technology

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

Alternative 2 (MNA) is considered highly favorable because implementation of a long-term monitoring program to confirm attenuation is straightforward because the monitoring system is already in place. Alternatives 1 (ISI) and 3 (P&T) are considered only favorable due to additional pilot testing, site preparation, and groundwork needed for implementation. Alternative 4 (PRB) is ranked less favorably under this sub-criterion due to the need to expand and shore the dike to allow for equipment operation. In addition, Alternatives 1 (ISI), 2 (MNA), and 4 (PRB) also require additional design and may need specific permits for implementation, particularly Alternative 4 (PRB).

5.2.3.2 Expected operational reliability of the technologies

This section compares the operational reliability of each of the proposed remedies in accordance with 40 CFR §257.97(c)(3)(ii). Typically, simple remedies that do not require the installation of significant infrastructure are more reliable and do not require significant O&M; however, more complex remedies that rely on groundwater flow manipulation, geochemical manipulation, or mechanical systems would be considered less favorable.

Alternative 2 (MNA) is considered highly favorable from an operational perspective because MNA requires only long-term monitoring following implementation. While Alternative 3 (P&T) is also expected to be reliable, this alternative will utilize an extraction well, associated piping, and an ex situ treatment system with ongoing O&M. It is, therefore, less favorable compared to Alternatives 1 (ISI) and 4 (PRB), which, after implementation, require substantially less active O&M, although PRB media replacement or additional reagent injections for ISI may be required.

5.2.3.3 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 to, 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 (e.g., a P&T system) would be considered less favorable when compared to a remedial alternative that would require fewer permits (e.g., MNA).

Alternative 2 (MNA) is the most favorable because the implementation of the MNA remedy for groundwater is straightforward and would not require specific permits. The remaining alternatives will require additional permitting and approvals for treatability testing, field-scale pilot testing, groundwater discharge or injection, groundwater treatment, and/or disposal of secondary waste streams. Alternative 4 (PRB) is considered the least favorable because additional permitting and approvals will likely be necessary for the larger-scale construction anticipated for installing the permeable reactive barrier.

5.2.3.4 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 specialty contractor's/consultant's experience with the proposed remedy on similar sites.

All of the alternatives considered require specialists in geochemistry, while Alternative 1 (ISI), 3 (P&T), and 4 (PRB) require specialists in the design and implementation of the remedial technologies. Alternative 1 (ISI) will require equipment for drilling and injection well installation or direct injections. In addition to equipment to drilling, Alternative 3 (P&T) will require additional equipment for the construction of a treatment system. Alternative 4 (PRB) will require the most equipment for trenching, shoring, and access road construction. Although the qualified contractors and equipment required are generally available, recent global supply-chain issues may present a challenge, depending on the desired timeline for implementation. Overall, all of the alternatives are considered highly favorable with respect to this sub-criterion.

5.2.3.5 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 2 (MNA) is considered highly favorable because no additional treatment, storage, or disposal services are anticipated. Alternative 1 (ISI) is also considered highly favorable because treatment will be in situ, no additional waste streams will be generated, and only a modest land area would be needed for the injection points, while Alternative 3 (P&T) and Alternative 4 (PRB) both require a substantial footprint during construction. Alternative 3 (P&T) may generate treatment residuals. Alternative 4 (PRB) would also likely generate a substantial volume of excavated soil during trenching which would need to be disposed, and as such is the least favorable with respect to this criterion.

5.2.3.6 Ease of implementation summary

This sub-section provides a summary of the five 40 CFR §257.97(c)(3) sub-criteria relative to the ease or difficulty of implementing this remedy that are discussed in this section.

Alternative 2 (MNA) is highly favorable in each sub-criterion for ease of implementation because it is a straightforward implementation without additional equipment, permits, or other difficulties. Alternatives 1 (ISI) and 3 (P&T) are less favorable compared to Alternative 2 (MNA) because of additional equipment for installation, pilot testing, and permitting. Alternative 4 (PRB) is the relatively least favorable due to the more extensive groundwork and stabilization required to safely install the PRB.

Table 8. Category 3 – Ease of Implementation Summary

	Alternative 1 (ISI)	**Alternative 2 (MNA)**	**Alternative 3 (P&T)**	**Alternative 4 (PRB)**
Sub-criterion i Degree of difficulty associated with constructing the technology				
Sub-criterion ii Expected operational reliability of the technologies				
Sub-criterion iii Need to coordinate with and obtain necessary approvals and permits from other agencies				
Sub-criterion iv Availability of necessary equipment and specialists				
Sub-criterion v Available capacity and location of needed treatment, storage, and disposal services				
Category 3 Summary				

Color Legend:

Option performs *highly favorably* under this criterion

Option performs *favorably* under this criterion

Option performs *less favorably* under this criterion

5.2.4 Evaluation of Comparative 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 in Table 9, below.

Table 9 – Summary of Comparison Criteria

	Alternative 1 (ISI)	Alternative 2 (MNA)	Alternative 3 (P&T)	Alternative 4 (PRB)
Category 1 Long- and Short-Term Effectiveness, Protectiveness, and Certainty of Success				
Category 2 Effectiveness in controlling the source to reduce further releases				
Category 3 Ease of implementation				

Color Legend:

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

Alternative 1 (ISI) performs most favorably in Category 1 (Long- and Short- Term Effectiveness, Protectiveness, and Certainty of Success) overall. With regards to effectiveness and certainty, bench scale testing indicated favorable, rapid treatment, and shorter anticipated timelines relative to the other alternatives. All alternatives were considered similarly favorable for management of risks. While Alternative 2 (MNA) would require less long-term management and present less short-term risk during implementation, Alternative 1 is less likely to require a replacement remedy and is considered more reliable. All alternatives evaluated performed equally in Category 2 (Effectiveness in controlling the source to reduce further releases). Alternative 2 (MNA) scored most favorably in Category 3 (Ease of Implementation) due to the higher degree of effort needed to install additional infrastructure for the other remedies. Although Alternative 1 (ISI) and Alternative 2 (MNA) compare similarly across the three categories, Alternative 1 is considered the most favorable because it outperforms Alternative 2 in effectiveness and certainty of success, even though Alternative 2 is considered easier to implement.

5.3 Public Meeting and Community Engagement

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

6 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 ensure that performance criteria and site remedial objectives are met.

6.1 Summary of Proposed Remedy

Based on the evaluation of corrective measures, using the required and comparative criteria presented in Section 5, Alternative 1 (ISI) is the proposed remedy for arsenic in groundwater above the GWPS beyond the compliance boundary (Figure 8) – i.e., at MCM-06. ISI is proposed due to the favorable results shown in bench-scale testing, minimal requirements for site preparation; ease of implementation; and high overall relative performance on long- and short-term effectiveness, protectiveness, and likelihood of success.

Prior to full-scale implementation, an in situ pilot test would be 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 on Figure 8. The configuration of the implemented remedy may differ based on final design parameters and adaptive site management practices.

ISI may be completed through multiple rounds of injection. Following injection application, groundwater monitoring at downgradient points would be completed to track performance of the ISI 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 of the area of contaminated groundwater is directly related to the time to implement remediation. The horizontal and vertical extent of arsenic present in groundwater at concentrations greater than GWPS has been adequately delineated, as described in Section 3 of this Draft Remedy Selection Report, and is limited to a small area adjacent to MCM-06. The proposed 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: The proposed remedy is expected to achieve compliance with the GWPS within 5 years following injection completion. Groundwater monitoring following injections will confirm that groundwater arsenic concentrations remain less than the GWPS. As considered in Section 5 of this report, the proposed remedy is expected to address arsenic in groundwater. In the event that adequate progress is not made toward addressing arsenic in groundwater and achieving the GWPS, Georgia Power will enlist 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 documented in a 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-1. 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 5 of this Draft Remedy Selection Report, the risk evaluation for arsenic in groundwater at former AP-1 was conducted using methods consistent with GA EPD and USEPA guidance, included multiple conservative assumptions, and concluded that groundwater conditions are not expected to pose a risk to human health or the environment. Because of the lack of risk to human health and the environment, 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 Draft Remedy Selection Report, as required under 40 CFR §257.97I(1).

Resource value of the aquifer: As summarized in Section 5 of this report and detailed in the Risk Evaluation Report (Appendix B), no complete pathways for downgradient drinking water receptors or surface water ecological receptors were identified. Because receptors are absent downgradient from the CCR unit, an alternative drinking water supply or interim remedial measure, as outlined in 40 CFR §257.98(a)(3), is not necessary. Further, Georgia Power will retain ownership of the site. As former AP-1 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 remedial activities is described below. The general approach and implementation schedule will be modified based on new groundwater quality data obtained during the remedial implementation process, following adaptive site management practices and in accordance with 40 CFR §257.98(b).

6.2.1 Planning and Design

Subject to the timeline associated with any needed GA EPD approvals, approximately 1 year will be required to design the proposed remedy and develop a corrective action plan. Significant planning and design of Alternative 1 (ISI) may include the following:

- Pre-design investigation (PDI): While no plume refinement tasks are likely necessary, additional treatability testing may be necessary to verify the in situ reagent used and the corresponding quantity of reagent required. These PDI elements are anticipated to take 2 to 4 months to complete.
- Pilot Study: Permanent wells have been installed to further characterize the aquifer, and they will be utilized during pilot testing as either injection points or performance monitoring wells. To expedite remedy design and implementation, Georgia Power requests written concurrence from GA EPD to initiate pilot studies following receipt of the Draft Remedy Selection Report. Following receipt of GA EPD concurrence to proceed, a pilot study workplan will be developed, submitted to GA EPD, and implemented near MCM-06. Prior to injection, an Underground Injection Control permit application will be prepared and submitted to GA EPD for review and approval (total of 6 months). Pilot study injections are expected to occur over a period of approximately 1 month, with an additional 9 to 12 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 12 months of performance monitoring and prior to finalizing the injection design.

- Finalized Design and Corrective Action Plan: Development of a corrective action groundwater monitoring plan will also be completed to evaluate the performance of the proposed remedy to reach and maintain the GWPS at the compliance boundary through temporal and spatial groundwater quality monitoring. In accordance with 40 CFR §257.98(a) the corrective action groundwater monitoring plan and program will be established within 90 days of selection and final GA EPD approval of the groundwater remedy.

6.2.2 Construction and Implementation

Following injection design, coordination with drilling contractors will commence. Due to the small footprint required for the remedy, it is anticipated that a small number of injection points will be needed, and that implementation will be completed within 1 year of the finalization and approval of the corrective action plan. Following injection activities, groundwater will be monitored to track remedy progress.

6.2.3 Operation

Once injection activities are completed, there will be no active operational requirements, with the exception of groundwater monitoring activities. The groundwater remedy will be considered complete when applicable requirements listed under 40 CFR §257.98(c) and GA EPD's Rules for Solid Waste Management 391-3-4-.10(6) are satisfied. In accordance with 40 CFR §257.98(c)(2), groundwater monitoring will be completed over at least 3 years to demonstrate compliance with GWPS. In total, it is estimated that GWPS will be achieved within 5 years following the completion of injection activities.

If, during post-remedy groundwater monitoring, a determination is made that compliance with the requirements of 40 CFR §257.97(b) is not being achieved through the proposed remedy, other remedy methods or techniques will be evaluated to achieve compliance with the requirements listed under 40 CFR §257.98(b).

6.3 Reporting

In accordance with 40 CFR §257.105(h) and 40 CFR §257.107(h), Georgia Power will place the Final Remedy Selection Report into the site operating record and post it 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.

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Tables

Table 1
Monitoring Well Network Summary
Georgia Power Company
Plant McManus Former Ash Pond 1
Brunswick, Georgia

Well ID	Well Function	Northing[1] (ft)	Easting[1] (ft)	Top of Casing Elevation[2] (ft NAVD 88)	Ground Surface Elevation[2,3] (ft NAVD 88)	Total Depth[4] (ft BTOC)	Top of Screen Elevation[2] (ft NAVD 88)	Bottom of Screen Elevation[2] (ft NAVD 88)
Detection Wells								
MCM-01	Upgradient Monitoring	443727.31	852732.08	8.63	5.70	27.32	-7.93	-17.93
MCM-02	Upgradient Monitoring	444496.53	852663.64	11.25	8.25	27.35	-5.22	-15.22
MCM-04	Downgradient Monitoring	444804.73	851695.27	12.39	9.50	28.57	-5.18	-15.18
MCM-05	Downgradient Monitoring	444716.63	851309.91	10.04	7.80	28.05	-7.25	-17.25
MCM-06	Downgradient Monitoring	444407.22	850782.11	10.15	7.87	27.20	-6.27	-16.27
MCM-07	Downgradient Monitoring	444059.38	850195.96	10.20	7.52	23.75	-2.76	-12.76
MCM-11	Upgradient Monitoring	442429.80	851072.91	10.23	7.52	24.00	-3.34	-13.34
MCM-12	Sidegradient Monitoring	442821.17	851312.45	11.87	8.99	29.00	-6.12	-16.12
MCM-14	Sidegradient Monitoring	443358.82	852317.59	11.50	8.66	28.11	-6.23	-16.23
MCM-15	Upgradient Monitoring	444825.53	851949.02	12.84	10.18	26.60	-4.53	-14.53
MCM-16	Upgradient Monitoring	444551.32	852716.60	16.02	13.04	28.39	-1.72	-11.72
MCM-17	Sidegradient Monitoring	443074.41	851899.68	11.49	9.09	27.44	-4.81	-14.81
MCM-18	Upgradient Monitoring	442067.07	851698.41	9.00	6.01	27.86	-8.76	-18.76
MCM-19	Upgradient Monitoring	441157.82	852338.86	8.71	5.77	28.32	-9.53	-19.53
MCM-20	Upgradient Monitoring	440944.40	852185.15	10.07	7.07	23.05	-2.98	-12.98
Assessment Wells								
DPZ-02	Vertical Assessment Well	444391.02	850757.94	9.54	7.34	43.46	-28.84	-33.84

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Monitoring Well Network Summary
Georgia Power Company
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Well ID	Well Function	Northing[1] (ft)	Easting[1] (ft)	Top of Casing Elevation[2] (ft NAVD 88)	Ground Surface Elevation[2,3] (ft NAVD 88)	Total Depth[4] (ft BTOC)	Top of Screen Elevation[2] (ft NAVD 88)	Bottom of Screen Elevation[2] (ft NAVD 88)
Piezometers								
MW-01R	Piezometer	443632.56	852715.13	12.61	NA	27.44	0.17	-14.83
MW-02	Piezometer	443354.39	852304.20	11.10	NA	26.80	-0.70	-15.70
MW-03	Piezometer	443081.34	851904.85	11.26	NA	27.00	-0.60	-15.60
MW-04	Piezometer	442854.63	851408.14	9.20	NA	27.40	-3.00	-18.00
MW-05	Piezometer	442578.20	850752.35	13.24	NA	27.60	0.90	-14.10
MW-06R	Piezometer	442378.53	850499.04	13.25	NA	20.00	3.25	-6.75
MW-07	Piezometer	442792.99	850224.35	9.94	NA	21.50	3.40	-11.60
MW-08	Piezometer	443310.06	849978.00	8.95	NA	27.70	-3.70	-18.70
MW-09	Piezometer	443736.77	849920.90	10.10	NA	24.20	0.80	-14.20
MW-10	Piezometer	444045.12	850181.41	10.24	NA	27.10	-2.80	-17.80
MW-11	Piezometer	444359.53	850709.32	10.42	NA	32.20	-8.20	-23.20
MW-12	Piezometer	444667.36	851186.90	10.08	NA	32.30	-8.60	-23.60
MCM-03	Piezometer	444414.88	851984.67	9.97	7.10	27.70	-7.73	-17.73
MCM-08	Piezometer	443758.80	849716.96	9.42	6.55	28.29	-8.39	-18.39
MCM-09	Piezometer	443252.16	850147.75	Abandoned				
MCM-10	Piezometer	442791.88	850453.05	11.75	8.61	23.96	-1.25	-11.25
MCM-13	Piezometer	443030.23	851826.19	12.56	9.79	27.46	-4.90	-14.90
PZ-09	Piezometer	444082.13	849471.64	9.41	6.57	24.05	-4.56	-14.56
PZ-10	Piezometer	444949.09	851673.98	12.17	9.74	22.91	-0.66	-10.66
PZ-11	Piezometer	443222.86	849280.51	9.37	6.57	19.08	-4.63	-9.63
PZ-12	Piezometer	443593.34	849396.87	7.90	5.02	18.70	-5.72	-10.72
DR-01	Piezometer	444407.62	850777.93	7.58	7.86	30.72	-8.14	-23.14
DR-02	Piezometer	444411.68	850784.46	7.49	7.90	30.59	-8.10	-23.10
PT-01	Piezometer	444408.70	850768.53	7.49	7.82	24.67	-7.18	-17.18
PT-02	Piezometer	444414.19	850777.91	7.64	7.91	24.73	-6.59	-16.59
PT-03	Piezometer	444418.92	850785.95	7.45	7.93	24.72	-7.27	-17.27
DPZ-01	Deep Piezometer	444695.71	851277.40	9.71	7.36	40.78	-25.99	-30.99
DPZ-03	Deep Piezometer	444073.16	850218.83	9.46	7.04	47.57	-33.03	-38.03
DPZ-04	Deep Piezometer	443062.60	851881.94	11.45	8.96	51.23	-34.70	-39.70
DPZ-05	Deep Piezometer	443376.32	852342.11	11.00	8.60	51.20	-35.12	-40.12
DPZ-06	Deep Piezometer	444614.79	851846.27	12.04	9.59	40.50	-23.38	-28.38
PT-04D	Deep Piezometer	444400.23	850753.07	7.51	7.80	40.71	-28.20	-33.20

Table 1
Monitoring Well Network Summary
Georgia Power Company
Plant McManus Former Ash Pond 1
Brunswick, Georgia

Well ID	Well Function	Northing[1] (ft)	Easting[1] (ft)	Top of Casing Elevation[2] (ft NAVD 88)	Ground Surface Elevation[2,3] (ft NAVD 88)	Total Depth[4] (ft BTOC)	Top of Screen Elevation[2] (ft NAVD 88)	Bottom of Screen Elevation[2] (ft NAVD 88)
Dewatering Wells/Piezometers								
RW-2	Dewatering for Construction	444161.84	850367.20	9.96	NA	27.27	-2.83	-12.83
RW-3	Dewatering for Construction	444228.43	850479.77	9.89	NA	32.29	-3.07	-13.07
RW-4	Dewatering for Construction	444299.33	850599.26	9.49	NA	26.88	-2.97	-12.97
RW-5	Dewatering for Construction	444369.68	850714.24	10.11	NA	37.22	-2.92	-22.92
RW-6	Dewatering for Construction	444436.37	850831.72	10.25	NA	36.58	-2.67	-22.67
RW-7	Dewatering for Construction	444504.59	850949.35	10.19	NA	38.17	-7.69	-22.69
RW-8	Dewatering for Construction	444572.91	851064.47	10.22	NA	31.62	-2.80	-17.80
RW-9	Dewatering for Construction	444641.60	851181.30	10.26	NA	37.71	-7.66	-22.66
RW-10	Dewatering for Construction	444706.87	851295.50	10.56	NA	37.80	-7.54	-22.54
PZ-1	Piezometer for Dewatering	444127.68	850308.32			Abandoned		
PZ-2	Piezometer for Dewatering	444196.66	850423.46			Abandoned		
PZ-3	Piezometer for Dewatering	444264.81	850540.09			Abandoned		
PZ-4	Piezometer for Dewatering	444335.45	850656.48			Abandoned		
PZ-5	Piezometer for Dewatering	444471.11	850888.80			Abandoned		
PZ-6	Piezometer for Dewatering	444538.49	851005.46			Abandoned		
PZ-7	Piezometer for Dewatering	444605.96	851121.65			Abandoned		
PZ-8	Piezometer for Dewatering	444674.43	851238.67			Abandoned		

Notes:
1. Georgia State Plane - NAD 83 East Zone.
2. NAVD 88 - North American Vertical Datum of 1988
3. Ground surface measured at the mag nail in the concrete pad.
4. ft BTOC - feet below top of casing

Table 4

Remedy Evaluation Summary
Georgia Power Company
Plant McManus Former Ash Pond 1
Brunswick, Georgia

Technology	Description	Retain Technology for Further Evaluation?
Geochemical Manipulation (In Situ Injection)	Injection of a chemical or organic substrate to alter geochemical conditions to those more favorable for immobilization of arsenic.	Yes
In Situ Stabilization/ Solidification (ISS)	Use of amendments such as cement to reduce the bioavailability and mobility of contaminants through either physical encapsulation (solidification) or a reduction in solubility/mobility (stabilization).	No. ISS is not typically used to remediate dilute contaminant plumes.
Hydraulic Containment (P&T)	Use of a groundwater extraction system with a surface treatment system to remove target analytes from the subsurface and/or to control/prevent constituent migration.	Yes
Monitored Natural Attenuation (MNA)	A remedial solution that takes advantage of natural attenuation processes to reduce constituents in soil and groundwater.	Yes
Permeable Reactive Barrier (PRB)	Use of reactive material that extends below the water table to intercept and treat groundwater.	Yes
Phytoremediation	Use of plants to remove, transfer, or stabilize constituents in soil or groundwater.	No. Site-specific construction constraints, hydrogeology, and chemistry limits implementability, performance and effectiveness.
Subsurface Barrier Walls	Use of barriers to physically control the migration of impacted groundwater either directly or through manipulation of groundwater flow.	No. Further evaluation of PRB technology indicates that a subsurface barrier wall would not be needed.

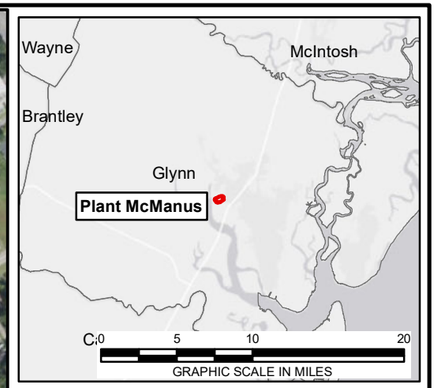
Acronyms and Abbreviations:
ISS = in situ stabilization/solidification
MNA = monitored natural attenuation
P&T = pump and treat
PRB = permeable reactive barrier

Figures

81°33'10"W 81°33'0"W 81°32'50"W 81°32'40"W 81°32'30"W 81°32'20"W 81°32'10"W 81°32'0"W 81°31'50"W

31°13'30"N
31°13'20"N
31°13'10"N
31°13'0"N
31°12'50"N
31°12'40"N

NORTHERN DIKE
FORMER AP-1
CRISPEN BOULEVARD (SOUTHERN DIKE)
CRISPEN ISLAND
Turtle River



LEGEND

- APPROXIMATE PROPERTY BOUNDARY
- CCR PERMITTED BOUNDARY

NOTE:
1. CCR - COAL COMBUSTION RESIDUALS

0 650 1,300
GRAPHIC SCALE IN FEET

COORDINATE SYSTEM: NAD 1983 STATE PLANE GEORGIA EAST FIPS 1001 FEET

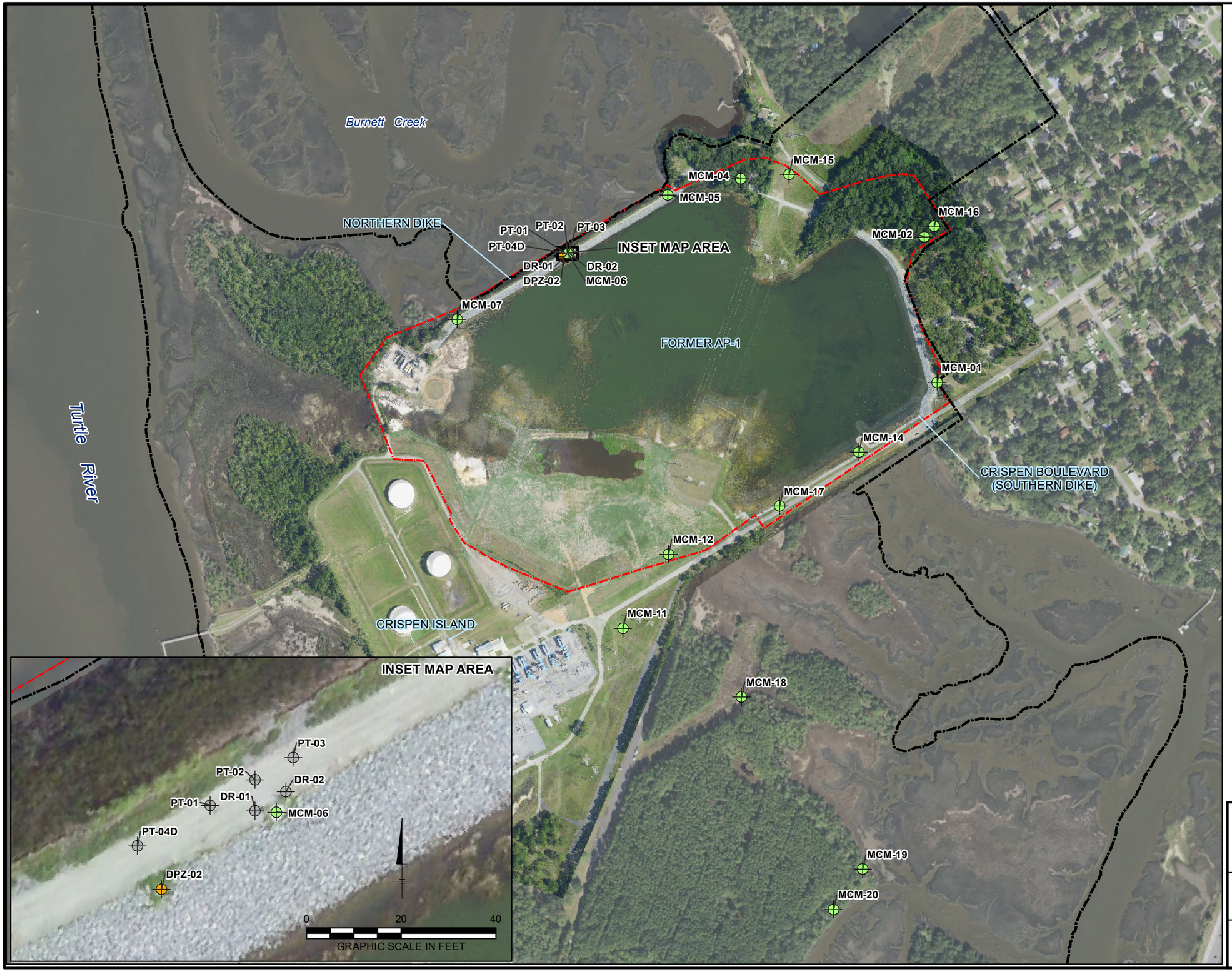
Georgia Power

PLANT MCMANUS FORMER ASH POND 1
BRUNSWICK, GEORGIA

LOCATION MAP

ARCADIS

FIGURE
1



LEGEND

- PROPERTY BOUNDARY
- PERMITTED CCR BOUNDARY
- DETECTION WELL
- ASSESSMENT WELL
- PIEZOMETER

0 500 1,000

GRAPHIC SCALE IN FEET

COORDINATE SYSTEM: NAD 1983 STATE PLANE
GEORGIA EAST FIPS 1001 FEET
IMAGERY FROM MCMANUS DRONE SURVEY IMAGERY

Georgia Power

PLANT MCMANUS FORMER ASH POND 1
BRUNSWICK, GEORGIA

WELL LOCATION MAP

ARCADIS

FIGURE
2

LEGEND

- CROSS SECTION TRAVERSE
- PROPERTY BOUNDARY
- PERMITTED CCR BOUNDARY
- DETECTION WELL
- ASSESSMENT WELL
- DEEP PIEZOMETER
- DEWATERING WELLS
- HPT LOCATIONS

NOTES:
1. HPT - HYDRAULIC PROFILING TOOL
2. CCR - COAL COMBUSTION RESIDUALS

0 160 320

GRAPHIC SCALE IN FEET

COORDINATE SYSTEM: NAD 1983 STATE PLANE GEORGIA EAST FIPS 1001 FEET
IMAGERY FROM MCMANUS DRONE SURVEY

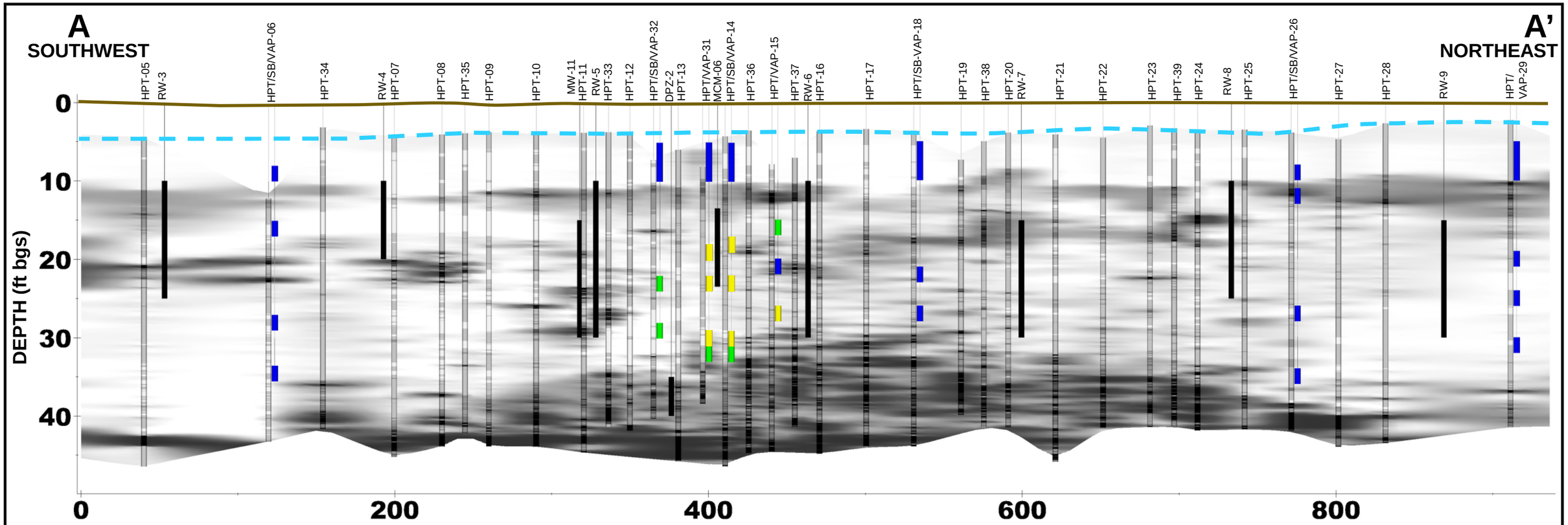
Georgia Power

PLANT MCMANUS FORMER ASH POND 1
BRUNSWICK, GEORGIA

CROSS SECTION LOCATION MAP

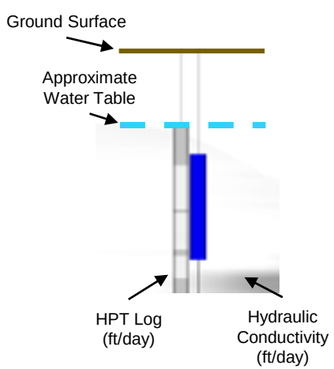
ARCADIS

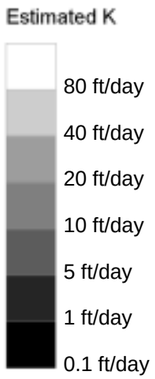
FIGURE
3



Dissolved Arsenic (February 2021)

- Detection greater than GWPS
- Detection less than GWPS
- Less than reporting limit





NOTES:

1. VERTICAL EXAGGERATION = 5.0 X

2. ESTIMATED K IS A MEASURE OF HYDRAULIC CONDUCTIVITY
3. VAP – VERTICAL AQUIFER PROFILING
   HPT – HYDRAULIC PROFILING TOOL
   FT/DAY – FEET PER DAY
   FT BGS – FEET BELOW GROUND SURFACE
   GWPS – GROUND WATER PROTECTION STANDARD FOR ARSENIC (0.032 milligrams per liter)
   K – HYDRAULIC CONDUCTIVITY
4. TURBIDITY READINGS IN THE HIGH RESOLUTION SAMPLES EXCEEDED 10 NTU, THE RESULTS ARE USED FOR SCREENING PURPOSES AND ARE ALIGNED WITH ROUTINE GROUNDWATER DATA COLLECTED FROM NEARBY WELLS

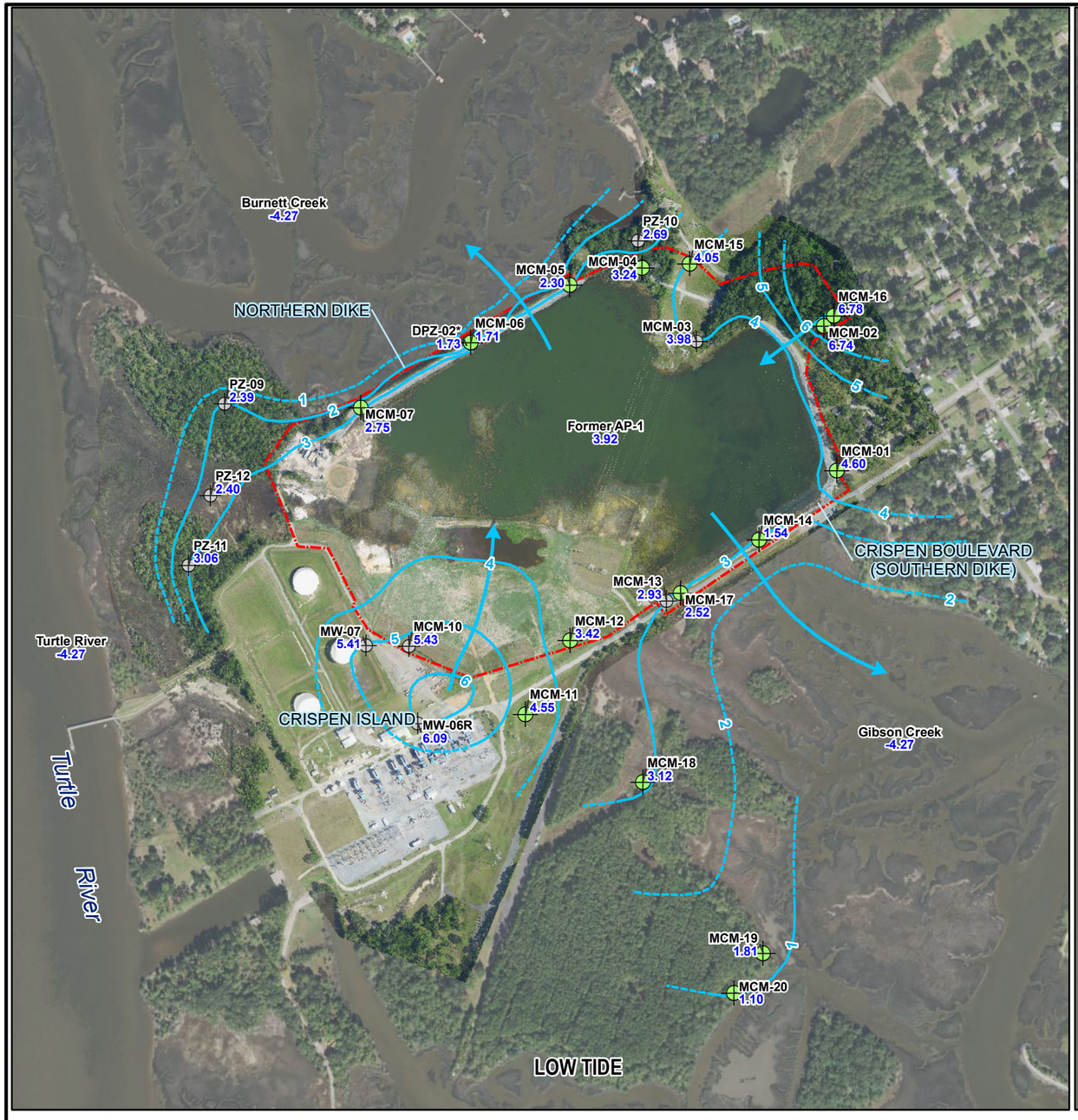
THE GROUND SURFACE IS SET AT 7.928 FT ABOVE MEAN SEA LEVEL
ANALYTICAL DATA INCLUDED IN ARCADIS 2021B

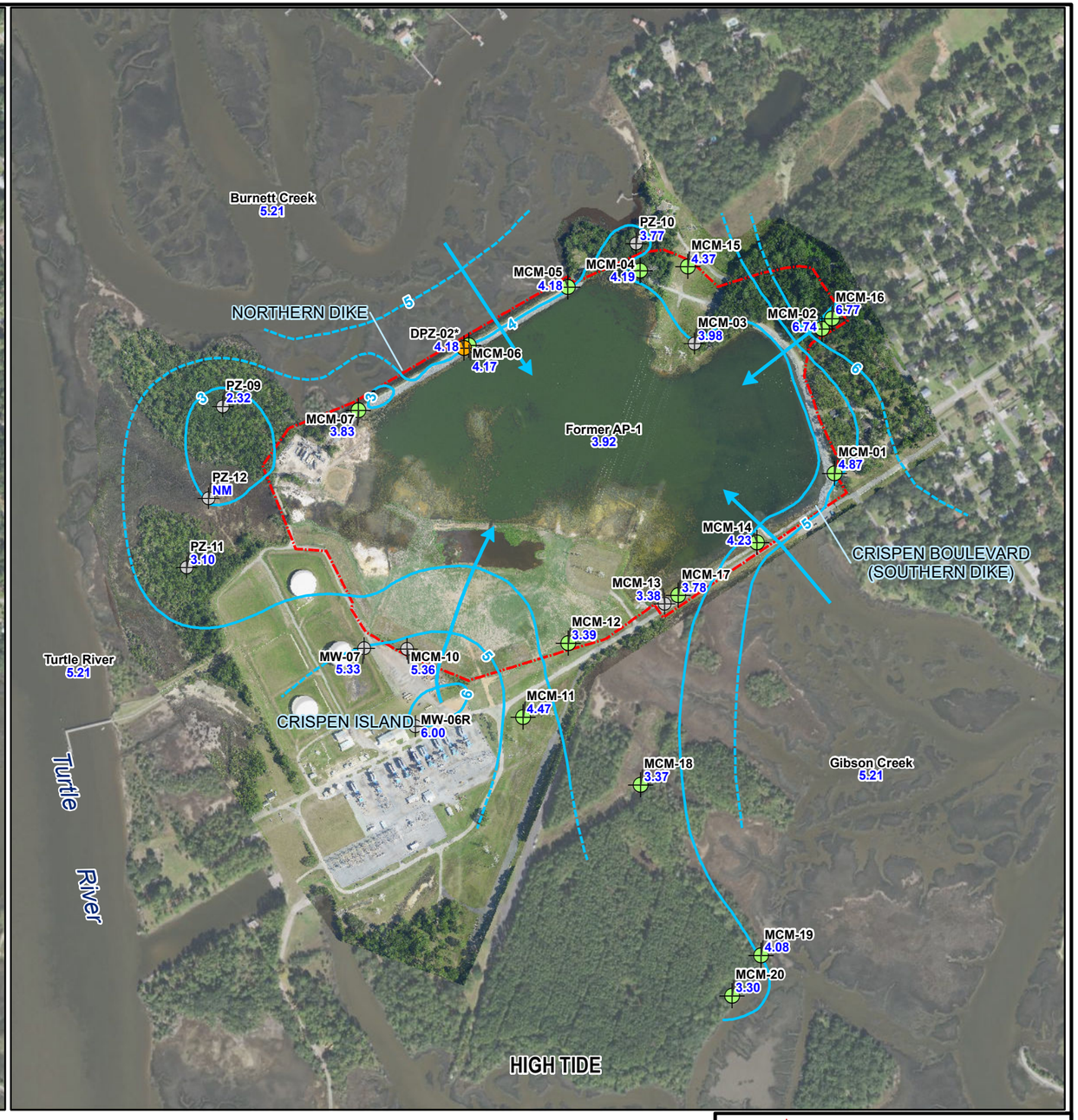
GEORGIA POWER
PLANT MCMANUS FORMER ASH POND 1
BRUNSWICK, GEORGIA

HIGH RESOLUTION INVESTIGATION CROSS SECTION ARSENIC RESULTS

ARCADIS

FIGURE
4





LEGEND

- PERMITTED CCR BOUNDARY
- DETECTION WELL
- PIEZOMETER
- ASSESSMENT WELL
- MCM-01 4.60 — GROUNDWATER ELEVATION (FEET)
- GROUNDWATER CONTOURS (DASHED WHERE INFERRED)
- DIRECTION OF GROUNDWATER FLOW

NOTES:

1. LOW TIDE GROUNDWATER ELEVATIONS COLLECTED ON FEBRUARY 28, 2022.
2. HIGH TIDE GROUNDWATER ELEVATIONS COLLECTED ON MARCH 2, 2022.
3. ELEVATION PRESENTED IN U.S. SURVEY FEET (NAVD 88).
4. NM - NOT MEASURED.
5. * - DEEP PIEZOMETER NOT USED FOR CONTOURING. DPZ -02 HAS BEEN RECLASSIFIED AS A VERTICAL ASSESSMENT WELL
5. GROUNDWATER CONTOURS BASED ON ELEVATIONS AND INTERPRETATION PRESENTED IN *2022 SEMIANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT (RESOLUTE, 2022)*.

0 700 1,400

GRAPHIC SCALE IN FEET

COORDINATE SYSTEM: NAD 1983 STATE PLANE GEORGIA EAST FIPS 1001 FEET

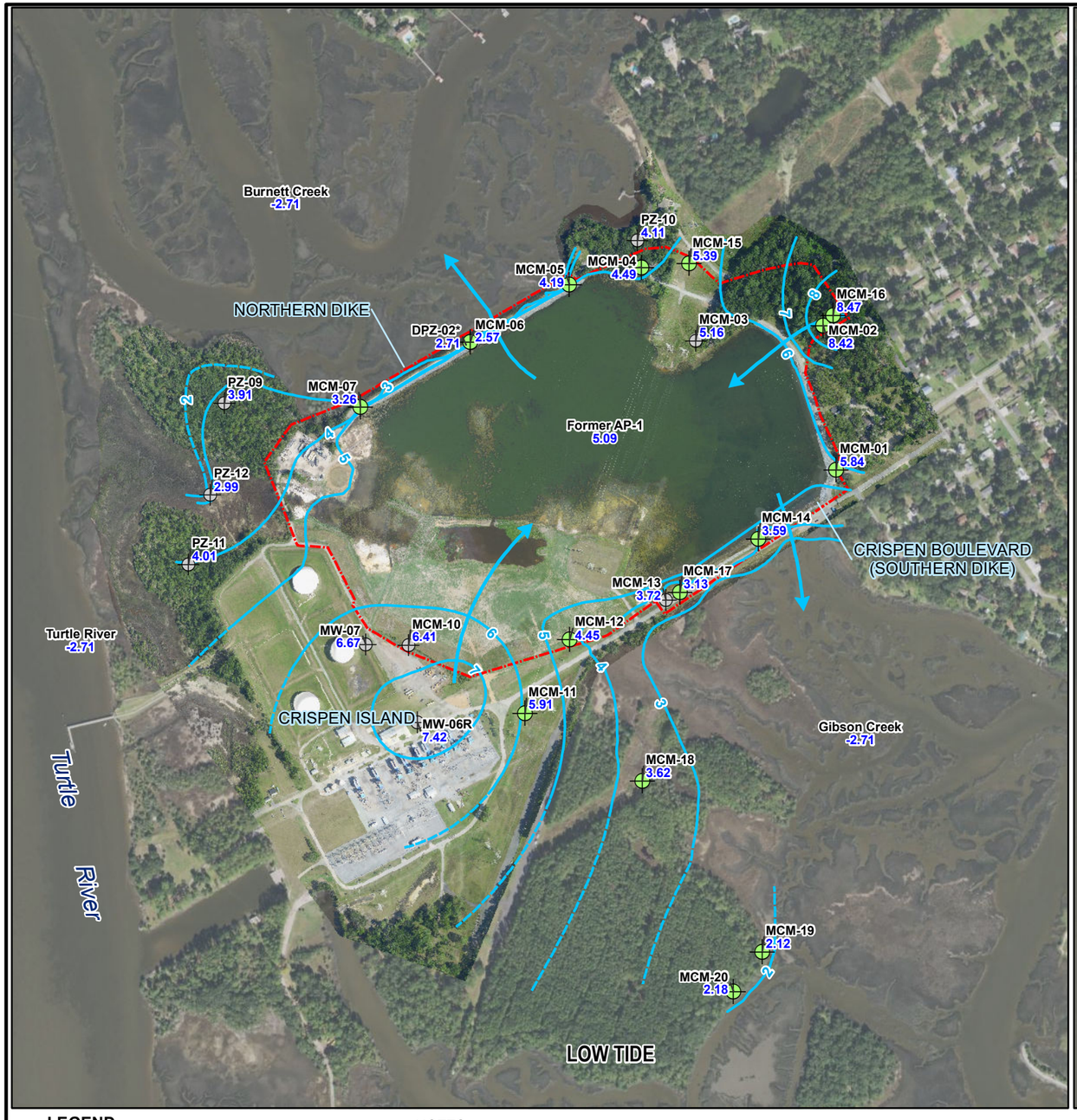
Georgia Power

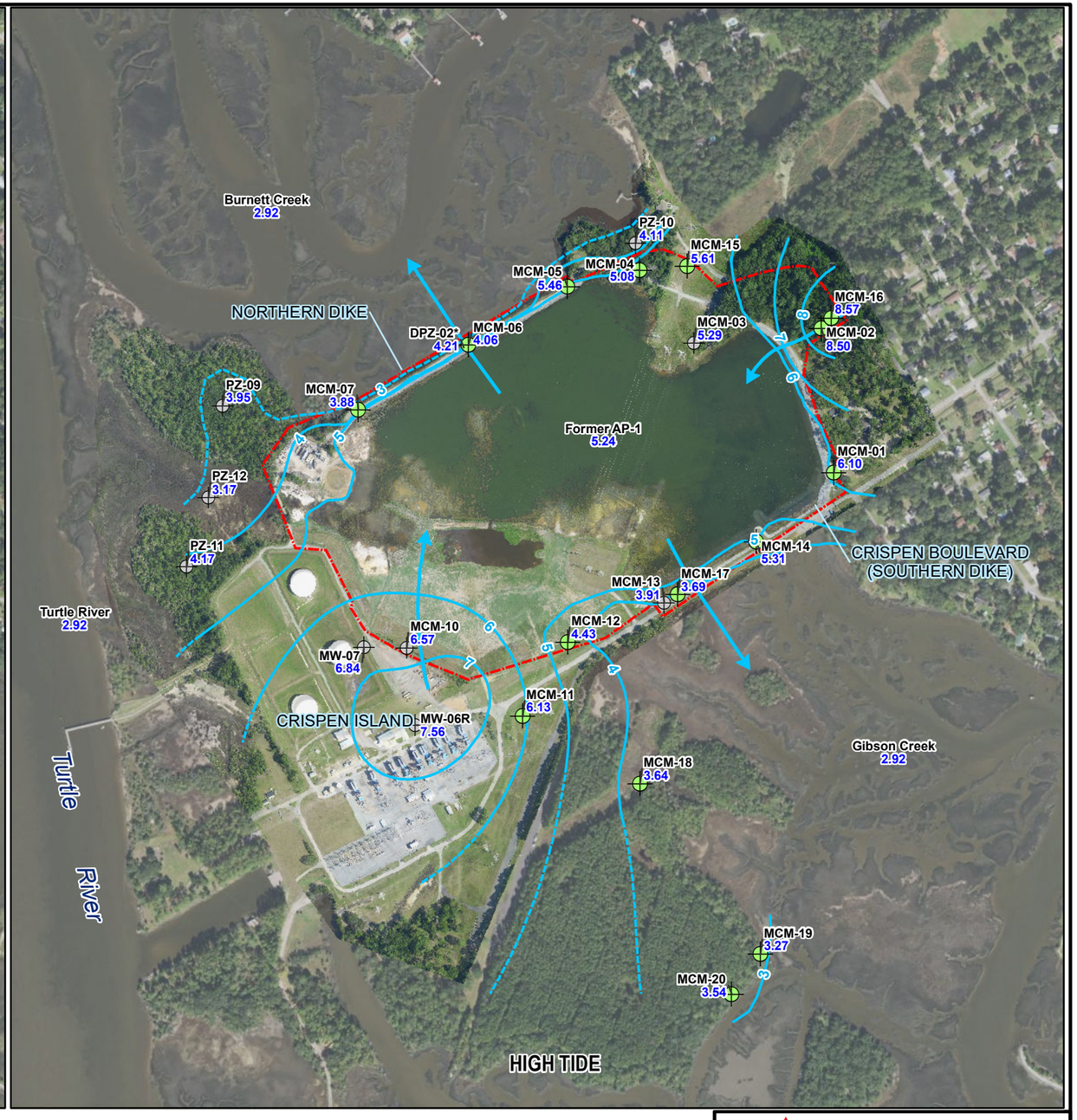
PLANT MCMANUS FORMER ASH POND 1
BRUNSWICK, GEORGIA

HIGH TIDE AND LOW TIDE GROUNDWATER ELEVATION MAPS FEBRUARY AND MARCH 2022

ARCADIS

FIGURE
5





LEGEND

- PERMITTED CCR BOUNDARY
- DETECTION WELL
- PIEZOMETER
- ASSESSMENT WELL
- MCM-01 4.60 — GROUNDWATER ELEVATION (FEET)
- GROUNDWATER CONTOURS (DASHED WHERE INFERRED)
- DIRECTION OF GROUNDWATER FLOW

NOTES:

1. LOW TIDE GROUNDWATER ELEVATIONS COLLECTED ON SEPTEMBER 22, 2022.
2. HIGH TIDE GROUNDWATER ELEVATIONS COLLECTED ON SEPTEMBER 21, 2022.
3. ELEVATION PRESENTED IN U.S. SURVEY FEET (NAVD 88).
4. NM - NOT MEASURED.
5. * - DEEP PIEZOMETER NOT USED FOR CONTOURING. DPZ-02 HAS BEEN RECLASSIFIED AS A VERTICAL ASSESSMENT WELL.
6. GROUNDWATER CONTOURS BASED ON ELEVATIONS AND INTERPRETATION PRESENTED IN *2022 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT (RESOLUTE, 2023)*.

0 700 1,400

GRAPHIC SCALE IN FEET

COORDINATE SYSTEM: NAD 1983 STATE PLANE GEORGIA EAST FIPS 1001 FEET

Georgia Power

PLANT MCMANUS FORMER ASH POND 1
BRUNSWICK, GEORGIA

HIGH TIDE AND LOW TIDE GROUNDWATER ELEVATION MAPS SEPTEMBER 2022

ARCADIS

FIGURE
6

LEGEND

- PERMITTED CCR BOUNDARY
- DETECTION WELL
- PIEZOMETER
- ASSESSMENT WELL
- SURFACE WATER SAMPLE
- ARSENIC ISOCONCENTRATION LINE (SEPTEMBER 2022) DASHED WHERE INFERRED
- MCM-01 (0.0043) WELL ID WITH ARSENIC CONCENTRATION

NOTES:

1. BLUE LABELS INDICATE WELL WAS USED FOR GROUNDWATER ELEVATION CONTOURING. BLACK LABELS ARE ARSENIC CONCENTRATIONS.
2. DATA SHOWN FROM GROUNDWATER SAMPLING EVENT CONDUCTED SEPTEMBER 2022.
3. ISOCONCENTRATION LINE DEVELOPED FROM GROUNDWATER COLLECTED DURING SEPTEMBER 2022 SAMPLING EVENT AND HIGH RESOLUTION INVESTIGATION (ARCADIS 2021B) ISOCONTOUR DASHED WHERE APPROXIMATE.
4. CONCENTRATIONS REPORTED IN MILLIGRAMS PER LITER (MG/L).
5. ASSESSMENT WELL DPZ-02 DATA ARE NOT USED IN ISOCONTOUR DEVELOPMENT.
6. NS = NOT SAMPLED.
7. CCR = COAL COMBUSTION RESIDUALS
8. < = NOT DETECTED AT OR ABOVE ADJUSTED REPORTING LIMIT.
9. ARSENIC GROUNDWATER PROTECTION STANDARD = 0.032 MILLIGRAMS PER LITER.
11. LOW TIDE GROUNDWATER CONTOURS BASED ON INTERPRETATION PRESENTED IN *2022 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT (RESOLUTE, 2023).*

0 500 1,000

GRAPHIC SCALE IN FEET

COORDINATE SYSTEM: NAD 1983 STATE PLANE GEORGIA EAST FIPS 1001 FEET

Georgia Power

PLANT MCMANUS FORMER ASH POND 1
BRUNSWICK, GEORGIA

ARSENIC ISOCONCENTRATION MAP SEPTEMBER 2022

ARCADIS

FIGURE **7**

LEGEND

- PERMITTED CCR BOUNDARY
- PIEZOMETER
- DETECTION WELL
- ASSESSMENT WELL
- INJECTION POINTS
- DRILLING PAD
- ARSENIC ISOCONCENTRATION LINE (SEPTEMBER 2022) DASHED WHERE INFERRED

NOTES:

1. ISOCONCENTRATION LINE DEVELOPED FROM GROUNDWATER COLLECTED DURING SEPTEMBER 2022 SAMPLING EVENT AND HIGH RESOLUTION INVESTIGATION (ARCADIS 2021B). ISOCONTOUR DASHED WHERE APPROXIMATE.
2. CCR - COAL COMBUSTION RESIDUAL
3. ACTUAL LOCATION AND NUMBERS OF INJECTION POINTS MAY VARY.

0 100 200

GRAPHIC SCALE IN FEET

COORDINATE SYSTEM: NAD 1983 STATE PLANE GEORGIA EAST FIPS 1001 FEET

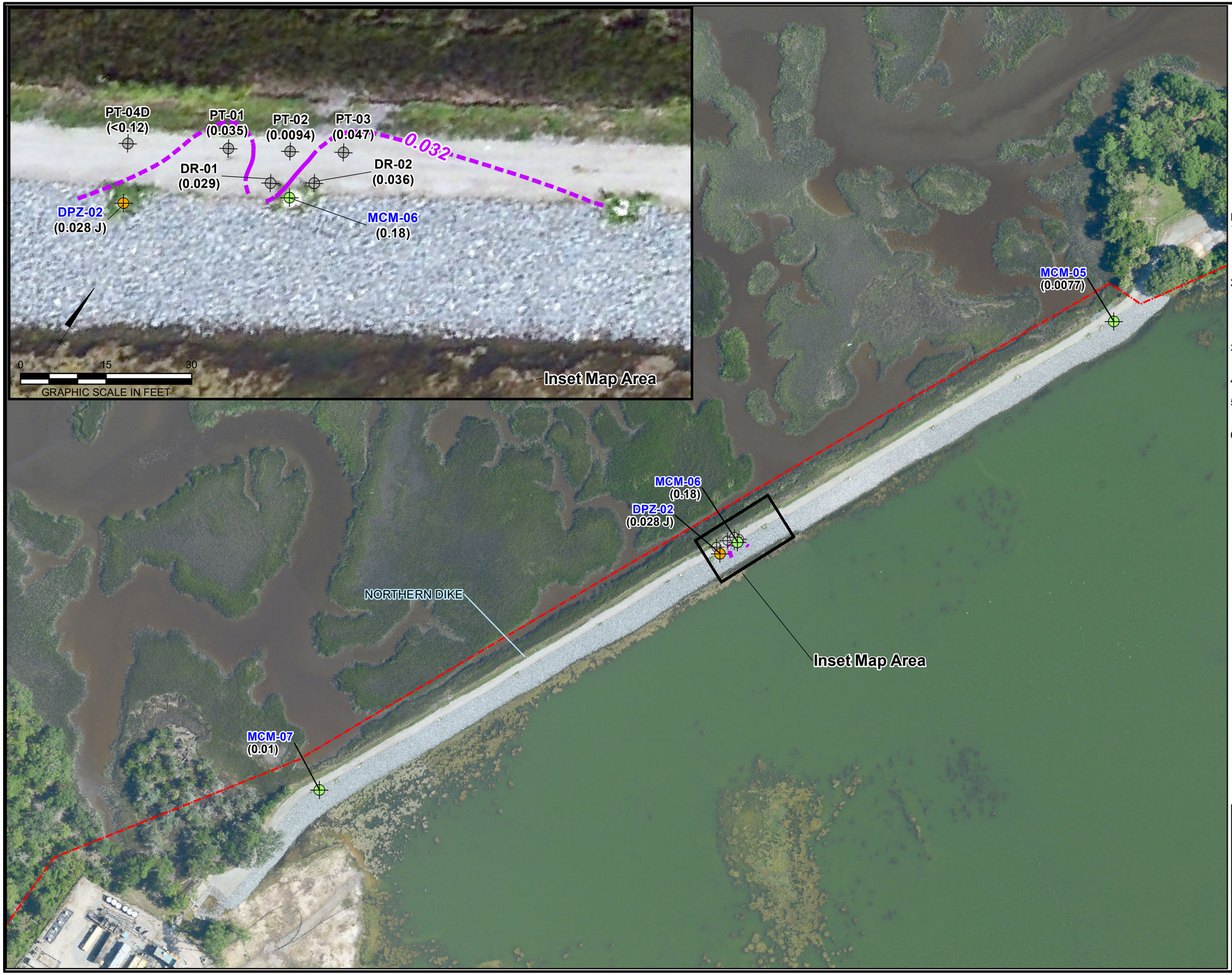
Georgia Power

PLANT MCMANUS FORMER ASH POND 1
BRUNSWICK, GEORGIA

CONCEPTUAL LAYOUT
REMEDIAL ALTERNATIVE 1
IN SITU INJECTION

ARCADIS

FIGURE
8



LEGEND

- PERMITTED CCR BOUNDARY
- DETECTION WELL
- PIEZOMETER
- ASSESSMENT WELL
- ARSENIC ISCONCENTRATION LINE (SEPTEMBER 2022) DASHED WHERE INFERRED
- MCM-01 (0.0043) WELL ID WITH ARSENIC CONCENTRATION

NOTES:

1. BLUE LABELS INDICATE WELL WAS USED FOR GROUNDWATER ELEVATION CONTOURING. BLACK LABELS ARE ARESENIC CONCENTRATIONS.
2. ISOCONCENTRATION LINE DEVELOPED FROM GROUNDWATER COLLECTED DURING SEPTEMBER 2022 SAMPLING EVENT AND HIGH RESOLUTION INVESTIGATION (ARCADIS 2021B). ISOCONTOUR DASHED WHERE APPROXIMATE.
3. CONCENTRATIONS REPORTED IN MILLIGRAMS PER LITER (MG/L).
4. NS = NOT SAMPLED.
5. < = NOT DETECTED AT OR ABOVE ADJUSTED REPORTING LIMIT.
6. ARSENIC GROUNDWATER PROTECTION STANDARD = 0.032 MILLIGRAMS PER LITER.

0 130 260

GRAPHIC SCALE IN FEET

COORDINATE SYSTEM: NAD 1983 STATE PLANE GEORGIA EAST FIPS 1001 FEET

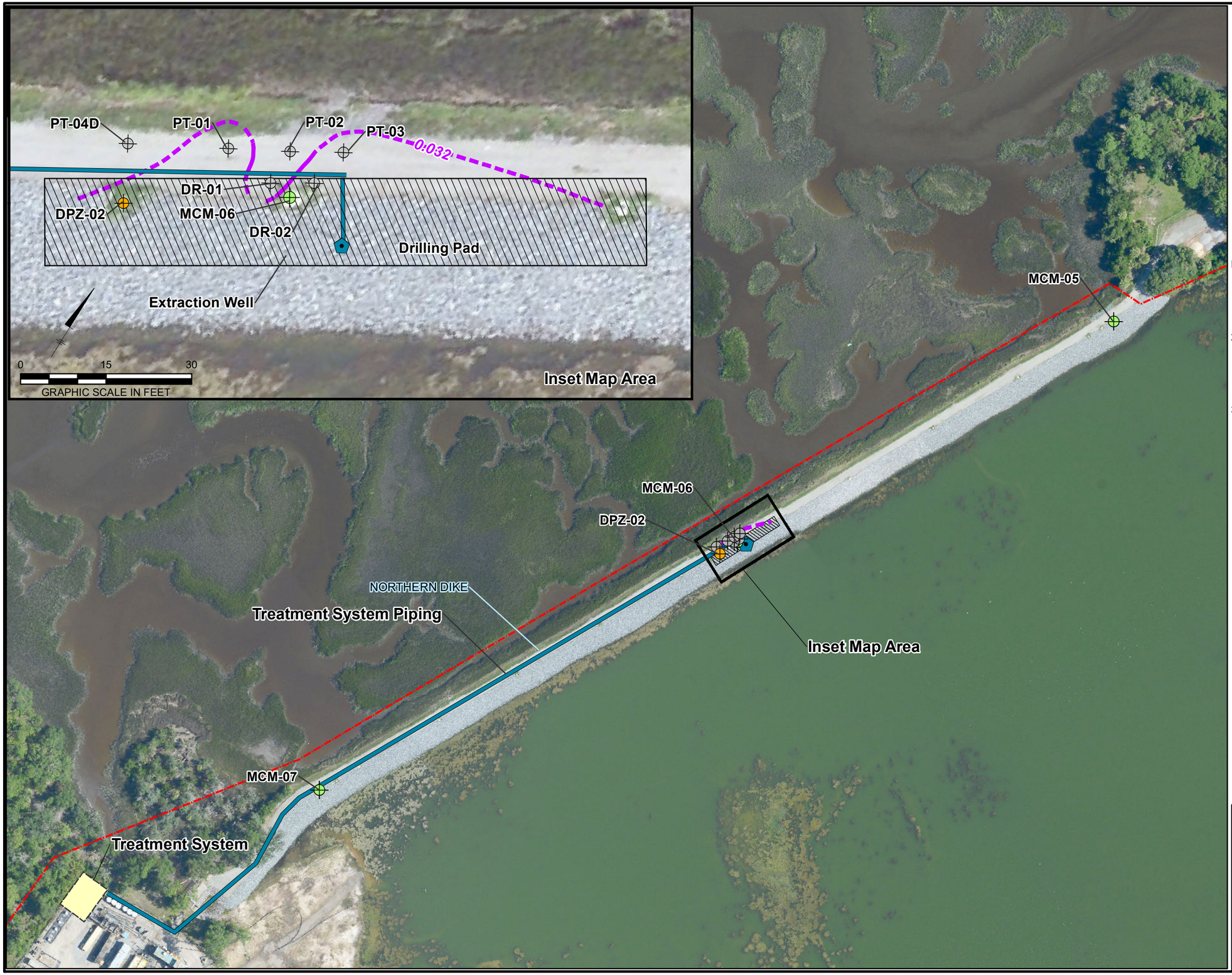
Georgia Power

PLANT MCMANUS FORMER ASH POND 1
BRUNSWICK, GEORGIA

CONCEPTUAL LAYOUT
REMEDIAL ALTERNATIVE 2
MNA

ARCADIS

FIGURE
9



LEGEND

- PERMITTED CCR BOUNDARY
- PIEZOMETER
- DETECTION WELL
- ASSESSMENT WELL
- EXTRACTION WELL
- ARSENIC ISCONCENTRATION LINE (SEPTEMBER 2022) DASHED WHERE INFERRED
- TREATMENT SYSTEM PIPING

NOTES:

1. TREATMENT SYSTEM LOCATION IS FOR ILLUSTRATIVE PURPOSES. ACTUAL LOCATION WOULD BE DECIDED IF REMEDY SELECTED
2. ISOCONCENTRATION LINE DEVELOPED FROM GROUNDWATER COLLECTED DURING SEPTEMBER 2022 SAMPLING EVENT AND HIGH RESOLUTION INVESTIGATION (ARCADIS 2021B). ISOCONTOUR DASHED WHERE APPROXIMATE.
3. CCR - COAL COMBUSTION RESIDUALS

0 130 260

GRAPHIC SCALE IN FEET

COORDINATE SYSTEM: NAD 1983 STATE PLANE GEORGIA EAST FIPS 1001 FEET

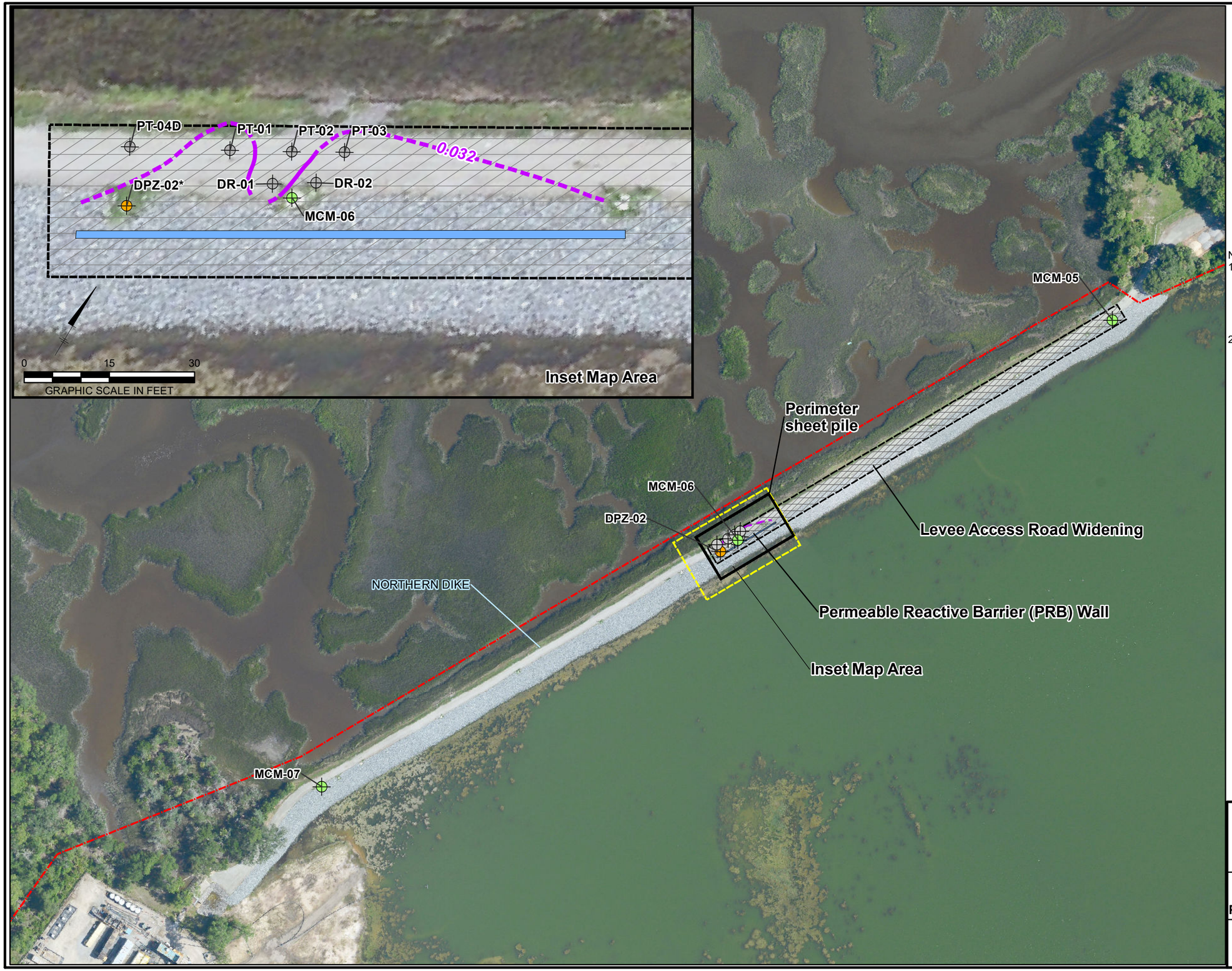
Georgia Power

PLANT MCMANUS FORMER ASH POND 1
BRUNSWICK, GEORGIA

CONCEPTUAL LAYOUT
REMEDIAL ALTERNATIVE 3
HYDRAULIC CONTROL (P&T)

ARCADIS

FIGURE
10



LEGEND

- PIEZOMETER
- DETECTION WELL
- ASSESSMENT WELL
- PERMITTED CCR BOUNDARY
- ROAD WIDENING AREA
- PERMEABLE REACTIVE BARRIER
- SHEET PILE
- ARSENIC ISOCONCENTRATION LINE (SEPTEMBER 2022) DASHED WHERE INFERRED

NOTES:
1. ISOCONCENTRATION LINE DEVELOPED FROM GROUNDWATER COLLECTED DURING SEPTEMBER 2022 SAMPLING EVENT AND HIGH RESOLUTION INVESTIGATION (ARCADIS 2021B) ISOCONTOUR DASHED WHERE APPROXIMATE.
2. CCR - COAL COMBUSTION RESIDUALS

0 125 250
GRAPHIC SCALE IN FEET

COORDINATE SYSTEM: NAD 1983 STATE PLANE GEORGIA EAST FIPS 1001 FEET

Georgia Power

PLANT MCMANUS FORMER ASH POND 1
BRUNSWICK, GEORGIA

CONCEPTUAL LAYOUT
REMEDIAL ALTERNATIVE 4
PERMEABLE REACTIVE BARRIER (PRB)

ARCADIS

FIGURE
11

Appendix A

Geochemical Conceptual Site Model Report

Geochemical Conceptual Site Model Report

Plant McManus Former Ash Pond 1,

Brunswick, Georgia

February 28, 2023

Geochemical Conceptual Site Model

Plant McManus Former Ash Pond 1
Brunswick, Georgia

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Contents

Tables

Figures

Attachments

Acronyms and Abbreviations

Arcadis	Arcadis, Inc.
amsl	above mean sea level
AP	Ash Pond
AVS	Acid volatile sulfide
bgs	below ground surface
CCR	coal combustion residuals
CSM	conceptual site model
Eh	electron potential
ft	feet
GWPS	Groundwater Protection Standard
H_3AsO_3	arsenite
$HAsO_4^{2-}$	arsenate
mg/L	milligram per liter
mg/kg	milligram per kilogram
Mn^{2+}	manganous ion
MTA^v	mono-thioarsenate
mV	millivolt
ORP	oxidation-reduction potential
SB	soil boring
SEM	simultaneous extracted metals
SI	saturation index
su	standard unit
TDS	total dissolved solids
USEPA	United States Environmental Protection Agency
XRD	x-ray diffraction

1 Introduction

This Geochemical Conceptual Site Model (CSM) Report summarizes the current understanding of geochemical conditions and factors affecting the fate and transport of arsenic in groundwater at Plant McManus former Ash Pond 1 (AP-1) (the Site). This geochemical CSM has been prepared to inform the remedy selection process at the Site to address statistically significant levels (SSL) of arsenic in groundwater greater than the arsenic groundwater protection standard (GWPS; 0.032 milligrams per liter [mg/L]) identified in the northern portion of the Site at MCM-06 (**Figure 1.1**). The GWPS for arsenic under the United States Environmental Protection Agency (USEPA) 40 Code of Federal Regulations § 257.95(h)(1-3) is defined by the higher value between the Maximum Contaminant Limit (0.01 mg/L) and the background level. The background level for arsenic at the site, based on a statistical analysis of pooled upgradient data through September 2022, is 0.032 mg/L and 0.032 mg/L is therefore the GWPS.

2 Overview – Arsenic

Arsenic is a 40 CFR Part 257 Appendix IV constituent commonly present in the environment in soil and groundwater. It occurs within the environment in a variety of minerals, including elemental arsenic, arsenides, sulfides (e.g., realgar; AsS), oxides, arsenates (scorodite; $FeAsO_4 \cdot 2H_2O$), mixed-anion arsenates, and arsenites. It is also capable of substituting for phosphorus(V), silicon(IV), aluminum(III) and iron(III), and as a result can be found in low concentrations in a variety of other rock-forming minerals (Salminen 2005). As a chalcophile, arsenic can be partitioned into a variety of sulfide minerals but can also be found in association with oxic mineral phases, especially iron (oxy)hydroxides. Average background arsenic soil concentrations range between < 0.1 to 30

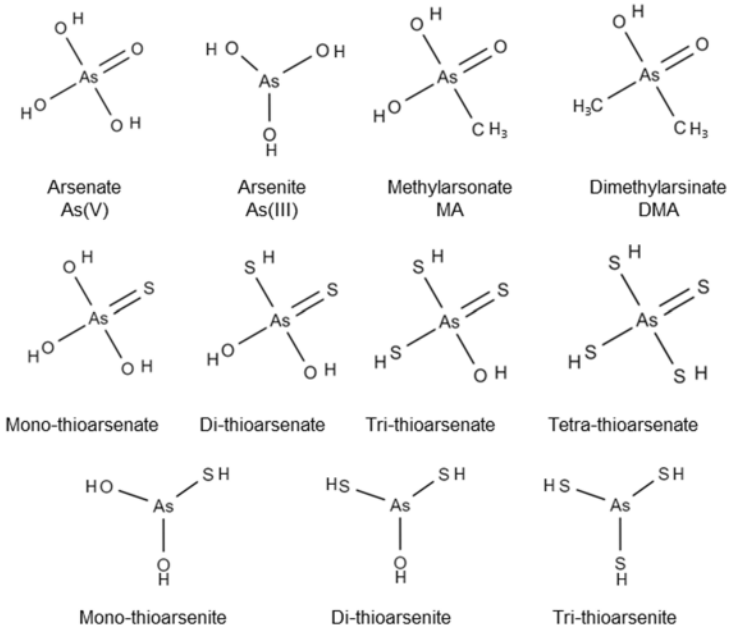

Exhibit 1. Arsenic Species

mg/kg (Kabata-Pendias 2007). In ground and surface waters, arsenic is most commonly present as the negatively charged oxyanions arsenite (H_3AsO_3) or arsenate ($HAsO_4^{2-}$) (**Exhibit 1**). Organic arsenic species may

also be produced through biological activity. Arsenic's fate and transport is governed primarily by its speciation and its interaction with mineral surfaces such as iron and manganese (oxy)hydroxides and clays. pH and oxidation-reduction potential (ORP) are important factors that influence both speciation and the occurrence of these mineral species in natural systems. Biological activities and sulfur cycling can also influence arsenic speciation through methylation or sulfidation of the arsenite or arsenate molecules (**Exhibit 1**).

In order to develop a geochemical CSM for arsenic at this Site, the following was completed:

Aquifer Matrix Composition was reviewed to evaluate the presence or absence of potential sorptive or co-precipitated mineral phases, which can attenuate arsenic. Data evaluated included soil metals analyses and mineralogy.

pH and Redox Conditions were reviewed to understand how these parameters influence arsenic speciation and whether conditions were favorable for sorptive mineral phases. Data evaluated to inform the redox conditions included historical groundwater field parameter data, dissolved and total metals concentrations, mineralogy, organic carbon, and specific oxidation reduction couples.

Major Ion Chemistry was reviewed to understand the potential impact of the regional setting of the Site adjacent to a tidal estuary.

Major Trends at MCM-06 were reviewed including water level, arsenic concentrations, and select geochemical markers to evaluate how site activities, including site dewatering during source removal and pond water level management, may have influenced site conditions.

Following this general characterization of the geochemical environment, arsenic-specific data (including arsenic extent, speciation analysis, and modeling) were evaluated to create a site-specific arsenic geochemical CSM.

3 General Site Geochemical Conditions

3.1 Aquifer Matrix Composition

Aquifer matrix composition is an important consideration in arsenic fate and transport because these solids can interact with arsenic by providing sites for sorption or by incorporating arsenic into the mineral solids directly (Herath et al. 2018). Results from the aquifer matrix composition evaluation, described in this section, indicate that arsenic-attenuating minerals are present.

In 2021, aquifer matrix solids were collected as part of a high resolution investigation (Arcadis 2021a) and analyzed for total metals (aluminum, arsenic, calcium, iron, manganese), x-ray diffraction (XRD), and total organic carbon. These results are summarized in **Tables 3.1a and 3.1b** and locations are provided on **Figure 3.1**. Soil sample collection was focused on higher-conductivity zones to facilitate a mass-flux characterization. Additional information on sample collection methods for this high resolution investigation is provided in the July 2021 Semiannual Remedy Selection and Design Progress Report (Arcadis 2021a) and summarized in **Attachment 1**. Analytical data is provided in **Attachment 2**. In June 2022, six piezometers were installed to provide additional data for characterization of groundwater flow and quality near MCM-06 and DPZ-02. During this event, additional soil samples were collected and analyzed for grain size and total organic carbon. These results are summarized in **Table 3.2**. Analytical data is provided in **Attachment 2**.

Soil borings advanced across this Site show that the soils on site are composed predominantly of light to dark gray and orange fine sand with discontinuous clay layers (**Attachment 3**), this is consistent with the grain size

data (**Table 3.2**). Concentrations of aluminum, iron, and manganese were measured in order to evaluate the presence of potential arsenic sorptive minerals such as iron and manganese (oxy)hydroxides, reduced iron and sulfide minerals, and clays. Sandy soils, such as those encountered on site, are typically low in total iron compared to the crustal average of 5% (50,000 mg/kg), and the Site data were consistent with observation. Iron concentrations in soils ranged from 550 to 16,000 mg/kg, consistent with average background for sandy soils (1,000 to 10,000 mg/kg (Kabata-Pendias 2007)). Manganese concentrations in site soils ranged from 9.4 to 150 mg/kg, and aluminum concentrations ranged from 330 to 16,000 mg/kg. Site manganese and aluminum concentrations fell on the lower part of the range for average backgrounds for sandy soil (7 to 2,000 mg/kg and 10,000 to 40,000 mg/kg for manganese and aluminum respectively; Kabata-Pendias 2007). Arsenic concentrations in these samples correlated well ($R^2 > 0.70$) with aluminum and iron data (**Figure 3.2**).

Mineral composition was evaluated semi-quantitatively by XRD from SB-14 at two depth intervals (17 to 19 and 22 to 24 feet below ground surface [bgs]). SB-14 is located within the arsenic-impacted area (Arcadis 2021a; **Figure 3.1**). Results indicate that the aquifer matrix is predominantly composed of quartz (SiO_2), which was measured at values greater than 75 percent in both samples. The most predominant secondary mineral phases were other siliceous minerals (e.g. plagioclase ($[NaSi,CaAl]AlSi_2O_8$), potassium feldspar ($[KAlSi_3O_8]$), and the clay mineral kaolinite ($Al_2Si_2O_5[OH]_4$). Iron was detected in the form of the reduced-phase iron-sulfide mineral pyrite. XRD's ability to evaluate the presence of amorphous phases is more limited. As such, amorphous minerals such as the iron-oxide mineral ferrihydrite, may also be present although not detected by XRD.

Total organic carbon concentrations ranged from 990 to 35,000 mg/kg (**Tables 3.1a** and **3.2**). The highest concentration of total organic carbon (35,000 mg/kg) was detected in SB-26-S(11-13). This sample was collected from directly beneath a clay/silt zone, with noted presence of organics (**Attachment 3**).

3.2 pH and Redox Conditions

Groundwater pH and reduction-oxidation (redox) conditions are two important factors in controlling arsenic fate and transport in the environment, as these parameters influence the speciation and mineral formation. In order to characterize redox conditions across the Site, field parameters collected during groundwater sampling events, including pH and electron potential (Eh) data, were compiled, evaluated (**Table 3.3**), and graphically presented in **Figure 3.3a**. A Pourbaix diagram focused on the geochemical conditions in wells nearest to MCM-06 along with predicted iron speciation is provided in **Figure 3.3b**.

Across the Site, there are two distinct Eh-pH signatures. The first signature is associated with groundwater in the background (e.g., MCM-20) and mainland or island wells (e.g., MCM-01, MCM-11) shown with black and orange symbols on **Figure 3.3a**, respectively. These wells are generally moderately to slightly acidic, with pH ranging from 3.5 to 7 standard units (su) and have suboxic to oxic Eh, generally greater than 100 millivolts (mV). The lowest pH was measured in water collected from background well MCM-20. pH in groundwater at that location has averaged 3.75 since the well was installed in 2019. It should be noted that the background wells, shown in black symbols on **Figure 3.3a**, have exhibited some of the highest Eh and lowest pH conditions on site and may be considered a subgrouping of the first signature type, and may represent the presence of acid sulfate soils (USACE 2020). The second Eh-pH signature is associated with wells constructed within the dike shown with blue symbols on **Figure 3.3a**, to the north and south of former AP-1, including well MCM-06. These wells are generally less acidic, with pH values between 6 and 7.5 su, and have substantially lower Eh (generally less than 100 mV). Eh/pH conditions across the period of monitoring (2016 to 2022) in groundwater along the dike, particularly with the groundwater at MCM-06, has plotted across both stability fields for reduced iron-containing minerals

arsenopyrite, mixed valence iron minerals such as magnetite, and oxidized iron minerals (**Figure 3.3b**). The oxidized iron minerals are predicted in the Pourbaix diagram to be present as goethite. In reality, iron oxides that form as iron cycles between reduced and oxidized iron as may be occurring in the dike monitoring wells would form as amorphous minerals, i.e., ferrihydrite, and would transform to crystalline minerals like goethite over time, which is the more thermodynamically favorable form shown on the Pourbaix diagram.

In addition to the field parameters, groundwater samples were collected during the October 2020 routine groundwater sampling event and February 2021 screening level groundwater samples were collected from high resolution investigation borings along the dike to characterize redox conditions (Arcadis 2021a, 2021b). Results are presented in **Tables 3.4a** and **3.4b**. Manganese results were detected primarily in the dissolved phase, indicating that this metal was in the soluble reduced-phase manganous ion (Mn^{2+}; **Table 3.4a and Table 3.4b**). Iron results varied, with elevated dissolved iron present in certain samples (e.g., VAP-15-W[15-17]) and not in others (e.g., VAP-14-W([7-19]). Sulfide concentrations in groundwater samples collected during the high resolution sampling event ranged from less than the detection limit (0.05 mg/L) to 89.3 mg/L. Shallow groundwater samples, collected from 8 to 10 feet bgs, exhibited substantially lower sulfide concentrations compared to deeper samples. Recent groundwater data collected in June 2022 at MCM-06 and at newly wells installed adjacent to MCM-06, show similar characteristics but with slightly higher Eh values (range of 39.4 mV to 169 mV shown in maroon on the Pourbaix diagram on **Figure 3.3b**). However, sulfide concentrations are still moderate (range of 8.2 mg/L to 24.3 mg/L), suggesting continued sulfate reduction in groundwater (**Table 3.4c, Attachment 4**). These data were evaluated for redox processes in groundwater consistent with the framework presented in McMahon and Chappelle (2008) and USGS 2009. Based on this evaluation, waters on site are considered to be predominantly anoxic, consistent with iron and sulfate reduction (**Attachment 4**).

To understand whether biogeochemical pathways play a role in producing reducing conditions, total organic carbon and alkalinity data were evaluated. During sulfate reduction, organic carbon is utilized as an electron donor, producing bicarbonate, a component of alkalinity. This process can be simplified into the following chemical reaction:

$$SO_4^{2-} + CH_3COOH + 2H^+ \rightarrow HS^- + 2HCO_3^- + 3H^+ \qquad (1)$$

Where sulfate reduction is occurring, an increase in bicarbonate (HCO_3^-) alkalinity would be observed. This relationship can be seen in the site samples. As shown on **Figure 3.4**, alkalinity ranged from 96.2 to 879 mg/L and was positively correlated with sulfide concentration (Arcadis 2021a). Total organic carbon data collected during the high resolution investigation ranged from 4.7 to 110 mg/L (**Table 3.4b**), which shows that there are electron donors present to fuel biological sulfate reduction.

Overall, the evaluation of redox indicator parameters demonstrates that the site groundwater along the dike is reducing and anoxic by:

- Eh values consistent with iron and sulfate reducing conditions;
- Widespread detections of sulfide at high concentrations; and
- Presence of organic carbon for electron donor and an observed relationship of increasing sulfide with alkalinity, consistent with the biological sulfate reduction.

Arsenic fate and transport were evaluated in the context of these pH and redox conditions, as discussed in Section 4.

3.3 Major Ion Chemistry

Plant McManus is located within 13 miles of the Atlantic Ocean, adjacent to a tidal marsh. Based on a review of site data, the Site is influenced by saltwater intrusion, with elevated salinity and total dissolved solids (TDS) concentrations (Arcadis 2022a). Saltwater has high ionic strength and salinity, which can affect the solubility of arsenic. Consequently, the flow and mixing of seawater and freshwater in the coastal aquifer are important processes to consider. Site groundwater major ion chemistry was evaluated to understand the degree to which the Site is influenced by saltwater intrusion. This evaluation included a review of groundwater and surface water data from the Site for variability in chemical composition, ionic ratios, and seawater indicator parameters.

Brackish waters, defined as waters having TDS concentrations greater than 1,000 mg/L but less than 35,000 mg/L, are characteristic of this transitional zone between the fresh inland-derived groundwater and saline ocean-derived groundwater (Barlow 2003). Based on historical and recent TDS data collected on site, most groundwater across the Site would be considered brackish, having a TDS concentration greater than 1,000 mg/L. **Figure 3.5** plots data sodium and chloride ratios versus TDS concentrations for a recent applicable groundwater sampling event (March 2022) for monitoring wells DPZ-02 and MCM-01, -02, -05, -06, -07, -11, -12, -14, -15, -16, -17, -18, -19, and MCM-20. Only mainland wells MCM-01, MCM-02, MCM-04, MCM-15, and MCM-16 exhibited groundwater TDS concentrations that would be considered freshwater (**Table 3.5**). DPZ-02 and PT-04D, the deepest monitoring wells evaluated, have a sodium-to-chloride ratio of 0.98 and 0.78, respectively and the highest TDS concentration measured in the monitoring wells of 15,600 mg/L and 13,700 mg/L, respectively. These ratios are close to the sodium-to-chloride (molar) ratio of approximately 0.86 reported for average seawater composition (e.g., Hem 1989) and for brackish water in coastal regions (Klassen et al. 2014; Shin et al. 2020). In contrast, mainland groundwater wells plotted with TDS less than 2,000 mg/L and sodium-to-chloride ratios equal to or greater than 1 (**Figure 3.5**). This higher proportion of sodium observed at mainland wells can be seen from continental (feldspar) weathering sources or exchange of sodium for calcium during the mixing process (Anders et al. 2014; Shin et al. 2020). Thus, the sodium-to-chloride ratios reflect distinct sources and processes, with the ratios at DPZ-02 and PT-04D showing a signature of a coastal transition zone.

Additionally, a historical review of TDS results for paired wells DPZ-02 and MCM-06 shows that deeper well DPZ-02 has exhibited a consistently higher TDS (average of 18,700 mg/L) compared to shallower well MCM-06 (average of 14,980 mg/L), as shown on the graph on **Figure 3.6** (Arcadis 2022a). This is expected when a site is influenced by saltwater intrusion, in which the difference in densities between higher density saltwater and lower density freshwater results in stratification of the water column. These vertical concentrations gradients are also observed for other saltwater indicators such as sulfate, chloride, and boron**. Figure 3.6** also provides a conceptual illustration of the salinity gradient demonstrated by the surface and groundwater data. Higher salinity is shown by an increase in color saturation. DPZ-02, screened between -29 and -34 feet above North American Vertical Datum of 1988 (NAVD 88), is screened within a more shaded zone on the figure compared to MCM-06 (screened between -6.27 and -16.27 ft NAVD 88), which is consistent with the presence of a saltwater wedge.

Piper plots were also developed from recent compiled data from surface water and groundwater monitoring wells (**Figure 3.7**). Piper plots assess relative abundance of major cations and anions in groundwater and are a useful tool in differentiating water sources (Chu et al. 2017). Overall, the chemical compositions of groundwater and surface water reflect a sodium-chloride-type water source. Additionally, **Figure 3.7** shows a tight cluster of dike wells (e.g., MCM-06 and DPZ-02, circled on the figure) with background surface water and groundwater. The tight clustering of sample locations indicates that these locations have similar major ion chemical compositions. These samples also exhibit higher TDS concentrations compared to other locations (**Table 3.5**).

The evaluation of major ion chemistry indicates the natural presence of a saltwater wedge. This is supported by:

- Sodium-to-chloride ratio consistent with that reported for average seawater composition and for brackish water;
- The similarity in chemical composition of the wells to background surface and groundwater data as shown in piper plots;
- A corresponding increase in salinity as demonstrated by elevated TDS with depth

The influence of salinity on arsenic fate and transport is discussed further in Section 4.

3.4 Trend Analysis

Groundwater elevation and analytical data (through June 2022) for MCM-06 are presented as time-series plots on **Figure 3.8,** with data presented in **Table 3.6**. Groundwater trends reflect the influence of dewatering during pond closure and pondwater elevation control on groundwater geochemistry. Analytical reports associated with these data are provided in Groundwater Monitoring and Corrective Action Reports (Resolute 2019, 2020a, 2020b, 2021a, 2021b, 2022a, 2022b, 2023).

3.4.1 Water Level Trends

Dewatering of AP-1 was required for coal combustion residuals removal and pond closure. Dewatering wells were installed along the northern dike (**Figure 3.1**), and dewatering progressed in a stepwise process according to which part of the pond was actively undergoing excavation. Dewatering first began in late 2016. By May 2018, the pond was completely dewatered and remained so nearly continuously until April 2019. The prolonged pumping created a temporary shift in the hydrologic and geochemical characteristics of the Site. Aerials showing the dewatering progression during excavation are provided as **Figure 3.9**. Following pond closure, the dewatering wells were shut off, and the pond was allowed to fill with water, but the pond elevation was actively managed until summer 2021, when active elevation control was suspended. Water elevation continues to be monitored.

The trends of water levels over time at monitoring well MCM-06 align with dewatering (**Figure 3.8**). As the pond was dewatered, and the excavation of coal combustion residuals progressed across the pond, water levels decreased in MCM-06, with a minimum water elevation of -4.23 ft NAVD88 measured in February 2019. After the conclusion of dewatering, the groundwater elevation returned to historical levels, and since the cessation of active pondwater elevation management, the water level has been slightly higher than historical elevations (average of 2.22 ft NAVD88 since summer 2021**,** compared to average of 0.21 in 2016).

3.4.2 Analytical Data Trends

The trends for saltwater indicator parameters over time at monitoring well MCM-06 align with dewatering (**Figure 3.8; Table 3.6**). Pronounced increases in saltwater indicator parameters TDS, chloride, sulfate, and boron were seen in groundwater at MCM-06 during the November 2018 sampling event after the whole pond was dewatered fully. The highest concentrations for TDS, chloride, and sulfate at MCM-06 were detected during the March 2019 sampling event soon after the minimum water elevation was measured at that well in February 2019.

The increase in water quality parameters such as TDS, sulfate, and chloride concentrations in these monitoring wells likely reflects the impact of saltwater intrusion resulting from pumping, which reduces the hydrostatic pressure, drawing saltwater up from the lower-lying strata in the aquifer (**Figure 3.6**). Following the cessation of continuous dewatering related to pond closure in April 2019, the water elevation increased in the pond and at MCM-06. TDS, sulfate, and chloride concentrations decreased over that same time period. Boron, which is an indicator parameter for both CCR and seawater, has remained elevated. The persistence of elevated boron concentrations following cessation of dewatering while other salt concentration declined may be due its different transport properties compared to more conservative constituents such as chloride or may represent a transition from boron associated with seawater to boron associated with CCR.

The arsenic trends do not appear to be closely linked to the saltwater intrusion conditions based on the earlier arrival of higher arsenic concentrations compared to other parameters. However, it does appear that pumping may have contributed to the higher arsenic concentrations. Arsenic concentrations were lower than current values before pumping, ranging from 0.129 mg/L to 0.257 mg/L (**Figure 3.8**). Approximately six months into pond dewatering, concentrations nearly doubled, averaging 0.43 mg/L between August 2017 and April 2019. Since the conclusion of pond water level management in 2021, the average arsenic concentration has decreased. The most recent arsenic result at this well (0.17 mg/L) continues a recent decreasing trend observed for arsenic for the past three monitoring events. The redox conditions also appear to be shifting towards more oxic conditions. In the September 2021 through June 2022 sampling events, the Eh at MCM-06 were positive in comparison with prior negative values (**Table 3.3**). This redox transition shift is also seen with a reduction in sulfide concentrations (23.3 mg/L measured in June 2022 in comparison with 50.8 mg/L measured in October 2020). The decrease in arsenic concentrations and potential shift in redox conditions may be due to the cessation of pumping for water elevation management at AP-1 in summer 2021. If the recent trends continue, arsenic may naturally attenuate to levels lower than the GWPS or the conditions could equilibrate to a lower arsenic concentration that remains above the GWPS.

4 Arsenic Geochemical CSM

4.1 Arsenic Extent

An SSL was first identified for arsenic at MCM-06 in October 2019 and March 2020 (Resolute 2020b). The arsenic concentrations at MCM-06 during the March and June 2022 groundwater sampling events were 0.24 mg/L and 0.17 mg/L, respectively (Resolute 2022b) and have ranged from 0.0559 mg/L to 0.51 mg/L since 2016. To evaluate the lateral extent of arsenic concentrations exceeding the GWPS across the dike, a high resolution investigation was completed in February 2021. Screening results indicated that the lateral extent of arsenic concentrations greater than the GWPS is limited to an approximately 95-foot length across the northern dike, bounded by sample locations VAP-32 and VAP-18. Arsenic results for vertical assessment well DPZ-02 (installed March 2020) have been consistently below the arsenic GWPS, indicating that arsenic concentrations above the GWPS present in groundwater at MCM-06 do not extend to the deeper portion of the aquifer, and that DPZ-02 provides vertical delineation of arsenic at MCM-06.

In June 2022, six piezometers were installed to provide additional data for characterization of groundwater flow and quality near MCM-06 and DPZ-02 (**Figure 1.1**) (Arcadis 2022b). Five piezometers (DR-01, DR-02, PT-01, PT-02, and PT-03) were screened at a similar depth and lithology to MCM-06 and one piezometer (PT-04D) was installed across the dike from the existing assessment well DPZ-02 (36 to 41 feet below ground surface [ft bgs]).

These piezometers are located north of MCM-06 and DPZ-02 along the northern side of the northern dike. DR piezometers were constructed with 15 ft wells screens (16-31 ft bgs) to have the capability to support potential pilot study activities as part of assessment of corrective measures and remedy selection process.

Groundwater samples were collected from the MCM-06 area piezometer and well locations in June and September 2022 (see Figure 7 in main body of remedy selection report for locations). Results have shown substantially lower total arsenic concentrations in groundwater at the MCM-06 area piezometers (**Table 3.4c**), close to the GWPS for arsenic (0.032 mg/L). For example, in September 2022, the groundwater total arsenic concentrations at PT-01, PT-02, and PT-03 were 0.035 mg/L, 0.00094 mg/L, and 0.047 mg/L, respectively. Data will continue to be collected to evaluate arsenic concentrations at these locations. The analytical data reports for both the June and September 2022 sampling events are provided in the 2022 Semiannual Report (Resolute 2023).

Since 2020, horizontal delineation of arsenic has been evaluated by sampling surface water in the tidal salt marsh. The March and September 2022 results, reported in the 2022 Annual Report, and 2022 Semiannual Report, respectively, were less than the laboratory reporting limit of 0.0026 mg/L in surface water samples (Resolute 2022, 2023). All historical arsenic data collected since 2020 have been less than the Georgia instream water quality standard for marine estuary environments (0.036 mg/L), and generally less than the laboratory's reporting limits. Based on these results, no impacts to surface water have been detected and horizontal delineation is complete.

4.2 Geochemical Modeling

Geochemical modeling was completed to evaluate aqueous- and solid-phase species that control arsenic solubility at the Site with a specific focus on sulfide and arsenic species. Modeling was completed using PHREEQC Version 3.6, WATEQ database. Thioarsenic species data were based on sourced literature values (Helz and Tossell 2008). Solution Eh was based on the sulfate/sulfide redox couple, and the arsenic speciation was calculated based on the solution Eh. Iron concentrations were estimated in the model using the solubility of the mineral mackinawite, an iron-sulfur containing mineral. PHREEQC input text is provided as **Attachment 5**.

4.2.1 Speciation Modeling Results

To evaluate the speciation of arsenic present at the Site and the influence of sulfide concentrations on speciation, speciation calculations were done for a range of sulfide concentrations from 0 to 50 mg/L, generally representing the range of sulfide detected in monitoring data. Speciation model results predicted that highly soluble thioarsenic species become dominant at sulfide concentrations greater than 0.5 to 1 mg/L (**Figure 4.1**). At site-relevant concentrations, the model predicts that nearly all the arsenic present in solution should be present as one or more thioarsenate species. As discussed in Section 4.3, field data were consistent with the model predictions that thiospecies are present.

4.2.2 Saturation Index – Mineral Solubility

Mineral solubility modeling to evaluate formation of minerals that interact with arsenic was completed by evaluating saturation indices (SIs). The SI is a calculated value of the solubility product and modeled solution concentrations to evaluate whether mineral precipitation is favorable under a specific condition. A positive SI indicates that the groundwater conditions are oversaturated, and mineral precipitation is favorable. A negative SI

indicates undersaturation and unfavorable conditions for mineral precipitation. In this study, SIs for the arsenic-containing iron-sulfide mineral arsenopyrite and the arsenic-sulfide minerals orpiment and realgar were evaluated. SIs were evaluated with and without thioarsenic species to understand the impact of their formation on the solubility of common arsenic-attenuating reduced-phase minerals.

Modeling results showed that the formation of thiospecies enhances the solubility of arsenic and decreases the precipitation of arsenic-bearing minerals. A shown on **Figure 4.2,** when thioarsenic species are not included in the model (represented by a dashed line), the model predicts positive SIs for realgar and orpiment as sulfide is added to the model. The model predicts that these minerals would form with increasing sulfide concentrations. However, with the inclusion of thioarsenic species in the model (represented by a solid line), the SI values have an inflection point at approximately 0.5 to 1 mg/L and begin to become more negative with increasing sulfide concentration. A similar trend and inflection point are also observed for the SI for arsenopyrite **(Figure 4.2)**. These results predict that the presence of thioarsenic species enhances the solubility of common arsenic-containing minerals.

4.2.3 Salinity Effects

As discussed in Sections 3.3 and 3.4, groundwater along the dike is influenced by saltwater intrusion and has varied over time based on pond elevation and local pumping conditions. To assess the potential influence of salinity on arsenic speciation and solubility, the models presented above were run at high and low TDS concentrations using the Davies equation to calculate activity. The high TDS model used data collected during the October 2020 sampling event (**Table 3.4a**). The low TDS model used data collected during the March 2022 sampling event (**Table 3.5**). As presented in **Figures 4.1** and **4.2**, only slight changes to model results were observed with changes in TDS, indicating that, although salinity is changing, it is not greatly affecting arsenic solubility.

4.3 Arsenic in the Solid Phase

Soil data were collected from soil cores advanced across the dike as part of the high resolution investigation (Arcadis, 2021a). Arsenic concentrations in soil along the dike ranged from 0.52 mg/kg at SB-06-S(15-17) to 8.4 mg/kg at SB-26-S(11-13) (**Table 3.1a**). This range is consistent or slightly greater than background regional average arsenic concentrations (0.4 mg/kg to 3.70 mg/kg; Missimer 2018). To evaluate how arsenic is associated with the soils, soils were analyzed by acid volatile sulfide with simultaneously extracted metals (AVS/SEM) and selective sequential extractions (SSE).

Given the sulfate reducing conditions present at the Site (see Section 3.2), the potential presence of arsenic-associated sulfide minerals were evaluated by AVS/SEM. AVS/SEM is an analytical procedure in which an acid is applied to a sample, resulting in the dissolution of reduced-phase reactive sulfide minerals. Sulfide and any associated liberated metals can then be measured. Results of the AVS/SEM evaluation are presented on **Figure 4.3** and in **Table 3.1a**. Of the 19 samples evaluated, eight released detectable sulfide, ranging from 6.4 mg/kg, estimated to 11 mg/kg, estimated. These AVS results are substantially lower than the average for coastal marine environments (927 mg/kg, range of 2 mg/kg to 17,000 mg/kg; Hall and Anderson, 2022). The highest concentration of AVS was measured from soil collected from soil boring SB-14 (sample SB-14-S[29-31]; 11 mg/kg, estimated), adjacent to monitoring well MCM-06. The SEM arsenic result from this sample was 1.5 mg/kg[1]

[1] The AVS/SEM ratio for all samples evaluated was less than 1, and therefore the arsenic measured as part of this evaluation would not be considered bioavailable.

(**Figure 4.3**). A comparison of the SEM arsenic result (1.5 mg/kg) to the total measured arsenic in soil (3.8 mg/kg) indicates that approximately 40% of arsenic in sample SB-14-S(29-31) was associated with sulfide or acid-reactive minerals. Arsenic was also detected in samples which contained AVS results less than the reporting limit (e.g., SB-6-S[8-10]), which may suggest that some arsenic in soil may also be associated with other phases, such as iron (oxy)hydroxides.

SSE is an analytical test that uses a series of solutions to selectively extract a desired analyte associated with the soils. The sequential extraction steps completed for Plant McManus soils followed a procedure developed presented in Paul et al. 2009 which evaluates arsenic extracted from various forms of arsenic sulfide mineral species and iron-(oxy)hydroxide species, as described in **Table 4.2.** Two samples (SB-14-S[17-19] and SB-14-S[22-24]) were collected from soil boring SB-14 and evaluated by SSE. The selective extraction results indicated that approximately half of the arsenic present in soil is associated with non-specifically or specifically sorbed phases (Steps 1 and 2 shown on **Table 4.2**). These sorptive phases can be iron (oxy)hydroxides, iron sulfides, or clays and organics. Arsenic was also detected associated in crystalline iron sulfide minerals (Step 4), but at a lower concentration (0.4 mg/kg). Arsenic may be present associated with poorly crystalline iron oxides and sulfides (Step 3) but at amounts less than the elevated reporting limits (1.71 and 1.52 mg/kg for the two samples, respectively),

The results of this evaluation indicate that some arsenic is associated with the solid phase, based on AVS/SEM and SSE results and an overall positive correlation of total arsenic and iron. However, the observation that arsenic concentrations in soil are generally low, and arsenic concentrations persist in groundwater near MCM-06 at concentrations an order of magnitude greater than the GWPS, indicates that current conditions favor soluble arsenic over sequestration in the solid phase.

4.4 Arsenic Speciation in Groundwater

Arsenic speciation testing on groundwater collected from wells along the dike is summarized on **Table 4.1.** Initial speciation tests results on groundwater collected at dike wells indicated that arsenic was not present as one of the standard arsenic species typically tested (arsenite, arsenate, methylarsonate [MMA], and dimethylarsinate [DMA]). Rather, the arsenic was reported as an “unknown arsenic specie.” In order to further refine the understanding of the specific arsenic specie present on site, groundwater was collected and submitted to Brooks Applied Laboratories located in Bothell, Washington following the high-resolution investigation for a focused arsenic speciation analysis. In this analysis, thioarsenical standards were synthesized from arsenite, and were differentiated based on the sulfur to arsenic ratios. ThioAs1, ThioAs2, and ThioAs3, corresponded to S/As ratios of approximately 1, 2, and 3, respectively. Samples and standards were evaluated using a hyphenated inductively coupled plasma mass-spectroscopy method (Arcadis 2021a) (**Figure 4.4, Table 4.1**). Results of the speciation testing demonstrated that most arsenic was present as a single sulfur substituted mono-thioarsenic specie[2], possibly monothioarsenate (MTA^{v}), due to its high stability across a wide array of redox and pH conditions (Sun et al. 2020).

The formation of soluble thioarsenic species is consistent with the presence of sulfate-reducing conditions along the dike indicated by groundwater geochemical data. As discussed in Section 3.2, conditions that favor microbially driven sulfur cycling predominate along the dike, especially in groundwater nearest MCM-06. The groundwater at MCM-06 has lower Eh than other groundwater across the site (**Figure 3.3a**), even among the group of monitoring

[2] Laboratory equipment was not able to identify whether the single-sulfur substituted species was monothioarsenate (MTA^{v}) or monothioarsenite (MTA^{III}) because of the high sensitivity required.

wells with more reduced Eh shown in blue on **Figure 3.3b**. Groundwater data collected during the high resolution investigation showed widespread elevated sulfide concentrations across most sample points, with the exception of shallow samples less than 10 feet below ground surface. These higher sulfide concentrations correspond with higher arsenic concentrations in groundwater (**Figure 4.5**). For example, all samples with sulfide concentrations greater than 60 mg/L exhibited arsenic concentrations greater than the GWPS. These samples generally corresponded to lower dissolved and total iron concentrations. In samples with sulfide concentrations lower than 15 mg/L, arsenic concentrations were lower than the GWPS (**Figure 4.5**)

Thioarsenic species' fate and transport is governed primarily by their interaction with and integration into mineral phases, either through sorption or direct precipitation/co-precipitation (Saunders et al. 2018, Couture et al. 2013). However, their sorption behavior is distinct from that of arsenic oxyanions arsenate and arsenite. For example, arsenate and arsenite have a greater affinity for sorption to the mineral goethite, compared to MTA^{v}, but MTA^{v} has a higher affinity to the mineral ferrihydrite (Couture et al. 2013). Thioarsenites also have shown weaker sorption compared to arsenite (Shan et al. 2021). Overall, studies indicate that thioarsenic species do not sorb as strongly to common sorptive minerals such as ferrihydrite, pyrite, and amorphous aluminum hydroxides (Shan et al. 2021). As such, thioarsenic species are more soluble compared to arsenic oxyanions. In addition to their high solubility, once formed, thioarsenic species are kinetically stable across a wide range of ORP and pH (Sun et al. 2020). The stability of site thioarsenic species was demonstrated in the control trial during bench scale testing (**Attachment 6**). Thioarsenic specie concentrations remained consistent in the control trial throughout the two-week duration of testing for reactive barrier media.

4.5 Fate and Transport Summary

Data collected at the Site have demonstrated that the arsenic present in groundwater adjacent to MCM-06 is a highly soluble thioarsenic specie. Geochemical conditions in groundwater near MCM-06 are favorable for the formation of thioarsenic species. These species can form in environments with high concentrations of sulfide and reducing or transitional redox conditions, consistent with the tidal marsh area surrounding the Site (Kumar et al. 2020). Thioarsenic species have been characterized as kinetically stable across a wider array of Eh and pH conditions and are highly mobile under neutral to moderate alkalinity conditions. Collectively, elemental concentrations of arsenic and sulfide in groundwater, the speciation data of arsenic in groundwater along with selective extraction and XRD data of aquifer solids demonstrate the potential for arsenic attenuation in the aquifer either through sequestration in the sulfide phases or sorption to the oxy-hydroxides phases. However, the persistent elevated sulfide concentrations, and generally lower iron concentrations in the environmental system, appear to be a limitation on potential sorption and precipitation attenuation pathways for arsenic. This results in the persistent presence of arsenic thiospecies at MCM-06 at concentrations greater than the GWPS.

Arsenic concentrations recently have decreased, potentially related to shifts in water elevation management at AP-1. The redox conditions also appear to be shifting, with Eh of 110 mV in June 2022 in comparison with prior negative values and a sulfide concentration of 23.3 mg/L in June 2022 in comparison with 50.8 mg/L measured in October 2020. The decrease in arsenic concentrations and potential shift in redox conditions may be due to the cessation of pumping for water elevation management at AP-1 in summer 2021. If the recent trends continue, arsenic may naturally attenuate to levels lower than the GWPS or the conditions could equilibrate to a lower arsenic concentration that remains above the GWPS.

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Tables

Table 3.1a
High Resolution Investigation Analytical Data Summary – Soil
Georgia Power Company
Plant McManus Former Ash Pond 1
Brunswick, Georgia

Location			SB-06	SB-06	SB-06	SB-06	SB-14	SB-14	SB-14	SB-14	SB-14	SB-18
Sample ID (date)			SB-6-S(8-10)	SB-6-S(15-17)	SB-6-S(27-29)	SB-6-S(33.5-35.5)	SB-14-S(8-10)	SB-14-S(17-19)	SB-14-S(22-24)	SB-14-S(29-31)	SB-14-S(31-33)	SB-18-S(8-10)
Depth (feet below ground surface)			8-10	15-17	27-29	33.5-35.5	8-10	17-19	22-24	29-31	31-33	8-10
Sample Date			2/27/2021	2/27/2021	2/27/2021	2/27/2021	2/28/2021	2/28/2021	2/28/2021	2/28/2021	2/28/2021	2/27/2021
Analyte	**Units**	**Method**										
Total Organic Carbon	mg/kg	Lloyd Kahn	1600	1100 J	990 J	1900	1900	2300	2000	2500	1600	2100
AVS/SEM												
SEM/AVS Ratio	none	AVS/SEM	NC	NC	NC	NC	0.023	0.099	NC	0.086	0.049	NC
Simultaneously Extracted Arsenic	mg/kg	AVS extraction/ SW6010D	1.8	0.29 J	0.31 J	0.27 J	0.26 J	1.4	0.96	1.5	0.62	0.73
Sulfide	mg/kg	AVS by SW9034	< 6.4	< 6.1	< 6.6	< 6.2	7.1 J	9.1 J	< 5.5	11 J	8.1 J	< 6.3
Metals												
Aluminum	mg/kg	SW6020	4000	330	650 J	1200	3500	2600	1900	4300	1900	4900
Arsenic	mg/kg	SW6020	4.6	0.52	0.99	1.4	1.0	4.6	2.4	3.8	3.5	4.6
Calcium	mg/kg	SW6020	240	390	2700	4000	230	1900	2400	11000	73000	200
Iron	mg/kg	SW6020	1800	550	1100 J	1700	1300	5200	3600	6900	4600	1600
Manganese	mg/kg	SW6020	16	14	18	25	9.4	55	30	96	63	12

Location			SB-18	SB-18	SB-26	SB-26	SB-26	SB-26	SB-32	SB-32	SB-32
Sample ID			SB-18-S(21-23)	SB-18-S(26-28)	SB-26-S(11-13)	SB-26-S(5-10)	SB-26-S(26-28)	SB-26-S(34-36)	SB-32-S(5-10)	SB-32-S(22-24)	SB-32-S(28-30)
Depth (feet below ground surface)			21-23	26-28	11-13	5-10	26-28	34-36	5-10	22-24	28-30
Sample Date			2/27/2021	2/27/2021	2/28/2021	2/28/2021	2/28/2021	2/28/2021	2/28/2021	2/28/2021	2/28/2021
Analyte	**Units**	**Method**									
Total Organic Carbon	mg/kg	Lloyd Kahn	1500	5600	35000	1700	3700	1800	1800	1200	1500
AVS/SEM											
SEM/AVS Ratio	none	AVS/SEM	0.023	0.024	NC	NC	NC	0.016	0.022	NC	NC
Simultaneously Extracted Arsenic	mg/kg	AVS extraction/ SW6010D	0.23 J	0.30	0.65	0.13 J	< 0.13	0.16 J	0.25 J	0.47	0.73
Sulfide	mg/kg	AVS by SW9034	6.4 J	8.2 J	< 9.9	< 6.3	< 6.3	6.5 J	7.2 J	< 6.1	< 6.2
Metals											
Aluminum	mg/kg	SW6020	1100	7500	16000	4100	3700	2100	4600	630	1900
Arsenic	mg/kg	SW6020	1.2	5.5	8.4	1.9	3.1	2.0	1.8	1.4	2.5
Calcium	mg/kg	SW6020	1100	4800	1800	290	280	1400	250	7700	17000
Iron	mg/kg	SW6020	2000	10000	16000	1900	5400	2900	1400	1500	3500
Manganese	mg/kg	SW6020	26	150	110	17	63	31	8.8	19	46

Note:
< - Not detected above method detection limit listed.
J - Estimated concentration
All AVS/SEM ratios were less than 1, indicating that arsenic is not bioavailable.

Acronyms and Abbreviations:
AVS - acid volatile sulfide
mg/kg - milligram per kilogram
SEM - simultaneously extracted metal
NC - not calculated due to sulfide concentrations below detection limit
SB - soil boring
S - soil

Table 3.1b
High Resolution Investigation Analytical Data Summary – Mineralogy
Georgia Power Company
Plant McManus Former Ash Pond 1
Brunswick, Georgia

	Location	SB-14	SB-14
	Sample ID	SB-14-S (17-19)	SB-14-S (22-24)
	Depth (feet)	17-19	22-24
	Sample Date	2/28/2021	2/28/2021
	Units	(% wt)	(% wt)
Mineral	***Formula***		
Quartz	SiO_2	78.8	87.9
Plagioclase	$(NaSi,CaAl)AlSi_2O_8$	5.9	4.4
Potassium-feldspar	$KAlSi_3O_8$	3.9	3.0
Pyrite	FeS_2	0.9	0.2
Kaolinite	$Al_2Si_2O_5(OH)_4$	3.6	0.7
Muscovite	$KAl_2(AlSi_3O_{10})(OH)_2$	4.4	1.5
Actinolite	$Ca_2(Mg,Fe)_5Si_8O_{22}(OH)_2$	1.8	1.5
Diopside	$CaMgSi_2O_6$	0.4	0.4
Epidote	$Ca_2(Al,Fe)Al_2O(SiO_4)(Si_2O_7)(OH)$	0.2	0.3

Notes:
1. Samples were evaluated with X-ray Diffraction (XRD)

Acronyms and Abbreviations:
% wt - percent by weight

Table 3.2
June 2022 Soil Results
Georgia Power Company
Plant McManus Former Ash Pond 1
Brunswick, Georgia

			Location	DR-01	DR-01	DR-01	PT-01	PT-02	PT-03	PT-04D	DR-02
			Sample ID	DR-01 (17-19)	DR-01 (24-26)	DR-01 (29-31)	PT-01 (17-17.5)	PT-02 (18-18.5)	PT-03 (17-17.4)	PT-04D (28-28.4)	DR-02 (18-18.5)
			Depth (feet below ground surface)	17-19	24-26	29-31	(17-17.5)	(18-18.5)	(17-17.4)	(28-28.4)	(18-18.5)
			Sample Date	5/26/2022	5/26/2022	5/26/2022	5/26/2022	5/31/2022	6/1/2022	5/25/2022	5/26/2022
Sieve Size/Analysis	**Units**	**Method**									
3.0"	%	ASTM D6913		100	100	100	--	--	--	--	--
2.0"	%	ASTM D6913		100	100	100	--	--	--	--	--
1.5"	%	ASTM D6913		100	100	100	--	--	--	--	--
1.0"	%	ASTM D6913		100	100	100	--	--	--	--	--
0.75"	%	ASTM D6913		100	100	100	--	--	--	--	--
0.375"	%	ASTM D6913		99.9	100	98.6	--	--	--	--	--
#4	%	ASTM D6913		99.9	100	98.6	--	--	--	--	--
#10	%	ASTM D6913		99.6	100	98.4	--	--	--	--	--
#20	%	ASTM D6913		92.8	96	95.7	--	--	--	--	--
#40	%	ASTM D6913		85.9	88.4	76.8	--	--	--	--	--
#60	%	ASTM D6913		66.9	68.1	24.9	--	--	--	--	--
#100	%	ASTM D6913		33	39.2	9.8	--	--	--	--	--
#140	%	ASTM D6913		8	9.2	4.6	--	--	--	--	--
#200	%	ASTM D6913		3.9	3.5	2.8	--	--	--	--	--
Total Organic Carbon	mg/kg	Lloyd Kahn		--	--	--	4720	4670	4190	3650	3820

Acronyms and Abbreviations:
% - percent passed through
mg/kg - milligrams per kilogram
-- Not evaluated

Table 3.3
Water Quality Parameter Summary - 2016 to 2022
Georgia Power Company
Plant McManus Former Ash Pond 1
Brunswick, Georgia

Well ID	Sample Date	Water Quality Parameter		
		pH Standard Units	ORP milliVolts	Eh milliVolts
DPZ-02	10/15/2020	7.08	-178.06	31.94
DPZ-02	3/4/2021	7.21	-339.24	-129.24
DPZ-02	9/14/2021	7.11	-260.20	-50.20
DPZ-02	3/1/2022	7.08	-190.80	19.20
DPZ-02	6/28/2022	7.09	-193.81	16.19
MCM-01	8/30/2016	5.66	-75.30	134.70
MCM-01	11/30/2016	5.36	76.50	286.50
MCM-01	2/15/2017	5.25	58.90	268.90
MCM-01	6/1/2017	5.59	62.90	272.90
MCM-01	8/16/2017	5.58	50.20	260.20
MCM-01	6/19/2018	5.51	-9.00	201.00
MCM-01	6/27/2018	5.65	9.40	219.40
MCM-01	9/26/2018	5.32	50.60	260.60
MCM-01	11/7/2018	5.72	-2.10	207.90
MCM-01	3/25/2019	5.75	35.10	245.10
MCM-01	8/27/2019	5.58	22.00	232.00
MCM-01	10/16/2019	5.72	35.50	245.50
MCM-01	11/20/2019	5.77	92.80	302.80
MCM-01[1]	3/26/2020	5.45	125.70	335.70
MCM-01	8/26/2020	5.79	17.53	227.53
MCM-01	10/13/2020	5.69	8.81	218.81
MCM-01	3/3/2021	5.81	26.38	236.38
MCM-01	9/14/2021	5.13	89.60	299.60
MCM-01	3/2/2022	5.32	48.50	258.50
MCM-02	5/31/2017	5.06	13.50	223.50
MCM-02	8/2/2017	5.00	70.30	280.30
MCM-02	8/16/2017	4.98	149.20	359.20
MCM-02	4/5/2018	5.02	102.90	312.90
MCM-02	5/9/2018	4.96	96.70	306.70
MCM-02	6/19/2018	5.02	11.30	221.30
MCM-02	9/26/2018	5.06	62.30	272.30
MCM-02	11/7/2018	5.03	-53.40	156.60
MCM-02	3/25/2019	5.08	38.40	248.40
MCM-02	8/28/2019	4.99	98.00	308.00
MCM-02	10/16/2019	4.98	29.30	239.30
MCM-02[1]	11/19/2019	5.11	90.70	300.70
MCM-02	3/27/2020	5.12	10.80	220.80
MCM-02	8/26/2020	5.03	24.63	234.63
MCM-02	10/13/2020	5.03	50.34	260.34
MCM-02	3/3/2021	5.06	106.83	316.83
MCM-02	9/14/2021	5.04	39.00	249.00
MCM-02	3/2/2022	5.16	119.80	329.80
MCM-03	6/1/2017	5.39	-4.60	205.40
MCM-03	6/2/2017	5.58	62.10	272.10
MCM-03	8/16/2017	5.42	12.80	222.80
MCM-04	6/1/2017	5.68	27.70	237.70
MCM-04	8/2/2017	5.20	95.00	305.00
MCM-04	8/17/2017	5.31	55.90	265.90

Table 3.3
Water Quality Parameter Summary - 2016 to 2022
Georgia Power Company
Plant McManus Former Ash Pond 1
Brunswick, Georgia

Well ID	Sample Date	Water Quality Parameter		
		pH Standard Units	ORP milliVolts	Eh milliVolts
MCM-04	4/4/2018	4.74	162.40	372.40
MCM-04	5/8/2018	4.78	101.40	311.40
MCM-04	6/20/2018	4.79	68.40	278.40
MCM-04	9/27/2018	5.14	85.80	295.80
MCM-04	11/6/2018	4.90	86.20	296.20
MCM-04	3/25/2019	4.93	159.30	369.30
MCM-04	8/27/2019	5.05	51.80	261.80
MCM-04	10/15/2019	4.89	64.30	274.30
MCM-04[1]	11/20/2019	5.03	94.60	304.60
MCM-04	3/27/2020	5.27	53.80	263.80
MCM-04	8/26/2020	4.95	63.90	273.90
MCM-04	10/13/2020	5.25	94.65	304.65
MCM-04	3/4/2021	5.31	72.86	282.86
MCM-04	9/14/2021	5.09	68.20	278.20
MCM-04	3/3/2022	4.98	54.80	264.80
MCM-05	8/31/2016	6.93	-312.10	-102.10
MCM-05	11/30/2016	6.77	-313.10	-103.10
MCM-05	2/16/2017	6.89	-318.70	-108.70
MCM-05	6/2/2017	6.83	-339.30	-129.30
MCM-05	8/17/2017	6.76	-339.20	-129.20
MCM-05	6/20/2018	6.83	-306.20	-96.20
MCM-05	9/27/2018	6.64	-254.80	-44.80
MCM-05	11/7/2018	6.60	-156.60	53.40
MCM-05	3/24/2019	6.61	-242.60	-32.60
MCM-05	8/28/2019	6.69	-240.40	-30.40
MCM-05	10/16/2019	6.64	-50.00	160.00
MCM-05[1]	11/20/2019	6.58	5.90	215.90
MCM-05	3/28/2020	6.60	-251.30	-41.30
MCM-05	8/26/2020	6.59	-147.52	62.48
MCM-05	10/15/2020	6.52	-135.17	74.83
MCM-05	3/4/2021	6.52	-243.89	-33.89
MCM-05	9/14/2021	6.67	-127.70	82.30
MCM-05	3/1/2022	6.87	-178.80	31.20
MCM-06	8/31/2016	7.21	-331.20	-121.20
MCM-06	11/30/2016	7.23	-299.10	-89.10
MCM-06	2/2/2017	7.21	-355.50	-145.50
MCM-06	2/16/2017	7.27	-343.50	-133.50
MCM-06	6/2/2017	7.18	-355.20	-145.20
MCM-06	8/17/2017	7.15	-308.60	-98.60
MCM-06	6/20/2018	7.19	-326.70	-116.70
MCM-06	9/27/2018	7.21	-281.70	-71.70
MCM-06	11/7/2018	6.91	-202.40	7.60
MCM-06	11/8/2018	7.02	-346.50	-136.50
MCM-06[1]	3/6/2019	6.77	-297.20	-87.20
MCM-06	3/24/2019	6.98	-361.90	-151.90
MCM-06	8/28/2019	6.87	-279.80	-69.80
MCM-06	10/17/2019	6.86	-394.10	-184.10
MCM-06	3/28/2020	6.80	-398.70	-188.70

Table 3.3
Water Quality Parameter Summary - 2016 to 2022
Georgia Power Company
Plant McManus Former Ash Pond 1
Brunswick, Georgia

Well ID	Sample Date	Water Quality Parameter		
		pH Standard Units	ORP milliVolts	Eh milliVolts
MCM-06	8/26/2020	6.89	-285.51	-75.51
MCM-06	10/14/2020	6.93	-279.47	-69.47
MCM-06	3/4/2021	6.94	-328.71	-118.71
MCM-06	9/14/2021	6.94	-232.80	-22.80
MCM-06	3/1/2022	7.24	-200.30	9.70
MCM-06	6/28/2022	7.38	-129.80	80.20
MCM-07	8/31/2016	6.66	-284.80	-74.80
MCM-07	11/30/2016	6.69	-255.40	-45.40
MCM-07	2/16/2017	6.72	-275.90	-65.90
MCM-07	6/2/2017	6.53	-232.10	-22.10
MCM-07	8/17/2017	6.28	-161.70	48.30
MCM-07	6/21/2018	6.45	-208.20	1.80
MCM-07	9/27/2018	6.48	-270.10	-60.10
MCM-07	11/6/2018	6.18	-181.50	28.50
MCM-07	3/24/2019	6.39	-240.40	-30.40
MCM-07	8/28/2019	6.35	-7.90	202.10
MCM-07	10/17/2019	6.40	15.40	225.40
MCM-07	11/20/2019	6.27	20.60	230.60
MCM-07[1]	3/28/2020	6.35	-257.80	-47.80
MCM-07	8/26/2020	6.32	-165.46	44.54
MCM-07	10/14/2020	6.32	-158.65	51.35
MCM-07	3/4/2021	6.33	-236.56	-26.56
MCM-07	9/14/2021	6.28	-100.00	110.00
MCM-07	3/2/2022	6.41	-115.90	94.10
MCM-08	6/1/2017	5.41	49.30	259.30
MCM-08	8/2/2017	5.31	104.50	314.50
MCM-08	8/15/2017	5.40	41.70	251.70
MCM-08	4/5/2018	5.38	100.90	310.90
MCM-08	5/9/2018	5.38	92.60	302.60
MCM-08	6/19/2018	5.32	57.30	267.30
MCM-08[1]	6/28/2018	5.41	32.80	242.80
MCM-08	9/26/2018	5.31	42.00	252.00
MCM-08	11/8/2018	5.37	-90.50	119.50
MCM-08	3/25/2019	5.34	87.50	297.50
MCM-08	8/28/2019	5.11	34.00	244.00
MCM-08	10/16/2019	5.23	74.40	284.40
MCM-08[1]	11/19/2019	5.29	83.40	293.40
MCM-09	8/31/2016	5.66	-36.30	173.70
MCM-09	11/30/2016	6.10	-59.00	151.00
MCM-09	2/16/2017	5.65	3.70	213.70
MCM-09	6/2/2017	5.76	-15.70	194.30
MCM-09	8/15/2017	5.45	2.40	212.40
MCM-09	6/19/2018	5.48	66.20	276.20
MCM-09	9/25/2018	5.80	25.30	235.30
MCM-09	11/6/2018	5.51	-48.20	161.80
MCM-09	3/24/2019	5.38	72.50	282.50
MCM-10	8/2/2017	4.04	173.90	383.90
MCM-10	8/15/2017	4.15	171.00	381.00

Table 3.3
Water Quality Parameter Summary - 2016 to 2022
Georgia Power Company
Plant McManus Former Ash Pond 1
Brunswick, Georgia

Well ID	Sample Date	Water Quality Parameter		
		pH Standard Units	ORP milliVolts	Eh milliVolts
MCM-10	4/4/2018	4.25	190.70	400.70
MCM-10	5/8/2018	4.25	128.80	338.80
MCM-10	6/19/2018	4.17	136.50	346.50
MCM-10	9/27/2018	4.22	58.60	268.60
MCM-10	11/6/2018	4.15	85.30	295.30
MCM-10	3/24/2019	4.39	77.30	287.30
MCM-11	5/31/2017	4.42	78.90	288.90
MCM-11	8/2/2017	5.19	193.50	403.50
MCM-11	8/15/2017	5.19	130.50	340.50
MCM-11	4/4/2018	5.19	109.40	319.40
MCM-11	5/8/2018	5.30	53.30	263.30
MCM-11	6/19/2018	5.15	142.40	352.40
MCM-11	9/25/2018	5.13	-9.10	200.90
MCM-11	11/6/2018	5.08	63.40	273.40
MCM-11	3/25/2019	5.05	164.30	374.30
MCM-11	8/28/2019	4.87	86.60	296.60
MCM-11	10/16/2019	5.05	45.50	255.50
MCM-11	3/27/2020	5.09	133.70	343.70
MCM-11	8/26/2020	4.96	59.66	269.66
MCM-11	10/12/2020	5.00	48.07	258.07
MCM-11	3/3/2021	5.07	173.54	383.54
MCM-11	9/14/2021	5.50	103.60	313.60
MCM-11	3/2/2022	5.11	145.10	355.10
MCM-12	8/30/2016	6.49	-186.70	23.30
MCM-12	11/30/2016	6.50	-99.20	110.80
MCM-12	2/15/2017	6.51	-105.90	104.10
MCM-12	5/31/2017	6.45	35.10	245.10
MCM-12	8/15/2017	6.41	-74.80	135.20
MCM-12	6/19/2018	6.32	103.60	313.60
MCM-12	6/26/2018	6.43	-30.00	180.00
MCM-12	9/25/2018	6.31	38.40	248.40
MCM-12	11/7/2018	6.30	-46.00	164.00
MCM-12	3/24/2019	6.40	-33.10	176.90
MCM-12	8/27/2019	6.24	-80.00	130.00
MCM-12	10/15/2019	6.19	87.90	297.90
MCM-12	3/27/2020	6.33	84.10	294.10
MCM-12	8/26/2020	6.32	-28.58	181.42
MCM-12	10/12/2020	6.35	-31.52	178.48
MCM-12	3/2/2021	6.34	-10.43	199.57
MCM-12	9/13/2021	6.24	40.40	250.40
MCM-12	3/3/2022	6.51	-279.90	-69.90
MCM-13	8/30/2016	6.42	-134.20	75.80
MCM-13	8/31/2016	6.67	-145.60	64.40
MCM-13	6/27/2018	6.28	-72.80	137.20
MCM-14	8/30/2016	7.04	-219.60	-9.60
MCM-14	11/30/2016	7.13	-232.50	-22.50
MCM-14	2/15/2017	7.02	-174.90	35.10
MCM-14	5/31/2017	7.00	-143.70	66.30

Table 3.3
Water Quality Parameter Summary - 2016 to 2022
Georgia Power Company
Plant McManus Former Ash Pond 1
Brunswick, Georgia

Well ID	Sample Date	Water Quality Parameter		
		pH Standard Units	ORP milliVolts	Eh milliVolts
MCM-14	8/16/2017	6.88	315.20	525.20
MCM-14	6/19/2018	6.78	-300.80	-90.80
MCM-14	6/26/2018	6.76	-282.10	-72.10
MCM-14	9/25/2018	6.75	-310.80	-100.80
MCM-14	11/6/2018	6.92	-255.30	-45.30
MCM-14	3/24/2019	6.59	-257.20	-47.20
MCM-14	8/26/2019	6.62	-257.30	-47.30
MCM-14	10/15/2019	6.58	-226.00	-16.00
MCM-14[1]	11/21/2019	6.67	40.60	250.60
MCM-14	3/27/2020	6.59	12.50	222.50
MCM-14	8/26/2020	6.62	-194.40	15.60
MCM-14	10/13/2020	6.56	-154.85	55.15
MCM-14	10/14/2020	6.50	-178.97	31.03
MCM-14	3/2/2021	6.55	-143.59	66.41
MCM-14	9/13/2021	6.30	-250.60	-40.60
MCM-14	3/3/2022	6.49	-312.20	-102.20
MCM-15	6/2/2017	5.31	62.90	272.90
MCM-15	8/2/2017	5.05	110.50	320.50
MCM-15	8/17/2017	5.52	65.50	275.50
MCM-15	4/4/2018	5.45	147.80	357.80
MCM-15	5/8/2018	5.54	170.10	380.10
MCM-15	6/19/2018	5.60	87.70	297.70
MCM-15	9/26/2018	5.17	83.80	293.80
MCM-15	11/7/2018	5.47	-7.20	202.80
MCM-15	3/25/2019	5.40	133.20	343.20
MCM-15	8/27/2019	5.35	87.60	297.60
MCM-15	10/15/2019	5.32	35.70	245.70
MCM-15	3/27/2020	5.30	56.70	266.70
MCM-15	8/26/2020	5.33	23.93	233.93
MCM-15	10/13/2020	5.02	102.79	312.79
MCM-15	3/2/2021	5.16	43.77	253.77
MCM-15	9/14/2021	5.39	25.50	235.50
MCM-15	3/2/2022	5.37	24.00	234.00
MCM-16	8/30/2016	5.18	-11.00	199.00
MCM-16	11/30/2016	4.96	101.80	311.80
MCM-16	2/15/2017	5.13	51.20	261.20
MCM-16	6/1/2017	4.99	105.70	315.70
MCM-16	8/17/2017	4.68	13.80	223.80
MCM-16	6/20/2018	4.77	52.10	262.10
MCM-16	9/26/2018	4.65	57.30	267.30
MCM-16	11/7/2018	4.99	-51.90	158.10
MCM-16	3/25/2019	5.13	55.60	265.60
MCM-16	8/27/2019	4.88	58.80	268.80
MCM-16	10/16/2019	4.89	36.00	246.00
MCM-16	3/27/2020	5.12	31.70	241.70
MCM-16	8/26/2020	4.92	49.66	259.66
MCM-16	10/13/2020	5.17	91.00	301.00
MCM-16	3/3/2021	5.71	-11.26	198.74

Table 3.3
Water Quality Parameter Summary - 2016 to 2022
Georgia Power Company
Plant McManus Former Ash Pond 1
Brunswick, Georgia

Well ID	Sample Date	Water Quality Parameter		
		pH Standard Units	ORP milliVolts	Eh milliVolts
MCM-16	9/14/2021	4.64	95.30	305.30
MCM-16	3/3/2022	4.88	68.30	278.30
MCM-17	10/25/2016	6.95	-208.50	1.50
MCM-17	11/30/2016	6.95	-244.50	-34.50
MCM-17	2/15/2017	6.85	-198.70	11.30
MCM-17	5/31/2017	6.96	-178.10	31.90
MCM-17	8/15/2017	6.99	-222.00	-12.00
MCM-17	6/19/2018	6.91	-241.70	-31.70
MCM-17	9/26/2018	6.81	-222.50	-12.50
MCM-17	11/6/2018	5.99	-30.60	179.40
MCM-17	3/24/2019	6.62	-281.70	-71.70
MCM-17	8/27/2019	6.23	-166.60	43.40
MCM-17	10/16/2019	6.54	24.90	234.90
MCM-17[1]	11/21/2019	6.44	26.00	236.00
MCM-17	3/27/2020	6.93	-236.00	-26.00
MCM-17	8/26/2020	6.65	-131.14	78.86
MCM-17	10/13/2020	6.34	-113.54	96.46
MCM-17	3/3/2021	6.58	-114.56	95.44
MCM-17	9/14/2021	6.77	-64.40	145.60
MCM-17	3/3/2022	6.26	-119.00	91.00
MCM-18	11/7/2019	4.25	206.30	416.30
MCM-18	11/18/2019	4.12	122.50	332.50
MCM-18	12/5/2019	4.17	105.70	315.70
MCM-18	12/5/2019	4.17	105.70	315.70
MCM-18	1/9/2020	4.19	103.20	313.20
MCM-18	1/21/2020	4.28	118.60	328.60
MCM-18	2/4/2020	4.26	95.30	305.30
MCM-18	2/13/2020	4.20	105.60	315.60
MCM-18	3/27/2020	4.34	165.00	375.00
MCM-18	8/26/2020	4.27	64.34	274.34
MCM-18	10/12/2020	4.29	103.57	313.57
MCM-18	3/3/2021	4.37	107.96	317.96
MCM-18	9/14/2021	4.28	114.10	324.10
MCM-18	3/2/2022	4.33	87.10	297.10
MCM-19	11/7/2019	5.21	129.70	339.70
MCM-19	11/19/2019	5.15	98.50	308.50
MCM-19	12/4/2019	5.28	62.50	272.50
MCM-19	12/4/2019	5.28	62.50	272.50
MCM-19	1/8/2020	5.04	94.40	304.40
MCM-19	1/21/2020	5.10	142.70	352.70
MCM-19	2/4/2020	5.15	84.30	294.30
MCM-19	2/13/2020	5.07	133.20	343.20
MCM-19	3/27/2020	5.14	148.10	358.10
MCM-19	8/26/2020	5.25	97.96	307.96
MCM-19	10/13/2020	5.04	79.24	289.24
MCM-19	3/3/2021	5.10	84.99	294.99
MCM-19	9/14/2021	5.31	94.40	304.40
MCM-19	3/1/2022	5.38	86.30	296.30

Table 3.3
Water Quality Parameter Summary - 2016 to 2022
Georgia Power Company
Plant McManus Former Ash Pond 1
Brunswick, Georgia

Well ID	Sample Date	Water Quality Parameter		
		pH Standard Units	ORP milliVolts	Eh milliVolts
MCM-20	11/7/2019	3.79	317.80	527.80
MCM-20	11/19/2019	3.78	111.30	321.30
MCM-20	12/4/2019	3.87	71.40	281.40
MCM-20	1/8/2020	3.77	140.30	350.30
MCM-20	1/21/2020	3.73	157.40	367.40
MCM-20	2/4/2020	3.72	140.60	350.60
MCM-20	2/13/2020	3.75	164.30	374.30
MCM-20	3/27/2020	3.81	188.80	398.80
MCM-20	8/26/2020	3.67	254.18	464.18
MCM-20	10/13/2020	3.72	175.71	385.71
MCM-20	3/3/2021	3.76	131.54	341.54
MCM-20	9/14/2021	3.72	130.60	340.60
MCM-20	3/1/2022	3.69	201.10	411.10
DR-01	6/28/2022	7.08	-112.75	97.25
DR-02	6/28/2022	7.68	-167.94	42.06
PT-01	6/28/2022	7.24	-200.61	9.39
PT-02	6/28/2022	7.34	-179.84	30.16
PT-03	6/28/2022	6.85	-70.57	139.43
PT-04D	6/28/2022	7.23	-188.40	21.60

Notes:
1. Indicates sample was resampled to record high and low tide.
2. Electrical potential (Eh) values were converted by adding +210 millivolts to field measured Oxidation Reduction Potential (ORP) values.

Acronyms and Abbreviations:
"--" - data not available
* - probe malfunction

Table 3.4a
Geochemical Sampling October 2020 Groundwater Results
Georgia Power Company
Plant McManus Former Ash Pond 1
Brunswick, Georgia

Monitoring Well Locations / Sample Date	Units	DPZ-02 10/15/2020	MCM-05 10/15/2020	MCM-06 10/14/2020	MCM-07 10/14/2020	MCM-14 10/13/2020	RW-01 10/14/2020	RW-02 10/14/2020	RW-03 10/14/2020	RW-04 10/15/2020	RW-05 10/15/2020	RW-06 10/15/2020	RW-07 10/14/2020	RW-08 10/14/2020	RW-09 10/14/2020	RW-10 10/14/2020
Arsenic	mg/L	0.021	<0.0017 (0.024)	0.45 (0.43)	0.015 (0.013)	<0.0017 (<0.0017)	0.0018 J	<0.0017	<0.0017	0.0028 J	0.0026 J	0.0029 J	0.013	0.0024 J	0.038	0.0058
Boron	mg/L	2.1	0.67 (0.61)	1.5 (1.5)	1.7 (1.8)	1.2 (1.1)	2.3	3.1	2.5	2.1	2.7	2.5	1.0	2.5	1.6	1.8
Calcium	mg/L	225 (194)	60.7 (69.1)	193 (245)	216 (207)	177 (40.9)	151	132	118	128	152	153	160	131	256	138
Chloride	mg/L	8000	1660 (1660)	6930 (6630)	8170 (7910)	6230 (6230)	7340	7870	7370	5600	6190	7030	3980	6810	7160	5880
Iron	mg/L	<0.83	<0.83	<0.21	<0.21	<0.21	1.0	<0.21	1.5	2.6	1.3	<0.83	<0.21	1.4	<0.83	<0.83
Iron, Ferric[1]	mg/L	0.35 J	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	0.79	1.6	0.94	<0.25	<0.25	0.65	<0.25	<0.25
Iron, Ferrous[1,2]	mg/L	<0.084	<0.084	0.099 J	< 0.084	<0.084	1.1	<0.084	0.71	1.1	0.32 J	0.41 J	<0.084	0.75	<0.084	<0.084
Magnesium	mg/L	485	138	445	614	379	418	436	380	373	397	447	309	422	567	378
Manganese	mg/L	0.26	<0.069	0.24	0.13	0.29	0.18	0.12	0.14	0.23	0.14	<0.069	0.13	0.11	0.28	0.16
Potassium	mg/L	151	<60.8	121	148	107	158	171	156	145	159	164	94.1 J	151	151	136
Sodium	mg/L	4720	996	<30.5	4310	3420	4280	4540	4220	3370	3770	4050	2150	3790	3820	3200
Nitrate as N	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Nitrite as N	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Sulfate	mg/L	989 (1060)	148 (147)	552 (510)	938 (904)	682 (695)	836	984	930	732	806	839	310	829	731	701
Sulfide	mg/L	41.6	21	50.8	25.7	15.7	<0.050	0.19	2.1	0.44	0.95	8.3	52.5	0.054 J	50.8	1.6
Orthophosphate		0.13 J	0.37	0.81	0.59	0.58	0.65	0.66	0.47	0.21	1.0	0.23	0.68	0.27	0.6	0.51
Alkalinity,Bicarbonate ($CaCO_3$)	mg/L	349	174	532	253	164	234	151	147	131	197	108	301	127	307	192
Alkalinity,Carbonate ($CaCO_3$)	mg/L	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Total Dissolved Solids	mg/L	(19300)	(5100)	(15200)	(18400)	(15600)	17800	20600	19100	13100	15500	16400	9700	17200	17500	11800
Total Organic Carbon	mg/L	7.0	6.6	9.3	15.9	5.0	15.1	7.9	10.2	11.0	11.9	7.6	8.7	8.0	9.5	9.4
Biochemical Oxygen Demand	mg/L	<2.0	4.2	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Field Parameters																
pH (field)	SU	7.08	6.52	6.93	6.32	6.50	6.45	6.53	6.26	6.24	6.62	6.15	6.74	6.25	6.55	6.63
Temperature	°C	25.74	25.55	25.32	27.30	25.50	26.46	27.71	26.62	27.74	26.69	27.99	26.33	26.78	25.30	26.41
Specific Conductivity	µS/cm	26033	6398	21942	25574	20468	23526	24632	23260	18606	21578	23045	13350	21848	22441	19245
Dissolved Oxygen	mg/L	0.11	0.10	0.04	0.05	0.02	0.16	0.15	0.33	0.10	0.11	0.09	0.12	0.05	0.15	0.04
Turbidity	NTU	0.35	0.60	2.85	4.87	0.31	0.26	0.26	0.34	4.79	2.99	0.38	0.14	0.67	0.23	0.53
Electrical Potential	mV	31.9	74.80	-69.5	51.4	31	169.8	53.5	94	162.8	148.3	133.9	-7.3	139.8	54.1	37
Oxidation Reduction Potential	mV	-178.1	-135.2	-279.5	-158.6	-179.0	-40.2	-156.5	-116.0	-47.2	-61.7	-76.1	-217.3	-70.2	-155.9	-173.0

Notes:
Data collected as part of semi-annual monitoring (laboratory report #92500314) indicated in parentheses. All other data presented was collected as part of supplemental groundwater data collection (laboratory report #92500569)
1. Laboratory not certified for analyte.
2. Ferrous iron samples were analyzed outside of the holding time. Results are still useful for interpretation of variation in geochemical conditions, given that sum of ferric and ferrous iron is consistent with total iron.
3. Electrical potential (Eh) values were converted by adding +210 millivolts to field measured Oxidation Reduction Potential (ORP) values.
J - Estimated concentation greater than the laboratory's method detection limit, but less than the laboratory's reporting limit.
< - Not detected above method detection limited listed

Acronyms and Abbreviations:

°C - degrees Centigrade
µg/L - micrograms per liter
µS/cm - microsiemens per centimeter
$CaCO_3$ - calcium carbonate
mg/L - milligram per liter
mV - millivolts
NTU - Nepholometric Turbidity Units
SU - standard units

Table 3.4b
High Resolution Investigation Analytical Data Summary – Vertical Aquifer Profiling Groundwater
Georgia Power Company
Plant McManus Former Ash Pond 1
Brunswick, Georgia

			Location	VAP-06	VAP-06	VAP-06	VAP-06	VAP-14	VAP-14	VAP-14	VAP-14	VAP-14	VAP-15
			Sample ID	VAP-06-W (8-10)	VAP-06-W (15-17)	VAP-06-W (27-29)	VAP-06-W (33.5-35.5)	VAP-14-W (5-10)	VAP-14-W (17-19)	VAP-14-W (22-24)	VAP-14-W (29-31)	VAP-14-W (31-33)	VAP-15-W (15-17)
			Depth (feet)	8-10	15-17	27-29	33.5-35.5	5-10	17-19	22-24	29-31	31-33	15-17
			Sample Date	2/24/2021	2/24/2021	2/24/2021	2/24/2021	2/23/2021	2/23/2021	2/23/2021	2/23/2021	2/23/2021	2/26/2021
Total Metals	**Units**	**Method**											
Arsenic	mg/L	SW6020		< 0.0087	< 0.0087	< 0.0087	< 0.0087 J	< 0.0087	0.42	0.32	0.078	0.032	0.018 J
Boron	mg/L	SW6020		1.8 J	2.0 J	2.4 J	2.4 J	1.7 J	0.95 J	1.7 J	2.1 J	2.0 J	1.3 J
Calcium	mg/L	SW6010D		218	191	407	462	196	287	263	261	248	183
Iron	mg/L	SW6010D		3.7	1.0	22.8	6.4	3.9	0.14	2.1	0.89	0.77	0.51
Magnesium	mg/L	SW6010D		611	496	660	689	588	543	648	584	537	496
Manganese	mg/L	SW6010D		0.24	0.31	1.9	1.6	0.13	0.26	0.38	0.35	0.30	0.20
Potassium	mg/L	SW6010D		167	157	173	168	199	120	199	206	194	150
Sodium	mg/L	SW6010D		5050	4450	5550	5690	4340	2880	4740	4690	4410	4480
Dissolved Metals													
Arsenic	mg/L	SW6020		< 0.0087	< 0.0087	< 0.0087	< 0.0087	< 0.0087	0.170	0.180	0.044	0.012	0.0095 J
Boron	mg/L	SW6020		1.7 J	1.8 J	1.8 J	2.2 J	1.7 J	0.97 J	1.7 J	2.1 J	2.0 J	1.7 J
Calcium	mg/L	SW6010D		203	177	351	408	164	240	216	209	213	174
Iron	mg/L	SW6010D		2.7	0.85	< 0.42	< 0.42	3.3	0.080	0.063	0.14	0.29	< 0.42
Magnesium	mg/L	SW6010D		605	477	597	636	529	468	572	495	492	459
Manganese	mg/L	SW6010D		0.22	0.29	1.5	1.4 J	0.12	0.27	0.35	0.31	0.29	0.19
Potassium	mg/L	SW6010D		162	152	158	154	166	98.7	158	165	167	140
Sodium	mg/L	SW6010D		4270	4010	4770	4990	3900	2650	4500	4310	4050	4210
General Chemistry													
Alkalinity	mg/L	A2320		111	237	643	700	109	720	708	440	413	298
Alkalinity, Bicarbonate	mg/L	A2320		111	237	643	700	109	720	708	440	413	298
Alkalinity, Carbonate	mg/L	A2320		< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Chloride	mg/L	E300.0		8090	7080	8950	9250	5400	5480	7760	8200	7370	7190
Nitrate-N	mg/L	E300.0		< 6.0	< 6.0	< 6.0	< 6.0 J	< 0.060	< 0.060 J	< 0.060	< 0.060	< 0.060	< 0.060
Nitrite	mg/L	E300.0		< 5.0	< 5.0	< 5.0	< 5.0 J	< 0.050	R	< 0.050	< 0.050	< 0.050	< 5.0
Sulfate	mg/L	E300.0		1060	900	850	853	253	295 J	900	655	866	855
Sulfide	mg/L	SM4500-S-D		< 0.050	15.9	58.3	59.1	0.47	85.6	87.2	41.7	46	38.3
ortho-Phosphate (As P)	mg/L	SM4500-P-E		0.21	0.75	0.23	0.24	0.25	0.66	0.56	0.54	0.46	1.1
Total Dissolved Solids	mg/L	SM2540C		17500	17300	20300	20600	15900	13000	18800	17800	17800	16300
Biological Oxygen Demand	mg/L	SM5210B		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	19000
Total Organic Carbon	mg/L	SW9060A		5.7	8.6	7.1	7.9	10.8	9.4	10.4	7.4	6.9	11.4
Field Parameters													
pH (field)	SU	Field Collected		6.95	6.75	6.86	6.87	6.37	7.06	7.01	7.37	7.39	6.94
Specific Conductivity	µS/cm	Field Collected		25384	22314	27887	28887	23368	18247	26194	25325	24100	22890
Turbidity	NTU	Field Collected		24.7	6.66	9.29	293	6.35	57.9	28.1	24.9	10.2	70.1
Dissolved Oxygen	mg/L	Field Collected		0.72	1.80	1.54	1.98	0.43	0.77	0.89	0.31	0.20	1.07
Temperature	°C	Field Collected		19.9	21.1	22.1	23.1	16.5	21.5	17.8	16.5	17.9	22.4
Electrical Potential	mV	Calculated*		22.8	-137.5	-156.8	-169.8	190.5	-164.4	-150.1	-134.7	-137.5	-135.6
Oxidation Reduction Potential	mV	Field Collected		-187.2	-347.5	-366.8	-379.8	-19.5	-374.4	-360.1	-344.7	-347.5	-345.6

Table 3.4b
High Resolution Investigation Analytical Data Summary – Vertical Aquifer Profiling Groundwater
Georgia Power Company
Plant McManus Former Ash Pond 1
Brunswick, Georgia

			Location	VAP-15	VAP-15	VAP-18	VAP-18	VAP-18	VAP-26	VAP-26	VAP-26	VAP-26	VAP-29
			Sample ID	VAP-15-W (20-22)	VAP-15-W (26-28)	VAP-18-W (5-10)	VAP-18-W (21-23)	VAP-18-W (26-28)	VAP-26-W (8-10)	VAP-26-W (11-13)	VAP-26-W (26-28)	VAP-26-W (34-36)	VAP-29-W (5-10)
			Depth (feet)	20-22	26-28	5-10	21-23	26-28	8-10	11-13	26-28	34-36	5-10
			Sample Date	2/26/2021	2/26/2021	2/25/2021	2/25/2021	2/25/2021	2/24/2021	2/25/2021	2/25/2021	2/25/2021	2/26/2021
Total Metals	**Units**	**Method**											
Arsenic	mg/L	SW6020	< 0.0087	0.057 J	< 0.0087	< 0.0087	< 0.0087	< 0.0087	< 0.0087	< 0.0087	< 0.0087	0.0092 J
Boron	mg/L	SW6020	1.2 J	1.0 J	1.5 J	1.3 J	1.2 J	1.6 J	1.4 J	0.81 J	1.2 J	R
Calcium	mg/L	SW6010D	259	199	48.7	171	143	222	139	23.5	103	111
Iron	mg/L	SW6010D	2.6	1.5	1.9	2.3 J	0.54 J	3.0	0.12 J	1.6 J	5.0	3.1 J
Magnesium	mg/L	SW6010D	606	386	157	440	296	671	386	68.8	190	282
Manganese	mg/L	SW6010D	0.32	0.22	0.037 J	0.23	0.15	0.12	0.15	0.043 J	0.083	0.11
Potassium	mg/L	SW6010D	164	116	77.2	153	105	175	136	68.1	82.0	101
Sodium	mg/L	SW6010D	4300	3410	1750	3770	2280	5140	3010	656	1830	2970
Dissolved Metals												
Arsenic	mg/L	SW6020	< 0.0087	0.035 J	< 0.0087	< 0.0087	< 0.0087	< 0.0087 J	< 0.0087	< 0.0087 J	< 0.0087	< 0.0087 J
Boron	mg/L	SW6020	1.3 J	1.4 J	1.4 J	1.2 J	0.82 J	1.7 J	1.6 J	R	1.2 J	1.2 J
Calcium	mg/L	SW6010D	244	216	43.3	173	142	218	133	21	94.2	116
Iron	mg/L	SW6010D	< 0.42	< 0.42	< 0.83	4.0 J	4.9 J	2.5 J	4.2 J	< 0.42 J	1.2 J	0.73
Magnesium	mg/L	SW6010D	572	414	151	439	291	654	373	57.3	192	303
Manganese	mg/L	SW6010D	0.29	0.23	0.027	0.19	0.13	0.098	0.13	0.036	0.049	0.091
Potassium	mg/L	SW6010D	151	115	73.4 J	< 152	< 152	172	< 152	63.8	80.3 J	105
Sodium	mg/L	SW6010D	4040	3180	1610	3560	2160	4360	2770	622	1780	2840
General Chemistry												
Alkalinity	mg/L	A2320	525	498	148	259	483	96.2	434	309	326	166
Alkalinity, Bicarbonate	mg/L	A2320	525	498	148	259	483	96.2	434	309	326	166
Alkalinity, Carbonate	mg/L	A2320	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Chloride	mg/L	E300.0	7130	5630	2580	6300	3960	8740	5330	971	2940	4620
Nitrate-N	mg/L	E300.0	< 0.060	< 0.060	< 0.060	< 0.060	< 0.060	< 0.060	< 0.060	< 0.060	< 0.060	0.067 J
Nitrite	mg/L	E300.0	< 5.0	< 5.0 J	< 0.050 J	< 0.050	< 0.050	< 0.050	< 0.050	R	< 0.050	< 5.0
Sulfate	mg/L	E300.0	706	540	384	765	334	1210	194	4.8	329	656
Sulfide	mg/L	SM4500-S-D	60.9	39.7	< 0.050	25.3	35.1	< 0.050	54.5	36.8	1.8	7.9
ortho-Phosphate (As P)	mg/L	SM4500-P-E	0.48	0.63	0.33	0.49	0.64	0.44 J	1.6	0.85	0.30	0.20 J
Total Dissolved Solids	mg/L	SM2540C	16300	12400	6800	10900	8450	18500	11000	2330	6670	10700
Biological Oxygen Demand	mg/L	SM5210B	364	194	< 2.0	40	20.0	< 2.0 J	100	25.1	< 2.0	276
Total Organic Carbon	mg/L	SW9060A	9.4	7.4	14.1	8.5	7.4	6.3	18.0	7.7	4.7	14.9
Field Parameters												
pH (field)	SU	Field Collected	6.94	7.15	6.74	6.75	7.10	6.36	7.10	7.13	7.28	6.90
Specific Conductivity	µS/cm	Field Collected	22415	18059	8840	19365	12645	26923	16056	3785	9851	15300
Turbidity	NTU	Field Collected	86.7	81.9	69.6	40.6	4.37	9.92	23.0	28.6	67.8	23.9
Dissolved Oxygen	mg/L	Field Collected	0.91	0.56	NA	2.04	1.22	2.52	1.69	1.92	1.13	1.54
Temperature	°C	Field Collected	22.8	22.1	18.8	23.0	22.5	18.9	18.8	17.9	17.5	18.5
Electrical Potential	mV	Calculated*	-151.8	-153.8	-62.7	-132.3	-155.8	133.8	-108.2	-79.1	-78.9	-40.8
Oxidation Reduction Potential	mV	Field Collected	-361.8	-363.8	-272.7	-342.3	-365.8	-76.2	-318.2	-289.1	-288.9	-250.8

Table 3.4b
High Resolution Investigation Analytical Data Summary – Vertical Aquifer Profiling Groundwater
Georgia Power Company
Plant McManus Former Ash Pond 1
Brunswick, Georgia

			Location	VAP-29	VAP-29	VAP-29	VAP-31	VAP-31	VAP-31	VAP-31	VAP-31	VAP-32	VAP-32
			Sample ID	VAP-29-W (19-21)	VAP-29-W (24-26)	VAP-29-W (30-32)	VAP-31-W (5-10)	VAP-31-W (18-20)	VAP-31-W (22-24)	VAP-31-W (29-31)	VAP-31-W (31-33)	VAP-32-W (5-10)	VAP-32-W (22-24)
			Depth (feet)	19-21	24-26	30-32	5-10	18-20	22-24	29-31	31-33	5-10	22-24
			Sample Date	2/26/2021	2/26/2021	2/26/2021	2/23/2021	2/24/2021	2/24/2021	2/24/2021	2/24/2021	2/25/2021	2/25/2021
Total Metals	**Units**	**Method**											
Arsenic	mg/L	SW6020	< 0.0087 J	0.010 J	0.016 J	< 0.0087	0.63	0.31	0.17	0.038	< 0.0087	0.019
Boron	mg/L	SW6020	1.3 J	1.3 J	1.0 J	1.6 J	1.1 J	1.9 J	2.2 J	2.3 J	1.4 J	1.9 J
Calcium	mg/L	SW6010D	230	191	218	173	335	260	263	282	170	207
Iron	mg/L	SW6010D	0.66 J	7.3 J	2.9	2.5	1.2	2.7	1.2	< 0.42	1.5 J	2.7
Magnesium	mg/L	SW6010D	623	540	565	490	606	634	597	618	495	547
Manganese	mg/L	SW6010D	0.33	0.38	0.27	0.082	0.31	0.38	0.37	0.32	0.059	0.30
Potassium	mg/L	SW6010D	< 304	172	141	134	109	170	175	184	142	190
Sodium	mg/L	SW6010D	4870	5350	4400	3900	3680	5220	5230	5380	4050	5000
Dissolved Metals												
Arsenic	mg/L	SW6020	< 0.0087 J	< 0.0087 J	< 0.0087	< 0.0087	0.390	0.079	0.100	0.020	< 0.0087	0.014 J
Boron	mg/L	SW6020	1.7 J	1.9 J	1.2 J	1.5 J	0.98 J	1.4 J	1.7 J	1.6 J	1.7 J	2.1 J
Calcium	mg/L	SW6010D	222	195	232	152	294	203	236	238	162	194
Iron	mg/L	SW6010D	< 0.42	0.90	0.46 J	2.0	< 0.42	0.88	< 0.42	< 0.42	12.6 J	0.69
Magnesium	mg/L	SW6010D	643	544	575	458	552	529	559	548	469	538
Manganese	mg/L	SW6010D	0.32	0.35	0.27	0.076	0.27	0.36	0.34	0.28	0.052	0.24
Potassium	mg/L	SW6010D	164	171	145	125	101	146	166	163	< 152	182
Sodium	mg/L	SW6010D	5070	5120	4180	3360	3180	4200	4460	4510	3720	4380
General Chemistry												
Alkalinity	mg/L	A2320	166	173	253	123	879	741	454	420	133	212
Alkalinity, Bicarbonate	mg/L	A2320	166	173	253	123	879	741	454	420	133	212
Alkalinity, Carbonate	mg/L	A2320	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Chloride	mg/L	E300.0	8450	8670	7580	6140	6480	8350	8050	8180	6730	8570
Nitrate-N	mg/L	E300.0	< 0.060	< 0.060	< 0.060	< 0.060	< 6.0	< 6.0	< 6.0	< 6.0	< 0.060	< 0.060
Nitrite	mg/L	E300.0	< 5.0	< 5.0	< 5.0	< 0.050	< 5.0	< 5.0	< 5.0	< 5.0	< 0.050	< 0.050
Sulfate	mg/L	E300.0	1100	1140	889	767	256	636	908	977	920	1200
Sulfide	mg/L	SM4500-S-D	19.1	19.2	38.5	0.38	89.3	71.1	54.5	33.2	0.11	9
ortho-Phosphate (As P)	mg/L	SM4500-P-E	0.21 J	0.30	0.45	0.22	1.1	1.2	0.70	0.92	0.20	0.53
Total Dissolved Solids	mg/L	SM2540C	19900	19900	17700	15200	15300	18500	20100	18200	16900	13900
Biological Oxygen Demand	mg/L	SM5210B	50700	6420	990	< 2.0 J	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	160
Total Organic Carbon	mg/L	SW9060A	7.2	7.2	7.8	6.0	10.3	110	93.3	7.8	7.0	6.9
Field Parameters												
pH (field)	SU	Field Collected	6.52	6.67	6.56	6.84	6.85	6.77	7.13	7.05	6.74	7.66
Specific Conductivity	µS/cm	Field Collected	26412	26591	23079	21179	20580	23269	25619	26475	20572	25894
Turbidity	NTU	Field Collected	31.6	58.1	61.9	14.9	16.1	17.2	21.8	2.92	1.66	81.9
Dissolved Oxygen	mg/L	Field Collected	1.28	0.44	0.68	0.95	1.71	0.81	1.05	0.65	2.15	0.70
Temperature	°C	Field Collected	22.4	22.7	22.1	20.1	16.7	20	18.2	17.5	18.8	22.2
Electrical Potential	mV	Calculated*	-94.2	-119.5	-137.4	80.7	-167.5	-131.2	-152.9	-147.6	121.9	-146.7
Oxidation Reduction Potential	mV	Field Collected	-304.2	-329.5	-347.4	-129.3	-377.5	-341.2	-362.9	-357.6	-88.1	-356.7

Table 3.4b
High Resolution Investigation Analytical Data Summary – Vertical Aquifer Profiling Groundwater
Georgia Power Company
Plant McManus Former Ash Pond 1
Brunswick, Georgia

			Location	VAP-32
			Sample ID	VAP-32-W (28-30)
			Depth (feet)	28-30
			Sample Date	2/25/2021
Total Metals	**Units**	**Method**		
Arsenic	mg/L	SW6020		0.031
Boron	mg/L	SW6020		1.9 J
Calcium	mg/L	SW6010D		271
Iron	mg/L	SW6010D		7.4
Magnesium	mg/L	SW6010D		594
Manganese	mg/L	SW6010D		0.39
Potassium	mg/L	SW6010D		183
Sodium	mg/L	SW6010D		4960
Dissolved Metals				
Arsenic	mg/L	SW6020		0.011 J
Boron	mg/L	SW6020		2.2 J
Calcium	mg/L	SW6010D		235
Iron	mg/L	SW6010D		0.21
Magnesium	mg/L	SW6010D		522
Manganese	mg/L	SW6010D		0.26
Potassium	mg/L	SW6010D		168
Sodium	mg/L	SW6010D		4650
General Chemistry				
Alkalinity	mg/L	A2320		481
Alkalinity, Bicarbonate	mg/L	A2320		481
Alkalinity, Carbonate	mg/L	A2320		< 5.0
Chloride	mg/L	E300.0		8680
Nitrate-N	mg/L	E300.0		< 0.060
Nitrite	mg/L	E300.0		< 0.050
Sulfate	mg/L	E300.0		1120
Sulfide	mg/L	SM4500-S-D		29.8
ortho-Phosphate (As P)	mg/L	SM4500-P-E		0.77
Total Dissolved Solids	mg/L	SM2540C		22000
Biological Oxygen Demand	mg/L	SM5210B		< 2.0
Total Organic Carbon	mg/L	SW9060A		7.4
Field Parameters				
pH (field)	SU	Field Collected		7.33
Specific Conductivity	µS/cm	Field Collected		26113
Turbidity	NTU	Field Collected		309
Dissolved Oxygen	mg/L	Field Collected		1.55
Temperature	°C	Field Collected		22.4
Electrical Potential	mV	Calculated*		-159.4
Oxidation Reduction Potential	mV	Field Collected		-369.4

Notes:

1. Due to matrix effects, dilutions were needed on a number of samples.
2. Due to weather delays with shipments, some samples arrived at lab outside of holding time for some analytes.
< - Not detected above method detection limited listed.

J - Estimated concentration.

R - Sample results are rejected after data validation due to analysis outside of holding time.

* Electrical potential (Eh) values were converted by adding +210 millivolts to field measured Oxidation Reduction Potential (ORP) values.

Acronyms and Abbreviations:

°C - degrees Centigrade

µS/cm - microsiemens per centimeter

mg/L - milligram per liter

mV - millivolts

NTU - Nepholometric Turbidity Units

SU - standard units

Table 3.4c
June and September 2022 Analytical Data - MCM-06 Area
Georgia Power Company
Plant McManus Former Ash Pond 1
Brunswick, Georgia

Monitoring Well Locations / Sample Date	Units	DPZ-02 6/28/2022	DPZ-02 9/20/2022	DR-01 6/28/2022	DR-01 9/20/2022	DR-02 6/28/2022	DR-02 9/20/2022	MCM-06 6/28/2022	MCM-06 9/20/2022	PT-01 6/28/2022	PT-01 9/20/2022	PT-02 6/28/2022	PT-02 9/20/2022	PT-03 6/28/2022	PT-03 9/20/2022	PT-04D 6/28/2022	PT-04D 9/21/2022
Metals																	
Arsenic	mg/L	0.025	0.028 J	0.077	0.029	0.0078	0.036	0.17	0.18	0.026	0.035	0.0019	0.0094	0.0011	0.047	0.0027	<0.12
Arsenic, Dissolved	mg/L	0.032	--	0.083	--	0.0075	--	0.20	--	0.028	--	0.0018	--	0.0012	--	0.0036	--
Calcium	mg/L	225	240	84.1	--	107	--	73.5	47	81.1	--	56.7	--	30.1	--	193	--
Calcium, Dissolved	mg/L	233	--	79.5	--	106	--	69.6	--	75.9	--	54.9	--	29.2	--	189	--
Iron	mg/L	0.022 J	<0.026	0.12	<0.079	0.21	<0.79	0.11	0.056 J	0.22	<0.079	0.22	0.12 J	0.24	0.097 J	0.12	<0.079
Iron, Dissolved	mg/L	<0.022	<0.026	0.069	<0.026	0.13	0.035 J	<0.022	<0.026	0.062	0.039 J	0.051	0.035 J	0.044	<0.026	0.084	<0.026
Magnesium	mg/L	471	450	184	--	253	--	154	91	179	--	124	--	80	--	427	--
Magnesium, Dissolved	mg/L	503	--	178	--	258	--	151	--	174 J	--	125	--	80.9	--	428	--
Potassium	mg/L	184	140	97.9	--	136	--	94	56	101	--	81.1	--	69.4	--	183	--
Potassium, Dissolved	mg/L	182	--	88	--	126	--	83	--	89.3 J	--	75.6	--	64.2	--	175	--
Sodium	mg/L	3610	4100	1800	--	2360	--	1720	1400	1800 J	--	1340	--	889	--	3360	--
Sodium, Dissolved	mg/L	4370	--	2070	--	2930	--	2160	--	2100 J	--	1460	--	1110	--	3600	--
General Chemistry																	
Alkalinity, Total as CaCO3	mg/L	394	410	271	--	354	--	286	270	290	--	272	--	197	--	451	--
Chloride	mg/L	9640	7400	2470	3100	4540	3700	3520	2800	3950	2400	2870	2100	1790	1900	6670	6200
Sulfate	mg/L	553	820	238	330	299	430	213	320	269	210	203	190	142	210	465	750
Sulfide	mg/L	24.3	23	17.4	24	23	22	23.3	20	18.7	19	12.7	19	8.2	18	18.4	23
Total Dissolved Solids	mg/L	15400	13000	6280	5800	8220	7800	6140	3900	6820	4600	5060	3800	3260	3700	13700	11000
Field Parameters																	
Specific Conductivity	µS/cm	23014	22255	10637	9878	10475	11848	9973	7166	10851	8272	8848	6841	5532	6660	20551	19056
Dissolved Oxygen	mg/L	0.11	0.11	0.08	0.05	0.04	0.06	0.04	0.00	0.02	0.04	0.07	0.06	0.09	0.06	0.10	0.12
ORP (mV)	mV	-193.8	-197.0	-112.8	-186.6	-167.9	-75.6	-129.8	-58.8	-200.6	-196.3	-179.8	-176.8	-70.6	-68.5	-188.4	-185.5
pH (field)	su	7.1	7.1	7.1	7.4	7.7	7.3	7.3	7.3	7.2	7.1	7.3	7.4	6.8	7.3	7.2	7.2
Temperature	°C	25.0	25.5	26.4	25.1	24.3	27.8	27.4	25.4	24.9	25.9	25.0	26.1	25.5	27.6	24.5	25.1
Turbidity	NTU	1.02	0.4	1.82	0.87	1.66	0.56	1.7	1.82	2.58	0.98	2.05	0.5	1.94	1.37	0.88	0.46

Notes:
< Not detected above method detection limited listed.
J - Estimated concentration.
-- not evaluated
Acronyms and Abbreviations:
°C - degrees Centigrade
µS/cm - microsiemens per centimeter
mg/L - milligram per liter
mV - millivolts
NTU - Nepholometric Turbidity Units
SU - standard units
PSU - practical salinity unit
ppt - parts per trillion

Table 3.5
Ion Chemistry Data for Select Wells and Surface Water
Georgia Power Company
Plant McManus Former Ash Pond 1
Brunswick, Georgia

	Analyte	Alkalinity (calcium carbonate)	Alkalinity (bicarbonate)	Alkalinity (carbonate)	Arsenic	Boron	Calcium	Chloride	Fluoride	Lithium	Magnesium	Potassium	Sodium	Sulfate	Total Dissolved Solids (TDS)
	Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Sample Type	Sample Location	Sample Date													
Surface Water	T1-1HT	3/2/2022	107	107	<1.8	< 0.0026	3.1	253	9300 J	8.6 J	0.11	765 J	302	5950 J	1230 J	18300
	T1-2HT	3/2/2022	107	107	<1.8	< 0.0026	3.0	250	9270	<5.0	0.1	746	295	5840	1200	19700
	T1-2HTS	3/2/2022	107	107	<1.8	< 0.0026	3.0	246	9090	<5.0	0.1	736	292	5940	1190	20500
	T1-3HT	3/2/2022	106	106	<1.8	< 0.0026	3.0	235	9050	<5.0	0.098	702	276	5820	1180	23300
	T1-3HTS	3/2/2022	107	107	<1.8	< 0.0026	2.9 J	252	18300	<5.0	0.11	763	303	5900	1330	21900
	T1-4HT	3/2/2022	107	107	<1.8	< 0.0026	3.0	248	9220	<5.0	0.11	751	297	5890	1200	21100
	T1-4HTS	3/2/2022	108	108	<1.8	< 0.0026	3.1	250	9180	<5.0	0.11	750	298	5830	1200	20100
	T1-4LT	3/1/2022	106	106	<1.8	< 0.0026	2.8	247	8910 J	<5.0	0.10	721	283	5700	1140 J	23000
	T2-1HT	3/2/2022	108	108	<1.8	< 0.0026	2.8	243	9210	<5.0	0.10	722	290	5780	1190	21900
	T2-2HT	3/2/2022	108	108	<1.8	< 0.0026	2.9	251	9190	<5.0	0.10	761	300	5850	1200	21300
	T2-2HTS	3/2/2022	107	107	<1.8	< 0.0026	3.0	262	9140 J	<5.0	0.11	783	302	5830	1200 J	20500
	T2-3HT	3/2/2022	106	106	<1.8	< 0.0026	2.9	248	9450	<5.0	0.11	730	290	5940	1220	19800
	T2-3HTS	3/2/2022	107	107	<1.8	< 0.0026	3.0	242	9080	<5.0	0.11	710	281	5920	1180	20500
	T2-4HT	3/2/2022	106	106	<1.8	< 0.0026	2.9	239	9150 J	<5.0	0.11	701	277	5760	1180 J	20900
	T2-4HTS	3/2/2022	107	107	<1.8	< 0.0026	2.9	240	9030	<5.0	0.10	701	278	5840	1170	22200
	T2-4LT	3/1/2022	106	106	<1.8	< 0.0026	2.7	246	8640	<5.0	0.089	718	279	5710	1100	21900
	T3-1HT	3/2/2022	107	107	<1.8	< 0.0026	3.1	237	8970	<5.0	0.11	694	280	5790	1160	22100
	T3-2HT	3/2/2022	107	107	<1.8	< 0.0026	3.0	247	9040	<5.0	0.11	722	287	5880	1170	23600
	T3-2HTS	3/2/2022	107	107	<1.8	< 0.0026	3.3	246	9130	<5.0	0.10	717	287	5910	1180	21400
	T3-3HT	3/2/2022	107	107	<1.8	< 0.0026	3.1	254	9160	<5.0	0.11	731	289	5720	1180	22100
	T3-3HTS	3/2/2022	106	106	<1.8	< 0.0026	3.1	251	9030	<5.0	0.11	731	282	5650	1170	20000
	T3-4HT	3/2/2022	107	107	<1.8	< 0.0026	3.2	246	9180	<5.0	0.11	733	289	5730	1190	22900
	T3-4HTS	3/2/2022	107	107	<1.8	< 0.0026	2.9	245	8970	<5.0	0.11	729 J	284	6190 J	1150	21600
	T3-4LT	3/1/2022	106	106	<1.8	< 0.0026	3.0	236	8830	<5.0	0.10	701	273	5750	1180	21000
	T4-1HB	3/3/2022	113	113	<1.8	< 0.0026	2.9	252	9360	<5.0	0.11	746	292	6270	1200	22700
	T4-1HS	3/3/2022	110	110	<1.8	< 0.0026	3.1	253	9510	<5.0	0.11	749	295	6100	1230	24300
	T4-2HB	3/3/2022	111	111	<1.8	< 0.0026	3.1	253	9390	<5.0	0.11	752	296	6190	1220	<2500
	T4-2HS	3/3/2022	110	110	<1.8	< 0.0026	3.2	251	9420	<5.0	0.12	750	297	6220	1210	24000
	T4-3HB	3/3/2022	112	112	<1.8	< 0.0026	3.2	254	9350	<5.0	0.11	751	297	6210	1210	23100
	T4-3HS	3/3/2022	109	109	<1.8	< 0.0026	3.0	261	9680	<5.0	0.11	773	308	6220	1240	24500
	T4-4HB	3/3/2022	108	108	<1.8	< 0.0026	2.9	258	9370	<5.0	0.11	765	304	6130	1210	25700
	T4-4HS	3/3/2022	109	109	<1.8	< 0.0026	3.0	260	9380	<5.0	0.099	775	306	6270	1210	23800
	T4-4L	3/1/2022	109	109	<1.8	< 0.0026	3.1	267	9390	<5.0	0.11	792	313	6240	1210	21600

Table 3.5
Ion Chemistry Data for Select Wells and Surface Water
Georgia Power Company
Plant McManus Former Ash Pond 1
Brunswick, Georgia

		Analyte	Alkalinity (calcium carbonate)	Alkalinity (bicarbonate)	Alkalinity (carbonate)	Arsenic	Boron	Calcium	Chloride	Fluoride	Lithium	Magnesium	Potassium	Sodium	Sulfate	Total Dissolved Solids (TDS)
		Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Sample Type	**Sample Location**	**Sample Date**														
Background Surface Water	BG-1LT	3/1/2022	106	106	<1.8	< 0.0026	2.8 J	245.0	9150	<5.0	0.1	732	286	5680	1180	20800
	BG-2HT	3/3/2022	109	109	<1.8	< 0.0026	3.1	274	10400	<5.0	0.11	821	325	6530	1310	29000
Groundwater	DPZ-02	3/4/2021	--	--	--	0.017 J	2.2 J	257.0	8280	< 0.050	0.094 J	--	--	--	1060	19000
	DPZ-02	3/1/2022	372	372	<1.8	0.015 J	1.6 J	303	6750	<0.050	0.088 J	506	171	4320	755	15600
	MCM-01	3/3/2021	15.8	15.8	< 5.0	0.016	< 0.42	14.0	13.6	< 0.050	< 0.025	1.7	< 30.4 J	14.2 J	33.8	99
	MCM-01	3/2/2022	--	--	--	0.0043	0.05 J	8.2	13.4	<0.050	0.00064 J	--	--	--	30.8	97
	MCM-02	3/3/2021	< 5.0	< 5.0	< 5.0	< 0.0043	< 0.42	4.0	20.5	< 0.050	< 0.025	2.3	< 30.4	18.7 J	27.6	84
	MCM-02	3/2/2022	--	--	--	0.00077 J	0.090	4.1	20.6	<0.050	<0.00050	--	--	--	25.7	94
	MCM-04	3/4/2021	--	--	--	0.0018 J	0.11 J	15.1	69.6	<0.050	< 0.0025	--	--	--	99.1	285
	MCM-04	3/3/2022	--	--	--	0.0041	0.050	8.0 J	12.2	<0.050	0.0017 J	--	--	--	50.6	146
	MCM-05	3/4/2021	--	--	--	< 0.0017	0.4 J	23.4	652	0.45	0.017 J	--	--	--	82.2	1700
	MCM-05	3/1/2022	262	262	<1.8	0.011 J	0.75 J	48.4	1680	<1.2	0.028 J	135	63.6 J	1160	143	3780
	MCM-06	3/4/2021	--	--	--	0.35	1.4 J	233.0	6310	< 0.050	0.096 J	--	--	--	596	14200
	MCM-06	3/1/2022	377	377	<1.8	0.24	1.7	131.0	4150	<5.0	0.074	254	106 J	2440 J	440	9040
	MCM-07	3/4/2021	--	--	--	0.015 J	1.6 J	244.0	7540	< 0.050	0.035 J	--	--	--	982	17100
	MCM-07	3/2/2022	279	279	<1.8	0.009 J	1.3	198.0	5630	<5.0	0.022 J	431	131	3260	702	12600
	MCM-11	3/3/2021	< 5.0	< 5.0	< 5.0	0.011 J	< 0.42	2.1	9.4	0.082 J	< 0.025	1.3	< 30.4	11.3 J	19.9	66
	MCM-11	3/2/2022	--	--	--	0.0071	0.040 J	6.8	28.4	0.097 J	0.0026	--	--	--	19.5	124
	MCM-12	3/2/2021	496 J	496	< 5.0	< 0.0043	1.4 J	6.5	459	1.0	< 0.025	12.5	< 30.4	497	1.2	1430
	MCM-12	3/3/2022	--	--	--	< 0.0017	1.2	4.6	394	0.95 J	<0.010	--	--	--	<2.5	1400
	MCM-14	3/2/2021	170	170	< 5.0	< 0.0043	1.4 J	205	5680	< 0.050	0.046 J	422	130	3320	97.5	12000
	MCM-14	3/3/2022	264	264	<1.8	< 0.0017	0.89 J	224	5040	<5.0	0.037 J	387	134	2950	754.0	11500.0
	MCM-15	3/2/2021	< 5.0	< 5.0	< 5.0	0.021 J	< 0.42	1.4	4.2	< 0.050	< 0.025	1.1	< 30.4	11.9 J	8.0	40
	MCM-15	3/2/2022	--	--	--	0.0032	0.05	7.2	14.3	<0.050	0.0017 J	--	--	--	16.0	103.0
	MCM-16	3/3/2021	10.7	10.7	< 5.0	0.0012 J	< 0.085 J	11.2	27.6	< 0.050	< 0.0050	3.0	< 30.4	19.7 J	30.5	122
	MCM-16	3/3/2022	--	--	--	0.00024 J	0.06	5.4	26.5	<0.050	0.00061 J	--	--	--	20.4	104
	MCM-17	3/3/2021	407	407	< 5.0	< 0.0043	1.7 J	143	< 0.60	< 0.050	< 0.025	266	107	2650	420	8830
	MCM-17	3/3/2022	257	257	<1.8	<0.0017	1.4	84	3540	<5.0	0.020 J	222	106	2180	324	8120
Background Groundwater	MCM-18	3/3/2021	< 5.0 J	< 5.0	< 5.0	0.0014 J	0.21 J	26	1230	0.32	< 0.0050	86.5	< 30.4	792	171	2620
	MCM-18	3/2/2022	--	--	--	0.0064 J	0.23 J	22.3	1420	<1.0	<0.010	--	--	--	186	3100
	MCM-19	3/3/2021	5.6	5.6	< 5.0	0.0086 J	0.79 J	123	5170	< 0.050	0.019 J	377	52.6	3150	< 0.50	11000
	MCM-19	3/1/2022	--	--	--	0.0061 J	0.41 J	35.5	1870	<5.0	<0.010	--	--	--	158	4050
	MCM-20	3/3/2021	< 5.0 J	< 5.0	< 5.0	0.016 J	0.91 J	110	< 0.60	< 0.050	0.018 J	334	68.2	3360	743	11400
	MCM-20	3/1/2022	--	--	--	0.032	0.87 J	99.8	4900	<5.0	0.020 J	--	--	--	543	10500

Notes:
-- - analyte not evaluated
< - Not detected above method detection limited listed
J- estimated concentation greater than the laboratory's method detection limit, but less than the laboratory's reporting limit.
mg/L - milligrams per liter
Full analytical data reports and summary tables for March 2021 and September 2021 samples can be found in the 2021 Annual Groundwater Monitoring and Corrective Action Report (Resolute 2021b) and 2022 Annual Groundwater Monitoring and Corrective Action Report (Resolute 2022b), respectively

Table 3.6
MCM-06 Analytical Trend Data (2016 - 2022)
Georgia Power Company
Plant McManus Former Ash Pond 1
Brunswick, Georgia

Analyte Units	Arsenic mg/L	Boron mg/L	Chloride mg/L	Sulfate mg/L	Total Dissolved Solids mg/L
Sample Date					
8/31/2016	0.21	0.63	2200	21	4160
11/30/2016	0.13	0.64	2100	19	3950
2/16/2017	0.26	0.70	2500	22	4600
6/2/2017	0.056	0.67	2500	28	4470
8/17/2017	0.46	0.70	2700	69	5450
6/20/2018	0.44	0.69	3100	33	4940
9/27/2018	0.27	0.62	617	36.9	4480
11/7/2018	0.50	0.86	8860	734	15100
3/6/2019	0.49	1.5	11700	1220 J	19000
3/24/2019	--	1.1	6470	413	13700
8/26/2019	0.46	--	--	--	--
8/28/2019	0.50	--	--	--	--
10/17/2019	0.34	1.3	9930	507	16100
3/28/2020	0.30	0.95	9190	701	18800
8/26/2020	0.46	1.6	6510	514	14900
10/14/2020	0.45	1.5	6930	552	15200
3/4/2021	0.35	1.4 J	6310	596	14200
9/14/2021	0.51	1.1	5360	490	11800
3/1/2022	0.24	1.7	4150	440	9040
6/28/2022	0.17	--	3520	213	6140
9/20/2022	0.18	1.1	2800	320	3900

Notes:
-- = analyte not evaluated
< = analyte not detected in sample. Method detection limit provided.
mg/L = milligrams per liter
limit.
Full analytical data reports and summary tables provided in the following reports Resolute 2019, Resolute 2020a, Resolute 2020c, Resolute 2021a, Resolute 2021b, Resolute 2022a, Resolute 2022b and Resolute 2023.

Table 4.1
Arsenic Speciation Results
Georgia Power Company
Plant McManus Former Ash Pond 1
Brunswick, Georgia

		Analyte	As(III)	As(V)	DMAs	MMAs	Unknown Arsenic Species	ThioAs1	ThioDMA	ThioAs3	ThioMMA
		Units	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Sample Type	**Sample Location**	**Sample Date**									
Focused Speciation Testing	MCM-05	4/6/2021	<0.400	<0.400	<0.500	<0.400	--	<0.500	<0.500	<0.500	<0.500
	MCM-06	4/6/2021	2.92	<0.400	<0.500	<0.400	--	312	<0.500	6.49	<0.500
	MCM-07	4/6/2021	<0.400	<0.400	<0.500	<0.400	--	9.35	<0.500	<0.500	<0.500
	RW-9	4/6/2021	<0.400	<0.400	<0.500	<0.400	--	21.6	<0.500	<0.500	<0.500
2020 Speciation Testing	DPZ-02	10/15/2020	0.461 J	<0.400	<0.500	<0.400	17.3	--	--	--	--
	MCM-05	10/15/2020	1.13 J	<0.400	<0.500	<0.400	<0.500	--	--	--	--
	MCM-06	10/14/2020	53.6	1.69 J	<0.500	<0.400	291	--	--	--	--
	MCM-07	10/14/2020	<0.400	<0.400	<0.500	<0.400	8.98	--	--	--	--
	MCM-14	10/13/2020	<0.400	<0.400	<0.500	<0.400	<0.500	--	--	--	--
	RW-01	10/14/2020	0.687 J	<0.400	<0.500	<0.400	<0.500	--	--	--	--
	RW-02	10/14/2020	<0.400	<0.400	<0.500	<0.400	<0.500	--	--	--	--
	RW-03	10/14/2020	<0.400	<0.400	<0.500	<0.400	<0.500	--	--	--	--
	RW-04	10/15/2020	1.27 J	<0.400	<0.500	<0.400	<0.500	--	--	--	--
	RW-05	10/15/2020	0.401 J	<0.400	<0.500	<0.400	<0.500	--	--	--	--
	RW-06	10/15/2020	0.714 J	<0.400	<0.500	<0.400	0.946 J	--	--	--	--
	RW-07	10/14/2020	<0.400	<0.400	<0.500	<0.400	10.3	--	--	--	--
	RW-08	10/14/2020	0.541 J	<0.400	<0.500	<0.400	<0.500	--	--	--	--
	RW-09	10/14/2020	0.46 J	<0.400	<0.500	<0.400	32.5	--	--	--	--
	RW-10	10/14/2020	<0.400	<0.400	<0.500	<0.400	3.92	--	--	--	--

Notes:
< Not detected above method detection limited listed.
October 2020 arsenic speciation samples from MCM-06, MCM-07, MCM-14, RW-01, RW-02, MW-03, RW-07, RW-08, RW-09, and RW-10 arrived at the lab at 7.1°C, above the lab recommended temperature of 6°C. The results do not appear to have been affected, i.e. oxic species were not dominant and results were comparable to DPZ-02 that was maintained below 6°C.
Samples collected during April 2021 sampling event were specifically evaluated for thioarsenic species. October 2020 samples results were reported as "unknown arsenic species."
J - Estimated concentration.

Acronyms and Abbreviations:
µg/L - micrograms per liter
As(III) - arsenite
As(V) - arsenate
DMA - dimetholarsonic acid
MMA - monomethylarsonic acid
ThioAs1 - thioarsenical species, sulfur to arsenic ratio of 1
ThioAs3 - thioarsenical species, sulfur to arsenic ratio of 3
ThioDMA- thioarsenical species generated from DMA
ThioMMA- thioarsenical species generated from MMA
-- not evaluated

Table 4.2
Sequential Selective Extraction Results
Georgia Power Company
Plant McManus Former Ash Pond 1
Brunswick, Georgia

		Location Sample ID Depth (feet) Sample Date	SB-14 SB-14-S (17-19) 17-19 2/28/2021	SB-14 SB-14-S (22-24) 22-24 2/28/2021
Sequential Extraction	**Target Fraction**	**Unit**		
Percent Solids		%	70.6	80.2
			Arsenic	Arsenic
Step 1	Non-specifically sorbed arsenic ($MgCl_2$-extractable)	mg/kg	2.2	1.14
Step 2	Specifically sorbed arsenic (phosphate-extractable)	mg/kg	0.9	0.9
Step 3	Arsenic mineralized with with poorly crystalline iron oxides, iron sulfides or arsenic sulfides (Ascorbate-extractable)	mg/kg	< 1.71	< 1.52
Step 4	Arsenic mineralized with iron sulfides or arsenic sulfides (HCl-Extractable)	mg/kg	0.4	< 0.30
Step 5	Arsenic mineralized with more crystalline iron oxides (Residual phase)	mg/kg	0.8	0.57
Total Lab Analyzed		mg/kg	4.6	2.4
Sum of Extraction Steps		mg/kg	4.3	2.6

Notes:
1. < Not detected above method detection limited listed.
2. Sequential procedure steps as presented in Paul et al. 2009.
3. Sum of extraction steps inludes only detected results.

Acronyms and Abbreviations:
% - percent
HCl - hydrochloric acid
$MgCl_2$ - magnesium chloride
mg/kg - milligrams per kilogram

Reference:
Paul, C, R.G Ford, and R.T. Wilkin . 2009. Assessing the selectivity of extractant solutions for recovering labile arsenic associated with iron (hydr)oxides and sulfides in sediments. Geoderma. 152. 137-144.

Figures

Cowpen Creek

Burnett Creek

Turtle River

NORTHERN DIKE

CRISPEN ISLAND

CRISPEN BOULEVARD (SOUTHERN DIKE)

FORMER AP-1

INSET MAP AREA

PT-03
PT-02
PT-01
PT-04D
DR-01
DR-02
DPZ-02
MCM-06
MCM-04
MCM-05
MCM-15
MCM-16
MCM-02
MCM-01
MCM-14
MCM-17
MCM-12
MCM-11
MCM-18
MCM-07

Legend

- PROPERTY BOUNDARY
- PERMITTED CCR BOUNDARY
- DETECTION WELL
- ASSESSMENT WELL
- NEW PIEZOMETERS

0 600 1,200
Feet
1 inch = 600 feet

GEORGIA POWER
PLANT MCMANUS FORMER ASH POND 1
BRUNSWICK, GEORGIA

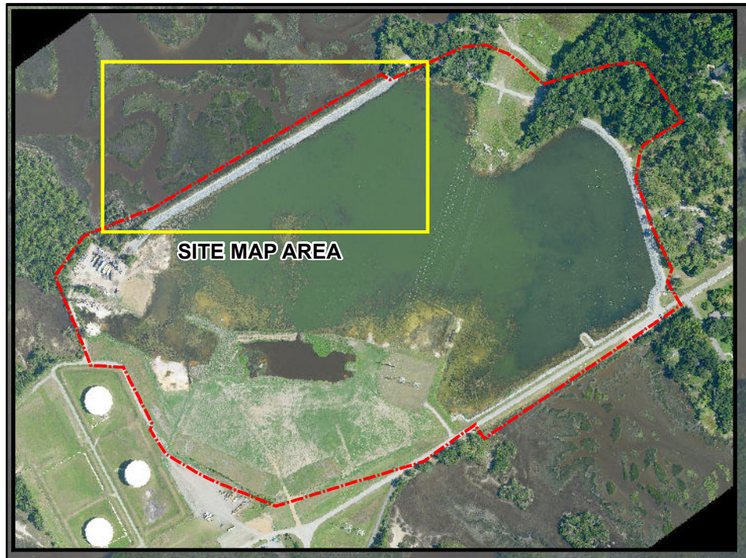
SITE MAP

ARCADIS

FIGURE
1.1

GEOCHEMICAL CONCEPTUAL SITE MODEL PLANT MCMANUS FORMER ASH POND 1

Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, IGN, and the GIS User Community



RW-10
RW-8
RW-9
HPT-24
HPT-39
HPT-22
HPT-16
RW-7
HPT-20
RW-6
HPT-19
HPT-13
HPT/VAP-15
HPT/SB/VAP-32
HPT-36
HPT-12
HPT-33
RW-5
HPT-11
HPT-35
HPT-7
HPT-34
NORTHERN DIKE
RW-3
HPT-5
HPT-4
HPT-3
HPT-2
HPT-1
RW-2
RW-1
MCM-07
DPZ-03
HPT/SB/VAP-6
RW-4
HPT-8
HPT-9
HPT-10
DPZ-02
HPT/VAP-31
MCM-06
HPT/SB/VAP-14
HPT-37
HPT-17
HPT/SB/VAP-18
HPT-38
HPT-21
HPT-23
HPT-25
HPT/SB/VAP-26
HPT-27
HPT-28
HPT/VAP-29
HPT-40
DPZ-01
HPT-30
MCM-05

Legend

- ASSESSMENT WELL
- DATA COLLECTION POINT (HPT/VAP/SB)
- DETECTION WELL
- DEEP PIEZOMETER
- DEWATERING WELLS
- PERMITTED CCR BOUNDARY

NOTE:
HPT - HYDRAULIC PROFILING TOOL
VAP - VERTICAL AQUIFER PROFILE
SB - SOIL BORING

0 100 200
Feet
1 inch = 100 feet

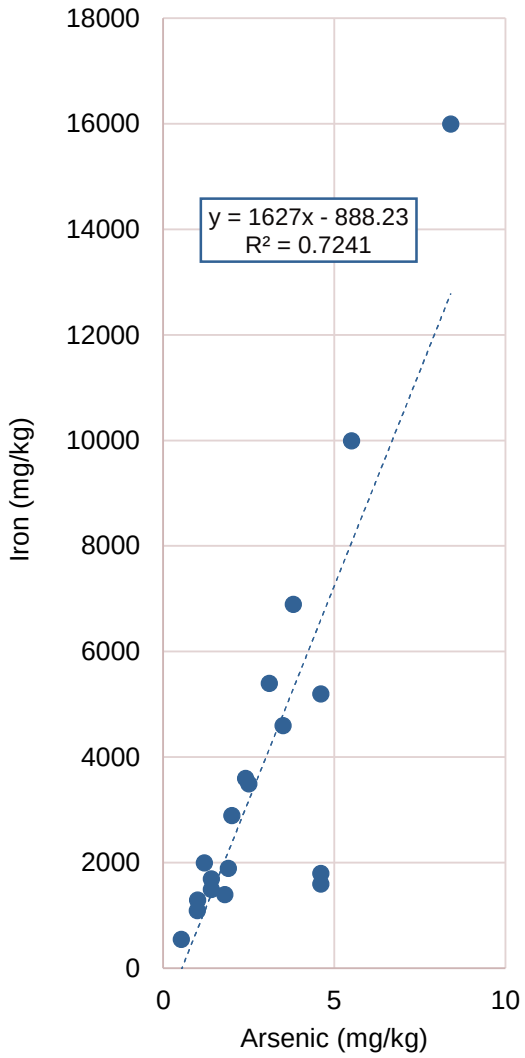
GEORGIA POWER
REMEDY SELECTION PROGRESS REPORT
PLANT MCMANUS FORMER ASH POND 1
BRUNSWICK, GEORGIA

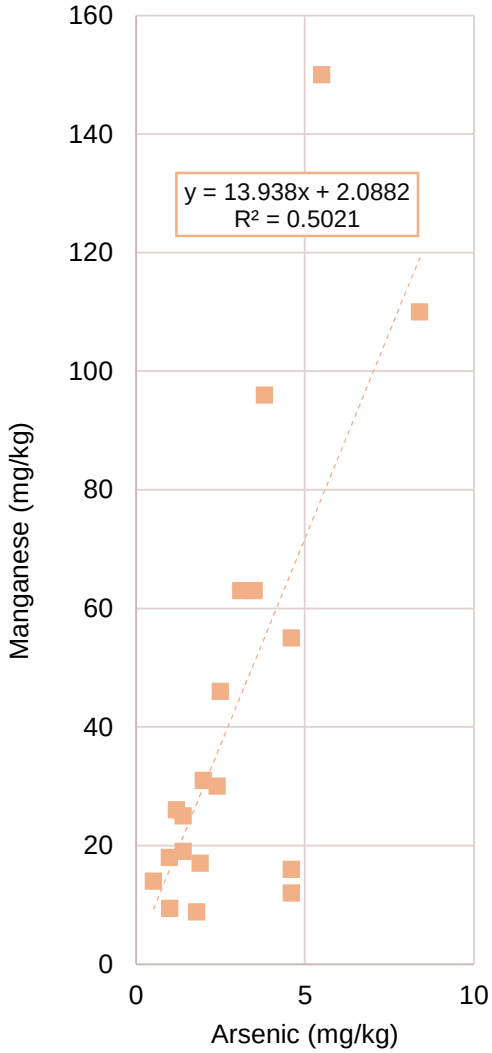
HIGH RESOLUTION INVESTIGATION LOCATIONS

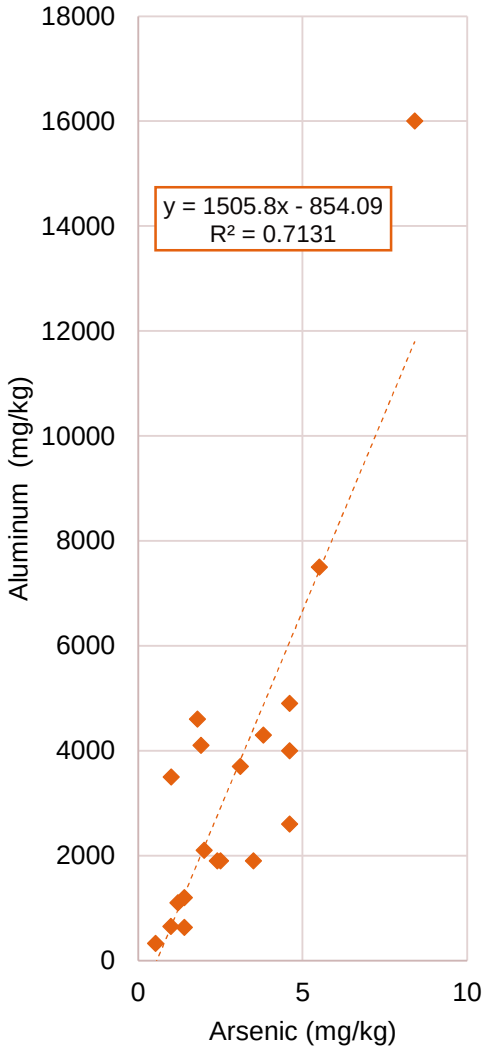
ARCADIS

FIGURE
3.1

GEOCHEMICAL CONCEPTUAL SITE MODEL PLANT MCMANUS FORMER ASH POND 1







Notes:
mg/kg – milligram per kilogram

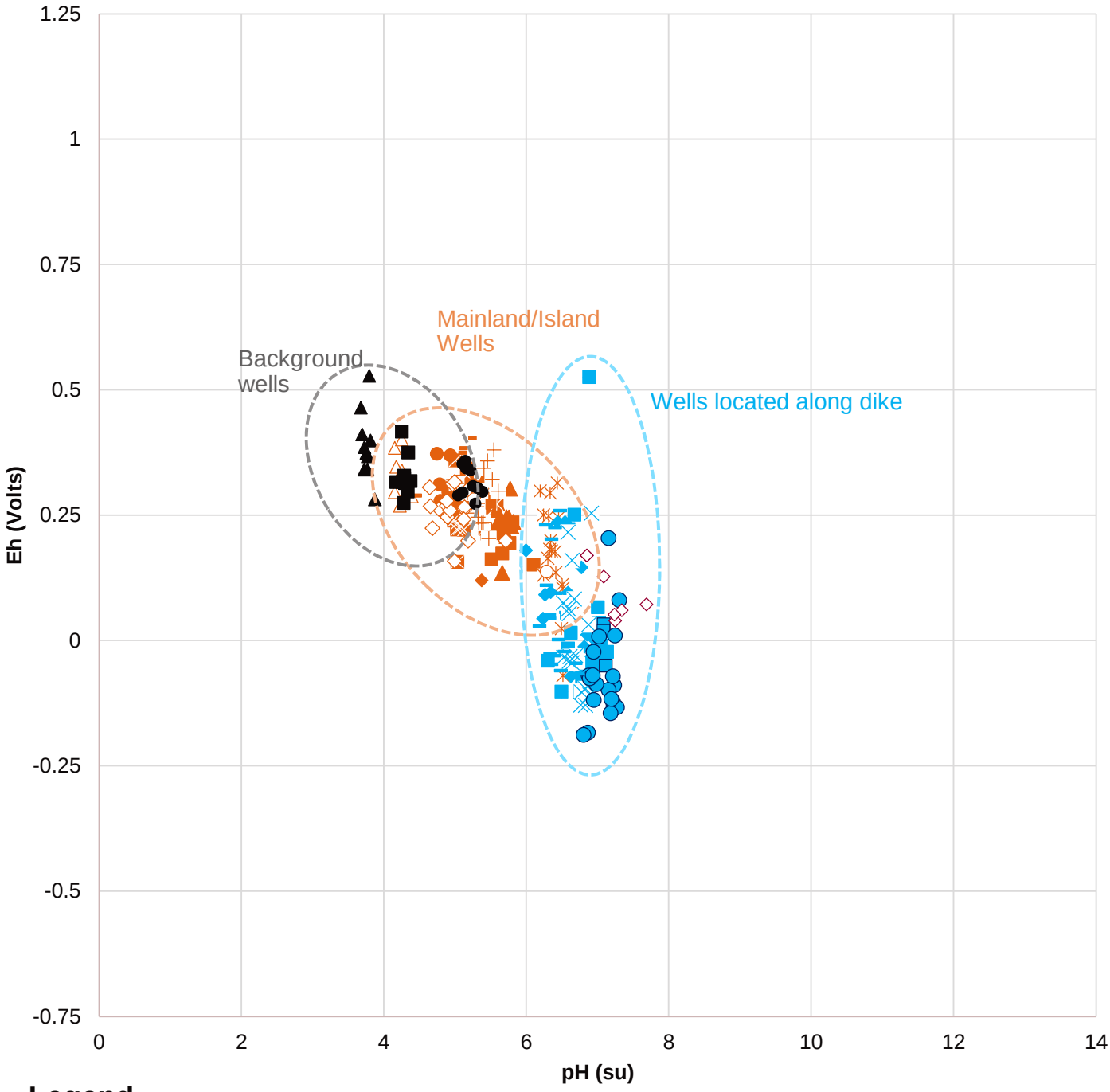
GEOCHEMICAL CONCEPTUAL SITE MODEL PLANT MCMANUS - FORMER ASH POND 1

GEORGIA POWER
PLANT MCMANUS FORMER ASH POND 1
BRUNSWICK, GEORGIA

SOIL METALS RESULTS – HIGH RESOLUTION INVESTIGATION

ARCADIS

FIGURE
3.2



Legend

- MCM-01
- MCM-02
- MCM-03
- MCM-04
- MCM-08
- MCM-09
- MCM-10
- MCM-11
- MCM-12
- MCM-13
- MCM-15
- MCM-16
- MCM-14
- MCM-17
- DPZ-02
- MCM-05
- MCM-06
- MCM-07
- MCM-18
- MCM-19
- MCM-20
- 2022 New Piezometers

Abbreviations:
Eh – redox potential
su – standard units

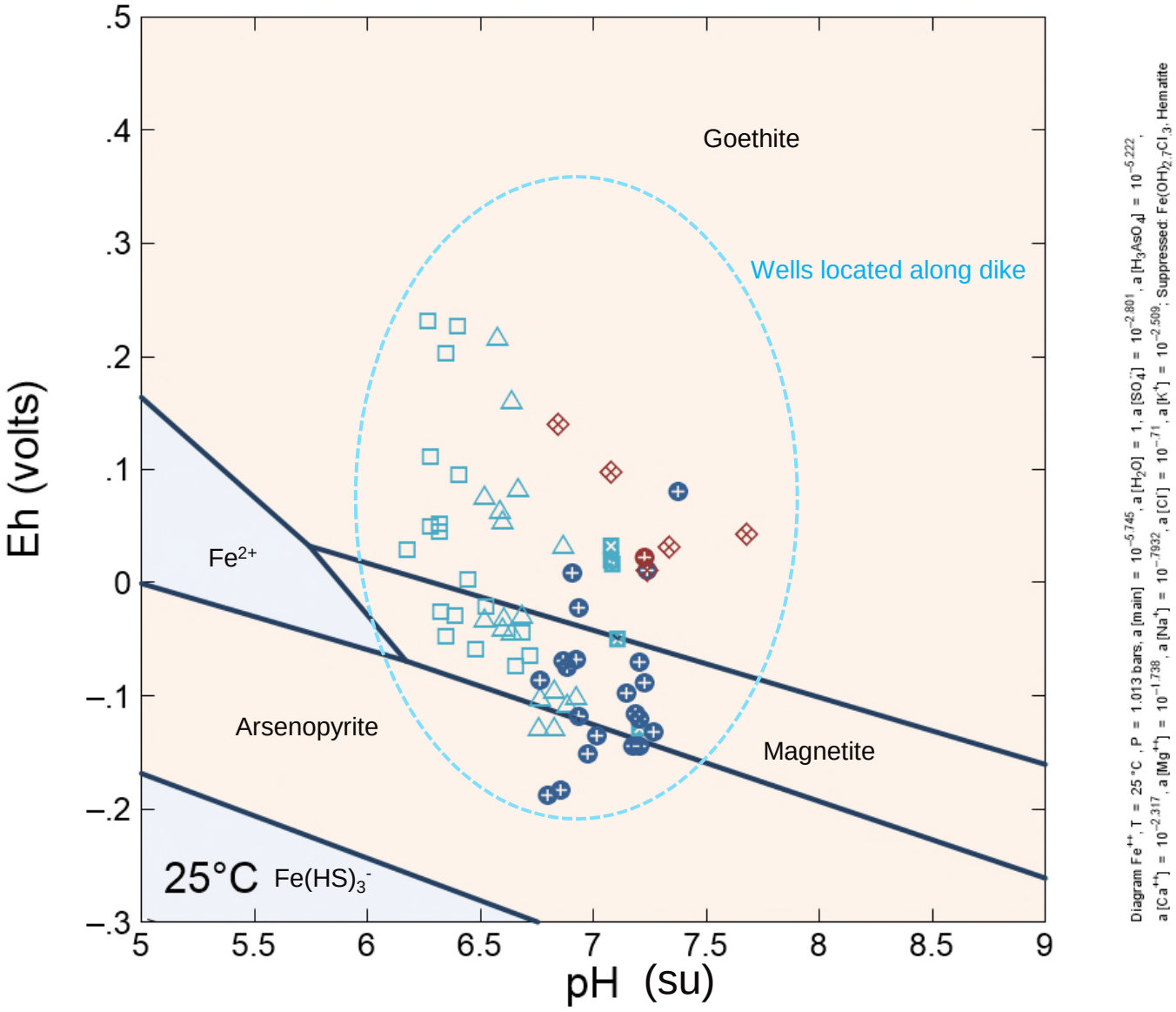
GEORGIA POWER
PLANT MCMANUS FORMER ASH POND 1
BRUNSWICK, GEORGIA

EH AND PH CONDITIONS

ARCADIS

FIGURE
3.3a

GEOCHEMICAL CONCEPTUAL SITE MODEL PLANT MCMANUS - FORMER ASH POND 1



Notes:

1. This Eh-pH diagram was produced with Geochemist's Workbench. The WATEQ thermodynamic database, "WATEQ.tdat" was modified to include constants from Helz and Tossell 2008.
2. The basis species in the WATEQ thermodynamic database for ferrous iron (Fe^{2+}) was used to construct the Eh-pH diagram. A representative value of all wells included in this figure (1.8×10^{-06} mol/L) was used.
3. Major complexing ions (redox sensitive species Ca^{2+}, Cl^-, K^+, Mg^{2+}, Na^+, SO_4^{2-}) were speciated by reaction with species on both the x and y axes.
4. Hematite and $Fe(OH)_{2.7}Cl_{0.3}$ were suppressed.
5. Iron mineral phases are shaded in light orange. Aqueous species are shaded in blue.
6. Eh-pH diagram produced for iron at 25 °C
7. Data collected during routine semiannual groundwater sampling events between 2016 and June 2022.

Abbreviations:
°C – degrees Celsius
mol/L – mol per liter
Eh – redox potential
su – standard unit

Legend

- DPZ-02
- MCM-05
- MCM-06
- MCM-07
- 2022 New Shallow Piezometers
- PT-04D

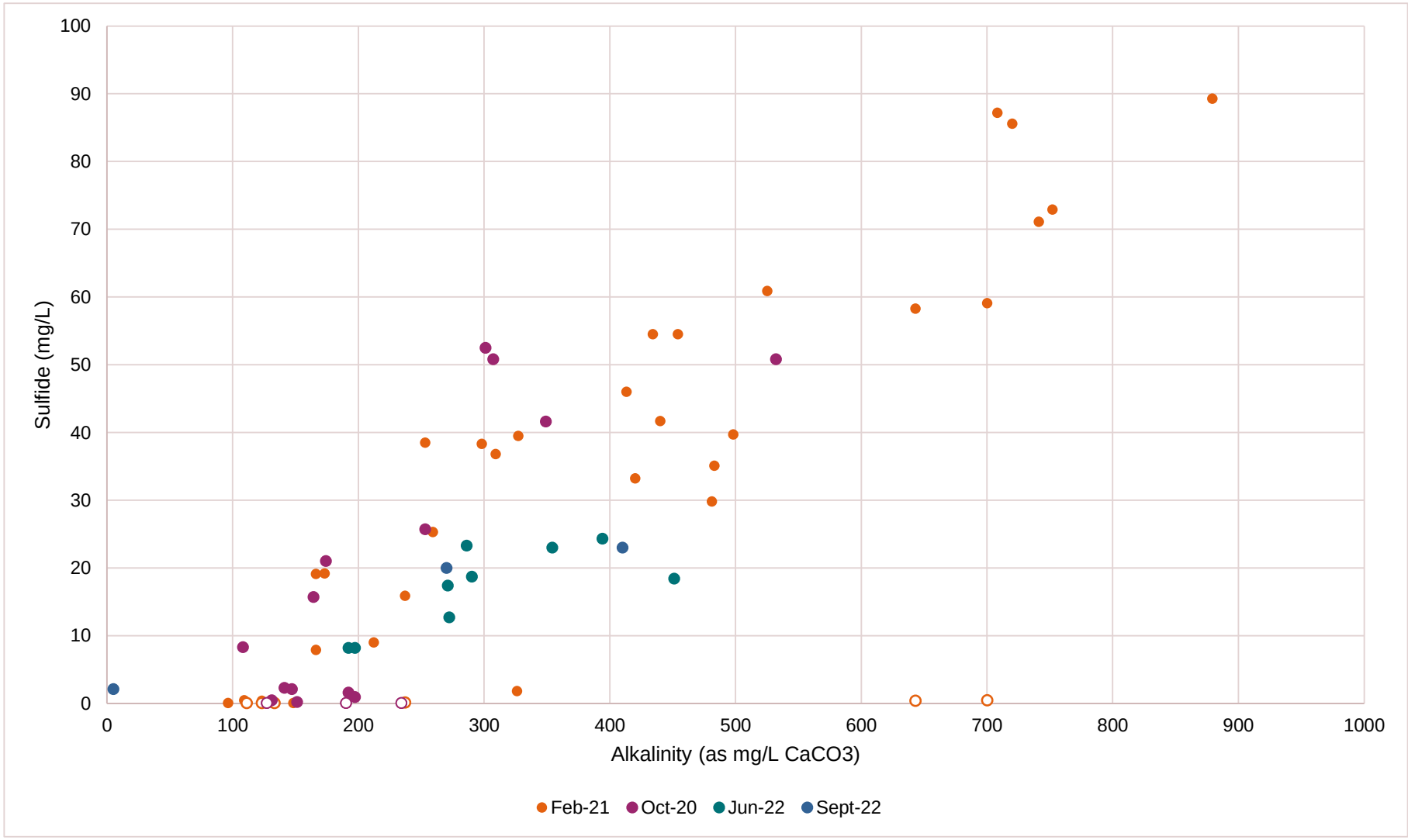
GEORGIA POWER
PLANT MCMANUS FORMER ASH POND 1
BRUNSWICK, GEORGIA

IRON SPECIATION DIAGRAM – NORTHERN DIKE WELLS

ARCADIS

FIGURE
3.3b

GEOCHEMICAL CONCEPTUAL SITE MODEL PLANT MCMANUS - FORMER ASH POND 1



Notes:
mg/L – milligrams per liter

CaCO3 – calcium carbonate

Open shapes indicate non-detect results for sulfide. Reporting limit shown.

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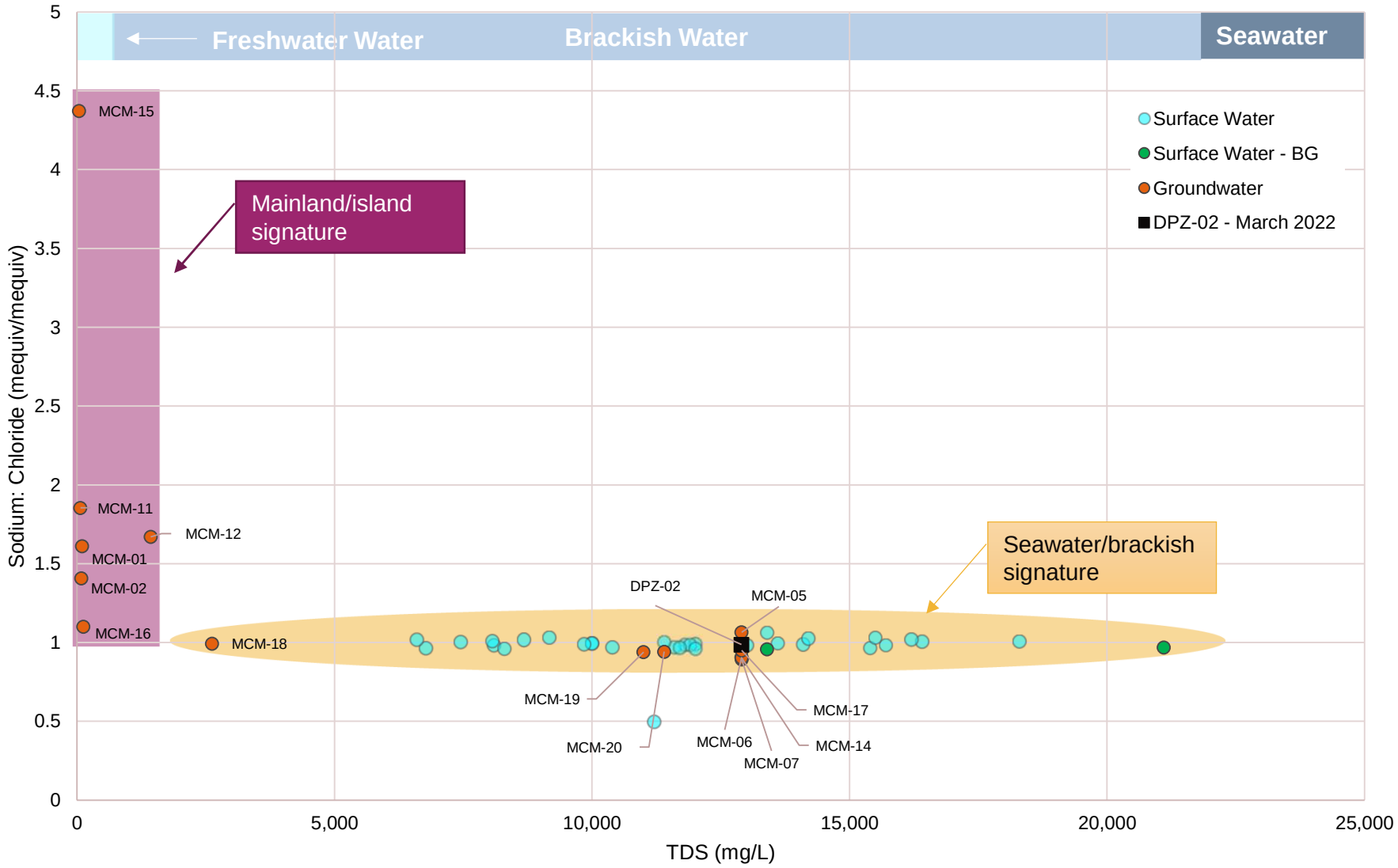
BRUNSWICK, GEORGIA

SULFIDE VS ALKALINITY

ARCADIS

FIGURE
3.4

GEOCHEMICAL CONCEPTUAL SITE MODEL PLANT MCMANUS - FORMER ASH POND 1



Notes:
mequiv = milliequivalent
TDS = total dissolved solids
mg/L = milligrams per liter
BG = background samples
Data shown collected during March 2022 sampling event.

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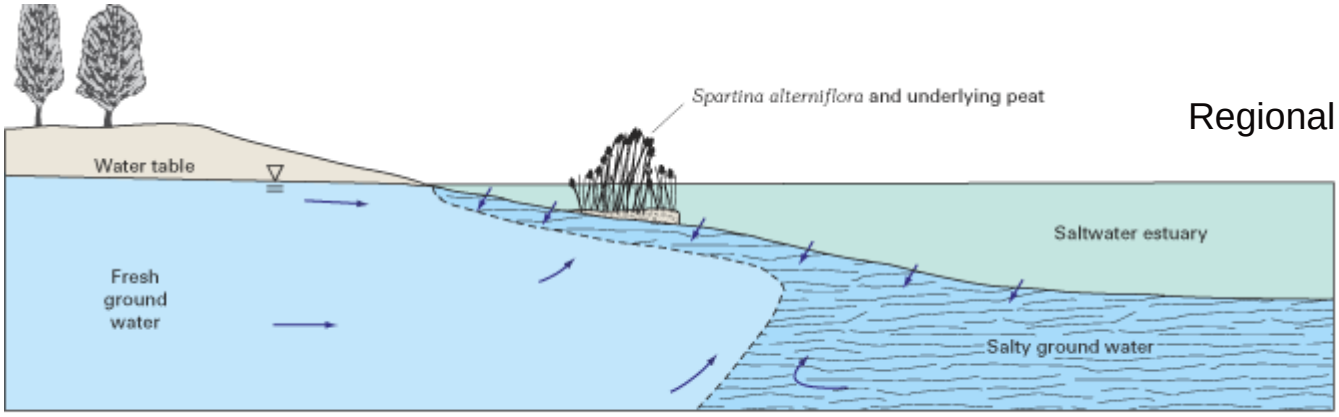
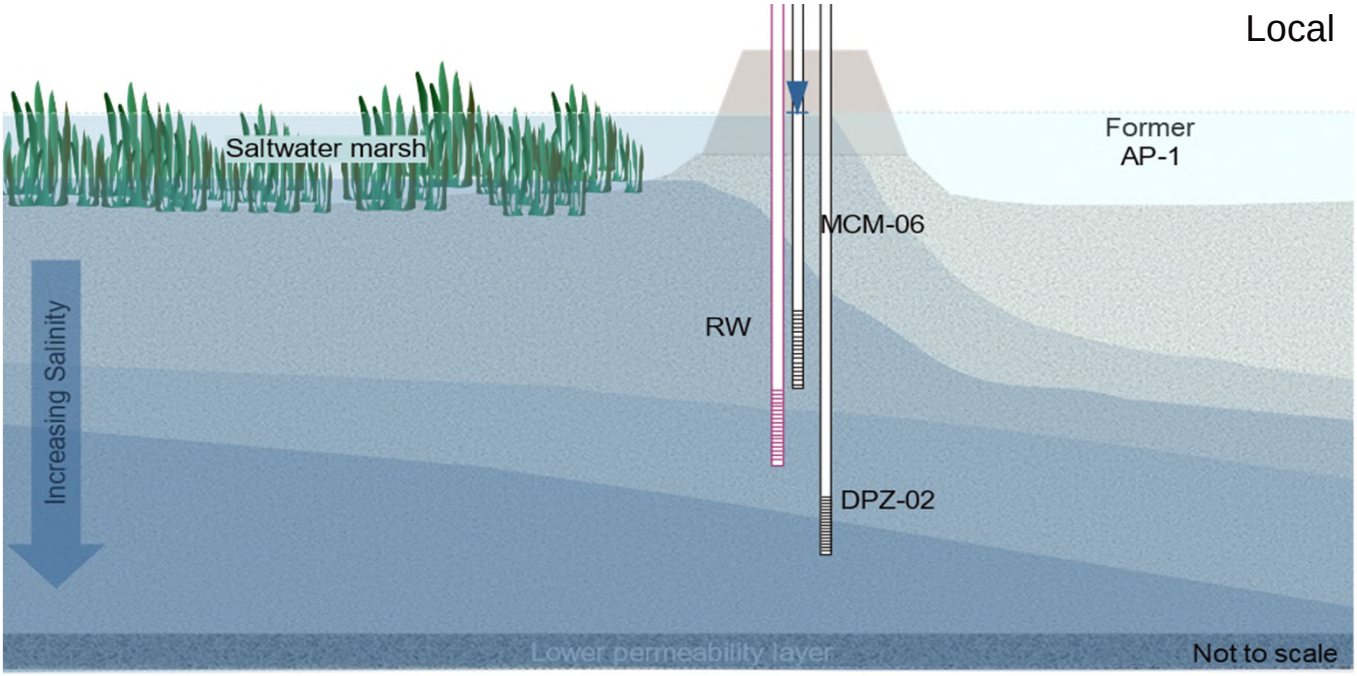
SODIUM TO CHLORIDE RATIOS VERSUS TOTAL DISSOLVED SOLIDS

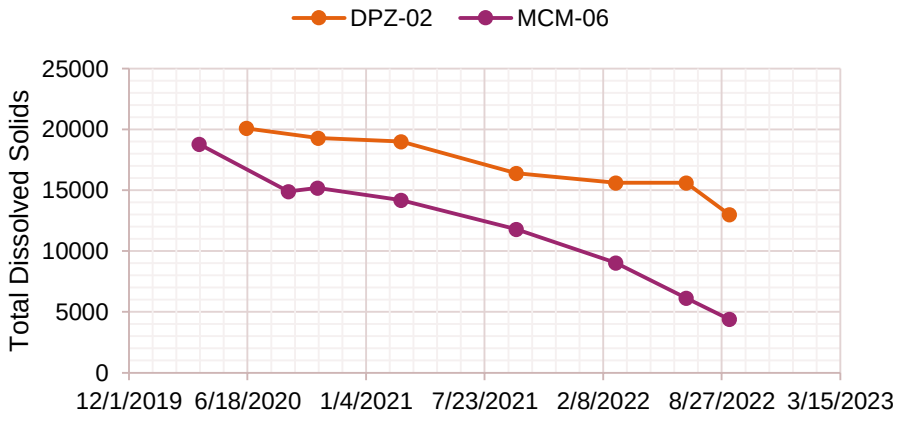
ARCADIS

FIGURE
3.5

GEOCHEMICAL CONCEPTUAL SITE MODEL PLANT MCMANUS - FORMER ASH POND 1







Analyte	Total Dissolved Solids (mg/L)	
DATE	MCM-06	DPZ-02
03/28/2020	18,800	20,100
08/26/2020	14,900	NM
10/14/2020	15,200	19,300
03/04/2021	14,200	19,000
09/14/2021	11,800	16,400
03/1/2022	9,040	15,600
06/28/22	6,140	15,400
09/09/22	4,400	13,000

Note:
mg/L – milligrams per liter
NM – not measured
RW – dewatering well
TDS – total dissolved solids

Analytical reports for total dissolved solids data provided in Resolute 2020b, 2021a, 2021b, 2022a, 2022b, and 2023.
Regional conceptual diagram – from U.S. Geological Survey. 2003. Ground Water in Freshwater-Saltwater Environments of the Atlantic Coast. Circular 1262. Reston VA. GB1197.83.A87B27 2003

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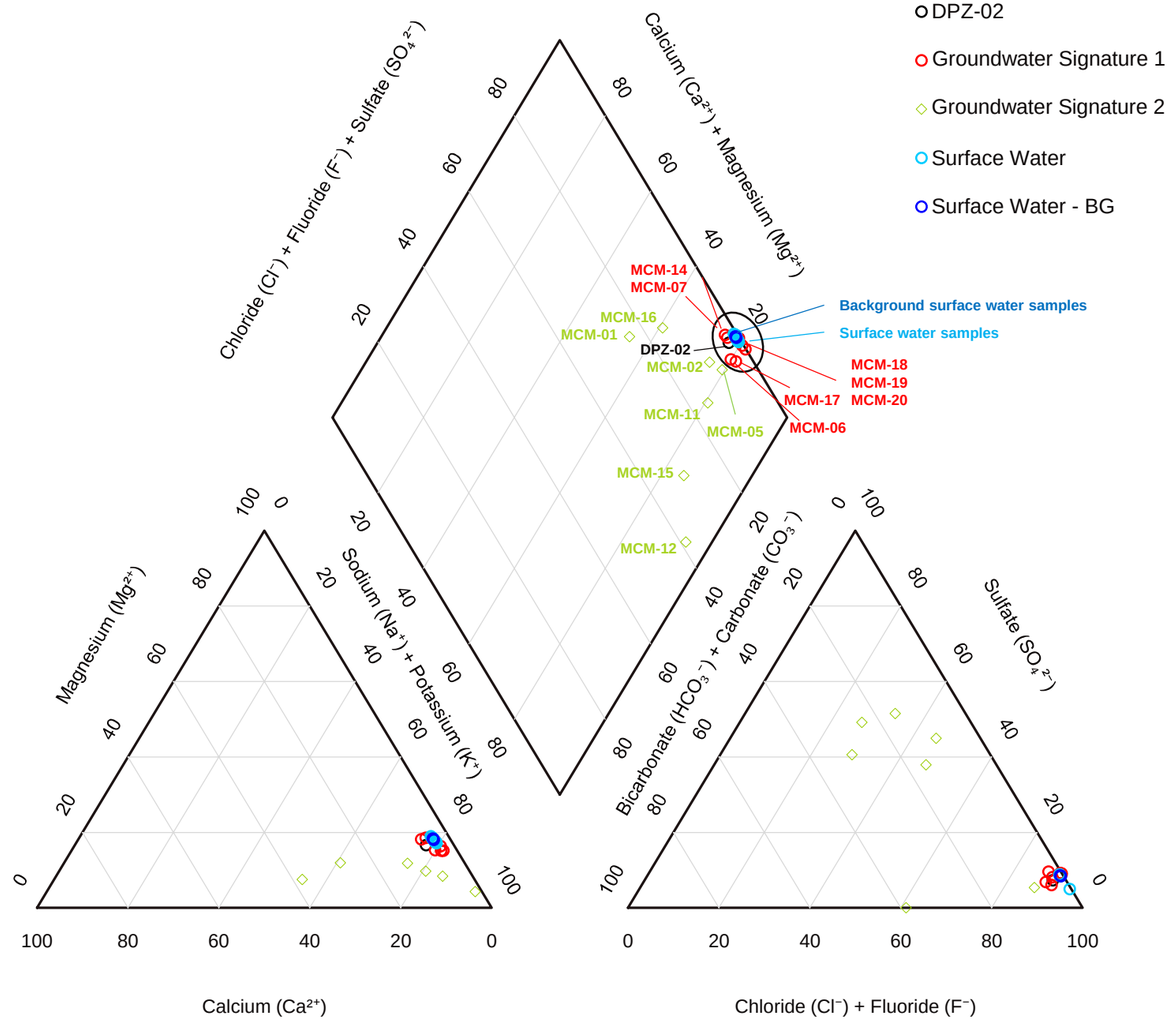
PLANT MCMANUS FORMER ASH POND 1
BRUNSWICK, GEORGIA

CONCEPTUAL DIAGRAM OF SALTWATER WEDGE AND MONITORING WELL TDS CONCENTRATIONS

ARCADIS

FIGURE
3.6

GEOCHEMICAL CONCEPTUAL SITE MODEL PLANT MCMANUS - FORMER ASH POND 1



LEGEND

- CCR PERMITTED BOUNDARY
- PIEZOMETER
- ASSESSMENT WELL
- DETECTION WELL
- DEEP PIEZOMETER
- BACKGROUND SURFACE WATER SAMPLE LOCATION

Notes:
Units in milligram per liter (mg/L)
Data presented in Piper plot presented on Table 3.5.
Service Layer Credit: Source Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
BG - Background

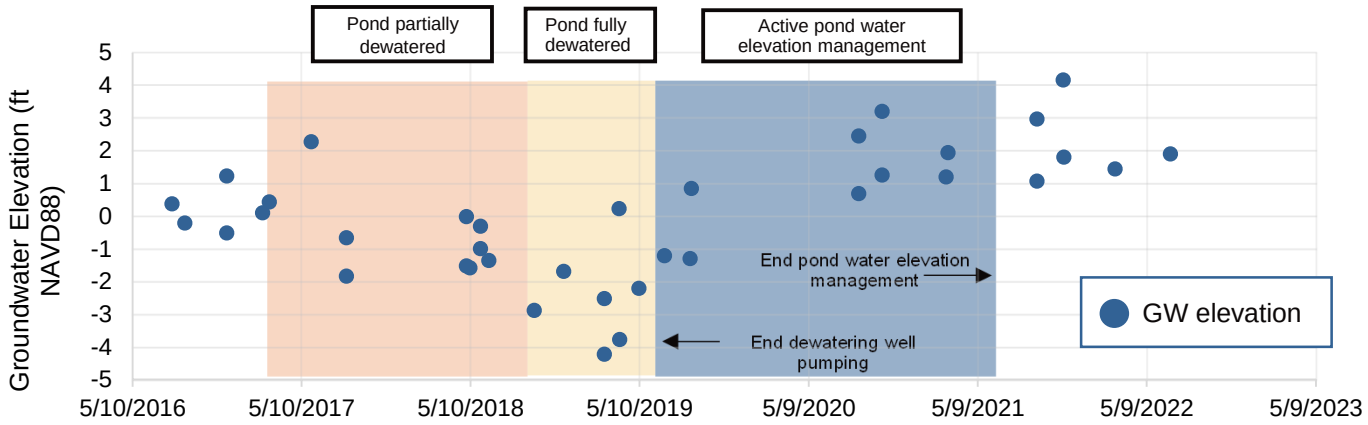
GEORGIA POWER
PLANT MCMANUS FORMER ASH POND 1
BRUNSWICK, GEORGIA

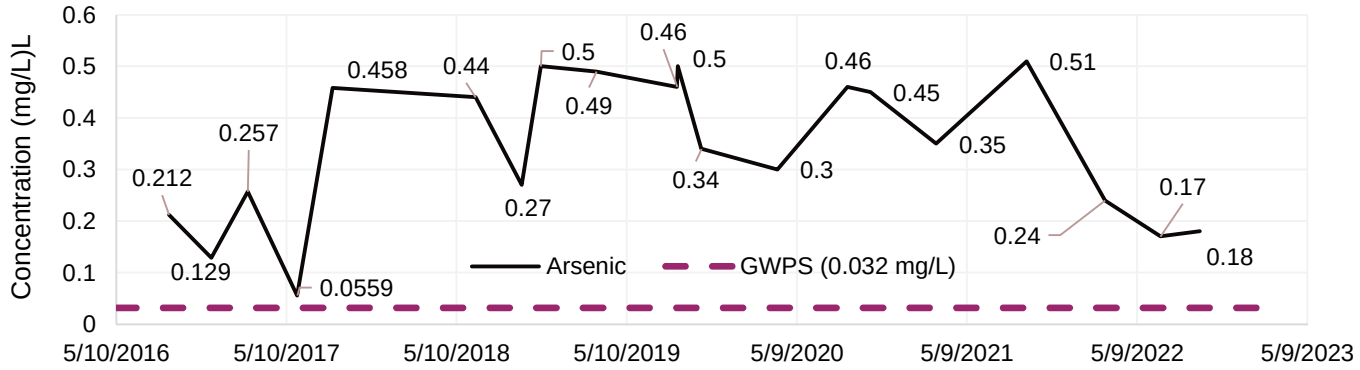
SURFACE AND GROUNDWATER GEOCHEMISTRY

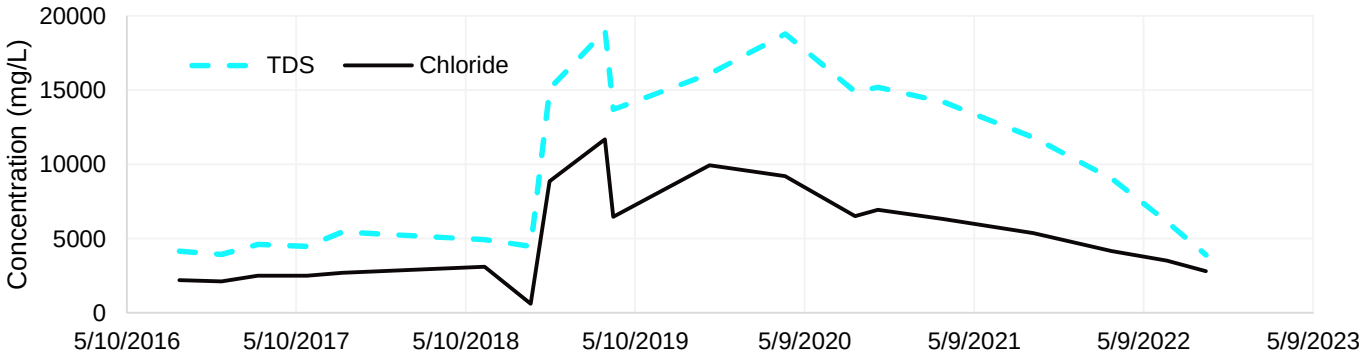
ARCADIS

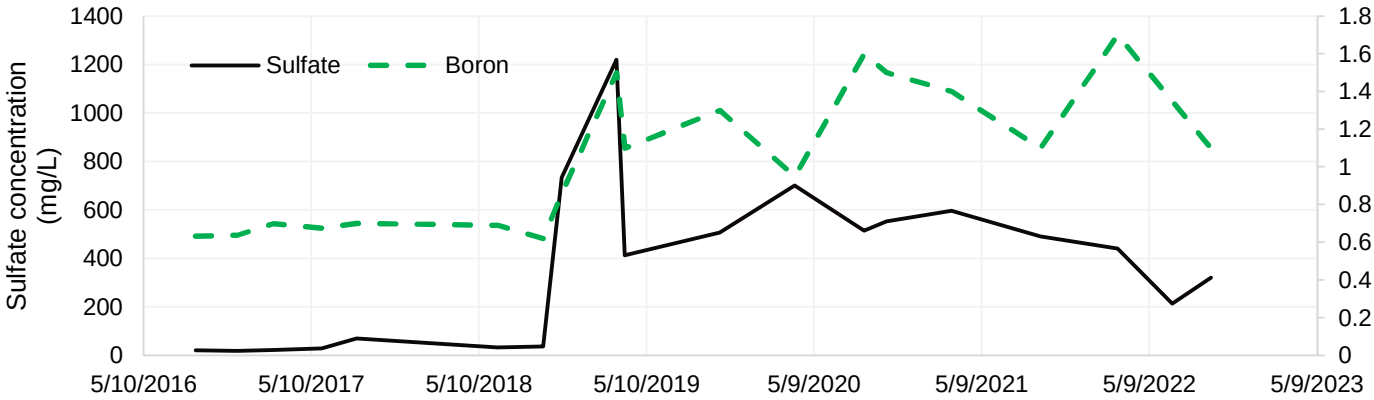
FIGURE
3.7

GEOCHEMICAL CONCEPTUAL SITE MODEL PLANT MCMANUS - FORMER ASH POND 1









Notes:
mg/L – milligrams per liter
GW - groundwater
ft amsl – feet above mean sea level
TDS – total dissolved solids
Dewatering dates approximate.
Active pond water elevation management - pond was allowed to fill, but elevation was controlled by pumping.

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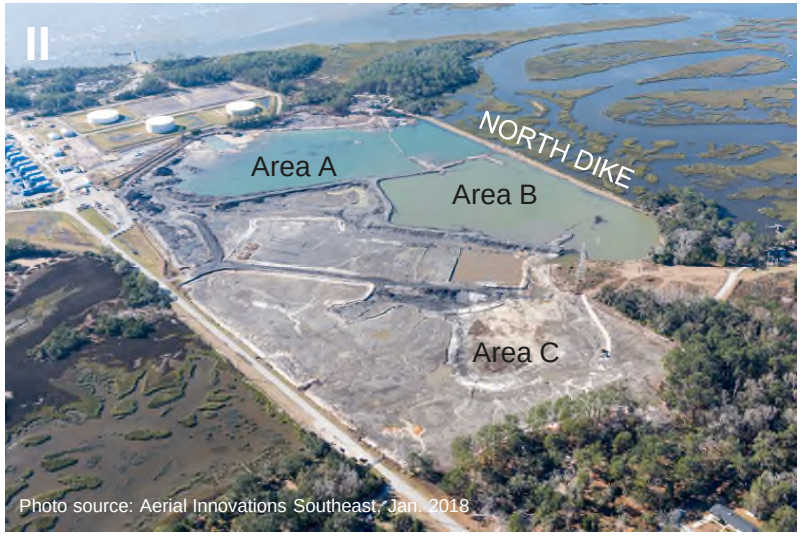
PLANT MCMANUS FORMER ASH POND 1
BRUNSWICK, GEORGIA

TREND DATA – MCM-06

ARCADIS

FIGURE
3.8

GEOCHEMICAL CONCEPTUAL SITE MODEL PLANT MCMANUS - FORMER ASH POND 1



Note:
Aerial photos taken during coal ash removal by Aerial Innovations Southeast
Photo Dates:
I - November 2017; II - January 2018, III - March 2018, IV - May 2018.

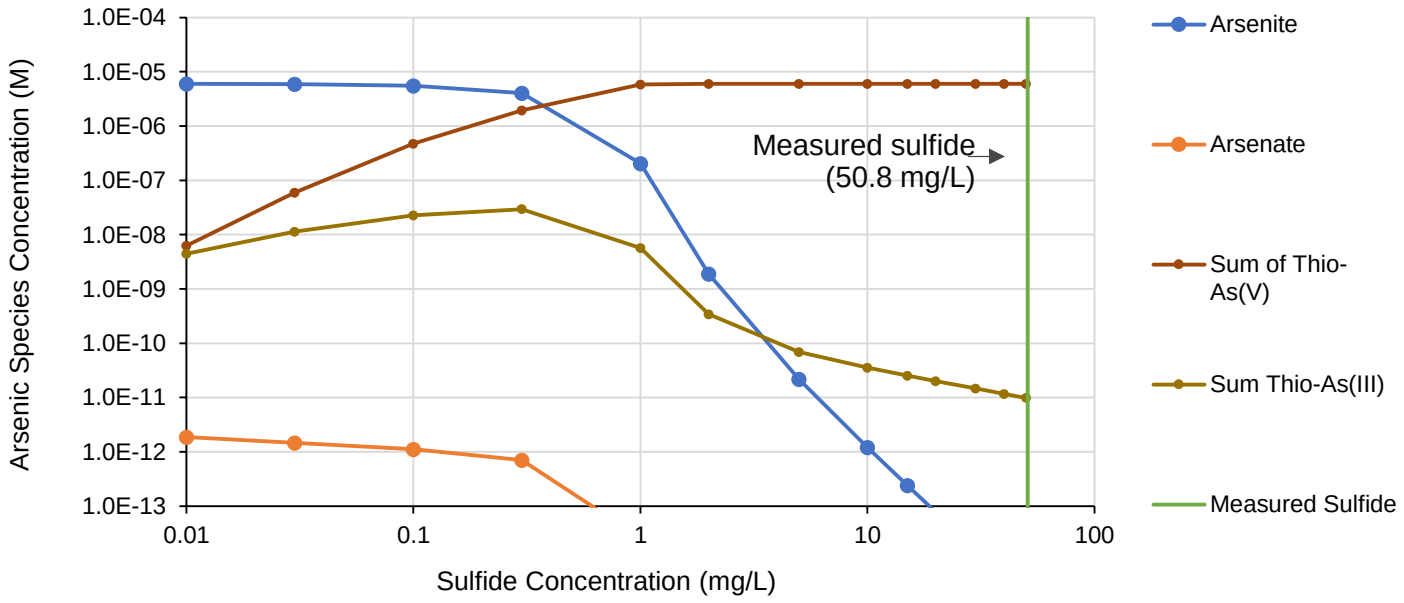
GEORGIA POWER
PLANT MCMANUS FORMER ASH POND 1
BRUNSWICK, GEORGIA

DEWATERING PROGRESSION AERIALS

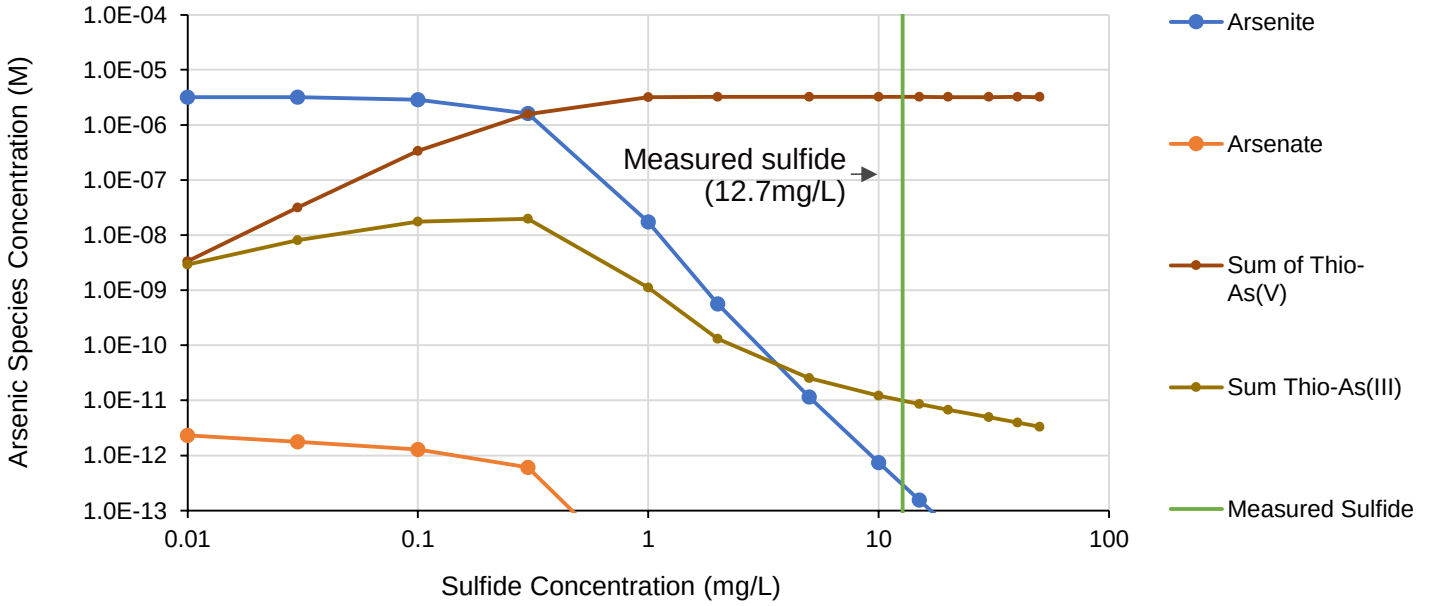
ARCADIS

FIGURE
3.9

Aqueous Arsenic Speciation vs. Sulfide Concentration - MCM-06
October 2020: TDS = 15,200 mg/L



Aqueous Arsenic Speciation vs. Sulfide Concentration - MCM-06
March 2022: TDS = 9,040 mg/L



Notes:
Thio-As(III) – thioarsenite species
Thio-As(V) – thioarsenate species
mg/L – milligram per liter
TDS – total dissolved solids
Models were run at a high (October 2020) and low (March 2022) TDS.

Total thioarsenite and thioarsenate species were summed from individually modeled species.

Vertical green line indicates measured sulfide concentrations for the indicated sampling events (October 2020 and March 2022).

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PLANT MCMANUS FORMER ASH POND 1
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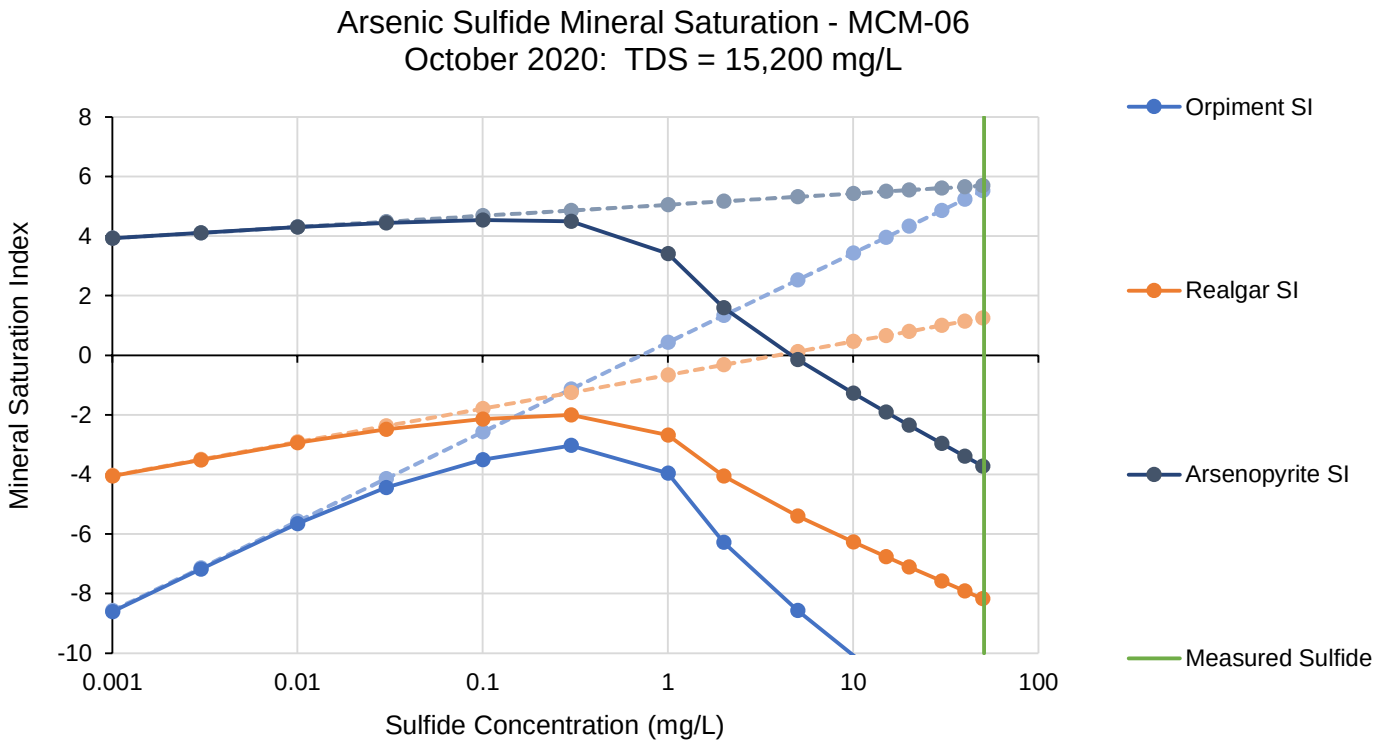
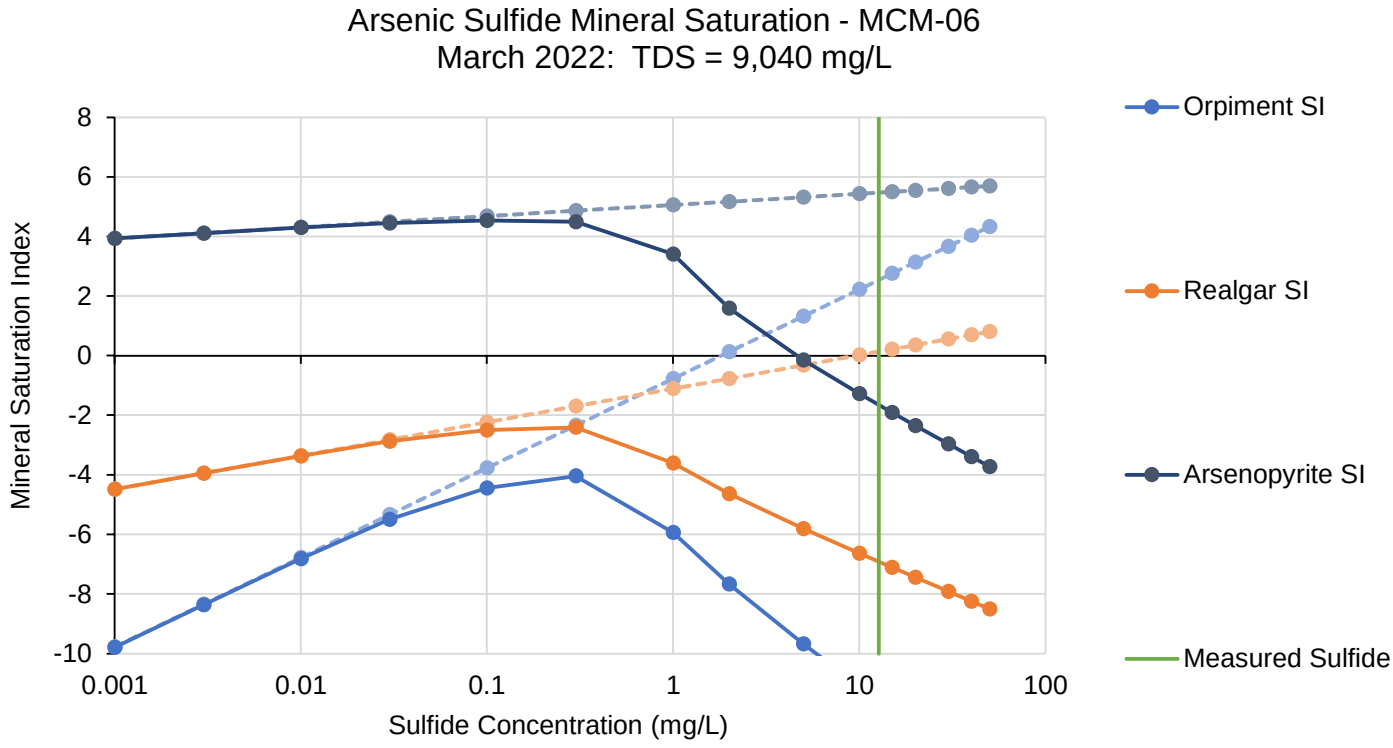
ARSENIC SPECIATION VS. SULFIDE CONCENTRATIONS

ARCADIS

FIGURE
4.1

GEOCHEMICAL CONCEPTUAL SITE MODEL PLANT MCMANUS - FORMER ASH POND 1





Notes:
Model results shown by solid lines include thioarsenic species. Dashed lines show results from models which excluded thioarsenic species.
Arsenopyrite SI model was evaluated assuming iron concentrations at equilibrium with iron mineral mackinawite.
SI – Saturation index. Positive SI indicates favorable mineral formation, negative SI indicates low favorability for mineral formation.
Vertical sulfide line indicates measured sulfide concentrations for the indicated sampling events (October 2020 and March 2022)

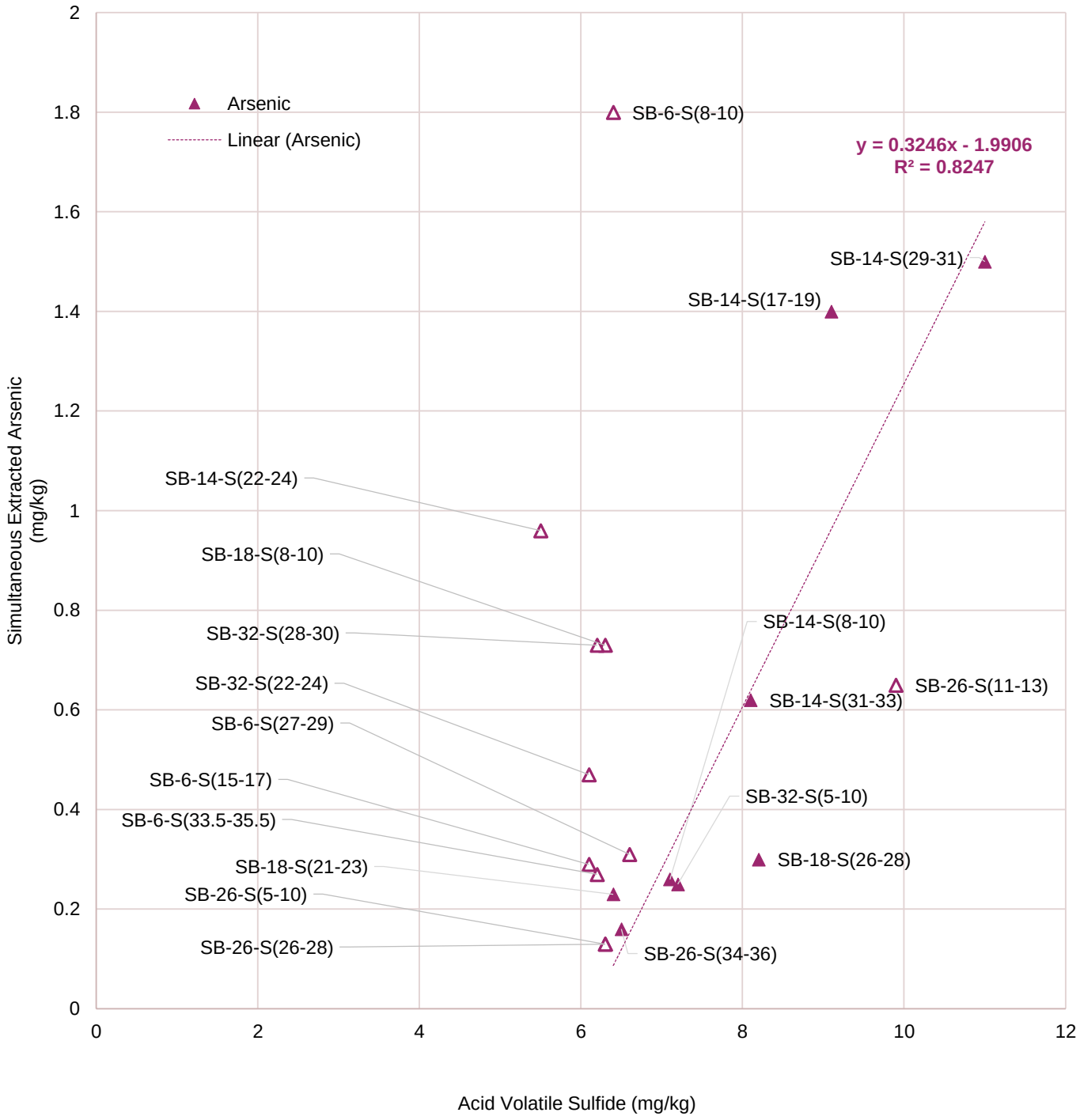
GEORGIA POWER
PLANT MCMANUS FORMER ASH POND 1
BRUNSWICK, GEORGIA

SATURATION INDICES FOR ARSENIC CONTAINING MINERALS

ARCADIS

FIGURE
4.2

GEOCHEMICAL CONCEPTUAL SITE MODEL PLANT MCMANUS - FORMER ASH POND 1



Notes:
mg/kg – milligram per kilogram
Open shapes indicate non-detect results for sulfide. Reporting limit shown.
Arsenic results evaluated as part of the acid volatile sulfide with simultaneous extracted metals (AVS/SEM) analysis.
Trend line shown for detected sulfide results only.

GEORGIA POWER
PLANT MCMANUS FORMER ASH POND 1
BRUNSWICK, GEORGIA

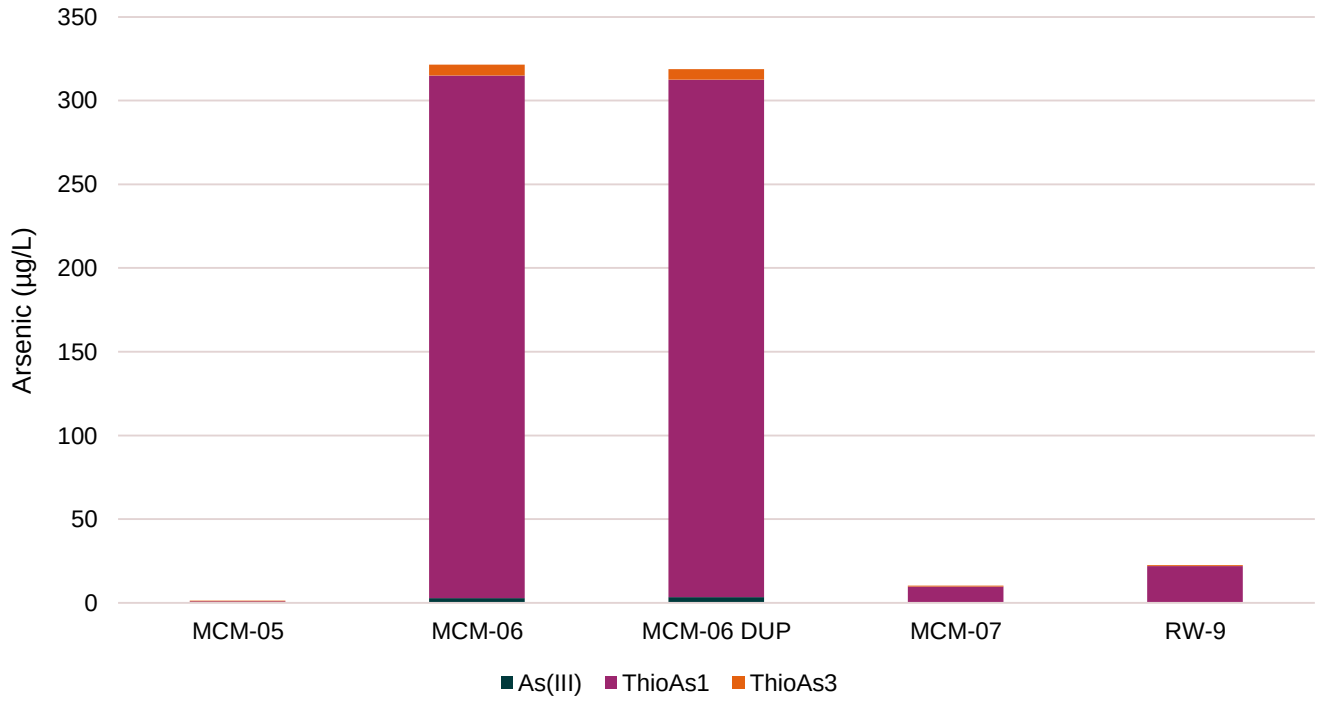
AVS/SEM RESULTS FOR SOIL

ARCADIS

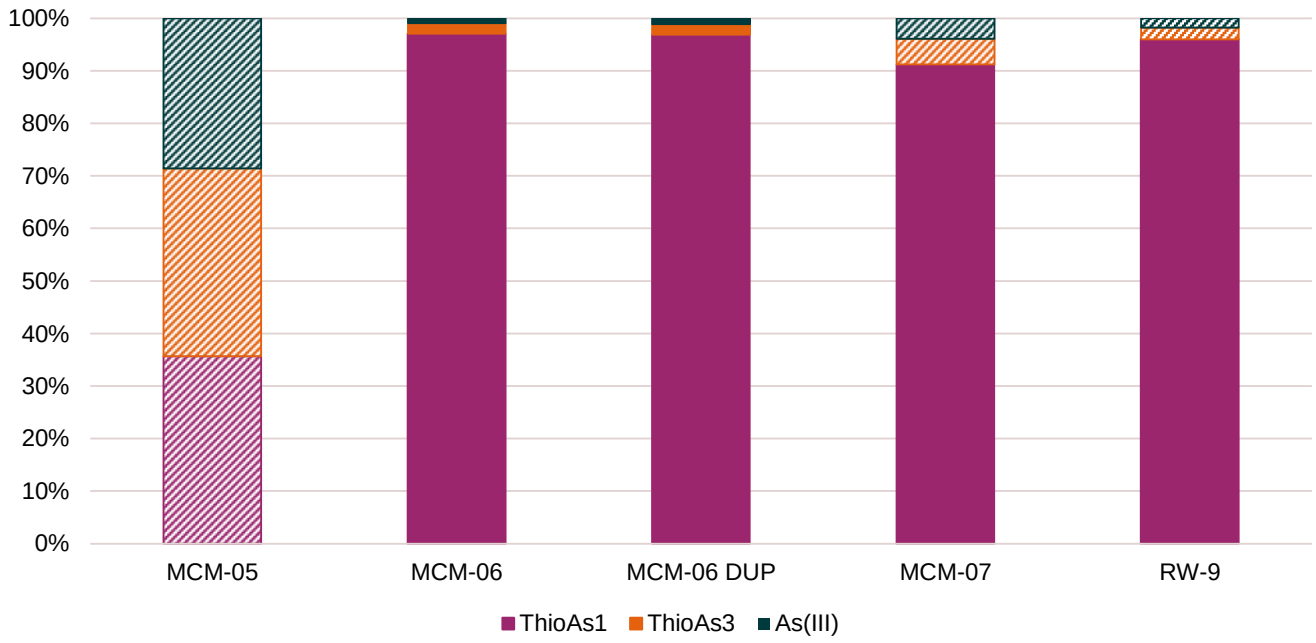
FIGURE
4.3

GEOCHEMICAL CONCEPTUAL SITE MODEL PLANT MCMANUS - FORMER ASH POND 1

Arsenic Speciation Results



Percent Contribution



Notes:
As(III) – arsenite
µg/L – microgram per liter
ThioAs1 - thioarsenical species, sulfur to arsenic ratio of 1
ThioAs3 - thioarsenical species, sulfur to arsenic ratio of 3
Data collected April 2021.
Dashed bar indicates sample result less than detection limit

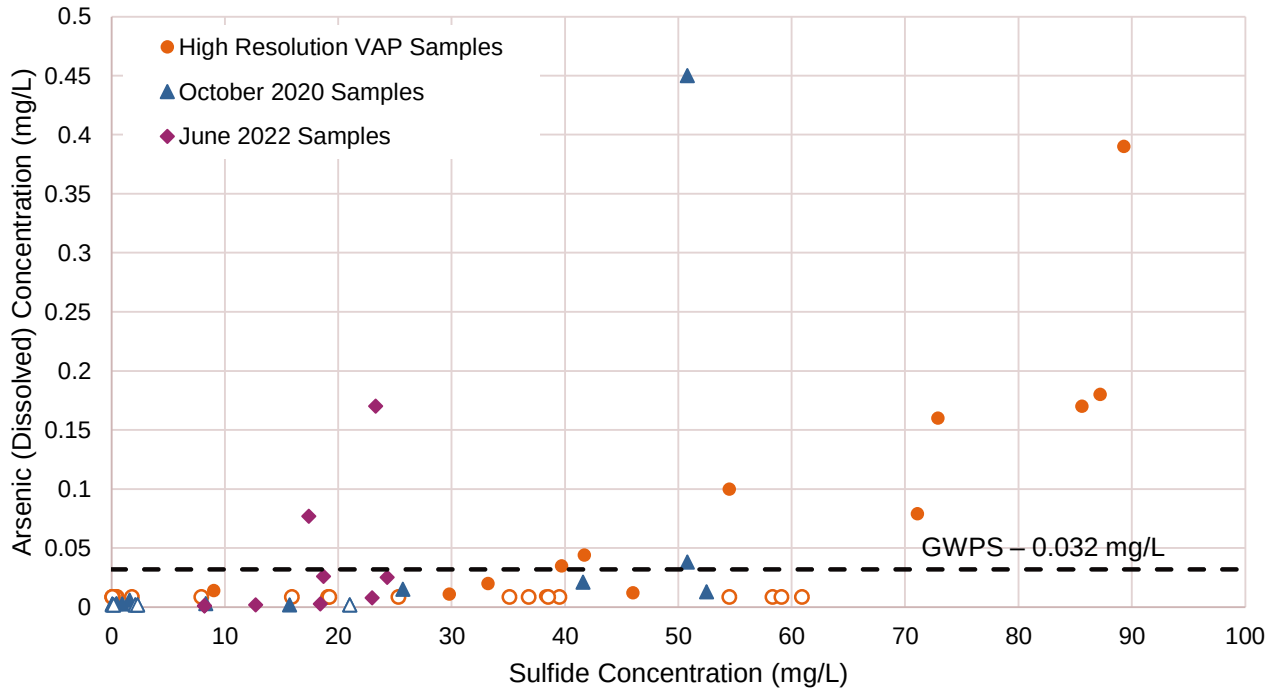
GEORGIA POWER
PLANT MCMANUS FORMER ASH POND 1
BRUNSWICK, GEORGIA

APRIL 2021 SPECIATION RESULTS

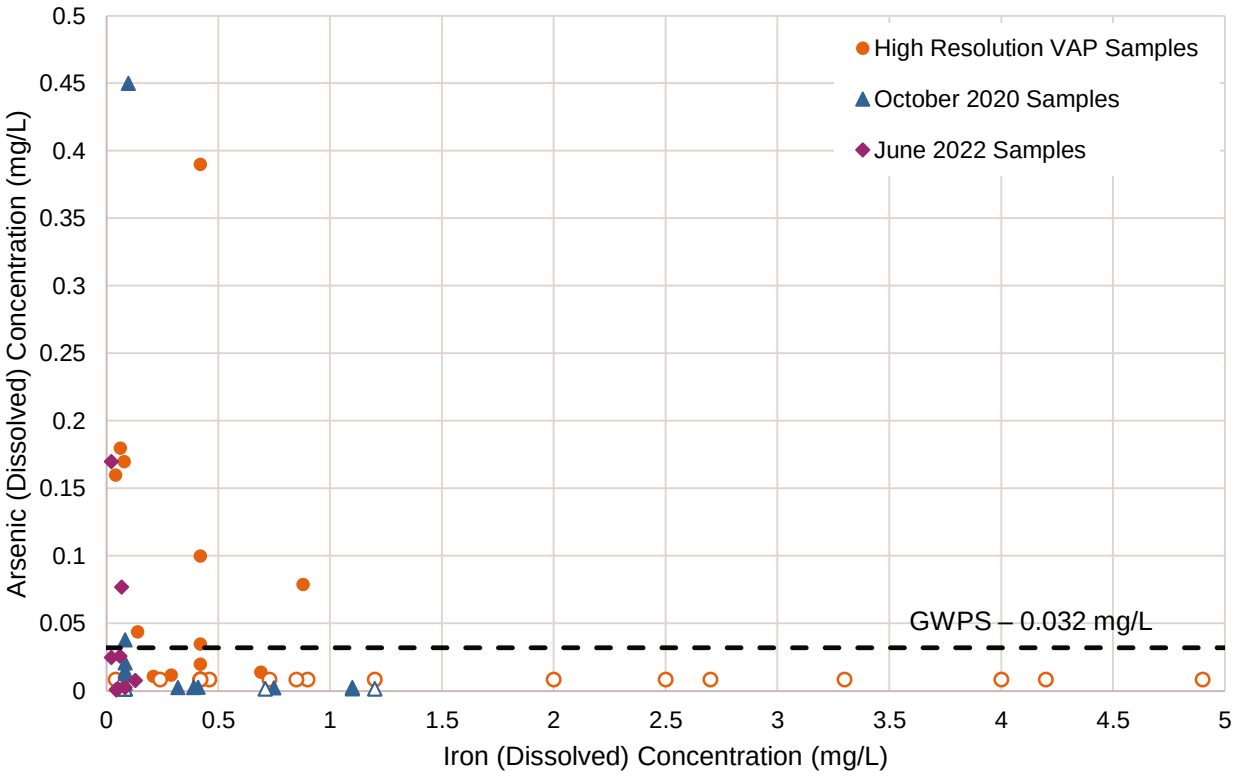
ARCADIS

FIGURE
4.4

Dissolved Arsenic vs. Total Sulfide Concentrations



Dissolved Arsenic vs. Dissolved Iron Concentrations



Notes:

VAP – Vertical aquifer profile
GWPS – Arsenic groundwater protection standard 0.032 mg/L
mg/L – milligrams per liter
Geochemical data presented was gathered during sampling events completed between 2020 and 2022. Analytical data provided on Tables 3.4a , 3.4b, and 3.4c.
Open shapes indicate non-detect results for arsenic. Reporting limit shown.
Ferrous iron data presented for October 2020 data.

GEORGIA POWER
PLANT MCMANUS FORMER ASH POND 1
BRUNSWICK, GEORGIA

ARSENIC VS. SULFIDE AND ARSENIC VS. IRON CONCENTRATIONS IN GROUNDWATER

ARCADIS

FIGURE
4.5

GEOCHEMICAL CONCEPTUAL SITE MODEL PLANT MCMANUS - FORMER ASH POND 1

Attachment 1

Summary of Investigation Methods

Attachment 1
Summary of Investigation Methods

The following provides a general summary of field methods implemented to collect geochemical data at the Plant McManus Former AP-1 site. These methods have been described in previously submitted reports, as indicated in italics.

Groundwater Sampling

Resolute. 2022. Annual Groundwater Monitoring Corrective Action Report. Prepared for Georgia Power Company. June.

"Groundwater samples were collected from the compliance well network and select piezometers using low-flow sampling procedures in accordance with § 257.93(a). Purging and sampling was performed using a peristaltic pump with the intake tubing lowered to the midpoint of the well screen (or as appropriate determined by the water level). QED dedicated pumps are utilized in monitoring wells MCM-01, MCM-05, MCM-06, MCM-07, MCM-12, MCM-14, MCM-15, MCM-16, and MCM-17. Non-disposable equipment was decontaminated before use and between well locations.

An AquaTroll (In-Situ field instrument) was used to monitor and record field water quality parameters (pH, conductivity, dissolved oxygen (DO), temperature, and oxidation reduction potential [ORP]) during well purging to verify stabilization prior to sampling. Turbidity was monitored using a LaMotte 2020 (or similar) 1970-USEPA and ISO Compliant Model turbidity meter.

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

- *± 0.1 standard units for pH*
- *± 5% for specific conductance*
- *± 0.2 milligrams per liter (mg/L) or ± 10%, whichever is greater for DO > 0.5 mg/L. No criterion applies if DO < 0.5 mg/L, record only*
- *Turbidity measurements less than or equal to 5 nephelometric turbidity units (NTU)*

Once stabilization was achieved, unfiltered samples were collected in appropriately preserved laboratory-supplied containers, placed in ice-packed coolers… Upon completion of the sampling events, samples were submitted to the analytical laboratory following chain-of custody protocol."

Brooks Applied Labs. 2021. Results of Arsenic Speciation Analysis. Prepared for Pace Analytical Services. 2021.

During groundwater sampling for arsenic speciation, water was directly filtered (0.45µm) into an evacuated container in the field, placed in ice-packed coolers and submitted to Brooks Applied Labs (BAL). At the laboratory, all samples were stored according to BAL SOPs and EPA methodology.

"Arsenic speciation was performed by ion chromatography inductively coupled plasma collision reaction cell mass spectrometry (IC-ICP-CRC-MS). Arsenic species are first chromatographically separated on an ion exchange column and then quantified using inductively coupled plasma collision reaction cell mass spectrometry (ICP-CRC-MS). For more information on this determinative technique, please visit the Interference Reduction Technology section on our website.

In accordance with the client's request, thioarsenical "standards" were synthesized from MMAs, DMAs, and arsenite and then characterized for their sulfur-to-arsenic (S/As) ratios by IC-ICP-CRC-MS. MMAs and DMAs each yielded only one primary thioarsenical species with S/As ratios of approximately 1, which were designated as ThioMMA and ThioDMA respectively. Arsenite yielded three thioarsenical species – designated as ThioAs1, ThioAs2, and ThioAs3 – that corresponded to S/As ratios of approximately 1, 2, or 3. Traces of a fourth unknown species were also observed in the latter solution, but chromatographic interference precluded its confirmation as a thioarsenical.

The 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.
All data was reported without further qualification and all other 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."

Surface Water Sampling

Resolute. 2020. Surface Water Sampling Work Plan. Prepared for Georgia Power Company. January.
"Surface water and pond water sampling points will be established using a Trimble 500 or similar hand-held surveying equipment. Surface water sampling will be conducted using USEPA Region 4 Science and Ecosystem Support Division (SESD), Operating Procedure, Surface Water Sampling SESDPROC-201-R3 (February 28, 2013) as a guide. The preferred sampling method is to dip the container directly into the surface water, at an angle and facing upstream in order to ensure no preservative is lost during the process, without disturbing any bottom sediment. The bottles will be placed with a small portion of the opening just below the water line and water allowed to slowly fill the container.

If the sampler cannot easily reach the surface water from the location where they are working, a peristaltic pump, extension handle with scoop, or Teflon® bailer may be used to collect the samples. For these collection methods, the water will be allowed to gently run from the collection container down the inside of the laboratory container until it is full.

Once filled, the sample container will be placed in a laboratory provided cooler and maintained at approximately 4°C (± 2°C) until delivery to the analytical laboratory under chain of custody protocol.
Disposable materials (e.g., miscellaneous trash, plastic and PPE) will be placed in plastic garbage bags and disposed in an on-site dumpster.

Samples will be named according to the transect and location number, then the tide level, then the depth of the sample for those collected during high tide (e.g., T1-1H-S, T1-1H-B or T1-1L). Samples collected from the pond will be named according to the location identified in [a] Figure… All samples collected for dissolved analyses will use the name assigned to the totals sample and have the letter 'D' added to the sample name (e.g., T1-1H-S-D, Pond-1-D, or T1- 1L-D)."

High Resolution Investigation

Arcadis. 2021. Semiannual Remedy Selection and Design Progress Report. Prepared for Georgia Power Company. July.

"A High Resolution Investigation was completed in February 2021 to further characterize groundwater flow properties at the site and the nature and extent of arsenic exceeding the GWPS. This investigation included the following activities:

- *Advancement of 40 hydraulic profiling tool (HPT) locations via direct-push technology (DPT) to evaluate relative hydraulic conductivity (K) of aquifer sediments and groundwater flow.*
- *Advancement of eight DPT vertical aquifer profile (VAP) locations and concurrent collection of groundwater samples to evaluate groundwater geochemical conditions controlling the fate and transport of arsenic, and to delineate arsenic concentrations in soil and groundwater laterally across the dike near MCM-06.*
- *Advancement of five DPT soil sampling locations (based on HPT and VAP sampling results) and collection of soil samples to evaluate site soil geochemical conditions controlling the fate and transport of arsenic.*

Hydraulic Profiling Tool

A HPT is a probe that is advanced through the subsurface using direct-push drilling methods. It is used to create a log of the relative formation K versus depth as it is advanced through the subsurface. A small amount of clean water is injected into the formation through the probe, and the flowrate and back pressure are monitored and used to estimate K. Electrical conductivity is logged simultaneously with HPT on the same probe. Electrical conductivity is typically used to differentiate between finer and coarser grained soil (i.e., clay and sand), but also responds to salinity of the groundwater.

During the High Resolution Investigation, a total of 40 HPT locations were advanced with DPT to evaluate relative K and groundwater flow. Each boring was advanced until drilling refusal was encountered.

Direct Push Technology – Vertical Aquifer Profiling

VAP is an investigation method where depth-discrete groundwater samples are collected at multiple depths from multiple locations, usually along a transect. VAP provides a one-time snapshot of data that can be used to refine the understanding of the distribution of arsenic within the dike and to evaluate treatment technologies under consideration that are sensitive to geochemical conditions (i.e., in situ injections, P&T, ISS, MNA, PRB). VAP samples were collected through a screen-point sampler advanced using DPT drilling and low flow sampling methods.

A total of 33 groundwater samples were collected across eight locations.

Samples were submitted under chain-of-custody to Pace Analytical in Asheville, North Carolina for analysis of total and dissolved metals, alkalinity, chloride, sulfate, nitrate/nitrite, sulfide, orthophosphate, total organic carbon (TOC), biological oxygen demand (BOD), and total dissolved solids (TDS). Field parameters (pH, dissolved oxygen, oxidation reduction potential, temperature, specific conductance, and depth-to-water) were also recorded… Samples collected through VAP sampling process can exhibit elevated turbidity, which can artificially elevate total metals concentrations. Therefore, groundwater samples collecting through VAP were analyzed for dissolved metals as well as total metals to assess geochemical conditions and the distribution of arsenic in the subsurface in the vicinity of MCM-06.

Direct Push Technology – Soil Sampling

Soil analysis was performed to identify and evaluate the presence of mineral phases that may support an MNA mechanism for attenuation of arsenic in groundwater. Based on the results from the VAP sampling, soil borings were advanced at select locations to analyze subsurface lithology and collect soil samples for laboratory analysis. To facilitate comparisons between soil and groundwater, soil samples were co-located with groundwater samples. Soil logging results for the five soil boring locations were used to help verify relative K values observed in corresponding HPT.

During investigation activities, a total of 19 soil samples were collected at varying intervals across five soil boring locations and submitted to Eurofins Test America Laboratories for analysis of total metals (arsenic, aluminum, calcium, iron, and manganese), TOC, and acid volatile sulfide (AVS) with simultaneous extracted metals (SEM) for arsenic. Two samples (SB-14-S(17-19) and SB-14-S(22-24)) were submitted for Sequential Selective Extraction (SSE) testing and X-ray diffraction (XRD) analysis."

Soil samples were collected by DPT. Samples were maintained in acetate liners when shipped on wet ice to the analytical lab for analysis to limit soil exposure to oxygen.

Attachment 2

Analytical Reports

WATER ANALYTICAL DATA

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

March 09, 2021

Ms. Lauren Petty
Southern Co. Services
42 Inverness Center Parkway
Birmingham, AL 35242

RE: Project: MCMANUS 30050105.00006
Pace Project No.: 92524150

Dear Ms. Petty:

Enclosed are the analytical results for sample(s) received by the laboratory on February 25, 2021. 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

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: Joju Abraham, Georgia Power-CCR
Kathryn Farris
Geoffrey Gay, ARCADIS - Atlanta
Margaret Gentile, Arcadis
Kristen Jurinko
Charles Lawson, Arcadis
Bryan Mayeux
Kelley Sharpe, ARCADIS - Atlanta
Maribel Vital

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

CERTIFICATIONS

Project: MCMANUS 30050105.00006
Pace Project No.: 92524150

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

REPORT OF LABORATORY ANALYSIS

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

SAMPLE SUMMARY

Project: MCMANUS 30050105.00006
Pace Project No.: 92524150

Lab ID	Sample ID	Matrix	Date Collected	Date Received
92524150001	**VAP-31-W (31-33)**	Water	02/24/21 09:20	02/25/21 11:00
92524150002	**VAP-06-W (15-17)**	Water	02/24/21 11:43	02/25/21 11:00
92524150003	**VAP-06-W (8-10)**	Water	02/24/21 12:14	02/25/21 11:00
92524150004	**VAP-06-W (27-29)**	Water	02/24/21 13:03	02/25/21 11:00

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SAMPLE ANALYTE COUNT

Project: MCMANUS 30050105.00006
Pace Project No.: 92524150

Lab ID	Sample ID	Method	Analysts	Analytes Reported
92524150001	**VAP-31-W (31-33)**	EPA 6010D	DS, KQ	6
		EPA 6010D	SH1	6
		EPA 6020B	JOR	2
		EPA 6020B	JOR	2
		SM 2320B-2011	ECH	3
		SM 2540C-2011	RED	1
		SM 4500-S2D-2011	JP1	1
		SM 5210B-2011	NFW	1
		EPA 300.0 Rev 2.1 1993	CDC	4
		SM 4500-P E-2011	JP1	1
		EPA 9060A	JLH	5
92524150002	**VAP-06-W (15-17)**	EPA 6010D	DS, KQ	6
		EPA 6010D	SH1	6
		EPA 6020B	JOR	2
		EPA 6020B	JOR	2
		SM 2320B-2011	ECH	3
		SM 2540C-2011	RED	1
		SM 4500-S2D-2011	JP1	1
		SM 5210B-2011	NFW	1
		EPA 300.0 Rev 2.1 1993	CDC	4
		SM 4500-P E-2011	JP1	1
		EPA 9060A	JLH	5
92524150003	**VAP-06-W (8-10)**	EPA 6010D	DS, KQ	6
		EPA 6010D	SH1	6
		EPA 6020B	JOR	2
		EPA 6020B	JOR	2
		SM 2320B-2011	ECH	3
		SM 2540C-2011	RED	1
		SM 4500-S2D-2011	JP1	1
		SM 5210B-2011	NFW	1
		EPA 300.0 Rev 2.1 1993	CDC	4
		SM 4500-P E-2011	JP1	1
		EPA 9060A	JLH	5
92524150004	**VAP-06-W (27-29)**	EPA 6010D	DS, KQ	6
		EPA 6010D	SH1	6
		EPA 6020B	JOR	2
		EPA 6020B	JOR	2

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SAMPLE ANALYTE COUNT

Project: MCMANUS 30050105.00006
Pace Project No.: 92524150

Lab ID	Sample ID	Method	Analysts	Analytes Reported
		SM 2320B-2011	ECH	3
		SM 2540C-2011	RED	1
		SM 4500-S2D-2011	JP1	1
		SM 5210B-2011	NFW	1
		EPA 300.0 Rev 2.1 1993	CDC	4
		SM 4500-P E-2011	JP1	1
		EPA 9060A	JLH	5

PASI-A = Pace Analytical Services - Asheville

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SUMMARY OF DETECTION

Project: MCMANUS 30050105.00006
Pace Project No.: 92524150

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92524150001	**VAP-31-W (31-33)**					
EPA 6010D	Calcium	282	mg/L	1.0	02/27/21 21:51	
EPA 6010D	Magnesium	618	mg/L	1.0	02/27/21 21:51	
EPA 6010D	Manganese	0.32	mg/L	0.050	02/27/21 21:51	
EPA 6010D	Potassium	184	mg/L	50.0	02/27/21 21:51	
EPA 6010D	Sodium	5380	mg/L	500	03/01/21 19:02	
EPA 6010D	Calcium, Dissolved	238	mg/L	1.0	03/03/21 02:52	
EPA 6010D	Magnesium, Dissolved	548	mg/L	1.0	03/03/21 02:52	
EPA 6010D	Manganese, Dissolved	0.28	mg/L	0.050	03/03/21 02:52	
EPA 6010D	Potassium, Dissolved	163	mg/L	50.0	03/03/21 02:52	
EPA 6010D	Sodium, Dissolved	4510	mg/L	500	03/03/21 01:53	
EPA 6020B	Arsenic	0.038	mg/L	0.010	02/26/21 11:15	D3
EPA 6020B	Boron	2.3J	mg/L	2.5	02/26/21 11:15	D3
EPA 6020B	Arsenic, Dissolved	0.020	mg/L	0.010	02/25/21 21:01	D3
EPA 6020B	Boron, Dissolved	1.6J	mg/L	2.5	02/25/21 21:01	D3
SM 2320B-2011	Alkalinity,Bicarbonate (CaCO3)	420	mg/L	5.0	02/26/21 19:07	
SM 2320B-2011	Alkalinity, Total as CaCO3	420	mg/L	5.0	02/26/21 19:07	
SM 2540C-2011	Total Dissolved Solids	18200	mg/L	2500	03/02/21 19:20	
SM 4500-S2D-2011	Sulfide	33.2	mg/L	10.0	02/26/21 06:36	
EPA 300.0 Rev 2.1 1993	Chloride	8180	mg/L	100	02/25/21 18:12	
EPA 300.0 Rev 2.1 1993	Sulfate	977	mg/L	100	02/25/21 18:12	
SM 4500-P E-2011	Orthophosphate as P	0.92	mg/L	0.25	02/26/21 03:49	
EPA 9060A	Total Organic Carbon	7.8	mg/L	1.0	03/03/21 23:31	
EPA 9060A	Total Organic Carbon	7.7	mg/L	1.0	03/03/21 23:31	
EPA 9060A	Total Organic Carbon	7.8	mg/L	1.0	03/03/21 23:31	
EPA 9060A	Total Organic Carbon	7.7	mg/L	1.0	03/03/21 23:31	
EPA 9060A	Mean Total Organic Carbon	7.8	mg/L	1.0	03/03/21 23:31	
92524150002	**VAP-06-W (15-17)**					
EPA 6010D	Calcium	191	mg/L	1.0	02/27/21 21:54	
EPA 6010D	Iron	1.0	mg/L	0.50	02/27/21 21:54	
EPA 6010D	Magnesium	496	mg/L	1.0	02/27/21 21:54	
EPA 6010D	Manganese	0.31	mg/L	0.050	02/27/21 21:54	
EPA 6010D	Potassium	157	mg/L	50.0	02/27/21 21:54	
EPA 6010D	Sodium	4450	mg/L	500	03/01/21 19:05	
EPA 6010D	Calcium, Dissolved	177	mg/L	1.0	03/03/21 02:55	
EPA 6010D	Iron, Dissolved	0.85	mg/L	0.50	03/03/21 02:55	
EPA 6010D	Magnesium, Dissolved	477	mg/L	1.0	03/03/21 02:55	
EPA 6010D	Manganese, Dissolved	0.29	mg/L	0.050	03/03/21 02:55	
EPA 6010D	Potassium, Dissolved	152	mg/L	50.0	03/03/21 02:55	
EPA 6010D	Sodium, Dissolved	4010	mg/L	500	03/03/21 01:56	
EPA 6020B	Boron	2.0J	mg/L	2.5	02/26/21 11:19	D3
EPA 6020B	Boron, Dissolved	1.8J	mg/L	2.5	02/25/21 21:05	D3
SM 2320B-2011	Alkalinity,Bicarbonate (CaCO3)	237	mg/L	5.0	03/08/21 17:23	
SM 2320B-2011	Alkalinity, Total as CaCO3	237	mg/L	5.0	03/08/21 17:23	
SM 2540C-2011	Total Dissolved Solids	17300	mg/L	2500	03/02/21 19:20	
SM 4500-S2D-2011	Sulfide	15.9	mg/L	10.0	02/26/21 06:37	
EPA 300.0 Rev 2.1 1993	Chloride	7080	mg/L	100	02/25/21 19:09	
EPA 300.0 Rev 2.1 1993	Sulfate	900	mg/L	100	02/25/21 19:09	

REPORT OF LABORATORY ANALYSIS

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SUMMARY OF DETECTION

Project: MCMANUS 30050105.00006
Pace Project No.: 92524150

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92524150002	**VAP-06-W (15-17)**					
SM 4500-P E-2011	Orthophosphate as P	0.75	mg/L	0.25	02/26/21 03:49	
EPA 9060A	Total Organic Carbon	8.6	mg/L	1.0	03/03/21 23:49	
EPA 9060A	Total Organic Carbon	8.6	mg/L	1.0	03/03/21 23:49	
EPA 9060A	Total Organic Carbon	8.8	mg/L	1.0	03/03/21 23:49	
EPA 9060A	Total Organic Carbon	8.6	mg/L	1.0	03/03/21 23:49	
EPA 9060A	Mean Total Organic Carbon	8.7	mg/L	1.0	03/03/21 23:49	
92524150003	**VAP-06-W (8-10)**					
EPA 6010D	Calcium	218	mg/L	1.0	02/27/21 21:57	
EPA 6010D	Iron	3.7	mg/L	0.50	02/27/21 21:57	
EPA 6010D	Magnesium	611	mg/L	1.0	02/27/21 21:57	
EPA 6010D	Manganese	0.24	mg/L	0.050	02/27/21 21:57	
EPA 6010D	Potassium	167	mg/L	50.0	02/27/21 21:57	
EPA 6010D	Sodium	5050	mg/L	500	03/01/21 19:22	
EPA 6010D	Calcium, Dissolved	203	mg/L	1.0	03/03/21 02:59	
EPA 6010D	Iron, Dissolved	2.7	mg/L	0.50	03/03/21 02:59	
EPA 6010D	Magnesium, Dissolved	605	mg/L	1.0	03/03/21 02:59	
EPA 6010D	Manganese, Dissolved	0.22	mg/L	0.050	03/03/21 02:59	
EPA 6010D	Potassium, Dissolved	162	mg/L	50.0	03/03/21 02:59	
EPA 6010D	Sodium, Dissolved	4270	mg/L	500	03/03/21 02:06	
EPA 6020B	Boron	1.8J	mg/L	2.5	02/26/21 11:24	D3
EPA 6020B	Boron, Dissolved	1.7J	mg/L	2.5	02/25/21 21:26	D3
SM 2320B-2011	Alkalinity,Bicarbonate (CaCO3)	111	mg/L	5.0	03/08/21 17:32	
SM 2320B-2011	Alkalinity, Total as CaCO3	111	mg/L	5.0	03/08/21 17:32	
SM 2540C-2011	Total Dissolved Solids	17500	mg/L	2500	03/02/21 19:20	
EPA 300.0 Rev 2.1 1993	Chloride	8090	mg/L	100	02/25/21 19:38	
EPA 300.0 Rev 2.1 1993	Sulfate	1060	mg/L	100	02/25/21 19:38	
SM 4500-P E-2011	Orthophosphate as P	0.21	mg/L	0.050	02/26/21 03:50	
EPA 9060A	Total Organic Carbon	5.7	mg/L	1.0	03/04/21 00:07	
EPA 9060A	Total Organic Carbon	5.7	mg/L	1.0	03/04/21 00:07	
EPA 9060A	Total Organic Carbon	5.7	mg/L	1.0	03/04/21 00:07	
EPA 9060A	Total Organic Carbon	5.9	mg/L	1.0	03/04/21 00:07	
EPA 9060A	Mean Total Organic Carbon	5.7	mg/L	1.0	03/04/21 00:07	
92524150004	**VAP-06-W (27-29)**					
EPA 6010D	Calcium	407	mg/L	1.0	02/27/21 22:01	
EPA 6010D	Iron	22.8	mg/L	0.50	02/27/21 22:01	
EPA 6010D	Magnesium	660	mg/L	1.0	02/27/21 22:01	
EPA 6010D	Manganese	1.9	mg/L	0.050	02/27/21 22:01	
EPA 6010D	Potassium	173	mg/L	50.0	02/27/21 22:01	
EPA 6010D	Sodium	5550	mg/L	500	03/01/21 19:25	
EPA 6010D	Calcium, Dissolved	351	mg/L	1.0	03/03/21 03:02	
EPA 6010D	Magnesium, Dissolved	597	mg/L	1.0	03/03/21 03:02	
EPA 6010D	Manganese, Dissolved	1.5	mg/L	0.050	03/03/21 03:02	
EPA 6010D	Potassium, Dissolved	158	mg/L	50.0	03/03/21 03:02	
EPA 6010D	Sodium, Dissolved	4770	mg/L	500	03/03/21 02:09	
EPA 6020B	Boron	2.4J	mg/L	2.5	02/26/21 11:36	D3
EPA 6020B	Boron, Dissolved	1.8J	mg/L	2.5	02/25/21 21:30	D3

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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(770)734-4200

SUMMARY OF DETECTION

Project: MCMANUS 30050105.00006
Pace Project No.: 92524150

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92524150004	**VAP-06-W (27-29)**					
SM 2320B-2011	Alkalinity,Bicarbonate (CaCO3)	643	mg/L	5.0	03/08/21 17:41	
SM 2320B-2011	Alkalinity, Total as CaCO3	643	mg/L	5.0	03/08/21 17:41	
SM 2540C-2011	Total Dissolved Solids	20300	mg/L	2500	02/25/21 18:51	
SM 4500-S2D-2011	Sulfide	58.3	mg/L	10.0	02/26/21 06:38	
EPA 300.0 Rev 2.1 1993	Chloride	8950	mg/L	100	02/25/21 20:07	
EPA 300.0 Rev 2.1 1993	Sulfate	850	mg/L	100	02/25/21 20:07	
SM 4500-P E-2011	Orthophosphate as P	0.23	mg/L	0.050	02/26/21 03:50	
EPA 9060A	Total Organic Carbon	7.1	mg/L	1.0	03/04/21 01:04	
EPA 9060A	Total Organic Carbon	7.2	mg/L	1.0	03/04/21 01:04	
EPA 9060A	Total Organic Carbon	7.3	mg/L	1.0	03/04/21 01:04	
EPA 9060A	Total Organic Carbon	7.3	mg/L	1.0	03/04/21 01:04	
EPA 9060A	Mean Total Organic Carbon	7.2	mg/L	1.0	03/04/21 01:04	

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ANALYTICAL RESULTS

Project: MCMANUS 30050105.00006
Pace Project No.: 92524150

Sample: VAP-31-W (31-33) **Lab ID: 92524150001** Collected: 02/24/21 09:20 Received: 02/25/21 11:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Calcium	**282**	mg/L	1.0	0.94	10	02/26/21 02:09	02/27/21 21:51	7440-70-2	
Iron	ND	mg/L	0.50	0.42	10	02/26/21 02:09	02/27/21 21:51	7439-89-6	
Magnesium	**618**	mg/L	1.0	0.68	10	02/26/21 02:09	02/27/21 21:51	7439-95-4	
Manganese	**0.32**	mg/L	0.050	0.034	10	02/26/21 02:09	02/27/21 21:51	7439-96-5	
Potassium	**184**	mg/L	50.0	30.4	10	02/26/21 02:09	02/27/21 21:51	7440-09-7	
Sodium	**5380**	mg/L	500	61.1	100	02/26/21 02:09	03/01/21 19:02	7440-23-5	
6010 MET ICP, Dissolved	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Calcium, Dissolved	**238**	mg/L	1.0	0.94	10	03/01/21 08:33	03/03/21 02:52	7440-70-2	
Iron, Dissolved	ND	mg/L	0.50	0.42	10	03/01/21 08:33	03/03/21 02:52	7439-89-6	
Magnesium, Dissolved	**548**	mg/L	1.0	0.68	10	03/01/21 08:33	03/03/21 02:52	7439-95-4	
Manganese, Dissolved	**0.28**	mg/L	0.050	0.034	10	03/01/21 08:33	03/03/21 02:52	7439-96-5	
Potassium, Dissolved	**163**	mg/L	50.0	30.4	10	03/01/21 08:33	03/03/21 02:52	7440-09-7	
Sodium, Dissolved	**4510**	mg/L	500	61.1	100	03/01/21 08:33	03/03/21 01:53	7440-23-5	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Arsenic	**0.038**	mg/L	0.010	0.0087	100	02/25/21 19:24	02/26/21 11:15	7440-38-2	D3
Boron	**2.3J**	mg/L	2.5	0.62	100	02/25/21 19:24	02/26/21 11:15	7440-42-8	D3
6020 MET ICPMS, Dissolved	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Arsenic, Dissolved	**0.020**	mg/L	0.010	0.0087	100	02/25/21 16:11	02/25/21 21:01	7440-38-2	D3
Boron, Dissolved	**1.6J**	mg/L	2.5	0.62	100	02/25/21 16:11	02/25/21 21:01	7440-42-8	D3
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**420**	mg/L	5.0	5.0	1		02/26/21 19:07		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		02/26/21 19:07		
Alkalinity, Total as CaCO3	**420**	mg/L	5.0	5.0	1		02/26/21 19:07		
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**18200**	mg/L	2500	2500	1		03/02/21 19:20		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	**33.2**	mg/L	10.0	5.0	100		02/26/21 06:36	18496-25-8	
5210B BOD, 5 day	Analytical Method: SM 5210B-2011 Pace Analytical Services - Asheville								
BOD, 5 day	ND	mg/L	2.0	2.0	1	02/26/21 05:00	03/03/21 01:31		B2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: MCMANUS 30050105.00006
Pace Project No.: 92524150

Sample: VAP-31-W (31-33) **Lab ID: 92524150001** Collected: 02/24/21 09:20 Received: 02/25/21 11:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC anions 48hr	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**8180**	mg/L	100	60.0	100		02/25/21 18:12	16887-00-6	
Nitrate as N	ND	mg/L	10.0	6.0	100		02/25/21 18:12	14797-55-8	D3
Nitrite as N	ND	mg/L	10.0	5.0	100		02/25/21 18:12	14797-65-0	D3
Sulfate	**977**	mg/L	100	50.0	100		02/25/21 18:12	14808-79-8	
SM4500P-E, Phosphate, Ortho	Analytical Method: SM 4500-P E-2011 Pace Analytical Services - Asheville								
Orthophosphate as P	**0.92**	mg/L	0.25	0.059	5		02/26/21 03:49		
Total Organic Carbon,Asheville	Analytical Method: EPA 9060A Pace Analytical Services - Asheville								
Total Organic Carbon	**7.8**	mg/L	1.0	0.50	1		03/03/21 23:31	7440-44-0	
Total Organic Carbon	**7.7**	mg/L	1.0	0.50	1		03/03/21 23:31	7440-44-0	
Total Organic Carbon	**7.8**	mg/L	1.0	0.50	1		03/03/21 23:31	7440-44-0	
Total Organic Carbon	**7.7**	mg/L	1.0	0.50	1		03/03/21 23:31	7440-44-0	
Mean Total Organic Carbon	**7.8**	mg/L	1.0	0.50	1		03/03/21 23:31	7440-44-0	

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ANALYTICAL RESULTS

Project: MCMANUS 30050105.00006
Pace Project No.: 92524150

Sample: VAP-06-W (15-17) **Lab ID: 92524150002** Collected: 02/24/21 11:43 Received: 02/25/21 11:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Calcium	**191**	mg/L	1.0	0.94	10	02/26/21 02:09	02/27/21 21:54	7440-70-2	
Iron	**1.0**	mg/L	0.50	0.42	10	02/26/21 02:09	02/27/21 21:54	7439-89-6	
Magnesium	**496**	mg/L	1.0	0.68	10	02/26/21 02:09	02/27/21 21:54	7439-95-4	
Manganese	**0.31**	mg/L	0.050	0.034	10	02/26/21 02:09	02/27/21 21:54	7439-96-5	
Potassium	**157**	mg/L	50.0	30.4	10	02/26/21 02:09	02/27/21 21:54	7440-09-7	
Sodium	**4450**	mg/L	500	61.1	100	02/26/21 02:09	03/01/21 19:05	7440-23-5	
6010 MET ICP, Dissolved	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Calcium, Dissolved	**177**	mg/L	1.0	0.94	10	03/01/21 08:33	03/03/21 02:55	7440-70-2	
Iron, Dissolved	**0.85**	mg/L	0.50	0.42	10	03/01/21 08:33	03/03/21 02:55	7439-89-6	
Magnesium, Dissolved	**477**	mg/L	1.0	0.68	10	03/01/21 08:33	03/03/21 02:55	7439-95-4	
Manganese, Dissolved	**0.29**	mg/L	0.050	0.034	10	03/01/21 08:33	03/03/21 02:55	7439-96-5	
Potassium, Dissolved	**152**	mg/L	50.0	30.4	10	03/01/21 08:33	03/03/21 02:55	7440-09-7	
Sodium, Dissolved	**4010**	mg/L	500	61.1	100	03/01/21 08:33	03/03/21 01:56	7440-23-5	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Arsenic	ND	mg/L	0.010	0.0087	100	02/25/21 19:24	02/26/21 11:19	7440-38-2	D3
Boron	**2.0J**	mg/L	2.5	0.62	100	02/25/21 19:24	02/26/21 11:19	7440-42-8	D3
6020 MET ICPMS, Dissolved	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Arsenic, Dissolved	ND	mg/L	0.010	0.0087	100	02/25/21 16:11	02/25/21 21:05	7440-38-2	D3
Boron, Dissolved	**1.8J**	mg/L	2.5	0.62	100	02/25/21 16:11	02/25/21 21:05	7440-42-8	D3
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**237**	mg/L	5.0	5.0	1		03/08/21 17:23		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		03/08/21 17:23		
Alkalinity, Total as CaCO3	**237**	mg/L	5.0	5.0	1		03/08/21 17:23		
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**17300**	mg/L	2500	2500	1		03/02/21 19:20		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	**15.9**	mg/L	10.0	5.0	100		02/26/21 06:37	18496-25-8	
5210B BOD, 5 day	Analytical Method: SM 5210B-2011 Pace Analytical Services - Asheville								
BOD, 5 day	ND	mg/L	2.0	2.0	1	02/26/21 05:00	03/03/21 01:35		B2

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: MCMANUS 30050105.00006
Pace Project No.: 92524150

Sample: VAP-06-W (15-17) **Lab ID: 92524150002** Collected: 02/24/21 11:43 Received: 02/25/21 11:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC anions 48hr	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**7080**	mg/L	100	60.0	100		02/25/21 19:09	16887-00-6	
Nitrate as N	ND	mg/L	10.0	6.0	100		02/25/21 19:09	14797-55-8	D3
Nitrite as N	ND	mg/L	10.0	5.0	100		02/25/21 19:09	14797-65-0	D3
Sulfate	**900**	mg/L	100	50.0	100		02/25/21 19:09	14808-79-8	
SM4500P-E, Phosphate, Ortho	Analytical Method: SM 4500-P E-2011 Pace Analytical Services - Asheville								
Orthophosphate as P	**0.75**	mg/L	0.25	0.059	5		02/26/21 03:49		
Total Organic Carbon,Asheville	Analytical Method: EPA 9060A Pace Analytical Services - Asheville								
Total Organic Carbon	**8.6**	mg/L	1.0	0.50	1		03/03/21 23:49	7440-44-0	
Total Organic Carbon	**8.6**	mg/L	1.0	0.50	1		03/03/21 23:49	7440-44-0	
Total Organic Carbon	**8.8**	mg/L	1.0	0.50	1		03/03/21 23:49	7440-44-0	
Total Organic Carbon	**8.6**	mg/L	1.0	0.50	1		03/03/21 23:49	7440-44-0	
Mean Total Organic Carbon	**8.7**	mg/L	1.0	0.50	1		03/03/21 23:49	7440-44-0	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: MCMANUS 30050105.00006
Pace Project No.: 92524150

Sample: VAP-06-W (8-10) **Lab ID: 92524150003** Collected: 02/24/21 12:14 Received: 02/25/21 11:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Calcium	**218**	mg/L	1.0	0.94	10	02/26/21 02:09	02/27/21 21:57	7440-70-2	
Iron	**3.7**	mg/L	0.50	0.42	10	02/26/21 02:09	02/27/21 21:57	7439-89-6	
Magnesium	**611**	mg/L	1.0	0.68	10	02/26/21 02:09	02/27/21 21:57	7439-95-4	
Manganese	**0.24**	mg/L	0.050	0.034	10	02/26/21 02:09	02/27/21 21:57	7439-96-5	
Potassium	**167**	mg/L	50.0	30.4	10	02/26/21 02:09	02/27/21 21:57	7440-09-7	
Sodium	**5050**	mg/L	500	61.1	100	02/26/21 02:09	03/01/21 19:22	7440-23-5	
6010 MET ICP, Dissolved	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Calcium, Dissolved	**203**	mg/L	1.0	0.94	10	03/01/21 08:33	03/03/21 02:59	7440-70-2	
Iron, Dissolved	**2.7**	mg/L	0.50	0.42	10	03/01/21 08:33	03/03/21 02:59	7439-89-6	
Magnesium, Dissolved	**605**	mg/L	1.0	0.68	10	03/01/21 08:33	03/03/21 02:59	7439-95-4	
Manganese, Dissolved	**0.22**	mg/L	0.050	0.034	10	03/01/21 08:33	03/03/21 02:59	7439-96-5	
Potassium, Dissolved	**162**	mg/L	50.0	30.4	10	03/01/21 08:33	03/03/21 02:59	7440-09-7	
Sodium, Dissolved	**4270**	mg/L	500	61.1	100	03/01/21 08:33	03/03/21 02:06	7440-23-5	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Arsenic	ND	mg/L	0.010	0.0087	100	02/25/21 19:24	02/26/21 11:24	7440-38-2	D3
Boron	**1.8J**	mg/L	2.5	0.62	100	02/25/21 19:24	02/26/21 11:24	7440-42-8	D3
6020 MET ICPMS, Dissolved	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Arsenic, Dissolved	ND	mg/L	0.010	0.0087	100	02/25/21 16:11	02/25/21 21:26	7440-38-2	D3
Boron, Dissolved	**1.7J**	mg/L	2.5	0.62	100	02/25/21 16:11	02/25/21 21:26	7440-42-8	D3
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**111**	mg/L	5.0	5.0	1		03/08/21 17:32		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		03/08/21 17:32		
Alkalinity, Total as CaCO3	**111**	mg/L	5.0	5.0	1		03/08/21 17:32		
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**17500**	mg/L	2500	2500	1		03/02/21 19:20		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	ND	mg/L	0.10	0.050	1		02/26/21 06:37	18496-25-8	
5210B BOD, 5 day	Analytical Method: SM 5210B-2011 Pace Analytical Services - Asheville								
BOD, 5 day	ND	mg/L	2.0	2.0	1	02/26/21 05:00	03/03/21 01:36		B2

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: MCMANUS 30050105.00006
Pace Project No.: 92524150

Sample: VAP-06-W (8-10) **Lab ID: 92524150003** Collected: 02/24/21 12:14 Received: 02/25/21 11:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC anions 48hr	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**8090**	mg/L	100	60.0	100		02/25/21 19:38	16887-00-6	
Nitrate as N	ND	mg/L	10.0	6.0	100		02/25/21 19:38	14797-55-8	D3
Nitrite as N	ND	mg/L	10.0	5.0	100		02/25/21 19:38	14797-65-0	D3
Sulfate	**1060**	mg/L	100	50.0	100		02/25/21 19:38	14808-79-8	
SM4500P-E, Phosphate, Ortho	Analytical Method: SM 4500-P E-2011 Pace Analytical Services - Asheville								
Orthophosphate as P	**0.21**	mg/L	0.050	0.012	1		02/26/21 03:50		
Total Organic Carbon,Asheville	Analytical Method: EPA 9060A Pace Analytical Services - Asheville								
Total Organic Carbon	**5.7**	mg/L	1.0	0.50	1		03/04/21 00:07	7440-44-0	
Total Organic Carbon	**5.7**	mg/L	1.0	0.50	1		03/04/21 00:07	7440-44-0	
Total Organic Carbon	**5.7**	mg/L	1.0	0.50	1		03/04/21 00:07	7440-44-0	
Total Organic Carbon	**5.9**	mg/L	1.0	0.50	1		03/04/21 00:07	7440-44-0	
Mean Total Organic Carbon	**5.7**	mg/L	1.0	0.50	1		03/04/21 00:07	7440-44-0	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: MCMANUS 30050105.00006
Pace Project No.: 92524150

Sample: VAP-06-W (27-29) **Lab ID: 92524150004** Collected: 02/24/21 13:03 Received: 02/25/21 11:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Calcium	**407**	mg/L	1.0	0.94	10	02/26/21 02:09	02/27/21 22:01	7440-70-2	
Iron	**22.8**	mg/L	0.50	0.42	10	02/26/21 02:09	02/27/21 22:01	7439-89-6	
Magnesium	**660**	mg/L	1.0	0.68	10	02/26/21 02:09	02/27/21 22:01	7439-95-4	
Manganese	**1.9**	mg/L	0.050	0.034	10	02/26/21 02:09	02/27/21 22:01	7439-96-5	
Potassium	**173**	mg/L	50.0	30.4	10	02/26/21 02:09	02/27/21 22:01	7440-09-7	
Sodium	**5550**	mg/L	500	61.1	100	02/26/21 02:09	03/01/21 19:25	7440-23-5	
6010 MET ICP, Dissolved	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Calcium, Dissolved	**351**	mg/L	1.0	0.94	10	03/01/21 08:33	03/03/21 03:02	7440-70-2	
Iron, Dissolved	ND	mg/L	0.50	0.42	10	03/01/21 08:33	03/03/21 03:02	7439-89-6	
Magnesium, Dissolved	**597**	mg/L	1.0	0.68	10	03/01/21 08:33	03/03/21 03:02	7439-95-4	
Manganese, Dissolved	**1.5**	mg/L	0.050	0.034	10	03/01/21 08:33	03/03/21 03:02	7439-96-5	
Potassium, Dissolved	**158**	mg/L	50.0	30.4	10	03/01/21 08:33	03/03/21 03:02	7440-09-7	
Sodium, Dissolved	**4770**	mg/L	500	61.1	100	03/01/21 08:33	03/03/21 02:09	7440-23-5	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Arsenic	ND	mg/L	0.010	0.0087	100	02/25/21 19:24	02/26/21 11:36	7440-38-2	D3
Boron	**2.4J**	mg/L	2.5	0.62	100	02/25/21 19:24	02/26/21 11:36	7440-42-8	D3
6020 MET ICPMS, Dissolved	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Arsenic, Dissolved	ND	mg/L	0.010	0.0087	100	02/25/21 16:11	02/25/21 21:30	7440-38-2	D3
Boron, Dissolved	**1.8J**	mg/L	2.5	0.62	100	02/25/21 16:11	02/25/21 21:30	7440-42-8	D3
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**643**	mg/L	5.0	5.0	1		03/08/21 17:41		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		03/08/21 17:41		
Alkalinity, Total as CaCO3	**643**	mg/L	5.0	5.0	1		03/08/21 17:41		
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**20300**	mg/L	2500	2500	1		02/25/21 18:51		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	**58.3**	mg/L	10.0	5.0	100		02/26/21 06:38	18496-25-8	
5210B BOD, 5 day	Analytical Method: SM 5210B-2011 Pace Analytical Services - Asheville								
BOD, 5 day	ND	mg/L	2.0	2.0	1	02/26/21 05:00	03/03/21 01:40		B2

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: MCMANUS 30050105.00006
Pace Project No.: 92524150

Sample: VAP-06-W (27-29) **Lab ID: 92524150004** Collected: 02/24/21 13:03 Received: 02/25/21 11:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC anions 48hr	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**8950**	mg/L	100	60.0	100		02/25/21 20:07	16887-00-6	
Nitrate as N	ND	mg/L	10.0	6.0	100		02/25/21 20:07	14797-55-8	D3
Nitrite as N	ND	mg/L	10.0	5.0	100		02/25/21 20:07	14797-65-0	D3
Sulfate	**850**	mg/L	100	50.0	100		02/25/21 20:07	14808-79-8	
SM4500P-E, Phosphate, Ortho	Analytical Method: SM 4500-P E-2011 Pace Analytical Services - Asheville								
Orthophosphate as P	**0.23**	mg/L	0.050	0.012	1		02/26/21 03:50		
Total Organic Carbon,Asheville	Analytical Method: EPA 9060A Pace Analytical Services - Asheville								
Total Organic Carbon	**7.1**	mg/L	1.0	0.50	1		03/04/21 01:04	7440-44-0	
Total Organic Carbon	**7.2**	mg/L	1.0	0.50	1		03/04/21 01:04	7440-44-0	
Total Organic Carbon	**7.3**	mg/L	1.0	0.50	1		03/04/21 01:04	7440-44-0	
Total Organic Carbon	**7.3**	mg/L	1.0	0.50	1		03/04/21 01:04	7440-44-0	
Mean Total Organic Carbon	**7.2**	mg/L	1.0	0.50	1		03/04/21 01:04	7440-44-0	

REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: MCMANUS 30050105.00006
Pace Project No.: 92524150

QC Batch: 602778
QC Batch Method: EPA 3010A
Analysis Method: EPA 6010D
Analysis Description: 6010 MET
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524150001, 92524150002, 92524150003, 92524150004

METHOD BLANK: 3176256 Matrix: Water
Associated Lab Samples: 92524150001, 92524150002, 92524150003, 92524150004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Calcium	mg/L	ND	0.10	0.094	03/01/21 18:43	
Iron	mg/L	ND	0.050	0.042	03/01/21 18:43	
Magnesium	mg/L	ND	0.10	0.068	03/01/21 18:43	
Manganese	mg/L	ND	0.0050	0.0034	03/01/21 18:43	
Potassium	mg/L	ND	5.0	3.0	03/01/21 18:43	
Sodium	mg/L	ND	5.0	0.61	03/01/21 18:43	

LABORATORY CONTROL SAMPLE: 3176257

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium	mg/L	5	5.2	105	80-120	
Iron	mg/L	5	5.2	104	80-120	
Magnesium	mg/L	5	5.4	107	80-120	
Manganese	mg/L	0.5	0.51	103	80-120	
Potassium	mg/L	5	5.2	103	80-120	
Sodium	mg/L	5	5.3	105	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3176258 3176259

Parameter	Units	92524147001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium	mg/L	462	5	5	456	453	-132	-186	75-125	1	20	M6
Iron	mg/L	6.4	5	5	11.2	11.3	98	98	75-125	0	20	
Magnesium	mg/L	689	5	5	660	676	-580	-254	75-125	2	20	M6
Manganese	mg/L	1.6	0.5	0.5	2.0	2.0	82	89	75-125	2	20	
Potassium	mg/L	168	5	5	169	168	28	10	75-125	1	20	M6
Sodium	mg/L	5690	5	5	5580	5600	-2200	-1720	75-125	0	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: MCMANUS 30050105.00006
Pace Project No.: 92524150

QC Batch: 603185
QC Batch Method: EPA 3010A
Analysis Method: EPA 6010D
Analysis Description: 6010 MET Filtered Diss.
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524150001, 92524150002, 92524150003, 92524150004

METHOD BLANK: 3178071 Matrix: Water
Associated Lab Samples: 92524150001, 92524150002, 92524150003, 92524150004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Calcium, Dissolved	mg/L	ND	0.10	0.094	03/03/21 01:33	
Iron, Dissolved	mg/L	ND	0.050	0.042	03/03/21 01:33	
Magnesium, Dissolved	mg/L	ND	0.10	0.068	03/03/21 01:33	
Manganese, Dissolved	mg/L	ND	0.0050	0.0034	03/03/21 01:33	
Potassium, Dissolved	mg/L	ND	5.0	3.0	03/03/21 01:33	
Sodium, Dissolved	mg/L	ND	5.0	0.61	03/03/21 01:33	

LABORATORY CONTROL SAMPLE: 3178072

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium, Dissolved	mg/L	5	4.4	88	80-120	
Iron, Dissolved	mg/L	5	4.4	89	80-120	
Magnesium, Dissolved	mg/L	5	4.6	93	80-120	
Manganese, Dissolved	mg/L	0.5	0.43	87	80-120	
Potassium, Dissolved	mg/L	5	4.5J	89	80-120	
Sodium, Dissolved	mg/L	5	4.5J	91	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3178073 3178074

Parameter	Units	92524147001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium, Dissolved	mg/L	408	5	5	392	380	-314	-560	75-125	3	20	M6
Iron, Dissolved	mg/L	ND	5	5	4.5	4.9	84	93	75-125	10	20	
Magnesium, Dissolved	mg/L	636	5	5	606	581	-598	-1100	75-125	4	20	M6
Manganese, Dissolved	mg/L	1.4	0.5	0.5	1.7	1.7	70	57	75-125	4	20	M6
Potassium, Dissolved	mg/L	154	5	5	154	149	-4	-86	75-125	3	20	M6
Sodium, Dissolved	mg/L	4990	5	5	4880	4940	-2160	-960	75-125	1	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: MCMANUS 30050105.00006
Pace Project No.: 92524150

QC Batch: 602702 | Analysis Method: EPA 6020B
QC Batch Method: EPA 3010A | Analysis Description: 6020 MET
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524150001, 92524150002, 92524150003, 92524150004

METHOD BLANK: 3175906 Matrix: Water
Associated Lab Samples: 92524150001, 92524150002, 92524150003, 92524150004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Arsenic	mg/L	ND	0.00010	0.000087	02/26/21 10:46	
Boron	mg/L	ND	0.025	0.0062	02/26/21 10:46	

LABORATORY CONTROL SAMPLE: 3175907

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	0.01	0.011	107	80-120	
Boron	mg/L	0.05	0.051	101	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3175908 3175909

Parameter	Units	92524147001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	mg/L	ND	0.01	0.01	0.014	0.011	115	84	75-125	24	20	R1
Boron	mg/L	2.4J	0.05	0.05	2.3J	2.4J	-263	-1	75-125		20	M6

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REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: MCMANUS 30050105.00006
Pace Project No.: 92524150

QC Batch: 602658 Analysis Method: EPA 6020B
QC Batch Method: EPA 3010A Analysis Description: 6020 MET Dissolved
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524150001, 92524150002, 92524150003, 92524150004

METHOD BLANK: 3175488 Matrix: Water
Associated Lab Samples: 92524150001, 92524150002, 92524150003, 92524150004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Arsenic, Dissolved	mg/L	ND	0.00010	0.000087	02/25/21 20:32	
Boron, Dissolved	mg/L	ND	0.025	0.0062	02/25/21 20:32	

LABORATORY CONTROL SAMPLE: 3175489

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic, Dissolved	mg/L	0.01	0.010	104	80-120	
Boron, Dissolved	mg/L	0.05	0.051	102	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3175490 3175491

Parameter	Units	92524147001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic, Dissolved	mg/L	ND	0.01	0.01	0.0094J	0.011	77	94	75-125		20	
Boron, Dissolved	mg/L	2.2J	0.05	0.05	1.8J	2.1J	-786	-285	75-125		20	M6

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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(770)734-4200

QUALITY CONTROL DATA

Project: MCMANUS 30050105.00006
Pace Project No.: 92524150

QC Batch: 602849
QC Batch Method: SM 2320B-2011
Analysis Method: SM 2320B-2011
Analysis Description: 2320B Alkalinity
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524150001

METHOD BLANK: 3176456 Matrix: Water
Associated Lab Samples: 92524150001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	ND	5.0	5.0	02/26/21 18:20	
Alkalinity,Bicarbonate (CaCO3)	mg/L	ND	5.0	5.0	02/26/21 18:20	
Alkalinity,Carbonate (CaCO3)	mg/L	ND	5.0	5.0	02/26/21 18:20	

LABORATORY CONTROL SAMPLE: 3176457

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	50	50.1	100	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3176458 3176459

Parameter	Units	92524147001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	700	50	50	734	758	68	116	80-120	3	25	M1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3176460 3176461

Parameter	Units	92522663002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	23.0	50	50	72.0	72.1	98	98	80-120	0	25	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: MCMANUS 30050105.00006
Pace Project No.: 92524150

QC Batch: 604855
QC Batch Method: SM 2320B-2011
Analysis Method: SM 2320B-2011
Analysis Description: 2320B Alkalinity
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524150002, 92524150003, 92524150004

METHOD BLANK: 3186615 Matrix: Water
Associated Lab Samples: 92524150002, 92524150003, 92524150004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	ND	5.0	5.0	03/08/21 16:33	
Alkalinity,Bicarbonate (CaCO3)	mg/L	ND	5.0	5.0	03/08/21 16:33	
Alkalinity,Carbonate (CaCO3)	mg/L	ND	5.0	5.0	03/08/21 16:33	

LABORATORY CONTROL SAMPLE: 3186616

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	50	51.0	102	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3186617 3186618

Parameter	Units	92523800014 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	43.6	50	50	95.4	96.0	104	105	80-120	1	25	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3186619 3186620

Parameter	Units	92524091001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	16.3	50	50	70.8	70.9	109	109	80-120	0	25	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: MCMANUS 30050105.00006
Pace Project No.: 92524150

QC Batch: 602730
QC Batch Method: SM 2540C-2011
Analysis Method: SM 2540C-2011
Analysis Description: 2540C Total Dissolved Solids
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524150004

METHOD BLANK: 3176027 Matrix: Water
Associated Lab Samples: 92524150004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	ND	25.0	25.0	02/25/21 18:51	

LABORATORY CONTROL SAMPLE: 3176028

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	250	262	105	90-110	

SAMPLE DUPLICATE: 3176029

Parameter	Units	92524147001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	20600	20500	0	25	

SAMPLE DUPLICATE: 3176030

Parameter	Units	92523440012 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	98.0	91.0	7	25	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: MCMANUS 30050105.00006
Pace Project No.: 92524150

QC Batch: 603683 | Analysis Method: SM 2540C-2011
QC Batch Method: SM 2540C-2011 | Analysis Description: 2540C Total Dissolved Solids
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524150001, 92524150002, 92524150003

METHOD BLANK: 3180457 Matrix: Water
Associated Lab Samples: 92524150001, 92524150002, 92524150003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	ND	25.0	25.0	03/02/21 19:18	

LABORATORY CONTROL SAMPLE: 3180458

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	251	252	101	90-110	

SAMPLE DUPLICATE: 3180459

Parameter	Units	92524091017 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	116	103	12	25	

SAMPLE DUPLICATE: 3180460

Parameter	Units	92524097007 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	924	976	5	25	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: MCMANUS 30050105.00006
Pace Project No.: 92524150

QC Batch: 602771 | Analysis Method: SM 4500-S2D-2011
QC Batch Method: SM 4500-S2D-2011 | Analysis Description: 4500S2D Sulfide Water
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524150001, 92524150002, 92524150003, 92524150004

METHOD BLANK: 3176220 Matrix: Water
Associated Lab Samples: 92524150001, 92524150002, 92524150003, 92524150004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Sulfide	mg/L	ND	0.10	0.050	02/26/21 06:34	

LABORATORY CONTROL SAMPLE: 3176221

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfide	mg/L	0.5	0.47	93	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3176222 3176223

Parameter	Units	92523670003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfide	mg/L	ND	0.5	0.5	0.47	0.47	94	94	80-120	0	10	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3176224 3176225

Parameter	Units	92523670004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfide	mg/L	0.073J	0.5	0.5	0.58	0.58	101	101	80-120	0	10	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: MCMANUS 30050105.00006
Pace Project No.: 92524150

QC Batch: 602789 | Analysis Method: SM 5210B-2011
QC Batch Method: SM 5210B-2011 | Analysis Description: 5210B BOD, 5 day
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524150001, 92524150002, 92524150003, 92524150004

METHOD BLANK: 3176288 Matrix: Water
Associated Lab Samples: 92524150001, 92524150002, 92524150003, 92524150004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
BOD, 5 day	mg/L	ND	2.0	2.0	03/03/21 01:10	

LABORATORY CONTROL SAMPLE: 3176290

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
BOD, 5 day	mg/L	198	205	104	84.6-115	

SAMPLE DUPLICATE: 3176291

Parameter	Units	92523947003 Result	Dup Result	RPD	Max RPD	Qualifiers
BOD, 5 day	mg/L	97.3	84.6	14	25	

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QUALITY CONTROL DATA

Project: MCMANUS 30050105.00006
Pace Project No.: 92524150

QC Batch: 602684
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: 92524150001, 92524150002, 92524150003, 92524150004

METHOD BLANK: 3175722 Matrix: Water
Associated Lab Samples: 92524150001, 92524150002, 92524150003, 92524150004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	ND	1.0	0.60	02/25/21 16:02	
Nitrate as N	mg/L	ND	0.10	0.060	02/25/21 16:02	
Nitrite as N	mg/L	ND	0.10	0.050	02/25/21 16:02	
Sulfate	mg/L	ND	1.0	0.50	02/25/21 16:02	

LABORATORY CONTROL SAMPLE: 3175723

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	50	48.8	98	90-110	
Nitrate as N	mg/L	2.5	2.3	94	90-110	
Nitrite as N	mg/L	2.5	2.4	97	90-110	
Sulfate	mg/L	50	49.5	99	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3175724 3175725

Parameter	Units	92524147001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	9250	50	50	9270	9180	44	-124	90-110	1	10	M6
Nitrate as N	mg/L	ND	2.5	2.5	ND	ND	56	52	90-110		10	D3,M6
Nitrite as N	mg/L	ND	2.5	2.5	ND	ND	40	40	90-110		10	D3,M6
Sulfate	mg/L	853	50	50	902	890	99	76	90-110	1	10	M6

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QUALITY CONTROL DATA

Project: MCMANUS 30050105.00006
Pace Project No.: 92524150

QC Batch: 602772 | Analysis Method: SM 4500-P E-2011
QC Batch Method: SM 4500-P E-2011 | Analysis Description: SM4500P-E Phosphorus, Ortho
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524150001, 92524150002, 92524150003, 92524150004

METHOD BLANK: 3176226 Matrix: Water
Associated Lab Samples: 92524150001, 92524150002, 92524150003, 92524150004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Orthophosphate as P	mg/L	ND	0.050	0.012	02/26/21 03:28	

LABORATORY CONTROL SAMPLE: 3176227

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Orthophosphate as P	mg/L	0.25	0.24	96	49-145	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3176228 3176229

Parameter	Units	92524178001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Orthophosphate as P	mg/L	0.92	1.2	1.2	1.8	1.8	67	67	90-110	0	10	M1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3176230 3176231

Parameter	Units	92524193001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Orthophosphate as P	mg/L	0.057	0.25	0.25	0.23	0.23	68	69	90-110	1	10	M1

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: MCMANUS 30050105.00006
Pace Project No.: 92524150

QC Batch: 603999
QC Batch Method: EPA 9060A
Analysis Method: EPA 9060A
Analysis Description: 9060 TOC, AVL
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524150001, 92524150002, 92524150003, 92524150004

METHOD BLANK: 3181952 Matrix: Water
Associated Lab Samples: 92524150001, 92524150002, 92524150003, 92524150004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mean Total Organic Carbon	mg/L	ND	1.0	0.50	03/03/21 21:06	
Total Organic Carbon	mg/L	ND	1.0	0.50	03/03/21 21:06	
Total Organic Carbon	mg/L	ND	1.0	0.50	03/03/21 21:06	
Total Organic Carbon	mg/L	ND	1.0	0.50	03/03/21 21:06	
Total Organic Carbon	mg/L	ND	1.0	0.50	03/03/21 21:06	

LABORATORY CONTROL SAMPLE: 3181953

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mean Total Organic Carbon	mg/L	25	24.4	98	75-125	
Total Organic Carbon	mg/L	25	24.2	97	75-125	
Total Organic Carbon	mg/L	25	24.7	99	75-125	
Total Organic Carbon	mg/L	25	24.3	97	75-125	
Total Organic Carbon	mg/L	25	24.6	98	75-125	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3181954 3181955

Parameter	Units	92524081005 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/L	32.6	25	25	55.7	56.0	92	94	75-125	1	25	
Total Organic Carbon	mg/L	32.6	25	25	55.6	55.9	92	93	75-125	1	25	
Total Organic Carbon	mg/L	32.8	25	25	56.0	56.5	93	95	75-125	1	25	
Total Organic Carbon	mg/L	32.0	25	25	54.6	55.4	90	93	75-125	1	25	
Total Organic Carbon	mg/L	32.9	25	25	56.3	56.4	94	94	75-125	0	25	

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REPORT OF LABORATORY ANALYSIS

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QUALIFIERS

Project: MCMANUS 30050105.00006
Pace Project No.: 92524150

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

B2	Oxygen usage is less than 2.0 for all dilutions set. The reported value is an estimated less than value and is calculated for the dilution using the most amount of sample.
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.
R1	RPD value was outside control limits.

Pace Analytical Services, LLC
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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: MCMANUS 30050105.00006
Pace Project No.: 92524150

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
92524150001	**VAP-31-W (31-33)**	EPA 3010A	602778	EPA 6010D	602799
92524150002	**VAP-06-W (15-17)**	EPA 3010A	602778	EPA 6010D	602799
92524150003	**VAP-06-W (8-10)**	EPA 3010A	602778	EPA 6010D	602799
92524150004	**VAP-06-W (27-29)**	EPA 3010A	602778	EPA 6010D	602799
92524150001	**VAP-31-W (31-33)**	EPA 3010A	603185	EPA 6010D	603191
92524150002	**VAP-06-W (15-17)**	EPA 3010A	603185	EPA 6010D	603191
92524150003	**VAP-06-W (8-10)**	EPA 3010A	603185	EPA 6010D	603191
92524150004	**VAP-06-W (27-29)**	EPA 3010A	603185	EPA 6010D	603191
92524150001	**VAP-31-W (31-33)**	EPA 3010A	602702	EPA 6020B	602750
92524150002	**VAP-06-W (15-17)**	EPA 3010A	602702	EPA 6020B	602750
92524150003	**VAP-06-W (8-10)**	EPA 3010A	602702	EPA 6020B	602750
92524150004	**VAP-06-W (27-29)**	EPA 3010A	602702	EPA 6020B	602750
92524150001	**VAP-31-W (31-33)**	EPA 3010A	602658	EPA 6020B	602711
92524150002	**VAP-06-W (15-17)**	EPA 3010A	602658	EPA 6020B	602711
92524150003	**VAP-06-W (8-10)**	EPA 3010A	602658	EPA 6020B	602711
92524150004	**VAP-06-W (27-29)**	EPA 3010A	602658	EPA 6020B	602711
92524150001	**VAP-31-W (31-33)**	SM 2320B-2011	602849		
92524150002	**VAP-06-W (15-17)**	SM 2320B-2011	604855		
92524150003	**VAP-06-W (8-10)**	SM 2320B-2011	604855		
92524150004	**VAP-06-W (27-29)**	SM 2320B-2011	604855		
92524150001	**VAP-31-W (31-33)**	SM 2540C-2011	603683		
92524150002	**VAP-06-W (15-17)**	SM 2540C-2011	603683		
92524150003	**VAP-06-W (8-10)**	SM 2540C-2011	603683		
92524150004	**VAP-06-W (27-29)**	SM 2540C-2011	602730		
92524150001	**VAP-31-W (31-33)**	SM 4500-S2D-2011	602771		
92524150002	**VAP-06-W (15-17)**	SM 4500-S2D-2011	602771		
92524150003	**VAP-06-W (8-10)**	SM 4500-S2D-2011	602771		
92524150004	**VAP-06-W (27-29)**	SM 4500-S2D-2011	602771		
92524150001	**VAP-31-W (31-33)**	SM 5210B-2011	602789	SM 5210B-2011	602834
92524150002	**VAP-06-W (15-17)**	SM 5210B-2011	602789	SM 5210B-2011	602834
92524150003	**VAP-06-W (8-10)**	SM 5210B-2011	602789	SM 5210B-2011	602834
92524150004	**VAP-06-W (27-29)**	SM 5210B-2011	602789	SM 5210B-2011	602834
92524150001	**VAP-31-W (31-33)**	EPA 300.0 Rev 2.1 1993	602684		
92524150002	**VAP-06-W (15-17)**	EPA 300.0 Rev 2.1 1993	602684		
92524150003	**VAP-06-W (8-10)**	EPA 300.0 Rev 2.1 1993	602684		
92524150004	**VAP-06-W (27-29)**	EPA 300.0 Rev 2.1 1993	602684		
92524150001	**VAP-31-W (31-33)**	SM 4500-P E-2011	602772		
92524150002	**VAP-06-W (15-17)**	SM 4500-P E-2011	602772		
92524150003	**VAP-06-W (8-10)**	SM 4500-P E-2011	602772		
92524150004	**VAP-06-W (27-29)**	SM 4500-P E-2011	602772		
92524150001	**VAP-31-W (31-33)**	EPA 9060A	603999		
92524150002	**VAP-06-W (15-17)**	EPA 9060A	603999		
92524150003	**VAP-06-W (8-10)**	EPA 9060A	603999		

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

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: MCMANUS 30050105.00006
Pace Project No.: 92524150

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
92524150004	**VAP-06-W (27-29)**	EPA 9060A	603999		

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: ARCADIA

Project #: WO# : 92524150

92524150

Courier: ☐ Commercial ☑ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Pace ☐ Other:

Custody Seal Present? ☑ Yes ☐ No **Seals Intact?** ☑ Yes ☐ No

Initials of Person Examining Contents: LZ 2-21/SR

Packing Material: ☐ Bubble Wrap ☑ Bubble Bags ☐ None ☐ Other

Biological Tissue Frozen? ☐ Yes ☐ No ☑ N/A

Thermometer: ☑ IR Gun ID: 93T071 ☑ Wet ☐ Blue ☐ None

Type of Ice:

Cooler Temp: 1.8 **Correction Factor:** Add/Subtract (°C) 0

Temp should be above freezing to 6°C
☐ Samples out of temp criteria. Samples on ice, cooling process has begun

Cooler Temp Corrected (°C): 1.8

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: 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#: 92524150

PM: KLH1 Due Date: 02/26/21

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)	GN	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		2	1	1		2 ✓	1 ✓										3								1			
2		2	1	1		2 ✓	1 ✓										3								1			
3		2	1	1		2 ✓	1 ✓										3								1			
4		2	1	1		2 ✓	1 ✓										3								1			
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.

ARCADIS

ID#:

CHAIN OF CUSTODY & LABORATORY ANALYSIS REQUEST FORM

Page ___ of ___

Lab Work Order #: 420241150

Send Results to:

Contact & Company Name: MATT WEBB ARCADIS
Telephone: 919-415-2284
Address: Ste 350 5420 WADE PARK BLVD
Fax:
City: RALEIGH State: NC Zip: 27607
E-mail Address: Matthew.Webb@Arcadis.com
Project Name/Location (City, State): McMANUS PLANT - BMW
Project #: 30050105.00006
Sampler's Printed Name:
Sampler's Signature:

Preservative	C	C	E	E		F	G	E	E
Filtered (✓)					KIT				
# of Containers	1	1	1	1		1	3	1	1
Container Information	3	3	3	3		9	1	2	4

PARAMETER ANALYSIS & METHOD

Sample ID	Collection Date	Collection Time	Type (✓) Comp	Type (✓) Grab	Matrix	Total metals	Dissolved metals	Alkalinity	Cl, SO4, NO2/NO3	Orthophosphate KIT	Sulfide NaOH + Zn Acetate	TOC	BOD	TDS	REMARKS
VAP-31-W (31-33)	2/24/21	9:20		X	W	1	1	1		1	1	3	1	1	
VAP-06-W (15-17)	2/24/21	11:43		X	W	1	1	1		1	1	3	1	1	VAP-06-W (15-17)
VAP-06-W (8-10)	2/24/21	12:14		X	W	1	1	1		1	1	3	1	1	
VAP-06-W (27-29)	2/24/21	13:03		X	W	1	1	1		1	1	3	1	1	

Keys

Preservation Key: A. H_2SO_4; B. HCl; C. HNO_3; D. NaOH; E. None; F. Other: MeOH Encore; G. Other: H_3PO_4; H. Other:

Container Information Key: 1. 40 ml Vial; 2. 1 L Amber; 3. 250 ml Plastic; 4. 500 ml Plastic; 5. Encore; 6. 2 oz. Glass; 7. 4 oz. Glass; 8. 8 oz. Glass; 9. Other: 125 mL; 10. Other:

Matrix Key: SO - Soil; SE - Sediment; NL - NAPL/Oil; W - Water; SL - Sludge; SW - Sample Wipe; T - Tissue; A - Air; Other:

Special Instructions/Comments: Metals: As, Fe, Mn, Mg, Cu, Na, K, B
Dissolved metals field filtered
Total/Dissolved As on 24 TAT

☐ Special QA/QC Instructions(✓):

Laboratory Information and Receipt:

Lab Name: PACE
☑ Cooler packed with ice (✓)
Specify Turnaround Requirements:
Shipping Tracking #:

Cooler Custody Seal (✓): ☑ Intact ☐ Not Intact
Sample Receipt:
Condition/Cooler Temp: 1.8

Relinquished By	Received By	Relinquished By	Laboratory Received By
Printed Name: Grant Allsworth	Printed Name: FedEx	Printed Name: STACY F. RICE	Printed Name:
Signature:	Signature:	Signature:	Signature:
Firm: ANA	Firm/Courier:	Firm/Courier: PACE/AVL	Firm:
Date/Time: 2/24/21 1600	Date/Time:	Date/Time: 2-25-21 1100	Date/Time:

20730825 CofC AR Form 08.27.2015

Distribution: WHITE – Laboratory returns with results YELLOW – Lab copy PINK – Retained by Arcadis

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

March 03, 2021

Ms. Lauren Petty
Southern Co. Services
42 Inverness Center Parkway
Birmingham, AL 35242

RE: Project: MCMANUS 30050105.00006
Pace Project No.: 92524147

Dear Ms. Petty:

Enclosed are the analytical results for sample(s) received by the laboratory on February 25, 2021. 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

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

Sincerely,

Tyler Forney for
Kevin Herring
kevin.herring@pacelabs.com
1(704)875-9092
HORIZON Database Administrator

Enclosures

cc: Joju Abraham, Georgia Power-CCR
Kathyrn Farris
Geoffrey Gay, ARCADIS - Atlanta
Margaret Gentile, Arcadis
Kristen Jurinko
Charles Lawson, Arcadis
Bryan Mayeux
Kelley Sharpe, ARCADIS - Atlanta
Maribel Vital

Pace Analytical Services, LLC
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CERTIFICATIONS

Project: MCMANUS 30050105.00006
Pace Project No.: 92524147

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

REPORT OF LABORATORY ANALYSIS

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

SAMPLE SUMMARY

Project: MCMANUS 30050105.00006
Pace Project No.: 92524147

Lab ID	Sample ID	Matrix	Date Collected	Date Received
92524147001	**VAP-6-W (33.5-35.5)**	Water	02/24/21 13:50	02/25/21 11:00

REPORT OF LABORATORY ANALYSIS

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

SAMPLE ANALYTE COUNT

Project: MCMANUS 30050105.00006
Pace Project No.: 92524147

Lab ID	Sample ID	Method	Analysts	Analytes Reported
92524147001	**VAP-6-W (33.5-35.5)**	EPA 6010D	DS, KQ	6
		EPA 6010D	SH1	6
		EPA 6020B	JOR	2
		EPA 6020B	JOR	2
		SM 2320B-2011	ECH	3
		SM 2540C-2011	RED	1
		SM 4500-S2D-2011	JP1	1
		SM 5210B-2011	NFW	1
		EPA 300.0 Rev 2.1 1993	CDC	4
		SM 4500-P E-2011	JP1	1
		EPA 9060A	JLH	5

PASI-A = Pace Analytical Services - Asheville

REPORT OF LABORATORY ANALYSIS

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

SUMMARY OF DETECTION

Project: MCMANUS 30050105.00006
Pace Project No.: 92524147

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92524147001	**VAP-6-W (33.5-35.5)**					
EPA 6010D	Calcium	462	mg/L	1.0	02/27/21 21:37	M6
EPA 6010D	Iron	6.4	mg/L	0.50	02/27/21 21:37	
EPA 6010D	Magnesium	689	mg/L	1.0	02/27/21 21:37	M6
EPA 6010D	Manganese	1.6	mg/L	0.050	02/27/21 21:37	
EPA 6010D	Potassium	168	mg/L	50.0	02/27/21 21:37	M6
EPA 6010D	Sodium	5690	mg/L	500	03/01/21 18:49	M6
EPA 6010D	Calcium, Dissolved	408	mg/L	1.0	03/03/21 02:26	M6
EPA 6010D	Magnesium, Dissolved	636	mg/L	1.0	03/03/21 02:26	M6
EPA 6010D	Manganese, Dissolved	1.4	mg/L	0.050	03/03/21 02:26	M6
EPA 6010D	Potassium, Dissolved	154	mg/L	50.0	03/03/21 02:26	M6
EPA 6010D	Sodium, Dissolved	4990	mg/L	500	03/03/21 01:40	M6
EPA 6020B	Boron	2.4J	mg/L	2.5	02/26/21 10:55	D3,M6
EPA 6020B	Boron, Dissolved	2.2J	mg/L	2.5	02/25/21 20:40	D3,M6
SM 2320B-2011	Alkalinity,Bicarbonate (CaCO3)	700	mg/L	5.0	02/26/21 18:29	
SM 2320B-2011	Alkalinity, Total as CaCO3	700	mg/L	5.0	02/26/21 18:29	M1
SM 2540C-2011	Total Dissolved Solids	20600	mg/L	2500	02/25/21 18:51	
SM 4500-S2D-2011	Sulfide	59.1	mg/L	10.0	02/26/21 06:36	
EPA 300.0 Rev 2.1 1993	Chloride	9250	mg/L	100	02/25/21 20:35	M6
EPA 300.0 Rev 2.1 1993	Sulfate	853	mg/L	100	02/25/21 20:35	M6
SM 4500-P E-2011	Orthophosphate as P	0.24	mg/L	0.050	02/26/21 03:50	
EPA 9060A	Total Organic Carbon	7.9	mg/L	1.0	03/02/21 09:48	
EPA 9060A	Total Organic Carbon	7.6	mg/L	1.0	03/02/21 09:48	
EPA 9060A	Total Organic Carbon	7.9	mg/L	1.0	03/02/21 09:48	
EPA 9060A	Total Organic Carbon	7.7	mg/L	1.0	03/02/21 09:48	
EPA 9060A	Mean Total Organic Carbon	7.8	mg/L	1.0	03/02/21 09:48	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: MCMANUS 30050105.00006
Pace Project No.: 92524147

Sample: VAP-6-W (33.5-35.5) **Lab ID: 92524147001** Collected: 02/24/21 13:50 Received: 02/25/21 11:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Calcium	**462**	mg/L	1.0	0.94	10	02/26/21 02:09	02/27/21 21:37	7440-70-2	M6
Iron	**6.4**	mg/L	0.50	0.42	10	02/26/21 02:09	02/27/21 21:37	7439-89-6	
Magnesium	**689**	mg/L	1.0	0.68	10	02/26/21 02:09	02/27/21 21:37	7439-95-4	M6
Manganese	**1.6**	mg/L	0.050	0.034	10	02/26/21 02:09	02/27/21 21:37	7439-96-5	
Potassium	**168**	mg/L	50.0	30.4	10	02/26/21 02:09	02/27/21 21:37	7440-09-7	M6
Sodium	**5690**	mg/L	500	61.1	100	02/26/21 02:09	03/01/21 18:49	7440-23-5	M6
6010 MET ICP, Dissolved	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Calcium, Dissolved	**408**	mg/L	1.0	0.94	10	03/01/21 08:33	03/03/21 02:26	7440-70-2	M6
Iron, Dissolved	ND	mg/L	0.50	0.42	10	03/01/21 08:33	03/03/21 02:26	7439-89-6	
Magnesium, Dissolved	**636**	mg/L	1.0	0.68	10	03/01/21 08:33	03/03/21 02:26	7439-95-4	M6
Manganese, Dissolved	**1.4**	mg/L	0.050	0.034	10	03/01/21 08:33	03/03/21 02:26	7439-96-5	M6
Potassium, Dissolved	**154**	mg/L	50.0	30.4	10	03/01/21 08:33	03/03/21 02:26	7440-09-7	M6
Sodium, Dissolved	**4990**	mg/L	500	61.1	100	03/01/21 08:33	03/03/21 01:40	7440-23-5	M6
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Arsenic	ND	mg/L	0.010	0.0087	100	02/25/21 19:24	02/26/21 10:55	7440-38-2	D3,R1
Boron	**2.4J**	mg/L	2.5	0.62	100	02/25/21 19:24	02/26/21 10:55	7440-42-8	D3,M6
6020 MET ICPMS, Dissolved	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Arsenic, Dissolved	ND	mg/L	0.010	0.0087	100	02/25/21 16:11	02/25/21 20:40	7440-38-2	D3
Boron, Dissolved	**2.2J**	mg/L	2.5	0.62	100	02/25/21 16:11	02/25/21 20:40	7440-42-8	D3,M6
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**700**	mg/L	5.0	5.0	1		02/26/21 18:29		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		02/26/21 18:29		
Alkalinity, Total as CaCO3	**700**	mg/L	5.0	5.0	1		02/26/21 18:29		M1
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**20600**	mg/L	2500	2500	1		02/25/21 18:51		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	**59.1**	mg/L	10.0	5.0	100		02/26/21 06:36	18496-25-8	
5210B BOD, 5 day	Analytical Method: SM 5210B-2011 Pace Analytical Services - Asheville								
BOD, 5 day	ND	mg/L	2.0	2.0	1	02/26/21 05:00	03/03/21 01:28		B2

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: MCMANUS 30050105.00006
Pace Project No.: 92524147

Sample: VAP-6-W (33.5-35.5) **Lab ID: 92524147001** Collected: 02/24/21 13:50 Received: 02/25/21 11:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC anions 48hr	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**9250**	mg/L	100	60.0	100		02/25/21 20:35	16887-00-6	M6
Nitrate as N	ND	mg/L	10.0	6.0	100		02/25/21 20:35	14797-55-8	D3,M6
Nitrite as N	ND	mg/L	10.0	5.0	100		02/25/21 20:35	14797-65-0	D3,M6
Sulfate	**853**	mg/L	100	50.0	100		02/25/21 20:35	14808-79-8	M6
SM4500P-E, Phosphate, Ortho	Analytical Method: SM 4500-P E-2011 Pace Analytical Services - Asheville								
Orthophosphate as P	**0.24**	mg/L	0.050	0.012	1		02/26/21 03:50		
Total Organic Carbon,Asheville	Analytical Method: EPA 9060A Pace Analytical Services - Asheville								
Total Organic Carbon	**7.9**	mg/L	1.0	0.50	1		03/02/21 09:48	7440-44-0	
Total Organic Carbon	**7.6**	mg/L	1.0	0.50	1		03/02/21 09:48	7440-44-0	
Total Organic Carbon	**7.9**	mg/L	1.0	0.50	1		03/02/21 09:48	7440-44-0	
Total Organic Carbon	**7.7**	mg/L	1.0	0.50	1		03/02/21 09:48	7440-44-0	
Mean Total Organic Carbon	**7.8**	mg/L	1.0	0.50	1		03/02/21 09:48	7440-44-0	

REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: MCMANUS 30050105.00006
Pace Project No.: 92524147

QC Batch: 602778
QC Batch Method: EPA 3010A
Analysis Method: EPA 6010D
Analysis Description: 6010 MET
Laboratory: Pace Analytical Services - Asheville

Associated Lab Samples: 92524147001

METHOD BLANK: 3176256 Matrix: Water
Associated Lab Samples: 92524147001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Calcium	mg/L	ND	0.10	0.094	03/01/21 18:43	
Iron	mg/L	ND	0.050	0.042	03/01/21 18:43	
Magnesium	mg/L	ND	0.10	0.068	03/01/21 18:43	
Manganese	mg/L	ND	0.0050	0.0034	03/01/21 18:43	
Potassium	mg/L	ND	5.0	3.0	03/01/21 18:43	
Sodium	mg/L	ND	5.0	0.61	03/01/21 18:43	

LABORATORY CONTROL SAMPLE: 3176257

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium	mg/L	5	5.2	105	80-120	
Iron	mg/L	5	5.2	104	80-120	
Magnesium	mg/L	5	5.4	107	80-120	
Manganese	mg/L	0.5	0.51	103	80-120	
Potassium	mg/L	5	5.2	103	80-120	
Sodium	mg/L	5	5.3	105	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3176258 3176259

Parameter	Units	92524147001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium	mg/L	462	5	5	456	453	-132	-186	75-125	1	20	M6
Iron	mg/L	6.4	5	5	11.2	11.3	98	98	75-125	0	20	
Magnesium	mg/L	689	5	5	660	676	-580	-254	75-125	2	20	M6
Manganese	mg/L	1.6	0.5	0.5	2.0	2.0	82	89	75-125	2	20	
Potassium	mg/L	168	5	5	169	168	28	10	75-125	1	20	M6
Sodium	mg/L	5690	5	5	5580	5600	-2200	-1720	75-125	0	20	M6

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REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: MCMANUS 30050105.00006
Pace Project No.: 92524147

QC Batch: 603185
QC Batch Method: EPA 3010A
Analysis Method: EPA 6010D
Analysis Description: 6010 MET Filtered Diss.
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524147001

METHOD BLANK: 3178071 Matrix: Water
Associated Lab Samples: 92524147001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Calcium, Dissolved	mg/L	ND	0.10	0.094	03/03/21 01:33	
Iron, Dissolved	mg/L	ND	0.050	0.042	03/03/21 01:33	
Magnesium, Dissolved	mg/L	ND	0.10	0.068	03/03/21 01:33	
Manganese, Dissolved	mg/L	ND	0.0050	0.0034	03/03/21 01:33	
Potassium, Dissolved	mg/L	ND	5.0	3.0	03/03/21 01:33	
Sodium, Dissolved	mg/L	ND	5.0	0.61	03/03/21 01:33	

LABORATORY CONTROL SAMPLE: 3178072

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium, Dissolved	mg/L	5	4.4	88	80-120	
Iron, Dissolved	mg/L	5	4.4	89	80-120	
Magnesium, Dissolved	mg/L	5	4.6	93	80-120	
Manganese, Dissolved	mg/L	0.5	0.43	87	80-120	
Potassium, Dissolved	mg/L	5	4.5J	89	80-120	
Sodium, Dissolved	mg/L	5	4.5J	91	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3178073 3178074

Parameter	Units	92524147001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium, Dissolved	mg/L	408	5	5	392	380	-314	-560	75-125	3	20	M6
Iron, Dissolved	mg/L	ND	5	5	4.5	4.9	84	93	75-125	10	20	
Magnesium, Dissolved	mg/L	636	5	5	606	581	-598	-1100	75-125	4	20	M6
Manganese, Dissolved	mg/L	1.4	0.5	0.5	1.7	1.7	70	57	75-125	4	20	M6
Potassium, Dissolved	mg/L	154	5	5	154	149	-4	-86	75-125	3	20	M6
Sodium, Dissolved	mg/L	4990	5	5	4880	4940	-2160	-960	75-125	1	20	M6

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
110 Technology Parkway
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(770)734-4200

QUALITY CONTROL DATA

Project: MCMANUS 30050105.00006
Pace Project No.: 92524147

QC Batch: 602702
QC Batch Method: EPA 3010A
Analysis Method: EPA 6020B
Analysis Description: 6020 MET
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524147001

METHOD BLANK: 3175906 Matrix: Water
Associated Lab Samples: 92524147001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Arsenic	mg/L	ND	0.00010	0.000087	02/26/21 10:46	
Boron	mg/L	ND	0.025	0.0062	02/26/21 10:46	

LABORATORY CONTROL SAMPLE: 3175907

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	0.01	0.011	107	80-120	
Boron	mg/L	0.05	0.051	101	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3175908 3175909

Parameter	Units	92524147001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	mg/L	ND	0.01	0.01	0.014	0.011	115	84	75-125	24	20	R1
Boron	mg/L	2.4J	0.05	0.05	2.3J	2.4J	-263	-1	75-125		20	M6

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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(770)734-4200

QUALITY CONTROL DATA

Project: MCMANUS 30050105.00006
Pace Project No.: 92524147

QC Batch: 602658
QC Batch Method: EPA 3010A
Analysis Method: EPA 6020B
Analysis Description: 6020 MET Dissolved
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524147001

METHOD BLANK: 3175488 Matrix: Water
Associated Lab Samples: 92524147001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Arsenic, Dissolved	mg/L	ND	0.00010	0.000087	02/25/21 20:32	
Boron, Dissolved	mg/L	ND	0.025	0.0062	02/25/21 20:32	

LABORATORY CONTROL SAMPLE: 3175489

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic, Dissolved	mg/L	0.01	0.010	104	80-120	
Boron, Dissolved	mg/L	0.05	0.051	102	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3175490 3175491

Parameter	Units	92524147001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic, Dissolved	mg/L	ND	0.01	0.01	0.0094J	0.011	77	94	75-125		20	
Boron, Dissolved	mg/L	2.2J	0.05	0.05	1.8J	2.1J	-786	-285	75-125		20	M6

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
110 Technology Parkway
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(770)734-4200

QUALITY CONTROL DATA

Project: MCMANUS 30050105.00006
Pace Project No.: 92524147

QC Batch: 602849
QC Batch Method: SM 2320B-2011
Analysis Method: SM 2320B-2011
Analysis Description: 2320B Alkalinity
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524147001

METHOD BLANK: 3176456 Matrix: Water
Associated Lab Samples: 92524147001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	ND	5.0	5.0	02/26/21 18:20	
Alkalinity,Bicarbonate (CaCO3)	mg/L	ND	5.0	5.0	02/26/21 18:20	
Alkalinity,Carbonate (CaCO3)	mg/L	ND	5.0	5.0	02/26/21 18:20	

LABORATORY CONTROL SAMPLE: 3176457

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	50	50.1	100	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3176458 3176459

Parameter	Units	92524147001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	700	50	50	734	758	68	116	80-120	3	25	M1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3176460 3176461

Parameter	Units	92522663002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	23.0	50	50	72.0	72.1	98	98	80-120	0	25	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: MCMANUS 30050105.00006
Pace Project No.: 92524147

QC Batch: 602730
QC Batch Method: SM 2540C-2011
Analysis Method: SM 2540C-2011
Analysis Description: 2540C Total Dissolved Solids
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524147001

METHOD BLANK: 3176027 Matrix: Water
Associated Lab Samples: 92524147001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	ND	25.0	25.0	02/25/21 18:51	

LABORATORY CONTROL SAMPLE: 3176028

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	250	262	105	90-110	

SAMPLE DUPLICATE: 3176029

Parameter	Units	92524147001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	20600	20500	0	25	

SAMPLE DUPLICATE: 3176030

Parameter	Units	92523440012 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	98.0	91.0	7	25	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: MCMANUS 30050105.00006
Pace Project No.: 92524147

QC Batch: 602771
QC Batch Method: SM 4500-S2D-2011
Analysis Method: SM 4500-S2D-2011
Analysis Description: 4500S2D Sulfide Water
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524147001

METHOD BLANK: 3176220 Matrix: Water
Associated Lab Samples: 92524147001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Sulfide	mg/L	ND	0.10	0.050	02/26/21 06:34	

LABORATORY CONTROL SAMPLE: 3176221

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfide	mg/L	0.5	0.47	93	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3176222 3176223

Parameter	Units	92523670003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfide	mg/L	ND	0.5	0.5	0.47	0.47	94	94	80-120	0	10	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3176224 3176225

Parameter	Units	92523670004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfide	mg/L	0.073J	0.5	0.5	0.58	0.58	101	101	80-120	0	10	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: MCMANUS 30050105.00006
Pace Project No.: 92524147

QC Batch: 602789
QC Batch Method: SM 5210B-2011
Analysis Method: SM 5210B-2011
Analysis Description: 5210B BOD, 5 day
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524147001

METHOD BLANK: 3176288 Matrix: Water
Associated Lab Samples: 92524147001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
BOD, 5 day	mg/L	ND	2.0	2.0	03/03/21 01:10	

LABORATORY CONTROL SAMPLE: 3176290

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
BOD, 5 day	mg/L	198	205	104	84.6-115	

SAMPLE DUPLICATE: 3176291

Parameter	Units	92523947003 Result	Dup Result	RPD	Max RPD	Qualifiers
BOD, 5 day	mg/L	97.3	84.6	14	25	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: MCMANUS 30050105.00006
Pace Project No.: 92524147

QC Batch: 602684
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: 92524147001

METHOD BLANK: 3175722 Matrix: Water
Associated Lab Samples: 92524147001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	ND	1.0	0.60	02/25/21 16:02	
Nitrate as N	mg/L	ND	0.10	0.060	02/25/21 16:02	
Nitrite as N	mg/L	ND	0.10	0.050	02/25/21 16:02	
Sulfate	mg/L	ND	1.0	0.50	02/25/21 16:02	

LABORATORY CONTROL SAMPLE: 3175723

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	50	48.8	98	90-110	
Nitrate as N	mg/L	2.5	2.3	94	90-110	
Nitrite as N	mg/L	2.5	2.4	97	90-110	
Sulfate	mg/L	50	49.5	99	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3175724 3175725

Parameter	Units	92524147001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	9250	50	50	9270	9180	44	-124	90-110	1	10	M6
Nitrate as N	mg/L	ND	2.5	2.5	ND	ND	56	52	90-110		10	D3,M6
Nitrite as N	mg/L	ND	2.5	2.5	ND	ND	40	40	90-110		10	D3,M6
Sulfate	mg/L	853	50	50	902	890	99	76	90-110	1	10	M6

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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QUALITY CONTROL DATA

Project: MCMANUS 30050105.00006
Pace Project No.: 92524147

QC Batch: 602772
QC Batch Method: SM 4500-P E-2011
Analysis Method: SM 4500-P E-2011
Analysis Description: SM4500P-E Phosphorus, Ortho
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524147001

METHOD BLANK: 3176226 Matrix: Water
Associated Lab Samples: 92524147001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Orthophosphate as P	mg/L	ND	0.050	0.012	02/26/21 03:28	

LABORATORY CONTROL SAMPLE: 3176227

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Orthophosphate as P	mg/L	0.25	0.24	96	49-145	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3176228 3176229

Parameter	Units	92524178001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Orthophosphate as P	mg/L	0.92	1.2	1.2	1.8	1.8	67	67	90-110	0	10	M1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3176230 3176231

Parameter	Units	92524193001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Orthophosphate as P	mg/L	0.057	0.25	0.25	0.23	0.23	68	69	90-110	1	10	M1

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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(770)734-4200

QUALITY CONTROL DATA

Project: MCMANUS 30050105.00006
Pace Project No.: 92524147

QC Batch: 603153
QC Batch Method: EPA 9060A
Analysis Method: EPA 9060A
Analysis Description: 9060 TOC, AVL
Laboratory: Pace Analytical Services - Asheville

Associated Lab Samples: 92524147001

METHOD BLANK: 3177969 Matrix: Water
Associated Lab Samples: 92524147001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mean Total Organic Carbon	mg/L	ND	1.0	0.50	03/02/21 22:12	
Total Organic Carbon	mg/L	ND	1.0	0.50	03/02/21 22:12	
Total Organic Carbon	mg/L	ND	1.0	0.50	03/02/21 22:12	
Total Organic Carbon	mg/L	ND	1.0	0.50	03/02/21 22:12	
Total Organic Carbon	mg/L	ND	1.0	0.50	03/02/21 22:12	

LABORATORY CONTROL SAMPLE: 3177970

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mean Total Organic Carbon	mg/L	25	24.2	97	75-125	
Total Organic Carbon	mg/L	25	24.2	97	75-125	
Total Organic Carbon	mg/L	25	24.9	100	75-125	
Total Organic Carbon	mg/L	25	23.2	93	75-125	
Total Organic Carbon	mg/L	25	24.4	97	75-125	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3177971 3177972

Parameter	Units	92523998001 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/L	264	25	25	285	280	81	60	75-125	2	25	M6
Total Organic Carbon	mg/L		25	25	283	278	90	71	75-125	2	25	M6
Total Organic Carbon	mg/L		25	25	289	282	71	44	75-125	2	25	M6
Total Organic Carbon	mg/L		25	25	280	276	87	74	75-125	1	25	M6
Total Organic Carbon	mg/L		25	25	287	282	76	52	75-125	2	25	M6

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3177973 3177974

Parameter	Units	92523918001 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/L	9.3	25	25	34.9	34.8	102	102	75-125	0	25	
Total Organic Carbon	mg/L	9.1	25	25	34.7	34.8	102	103	75-125	0	25	
Total Organic Carbon	mg/L	9.4	25	25	35.0	34.8	102	102	75-125	0	25	
Total Organic Carbon	mg/L	9.4	25	25	35.0	34.5	102	101	75-125	1	25	
Total Organic Carbon	mg/L	9.4	25	25	34.9	35.0	102	103	75-125	0	25	

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REPORT OF LABORATORY ANALYSIS

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(770)734-4200

QUALIFIERS

Project: MCMANUS 30050105.00006
Pace Project No.: 92524147

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

B2	Oxygen usage is less than 2.0 for all dilutions set. The reported value is an estimated less than value and is calculated for the dilution using the most amount of sample.
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.
R1	RPD value was outside control limits.

Pace Analytical Services, LLC
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(770)734-4200

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: MCMANUS 30050105.00006
Pace Project No.: 92524147

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
92524147001	**VAP-6-W (33.5-35.5)**	EPA 3010A	602778	EPA 6010D	602799
92524147001	**VAP-6-W (33.5-35.5)**	EPA 3010A	603185	EPA 6010D	603191
92524147001	**VAP-6-W (33.5-35.5)**	EPA 3010A	602702	EPA 6020B	602750
92524147001	**VAP-6-W (33.5-35.5)**	EPA 3010A	602658	EPA 6020B	602711
92524147001	**VAP-6-W (33.5-35.5)**	SM 2320B-2011	602849		
92524147001	**VAP-6-W (33.5-35.5)**	SM 2540C-2011	602730		
92524147001	**VAP-6-W (33.5-35.5)**	SM 4500-S2D-2011	602771		
92524147001	**VAP-6-W (33.5-35.5)**	SM 5210B-2011	602789	SM 5210B-2011	602834
92524147001	**VAP-6-W (33.5-35.5)**	EPA 300.0 Rev 2.1 1993	602684		
92524147001	**VAP-6-W (33.5-35.5)**	SM 4500-P E-2011	602772		
92524147001	**VAP-6-W (33.5-35.5)**	EPA 9060A	603153		

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: ARCADIS

Project #:

WO# : 92524147

92524147

Courier: ☑ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ Other:____

Custody Seal Present? ☑ Yes ☐ No **Seals Intact?** ☑ Yes ☐ No

Date/Initials Person Examining Contents: 7-25-21 SR

Packing Material: ☐ Bubble Wrap ☑ Bubble Bags ☐ None ☐ Other

Biological Tissue Frozen? ☐ Yes ☐ No ☑ N/A

Thermometer: ☑ IR Gun ID: 93T071 ☑ Wet ☐ Blue ☐ None

Type of Ice:

Cooler Temp: 5.0 **Correction Factor: Add/Subtract (°C)** 0

Cooler Temp Corrected (°C): 5.0

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 7-25-21	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# : 92524147

PM: KLH1 Due Date: 02/26/21

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)	GN	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		2	1	1		2 ✓	1 ✓										3								1				
2																													
3																													
4																													
5																													
6																													
7																													
8																													
9																													
10																													
11																													
12																													

pH Adjustment Log for Preserved Samples

Sample ID	Type of Preservative	pH upon receipt	Date preservation adjusted	Time preservation adjusted	Amount of Preservative added	Lot #

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

ARCADIS

ID#:

CHAIN OF CUSTODY & LABORATORY ANALYSIS REQUEST FORM

Page ___ of ___

Lab Work Order #: 92524147

Send Results to:

Contact & Company Name: MATT WEBB ARCADIS
Telephone: 919-415-2294
Address: Ste 350 5420 WADE PARK BLVD
Fax:
City: RALEIGH State: NC Zip: 27607
E-mail Address: Matthew.Webb@Arcadis.com
Project Name/Location (City, State): MCMANUS - BRUNSWICK
Project #: 30050105.00006
Sampler's Printed Name:
Sampler's Signature:

Preservative	C	C	E	C	F		G	E	F
Filtered (✓)						K			
# of Containers	1	1	1	1	1	T	3	1	1
Container Information	3	3	3	3	9		1	2	4

Keys

Preservation Key: A. H2SO4 B. HCL C. HNO3 D. NaOH E. None F. Other: Ascorbic Acid G. Other: H3PO4 H. Other:

Container Information Key: 1. 40 ml Vial 2. 1 L Amber 3. 250 ml Plastic 4. 500 ml Plastic 5. Encore 6. 2 oz. Glass 7. 4 oz. Glass 8. 8 oz. Glass 9. Other: 125 ml 10. Other:

Matrix Key: SO - Soil, SE - Sediment, NL - NAPL/Oil, W - Water, SL - Sludge, SW - Sample Wipe, T - Tissue, A - Air, Other:

Sample ID	Collection Date	Collection Time	Type (✓) Comp	Type (✓) Grab	Matrix	TOTAL Metals	Dissolved Metals	Alkalinity	Cl, SO4, NO3, NO2	Sulfide NaOH ZnAcetate	Orthophosphate Kit	TOC	BOD	TDS
VA-6-W-(33.5-35.5)	2/24/21	1350		X		1	1	1	1	1	1	3	1	1

PARAMETER ANALYSIS & METHOD

REMARKS

Special Instructions/Comments: METALS = As, Fe, Mn, Mg, Ca, Na, K, B
DISSOLVED METALS ARE FIELD FILTER
TOTAL AND DISSOLVED AS are to be Analyzed on a 24 hr TAT

☐ Special QA/QC Instructions(✓):

Laboratory Information and Receipt

Lab Name: PACE
☑ Cooler packed with ice (✓)
Specify Turnaround Requirements:
Shipping Tracking #:
Cooler Custody Seal (✓): ☐ Intact ☐ Not Intact
Sample Receipt Condition/Cooler Temp: 5.0

Relinquished By	Received By	Relinquished By	Laboratory Received By
Printed Name: Grant A. Wilford	Printed Name: FedEx	Printed Name: STACY RICE	Printed Name:
Signature:	Signature:	Signature:	Signature:
Firm: AVA	Firm/Courier:	Firm/Courier: PACE/AVL	Firm:
Date/Time: 2/24/21 1600	Date/Time:	Date/Time: 2-25-21 1100	Date/Time:

Distribution: WHITE – Laboratory returns with results YELLOW – Lab copy PINK – Retained by Arcadis

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

March 10, 2021

Ms. Lauren Petty
Southern Co. Services
42 Inverness Center Parkway
Birmingham, AL 35242

RE: Project: MCMANUS 30050105.00006
Pace Project No.: 92524152

Dear Ms. Petty:

Enclosed are the analytical results for sample(s) received by the laboratory on February 25, 2021. 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

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: Joju Abraham, Georgia Power-CCR
Kathryn Farris
Geoffrey Gay, ARCADIS - Atlanta
Margaret Gentile, Arcadis
Kristen Jurinko
Charles Lawson, Arcadis
Bryan Mayeux
Kelley Sharpe, ARCADIS - Atlanta
Maribel Vital

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

CERTIFICATIONS

Project: MCMANUS 30050105.00006
Pace Project No.: 92524152

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

REPORT OF LABORATORY ANALYSIS

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

SAMPLE SUMMARY

Project: MCMANUS 30050105.00006
Pace Project No.: 92524152

Lab ID	Sample ID	Matrix	Date Collected	Date Received
92524152001	**VAP-31-W (5-10)**	Water	02/23/21 15:00	02/25/21 11:00
92524152002	**VAP-31-W (18-20)**	Water	02/24/21 07:45	02/25/21 11:00
92524152003	**VAP-31-W (22-24)**	Water	02/24/21 08:08	02/25/21 11:00
92524152004	**VAP-31-W (29-31)**	Water	02/24/21 08:50	02/25/21 11:00

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

SAMPLE ANALYTE COUNT

Project: MCMANUS 30050105.00006
Pace Project No.: 92524152

Lab ID	Sample ID	Method	Analysts	Analytes Reported
92524152001	**VAP-31-W (5-10)**	EPA 6010D	DS, KQ	6
		EPA 6010D	SH1	6
		EPA 6020B	JOR	2
		EPA 6020B	JOR	2
		SM 2320B-2011	ECH	3
		SM 2540C-2011	RED	1
		SM 4500-S2D-2011	JP1	1
		SM 5210B-2011	NFW	1
		EPA 300.0 Rev 2.1 1993	CDC	4
		SM 4500-P E-2011	DMN	1
		EPA 9060A	JLH	5
92524152002	**VAP-31-W (18-20)**	EPA 6010D	DS, KQ	6
		EPA 6010D	SH1	6
		EPA 6020B	JOR	2
		EPA 6020B	JOR	2
		SM 2320B-2011	ECH	3
		SM 2540C-2011	RED	1
		SM 4500-S2D-2011	JP1	1
		SM 5210B-2011	NFW	1
		EPA 300.0 Rev 2.1 1993	CDC	4
		SM 4500-P E-2011	JP1	1
		EPA 9060A	JLH	5
92524152003	**VAP-31-W (22-24)**	EPA 6010D	DS, KQ	6
		EPA 6010D	SH1	6
		EPA 6020B	JOR	2
		EPA 6020B	JOR	2
		SM 2320B-2011	ECH	3
		SM 2540C-2011	RED	1
		SM 4500-S2D-2011	JP1	1
		SM 5210B-2011	NFW	1
		EPA 300.0 Rev 2.1 1993	CDC	4
		SM 4500-P E-2011	JP1	1
		EPA 9060A	JLH	5
92524152004	**VAP-31-W (29-31)**	EPA 6010D	DS, KQ	6
		EPA 6010D	SH1	6
		EPA 6020B	JOR	2
		EPA 6020B	JOR	2

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

SAMPLE ANALYTE COUNT

Project: MCMANUS 30050105.00006
Pace Project No.: 92524152

Lab ID	Sample ID	Method	Analysts	Analytes Reported
		SM 2320B-2011	ECH	3
		SM 2540C-2011	RED	1
		SM 4500-S2D-2011	JP1	1
		SM 5210B-2011	NFW	1
		EPA 300.0 Rev 2.1 1993	CDC	4
		SM 4500-P E-2011	JP1	1
		EPA 9060A	JLH	5

PASI-A = Pace Analytical Services - Asheville

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

SUMMARY OF DETECTION

Project: MCMANUS 30050105.00006
Pace Project No.: 92524152

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92524152001	**VAP-31-W (5-10)**					
EPA 6010D	Calcium	173	mg/L	1.0	02/27/21 22:04	
EPA 6010D	Iron	2.5	mg/L	0.50	02/27/21 22:04	
EPA 6010D	Magnesium	490	mg/L	1.0	02/27/21 22:04	
EPA 6010D	Manganese	0.082	mg/L	0.050	02/27/21 22:04	
EPA 6010D	Potassium	134	mg/L	50.0	02/27/21 22:04	
EPA 6010D	Sodium	3900	mg/L	500	03/01/21 19:28	
EPA 6010D	Calcium, Dissolved	152	mg/L	1.0	03/03/21 03:06	
EPA 6010D	Iron, Dissolved	2.0	mg/L	0.50	03/03/21 03:06	
EPA 6010D	Magnesium, Dissolved	458	mg/L	1.0	03/03/21 03:06	
EPA 6010D	Manganese, Dissolved	0.076	mg/L	0.050	03/03/21 03:06	
EPA 6010D	Potassium, Dissolved	125	mg/L	50.0	03/03/21 03:06	
EPA 6010D	Sodium, Dissolved	3360	mg/L	500	03/03/21 02:13	
EPA 6020B	Boron	1.6J	mg/L	2.5	02/26/21 11:40	D3
EPA 6020B	Boron, Dissolved	1.5J	mg/L	2.5	02/25/21 21:34	D3
SM 2320B-2011	Alkalinity,Bicarbonate (CaCO3)	123	mg/L	5.0	03/05/21 20:07	
SM 2320B-2011	Alkalinity, Total as CaCO3	123	mg/L	5.0	03/05/21 20:07	
SM 2540C-2011	Total Dissolved Solids	15200	mg/L	2500	02/25/21 18:51	
SM 4500-S2D-2011	Sulfide	0.38	mg/L	0.10	02/26/21 06:38	
EPA 300.0 Rev 2.1 1993	Chloride	6140	mg/L	100	02/25/21 14:44	
EPA 300.0 Rev 2.1 1993	Sulfate	767	mg/L	100	02/25/21 14:44	
SM 4500-P E-2011	Orthophosphate as P	0.22	mg/L	0.050	02/25/21 14:53	
EPA 9060A	Total Organic Carbon	6.0	mg/L	1.0	03/04/21 01:22	
EPA 9060A	Total Organic Carbon	5.8	mg/L	1.0	03/04/21 01:22	
EPA 9060A	Total Organic Carbon	5.8	mg/L	1.0	03/04/21 01:22	
EPA 9060A	Total Organic Carbon	5.8	mg/L	1.0	03/04/21 01:22	
EPA 9060A	Mean Total Organic Carbon	5.9	mg/L	1.0	03/04/21 01:22	
92524152002	**VAP-31-W (18-20)**					
EPA 6010D	Calcium	335	mg/L	1.0	02/27/21 22:14	
EPA 6010D	Iron	1.2	mg/L	0.50	02/27/21 22:14	
EPA 6010D	Magnesium	606	mg/L	1.0	02/27/21 22:14	
EPA 6010D	Manganese	0.31	mg/L	0.050	02/27/21 22:14	
EPA 6010D	Potassium	109	mg/L	50.0	02/27/21 22:14	
EPA 6010D	Sodium	3680	mg/L	500	03/01/21 19:31	
EPA 6010D	Calcium, Dissolved	294	mg/L	1.0	03/03/21 03:09	
EPA 6010D	Magnesium, Dissolved	552	mg/L	1.0	03/03/21 03:09	
EPA 6010D	Manganese, Dissolved	0.27	mg/L	0.050	03/03/21 03:09	
EPA 6010D	Potassium, Dissolved	101	mg/L	50.0	03/03/21 03:09	
EPA 6010D	Sodium, Dissolved	3180	mg/L	500	03/03/21 02:16	
EPA 6020B	Arsenic	0.63	mg/L	0.010	02/26/21 11:44	D3
EPA 6020B	Boron	1.1J	mg/L	2.5	02/26/21 11:44	D3
EPA 6020B	Arsenic, Dissolved	0.39	mg/L	0.010	02/25/21 21:38	D3
EPA 6020B	Boron, Dissolved	0.98J	mg/L	2.5	02/25/21 21:38	D3
SM 2320B-2011	Alkalinity,Bicarbonate (CaCO3)	879	mg/L	5.0	03/08/21 17:52	
SM 2320B-2011	Alkalinity, Total as CaCO3	879	mg/L	5.0	03/08/21 17:52	
SM 2540C-2011	Total Dissolved Solids	15300	mg/L	2500	02/25/21 18:52	
SM 4500-S2D-2011	Sulfide	89.3	mg/L	10.0	02/26/21 06:38	
EPA 300.0 Rev 2.1 1993	Chloride	6480	mg/L	100	02/25/21 16:45	

REPORT OF LABORATORY ANALYSIS

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

SUMMARY OF DETECTION

Project: MCMANUS 30050105.00006
Pace Project No.: 92524152

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92524152002	**VAP-31-W (18-20)**					
EPA 300.0 Rev 2.1 1993	Sulfate	256	mg/L	100	02/25/21 16:45	
SM 4500-P E-2011	Orthophosphate as P	1.1	mg/L	0.25	02/26/21 03:47	
EPA 9060A	Total Organic Carbon	10.3	mg/L	1.0	03/04/21 01:40	
EPA 9060A	Total Organic Carbon	10.4	mg/L	1.0	03/04/21 01:40	
EPA 9060A	Total Organic Carbon	10.4	mg/L	1.0	03/04/21 01:40	
EPA 9060A	Total Organic Carbon	10.5	mg/L	1.0	03/04/21 01:40	
EPA 9060A	Mean Total Organic Carbon	10.4	mg/L	1.0	03/04/21 01:40	
92524152003	**VAP-31-W (22-24)**					
EPA 6010D	Calcium	260	mg/L	1.0	02/27/21 22:17	
EPA 6010D	Iron	2.7	mg/L	0.50	02/27/21 22:17	
EPA 6010D	Magnesium	634	mg/L	1.0	02/27/21 22:17	
EPA 6010D	Manganese	0.38	mg/L	0.050	02/27/21 22:17	
EPA 6010D	Potassium	170	mg/L	50.0	02/27/21 22:17	
EPA 6010D	Sodium	5220	mg/L	500	03/01/21 19:35	
EPA 6010D	Calcium, Dissolved	203	mg/L	1.0	03/03/21 03:12	
EPA 6010D	Iron, Dissolved	0.88	mg/L	0.50	03/03/21 03:12	
EPA 6010D	Magnesium, Dissolved	529	mg/L	1.0	03/03/21 03:12	
EPA 6010D	Manganese, Dissolved	0.36	mg/L	0.050	03/03/21 03:12	
EPA 6010D	Potassium, Dissolved	146	mg/L	50.0	03/03/21 03:12	
EPA 6010D	Sodium, Dissolved	4200	mg/L	500	03/03/21 02:19	
EPA 6020B	Arsenic	0.31	mg/L	0.010	02/26/21 11:48	D3
EPA 6020B	Boron	1.9J	mg/L	2.5	02/26/21 11:48	D3
EPA 6020B	Arsenic, Dissolved	0.079	mg/L	0.010	02/25/21 21:42	D3
EPA 6020B	Boron, Dissolved	1.4J	mg/L	2.5	02/25/21 21:42	D3
SM 2320B-2011	Alkalinity,Bicarbonate (CaCO3)	741	mg/L	5.0	03/08/21 18:12	
SM 2320B-2011	Alkalinity, Total as CaCO3	741	mg/L	5.0	03/08/21 18:12	
SM 2540C-2011	Total Dissolved Solids	18500	mg/L	2500	02/25/21 18:52	
SM 4500-S2D-2011	Sulfide	71.1	mg/L	10.0	02/26/21 06:39	
EPA 300.0 Rev 2.1 1993	Chloride	8350	mg/L	100	02/25/21 17:14	
EPA 300.0 Rev 2.1 1993	Sulfate	636	mg/L	100	02/25/21 17:14	
SM 4500-P E-2011	Orthophosphate as P	1.2	mg/L	0.25	02/26/21 03:48	
EPA 9060A	Total Organic Carbon	110	mg/L	25.0	03/04/21 01:58	
EPA 9060A	Total Organic Carbon	104	mg/L	25.0	03/04/21 01:58	
EPA 9060A	Total Organic Carbon	104	mg/L	25.0	03/04/21 01:58	
EPA 9060A	Total Organic Carbon	106	mg/L	25.0	03/04/21 01:58	
EPA 9060A	Mean Total Organic Carbon	106	mg/L	25.0	03/04/21 01:58	
92524152004	**VAP-31-W (29-31)**					
EPA 6010D	Calcium	263	mg/L	1.0	02/27/21 22:21	
EPA 6010D	Iron	1.2	mg/L	0.50	02/27/21 22:21	
EPA 6010D	Magnesium	597	mg/L	1.0	02/27/21 22:21	
EPA 6010D	Manganese	0.37	mg/L	0.050	02/27/21 22:21	
EPA 6010D	Potassium	175	mg/L	50.0	02/27/21 22:21	
EPA 6010D	Sodium	5230	mg/L	500	03/01/21 19:38	
EPA 6010D	Calcium, Dissolved	236	mg/L	1.0	03/03/21 03:16	
EPA 6010D	Magnesium, Dissolved	559	mg/L	1.0	03/03/21 03:16	
EPA 6010D	Manganese, Dissolved	0.34	mg/L	0.050	03/03/21 03:16	

REPORT OF LABORATORY ANALYSIS

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

SUMMARY OF DETECTION

Project: MCMANUS 30050105.00006
Pace Project No.: 92524152

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92524152004	**VAP-31-W (29-31)**					
EPA 6010D	Potassium, Dissolved	166	mg/L	50.0	03/03/21 03:16	
EPA 6010D	Sodium, Dissolved	4460	mg/L	500	03/03/21 02:22	
EPA 6020B	Arsenic	0.17	mg/L	0.010	02/26/21 11:52	D3
EPA 6020B	Boron	2.2J	mg/L	2.5	02/26/21 11:52	D3
EPA 6020B	Arsenic, Dissolved	0.10	mg/L	0.010	02/25/21 21:47	D3
EPA 6020B	Boron, Dissolved	1.7J	mg/L	2.5	02/25/21 21:47	D3
SM 2320B-2011	Alkalinity,Bicarbonate (CaCO3)	454	mg/L	5.0	03/08/21 18:24	
SM 2320B-2011	Alkalinity, Total as CaCO3	454	mg/L	5.0	03/08/21 18:24	
SM 2540C-2011	Total Dissolved Solids	20100	mg/L	2500	02/25/21 18:52	
SM 4500-S2D-2011	Sulfide	54.5	mg/L	10.0	02/26/21 06:40	
EPA 300.0 Rev 2.1 1993	Chloride	8050	mg/L	100	02/25/21 17:43	
EPA 300.0 Rev 2.1 1993	Sulfate	908	mg/L	100	02/25/21 17:43	
SM 4500-P E-2011	Orthophosphate as P	0.70	mg/L	0.25	02/26/21 03:48	
EPA 9060A	Total Organic Carbon	93.3	mg/L	25.0	03/04/21 02:16	
EPA 9060A	Total Organic Carbon	92.4	mg/L	25.0	03/04/21 02:16	
EPA 9060A	Total Organic Carbon	91.0	mg/L	25.0	03/04/21 02:16	
EPA 9060A	Total Organic Carbon	92.8	mg/L	25.0	03/04/21 02:16	
EPA 9060A	Mean Total Organic Carbon	92.4	mg/L	25.0	03/04/21 02:16	

Pace Analytical Services, LLC
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ANALYTICAL RESULTS

Project: MCMANUS 30050105.00006
Pace Project No.: 92524152

Sample: VAP-31-W (5-10) **Lab ID: 92524152001** Collected: 02/23/21 15:00 Received: 02/25/21 11:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Calcium	**173**	mg/L	1.0	0.94	10	02/26/21 02:09	02/27/21 22:04	7440-70-2	
Iron	**2.5**	mg/L	0.50	0.42	10	02/26/21 02:09	02/27/21 22:04	7439-89-6	
Magnesium	**490**	mg/L	1.0	0.68	10	02/26/21 02:09	02/27/21 22:04	7439-95-4	
Manganese	**0.082**	mg/L	0.050	0.034	10	02/26/21 02:09	02/27/21 22:04	7439-96-5	
Potassium	**134**	mg/L	50.0	30.4	10	02/26/21 02:09	02/27/21 22:04	7440-09-7	
Sodium	**3900**	mg/L	500	61.1	100	02/26/21 02:09	03/01/21 19:28	7440-23-5	
6010 MET ICP, Dissolved	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Calcium, Dissolved	**152**	mg/L	1.0	0.94	10	03/01/21 08:33	03/03/21 03:06	7440-70-2	
Iron, Dissolved	**2.0**	mg/L	0.50	0.42	10	03/01/21 08:33	03/03/21 03:06	7439-89-6	
Magnesium, Dissolved	**458**	mg/L	1.0	0.68	10	03/01/21 08:33	03/03/21 03:06	7439-95-4	
Manganese, Dissolved	**0.076**	mg/L	0.050	0.034	10	03/01/21 08:33	03/03/21 03:06	7439-96-5	
Potassium, Dissolved	**125**	mg/L	50.0	30.4	10	03/01/21 08:33	03/03/21 03:06	7440-09-7	
Sodium, Dissolved	**3360**	mg/L	500	61.1	100	03/01/21 08:33	03/03/21 02:13	7440-23-5	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Arsenic	ND	mg/L	0.010	0.0087	100	02/25/21 19:24	02/26/21 11:40	7440-38-2	D3
Boron	**1.6J**	mg/L	2.5	0.62	100	02/25/21 19:24	02/26/21 11:40	7440-42-8	D3
6020 MET ICPMS, Dissolved	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Arsenic, Dissolved	ND	mg/L	0.010	0.0087	100	02/25/21 16:11	02/25/21 21:34	7440-38-2	D3
Boron, Dissolved	**1.5J**	mg/L	2.5	0.62	100	02/25/21 16:11	02/25/21 21:34	7440-42-8	D3
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**123**	mg/L	5.0	5.0	1		03/05/21 20:07		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		03/05/21 20:07		
Alkalinity, Total as CaCO3	**123**	mg/L	5.0	5.0	1		03/05/21 20:07		
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**15200**	mg/L	2500	2500	1		02/25/21 18:51		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	**0.38**	mg/L	0.10	0.050	1		02/26/21 06:38	18496-25-8	
5210B BOD, 5 day	Analytical Method: SM 5210B-2011 Pace Analytical Services - Asheville								
BOD, 5 day	ND	mg/L	2.0	2.0	1	02/26/21 05:00	03/03/21 01:24		B2,H2

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
110 Technology Parkway
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(770)734-4200

ANALYTICAL RESULTS

Project: MCMANUS 30050105.00006
Pace Project No.: 92524152

Sample: VAP-31-W (5-10) **Lab ID: 92524152001** Collected: 02/23/21 15:00 Received: 02/25/21 11:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC anions 48hr	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**6140**	mg/L	100	60.0	100		02/25/21 14:44	16887-00-6	
Nitrate as N	ND	mg/L	0.10	0.060	1		02/25/21 14:15	14797-55-8	
Nitrite as N	ND	mg/L	0.10	0.050	1		02/25/21 14:15	14797-65-0	
Sulfate	**767**	mg/L	100	50.0	100		02/25/21 14:44	14808-79-8	
SM4500P-E, Phosphate, Ortho	Analytical Method: SM 4500-P E-2011 Pace Analytical Services - Asheville								
Orthophosphate as P	**0.22**	mg/L	0.050	0.012	1		02/25/21 14:53		
Total Organic Carbon,Asheville	Analytical Method: EPA 9060A Pace Analytical Services - Asheville								
Total Organic Carbon	**6.0**	mg/L	1.0	0.50	1		03/04/21 01:22	7440-44-0	
Total Organic Carbon	**5.8**	mg/L	1.0	0.50	1		03/04/21 01:22	7440-44-0	
Total Organic Carbon	**5.8**	mg/L	1.0	0.50	1		03/04/21 01:22	7440-44-0	
Total Organic Carbon	**5.8**	mg/L	1.0	0.50	1		03/04/21 01:22	7440-44-0	
Mean Total Organic Carbon	**5.9**	mg/L	1.0	0.50	1		03/04/21 01:22	7440-44-0	

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ANALYTICAL RESULTS

Project: MCMANUS 30050105.00006
Pace Project No.: 92524152

Sample: VAP-31-W (18-20) **Lab ID: 92524152002** Collected: 02/24/21 07:45 Received: 02/25/21 11:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Calcium	**335**	mg/L	1.0	0.94	10	02/26/21 02:09	02/27/21 22:14	7440-70-2	
Iron	**1.2**	mg/L	0.50	0.42	10	02/26/21 02:09	02/27/21 22:14	7439-89-6	
Magnesium	**606**	mg/L	1.0	0.68	10	02/26/21 02:09	02/27/21 22:14	7439-95-4	
Manganese	**0.31**	mg/L	0.050	0.034	10	02/26/21 02:09	02/27/21 22:14	7439-96-5	
Potassium	**109**	mg/L	50.0	30.4	10	02/26/21 02:09	02/27/21 22:14	7440-09-7	
Sodium	**3680**	mg/L	500	61.1	100	02/26/21 02:09	03/01/21 19:31	7440-23-5	
6010 MET ICP, Dissolved	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Calcium, Dissolved	**294**	mg/L	1.0	0.94	10	03/01/21 08:33	03/03/21 03:09	7440-70-2	
Iron, Dissolved	ND	mg/L	0.50	0.42	10	03/01/21 08:33	03/03/21 03:09	7439-89-6	
Magnesium, Dissolved	**552**	mg/L	1.0	0.68	10	03/01/21 08:33	03/03/21 03:09	7439-95-4	
Manganese, Dissolved	**0.27**	mg/L	0.050	0.034	10	03/01/21 08:33	03/03/21 03:09	7439-96-5	
Potassium, Dissolved	**101**	mg/L	50.0	30.4	10	03/01/21 08:33	03/03/21 03:09	7440-09-7	
Sodium, Dissolved	**3180**	mg/L	500	61.1	100	03/01/21 08:33	03/03/21 02:16	7440-23-5	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Arsenic	**0.63**	mg/L	0.010	0.0087	100	02/25/21 19:24	02/26/21 11:44	7440-38-2	D3
Boron	**1.1J**	mg/L	2.5	0.62	100	02/25/21 19:24	02/26/21 11:44	7440-42-8	D3
6020 MET ICPMS, Dissolved	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Arsenic, Dissolved	**0.39**	mg/L	0.010	0.0087	100	02/25/21 16:11	02/25/21 21:38	7440-38-2	D3
Boron, Dissolved	**0.98J**	mg/L	2.5	0.62	100	02/25/21 16:11	02/25/21 21:38	7440-42-8	D3
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**879**	mg/L	5.0	5.0	1		03/08/21 17:52		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		03/08/21 17:52		
Alkalinity, Total as CaCO3	**879**	mg/L	5.0	5.0	1		03/08/21 17:52		
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**15300**	mg/L	2500	2500	1		02/25/21 18:52		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	**89.3**	mg/L	10.0	5.0	100		02/26/21 06:38	18496-25-8	
5210B BOD, 5 day	Analytical Method: SM 5210B-2011 Pace Analytical Services - Asheville								
BOD, 5 day	ND	mg/L	2.0	2.0	1	02/26/21 05:00	03/03/21 01:41		B2

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
110 Technology Parkway
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ANALYTICAL RESULTS

Project: MCMANUS 30050105.00006
Pace Project No.: 92524152

Sample: VAP-31-W (18-20) **Lab ID: 92524152002** Collected: 02/24/21 07:45 Received: 02/25/21 11:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC anions 48hr	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**6480**	mg/L	100	60.0	100		02/25/21 16:45	16887-00-6	
Nitrate as N	ND	mg/L	10.0	6.0	100		02/25/21 16:45	14797-55-8	D3
Nitrite as N	ND	mg/L	10.0	5.0	100		02/25/21 16:45	14797-65-0	D3
Sulfate	**256**	mg/L	100	50.0	100		02/25/21 16:45	14808-79-8	
SM4500P-E, Phosphate, Ortho	Analytical Method: SM 4500-P E-2011 Pace Analytical Services - Asheville								
Orthophosphate as P	**1.1**	mg/L	0.25	0.059	5		02/26/21 03:47		
Total Organic Carbon,Asheville	Analytical Method: EPA 9060A Pace Analytical Services - Asheville								
Total Organic Carbon	**10.3**	mg/L	1.0	0.50	1		03/04/21 01:40	7440-44-0	
Total Organic Carbon	**10.4**	mg/L	1.0	0.50	1		03/04/21 01:40	7440-44-0	
Total Organic Carbon	**10.4**	mg/L	1.0	0.50	1		03/04/21 01:40	7440-44-0	
Total Organic Carbon	**10.5**	mg/L	1.0	0.50	1		03/04/21 01:40	7440-44-0	
Mean Total Organic Carbon	**10.4**	mg/L	1.0	0.50	1		03/04/21 01:40	7440-44-0	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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ANALYTICAL RESULTS

Project: MCMANUS 30050105.00006
Pace Project No.: 92524152

Sample: VAP-31-W (22-24) **Lab ID: 92524152003** Collected: 02/24/21 08:08 Received: 02/25/21 11:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Calcium	**260**	mg/L	1.0	0.94	10	02/26/21 02:09	02/27/21 22:17	7440-70-2	
Iron	**2.7**	mg/L	0.50	0.42	10	02/26/21 02:09	02/27/21 22:17	7439-89-6	
Magnesium	**634**	mg/L	1.0	0.68	10	02/26/21 02:09	02/27/21 22:17	7439-95-4	
Manganese	**0.38**	mg/L	0.050	0.034	10	02/26/21 02:09	02/27/21 22:17	7439-96-5	
Potassium	**170**	mg/L	50.0	30.4	10	02/26/21 02:09	02/27/21 22:17	7440-09-7	
Sodium	**5220**	mg/L	500	61.1	100	02/26/21 02:09	03/01/21 19:35	7440-23-5	
6010 MET ICP, Dissolved	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Calcium, Dissolved	**203**	mg/L	1.0	0.94	10	03/01/21 08:33	03/03/21 03:12	7440-70-2	
Iron, Dissolved	**0.88**	mg/L	0.50	0.42	10	03/01/21 08:33	03/03/21 03:12	7439-89-6	
Magnesium, Dissolved	**529**	mg/L	1.0	0.68	10	03/01/21 08:33	03/03/21 03:12	7439-95-4	
Manganese, Dissolved	**0.36**	mg/L	0.050	0.034	10	03/01/21 08:33	03/03/21 03:12	7439-96-5	
Potassium, Dissolved	**146**	mg/L	50.0	30.4	10	03/01/21 08:33	03/03/21 03:12	7440-09-7	
Sodium, Dissolved	**4200**	mg/L	500	61.1	100	03/01/21 08:33	03/03/21 02:19	7440-23-5	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Arsenic	**0.31**	mg/L	0.010	0.0087	100	02/25/21 19:24	02/26/21 11:48	7440-38-2	D3
Boron	**1.9J**	mg/L	2.5	0.62	100	02/25/21 19:24	02/26/21 11:48	7440-42-8	D3
6020 MET ICPMS, Dissolved	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Arsenic, Dissolved	**0.079**	mg/L	0.010	0.0087	100	02/25/21 16:11	02/25/21 21:42	7440-38-2	D3
Boron, Dissolved	**1.4J**	mg/L	2.5	0.62	100	02/25/21 16:11	02/25/21 21:42	7440-42-8	D3
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**741**	mg/L	5.0	5.0	1		03/08/21 18:12		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		03/08/21 18:12		
Alkalinity, Total as CaCO3	**741**	mg/L	5.0	5.0	1		03/08/21 18:12		
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**18500**	mg/L	2500	2500	1		02/25/21 18:52		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	**71.1**	mg/L	10.0	5.0	100		02/26/21 06:39	18496-25-8	
5210B BOD, 5 day	Analytical Method: SM 5210B-2011 Pace Analytical Services - Asheville								
BOD, 5 day	ND	mg/L	2.0	2.0	1	02/26/21 05:00	03/03/21 01:44		B2

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
110 Technology Parkway
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(770)734-4200

ANALYTICAL RESULTS

Project: MCMANUS 30050105.00006
Pace Project No.: 92524152

Sample: VAP-31-W (22-24) **Lab ID: 92524152003** Collected: 02/24/21 08:08 Received: 02/25/21 11:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC anions 48hr	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**8350**	mg/L	100	60.0	100		02/25/21 17:14	16887-00-6	
Nitrate as N	ND	mg/L	10.0	6.0	100		02/25/21 17:14	14797-55-8	D3
Nitrite as N	ND	mg/L	10.0	5.0	100		02/25/21 17:14	14797-65-0	D3
Sulfate	**636**	mg/L	100	50.0	100		02/25/21 17:14	14808-79-8	
SM4500P-E, Phosphate, Ortho	Analytical Method: SM 4500-P E-2011 Pace Analytical Services - Asheville								
Orthophosphate as P	**1.2**	mg/L	0.25	0.059	5		02/26/21 03:48		
Total Organic Carbon,Asheville	Analytical Method: EPA 9060A Pace Analytical Services - Asheville								
Total Organic Carbon	**110**	mg/L	25.0	12.5	25		03/04/21 01:58	7440-44-0	
Total Organic Carbon	**104**	mg/L	25.0	12.5	25		03/04/21 01:58	7440-44-0	
Total Organic Carbon	**104**	mg/L	25.0	12.5	25		03/04/21 01:58	7440-44-0	
Total Organic Carbon	**106**	mg/L	25.0	12.5	25		03/04/21 01:58	7440-44-0	
Mean Total Organic Carbon	**106**	mg/L	25.0	12.5	25		03/04/21 01:58	7440-44-0	

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ANALYTICAL RESULTS

Project: MCMANUS 30050105.00006
Pace Project No.: 92524152

Sample: VAP-31-W (29-31) **Lab ID: 92524152004** Collected: 02/24/21 08:50 Received: 02/25/21 11:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Calcium	**263**	mg/L	1.0	0.94	10	02/26/21 02:09	02/27/21 22:21	7440-70-2	
Iron	**1.2**	mg/L	0.50	0.42	10	02/26/21 02:09	02/27/21 22:21	7439-89-6	
Magnesium	**597**	mg/L	1.0	0.68	10	02/26/21 02:09	02/27/21 22:21	7439-95-4	
Manganese	**0.37**	mg/L	0.050	0.034	10	02/26/21 02:09	02/27/21 22:21	7439-96-5	
Potassium	**175**	mg/L	50.0	30.4	10	02/26/21 02:09	02/27/21 22:21	7440-09-7	
Sodium	**5230**	mg/L	500	61.1	100	02/26/21 02:09	03/01/21 19:38	7440-23-5	
6010 MET ICP, Dissolved	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Calcium, Dissolved	**236**	mg/L	1.0	0.94	10	03/01/21 08:33	03/03/21 03:16	7440-70-2	
Iron, Dissolved	ND	mg/L	0.50	0.42	10	03/01/21 08:33	03/03/21 03:16	7439-89-6	
Magnesium, Dissolved	**559**	mg/L	1.0	0.68	10	03/01/21 08:33	03/03/21 03:16	7439-95-4	
Manganese, Dissolved	**0.34**	mg/L	0.050	0.034	10	03/01/21 08:33	03/03/21 03:16	7439-96-5	
Potassium, Dissolved	**166**	mg/L	50.0	30.4	10	03/01/21 08:33	03/03/21 03:16	7440-09-7	
Sodium, Dissolved	**4460**	mg/L	500	61.1	100	03/01/21 08:33	03/03/21 02:22	7440-23-5	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Arsenic	**0.17**	mg/L	0.010	0.0087	100	02/25/21 19:24	02/26/21 11:52	7440-38-2	D3
Boron	**2.2J**	mg/L	2.5	0.62	100	02/25/21 19:24	02/26/21 11:52	7440-42-8	D3
6020 MET ICPMS, Dissolved	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Arsenic, Dissolved	**0.10**	mg/L	0.010	0.0087	100	02/25/21 16:11	02/25/21 21:47	7440-38-2	D3
Boron, Dissolved	**1.7J**	mg/L	2.5	0.62	100	02/25/21 16:11	02/25/21 21:47	7440-42-8	D3
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**454**	mg/L	5.0	5.0	1		03/08/21 18:24		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		03/08/21 18:24		
Alkalinity, Total as CaCO3	**454**	mg/L	5.0	5.0	1		03/08/21 18:24		
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**20100**	mg/L	2500	2500	1		02/25/21 18:52		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	**54.5**	mg/L	10.0	5.0	100		02/26/21 06:40	18496-25-8	
5210B BOD, 5 day	Analytical Method: SM 5210B-2011 Pace Analytical Services - Asheville								
BOD, 5 day	ND	mg/L	2.0	2.0	1	02/26/21 05:00	03/03/21 01:45		B2

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
110 Technology Parkway
Peachtree Corners, GA 30092
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ANALYTICAL RESULTS

Project: MCMANUS 30050105.00006
Pace Project No.: 92524152

Sample: VAP-31-W (29-31) **Lab ID: 92524152004** Collected: 02/24/21 08:50 Received: 02/25/21 11:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC anions 48hr	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**8050**	mg/L	100	60.0	100		02/25/21 17:43	16887-00-6	
Nitrate as N	ND	mg/L	10.0	6.0	100		02/25/21 17:43	14797-55-8	D3
Nitrite as N	ND	mg/L	10.0	5.0	100		02/25/21 17:43	14797-65-0	D3
Sulfate	**908**	mg/L	100	50.0	100		02/25/21 17:43	14808-79-8	
SM4500P-E, Phosphate, Ortho	Analytical Method: SM 4500-P E-2011 Pace Analytical Services - Asheville								
Orthophosphate as P	**0.70**	mg/L	0.25	0.059	5		02/26/21 03:48		
Total Organic Carbon,Asheville	Analytical Method: EPA 9060A Pace Analytical Services - Asheville								
Total Organic Carbon	**93.3**	mg/L	25.0	12.5	25		03/04/21 02:16	7440-44-0	
Total Organic Carbon	**92.4**	mg/L	25.0	12.5	25		03/04/21 02:16	7440-44-0	
Total Organic Carbon	**91.0**	mg/L	25.0	12.5	25		03/04/21 02:16	7440-44-0	
Total Organic Carbon	**92.8**	mg/L	25.0	12.5	25		03/04/21 02:16	7440-44-0	
Mean Total Organic Carbon	**92.4**	mg/L	25.0	12.5	25		03/04/21 02:16	7440-44-0	

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QUALITY CONTROL DATA

Project: MCMANUS 30050105.00006
Pace Project No.: 92524152

QC Batch: 602778
QC Batch Method: EPA 3010A
Analysis Method: EPA 6010D
Analysis Description: 6010 MET
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524152001, 92524152002, 92524152003, 92524152004

METHOD BLANK: 3176256 Matrix: Water
Associated Lab Samples: 92524152001, 92524152002, 92524152003, 92524152004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Calcium	mg/L	ND	0.10	0.094	03/01/21 18:43	
Iron	mg/L	ND	0.050	0.042	03/01/21 18:43	
Magnesium	mg/L	ND	0.10	0.068	03/01/21 18:43	
Manganese	mg/L	ND	0.0050	0.0034	03/01/21 18:43	
Potassium	mg/L	ND	5.0	3.0	03/01/21 18:43	
Sodium	mg/L	ND	5.0	0.61	03/01/21 18:43	

LABORATORY CONTROL SAMPLE: 3176257

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium	mg/L	5	5.2	105	80-120	
Iron	mg/L	5	5.2	104	80-120	
Magnesium	mg/L	5	5.4	107	80-120	
Manganese	mg/L	0.5	0.51	103	80-120	
Potassium	mg/L	5	5.2	103	80-120	
Sodium	mg/L	5	5.3	105	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3176258 3176259

Parameter	Units	92524147001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium	mg/L	462	5	5	456	453	-132	-186	75-125	1	20	M6
Iron	mg/L	6.4	5	5	11.2	11.3	98	98	75-125	0	20	
Magnesium	mg/L	689	5	5	660	676	-580	-254	75-125	2	20	M6
Manganese	mg/L	1.6	0.5	0.5	2.0	2.0	82	89	75-125	2	20	
Potassium	mg/L	168	5	5	169	168	28	10	75-125	1	20	M6
Sodium	mg/L	5690	5	5	5580	5600	-2200	-1720	75-125	0	20	M6

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: MCMANUS 30050105.00006
Pace Project No.: 92524152

QC Batch: 603185
QC Batch Method: EPA 3010A
Analysis Method: EPA 6010D
Analysis Description: 6010 MET Filtered Diss.
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524152001, 92524152002, 92524152003, 92524152004

METHOD BLANK: 3178071 Matrix: Water
Associated Lab Samples: 92524152001, 92524152002, 92524152003, 92524152004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Calcium, Dissolved	mg/L	ND	0.10	0.094	03/03/21 01:33	
Iron, Dissolved	mg/L	ND	0.050	0.042	03/03/21 01:33	
Magnesium, Dissolved	mg/L	ND	0.10	0.068	03/03/21 01:33	
Manganese, Dissolved	mg/L	ND	0.0050	0.0034	03/03/21 01:33	
Potassium, Dissolved	mg/L	ND	5.0	3.0	03/03/21 01:33	
Sodium, Dissolved	mg/L	ND	5.0	0.61	03/03/21 01:33	

LABORATORY CONTROL SAMPLE: 3178072

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium, Dissolved	mg/L	5	4.4	88	80-120	
Iron, Dissolved	mg/L	5	4.4	89	80-120	
Magnesium, Dissolved	mg/L	5	4.6	93	80-120	
Manganese, Dissolved	mg/L	0.5	0.43	87	80-120	
Potassium, Dissolved	mg/L	5	4.5J	89	80-120	
Sodium, Dissolved	mg/L	5	4.5J	91	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3178073 3178074

Parameter	Units	92524147001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium, Dissolved	mg/L	408	5	5	392	380	-314	-560	75-125	3	20	M6
Iron, Dissolved	mg/L	ND	5	5	4.5	4.9	84	93	75-125	10	20	
Magnesium, Dissolved	mg/L	636	5	5	606	581	-598	-1100	75-125	4	20	M6
Manganese, Dissolved	mg/L	1.4	0.5	0.5	1.7	1.7	70	57	75-125	4	20	M6
Potassium, Dissolved	mg/L	154	5	5	154	149	-4	-86	75-125	3	20	M6
Sodium, Dissolved	mg/L	4990	5	5	4880	4940	-2160	-960	75-125	1	20	M6

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: MCMANUS 30050105.00006
Pace Project No.: 92524152

QC Batch: 602702 | Analysis Method: EPA 6020B
QC Batch Method: EPA 3010A | Analysis Description: 6020 MET
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524152001, 92524152002, 92524152003, 92524152004

METHOD BLANK: 3175906 Matrix: Water
Associated Lab Samples: 92524152001, 92524152002, 92524152003, 92524152004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Arsenic	mg/L	ND	0.00010	0.000087	02/26/21 10:46	
Boron	mg/L	ND	0.025	0.0062	02/26/21 10:46	

LABORATORY CONTROL SAMPLE: 3175907

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	0.01	0.011	107	80-120	
Boron	mg/L	0.05	0.051	101	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3175908 3175909

Parameter	Units	92524147001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	mg/L	ND	0.01	0.01	0.014	0.011	115	84	75-125	24	20	R1
Boron	mg/L	2.4J	0.05	0.05	2.3J	2.4J	-263	-1	75-125		20	M6

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: MCMANUS 30050105.00006
Pace Project No.: 92524152

QC Batch: 602658 | Analysis Method: EPA 6020B
QC Batch Method: EPA 3010A | Analysis Description: 6020 MET Dissolved
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524152001, 92524152002, 92524152003, 92524152004

METHOD BLANK: 3175488 Matrix: Water
Associated Lab Samples: 92524152001, 92524152002, 92524152003, 92524152004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Arsenic, Dissolved	mg/L	ND	0.00010	0.000087	02/25/21 20:32	
Boron, Dissolved	mg/L	ND	0.025	0.0062	02/25/21 20:32	

LABORATORY CONTROL SAMPLE: 3175489

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic, Dissolved	mg/L	0.01	0.010	104	80-120	
Boron, Dissolved	mg/L	0.05	0.051	102	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3175490 3175491

Parameter	Units	92524147001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic, Dissolved	mg/L	ND	0.01	0.01	0.0094J	0.011	77	94	75-125		20	
Boron, Dissolved	mg/L	2.2J	0.05	0.05	1.8J	2.1J	-786	-285	75-125		20	M6

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QUALITY CONTROL DATA

Project: MCMANUS 30050105.00006
Pace Project No.: 92524152

QC Batch: 604532
QC Batch Method: SM 2320B-2011
Analysis Method: SM 2320B-2011
Analysis Description: 2320B Alkalinity
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524152001

METHOD BLANK: 3184660 Matrix: Water
Associated Lab Samples: 92524152001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	ND	5.0	5.0	03/05/21 17:15	
Alkalinity,Bicarbonate (CaCO3)	mg/L	ND	5.0	5.0	03/05/21 17:15	
Alkalinity,Carbonate (CaCO3)	mg/L	ND	5.0	5.0	03/05/21 17:15	

LABORATORY CONTROL SAMPLE: 3184661

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	50	48.2	96	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3184662 3184663

Parameter	Units	92523795002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	170	50	50	219	224	98	109	80-120	2	25	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3184664 3184665

Parameter	Units	92523800009 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	42.8	50	50	78.0	77.9	70	70	80-120	0	25	M1

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: MCMANUS 30050105.00006
Pace Project No.: 92524152

QC Batch: 604855
QC Batch Method: SM 2320B-2011
Analysis Method: SM 2320B-2011
Analysis Description: 2320B Alkalinity
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524152002, 92524152003, 92524152004

METHOD BLANK: 3186615 Matrix: Water
Associated Lab Samples: 92524152002, 92524152003, 92524152004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	ND	5.0	5.0	03/08/21 16:33	
Alkalinity,Bicarbonate (CaCO3)	mg/L	ND	5.0	5.0	03/08/21 16:33	
Alkalinity,Carbonate (CaCO3)	mg/L	ND	5.0	5.0	03/08/21 16:33	

LABORATORY CONTROL SAMPLE: 3186616

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	50	51.0	102	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3186617 3186618

Parameter	Units	92523800014 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	43.6	50	50	95.4	96.0	104	105	80-120	1	25	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3186619 3186620

Parameter	Units	92524091001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	16.3	50	50	70.8	70.9	109	109	80-120	0	25	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: MCMANUS 30050105.00006
Pace Project No.: 92524152

QC Batch: 602730 | Analysis Method: SM 2540C-2011
QC Batch Method: SM 2540C-2011 | Analysis Description: 2540C Total Dissolved Solids
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524152001, 92524152002, 92524152003, 92524152004

METHOD BLANK: 3176027 Matrix: Water
Associated Lab Samples: 92524152001, 92524152002, 92524152003, 92524152004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	ND	25.0	25.0	02/25/21 18:51	

LABORATORY CONTROL SAMPLE: 3176028

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	250	262	105	90-110	

SAMPLE DUPLICATE: 3176029

Parameter	Units	92524147001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	20600	20500	0	25	

SAMPLE DUPLICATE: 3176030

Parameter	Units	92523440012 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	98.0	91.0	7	25	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: MCMANUS 30050105.00006
Pace Project No.: 92524152

QC Batch: 602771 | Analysis Method: SM 4500-S2D-2011
QC Batch Method: SM 4500-S2D-2011 | Analysis Description: 4500S2D Sulfide Water
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524152001, 92524152002, 92524152003, 92524152004

METHOD BLANK: 3176220 Matrix: Water
Associated Lab Samples: 92524152001, 92524152002, 92524152003, 92524152004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Sulfide	mg/L	ND	0.10	0.050	02/26/21 06:34	

LABORATORY CONTROL SAMPLE: 3176221

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfide	mg/L	0.5	0.47	93	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3176222 3176223

Parameter	Units	92523670003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfide	mg/L	ND	0.5	0.5	0.47	0.47	94	94	80-120	0	10	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3176224 3176225

Parameter	Units	92523670004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfide	mg/L	0.073J	0.5	0.5	0.58	0.58	101	101	80-120	0	10	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: MCMANUS 30050105.00006
Pace Project No.: 92524152

QC Batch: 602789 | Analysis Method: SM 5210B-2011
QC Batch Method: SM 5210B-2011 | Analysis Description: 5210B BOD, 5 day
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524152001, 92524152002, 92524152003, 92524152004

METHOD BLANK: 3176288 Matrix: Water
Associated Lab Samples: 92524152001, 92524152002, 92524152003, 92524152004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
BOD, 5 day	mg/L	ND	2.0	2.0	03/03/21 01:10	

LABORATORY CONTROL SAMPLE: 3176290

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
BOD, 5 day	mg/L	198	205	104	84.6-115	

SAMPLE DUPLICATE: 3176291

Parameter	Units	92523947003 Result	Dup Result	RPD	Max RPD	Qualifiers
BOD, 5 day	mg/L	97.3	84.6	14	25	

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QUALITY CONTROL DATA

Project: MCMANUS 30050105.00006
Pace Project No.: 92524152

QC Batch: 602412
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: 92524152001

METHOD BLANK: 3174210 Matrix: Water
Associated Lab Samples: 92524152001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	ND	1.0	0.60	02/24/21 20:50	
Nitrate as N	mg/L	ND	0.10	0.060	02/24/21 20:50	
Nitrite as N	mg/L	ND	0.10	0.050	02/24/21 20:50	
Sulfate	mg/L	ND	1.0	0.50	02/24/21 20:50	

LABORATORY CONTROL SAMPLE: 3174211

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	50	48.2	96	90-110	
Nitrate as N	mg/L	2.5	2.3	94	90-110	
Nitrite as N	mg/L	2.5	2.4	96	90-110	
Sulfate	mg/L	50	48.8	98	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3174212 3174213

Parameter	Units	92523918001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	5480	50	50	5610	5550	248	130	90-110	1	10	M6
Nitrate as N	mg/L	ND	2.5	2.5	1.7	1.7	69	69	90-110	0	10	M6
Nitrite as N	mg/L	ND	2.5	2.5	ND	ND	0	0	90-110		10	M6
Sulfate	mg/L	295	50	50	339	339	89	88	90-110	0	10	M6

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: MCMANUS 30050105.00006
Pace Project No.: 92524152

QC Batch: 602684
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: 92524152002, 92524152003, 92524152004

METHOD BLANK: 3175722 Matrix: Water
Associated Lab Samples: 92524152002, 92524152003, 92524152004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	ND	1.0	0.60	02/25/21 16:02	
Nitrate as N	mg/L	ND	0.10	0.060	02/25/21 16:02	
Nitrite as N	mg/L	ND	0.10	0.050	02/25/21 16:02	
Sulfate	mg/L	ND	1.0	0.50	02/25/21 16:02	

LABORATORY CONTROL SAMPLE: 3175723

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	50	48.8	98	90-110	
Nitrate as N	mg/L	2.5	2.3	94	90-110	
Nitrite as N	mg/L	2.5	2.4	97	90-110	
Sulfate	mg/L	50	49.5	99	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3175724 3175725

Parameter	Units	92524147001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	9250	50	50	9270	9180	44	-124	90-110	1	10	M6
Nitrate as N	mg/L	ND	2.5	2.5	ND	ND	56	52	90-110		10	D3,M6
Nitrite as N	mg/L	ND	2.5	2.5	ND	ND	40	40	90-110		10	D3,M6
Sulfate	mg/L	853	50	50	902	890	99	76	90-110	1	10	M6

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: MCMANUS 30050105.00006
Pace Project No.: 92524152

QC Batch: 602647
QC Batch Method: SM 4500-P E-2011
Analysis Method: SM 4500-P E-2011
Analysis Description: SM4500P-E Phosphorus, Ortho
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524152001

METHOD BLANK: 3175375 Matrix: Water
Associated Lab Samples: 92524152001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Orthophosphate as P	mg/L	ND	0.050	0.012	02/25/21 14:50	

LABORATORY CONTROL SAMPLE & LCSD: 3175376 3175377

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Orthophosphate as P	mg/L	0.25	0.24	0.24	98	98	49-145	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: MCMANUS 30050105.00006
Pace Project No.: 92524152

QC Batch: 602772 | Analysis Method: SM 4500-P E-2011
QC Batch Method: SM 4500-P E-2011 | Analysis Description: SM4500P-E Phosphorus, Ortho
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524152002, 92524152003, 92524152004

METHOD BLANK: 3176226 Matrix: Water
Associated Lab Samples: 92524152002, 92524152003, 92524152004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Orthophosphate as P	mg/L	ND	0.050	0.012	02/26/21 03:28	

LABORATORY CONTROL SAMPLE: 3176227

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Orthophosphate as P	mg/L	0.25	0.24	96	49-145	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3176228 3176229

Parameter	Units	92524178001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Orthophosphate as P	mg/L	0.92	1.2	1.2	1.8	1.8	67	67	90-110	0	10	M1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3176230 3176231

Parameter	Units	92524193001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Orthophosphate as P	mg/L	0.057	0.25	0.25	0.23	0.23	68	69	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.

REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: MCMANUS 30050105.00006
Pace Project No.: 92524152

QC Batch: 603999
QC Batch Method: EPA 9060A
Analysis Method: EPA 9060A
Analysis Description: 9060 TOC, AVL
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524152001, 92524152002, 92524152003, 92524152004

METHOD BLANK: 3181952 Matrix: Water
Associated Lab Samples: 92524152001, 92524152002, 92524152003, 92524152004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mean Total Organic Carbon	mg/L	ND	1.0	0.50	03/03/21 21:06	
Total Organic Carbon	mg/L	ND	1.0	0.50	03/03/21 21:06	
Total Organic Carbon	mg/L	ND	1.0	0.50	03/03/21 21:06	
Total Organic Carbon	mg/L	ND	1.0	0.50	03/03/21 21:06	
Total Organic Carbon	mg/L	ND	1.0	0.50	03/03/21 21:06	

LABORATORY CONTROL SAMPLE: 3181953

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mean Total Organic Carbon	mg/L	25	24.4	98	75-125	
Total Organic Carbon	mg/L	25	24.2	97	75-125	
Total Organic Carbon	mg/L	25	24.7	99	75-125	
Total Organic Carbon	mg/L	25	24.3	97	75-125	
Total Organic Carbon	mg/L	25	24.6	98	75-125	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3181954 3181955

Parameter	Units	92524081005 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/L	32.6	25	25	55.7	56.0	92	94	75-125	1	25	
Total Organic Carbon	mg/L	32.6	25	25	55.6	55.9	92	93	75-125	1	25	
Total Organic Carbon	mg/L	32.8	25	25	56.0	56.5	93	95	75-125	1	25	
Total Organic Carbon	mg/L	32.0	25	25	54.6	55.4	90	93	75-125	1	25	
Total Organic Carbon	mg/L	32.9	25	25	56.3	56.4	94	94	75-125	0	25	

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

REPORT OF LABORATORY ANALYSIS

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

QUALIFIERS

Project: MCMANUS 30050105.00006
Pace Project No.: 92524152

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

B2	Oxygen usage is less than 2.0 for all dilutions set. The reported value is an estimated less than value and is calculated for the dilution using the most amount of sample.
D3	Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference.
H2	Extraction or preparation conducted outside EPA method holding time.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
M6	Matrix spike and Matrix spike duplicate recovery not evaluated against control limits due to sample dilution.
R1	RPD value was outside control limits.

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

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: MCMANUS 30050105.00006
Pace Project No.: 92524152

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
92524152001	**VAP-31-W (5-10)**	EPA 3010A	602778	EPA 6010D	602799
92524152002	**VAP-31-W (18-20)**	EPA 3010A	602778	EPA 6010D	602799
92524152003	**VAP-31-W (22-24)**	EPA 3010A	602778	EPA 6010D	602799
92524152004	**VAP-31-W (29-31)**	EPA 3010A	602778	EPA 6010D	602799
92524152001	**VAP-31-W (5-10)**	EPA 3010A	603185	EPA 6010D	603191
92524152002	**VAP-31-W (18-20)**	EPA 3010A	603185	EPA 6010D	603191
92524152003	**VAP-31-W (22-24)**	EPA 3010A	603185	EPA 6010D	603191
92524152004	**VAP-31-W (29-31)**	EPA 3010A	603185	EPA 6010D	603191
92524152001	**VAP-31-W (5-10)**	EPA 3010A	602702	EPA 6020B	602750
92524152002	**VAP-31-W (18-20)**	EPA 3010A	602702	EPA 6020B	602750
92524152003	**VAP-31-W (22-24)**	EPA 3010A	602702	EPA 6020B	602750
92524152004	**VAP-31-W (29-31)**	EPA 3010A	602702	EPA 6020B	602750
92524152001	**VAP-31-W (5-10)**	EPA 3010A	602658	EPA 6020B	602711
92524152002	**VAP-31-W (18-20)**	EPA 3010A	602658	EPA 6020B	602711
92524152003	**VAP-31-W (22-24)**	EPA 3010A	602658	EPA 6020B	602711
92524152004	**VAP-31-W (29-31)**	EPA 3010A	602658	EPA 6020B	602711
92524152001	**VAP-31-W (5-10)**	SM 2320B-2011	604532		
92524152002	**VAP-31-W (18-20)**	SM 2320B-2011	604855		
92524152003	**VAP-31-W (22-24)**	SM 2320B-2011	604855		
92524152004	**VAP-31-W (29-31)**	SM 2320B-2011	604855		
92524152001	**VAP-31-W (5-10)**	SM 2540C-2011	602730		
92524152002	**VAP-31-W (18-20)**	SM 2540C-2011	602730		
92524152003	**VAP-31-W (22-24)**	SM 2540C-2011	602730		
92524152004	**VAP-31-W (29-31)**	SM 2540C-2011	602730		
92524152001	**VAP-31-W (5-10)**	SM 4500-S2D-2011	602771		
92524152002	**VAP-31-W (18-20)**	SM 4500-S2D-2011	602771		
92524152003	**VAP-31-W (22-24)**	SM 4500-S2D-2011	602771		
92524152004	**VAP-31-W (29-31)**	SM 4500-S2D-2011	602771		
92524152001	**VAP-31-W (5-10)**	SM 5210B-2011	602789	SM 5210B-2011	602834
92524152002	**VAP-31-W (18-20)**	SM 5210B-2011	602789	SM 5210B-2011	602834
92524152003	**VAP-31-W (22-24)**	SM 5210B-2011	602789	SM 5210B-2011	602834
92524152004	**VAP-31-W (29-31)**	SM 5210B-2011	602789	SM 5210B-2011	602834
92524152001	**VAP-31-W (5-10)**	EPA 300.0 Rev 2.1 1993	602412		
92524152002	**VAP-31-W (18-20)**	EPA 300.0 Rev 2.1 1993	602684		
92524152003	**VAP-31-W (22-24)**	EPA 300.0 Rev 2.1 1993	602684		
92524152004	**VAP-31-W (29-31)**	EPA 300.0 Rev 2.1 1993	602684		
92524152001	**VAP-31-W (5-10)**	SM 4500-P E-2011	602647		
92524152002	**VAP-31-W (18-20)**	SM 4500-P E-2011	602772		
92524152003	**VAP-31-W (22-24)**	SM 4500-P E-2011	602772		
92524152004	**VAP-31-W (29-31)**	SM 4500-P E-2011	602772		
92524152001	**VAP-31-W (5-10)**	EPA 9060A	603999		
92524152002	**VAP-31-W (18-20)**	EPA 9060A	603999		

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

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: MCMANUS 30050105.00006
Pace Project No.: 92524152

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
92524152003	**VAP-31-W (22-24)**	EPA 9060A	603999		
92524152004	**VAP-31-W (29-31)**	EPA 9060A	603999		

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 [X] Eden [ ] Greenwood [ ] Huntersville [ ] Raleigh [ ] Mechanicsville [ ] Atlanta [ ] Kernersville [ ]

Sample Condition Upon Receipt

Client Name: Arcadis

Project #: WO# : 92524152

92524152

Courier: [X] Fed Ex [ ] UPS [ ] USPS [ ] Client [ ] Commercial [ ] Pace [ ] Other:____

Custody Seal Present? [X] Yes [ ] No **Seals Intact?** [X] Yes [ ] No

Date/Initials Person Examining Contents: 2-25-21/AR

Packing Material: [ ] Bubble Wrap [X] Bubble Bags [ ] None [ ] Other

Biological Tissue Frozen? [ ] Yes [ ] No [X] N/A

Thermometer: [X] IR Gun ID: 93-T071 **Type of Ice:** [X] Wet [ ] Blue [ ] None

Cooler Temp: 4.1 **Correction Factor:** Add/Subtract (°C) 0

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 ([X] N/A, water sample)
Did samples originate in a quarantine zone within the United States: CA, NY, or SC (check maps)? [ ] Yes [X] No

Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? [ ] Yes [X] No

				Comments/Discrepancy:
Chain of Custody Present?	[X] Yes	[ ] No	[ ] N/A	1.
Samples Arrived within Hold Time?	[X] Yes	[ ] No	[ ] N/A	2.
Short Hold Time Analysis (<72 hr.)?	[X] Yes	[ ] No	[ ] N/A	3.
Rush Turn Around Time Requested?	[ ] Yes	[X] No	[ ] N/A	4.
Sufficient Volume?	[X] Yes	[ ] No	[ ] N/A	5.
Correct Containers Used?	[X] Yes	[ ] No	[ ] N/A	6.
-Pace Containers Used?	[X] Yes	[ ] No	[ ] N/A	
Containers Intact?	[X] Yes	[ ] No	[ ] N/A	7.
Dissolved analysis: Samples Field Filtered?	[ ] Yes	[ ] No	[X] N/A	8.
Sample Labels Match COC?	[X] Yes	[ ] No	[ ] N/A	9.
-Includes Date/Time/ID/Analysis Matrix: WT				
Headspace in VOA Vials (>5-6mm)?	[ ] Yes	[X] No	[ ] N/A	10.
Trip Blank Present?	[ ] Yes	[X] No	[ ] N/A	11.
Trip Blank Custody Seals Present?	[ ] Yes	[X] 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#: 92524152

PM: KLH1 Due Date: 02/26/21

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)	GN	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		2	1	1		2	1												3					1				
2		2	1	1		2	1												3					1				
3		2	1	1		2	1												3					1				
4		2	1	1		2	1												3					1				
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.

ARCADIS

ID#:

CHAIN OF CUSTODY & LABORATORY ANALYSIS REQUEST FORM

Page ___ of ___

Lab Work Order #: G2524152

Send Results to:

Contact & Company Name: MATT WEBB ARCADIS
Telephone: 919-410-2284
Address: 5420 WADE PARK BLVD Ste 350
Fax:
City: RALEIGH State: NC Zip: 27607
E-mail Address: Matthew.Webb@Arcadis.com
Project Name/Location (City, State): McMANUS N.C. Brown
Project #: 30050105.0000
Sampler's Printed Name:
Sampler's Signature:

	Total metals	Dissolved Metals	Alkalinity	CL, SO4, NO2/NO3	Sulfide NaOH+Zn Acetate	Ortho phosphate	KVT TOC	BOD	TDS
Preservative	C	C	E	E	F		G	E	E
Filtered (✓)									
# of Containers	1	1	1	1	1	KVT	3	1	1
Container Information	3	3	3	3	9		1	2	4

PARAMETER ANALYSIS & METHOD

Sample ID	Collection Date	Collection Time	Type Comp	Type Grab	Matrix	Total metals	Dissolved Metals	Alkalinity	CL, SO4, NO2/NO3	Sulfide NaOH+Zn Acetate	Ortho phosphate	KVT TOC	BOD	TDS	REMARKS
VAP-31-W (5-10)	2/23/2021	15:00		X	W	1	1	1	1	1	1	3	1	1	
VAP-31-W (18-20)	2/24/2021	7:45		X	W	1	1	1	1	1	1	3	1	1	
VAP-31-W (22-24)	2/24/2021	8:08		X	W	1	1	1	1	1	1	3	1	1	
VAP-31-W (29-31)	2/24/21	8:50		X	W	1	1	1	1	1	1	3	1	1	

Keys

Preservation Key: A. H_2SO_4 B. HCL C. HNO_3 D. NaOH E. None F. Other: NaOH/Zn Acetate G. Other: H_3PO_4 H. Other:

Container Information Key: 1. 40 ml Vial 2. 1 L Amber 3. 250 ml Plastic 4. 500 ml Plastic 5. Encore 6. 2 oz. Glass 7. 4 oz. Glass 8. 8 oz. Glass 9. Other: 125 ml 10. Other:

Matrix Key: SO - Soil, W - Water, T - Tissue, SE - Sediment, SL - Sludge, A - Air, NL - NAPL/Oil, SW - Sample Wipe, Other:

Special Instructions/Comments: METALS = As Fe, Mn, Mg, Ca, Na, K, B
Dissolved metals = field filter
* TOTAL/DISSOLVED As = 24 hr TAT

☐ Special QA/QC Instructions(✓):

Laboratory Information and Receipt

Lab Name: PACE
☑ Cooler packed with ice (✓)
Specify Turnaround Requirements:
Shipping Tracking #:
Cooler Custody Seal (✓): ☒ Intact ☐ Not Intact
Sample Receipt:
Condition/Cooler Temp: 4.1

	Relinquished By	Received By	Relinquished By	Laboratory Received By
Printed Name	Grant A Williford	FedEx	A. Rucker	
Signature	[signature]		[signature]	
Firm	AWA		PACE/ATL	
Date/Time	2/24/2021 1600		2-25-21 1100	

20730826 CofC AR Form 08.27.2015 Distribution: WHITE – Laboratory returns with results YELLOW – Lab copy PINK – Retained by Arcadis

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

March 10, 2021

Ms. Lauren Petty
Southern Co. Services
42 Inverness Center Parkway
Birmingham, AL 35242

RE: Project: MCMANUS PLANT 30050105.00006
Pace Project No.: 92523889

Dear Ms. Petty:

Enclosed are the analytical results for sample(s) received by the laboratory on February 24, 2021. 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

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: Joju Abraham, Georgia Power-CCR
Kathryn Farris
Geoffrey Gay, ARCADIS - Atlanta
Margaret Gentile, Arcadis
Kristen Jurinko
Charles Lawson, Arcadis
Bryan Mayeux
Kelley Sharpe, ARCADIS - Atlanta
Maribel Vital

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

CERTIFICATIONS

Project: MCMANUS PLANT 30050105.00006
Pace Project No.: 92523889

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

REPORT OF LABORATORY ANALYSIS

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

SAMPLE SUMMARY

Project: MCMANUS PLANT 30050105.00006
Pace Project No.: 92523889

Lab ID	Sample ID	Matrix	Date Collected	Date Received
92523889001	**VAP-14-W (5-10)**	Water	02/23/21 08:40	02/24/21 12:30
92523889002	**VAP-14-W (22-24)**	Water	02/23/21 09:15	02/24/21 12:30
92523889003	**VAP-14-W (29-31)**	Water	02/23/21 09:45	02/24/21 12:30
92523889004	**VAP-14-W (31-33)**	Water	02/23/21 10:10	02/24/21 12:30

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

SAMPLE ANALYTE COUNT

Project: MCMANUS PLANT 30050105.00006
Pace Project No.: 92523889

Lab ID	Sample ID	Method	Analysts	Analytes Reported
92523889001	**VAP-14-W (5-10)**	EPA 6010D	KQ, RDT	6
		EPA 6010D	KQ, SH1	6
		EPA 6020B	JOR	2
		EPA 6020B	JOR	2
		SM 2320B-2011	ECH	3
		SM 2540C-2011	RED	1
		SM 4500-S2D-2011	JP1	1
		SM 5210B-2011	MFO	1
		EPA 300.0 Rev 2.1 1993	CDC	4
		SM 4500-P E-2011	JP1	1
		EPA 9060A	JLH	5
92523889002	**VAP-14-W (22-24)**	EPA 6010D	KQ, RDT	6
		EPA 6010D	KQ, SH1	6
		EPA 6020B	JOR	2
		EPA 6020B	JOR	2
		SM 2320B-2011	ECH	3
		SM 2540C-2011	RED	1
		SM 4500-S2D-2011	JP1	1
		SM 5210B-2011	MFO	1
		EPA 300.0 Rev 2.1 1993	CDC	4
		SM 4500-P E-2011	JP1	1
		EPA 9060A	JLH	5
92523889003	**VAP-14-W (29-31)**	EPA 6010D	KQ, RDT	6
		EPA 6010D	KQ, SH1	6
		EPA 6020B	JOR	2
		EPA 6020B	JOR	2
		SM 2320B-2011	ECH	3
		SM 2540C-2011	RED	1
		SM 4500-S2D-2011	JP1	1
		SM 5210B-2011	MFO	1
		EPA 300.0 Rev 2.1 1993	CDC	4
		SM 4500-P E-2011	JP1	1
		EPA 9060A	JLH	5
92523889004	**VAP-14-W (31-33)**	EPA 6010D	KQ, RDT	6
		EPA 6010D	KQ, SH1	6
		EPA 6020B	JOR	2
		EPA 6020B	JOR	2

REPORT OF LABORATORY ANALYSIS

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

SAMPLE ANALYTE COUNT

Project: MCMANUS PLANT 30050105.00006
Pace Project No.: 92523889

Lab ID	Sample ID	Method	Analysts	Analytes Reported
		SM 2320B-2011	ECH	3
		SM 2540C-2011	RED	1
		SM 4500-S2D-2011	JP1	1
		SM 5210B-2011	MFO	1
		EPA 300.0 Rev 2.1 1993	CDC	4
		SM 4500-P E-2011	JP1	1
		EPA 9060A	JLH	5

PASI-A = Pace Analytical Services - Asheville

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

SUMMARY OF DETECTION

Project: MCMANUS PLANT 30050105.00006
Pace Project No.: 92523889

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92523889001	**VAP-14-W (5-10)**					
EPA 6010D	Calcium	196	mg/L	1.0	02/26/21 14:22	
EPA 6010D	Iron	3.9	mg/L	0.050	02/25/21 10:10	
EPA 6010D	Magnesium	588	mg/L	1.0	02/26/21 14:22	
EPA 6010D	Manganese	0.13	mg/L	0.0050	02/25/21 10:10	
EPA 6010D	Potassium	199	mg/L	50.0	02/26/21 14:22	
EPA 6010D	Sodium	4340	mg/L	500	02/26/21 10:57	
EPA 6010D	Calcium, Dissolved	164	mg/L	1.0	03/02/21 15:23	
EPA 6010D	Iron, Dissolved	3.3	mg/L	0.050	03/02/21 04:21	
EPA 6010D	Magnesium, Dissolved	529	mg/L	1.0	03/02/21 15:23	
EPA 6010D	Manganese, Dissolved	0.12	mg/L	0.0050	03/02/21 04:21	
EPA 6010D	Potassium, Dissolved	166	mg/L	50.0	03/02/21 15:23	
EPA 6010D	Sodium, Dissolved	3900	mg/L	500	03/02/21 14:53	
EPA 6020B	Boron	1.7J	mg/L	2.5	02/25/21 13:36	
EPA 6020B	Boron, Dissolved	1.7J	mg/L	2.5	02/25/21 13:11	
SM 2320B-2011	Alkalinity,Bicarbonate (CaCO3)	109	mg/L	5.0	02/25/21 17:16	
SM 2320B-2011	Alkalinity, Total as CaCO3	109	mg/L	5.0	02/25/21 17:16	
SM 2540C-2011	Total Dissolved Solids	15900	mg/L	2500	02/24/21 18:41	
SM 4500-S2D-2011	Sulfide	0.47	mg/L	0.10	02/25/21 07:03	
EPA 300.0 Rev 2.1 1993	Chloride	5400	mg/L	80.0	02/25/21 08:33	
EPA 300.0 Rev 2.1 1993	Sulfate	253	mg/L	80.0	02/25/21 08:33	
SM 4500-P E-2011	Orthophosphate as P	0.25	mg/L	0.050	02/25/21 03:08	
EPA 9060A	Total Organic Carbon	10.8	mg/L	1.0	03/02/21 06:36	
EPA 9060A	Total Organic Carbon	10.8	mg/L	1.0	03/02/21 06:36	
EPA 9060A	Total Organic Carbon	10.9	mg/L	1.0	03/02/21 06:36	
EPA 9060A	Total Organic Carbon	11.0	mg/L	1.0	03/02/21 06:36	
EPA 9060A	Mean Total Organic Carbon	10.9	mg/L	1.0	03/02/21 06:36	
92523889002	**VAP-14-W (22-24)**					
EPA 6010D	Calcium	263	mg/L	1.0	02/26/21 14:25	
EPA 6010D	Iron	2.1	mg/L	0.050	02/25/21 10:14	
EPA 6010D	Magnesium	648	mg/L	1.0	02/26/21 14:25	
EPA 6010D	Manganese	0.38	mg/L	0.0050	02/25/21 10:14	
EPA 6010D	Potassium	199	mg/L	50.0	02/26/21 14:25	
EPA 6010D	Sodium	4740	mg/L	500	02/26/21 11:00	
EPA 6010D	Calcium, Dissolved	216	mg/L	1.0	03/02/21 15:39	
EPA 6010D	Iron, Dissolved	0.063	mg/L	0.050	03/02/21 04:24	
EPA 6010D	Magnesium, Dissolved	572	mg/L	1.0	03/02/21 15:39	
EPA 6010D	Manganese, Dissolved	0.35	mg/L	0.0050	03/02/21 04:24	
EPA 6010D	Potassium, Dissolved	158	mg/L	50.0	03/02/21 15:39	
EPA 6010D	Sodium, Dissolved	4500	mg/L	500	03/02/21 14:56	
EPA 6020B	Arsenic	0.32	mg/L	0.010	02/25/21 13:40	
EPA 6020B	Boron	1.7J	mg/L	2.5	02/25/21 13:40	
EPA 6020B	Arsenic, Dissolved	0.18	mg/L	0.010	02/25/21 12:42	
EPA 6020B	Boron, Dissolved	1.7J	mg/L	2.5	02/25/21 12:42	
SM 2320B-2011	Alkalinity,Bicarbonate (CaCO3)	708	mg/L	5.0	02/25/21 17:44	
SM 2320B-2011	Alkalinity, Total as CaCO3	708	mg/L	5.0	02/25/21 17:44	
SM 2540C-2011	Total Dissolved Solids	18800	mg/L	2500	02/24/21 18:41	
SM 4500-S2D-2011	Sulfide	87.2	mg/L	10.0	02/25/21 07:04	

REPORT OF LABORATORY ANALYSIS

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

SUMMARY OF DETECTION

Project: MCMANUS PLANT 30050105.00006
Pace Project No.: 92523889

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92523889002	**VAP-14-W (22-24)**					
EPA 300.0 Rev 2.1 1993	Chloride	7760	mg/L	100	02/25/21 08:48	
EPA 300.0 Rev 2.1 1993	Sulfate	900	mg/L	100	02/25/21 08:48	
SM 4500-P E-2011	Orthophosphate as P	0.56	mg/L	0.25	02/25/21 03:09	
EPA 9060A	Total Organic Carbon	10.4	mg/L	1.0	03/02/21 06:54	
EPA 9060A	Total Organic Carbon	10.4	mg/L	1.0	03/02/21 06:54	
EPA 9060A	Total Organic Carbon	10.7	mg/L	1.0	03/02/21 06:54	
EPA 9060A	Total Organic Carbon	10.7	mg/L	1.0	03/02/21 06:54	
EPA 9060A	Mean Total Organic Carbon	10.5	mg/L	1.0	03/02/21 06:54	
92523889003	**VAP-14-W (29-31)**					
EPA 6010D	Calcium	261	mg/L	1.0	02/26/21 14:28	
EPA 6010D	Iron	0.89	mg/L	0.050	02/25/21 10:17	
EPA 6010D	Magnesium	584	mg/L	1.0	02/26/21 14:28	
EPA 6010D	Manganese	0.35	mg/L	0.0050	02/25/21 10:17	
EPA 6010D	Potassium	206	mg/L	50.0	02/26/21 14:28	
EPA 6010D	Sodium	4690	mg/L	500	02/26/21 11:04	
EPA 6010D	Calcium, Dissolved	209	mg/L	1.0	03/02/21 15:42	
EPA 6010D	Iron, Dissolved	0.14	mg/L	0.050	03/02/21 04:28	
EPA 6010D	Magnesium, Dissolved	495	mg/L	1.0	03/02/21 15:42	
EPA 6010D	Manganese, Dissolved	0.31	mg/L	0.0050	03/02/21 04:28	
EPA 6010D	Potassium, Dissolved	165	mg/L	50.0	03/02/21 15:42	
EPA 6010D	Sodium, Dissolved	4310	mg/L	500	03/02/21 15:00	
EPA 6020B	Arsenic	0.078	mg/L	0.010	02/25/21 13:44	
EPA 6020B	Boron	2.1J	mg/L	2.5	02/25/21 13:44	
EPA 6020B	Arsenic, Dissolved	0.044	mg/L	0.010	02/25/21 12:46	
EPA 6020B	Boron, Dissolved	2.1J	mg/L	2.5	02/25/21 12:46	
SM 2320B-2011	Alkalinity,Bicarbonate (CaCO3)	440	mg/L	5.0	02/25/21 17:58	
SM 2320B-2011	Alkalinity, Total as CaCO3	440	mg/L	5.0	02/25/21 17:58	
SM 2540C-2011	Total Dissolved Solids	17800	mg/L	2500	02/24/21 18:41	
SM 4500-S2D-2011	Sulfide	41.7	mg/L	10.0	02/25/21 07:04	
EPA 300.0 Rev 2.1 1993	Chloride	8200	mg/L	100	02/25/21 09:02	
EPA 300.0 Rev 2.1 1993	Sulfate	655	mg/L	100	02/25/21 09:02	
SM 4500-P E-2011	Orthophosphate as P	0.54	mg/L	0.25	02/25/21 03:09	
EPA 9060A	Total Organic Carbon	7.4	mg/L	1.0	03/02/21 07:51	
EPA 9060A	Total Organic Carbon	7.5	mg/L	1.0	03/02/21 07:51	
EPA 9060A	Total Organic Carbon	7.6	mg/L	1.0	03/02/21 07:51	
EPA 9060A	Total Organic Carbon	7.6	mg/L	1.0	03/02/21 07:51	
EPA 9060A	Mean Total Organic Carbon	7.5	mg/L	1.0	03/02/21 07:51	
92523889004	**VAP-14-W (31-33)**					
EPA 6010D	Calcium	248	mg/L	1.0	02/26/21 14:32	
EPA 6010D	Iron	0.77	mg/L	0.050	02/25/21 10:21	
EPA 6010D	Magnesium	537	mg/L	1.0	02/26/21 14:32	
EPA 6010D	Manganese	0.30	mg/L	0.0050	02/25/21 10:21	
EPA 6010D	Potassium	194	mg/L	50.0	02/26/21 14:32	
EPA 6010D	Sodium	4410	mg/L	500	02/26/21 11:07	
EPA 6010D	Calcium, Dissolved	213	mg/L	1.0	03/02/21 15:46	
EPA 6010D	Iron, Dissolved	0.29	mg/L	0.050	03/02/21 04:31	

REPORT OF LABORATORY ANALYSIS

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

SUMMARY OF DETECTION

Project: MCMANUS PLANT 30050105.00006
Pace Project No.: 92523889

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92523889004	**VAP-14-W (31-33)**					
EPA 6010D	Magnesium, Dissolved	492	mg/L	1.0	03/02/21 15:46	
EPA 6010D	Manganese, Dissolved	0.29	mg/L	0.0050	03/02/21 04:31	
EPA 6010D	Potassium, Dissolved	167	mg/L	50.0	03/02/21 15:46	
EPA 6010D	Sodium, Dissolved	4050	mg/L	500	03/02/21 15:03	
EPA 6020B	Arsenic	0.032	mg/L	0.010	02/25/21 13:59	
EPA 6020B	Boron	2.0J	mg/L	2.5	02/25/21 13:59	
EPA 6020B	Arsenic, Dissolved	0.012	mg/L	0.010	02/25/21 12:50	
EPA 6020B	Boron, Dissolved	2.0J	mg/L	2.5	02/25/21 12:50	
SM 2320B-2011	Alkalinity,Bicarbonate (CaCO3)	413	mg/L	5.0	02/25/21 18:07	
SM 2320B-2011	Alkalinity, Total as CaCO3	413	mg/L	5.0	02/25/21 18:07	
SM 2540C-2011	Total Dissolved Solids	17800	mg/L	2500	02/24/21 18:41	
SM 4500-S2D-2011	Sulfide	46.0	mg/L	10.0	02/25/21 07:04	
EPA 300.0 Rev 2.1 1993	Chloride	7370	mg/L	100	02/25/21 09:16	
EPA 300.0 Rev 2.1 1993	Sulfate	866	mg/L	100	02/25/21 09:16	
SM 4500-P E-2011	Orthophosphate as P	0.46	mg/L	0.050	02/25/21 03:10	
EPA 9060A	Total Organic Carbon	6.9	mg/L	1.0	03/02/21 08:09	
EPA 9060A	Total Organic Carbon	6.9	mg/L	1.0	03/02/21 08:09	
EPA 9060A	Total Organic Carbon	7.2	mg/L	1.0	03/02/21 08:09	
EPA 9060A	Total Organic Carbon	7.1	mg/L	1.0	03/02/21 08:09	
EPA 9060A	Mean Total Organic Carbon	7.0	mg/L	1.0	03/02/21 08:09	

Pace Analytical Services, LLC
110 Technology Parkway
Peachtree Corners, GA 30092
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ANALYTICAL RESULTS

Project: MCMANUS PLANT 30050105.00006
Pace Project No.: 92523889

Sample: VAP-14-W (5-10) **Lab ID: 92523889001** Collected: 02/23/21 08:40 Received: 02/24/21 12:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Calcium	**196**	mg/L	1.0	0.94	10	02/25/21 02:37	02/26/21 14:22	7440-70-2	
Iron	**3.9**	mg/L	0.050	0.042	1	02/25/21 02:37	02/25/21 10:10	7439-89-6	
Magnesium	**588**	mg/L	1.0	0.68	10	02/25/21 02:37	02/26/21 14:22	7439-95-4	
Manganese	**0.13**	mg/L	0.0050	0.0034	1	02/25/21 02:37	02/25/21 10:10	7439-96-5	
Potassium	**199**	mg/L	50.0	30.4	10	02/25/21 02:37	02/26/21 14:22	7440-09-7	
Sodium	**4340**	mg/L	500	61.1	100	02/25/21 02:37	02/26/21 10:57	7440-23-5	
6010 MET ICP, Dissolved	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Calcium, Dissolved	**164**	mg/L	1.0	0.94	10	02/26/21 11:20	03/02/21 15:23	7440-70-2	
Iron, Dissolved	**3.3**	mg/L	0.050	0.042	1	02/26/21 11:20	03/02/21 04:21	7439-89-6	
Magnesium, Dissolved	**529**	mg/L	1.0	0.68	10	02/26/21 11:20	03/02/21 15:23	7439-95-4	
Manganese, Dissolved	**0.12**	mg/L	0.0050	0.0034	1	02/26/21 11:20	03/02/21 04:21	7439-96-5	
Potassium, Dissolved	**166**	mg/L	50.0	30.4	10	02/26/21 11:20	03/02/21 15:23	7440-09-7	
Sodium, Dissolved	**3900**	mg/L	500	61.1	100	02/26/21 11:20	03/02/21 14:53	7440-23-5	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Arsenic	ND	mg/L	0.010	0.0087	100	02/24/21 16:47	02/25/21 13:36	7440-38-2	
Boron	**1.7J**	mg/L	2.5	0.62	100	02/24/21 16:47	02/25/21 13:36	7440-42-8	
6020 MET ICPMS, Dissolved	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Arsenic, Dissolved	ND	mg/L	0.010	0.0087	100	02/24/21 16:30	02/25/21 13:11	7440-38-2	
Boron, Dissolved	**1.7J**	mg/L	2.5	0.62	100	02/24/21 16:30	02/25/21 13:11	7440-42-8	
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**109**	mg/L	5.0	5.0	1		02/25/21 17:16		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		02/25/21 17:16		
Alkalinity, Total as CaCO3	**109**	mg/L	5.0	5.0	1		02/25/21 17:16		
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**15900**	mg/L	2500	2500	1		02/24/21 18:41		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	**0.47**	mg/L	0.10	0.050	1		02/25/21 07:03	18496-25-8	
5210B BOD, 5 day	Analytical Method: SM 5210B-2011 Pace Analytical Services - Asheville								
BOD, 5 day	ND	mg/L	2.0	2.0	1	02/25/21 07:22	03/02/21 06:01		

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: MCMANUS PLANT 30050105.00006
Pace Project No.: 92523889

Sample: VAP-14-W (5-10) **Lab ID: 92523889001** Collected: 02/23/21 08:40 Received: 02/24/21 12:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC anions 48hr	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**5400**	mg/L	80.0	48.0	80		02/25/21 08:33	16887-00-6	
Nitrate as N	ND	mg/L	0.10	0.060	1		02/24/21 21:45	14797-55-8	
Nitrite as N	ND	mg/L	0.10	0.050	1		02/24/21 21:45	14797-65-0	
Sulfate	**253**	mg/L	80.0	40.0	80		02/25/21 08:33	14808-79-8	
SM4500P-E, Phosphate, Ortho	Analytical Method: SM 4500-P E-2011 Pace Analytical Services - Asheville								
Orthophosphate as P	**0.25**	mg/L	0.050	0.012	1		02/25/21 03:08		
Total Organic Carbon,Asheville	Analytical Method: EPA 9060A Pace Analytical Services - Asheville								
Total Organic Carbon	**10.8**	mg/L	1.0	0.50	1		03/02/21 06:36	7440-44-0	
Total Organic Carbon	**10.8**	mg/L	1.0	0.50	1		03/02/21 06:36	7440-44-0	
Total Organic Carbon	**10.9**	mg/L	1.0	0.50	1		03/02/21 06:36	7440-44-0	
Total Organic Carbon	**11.0**	mg/L	1.0	0.50	1		03/02/21 06:36	7440-44-0	
Mean Total Organic Carbon	**10.9**	mg/L	1.0	0.50	1		03/02/21 06:36	7440-44-0	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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ANALYTICAL RESULTS

Project: MCMANUS PLANT 30050105.00006
Pace Project No.: 92523889

Sample: VAP-14-W (22-24) **Lab ID: 92523889002** Collected: 02/23/21 09:15 Received: 02/24/21 12:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Calcium	**263**	mg/L	1.0	0.94	10	02/25/21 02:37	02/26/21 14:25	7440-70-2	
Iron	**2.1**	mg/L	0.050	0.042	1	02/25/21 02:37	02/25/21 10:14	7439-89-6	
Magnesium	**648**	mg/L	1.0	0.68	10	02/25/21 02:37	02/26/21 14:25	7439-95-4	
Manganese	**0.38**	mg/L	0.0050	0.0034	1	02/25/21 02:37	02/25/21 10:14	7439-96-5	
Potassium	**199**	mg/L	50.0	30.4	10	02/25/21 02:37	02/26/21 14:25	7440-09-7	
Sodium	**4740**	mg/L	500	61.1	100	02/25/21 02:37	02/26/21 11:00	7440-23-5	
6010 MET ICP, Dissolved	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Calcium, Dissolved	**216**	mg/L	1.0	0.94	10	02/26/21 11:20	03/02/21 15:39	7440-70-2	
Iron, Dissolved	**0.063**	mg/L	0.050	0.042	1	02/26/21 11:20	03/02/21 04:24	7439-89-6	
Magnesium, Dissolved	**572**	mg/L	1.0	0.68	10	02/26/21 11:20	03/02/21 15:39	7439-95-4	
Manganese, Dissolved	**0.35**	mg/L	0.0050	0.0034	1	02/26/21 11:20	03/02/21 04:24	7439-96-5	
Potassium, Dissolved	**158**	mg/L	50.0	30.4	10	02/26/21 11:20	03/02/21 15:39	7440-09-7	
Sodium, Dissolved	**4500**	mg/L	500	61.1	100	02/26/21 11:20	03/02/21 14:56	7440-23-5	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Arsenic	**0.32**	mg/L	0.010	0.0087	100	02/24/21 16:47	02/25/21 13:40	7440-38-2	
Boron	**1.7J**	mg/L	2.5	0.62	100	02/24/21 16:47	02/25/21 13:40	7440-42-8	
6020 MET ICPMS, Dissolved	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Arsenic, Dissolved	**0.18**	mg/L	0.010	0.0087	100	02/24/21 16:30	02/25/21 12:42	7440-38-2	
Boron, Dissolved	**1.7J**	mg/L	2.5	0.62	100	02/24/21 16:30	02/25/21 12:42	7440-42-8	
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**708**	mg/L	5.0	5.0	1		02/25/21 17:44		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		02/25/21 17:44		
Alkalinity, Total as CaCO3	**708**	mg/L	5.0	5.0	1		02/25/21 17:44		
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**18800**	mg/L	2500	2500	1		02/24/21 18:41		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	**87.2**	mg/L	10.0	5.0	100		02/25/21 07:04	18496-25-8	
5210B BOD, 5 day	Analytical Method: SM 5210B-2011 Pace Analytical Services - Asheville								
BOD, 5 day	ND	mg/L	2.0	2.0	1	02/25/21 07:22	03/02/21 06:04		

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: MCMANUS PLANT 30050105.00006
Pace Project No.: 92523889

Sample: VAP-14-W (22-24) **Lab ID: 92523889002** Collected: 02/23/21 09:15 Received: 02/24/21 12:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC anions 48hr	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**7760**	mg/L	100	60.0	100		02/25/21 08:48	16887-00-6	
Nitrate as N	ND	mg/L	0.10	0.060	1		02/24/21 21:59	14797-55-8	
Nitrite as N	ND	mg/L	0.10	0.050	1		02/24/21 21:59	14797-65-0	
Sulfate	**900**	mg/L	100	50.0	100		02/25/21 08:48	14808-79-8	
SM4500P-E, Phosphate, Ortho	Analytical Method: SM 4500-P E-2011 Pace Analytical Services - Asheville								
Orthophosphate as P	**0.56**	mg/L	0.25	0.059	5		02/25/21 03:09		
Total Organic Carbon,Asheville	Analytical Method: EPA 9060A Pace Analytical Services - Asheville								
Total Organic Carbon	**10.4**	mg/L	1.0	0.50	1		03/02/21 06:54	7440-44-0	
Total Organic Carbon	**10.4**	mg/L	1.0	0.50	1		03/02/21 06:54	7440-44-0	
Total Organic Carbon	**10.7**	mg/L	1.0	0.50	1		03/02/21 06:54	7440-44-0	
Total Organic Carbon	**10.7**	mg/L	1.0	0.50	1		03/02/21 06:54	7440-44-0	
Mean Total Organic Carbon	**10.5**	mg/L	1.0	0.50	1		03/02/21 06:54	7440-44-0	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: MCMANUS PLANT 30050105.00006
Pace Project No.: 92523889

Sample: VAP-14-W (29-31) **Lab ID: 92523889003** Collected: 02/23/21 09:45 Received: 02/24/21 12:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Calcium	**261**	mg/L	1.0	0.94	10	02/25/21 02:37	02/26/21 14:28	7440-70-2	
Iron	**0.89**	mg/L	0.050	0.042	1	02/25/21 02:37	02/25/21 10:17	7439-89-6	
Magnesium	**584**	mg/L	1.0	0.68	10	02/25/21 02:37	02/26/21 14:28	7439-95-4	
Manganese	**0.35**	mg/L	0.0050	0.0034	1	02/25/21 02:37	02/25/21 10:17	7439-96-5	
Potassium	**206**	mg/L	50.0	30.4	10	02/25/21 02:37	02/26/21 14:28	7440-09-7	
Sodium	**4690**	mg/L	500	61.1	100	02/25/21 02:37	02/26/21 11:04	7440-23-5	
6010 MET ICP, Dissolved	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Calcium, Dissolved	**209**	mg/L	1.0	0.94	10	02/26/21 11:20	03/02/21 15:42	7440-70-2	
Iron, Dissolved	**0.14**	mg/L	0.050	0.042	1	02/26/21 11:20	03/02/21 04:28	7439-89-6	
Magnesium, Dissolved	**495**	mg/L	1.0	0.68	10	02/26/21 11:20	03/02/21 15:42	7439-95-4	
Manganese, Dissolved	**0.31**	mg/L	0.0050	0.0034	1	02/26/21 11:20	03/02/21 04:28	7439-96-5	
Potassium, Dissolved	**165**	mg/L	50.0	30.4	10	02/26/21 11:20	03/02/21 15:42	7440-09-7	
Sodium, Dissolved	**4310**	mg/L	500	61.1	100	02/26/21 11:20	03/02/21 15:00	7440-23-5	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Arsenic	**0.078**	mg/L	0.010	0.0087	100	02/24/21 16:47	02/25/21 13:44	7440-38-2	
Boron	**2.1J**	mg/L	2.5	0.62	100	02/24/21 16:47	02/25/21 13:44	7440-42-8	
6020 MET ICPMS, Dissolved	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Arsenic, Dissolved	**0.044**	mg/L	0.010	0.0087	100	02/24/21 16:30	02/25/21 12:46	7440-38-2	
Boron, Dissolved	**2.1J**	mg/L	2.5	0.62	100	02/24/21 16:30	02/25/21 12:46	7440-42-8	
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**440**	mg/L	5.0	5.0	1		02/25/21 17:58		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		02/25/21 17:58		
Alkalinity, Total as CaCO3	**440**	mg/L	5.0	5.0	1		02/25/21 17:58		
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**17800**	mg/L	2500	2500	1		02/24/21 18:41		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	**41.7**	mg/L	10.0	5.0	100		02/25/21 07:04	18496-25-8	
5210B BOD, 5 day	Analytical Method: SM 5210B-2011 Pace Analytical Services - Asheville								
BOD, 5 day	ND	mg/L	2.0	2.0	1	02/25/21 07:22	03/02/21 06:07		

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
110 Technology Parkway
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(770)734-4200

ANALYTICAL RESULTS

Project: MCMANUS PLANT 30050105.00006
Pace Project No.: 92523889

Sample: VAP-14-W (29-31) **Lab ID: 92523889003** Collected: 02/23/21 09:45 Received: 02/24/21 12:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC anions 48hr	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**8200**	mg/L	100	60.0	100		02/25/21 09:02	16887-00-6	
Nitrate as N	ND	mg/L	0.10	0.060	1		02/24/21 22:14	14797-55-8	
Nitrite as N	ND	mg/L	0.10	0.050	1		02/24/21 22:14	14797-65-0	
Sulfate	**655**	mg/L	100	50.0	100		02/25/21 09:02	14808-79-8	
SM4500P-E, Phosphate, Ortho	Analytical Method: SM 4500-P E-2011 Pace Analytical Services - Asheville								
Orthophosphate as P	**0.54**	mg/L	0.25	0.059	5		02/25/21 03:09		
Total Organic Carbon,Asheville	Analytical Method: EPA 9060A Pace Analytical Services - Asheville								
Total Organic Carbon	**7.4**	mg/L	1.0	0.50	1		03/02/21 07:51	7440-44-0	
Total Organic Carbon	**7.5**	mg/L	1.0	0.50	1		03/02/21 07:51	7440-44-0	
Total Organic Carbon	**7.6**	mg/L	1.0	0.50	1		03/02/21 07:51	7440-44-0	
Total Organic Carbon	**7.6**	mg/L	1.0	0.50	1		03/02/21 07:51	7440-44-0	
Mean Total Organic Carbon	**7.5**	mg/L	1.0	0.50	1		03/02/21 07:51	7440-44-0	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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ANALYTICAL RESULTS

Project: MCMANUS PLANT 30050105.00006
Pace Project No.: 92523889

Sample: VAP-14-W (31-33) **Lab ID: 92523889004** Collected: 02/23/21 10:10 Received: 02/24/21 12:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Calcium	**248**	mg/L	1.0	0.94	10	02/25/21 02:37	02/26/21 14:32	7440-70-2	
Iron	**0.77**	mg/L	0.050	0.042	1	02/25/21 02:37	02/25/21 10:21	7439-89-6	
Magnesium	**537**	mg/L	1.0	0.68	10	02/25/21 02:37	02/26/21 14:32	7439-95-4	
Manganese	**0.30**	mg/L	0.0050	0.0034	1	02/25/21 02:37	02/25/21 10:21	7439-96-5	
Potassium	**194**	mg/L	50.0	30.4	10	02/25/21 02:37	02/26/21 14:32	7440-09-7	
Sodium	**4410**	mg/L	500	61.1	100	02/25/21 02:37	02/26/21 11:07	7440-23-5	
6010 MET ICP, Dissolved	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Calcium, Dissolved	**213**	mg/L	1.0	0.94	10	02/26/21 11:20	03/02/21 15:46	7440-70-2	
Iron, Dissolved	**0.29**	mg/L	0.050	0.042	1	02/26/21 11:20	03/02/21 04:31	7439-89-6	
Magnesium, Dissolved	**492**	mg/L	1.0	0.68	10	02/26/21 11:20	03/02/21 15:46	7439-95-4	
Manganese, Dissolved	**0.29**	mg/L	0.0050	0.0034	1	02/26/21 11:20	03/02/21 04:31	7439-96-5	
Potassium, Dissolved	**167**	mg/L	50.0	30.4	10	02/26/21 11:20	03/02/21 15:46	7440-09-7	
Sodium, Dissolved	**4050**	mg/L	500	61.1	100	02/26/21 11:20	03/02/21 15:03	7440-23-5	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Arsenic	**0.032**	mg/L	0.010	0.0087	100	02/24/21 16:47	02/25/21 13:59	7440-38-2	
Boron	**2.0J**	mg/L	2.5	0.62	100	02/24/21 16:47	02/25/21 13:59	7440-42-8	
6020 MET ICPMS, Dissolved	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Arsenic, Dissolved	**0.012**	mg/L	0.010	0.0087	100	02/24/21 16:30	02/25/21 12:50	7440-38-2	
Boron, Dissolved	**2.0J**	mg/L	2.5	0.62	100	02/24/21 16:30	02/25/21 12:50	7440-42-8	
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**413**	mg/L	5.0	5.0	1		02/25/21 18:07		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		02/25/21 18:07		
Alkalinity, Total as CaCO3	**413**	mg/L	5.0	5.0	1		02/25/21 18:07		
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**17800**	mg/L	2500	2500	1		02/24/21 18:41		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	**46.0**	mg/L	10.0	5.0	100		02/25/21 07:04	18496-25-8	
5210B BOD, 5 day	Analytical Method: SM 5210B-2011 Pace Analytical Services - Asheville								
BOD, 5 day	ND	mg/L	2.0	2.0	1	02/25/21 07:22	03/02/21 06:08		

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: MCMANUS PLANT 30050105.00006
Pace Project No.: 92523889

Sample: VAP-14-W (31-33) **Lab ID: 92523889004** Collected: 02/23/21 10:10 Received: 02/24/21 12:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC anions 48hr	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**7370**	mg/L	100	60.0	100		02/25/21 09:16	16887-00-6	
Nitrate as N	ND	mg/L	0.10	0.060	1		02/24/21 22:28	14797-55-8	
Nitrite as N	ND	mg/L	0.10	0.050	1		02/24/21 22:28	14797-65-0	
Sulfate	**866**	mg/L	100	50.0	100		02/25/21 09:16	14808-79-8	
SM4500P-E, Phosphate, Ortho	Analytical Method: SM 4500-P E-2011 Pace Analytical Services - Asheville								
Orthophosphate as P	**0.46**	mg/L	0.050	0.012	1		02/25/21 03:10		
Total Organic Carbon,Asheville	Analytical Method: EPA 9060A Pace Analytical Services - Asheville								
Total Organic Carbon	**6.9**	mg/L	1.0	0.50	1		03/02/21 08:09	7440-44-0	
Total Organic Carbon	**6.9**	mg/L	1.0	0.50	1		03/02/21 08:09	7440-44-0	
Total Organic Carbon	**7.2**	mg/L	1.0	0.50	1		03/02/21 08:09	7440-44-0	
Total Organic Carbon	**7.1**	mg/L	1.0	0.50	1		03/02/21 08:09	7440-44-0	
Mean Total Organic Carbon	**7.0**	mg/L	1.0	0.50	1		03/02/21 08:09	7440-44-0	

REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: MCMANUS PLANT 30050105.00006
Pace Project No.: 92523889

QC Batch: 602444
QC Batch Method: EPA 3010A
Analysis Method: EPA 6010D
Analysis Description: 6010 MET
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92523889001, 92523889002, 92523889003, 92523889004

METHOD BLANK: 3174321 Matrix: Water
Associated Lab Samples: 92523889001, 92523889002, 92523889003, 92523889004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Calcium	mg/L	ND	0.10	0.094	02/25/21 10:04	
Iron	mg/L	ND	0.050	0.042	02/25/21 10:04	
Magnesium	mg/L	ND	0.10	0.068	02/25/21 10:04	
Manganese	mg/L	ND	0.0050	0.0034	02/25/21 10:04	
Potassium	mg/L	ND	5.0	3.0	02/26/21 10:50	
Sodium	mg/L	ND	5.0	0.61	02/26/21 10:50	

LABORATORY CONTROL SAMPLE: 3174322

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium	mg/L	5	5.1	103	80-120	
Iron	mg/L	5	5.2	103	80-120	
Magnesium	mg/L	5	5.2	103	80-120	
Manganese	mg/L	0.5	0.51	103	80-120	
Potassium	mg/L	5	4.9J	98	80-120	
Sodium	mg/L	5	5.0J	100	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3174323 3174324

Parameter	Units	92523918001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium	mg/L	287	5	5	288	297	28	196	75-125	3	20	M6
Iron	mg/L	0.14	5	5	5.2	5.2	101	102	75-125	1	20	
Magnesium	mg/L	543	5	5	543	571	-14	544	75-125	5	20	M6
Manganese	mg/L	0.26	0.5	0.5	0.74	0.76	96	101	75-125	3	20	
Potassium	mg/L	120	5	5	125	133	98	246	75-125	6	20	M6
Sodium	mg/L	2880	5	5	2900	2950	369	1540	75-125	2	20	M6

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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QUALITY CONTROL DATA

Project: MCMANUS PLANT 30050105.00006
Pace Project No.: 92523889

QC Batch: 602895
QC Batch Method: EPA 3010A
Analysis Method: EPA 6010D
Analysis Description: 6010 MET Filtered Diss.
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92523889001, 92523889002, 92523889003, 92523889004

METHOD BLANK: 3176620 Matrix: Water
Associated Lab Samples: 92523889001, 92523889002, 92523889003, 92523889004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Calcium, Dissolved	mg/L	ND	0.10	0.094	03/02/21 04:14	
Iron, Dissolved	mg/L	ND	0.050	0.042	03/02/21 04:14	
Magnesium, Dissolved	mg/L	ND	0.10	0.068	03/02/21 04:14	
Manganese, Dissolved	mg/L	ND	0.0050	0.0034	03/02/21 04:14	
Potassium, Dissolved	mg/L	ND	5.0	3.0	03/02/21 14:40	
Sodium, Dissolved	mg/L	ND	5.0	0.61	03/02/21 14:40	

LABORATORY CONTROL SAMPLE: 3176621

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium, Dissolved	mg/L	5	4.7	94	80-120	
Iron, Dissolved	mg/L	5	4.7	93	80-120	
Magnesium, Dissolved	mg/L	5	4.9	98	80-120	
Manganese, Dissolved	mg/L	0.5	0.46	92	80-120	
Potassium, Dissolved	mg/L	5	4.8J	96	80-120	
Sodium, Dissolved	mg/L	5	4.9J	98	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3176622 3176623

Parameter	Units	92523918001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium, Dissolved	mg/L	240	5	5	252	254	239	291	75-125	1	20	M6
Iron, Dissolved	mg/L	0.080	5	5	4.6	4.4	91	87	75-125	4	20	
Magnesium, Dissolved	mg/L	468	5	5	489	495	423	554	75-125	1	20	M6
Manganese, Dissolved	mg/L	0.27	0.5	0.5	0.72	0.70	89	86	75-125	2	20	
Potassium, Dissolved	mg/L	98.7	5	5	107	109	160	196	75-125	2	20	M6
Sodium, Dissolved	mg/L	2650	5	5	2730	2590	1570	-1310	75-125	5	20	M6

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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QUALITY CONTROL DATA

Project: MCMANUS PLANT 30050105.00006
Pace Project No.: 92523889

QC Batch: 602358
QC Batch Method: EPA 3010A
Analysis Method: EPA 6020B
Analysis Description: 6020 MET
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92523889001, 92523889002, 92523889003, 92523889004

METHOD BLANK: 3173960 Matrix: Water
Associated Lab Samples: 92523889001, 92523889002, 92523889003, 92523889004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Arsenic	mg/L	ND	0.00010	0.000087	02/25/21 12:13	
Boron	mg/L	ND	0.025	0.0062	02/25/21 12:13	

LABORATORY CONTROL SAMPLE: 3173961

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	0.01	0.011	106	80-120	
Boron	mg/L	0.05	0.050	101	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3173962 3173963

Parameter	Units	92523918001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	mg/L	0.42	0.01	0.01	0.44	0.43	172	127	75-125	1	20	M6
Boron	mg/L	0.95J	0.05	0.05	0.98J	0.98J	53	59	75-125		20	M6

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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(770)734-4200

QUALITY CONTROL DATA

Project: MCMANUS PLANT 30050105.00006
Pace Project No.: 92523889

QC Batch: 602352
QC Batch Method: EPA 3010A
Analysis Method: EPA 6020B
Analysis Description: 6020 MET Dissolved
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92523889001, 92523889002, 92523889003, 92523889004

METHOD BLANK: 3173929 Matrix: Water
Associated Lab Samples: 92523889001, 92523889002, 92523889003, 92523889004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Arsenic, Dissolved	mg/L	ND	0.00010	0.000087	02/24/21 20:49	
Boron, Dissolved	mg/L	ND	0.025	0.0062	02/24/21 20:49	

LABORATORY CONTROL SAMPLE: 3173930

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic, Dissolved	mg/L	0.01	0.010	104	80-120	
Boron, Dissolved	mg/L	0.05	0.050	101	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3173931 3173932

Parameter	Units	92523918001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic, Dissolved	mg/L	0.17	0.01	0.01	0.26	0.18	921	154	75-125	34	20	M6,R1
Boron, Dissolved	mg/L	0.97J	0.05	0.05	0.91J	0.95J	-122	-55	75-125		20	M6

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REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: MCMANUS PLANT 30050105.00006
Pace Project No.: 92523889

QC Batch: 602563
QC Batch Method: SM 2320B-2011
Analysis Method: SM 2320B-2011
Analysis Description: 2320B Alkalinity
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92523889001, 92523889002, 92523889003, 92523889004

METHOD BLANK: 3174842 Matrix: Water
Associated Lab Samples: 92523889001, 92523889002, 92523889003, 92523889004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	ND	5.0	5.0	02/25/21 17:02	
Alkalinity,Bicarbonate (CaCO3)	mg/L	ND	5.0	5.0	02/25/21 17:02	
Alkalinity,Carbonate (CaCO3)	mg/L	ND	5.0	5.0	02/25/21 17:02	

LABORATORY CONTROL SAMPLE: 3174843

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	50	53.2	106	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3174844 3174845

Parameter	Units	92523889001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	109	50	50	154	159	91	101	80-120	3	25	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3174846 3174847

Parameter	Units	92523918001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	720	50	50	726	716	12	-8	80-120	1	25	M1

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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QUALITY CONTROL DATA

Project: MCMANUS PLANT 30050105.00006
Pace Project No.: 92523889

QC Batch: 602365 | Analysis Method: SM 2540C-2011
QC Batch Method: SM 2540C-2011 | Analysis Description: 2540C Total Dissolved Solids
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92523889001, 92523889002, 92523889003, 92523889004

METHOD BLANK: 3173982 Matrix: Water
Associated Lab Samples: 92523889001, 92523889002, 92523889003, 92523889004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	ND	25.0	25.0	02/24/21 18:41	

LABORATORY CONTROL SAMPLE: 3173983

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	250	272	109	90-110	

SAMPLE DUPLICATE: 3174230

Parameter	Units	92523918001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	13000	13600	5	25	

SAMPLE DUPLICATE: 3174231

Parameter	Units	92523308005 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	116	101	14	25	

SAMPLE DUPLICATE: 3174232

Parameter	Units	92523308008 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	90.0	75.0	18	25	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: MCMANUS PLANT 30050105.00006
Pace Project No.: 92523889

QC Batch: 602438
QC Batch Method: SM 4500-S2D-2011
Analysis Method: SM 4500-S2D-2011
Analysis Description: 4500S2D Sulfide Water
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92523889001, 92523889002, 92523889003, 92523889004

METHOD BLANK: 3174289 Matrix: Water
Associated Lab Samples: 92523889001, 92523889002, 92523889003, 92523889004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Sulfide	mg/L	ND	0.10	0.050	02/25/21 07:02	

LABORATORY CONTROL SAMPLE: 3174290

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfide	mg/L	0.5	0.50	100	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3174291 3174292

Parameter	Units	92523918001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfide	mg/L	85.6	125	125	201	198	92	90	80-120	1	10	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3174293 3174294

Parameter	Units	92523038013 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfide	mg/L	ND	0.5	0.5	0.53	0.53	106	106	80-120	0	10	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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QUALITY CONTROL DATA

Project: MCMANUS PLANT 30050105.00006
Pace Project No.: 92523889

QC Batch: 602454 Analysis Method: SM 5210B-2011
QC Batch Method: SM 5210B-2011 Analysis Description: 5210B BOD, 5 day
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92523889001, 92523889002, 92523889003, 92523889004

METHOD BLANK: 3174365 Matrix: Water
Associated Lab Samples: 92523889001, 92523889002, 92523889003, 92523889004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
BOD, 5 day	mg/L	ND	2.0	2.0	03/02/21 05:54	

LABORATORY CONTROL SAMPLE: 3174367

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
BOD, 5 day	mg/L	198	202	102	84.6-115	

SAMPLE DUPLICATE: 3174368

Parameter	Units	92523918001 Result	Dup Result	RPD	Max RPD	Qualifiers
BOD, 5 day	mg/L	ND	ND		25	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: MCMANUS PLANT 30050105.00006
Pace Project No.: 92523889

QC Batch: 602412
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: 92523889001, 92523889002, 92523889003, 92523889004

METHOD BLANK: 3174210 Matrix: Water
Associated Lab Samples: 92523889001, 92523889002, 92523889003, 92523889004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	ND	1.0	0.60	02/24/21 20:50	
Nitrate as N	mg/L	ND	0.10	0.060	02/24/21 20:50	
Nitrite as N	mg/L	ND	0.10	0.050	02/24/21 20:50	
Sulfate	mg/L	ND	1.0	0.50	02/24/21 20:50	

LABORATORY CONTROL SAMPLE: 3174211

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	50	48.2	96	90-110	
Nitrate as N	mg/L	2.5	2.3	94	90-110	
Nitrite as N	mg/L	2.5	2.4	96	90-110	
Sulfate	mg/L	50	48.8	98	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3174212 3174213

Parameter	Units	92523918001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	5480	50	50	5610	5550	248	130	90-110	1	10	M6
Nitrate as N	mg/L	ND	2.5	2.5	1.7	1.7	69	69	90-110	0	10	M6
Nitrite as N	mg/L	ND	2.5	2.5	ND	ND	0	0	90-110		10	M6
Sulfate	mg/L	295	50	50	339	339	89	88	90-110	0	10	M6

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: MCMANUS PLANT 30050105.00006
Pace Project No.: 92523889

QC Batch: 602429
QC Batch Method: SM 4500-P E-2011
Analysis Method: SM 4500-P E-2011
Analysis Description: SM4500P-E Phosphorus, Ortho
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92523889001, 92523889002, 92523889003, 92523889004

METHOD BLANK: 3174265 Matrix: Water
Associated Lab Samples: 92523889001, 92523889002, 92523889003, 92523889004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Orthophosphate as P	mg/L	ND	0.050	0.012	02/25/21 03:04	

LABORATORY CONTROL SAMPLE: 3174266

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Orthophosphate as P	mg/L	0.25	0.24	98	49-145	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3174269 3174270

Parameter	Units	92523918001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Orthophosphate as P	mg/L	0.66	1.2	1.2	1.9	1.9	103	96	90-110	5	10	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: MCMANUS PLANT 30050105.00006
Pace Project No.: 92523889

QC Batch: 603153
QC Batch Method: EPA 9060A
Analysis Method: EPA 9060A
Analysis Description: 9060 TOC, AVL
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92523889001, 92523889002, 92523889003, 92523889004

METHOD BLANK: 3177969 Matrix: Water
Associated Lab Samples: 92523889001, 92523889002, 92523889003, 92523889004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mean Total Organic Carbon	mg/L	ND	1.0	0.50	03/02/21 22:12	
Total Organic Carbon	mg/L	ND	1.0	0.50	03/02/21 22:12	
Total Organic Carbon	mg/L	ND	1.0	0.50	03/02/21 22:12	
Total Organic Carbon	mg/L	ND	1.0	0.50	03/02/21 22:12	
Total Organic Carbon	mg/L	ND	1.0	0.50	03/02/21 22:12	

LABORATORY CONTROL SAMPLE: 3177970

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mean Total Organic Carbon	mg/L	25	24.2	97	75-125	
Total Organic Carbon	mg/L	25	24.2	97	75-125	
Total Organic Carbon	mg/L	25	24.9	100	75-125	
Total Organic Carbon	mg/L	25	23.2	93	75-125	
Total Organic Carbon	mg/L	25	24.4	97	75-125	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3177971 3177972

Parameter	Units	92523998001 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/L	264	25	25	285	280	81	60	75-125	2	25	M6
Total Organic Carbon	mg/L	261	25	25	283	278	90	71	75-125	2	25	M6
Total Organic Carbon	mg/L	271	25	25	289	282	71	44	75-125	2	25	M6
Total Organic Carbon	mg/L	258	25	25	280	276	87	74	75-125	1	25	M6
Total Organic Carbon	mg/L	268	25	25	287	282	76	52	75-125	2	25	M6

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3177973 3177974

Parameter	Units	92523918001 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/L	9.3	25	25	34.9	34.8	102	102	75-125	0	25	
Total Organic Carbon	mg/L	9.1	25	25	34.7	34.8	102	103	75-125	0	25	
Total Organic Carbon	mg/L	9.4	25	25	35.0	34.8	102	102	75-125	0	25	
Total Organic Carbon	mg/L	9.4	25	25	35.0	34.5	102	101	75-125	1	25	
Total Organic Carbon	mg/L	9.4	25	25	34.9	35.0	102	103	75-125	0	25	

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REPORT OF LABORATORY ANALYSIS

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QUALIFIERS

Project: MCMANUS PLANT 30050105.00006
Pace Project No.: 92523889

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.
R1	RPD value was outside control limits.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: MCMANUS PLANT 30050105.00006
Pace Project No.: 92523889

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
92523889001	**VAP-14-W (5-10)**	EPA 3010A	602444	EPA 6010D	602471
92523889002	**VAP-14-W (22-24)**	EPA 3010A	602444	EPA 6010D	602471
92523889003	**VAP-14-W (29-31)**	EPA 3010A	602444	EPA 6010D	602471
92523889004	**VAP-14-W (31-33)**	EPA 3010A	602444	EPA 6010D	602471
92523889001	**VAP-14-W (5-10)**	EPA 3010A	602895	EPA 6010D	602904
92523889002	**VAP-14-W (22-24)**	EPA 3010A	602895	EPA 6010D	602904
92523889003	**VAP-14-W (29-31)**	EPA 3010A	602895	EPA 6010D	602904
92523889004	**VAP-14-W (31-33)**	EPA 3010A	602895	EPA 6010D	602904
92523889001	**VAP-14-W (5-10)**	EPA 3010A	602358	EPA 6020B	602425
92523889002	**VAP-14-W (22-24)**	EPA 3010A	602358	EPA 6020B	602425
92523889003	**VAP-14-W (29-31)**	EPA 3010A	602358	EPA 6020B	602425
92523889004	**VAP-14-W (31-33)**	EPA 3010A	602358	EPA 6020B	602425
92523889001	**VAP-14-W (5-10)**	EPA 3010A	602352	EPA 6020B	602389
92523889002	**VAP-14-W (22-24)**	EPA 3010A	602352	EPA 6020B	602389
92523889003	**VAP-14-W (29-31)**	EPA 3010A	602352	EPA 6020B	602389
92523889004	**VAP-14-W (31-33)**	EPA 3010A	602352	EPA 6020B	602389
92523889001	**VAP-14-W (5-10)**	SM 2320B-2011	602563		
92523889002	**VAP-14-W (22-24)**	SM 2320B-2011	602563		
92523889003	**VAP-14-W (29-31)**	SM 2320B-2011	602563		
92523889004	**VAP-14-W (31-33)**	SM 2320B-2011	602563		
92523889001	**VAP-14-W (5-10)**	SM 2540C-2011	602365		
92523889002	**VAP-14-W (22-24)**	SM 2540C-2011	602365		
92523889003	**VAP-14-W (29-31)**	SM 2540C-2011	602365		
92523889004	**VAP-14-W (31-33)**	SM 2540C-2011	602365		
92523889001	**VAP-14-W (5-10)**	SM 4500-S2D-2011	602438		
92523889002	**VAP-14-W (22-24)**	SM 4500-S2D-2011	602438		
92523889003	**VAP-14-W (29-31)**	SM 4500-S2D-2011	602438		
92523889004	**VAP-14-W (31-33)**	SM 4500-S2D-2011	602438		
92523889001	**VAP-14-W (5-10)**	SM 5210B-2011	602454	SM 5210B-2011	602495
92523889002	**VAP-14-W (22-24)**	SM 5210B-2011	602454	SM 5210B-2011	602495
92523889003	**VAP-14-W (29-31)**	SM 5210B-2011	602454	SM 5210B-2011	602495
92523889004	**VAP-14-W (31-33)**	SM 5210B-2011	602454	SM 5210B-2011	602495
92523889001	**VAP-14-W (5-10)**	EPA 300.0 Rev 2.1 1993	602412		
92523889002	**VAP-14-W (22-24)**	EPA 300.0 Rev 2.1 1993	602412		
92523889003	**VAP-14-W (29-31)**	EPA 300.0 Rev 2.1 1993	602412		
92523889004	**VAP-14-W (31-33)**	EPA 300.0 Rev 2.1 1993	602412		
92523889001	**VAP-14-W (5-10)**	SM 4500-P E-2011	602429		
92523889002	**VAP-14-W (22-24)**	SM 4500-P E-2011	602429		
92523889003	**VAP-14-W (29-31)**	SM 4500-P E-2011	602429		
92523889004	**VAP-14-W (31-33)**	SM 4500-P E-2011	602429		
92523889001	**VAP-14-W (5-10)**	EPA 9060A	603153		
92523889002	**VAP-14-W (22-24)**	EPA 9060A	603153		
92523889003	**VAP-14-W (29-31)**	EPA 9060A	603153		
92523889004	**VAP-14-W (31-33)**	EPA 9060A	603153		

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: MCMANUS PLANT 30050105.00006
Pace Project No.: 92523889

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch

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: ARCADIS

Project #: WO# : 92523889

92523889

Courier: ☑ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ Other:

Custody Seal Present? ☑ Yes ☐ No Seals Intact? ☑ Yes ☐ No

Date/Initials Person Examining Contents: 2-24-21/SR

Packing Material: ☐ Bubble Wrap ☑ Bubble Bags ☐ None ☐ Other

Biological Tissue Frozen? ☐ Yes ☐ No ☑ N/A

Thermometer: ☑ IR Gun ID: 93T071 Type of Ice: ☑ Wet ☐ Blue ☐ None

Cooler Temp: 6.0 Correction Factor: Add/Subtract (°C) 0

Temp should be above freezing to 6°C
☐ Samples out of temp criteria. Samples on ice, cooling process has begun

Cooler Temp Corrected (°C): 6.0

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: 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# : 92523889**

PM: KLH1 Due Date: 02/25/21

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)	GN	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		2	1	1		2	1												3					1			
2		2	1	1		2	1												3					1			
3		2	1	1		2	1												3					1			
4		2	1	1		2	1												3					1			
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.

ARCADIS

ID#:

CHAIN OF CUSTODY & LABORATORY ANALYSIS REQUEST FORM

Page 1 of 1

Lab Work Order # 92523884

Send Results to:

Contact & Company Name: MATT WEBB ARCADIS
Telephone: 919-415-2294
Address: Ste 350 5420 WADE PARK BLVD
Fax:
City: RALEIGH State: N.C. Zip: 27607
E-mail Address: Mathew.Webb@ARCADIS.com
Project Name/Location (City, State): MCMANUS PLANT - BRUNSWICK
Project #: 30050105.88006
Sampler's Printed Name:
Sampler's Signature:

Sample ID	Collection Date	Collection Time	Type (✓) Comp	Type (✓) Grab	Matrix	Total metals	Dissolved metals	Alkalinity	Cl, SO4, NO2/NO3	Sulfide NaOH + Zinc Acetate	Ortho-Phosphate	KJ	TOC	BOD	TDS
VAP-14-W (5-10)	2/23/2024	9:40		X	W	1	1	1	1	1	1	3	1	1	
VAP-14-W (22-24)	2/23/2024	9:15		X	W	1	1	1	1	1	1	3	1	1	
VAP-14-W (29-31)	2/23/2024	9:45		X	W	1	1	1	1	1	1	3	1	1	
VAP-14-W (31-33)	2/23/2024	10:15		X	W	1	1	1	1	1	1	3	1	1	

Preservative	G	C	E	E	F		G	E	E
Filtered (✓)									
# of Containers	1	1	1	1	1	K 17	3	1	1
Container Information	3	3	3	3	9		1	2	4

PARAMETER ANALYSIS & METHOD

Keys

Preservation Key: A. H_2SO_4 B. HCL C. HNO_3 D. NaOH E. None F. Other: $Na_2S_2O_3$ G. Other: H_3PO_4 H. Other:

Container Information Key: 1. 40 ml Vial 2. 1 L Amber 3. 250 ml Plastic 4. 500 ml Plastic 5. Encore 6. 2 oz. Glass 7. 4 oz. Glass 8. 8 oz. Glass 9. Other: 120 ml 10. Other:

Matrix Key: SO - Soil, W - Water, T - Tissue, SE - Sediment, SL - Sludge, A - Air, NL - NAPL/Oil, SW - Sample Wipe, Other:

REMARKS

Special Instructions/Comments: METALS = As, Fe, Mn, Mg, Ca, Na, K, B
* TOTAL/Dissolved As = 24 hour TAT Dissolved metals field filter

☐ Special QA/QC Instructions(✓):

Laboratory Information and Receipt

Lab Name: PACE
☒ Cooler packed with ice (✓)
Specify Turnaround Requirements:
Shipping Tracking #:
Cooler Custody Seal (✓): ☐ Intact ☐ Not Intact
Sample Receipt:
Condition/Cooler Temp:

Relinquished By	Received By	Relinquished By	Laboratory Received By
Printed Name: Grant Willford	Printed Name: FedEX	Printed Name:	Printed Name:
Signature:	Signature:	Signature:	Signature:
Firm: ANA	Firm/Courier:	Firm/Courier:	Firm:
Date/Time: 2/23/2024 1700	Date/Time: 2/24/24 1230	Date/Time:	Date/Time:

20730826 CofC AR Form 08.27.2015

Distribution: WHITE – Laboratory returns with results YELLOW – Lab copy PINK – Retained by Arcadis

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

March 10, 2021

Ms. Lauren Petty
Southern Co. Services
42 Inverness Center Parkway
Birmingham, AL 35242

RE: Project: MCMANUS PLANT 30050105.00006
Pace Project No.: 92523918

Dear Ms. Petty:

Enclosed are the analytical results for sample(s) received by the laboratory on February 24, 2021. 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

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: Joju Abraham, Georgia Power-CCR
Kathryn Farris
Geoffrey Gay, ARCADIS - Atlanta
Margaret Gentile, Arcadis
Kristen Jurinko
Charles Lawson, Arcadis
Bryan Mayeux
Kelley Sharpe, ARCADIS - Atlanta
Maribel Vital

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

CERTIFICATIONS

Project: MCMANUS PLANT 30050105.00006
Pace Project No.: 92523918

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

SAMPLE SUMMARY

Project: MCMANUS PLANT 30050105.00006
Pace Project No.: 92523918

Lab ID	Sample ID	Matrix	Date Collected	Date Received
92523918001	**VAP-14-W (17-19)**	Water	02/23/21 12:35	02/24/21 12:30
92523918002	**DUP-01-W (02232021)**	Water	02/23/21 00:00	02/24/21 12:30

Pace Analytical Services, LLC
110 Technology Parkway
Peachtree Corners, GA 30092
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SAMPLE ANALYTE COUNT

Project: MCMANUS PLANT 30050105.00006
Pace Project No.: 92523918

Lab ID	Sample ID	Method	Analysts	Analytes Reported
92523918001	**VAP-14-W (17-19)**	EPA 6010D	KQ, RDT	6
		EPA 6010D	KQ, SH1	6
		EPA 6020B	JOR	2
		EPA 6020B	JOR	2
		SM 2320B-2011	ECH	3
		SM 2540C-2011	RED	1
		SM 4500-S2D-2011	JP1	1
		SM 5210B-2011	MFO	1
		EPA 300.0 Rev 2.1 1993	CDC	4
		SM 4500-P E-2011	JP1	1
		EPA 9060A	JLH	5
92523918002	**DUP-01-W (02232021)**	EPA 6010D	KQ, RDT	6
		EPA 6010D	KQ, SH1	6
		EPA 6020B	JOR	2
		EPA 6020B	JOR	2
		SM 2320B-2011	ECH	3
		SM 2540C-2011	RED	1
		SM 4500-S2D-2011	JP1	1
		SM 5210B-2011	MFO	1
		EPA 300.0 Rev 2.1 1993	CDC	4
		SM 4500-P E-2011	JP1	1
		EPA 9060A	JLH	5

PASI-A = Pace Analytical Services - Asheville

REPORT OF LABORATORY ANALYSIS

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

SUMMARY OF DETECTION

Project: MCMANUS PLANT 30050105.00006
Pace Project No.: 92523918

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92523918001	**VAP-14-W (17-19)**					
EPA 6010D	Calcium	287	mg/L	1.0	02/26/21 14:35	M6
EPA 6010D	Iron	0.14	mg/L	0.050	02/25/21 10:24	
EPA 6010D	Magnesium	543	mg/L	1.0	02/26/21 14:35	M6
EPA 6010D	Manganese	0.26	mg/L	0.0050	02/25/21 10:24	
EPA 6010D	Potassium	120	mg/L	50.0	02/26/21 14:35	M6
EPA 6010D	Sodium	2880	mg/L	500	02/26/21 11:10	M6
EPA 6010D	Calcium, Dissolved	240	mg/L	1.0	03/02/21 15:49	M6
EPA 6010D	Iron, Dissolved	0.080	mg/L	0.050	03/02/21 04:35	
EPA 6010D	Magnesium, Dissolved	468	mg/L	1.0	03/02/21 15:49	M6
EPA 6010D	Manganese, Dissolved	0.27	mg/L	0.0050	03/02/21 04:35	
EPA 6010D	Potassium, Dissolved	98.7	mg/L	50.0	03/02/21 15:49	M6
EPA 6010D	Sodium, Dissolved	2650	mg/L	500	03/02/21 15:06	M6
EPA 6020B	Arsenic	0.42	mg/L	0.010	02/25/21 13:15	M6
EPA 6020B	Boron	0.95J	mg/L	2.5	02/25/21 13:15	M6
EPA 6020B	Arsenic, Dissolved	0.17	mg/L	0.010	02/25/21 12:21	M6,R1
EPA 6020B	Boron, Dissolved	0.97J	mg/L	2.5	02/25/21 12:21	M6
SM 2320B-2011	Alkalinity,Bicarbonate (CaCO3)	720	mg/L	5.0	02/25/21 18:16	
SM 2320B-2011	Alkalinity, Total as CaCO3	720	mg/L	5.0	02/25/21 18:16	M1
SM 2540C-2011	Total Dissolved Solids	13000	mg/L	2500	02/24/21 18:42	
SM 4500-S2D-2011	Sulfide	85.6	mg/L	25.0	02/25/21 07:04	
EPA 300.0 Rev 2.1 1993	Chloride	5480	mg/L	70.0	02/25/21 09:30	M6
EPA 300.0 Rev 2.1 1993	Sulfate	295	mg/L	10.0	02/24/21 22:42	M6
SM 4500-P E-2011	Orthophosphate as P	0.66	mg/L	0.25	02/25/21 03:10	
EPA 9060A	Total Organic Carbon	9.4	mg/L	1.0	03/02/21 08:28	
EPA 9060A	Total Organic Carbon	9.1	mg/L	1.0	03/02/21 08:28	
EPA 9060A	Total Organic Carbon	9.4	mg/L	1.0	03/02/21 08:28	
EPA 9060A	Total Organic Carbon	9.4	mg/L	1.0	03/02/21 08:28	
EPA 9060A	Mean Total Organic Carbon	9.3	mg/L	1.0	03/02/21 08:28	
92523918002	**DUP-01-W (02232021)**					
EPA 6010D	Calcium	298	mg/L	10.0	02/26/21 14:18	
EPA 6010D	Iron	0.067	mg/L	0.050	02/25/21 10:45	
EPA 6010D	Magnesium	536	mg/L	10.0	02/26/21 14:18	
EPA 6010D	Manganese	0.26	mg/L	0.0050	02/25/21 10:45	
EPA 6010D	Sodium	2970	mg/L	500	02/26/21 14:18	
EPA 6010D	Calcium, Dissolved	262	mg/L	1.0	03/02/21 16:02	
EPA 6010D	Magnesium, Dissolved	519	mg/L	1.0	03/02/21 16:02	
EPA 6010D	Manganese, Dissolved	0.24	mg/L	0.0050	03/02/21 04:55	
EPA 6010D	Potassium, Dissolved	111	mg/L	50.0	03/02/21 16:02	
EPA 6010D	Sodium, Dissolved	2610	mg/L	500	03/02/21 15:19	
EPA 6020B	Arsenic	0.42	mg/L	0.010	02/25/21 14:03	
EPA 6020B	Boron	0.97J	mg/L	2.5	02/25/21 14:03	
EPA 6020B	Arsenic, Dissolved	0.16	mg/L	0.010	02/25/21 13:07	
EPA 6020B	Boron, Dissolved	0.89J	mg/L	2.5	02/25/21 13:07	
SM 2320B-2011	Alkalinity,Bicarbonate (CaCO3)	752	mg/L	5.0	02/25/21 18:57	
SM 2320B-2011	Alkalinity, Total as CaCO3	752	mg/L	5.0	02/25/21 18:57	
SM 2540C-2011	Total Dissolved Solids	13000	mg/L	2500	02/24/21 18:42	
SM 4500-S2D-2011	Sulfide	72.9	mg/L	10.0	02/25/21 07:05	

REPORT OF LABORATORY ANALYSIS

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

SUMMARY OF DETECTION

Project: MCMANUS PLANT 30050105.00006
Pace Project No.: 92523918

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92523918002	**DUP-01-W (02232021)**					
EPA 300.0 Rev 2.1 1993	Chloride	7260	mg/L	100	02/25/21 08:13	
EPA 300.0 Rev 2.1 1993	Nitrate as N	0.13	mg/L	0.10	02/25/21 09:44	H1
EPA 300.0 Rev 2.1 1993	Sulfate	1040	mg/L	14.0	02/25/21 03:02	
SM 4500-P E-2011	Orthophosphate as P	0.82	mg/L	0.25	02/25/21 03:07	H1
EPA 9060A	Total Organic Carbon	9.9	mg/L	1.0	03/02/21 09:30	
EPA 9060A	Total Organic Carbon	9.7	mg/L	1.0	03/02/21 09:30	
EPA 9060A	Total Organic Carbon	9.8	mg/L	1.0	03/02/21 09:30	
EPA 9060A	Total Organic Carbon	9.9	mg/L	1.0	03/02/21 09:30	
EPA 9060A	Mean Total Organic Carbon	9.8	mg/L	1.0	03/02/21 09:30	

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

ANALYTICAL RESULTS

Project: MCMANUS PLANT 30050105.00006
Pace Project No.: 92523918

Sample: VAP-14-W (17-19) **Lab ID: 92523918001** Collected: 02/23/21 12:35 Received: 02/24/21 12:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Calcium	**287**	mg/L	1.0	0.94	10	02/25/21 02:37	02/26/21 14:35	7440-70-2	M6
Iron	**0.14**	mg/L	0.050	0.042	1	02/25/21 02:37	02/25/21 10:24	7439-89-6	
Magnesium	**543**	mg/L	1.0	0.68	10	02/25/21 02:37	02/26/21 14:35	7439-95-4	M6
Manganese	**0.26**	mg/L	0.0050	0.0034	1	02/25/21 02:37	02/25/21 10:24	7439-96-5	
Potassium	**120**	mg/L	50.0	30.4	10	02/25/21 02:37	02/26/21 14:35	7440-09-7	M6
Sodium	**2880**	mg/L	500	61.1	100	02/25/21 02:37	02/26/21 11:10	7440-23-5	M6
6010 MET ICP, Dissolved	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Calcium, Dissolved	**240**	mg/L	1.0	0.94	10	02/26/21 11:20	03/02/21 15:49	7440-70-2	M6
Iron, Dissolved	**0.080**	mg/L	0.050	0.042	1	02/26/21 11:20	03/02/21 04:35	7439-89-6	
Magnesium, Dissolved	**468**	mg/L	1.0	0.68	10	02/26/21 11:20	03/02/21 15:49	7439-95-4	M6
Manganese, Dissolved	**0.27**	mg/L	0.0050	0.0034	1	02/26/21 11:20	03/02/21 04:35	7439-96-5	
Potassium, Dissolved	**98.7**	mg/L	50.0	30.4	10	02/26/21 11:20	03/02/21 15:49	7440-09-7	M6
Sodium, Dissolved	**2650**	mg/L	500	61.1	100	02/26/21 11:20	03/02/21 15:06	7440-23-5	M6
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Arsenic	**0.42**	mg/L	0.010	0.0087	100	02/24/21 16:47	02/25/21 13:15	7440-38-2	M6
Boron	**0.95J**	mg/L	2.5	0.62	100	02/24/21 16:47	02/25/21 13:15	7440-42-8	M6
6020 MET ICPMS, Dissolved	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Arsenic, Dissolved	**0.17**	mg/L	0.010	0.0087	100	02/24/21 16:30	02/25/21 12:21	7440-38-2	M6,R1
Boron, Dissolved	**0.97J**	mg/L	2.5	0.62	100	02/24/21 16:30	02/25/21 12:21	7440-42-8	M6
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**720**	mg/L	5.0	5.0	1		02/25/21 18:16		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		02/25/21 18:16		
Alkalinity, Total as CaCO3	**720**	mg/L	5.0	5.0	1		02/25/21 18:16		M1
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**13000**	mg/L	2500	2500	1		02/24/21 18:42		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	**85.6**	mg/L	25.0	12.5	250		02/25/21 07:04	18496-25-8	
5210B BOD, 5 day	Analytical Method: SM 5210B-2011 Pace Analytical Services - Asheville								
BOD, 5 day	ND	mg/L	2.0	2.0	1	02/25/21 07:22	03/02/21 06:13		

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: MCMANUS PLANT 30050105.00006
Pace Project No.: 92523918

Sample: VAP-14-W (17-19) **Lab ID: 92523918001** Collected: 02/23/21 12:35 Received: 02/24/21 12:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC anions 48hr	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**5480**	mg/L	70.0	42.0	70		02/25/21 09:30	16887-00-6	M6
Nitrate as N	ND	mg/L	0.10	0.060	1		02/25/21 09:59	14797-55-8	M6
Nitrite as N	ND	mg/L	0.10	0.050	1		02/25/21 09:59	14797-65-0	M6
Sulfate	**295**	mg/L	10.0	5.0	10		02/24/21 22:42	14808-79-8	M6
SM4500P-E, Phosphate, Ortho	Analytical Method: SM 4500-P E-2011 Pace Analytical Services - Asheville								
Orthophosphate as P	**0.66**	mg/L	0.25	0.059	5		02/25/21 03:10		
Total Organic Carbon,Asheville	Analytical Method: EPA 9060A Pace Analytical Services - Asheville								
Total Organic Carbon	**9.4**	mg/L	1.0	0.50	1		03/02/21 08:28	7440-44-0	
Total Organic Carbon	**9.1**	mg/L	1.0	0.50	1		03/02/21 08:28	7440-44-0	
Total Organic Carbon	**9.4**	mg/L	1.0	0.50	1		03/02/21 08:28	7440-44-0	
Total Organic Carbon	**9.4**	mg/L	1.0	0.50	1		03/02/21 08:28	7440-44-0	
Mean Total Organic Carbon	**9.3**	mg/L	1.0	0.50	1		03/02/21 08:28	7440-44-0	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: MCMANUS PLANT 30050105.00006
Pace Project No.: 92523918

Sample: DUP-01-W (02232021) **Lab ID: 92523918002** Collected: 02/23/21 00:00 Received: 02/24/21 12:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Calcium	**298**	mg/L	10.0	9.4	100	02/25/21 02:37	02/26/21 14:18	7440-70-2	
Iron	**0.067**	mg/L	0.050	0.042	1	02/25/21 02:37	02/25/21 10:45	7439-89-6	
Magnesium	**536**	mg/L	10.0	6.8	100	02/25/21 02:37	02/26/21 14:18	7439-95-4	
Manganese	**0.26**	mg/L	0.0050	0.0034	1	02/25/21 02:37	02/25/21 10:45	7439-96-5	
Potassium	ND	mg/L	500	304	100	02/25/21 02:37	02/26/21 14:18	7440-09-7	
Sodium	**2970**	mg/L	500	61.1	100	02/25/21 02:37	02/26/21 14:18	7440-23-5	
6010 MET ICP, Dissolved	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Calcium, Dissolved	**262**	mg/L	1.0	0.94	10	02/26/21 11:20	03/02/21 16:02	7440-70-2	
Iron, Dissolved	ND	mg/L	0.050	0.042	1	02/26/21 11:20	03/02/21 04:55	7439-89-6	
Magnesium, Dissolved	**519**	mg/L	1.0	0.68	10	02/26/21 11:20	03/02/21 16:02	7439-95-4	
Manganese, Dissolved	**0.24**	mg/L	0.0050	0.0034	1	02/26/21 11:20	03/02/21 04:55	7439-96-5	
Potassium, Dissolved	**111**	mg/L	50.0	30.4	10	02/26/21 11:20	03/02/21 16:02	7440-09-7	
Sodium, Dissolved	**2610**	mg/L	500	61.1	100	02/26/21 11:20	03/02/21 15:19	7440-23-5	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Arsenic	**0.42**	mg/L	0.010	0.0087	100	02/24/21 16:47	02/25/21 14:03	7440-38-2	
Boron	**0.97J**	mg/L	2.5	0.62	100	02/24/21 16:47	02/25/21 14:03	7440-42-8	
6020 MET ICPMS, Dissolved	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Arsenic, Dissolved	**0.16**	mg/L	0.010	0.0087	100	02/24/21 16:30	02/25/21 13:07	7440-38-2	
Boron, Dissolved	**0.89J**	mg/L	2.5	0.62	100	02/24/21 16:30	02/25/21 13:07	7440-42-8	
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**752**	mg/L	5.0	5.0	1		02/25/21 18:57		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		02/25/21 18:57		
Alkalinity, Total as CaCO3	**752**	mg/L	5.0	5.0	1		02/25/21 18:57		
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**13000**	mg/L	2500	2500	1		02/24/21 18:42		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	**72.9**	mg/L	10.0	5.0	100		02/25/21 07:05	18496-25-8	
5210B BOD, 5 day	Analytical Method: SM 5210B-2011 Pace Analytical Services - Asheville								
BOD, 5 day	ND	mg/L	2.0	2.0	1	02/25/21 07:22	03/02/21 06:17		H2

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: MCMANUS PLANT 30050105.00006
Pace Project No.: 92523918

Sample: DUP-01-W (02232021) **Lab ID: 92523918002** Collected: 02/23/21 00:00 Received: 02/24/21 12:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC anions 48hr	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**7260**	mg/L	100	60.0	100		02/25/21 08:13	16887-00-6	
Nitrate as N	ND	mg/L	1.0	0.60	10		02/24/21 21:24	14797-55-8	
Nitrate as N	**0.13**	mg/L	0.10	0.060	1		02/25/21 09:44	14797-55-8	H1
Nitrite as N	ND	mg/L	1.0	0.50	10		02/24/21 21:24	14797-65-0	
Nitrite as N	ND	mg/L	0.10	0.050	1		02/25/21 09:44	14797-65-0	H1
Sulfate	**1040**	mg/L	14.0	7.0	14		02/25/21 03:02	14808-79-8	
SM4500P-E, Phosphate, Ortho	Analytical Method: SM 4500-P E-2011 Pace Analytical Services - Asheville								
Orthophosphate as P	**0.82**	mg/L	0.25	0.059	5		02/25/21 03:07		H1
Total Organic Carbon,Asheville	Analytical Method: EPA 9060A Pace Analytical Services - Asheville								
Total Organic Carbon	**9.9**	mg/L	1.0	0.50	1		03/02/21 09:30	7440-44-0	
Total Organic Carbon	**9.7**	mg/L	1.0	0.50	1		03/02/21 09:30	7440-44-0	
Total Organic Carbon	**9.8**	mg/L	1.0	0.50	1		03/02/21 09:30	7440-44-0	
Total Organic Carbon	**9.9**	mg/L	1.0	0.50	1		03/02/21 09:30	7440-44-0	
Mean Total Organic Carbon	**9.8**	mg/L	1.0	0.50	1		03/02/21 09:30	7440-44-0	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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QUALITY CONTROL DATA

Project: MCMANUS PLANT 30050105.00006
Pace Project No.: 92523918

QC Batch: 602444
QC Batch Method: EPA 3010A
Analysis Method: EPA 6010D
Analysis Description: 6010 MET
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92523918001, 92523918002

METHOD BLANK: 3174321 Matrix: Water
Associated Lab Samples: 92523918001, 92523918002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Calcium	mg/L	ND	0.10	0.094	02/25/21 10:04	
Iron	mg/L	ND	0.050	0.042	02/25/21 10:04	
Magnesium	mg/L	ND	0.10	0.068	02/25/21 10:04	
Manganese	mg/L	ND	0.0050	0.0034	02/25/21 10:04	
Potassium	mg/L	ND	5.0	3.0	02/26/21 10:50	
Sodium	mg/L	ND	5.0	0.61	02/26/21 10:50	

LABORATORY CONTROL SAMPLE: 3174322

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium	mg/L	5	5.1	103	80-120	
Iron	mg/L	5	5.2	103	80-120	
Magnesium	mg/L	5	5.2	103	80-120	
Manganese	mg/L	0.5	0.51	103	80-120	
Potassium	mg/L	5	4.9J	98	80-120	
Sodium	mg/L	5	5.0J	100	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3174323 3174324

Parameter	Units	92523918001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium	mg/L	287	5	5	288	297	28	196	75-125	3	20	M6
Iron	mg/L	0.14	5	5	5.2	5.2	101	102	75-125	1	20	
Magnesium	mg/L	543	5	5	543	571	-14	544	75-125	5	20	M6
Manganese	mg/L	0.26	0.5	0.5	0.74	0.76	96	101	75-125	3	20	
Potassium	mg/L	120	5	5	125	133	98	246	75-125	6	20	M6
Sodium	mg/L	2880	5	5	2900	2950	369	1540	75-125	2	20	M6

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: MCMANUS PLANT 30050105.00006
Pace Project No.: 92523918

QC Batch: 602895
QC Batch Method: EPA 3010A
Analysis Method: EPA 6010D
Analysis Description: 6010 MET Filtered Diss.
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92523918001, 92523918002

METHOD BLANK: 3176620 Matrix: Water
Associated Lab Samples: 92523918001, 92523918002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Calcium, Dissolved	mg/L	ND	0.10	0.094	03/02/21 04:14	
Iron, Dissolved	mg/L	ND	0.050	0.042	03/02/21 04:14	
Magnesium, Dissolved	mg/L	ND	0.10	0.068	03/02/21 04:14	
Manganese, Dissolved	mg/L	ND	0.0050	0.0034	03/02/21 04:14	
Potassium, Dissolved	mg/L	ND	5.0	3.0	03/02/21 14:40	
Sodium, Dissolved	mg/L	ND	5.0	0.61	03/02/21 14:40	

LABORATORY CONTROL SAMPLE: 3176621

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium, Dissolved	mg/L	5	4.7	94	80-120	
Iron, Dissolved	mg/L	5	4.7	93	80-120	
Magnesium, Dissolved	mg/L	5	4.9	98	80-120	
Manganese, Dissolved	mg/L	0.5	0.46	92	80-120	
Potassium, Dissolved	mg/L	5	4.8J	96	80-120	
Sodium, Dissolved	mg/L	5	4.9J	98	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3176622 3176623

Parameter	Units	92523918001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium, Dissolved	mg/L	240	5	5	252	254	239	291	75-125	1	20	M6
Iron, Dissolved	mg/L	0.080	5	5	4.6	4.4	91	87	75-125	4	20	
Magnesium, Dissolved	mg/L	468	5	5	489	495	423	554	75-125	1	20	M6
Manganese, Dissolved	mg/L	0.27	0.5	0.5	0.72	0.70	89	86	75-125	2	20	
Potassium, Dissolved	mg/L	98.7	5	5	107	109	160	196	75-125	2	20	M6
Sodium, Dissolved	mg/L	2650	5	5	2730	2590	1570	-1310	75-125	5	20	M6

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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QUALITY CONTROL DATA

Project: MCMANUS PLANT 30050105.00006
Pace Project No.: 92523918

QC Batch: 602358
QC Batch Method: EPA 3010A
Analysis Method: EPA 6020B
Analysis Description: 6020 MET
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92523918001, 92523918002

METHOD BLANK: 3173960 Matrix: Water
Associated Lab Samples: 92523918001, 92523918002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Arsenic	mg/L	ND	0.00010	0.000087	02/25/21 12:13	
Boron	mg/L	ND	0.025	0.0062	02/25/21 12:13	

LABORATORY CONTROL SAMPLE: 3173961

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	0.01	0.011	106	80-120	
Boron	mg/L	0.05	0.050	101	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3173962 3173963

Parameter	Units	92523918001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	mg/L	0.42	0.01	0.01	0.44	0.43	172	127	75-125	1	20	M6
Boron	mg/L	0.95J	0.05	0.05	0.98J	0.98J	53	59	75-125		20	M6

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: MCMANUS PLANT 30050105.00006
Pace Project No.: 92523918

QC Batch: 602352
QC Batch Method: EPA 3010A
Analysis Method: EPA 6020B
Analysis Description: 6020 MET Dissolved
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92523918001, 92523918002

METHOD BLANK: 3173929 Matrix: Water
Associated Lab Samples: 92523918001, 92523918002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Arsenic, Dissolved	mg/L	ND	0.00010	0.000087	02/24/21 20:49	
Boron, Dissolved	mg/L	ND	0.025	0.0062	02/24/21 20:49	

LABORATORY CONTROL SAMPLE: 3173930

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic, Dissolved	mg/L	0.01	0.010	104	80-120	
Boron, Dissolved	mg/L	0.05	0.050	101	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3173931 3173932

Parameter	Units	92523918001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic, Dissolved	mg/L	0.17	0.01	0.01	0.26	0.18	921	154	75-125	34	20	M6,R1
Boron, Dissolved	mg/L	0.97J	0.05	0.05	0.91J	0.95J	-122	-55	75-125		20	M6

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: MCMANUS PLANT 30050105.00006
Pace Project No.: 92523918

QC Batch: 602563
QC Batch Method: SM 2320B-2011
Analysis Method: SM 2320B-2011
Analysis Description: 2320B Alkalinity
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92523918001, 92523918002

METHOD BLANK: 3174842 Matrix: Water
Associated Lab Samples: 92523918001, 92523918002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	ND	5.0	5.0	02/25/21 17:02	
Alkalinity,Bicarbonate (CaCO3)	mg/L	ND	5.0	5.0	02/25/21 17:02	
Alkalinity,Carbonate (CaCO3)	mg/L	ND	5.0	5.0	02/25/21 17:02	

LABORATORY CONTROL SAMPLE: 3174843

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	50	53.2	106	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3174844 3174845

Parameter	Units	92523889001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	109	50	50	154	159	91	101	80-120	3	25	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3174846 3174847

Parameter	Units	92523918001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	720	50	50	726	716	12	-8	80-120	1	25	M1

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REPORT OF LABORATORY ANALYSIS

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(770)734-4200

QUALITY CONTROL DATA

Project: MCMANUS PLANT 30050105.00006
Pace Project No.: 92523918

QC Batch: 602365
QC Batch Method: SM 2540C-2011
Analysis Method: SM 2540C-2011
Analysis Description: 2540C Total Dissolved Solids
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92523918001, 92523918002

METHOD BLANK: 3173982 Matrix: Water
Associated Lab Samples: 92523918001, 92523918002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	ND	25.0	25.0	02/24/21 18:41	

LABORATORY CONTROL SAMPLE: 3173983

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	250	272	109	90-110	

SAMPLE DUPLICATE: 3174230

Parameter	Units	92523918001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	13000	13600	5	25	

SAMPLE DUPLICATE: 3174231

Parameter	Units	92523308005 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	116	101	14	25	

SAMPLE DUPLICATE: 3174232

Parameter	Units	92523308008 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	90.0	75.0	18	25	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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(770)734-4200

QUALITY CONTROL DATA

Project: MCMANUS PLANT 30050105.00006
Pace Project No.: 92523918

QC Batch: 602438
QC Batch Method: SM 4500-S2D-2011
Analysis Method: SM 4500-S2D-2011
Analysis Description: 4500S2D Sulfide Water
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92523918001, 92523918002

METHOD BLANK: 3174289 Matrix: Water
Associated Lab Samples: 92523918001, 92523918002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Sulfide	mg/L	ND	0.10	0.050	02/25/21 07:02	

LABORATORY CONTROL SAMPLE: 3174290

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfide	mg/L	0.5	0.50	100	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3174291 3174292

Parameter	Units	92523918001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfide	mg/L	85.6	125	125	201	198	92	90	80-120	1	10	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3174293 3174294

Parameter	Units	92523038013 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfide	mg/L	ND	0.5	0.5	0.53	0.53	106	106	80-120	0	10	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: MCMANUS PLANT 30050105.00006
Pace Project No.: 92523918

QC Batch: 602454
QC Batch Method: SM 5210B-2011
Analysis Method: SM 5210B-2011
Analysis Description: 5210B BOD, 5 day
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92523918001, 92523918002

METHOD BLANK: 3174365 Matrix: Water
Associated Lab Samples: 92523918001, 92523918002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
BOD, 5 day	mg/L	ND	2.0	2.0	03/02/21 05:54	

LABORATORY CONTROL SAMPLE: 3174367

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
BOD, 5 day	mg/L	198	202	102	84.6-115	

SAMPLE DUPLICATE: 3174368

Parameter	Units	92523918001 Result	Dup Result	RPD	Max RPD	Qualifiers
BOD, 5 day	mg/L	ND	ND		25	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: MCMANUS PLANT 30050105.00006
Pace Project No.: 92523918

QC Batch: 602412
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: 92523918001, 92523918002

METHOD BLANK: 3174210 Matrix: Water
Associated Lab Samples: 92523918001, 92523918002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	ND	1.0	0.60	02/24/21 20:50	
Nitrate as N	mg/L	ND	0.10	0.060	02/24/21 20:50	
Nitrite as N	mg/L	ND	0.10	0.050	02/24/21 20:50	
Sulfate	mg/L	ND	1.0	0.50	02/24/21 20:50	

LABORATORY CONTROL SAMPLE: 3174211

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	50	48.2	96	90-110	
Nitrate as N	mg/L	2.5	2.3	94	90-110	
Nitrite as N	mg/L	2.5	2.4	96	90-110	
Sulfate	mg/L	50	48.8	98	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3174212 3174213

Parameter	Units	92523918001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	5480	50	50	5610	5550	248	130	90-110	1	10	M6
Nitrate as N	mg/L	ND	2.5	2.5	1.7	1.7	69	69	90-110	0	10	M6
Nitrite as N	mg/L	ND	2.5	2.5	ND	ND	0	0	90-110		10	M6
Sulfate	mg/L	295	50	50	339	339	89	88	90-110	0	10	M6

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REPORT OF LABORATORY ANALYSIS

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Peachtree Corners, GA 30092
(770)734-4200

QUALITY CONTROL DATA

Project: MCMANUS PLANT 30050105.00006
Pace Project No.: 92523918

QC Batch: 602429
QC Batch Method: SM 4500-P E-2011
Analysis Method: SM 4500-P E-2011
Analysis Description: SM4500P-E Phosphorus, Ortho
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92523918001, 92523918002

METHOD BLANK: 3174265 Matrix: Water
Associated Lab Samples: 92523918001, 92523918002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Orthophosphate as P	mg/L	ND	0.050	0.012	02/25/21 03:04	

LABORATORY CONTROL SAMPLE: 3174266

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Orthophosphate as P	mg/L	0.25	0.24	98	49-145	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3174269 3174270

Parameter	Units	92523918001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Orthophosphate as P	mg/L	0.66	1.2	1.2	1.9	1.9	103	96	90-110	5	10	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: MCMANUS PLANT 30050105.00006
Pace Project No.: 92523918

QC Batch: 603153
QC Batch Method: EPA 9060A
Analysis Method: EPA 9060A
Analysis Description: 9060 TOC, AVL
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92523918001, 92523918002

METHOD BLANK: 3177969 Matrix: Water
Associated Lab Samples: 92523918001, 92523918002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mean Total Organic Carbon	mg/L	ND	1.0	0.50	03/02/21 22:12	
Total Organic Carbon	mg/L	ND	1.0	0.50	03/02/21 22:12	
Total Organic Carbon	mg/L	ND	1.0	0.50	03/02/21 22:12	
Total Organic Carbon	mg/L	ND	1.0	0.50	03/02/21 22:12	
Total Organic Carbon	mg/L	ND	1.0	0.50	03/02/21 22:12	

LABORATORY CONTROL SAMPLE: 3177970

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mean Total Organic Carbon	mg/L	25	24.2	97	75-125	
Total Organic Carbon	mg/L	25	24.2	97	75-125	
Total Organic Carbon	mg/L	25	24.9	100	75-125	
Total Organic Carbon	mg/L	25	23.2	93	75-125	
Total Organic Carbon	mg/L	25	24.4	97	75-125	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3177971 3177972

Parameter	Units	92523998001 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/L	264	25	25	285	280	81	60	75-125	2	25	M6
Total Organic Carbon	mg/L	261	25	25	283	278	90	71	75-125	2	25	M6
Total Organic Carbon	mg/L	271	25	25	289	282	71	44	75-125	2	25	M6
Total Organic Carbon	mg/L	258	25	25	280	276	87	74	75-125	1	25	M6
Total Organic Carbon	mg/L	268	25	25	287	282	76	52	75-125	2	25	M6

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3177973 3177974

Parameter	Units	92523918001 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/L	9.3	25	25	34.9	34.8	102	102	75-125	0	25	
Total Organic Carbon	mg/L	9.1	25	25	34.7	34.8	102	103	75-125	0	25	
Total Organic Carbon	mg/L	9.4	25	25	35.0	34.8	102	102	75-125	0	25	
Total Organic Carbon	mg/L	9.4	25	25	35.0	34.5	102	101	75-125	1	25	
Total Organic Carbon	mg/L	9.4	25	25	34.9	35.0	102	103	75-125	0	25	

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

REPORT OF LABORATORY ANALYSIS

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

QUALIFIERS

Project: MCMANUS PLANT 30050105.00006
Pace Project No.: 92523918

DEFINITIONS

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

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

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

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

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

S - Surrogate

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

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

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

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

Acid preservation may not be appropriate for 2 Chloroethylvinyl ether.

A separate vial preserved to a pH of 4-5 is recommended in SW846 Chapter 4 for the analysis of Acrolein and Acrylonitrile by EPA Method 8260.

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

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

TNI - The NELAC Institute.

ANALYTE QUALIFIERS

H1	Analysis conducted outside the EPA method holding time.
H2	Extraction or preparation conducted outside EPA method holding time.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
M6	Matrix spike and Matrix spike duplicate recovery not evaluated against control limits due to sample dilution.
R1	RPD value was outside control limits.

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

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: MCMANUS PLANT 30050105.00006
Pace Project No.: 92523918

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
92523918001	**VAP-14-W (17-19)**	EPA 3010A	602444	EPA 6010D	602471
92523918002	**DUP-01-W (02232021)**	EPA 3010A	602444	EPA 6010D	602471
92523918001	**VAP-14-W (17-19)**	EPA 3010A	602895	EPA 6010D	602904
92523918002	**DUP-01-W (02232021)**	EPA 3010A	602895	EPA 6010D	602904
92523918001	**VAP-14-W (17-19)**	EPA 3010A	602358	EPA 6020B	602425
92523918002	**DUP-01-W (02232021)**	EPA 3010A	602358	EPA 6020B	602425
92523918001	**VAP-14-W (17-19)**	EPA 3010A	602352	EPA 6020B	602389
92523918002	**DUP-01-W (02232021)**	EPA 3010A	602352	EPA 6020B	602389
92523918001	**VAP-14-W (17-19)**	SM 2320B-2011	602563		
92523918002	**DUP-01-W (02232021)**	SM 2320B-2011	602563		
92523918001	**VAP-14-W (17-19)**	SM 2540C-2011	602365		
92523918002	**DUP-01-W (02232021)**	SM 2540C-2011	602365		
92523918001	**VAP-14-W (17-19)**	SM 4500-S2D-2011	602438		
92523918002	**DUP-01-W (02232021)**	SM 4500-S2D-2011	602438		
92523918001	**VAP-14-W (17-19)**	SM 5210B-2011	602454	SM 5210B-2011	602495
92523918002	**DUP-01-W (02232021)**	SM 5210B-2011	602454	SM 5210B-2011	602495
92523918001	**VAP-14-W (17-19)**	EPA 300.0 Rev 2.1 1993	602412		
92523918002	**DUP-01-W (02232021)**	EPA 300.0 Rev 2.1 1993	602412		
92523918001	**VAP-14-W (17-19)**	SM 4500-P E-2011	602429		
92523918002	**DUP-01-W (02232021)**	SM 4500-P E-2011	602429		
92523918001	**VAP-14-W (17-19)**	EPA 9060A	603153		
92523918002	**DUP-01-W (02232021)**	EPA 9060A	603153		

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: ARCADIS

Project #: **WO# : 92523918**

92523918

Courier: ☑ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ Other:

Custody Seal Present? ☑ Yes ☐ No Seals Intact? ☑ Yes ☐ No

Date/Initials Person Examining Contents: 2-24-21/SR

Packing Material: ☐ Bubble Wrap ☑ Bubble Bags ☐ None ☐ Other

Biological Tissue Frozen? ☐ Yes ☐ No ☑ N/A

Thermometer: ☑ IR Gun ID: 93T071 Type of Ice: ☑ Wet ☐ Blue ☐ None

Cooler Temp: 4.5 6.0 2-24-21 SR Correction Factor: Add/Subtract (°C) 0

Cooler Temp Corrected (°C): 2-24-21 SR 6.0 4.5

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: 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	

Field Data Required? ☐ Yes ☐ No

COMMENTS/SAMPLE DISCREPANCY

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# : 92523918**

PM: KLH1 Due Date: 02/25/21

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)	SPZT-250 mL Sterile Plastic (N/A – lab)	GN	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		2	1	1		2	1												3					1				
2		2	1	1		2	1												3					1				
3		4	2	2		4	2												6					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.

ARCADIS ID#:

CHAIN OF CUSTODY & LABORATORY ANALYSIS REQUEST FORM

Page ___ of ___

Lab Work Order #: 92523418

Send Results to:

Contact & Company Name: MATT WEBB ARCADIS
Telephone: 919-415-2294
Address: 5420 WADE PARK BLVD Ste350
Fax:
City: RALEIGH State: NC Zip: 27607
E-mail Address: Mathew.WEBB@ARCADIS.COM
Project Name/Location (City, State): McMANUS PLANT-BRUNSWICK
Project #: 30050105.00006
Sampler's Printed Name:
Sampler's Signature:

PARAMETER ANALYSIS & METHOD

Sample ID	Collection Date	Collection Time	Type Comp	Type Grab	Matrix	TOTAL METALS	DISSOLVED Metals	ALKALINITY	$Cl, SO_4, NO_2/NO_3$	SULFIDE NaOH+Zinc Acetate	ORTHOphosphate KIT	TOC	BOD	TDS	REMARKS	
Preservative						C	C	E	E	F		G	E	E		
Filtered (✓)							✓									
# of Containers						1	1	1	1	1	KIT	3	1	1		
Container Information						3	3	3	3	9		1	2	4		
VAP-14-W(17-19)	2/23/2021	12:35		X	W	1	1	1	1	1	1	3	1	1		001
DUP01-W(02232021)	"	✓		X	W	1	1	1	1	1	1	3	1	1		002
MS/MSD-W(17-19)	"	"		X	W	2	2	2	2	2	2	6	2	2	VAP-14-W(17-19)	001

Keys

Preservation Key: A. H_2SO_4 B. HCL C. HNO_3 D. NaOH E. None F. Other: NaOH/Zn Ac G. Other: H_3PO_4 H. Other: ______

Container Information Key: 1. 40 ml Vial 2. 1 L Amber 3. 250 ml Plastic 4. 500 ml Plastic 5. Encore 6. 2 oz. Glass 7. 4 oz. Glass 8. 8 oz. Glass 9. Other: 125 ml 10. Other: ______

Matrix Key: SO - Soil W - Water T - Tissue SE - Sediment SL - Sludge A - Air NL - NAPL/Oil SW - Sample Wipe Other: ______

Special Instructions/Comments: METALS = As, Fe, Mn, Mg, Ca, Na, K, B
Dissolved metals are field filtered
✱ TOTAL AND DISSOLVED As HAVE 24 hour TAT

☐ Special QA/QC Instructions(✓):

Laboratory Information and Receipt

Lab Name: PACE
☒ Cooler packed with ice (✓)
Specify Turnaround Requirements:
Shipping Tracking #:
Cooler Custody Seal (✓): ☐ Intact ☐ Not Intact
Sample Receipt:
Condition/Cooler Temp: ______

	Relinquished By	Received By	Relinquished By	Laboratory Received By
Printed Name	Grant A Williford	FedEx		
Signature	[signature]	[signature]		
Firm/Courier	ANA	PACE/AVL		
Date/Time	2/23/2021/1700	2/24/21 1230		

20730826 CofC AR Form 08.27.2015

Distribution: WHITE – Laboratory returns with results YELLOW – Lab copy PINK – Retained by Arcadis

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

March 11, 2021

Ms. Lauren Petty
Southern Co. Services
42 Inverness Center Parkway
Birmingham, AL 35242

RE: Project: McManus 30050105.0006
Pace Project No.: 92524618

Dear Ms. Petty:

Enclosed are the analytical results for sample(s) received by the laboratory on February 27, 2021. 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

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: Joju Abraham, Georgia Power-CCR
Kathryn Farris
Geoffrey Gay, ARCADIS - Atlanta
Margaret Gentile, Arcadis
Kristen Jurinko
Charles Lawson, Arcadis
Bryan Mayeux
Kelley Sharpe, ARCADIS - Atlanta
Maribel Vital

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

CERTIFICATIONS

Project: McManus 30050105.0006
Pace Project No.: 92524618

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

SAMPLE SUMMARY

Project: McManus 30050105.0006
Pace Project No.: 92524618

Lab ID	Sample ID	Matrix	Date Collected	Date Received
92524618001	**VAP-15-W (15-17)**	Water	02/26/21 14:34	02/27/21 12:45
92524618002	**VAP-15-W (20-22)**	Water	02/26/21 14:45	02/27/21 12:45
92524618003	**VAP-15-W (26-28)**	Water	02/26/21 15:10	02/27/21 12:45

REPORT OF LABORATORY ANALYSIS

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

SAMPLE ANALYTE COUNT

Project: McManus 30050105.0006
Pace Project No.: 92524618

Lab ID	Sample ID	Method	Analysts	Analytes Reported
92524618001	**VAP-15-W (15-17)**	EPA 6010D	KQ, SH1	6
		EPA 6010D	SH1	6
		EPA 6020B	JOR	2
		EPA 6020B	JOR	2
		SM 2320B-2011	ECH	3
		SM 2540C-2011	RED	1
		SM 4500-S2D-2011	NAL	1
		SM 5210B-2011	NFW	1
		EPA 300.0 Rev 2.1 1993	JLH	4
		SM 4500-P E-2011	MJP	1
		EPA 9060A	JLH	5
92524618002	**VAP-15-W (20-22)**	EPA 6010D	KQ, SH1	6
		EPA 6010D	SH1	6
		EPA 6020B	JOR	2
		EPA 6020B	JOR	2
		SM 2320B-2011	ECH	3
		SM 2540C-2011	RED	1
		SM 4500-S2D-2011	NAL	1
		SM 5210B-2011	NFW	1
		EPA 300.0 Rev 2.1 1993	JLH	4
		SM 4500-P E-2011	MJP	1
		EPA 9060A	JLH	5
92524618003	**VAP-15-W (26-28)**	EPA 6010D	KQ, SH1	6
		EPA 6010D	SH1	6
		EPA 6020B	JOR	2
		EPA 6020B	JOR	2
		SM 2320B-2011	ECH	3
		SM 2540C-2011	RED	1
		SM 4500-S2D-2011	NAL	1
		SM 5210B-2011	NFW	1
		EPA 300.0 Rev 2.1 1993	JLH	4
		SM 4500-P E-2011	MJP	1
		EPA 9060A	JLH	5

PASI-A = Pace Analytical Services - Asheville

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

SUMMARY OF DETECTION

Project: McManus 30050105.0006
Pace Project No.: 92524618

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92524618001	**VAP-15-W (15-17)**					
EPA 6010D	Calcium	183	mg/L	1.0	03/02/21 06:24	
EPA 6010D	Iron	0.51	mg/L	0.50	03/02/21 06:24	
EPA 6010D	Magnesium	496	mg/L	1.0	03/02/21 06:24	
EPA 6010D	Manganese	0.20	mg/L	0.050	03/02/21 06:24	
EPA 6010D	Potassium	150	mg/L	50.0	03/02/21 06:24	
EPA 6010D	Sodium	4480	mg/L	500	03/02/21 16:28	
EPA 6010D	Calcium, Dissolved	174	mg/L	1.0	03/04/21 03:39	
EPA 6010D	Magnesium, Dissolved	459	mg/L	1.0	03/04/21 03:39	
EPA 6010D	Manganese, Dissolved	0.19	mg/L	0.050	03/04/21 03:39	
EPA 6010D	Potassium, Dissolved	140	mg/L	50.0	03/04/21 03:39	
EPA 6010D	Sodium, Dissolved	4210	mg/L	500	03/02/21 17:14	
EPA 6020B	Arsenic	0.018J	mg/L	0.10	03/01/21 17:09	D3
EPA 6020B	Boron	1.3J	mg/L	5.0	03/01/21 17:09	D3
EPA 6020B	Arsenic, Dissolved	0.0095J	mg/L	0.10	03/01/21 15:06	D3
EPA 6020B	Boron, Dissolved	1.7J	mg/L	5.0	03/01/21 15:06	D3
SM 2320B-2011	Alkalinity,Bicarbonate (CaCO3)	298	mg/L	5.0	03/01/21 20:20	
SM 2320B-2011	Alkalinity, Total as CaCO3	298	mg/L	5.0	03/01/21 20:20	
SM 2540C-2011	Total Dissolved Solids	16300	mg/L	2500	03/01/21 19:03	
SM 4500-S2D-2011	Sulfide	38.3	mg/L	10.0	03/02/21 17:40	
SM 5210B-2011	BOD, 5 day	19000	mg/L	2.0	03/05/21 05:30	R6
EPA 300.0 Rev 2.1 1993	Chloride	7190	mg/L	100	02/27/21 17:56	
EPA 300.0 Rev 2.1 1993	Sulfate	855	mg/L	100	02/27/21 17:56	
SM 4500-P E-2011	Orthophosphate as P	1.1	mg/L	0.25	02/27/21 16:11	
EPA 9060A	Total Organic Carbon	11.4	mg/L	1.0	03/02/21 05:40	
EPA 9060A	Total Organic Carbon	11.5	mg/L	1.0	03/02/21 05:40	
EPA 9060A	Total Organic Carbon	11.8	mg/L	1.0	03/02/21 05:40	
EPA 9060A	Total Organic Carbon	11.8	mg/L	1.0	03/02/21 05:40	
EPA 9060A	Mean Total Organic Carbon	11.6	mg/L	1.0	03/02/21 05:40	
92524618002	**VAP-15-W (20-22)**					
EPA 6010D	Calcium	259	mg/L	1.0	03/02/21 06:27	
EPA 6010D	Iron	2.6	mg/L	0.50	03/02/21 06:27	
EPA 6010D	Magnesium	606	mg/L	1.0	03/02/21 06:27	
EPA 6010D	Manganese	0.32	mg/L	0.050	03/02/21 06:27	
EPA 6010D	Potassium	164	mg/L	50.0	03/02/21 06:27	
EPA 6010D	Sodium	4300	mg/L	500	03/02/21 16:32	
EPA 6010D	Calcium, Dissolved	244	mg/L	1.0	03/04/21 03:43	
EPA 6010D	Magnesium, Dissolved	572	mg/L	1.0	03/04/21 03:43	
EPA 6010D	Manganese, Dissolved	0.29	mg/L	0.050	03/04/21 03:43	
EPA 6010D	Potassium, Dissolved	151	mg/L	50.0	03/04/21 03:43	
EPA 6010D	Sodium, Dissolved	4040	mg/L	500	03/02/21 17:17	
EPA 6020B	Boron	1.2J	mg/L	5.0	03/01/21 17:13	D3
EPA 6020B	Boron, Dissolved	1.3J	mg/L	5.0	03/01/21 15:11	D3
SM 2320B-2011	Alkalinity,Bicarbonate (CaCO3)	525	mg/L	5.0	03/01/21 20:29	
SM 2320B-2011	Alkalinity, Total as CaCO3	525	mg/L	5.0	03/01/21 20:29	
SM 2540C-2011	Total Dissolved Solids	16300	mg/L	2500	03/01/21 19:03	
SM 4500-S2D-2011	Sulfide	60.9	mg/L	10.0	03/02/21 17:40	
SM 5210B-2011	BOD, 5 day	364	mg/L	2.0	03/05/21 05:34	R6

REPORT OF LABORATORY ANALYSIS

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

SUMMARY OF DETECTION

Project: McManus 30050105.0006
Pace Project No.: 92524618

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92524618002	**VAP-15-W (20-22)**					
EPA 300.0 Rev 2.1 1993	Chloride	7130	mg/L	100	02/27/21 18:24	
EPA 300.0 Rev 2.1 1993	Sulfate	706	mg/L	100	02/27/21 18:24	
SM 4500-P E-2011	Orthophosphate as P	0.48	mg/L	0.25	02/27/21 16:12	
EPA 9060A	Total Organic Carbon	9.4	mg/L	1.0	03/02/21 05:59	
EPA 9060A	Total Organic Carbon	9.3	mg/L	1.0	03/02/21 05:59	
EPA 9060A	Total Organic Carbon	9.5	mg/L	1.0	03/02/21 05:59	
EPA 9060A	Total Organic Carbon	9.6	mg/L	1.0	03/02/21 05:59	
EPA 9060A	Mean Total Organic Carbon	9.5	mg/L	1.0	03/02/21 05:59	
92524618003	**VAP-15-W (26-28)**					
EPA 6010D	Calcium	199	mg/L	1.0	03/02/21 06:31	
EPA 6010D	Iron	1.5	mg/L	0.50	03/02/21 06:31	
EPA 6010D	Magnesium	386	mg/L	1.0	03/02/21 06:31	
EPA 6010D	Manganese	0.22	mg/L	0.050	03/02/21 06:31	
EPA 6010D	Potassium	116	mg/L	50.0	03/02/21 06:31	
EPA 6010D	Sodium	3410	mg/L	500	03/02/21 16:35	
EPA 6010D	Calcium, Dissolved	216	mg/L	1.0	03/04/21 16:42	
EPA 6010D	Magnesium, Dissolved	414	mg/L	1.0	03/04/21 16:42	
EPA 6010D	Manganese, Dissolved	0.23	mg/L	0.050	03/04/21 16:42	
EPA 6010D	Potassium, Dissolved	115	mg/L	50.0	03/04/21 16:42	
EPA 6010D	Sodium, Dissolved	3180	mg/L	500	03/02/21 17:20	
EPA 6020B	Arsenic	0.057J	mg/L	0.10	03/01/21 17:18	D3
EPA 6020B	Boron	1.0J	mg/L	5.0	03/01/21 17:18	D3
EPA 6020B	Arsenic, Dissolved	0.035J	mg/L	0.10	03/01/21 15:15	D3
EPA 6020B	Boron, Dissolved	1.4J	mg/L	5.0	03/01/21 15:15	D3
SM 2320B-2011	Alkalinity,Bicarbonate (CaCO3)	498	mg/L	5.0	03/01/21 20:41	
SM 2320B-2011	Alkalinity, Total as CaCO3	498	mg/L	5.0	03/01/21 20:41	
SM 2540C-2011	Total Dissolved Solids	12400	mg/L	2500	03/01/21 19:03	
SM 4500-S2D-2011	Sulfide	39.7	mg/L	10.0	03/02/21 16:09	
SM 5210B-2011	BOD, 5 day	194	mg/L	2.0	03/05/21 05:38	R6
EPA 300.0 Rev 2.1 1993	Chloride	5630	mg/L	100	02/27/21 18:53	M6
EPA 300.0 Rev 2.1 1993	Sulfate	540	mg/L	100	02/27/21 18:53	M6
SM 4500-P E-2011	Orthophosphate as P	0.63	mg/L	0.25	02/27/21 16:13	
EPA 9060A	Total Organic Carbon	7.4	mg/L	1.0	03/02/21 06:17	
EPA 9060A	Total Organic Carbon	7.3	mg/L	1.0	03/02/21 06:17	
EPA 9060A	Total Organic Carbon	7.4	mg/L	1.0	03/02/21 06:17	
EPA 9060A	Total Organic Carbon	7.6	mg/L	1.0	03/02/21 06:17	
EPA 9060A	Mean Total Organic Carbon	7.4	mg/L	1.0	03/02/21 06:17	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: McManus 30050105.0006
Pace Project No.: 92524618

Sample: VAP-15-W (15-17) **Lab ID: 92524618001** Collected: 02/26/21 14:34 Received: 02/27/21 12:45 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Calcium	**183**	mg/L	1.0	0.94	10	03/01/21 10:39	03/02/21 06:24	7440-70-2	
Iron	**0.51**	mg/L	0.50	0.42	10	03/01/21 10:39	03/02/21 06:24	7439-89-6	
Magnesium	**496**	mg/L	1.0	0.68	10	03/01/21 10:39	03/02/21 06:24	7439-95-4	
Manganese	**0.20**	mg/L	0.050	0.034	10	03/01/21 10:39	03/02/21 06:24	7439-96-5	
Potassium	**150**	mg/L	50.0	30.4	10	03/01/21 10:39	03/02/21 06:24	7440-09-7	
Sodium	**4480**	mg/L	500	61.1	100	03/01/21 10:39	03/02/21 16:28	7440-23-5	
6010 MET ICP, Dissolved	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Calcium, Dissolved	**174**	mg/L	1.0	0.94	10	03/02/21 12:06	03/04/21 03:39	7440-70-2	
Iron, Dissolved	ND	mg/L	0.50	0.42	10	03/02/21 12:06	03/04/21 03:39	7439-89-6	
Magnesium, Dissolved	**459**	mg/L	1.0	0.68	10	03/02/21 12:06	03/04/21 03:39	7439-95-4	
Manganese, Dissolved	**0.19**	mg/L	0.050	0.034	10	03/02/21 12:06	03/04/21 03:39	7439-96-5	
Potassium, Dissolved	**140**	mg/L	50.0	30.4	10	03/02/21 12:06	03/04/21 03:39	7440-09-7	
Sodium, Dissolved	**4210**	mg/L	500	61.1	100	03/02/21 12:06	03/02/21 17:14	7440-23-5	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Arsenic	**0.018J**	mg/L	0.10	0.0087	100	03/01/21 10:39	03/01/21 17:09	7440-38-2	D3
Boron	**1.3J**	mg/L	5.0	0.85	100	03/01/21 10:39	03/01/21 17:09	7440-42-8	D3
6020 MET ICPMS, Dissolved	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Arsenic, Dissolved	**0.0095J**	mg/L	0.10	0.0087	100	02/28/21 17:20	03/01/21 15:06	7440-38-2	D3
Boron, Dissolved	**1.7J**	mg/L	5.0	0.85	100	02/28/21 17:20	03/01/21 15:06	7440-42-8	D3
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**298**	mg/L	5.0	5.0	1		03/01/21 20:20		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		03/01/21 20:20		
Alkalinity, Total as CaCO3	**298**	mg/L	5.0	5.0	1		03/01/21 20:20		
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**16300**	mg/L	2500	2500	1		03/01/21 19:03		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	**38.3**	mg/L	10.0	5.0	100		03/02/21 17:40	18496-25-8	
5210B BOD, 5 day	Analytical Method: SM 5210B-2011 Pace Analytical Services - Asheville								
BOD, 5 day	**19000**	mg/L	2.0	2.0	1	02/28/21 04:02	03/05/21 05:30		R6

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: McManus 30050105.0006
Pace Project No.: 92524618

Sample: VAP-15-W (15-17) **Lab ID: 92524618001** Collected: 02/26/21 14:34 Received: 02/27/21 12:45 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC anions 48hr	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**7190**	mg/L	100	60.0	100		02/27/21 17:56	16887-00-6	
Nitrate as N	ND	mg/L	0.10	0.060	1		02/27/21 17:41	14797-55-8	
Nitrite as N	ND	mg/L	10.0	5.0	100		02/27/21 17:56	14797-65-0	D3
Sulfate	**855**	mg/L	100	50.0	100		02/27/21 17:56	14808-79-8	
SM4500P-E, Phosphate, Ortho	Analytical Method: SM 4500-P E-2011 Pace Analytical Services - Asheville								
Orthophosphate as P	**1.1**	mg/L	0.25	0.059	5		02/27/21 16:11		
Total Organic Carbon,Asheville	Analytical Method: EPA 9060A Pace Analytical Services - Asheville								
Total Organic Carbon	**11.4**	mg/L	1.0	0.50	1		03/02/21 05:40	7440-44-0	
Total Organic Carbon	**11.5**	mg/L	1.0	0.50	1		03/02/21 05:40	7440-44-0	
Total Organic Carbon	**11.8**	mg/L	1.0	0.50	1		03/02/21 05:40	7440-44-0	
Total Organic Carbon	**11.8**	mg/L	1.0	0.50	1		03/02/21 05:40	7440-44-0	
Mean Total Organic Carbon	**11.6**	mg/L	1.0	0.50	1		03/02/21 05:40	7440-44-0	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: McManus 30050105.0006
Pace Project No.: 92524618

Sample: VAP-15-W (20-22) **Lab ID: 92524618002** Collected: 02/26/21 14:45 Received: 02/27/21 12:45 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Calcium	**259**	mg/L	1.0	0.94	10	03/01/21 10:39	03/02/21 06:27	7440-70-2	
Iron	**2.6**	mg/L	0.50	0.42	10	03/01/21 10:39	03/02/21 06:27	7439-89-6	
Magnesium	**606**	mg/L	1.0	0.68	10	03/01/21 10:39	03/02/21 06:27	7439-95-4	
Manganese	**0.32**	mg/L	0.050	0.034	10	03/01/21 10:39	03/02/21 06:27	7439-96-5	
Potassium	**164**	mg/L	50.0	30.4	10	03/01/21 10:39	03/02/21 06:27	7440-09-7	
Sodium	**4300**	mg/L	500	61.1	100	03/01/21 10:39	03/02/21 16:32	7440-23-5	
6010 MET ICP, Dissolved	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Calcium, Dissolved	**244**	mg/L	1.0	0.94	10	03/02/21 12:06	03/04/21 03:43	7440-70-2	
Iron, Dissolved	ND	mg/L	0.50	0.42	10	03/02/21 12:06	03/04/21 03:43	7439-89-6	
Magnesium, Dissolved	**572**	mg/L	1.0	0.68	10	03/02/21 12:06	03/04/21 03:43	7439-95-4	
Manganese, Dissolved	**0.29**	mg/L	0.050	0.034	10	03/02/21 12:06	03/04/21 03:43	7439-96-5	
Potassium, Dissolved	**151**	mg/L	50.0	30.4	10	03/02/21 12:06	03/04/21 03:43	7440-09-7	
Sodium, Dissolved	**4040**	mg/L	500	61.1	100	03/02/21 12:06	03/02/21 17:17	7440-23-5	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Arsenic	ND	mg/L	0.10	0.0087	100	03/01/21 10:39	03/01/21 17:13	7440-38-2	D3
Boron	**1.2J**	mg/L	5.0	0.85	100	03/01/21 10:39	03/01/21 17:13	7440-42-8	D3
6020 MET ICPMS, Dissolved	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Arsenic, Dissolved	ND	mg/L	0.10	0.0087	100	02/28/21 17:20	03/01/21 15:11	7440-38-2	D3
Boron, Dissolved	**1.3J**	mg/L	5.0	0.85	100	02/28/21 17:20	03/01/21 15:11	7440-42-8	D3
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**525**	mg/L	5.0	5.0	1		03/01/21 20:29		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		03/01/21 20:29		
Alkalinity, Total as CaCO3	**525**	mg/L	5.0	5.0	1		03/01/21 20:29		
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**16300**	mg/L	2500	2500	1		03/01/21 19:03		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	**60.9**	mg/L	10.0	5.0	100		03/02/21 17:40	18496-25-8	
5210B BOD, 5 day	Analytical Method: SM 5210B-2011 Pace Analytical Services - Asheville								
BOD, 5 day	**364**	mg/L	2.0	2.0	1	02/28/21 04:02	03/05/21 05:34		R6

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: McManus 30050105.0006
Pace Project No.: 92524618

Sample: VAP-15-W (20-22) **Lab ID: 92524618002** Collected: 02/26/21 14:45 Received: 02/27/21 12:45 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC anions 48hr	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**7130**	mg/L	100	60.0	100		02/27/21 18:24	16887-00-6	
Nitrate as N	ND	mg/L	0.10	0.060	1		02/27/21 18:10	14797-55-8	
Nitrite as N	ND	mg/L	10.0	5.0	100		02/27/21 18:24	14797-65-0	D3
Sulfate	**706**	mg/L	100	50.0	100		02/27/21 18:24	14808-79-8	
SM4500P-E, Phosphate, Ortho	Analytical Method: SM 4500-P E-2011 Pace Analytical Services - Asheville								
Orthophosphate as P	**0.48**	mg/L	0.25	0.059	5		02/27/21 16:12		
Total Organic Carbon,Asheville	Analytical Method: EPA 9060A Pace Analytical Services - Asheville								
Total Organic Carbon	**9.4**	mg/L	1.0	0.50	1		03/02/21 05:59	7440-44-0	
Total Organic Carbon	**9.3**	mg/L	1.0	0.50	1		03/02/21 05:59	7440-44-0	
Total Organic Carbon	**9.5**	mg/L	1.0	0.50	1		03/02/21 05:59	7440-44-0	
Total Organic Carbon	**9.6**	mg/L	1.0	0.50	1		03/02/21 05:59	7440-44-0	
Mean Total Organic Carbon	**9.5**	mg/L	1.0	0.50	1		03/02/21 05:59	7440-44-0	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: McManus 30050105.0006
Pace Project No.: 92524618

Sample: VAP-15-W (26-28) **Lab ID: 92524618003** Collected: 02/26/21 15:10 Received: 02/27/21 12:45 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Calcium	**199**	mg/L	1.0	0.94	10	03/01/21 10:39	03/02/21 06:31	7440-70-2	
Iron	**1.5**	mg/L	0.50	0.42	10	03/01/21 10:39	03/02/21 06:31	7439-89-6	
Magnesium	**386**	mg/L	1.0	0.68	10	03/01/21 10:39	03/02/21 06:31	7439-95-4	
Manganese	**0.22**	mg/L	0.050	0.034	10	03/01/21 10:39	03/02/21 06:31	7439-96-5	
Potassium	**116**	mg/L	50.0	30.4	10	03/01/21 10:39	03/02/21 06:31	7440-09-7	
Sodium	**3410**	mg/L	500	61.1	100	03/01/21 10:39	03/02/21 16:35	7440-23-5	
6010 MET ICP, Dissolved	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Calcium, Dissolved	**216**	mg/L	1.0	0.94	10	03/02/21 12:06	03/04/21 16:42	7440-70-2	
Iron, Dissolved	ND	mg/L	0.50	0.42	10	03/02/21 12:06	03/04/21 16:42	7439-89-6	
Magnesium, Dissolved	**414**	mg/L	1.0	0.68	10	03/02/21 12:06	03/04/21 16:42	7439-95-4	
Manganese, Dissolved	**0.23**	mg/L	0.050	0.034	10	03/02/21 12:06	03/04/21 16:42	7439-96-5	
Potassium, Dissolved	**115**	mg/L	50.0	30.4	10	03/02/21 12:06	03/04/21 16:42	7440-09-7	
Sodium, Dissolved	**3180**	mg/L	500	61.1	100	03/02/21 12:06	03/02/21 17:20	7440-23-5	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Arsenic	**0.057J**	mg/L	0.10	0.0087	100	03/01/21 10:39	03/01/21 17:18	7440-38-2	D3
Boron	**1.0J**	mg/L	5.0	0.85	100	03/01/21 10:39	03/01/21 17:18	7440-42-8	D3
6020 MET ICPMS, Dissolved	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Arsenic, Dissolved	**0.035J**	mg/L	0.10	0.0087	100	02/28/21 17:20	03/01/21 15:15	7440-38-2	D3
Boron, Dissolved	**1.4J**	mg/L	5.0	0.85	100	02/28/21 17:20	03/01/21 15:15	7440-42-8	D3
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**498**	mg/L	5.0	5.0	1		03/01/21 20:41		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		03/01/21 20:41		
Alkalinity, Total as CaCO3	**498**	mg/L	5.0	5.0	1		03/01/21 20:41		
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**12400**	mg/L	2500	2500	1		03/01/21 19:03		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	**39.7**	mg/L	10.0	5.0	100		03/02/21 16:09	18496-25-8	
5210B BOD, 5 day	Analytical Method: SM 5210B-2011 Pace Analytical Services - Asheville								
BOD, 5 day	**194**	mg/L	2.0	2.0	1	02/28/21 04:02	03/05/21 05:38		R6

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: McManus 30050105.0006
Pace Project No.: 92524618

Sample: VAP-15-W (26-28) **Lab ID: 92524618003** Collected: 02/26/21 15:10 Received: 02/27/21 12:45 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC anions 48hr	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**5630**	mg/L	100	60.0	100		02/27/21 18:53	16887-00-6	M6
Nitrate as N	ND	mg/L	0.10	0.060	1		02/27/21 18:39	14797-55-8	
Nitrite as N	ND	mg/L	10.0	5.0	100		02/27/21 18:53	14797-65-0	D3,M6
Sulfate	**540**	mg/L	100	50.0	100		02/27/21 18:53	14808-79-8	M6
SM4500P-E, Phosphate, Ortho	Analytical Method: SM 4500-P E-2011 Pace Analytical Services - Asheville								
Orthophosphate as P	**0.63**	mg/L	0.25	0.059	5		02/27/21 16:13		
Total Organic Carbon,Asheville	Analytical Method: EPA 9060A Pace Analytical Services - Asheville								
Total Organic Carbon	**7.4**	mg/L	1.0	0.50	1		03/02/21 06:17	7440-44-0	
Total Organic Carbon	**7.3**	mg/L	1.0	0.50	1		03/02/21 06:17	7440-44-0	
Total Organic Carbon	**7.4**	mg/L	1.0	0.50	1		03/02/21 06:17	7440-44-0	
Total Organic Carbon	**7.6**	mg/L	1.0	0.50	1		03/02/21 06:17	7440-44-0	
Mean Total Organic Carbon	**7.4**	mg/L	1.0	0.50	1		03/02/21 06:17	7440-44-0	

REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: McManus 30050105.0006
Pace Project No.: 92524618

QC Batch: 603201
QC Batch Method: EPA 3010A
Analysis Method: EPA 6010D
Analysis Description: 6010 MET
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524618001, 92524618002, 92524618003

METHOD BLANK: 3178184 Matrix: Water
Associated Lab Samples: 92524618001, 92524618002, 92524618003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Calcium	mg/L	ND	0.10	0.094	03/02/21 15:53	
Iron	mg/L	ND	0.050	0.042	03/02/21 15:53	
Magnesium	mg/L	ND	0.10	0.068	03/02/21 05:02	
Manganese	mg/L	ND	0.0050	0.0034	03/02/21 15:53	
Potassium	mg/L	ND	5.0	3.0	03/02/21 15:53	
Sodium	mg/L	ND	5.0	0.61	03/02/21 15:53	

LABORATORY CONTROL SAMPLE: 3178185

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium	mg/L	5	5.2	104	80-120	
Iron	mg/L	5	5.2	104	80-120	
Magnesium	mg/L	5	5.3	107	80-120	
Manganese	mg/L	0.5	0.54	107	80-120	
Potassium	mg/L	5	5.4	109	80-120	
Sodium	mg/L	5	5.3	106	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3178186 3178187

Parameter	Units	92524617001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium	mg/L	111	5	5	107	124	-68	270	75-125	15	20	M6
Iron	mg/L	3.1	5	5	5.1	5.9	39	55	75-125	15	20	M6
Magnesium	mg/L	282	5	5	298	308	320	524	75-125	3	20	M6
Manganese	mg/L	0.11	0.5	0.5	0.52	0.59	82	97	75-125	14	20	
Potassium	mg/L	101	5	5	98.6	113	-42	240	75-125	13	20	M6
Sodium	mg/L	2970	5	5	3010	3070	780	2060	75-125	2	20	M6

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REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: McManus 30050105.0006
Pace Project No.: 92524618

QC Batch: 603568
QC Batch Method: EPA 3010A
Analysis Method: EPA 6010D
Analysis Description: 6010 MET Filtered Diss.
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524618001, 92524618002, 92524618003

METHOD BLANK: 3179709 Matrix: Water
Associated Lab Samples: 92524618001, 92524618002, 92524618003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Calcium, Dissolved	mg/L	ND	0.10	0.094	03/04/21 03:23	
Iron, Dissolved	mg/L	ND	0.050	0.042	03/04/21 03:23	
Magnesium, Dissolved	mg/L	ND	0.10	0.068	03/04/21 03:23	
Manganese, Dissolved	mg/L	ND	0.0050	0.0034	03/04/21 03:23	
Potassium, Dissolved	mg/L	ND	5.0	3.0	03/04/21 03:23	
Sodium, Dissolved	mg/L	ND	5.0	0.61	03/04/21 03:23	

LABORATORY CONTROL SAMPLE: 3179710

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium, Dissolved	mg/L	5	4.8	95	80-120	
Iron, Dissolved	mg/L	5	4.7	94	80-120	
Magnesium, Dissolved	mg/L	5	5.1	103	80-120	
Manganese, Dissolved	mg/L	0.5	0.49	98	80-120	
Potassium, Dissolved	mg/L	5	4.9J	99	80-120	
Sodium, Dissolved	mg/L	5	4.8J	97	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3179711 3179712

Parameter	Units	92524617002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium, Dissolved	mg/L	222	5	5	213	228	-186	112	75-125	7	20	M6
Iron, Dissolved	mg/L	ND	5	5	4.4	4.7	85	92	75-125	7	20	
Magnesium, Dissolved	mg/L	643	5	5	616	638	-528	-106	75-125	3	20	M6
Manganese, Dissolved	mg/L	0.32	0.5	0.5	0.75	0.80	86	96	75-125	6	20	
Potassium, Dissolved	mg/L	164	5	5	160	172	-80	144	75-125	7	20	M6
Sodium, Dissolved	mg/L	5070	5	5	4870	4940	-3960	-2600	75-125	1	20	M6

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REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: McManus 30050105.0006
Pace Project No.: 92524618

QC Batch: 603195
QC Batch Method: EPA 3010A
Analysis Method: EPA 6020B
Analysis Description: 6020 MET
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524618001, 92524618002, 92524618003

METHOD BLANK: 3178129 Matrix: Water
Associated Lab Samples: 92524618001, 92524618002, 92524618003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Arsenic	mg/L	ND	0.0010	0.000087	03/01/21 16:13	
Boron	mg/L	ND	0.050	0.0085	03/01/21 16:13	

LABORATORY CONTROL SAMPLE: 3178130

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	0.01	0.010	102	80-120	
Boron	mg/L	0.05	0.048J	95	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3178131 3178132

Parameter	Units	92524617001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	mg/L	0.0092J	0.01	0.01	0.023J	0.016J	134	68	75-125		20	M6
Boron	mg/L	ND	0.05	0.05	0.92J	ND	174	-102	75-125		20	M6

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REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: McManus 30050105.0006
Pace Project No.: 92524618

QC Batch: 603157
QC Batch Method: EPA 3010A
Analysis Method: EPA 6020B
Analysis Description: 6020 MET Dissolved
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524618001, 92524618002, 92524618003

METHOD BLANK: 3177984 Matrix: Water
Associated Lab Samples: 92524618001, 92524618002, 92524618003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Arsenic, Dissolved	mg/L	ND	0.0010	0.000087	03/01/21 14:17	
Boron, Dissolved	mg/L	ND	0.050	0.0085	03/01/21 14:17	

LABORATORY CONTROL SAMPLE: 3177985

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic, Dissolved	mg/L	0.01	0.0096	96	80-120	
Boron, Dissolved	mg/L	0.05	0.044J	89	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3177986 3177987

Parameter	Units	92524617001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic, Dissolved	mg/L	ND	0.01	0.01	0.012J	0.010J	62	49	75-125		20	M6
Boron, Dissolved	mg/L	1.2J	0.05	0.05	1.1J	1.1J	-179	-141	75-125		20	M6

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REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: McManus 30050105.0006
Pace Project No.: 92524618

QC Batch: 603230 | Analysis Method: SM 2320B-2011
QC Batch Method: SM 2320B-2011 | Analysis Description: 2320B Alkalinity
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524618001, 92524618002, 92524618003

METHOD BLANK: 3178334 Matrix: Water
Associated Lab Samples: 92524618001, 92524618002, 92524618003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	ND	5.0	5.0	03/01/21 16:46	
Alkalinity,Bicarbonate (CaCO3)	mg/L	ND	5.0	5.0	03/01/21 16:46	
Alkalinity,Carbonate (CaCO3)	mg/L	ND	5.0	5.0	03/01/21 16:46	

LABORATORY CONTROL SAMPLE: 3178335

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	50	50.1	100	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3178336 3178337

Parameter	Units	92524425001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	212	50	50	256	258	88	93	80-120	1	25	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3178340 3178341

Parameter	Units	92524458002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	309	50	50	363	360	108	101	80-120	1	25	

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REPORT OF LABORATORY ANALYSIS

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Peachtree Corners, GA 30092
(770)734-4200

QUALITY CONTROL DATA

Project: McManus 30050105.0006
Pace Project No.: 92524618

QC Batch: 603382 | Analysis Method: SM 2540C-2011
QC Batch Method: SM 2540C-2011 | Analysis Description: 2540C Total Dissolved Solids
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524618001, 92524618002, 92524618003

METHOD BLANK: 3179110 Matrix: Water
Associated Lab Samples: 92524618001, 92524618002, 92524618003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	ND	25.0	25.0	03/01/21 19:02	

LABORATORY CONTROL SAMPLE: 3179111

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	251	266	106	90-110	

SAMPLE DUPLICATE: 3179112

Parameter	Units	92524617001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	10700	10600	1	25	

SAMPLE DUPLICATE: 3179113

Parameter	Units	92523800006 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	285	275	4	25	

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REPORT OF LABORATORY ANALYSIS

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(770)734-4200

QUALITY CONTROL DATA

Project: McManus 30050105.0006
Pace Project No.: 92524618

QC Batch: 603512
QC Batch Method: SM 4500-S2D-2011
Analysis Method: SM 4500-S2D-2011
Analysis Description: 4500S2D Sulfide Water
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524618001, 92524618002, 92524618003

METHOD BLANK: 3179455 Matrix: Water
Associated Lab Samples: 92524618001, 92524618002, 92524618003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Sulfide	mg/L	ND	0.10	0.050	03/02/21 15:50	

LABORATORY CONTROL SAMPLE: 3179456

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfide	mg/L	0.5	0.42	84	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3179457 3179458

Parameter	Units	92524530002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfide	mg/L	ND	0.5	0.5	0.52	0.52	104	104	80-120	0	10	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3179459 3179460

Parameter	Units	35614611001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfide	mg/L	0.40	0.5	0.5	0.91	0.91	101	102	80-120	0	10	

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REPORT OF LABORATORY ANALYSIS

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(770)734-4200

QUALITY CONTROL DATA

Project: McManus 30050105.0006
Pace Project No.: 92524618

QC Batch: 603132
QC Batch Method: SM 5210B-2011
Analysis Method: SM 5210B-2011
Analysis Description: 5210B BOD, 5 day
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524618001, 92524618002, 92524618003

METHOD BLANK: 3177918 Matrix: Water
Associated Lab Samples: 92524618001, 92524618002, 92524618003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
BOD, 5 day	mg/L	ND	2.0	2.0	03/05/21 03:03	

LABORATORY CONTROL SAMPLE: 3177920

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
BOD, 5 day	mg/L	198	203	102	84.6-115	

SAMPLE DUPLICATE: 3177921

Parameter	Units	92524407001 Result	Dup Result	RPD	Max RPD	Qualifiers
BOD, 5 day	mg/L	222	210	6	25	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: McManus 30050105.0006
Pace Project No.: 92524618

QC Batch: 603129
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: 92524618001, 92524618002, 92524618003

METHOD BLANK: 3177904 Matrix: Water
Associated Lab Samples: 92524618001, 92524618002, 92524618003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	ND	1.0	0.60	02/27/21 14:48	
Nitrate as N	mg/L	ND	0.10	0.060	02/27/21 14:48	
Nitrite as N	mg/L	ND	0.10	0.050	02/27/21 14:48	
Sulfate	mg/L	ND	1.0	0.50	02/27/21 14:48	

LABORATORY CONTROL SAMPLE: 3177905

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	50	48.7	97	90-110	
Nitrate as N	mg/L	2.5	2.3	94	90-110	
Nitrite as N	mg/L	2.5	2.4	98	90-110	
Sulfate	mg/L	50	49.4	99	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3177906 3177907

Parameter	Units	92524618003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	5630	50	50	5540	5580	-180	-100	90-110	1	10	M6
Nitrate as N	mg/L	ND	2.5	2.5	2.5	2.5	98	99	90-110	1	10	
Nitrite as N	mg/L	ND	2.5	2.5	ND	ND	48	52	90-110		10	D3,M6
Sulfate	mg/L	540	50	50	576	581	72	82	90-110	1	10	M6

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: McManus 30050105.0006
Pace Project No.: 92524618

QC Batch: 603131 | Analysis Method: SM 4500-P E-2011
QC Batch Method: SM 4500-P E-2011 | Analysis Description: SM4500P-E Phosphorus, Ortho
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524618001, 92524618002, 92524618003

METHOD BLANK: 3177914 Matrix: Water
Associated Lab Samples: 92524618001, 92524618002, 92524618003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Orthophosphate as P	mg/L	ND	0.050	0.012	02/27/21 16:06	

LABORATORY CONTROL SAMPLE & LCSD: 3177915 3177916

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Orthophosphate as P	mg/L	0.25	0.25	0.25	99	99	49-145	0	10	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: McManus 30050105.0006
Pace Project No.: 92524618

QC Batch: 603153
QC Batch Method: EPA 9060A
Analysis Method: EPA 9060A
Analysis Description: 9060 TOC, AVL
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524618001, 92524618002, 92524618003

METHOD BLANK: 3177969 Matrix: Water
Associated Lab Samples: 92524618001, 92524618002, 92524618003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mean Total Organic Carbon	mg/L	ND	1.0	0.50	03/02/21 22:12	
Total Organic Carbon	mg/L	ND	1.0	0.50	03/02/21 22:12	
Total Organic Carbon	mg/L	ND	1.0	0.50	03/02/21 22:12	
Total Organic Carbon	mg/L	ND	1.0	0.50	03/02/21 22:12	
Total Organic Carbon	mg/L	ND	1.0	0.50	03/02/21 22:12	

LABORATORY CONTROL SAMPLE: 3177970

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mean Total Organic Carbon	mg/L	25	24.2	97	75-125	
Total Organic Carbon	mg/L	25	24.2	97	75-125	
Total Organic Carbon	mg/L	25	24.9	100	75-125	
Total Organic Carbon	mg/L	25	23.2	93	75-125	
Total Organic Carbon	mg/L	25	24.4	97	75-125	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3177971 3177972

Parameter	Units	92523998001 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/L	264	25	25	285	280	81	60	75-125	2	25	M6
Total Organic Carbon	mg/L	261	25	25	283	278	90	71	75-125	2	25	M6
Total Organic Carbon	mg/L	271	25	25	289	282	71	44	75-125	2	25	M6
Total Organic Carbon	mg/L	258	25	25	280	276	87	74	75-125	1	25	M6
Total Organic Carbon	mg/L	268	25	25	287	282	76	52	75-125	2	25	M6

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3177973 3177974

Parameter	Units	92523918001 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/L	9.3	25	25	34.9	34.8	102	102	75-125	0	25	
Total Organic Carbon	mg/L	9.1	25	25	34.7	34.8	102	103	75-125	0	25	
Total Organic Carbon	mg/L	9.4	25	25	35.0	34.8	102	102	75-125	0	25	
Total Organic Carbon	mg/L	9.4	25	25	35.0	34.5	102	101	75-125	1	25	
Total Organic Carbon	mg/L	9.4	25	25	34.9	35.0	102	103	75-125	0	25	

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REPORT OF LABORATORY ANALYSIS

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

QUALIFIERS

Project: McManus 30050105.0006
Pace Project No.: 92524618

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.
M6	Matrix spike and Matrix spike duplicate recovery not evaluated against control limits due to sample dilution.
R6	The RPD between valid sample dilutions exceeded 30%.

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

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: McManus 30050105.0006
Pace Project No.: 92524618

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
92524618001	**VAP-15-W (15-17)**	EPA 3010A	603201	EPA 6010D	603275
92524618002	**VAP-15-W (20-22)**	EPA 3010A	603201	EPA 6010D	603275
92524618003	**VAP-15-W (26-28)**	EPA 3010A	603201	EPA 6010D	603275
92524618001	**VAP-15-W (15-17)**	EPA 3010A	603568	EPA 6010D	603578
92524618002	**VAP-15-W (20-22)**	EPA 3010A	603568	EPA 6010D	603578
92524618003	**VAP-15-W (26-28)**	EPA 3010A	603568	EPA 6010D	603578
92524618001	**VAP-15-W (15-17)**	EPA 3010A	603195	EPA 6020B	603270
92524618002	**VAP-15-W (20-22)**	EPA 3010A	603195	EPA 6020B	603270
92524618003	**VAP-15-W (26-28)**	EPA 3010A	603195	EPA 6020B	603270
92524618001	**VAP-15-W (15-17)**	EPA 3010A	603157	EPA 6020B	603159
92524618002	**VAP-15-W (20-22)**	EPA 3010A	603157	EPA 6020B	603159
92524618003	**VAP-15-W (26-28)**	EPA 3010A	603157	EPA 6020B	603159
92524618001	**VAP-15-W (15-17)**	SM 2320B-2011	603230		
92524618002	**VAP-15-W (20-22)**	SM 2320B-2011	603230		
92524618003	**VAP-15-W (26-28)**	SM 2320B-2011	603230		
92524618001	**VAP-15-W (15-17)**	SM 2540C-2011	603382		
92524618002	**VAP-15-W (20-22)**	SM 2540C-2011	603382		
92524618003	**VAP-15-W (26-28)**	SM 2540C-2011	603382		
92524618001	**VAP-15-W (15-17)**	SM 4500-S2D-2011	603512		
92524618002	**VAP-15-W (20-22)**	SM 4500-S2D-2011	603512		
92524618003	**VAP-15-W (26-28)**	SM 4500-S2D-2011	603512		
92524618001	**VAP-15-W (15-17)**	SM 5210B-2011	603132	SM 5210B-2011	603133
92524618002	**VAP-15-W (20-22)**	SM 5210B-2011	603132	SM 5210B-2011	603133
92524618003	**VAP-15-W (26-28)**	SM 5210B-2011	603132	SM 5210B-2011	603133
92524618001	**VAP-15-W (15-17)**	EPA 300.0 Rev 2.1 1993	603129		
92524618002	**VAP-15-W (20-22)**	EPA 300.0 Rev 2.1 1993	603129		
92524618003	**VAP-15-W (26-28)**	EPA 300.0 Rev 2.1 1993	603129		
92524618001	**VAP-15-W (15-17)**	SM 4500-P E-2011	603131		
92524618002	**VAP-15-W (20-22)**	SM 4500-P E-2011	603131		
92524618003	**VAP-15-W (26-28)**	SM 4500-P E-2011	603131		
92524618001	**VAP-15-W (15-17)**	EPA 9060A	603153		
92524618002	**VAP-15-W (20-22)**	EPA 9060A	603153		
92524618003	**VAP-15-W (26-28)**	EPA 9060A	603153		

ARCADIS

ID#:

CHAIN OF CUSTODY & LABORATORY ANALYSIS REQUEST FORM

Page ___ of ___

Lab Work Order #

Send Results to:

Contact & Company Name: MATT WEBB ARCADIS

Telephone: 919-415-2294

Address: Ste 350 5420 WADE PARK BLVD

Fax:

City: RALEIGH State: N.C. Zip: 27607

E-mail Address: Matthew.Webb@ARCADIS.com

Project Name/Location (City, State): MCMANUS-BRUNSWICK

Project #: 30050105.00006

Sampler's Printed Name:

Sampler's Signature:

Sample ID	Collection Date	Collection Time	Type (✓) Comp	Type (✓) Grab	Matrix	Preservative	Filtered (✓)	# of Containers	Container Information	TOTAL metals	Dissolved Metals	Alkalinity	Cl, SO4, NO2/NO3	Sulfide NaOH+ZnAcetate	Orthophosphate	KLT	TOC	BOD	TDS
						C	C	E	E	F		G	E	E						
							✓				K									
						1	1	1	1	1		3	1	1						
						3	3	3	3	9		1	2	4						
VAP-15-W (15-17)	2/26/21	14:35		X	W	1	1	1	1	1		1	3	1	1					
VAP-15-W (20-22)	2/26/21	14:45		X	W	1	1	1	1	1		1	3	1	1					
VAP-15-W (26-29)	2/26/21	15:10		X	W	1	1	1	1	1		1	3	1	1					

Keys

Preservation Key:
A. H_2SO_4
B. HCL
C. HNO_3
D. NaOH
E. None
F. Other: NaOH/ZnAcetate
G. Other: H_3PO_4
H. Other: _____

Container Information Key:
1. 40 ml Vial
2. 1 L Amber
3. 250 ml Plastic
4. 500 ml Plastic
5. Encore
6. 2 oz. Glass
7. 4 oz. Glass
8. 8 oz. Glass
9. Other: 125ml
10. Other: _____

Matrix Key:
SO - Soil | SE - Sediment | NL - NAPL/Oil
W - Water | SL - Sludge | SW - Sample Wipe
T - Tissue | A - Air | Other: _____

REMARKS

Special Instructions/Comments: Metals = As, Fe, Mn, Mg, Ca, Na, K, B
Dissolved metals are field filtered
TOTAL/Dissolved As are to be Analyzed on 24 TAT

☐ Special QA/QC Instructions(✓):

Laboratory Information and Receipt		Relinquished By	Received By	Relinquished By	Laboratory Received By
Lab Name: PACE	Cooler Custody Seal (✓) ☑ Intact ☐ Not Intact	Printed Name: Grant Willford	Printed Name: Fedex	Printed Name: A. Rucker	Printed Name:
☑ Cooler packed with ice (✓)		Signature:	Signature:	Signature:	Signature:
Specify Turnaround Requirements:	Sample Receipt:	Firm: ANA	Firm/Courier:	Firm/Courier: PACE/AVL	Firm:
Shipping Tracking #:	Condition/Cooler Temp: 4.4	Date/Time: 2/26/2021/1730	Date/Time: 2/26/2021/1730	Date/Time: 2-27-21 1245	Date/Time:

Distribution: WHITE – Laboratory returns with results YELLOW – Lab copy PINK – Retained by Arcadis

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 [X] Eden [ ] Greenwood [ ] Huntersville [ ] Raleigh [ ] Mechanicsville [ ] Atlanta [ ] Kernersville [ ]

Sample Condition Upon Receipt

Client Name: Arcadis

Project #:

Courier: [ ] Commercial [X] Fed Ex [ ] Pace [ ] UPS [ ] USPS [ ] Other:____ [ ] Client

Custody Seal Present? [X] Yes [ ] No **Seals Intact?** [X] Yes [ ] No

Date/Initials Person Examining Contents: 12/7/21 AR

Packing Material: [ ] Bubble Wrap [X] Bubble Bags [ ] None [ ] Other

Biological Tissue Frozen? [ ] Yes [ ] No [X] N/A

Thermometer: [X] IR Gun ID: 93-T071 **Type of Ice:** [X] Wet [ ] Blue [ ] None

Cooler Temp: 4.4 **Correction Factor:** Add/Subtract (°C) 0

Cooler Temp Corrected (°C): 4.4

Temp should be above freezing to 6°C
[ ] Samples out of temp criteria. Samples on ice, cooling process has begun

USDA Regulated Soil ([X] N/A, water sample)
Did samples originate in a quarantine zone within the United States: CA, NY, or SC (check maps)? [ ] Yes [X] No

Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? [ ] Yes [X] No

				Comments/Discrepancy:
Chain of Custody Present?	[X] Yes	[ ] No	[ ] N/A	1.
Samples Arrived within Hold Time?	[X] Yes	[ ] No	[ ] N/A	2.
Short Hold Time Analysis (<72 hr.)?	[X] Yes	[ ] No	[ ] N/A	3.
Rush Turn Around Time Requested?	[ ] Yes	[X] No	[ ] N/A	4.
Sufficient Volume?	[X] Yes	[ ] No	[ ] N/A	5.
Correct Containers Used?	[X] Yes	[ ] No	[ ] N/A	6.
-Pace Containers Used?	[X] Yes	[ ] No	[ ] N/A	
Containers Intact?	[X] Yes	[ ] No	[ ] N/A	7.
Dissolved analysis: Samples Field Filtered?	[X] Yes	[ ] No	[ ] N/A	8. Dissolved Metals
Sample Labels Match COC?	[X] Yes	[ ] No	[ ] N/A	9.
-Includes Date/Time/ID/Analysis Matrix: WT				
Headspace in VOA Vials (>5-6mm)?	[ ] Yes	[X] No	[ ] N/A	10.
Trip Blank Present?	[ ] Yes	[X] No	[ ] N/A	11.
Trip Blank Custody Seals Present?	[ ] Yes	[X] 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 #

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)	G-M	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		2	1	1		2	1												3					1				
2		2	1	1		2	1												3					1				
3		2	1	1		2	1												3					1				
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 Services, LLC
110 Technology Parkway
Peachtree Corners, GA 30092
(770)734-4200

March 05, 2021

Ms. Lauren Petty
Southern Co. Services
42 Inverness Center Parkway
Birmingham, AL 35242

RE: Project: MCMANUS 30050105.00006
Pace Project No.: 92524458

Dear Ms. Petty:

Enclosed are the analytical results for sample(s) received by the laboratory on February 26, 2021. 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

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: Joju Abraham, Georgia Power-CCR
Kathyrn Farris
Geoffrey Gay, ARCADIS - Atlanta
Margaret Gentile, Arcadis
Kristen Jurinko
Charles Lawson, Arcadis
Bryan Mayeux
Kelley Sharpe, ARCADIS - Atlanta
Maribel Vital

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

CERTIFICATIONS

Project: MCMANUS 30050105.00006
Pace Project No.: 92524458

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

REPORT OF LABORATORY ANALYSIS

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

SAMPLE SUMMARY

Project: MCMANUS 30050105.00006
Pace Project No.: 92524458

Lab ID	Sample ID	Matrix	Date Collected	Date Received
92524458001	**VAP-26-W (8-10)**	Water	02/24/21 16:45	02/26/21 11:10
92524458002	**VAP-26-W (26-28)**	Water	02/25/21 07:05	02/26/21 11:10
92524458003	**VAP-DUP02-W (2-25-21)**	Water	02/25/21 00:00	02/26/21 11:10

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

SAMPLE ANALYTE COUNT

Project: MCMANUS 30050105.00006
Pace Project No.: 92524458

Lab ID	Sample ID	Method	Analysts	Analytes Reported
92524458001	**VAP-26-W (8-10)**	EPA 6010D	DS, KQ	6
		EPA 6010D	KQ, SH1	6
		EPA 6020B	JOR	2
		EPA 6020B	BG2	2
		SM 2320B-2011	ECH	3
		SM 2540C-2011	RED	1
		SM 4500-S2D-2011	NAL	1
		SM 5210B-2011	NFW	1
		EPA 300.0 Rev 2.1 1993	JLH	4
		SM 4500-P E-2011	JP1	1
		EPA 9060A	JLH	5
92524458002	**VAP-26-W (26-28)**	EPA 6010D	KQ	6
		EPA 6010D	KQ	6
		EPA 6020B	JOR	2
		EPA 6020B	BG2	2
		SM 2320B-2011	ECH	3
		SM 2540C-2011	RED	1
		SM 4500-S2D-2011	NAL	1
		SM 5210B-2011	NFW	1
		EPA 300.0 Rev 2.1 1993	JLH	4
		SM 4500-P E-2011	JP1	1
		EPA 9060A	JLH	5
92524458003	**VAP-DUP02-W (2-25-21)**	EPA 6010D	KQ	6
		EPA 6010D	KQ, SH1	6
		EPA 6020B	BG2	2
		EPA 6020B	BG2	2
		SM 2320B-2011	ECH	3
		SM 2540C-2011	RED	1
		SM 4500-S2D-2011	NAL	1
		SM 5210B-2011	NFW	1
		EPA 300.0 Rev 2.1 1993	JLH	4
		SM 4500-P E-2011	JP1	1
		EPA 9060A	JLH	5

PASI-A = Pace Analytical Services - Asheville

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

SUMMARY OF DETECTION

Project: MCMANUS 30050105.00006
Pace Project No.: 92524458

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92524458001	**VAP-26-W (8-10)**					
EPA 6010D	Calcium	222	mg/L	1.0	02/27/21 20:09	
EPA 6010D	Iron	3.0	mg/L	0.50	02/27/21 20:09	
EPA 6010D	Magnesium	671	mg/L	1.0	02/27/21 20:09	
EPA 6010D	Manganese	0.12	mg/L	0.050	02/27/21 20:09	
EPA 6010D	Potassium	175	mg/L	50.0	02/27/21 20:09	
EPA 6010D	Sodium	5140	mg/L	500	03/01/21 20:20	
EPA 6010D	Calcium, Dissolved	218	mg/L	1.0	03/01/21 18:26	
EPA 6010D	Iron, Dissolved	2.5	mg/L	0.050	03/01/21 01:44	
EPA 6010D	Magnesium, Dissolved	654	mg/L	1.0	03/01/21 18:26	
EPA 6010D	Manganese, Dissolved	0.098	mg/L	0.0050	03/01/21 01:44	
EPA 6010D	Potassium, Dissolved	172	mg/L	50.0	03/01/21 18:26	
EPA 6010D	Sodium, Dissolved	4360	mg/L	500	03/02/21 18:01	
EPA 6020B	Boron	1.6J	mg/L	2.5	02/28/21 21:51	D3
EPA 6020B	Boron, Dissolved	1.7J	mg/L	5.0	03/01/21 12:51	
SM 2320B-2011	Alkalinity,Bicarbonate (CaCO3)	96.2	mg/L	5.0	03/01/21 18:41	
SM 2320B-2011	Alkalinity, Total as CaCO3	96.2	mg/L	5.0	03/01/21 18:41	
SM 2540C-2011	Total Dissolved Solids	18500	mg/L	2500	02/26/21 18:19	MW
EPA 300.0 Rev 2.1 1993	Chloride	8740	mg/L	100	02/26/21 14:48	
EPA 300.0 Rev 2.1 1993	Sulfate	1210	mg/L	100	02/26/21 14:48	
SM 4500-P E-2011	Orthophosphate as P	0.44	mg/L	0.25	02/27/21 04:31	H1
EPA 9060A	Total Organic Carbon	6.3	mg/L	1.0	02/28/21 23:42	
EPA 9060A	Total Organic Carbon	6.1	mg/L	1.0	02/28/21 23:42	
EPA 9060A	Total Organic Carbon	6.2	mg/L	1.0	02/28/21 23:42	
EPA 9060A	Total Organic Carbon	6.1	mg/L	1.0	02/28/21 23:42	
EPA 9060A	Mean Total Organic Carbon	6.2	mg/L	1.0	02/28/21 23:42	
92524458002	**VAP-26-W (26-28)**					
EPA 6010D	Calcium	23.5	mg/L	1.0	03/01/21 20:23	
EPA 6010D	Iron	1.6	mg/L	0.50	03/01/21 20:23	
EPA 6010D	Magnesium	68.8	mg/L	1.0	03/01/21 20:23	
EPA 6010D	Manganese	0.043J	mg/L	0.050	03/01/21 20:23	
EPA 6010D	Potassium	68.1	mg/L	50.0	03/01/21 20:23	
EPA 6010D	Sodium	656	mg/L	50.0	03/01/21 20:23	M6
EPA 6010D	Calcium, Dissolved	21.0	mg/L	0.10	03/01/21 00:54	
EPA 6010D	Magnesium, Dissolved	57.3	mg/L	0.10	03/01/21 00:54	
EPA 6010D	Manganese, Dissolved	0.036	mg/L	0.0050	03/01/21 00:54	B
EPA 6010D	Potassium, Dissolved	63.8	mg/L	50.0	03/01/21 17:44	M6
EPA 6010D	Sodium, Dissolved	622	mg/L	50.0	03/01/21 17:44	M6
EPA 6020B	Boron	0.81J	mg/L	2.5	02/28/21 21:56	D3,M6
SM 2320B-2011	Alkalinity,Bicarbonate (CaCO3)	309	mg/L	5.0	03/01/21 18:51	
SM 2320B-2011	Alkalinity, Total as CaCO3	309	mg/L	5.0	03/01/21 18:51	
SM 2540C-2011	Total Dissolved Solids	2330	mg/L	250	02/26/21 18:20	
SM 4500-S2D-2011	Sulfide	36.8	mg/L	5.0	03/02/21 16:37	M6
SM 5210B-2011	BOD, 5 day	25.1	mg/L	2.0	03/04/21 01:43	B2
EPA 300.0 Rev 2.1 1993	Chloride	971	mg/L	100	02/26/21 15:16	M6
EPA 300.0 Rev 2.1 1993	Sulfate	4.8	mg/L	1.0	02/26/21 15:02	
SM 4500-P E-2011	Orthophosphate as P	0.85	mg/L	0.25	02/27/21 04:32	
EPA 9060A	Total Organic Carbon	7.7	mg/L	1.0	03/01/21 00:00	

REPORT OF LABORATORY ANALYSIS

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

SUMMARY OF DETECTION

Project: MCMANUS 30050105.00006
Pace Project No.: 92524458

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92524458002	**VAP-26-W (26-28)**					
EPA 9060A	Total Organic Carbon	7.7	mg/L	1.0	03/01/21 00:00	
EPA 9060A	Total Organic Carbon	7.7	mg/L	1.0	03/01/21 00:00	
EPA 9060A	Total Organic Carbon	7.8	mg/L	1.0	03/01/21 00:00	
EPA 9060A	Mean Total Organic Carbon	7.7	mg/L	1.0	03/01/21 00:00	
92524458003	**VAP-DUP02-W (2-25-21)**					
EPA 6010D	Calcium	23.4	mg/L	1.0	03/01/21 20:43	
EPA 6010D	Iron	2.9	mg/L	0.50	03/01/21 20:43	
EPA 6010D	Magnesium	67.9	mg/L	1.0	03/01/21 20:43	
EPA 6010D	Manganese	0.052	mg/L	0.050	03/01/21 20:43	
EPA 6010D	Potassium	66.8	mg/L	50.0	03/01/21 20:43	
EPA 6010D	Sodium	649	mg/L	50.0	03/01/21 20:43	
EPA 6010D	Calcium, Dissolved	21.4	mg/L	0.10	03/01/21 01:47	
EPA 6010D	Iron, Dissolved	0.24	mg/L	0.050	03/01/21 01:47	
EPA 6010D	Magnesium, Dissolved	59.2	mg/L	0.10	03/01/21 01:47	
EPA 6010D	Manganese, Dissolved	0.031	mg/L	0.0050	03/01/21 01:47	B
EPA 6010D	Potassium, Dissolved	63.8	mg/L	25.0	03/01/21 18:36	
EPA 6010D	Sodium, Dissolved	584	mg/L	500	03/02/21 18:04	
SM 2320B-2011	Alkalinity,Bicarbonate (CaCO3)	327	mg/L	5.0	03/01/21 19:19	
SM 2320B-2011	Alkalinity, Total as CaCO3	327	mg/L	5.0	03/01/21 19:19	
SM 2540C-2011	Total Dissolved Solids	2240	mg/L	250	02/26/21 18:20	
SM 4500-S2D-2011	Sulfide	39.5	mg/L	10.0	03/02/21 16:39	
SM 5210B-2011	BOD, 5 day	25.4	mg/L	2.0	03/04/21 01:44	B2,H2
EPA 300.0 Rev 2.1 1993	Chloride	979	mg/L	100	02/26/21 16:11	
EPA 300.0 Rev 2.1 1993	Sulfate	4.7	mg/L	1.0	02/26/21 15:57	
SM 4500-P E-2011	Orthophosphate as P	0.63	mg/L	0.25	02/27/21 04:31	H1
EPA 9060A	Total Organic Carbon	7.2	mg/L	1.0	03/01/21 18:27	
EPA 9060A	Total Organic Carbon	7.4	mg/L	1.0	03/01/21 18:27	
EPA 9060A	Total Organic Carbon	7.5	mg/L	1.0	03/01/21 18:27	
EPA 9060A	Total Organic Carbon	7.6	mg/L	1.0	03/01/21 18:27	
EPA 9060A	Mean Total Organic Carbon	7.4	mg/L	1.0	03/01/21 18:27	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: MCMANUS 30050105.00006
Pace Project No.: 92524458

Sample: VAP-26-W (8-10) **Lab ID: 92524458001** Collected: 02/24/21 16:45 Received: 02/26/21 11:10 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Calcium	**222**	mg/L	1.0	0.94	10	02/27/21 01:37	02/27/21 20:09	7440-70-2	
Iron	**3.0**	mg/L	0.50	0.42	10	02/27/21 01:37	02/27/21 20:09	7439-89-6	
Magnesium	**671**	mg/L	1.0	0.68	10	02/27/21 01:37	02/27/21 20:09	7439-95-4	
Manganese	**0.12**	mg/L	0.050	0.034	10	02/27/21 01:37	02/27/21 20:09	7439-96-5	
Potassium	**175**	mg/L	50.0	30.4	10	02/27/21 01:37	02/27/21 20:09	7440-09-7	
Sodium	**5140**	mg/L	500	61.1	100	02/27/21 01:37	03/01/21 20:20	7440-23-5	
6010 MET ICP, Dissolved	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Calcium, Dissolved	**218**	mg/L	1.0	0.94	10	02/28/21 16:17	03/01/21 18:26	7440-70-2	
Iron, Dissolved	**2.5**	mg/L	0.050	0.042	1	02/28/21 16:17	03/01/21 01:44	7439-89-6	
Magnesium, Dissolved	**654**	mg/L	1.0	0.68	10	02/28/21 16:17	03/01/21 18:26	7439-95-4	
Manganese, Dissolved	**0.098**	mg/L	0.0050	0.0034	1	02/28/21 16:17	03/01/21 01:44	7439-96-5	
Potassium, Dissolved	**172**	mg/L	50.0	30.4	10	02/28/21 16:17	03/01/21 18:26	7440-09-7	
Sodium, Dissolved	**4360**	mg/L	500	61.1	100	02/28/21 16:17	03/02/21 18:01	7440-23-5	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Arsenic	ND	mg/L	0.010	0.0087	100	02/27/21 01:32	02/28/21 21:51	7440-38-2	D3
Boron	**1.6J**	mg/L	2.5	0.62	100	02/27/21 01:32	02/28/21 21:51	7440-42-8	D3
6020 MET ICPMS, Dissolved	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Arsenic, Dissolved	ND	mg/L	0.10	0.0087	100	02/28/21 16:17	03/01/21 12:51	7440-38-2	D3
Boron, Dissolved	**1.7J**	mg/L	5.0	0.85	100	02/28/21 16:17	03/01/21 12:51	7440-42-8	
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**96.2**	mg/L	5.0	5.0	1		03/01/21 18:41		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		03/01/21 18:41		
Alkalinity, Total as CaCO3	**96.2**	mg/L	5.0	5.0	1		03/01/21 18:41		
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**18500**	mg/L	2500	2500	1		02/26/21 18:19		MW
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	ND	mg/L	0.10	0.050	1		03/02/21 16:29	18496-25-8	
5210B BOD, 5 day	Analytical Method: SM 5210B-2011 Pace Analytical Services - Asheville								
BOD, 5 day	ND	mg/L	2.0	2.0	1	02/27/21 04:40	03/04/21 02:26		B2,H2

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: MCMANUS 30050105.00006
Pace Project No.: 92524458

Sample: VAP-26-W (8-10) **Lab ID: 92524458001** Collected: 02/24/21 16:45 Received: 02/26/21 11:10 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC anions 48hr	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**8740**	mg/L	100	60.0	100		02/26/21 14:48	16887-00-6	
Nitrate as N	ND	mg/L	0.10	0.060	1		02/26/21 14:34	14797-55-8	
Nitrite as N	ND	mg/L	0.10	0.050	1		02/26/21 14:34	14797-65-0	
Sulfate	**1210**	mg/L	100	50.0	100		02/26/21 14:48	14808-79-8	
SM4500P-E, Phosphate, Ortho	Analytical Method: SM 4500-P E-2011 Pace Analytical Services - Asheville								
Orthophosphate as P	**0.44**	mg/L	0.25	0.059	5		02/27/21 04:31		H1
Total Organic Carbon,Asheville	Analytical Method: EPA 9060A Pace Analytical Services - Asheville								
Total Organic Carbon	**6.3**	mg/L	1.0	0.50	1		02/28/21 23:42	7440-44-0	
Total Organic Carbon	**6.1**	mg/L	1.0	0.50	1		02/28/21 23:42	7440-44-0	
Total Organic Carbon	**6.2**	mg/L	1.0	0.50	1		02/28/21 23:42	7440-44-0	
Total Organic Carbon	**6.1**	mg/L	1.0	0.50	1		02/28/21 23:42	7440-44-0	
Mean Total Organic Carbon	**6.2**	mg/L	1.0	0.50	1		02/28/21 23:42	7440-44-0	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: MCMANUS 30050105.00006
Pace Project No.: 92524458

Sample: VAP-26-W (26-28) **Lab ID: 92524458002** Collected: 02/25/21 07:05 Received: 02/26/21 11:10 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Calcium	**23.5**	mg/L	1.0	0.94	10	02/27/21 01:37	03/01/21 20:23	7440-70-2	
Iron	**1.6**	mg/L	0.50	0.42	10	02/27/21 01:37	03/01/21 20:23	7439-89-6	
Magnesium	**68.8**	mg/L	1.0	0.68	10	02/27/21 01:37	03/01/21 20:23	7439-95-4	
Manganese	**0.043J**	mg/L	0.050	0.034	10	02/27/21 01:37	03/01/21 20:23	7439-96-5	
Potassium	**68.1**	mg/L	50.0	30.4	10	02/27/21 01:37	03/01/21 20:23	7440-09-7	
Sodium	**656**	mg/L	50.0	6.1	10	02/27/21 01:37	03/01/21 20:23	7440-23-5	M6
6010 MET ICP, Dissolved	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Calcium, Dissolved	**21.0**	mg/L	0.10	0.094	1	02/28/21 16:17	03/01/21 00:54	7440-70-2	
Iron, Dissolved	ND	mg/L	0.50	0.42	10	02/28/21 16:17	03/01/21 17:44	7439-89-6	M6,R1
Magnesium, Dissolved	**57.3**	mg/L	0.10	0.068	1	02/28/21 16:17	03/01/21 00:54	7439-95-4	
Manganese, Dissolved	**0.036**	mg/L	0.0050	0.0034	1	02/28/21 16:17	03/01/21 00:54	7439-96-5	B
Potassium, Dissolved	**63.8**	mg/L	50.0	30.4	10	02/28/21 16:17	03/01/21 17:44	7440-09-7	M6
Sodium, Dissolved	**622**	mg/L	50.0	6.1	10	02/28/21 16:17	03/01/21 17:44	7440-23-5	M6
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Arsenic	ND	mg/L	0.010	0.0087	100	02/27/21 01:32	02/28/21 21:56	7440-38-2	D3
Boron	**0.81J**	mg/L	2.5	0.62	100	02/27/21 01:32	02/28/21 21:56	7440-42-8	D3,M6
6020 MET ICPMS, Dissolved	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Arsenic, Dissolved	ND	mg/L	0.10	0.0087	100	02/28/21 16:17	03/01/21 12:55	7440-38-2	D3,M6
Boron, Dissolved	ND	mg/L	5.0	0.85	100	02/28/21 16:17	03/01/21 12:55	7440-42-8	D3,M6
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**309**	mg/L	5.0	5.0	1		03/01/21 18:51		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		03/01/21 18:51		
Alkalinity, Total as CaCO3	**309**	mg/L	5.0	5.0	1		03/01/21 18:51		
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**2330**	mg/L	250	250	1		02/26/21 18:20		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	**36.8**	mg/L	5.0	2.5	50		03/02/21 16:37	18496-25-8	M6
5210B BOD, 5 day	Analytical Method: SM 5210B-2011 Pace Analytical Services - Asheville								
BOD, 5 day	**25.1**	mg/L	2.0	2.0	1	02/27/21 04:40	03/04/21 01:43		B2

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: MCMANUS 30050105.00006
Pace Project No.: 92524458

Sample: VAP-26-W (26-28) **Lab ID: 92524458002** Collected: 02/25/21 07:05 Received: 02/26/21 11:10 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC anions 48hr	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**971**	mg/L	100	60.0	100		02/26/21 15:16	16887-00-6	M6
Nitrate as N	ND	mg/L	0.10	0.060	1		02/26/21 15:02	14797-55-8	
Nitrite as N	ND	mg/L	0.10	0.050	1		02/26/21 15:02	14797-65-0	M1
Sulfate	**4.8**	mg/L	1.0	0.50	1		02/26/21 15:02	14808-79-8	
SM4500P-E, Phosphate, Ortho	Analytical Method: SM 4500-P E-2011 Pace Analytical Services - Asheville								
Orthophosphate as P	**0.85**	mg/L	0.25	0.059	5		02/27/21 04:32		
Total Organic Carbon,Asheville	Analytical Method: EPA 9060A Pace Analytical Services - Asheville								
Total Organic Carbon	**7.7**	mg/L	1.0	0.50	1		03/01/21 00:00	7440-44-0	
Total Organic Carbon	**7.7**	mg/L	1.0	0.50	1		03/01/21 00:00	7440-44-0	
Total Organic Carbon	**7.7**	mg/L	1.0	0.50	1		03/01/21 00:00	7440-44-0	
Total Organic Carbon	**7.8**	mg/L	1.0	0.50	1		03/01/21 00:00	7440-44-0	
Mean Total Organic Carbon	**7.7**	mg/L	1.0	0.50	1		03/01/21 00:00	7440-44-0	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: MCMANUS 30050105.00006
Pace Project No.: 92524458

Sample: VAP-DUP02-W (2-25-21) **Lab ID: 92524458003** Collected: 02/25/21 00:00 Received: 02/26/21 11:10 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Calcium	**23.4**	mg/L	1.0	0.94	10	02/27/21 01:37	03/01/21 20:43	7440-70-2	
Iron	**2.9**	mg/L	0.50	0.42	10	02/27/21 01:37	03/01/21 20:43	7439-89-6	
Magnesium	**67.9**	mg/L	1.0	0.68	10	02/27/21 01:37	03/01/21 20:43	7439-95-4	
Manganese	**0.052**	mg/L	0.050	0.034	10	02/27/21 01:37	03/01/21 20:43	7439-96-5	
Potassium	**66.8**	mg/L	50.0	30.4	10	02/27/21 01:37	03/01/21 20:43	7440-09-7	
Sodium	**649**	mg/L	50.0	6.1	10	02/27/21 01:37	03/01/21 20:43	7440-23-5	
6010 MET ICP, Dissolved	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Calcium, Dissolved	**21.4**	mg/L	0.10	0.094	1	02/28/21 16:17	03/01/21 01:47	7440-70-2	
Iron, Dissolved	**0.24**	mg/L	0.050	0.042	1	02/28/21 16:17	03/01/21 01:47	7439-89-6	
Magnesium, Dissolved	**59.2**	mg/L	0.10	0.068	1	02/28/21 16:17	03/01/21 01:47	7439-95-4	
Manganese, Dissolved	**0.031**	mg/L	0.0050	0.0034	1	02/28/21 16:17	03/01/21 01:47	7439-96-5	B
Potassium, Dissolved	**63.8**	mg/L	25.0	15.2	5	02/28/21 16:17	03/01/21 18:36	7440-09-7	
Sodium, Dissolved	**584**	mg/L	500	61.1	100	02/28/21 16:17	03/02/21 18:04	7440-23-5	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Arsenic	ND	mg/L	0.10	0.0087	100	02/27/21 01:32	03/01/21 12:14	7440-38-2	D3
Boron	ND	mg/L	5.0	0.85	100	02/27/21 01:32	03/01/21 12:14	7440-42-8	D3
6020 MET ICPMS, Dissolved	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Arsenic, Dissolved	ND	mg/L	0.10	0.0087	100	02/28/21 16:17	03/01/21 12:59	7440-38-2	D3
Boron, Dissolved	ND	mg/L	5.0	0.85	100	02/28/21 16:17	03/01/21 12:59	7440-42-8	D3
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**327**	mg/L	5.0	5.0	1		03/01/21 19:19		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		03/01/21 19:19		
Alkalinity, Total as CaCO3	**327**	mg/L	5.0	5.0	1		03/01/21 19:19		
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**2240**	mg/L	250	250	1		02/26/21 18:20		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	**39.5**	mg/L	10.0	5.0	100		03/02/21 16:39	18496-25-8	
5210B BOD, 5 day	Analytical Method: SM 5210B-2011 Pace Analytical Services - Asheville								
BOD, 5 day	**25.4**	mg/L	2.0	2.0	1	02/27/21 04:40	03/04/21 01:44		B2,H2

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: MCMANUS 30050105.00006
Pace Project No.: 92524458

Sample: VAP-DUP02-W (2-25-21) **Lab ID: 92524458003** Collected: 02/25/21 00:00 Received: 02/26/21 11:10 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC anions 48hr	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**979**	mg/L	100	60.0	100		02/26/21 16:11	16887-00-6	
Nitrate as N	ND	mg/L	0.10	0.060	1		02/26/21 15:57	14797-55-8	
Nitrite as N	ND	mg/L	0.10	0.050	1		02/26/21 15:57	14797-65-0	
Sulfate	**4.7**	mg/L	1.0	0.50	1		02/26/21 15:57	14808-79-8	
SM4500P-E, Phosphate, Ortho	Analytical Method: SM 4500-P E-2011 Pace Analytical Services - Asheville								
Orthophosphate as P	**0.63**	mg/L	0.25	0.059	5		02/27/21 04:31		H1
Total Organic Carbon,Asheville	Analytical Method: EPA 9060A Pace Analytical Services - Asheville								
Total Organic Carbon	**7.2**	mg/L	1.0	0.50	1		03/01/21 18:27	7440-44-0	
Total Organic Carbon	**7.4**	mg/L	1.0	0.50	1		03/01/21 18:27	7440-44-0	
Total Organic Carbon	**7.5**	mg/L	1.0	0.50	1		03/01/21 18:27	7440-44-0	
Total Organic Carbon	**7.6**	mg/L	1.0	0.50	1		03/01/21 18:27	7440-44-0	
Mean Total Organic Carbon	**7.4**	mg/L	1.0	0.50	1		03/01/21 18:27	7440-44-0	

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

QUALITY CONTROL DATA

Project: MCMANUS 30050105.00006
Pace Project No.: 92524458

QC Batch: 603057
QC Batch Method: EPA 3010A
Analysis Method: EPA 6010D
Analysis Description: 6010 MET
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524458001, 92524458002, 92524458003

METHOD BLANK: 3177656 Matrix: Water
Associated Lab Samples: 92524458001, 92524458002, 92524458003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Calcium	mg/L	ND	0.10	0.094	03/01/21 19:41	
Iron	mg/L	ND	0.050	0.042	03/01/21 19:41	
Magnesium	mg/L	ND	0.10	0.068	03/01/21 19:41	
Manganese	mg/L	ND	0.0050	0.0034	03/01/21 19:41	
Potassium	mg/L	ND	5.0	3.0	03/01/21 19:41	
Sodium	mg/L	ND	5.0	0.61	03/01/21 19:41	

LABORATORY CONTROL SAMPLE: 3177657

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium	mg/L	5	5.1	102	80-120	
Iron	mg/L	5	5.1	102	80-120	
Magnesium	mg/L	5	5.2	105	80-120	
Manganese	mg/L	0.5	0.51	101	80-120	
Potassium	mg/L	5	5.1	102	80-120	
Sodium	mg/L	5	5.1	103	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3177658 3177659

Parameter	Units	92524458002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium	mg/L	23.5	5	5	29.1	28.7	111	104	75-125	1	20	
Iron	mg/L	1.6	5	5	6.7	6.6	103	100	75-125	2	20	
Magnesium	mg/L	68.8	5	5	73.3	74.6	90	116	75-125	2	20	
Manganese	mg/L	0.043J	0.5	0.5	0.55	0.55	102	102	75-125	0	20	
Potassium	mg/L	68.1	5	5	72.8	73.0	93	98	75-125	0	20	
Sodium	mg/L	656	5	5	666	661	196	106	75-125	1	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: MCMANUS 30050105.00006
Pace Project No.: 92524458

QC Batch: 603011
QC Batch Method: EPA 3010A
Analysis Method: EPA 6010D
Analysis Description: 6010 MET Filtered Diss.
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524458001, 92524458002, 92524458003

METHOD BLANK: 3177320 Matrix: Water
Associated Lab Samples: 92524458001, 92524458002, 92524458003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Calcium, Dissolved	mg/L	ND	0.10	0.094	03/02/21 13:07	
Iron, Dissolved	mg/L	ND	0.050	0.042	03/02/21 13:07	
Magnesium, Dissolved	mg/L	ND	0.10	0.068	03/01/21 17:38	
Manganese, Dissolved	mg/L	0.0047J	0.0050	0.0034	03/01/21 17:38	
Potassium, Dissolved	mg/L	ND	5.0	3.0	03/01/21 17:38	
Sodium, Dissolved	mg/L	ND	5.0	0.61	03/01/21 17:38	

LABORATORY CONTROL SAMPLE: 3177321

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium, Dissolved	mg/L	5	4.9	97	80-120	
Iron, Dissolved	mg/L	5	4.9	97	80-120	
Magnesium, Dissolved	mg/L	5	4.9	97	80-120	
Manganese, Dissolved	mg/L	0.5	0.47	94	80-120	
Potassium, Dissolved	mg/L	5	4.8J	95	80-120	
Sodium, Dissolved	mg/L	5	4.8J	97	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3177322 3177323

Parameter	Units	92524458002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium, Dissolved	mg/L	21.0	5	5	25.6	25.2	92	86	75-125	1	20	
Iron, Dissolved	mg/L	ND	5	5	7.3	5.1	141	96	75-125	36	20	M6,R1
Magnesium, Dissolved	mg/L	57.3	5	5	62.9	62.8	111	111	75-125	0	20	
Manganese, Dissolved	mg/L	0.036	0.5	0.5	0.45	0.45	83	82	75-125	1	20	
Potassium, Dissolved	mg/L	63.8	5	5	66.1	67.7	47	78	75-125	2	20	M6
Sodium, Dissolved	mg/L	622	5	5	605	616	-350	-120	75-125	2	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: MCMANUS 30050105.00006
Pace Project No.: 92524458

QC Batch: 603022
QC Batch Method: EPA 3010A
Analysis Method: EPA 6020B
Analysis Description: 6020 MET
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524458001, 92524458002, 92524458003

METHOD BLANK: 3177388 Matrix: Water
Associated Lab Samples: 92524458001, 92524458002, 92524458003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Arsenic	mg/L	ND	0.00010	0.000087	02/28/21 20:38	
Boron	mg/L	ND	0.025	0.0062	02/28/21 20:38	

LABORATORY CONTROL SAMPLE: 3177389

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	0.01	0.010	101	80-120	
Boron	mg/L	0.05	0.050	99	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3177390 3177391

Parameter	Units	92524458002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	mg/L	ND	0.01	0.01	0.0096J	0.010	88	96	75-125		20	
Boron	mg/L	0.81J	0.05	0.05	0.95J	0.83J	277	48	75-125		20	M6

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REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: MCMANUS 30050105.00006
Pace Project No.: 92524458

QC Batch: 603012
QC Batch Method: EPA 3010A
Analysis Method: EPA 6020B
Analysis Description: 6020 MET Dissolved
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524458001, 92524458002, 92524458003

METHOD BLANK: 3177326 Matrix: Water
Associated Lab Samples: 92524458001, 92524458002, 92524458003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Arsenic, Dissolved	mg/L	ND	0.0010	0.000087	03/01/21 11:57	
Boron, Dissolved	mg/L	ND	0.050	0.0085	03/01/21 11:57	

LABORATORY CONTROL SAMPLE: 3177327

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic, Dissolved	mg/L	0.01	0.0096	96	80-120	
Boron, Dissolved	mg/L	0.05	0.045J	89	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3177328 3177329

Parameter	Units	92524458002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic, Dissolved	mg/L	ND	0.01	0.01	ND	0.0094J	73	91	75-125		20	M6
Boron, Dissolved	mg/L	ND	0.05	0.05	ND	ND	-369	-74	75-125		20	M6

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REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: MCMANUS 30050105.00006
Pace Project No.: 92524458

QC Batch: 603230 | Analysis Method: SM 2320B-2011
QC Batch Method: SM 2320B-2011 | Analysis Description: 2320B Alkalinity
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524458001, 92524458002, 92524458003

METHOD BLANK: 3178334 Matrix: Water
Associated Lab Samples: 92524458001, 92524458002, 92524458003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	ND	5.0	5.0	03/01/21 16:46	
Alkalinity,Bicarbonate (CaCO3)	mg/L	ND	5.0	5.0	03/01/21 16:46	
Alkalinity,Carbonate (CaCO3)	mg/L	ND	5.0	5.0	03/01/21 16:46	

LABORATORY CONTROL SAMPLE: 3178335

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	50	50.1	100	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3178336 3178337

Parameter	Units	92524425001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	212	50	50	256	258	88	93	80-120	1	25	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3178340 3178341

Parameter	Units	92524458002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	309	50	50	363	360	108	101	80-120	1	25	

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REPORT OF LABORATORY ANALYSIS

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Peachtree Corners, GA 30092
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QUALITY CONTROL DATA

Project: MCMANUS 30050105.00006
Pace Project No.: 92524458

QC Batch: 603013 | Analysis Method: SM 2540C-2011
QC Batch Method: SM 2540C-2011 | Analysis Description: 2540C Total Dissolved Solids
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524458001, 92524458002, 92524458003

METHOD BLANK: 3177334 Matrix: Water
Associated Lab Samples: 92524458001, 92524458002, 92524458003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	ND	25.0	25.0	02/26/21 18:18	

LABORATORY CONTROL SAMPLE: 3177335

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	250	248	99	90-110	

SAMPLE DUPLICATE: 3177336

Parameter	Units	92524425001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	13900	12500	11	25	

SAMPLE DUPLICATE: 3177597

Parameter	Units	92524458002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	2330	2090	11	25	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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QUALITY CONTROL DATA

Project: MCMANUS 30050105.00006
Pace Project No.: 92524458

QC Batch: 603514 | Analysis Method: SM 4500-S2D-2011
QC Batch Method: SM 4500-S2D-2011 | Analysis Description: 4500S2D Sulfide Water
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524458001, 92524458002, 92524458003

METHOD BLANK: 3179465 Matrix: Water
Associated Lab Samples: 92524458001, 92524458002, 92524458003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Sulfide	mg/L	ND	0.10	0.050	03/02/21 16:23	

LABORATORY CONTROL SAMPLE: 3179466

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfide	mg/L	0.5	0.44	88	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3179467 3179468

Parameter	Units	92524097006 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfide	mg/L	ND	0.5	0.5	0.50	0.50	100	100	80-120	0	10	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3179477 3179478

Parameter	Units	92524458002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfide	mg/L	36.8	0.5	0.5	34.3	34.4	-501	-483	80-120	0	10	M6

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: MCMANUS 30050105.00006
Pace Project No.: 92524458

QC Batch: 603073 — Analysis Method: SM 5210B-2011
QC Batch Method: SM 5210B-2011 — Analysis Description: 5210B BOD, 5 day
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524458001, 92524458002, 92524458003

METHOD BLANK: 3177707 — Matrix: Water
Associated Lab Samples: 92524458001, 92524458002, 92524458003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
BOD, 5 day	mg/L	ND	2.0	2.0	03/04/21 01:07	

LABORATORY CONTROL SAMPLE: 3177709

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
BOD, 5 day	mg/L	198	203	102	84.6-115	

SAMPLE DUPLICATE: 3177710

Parameter	Units	92524430001 Result	Dup Result	RPD	Max RPD	Qualifiers
BOD, 5 day	mg/L	195	189	3	25	

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REPORT OF LABORATORY ANALYSIS

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(770)734-4200

QUALITY CONTROL DATA

Project: MCMANUS 30050105.00006
Pace Project No.: 92524458

QC Batch: 602986
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: 92524458001, 92524458002, 92524458003

METHOD BLANK: 3177123 Matrix: Water
Associated Lab Samples: 92524458001, 92524458002, 92524458003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	ND	1.0	0.60	02/26/21 11:43	
Nitrate as N	mg/L	ND	0.10	0.060	02/26/21 11:43	
Nitrite as N	mg/L	ND	0.10	0.050	02/26/21 11:43	
Sulfate	mg/L	ND	1.0	0.50	02/26/21 11:43	

LABORATORY CONTROL SAMPLE: 3177124

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	50	50.7	101	90-110	
Nitrate as N	mg/L	2.5	2.5	100	90-110	
Nitrite as N	mg/L	2.5	2.6	105	90-110	
Sulfate	mg/L	50	51.9	104	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3177125 3177126

Parameter	Units	92524458002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	971	50	50	1010	1040	86	133	90-110	2	10	M6
Nitrate as N	mg/L	ND	2.5	2.5	2.6	2.6	103	105	90-110	2	10	
Nitrite as N	mg/L	ND	2.5	2.5	ND	ND	0	0	90-110		10	M1
Sulfate	mg/L	4.8	50	50	58.0	59.0	106	108	90-110	2	10	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3177127 3177128

Parameter	Units	92524425004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	2580	50	50	2700	2650	236	141	90-110	2	10	M6
Nitrate as N	mg/L	ND	2.5	2.5	2.6	2.7	104	106	90-110	2	10	
Nitrite as N	mg/L	ND	2.5	2.5	1.6	1.5	65	62	90-110	5	10	M1
Sulfate	mg/L	384	50	50	473	464	177	160	90-110	2	10	M6

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: MCMANUS 30050105.00006
Pace Project No.: 92524458

QC Batch: 603072 | Analysis Method: SM 4500-P E-2011
QC Batch Method: SM 4500-P E-2011 | Analysis Description: SM4500P-E Phosphorus, Ortho
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524458001, 92524458002, 92524458003

METHOD BLANK: 3177701 Matrix: Water
Associated Lab Samples: 92524458001, 92524458002, 92524458003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Orthophosphate as P	mg/L	ND	0.050	0.012	02/27/21 04:29	

LABORATORY CONTROL SAMPLE: 3177702

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Orthophosphate as P	mg/L	0.25	0.26	103	49-145	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3177703 3177704

Parameter	Units	92524458002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Orthophosphate as P	mg/L	0.85	1.2	1.2	2.2	2.2	105	105	90-110	0	10	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3177705 3177706

Parameter	Units	92524425004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Orthophosphate as P	mg/L	0.33	1.2	1.2	1.5	1.5	97	97	90-110	0	10	H1

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
110 Technology Parkway
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(770)734-4200

QUALITY CONTROL DATA

Project: MCMANUS 30050105.00006
Pace Project No.: 92524458

QC Batch: 603152
QC Batch Method: EPA 9060A
Analysis Method: EPA 9060A
Analysis Description: 9060 TOC, AVL
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524458001, 92524458002, 92524458003

METHOD BLANK: 3177963 Matrix: Water
Associated Lab Samples: 92524458001, 92524458002, 92524458003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mean Total Organic Carbon	mg/L	ND	1.0	0.50	02/28/21 18:24	
Total Organic Carbon	mg/L	ND	1.0	0.50	02/28/21 18:24	
Total Organic Carbon	mg/L	ND	1.0	0.50	02/28/21 18:24	
Total Organic Carbon	mg/L	ND	1.0	0.50	02/28/21 18:24	
Total Organic Carbon	mg/L	ND	1.0	0.50	02/28/21 18:24	

LABORATORY CONTROL SAMPLE: 3177964

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mean Total Organic Carbon	mg/L	25	24.1	96	75-125	
Total Organic Carbon	mg/L	25	23.8	95	75-125	
Total Organic Carbon	mg/L	25	24.7	99	75-125	
Total Organic Carbon	mg/L	25	23.7	95	75-125	
Total Organic Carbon	mg/L	25	24.3	97	75-125	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3177965 3177966

Parameter	Units	92523018011 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/L	1.0	25	25	26.0	26.3	100	101	75-125	1	25	
Total Organic Carbon	mg/L	ND	25	25	26.0	26.5	100	102	75-125	2	25	
Total Organic Carbon	mg/L	ND	25	25	26.3	26.5	102	103	75-125	1	25	
Total Organic Carbon	mg/L	1.6	25	25	25.8	25.6	97	96	75-125	1	25	
Total Organic Carbon	mg/L	ND	25	25	26.0	26.5	101	103	75-125	2	25	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3177967 3177968

Parameter	Units	92524458002 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/L	7.7	25	25	32.6	33.1	100	102	75-125	2	25	
Total Organic Carbon	mg/L	7.7	25	25	32.8	33.2	100	102	75-125	1	25	
Total Organic Carbon	mg/L	7.8	25	25	33.1	33.1	101	101	75-125	0	25	
Total Organic Carbon	mg/L	7.7	25	25	31.6	33.0	96	101	75-125	4	25	
Total Organic Carbon	mg/L	7.7	25	25	33.0	33.3	101	103	75-125	1	25	

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REPORT OF LABORATORY ANALYSIS

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(770)734-4200

QUALIFIERS

Project: MCMANUS 30050105.00006
Pace Project No.: 92524458

DEFINITIONS

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

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

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

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

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

S - Surrogate

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

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

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

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

Acid preservation may not be appropriate for 2 Chloroethylvinyl ether.

A separate vial preserved to a pH of 4-5 is recommended in SW846 Chapter 4 for the analysis of Acrolein and Acrylonitrile by EPA Method 8260.

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

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

TNI - The NELAC Institute.

ANALYTE QUALIFIERS

B	Analyte was detected in the associated method blank.
B2	Oxygen usage is less than 2.0 for all dilutions set. The reported value is an estimated less than value and is calculated for the dilution using the most amount of sample.
D3	Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference.
H1	Analysis conducted outside the EPA method holding time.
H2	Extraction or preparation conducted outside EPA method holding time.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
M6	Matrix spike and Matrix spike duplicate recovery not evaluated against control limits due to sample dilution.
MW	Due to matrix interference, achieving a constant weight is not possible.
R1	RPD value was outside control limits.

Pace Analytical Services, LLC
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(770)734-4200

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: MCMANUS 30050105.00006
Pace Project No.: 92524458

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
92524458001	**VAP-26-W (8-10)**	EPA 3010A	603057	EPA 6010D	603096
92524458002	**VAP-26-W (26-28)**	EPA 3010A	603057	EPA 6010D	603096
92524458003	**VAP-DUP02-W (2-25-21)**	EPA 3010A	603057	EPA 6010D	603096
92524458001	**VAP-26-W (8-10)**	EPA 3010A	603011	EPA 6010D	603155
92524458002	**VAP-26-W (26-28)**	EPA 3010A	603011	EPA 6010D	603155
92524458003	**VAP-DUP02-W (2-25-21)**	EPA 3010A	603011	EPA 6010D	603155
92524458001	**VAP-26-W (8-10)**	EPA 3010A	603022	EPA 6020B	603097
92524458002	**VAP-26-W (26-28)**	EPA 3010A	603022	EPA 6020B	603097
92524458003	**VAP-DUP02-W (2-25-21)**	EPA 3010A	603022	EPA 6020B	603097
92524458001	**VAP-26-W (8-10)**	EPA 3010A	603012	EPA 6020B	603156
92524458002	**VAP-26-W (26-28)**	EPA 3010A	603012	EPA 6020B	603156
92524458003	**VAP-DUP02-W (2-25-21)**	EPA 3010A	603012	EPA 6020B	603156
92524458001	**VAP-26-W (8-10)**	SM 2320B-2011	603230		
92524458002	**VAP-26-W (26-28)**	SM 2320B-2011	603230		
92524458003	**VAP-DUP02-W (2-25-21)**	SM 2320B-2011	603230		
92524458001	**VAP-26-W (8-10)**	SM 2540C-2011	603013		
92524458002	**VAP-26-W (26-28)**	SM 2540C-2011	603013		
92524458003	**VAP-DUP02-W (2-25-21)**	SM 2540C-2011	603013		
92524458001	**VAP-26-W (8-10)**	SM 4500-S2D-2011	603514		
92524458002	**VAP-26-W (26-28)**	SM 4500-S2D-2011	603514		
92524458003	**VAP-DUP02-W (2-25-21)**	SM 4500-S2D-2011	603514		
92524458001	**VAP-26-W (8-10)**	SM 5210B-2011	603073	SM 5210B-2011	603106
92524458002	**VAP-26-W (26-28)**	SM 5210B-2011	603073	SM 5210B-2011	603106
92524458003	**VAP-DUP02-W (2-25-21)**	SM 5210B-2011	603073	SM 5210B-2011	603106
92524458001	**VAP-26-W (8-10)**	EPA 300.0 Rev 2.1 1993	602986		
92524458002	**VAP-26-W (26-28)**	EPA 300.0 Rev 2.1 1993	602986		
92524458003	**VAP-DUP02-W (2-25-21)**	EPA 300.0 Rev 2.1 1993	602986		
92524458001	**VAP-26-W (8-10)**	SM 4500-P E-2011	603072		
92524458002	**VAP-26-W (26-28)**	SM 4500-P E-2011	603072		
92524458003	**VAP-DUP02-W (2-25-21)**	SM 4500-P E-2011	603072		
92524458001	**VAP-26-W (8-10)**	EPA 9060A	603152		
92524458002	**VAP-26-W (26-28)**	EPA 9060A	603152		
92524458003	**VAP-DUP02-W (2-25-21)**	EPA 9060A	603152		

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: Arcadis

Project #: WO# : 92524458

92524458

Courier: ☐ Commercial ☐ Fed Ex ☐ Pace ☐ UPS ☐ USPS ☐ Other:____ ☐ Client

Custody Seal Present? ☑ Yes ☐ No Seals Intact? ☑ Yes ☐ No

Date/Initials Person Examining Contents: DH 2-26-21

Packing Material: ☐ Bubble Wrap ☑ Bubble Bags ☐ None ☐ Other

Biological Tissue Frozen? ☐ Yes ☐ No ☑ N/A

Thermometer: ☑ IR Gun ID: 93T071

Type of Ice: ☑ Wet ☐ Blue ☐ None

Cooler Temp: 1.6 Correction Factor: Add/Subtract (°C) 0

Cooler Temp Corrected (°C): 1.6

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: 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, Collform, TOC, Oil and Grease, DRO/8015 (water) DOC, LLHg

**Bottom half of box is to list number of bottles

Project # **WO# : 92524458**

PM: KLH1 Due Date: 03/01/21

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)	GN	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		2	1	1		2	1												3					1				
2																													
3		2	1	1		2	1												3					1				
4		2	1	1		2	1												3					1				
5		2	1	1		2	1												3					1				
6																													
7																													
8																													
9																													
10																													
11																													
12																													

pH Adjustment Log for Preserved Samples

Sample ID	Type of Preservative	pH upon receipt	Date preservation adjusted	Time preservation adjusted	Amount of Preservative added	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.

ARCADIS

ID#:

CHAIN OF CUSTODY & LABORATORY ANALYSIS REQUEST FORM

Page 1 of 1

Lab Work Order #: 92544

Send Results to:

Contact & Company Name: MATT WEBB ARCADIS

Address: Ste 350 5420 WADE PARK BLVD

City: RALEIGH State: NC Zip: 27607

Telephone: 919-415-2294

Fax:

E-mail Address: Mathew.Webb@Arcadis.com

Project Name/Location (City, State): McMANUS PLANT-BRUNSWICK

Project #: 30050105.00006

Sampler's Printed Name:

Sampler's Signature:

Sample ID	Collection Date	Collection Time	Type (✓) Comp	Type (✓) Grab	Matrix	TOTAL Metals	Dissolved Metals	Alkalinity	$Cl, SO_4, NO_2/NO_3$	Sulfide NaOH/ZnAcetate	Orthophosphate	TOC	BOD	TDS	REMARKS
VAP-26-W(8-10)	2/24/2021	16:45		X	W	1	1	1	1	1	1	3	1	1	
VAP-26-W(26-28)	2/25/21	7:03		X	W	1	1	1	1	1	1	3	1	1	
VAP-DUP02-W(2-25-21)	2/25/21			X	W	1	1	1	1	1	1	3	1	1	
VAP-26-W(2-25-21)MS/MSD	2/25/21	7:55		X	W	1	1	1	1	1	1	3	1	1	VAP-26-W(26-28) MS/MSD

Preservative	E	E	E	E	XF		G	E	E
Filtered (✓)		✓							
# of Containers	1	1	1	1	1	DIETHYL KIT	3	1	1
Container Information	3	3	3	3	9		13	2	4

PARAMETER ANALYSIS & METHOD

Keys

Preservation Key: A. H_2SO_4 B. HCL C. HNO_3 D. NaOH E. None F. Other: NaOH/ZnAc G. Other: H_3PO_4 H. Other:

Container Information Key: 1. 40 ml Vial 2. 1 L Amber 3. 250 ml Plastic 4. 500 ml Plastic 5. Encore 6. 2 oz. Glass 7. 4 oz. Glass 8. 8 oz. Glass 9. Other: 125 ml 10. Other:

Matrix Key: SO - Soil SE - Sediment NL - NAPL/Oil W - Water SC - Sludge SW - Sample Wipe T - Tissue A - Air Other:

Special Instructions/Comments: METALS = As, Fe, Mn, Mg, Ca, Na, K, B
Dissolved metals are field filtered
* TOTAL AND DISSOLVED As ARE to be ANALYZED in 24 hour TAT

☐ Special QA/QC Instructions(✓):

Laboratory Information and Receipt

Lab Name: PACE

Cooler packed with ice (✓)

Specify Turnaround Requirements: STAT

Shipping Tracking #:

Cooler Custody Seal (✓): ☒ Intact ☐ Not Intact

Sample Receipt:

Condition/Cooler Temp: 1.6

Relinquished By	Received By	Relinquished By	Laboratory Received By
Printed Name: Grant Ashworth	Printed Name: FedEx	Printed Name:	Printed Name: Daniel Hudson
Signature:	Signature:	Signature:	Signature:
Firm: ANA	Firm/Courier:	Firm/Courier:	Firm: Pace
Date/Time: 2/25/2021 1730	Date/Time: 2/25/2021 1730	Date/Time:	Date/Time: 2-26-21 11:10

20730826 CofC AR Form 08.27.2015

Distribution: WHITE – Laboratory returns with results YELLOW – Lab copy PINK – Retained by Arcadis

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

March 10, 2021

Ms. Lauren Petty
Southern Co. Services
42 Inverness Center Parkway
Birmingham, AL 35242

RE: Project: MCMANUS 30050105.00006
Pace Project No.: 92524429

Dear Ms. Petty:

Enclosed are the analytical results for sample(s) received by the laboratory on February 26, 2021. 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

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: Joju Abraham, Georgia Power-CCR
Kathryn Farris
Geoffrey Gay, ARCADIS - Atlanta
Margaret Gentile, Arcadis
Kristen Jurinko
Charles Lawson, Arcadis
Bryan Mayeux
Kelley Sharpe, ARCADIS - Atlanta
Maribel Vital

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

CERTIFICATIONS

Project: MCMANUS 30050105.00006
Pace Project No.: 92524429

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

REPORT OF LABORATORY ANALYSIS

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

SAMPLE SUMMARY

Project: MCMANUS 30050105.00006
Pace Project No.: 92524429

Lab ID	Sample ID	Matrix	Date Collected	Date Received
92524429001	**VAP-26-W (34-36)**	Water	02/25/21 08:10	02/26/21 11:10
92524429002	**VAP-26-W (11-13)**	Water	02/25/21 10:30	02/26/21 11:10
92524429003	**VAP-32-W (5-10)**	Water	02/25/21 11:17	02/26/21 11:10
92524429004	**VAP-32-W (28-30)**	Water	02/25/21 12:03	02/26/21 11:10

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

SAMPLE ANALYTE COUNT

Project: MCMANUS 30050105.00006
Pace Project No.: 92524429

Lab ID	Sample ID	Method	Analysts	Analytes Reported
92524429001	**VAP-26-W (34-36)**	EPA 6010D	DS, KQ	6
		EPA 6010D	KQ	6
		EPA 6020B	JOR	2
		EPA 6020B	BG2	2
		SM 2320B-2011	ECH	3
		SM 2540C-2011	RED	1
		SM 4500-S2D-2011	NAL	1
		SM 5210B-2011	NFW	1
		EPA 300.0 Rev 2.1 1993	JLH	4
		SM 4500-P E-2011	JP1	1
		EPA 9060A	JLH	5
92524429002	**VAP-26-W (11-13)**	EPA 6010D	DS, KQ	6
		EPA 6010D	KQ, SH1	6
		EPA 6020B	JOR	2
		EPA 6020B	BG2	2
		SM 2320B-2011	ECH	3
		SM 2540C-2011	RED	1
		SM 4500-S2D-2011	NAL	1
		SM 5210B-2011	NFW	1
		EPA 300.0 Rev 2.1 1993	JLH	4
		SM 4500-P E-2011	JP1	1
		EPA 9060A	JLH	5
92524429003	**VAP-32-W (5-10)**	EPA 6010D	DS, KQ	6
		EPA 6010D	KQ	6
		EPA 6020B	JOR	2
		EPA 6020B	BG2	2
		SM 2320B-2011	ECH	3
		SM 2540C-2011	RED	1
		SM 4500-S2D-2011	NAL	1
		SM 5210B-2011	NFW	1
		EPA 300.0 Rev 2.1 1993	JLH	4
		SM 4500-P E-2011	JP1	1
		EPA 9060A	JLH	5
92524429004	**VAP-32-W (28-30)**	EPA 6010D	DS, KQ	6
		EPA 6010D	KQ, SH1	6
		EPA 6020B	JOR	2
		EPA 6020B	BG2	2

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

SAMPLE ANALYTE COUNT

Project: MCMANUS 30050105.00006
Pace Project No.: 92524429

Lab ID	Sample ID	Method	Analysts	Analytes Reported
		SM 2320B-2011	ECH	3
		SM 2540C-2011	RED	1
		SM 4500-S2D-2011	NAL	1
		SM 5210B-2011	NFW	1
		EPA 300.0 Rev 2.1 1993	JLH	4
		SM 4500-P E-2011	JP1	1
		EPA 9060A	JLH	5

PASI-A = Pace Analytical Services - Asheville

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

SUMMARY OF DETECTION

Project: MCMANUS 30050105.00006
Pace Project No.: 92524429

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92524429001	**VAP-26-W (34-36)**					
EPA 6010D	Calcium	103	mg/L	1.0	02/27/21 19:49	
EPA 6010D	Iron	5.0	mg/L	0.50	02/27/21 19:49	
EPA 6010D	Magnesium	190	mg/L	1.0	02/27/21 19:49	
EPA 6010D	Manganese	0.083	mg/L	0.050	02/27/21 19:49	
EPA 6010D	Potassium	82.0	mg/L	50.0	02/27/21 19:49	
EPA 6010D	Sodium	1830	mg/L	500	03/01/21 20:07	
EPA 6010D	Calcium, Dissolved	94.2	mg/L	0.10	03/01/21 01:17	
EPA 6010D	Iron, Dissolved	1.2J	mg/L	1.2	03/01/21 18:13	
EPA 6010D	Magnesium, Dissolved	192	mg/L	2.5	03/01/21 18:13	
EPA 6010D	Manganese, Dissolved	0.049	mg/L	0.0050	03/01/21 01:17	
EPA 6010D	Potassium, Dissolved	80.3J	mg/L	125	03/01/21 18:13	
EPA 6010D	Sodium, Dissolved	1780	mg/L	125	03/01/21 18:13	
EPA 6020B	Boron	1.2J	mg/L	2.5	02/28/21 21:21	D3
EPA 6020B	Boron, Dissolved	1.2J	mg/L	5.0	03/01/21 12:26	
SM 2320B-2011	Alkalinity,Bicarbonate (CaCO3)	326	mg/L	5.0	03/01/21 17:54	
SM 2320B-2011	Alkalinity, Total as CaCO3	326	mg/L	5.0	03/01/21 17:54	
SM 2540C-2011	Total Dissolved Solids	6670	mg/L	833	02/26/21 18:19	
SM 4500-S2D-2011	Sulfide	1.8	mg/L	1.0	03/02/21 17:41	
EPA 300.0 Rev 2.1 1993	Chloride	2940	mg/L	100	02/26/21 17:34	
EPA 300.0 Rev 2.1 1993	Sulfate	329	mg/L	100	02/26/21 17:34	
SM 4500-P E-2011	Orthophosphate as P	0.30	mg/L	0.25	02/27/21 04:33	
EPA 9060A	Total Organic Carbon	4.7	mg/L	1.0	02/28/21 22:30	
EPA 9060A	Total Organic Carbon	4.5	mg/L	1.0	02/28/21 22:30	
EPA 9060A	Total Organic Carbon	4.5	mg/L	1.0	02/28/21 22:30	
EPA 9060A	Total Organic Carbon	4.5	mg/L	1.0	02/28/21 22:30	
EPA 9060A	Mean Total Organic Carbon	4.5	mg/L	1.0	02/28/21 22:30	
92524429002	**VAP-26-W (11-13)**					
EPA 6010D	Calcium	139	mg/L	1.0	02/27/21 19:52	
EPA 6010D	Iron	0.12	mg/L	0.050	03/08/21 23:45	
EPA 6010D	Magnesium	386	mg/L	1.0	02/27/21 19:52	
EPA 6010D	Manganese	0.15	mg/L	0.050	02/27/21 19:52	
EPA 6010D	Potassium	136	mg/L	50.0	02/27/21 19:52	
EPA 6010D	Sodium	3010	mg/L	250	03/01/21 20:10	
EPA 6010D	Calcium, Dissolved	133	mg/L	5.0	03/01/21 18:16	
EPA 6010D	Iron, Dissolved	4.2	mg/L	0.50	03/09/21 17:48	
EPA 6010D	Magnesium, Dissolved	373	mg/L	5.0	03/01/21 18:16	
EPA 6010D	Manganese, Dissolved	0.13	mg/L	0.0050	03/01/21 01:21	
EPA 6010D	Sodium, Dissolved	2770	mg/L	250	03/01/21 18:16	
EPA 6020B	Boron	1.4J	mg/L	2.5	02/28/21 21:25	D3
EPA 6020B	Boron, Dissolved	1.6J	mg/L	5.0	03/01/21 12:38	
SM 2320B-2011	Alkalinity,Bicarbonate (CaCO3)	434	mg/L	5.0	03/01/21 18:03	
SM 2320B-2011	Alkalinity, Total as CaCO3	434	mg/L	5.0	03/01/21 18:03	
SM 2540C-2011	Total Dissolved Solids	11000	mg/L	1250	02/26/21 18:19	MW
SM 4500-S2D-2011	Sulfide	54.5	mg/L	10.0	03/02/21 16:35	
SM 5210B-2011	BOD, 5 day	100	mg/L	2.0	03/04/21 01:36	B2
EPA 300.0 Rev 2.1 1993	Chloride	5330	mg/L	100	02/26/21 18:02	
EPA 300.0 Rev 2.1 1993	Sulfate	194	mg/L	100	02/26/21 18:02	

REPORT OF LABORATORY ANALYSIS

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

SUMMARY OF DETECTION

Project: MCMANUS 30050105.00006
Pace Project No.: 92524429

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92524429002	**VAP-26-W (11-13)**					
SM 4500-P E-2011	Orthophosphate as P	1.6	mg/L	0.25	02/27/21 04:34	
EPA 9060A	Total Organic Carbon	18.0	mg/L	1.0	02/28/21 22:48	
EPA 9060A	Total Organic Carbon	18.4	mg/L	1.0	02/28/21 22:48	
EPA 9060A	Total Organic Carbon	18.8	mg/L	1.0	02/28/21 22:48	
EPA 9060A	Total Organic Carbon	18.8	mg/L	1.0	02/28/21 22:48	
EPA 9060A	Mean Total Organic Carbon	18.5	mg/L	1.0	02/28/21 22:48	
92524429003	**VAP-32-W (5-10)**					
EPA 6010D	Calcium	170	mg/L	1.0	02/27/21 19:56	
EPA 6010D	Iron	1.5	mg/L	0.50	02/27/21 19:56	
EPA 6010D	Magnesium	495	mg/L	1.0	02/27/21 19:56	
EPA 6010D	Manganese	0.059	mg/L	0.050	02/27/21 19:56	
EPA 6010D	Potassium	142	mg/L	50.0	02/27/21 19:56	
EPA 6010D	Sodium	4050	mg/L	250	03/01/21 20:13	
EPA 6010D	Calcium, Dissolved	162	mg/L	5.0	03/01/21 18:20	
EPA 6010D	Iron, Dissolved	12.6	mg/L	2.5	03/01/21 18:20	
EPA 6010D	Magnesium, Dissolved	469	mg/L	5.0	03/01/21 18:20	
EPA 6010D	Manganese, Dissolved	0.052	mg/L	0.0050	03/01/21 01:24	
EPA 6010D	Sodium, Dissolved	3720	mg/L	250	03/01/21 18:20	
EPA 6020B	Boron	1.4J	mg/L	2.5	02/28/21 21:30	D3
EPA 6020B	Boron, Dissolved	1.7J	mg/L	5.0	03/01/21 12:42	
SM 2320B-2011	Alkalinity,Bicarbonate (CaCO3)	133	mg/L	5.0	03/01/21 18:21	
SM 2320B-2011	Alkalinity, Total as CaCO3	133	mg/L	5.0	03/01/21 18:21	
SM 2540C-2011	Total Dissolved Solids	16900	mg/L	2500	02/26/21 18:19	
SM 4500-S2D-2011	Sulfide	0.11	mg/L	0.10	03/02/21 16:35	
EPA 300.0 Rev 2.1 1993	Chloride	6730	mg/L	100	02/26/21 18:29	
EPA 300.0 Rev 2.1 1993	Sulfate	920	mg/L	100	02/26/21 18:29	
SM 4500-P E-2011	Orthophosphate as P	0.20	mg/L	0.050	02/27/21 04:35	
EPA 9060A	Total Organic Carbon	7.0	mg/L	1.0	02/28/21 23:06	
EPA 9060A	Total Organic Carbon	6.8	mg/L	1.0	02/28/21 23:06	
EPA 9060A	Total Organic Carbon	6.9	mg/L	1.0	02/28/21 23:06	
EPA 9060A	Total Organic Carbon	6.8	mg/L	1.0	02/28/21 23:06	
EPA 9060A	Mean Total Organic Carbon	6.9	mg/L	1.0	02/28/21 23:06	
92524429004	**VAP-32-W (28-30)**					
EPA 6010D	Calcium	271	mg/L	1.0	02/27/21 19:59	
EPA 6010D	Iron	7.4	mg/L	0.50	02/27/21 19:59	
EPA 6010D	Magnesium	594	mg/L	1.0	02/27/21 19:59	
EPA 6010D	Manganese	0.39	mg/L	0.050	02/27/21 19:59	
EPA 6010D	Potassium	183	mg/L	50.0	02/27/21 19:59	
EPA 6010D	Sodium	4960	mg/L	500	03/01/21 20:17	
EPA 6010D	Calcium, Dissolved	235	mg/L	1.0	03/01/21 18:23	
EPA 6010D	Iron, Dissolved	0.21	mg/L	0.050	03/01/21 01:40	
EPA 6010D	Magnesium, Dissolved	522	mg/L	1.0	03/01/21 18:23	
EPA 6010D	Manganese, Dissolved	0.26	mg/L	0.0050	03/01/21 01:40	
EPA 6010D	Potassium, Dissolved	168	mg/L	50.0	03/01/21 18:23	
EPA 6010D	Sodium, Dissolved	4650	mg/L	500	03/02/21 17:58	
EPA 6020B	Arsenic	0.031	mg/L	0.010	02/28/21 21:47	D3

REPORT OF LABORATORY ANALYSIS

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

SUMMARY OF DETECTION

Project: MCMANUS 30050105.00006
Pace Project No.: 92524429

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92524429004	**VAP-32-W (28-30)**					
EPA 6020B	Boron	1.9J	mg/L	2.5	02/28/21 21:47	D3
EPA 6020B	Arsenic, Dissolved	0.011J	mg/L	0.10	03/01/21 12:47	
EPA 6020B	Boron, Dissolved	2.2J	mg/L	5.0	03/01/21 12:47	
SM 2320B-2011	Alkalinity,Bicarbonate (CaCO3)	481	mg/L	5.0	03/01/21 18:30	
SM 2320B-2011	Alkalinity, Total as CaCO3	481	mg/L	5.0	03/01/21 18:30	
SM 2540C-2011	Total Dissolved Solids	22000	mg/L	2500	02/26/21 18:19	
SM 4500-S2D-2011	Sulfide	29.8	mg/L	5.0	03/02/21 17:42	
EPA 300.0 Rev 2.1 1993	Chloride	8680	mg/L	100	02/26/21 18:57	
EPA 300.0 Rev 2.1 1993	Sulfate	1120	mg/L	100	02/26/21 18:57	
SM 4500-P E-2011	Orthophosphate as P	0.77	mg/L	0.25	02/27/21 04:35	
EPA 9060A	Total Organic Carbon	7.4	mg/L	1.0	02/28/21 23:24	
EPA 9060A	Total Organic Carbon	7.6	mg/L	1.0	02/28/21 23:24	
EPA 9060A	Total Organic Carbon	7.5	mg/L	1.0	02/28/21 23:24	
EPA 9060A	Total Organic Carbon	7.5	mg/L	1.0	02/28/21 23:24	
EPA 9060A	Mean Total Organic Carbon	7.5	mg/L	1.0	02/28/21 23:24	

Pace Analytical Services, LLC
110 Technology Parkway
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ANALYTICAL RESULTS

Project: MCMANUS 30050105.00006
Pace Project No.: 92524429

Sample: VAP-26-W (34-36) **Lab ID: 92524429001** Collected: 02/25/21 08:10 Received: 02/26/21 11:10 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Calcium	**103**	mg/L	1.0	0.94	10	02/27/21 01:37	02/27/21 19:49	7440-70-2	
Iron	**5.0**	mg/L	0.50	0.42	10	02/27/21 01:37	02/27/21 19:49	7439-89-6	
Magnesium	**190**	mg/L	1.0	0.68	10	02/27/21 01:37	02/27/21 19:49	7439-95-4	
Manganese	**0.083**	mg/L	0.050	0.034	10	02/27/21 01:37	02/27/21 19:49	7439-96-5	
Potassium	**82.0**	mg/L	50.0	30.4	10	02/27/21 01:37	02/27/21 19:49	7440-09-7	
Sodium	**1830**	mg/L	500	61.1	100	02/27/21 01:37	03/01/21 20:07	7440-23-5	
6010 MET ICP, Dissolved	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Calcium, Dissolved	**94.2**	mg/L	0.10	0.094	1	02/28/21 16:17	03/01/21 01:17	7440-70-2	
Iron, Dissolved	**1.2J**	mg/L	1.2	1.0	25	02/28/21 16:17	03/01/21 18:13	7439-89-6	
Magnesium, Dissolved	**192**	mg/L	2.5	1.7	25	02/28/21 16:17	03/01/21 18:13	7439-95-4	
Manganese, Dissolved	**0.049**	mg/L	0.0050	0.0034	1	02/28/21 16:17	03/01/21 01:17	7439-96-5	
Potassium, Dissolved	**80.3J**	mg/L	125	76.0	25	02/28/21 16:17	03/01/21 18:13	7440-09-7	
Sodium, Dissolved	**1780**	mg/L	125	15.3	25	02/28/21 16:17	03/01/21 18:13	7440-23-5	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Arsenic	ND	mg/L	0.010	0.0087	100	02/27/21 01:32	02/28/21 21:21	7440-38-2	D3
Boron	**1.2J**	mg/L	2.5	0.62	100	02/27/21 01:32	02/28/21 21:21	7440-42-8	D3
6020 MET ICPMS, Dissolved	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Arsenic, Dissolved	ND	mg/L	0.10	0.0087	100	02/28/21 16:17	03/01/21 12:26	7440-38-2	D3
Boron, Dissolved	**1.2J**	mg/L	5.0	0.85	100	02/28/21 16:17	03/01/21 12:26	7440-42-8	
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**326**	mg/L	5.0	5.0	1		03/01/21 17:54		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		03/01/21 17:54		
Alkalinity, Total as CaCO3	**326**	mg/L	5.0	5.0	1		03/01/21 17:54		
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**6670**	mg/L	833	833	1		02/26/21 18:19		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	**1.8**	mg/L	1.0	0.50	10		03/02/21 17:41	18496-25-8	
5210B BOD, 5 day	Analytical Method: SM 5210B-2011 Pace Analytical Services - Asheville								
BOD, 5 day	ND	mg/L	2.0	2.0	1	02/27/21 04:40	03/04/21 01:34		B2

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
110 Technology Parkway
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(770)734-4200

ANALYTICAL RESULTS

Project: MCMANUS 30050105.00006
Pace Project No.: 92524429

Sample: VAP-26-W (34-36) **Lab ID: 92524429001** Collected: 02/25/21 08:10 Received: 02/26/21 11:10 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC anions 48hr	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**2940**	mg/L	100	60.0	100		02/26/21 17:34	16887-00-6	
Nitrate as N	ND	mg/L	0.10	0.060	1		02/26/21 17:20	14797-55-8	
Nitrite as N	ND	mg/L	0.10	0.050	1		02/26/21 17:20	14797-65-0	
Sulfate	**329**	mg/L	100	50.0	100		02/26/21 17:34	14808-79-8	
SM4500P-E, Phosphate, Ortho	Analytical Method: SM 4500-P E-2011 Pace Analytical Services - Asheville								
Orthophosphate as P	**0.30**	mg/L	0.25	0.059	5		02/27/21 04:33		
Total Organic Carbon,Asheville	Analytical Method: EPA 9060A Pace Analytical Services - Asheville								
Total Organic Carbon	**4.7**	mg/L	1.0	0.50	1		02/28/21 22:30	7440-44-0	
Total Organic Carbon	**4.5**	mg/L	1.0	0.50	1		02/28/21 22:30	7440-44-0	
Total Organic Carbon	**4.5**	mg/L	1.0	0.50	1		02/28/21 22:30	7440-44-0	
Total Organic Carbon	**4.5**	mg/L	1.0	0.50	1		02/28/21 22:30	7440-44-0	
Mean Total Organic Carbon	**4.5**	mg/L	1.0	0.50	1		02/28/21 22:30	7440-44-0	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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ANALYTICAL RESULTS

Project: MCMANUS 30050105.00006
Pace Project No.: 92524429

Sample: VAP-26-W (11-13) **Lab ID: 92524429002** Collected: 02/25/21 10:30 Received: 02/26/21 11:10 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Calcium	**139**	mg/L	1.0	0.94	10	02/27/21 01:37	02/27/21 19:52	7440-70-2	
Iron	**0.12**	mg/L	0.050	0.042	1	03/06/21 02:07	03/08/21 23:45	7439-89-6	
Magnesium	**386**	mg/L	1.0	0.68	10	02/27/21 01:37	02/27/21 19:52	7439-95-4	
Manganese	**0.15**	mg/L	0.050	0.034	10	02/27/21 01:37	02/27/21 19:52	7439-96-5	
Potassium	**136**	mg/L	50.0	30.4	10	02/27/21 01:37	02/27/21 19:52	7440-09-7	
Sodium	**3010**	mg/L	250	30.5	50	02/27/21 01:37	03/01/21 20:10	7440-23-5	
6010 MET ICP, Dissolved	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Calcium, Dissolved	**133**	mg/L	5.0	4.7	50	02/28/21 16:17	03/01/21 18:16	7440-70-2	
Iron, Dissolved	**4.2**	mg/L	0.50	0.42	10	03/09/21 10:30	03/09/21 17:48	7439-89-6	
Magnesium, Dissolved	**373**	mg/L	5.0	3.4	50	02/28/21 16:17	03/01/21 18:16	7439-95-4	
Manganese, Dissolved	**0.13**	mg/L	0.0050	0.0034	1	02/28/21 16:17	03/01/21 01:21	7439-96-5	
Potassium, Dissolved	ND	mg/L	250	152	50	02/28/21 16:17	03/01/21 18:16	7440-09-7	
Sodium, Dissolved	**2770**	mg/L	250	30.5	50	02/28/21 16:17	03/01/21 18:16	7440-23-5	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Arsenic	ND	mg/L	0.010	0.0087	100	02/27/21 01:32	02/28/21 21:25	7440-38-2	D3
Boron	**1.4J**	mg/L	2.5	0.62	100	02/27/21 01:32	02/28/21 21:25	7440-42-8	D3
6020 MET ICPMS, Dissolved	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Arsenic, Dissolved	ND	mg/L	0.10	0.0087	100	02/28/21 16:17	03/01/21 12:38	7440-38-2	D3
Boron, Dissolved	**1.6J**	mg/L	5.0	0.85	100	02/28/21 16:17	03/01/21 12:38	7440-42-8	
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**434**	mg/L	5.0	5.0	1		03/01/21 18:03		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		03/01/21 18:03		
Alkalinity, Total as CaCO3	**434**	mg/L	5.0	5.0	1		03/01/21 18:03		
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**11000**	mg/L	1250	1250	1		02/26/21 18:19		MW
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	**54.5**	mg/L	10.0	5.0	100		03/02/21 16:35	18496-25-8	
5210B BOD, 5 day	Analytical Method: SM 5210B-2011 Pace Analytical Services - Asheville								
BOD, 5 day	**100**	mg/L	2.0	2.0	1	02/27/21 04:40	03/04/21 01:36		B2

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
110 Technology Parkway
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ANALYTICAL RESULTS

Project: MCMANUS 30050105.00006
Pace Project No.: 92524429

Sample: VAP-26-W (11-13) **Lab ID: 92524429002** Collected: 02/25/21 10:30 Received: 02/26/21 11:10 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC anions 48hr	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**5330**	mg/L	100	60.0	100		02/26/21 18:02	16887-00-6	
Nitrate as N	ND	mg/L	0.10	0.060	1		02/26/21 17:48	14797-55-8	
Nitrite as N	ND	mg/L	0.10	0.050	1		02/26/21 17:48	14797-65-0	
Sulfate	**194**	mg/L	100	50.0	100		02/26/21 18:02	14808-79-8	
SM4500P-E, Phosphate, Ortho	Analytical Method: SM 4500-P E-2011 Pace Analytical Services - Asheville								
Orthophosphate as P	**1.6**	mg/L	0.25	0.059	5		02/27/21 04:34		
Total Organic Carbon,Asheville	Analytical Method: EPA 9060A Pace Analytical Services - Asheville								
Total Organic Carbon	**18.0**	mg/L	1.0	0.50	1		02/28/21 22:48	7440-44-0	
Total Organic Carbon	**18.4**	mg/L	1.0	0.50	1		02/28/21 22:48	7440-44-0	
Total Organic Carbon	**18.8**	mg/L	1.0	0.50	1		02/28/21 22:48	7440-44-0	
Total Organic Carbon	**18.8**	mg/L	1.0	0.50	1		02/28/21 22:48	7440-44-0	
Mean Total Organic Carbon	**18.5**	mg/L	1.0	0.50	1		02/28/21 22:48	7440-44-0	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: MCMANUS 30050105.00006
Pace Project No.: 92524429

Sample: VAP-32-W (5-10) **Lab ID: 92524429003** Collected: 02/25/21 11:17 Received: 02/26/21 11:10 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Calcium	**170**	mg/L	1.0	0.94	10	02/27/21 01:37	02/27/21 19:56	7440-70-2	
Iron	**1.5**	mg/L	0.50	0.42	10	02/27/21 01:37	02/27/21 19:56	7439-89-6	
Magnesium	**495**	mg/L	1.0	0.68	10	02/27/21 01:37	02/27/21 19:56	7439-95-4	
Manganese	**0.059**	mg/L	0.050	0.034	10	02/27/21 01:37	02/27/21 19:56	7439-96-5	
Potassium	**142**	mg/L	50.0	30.4	10	02/27/21 01:37	02/27/21 19:56	7440-09-7	
Sodium	**4050**	mg/L	250	30.5	50	02/27/21 01:37	03/01/21 20:13	7440-23-5	
6010 MET ICP, Dissolved	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Calcium, Dissolved	**162**	mg/L	5.0	4.7	50	02/28/21 16:17	03/01/21 18:20	7440-70-2	
Iron, Dissolved	**12.6**	mg/L	2.5	2.1	50	02/28/21 16:17	03/01/21 18:20	7439-89-6	
Magnesium, Dissolved	**469**	mg/L	5.0	3.4	50	02/28/21 16:17	03/01/21 18:20	7439-95-4	
Manganese, Dissolved	**0.052**	mg/L	0.0050	0.0034	1	02/28/21 16:17	03/01/21 01:24	7439-96-5	
Potassium, Dissolved	ND	mg/L	250	152	50	02/28/21 16:17	03/01/21 18:20	7440-09-7	
Sodium, Dissolved	**3720**	mg/L	250	30.5	50	02/28/21 16:17	03/01/21 18:20	7440-23-5	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Arsenic	ND	mg/L	0.010	0.0087	100	02/27/21 01:32	02/28/21 21:30	7440-38-2	D3
Boron	**1.4J**	mg/L	2.5	0.62	100	02/27/21 01:32	02/28/21 21:30	7440-42-8	D3
6020 MET ICPMS, Dissolved	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Arsenic, Dissolved	ND	mg/L	0.10	0.0087	100	02/28/21 16:17	03/01/21 12:42	7440-38-2	D3
Boron, Dissolved	**1.7J**	mg/L	5.0	0.85	100	02/28/21 16:17	03/01/21 12:42	7440-42-8	
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**133**	mg/L	5.0	5.0	1		03/01/21 18:21		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		03/01/21 18:21		
Alkalinity, Total as CaCO3	**133**	mg/L	5.0	5.0	1		03/01/21 18:21		
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**16900**	mg/L	2500	2500	1		02/26/21 18:19		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	**0.11**	mg/L	0.10	0.050	1		03/02/21 16:35	18496-25-8	
5210B BOD, 5 day	Analytical Method: SM 5210B-2011 Pace Analytical Services - Asheville								
BOD, 5 day	ND	mg/L	2.0	2.0	1	02/27/21 04:40	03/04/21 01:38		B2

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
110 Technology Parkway
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ANALYTICAL RESULTS

Project: MCMANUS 30050105.00006
Pace Project No.: 92524429

Sample: VAP-32-W (5-10) **Lab ID: 92524429003** Collected: 02/25/21 11:17 Received: 02/26/21 11:10 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC anions 48hr	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**6730**	mg/L	100	60.0	100		02/26/21 18:29	16887-00-6	
Nitrate as N	ND	mg/L	0.10	0.060	1		02/26/21 18:15	14797-55-8	
Nitrite as N	ND	mg/L	0.10	0.050	1		02/26/21 18:15	14797-65-0	
Sulfate	**920**	mg/L	100	50.0	100		02/26/21 18:29	14808-79-8	
SM4500P-E, Phosphate, Ortho	Analytical Method: SM 4500-P E-2011 Pace Analytical Services - Asheville								
Orthophosphate as P	**0.20**	mg/L	0.050	0.012	1		02/27/21 04:35		
Total Organic Carbon,Asheville	Analytical Method: EPA 9060A Pace Analytical Services - Asheville								
Total Organic Carbon	**7.0**	mg/L	1.0	0.50	1		02/28/21 23:06	7440-44-0	
Total Organic Carbon	**6.8**	mg/L	1.0	0.50	1		02/28/21 23:06	7440-44-0	
Total Organic Carbon	**6.9**	mg/L	1.0	0.50	1		02/28/21 23:06	7440-44-0	
Total Organic Carbon	**6.8**	mg/L	1.0	0.50	1		02/28/21 23:06	7440-44-0	
Mean Total Organic Carbon	**6.9**	mg/L	1.0	0.50	1		02/28/21 23:06	7440-44-0	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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ANALYTICAL RESULTS

Project: MCMANUS 30050105.00006
Pace Project No.: 92524429

Sample: VAP-32-W (28-30) **Lab ID: 92524429004** Collected: 02/25/21 12:03 Received: 02/26/21 11:10 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Calcium	**271**	mg/L	1.0	0.94	10	02/27/21 01:37	02/27/21 19:59	7440-70-2	
Iron	**7.4**	mg/L	0.50	0.42	10	02/27/21 01:37	02/27/21 19:59	7439-89-6	
Magnesium	**594**	mg/L	1.0	0.68	10	02/27/21 01:37	02/27/21 19:59	7439-95-4	
Manganese	**0.39**	mg/L	0.050	0.034	10	02/27/21 01:37	02/27/21 19:59	7439-96-5	
Potassium	**183**	mg/L	50.0	30.4	10	02/27/21 01:37	02/27/21 19:59	7440-09-7	
Sodium	**4960**	mg/L	500	61.1	100	02/27/21 01:37	03/01/21 20:17	7440-23-5	
6010 MET ICP, Dissolved	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Calcium, Dissolved	**235**	mg/L	1.0	0.94	10	02/28/21 16:17	03/01/21 18:23	7440-70-2	
Iron, Dissolved	**0.21**	mg/L	0.050	0.042	1	02/28/21 16:17	03/01/21 01:40	7439-89-6	
Magnesium, Dissolved	**522**	mg/L	1.0	0.68	10	02/28/21 16:17	03/01/21 18:23	7439-95-4	
Manganese, Dissolved	**0.26**	mg/L	0.0050	0.0034	1	02/28/21 16:17	03/01/21 01:40	7439-96-5	
Potassium, Dissolved	**168**	mg/L	50.0	30.4	10	02/28/21 16:17	03/01/21 18:23	7440-09-7	
Sodium, Dissolved	**4650**	mg/L	500	61.1	100	02/28/21 16:17	03/02/21 17:58	7440-23-5	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Arsenic	**0.031**	mg/L	0.010	0.0087	100	02/27/21 01:32	02/28/21 21:47	7440-38-2	D3
Boron	**1.9J**	mg/L	2.5	0.62	100	02/27/21 01:32	02/28/21 21:47	7440-42-8	D3
6020 MET ICPMS, Dissolved	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Arsenic, Dissolved	**0.011J**	mg/L	0.10	0.0087	100	02/28/21 16:17	03/01/21 12:47	7440-38-2	
Boron, Dissolved	**2.2J**	mg/L	5.0	0.85	100	02/28/21 16:17	03/01/21 12:47	7440-42-8	
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**481**	mg/L	5.0	5.0	1		03/01/21 18:30		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		03/01/21 18:30		
Alkalinity, Total as CaCO3	**481**	mg/L	5.0	5.0	1		03/01/21 18:30		
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**22000**	mg/L	2500	2500	1		02/26/21 18:19		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	**29.8**	mg/L	5.0	2.5	50		03/02/21 17:42	18496-25-8	
5210B BOD, 5 day	Analytical Method: SM 5210B-2011 Pace Analytical Services - Asheville								
BOD, 5 day	ND	mg/L	2.0	2.0	1	02/27/21 04:40	03/04/21 01:39		B2

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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(770)734-4200

ANALYTICAL RESULTS

Project: MCMANUS 30050105.00006
Pace Project No.: 92524429

Sample: VAP-32-W (28-30) **Lab ID: 92524429004** Collected: 02/25/21 12:03 Received: 02/26/21 11:10 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC anions 48hr	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**8680**	mg/L	100	60.0	100		02/26/21 18:57	16887-00-6	
Nitrate as N	ND	mg/L	0.10	0.060	1		02/26/21 18:43	14797-55-8	
Nitrite as N	ND	mg/L	0.10	0.050	1		02/26/21 18:43	14797-65-0	
Sulfate	**1120**	mg/L	100	50.0	100		02/26/21 18:57	14808-79-8	
SM4500P-E, Phosphate, Ortho	Analytical Method: SM 4500-P E-2011 Pace Analytical Services - Asheville								
Orthophosphate as P	**0.77**	mg/L	0.25	0.059	5		02/27/21 04:35		
Total Organic Carbon,Asheville	Analytical Method: EPA 9060A Pace Analytical Services - Asheville								
Total Organic Carbon	**7.4**	mg/L	1.0	0.50	1		02/28/21 23:24	7440-44-0	
Total Organic Carbon	**7.6**	mg/L	1.0	0.50	1		02/28/21 23:24	7440-44-0	
Total Organic Carbon	**7.5**	mg/L	1.0	0.50	1		02/28/21 23:24	7440-44-0	
Total Organic Carbon	**7.5**	mg/L	1.0	0.50	1		02/28/21 23:24	7440-44-0	
Mean Total Organic Carbon	**7.5**	mg/L	1.0	0.50	1		02/28/21 23:24	7440-44-0	

REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: MCMANUS 30050105.00006
Pace Project No.: 92524429

QC Batch: 603057
QC Batch Method: EPA 3010A
Analysis Method: EPA 6010D
Analysis Description: 6010 MET
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524429001, 92524429002, 92524429003, 92524429004

METHOD BLANK: 3177656 Matrix: Water
Associated Lab Samples: 92524429001, 92524429002, 92524429003, 92524429004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Calcium	mg/L	ND	0.10	0.094	03/01/21 19:41	
Iron	mg/L	ND	0.050	0.042	03/01/21 19:41	
Magnesium	mg/L	ND	0.10	0.068	03/01/21 19:41	
Manganese	mg/L	ND	0.0050	0.0034	03/01/21 19:41	
Potassium	mg/L	ND	5.0	3.0	03/01/21 19:41	
Sodium	mg/L	ND	5.0	0.61	03/01/21 19:41	

LABORATORY CONTROL SAMPLE: 3177657

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium	mg/L	5	5.1	102	80-120	
Iron	mg/L	5	5.1	102	80-120	
Magnesium	mg/L	5	5.2	105	80-120	
Manganese	mg/L	0.5	0.51	101	80-120	
Potassium	mg/L	5	5.1	102	80-120	
Sodium	mg/L	5	5.1	103	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3177658 3177659

Parameter	Units	92524458002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium	mg/L	23.5	5	5	29.1	28.7	111	104	75-125	1	20	
Iron	mg/L	1.6	5	5	6.7	6.6	103	100	75-125	2	20	
Magnesium	mg/L	68.8	5	5	73.3	74.6	90	116	75-125	2	20	
Manganese	mg/L	0.043J	0.5	0.5	0.55	0.55	102	102	75-125	0	20	
Potassium	mg/L	68.1	5	5	72.8	73.0	93	98	75-125	0	20	
Sodium	mg/L	656	5	5	666	661	196	106	75-125	1	20	M6

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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QUALITY CONTROL DATA

Project: MCMANUS 30050105.00006
Pace Project No.: 92524429

QC Batch: 604726
QC Batch Method: EPA 3010A
Analysis Method: EPA 6010D
Analysis Description: 6010 MET
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524429002

METHOD BLANK: 3186229 Matrix: Water
Associated Lab Samples: 92524429002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Iron	mg/L	ND	0.050	0.042	03/08/21 23:22	

LABORATORY CONTROL SAMPLE: 3186230

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Iron	mg/L	5	5.1	101	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3186231 3186232

Parameter	Units	92524425002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Iron	mg/L	2.3	5	5	7.4	7.5	102	104	75-125	1	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: MCMANUS 30050105.00006
Pace Project No.: 92524429

QC Batch: 603011
QC Batch Method: EPA 3010A
Analysis Method: EPA 6010D
Analysis Description: 6010 MET Filtered Diss.
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524429001, 92524429002, 92524429003, 92524429004

METHOD BLANK: 3177320 Matrix: Water
Associated Lab Samples: 92524429001, 92524429002, 92524429003, 92524429004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Calcium, Dissolved	mg/L	ND	0.10	0.094	03/02/21 13:07	
Iron, Dissolved	mg/L	ND	0.050	0.042	03/02/21 13:07	
Magnesium, Dissolved	mg/L	ND	0.10	0.068	03/01/21 17:38	
Manganese, Dissolved	mg/L	0.0047J	0.0050	0.0034	03/01/21 17:38	
Potassium, Dissolved	mg/L	ND	5.0	3.0	03/01/21 17:38	
Sodium, Dissolved	mg/L	ND	5.0	0.61	03/01/21 17:38	

LABORATORY CONTROL SAMPLE: 3177321

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium, Dissolved	mg/L	5	4.9	97	80-120	
Iron, Dissolved	mg/L	5	4.9	97	80-120	
Magnesium, Dissolved	mg/L	5	4.9	97	80-120	
Manganese, Dissolved	mg/L	0.5	0.47	94	80-120	
Potassium, Dissolved	mg/L	5	4.8J	95	80-120	
Sodium, Dissolved	mg/L	5	4.8J	97	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3177322 3177323

Parameter	Units	92524458002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium, Dissolved	mg/L	21.0	5	5	25.6	25.2	92	86	75-125	1	20	
Iron, Dissolved	mg/L	ND	5	5	7.3	5.1	141	96	75-125	36	20	M6,R1
Magnesium, Dissolved	mg/L	57.3	5	5	62.9	62.8	111	111	75-125	0	20	
Manganese, Dissolved	mg/L	0.036	0.5	0.5	0.45	0.45	83	82	75-125	1	20	
Potassium, Dissolved	mg/L	63.8	5	5	66.1	67.7	47	78	75-125	2	20	M6
Sodium, Dissolved	mg/L	622	5	5	605	616	-350	-120	75-125	2	20	M6

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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QUALITY CONTROL DATA

Project: MCMANUS 30050105.00006
Pace Project No.: 92524429

QC Batch: 605173
QC Batch Method: EPA 3010A
Analysis Method: EPA 6010D
Analysis Description: 6010 MET Filtered Diss.
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524429002

METHOD BLANK: 3188175 Matrix: Water
Associated Lab Samples: 92524429002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Iron, Dissolved	mg/L	ND	0.050	0.042	03/09/21 17:18	

LABORATORY CONTROL SAMPLE: 3188176

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Iron, Dissolved	mg/L	5	5.0	100	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3188177 3188178

Parameter	Units	92524425002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Iron, Dissolved	mg/L	4.0	5	5	5.0	5.2	20	23	75-125	3	20	M6

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: MCMANUS 30050105.00006
Pace Project No.: 92524429

QC Batch: 603022
QC Batch Method: EPA 3010A
Analysis Method: EPA 6020B
Analysis Description: 6020 MET
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524429001, 92524429002, 92524429003, 92524429004

METHOD BLANK: 3177388 Matrix: Water
Associated Lab Samples: 92524429001, 92524429002, 92524429003, 92524429004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Arsenic	mg/L	ND	0.00010	0.000087	02/28/21 20:38	
Boron	mg/L	ND	0.025	0.0062	02/28/21 20:38	

LABORATORY CONTROL SAMPLE: 3177389

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	0.01	0.010	101	80-120	
Boron	mg/L	0.05	0.050	99	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3177390 3177391

Parameter	Units	92524458002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	mg/L	ND	0.01	0.01	0.0096J	0.010	88	96	75-125		20	
Boron	mg/L	0.81J	0.05	0.05	0.95J	0.83J	277	48	75-125		20	M6

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: MCMANUS 30050105.00006
Pace Project No.: 92524429

QC Batch: 603012 — Analysis Method: EPA 6020B
QC Batch Method: EPA 3010A — Analysis Description: 6020 MET Dissolved
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524429001, 92524429002, 92524429003, 92524429004

METHOD BLANK: 3177326 Matrix: Water
Associated Lab Samples: 92524429001, 92524429002, 92524429003, 92524429004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Arsenic, Dissolved	mg/L	ND	0.0010	0.000087	03/01/21 11:57	
Boron, Dissolved	mg/L	ND	0.050	0.0085	03/01/21 11:57	

LABORATORY CONTROL SAMPLE: 3177327

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic, Dissolved	mg/L	0.01	0.0096	96	80-120	
Boron, Dissolved	mg/L	0.05	0.045J	89	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3177328 3177329

Parameter	Units	92524458002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic, Dissolved	mg/L	ND	0.01	0.01	ND	0.0094J	73	91	75-125		20	M6
Boron, Dissolved	mg/L	ND	0.05	0.05	ND	ND	-369	-74	75-125		20	M6

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: MCMANUS 30050105.00006
Pace Project No.: 92524429

QC Batch: 603230 | Analysis Method: SM 2320B-2011
QC Batch Method: SM 2320B-2011 | Analysis Description: 2320B Alkalinity
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524429001, 92524429002, 92524429003, 92524429004

METHOD BLANK: 3178334 Matrix: Water
Associated Lab Samples: 92524429001, 92524429002, 92524429003, 92524429004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	ND	5.0	5.0	03/01/21 16:46	
Alkalinity,Bicarbonate (CaCO3)	mg/L	ND	5.0	5.0	03/01/21 16:46	
Alkalinity,Carbonate (CaCO3)	mg/L	ND	5.0	5.0	03/01/21 16:46	

LABORATORY CONTROL SAMPLE: 3178335

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	50	50.1	100	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3178336 3178337

Parameter	Units	92524425001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	212	50	50	256	258	88	93	80-120	1	25	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3178340 3178341

Parameter	Units	92524458002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	309	50	50	363	360	108	101	80-120	1	25	

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REPORT OF LABORATORY ANALYSIS

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(770)734-4200

QUALITY CONTROL DATA

Project: MCMANUS 30050105.00006
Pace Project No.: 92524429

QC Batch: 603013 | Analysis Method: SM 2540C-2011
QC Batch Method: SM 2540C-2011 | Analysis Description: 2540C Total Dissolved Solids
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524429001, 92524429002, 92524429003, 92524429004

METHOD BLANK: 3177334 Matrix: Water
Associated Lab Samples: 92524429001, 92524429002, 92524429003, 92524429004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	ND	25.0	25.0	02/26/21 18:18	

LABORATORY CONTROL SAMPLE: 3177335

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	250	248	99	90-110	

SAMPLE DUPLICATE: 3177336

Parameter	Units	92524425001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	13900	12500	11	25	

SAMPLE DUPLICATE: 3177597

Parameter	Units	92524458002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	2330	2090	11	25	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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QUALITY CONTROL DATA

Project: MCMANUS 30050105.00006
Pace Project No.: 92524429

QC Batch: 603514 — Analysis Method: SM 4500-S2D-2011
QC Batch Method: SM 4500-S2D-2011 — Analysis Description: 4500S2D Sulfide Water
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524429001, 92524429002, 92524429003, 92524429004

METHOD BLANK: 3179465 Matrix: Water
Associated Lab Samples: 92524429001, 92524429002, 92524429003, 92524429004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Sulfide	mg/L	ND	0.10	0.050	03/02/21 16:23	

LABORATORY CONTROL SAMPLE: 3179466

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfide	mg/L	0.5	0.44	88	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3179467 3179468

Parameter	Units	92524097006 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfide	mg/L	ND	0.5	0.5	0.50	0.50	100	100	80-120	0	10	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3179477 3179478

Parameter	Units	92524458002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfide	mg/L	36.8	0.5	0.5	34.3	34.4	-501	-483	80-120	0	10	M6

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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QUALITY CONTROL DATA

Project: MCMANUS 30050105.00006
Pace Project No.: 92524429

QC Batch: 603073 Analysis Method: SM 5210B-2011
QC Batch Method: SM 5210B-2011 Analysis Description: 5210B BOD, 5 day
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524429001, 92524429002, 92524429003, 92524429004

METHOD BLANK: 3177707 Matrix: Water
Associated Lab Samples: 92524429001, 92524429002, 92524429003, 92524429004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
BOD, 5 day	mg/L	ND	2.0	2.0	03/04/21 01:07	

LABORATORY CONTROL SAMPLE: 3177709

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
BOD, 5 day	mg/L	198	203	102	84.6-115	

SAMPLE DUPLICATE: 3177710

Parameter	Units	92524430001 Result	Dup Result	RPD	Max RPD	Qualifiers
BOD, 5 day	mg/L	195	189	3	25	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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(770)734-4200

QUALITY CONTROL DATA

Project: MCMANUS 30050105.00006
Pace Project No.: 92524429

QC Batch: 602986
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: 92524429001, 92524429002, 92524429003, 92524429004

METHOD BLANK: 3177123 Matrix: Water
Associated Lab Samples: 92524429001, 92524429002, 92524429003, 92524429004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	ND	1.0	0.60	02/26/21 11:43	
Nitrate as N	mg/L	ND	0.10	0.060	02/26/21 11:43	
Nitrite as N	mg/L	ND	0.10	0.050	02/26/21 11:43	
Sulfate	mg/L	ND	1.0	0.50	02/26/21 11:43	

LABORATORY CONTROL SAMPLE: 3177124

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	50	50.7	101	90-110	
Nitrate as N	mg/L	2.5	2.5	100	90-110	
Nitrite as N	mg/L	2.5	2.6	105	90-110	
Sulfate	mg/L	50	51.9	104	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3177125 3177126

Parameter	Units	92524458002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	971	50	50	1010	1040	86	133	90-110	2	10	M6
Nitrate as N	mg/L	ND	2.5	2.5	2.6	2.6	103	105	90-110	2	10	
Nitrite as N	mg/L	ND	2.5	2.5	ND	ND	0	0	90-110		10	M1
Sulfate	mg/L	4.8	50	50	58.0	59.0	106	108	90-110	2	10	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3177127 3177128

Parameter	Units	92524425004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	2580	50	50	2700	2650	236	141	90-110	2	10	M6
Nitrate as N	mg/L	ND	2.5	2.5	2.6	2.7	104	106	90-110	2	10	
Nitrite as N	mg/L	ND	2.5	2.5	1.6	1.5	65	62	90-110	5	10	M1
Sulfate	mg/L	384	50	50	473	464	177	160	90-110	2	10	M6

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: MCMANUS 30050105.00006
Pace Project No.: 92524429

QC Batch: 603072 | Analysis Method: SM 4500-P E-2011
QC Batch Method: SM 4500-P E-2011 | Analysis Description: SM4500P-E Phosphorus, Ortho
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524429001, 92524429002, 92524429003, 92524429004

METHOD BLANK: 3177701 Matrix: Water
Associated Lab Samples: 92524429001, 92524429002, 92524429003, 92524429004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Orthophosphate as P	mg/L	ND	0.050	0.012	02/27/21 04:29	

LABORATORY CONTROL SAMPLE: 3177702

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Orthophosphate as P	mg/L	0.25	0.26	103	49-145	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3177703 3177704

Parameter	Units	92524458002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Orthophosphate as P	mg/L	0.85	1.2	1.2	2.2	2.2	105	105	90-110	0	10	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3177705 3177706

Parameter	Units	92524425004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Orthophosphate as P	mg/L	0.33	1.2	1.2	1.5	1.5	97	97	90-110	0	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.

REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: MCMANUS 30050105.00006
Pace Project No.: 92524429

QC Batch: 603152
QC Batch Method: EPA 9060A
Analysis Method: EPA 9060A
Analysis Description: 9060 TOC, AVL
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524429001, 92524429002, 92524429003, 92524429004

METHOD BLANK: 3177963 Matrix: Water
Associated Lab Samples: 92524429001, 92524429002, 92524429003, 92524429004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mean Total Organic Carbon	mg/L	ND	1.0	0.50	02/28/21 18:24	
Total Organic Carbon	mg/L	ND	1.0	0.50	02/28/21 18:24	
Total Organic Carbon	mg/L	ND	1.0	0.50	02/28/21 18:24	
Total Organic Carbon	mg/L	ND	1.0	0.50	02/28/21 18:24	
Total Organic Carbon	mg/L	ND	1.0	0.50	02/28/21 18:24	

LABORATORY CONTROL SAMPLE: 3177964

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mean Total Organic Carbon	mg/L	25	24.1	96	75-125	
Total Organic Carbon	mg/L	25	23.8	95	75-125	
Total Organic Carbon	mg/L	25	24.7	99	75-125	
Total Organic Carbon	mg/L	25	23.7	95	75-125	
Total Organic Carbon	mg/L	25	24.3	97	75-125	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3177965 3177966

Parameter	Units	92523018011 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/L	1.0	25	25	26.0	26.3	100	101	75-125	1	25	
Total Organic Carbon	mg/L	ND	25	25	26.0	26.5	100	102	75-125	2	25	
Total Organic Carbon	mg/L	ND	25	25	26.3	26.5	102	103	75-125	1	25	
Total Organic Carbon	mg/L	1.6	25	25	25.8	25.6	97	96	75-125	1	25	
Total Organic Carbon	mg/L	ND	25	25	26.0	26.5	101	103	75-125	2	25	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3177967 3177968

Parameter	Units	92524458002 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/L	7.7	25	25	32.6	33.1	100	102	75-125	2	25	
Total Organic Carbon	mg/L	7.7	25	25	32.8	33.2	100	102	75-125	1	25	
Total Organic Carbon	mg/L	7.8	25	25	33.1	33.1	101	101	75-125	0	25	
Total Organic Carbon	mg/L	7.7	25	25	31.6	33.0	96	101	75-125	4	25	
Total Organic Carbon	mg/L	7.7	25	25	33.0	33.3	101	103	75-125	1	25	

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

REPORT OF LABORATORY ANALYSIS

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

QUALIFIERS

Project: MCMANUS 30050105.00006
Pace Project No.: 92524429

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

B2	Oxygen usage is less than 2.0 for all dilutions set. The reported value is an estimated less than value and is calculated for the dilution using the most amount of sample.
D3	Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference.
H1	Analysis conducted outside the EPA method holding time.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
M6	Matrix spike and Matrix spike duplicate recovery not evaluated against control limits due to sample dilution.
MW	Due to matrix interference, achieving a constant weight is not possible.
R1	RPD value was outside control limits.

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

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: MCMANUS 30050105.00006
Pace Project No.: 92524429

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
92524429001	**VAP-26-W (34-36)**	EPA 3010A	603057	EPA 6010D	603096
92524429002	**VAP-26-W (11-13)**	EPA 3010A	603057	EPA 6010D	603096
92524429002	**VAP-26-W (11-13)**	EPA 3010A	604726	EPA 6010D	604748
92524429003	**VAP-32-W (5-10)**	EPA 3010A	603057	EPA 6010D	603096
92524429004	**VAP-32-W (28-30)**	EPA 3010A	603057	EPA 6010D	603096
92524429001	**VAP-26-W (34-36)**	EPA 3010A	603011	EPA 6010D	603155
92524429002	**VAP-26-W (11-13)**	EPA 3010A	603011	EPA 6010D	603155
92524429002	**VAP-26-W (11-13)**	EPA 3010A	605173	EPA 6010D	605184
92524429003	**VAP-32-W (5-10)**	EPA 3010A	603011	EPA 6010D	603155
92524429004	**VAP-32-W (28-30)**	EPA 3010A	603011	EPA 6010D	603155
92524429001	**VAP-26-W (34-36)**	EPA 3010A	603022	EPA 6020B	603097
92524429002	**VAP-26-W (11-13)**	EPA 3010A	603022	EPA 6020B	603097
92524429003	**VAP-32-W (5-10)**	EPA 3010A	603022	EPA 6020B	603097
92524429004	**VAP-32-W (28-30)**	EPA 3010A	603022	EPA 6020B	603097
92524429001	**VAP-26-W (34-36)**	EPA 3010A	603012	EPA 6020B	603156
92524429002	**VAP-26-W (11-13)**	EPA 3010A	603012	EPA 6020B	603156
92524429003	**VAP-32-W (5-10)**	EPA 3010A	603012	EPA 6020B	603156
92524429004	**VAP-32-W (28-30)**	EPA 3010A	603012	EPA 6020B	603156
92524429001	**VAP-26-W (34-36)**	SM 2320B-2011	603230		
92524429002	**VAP-26-W (11-13)**	SM 2320B-2011	603230		
92524429003	**VAP-32-W (5-10)**	SM 2320B-2011	603230		
92524429004	**VAP-32-W (28-30)**	SM 2320B-2011	603230		
92524429001	**VAP-26-W (34-36)**	SM 2540C-2011	603013		
92524429002	**VAP-26-W (11-13)**	SM 2540C-2011	603013		
92524429003	**VAP-32-W (5-10)**	SM 2540C-2011	603013		
92524429004	**VAP-32-W (28-30)**	SM 2540C-2011	603013		
92524429001	**VAP-26-W (34-36)**	SM 4500-S2D-2011	603514		
92524429002	**VAP-26-W (11-13)**	SM 4500-S2D-2011	603514		
92524429003	**VAP-32-W (5-10)**	SM 4500-S2D-2011	603514		
92524429004	**VAP-32-W (28-30)**	SM 4500-S2D-2011	603514		
92524429001	**VAP-26-W (34-36)**	SM 5210B-2011	603073	SM 5210B-2011	603106
92524429002	**VAP-26-W (11-13)**	SM 5210B-2011	603073	SM 5210B-2011	603106
92524429003	**VAP-32-W (5-10)**	SM 5210B-2011	603073	SM 5210B-2011	603106
92524429004	**VAP-32-W (28-30)**	SM 5210B-2011	603073	SM 5210B-2011	603106
92524429001	**VAP-26-W (34-36)**	EPA 300.0 Rev 2.1 1993	602986		
92524429002	**VAP-26-W (11-13)**	EPA 300.0 Rev 2.1 1993	602986		
92524429003	**VAP-32-W (5-10)**	EPA 300.0 Rev 2.1 1993	602986		
92524429004	**VAP-32-W (28-30)**	EPA 300.0 Rev 2.1 1993	602986		
92524429001	**VAP-26-W (34-36)**	SM 4500-P E-2011	603072		
92524429002	**VAP-26-W (11-13)**	SM 4500-P E-2011	603072		
92524429003	**VAP-32-W (5-10)**	SM 4500-P E-2011	603072		
92524429004	**VAP-32-W (28-30)**	SM 4500-P E-2011	603072		

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

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: MCMANUS 30050105.00006
Pace Project No.: 92524429

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
92524429001	**VAP-26-W (34-36)**	EPA 9060A	603152		
92524429002	**VAP-26-W (11-13)**	EPA 9060A	603152		
92524429003	**VAP-32-W (5-10)**	EPA 9060A	603152		
92524429004	**VAP-32-W (28-30)**	EPA 9060A	603152		

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: ARCADIS

Project #: WO# : 92524429

92524429

Courier: ☐ Commercial ☑ Fed Ex ☐ Pace ☐ UPS ☐ USPS ☐ Other:____ ☐ Client

Custody Seal Present? ☑ Yes ☐ No **Seals Intact?** ☑ Yes ☐ No

Date/Initials Person Examining Contents: 6-26-21 YK

Packing Material: ☐ Bubble Wrap ☑ Bubble Bags ☐ None ☐ Other

Biological Tissue Frozen? ☐ Yes ☐ No ☑ N/A

Thermometer: ☑ IR Gun ID: 93507I

Type of Ice: ☑ Wet ☐ Blue ☐ None

Cooler Temp: 3.7 **Correction Factor:** Add/Subtract (°C) 0

Temp should be above freezing to 6°C
☐ Samples out of temp criteria. Samples on ice, cooling process has begun

Cooler Temp Corrected (°C): 3.7

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.
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# : 92524429

PM: KLH1 Due Date: 03/01/21

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)	GN	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		2	1	1		2	1												3					1				
2		2	1	1		2	1												3					1				
3		2	1	1		2	1												3					1				
4		2	1	1		2	1												3					1				
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.

ARCADIS

ID#:

CHAIN OF CUSTODY & LABORATORY ANALYSIS REQUEST FORM

Page ___ of ___

Lab Work Order # 92524

Send Results to:

Contact & Company Name: MATT WEBB ARCADIS
Telephone: 919-415-2284
Address: Ste 350 5420 WADE PARK BLVD
Fax:
City: RALEIGH State: NC Zip: 27607
E-mail Address: Mathew.Webb@arcadis.com
Project Name/Location (City, State): McMANUS - BRUNSWICK
Project #: 30058105.00006
Sampler's Printed Name:
Sampler's Signature:

Sample ID	Collection Date	Collection Time	Type (✓) Comp	Type (✓) Grab	Matrix	Preservative	Filtered (✓)	# of Containers	Container Information	Total Metals	Dissolved Metals	ALKALINITY	Cl/SO4/NO3/NO2	SULFIDE	Nitrogen/Ammonia	Orthophosphate	KIT	TOC	BOD	TDS
						C	C	E	E	F		G	E	E								
							✓				K											
						1	1	1	1	1	1	3	1	1								
						3	3	3	3	9	1	1	2	4								
VAP-26-W (34-36)	2/25/21	8:10	X		W	1	1	1	1	1	1	3	1	1								
VAP-26-W (11-13)	2/25/21	10:30	X		W	1	1	1	1	1	1	3	1	1								
VAP-32-W (5-10)	2/25/21	11:17	X		W	1	1	1	1	1	1	3	1	1								
VAP-32-W (28-30)	2/25/21	12:03	X		W	1	1	1	1	1	1	3	1	1								

Keys

Preservation Key: A. H_2SO_4 B. HCl C. HNO_3 D. NaOH E. None F. Other $NaOH/ZnAc$ G. Other H_3PO_4 H. Other: ____

Container Information Key: 1. 40 ml Vial 2. 1 L Amber 3. 250 ml Plastic 4. 500 ml Plastic 5. Encore 6. 2 oz. Glass 7. 4 oz. Glass 8. 8 oz. Glass 9. Other: 125 ml 10. Other:

Matrix Key: SO - Soil, SE - Sediment, NL - NAPL/Oil, W - Water, SL - Sludge, SW - Sample Wipe, T - Tissue, A - Air, Other: ____

PARAMETER ANALYSIS & METHOD

REMARKS

Special Instructions/Comments: METALS = As, Fe, Mn, Mg, Ca, Na, K, B
DISSOLVED metals were field filtered.
TOTAL/DISSOLVED As are to be analyzed on 24 TAT

☐ Special QA/QC Instructions(✓):

Laboratory Information and Receipt

Lab Name: PACE
☑ Cooler packed with ice (✓)
Specify Turnaround Requirements:
Shipping Tracking #:
Cooler Custody Seal (✓): ☑ Intact ☐ Not Intact
Sample Receipt: Condition/Cooler Temp: 5.7

Relinquished By	Received By	Relinquished By	Laboratory Received By
Printed Name: Grant Williford	Printed Name: FedEX	Printed Name: Stacy Rice	Printed Name:
Signature:	Signature:	Signature:	Signature:
Firm: ANA	Firm/Courier:	Firm/Courier: PACE/AVL	Firm:
Date/Time: 2/25/21 1730	Date/Time: 2/25/21 1730	Date/Time: 2-26-21 1110	Date/Time:

20730826 CofC AR Form 08.27.2015

Distribution: WHITE – Laboratory returns with results YELLOW – Lab copy PINK – Retained by Arcadis

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

March 10, 2021

Ms. Lauren Petty
Southern Co. Services
42 Inverness Center Parkway
Birmingham, AL 35242

RE: Project: MCMANUS 30050105.00006
Pace Project No.: 92524425

Dear Ms. Petty:

Enclosed are the analytical results for sample(s) received by the laboratory on February 26, 2021. 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

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: Joju Abraham, Georgia Power-CCR
Kathryn Farris
Geoffrey Gay, ARCADIS - Atlanta
Margaret Gentile, Arcadis
Kristen Jurinko
Charles Lawson, Arcadis
Bryan Mayeux
Kelley Sharpe, ARCADIS - Atlanta
Maribel Vital

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

CERTIFICATIONS

Project: MCMANUS 30050105.00006
Pace Project No.: 92524425

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

REPORT OF LABORATORY ANALYSIS

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

SAMPLE SUMMARY

Project: MCMANUS 30050105.00006
Pace Project No.: 92524425

Lab ID	Sample ID	Matrix	Date Collected	Date Received
92524425001	**VAP-32-W (22-24)**	Water	02/25/21 12:20	02/26/21 11:10
92524425002	**VAP-18-W (21-23)**	Water	02/25/21 14:07	02/26/21 11:10
92524425003	**VAP-18-W (26-28)**	Water	02/25/21 14:25	02/26/21 11:10
92524425004	**VAP-18-W (5-10)**	Water	02/25/21 14:52	02/26/21 11:10

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

SAMPLE ANALYTE COUNT

Project: MCMANUS 30050105.00006
Pace Project No.: 92524425

Lab ID	Sample ID	Method	Analysts	Analytes Reported
92524425001	**VAP-32-W (22-24)**	EPA 6010D	DS, KQ	6
		EPA 6010D	KQ, SH1	6
		EPA 6020B	JOR	2
		EPA 6020B	BG2	2
		SM 2320B-2011	ECH	3
		SM 2540C-2011	RED	1
		SM 4500-S2D-2011	NAL	1
		SM 5210B-2011	NFW	1
		EPA 300.0 Rev 2.1 1993	JLH	4
		SM 4500-P E-2011	JP1	1
		EPA 9060A	JLH	5
92524425002	**VAP-18-W (21-23)**	EPA 6010D	DS, KQ	6
		EPA 6010D	KQ, SH1	6
		EPA 6020B	JOR	2
		EPA 6020B	JOR	2
		SM 2320B-2011	ECH	3
		SM 2540C-2011	RED	1
		SM 4500-S2D-2011	NAL	1
		SM 5210B-2011	NFW	1
		EPA 300.0 Rev 2.1 1993	JLH	4
		SM 4500-P E-2011	JP1	1
		EPA 9060A	JLH	5
92524425003	**VAP-18-W (26-28)**	EPA 6010D	DS, KQ	6
		EPA 6010D	KQ, SH1	6
		EPA 6020B	JOR	2
		EPA 6020B	JOR	2
		SM 2320B-2011	ECH	3
		SM 2540C-2011	RED	1
		SM 4500-S2D-2011	NAL	1
		SM 5210B-2011	NFW	1
		EPA 300.0 Rev 2.1 1993	JLH	4
		SM 4500-P E-2011	JP1	1
		EPA 9060A	JLH	5
92524425004	**VAP-18-W (5-10)**	EPA 6010D	DS, KQ	6
		EPA 6010D	KQ	6
		EPA 6020B	JOR	2
		EPA 6020B	BG2	2

Pace Analytical Services, LLC
110 Technology Parkway
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SAMPLE ANALYTE COUNT

Project: MCMANUS 30050105.00006
Pace Project No.: 92524425

Lab ID	Sample ID	Method	Analysts	Analytes Reported
		SM 2320B-2011	ECH	3
		SM 2540C-2011	RED	1
		SM 4500-S2D-2011	NAL	1
		SM 5210B-2011	NFW	1
		EPA 300.0 Rev 2.1 1993	JLH	4
		SM 4500-P E-2011	JP1	1
		EPA 9060A	JLH	5

PASI-A = Pace Analytical Services - Asheville

Pace Analytical Services, LLC
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SUMMARY OF DETECTION

Project: MCMANUS 30050105.00006
Pace Project No.: 92524425

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92524425001	**VAP-32-W (22-24)**					
EPA 6010D	Calcium	207	mg/L	1.0	02/27/21 19:36	
EPA 6010D	Iron	2.7	mg/L	0.50	02/27/21 19:36	
EPA 6010D	Magnesium	547	mg/L	1.0	02/27/21 19:36	
EPA 6010D	Manganese	0.30	mg/L	0.050	02/27/21 19:36	
EPA 6010D	Potassium	190	mg/L	50.0	02/27/21 19:36	
EPA 6010D	Sodium	5000	mg/L	500	03/01/21 19:48	
EPA 6010D	Calcium, Dissolved	194	mg/L	1.0	03/01/21 18:39	
EPA 6010D	Iron, Dissolved	0.69	mg/L	0.050	03/01/21 01:51	
EPA 6010D	Magnesium, Dissolved	538	mg/L	1.0	03/01/21 18:39	
EPA 6010D	Manganese, Dissolved	0.24	mg/L	0.0050	03/01/21 01:51	
EPA 6010D	Potassium, Dissolved	182	mg/L	50.0	03/01/21 18:39	
EPA 6010D	Sodium, Dissolved	4380	mg/L	500	03/02/21 18:08	
EPA 6020B	Arsenic	0.019	mg/L	0.010	02/28/21 20:46	D3
EPA 6020B	Boron	1.9J	mg/L	2.5	02/28/21 20:46	D3
EPA 6020B	Arsenic, Dissolved	0.014J	mg/L	0.10	03/01/21 12:18	
EPA 6020B	Boron, Dissolved	2.1J	mg/L	5.0	03/01/21 12:18	
SM 2320B-2011	Alkalinity,Bicarbonate (CaCO3)	212	mg/L	5.0	03/01/21 16:56	
SM 2320B-2011	Alkalinity, Total as CaCO3	212	mg/L	5.0	03/01/21 16:56	
SM 2540C-2011	Total Dissolved Solids	13900	mg/L	2500	02/26/21 18:18	
SM 4500-S2D-2011	Sulfide	9.0	mg/L	5.0	03/02/21 16:30	
SM 5210B-2011	BOD, 5 day	160	mg/L	2.0	03/04/21 01:24	B2
EPA 300.0 Rev 2.1 1993	Chloride	8570	mg/L	100	02/26/21 19:52	
EPA 300.0 Rev 2.1 1993	Sulfate	1200	mg/L	100	02/26/21 19:52	
SM 4500-P E-2011	Orthophosphate as P	0.53	mg/L	0.25	02/27/21 04:36	
EPA 9060A	Total Organic Carbon	6.9	mg/L	1.0	02/28/21 20:40	
EPA 9060A	Total Organic Carbon	6.8	mg/L	1.0	02/28/21 20:40	
EPA 9060A	Total Organic Carbon	6.9	mg/L	1.0	02/28/21 20:40	
EPA 9060A	Total Organic Carbon	6.9	mg/L	1.0	02/28/21 20:40	
EPA 9060A	Mean Total Organic Carbon	6.9	mg/L	1.0	02/28/21 20:40	
92524425002	**VAP-18-W (21-23)**					
EPA 6010D	Calcium	171	mg/L	1.0	02/27/21 19:39	
EPA 6010D	Iron	2.3	mg/L	0.050	03/08/21 23:28	
EPA 6010D	Magnesium	440	mg/L	1.0	02/27/21 19:39	
EPA 6010D	Manganese	0.23	mg/L	0.050	02/27/21 19:39	
EPA 6010D	Potassium	153	mg/L	50.0	02/27/21 19:39	
EPA 6010D	Sodium	3770	mg/L	500	03/01/21 19:51	
EPA 6010D	Calcium, Dissolved	173	mg/L	5.0	03/01/21 18:03	
EPA 6010D	Iron, Dissolved	4.0	mg/L	0.50	03/09/21 17:25	M6
EPA 6010D	Magnesium, Dissolved	439	mg/L	5.0	03/01/21 18:03	
EPA 6010D	Manganese, Dissolved	0.19	mg/L	0.0050	03/01/21 01:07	
EPA 6010D	Sodium, Dissolved	3560	mg/L	250	03/01/21 18:03	
EPA 6020B	Boron	1.3J	mg/L	2.5	02/28/21 20:51	D3
EPA 6020B	Boron, Dissolved	1.2J	mg/L	2.5	02/28/21 23:53	
SM 2320B-2011	Alkalinity,Bicarbonate (CaCO3)	259	mg/L	5.0	03/01/21 17:23	
SM 2320B-2011	Alkalinity, Total as CaCO3	259	mg/L	5.0	03/01/21 17:23	
SM 2540C-2011	Total Dissolved Solids	10900	mg/L	2500	02/26/21 18:18	
SM 4500-S2D-2011	Sulfide	25.3	mg/L	5.0	03/02/21 17:41	

REPORT OF LABORATORY ANALYSIS

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

SUMMARY OF DETECTION

Project: MCMANUS 30050105.00006
Pace Project No.: 92524425

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92524425002	**VAP-18-W (21-23)**					
SM 5210B-2011	BOD, 5 day	40.0	mg/L	2.0	03/04/21 01:26	B2
EPA 300.0 Rev 2.1 1993	Chloride	6300	mg/L	100	02/26/21 20:20	
EPA 300.0 Rev 2.1 1993	Sulfate	765	mg/L	100	02/26/21 20:20	
SM 4500-P E-2011	Orthophosphate as P	0.49	mg/L	0.25	02/27/21 04:36	
EPA 9060A	Total Organic Carbon	8.5	mg/L	1.0	02/28/21 20:58	
EPA 9060A	Total Organic Carbon	8.2	mg/L	1.0	02/28/21 20:58	
EPA 9060A	Total Organic Carbon	8.4	mg/L	1.0	02/28/21 20:58	
EPA 9060A	Total Organic Carbon	8.5	mg/L	1.0	02/28/21 20:58	
EPA 9060A	Mean Total Organic Carbon	8.4	mg/L	1.0	02/28/21 20:58	
92524425003	**VAP-18-W (26-28)**					
EPA 6010D	Calcium	143	mg/L	1.0	02/27/21 19:43	
EPA 6010D	Iron	0.54	mg/L	0.050	03/08/21 23:42	
EPA 6010D	Magnesium	296	mg/L	1.0	02/27/21 19:43	
EPA 6010D	Manganese	0.15	mg/L	0.050	02/27/21 19:43	
EPA 6010D	Potassium	105	mg/L	50.0	02/27/21 19:43	
EPA 6010D	Sodium	2280	mg/L	250	03/01/21 20:00	
EPA 6010D	Calcium, Dissolved	142	mg/L	5.0	03/01/21 18:07	
EPA 6010D	Iron, Dissolved	4.9	mg/L	0.50	03/09/21 17:38	
EPA 6010D	Magnesium, Dissolved	291	mg/L	5.0	03/01/21 18:07	
EPA 6010D	Manganese, Dissolved	0.13	mg/L	0.0050	03/01/21 01:11	
EPA 6010D	Sodium, Dissolved	2160	mg/L	250	03/01/21 18:07	
EPA 6020B	Boron	1.2J	mg/L	2.5	02/28/21 20:55	D3
EPA 6020B	Boron, Dissolved	0.82J	mg/L	2.5	02/28/21 23:57	
SM 2320B-2011	Alkalinity,Bicarbonate (CaCO3)	483	mg/L	5.0	03/01/21 17:34	
SM 2320B-2011	Alkalinity, Total as CaCO3	483	mg/L	5.0	03/01/21 17:34	
SM 2540C-2011	Total Dissolved Solids	8450	mg/L	1250	02/26/21 18:19	
SM 4500-S2D-2011	Sulfide	35.1	mg/L	5.0	03/02/21 17:42	
SM 5210B-2011	BOD, 5 day	20.0	mg/L	2.0	03/04/21 01:30	B2
EPA 300.0 Rev 2.1 1993	Chloride	3960	mg/L	100	02/26/21 20:48	
EPA 300.0 Rev 2.1 1993	Sulfate	334	mg/L	100	02/26/21 20:48	
SM 4500-P E-2011	Orthophosphate as P	0.64	mg/L	0.25	02/27/21 04:37	
EPA 9060A	Total Organic Carbon	7.4	mg/L	1.0	02/28/21 21:53	
EPA 9060A	Total Organic Carbon	7.6	mg/L	1.0	02/28/21 21:53	
EPA 9060A	Total Organic Carbon	7.7	mg/L	1.0	02/28/21 21:53	
EPA 9060A	Total Organic Carbon	7.7	mg/L	1.0	02/28/21 21:53	
EPA 9060A	Mean Total Organic Carbon	7.6	mg/L	1.0	02/28/21 21:53	
92524425004	**VAP-18-W (5-10)**					
EPA 6010D	Calcium	48.7	mg/L	1.0	02/27/21 19:46	
EPA 6010D	Iron	1.9	mg/L	0.50	02/27/21 19:46	
EPA 6010D	Magnesium	157	mg/L	1.0	02/27/21 19:46	
EPA 6010D	Manganese	0.037J	mg/L	0.050	02/27/21 19:46	
EPA 6010D	Potassium	77.2	mg/L	50.0	02/27/21 19:46	
EPA 6010D	Sodium	1750	mg/L	250	03/01/21 20:04	
EPA 6010D	Calcium, Dissolved	43.3	mg/L	0.10	03/01/21 01:14	
EPA 6010D	Magnesium, Dissolved	151	mg/L	2.0	03/01/21 18:10	
EPA 6010D	Manganese, Dissolved	0.027	mg/L	0.0050	03/01/21 01:14	B

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
110 Technology Parkway
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(770)734-4200

SUMMARY OF DETECTION

Project: MCMANUS 30050105.00006
Pace Project No.: 92524425

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92524425004	**VAP-18-W (5-10)**					
EPA 6010D	Potassium, Dissolved	73.4J	mg/L	100	03/01/21 18:10	
EPA 6010D	Sodium, Dissolved	1610	mg/L	100	03/01/21 18:10	
EPA 6020B	Boron	1.5J	mg/L	2.5	02/28/21 21:17	D3
EPA 6020B	Boron, Dissolved	1.4J	mg/L	5.0	03/01/21 12:22	
SM 2320B-2011	Alkalinity,Bicarbonate (CaCO3)	148	mg/L	5.0	03/01/21 17:44	
SM 2320B-2011	Alkalinity, Total as CaCO3	148	mg/L	5.0	03/01/21 17:44	
SM 2540C-2011	Total Dissolved Solids	6800	mg/L	833	02/26/21 18:19	
EPA 300.0 Rev 2.1 1993	Chloride	2580	mg/L	100	02/26/21 21:15	M6
EPA 300.0 Rev 2.1 1993	Sulfate	384	mg/L	100	02/26/21 21:15	M6
SM 4500-P E-2011	Orthophosphate as P	0.33	mg/L	0.25	02/27/21 04:38	H1
EPA 9060A	Total Organic Carbon	14.1	mg/L	1.0	02/28/21 22:11	
EPA 9060A	Total Organic Carbon	13.8	mg/L	1.0	02/28/21 22:11	
EPA 9060A	Total Organic Carbon	13.7	mg/L	1.0	02/28/21 22:11	
EPA 9060A	Total Organic Carbon	13.8	mg/L	1.0	02/28/21 22:11	
EPA 9060A	Mean Total Organic Carbon	13.8	mg/L	1.0	02/28/21 22:11	

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ANALYTICAL RESULTS

Project: MCMANUS 30050105.00006
Pace Project No.: 92524425

Sample: VAP-32-W (22-24) **Lab ID: 92524425001** Collected: 02/25/21 12:20 Received: 02/26/21 11:10 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Calcium	**207**	mg/L	1.0	0.94	10	02/27/21 01:37	02/27/21 19:36	7440-70-2	
Iron	**2.7**	mg/L	0.50	0.42	10	02/27/21 01:37	02/27/21 19:36	7439-89-6	
Magnesium	**547**	mg/L	1.0	0.68	10	02/27/21 01:37	02/27/21 19:36	7439-95-4	
Manganese	**0.30**	mg/L	0.050	0.034	10	02/27/21 01:37	02/27/21 19:36	7439-96-5	
Potassium	**190**	mg/L	50.0	30.4	10	02/27/21 01:37	02/27/21 19:36	7440-09-7	
Sodium	**5000**	mg/L	500	61.1	100	02/27/21 01:37	03/01/21 19:48	7440-23-5	
6010 MET ICP, Dissolved	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Calcium, Dissolved	**194**	mg/L	1.0	0.94	10	02/28/21 16:17	03/01/21 18:39	7440-70-2	
Iron, Dissolved	**0.69**	mg/L	0.050	0.042	1	02/28/21 16:17	03/01/21 01:51	7439-89-6	
Magnesium, Dissolved	**538**	mg/L	1.0	0.68	10	02/28/21 16:17	03/01/21 18:39	7439-95-4	
Manganese, Dissolved	**0.24**	mg/L	0.0050	0.0034	1	02/28/21 16:17	03/01/21 01:51	7439-96-5	
Potassium, Dissolved	**182**	mg/L	50.0	30.4	10	02/28/21 16:17	03/01/21 18:39	7440-09-7	
Sodium, Dissolved	**4380**	mg/L	500	61.1	100	02/28/21 16:17	03/02/21 18:08	7440-23-5	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Arsenic	**0.019**	mg/L	0.010	0.0087	100	02/27/21 01:32	02/28/21 20:46	7440-38-2	D3
Boron	**1.9J**	mg/L	2.5	0.62	100	02/27/21 01:32	02/28/21 20:46	7440-42-8	D3
6020 MET ICPMS, Dissolved	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Arsenic, Dissolved	**0.014J**	mg/L	0.10	0.0087	100	02/28/21 16:17	03/01/21 12:18	7440-38-2	
Boron, Dissolved	**2.1J**	mg/L	5.0	0.85	100	02/28/21 16:17	03/01/21 12:18	7440-42-8	
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**212**	mg/L	5.0	5.0	1		03/01/21 16:56		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		03/01/21 16:56		
Alkalinity, Total as CaCO3	**212**	mg/L	5.0	5.0	1		03/01/21 16:56		
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**13900**	mg/L	2500	2500	1		02/26/21 18:18		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	**9.0**	mg/L	5.0	2.5	50		03/02/21 16:30	18496-25-8	
5210B BOD, 5 day	Analytical Method: SM 5210B-2011 Pace Analytical Services - Asheville								
BOD, 5 day	**160**	mg/L	2.0	2.0	1	02/27/21 04:40	03/04/21 01:24		B2

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: MCMANUS 30050105.00006
Pace Project No.: 92524425

Sample: VAP-32-W (22-24) **Lab ID: 92524425001** Collected: 02/25/21 12:20 Received: 02/26/21 11:10 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC anions 48hr	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**8570**	mg/L	100	60.0	100		02/26/21 19:52	16887-00-6	
Nitrate as N	ND	mg/L	0.10	0.060	1		02/26/21 19:38	14797-55-8	
Nitrite as N	ND	mg/L	0.10	0.050	1		02/26/21 19:38	14797-65-0	
Sulfate	**1200**	mg/L	100	50.0	100		02/26/21 19:52	14808-79-8	
SM4500P-E, Phosphate, Ortho	Analytical Method: SM 4500-P E-2011 Pace Analytical Services - Asheville								
Orthophosphate as P	**0.53**	mg/L	0.25	0.059	5		02/27/21 04:36		
Total Organic Carbon,Asheville	Analytical Method: EPA 9060A Pace Analytical Services - Asheville								
Total Organic Carbon	**6.9**	mg/L	1.0	0.50	1		02/28/21 20:40	7440-44-0	
Total Organic Carbon	**6.8**	mg/L	1.0	0.50	1		02/28/21 20:40	7440-44-0	
Total Organic Carbon	**6.9**	mg/L	1.0	0.50	1		02/28/21 20:40	7440-44-0	
Total Organic Carbon	**6.9**	mg/L	1.0	0.50	1		02/28/21 20:40	7440-44-0	
Mean Total Organic Carbon	**6.9**	mg/L	1.0	0.50	1		02/28/21 20:40	7440-44-0	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
110 Technology Parkway
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(770)734-4200

ANALYTICAL RESULTS

Project: MCMANUS 30050105.00006
Pace Project No.: 92524425

Sample: VAP-18-W (21-23) **Lab ID: 92524425002** Collected: 02/25/21 14:07 Received: 02/26/21 11:10 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Calcium	**171**	mg/L	1.0	0.94	10	02/27/21 01:37	02/27/21 19:39	7440-70-2	
Iron	**2.3**	mg/L	0.050	0.042	1	03/06/21 02:07	03/08/21 23:28	7439-89-6	
Magnesium	**440**	mg/L	1.0	0.68	10	02/27/21 01:37	02/27/21 19:39	7439-95-4	
Manganese	**0.23**	mg/L	0.050	0.034	10	02/27/21 01:37	02/27/21 19:39	7439-96-5	
Potassium	**153**	mg/L	50.0	30.4	10	02/27/21 01:37	02/27/21 19:39	7440-09-7	
Sodium	**3770**	mg/L	500	61.1	100	02/27/21 01:37	03/01/21 19:51	7440-23-5	
6010 MET ICP, Dissolved	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Calcium, Dissolved	**173**	mg/L	5.0	4.7	50	02/28/21 16:17	03/01/21 18:03	7440-70-2	
Iron, Dissolved	**4.0**	mg/L	0.50	0.42	10	03/09/21 10:30	03/09/21 17:25	7439-89-6	M6
Magnesium, Dissolved	**439**	mg/L	5.0	3.4	50	02/28/21 16:17	03/01/21 18:03	7439-95-4	
Manganese, Dissolved	**0.19**	mg/L	0.0050	0.0034	1	02/28/21 16:17	03/01/21 01:07	7439-96-5	
Potassium, Dissolved	ND	mg/L	250	152	50	02/28/21 16:17	03/01/21 18:03	7440-09-7	
Sodium, Dissolved	**3560**	mg/L	250	30.5	50	02/28/21 16:17	03/01/21 18:03	7440-23-5	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Arsenic	ND	mg/L	0.010	0.0087	100	02/27/21 01:32	02/28/21 20:51	7440-38-2	D3
Boron	**1.3J**	mg/L	2.5	0.62	100	02/27/21 01:32	02/28/21 20:51	7440-42-8	D3
6020 MET ICPMS, Dissolved	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Arsenic, Dissolved	ND	mg/L	0.010	0.0087	100	02/28/21 16:17	02/28/21 23:53	7440-38-2	D3
Boron, Dissolved	**1.2J**	mg/L	2.5	0.62	100	02/28/21 16:17	02/28/21 23:53	7440-42-8	
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**259**	mg/L	5.0	5.0	1		03/01/21 17:23		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		03/01/21 17:23		
Alkalinity, Total as CaCO3	**259**	mg/L	5.0	5.0	1		03/01/21 17:23		
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**10900**	mg/L	2500	2500	1		02/26/21 18:18		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	**25.3**	mg/L	5.0	2.5	50		03/02/21 17:41	18496-25-8	
5210B BOD, 5 day	Analytical Method: SM 5210B-2011 Pace Analytical Services - Asheville								
BOD, 5 day	**40.0**	mg/L	2.0	2.0	1	02/27/21 04:40	03/04/21 01:26		B2

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: MCMANUS 30050105.00006
Pace Project No.: 92524425

Sample: VAP-18-W (21-23) **Lab ID: 92524425002** Collected: 02/25/21 14:07 Received: 02/26/21 11:10 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC anions 48hr	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**6300**	mg/L	100	60.0	100		02/26/21 20:20	16887-00-6	
Nitrate as N	ND	mg/L	0.10	0.060	1		02/26/21 20:06	14797-55-8	
Nitrite as N	ND	mg/L	0.10	0.050	1		02/26/21 20:06	14797-65-0	
Sulfate	**765**	mg/L	100	50.0	100		02/26/21 20:20	14808-79-8	
SM4500P-E, Phosphate, Ortho	Analytical Method: SM 4500-P E-2011 Pace Analytical Services - Asheville								
Orthophosphate as P	**0.49**	mg/L	0.25	0.059	5		02/27/21 04:36		
Total Organic Carbon,Asheville	Analytical Method: EPA 9060A Pace Analytical Services - Asheville								
Total Organic Carbon	**8.5**	mg/L	1.0	0.50	1		02/28/21 20:58	7440-44-0	
Total Organic Carbon	**8.2**	mg/L	1.0	0.50	1		02/28/21 20:58	7440-44-0	
Total Organic Carbon	**8.4**	mg/L	1.0	0.50	1		02/28/21 20:58	7440-44-0	
Total Organic Carbon	**8.5**	mg/L	1.0	0.50	1		02/28/21 20:58	7440-44-0	
Mean Total Organic Carbon	**8.4**	mg/L	1.0	0.50	1		02/28/21 20:58	7440-44-0	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: MCMANUS 30050105.00006
Pace Project No.: 92524425

Sample: VAP-18-W (26-28) **Lab ID: 92524425003** Collected: 02/25/21 14:25 Received: 02/26/21 11:10 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Calcium	**143**	mg/L	1.0	0.94	10	02/27/21 01:37	02/27/21 19:43	7440-70-2	
Iron	**0.54**	mg/L	0.050	0.042	1	03/06/21 02:07	03/08/21 23:42	7439-89-6	
Magnesium	**296**	mg/L	1.0	0.68	10	02/27/21 01:37	02/27/21 19:43	7439-95-4	
Manganese	**0.15**	mg/L	0.050	0.034	10	02/27/21 01:37	02/27/21 19:43	7439-96-5	
Potassium	**105**	mg/L	50.0	30.4	10	02/27/21 01:37	02/27/21 19:43	7440-09-7	
Sodium	**2280**	mg/L	250	30.5	50	02/27/21 01:37	03/01/21 20:00	7440-23-5	
6010 MET ICP, Dissolved	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Calcium, Dissolved	**142**	mg/L	5.0	4.7	50	02/28/21 16:17	03/01/21 18:07	7440-70-2	
Iron, Dissolved	**4.9**	mg/L	0.50	0.42	10	03/09/21 10:30	03/09/21 17:38	7439-89-6	
Magnesium, Dissolved	**291**	mg/L	5.0	3.4	50	02/28/21 16:17	03/01/21 18:07	7439-95-4	
Manganese, Dissolved	**0.13**	mg/L	0.0050	0.0034	1	02/28/21 16:17	03/01/21 01:11	7439-96-5	
Potassium, Dissolved	ND	mg/L	250	152	50	02/28/21 16:17	03/01/21 18:07	7440-09-7	
Sodium, Dissolved	**2160**	mg/L	250	30.5	50	02/28/21 16:17	03/01/21 18:07	7440-23-5	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Arsenic	ND	mg/L	0.010	0.0087	100	02/27/21 01:32	02/28/21 20:55	7440-38-2	D3
Boron	**1.2J**	mg/L	2.5	0.62	100	02/27/21 01:32	02/28/21 20:55	7440-42-8	D3
6020 MET ICPMS, Dissolved	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Arsenic, Dissolved	ND	mg/L	0.010	0.0087	100	02/28/21 16:17	02/28/21 23:57	7440-38-2	D3
Boron, Dissolved	**0.82J**	mg/L	2.5	0.62	100	02/28/21 16:17	02/28/21 23:57	7440-42-8	
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**483**	mg/L	5.0	5.0	1		03/01/21 17:34		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		03/01/21 17:34		
Alkalinity, Total as CaCO3	**483**	mg/L	5.0	5.0	1		03/01/21 17:34		
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**8450**	mg/L	1250	1250	1		02/26/21 18:19		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	**35.1**	mg/L	5.0	2.5	50		03/02/21 17:42	18496-25-8	
5210B BOD, 5 day	Analytical Method: SM 5210B-2011 Pace Analytical Services - Asheville								
BOD, 5 day	**20.0**	mg/L	2.0	2.0	1	02/27/21 04:40	03/04/21 01:30		B2

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: MCMANUS 30050105.00006
Pace Project No.: 92524425

Sample: VAP-18-W (26-28) **Lab ID: 92524425003** Collected: 02/25/21 14:25 Received: 02/26/21 11:10 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC anions 48hr	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**3960**	mg/L	100	60.0	100		02/26/21 20:48	16887-00-6	
Nitrate as N	ND	mg/L	0.10	0.060	1		02/26/21 20:34	14797-55-8	
Nitrite as N	ND	mg/L	0.10	0.050	1		02/26/21 20:34	14797-65-0	
Sulfate	**334**	mg/L	100	50.0	100		02/26/21 20:48	14808-79-8	
SM4500P-E, Phosphate, Ortho	Analytical Method: SM 4500-P E-2011 Pace Analytical Services - Asheville								
Orthophosphate as P	**0.64**	mg/L	0.25	0.059	5		02/27/21 04:37		
Total Organic Carbon,Asheville	Analytical Method: EPA 9060A Pace Analytical Services - Asheville								
Total Organic Carbon	**7.4**	mg/L	1.0	0.50	1		02/28/21 21:53	7440-44-0	
Total Organic Carbon	**7.6**	mg/L	1.0	0.50	1		02/28/21 21:53	7440-44-0	
Total Organic Carbon	**7.7**	mg/L	1.0	0.50	1		02/28/21 21:53	7440-44-0	
Total Organic Carbon	**7.7**	mg/L	1.0	0.50	1		02/28/21 21:53	7440-44-0	
Mean Total Organic Carbon	**7.6**	mg/L	1.0	0.50	1		02/28/21 21:53	7440-44-0	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: MCMANUS 30050105.00006
Pace Project No.: 92524425

Sample: VAP-18-W (5-10) **Lab ID: 92524425004** Collected: 02/25/21 14:52 Received: 02/26/21 11:10 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Calcium	**48.7**	mg/L	1.0	0.94	10	02/27/21 01:37	02/27/21 19:46	7440-70-2	
Iron	**1.9**	mg/L	0.50	0.42	10	02/27/21 01:37	02/27/21 19:46	7439-89-6	
Magnesium	**157**	mg/L	1.0	0.68	10	02/27/21 01:37	02/27/21 19:46	7439-95-4	
Manganese	**0.037J**	mg/L	0.050	0.034	10	02/27/21 01:37	02/27/21 19:46	7439-96-5	
Potassium	**77.2**	mg/L	50.0	30.4	10	02/27/21 01:37	02/27/21 19:46	7440-09-7	
Sodium	**1750**	mg/L	250	30.5	50	02/27/21 01:37	03/01/21 20:04	7440-23-5	
6010 MET ICP, Dissolved	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Calcium, Dissolved	**43.3**	mg/L	0.10	0.094	1	02/28/21 16:17	03/01/21 01:14	7440-70-2	
Iron, Dissolved	ND	mg/L	1.0	0.83	20	02/28/21 16:17	03/01/21 18:10	7439-89-6	
Magnesium, Dissolved	**151**	mg/L	2.0	1.4	20	02/28/21 16:17	03/01/21 18:10	7439-95-4	
Manganese, Dissolved	**0.027**	mg/L	0.0050	0.0034	1	02/28/21 16:17	03/01/21 01:14	7439-96-5	B
Potassium, Dissolved	**73.4J**	mg/L	100	60.8	20	02/28/21 16:17	03/01/21 18:10	7440-09-7	
Sodium, Dissolved	**1610**	mg/L	100	12.2	20	02/28/21 16:17	03/01/21 18:10	7440-23-5	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Arsenic	ND	mg/L	0.010	0.0087	100	02/27/21 01:32	02/28/21 21:17	7440-38-2	D3
Boron	**1.5J**	mg/L	2.5	0.62	100	02/27/21 01:32	02/28/21 21:17	7440-42-8	D3
6020 MET ICPMS, Dissolved	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Arsenic, Dissolved	ND	mg/L	0.10	0.0087	100	02/28/21 16:17	03/01/21 12:22	7440-38-2	D3
Boron, Dissolved	**1.4J**	mg/L	5.0	0.85	100	02/28/21 16:17	03/01/21 12:22	7440-42-8	
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**148**	mg/L	5.0	5.0	1		03/01/21 17:44		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		03/01/21 17:44		
Alkalinity, Total as CaCO3	**148**	mg/L	5.0	5.0	1		03/01/21 17:44		
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**6800**	mg/L	833	833	1		02/26/21 18:19		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	ND	mg/L	0.10	0.050	1		03/02/21 16:33	18496-25-8	
5210B BOD, 5 day	Analytical Method: SM 5210B-2011 Pace Analytical Services - Asheville								
BOD, 5 day	ND	mg/L	2.0	2.0	1	02/27/21 04:40	03/04/21 01:31		B2

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: MCMANUS 30050105.00006
Pace Project No.: 92524425

Sample: VAP-18-W (5-10) **Lab ID: 92524425004** Collected: 02/25/21 14:52 Received: 02/26/21 11:10 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC anions 48hr	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**2580**	mg/L	100	60.0	100		02/26/21 21:15	16887-00-6	M6
Nitrate as N	ND	mg/L	0.10	0.060	1		02/26/21 21:01	14797-55-8	
Nitrite as N	ND	mg/L	0.10	0.050	1		02/26/21 21:01	14797-65-0	M1
Sulfate	**384**	mg/L	100	50.0	100		02/26/21 21:15	14808-79-8	M6
SM4500P-E, Phosphate, Ortho	Analytical Method: SM 4500-P E-2011 Pace Analytical Services - Asheville								
Orthophosphate as P	**0.33**	mg/L	0.25	0.059	5		02/27/21 04:38		H1
Total Organic Carbon,Asheville	Analytical Method: EPA 9060A Pace Analytical Services - Asheville								
Total Organic Carbon	**14.1**	mg/L	1.0	0.50	1		02/28/21 22:11	7440-44-0	
Total Organic Carbon	**13.8**	mg/L	1.0	0.50	1		02/28/21 22:11	7440-44-0	
Total Organic Carbon	**13.7**	mg/L	1.0	0.50	1		02/28/21 22:11	7440-44-0	
Total Organic Carbon	**13.8**	mg/L	1.0	0.50	1		02/28/21 22:11	7440-44-0	
Mean Total Organic Carbon	**13.8**	mg/L	1.0	0.50	1		02/28/21 22:11	7440-44-0	

REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: MCMANUS 30050105.00006
Pace Project No.: 92524425

QC Batch: 603057
QC Batch Method: EPA 3010A
Analysis Method: EPA 6010D
Analysis Description: 6010 MET
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524425001, 92524425002, 92524425003, 92524425004

METHOD BLANK: 3177656 Matrix: Water
Associated Lab Samples: 92524425001, 92524425002, 92524425003, 92524425004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Calcium	mg/L	ND	0.10	0.094	03/01/21 19:41	
Iron	mg/L	ND	0.050	0.042	03/01/21 19:41	
Magnesium	mg/L	ND	0.10	0.068	03/01/21 19:41	
Manganese	mg/L	ND	0.0050	0.0034	03/01/21 19:41	
Potassium	mg/L	ND	5.0	3.0	03/01/21 19:41	
Sodium	mg/L	ND	5.0	0.61	03/01/21 19:41	

LABORATORY CONTROL SAMPLE: 3177657

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium	mg/L	5	5.1	102	80-120	
Iron	mg/L	5	5.1	102	80-120	
Magnesium	mg/L	5	5.2	105	80-120	
Manganese	mg/L	0.5	0.51	101	80-120	
Potassium	mg/L	5	5.1	102	80-120	
Sodium	mg/L	5	5.1	103	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3177658 3177659

Parameter	Units	92524458002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium	mg/L	23.5	5	5	29.1	28.7	111	104	75-125	1	20	
Iron	mg/L	1.6	5	5	6.7	6.6	103	100	75-125	2	20	
Magnesium	mg/L	68.8	5	5	73.3	74.6	90	116	75-125	2	20	
Manganese	mg/L	0.043J	0.5	0.5	0.55	0.55	102	102	75-125	0	20	
Potassium	mg/L	68.1	5	5	72.8	73.0	93	98	75-125	0	20	
Sodium	mg/L	656	5	5	666	661	196	106	75-125	1	20	M6

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REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: MCMANUS 30050105.00006
Pace Project No.: 92524425

QC Batch: 604726
QC Batch Method: EPA 3010A
Analysis Method: EPA 6010D
Analysis Description: 6010 MET
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524425002, 92524425003

METHOD BLANK: 3186229 Matrix: Water
Associated Lab Samples: 92524425002, 92524425003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Iron	mg/L	ND	0.050	0.042	03/08/21 23:22	

LABORATORY CONTROL SAMPLE: 3186230

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Iron	mg/L	5	5.1	101	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3186231 3186232

Parameter	Units	92524425002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Iron	mg/L	2.3	5	5	7.4	7.5	102	104	75-125	1	20	

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REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: MCMANUS 30050105.00006
Pace Project No.: 92524425

QC Batch: 603011
QC Batch Method: EPA 3010A
Analysis Method: EPA 6010D
Analysis Description: 6010 MET Filtered Diss.
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524425001, 92524425002, 92524425003, 92524425004

METHOD BLANK: 3177320 Matrix: Water
Associated Lab Samples: 92524425001, 92524425002, 92524425003, 92524425004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Calcium, Dissolved	mg/L	ND	0.10	0.094	03/02/21 13:07	
Iron, Dissolved	mg/L	ND	0.050	0.042	03/02/21 13:07	
Magnesium, Dissolved	mg/L	ND	0.10	0.068	03/01/21 17:38	
Manganese, Dissolved	mg/L	0.0047J	0.0050	0.0034	03/01/21 17:38	
Potassium, Dissolved	mg/L	ND	5.0	3.0	03/01/21 17:38	
Sodium, Dissolved	mg/L	ND	5.0	0.61	03/01/21 17:38	

LABORATORY CONTROL SAMPLE: 3177321

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium, Dissolved	mg/L	5	4.9	97	80-120	
Iron, Dissolved	mg/L	5	4.9	97	80-120	
Magnesium, Dissolved	mg/L	5	4.9	97	80-120	
Manganese, Dissolved	mg/L	0.5	0.47	94	80-120	
Potassium, Dissolved	mg/L	5	4.8J	95	80-120	
Sodium, Dissolved	mg/L	5	4.8J	97	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3177322 3177323

Parameter	Units	92524458002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium, Dissolved	mg/L	21.0	5	5	25.6	25.2	92	86	75-125	1	20	
Iron, Dissolved	mg/L	ND	5	5	7.3	5.1	141	96	75-125	36	20	M6,R1
Magnesium, Dissolved	mg/L	57.3	5	5	62.9	62.8	111	111	75-125	0	20	
Manganese, Dissolved	mg/L	0.036	0.5	0.5	0.45	0.45	83	82	75-125	1	20	
Potassium, Dissolved	mg/L	63.8	5	5	66.1	67.7	47	78	75-125	2	20	M6
Sodium, Dissolved	mg/L	622	5	5	605	616	-350	-120	75-125	2	20	M6

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REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: MCMANUS 30050105.00006
Pace Project No.: 92524425

QC Batch: 605173
QC Batch Method: EPA 3010A
Analysis Method: EPA 6010D
Analysis Description: 6010 MET Filtered Diss.
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524425002, 92524425003

METHOD BLANK: 3188175 Matrix: Water
Associated Lab Samples: 92524425002, 92524425003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Iron, Dissolved	mg/L	ND	0.050	0.042	03/09/21 17:18	

LABORATORY CONTROL SAMPLE: 3188176

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Iron, Dissolved	mg/L	5	5.0	100	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3188177 3188178

Parameter	Units	92524425002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Iron, Dissolved	mg/L	4.0	5	5	5.0	5.2	20	23	75-125	3	20	M6

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REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: MCMANUS 30050105.00006
Pace Project No.: 92524425

QC Batch: 603022
QC Batch Method: EPA 3010A
Analysis Method: EPA 6020B
Analysis Description: 6020 MET
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524425001, 92524425002, 92524425003, 92524425004

METHOD BLANK: 3177388 Matrix: Water
Associated Lab Samples: 92524425001, 92524425002, 92524425003, 92524425004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Arsenic	mg/L	ND	0.00010	0.000087	02/28/21 20:38	
Boron	mg/L	ND	0.025	0.0062	02/28/21 20:38	

LABORATORY CONTROL SAMPLE: 3177389

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	0.01	0.010	101	80-120	
Boron	mg/L	0.05	0.050	99	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3177390 3177391

Parameter	Units	92524458002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	mg/L	ND	0.01	0.01	0.0096J	0.010	88	96	75-125		20	
Boron	mg/L	0.81J	0.05	0.05	0.95J	0.83J	277	48	75-125		20	M6

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REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: MCMANUS 30050105.00006
Pace Project No.: 92524425

QC Batch: 603012 — Analysis Method: EPA 6020B
QC Batch Method: EPA 3010A — Analysis Description: 6020 MET Dissolved
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524425001, 92524425002, 92524425003, 92524425004

METHOD BLANK: 3177326 Matrix: Water
Associated Lab Samples: 92524425001, 92524425002, 92524425003, 92524425004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Arsenic, Dissolved	mg/L	ND	0.0010	0.000087	03/01/21 11:57	
Boron, Dissolved	mg/L	ND	0.050	0.0085	03/01/21 11:57	

LABORATORY CONTROL SAMPLE: 3177327

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic, Dissolved	mg/L	0.01	0.0096	96	80-120	
Boron, Dissolved	mg/L	0.05	0.045J	89	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3177328 3177329

Parameter	Units	92524458002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic, Dissolved	mg/L	ND	0.01	0.01	ND	0.0094J	73	91	75-125		20	M6
Boron, Dissolved	mg/L	ND	0.05	0.05	ND	ND	-369	-74	75-125		20	M6

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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QUALITY CONTROL DATA

Project: MCMANUS 30050105.00006
Pace Project No.: 92524425

QC Batch: 603230 — Analysis Method: SM 2320B-2011
QC Batch Method: SM 2320B-2011 — Analysis Description: 2320B Alkalinity
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524425001, 92524425002, 92524425003, 92524425004

METHOD BLANK: 3178334 Matrix: Water
Associated Lab Samples: 92524425001, 92524425002, 92524425003, 92524425004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	ND	5.0	5.0	03/01/21 16:46	
Alkalinity,Bicarbonate (CaCO3)	mg/L	ND	5.0	5.0	03/01/21 16:46	
Alkalinity,Carbonate (CaCO3)	mg/L	ND	5.0	5.0	03/01/21 16:46	

LABORATORY CONTROL SAMPLE: 3178335

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	50	50.1	100	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3178336 3178337

Parameter	Units	92524425001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	212	50	50	256	258	88	93	80-120	1	25	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3178340 3178341

Parameter	Units	92524458002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	309	50	50	363	360	108	101	80-120	1	25	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: MCMANUS 30050105.00006
Pace Project No.: 92524425

QC Batch: 603013 | Analysis Method: SM 2540C-2011
QC Batch Method: SM 2540C-2011 | Analysis Description: 2540C Total Dissolved Solids
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524425001, 92524425002, 92524425003, 92524425004

METHOD BLANK: 3177334 Matrix: Water
Associated Lab Samples: 92524425001, 92524425002, 92524425003, 92524425004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	ND	25.0	25.0	02/26/21 18:18	

LABORATORY CONTROL SAMPLE: 3177335

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	250	248	99	90-110	

SAMPLE DUPLICATE: 3177336

Parameter	Units	92524425001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	13900	12500	11	25	

SAMPLE DUPLICATE: 3177597

Parameter	Units	92524458002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	2330	2090	11	25	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: MCMANUS 30050105.00006
Pace Project No.: 92524425

QC Batch: 603514 — Analysis Method: SM 4500-S2D-2011
QC Batch Method: SM 4500-S2D-2011 — Analysis Description: 4500S2D Sulfide Water
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524425001, 92524425002, 92524425003, 92524425004

METHOD BLANK: 3179465 Matrix: Water
Associated Lab Samples: 92524425001, 92524425002, 92524425003, 92524425004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Sulfide	mg/L	ND	0.10	0.050	03/02/21 16:23	

LABORATORY CONTROL SAMPLE: 3179466

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfide	mg/L	0.5	0.44	88	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3179467 3179468

Parameter	Units	92524097006 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfide	mg/L	ND	0.5	0.5	0.50	0.50	100	100	80-120	0	10	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3179477 3179478

Parameter	Units	92524458002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfide	mg/L	36.8	0.5	0.5	34.3	34.4	-501	-483	80-120	0	10	M6

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: MCMANUS 30050105.00006
Pace Project No.: 92524425

QC Batch: 603073 — Analysis Method: SM 5210B-2011
QC Batch Method: SM 5210B-2011 — Analysis Description: 5210B BOD, 5 day
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524425001, 92524425002, 92524425003, 92524425004

METHOD BLANK: 3177707 Matrix: Water
Associated Lab Samples: 92524425001, 92524425002, 92524425003, 92524425004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
BOD, 5 day	mg/L	ND	2.0	2.0	03/04/21 01:07	

LABORATORY CONTROL SAMPLE: 3177709

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
BOD, 5 day	mg/L	198	203	102	84.6-115	

SAMPLE DUPLICATE: 3177710

Parameter	Units	92524430001 Result	Dup Result	RPD	Max RPD	Qualifiers
BOD, 5 day	mg/L	195	189	3	25	

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REPORT OF LABORATORY ANALYSIS

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(770)734-4200

QUALITY CONTROL DATA

Project: MCMANUS 30050105.00006
Pace Project No.: 92524425

QC Batch: 602986
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: 92524425001, 92524425002, 92524425003, 92524425004

METHOD BLANK: 3177123 Matrix: Water
Associated Lab Samples: 92524425001, 92524425002, 92524425003, 92524425004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	ND	1.0	0.60	02/26/21 11:43	
Nitrate as N	mg/L	ND	0.10	0.060	02/26/21 11:43	
Nitrite as N	mg/L	ND	0.10	0.050	02/26/21 11:43	
Sulfate	mg/L	ND	1.0	0.50	02/26/21 11:43	

LABORATORY CONTROL SAMPLE: 3177124

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	50	50.7	101	90-110	
Nitrate as N	mg/L	2.5	2.5	100	90-110	
Nitrite as N	mg/L	2.5	2.6	105	90-110	
Sulfate	mg/L	50	51.9	104	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3177125 3177126

Parameter	Units	92524458002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	971	50	50	1010	1040	86	133	90-110	2	10	M6
Nitrate as N	mg/L	ND	2.5	2.5	2.6	2.6	103	105	90-110	2	10	
Nitrite as N	mg/L	ND	2.5	2.5	ND	ND	0	0	90-110		10	M1
Sulfate	mg/L	4.8	50	50	58.0	59.0	106	108	90-110	2	10	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3177127 3177128

Parameter	Units	92524425004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	2580	50	50	2700	2650	236	141	90-110	2	10	M6
Nitrate as N	mg/L	ND	2.5	2.5	2.6	2.7	104	106	90-110	2	10	
Nitrite as N	mg/L	ND	2.5	2.5	1.6	1.5	65	62	90-110	5	10	M1
Sulfate	mg/L	384	50	50	473	464	177	160	90-110	2	10	M6

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: MCMANUS 30050105.00006
Pace Project No.: 92524425

QC Batch: 603072 | Analysis Method: SM 4500-P E-2011
QC Batch Method: SM 4500-P E-2011 | Analysis Description: SM4500P-E Phosphorus, Ortho
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524425001, 92524425002, 92524425003, 92524425004

METHOD BLANK: 3177701 Matrix: Water
Associated Lab Samples: 92524425001, 92524425002, 92524425003, 92524425004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Orthophosphate as P	mg/L	ND	0.050	0.012	02/27/21 04:29	

LABORATORY CONTROL SAMPLE: 3177702

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Orthophosphate as P	mg/L	0.25	0.26	103	49-145	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3177703 3177704

Parameter	Units	92524458002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Orthophosphate as P	mg/L	0.85	1.2	1.2	2.2	2.2	105	105	90-110	0	10	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3177705 3177706

Parameter	Units	92524425004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Orthophosphate as P	mg/L	0.33	1.2	1.2	1.5	1.5	97	97	90-110	0	10	H1

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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(770)734-4200

QUALITY CONTROL DATA

Project: MCMANUS 30050105.00006
Pace Project No.: 92524425

QC Batch: 603152
QC Batch Method: EPA 9060A
Analysis Method: EPA 9060A
Analysis Description: 9060 TOC, AVL
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524425001, 92524425002, 92524425003, 92524425004

METHOD BLANK: 3177963 Matrix: Water
Associated Lab Samples: 92524425001, 92524425002, 92524425003, 92524425004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mean Total Organic Carbon	mg/L	ND	1.0	0.50	02/28/21 18:24	
Total Organic Carbon	mg/L	ND	1.0	0.50	02/28/21 18:24	
Total Organic Carbon	mg/L	ND	1.0	0.50	02/28/21 18:24	
Total Organic Carbon	mg/L	ND	1.0	0.50	02/28/21 18:24	
Total Organic Carbon	mg/L	ND	1.0	0.50	02/28/21 18:24	

LABORATORY CONTROL SAMPLE: 3177964

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mean Total Organic Carbon	mg/L	25	24.1	96	75-125	
Total Organic Carbon	mg/L	25	23.8	95	75-125	
Total Organic Carbon	mg/L	25	24.7	99	75-125	
Total Organic Carbon	mg/L	25	23.7	95	75-125	
Total Organic Carbon	mg/L	25	24.3	97	75-125	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3177965 3177966

Parameter	Units	92523018011 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/L	1.0	25	25	26.0	26.3	100	101	75-125	1	25	
Total Organic Carbon	mg/L	ND	25	25	26.0	26.5	100	102	75-125	2	25	
Total Organic Carbon	mg/L	ND	25	25	26.3	26.5	102	103	75-125	1	25	
Total Organic Carbon	mg/L	1.6	25	25	25.8	25.6	97	96	75-125	1	25	
Total Organic Carbon	mg/L	ND	25	25	26.0	26.5	101	103	75-125	2	25	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3177967 3177968

Parameter	Units	92524458002 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/L	7.7	25	25	32.6	33.1	100	102	75-125	2	25	
Total Organic Carbon	mg/L	7.7	25	25	32.8	33.2	100	102	75-125	1	25	
Total Organic Carbon	mg/L	7.8	25	25	33.1	33.1	101	101	75-125	0	25	
Total Organic Carbon	mg/L	7.7	25	25	31.6	33.0	96	101	75-125	4	25	
Total Organic Carbon	mg/L	7.7	25	25	33.0	33.3	101	103	75-125	1	25	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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(770)734-4200

QUALIFIERS

Project: MCMANUS 30050105.00006
Pace Project No.: 92524425

DEFINITIONS

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

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

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

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

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

S - Surrogate

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

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

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

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

Acid preservation may not be appropriate for 2 Chloroethylvinyl ether.

A separate vial preserved to a pH of 4-5 is recommended in SW846 Chapter 4 for the analysis of Acrolein and Acrylonitrile by EPA Method 8260.

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

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

TNI - The NELAC Institute.

ANALYTE QUALIFIERS

B	Analyte was detected in the associated method blank.
B2	Oxygen usage is less than 2.0 for all dilutions set. The reported value is an estimated less than value and is calculated for the dilution using the most amount of sample.
D3	Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference.
H1	Analysis conducted outside the EPA method holding time.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
M6	Matrix spike and Matrix spike duplicate recovery not evaluated against control limits due to sample dilution.
R1	RPD value was outside control limits.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: MCMANUS 30050105.00006
Pace Project No.: 92524425

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
92524425001	**VAP-32-W (22-24)**	EPA 3010A	603057	EPA 6010D	603096
92524425002	**VAP-18-W (21-23)**	EPA 3010A	603057	EPA 6010D	603096
92524425002	**VAP-18-W (21-23)**	EPA 3010A	604726	EPA 6010D	604748
92524425003	**VAP-18-W (26-28)**	EPA 3010A	603057	EPA 6010D	603096
92524425003	**VAP-18-W (26-28)**	EPA 3010A	604726	EPA 6010D	604748
92524425004	**VAP-18-W (5-10)**	EPA 3010A	603057	EPA 6010D	603096
92524425001	**VAP-32-W (22-24)**	EPA 3010A	603011	EPA 6010D	603155
92524425002	**VAP-18-W (21-23)**	EPA 3010A	603011	EPA 6010D	603155
92524425002	**VAP-18-W (21-23)**	EPA 3010A	605173	EPA 6010D	605184
92524425003	**VAP-18-W (26-28)**	EPA 3010A	603011	EPA 6010D	603155
92524425003	**VAP-18-W (26-28)**	EPA 3010A	605173	EPA 6010D	605184
92524425004	**VAP-18-W (5-10)**	EPA 3010A	603011	EPA 6010D	603155
92524425001	**VAP-32-W (22-24)**	EPA 3010A	603022	EPA 6020B	603097
92524425002	**VAP-18-W (21-23)**	EPA 3010A	603022	EPA 6020B	603097
92524425003	**VAP-18-W (26-28)**	EPA 3010A	603022	EPA 6020B	603097
92524425004	**VAP-18-W (5-10)**	EPA 3010A	603022	EPA 6020B	603097
92524425001	**VAP-32-W (22-24)**	EPA 3010A	603012	EPA 6020B	603156
92524425002	**VAP-18-W (21-23)**	EPA 3010A	603012	EPA 6020B	603156
92524425003	**VAP-18-W (26-28)**	EPA 3010A	603012	EPA 6020B	603156
92524425004	**VAP-18-W (5-10)**	EPA 3010A	603012	EPA 6020B	603156
92524425001	**VAP-32-W (22-24)**	SM 2320B-2011	603230		
92524425002	**VAP-18-W (21-23)**	SM 2320B-2011	603230		
92524425003	**VAP-18-W (26-28)**	SM 2320B-2011	603230		
92524425004	**VAP-18-W (5-10)**	SM 2320B-2011	603230		
92524425001	**VAP-32-W (22-24)**	SM 2540C-2011	603013		
92524425002	**VAP-18-W (21-23)**	SM 2540C-2011	603013		
92524425003	**VAP-18-W (26-28)**	SM 2540C-2011	603013		
92524425004	**VAP-18-W (5-10)**	SM 2540C-2011	603013		
92524425001	**VAP-32-W (22-24)**	SM 4500-S2D-2011	603514		
92524425002	**VAP-18-W (21-23)**	SM 4500-S2D-2011	603514		
92524425003	**VAP-18-W (26-28)**	SM 4500-S2D-2011	603514		
92524425004	**VAP-18-W (5-10)**	SM 4500-S2D-2011	603514		
92524425001	**VAP-32-W (22-24)**	SM 5210B-2011	603073	SM 5210B-2011	603106
92524425002	**VAP-18-W (21-23)**	SM 5210B-2011	603073	SM 5210B-2011	603106
92524425003	**VAP-18-W (26-28)**	SM 5210B-2011	603073	SM 5210B-2011	603106
92524425004	**VAP-18-W (5-10)**	SM 5210B-2011	603073	SM 5210B-2011	603106
92524425001	**VAP-32-W (22-24)**	EPA 300.0 Rev 2.1 1993	602986		
92524425002	**VAP-18-W (21-23)**	EPA 300.0 Rev 2.1 1993	602986		
92524425003	**VAP-18-W (26-28)**	EPA 300.0 Rev 2.1 1993	602986		
92524425004	**VAP-18-W (5-10)**	EPA 300.0 Rev 2.1 1993	602986		

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: MCMANUS 30050105.00006
Pace Project No.: 92524425

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
92524425001	**VAP-32-W (22-24)**	SM 4500-P E-2011	603072		
92524425002	**VAP-18-W (21-23)**	SM 4500-P E-2011	603072		
92524425003	**VAP-18-W (26-28)**	SM 4500-P E-2011	603072		
92524425004	**VAP-18-W (5-10)**	SM 4500-P E-2011	603072		
92524425001	**VAP-32-W (22-24)**	EPA 9060A	603152		
92524425002	**VAP-18-W (21-23)**	EPA 9060A	603152		
92524425003	**VAP-18-W (26-28)**	EPA 9060A	603152		
92524425004	**VAP-18-W (5-10)**	EPA 9060A	603152		

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: Aeradis

Project #: WO# : 92524425

92524425

Courier: ☐ Commercial ☑ Fed Ex ☑ Pace ☐ UPS ☐ USPS ☐ Other:____ ☐ Client

Custody Seal Present? ☑ Yes ☐ No **Seals Intact?** ☑ Yes ☐ No

Date/Initials Person Examining Contents: WH 2-26-21

Packing Material: ☐ Bubble Wrap ☑ Bubble Bags ☐ None ☐ Other

Biological Tissue Frozen? ☐ Yes ☐ No ☑ N/A

Thermometer: ☑ IR Gun ID: 93T071 ☑ Wet ☐ Blue ☐ None

Type of Ice:

Cooler Temp: 0.7 **Correction Factor:** Add/Subtract (°C) 0

Temp should be above freezing to 6°C
☐ Samples out of temp criteria. Samples on ice, cooling process has begun

Cooler Temp Corrected (°C): 0.7

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.
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? -Includes Date/Time/ID/Analysis Matrix: WT	☑ Yes	☐ No	☐ N/A	9.
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# : 92524425**

PM: KLH1 Due Date: 03/01/21

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)	GN	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		2	1	1		2	1												3					1				
2																												
3		2	1	1		2	1												3					1				
4		2	1	1		2	1												3					1				
5		2	1	1		2	1												3					1				
6																												
7																												
8																												
9																												
10																												
11																												
12																												

pH Adjustment Log for Preserved Samples

Sample ID	Type of Preservative	pH upon receipt	Date preservation adjusted	Time preservation adjusted	Amount of Preservative added	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.

ARCADIS

ID#:

CHAIN OF CUSTODY & LABORATORY ANALYSIS REQUEST FORM

Page ___ of ___

Lab Work Order # 92524425

Send Results to:

Contact & Company Name: MATTWEBB ARCADIS

Address: Ste 350, 5420 WADE PARK BLVD

City: RALEIGH State: NC Zip: 27607

Telephone: 919-415-2294

Fax:

E-mail Address: Mathew.Webb@arcadis.com

Project Name/Location (City, State): McMANUS BRUNSWICK

Project #: 30050105.AAAAb

Sampler's Printed Name:

Sampler's Signature:

Preservative	C	C	E	E	F		G	E	E
Filtered (✓)		✓							
# of Containers	1	1	1	1	1	KIT	3	1	1
Container Information	3	3	3	3	9		1	2	4

PARAMETER ANALYSIS & METHOD

Sample ID	Collection Date	Collection Time	Type (✓) Comp	Type (✓) Grab	Matrix	TOTAL Metals	Dissolved Metals	Alkalinity	Cl, SO4, NO3/NO2	Sulfide, Na OH + Zn Acetate	Ortho Phosphate	KIT	TOC	BOD	TDS
VAP-32-W (22-24)	2/25/21	12:20		X	W	1	1	1	1	1	1	3	1	1	
VAP-19-W (21-23)	2/25/21	14:55		X	W	1	1	1	1	1	1	3	1	1	
VAP-18-W (26-28)	2/25/21	14:25		X	W	1	1	1	1	1	1	3	1	1	
VAP-18-W (5-10)	2/24/21	14:52		X	W	1	1	1	1	1	1	3	1	1	

Keys

Preservation Key:
A. H2SO4
B. HCL
C. HNO3
D. NaOH
E. None
F. Other: NaOH ZnAc
G. Other: H3PO4
H. Other:

Container Information Key:
1. 40 ml Vial
2. 1 L Amber
3. 250 ml Plastic
4. 500 ml Plastic
5. Encore
6. 2 oz. Glass
7. 4 oz. Glass
8. 8 oz. Glass
9. Other: 125 ml
10. Other:

Matrix Key:
SO - Soil, SE - Sediment, NL - NAPL/Oil
W - Water, SL - Sludge, SW - Sample Wipe
T - Tissue, A - Air, Other:

REMARKS

Special Instructions/Comments: Metals - As, Fe, Mn, Mg, Ca, Na, K, B
DISSOLVED Metals are Field Filtered.
TOTAL/DISSOLVED As are to be Analyzed on 24 TAT

☐ Special QA/QC Instructions(✓):

Laboratory Information and Receipt:

Lab Name: PACE

☑ Cooler packed with ice (✓)

Specify Turnaround Requirements:

Shipping Tracking #:

Cooler Custody Seal (✓): ☐ Intact ☐ Not Intact

Sample Receipt:

Condition/Cooler Temp: ____

Relinquished By	Received By	Relinquished By	Laboratory Received By
Printed Name: Grant Williford	Printed Name: FedEx	Printed Name:	Printed Name:
Signature:	Signature:	Signature:	Signature: Daniel Hudson
Firm: ANA	Firm/Courier:	Firm/Courier:	Firm: Pace
Date/Time: 2/25/21 1730	Date/Time: 2/25/21 1730	Date/Time:	Date/Time: 2-26-21 11:10

20730826 CofC AR Form 06.27.2015

Distribution: WHITE – Laboratory returns with results YELLOW – Lab copy PINK – Retained by Arcadis

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

March 11, 2021

Ms. Lauren Petty
Southern Co. Services
42 Inverness Center Parkway
Birmingham, AL 35242

RE: Project: McManus 30050105.00006
Pace Project No.: 92524617

Dear Ms. Petty:

Enclosed are the analytical results for sample(s) received by the laboratory on February 27, 2021. 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

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: Joju Abraham, Georgia Power-CCR
Kathryn Farris
Geoffrey Gay, ARCADIS - Atlanta
Margaret Gentile, Arcadis
Kristen Jurinko
Charles Lawson, Arcadis
Bryan Mayeux
Kelley Sharpe, ARCADIS - Atlanta
Maribel Vital

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

CERTIFICATIONS

Project: McManus 30050105.00006
Pace Project No.: 92524617

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

REPORT OF LABORATORY ANALYSIS

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

SAMPLE SUMMARY

Project: McManus 30050105.00006
Pace Project No.: 92524617

Lab ID	Sample ID	Matrix	Date Collected	Date Received
92524617001	**VAP-29-W (5-10)**	Water	02/26/21 10:59	02/27/21 12:45
92524617002	**VAP-29-W (19-21)**	Water	02/26/21 11:34	02/27/21 12:45
92524617003	**VAP-29-W (24-26)**	Water	02/26/21 12:15	02/27/21 12:45
92524617004	**VAP-29-W (30-32)**	Water	02/26/21 12:47	02/27/21 12:45

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

SAMPLE ANALYTE COUNT

Project: McManus 30050105.00006
Pace Project No.: 92524617

Lab ID	Sample ID	Method	Analysts	Analytes Reported
92524617001	**VAP-29-W (5-10)**	EPA 6010D	KQ, SH1	6
		EPA 6010D	SH1	6
		EPA 6020B	JOR	2
		EPA 6020B	JOR	2
		SM 2320B-2011	ECH	3
		SM 2540C-2011	RED	1
		SM 4500-S2D-2011	NAL	1
		SM 5210B-2011	NFW	1
		EPA 300.0 Rev 2.1 1993	JLH	4
		SM 4500-P E-2011	MJP	1
		EPA 9060A	JLH	5
92524617002	**VAP-29-W (19-21)**	EPA 6010D	KQ, SH1	6
		EPA 6010D	SH1	6
		EPA 6020B	JOR	2
		EPA 6020B	JOR	2
		SM 2320B-2011	ECH	3
		SM 2540C-2011	RED	1
		SM 4500-S2D-2011	NAL	1
		SM 5210B-2011	NFW	1
		EPA 300.0 Rev 2.1 1993	JLH	4
		SM 4500-P E-2011	MJP	1
		EPA 9060A	JLH	5
92524617003	**VAP-29-W (24-26)**	EPA 6010D	KQ, SH1	6
		EPA 6010D	SH1	6
		EPA 6020B	JOR	2
		EPA 6020B	JOR	2
		SM 2320B-2011	ECH	3
		SM 2540C-2011	RED	1
		SM 4500-S2D-2011	NAL	1
		SM 5210B-2011	NFW	1
		EPA 300.0 Rev 2.1 1993	JLH	4
		SM 4500-P E-2011	MJP	1
		EPA 9060A	JLH	5
92524617004	**VAP-29-W (30-32)**	EPA 6010D	KQ, SH1	6
		EPA 6010D	SH1	6
		EPA 6020B	JOR	2
		EPA 6020B	JOR	2

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

SAMPLE ANALYTE COUNT

Project: McManus 30050105.00006
Pace Project No.: 92524617

Lab ID	Sample ID	Method	Analysts	Analytes Reported
		SM 2320B-2011	ECH	3
		SM 2540C-2011	RED	1
		SM 4500-S2D-2011	NAL	1
		SM 5210B-2011	NFW	1
		EPA 300.0 Rev 2.1 1993	JLH	4
		SM 4500-P E-2011	MJP	1
		EPA 9060A	JLH	5

PASI-A = Pace Analytical Services - Asheville

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

SUMMARY OF DETECTION

Project: McManus 30050105.00006
Pace Project No.: 92524617

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92524617001	**VAP-29-W (5-10)**					
EPA 6010D	Calcium	111	mg/L	1.0	03/02/21 17:23	M6
EPA 6010D	Iron	3.1	mg/L	0.50	03/02/21 17:23	M6
EPA 6010D	Magnesium	282	mg/L	1.0	03/02/21 05:54	M6
EPA 6010D	Manganese	0.11	mg/L	0.050	03/02/21 17:23	
EPA 6010D	Potassium	101	mg/L	50.0	03/02/21 17:23	M6
EPA 6010D	Sodium	2970	mg/L	500	03/02/21 15:59	M6
EPA 6010D	Calcium, Dissolved	116	mg/L	1.0	03/02/21 18:03	
EPA 6010D	Iron, Dissolved	0.73	mg/L	0.50	03/02/21 18:03	
EPA 6010D	Magnesium, Dissolved	303	mg/L	10.0	03/02/21 16:57	
EPA 6010D	Manganese, Dissolved	0.091	mg/L	0.050	03/02/21 18:03	
EPA 6010D	Potassium, Dissolved	105	mg/L	50.0	03/02/21 18:03	
EPA 6010D	Sodium, Dissolved	2840	mg/L	500	03/02/21 16:57	
EPA 6020B	Arsenic	0.0092J	mg/L	0.10	03/01/21 16:21	D3,M6
EPA 6020B	Boron, Dissolved	1.2J	mg/L	5.0	03/01/21 14:25	D3,M6
SM 2320B-2011	Alkalinity,Bicarbonate (CaCO3)	166	mg/L	5.0	03/01/21 19:29	
SM 2320B-2011	Alkalinity, Total as CaCO3	166	mg/L	5.0	03/01/21 19:29	
SM 2540C-2011	Total Dissolved Solids	10700	mg/L	1250	03/01/21 19:02	
SM 4500-S2D-2011	Sulfide	7.9	mg/L	5.0	03/02/21 17:44	
SM 5210B-2011	BOD, 5 day	276	mg/L	2.0	03/05/21 04:31	
EPA 300.0 Rev 2.1 1993	Chloride	4620	mg/L	100	02/27/21 15:32	
EPA 300.0 Rev 2.1 1993	Nitrate as N	0.067J	mg/L	0.10	02/27/21 15:17	
EPA 300.0 Rev 2.1 1993	Sulfate	656	mg/L	100	02/27/21 15:32	
SM 4500-P E-2011	Orthophosphate as P	0.20J	mg/L	0.25	02/27/21 16:08	
EPA 9060A	Total Organic Carbon	14.9	mg/L	1.0	03/02/21 03:48	
EPA 9060A	Total Organic Carbon	14.8	mg/L	1.0	03/02/21 03:48	
EPA 9060A	Total Organic Carbon	15.3	mg/L	1.0	03/02/21 03:48	
EPA 9060A	Total Organic Carbon	15.1	mg/L	1.0	03/02/21 03:48	
EPA 9060A	Mean Total Organic Carbon	15.0	mg/L	1.0	03/02/21 03:48	
92524617002	**VAP-29-W (19-21)**					
EPA 6010D	Calcium	230	mg/L	1.0	03/02/21 06:07	
EPA 6010D	Iron	0.66	mg/L	0.50	03/02/21 06:07	
EPA 6010D	Magnesium	623	mg/L	1.0	03/02/21 06:07	
EPA 6010D	Manganese	0.33	mg/L	0.050	03/02/21 06:07	
EPA 6010D	Sodium	4870	mg/L	500	03/02/21 16:12	
EPA 6010D	Calcium, Dissolved	222	mg/L	1.0	03/02/21 17:37	M6
EPA 6010D	Magnesium, Dissolved	643	mg/L	10.0	03/02/21 16:44	M6
EPA 6010D	Manganese, Dissolved	0.32	mg/L	0.050	03/02/21 17:37	
EPA 6010D	Potassium, Dissolved	164	mg/L	50.0	03/02/21 17:37	M6
EPA 6010D	Sodium, Dissolved	5070	mg/L	500	03/02/21 16:44	M6
EPA 6020B	Boron	1.3J	mg/L	5.0	03/01/21 16:57	D3
EPA 6020B	Boron, Dissolved	1.7J	mg/L	5.0	03/01/21 14:54	D3
SM 2320B-2011	Alkalinity,Bicarbonate (CaCO3)	166	mg/L	5.0	03/01/21 19:39	
SM 2320B-2011	Alkalinity, Total as CaCO3	166	mg/L	5.0	03/01/21 19:39	
SM 2540C-2011	Total Dissolved Solids	19900	mg/L	2500	03/01/21 19:02	
SM 4500-S2D-2011	Sulfide	19.1	mg/L	2.5	03/02/21 17:44	
SM 5210B-2011	BOD, 5 day	50700	mg/L	2.0	03/05/21 04:52	
EPA 300.0 Rev 2.1 1993	Chloride	8450	mg/L	100	02/27/21 16:00	

REPORT OF LABORATORY ANALYSIS

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

SUMMARY OF DETECTION

Project: McManus 30050105.00006
Pace Project No.: 92524617

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92524617002	**VAP-29-W (19-21)**					
EPA 300.0 Rev 2.1 1993	Sulfate	1100	mg/L	100	02/27/21 16:00	
SM 4500-P E-2011	Orthophosphate as P	0.21J	mg/L	0.25	02/27/21 16:09	
EPA 9060A	Total Organic Carbon	7.2	mg/L	1.0	03/02/21 04:07	
EPA 9060A	Total Organic Carbon	7.2	mg/L	1.0	03/02/21 04:07	
EPA 9060A	Total Organic Carbon	7.4	mg/L	1.0	03/02/21 04:07	
EPA 9060A	Total Organic Carbon	7.5	mg/L	1.0	03/02/21 04:07	
EPA 9060A	Mean Total Organic Carbon	7.3	mg/L	1.0	03/02/21 04:07	
92524617003	**VAP-29-W (24-26)**					
EPA 6010D	Calcium	191	mg/L	1.0	03/02/21 06:17	
EPA 6010D	Iron	7.3	mg/L	0.50	03/02/21 06:17	
EPA 6010D	Magnesium	540	mg/L	1.0	03/02/21 06:17	
EPA 6010D	Manganese	0.38	mg/L	0.050	03/02/21 06:17	
EPA 6010D	Potassium	172	mg/L	50.0	03/02/21 06:17	
EPA 6010D	Sodium	5350	mg/L	500	03/02/21 16:15	
EPA 6010D	Calcium, Dissolved	195	mg/L	1.0	03/04/21 03:26	
EPA 6010D	Iron, Dissolved	0.90	mg/L	0.50	03/04/21 03:26	
EPA 6010D	Magnesium, Dissolved	544	mg/L	1.0	03/04/21 03:26	
EPA 6010D	Manganese, Dissolved	0.35	mg/L	0.050	03/04/21 03:26	
EPA 6010D	Potassium, Dissolved	171	mg/L	50.0	03/04/21 03:26	
EPA 6010D	Sodium, Dissolved	5120	mg/L	500	03/02/21 17:07	
EPA 6020B	Arsenic	0.010J	mg/L	0.10	03/01/21 17:01	D3
EPA 6020B	Boron	1.3J	mg/L	5.0	03/01/21 17:01	D3
EPA 6020B	Boron, Dissolved	1.9J	mg/L	5.0	03/01/21 14:58	D3
SM 2320B-2011	Alkalinity,Bicarbonate (CaCO3)	173	mg/L	5.0	03/01/21 19:48	
SM 2320B-2011	Alkalinity, Total as CaCO3	173	mg/L	5.0	03/01/21 19:48	
SM 2540C-2011	Total Dissolved Solids	19900	mg/L	2500	03/01/21 19:02	
SM 4500-S2D-2011	Sulfide	19.2	mg/L	5.0	03/02/21 17:45	
SM 5210B-2011	BOD, 5 day	6420	mg/L	2.0	03/05/21 05:01	B2
EPA 300.0 Rev 2.1 1993	Chloride	8670	mg/L	100	02/27/21 16:29	
EPA 300.0 Rev 2.1 1993	Sulfate	1140	mg/L	100	02/27/21 16:29	
SM 4500-P E-2011	Orthophosphate as P	0.30	mg/L	0.25	02/27/21 16:10	
EPA 9060A	Total Organic Carbon	7.2	mg/L	1.0	03/02/21 05:03	
EPA 9060A	Total Organic Carbon	7.3	mg/L	1.0	03/02/21 05:03	
EPA 9060A	Total Organic Carbon	7.5	mg/L	1.0	03/02/21 05:03	
EPA 9060A	Total Organic Carbon	7.6	mg/L	1.0	03/02/21 05:03	
EPA 9060A	Mean Total Organic Carbon	7.4	mg/L	1.0	03/02/21 05:03	
92524617004	**VAP-29-W (30-32)**					
EPA 6010D	Calcium	218	mg/L	1.0	03/02/21 06:20	
EPA 6010D	Iron	2.9	mg/L	0.50	03/02/21 06:20	
EPA 6010D	Magnesium	565	mg/L	1.0	03/02/21 06:20	
EPA 6010D	Manganese	0.27	mg/L	0.050	03/02/21 06:20	
EPA 6010D	Potassium	141	mg/L	50.0	03/02/21 06:20	
EPA 6010D	Sodium	4400	mg/L	500	03/02/21 16:19	
EPA 6010D	Calcium, Dissolved	232	mg/L	1.0	03/04/21 03:29	
EPA 6010D	Iron, Dissolved	0.46J	mg/L	0.50	03/04/21 03:29	
EPA 6010D	Magnesium, Dissolved	575	mg/L	1.0	03/04/21 03:29	

REPORT OF LABORATORY ANALYSIS

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

SUMMARY OF DETECTION

Project: McManus 30050105.00006
Pace Project No.: 92524617

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92524617004	**VAP-29-W (30-32)**					
EPA 6010D	Manganese, Dissolved	0.27	mg/L	0.050	03/04/21 03:29	
EPA 6010D	Potassium, Dissolved	145	mg/L	50.0	03/04/21 03:29	
EPA 6010D	Sodium, Dissolved	4180	mg/L	500	03/02/21 17:10	
EPA 6020B	Arsenic	0.016J	mg/L	0.10	03/01/21 17:05	D3
EPA 6020B	Boron	1.0J	mg/L	5.0	03/01/21 17:05	D3
EPA 6020B	Boron, Dissolved	1.2J	mg/L	5.0	03/01/21 15:02	D3
SM 2320B-2011	Alkalinity,Bicarbonate (CaCO3)	253	mg/L	5.0	03/01/21 20:10	
SM 2320B-2011	Alkalinity, Total as CaCO3	253	mg/L	5.0	03/01/21 20:10	
SM 2540C-2011	Total Dissolved Solids	17700	mg/L	2500	03/01/21 19:03	
SM 4500-S2D-2011	Sulfide	38.5	mg/L	10.0	03/02/21 17:40	
SM 5210B-2011	BOD, 5 day	990	mg/L	2.0	03/05/21 05:09	B2
EPA 300.0 Rev 2.1 1993	Chloride	7580	mg/L	100	02/27/21 16:58	
EPA 300.0 Rev 2.1 1993	Sulfate	889	mg/L	100	02/27/21 16:58	
SM 4500-P E-2011	Orthophosphate as P	0.45	mg/L	0.25	02/27/21 16:10	
EPA 9060A	Total Organic Carbon	7.8	mg/L	1.0	03/02/21 05:22	
EPA 9060A	Total Organic Carbon	7.7	mg/L	1.0	03/02/21 05:22	
EPA 9060A	Total Organic Carbon	8.0	mg/L	1.0	03/02/21 05:22	
EPA 9060A	Total Organic Carbon	7.9	mg/L	1.0	03/02/21 05:22	
EPA 9060A	Mean Total Organic Carbon	7.9	mg/L	1.0	03/02/21 05:22	

Pace Analytical Services, LLC
110 Technology Parkway
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(770)734-4200

ANALYTICAL RESULTS

Project: McManus 30050105.00006
Pace Project No.: 92524617

Sample: VAP-29-W (5-10) **Lab ID: 92524617001** Collected: 02/26/21 10:59 Received: 02/27/21 12:45 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Calcium	**111**	mg/L	1.0	0.94	10	03/01/21 10:39	03/02/21 17:23	7440-70-2	M6
Iron	**3.1**	mg/L	0.50	0.42	10	03/01/21 10:39	03/02/21 17:23	7439-89-6	M6
Magnesium	**282**	mg/L	1.0	0.68	10	03/01/21 10:39	03/02/21 05:54	7439-95-4	M6
Manganese	**0.11**	mg/L	0.050	0.034	10	03/01/21 10:39	03/02/21 17:23	7439-96-5	
Potassium	**101**	mg/L	50.0	30.4	10	03/01/21 10:39	03/02/21 17:23	7440-09-7	M6
Sodium	**2970**	mg/L	500	61.1	100	03/01/21 10:39	03/02/21 15:59	7440-23-5	M6
6010 MET ICP, Dissolved	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Calcium, Dissolved	**116**	mg/L	1.0	0.94	10	03/02/21 12:06	03/02/21 18:03	7440-70-2	
Iron, Dissolved	**0.73**	mg/L	0.50	0.42	10	03/02/21 12:06	03/02/21 18:03	7439-89-6	
Magnesium, Dissolved	**303**	mg/L	10.0	6.8	100	03/02/21 12:06	03/02/21 16:57	7439-95-4	
Manganese, Dissolved	**0.091**	mg/L	0.050	0.034	10	03/02/21 12:06	03/02/21 18:03	7439-96-5	
Potassium, Dissolved	**105**	mg/L	50.0	30.4	10	03/02/21 12:06	03/02/21 18:03	7440-09-7	
Sodium, Dissolved	**2840**	mg/L	500	61.1	100	03/02/21 12:06	03/02/21 16:57	7440-23-5	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Arsenic	**0.0092J**	mg/L	0.10	0.0087	100	03/01/21 10:39	03/01/21 16:21	7440-38-2	D3,M6
Boron	ND	mg/L	5.0	0.85	100	03/01/21 10:39	03/01/21 16:21	7440-42-8	D3,M6
6020 MET ICPMS, Dissolved	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Arsenic, Dissolved	ND	mg/L	0.10	0.0087	100	02/28/21 17:20	03/01/21 14:25	7440-38-2	D3,M6
Boron, Dissolved	**1.2J**	mg/L	5.0	0.85	100	02/28/21 17:20	03/01/21 14:25	7440-42-8	D3,M6
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**166**	mg/L	5.0	5.0	1		03/01/21 19:29		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		03/01/21 19:29		
Alkalinity, Total as CaCO3	**166**	mg/L	5.0	5.0	1		03/01/21 19:29		
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**10700**	mg/L	1250	1250	1		03/01/21 19:02		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	**7.9**	mg/L	5.0	2.5	50		03/02/21 17:44	18496-25-8	
5210B BOD, 5 day	Analytical Method: SM 5210B-2011 Pace Analytical Services - Asheville								
BOD, 5 day	**276**	mg/L	2.0	2.0	1	02/28/21 04:02	03/05/21 04:31		

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
110 Technology Parkway
Peachtree Corners, GA 30092
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ANALYTICAL RESULTS

Project: McManus 30050105.00006
Pace Project No.: 92524617

Sample: VAP-29-W (5-10) **Lab ID: 92524617001** Collected: 02/26/21 10:59 Received: 02/27/21 12:45 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC anions 48hr	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**4620**	mg/L	100	60.0	100		02/27/21 15:32	16887-00-6	
Nitrate as N	**0.067J**	mg/L	0.10	0.060	1		02/27/21 15:17	14797-55-8	
Nitrite as N	ND	mg/L	10.0	5.0	100		02/27/21 15:32	14797-65-0	D3
Sulfate	**656**	mg/L	100	50.0	100		02/27/21 15:32	14808-79-8	
SM4500P-E, Phosphate, Ortho	Analytical Method: SM 4500-P E-2011 Pace Analytical Services - Asheville								
Orthophosphate as P	**0.20J**	mg/L	0.25	0.059	5		02/27/21 16:08		
Total Organic Carbon,Asheville	Analytical Method: EPA 9060A Pace Analytical Services - Asheville								
Total Organic Carbon	**14.9**	mg/L	1.0	0.50	1		03/02/21 03:48	7440-44-0	
Total Organic Carbon	**14.8**	mg/L	1.0	0.50	1		03/02/21 03:48	7440-44-0	
Total Organic Carbon	**15.3**	mg/L	1.0	0.50	1		03/02/21 03:48	7440-44-0	
Total Organic Carbon	**15.1**	mg/L	1.0	0.50	1		03/02/21 03:48	7440-44-0	
Mean Total Organic Carbon	**15.0**	mg/L	1.0	0.50	1		03/02/21 03:48	7440-44-0	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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ANALYTICAL RESULTS

Project: McManus 30050105.00006
Pace Project No.: 92524617

Sample: VAP-29-W (19-21) **Lab ID: 92524617002** Collected: 02/26/21 11:34 Received: 02/27/21 12:45 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Calcium	**230**	mg/L	1.0	0.94	10	03/01/21 10:39	03/02/21 06:07	7440-70-2	
Iron	**0.66**	mg/L	0.50	0.42	10	03/01/21 10:39	03/02/21 06:07	7439-89-6	
Magnesium	**623**	mg/L	1.0	0.68	10	03/01/21 10:39	03/02/21 06:07	7439-95-4	
Manganese	**0.33**	mg/L	0.050	0.034	10	03/01/21 10:39	03/02/21 06:07	7439-96-5	
Potassium	ND	mg/L	500	304	100	03/01/21 10:39	03/02/21 16:12	7440-09-7	
Sodium	**4870**	mg/L	500	61.1	100	03/01/21 10:39	03/02/21 16:12	7440-23-5	
6010 MET ICP, Dissolved	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Calcium, Dissolved	**222**	mg/L	1.0	0.94	10	03/02/21 12:06	03/02/21 17:37	7440-70-2	M6
Iron, Dissolved	ND	mg/L	0.50	0.42	10	03/02/21 12:06	03/02/21 17:37	7439-89-6	
Magnesium, Dissolved	**643**	mg/L	10.0	6.8	100	03/02/21 12:06	03/02/21 16:44	7439-95-4	M6
Manganese, Dissolved	**0.32**	mg/L	0.050	0.034	10	03/02/21 12:06	03/02/21 17:37	7439-96-5	
Potassium, Dissolved	**164**	mg/L	50.0	30.4	10	03/02/21 12:06	03/02/21 17:37	7440-09-7	M6
Sodium, Dissolved	**5070**	mg/L	500	61.1	100	03/02/21 12:06	03/02/21 16:44	7440-23-5	M6
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Arsenic	ND	mg/L	0.10	0.0087	100	03/01/21 10:39	03/01/21 16:57	7440-38-2	D3
Boron	**1.3J**	mg/L	5.0	0.85	100	03/01/21 10:39	03/01/21 16:57	7440-42-8	D3
6020 MET ICPMS, Dissolved	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Arsenic, Dissolved	ND	mg/L	0.10	0.0087	100	02/28/21 17:20	03/01/21 14:54	7440-38-2	D3
Boron, Dissolved	**1.7J**	mg/L	5.0	0.85	100	02/28/21 17:20	03/01/21 14:54	7440-42-8	D3
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**166**	mg/L	5.0	5.0	1		03/01/21 19:39		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		03/01/21 19:39		
Alkalinity, Total as CaCO3	**166**	mg/L	5.0	5.0	1		03/01/21 19:39		
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**19900**	mg/L	2500	2500	1		03/01/21 19:02		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	**19.1**	mg/L	2.5	1.2	25		03/02/21 17:44	18496-25-8	
5210B BOD, 5 day	Analytical Method: SM 5210B-2011 Pace Analytical Services - Asheville								
BOD, 5 day	**50700**	mg/L	2.0	2.0	1	02/28/21 04:02	03/05/21 04:52		

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
110 Technology Parkway
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ANALYTICAL RESULTS

Project: McManus 30050105.00006
Pace Project No.: 92524617

Sample: VAP-29-W (19-21) **Lab ID: 92524617002** Collected: 02/26/21 11:34 Received: 02/27/21 12:45 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC anions 48hr	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**8450**	mg/L	100	60.0	100		02/27/21 16:00	16887-00-6	
Nitrate as N	ND	mg/L	0.10	0.060	1		02/27/21 15:46	14797-55-8	
Nitrite as N	ND	mg/L	10.0	5.0	100		02/27/21 16:00	14797-65-0	D3
Sulfate	**1100**	mg/L	100	50.0	100		02/27/21 16:00	14808-79-8	
SM4500P-E, Phosphate, Ortho	Analytical Method: SM 4500-P E-2011 Pace Analytical Services - Asheville								
Orthophosphate as P	**0.21J**	mg/L	0.25	0.059	5		02/27/21 16:09		
Total Organic Carbon,Asheville	Analytical Method: EPA 9060A Pace Analytical Services - Asheville								
Total Organic Carbon	**7.2**	mg/L	1.0	0.50	1		03/02/21 04:07	7440-44-0	
Total Organic Carbon	**7.2**	mg/L	1.0	0.50	1		03/02/21 04:07	7440-44-0	
Total Organic Carbon	**7.4**	mg/L	1.0	0.50	1		03/02/21 04:07	7440-44-0	
Total Organic Carbon	**7.5**	mg/L	1.0	0.50	1		03/02/21 04:07	7440-44-0	
Mean Total Organic Carbon	**7.3**	mg/L	1.0	0.50	1		03/02/21 04:07	7440-44-0	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
110 Technology Parkway
Peachtree Corners, GA 30092
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ANALYTICAL RESULTS

Project: McManus 30050105.00006
Pace Project No.: 92524617

Sample: VAP-29-W (24-26) **Lab ID: 92524617003** Collected: 02/26/21 12:15 Received: 02/27/21 12:45 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Calcium	**191**	mg/L	1.0	0.94	10	03/01/21 10:39	03/02/21 06:17	7440-70-2	
Iron	**7.3**	mg/L	0.50	0.42	10	03/01/21 10:39	03/02/21 06:17	7439-89-6	
Magnesium	**540**	mg/L	1.0	0.68	10	03/01/21 10:39	03/02/21 06:17	7439-95-4	
Manganese	**0.38**	mg/L	0.050	0.034	10	03/01/21 10:39	03/02/21 06:17	7439-96-5	
Potassium	**172**	mg/L	50.0	30.4	10	03/01/21 10:39	03/02/21 06:17	7440-09-7	
Sodium	**5350**	mg/L	500	61.1	100	03/01/21 10:39	03/02/21 16:15	7440-23-5	
6010 MET ICP, Dissolved	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Calcium, Dissolved	**195**	mg/L	1.0	0.94	10	03/02/21 12:06	03/04/21 03:26	7440-70-2	
Iron, Dissolved	**0.90**	mg/L	0.50	0.42	10	03/02/21 12:06	03/04/21 03:26	7439-89-6	
Magnesium, Dissolved	**544**	mg/L	1.0	0.68	10	03/02/21 12:06	03/04/21 03:26	7439-95-4	
Manganese, Dissolved	**0.35**	mg/L	0.050	0.034	10	03/02/21 12:06	03/04/21 03:26	7439-96-5	
Potassium, Dissolved	**171**	mg/L	50.0	30.4	10	03/02/21 12:06	03/04/21 03:26	7440-09-7	
Sodium, Dissolved	**5120**	mg/L	500	61.1	100	03/02/21 12:06	03/02/21 17:07	7440-23-5	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Arsenic	**0.010J**	mg/L	0.10	0.0087	100	03/01/21 10:39	03/01/21 17:01	7440-38-2	D3
Boron	**1.3J**	mg/L	5.0	0.85	100	03/01/21 10:39	03/01/21 17:01	7440-42-8	D3
6020 MET ICPMS, Dissolved	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Arsenic, Dissolved	ND	mg/L	0.10	0.0087	100	02/28/21 17:20	03/01/21 14:58	7440-38-2	D3
Boron, Dissolved	**1.9J**	mg/L	5.0	0.85	100	02/28/21 17:20	03/01/21 14:58	7440-42-8	D3
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**173**	mg/L	5.0	5.0	1		03/01/21 19:48		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		03/01/21 19:48		
Alkalinity, Total as CaCO3	**173**	mg/L	5.0	5.0	1		03/01/21 19:48		
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**19900**	mg/L	2500	2500	1		03/01/21 19:02		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	**19.2**	mg/L	5.0	2.5	50		03/02/21 17:45	18496-25-8	
5210B BOD, 5 day	Analytical Method: SM 5210B-2011 Pace Analytical Services - Asheville								
BOD, 5 day	**6420**	mg/L	2.0	2.0	1	02/28/21 04:02	03/05/21 05:01		B2

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: McManus 30050105.00006
Pace Project No.: 92524617

Sample: VAP-29-W (24-26) **Lab ID: 92524617003** Collected: 02/26/21 12:15 Received: 02/27/21 12:45 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC anions 48hr	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**8670**	mg/L	100	60.0	100		02/27/21 16:29	16887-00-6	
Nitrate as N	ND	mg/L	0.10	0.060	1		02/27/21 16:15	14797-55-8	
Nitrite as N	ND	mg/L	10.0	5.0	100		02/27/21 16:29	14797-65-0	D3
Sulfate	**1140**	mg/L	100	50.0	100		02/27/21 16:29	14808-79-8	
SM4500P-E, Phosphate, Ortho	Analytical Method: SM 4500-P E-2011 Pace Analytical Services - Asheville								
Orthophosphate as P	**0.30**	mg/L	0.25	0.059	5		02/27/21 16:10		
Total Organic Carbon,Asheville	Analytical Method: EPA 9060A Pace Analytical Services - Asheville								
Total Organic Carbon	**7.2**	mg/L	1.0	0.50	1		03/02/21 05:03	7440-44-0	
Total Organic Carbon	**7.3**	mg/L	1.0	0.50	1		03/02/21 05:03	7440-44-0	
Total Organic Carbon	**7.5**	mg/L	1.0	0.50	1		03/02/21 05:03	7440-44-0	
Total Organic Carbon	**7.6**	mg/L	1.0	0.50	1		03/02/21 05:03	7440-44-0	
Mean Total Organic Carbon	**7.4**	mg/L	1.0	0.50	1		03/02/21 05:03	7440-44-0	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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ANALYTICAL RESULTS

Project: McManus 30050105.00006
Pace Project No.: 92524617

Sample: VAP-29-W (30-32) **Lab ID: 92524617004** Collected: 02/26/21 12:47 Received: 02/27/21 12:45 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Calcium	**218**	mg/L	1.0	0.94	10	03/01/21 10:39	03/02/21 06:20	7440-70-2	
Iron	**2.9**	mg/L	0.50	0.42	10	03/01/21 10:39	03/02/21 06:20	7439-89-6	
Magnesium	**565**	mg/L	1.0	0.68	10	03/01/21 10:39	03/02/21 06:20	7439-95-4	
Manganese	**0.27**	mg/L	0.050	0.034	10	03/01/21 10:39	03/02/21 06:20	7439-96-5	
Potassium	**141**	mg/L	50.0	30.4	10	03/01/21 10:39	03/02/21 06:20	7440-09-7	
Sodium	**4400**	mg/L	500	61.1	100	03/01/21 10:39	03/02/21 16:19	7440-23-5	
6010 MET ICP, Dissolved	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Calcium, Dissolved	**232**	mg/L	1.0	0.94	10	03/02/21 12:06	03/04/21 03:29	7440-70-2	
Iron, Dissolved	**0.46J**	mg/L	0.50	0.42	10	03/02/21 12:06	03/04/21 03:29	7439-89-6	
Magnesium, Dissolved	**575**	mg/L	1.0	0.68	10	03/02/21 12:06	03/04/21 03:29	7439-95-4	
Manganese, Dissolved	**0.27**	mg/L	0.050	0.034	10	03/02/21 12:06	03/04/21 03:29	7439-96-5	
Potassium, Dissolved	**145**	mg/L	50.0	30.4	10	03/02/21 12:06	03/04/21 03:29	7440-09-7	
Sodium, Dissolved	**4180**	mg/L	500	61.1	100	03/02/21 12:06	03/02/21 17:10	7440-23-5	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Arsenic	**0.016J**	mg/L	0.10	0.0087	100	03/01/21 10:39	03/01/21 17:05	7440-38-2	D3
Boron	**1.0J**	mg/L	5.0	0.85	100	03/01/21 10:39	03/01/21 17:05	7440-42-8	D3
6020 MET ICPMS, Dissolved	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Arsenic, Dissolved	ND	mg/L	0.10	0.0087	100	02/28/21 17:20	03/01/21 15:02	7440-38-2	D3
Boron, Dissolved	**1.2J**	mg/L	5.0	0.85	100	02/28/21 17:20	03/01/21 15:02	7440-42-8	D3
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**253**	mg/L	5.0	5.0	1		03/01/21 20:10		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		03/01/21 20:10		
Alkalinity, Total as CaCO3	**253**	mg/L	5.0	5.0	1		03/01/21 20:10		
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**17700**	mg/L	2500	2500	1		03/01/21 19:03		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	**38.5**	mg/L	10.0	5.0	100		03/02/21 17:40	18496-25-8	
5210B BOD, 5 day	Analytical Method: SM 5210B-2011 Pace Analytical Services - Asheville								
BOD, 5 day	**990**	mg/L	2.0	2.0	1	02/28/21 04:02	03/05/21 05:09		B2

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
110 Technology Parkway
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(770)734-4200

ANALYTICAL RESULTS

Project: McManus 30050105.00006
Pace Project No.: 92524617

Sample: VAP-29-W (30-32) **Lab ID: 92524617004** Collected: 02/26/21 12:47 Received: 02/27/21 12:45 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC anions 48hr	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Chloride	**7580**	mg/L	100	60.0	100		02/27/21 16:58	16887-00-6	
Nitrate as N	ND	mg/L	0.10	0.060	1		02/27/21 16:43	14797-55-8	
Nitrite as N	ND	mg/L	10.0	5.0	100		02/27/21 16:58	14797-65-0	D3
Sulfate	**889**	mg/L	100	50.0	100		02/27/21 16:58	14808-79-8	
SM4500P-E, Phosphate, Ortho	Analytical Method: SM 4500-P E-2011 Pace Analytical Services - Asheville								
Orthophosphate as P	**0.45**	mg/L	0.25	0.059	5		02/27/21 16:10		
Total Organic Carbon,Asheville	Analytical Method: EPA 9060A Pace Analytical Services - Asheville								
Total Organic Carbon	**7.8**	mg/L	1.0	0.50	1		03/02/21 05:22	7440-44-0	
Total Organic Carbon	**7.7**	mg/L	1.0	0.50	1		03/02/21 05:22	7440-44-0	
Total Organic Carbon	**8.0**	mg/L	1.0	0.50	1		03/02/21 05:22	7440-44-0	
Total Organic Carbon	**7.9**	mg/L	1.0	0.50	1		03/02/21 05:22	7440-44-0	
Mean Total Organic Carbon	**7.9**	mg/L	1.0	0.50	1		03/02/21 05:22	7440-44-0	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: McManus 30050105.00006
Pace Project No.: 92524617

QC Batch: 603201
QC Batch Method: EPA 3010A
Analysis Method: EPA 6010D
Analysis Description: 6010 MET
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524617001, 92524617002, 92524617003, 92524617004

METHOD BLANK: 3178184 Matrix: Water
Associated Lab Samples: 92524617001, 92524617002, 92524617003, 92524617004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Calcium	mg/L	ND	0.10	0.094	03/02/21 15:53	
Iron	mg/L	ND	0.050	0.042	03/02/21 15:53	
Magnesium	mg/L	ND	0.10	0.068	03/02/21 05:02	
Manganese	mg/L	ND	0.0050	0.0034	03/02/21 15:53	
Potassium	mg/L	ND	5.0	3.0	03/02/21 15:53	
Sodium	mg/L	ND	5.0	0.61	03/02/21 15:53	

LABORATORY CONTROL SAMPLE: 3178185

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium	mg/L	5	5.2	104	80-120	
Iron	mg/L	5	5.2	104	80-120	
Magnesium	mg/L	5	5.3	107	80-120	
Manganese	mg/L	0.5	0.54	107	80-120	
Potassium	mg/L	5	5.4	109	80-120	
Sodium	mg/L	5	5.3	106	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3178186 3178187

Parameter	Units	92524617001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium	mg/L	111	5	5	107	124	-68	270	75-125	15	20	M6
Iron	mg/L	3.1	5	5	5.1	5.9	39	55	75-125	15	20	M6
Magnesium	mg/L	282	5	5	298	308	320	524	75-125	3	20	M6
Manganese	mg/L	0.11	0.5	0.5	0.52	0.59	82	97	75-125	14	20	
Potassium	mg/L	101	5	5	98.6	113	-42	240	75-125	13	20	M6
Sodium	mg/L	2970	5	5	3010	3070	780	2060	75-125	2	20	M6

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: McManus 30050105.00006
Pace Project No.: 92524617

QC Batch: 603568
QC Batch Method: EPA 3010A
Analysis Method: EPA 6010D
Analysis Description: 6010 MET Filtered Diss.
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524617001, 92524617002, 92524617003, 92524617004

METHOD BLANK: 3179709 Matrix: Water
Associated Lab Samples: 92524617001, 92524617002, 92524617003, 92524617004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Calcium, Dissolved	mg/L	ND	0.10	0.094	03/04/21 03:23	
Iron, Dissolved	mg/L	ND	0.050	0.042	03/04/21 03:23	
Magnesium, Dissolved	mg/L	ND	0.10	0.068	03/04/21 03:23	
Manganese, Dissolved	mg/L	ND	0.0050	0.0034	03/04/21 03:23	
Potassium, Dissolved	mg/L	ND	5.0	3.0	03/04/21 03:23	
Sodium, Dissolved	mg/L	ND	5.0	0.61	03/04/21 03:23	

LABORATORY CONTROL SAMPLE: 3179710

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium, Dissolved	mg/L	5	4.8	95	80-120	
Iron, Dissolved	mg/L	5	4.7	94	80-120	
Magnesium, Dissolved	mg/L	5	5.1	103	80-120	
Manganese, Dissolved	mg/L	0.5	0.49	98	80-120	
Potassium, Dissolved	mg/L	5	4.9J	99	80-120	
Sodium, Dissolved	mg/L	5	4.8J	97	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3179711 3179712

Parameter	Units	92524617002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium, Dissolved	mg/L	222	5	5	213	228	-186	112	75-125	7	20	M6
Iron, Dissolved	mg/L	ND	5	5	4.4	4.7	85	92	75-125	7	20	
Magnesium, Dissolved	mg/L	643	5	5	616	638	-528	-106	75-125	3	20	M6
Manganese, Dissolved	mg/L	0.32	0.5	0.5	0.75	0.80	86	96	75-125	6	20	
Potassium, Dissolved	mg/L	164	5	5	160	172	-80	144	75-125	7	20	M6
Sodium, Dissolved	mg/L	5070	5	5	4870	4940	-3960	-2600	75-125	1	20	M6

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: McManus 30050105.00006
Pace Project No.: 92524617

QC Batch: 603195 | Analysis Method: EPA 6020B
QC Batch Method: EPA 3010A | Analysis Description: 6020 MET
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524617001, 92524617002, 92524617003, 92524617004

METHOD BLANK: 3178129 Matrix: Water
Associated Lab Samples: 92524617001, 92524617002, 92524617003, 92524617004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Arsenic	mg/L	ND	0.0010	0.000087	03/01/21 16:13	
Boron	mg/L	ND	0.050	0.0085	03/01/21 16:13	

LABORATORY CONTROL SAMPLE: 3178130

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	0.01	0.010	102	80-120	
Boron	mg/L	0.05	0.048J	95	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3178131 3178132

Parameter	Units	92524617001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	mg/L	0.0092J	0.01	0.01	0.023J	0.016J	134	68	75-125		20	M6
Boron	mg/L	ND	0.05	0.05	0.92J	ND	174	-102	75-125		20	M6

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: McManus 30050105.00006
Pace Project No.: 92524617

QC Batch: 603157
QC Batch Method: EPA 3010A
Analysis Method: EPA 6020B
Analysis Description: 6020 MET Dissolved
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524617001, 92524617002, 92524617003, 92524617004

METHOD BLANK: 3177984 Matrix: Water
Associated Lab Samples: 92524617001, 92524617002, 92524617003, 92524617004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Arsenic, Dissolved	mg/L	ND	0.0010	0.000087	03/01/21 14:17	
Boron, Dissolved	mg/L	ND	0.050	0.0085	03/01/21 14:17	

LABORATORY CONTROL SAMPLE: 3177985

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic, Dissolved	mg/L	0.01	0.0096	96	80-120	
Boron, Dissolved	mg/L	0.05	0.044J	89	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3177986 3177987

Parameter	Units	92524617001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic, Dissolved	mg/L	ND	0.01	0.01	0.012J	0.010J	62	49	75-125		20	M6
Boron, Dissolved	mg/L	1.2J	0.05	0.05	1.1J	1.1J	-179	-141	75-125		20	M6

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: McManus 30050105.00006
Pace Project No.: 92524617

QC Batch: 603230 — Analysis Method: SM 2320B-2011
QC Batch Method: SM 2320B-2011 — Analysis Description: 2320B Alkalinity
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524617001, 92524617002, 92524617003, 92524617004

METHOD BLANK: 3178334 Matrix: Water
Associated Lab Samples: 92524617001, 92524617002, 92524617003, 92524617004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	ND	5.0	5.0	03/01/21 16:46	
Alkalinity,Bicarbonate (CaCO3)	mg/L	ND	5.0	5.0	03/01/21 16:46	
Alkalinity,Carbonate (CaCO3)	mg/L	ND	5.0	5.0	03/01/21 16:46	

LABORATORY CONTROL SAMPLE: 3178335

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	50	50.1	100	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3178336 3178337

Parameter	Units	92524425001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	212	50	50	256	258	88	93	80-120	1	25	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3178340 3178341

Parameter	Units	92524458002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	309	50	50	363	360	108	101	80-120	1	25	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: McManus 30050105.00006
Pace Project No.: 92524617

QC Batch: 603382 — Analysis Method: SM 2540C-2011
QC Batch Method: SM 2540C-2011 — Analysis Description: 2540C Total Dissolved Solids
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524617001, 92524617002, 92524617003, 92524617004

METHOD BLANK: 3179110 — Matrix: Water
Associated Lab Samples: 92524617001, 92524617002, 92524617003, 92524617004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	ND	25.0	25.0	03/01/21 19:02	

LABORATORY CONTROL SAMPLE: 3179111

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	251	266	106	90-110	

SAMPLE DUPLICATE: 3179112

Parameter	Units	92524617001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	10700	10600	1	25	

SAMPLE DUPLICATE: 3179113

Parameter	Units	92523800006 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	285	275	4	25	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: McManus 30050105.00006
Pace Project No.: 92524617

QC Batch: 603512
QC Batch Method: SM 4500-S2D-2011
Analysis Method: SM 4500-S2D-2011
Analysis Description: 4500S2D Sulfide Water
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524617001, 92524617002, 92524617003, 92524617004

METHOD BLANK: 3179455 Matrix: Water
Associated Lab Samples: 92524617001, 92524617002, 92524617003, 92524617004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Sulfide	mg/L	ND	0.10	0.050	03/02/21 15:50	

LABORATORY CONTROL SAMPLE: 3179456

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfide	mg/L	0.5	0.42	84	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3179457 3179458

Parameter	Units	92524530002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfide	mg/L	ND	0.5	0.5	0.52	0.52	104	104	80-120	0	10	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3179459 3179460

Parameter	Units	35614611001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfide	mg/L	0.40	0.5	0.5	0.91	0.91	101	102	80-120	0	10	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: McManus 30050105.00006
Pace Project No.: 92524617

QC Batch: 603132 — Analysis Method: SM 5210B-2011
QC Batch Method: SM 5210B-2011 — Analysis Description: 5210B BOD, 5 day
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524617001, 92524617002, 92524617003, 92524617004

METHOD BLANK: 3177918 — Matrix: Water
Associated Lab Samples: 92524617001, 92524617002, 92524617003, 92524617004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
BOD, 5 day	mg/L	ND	2.0	2.0	03/05/21 03:03	

LABORATORY CONTROL SAMPLE: 3177920

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
BOD, 5 day	mg/L	198	203	102	84.6-115	

SAMPLE DUPLICATE: 3177921

Parameter	Units	92524407001 Result	Dup Result	RPD	Max RPD	Qualifiers
BOD, 5 day	mg/L	222	210	6	25	

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QUALITY CONTROL DATA

Project: McManus 30050105.00006
Pace Project No.: 92524617

QC Batch: 603129
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: 92524617001, 92524617002, 92524617003, 92524617004

METHOD BLANK: 3177904 Matrix: Water
Associated Lab Samples: 92524617001, 92524617002, 92524617003, 92524617004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	ND	1.0	0.60	02/27/21 14:48	
Nitrate as N	mg/L	ND	0.10	0.060	02/27/21 14:48	
Nitrite as N	mg/L	ND	0.10	0.050	02/27/21 14:48	
Sulfate	mg/L	ND	1.0	0.50	02/27/21 14:48	

LABORATORY CONTROL SAMPLE: 3177905

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	50	48.7	97	90-110	
Nitrate as N	mg/L	2.5	2.3	94	90-110	
Nitrite as N	mg/L	2.5	2.4	98	90-110	
Sulfate	mg/L	50	49.4	99	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3177906 3177907

Parameter	Units	92524618003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	5630	50	50	5540	5580	-180	-100	90-110	1	10	M6
Nitrate as N	mg/L	ND	2.5	2.5	2.5	2.5	98	99	90-110	1	10	
Nitrite as N	mg/L	ND	2.5	2.5	ND	ND	48	52	90-110		10	D3,M6
Sulfate	mg/L	540	50	50	576	581	72	82	90-110	1	10	M6

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: McManus 30050105.00006
Pace Project No.: 92524617

QC Batch: 603131 | Analysis Method: SM 4500-P E-2011
QC Batch Method: SM 4500-P E-2011 | Analysis Description: SM4500P-E Phosphorus, Ortho
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524617001, 92524617002, 92524617003, 92524617004

METHOD BLANK: 3177914 Matrix: Water
Associated Lab Samples: 92524617001, 92524617002, 92524617003, 92524617004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Orthophosphate as P	mg/L	ND	0.050	0.012	02/27/21 16:06	

LABORATORY CONTROL SAMPLE & LCSD: 3177915 3177916

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Orthophosphate as P	mg/L	0.25	0.25	0.25	99	99	49-145	0	10	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: McManus 30050105.00006
Pace Project No.: 92524617

QC Batch: 603153
QC Batch Method: EPA 9060A
Analysis Method: EPA 9060A
Analysis Description: 9060 TOC, AVL
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92524617001, 92524617002, 92524617003, 92524617004

METHOD BLANK: 3177969 Matrix: Water
Associated Lab Samples: 92524617001, 92524617002, 92524617003, 92524617004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mean Total Organic Carbon	mg/L	ND	1.0	0.50	03/02/21 22:12	
Total Organic Carbon	mg/L	ND	1.0	0.50	03/02/21 22:12	
Total Organic Carbon	mg/L	ND	1.0	0.50	03/02/21 22:12	
Total Organic Carbon	mg/L	ND	1.0	0.50	03/02/21 22:12	
Total Organic Carbon	mg/L	ND	1.0	0.50	03/02/21 22:12	

LABORATORY CONTROL SAMPLE: 3177970

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mean Total Organic Carbon	mg/L	25	24.2	97	75-125	
Total Organic Carbon	mg/L	25	24.2	97	75-125	
Total Organic Carbon	mg/L	25	24.9	100	75-125	
Total Organic Carbon	mg/L	25	23.2	93	75-125	
Total Organic Carbon	mg/L	25	24.4	97	75-125	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3177971 3177972

Parameter	Units	92523998001 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/L	264	25	25	285	280	81	60	75-125	2	25	M6
Total Organic Carbon	mg/L	261	25	25	283	278	90	71	75-125	2	25	M6
Total Organic Carbon	mg/L	271	25	25	289	282	71	44	75-125	2	25	M6
Total Organic Carbon	mg/L	258	25	25	280	276	87	74	75-125	1	25	M6
Total Organic Carbon	mg/L	268	25	25	287	282	76	52	75-125	2	25	M6

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3177973 3177974

Parameter	Units	92523918001 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/L	9.3	25	25	34.9	34.8	102	102	75-125	0	25	
Total Organic Carbon	mg/L	9.1	25	25	34.7	34.8	102	103	75-125	0	25	
Total Organic Carbon	mg/L	9.4	25	25	35.0	34.8	102	102	75-125	0	25	
Total Organic Carbon	mg/L	9.4	25	25	35.0	34.5	102	101	75-125	1	25	
Total Organic Carbon	mg/L	9.4	25	25	34.9	35.0	102	103	75-125	0	25	

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

REPORT OF LABORATORY ANALYSIS

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

QUALIFIERS

Project: McManus 30050105.00006
Pace Project No.: 92524617

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

B2	Oxygen usage is less than 2.0 for all dilutions set. The reported value is an estimated less than value and is calculated for the dilution using the most amount of sample.
D3	Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference.
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: McManus 30050105.00006
Pace Project No.: 92524617

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
92524617001	**VAP-29-W (5-10)**	EPA 3010A	603201	EPA 6010D	603275
92524617002	**VAP-29-W (19-21)**	EPA 3010A	603201	EPA 6010D	603275
92524617003	**VAP-29-W (24-26)**	EPA 3010A	603201	EPA 6010D	603275
92524617004	**VAP-29-W (30-32)**	EPA 3010A	603201	EPA 6010D	603275
92524617001	**VAP-29-W (5-10)**	EPA 3010A	603568	EPA 6010D	603578
92524617002	**VAP-29-W (19-21)**	EPA 3010A	603568	EPA 6010D	603578
92524617003	**VAP-29-W (24-26)**	EPA 3010A	603568	EPA 6010D	603578
92524617004	**VAP-29-W (30-32)**	EPA 3010A	603568	EPA 6010D	603578
92524617001	**VAP-29-W (5-10)**	EPA 3010A	603195	EPA 6020B	603270
92524617002	**VAP-29-W (19-21)**	EPA 3010A	603195	EPA 6020B	603270
92524617003	**VAP-29-W (24-26)**	EPA 3010A	603195	EPA 6020B	603270
92524617004	**VAP-29-W (30-32)**	EPA 3010A	603195	EPA 6020B	603270
92524617001	**VAP-29-W (5-10)**	EPA 3010A	603157	EPA 6020B	603159
92524617002	**VAP-29-W (19-21)**	EPA 3010A	603157	EPA 6020B	603159
92524617003	**VAP-29-W (24-26)**	EPA 3010A	603157	EPA 6020B	603159
92524617004	**VAP-29-W (30-32)**	EPA 3010A	603157	EPA 6020B	603159
92524617001	**VAP-29-W (5-10)**	SM 2320B-2011	603230		
92524617002	**VAP-29-W (19-21)**	SM 2320B-2011	603230		
92524617003	**VAP-29-W (24-26)**	SM 2320B-2011	603230		
92524617004	**VAP-29-W (30-32)**	SM 2320B-2011	603230		
92524617001	**VAP-29-W (5-10)**	SM 2540C-2011	603382		
92524617002	**VAP-29-W (19-21)**	SM 2540C-2011	603382		
92524617003	**VAP-29-W (24-26)**	SM 2540C-2011	603382		
92524617004	**VAP-29-W (30-32)**	SM 2540C-2011	603382		
92524617001	**VAP-29-W (5-10)**	SM 4500-S2D-2011	603512		
92524617002	**VAP-29-W (19-21)**	SM 4500-S2D-2011	603512		
92524617003	**VAP-29-W (24-26)**	SM 4500-S2D-2011	603512		
92524617004	**VAP-29-W (30-32)**	SM 4500-S2D-2011	603512		
92524617001	**VAP-29-W (5-10)**	SM 5210B-2011	603132	SM 5210B-2011	603133
92524617002	**VAP-29-W (19-21)**	SM 5210B-2011	603132	SM 5210B-2011	603133
92524617003	**VAP-29-W (24-26)**	SM 5210B-2011	603132	SM 5210B-2011	603133
92524617004	**VAP-29-W (30-32)**	SM 5210B-2011	603132	SM 5210B-2011	603133
92524617001	**VAP-29-W (5-10)**	EPA 300.0 Rev 2.1 1993	603129		
92524617002	**VAP-29-W (19-21)**	EPA 300.0 Rev 2.1 1993	603129		
92524617003	**VAP-29-W (24-26)**	EPA 300.0 Rev 2.1 1993	603129		
92524617004	**VAP-29-W (30-32)**	EPA 300.0 Rev 2.1 1993	603129		
92524617001	**VAP-29-W (5-10)**	SM 4500-P E-2011	603131		
92524617002	**VAP-29-W (19-21)**	SM 4500-P E-2011	603131		
92524617003	**VAP-29-W (24-26)**	SM 4500-P E-2011	603131		
92524617004	**VAP-29-W (30-32)**	SM 4500-P E-2011	603131		
92524617001	**VAP-29-W (5-10)**	EPA 9060A	603153		
92524617002	**VAP-29-W (19-21)**	EPA 9060A	603153		
92524617003	**VAP-29-W (24-26)**	EPA 9060A	603153		
92524617004	**VAP-29-W (30-32)**	EPA 9060A	603153		

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

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: McManus 30050105.00006
Pace Project No.: 92524617

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch

ARCADIS

ID#:

CHAIN OF CUSTODY & LABORATORY ANALYSIS REQUEST FORM

Page ___ of ___

Lab Work Order #

Send Results to:

Contact & Company Name: MATT WEBB ARCADIS

Telephone: 919-415-2294

Address: STE 350 5420 WADE PARK BLVD

Fax:

City: RALEIGH State: N.C. Zip: 27607

E-mail Address: MAThew.Webb@ARCADIS.com

Project Name/Location (City, State): McMANUS - BRUNSWICK

Project #: 30030105.00006

Sampler's Printed Name:

Sampler's Signature:

Sample ID	Collection Date	Collection Time	Type (✓) Comp	Type (✓) Grab	Matrix	Total Metals	Dissolved Metals	Alkalinity	Cl, SO_4, NO_3/NO_2	Sulfide Na_2OH Zn Acetate	Ortho Phosphate Kit	TOC	BOD	TDS
VAP-29-W (5-10)	2/26/21	10:59		X	W	1	1	1	1	1	1	3	1	1
VAP-29-W (19-21)	2/26/21	11:34		X	W	1	1	1	1	1	1	3	1	1
VAP-29-W (24-26)	2/26/21	12:15		X	W	1	1	1	1	1	1	3	1	1
VAP-29-W (30-32)	2/26/21	12:47		X	W	1	1	1	1	1	1	3	1	1

Preservative	C	C	F	F	F		G	E	E
Filtered (✓)		✓				K			
# of Containers	1	1	1	1	1	1	3	1	1
Container Information	3	3	3	3	9	1	1	2	4

Keys

Preservation Key:
A. H_2SO_4
B. HCL
C. HNO_3
D. NaOH
E. None
F. Other: NaOH/Zn Acetate
G. Other: H_3PO_4
H. Other: _____

Container Information Key:
1. 40 ml Vial
2. 1 L Amber
3. 250 ml Plastic
4. 500 ml Plastic
5. Encore
6. 2 oz. Glass
7. 4 oz. Glass
8. 8 oz. Glass
9. Other: 125ml
10. Other: _____

Matrix Key:
SO - Soil, SE - Sediment, NL - NAPL/Oil
W - Water, SL - Sludge, SW - Sample Wipe
T - Tissue, A - Air, Other: _____

REMARKS

Special Instructions/Comments: METALS= As, Fe, Mn, Mg, Ca, Na, K, B
DISSOLVED METALS ARE FIELD FILTER
TOTAL/DISSOLVED As are to be Analyzed on 24 TAT

☐ Special QA/QC Instructions(✓):

Laboratory Information and Receipt		Relinquished By	Received By	Relinquished By	Laboratory Received By
Lab Name: PACE	Cooler Custody Seal (✓)	Printed Name: Grant Williford	Printed Name: FedEx	Printed Name:	Printed Name: A. Ruckar
☑ Cooler packed with ice (✓)	☒ Intact ☐ Not Intact	Signature:	Signature:	Signature:	Signature:
Specify Turnaround Requirements:	Sample Receipt:	Firm: ANA	Firm/Courier:	Firm/Courier:	Firm: PACE/AVL
Shipping Tracking #:	Condition/Cooler Temp: 3.6	Date/Time: 2/26/2021 1730	Date/Time: 2/26/2021 1730	Date/Time:	Date/Time: 2-27-21 1245

20730826 CofC AR Form 08.27.2015

Distribution: WHITE – Laboratory returns with results YELLOW – Lab copy PINK – Retained by Arcadis

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 [X] Eden [ ] Greenwood [ ] Huntersville [ ] Raleigh [ ] Mechanicsville [ ] Atlanta [ ] Kernersville [ ]

Sample Condition Upon Receipt

Client Name: Arcadis

Project #:

Courier: [X] Fed Ex [ ] UPS [ ] USPS [ ] Client [ ] Commercial [ ] Pace [ ] Other:____

Custody Seal Present? [X] Yes [ ] No **Seals Intact?** [X] Yes [ ] No

Date/Initials Person Examining Contents: 2-27-21 AR

Packing Material: [ ] Bubble Wrap [X] Bubble Bags [ ] None [ ] Other

Biological Tissue Frozen? [ ] Yes [ ] No [X] N/A

Thermometer: [X] IR Gun ID: 93-T071

Type of Ice: [X] Wet [ ] Blue [ ] None

Cooler Temp: 3.6 **Correction Factor:** Add/Subtract (°C) 0

Temp should be above freezing to 6°C
[ ] Samples out of temp criteria. Samples on ice, cooling process has begun

Cooler Temp Corrected (°C): 3.6

USDA Regulated Soil ([X] N/A, water sample)
Did samples originate in a quarantine zone within the United States: CA, NY, or SC (check maps)? [ ] Yes [X] No

Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? [ ] Yes [X] No

				Comments/Discrepancy:
Chain of Custody Present?	[X] Yes	[ ] No	[ ] N/A	1.
Samples Arrived within Hold Time?	[X] Yes	[ ] No	[ ] N/A	2.
Short Hold Time Analysis (<72 hr.)?	[X] Yes	[ ] No	[ ] N/A	3.
Rush Turn Around Time Requested?	[ ] Yes	[X] No	[ ] N/A	4.
Sufficient Volume?	[X] Yes	[ ] No	[ ] N/A	5.
Correct Containers Used?	[X] Yes	[ ] No	[ ] N/A	6.
-Pace Containers Used?	[X] Yes	[ ] No	[ ] N/A	
Containers Intact?	[X] Yes	[ ] No	[ ] N/A	7.
Dissolved analysis: Samples Field Filtered?	[X] Yes	[ ] No	[ ] N/A	8. Dissolved Metals
Sample Labels Match COC?	[X] Yes	[ ] No	[ ] N/A	9.
-Includes Date/Time/ID/Analysis Matrix: WT				
Headspace in VOA Vials (>5-6mm)?	[ ] Yes	[X] No	[ ] N/A	10.
Trip Blank Present?	[ ] Yes	[X] No	[ ] N/A	11.
Trip Blank Custody Seals Present?	[ ] Yes	[X] 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 #

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)	GN	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		2	1	1		2	1												3					1				
2		2	1	1		2	1												3					1				
3		2	1	1		2	1												3					1				
4		2	1	1		2	1												3					1				
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.

eurofins | Environment Testing America

ANALYTICAL REPORT

Eurofins TestAmerica, Pittsburgh
301 Alpha Drive
RIDC Park
Pittsburgh, PA 15238
Tel: (412)963-7058

Laboratory Job ID: 180-117730-1
Client Project/Site: Plant McManus (AVS/SEM)

For:
ARCADIS U.S. Inc
855 Route 146
Suite 210
Clifton Park, New York 12065

Attn: Kathryn Farris

Authorized for release by:
5/4/2021 10:58:01 AM

Carrie Gamber, Senior Project Manager
(412)963-2428
Carrie.Gamber@Eurofinset.com

PA Lab ID: 02-00416

Table of Contents

Job ID: 180-117730-1

Laboratory: Eurofins TestAmerica, Pittsburgh

Narrative

CASE NARRATIVE

Client: ARCADIS U.S. Inc

Project: Plant McManus (AVS/SEM)

Report Number: 180-117730-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

RECEIPT
The samples were received on 03/02/2021; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 3.8 C.

AVS/SEM
No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

METALS
Aluminum failed the recovery criteria high for the MS of sample SB-6-S(8-10)MS (180-117730-5) in batch 180-349774. Aluminum and Iron failed the recovery criteria high for the MSD of sample SB-6-S(8-10)MSD (180-117730-5) in batch 180-349774. The presence of the '4' qualifier indicates analytes where the concentration in the unspiked sample exceeded four times the spiking amount.

Aluminum failed the recovery criteria high for the MS of sample SB-6-S(27-29)MS (180-117730-7) in batch 180-350237. Aluminum and Iron failed the recovery criteria high for the MSD of sample SB-6-S(27-29)MSD (180-117730-7) in batch 180-350237.

TOTAL ORGANIC CARBON
The reporting limit for Lloyd Kahn TOC analysis is a nominal value and does not reflect adjustments in sample mass processed on an individual basis.

PERCENT SOLIDS
No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Qualifiers

Metals

Qualifier	Qualifier Description
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.
F1	MS and/or MSD recovery exceeds control limits.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

General Chemistry

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Accreditation/Certification Summary

Client: ARCADIS U.S. Inc
Job ID: 180-117730-1
Project/Site: Plant McManus (AVS/SEM)

Laboratory: Eurofins TestAmerica, Pittsburgh

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
Georgia	State	PA 02-00416	04-30-21

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
2540G		Sediment	Percent Moisture
2540G		Sediment	Percent Solids
SEM		Sediment	SEM/AVS Ratio

Sample Summary

Client: ARCADIS U.S. Inc
Project/Site: Plant McManus (AVS/SEM)

Job ID: 180-117730-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
180-117730-1	SB-6-S(8-10)	Sediment	02/27/21 09:50	03/02/21 11:00	
180-117730-2	SB-6-S(15-17)	Sediment	02/27/21 10:00	03/02/21 11:00	
180-117730-3	SB-6-S(27-29)	Sediment	02/27/21 10:10	03/02/21 11:00	
180-117730-4	SB-6-S(33.5-35.5)	Sediment	02/27/21 10:23	03/02/21 11:00	
180-117730-5	SB-6-S(8-10)	Sediment	02/27/21 10:25	03/02/21 11:00	
180-117730-6	SB-6-S(15-17)	Sediment	02/27/21 10:30	03/02/21 11:00	
180-117730-7	SB-6-S(27-29)	Sediment	02/27/21 10:35	03/02/21 11:00	
180-117730-8	SB-6-S(33.5-35.5)	Sediment	02/27/21 10:40	03/02/21 11:00	
180-117730-9	SB-18-S(8-10)	Sediment	02/27/21 12:45	03/02/21 11:00	
180-117730-10	SB-18-S(21-23)	Sediment	02/27/21 12:50	03/02/21 11:00	
180-117730-11	SB-18-S(26-28)	Sediment	02/27/21 12:55	03/02/21 11:00	
180-117730-12	SB-18-S(8-10)	Sediment	02/27/21 14:20	03/02/21 11:00	
180-117730-13	SB-18-S(21-23)	Sediment	02/27/21 14:26	03/02/21 11:00	
180-117730-14	SB-18-S(26-28)	Sediment	02/27/21 14:35	03/02/21 11:00	
180-117730-15	SB-14-S(8-10)	Sediment	02/28/21 07:48	03/02/21 11:00	
180-117730-18	SB-14-S(29-31)	Sediment	02/28/21 08:15	03/02/21 11:00	
180-117730-19	SB-14-S(31-33)	Sediment	02/28/21 08:30	03/02/21 11:00	
180-117730-20	SB-14-S(8-10)	Sediment	02/28/21 08:45	03/02/21 11:00	
180-117730-21	SB-14-S(29-31)	Sediment	02/28/21 08:55	03/02/21 11:00	
180-117730-22	SB-14-S(31-33)	Sediment	02/28/21 09:10	03/02/21 11:00	
180-117730-23	SB-32-S(5-10)	Sediment	02/28/21 11:10	03/02/21 11:00	
180-117730-24	SB-32-S(5-10)	Sediment	02/28/21 11:15	03/02/21 11:00	
180-117730-25	SB-32-S(22-24)	Sediment	02/28/21 11:20	03/02/21 11:00	
180-117730-26	SB-32-S(28-30)	Sediment	02/28/21 11:22	03/02/21 11:00	
180-117730-27	SB-32-S(22-24)	Sediment	02/28/21 11:25	03/02/21 11:00	
180-117730-28	SB-32-S(28-30)	Sediment	02/28/21 11:40	03/02/21 11:00	
180-117730-29	SB-26-S(5-10)	Sediment	02/28/21 15:00	03/02/21 11:00	
180-117730-30	SB-26-S(11-13)	Sediment	02/28/21 15:20	03/02/21 11:00	
180-117730-31	SB-26-S(26-28)	Sediment	02/28/21 15:40	03/02/21 11:00	
180-117730-32	SB-26-S(34-36)	Sediment	02/28/21 15:50	03/02/21 11:00	
180-117730-33	SB-26-S(5-10)	Sediment	02/28/21 15:52	03/02/21 11:00	
180-117730-34	SB-26-S(11-13)	Sediment	02/28/21 15:54	03/02/21 11:00	
180-117730-35	SB-26-S(26-28)	Sediment	02/28/21 15:56	03/02/21 11:00	
180-117730-36	SB-26-S(34-36)	Sediment	02/28/21 15:58	03/02/21 11:00	

Method Summary

Client: ARCADIS U.S. Inc
Project/Site: Plant McManus (AVS/SEM)

Job ID: 180-117730-1

Method	Method Description	Protocol	Laboratory
6010D	Metals (ICP)	SW846	TAL PIT
EPA 6020B	Metals (ICP/MS)	SW846	TAL PIT
SEM	Metals, Simultaneously Extracted Metals (SEM)	EPA	TAL PIT
2540G	SM 2540G	SM22	TAL PIT
EPA 9034	Sulfide, Acid soluble and Insoluble (Titrimetric)	SW846	TAL PIT
EPA-Lloyd Kahn	Organic Carbon, Total (TOC)	EPA	TAL PIT
3050B	Preparation, Metals	SW846	TAL PIT
AVSSEM	Preparation, Acid Volatile Sulfide (AVS) and Simultaneously Extracted Metals (SE	EPA	TAL PIT

Protocol References:

EPA = US Environmental Protection Agency

SM22 = Standard Methods For The Examination Of Water And Wastewater, 22nd Edition

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL PIT = Eurofins TestAmerica, Pittsburgh, 301 Alpha Drive, RIDC Park, Pittsburgh, PA 15238, TEL (412)963-7058

Lab Chronicle

Client: ARCADIS U.S. Inc
Job ID: 180-117730-1
Project/Site: Plant McManus (AVS/SEM)

Client Sample ID: SB-6-S(8-10)
Lab Sample ID: 180-117730-1
Date Collected: 02/27/21 09:50
Matrix: Sediment
Date Received: 03/02/21 11:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
SEM/AVS	Analysis	SEM		1			349731	03/17/21 13:25	RJR	TAL PIT
	Instrument ID: NOEQUIP									
Total/NA	Analysis	2540G		1			349075	03/11/21 09:43	CMR	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: SB-6-S(8-10)
Lab Sample ID: 180-117730-1
Date Collected: 02/27/21 09:50
Matrix: Sediment
Date Received: 03/02/21 11:00
Percent Solids: 78.4

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
SEM/AVS	Prep	AVSSEM			10.02 g	250 mL	348972	03/10/21 12:25	CMR	TAL PIT
SEM/AVS	Analysis	6010D		1			349633	03/16/21 12:25	RJG	TAL PIT
	Instrument ID: C									
SEM/AVS	Prep	AVSSEM			10.02 g	50 mL	349015	03/10/21 17:00	CMR	TAL PIT
SEM/AVS	Analysis	EPA 9034		1			349062	03/10/21 21:38	CMR	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: SB-6-S(15-17)
Lab Sample ID: 180-117730-2
Date Collected: 02/27/21 10:00
Matrix: Sediment
Date Received: 03/02/21 11:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
SEM/AVS	Analysis	SEM		1			349731	03/17/21 13:25	RJR	TAL PIT
	Instrument ID: NOEQUIP									
Total/NA	Analysis	2540G		1			349075	03/11/21 09:43	CMR	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: SB-6-S(15-17)
Lab Sample ID: 180-117730-2
Date Collected: 02/27/21 10:00
Matrix: Sediment
Date Received: 03/02/21 11:00
Percent Solids: 81.1

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
SEM/AVS	Prep	AVSSEM			10.03 g	250 mL	348972	03/10/21 12:25	CMR	TAL PIT
SEM/AVS	Analysis	6010D		1			349633	03/16/21 12:56	RJG	TAL PIT
	Instrument ID: C									
SEM/AVS	Prep	AVSSEM			10.03 g	50 mL	349015	03/10/21 17:00	CMR	TAL PIT
SEM/AVS	Analysis	EPA 9034		1			349062	03/11/21 00:14	CMR	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: SB-6-S(27-29)
Lab Sample ID: 180-117730-3
Date Collected: 02/27/21 10:10
Matrix: Sediment
Date Received: 03/02/21 11:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
SEM/AVS	Analysis	SEM		1			349731	03/17/21 13:25	RJR	TAL PIT
	Instrument ID: NOEQUIP									

Lab Chronicle

Client: ARCADIS U.S. Inc
Job ID: 180-117730-1
Project/Site: Plant McManus (AVS/SEM)

Client Sample ID: SB-6-S(27-29)
Lab Sample ID: 180-117730-3
Date Collected: 02/27/21 10:10
Matrix: Sediment
Date Received: 03/02/21 11:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	2540G		1			349075	03/11/21 09:43	CMR	TAL PIT

Client Sample ID: SB-6-S(27-29)
Lab Sample ID: 180-117730-3
Date Collected: 02/27/21 10:10
Matrix: Sediment
Date Received: 03/02/21 11:00
Percent Solids: 75.3

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
SEM/AVS	Prep	AVSSEM			10.10 g	250 mL	348972	03/10/21 12:25	CMR	TAL PIT
SEM/AVS	Analysis	6010D		1			349633	03/16/21 13:00	RJG	TAL PIT
	Instrument ID: C									
SEM/AVS	Prep	AVSSEM			10.10 g	50 mL	349015	03/10/21 17:00	CMR	TAL PIT
SEM/AVS	Analysis	EPA 9034		1			349062	03/11/21 01:06	CMR	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: SB-6-S(33.5-35.5)
Lab Sample ID: 180-117730-4
Date Collected: 02/27/21 10:23
Matrix: Sediment
Date Received: 03/02/21 11:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
SEM/AVS	Analysis	SEM		1			349731	03/17/21 13:25	RJR	TAL PIT
	Instrument ID: NOEQUIP									
Total/NA	Analysis	2540G		1			349075	03/11/21 09:43	CMR	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: SB-6-S(33.5-35.5)
Lab Sample ID: 180-117730-4
Date Collected: 02/27/21 10:23
Matrix: Sediment
Date Received: 03/02/21 11:00
Percent Solids: 79.8

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
SEM/AVS	Prep	AVSSEM			10.04 g	250 mL	348972	03/10/21 12:25	CMR	TAL PIT
SEM/AVS	Analysis	6010D		1			349633	03/16/21 13:05	RJG	TAL PIT
	Instrument ID: C									
SEM/AVS	Prep	AVSSEM			10.04 g	50 mL	349015	03/10/21 17:00	CMR	TAL PIT
SEM/AVS	Analysis	EPA 9034		1			349062	03/11/21 01:58	CMR	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: SB-6-S(8-10)
Lab Sample ID: 180-117730-5
Date Collected: 02/27/21 10:25
Matrix: Sediment
Date Received: 03/02/21 11:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	2540G		1			349084	03/11/21 10:34	MM1	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: SB-6-S(8-10)
Lab Sample ID: 180-117730-5
Date Collected: 02/27/21 10:25
Matrix: Sediment
Date Received: 03/02/21 11:00
Percent Solids: 80.5

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			2.00 g	100 mL	349589	03/16/21 15:11	TJO	TAL PIT
Total/NA	Analysis	EPA 6020B		1			349774	03/17/21 13:59	RSK	TAL PIT
	Instrument ID: DORY									
Total/NA	Analysis	EPA-Lloyd Kahn		1			348486	03/04/21 13:24	DLF	TAL PIT
	Instrument ID: FLASHEA									

Client Sample ID: SB-6-S(15-17)
Lab Sample ID: 180-117730-6
Date Collected: 02/27/21 10:30
Matrix: Sediment
Date Received: 03/02/21 11:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	2540G		1			349084	03/11/21 10:34	MM1	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: SB-6-S(15-17)
Lab Sample ID: 180-117730-6
Date Collected: 02/27/21 10:30
Matrix: Sediment
Date Received: 03/02/21 11:00
Percent Solids: 81.2

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			2.04 g	100 mL	349589	03/16/21 15:11	TJO	TAL PIT
Total/NA	Analysis	EPA 6020B		1			349774	03/17/21 14:24	RSK	TAL PIT
	Instrument ID: DORY									
Total/NA	Analysis	EPA-Lloyd Kahn		1			348486	03/04/21 13:40	DLF	TAL PIT
	Instrument ID: FLASHEA									

Client Sample ID: SB-6-S(27-29)
Lab Sample ID: 180-117730-7
Date Collected: 02/27/21 10:35
Matrix: Sediment
Date Received: 03/02/21 11:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	2540G		1			349300	03/12/21 19:06	KMM	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: SB-6-S(27-29)
Lab Sample ID: 180-117730-7
Date Collected: 02/27/21 10:35
Matrix: Sediment
Date Received: 03/02/21 11:00
Percent Solids: 83.4

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			2.02 g	100 mL	350053	03/19/21 13:42	TJO	TAL PIT
Total/NA	Analysis	EPA 6020B		1			350237	03/20/21 17:38	RSK	TAL PIT
	Instrument ID: DORY									
Total/NA	Analysis	EPA-Lloyd Kahn		1	18.35 mg	18.35 mg	349210	03/11/21 13:23	DLF	TAL PIT
	Instrument ID: FLASHEA									

Lab Chronicle

Client: ARCADIS U.S. Inc
Job ID: 180-117730-1
Project/Site: Plant McManus (AVS/SEM)

Client Sample ID: SB-6-S(33.5-35.5)
Lab Sample ID: 180-117730-8
Date Collected: 02/27/21 10:40
Matrix: Sediment
Date Received: 03/02/21 11:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	2540G		1			349084	03/11/21 10:34	MM1	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: SB-6-S(33.5-35.5)
Lab Sample ID: 180-117730-8
Date Collected: 02/27/21 10:40
Matrix: Sediment
Date Received: 03/02/21 11:00
Percent Solids: 77.6

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			2.00 g	100 mL	349589	03/16/21 15:11	TJO	TAL PIT
Total/NA	Analysis	EPA 6020B		1			349774	03/17/21 14:28	RSK	TAL PIT
	Instrument ID: DORY									
Total/NA	Analysis	EPA-Lloyd Kahn		1			348486	03/04/21 15:04	DLF	TAL PIT
	Instrument ID: FLASHEA									

Client Sample ID: SB-18-S(8-10)
Lab Sample ID: 180-117730-9
Date Collected: 02/27/21 12:45
Matrix: Sediment
Date Received: 03/02/21 11:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	2540G		1			349084	03/11/21 10:34	MM1	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: SB-18-S(8-10)
Lab Sample ID: 180-117730-9
Date Collected: 02/27/21 12:45
Matrix: Sediment
Date Received: 03/02/21 11:00
Percent Solids: 79.6

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			2.04 g	100 mL	349589	03/16/21 15:11	TJO	TAL PIT
Total/NA	Analysis	EPA 6020B		1			349774	03/17/21 14:31	RSK	TAL PIT
	Instrument ID: DORY									
Total/NA	Analysis	EPA-Lloyd Kahn		1			348486	03/04/21 15:26	DLF	TAL PIT
	Instrument ID: FLASHEA									

Client Sample ID: SB-18-S(21-23)
Lab Sample ID: 180-117730-10
Date Collected: 02/27/21 12:50
Matrix: Sediment
Date Received: 03/02/21 11:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	2540G		1			349084	03/11/21 10:34	MM1	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: SB-18-S(21-23)
Lab Sample ID: 180-117730-10
Date Collected: 02/27/21 12:50
Matrix: Sediment
Date Received: 03/02/21 11:00
Percent Solids: 82.7

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			2.02 g	100 mL	349589	03/16/21 15:11	TJO	TAL PIT
Total/NA	Analysis	EPA 6020B		1			349774	03/17/21 14:35	RSK	TAL PIT
	Instrument ID: DORY									
Total/NA	Analysis	EPA-Lloyd Kahn		1			348486	03/04/21 15:43	DLF	TAL PIT
	Instrument ID: FLASHEA									

Client Sample ID: SB-18-S(26-28)
Lab Sample ID: 180-117730-11
Date Collected: 02/27/21 12:55
Matrix: Sediment
Date Received: 03/02/21 11:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	2540G		1			349084	03/11/21 10:34	MM1	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: SB-18-S(26-28)
Lab Sample ID: 180-117730-11
Date Collected: 02/27/21 12:55
Matrix: Sediment
Date Received: 03/02/21 11:00
Percent Solids: 69.6

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			2.03 g	100 mL	349589	03/16/21 15:11	TJO	TAL PIT
Total/NA	Analysis	EPA 6020B		1			349774	03/17/21 14:39	RSK	TAL PIT
	Instrument ID: DORY									
Total/NA	Analysis	EPA-Lloyd Kahn		1			348486	03/04/21 16:00	DLF	TAL PIT
	Instrument ID: FLASHEA									

Client Sample ID: SB-18-S(8-10)
Lab Sample ID: 180-117730-12
Date Collected: 02/27/21 14:20
Matrix: Sediment
Date Received: 03/02/21 11:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
SEM/AVS	Analysis	SEM		1			349731	03/17/21 13:25	RJR	TAL PIT
	Instrument ID: NOEQUIP									
Total/NA	Analysis	2540G		1			349075	03/11/21 09:43	CMR	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: SB-18-S(8-10)
Lab Sample ID: 180-117730-12
Date Collected: 02/27/21 14:20
Matrix: Sediment
Date Received: 03/02/21 11:00
Percent Solids: 78.4

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
SEM/AVS	Prep	AVSSEM			10.05 g	250 mL	348972	03/10/21 12:25	CMR	TAL PIT
SEM/AVS	Analysis	6010D		1			349633	03/16/21 13:09	RJG	TAL PIT
	Instrument ID: C									
SEM/AVS	Prep	AVSSEM			10.05 g	50 mL	349015	03/10/21 17:00	CMR	TAL PIT
SEM/AVS	Analysis	EPA 9034		1			349062	03/11/21 02:50	CMR	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: SB-18-S(21-23)
Lab Sample ID: 180-117730-13
Date Collected: 02/27/21 14:26
Matrix: Sediment
Date Received: 03/02/21 11:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
SEM/AVS	Analysis	SEM		1			349731	03/17/21 13:25	RJR	TAL PIT
	Instrument ID: NOEQUIP									
Total/NA	Analysis	2540G		1			349075	03/11/21 09:43	CMR	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: SB-18-S(21-23)
Lab Sample ID: 180-117730-13
Date Collected: 02/27/21 14:26
Matrix: Sediment
Date Received: 03/02/21 11:00
Percent Solids: 82.4

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
SEM/AVS	Prep	AVSSEM			10.04 g	250 mL	348972	03/10/21 12:25	CMR	TAL PIT
SEM/AVS	Analysis	6010D		1			349633	03/16/21 13:14	RJG	TAL PIT
	Instrument ID: C									
SEM/AVS	Prep	AVSSEM			10.04 g	50 mL	349015	03/10/21 17:00	CMR	TAL PIT
SEM/AVS	Analysis	EPA 9034		1			349062	03/11/21 03:42	CMR	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: SB-18-S(26-28)
Lab Sample ID: 180-117730-14
Date Collected: 02/27/21 14:35
Matrix: Sediment
Date Received: 03/02/21 11:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
SEM/AVS	Analysis	SEM		1			349731	03/17/21 13:25	RJR	TAL PIT
	Instrument ID: NOEQUIP									
Total/NA	Analysis	2540G		1			349075	03/11/21 09:43	CMR	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: SB-18-S(26-28)
Lab Sample ID: 180-117730-14
Date Collected: 02/27/21 14:35
Matrix: Sediment
Date Received: 03/02/21 11:00
Percent Solids: 82.7

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
SEM/AVS	Prep	AVSSEM			10.01 g	250 mL	348972	03/10/21 12:25	CMR	TAL PIT
SEM/AVS	Analysis	6010D		1			349633	03/16/21 13:19	RJG	TAL PIT
	Instrument ID: C									
SEM/AVS	Prep	AVSSEM			10.01 g	50 mL	349015	03/10/21 17:00	CMR	TAL PIT
SEM/AVS	Analysis	EPA 9034		1			349062	03/11/21 06:18	CMR	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: SB-14-S(8-10)
Lab Sample ID: 180-117730-15
Date Collected: 02/28/21 07:48
Matrix: Sediment
Date Received: 03/02/21 11:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	2540G		1			349084	03/11/21 10:34	MM1	TAL PIT
	Instrument ID: NOEQUIP									

Lab Chronicle

Client: ARCADIS U.S. Inc
Job ID: 180-117730-1
Project/Site: Plant McManus (AVS/SEM)

Client Sample ID: SB-14-S(8-10)
Lab Sample ID: 180-117730-15
Date Collected: 02/28/21 07:48
Matrix: Sediment
Date Received: 03/02/21 11:00
Percent Solids: 75.0

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			2.02 g	100 mL	349589	03/16/21 15:11	TJO	TAL PIT
Total/NA	Analysis	EPA 6020B		1			349774	03/17/21 14:42	RSK	TAL PIT
	Instrument ID: DORY									
Total/NA	Analysis	EPA-Lloyd Kahn		1			348486	03/04/21 16:17	DLF	TAL PIT
	Instrument ID: FLASHEA									

Client Sample ID: SB-14-S(29-31)
Lab Sample ID: 180-117730-18
Date Collected: 02/28/21 08:15
Matrix: Sediment
Date Received: 03/02/21 11:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
SEM/AVS	Analysis	SEM		1			349731	03/17/21 13:25	RJR	TAL PIT
	Instrument ID: NOEQUIP									
Total/NA	Analysis	2540G		1			349075	03/11/21 09:43	CMR	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: SB-14-S(29-31)
Lab Sample ID: 180-117730-18
Date Collected: 02/28/21 08:15
Matrix: Sediment
Date Received: 03/02/21 11:00
Percent Solids: 72.6

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
SEM/AVS	Prep	AVSSEM			10.09 g	250 mL	348972	03/10/21 12:25	CMR	TAL PIT
SEM/AVS	Analysis	6010D		1			349633	03/16/21 13:23	RJG	TAL PIT
	Instrument ID: C									
SEM/AVS	Prep	AVSSEM			10.09 g	50 mL	349015	03/10/21 17:00	CMR	TAL PIT
SEM/AVS	Analysis	EPA 9034		1			349062	03/11/21 07:11	CMR	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: SB-14-S(31-33)
Lab Sample ID: 180-117730-19
Date Collected: 02/28/21 08:30
Matrix: Sediment
Date Received: 03/02/21 11:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
SEM/AVS	Analysis	SEM		1			349731	03/17/21 13:25	RJR	TAL PIT
	Instrument ID: NOEQUIP									
Total/NA	Analysis	2540G		1			349075	03/11/21 09:43	CMR	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: SB-14-S(31-33)
Lab Sample ID: 180-117730-19
Date Collected: 02/28/21 08:30
Matrix: Sediment
Date Received: 03/02/21 11:00
Percent Solids: 84.3

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
SEM/AVS	Prep	AVSSEM			10.00 g	250 mL	348972	03/10/21 12:25	CMR	TAL PIT
SEM/AVS	Analysis	6010D		1			349633	03/16/21 13:37	RJG	TAL PIT
	Instrument ID: C									

Lab Chronicle

Client: ARCADIS U.S. Inc
Job ID: 180-117730-1
Project/Site: Plant McManus (AVS/SEM)

Client Sample ID: SB-14-S(31-33)
Lab Sample ID: 180-117730-19
Date Collected: 02/28/21 08:30
Matrix: Sediment
Date Received: 03/02/21 11:00
Percent Solids: 84.3

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
SEM/AVS	Prep	AVSSEM			10.00 g	50 mL	349015	03/10/21 17:00	CMR	TAL PIT
SEM/AVS	Analysis	EPA 9034		1			349062	03/11/21 08:03	CMR	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: SB-14-S(8-10)
Lab Sample ID: 180-117730-20
Date Collected: 02/28/21 08:45
Matrix: Sediment
Date Received: 03/02/21 11:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
SEM/AVS	Analysis	SEM		1			349731	03/17/21 13:25	RJR	TAL PIT
	Instrument ID: NOEQUIP									
Total/NA	Analysis	2540G		1			349075	03/11/21 09:43	CMR	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: SB-14-S(8-10)
Lab Sample ID: 180-117730-20
Date Collected: 02/28/21 08:45
Matrix: Sediment
Date Received: 03/02/21 11:00
Percent Solids: 79.9

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
SEM/AVS	Prep	AVSSEM			10.03 g	250 mL	348972	03/10/21 12:25	CMR	TAL PIT
SEM/AVS	Analysis	6010D		1			349633	03/16/21 13:41	RJG	TAL PIT
	Instrument ID: C									
SEM/AVS	Prep	AVSSEM			10.03 g	50 mL	349015	03/10/21 17:00	CMR	TAL PIT
SEM/AVS	Analysis	EPA 9034		1			349062	03/11/21 08:55	CMR	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: SB-14-S(29-31)
Lab Sample ID: 180-117730-21
Date Collected: 02/28/21 08:55
Matrix: Sediment
Date Received: 03/02/21 11:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	2540G		1			349084	03/11/21 10:34	MM1	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: SB-14-S(29-31)
Lab Sample ID: 180-117730-21
Date Collected: 02/28/21 08:55
Matrix: Sediment
Date Received: 03/02/21 11:00
Percent Solids: 75.9

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			2.01 g	100 mL	349589	03/16/21 15:11	TJO	TAL PIT
Total/NA	Analysis	EPA 6020B		1			349774	03/17/21 15:00	RSK	TAL PIT
	Instrument ID: DORY									
Total/NA	Analysis	EPA-Lloyd Kahn		1			348486	03/04/21 16:33	DLF	TAL PIT
	Instrument ID: FLASHEA									

Client Sample ID: SB-14-S(31-33)
Lab Sample ID: 180-117730-22
Date Collected: 02/28/21 09:10
Matrix: Sediment
Date Received: 03/02/21 11:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	2540G		1			349084	03/11/21 10:34	MM1	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: SB-14-S(31-33)
Lab Sample ID: 180-117730-22
Date Collected: 02/28/21 09:10
Matrix: Sediment
Date Received: 03/02/21 11:00
Percent Solids: 80.9

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			2.05 g	100 mL	349589	03/16/21 15:11	TJO	TAL PIT
Total/NA	Analysis	EPA 6020B		1			349774	03/17/21 15:04	RSK	TAL PIT
	Instrument ID: DORY									
Total/NA	Analysis	EPA-Lloyd Kahn		1			348486	03/04/21 17:07	DLF	TAL PIT
	Instrument ID: FLASHEA									

Client Sample ID: SB-32-S(5-10)
Lab Sample ID: 180-117730-23
Date Collected: 02/28/21 11:10
Matrix: Sediment
Date Received: 03/02/21 11:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	2540G		1			349084	03/11/21 10:34	MM1	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: SB-32-S(5-10)
Lab Sample ID: 180-117730-23
Date Collected: 02/28/21 11:10
Matrix: Sediment
Date Received: 03/02/21 11:00
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	3050B			2.03 g	100 mL	349589	03/16/21 15:11	TJO	TAL PIT
Total/NA	Analysis	EPA 6020B		1			349774	03/17/21 15:07	RSK	TAL PIT
	Instrument ID: DORY									
Total/NA	Analysis	EPA-Lloyd Kahn		1			348486	03/04/21 17:29	DLF	TAL PIT
	Instrument ID: FLASHEA									

Client Sample ID: SB-32-S(5-10)
Lab Sample ID: 180-117730-24
Date Collected: 02/28/21 11:15
Matrix: Sediment
Date Received: 03/02/21 11:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
SEM/AVS	Analysis	SEM		1			349731	03/17/21 13:25	RJR	TAL PIT
	Instrument ID: NOEQUIP									
Total/NA	Analysis	2540G		1			349075	03/11/21 09:43	CMR	TAL PIT
	Instrument ID: NOEQUIP									

Lab Chronicle

Client: ARCADIS U.S. Inc
Job ID: 180-117730-1
Project/Site: Plant McManus (AVS/SEM)

Client Sample ID: SB-32-S(5-10)
Lab Sample ID: 180-117730-24
Date Collected: 02/28/21 11:15
Matrix: Sediment
Date Received: 03/02/21 11:00
Percent Solids: 78.2

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
SEM/AVS	Prep	AVSSEM			9.98 g	250 mL	348972	03/10/21 12:25	CMR	TAL PIT
SEM/AVS	Analysis	6010D		1			349633	03/16/21 13:46	RJG	TAL PIT
	Instrument ID: C									
SEM/AVS	Prep	AVSSEM			9.98 g	50 mL	349015	03/10/21 17:00	CMR	TAL PIT
SEM/AVS	Analysis	EPA 9034		1			349062	03/11/21 09:47	CMR	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: SB-32-S(22-24)
Lab Sample ID: 180-117730-25
Date Collected: 02/28/21 11:20
Matrix: Sediment
Date Received: 03/02/21 11:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	2540G		1			349084	03/11/21 10:34	MM1	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: SB-32-S(22-24)
Lab Sample ID: 180-117730-25
Date Collected: 02/28/21 11:20
Matrix: Sediment
Date Received: 03/02/21 11:00
Percent Solids: 84.2

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			2.02 g	100 mL	349589	03/16/21 15:11	TJO	TAL PIT
Total/NA	Analysis	EPA 6020B		1			349774	03/17/21 15:11	RSK	TAL PIT
	Instrument ID: DORY									
Total/NA	Analysis	EPA-Lloyd Kahn		1			348486	03/04/21 17:46	DLF	TAL PIT
	Instrument ID: FLASHEA									

Client Sample ID: SB-32-S(28-30)
Lab Sample ID: 180-117730-26
Date Collected: 02/28/21 11:22
Matrix: Sediment
Date Received: 03/02/21 11:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	2540G		1			349084	03/11/21 10:34	MM1	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: SB-32-S(28-30)
Lab Sample ID: 180-117730-26
Date Collected: 02/28/21 11:22
Matrix: Sediment
Date Received: 03/02/21 11:00
Percent Solids: 81.5

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			2.03 g	100 mL	349589	03/16/21 15:11	TJO	TAL PIT
Total/NA	Analysis	EPA 6020B		1			349774	03/17/21 15:14	RSK	TAL PIT
	Instrument ID: DORY									
Total/NA	Analysis	EPA-Lloyd Kahn		1			348486	03/04/21 18:08	DLF	TAL PIT
	Instrument ID: FLASHEA									

Client Sample ID: SB-32-S(22-24)
Lab Sample ID: 180-117730-27
Date Collected: 02/28/21 11:25
Matrix: Sediment
Date Received: 03/02/21 11:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
SEM/AVS	Analysis	SEM		1			349731	03/17/21 13:25	RJR	TAL PIT
	Instrument ID: NOEQUIP									
Total/NA	Analysis	2540G		1			349075	03/11/21 09:43	CMR	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: SB-32-S(22-24)
Lab Sample ID: 180-117730-27
Date Collected: 02/28/21 11:25
Matrix: Sediment
Date Received: 03/02/21 11:00
Percent Solids: 81.7

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
SEM/AVS	Prep	AVSSEM			9.97 g	250 mL	348972	03/10/21 12:25	CMR	TAL PIT
SEM/AVS	Analysis	6010D		1			349633	03/16/21 13:51	RJG	TAL PIT
	Instrument ID: C									
SEM/AVS	Prep	AVSSEM			9.97 g	50 mL	349015	03/10/21 17:00	CMR	TAL PIT
SEM/AVS	Analysis	EPA 9034		1			349062	03/11/21 10:39	CMR	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: SB-32-S(28-30)
Lab Sample ID: 180-117730-28
Date Collected: 02/28/21 11:40
Matrix: Sediment
Date Received: 03/02/21 11:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
SEM/AVS	Analysis	SEM		1			349731	03/17/21 13:25	RJR	TAL PIT
	Instrument ID: NOEQUIP									
Total/NA	Analysis	2540G		1			349075	03/11/21 09:43	CMR	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: SB-32-S(28-30)
Lab Sample ID: 180-117730-28
Date Collected: 02/28/21 11:40
Matrix: Sediment
Date Received: 03/02/21 11:00
Percent Solids: 80.0

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
SEM/AVS	Prep	AVSSEM			10.02 g	250 mL	348972	03/10/21 12:25	CMR	TAL PIT
SEM/AVS	Analysis	6010D		1			349633	03/16/21 13:55	RJG	TAL PIT
	Instrument ID: C									
SEM/AVS	Prep	AVSSEM			10.02 g	50 mL	349015	03/10/21 17:00	CMR	TAL PIT
SEM/AVS	Analysis	EPA 9034		1			349062	03/11/21 11:31	CMR	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: SB-26-S(5-10)
Lab Sample ID: 180-117730-29
Date Collected: 02/28/21 15:00
Matrix: Sediment
Date Received: 03/02/21 11:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
SEM/AVS	Analysis	SEM		1			349731	03/17/21 13:25	RJR	TAL PIT
	Instrument ID: NOEQUIP									

Lab Chronicle

Client: ARCADIS U.S. Inc
Job ID: 180-117730-1
Project/Site: Plant McManus (AVS/SEM)

Client Sample ID: SB-26-S(5-10)
Lab Sample ID: 180-117730-29
Date Collected: 02/28/21 15:00
Matrix: Sediment
Date Received: 03/02/21 11:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	2540G		1			349075	03/11/21 09:43	CMR	TAL PIT

Client Sample ID: SB-26-S(5-10)
Lab Sample ID: 180-117730-29
Date Collected: 02/28/21 15:00
Matrix: Sediment
Date Received: 03/02/21 11:00
Percent Solids: 79.1

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
SEM/AVS	Prep	AVSSEM			10.04 g	250 mL	348972	03/10/21 12:25	CMR	TAL PIT
SEM/AVS	Analysis	6010D		1			349633	03/16/21 14:00	RJG	TAL PIT
	Instrument ID: C									
SEM/AVS	Prep	AVSSEM			10.04 g	50 mL	349015	03/10/21 17:00	CMR	TAL PIT
SEM/AVS	Analysis	EPA 9034		1			349062	03/11/21 12:23	CMR	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: SB-26-S(11-13)
Lab Sample ID: 180-117730-30
Date Collected: 02/28/21 15:20
Matrix: Sediment
Date Received: 03/02/21 11:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
SEM/AVS	Analysis	SEM		1			349731	03/17/21 13:25	RJR	TAL PIT
	Instrument ID: NOEQUIP									
Total/NA	Analysis	2540G		1			349075	03/11/21 09:43	CMR	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: SB-26-S(11-13)
Lab Sample ID: 180-117730-30
Date Collected: 02/28/21 15:20
Matrix: Sediment
Date Received: 03/02/21 11:00
Percent Solids: 50.5

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
SEM/AVS	Prep	AVSSEM			10.02 g	250 mL	348972	03/10/21 12:25	CMR	TAL PIT
SEM/AVS	Analysis	6010D		1			349633	03/16/21 14:04	RJG	TAL PIT
	Instrument ID: C									
SEM/AVS	Prep	AVSSEM			10.02 g	50 mL	349015	03/10/21 17:00	CMR	TAL PIT
SEM/AVS	Analysis	EPA 9034		1			349062	03/11/21 13:15	CMR	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: SB-26-S(26-28)
Lab Sample ID: 180-117730-31
Date Collected: 02/28/21 15:40
Matrix: Sediment
Date Received: 03/02/21 11:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
SEM/AVS	Analysis	SEM		1			349731	03/17/21 13:25	RJR	TAL PIT
	Instrument ID: NOEQUIP									
Total/NA	Analysis	2540G		1			349075	03/11/21 09:43	CMR	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: SB-26-S(26-28)
Lab Sample ID: 180-117730-31
Date Collected: 02/28/21 15:40
Matrix: Sediment
Date Received: 03/02/21 11:00
Percent Solids: 79.4

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
SEM/AVS	Prep	AVSSEM			10.05 g	250 mL	348972	03/10/21 12:25	CMR	TAL PIT
SEM/AVS	Analysis	6010D		1			349633	03/16/21 14:09	RJG	TAL PIT
	Instrument ID: C									
SEM/AVS	Prep	AVSSEM			10.05 g	50 mL	349015	03/10/21 17:00	CMR	TAL PIT
SEM/AVS	Analysis	EPA 9034		1			349062	03/11/21 14:07	CMR	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: SB-26-S(34-36)
Lab Sample ID: 180-117730-32
Date Collected: 02/28/21 15:50
Matrix: Sediment
Date Received: 03/02/21 11:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
SEM/AVS	Analysis	SEM		1			349731	03/17/21 13:25	RJR	TAL PIT
	Instrument ID: NOEQUIP									
Total/NA	Analysis	2540G		1			349075	03/11/21 09:43	CMR	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: SB-26-S(34-36)
Lab Sample ID: 180-117730-32
Date Collected: 02/28/21 15:50
Matrix: Sediment
Date Received: 03/02/21 11:00
Percent Solids: 81.1

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
SEM/AVS	Prep	AVSSEM			10.06 g	250 mL	348972	03/10/21 12:25	CMR	TAL PIT
SEM/AVS	Analysis	6010D		1			349633	03/16/21 14:14	RJG	TAL PIT
	Instrument ID: C									
SEM/AVS	Prep	AVSSEM			10.06 g	50 mL	349015	03/10/21 17:00	CMR	TAL PIT
SEM/AVS	Analysis	EPA 9034		1			349062	03/11/21 16:43	CMR	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: SB-26-S(5-10)
Lab Sample ID: 180-117730-33
Date Collected: 02/28/21 15:52
Matrix: Sediment
Date Received: 03/02/21 11:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	2540G		1			349084	03/11/21 10:34	MM1	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: SB-26-S(5-10)
Lab Sample ID: 180-117730-33
Date Collected: 02/28/21 15:52
Matrix: Sediment
Date Received: 03/02/21 11:00
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	3050B			2.04 g	100 mL	349589	03/16/21 15:11	TJO	TAL PIT
Total/NA	Analysis	EPA 6020B		1			349774	03/17/21 15:18	RSK	TAL PIT
	Instrument ID: DORY									

Lab Chronicle

Client: ARCADIS U.S. Inc
Job ID: 180-117730-1
Project/Site: Plant McManus (AVS/SEM)

Client Sample ID: SB-26-S(5-10)
Lab Sample ID: 180-117730-33
Date Collected: 02/28/21 15:52
Matrix: Sediment
Date Received: 03/02/21 11:00
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	Analysis	EPA-Lloyd Kahn		1			348486	03/04/21 18:31	DLF	TAL PIT

Client Sample ID: SB-26-S(11-13)
Lab Sample ID: 180-117730-34
Date Collected: 02/28/21 15:54
Matrix: Sediment
Date Received: 03/02/21 11:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	2540G		1			349084	03/11/21 10:34	MM1	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: SB-26-S(11-13)
Lab Sample ID: 180-117730-34
Date Collected: 02/28/21 15:54
Matrix: Sediment
Date Received: 03/02/21 11:00
Percent Solids: 50.8

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			2.01 g	100 mL	349589	03/16/21 15:11	TJO	TAL PIT
Total/NA	Analysis	EPA 6020B		1			349774	03/17/21 15:22	RSK	TAL PIT
	Instrument ID: DORY									
Total/NA	Analysis	EPA-Lloyd Kahn		1			348486	03/04/21 18:59	DLF	TAL PIT
	Instrument ID: FLASHEA									

Client Sample ID: SB-26-S(26-28)
Lab Sample ID: 180-117730-35
Date Collected: 02/28/21 15:56
Matrix: Sediment
Date Received: 03/02/21 11:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	2540G		1			349084	03/11/21 10:34	MM1	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: SB-26-S(26-28)
Lab Sample ID: 180-117730-35
Date Collected: 02/28/21 15:56
Matrix: Sediment
Date Received: 03/02/21 11:00
Percent Solids: 77.1

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			2.04 g	100 mL	349589	03/16/21 15:12	TJO	TAL PIT
Total/NA	Analysis	EPA 6020B		1			349774	03/17/21 15:25	RSK	TAL PIT
	Instrument ID: DORY									
Total/NA	Analysis	EPA-Lloyd Kahn		1			348486	03/04/21 19:21	DLF	TAL PIT
	Instrument ID: FLASHEA									

Lab Chronicle

Client: ARCADIS U.S. Inc
Job ID: 180-117730-1
Project/Site: Plant McManus (AVS/SEM)

Client Sample ID: SB-26-S(34-36)
Lab Sample ID: 180-117730-36
Date Collected: 02/28/21 15:58
Matrix: Sediment
Date Received: 03/02/21 11:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	2540G		1			349084	03/11/21 10:34	MM1	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: SB-26-S(34-36)
Lab Sample ID: 180-117730-36
Date Collected: 02/28/21 15:58
Matrix: Sediment
Date Received: 03/02/21 11:00
Percent Solids: 75.3

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			2.03 g	100 mL	349589	03/16/21 15:12	TJO	TAL PIT
Total/NA	Analysis	EPA 6020B		1			349774	03/17/21 15:29	RSK	TAL PIT
	Instrument ID: DORY									
Total/NA	Analysis	EPA-Lloyd Kahn		1			348486	03/04/21 19:43	DLF	TAL PIT
	Instrument ID: FLASHEA									

Laboratory References:

TAL PIT = Eurofins TestAmerica, Pittsburgh, 301 Alpha Drive, RIDC Park, Pittsburgh, PA 15238, TEL (412)963-7058

Analyst References:

Lab: TAL PIT

Batch Type: Prep

CMR = Carl Reagle
TJO = Tyler Oliver

Batch Type: Analysis

CMR = Carl Reagle
DLF = Donald Ferguson
KMM = Kendric Moore
MM1 = Mary Beth Miller
RJG = Rob Good
RJR = Ron Rosenbaum
RSK = Robert Kurtz

Client Sample ID: SB-6-S(8-10)
Lab Sample ID: 180-117730-1
Date Collected: 02/27/21 09:50
Matrix: Sediment
Date Received: 03/02/21 11:00
Percent Solids: 78.4

Method: 6010D - Metals (ICP) - SEM/AVS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic SEM	1.8		0.32	0.13	mg/Kg	☼	03/10/21 12:25	03/16/21 12:25	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic SEM	0.024		0.0043	0.0018	umol/g	☼	03/10/21 12:25	03/16/21 12:25	1

Method: SEM - Metals, Simultaneously Extracted Metals (SEM) - SEM/AVS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
SEM/AVS Ratio	NC		0.0010	NaN	NONE			03/17/21 13:25	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	21.6		0.1	0.1	%			03/11/21 09:43	1
Percent Solids	78.4		0.1	0.1	%			03/11/21 09:43	1

General Chemistry - SEM/AVS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acid Volatile Sulfides (AVS)	ND		19	6.4	mg/Kg	☼	03/10/21 17:00	03/10/21 21:38	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acid Volatile Sulfides (AVS)	ND		0.60	0.20	umol/g	☼	03/10/21 17:00	03/10/21 21:38	1

Client Sample ID: SB-6-S(15-17)
Lab Sample ID: 180-117730-2
Date Collected: 02/27/21 10:00
Matrix: Sediment
Date Received: 03/02/21 11:00
Percent Solids: 81.1

Method: 6010D - Metals (ICP) - SEM/AVS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic SEM	0.29	J	0.31	0.13	mg/Kg	☼	03/10/21 12:25	03/16/21 12:56	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic SEM	0.0039	J	0.0041	0.0017	umol/g	☼	03/10/21 12:25	03/16/21 12:56	1

Method: SEM - Metals, Simultaneously Extracted Metals (SEM) - SEM/AVS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
SEM/AVS Ratio	NC		0.0010	NaN	NONE			03/17/21 13:25	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	18.9		0.1	0.1	%			03/11/21 09:43	1
Percent Solids	81.1		0.1	0.1	%			03/11/21 09:43	1

General Chemistry - SEM/AVS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acid Volatile Sulfides (AVS)	ND		18	6.1	mg/Kg	☼	03/10/21 17:00	03/11/21 00:14	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acid Volatile Sulfides (AVS)	ND		0.58	0.19	umol/g	☼	03/10/21 17:00	03/11/21 00:14	1

Client Sample ID: SB-6-S(27-29)
Lab Sample ID: 180-117730-3
Date Collected: 02/27/21 10:10
Matrix: Sediment
Date Received: 03/02/21 11:00
Percent Solids: 75.3

Method: 6010D - Metals (ICP) - SEM/AVS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic SEM	0.31	J	0.33	0.14	mg/Kg	☼	03/10/21 12:25	03/16/21 13:00	1

Client Sample ID: SB-6-S(27-29)
Lab Sample ID: 180-117730-3
Date Collected: 02/27/21 10:10
Matrix: Sediment
Date Received: 03/02/21 11:00
Percent Solids: 75.3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic SEM	0.0041	J	0.0044	0.0018	umol/g	☼	03/10/21 12:25	03/16/21 13:00	1

Method: SEM - Metals, Simultaneously Extracted Metals (SEM) - SEM/AVS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
SEM/AVS Ratio	NC		0.0010	NaN	NONE			03/17/21 13:25	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	24.7		0.1	0.1	%			03/11/21 09:43	1
Percent Solids	75.3		0.1	0.1	%			03/11/21 09:43	1

General Chemistry - SEM/AVS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acid Volatile Sulfides (AVS)	ND		20	6.6	mg/Kg	☼	03/10/21 17:00	03/11/21 01:06	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acid Volatile Sulfides (AVS)	ND		0.61	0.20	umol/g	☼	03/10/21 17:00	03/11/21 01:06	1

Client Sample ID: SB-6-S(33.5-35.5)
Lab Sample ID: 180-117730-4
Date Collected: 02/27/21 10:23
Matrix: Sediment
Date Received: 03/02/21 11:00
Percent Solids: 79.8

Method: 6010D - Metals (ICP) - SEM/AVS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic SEM	0.27	J	0.31	0.13	mg/Kg	☼	03/10/21 12:25	03/16/21 13:05	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic SEM	0.0036	J	0.0042	0.0017	umol/g	☼	03/10/21 12:25	03/16/21 13:05	1

Method: SEM - Metals, Simultaneously Extracted Metals (SEM) - SEM/AVS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
SEM/AVS Ratio	NC		0.0010	NaN	NONE			03/17/21 13:25	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	20.2		0.1	0.1	%			03/11/21 09:43	1
Percent Solids	79.8		0.1	0.1	%			03/11/21 09:43	1

General Chemistry - SEM/AVS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acid Volatile Sulfides (AVS)	ND		19	6.2	mg/Kg	☼	03/10/21 17:00	03/11/21 01:58	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acid Volatile Sulfides (AVS)	ND		0.58	0.19	umol/g	☼	03/10/21 17:00	03/11/21 01:58	1

Client Sample ID: SB-6-S(8-10)
Lab Sample ID: 180-117730-5
Date Collected: 02/27/21 10:25
Matrix: Sediment
Date Received: 03/02/21 11:00
Percent Solids: 80.5

Method: EPA 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	4000		3.7	3.6	mg/Kg	☼	03/16/21 15:11	03/17/21 13:59	1
Arsenic	4.6		0.062	0.020	mg/Kg	☼	03/16/21 15:11	03/17/21 13:59	1
Calcium	240		31	4.7	mg/Kg	☼	03/16/21 15:11	03/17/21 13:59	1
Iron	1800		3.1	3.0	mg/Kg	☼	03/16/21 15:11	03/17/21 13:59	1

Client Sample ID: SB-6-S(8-10)
Lab Sample ID: 180-117730-5
Date Collected: 02/27/21 10:25
Matrix: Sediment
Date Received: 03/02/21 11:00
Percent Solids: 80.5

Method: EPA 6020B - Metals (ICP/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Manganese	16		0.31	0.27	mg/Kg	☼	03/16/21 15:11	03/17/21 13:59	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	19.5		0.1	0.1	%			03/11/21 10:34	1
Percent Solids	80.5		0.1	0.1	%			03/11/21 10:34	1
Total Organic Carbon - Duplicates	1600		1200	930	mg/Kg	☼		03/04/21 13:24	1

Client Sample ID: SB-6-S(15-17)
Lab Sample ID: 180-117730-6
Date Collected: 02/27/21 10:30
Matrix: Sediment
Date Received: 03/02/21 11:00
Percent Solids: 81.2

Method: EPA 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	330		3.6	3.5	mg/Kg	☼	03/16/21 15:11	03/17/21 14:24	1
Arsenic	0.52		0.060	0.019	mg/Kg	☼	03/16/21 15:11	03/17/21 14:24	1
Calcium	390		30	4.6	mg/Kg	☼	03/16/21 15:11	03/17/21 14:24	1
Iron	550		3.0	2.9	mg/Kg	☼	03/16/21 15:11	03/17/21 14:24	1
Manganese	14		0.30	0.26	mg/Kg	☼	03/16/21 15:11	03/17/21 14:24	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	18.8		0.1	0.1	%			03/11/21 10:34	1
Percent Solids	81.2		0.1	0.1	%			03/11/21 10:34	1
Total Organic Carbon - Duplicates	1100	J	1200	920	mg/Kg	☼		03/04/21 13:40	1

Client Sample ID: SB-6-S(27-29)
Lab Sample ID: 180-117730-7
Date Collected: 02/27/21 10:35
Matrix: Sediment
Date Received: 03/02/21 11:00
Percent Solids: 83.4

Method: EPA 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	650	F1	3.6	3.5	mg/Kg	☼	03/19/21 13:42	03/20/21 17:38	1
Arsenic	0.99		0.059	0.019	mg/Kg	☼	03/19/21 13:42	03/20/21 17:38	1
Calcium	2700		30	4.5	mg/Kg	☼	03/19/21 13:42	03/20/21 17:38	1
Iron	1100	F1	3.0	2.8	mg/Kg	☼	03/19/21 13:42	03/20/21 17:38	1
Manganese	18		0.30	0.26	mg/Kg	☼	03/19/21 13:42	03/20/21 17:38	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	16.6		0.1	0.1	%			03/12/21 19:06	1
Percent Solids	83.4		0.1	0.1	%			03/12/21 19:06	1
Total Organic Carbon - Duplicates	990	J	1200	890	mg/Kg	☼		03/11/21 13:23	1

Client Sample ID: SB-6-S(33.5-35.5)
Lab Sample ID: 180-117730-8
Date Collected: 02/27/21 10:40
Matrix: Sediment
Date Received: 03/02/21 11:00
Percent Solids: 77.6

Method: EPA 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	1200		3.9	3.7	mg/Kg	☼	03/16/21 15:11	03/17/21 14:28	1
Arsenic	1.4		0.064	0.021	mg/Kg	☼	03/16/21 15:11	03/17/21 14:28	1

Client Sample ID: SB-6-S(33.5-35.5)
Lab Sample ID: 180-117730-8
Date Collected: 02/27/21 10:40
Matrix: Sediment
Date Received: 03/02/21 11:00
Percent Solids: 77.6

Method: EPA 6020B - Metals (ICP/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	4000		32	4.9	mg/Kg	☼	03/16/21 15:11	03/17/21 14:28	1
Iron	1700		3.2	3.1	mg/Kg	☼	03/16/21 15:11	03/17/21 14:28	1
Manganese	25		0.32	0.28	mg/Kg	☼	03/16/21 15:11	03/17/21 14:28	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	22.4		0.1	0.1	%			03/11/21 10:34	1
Percent Solids	77.6		0.1	0.1	%			03/11/21 10:34	1
Total Organic Carbon - Duplicates	1900		1300	960	mg/Kg	☼		03/04/21 15:04	1

Client Sample ID: SB-18-S(8-10)
Lab Sample ID: 180-117730-9
Date Collected: 02/27/21 12:45
Matrix: Sediment
Date Received: 03/02/21 11:00
Percent Solids: 79.6

Method: EPA 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	4900		3.7	3.6	mg/Kg	☼	03/16/21 15:11	03/17/21 14:31	1
Arsenic	4.6		0.062	0.020	mg/Kg	☼	03/16/21 15:11	03/17/21 14:31	1
Calcium	200		31	4.7	mg/Kg	☼	03/16/21 15:11	03/17/21 14:31	1
Iron	1600		3.1	2.9	mg/Kg	☼	03/16/21 15:11	03/17/21 14:31	1
Manganese	12		0.31	0.26	mg/Kg	☼	03/16/21 15:11	03/17/21 14:31	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	20.4		0.1	0.1	%			03/11/21 10:34	1
Percent Solids	79.6		0.1	0.1	%			03/11/21 10:34	1
Total Organic Carbon - Duplicates	2100		1300	940	mg/Kg	☼		03/04/21 15:26	1

Client Sample ID: SB-18-S(21-23)
Lab Sample ID: 180-117730-10
Date Collected: 02/27/21 12:50
Matrix: Sediment
Date Received: 03/02/21 11:00
Percent Solids: 82.7

Method: EPA 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	1100		3.6	3.5	mg/Kg	☼	03/16/21 15:11	03/17/21 14:35	1
Arsenic	1.2		0.060	0.019	mg/Kg	☼	03/16/21 15:11	03/17/21 14:35	1
Calcium	1100		30	4.6	mg/Kg	☼	03/16/21 15:11	03/17/21 14:35	1
Iron	2000		3.0	2.9	mg/Kg	☼	03/16/21 15:11	03/17/21 14:35	1
Manganese	26		0.30	0.26	mg/Kg	☼	03/16/21 15:11	03/17/21 14:35	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	17.3		0.1	0.1	%			03/11/21 10:34	1
Percent Solids	82.7		0.1	0.1	%			03/11/21 10:34	1
Total Organic Carbon - Duplicates	1500		1200	900	mg/Kg	☼		03/04/21 15:43	1

Client Sample ID: SB-18-S(26-28)
Lab Sample ID: 180-117730-11
Date Collected: 02/27/21 12:55
Matrix: Sediment
Date Received: 03/02/21 11:00
Percent Solids: 69.6

Method: EPA 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	7500		4.2	4.1	mg/Kg	☼	03/16/21 15:11	03/17/21 14:39	1
Arsenic	5.5		0.071	0.023	mg/Kg	☼	03/16/21 15:11	03/17/21 14:39	1
Calcium	4800		35	5.4	mg/Kg	☼	03/16/21 15:11	03/17/21 14:39	1
Iron	10000		3.5	3.4	mg/Kg	☼	03/16/21 15:11	03/17/21 14:39	1
Manganese	150		0.35	0.30	mg/Kg	☼	03/16/21 15:11	03/17/21 14:39	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	30.4		0.1	0.1	%			03/11/21 10:34	1
Percent Solids	69.6		0.1	0.1	%			03/11/21 10:34	1
Total Organic Carbon - Duplicates	5600		1400	1100	mg/Kg	☼		03/04/21 16:00	1

Client Sample ID: SB-18-S(8-10)
Lab Sample ID: 180-117730-12
Date Collected: 02/27/21 14:20
Matrix: Sediment
Date Received: 03/02/21 11:00
Percent Solids: 78.4

Method: 6010D - Metals (ICP) - SEM/AVS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic SEM	0.73		0.32	0.13	mg/Kg	☼	03/10/21 12:25	03/16/21 13:09	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic SEM	0.0097		0.0042	0.0017	umol/g	☼	03/10/21 12:25	03/16/21 13:09	1

Method: SEM - Metals, Simultaneously Extracted Metals (SEM) - SEM/AVS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
SEM/AVS Ratio	NC		0.0010	NaN	NONE			03/17/21 13:25	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	21.6		0.1	0.1	%			03/11/21 09:43	1
Percent Solids	78.4		0.1	0.1	%			03/11/21 09:43	1

General Chemistry - SEM/AVS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acid Volatile Sulfides (AVS)	ND		19	6.3	mg/Kg	☼	03/10/21 17:00	03/11/21 02:50	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acid Volatile Sulfides (AVS)	ND		0.59	0.20	umol/g	☼	03/10/21 17:00	03/11/21 02:50	1

Client Sample ID: SB-18-S(21-23)
Lab Sample ID: 180-117730-13
Date Collected: 02/27/21 14:26
Matrix: Sediment
Date Received: 03/02/21 11:00
Percent Solids: 82.4

Method: 6010D - Metals (ICP) - SEM/AVS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic SEM	0.23	J	0.30	0.12	mg/Kg	☼	03/10/21 12:25	03/16/21 13:14	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic SEM	0.0030	J	0.0040	0.0017	umol/g	☼	03/10/21 12:25	03/16/21 13:14	1

Method: SEM - Metals, Simultaneously Extracted Metals (SEM) - SEM/AVS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
SEM/AVS Ratio	0.023		0.0010	NaN	NONE			03/17/21 13:25	1

Client Sample ID: SB-18-S(21-23)
Lab Sample ID: 180-117730-13
Date Collected: 02/27/21 14:26
Matrix: Sediment
Date Received: 03/02/21 11:00
Percent Solids: 82.4

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	17.6		0.1	0.1	%			03/11/21 09:43	1
Percent Solids	82.4		0.1	0.1	%			03/11/21 09:43	1

General Chemistry - SEM/AVS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acid Volatile Sulfides (AVS)	6.4	J	18	6.0	mg/Kg	☼	03/10/21 17:00	03/11/21 03:42	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acid Volatile Sulfides (AVS)	0.20	J	0.57	0.19	umol/g	☼	03/10/21 17:00	03/11/21 03:42	1

Client Sample ID: SB-18-S(26-28)
Lab Sample ID: 180-117730-14
Date Collected: 02/27/21 14:35
Matrix: Sediment
Date Received: 03/02/21 11:00
Percent Solids: 82.7

Method: 6010D - Metals (ICP) - SEM/AVS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic SEM	0.30		0.30	0.12	mg/Kg	☼	03/10/21 12:25	03/16/21 13:19	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic SEM	0.0041		0.0040	0.0017	umol/g	☼	03/10/21 12:25	03/16/21 13:19	1

Method: SEM - Metals, Simultaneously Extracted Metals (SEM) - SEM/AVS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
SEM/AVS Ratio	0.024		0.0010	NaN	NONE			03/17/21 13:25	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	17.3		0.1	0.1	%			03/11/21 09:43	1
Percent Solids	82.7		0.1	0.1	%			03/11/21 09:43	1

General Chemistry - SEM/AVS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acid Volatile Sulfides (AVS)	8.2	J	18	6.0	mg/Kg	☼	03/10/21 17:00	03/11/21 06:18	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acid Volatile Sulfides (AVS)	0.26	J	0.56	0.19	umol/g	☼	03/10/21 17:00	03/11/21 06:18	1

Client Sample ID: SB-14-S(8-10)
Lab Sample ID: 180-117730-15
Date Collected: 02/28/21 07:48
Matrix: Sediment
Date Received: 03/02/21 11:00
Percent Solids: 75.0

Method: EPA 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	3500		4.0	3.8	mg/Kg	☼	03/16/21 15:11	03/17/21 14:42	1
Arsenic	1.0		0.066	0.021	mg/Kg	☼	03/16/21 15:11	03/17/21 14:42	1
Calcium	230		33	5.0	mg/Kg	☼	03/16/21 15:11	03/17/21 14:42	1
Iron	1300		3.3	3.2	mg/Kg	☼	03/16/21 15:11	03/17/21 14:42	1
Manganese	9.4		0.33	0.28	mg/Kg	☼	03/16/21 15:11	03/17/21 14:42	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	25.0		0.1	0.1	%			03/11/21 10:34	1
Percent Solids	75.0		0.1	0.1	%			03/11/21 10:34	1
Total Organic Carbon - Duplicates	1900		1300	990	mg/Kg	☼		03/04/21 16:17	1

Client Sample ID: SB-14-S(29-31)
Lab Sample ID: 180-117730-18
Date Collected: 02/28/21 08:15
Matrix: Sediment
Date Received: 03/02/21 11:00
Percent Solids: 72.6

Method: 6010D - Metals (ICP) - SEM/AVS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic SEM	1.5		0.34	0.14	mg/Kg	☼	03/10/21 12:25	03/16/21 13:23	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic SEM	0.019		0.0046	0.0019	umol/g	☼	03/10/21 12:25	03/16/21 13:23	1

Method: SEM - Metals, Simultaneously Extracted Metals (SEM) - SEM/AVS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
SEM/AVS Ratio	0.086		0.0010	NaN	NONE			03/17/21 13:25	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	27.4		0.1	0.1	%			03/11/21 09:43	1
Percent Solids	72.6		0.1	0.1	%			03/11/21 09:43	1

General Chemistry - SEM/AVS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acid Volatile Sulfides (AVS)	11	J	20	6.8	mg/Kg	☼	03/10/21 17:00	03/11/21 07:11	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acid Volatile Sulfides (AVS)	0.34	J	0.64	0.21	umol/g	☼	03/10/21 17:00	03/11/21 07:11	1

Client Sample ID: SB-14-S(31-33)
Lab Sample ID: 180-117730-19
Date Collected: 02/28/21 08:30
Matrix: Sediment
Date Received: 03/02/21 11:00
Percent Solids: 84.3

Method: 6010D - Metals (ICP) - SEM/AVS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic SEM	0.62		0.30	0.12	mg/Kg	☼	03/10/21 12:25	03/16/21 13:37	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic SEM	0.0083		0.0040	0.0016	umol/g	☼	03/10/21 12:25	03/16/21 13:37	1

Method: SEM - Metals, Simultaneously Extracted Metals (SEM) - SEM/AVS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
SEM/AVS Ratio	0.049		0.0010	NaN	NONE			03/17/21 13:25	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	15.7		0.1	0.1	%			03/11/21 09:43	1
Percent Solids	84.3		0.1	0.1	%			03/11/21 09:43	1

General Chemistry - SEM/AVS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acid Volatile Sulfides (AVS)	8.1	J	18	5.9	mg/Kg	☼	03/10/21 17:00	03/11/21 08:03	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acid Volatile Sulfides (AVS)	0.25	J	0.55	0.18	umol/g	☼	03/10/21 17:00	03/11/21 08:03	1

Client Sample ID: SB-14-S(8-10)
Lab Sample ID: 180-117730-20
Date Collected: 02/28/21 08:45
Matrix: Sediment
Date Received: 03/02/21 11:00
Percent Solids: 79.9

Method: 6010D - Metals (ICP) - SEM/AVS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic SEM	0.26	J	0.31	0.13	mg/Kg	☼	03/10/21 12:25	03/16/21 13:41	1

Client Sample ID: SB-14-S(8-10)
Lab Sample ID: 180-117730-20
Date Collected: 02/28/21 08:45
Matrix: Sediment
Date Received: 03/02/21 11:00
Percent Solids: 79.9

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic SEM	0.0034	J	0.0042	0.0017	umol/g	☼	03/10/21 12:25	03/16/21 13:41	1

Method: SEM - Metals, Simultaneously Extracted Metals (SEM) - SEM/AVS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
SEM/AVS Ratio	0.023		0.0010	NaN	NONE			03/17/21 13:25	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	20.1		0.1	0.1	%			03/11/21 09:43	1
Percent Solids	79.9		0.1	0.1	%			03/11/21 09:43	1

General Chemistry - SEM/AVS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acid Volatile Sulfides (AVS)	7.1	J	19	6.2	mg/Kg	☼	03/10/21 17:00	03/11/21 08:55	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acid Volatile Sulfides (AVS)	0.22	J	0.58	0.19	umol/g	☼	03/10/21 17:00	03/11/21 08:55	1

Client Sample ID: SB-14-S(29-31)
Lab Sample ID: 180-117730-21
Date Collected: 02/28/21 08:55
Matrix: Sediment
Date Received: 03/02/21 11:00
Percent Solids: 75.9

Method: EPA 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	4300		3.9	3.8	mg/Kg	☼	03/16/21 15:11	03/17/21 15:00	1
Arsenic	3.8		0.066	0.021	mg/Kg	☼	03/16/21 15:11	03/17/21 15:00	1
Calcium	11000		33	5.0	mg/Kg	☼	03/16/21 15:11	03/17/21 15:00	1
Iron	6900		3.3	3.1	mg/Kg	☼	03/16/21 15:11	03/17/21 15:00	1
Manganese	96		0.33	0.28	mg/Kg	☼	03/16/21 15:11	03/17/21 15:00	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	24.1		0.1	0.1	%			03/11/21 10:34	1
Percent Solids	75.9		0.1	0.1	%			03/11/21 10:34	1
Total Organic Carbon - Duplicates	2500		1300	980	mg/Kg	☼		03/04/21 16:33	1

Client Sample ID: SB-14-S(31-33)
Lab Sample ID: 180-117730-22
Date Collected: 02/28/21 09:10
Matrix: Sediment
Date Received: 03/02/21 11:00
Percent Solids: 80.9

Method: EPA 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	1900		3.6	3.5	mg/Kg	☼	03/16/21 15:11	03/17/21 15:04	1
Arsenic	3.5		0.060	0.019	mg/Kg	☼	03/16/21 15:11	03/17/21 15:04	1
Calcium	73000		30	4.6	mg/Kg	☼	03/16/21 15:11	03/17/21 15:04	1
Iron	4600		3.0	2.9	mg/Kg	☼	03/16/21 15:11	03/17/21 15:04	1
Manganese	63		0.30	0.26	mg/Kg	☼	03/16/21 15:11	03/17/21 15:04	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	19.1		0.1	0.1	%			03/11/21 10:34	1
Percent Solids	80.9		0.1	0.1	%			03/11/21 10:34	1
Total Organic Carbon - Duplicates	1600		1200	920	mg/Kg	☼		03/04/21 17:07	1

Client Sample ID: SB-32-S(5-10)
Lab Sample ID: 180-117730-23
Date Collected: 02/28/21 11:10
Matrix: Sediment
Date Received: 03/02/21 11:00
Percent Solids: 82.1

Method: EPA 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	4600		3.6	3.5	mg/Kg	☼	03/16/21 15:11	03/17/21 15:07	1
Arsenic	1.8		0.060	0.019	mg/Kg	☼	03/16/21 15:11	03/17/21 15:07	1
Calcium	250		30	4.6	mg/Kg	☼	03/16/21 15:11	03/17/21 15:07	1
Iron	1400		3.0	2.9	mg/Kg	☼	03/16/21 15:11	03/17/21 15:07	1
Manganese	8.8		0.30	0.26	mg/Kg	☼	03/16/21 15:11	03/17/21 15:07	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	17.9		0.1	0.1	%			03/11/21 10:34	1
Percent Solids	82.1		0.1	0.1	%			03/11/21 10:34	1
Total Organic Carbon - Duplicates	1800		1200	910	mg/Kg	☼		03/04/21 17:29	1

Client Sample ID: SB-32-S(5-10)
Lab Sample ID: 180-117730-24
Date Collected: 02/28/21 11:15
Matrix: Sediment
Date Received: 03/02/21 11:00
Percent Solids: 78.2

Method: 6010D - Metals (ICP) - SEM/AVS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic SEM	0.25	J	0.32	0.13	mg/Kg	☼	03/10/21 12:25	03/16/21 13:46	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic SEM	0.0033	J	0.0043	0.0018	umol/g	☼	03/10/21 12:25	03/16/21 13:46	1

Method: SEM - Metals, Simultaneously Extracted Metals (SEM) - SEM/AVS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
SEM/AVS Ratio	0.022		0.0010	NaN	NONE			03/17/21 13:25	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	21.8		0.1	0.1	%			03/11/21 09:43	1
Percent Solids	78.2		0.1	0.1	%			03/11/21 09:43	1

General Chemistry - SEM/AVS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acid Volatile Sulfides (AVS)	7.2	J	19	6.4	mg/Kg	☼	03/10/21 17:00	03/11/21 09:47	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acid Volatile Sulfides (AVS)	0.23	J	0.60	0.20	umol/g	☼	03/10/21 17:00	03/11/21 09:47	1

Client Sample ID: SB-32-S(22-24)
Lab Sample ID: 180-117730-25
Date Collected: 02/28/21 11:20
Matrix: Sediment
Date Received: 03/02/21 11:00
Percent Solids: 84.2

Method: EPA 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	630		3.5	3.4	mg/Kg	☼	03/16/21 15:11	03/17/21 15:11	1
Arsenic	1.4		0.059	0.019	mg/Kg	☼	03/16/21 15:11	03/17/21 15:11	1
Calcium	7700		29	4.5	mg/Kg	☼	03/16/21 15:11	03/17/21 15:11	1
Iron	1500		2.9	2.8	mg/Kg	☼	03/16/21 15:11	03/17/21 15:11	1
Manganese	19		0.29	0.25	mg/Kg	☼	03/16/21 15:11	03/17/21 15:11	1

Client Sample ID: SB-32-S(22-24)
Lab Sample ID: 180-117730-25
Date Collected: 02/28/21 11:20
Matrix: Sediment
Date Received: 03/02/21 11:00
Percent Solids: 84.2

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	15.8		0.1	0.1	%			03/11/21 10:34	1
Percent Solids	84.2		0.1	0.1	%			03/11/21 10:34	1
Total Organic Carbon - Duplicates	1200		1200	890	mg/Kg	☼		03/04/21 17:46	1

Client Sample ID: SB-32-S(28-30)
Lab Sample ID: 180-117730-26
Date Collected: 02/28/21 11:22
Matrix: Sediment
Date Received: 03/02/21 11:00
Percent Solids: 81.5

Method: EPA 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	1900		3.6	3.5	mg/Kg	☼	03/16/21 15:11	03/17/21 15:14	1
Arsenic	2.5		0.060	0.019	mg/Kg	☼	03/16/21 15:11	03/17/21 15:14	1
Calcium	17000		30	4.6	mg/Kg	☼	03/16/21 15:11	03/17/21 15:14	1
Iron	3500		3.0	2.9	mg/Kg	☼	03/16/21 15:11	03/17/21 15:14	1
Manganese	46		0.30	0.26	mg/Kg	☼	03/16/21 15:11	03/17/21 15:14	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	18.5		0.1	0.1	%			03/11/21 10:34	1
Percent Solids	81.5		0.1	0.1	%			03/11/21 10:34	1
Total Organic Carbon - Duplicates	1500		1200	920	mg/Kg	☼		03/04/21 18:08	1

Client Sample ID: SB-32-S(22-24)
Lab Sample ID: 180-117730-27
Date Collected: 02/28/21 11:25
Matrix: Sediment
Date Received: 03/02/21 11:00
Percent Solids: 81.7

Method: 6010D - Metals (ICP) - SEM/AVS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic SEM	0.47		0.31	0.13	mg/Kg	☼	03/10/21 12:25	03/16/21 13:51	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic SEM	0.0062		0.0041	0.0017	umol/g	☼	03/10/21 12:25	03/16/21 13:51	1

Method: SEM - Metals, Simultaneously Extracted Metals (SEM) - SEM/AVS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
SEM/AVS Ratio	NC		0.0010	NaN	NONE			03/17/21 13:25	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	18.3		0.1	0.1	%			03/11/21 09:43	1
Percent Solids	81.7		0.1	0.1	%			03/11/21 09:43	1

General Chemistry - SEM/AVS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acid Volatile Sulfides (AVS)	ND		18	6.1	mg/Kg	☼	03/10/21 17:00	03/11/21 10:39	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acid Volatile Sulfides (AVS)	ND		0.57	0.19	umol/g	☼	03/10/21 17:00	03/11/21 10:39	1

Client Sample ID: SB-32-S(28-30)
Lab Sample ID: 180-117730-28
Date Collected: 02/28/21 11:40
Matrix: Sediment
Date Received: 03/02/21 11:00
Percent Solids: 80.0

Method: 6010D - Metals (ICP) - SEM/AVS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic SEM	0.73		0.31	0.13	mg/Kg	☼	03/10/21 12:25	03/16/21 13:55	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic SEM	0.0098		0.0042	0.0017	umol/g	☼	03/10/21 12:25	03/16/21 13:55	1

Method: SEM - Metals, Simultaneously Extracted Metals (SEM) - SEM/AVS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
SEM/AVS Ratio	NC		0.0010	NaN	NONE			03/17/21 13:25	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	20.0		0.1	0.1	%			03/11/21 09:43	1
Percent Solids	80.0		0.1	0.1	%			03/11/21 09:43	1

General Chemistry - SEM/AVS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acid Volatile Sulfides (AVS)	ND		19	6.2	mg/Kg	☼	03/10/21 17:00	03/11/21 11:31	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acid Volatile Sulfides (AVS)	ND		0.58	0.19	umol/g	☼	03/10/21 17:00	03/11/21 11:31	1

Client Sample ID: SB-26-S(5-10)
Lab Sample ID: 180-117730-29
Date Collected: 02/28/21 15:00
Matrix: Sediment
Date Received: 03/02/21 11:00
Percent Solids: 79.1

Method: 6010D - Metals (ICP) - SEM/AVS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic SEM	0.13	J	0.31	0.13	mg/Kg	☼	03/10/21 12:25	03/16/21 14:00	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic SEM	0.0017	J	0.0042	0.0017	umol/g	☼	03/10/21 12:25	03/16/21 14:00	1

Method: SEM - Metals, Simultaneously Extracted Metals (SEM) - SEM/AVS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
SEM/AVS Ratio	NC		0.0010	NaN	NONE			03/17/21 13:25	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	20.9		0.1	0.1	%			03/11/21 09:43	1
Percent Solids	79.1		0.1	0.1	%			03/11/21 09:43	1

General Chemistry - SEM/AVS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acid Volatile Sulfides (AVS)	ND		19	6.3	mg/Kg	☼	03/10/21 17:00	03/11/21 12:23	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acid Volatile Sulfides (AVS)	ND		0.59	0.20	umol/g	☼	03/10/21 17:00	03/11/21 12:23	1

Client Sample ID: SB-26-S(11-13)
Lab Sample ID: 180-117730-30
Date Collected: 02/28/21 15:20
Matrix: Sediment
Date Received: 03/02/21 11:00
Percent Solids: 50.5

Method: 6010D - Metals (ICP) - SEM/AVS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic SEM	0.65		0.49	0.20	mg/Kg	☼	03/10/21 12:25	03/16/21 14:04	1

Client Sample ID: SB-26-S(11-13)
Lab Sample ID: 180-117730-30
Date Collected: 02/28/21 15:20
Matrix: Sediment
Date Received: 03/02/21 11:00
Percent Solids: 50.5

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic SEM	**0.0087**		0.0066	0.0027	umol/g	☼	03/10/21 12:25	03/16/21 14:04	1

Method: SEM - Metals, Simultaneously Extracted Metals (SEM) - SEM/AVS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
SEM/AVS Ratio	**NC**		0.0010	NaN	NONE			03/17/21 13:25	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	**49.5**		0.1	0.1	%			03/11/21 09:43	1
Percent Solids	**50.5**		0.1	0.1	%			03/11/21 09:43	1

General Chemistry - SEM/AVS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acid Volatile Sulfides (AVS)	ND		30	9.9	mg/Kg	☼	03/10/21 17:00	03/11/21 13:15	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acid Volatile Sulfides (AVS)	ND		0.92	0.31	umol/g	☼	03/10/21 17:00	03/11/21 13:15	1

Client Sample ID: SB-26-S(26-28)
Lab Sample ID: 180-117730-31
Date Collected: 02/28/21 15:40
Matrix: Sediment
Date Received: 03/02/21 11:00
Percent Solids: 79.4

Method: 6010D - Metals (ICP) - SEM/AVS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic SEM	ND		0.31	0.13	mg/Kg	☼	03/10/21 12:25	03/16/21 14:09	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic SEM	ND		0.0042	0.0017	umol/g	☼	03/10/21 12:25	03/16/21 14:09	1

Method: SEM - Metals, Simultaneously Extracted Metals (SEM) - SEM/AVS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
SEM/AVS Ratio	**NC**		0.0010	NaN	NONE			03/17/21 13:25	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	**20.6**		0.1	0.1	%			03/11/21 09:43	1
Percent Solids	**79.4**		0.1	0.1	%			03/11/21 09:43	1

General Chemistry - SEM/AVS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acid Volatile Sulfides (AVS)	ND		19	6.3	mg/Kg	☼	03/10/21 17:00	03/11/21 14:07	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acid Volatile Sulfides (AVS)	ND		0.59	0.20	umol/g	☼	03/10/21 17:00	03/11/21 14:07	1

Client Sample ID: SB-26-S(34-36)
Lab Sample ID: 180-117730-32
Date Collected: 02/28/21 15:50
Matrix: Sediment
Date Received: 03/02/21 11:00
Percent Solids: 81.1

Method: 6010D - Metals (ICP) - SEM/AVS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic SEM	**0.16**	**J**	0.31	0.13	mg/Kg	☼	03/10/21 12:25	03/16/21 14:14	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic SEM	**0.0022**	**J**	0.0041	0.0017	umol/g	☼	03/10/21 12:25	03/16/21 14:14	1

Client Sample ID: SB-26-S(34-36)
Lab Sample ID: 180-117730-32
Date Collected: 02/28/21 15:50
Matrix: Sediment
Date Received: 03/02/21 11:00
Percent Solids: 81.1

Method: SEM - Metals, Simultaneously Extracted Metals (SEM) - SEM/AVS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
SEM/AVS Ratio	0.016		0.0010	NaN	NONE			03/17/21 13:25	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	18.9		0.1	0.1	%			03/11/21 09:43	1
Percent Solids	81.1		0.1	0.1	%			03/11/21 09:43	1

General Chemistry - SEM/AVS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acid Volatile Sulfides (AVS)	6.5	J	18	6.1	mg/Kg	☼	03/10/21 17:00	03/11/21 16:43	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acid Volatile Sulfides (AVS)	0.20	J	0.57	0.19	umol/g	☼	03/10/21 17:00	03/11/21 16:43	1

Client Sample ID: SB-26-S(5-10)
Lab Sample ID: 180-117730-33
Date Collected: 02/28/21 15:52
Matrix: Sediment
Date Received: 03/02/21 11:00
Percent Solids: 82.1

Method: EPA 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	4100		3.6	3.5	mg/Kg	☼	03/16/21 15:11	03/17/21 15:18	1
Arsenic	1.9		0.060	0.019	mg/Kg	☼	03/16/21 15:11	03/17/21 15:18	1
Calcium	290		30	4.5	mg/Kg	☼	03/16/21 15:11	03/17/21 15:18	1
Iron	1900		3.0	2.9	mg/Kg	☼	03/16/21 15:11	03/17/21 15:18	1
Manganese	17		0.30	0.26	mg/Kg	☼	03/16/21 15:11	03/17/21 15:18	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	17.9		0.1	0.1	%			03/11/21 10:34	1
Percent Solids	82.1		0.1	0.1	%			03/11/21 10:34	1
Total Organic Carbon - Duplicates	1700		1200	910	mg/Kg	☼		03/04/21 18:31	1

Client Sample ID: SB-26-S(11-13)
Lab Sample ID: 180-117730-34
Date Collected: 02/28/21 15:54
Matrix: Sediment
Date Received: 03/02/21 11:00
Percent Solids: 50.8

Method: EPA 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	16000		5.9	5.7	mg/Kg	☼	03/16/21 15:11	03/17/21 15:22	1
Arsenic	8.4		0.098	0.031	mg/Kg	☼	03/16/21 15:11	03/17/21 15:22	1
Calcium	1800		49	7.5	mg/Kg	☼	03/16/21 15:11	03/17/21 15:22	1
Iron	16000		4.9	4.7	mg/Kg	☼	03/16/21 15:11	03/17/21 15:22	1
Manganese	110		0.49	0.42	mg/Kg	☼	03/16/21 15:11	03/17/21 15:22	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	49.2		0.1	0.1	%			03/11/21 10:34	1
Percent Solids	50.8		0.1	0.1	%			03/11/21 10:34	1
Total Organic Carbon - Duplicates	35000		2000	1500	mg/Kg	☼		03/04/21 18:59	1

Client Sample ID: SB-26-S(26-28)
Lab Sample ID: 180-117730-35

Date Collected: 02/28/21 15:56
Matrix: Sediment
Date Received: 03/02/21 11:00
Percent Solids: 77.1

Method: EPA 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	3700		3.8	3.7	mg/Kg	☼	03/16/21 15:12	03/17/21 15:25	1
Arsenic	3.1		0.064	0.020	mg/Kg	☼	03/16/21 15:12	03/17/21 15:25	1
Calcium	280		32	4.8	mg/Kg	☼	03/16/21 15:12	03/17/21 15:25	1
Iron	5400		3.2	3.0	mg/Kg	☼	03/16/21 15:12	03/17/21 15:25	1
Manganese	63		0.32	0.27	mg/Kg	☼	03/16/21 15:12	03/17/21 15:25	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	22.9		0.1	0.1	%			03/11/21 10:34	1
Percent Solids	77.1		0.1	0.1	%			03/11/21 10:34	1
Total Organic Carbon - Duplicates	3700		1300	970	mg/Kg	☼		03/04/21 19:21	1

Client Sample ID: SB-26-S(34-36)
Lab Sample ID: 180-117730-36

Date Collected: 02/28/21 15:58
Matrix: Sediment
Date Received: 03/02/21 11:00
Percent Solids: 75.3

Method: EPA 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	2100		3.9	3.8	mg/Kg	☼	03/16/21 15:12	03/17/21 15:29	1
Arsenic	2.0		0.065	0.021	mg/Kg	☼	03/16/21 15:12	03/17/21 15:29	1
Calcium	1400		33	5.0	mg/Kg	☼	03/16/21 15:12	03/17/21 15:29	1
Iron	2900		3.3	3.1	mg/Kg	☼	03/16/21 15:12	03/17/21 15:29	1
Manganese	31		0.33	0.28	mg/Kg	☼	03/16/21 15:12	03/17/21 15:29	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	24.7		0.1	0.1	%			03/11/21 10:34	1
Percent Solids	75.3		0.1	0.1	%			03/11/21 10:34	1
Total Organic Carbon - Duplicates	1800		1300	990	mg/Kg	☼		03/04/21 19:43	1

Method: 6010D - Metals (ICP)

Lab Sample ID: MB 180-348972/1-A
Matrix: Sediment
Analysis Batch: 349633

Client Sample ID: Method Blank
Prep Type: SEM/AVS
Prep Batch: 348972

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic SEM	ND		0.25	0.10	mg/Kg		03/10/21 12:25	03/16/21 12:16	1

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic SEM	ND		0.0033	0.0014	umol/g		03/10/21 12:25	03/16/21 12:16	1

Lab Sample ID: LCS 180-348972/2-A
Matrix: Sediment
Analysis Batch: 349633

Client Sample ID: Lab Control Sample
Prep Type: SEM/AVS
Prep Batch: 348972

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic SEM	50.0	49.2		mg/Kg		98	80 - 120

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic SEM	0.67	0.656		umol/g		98	80 - 120

Lab Sample ID: 180-117730-1 MS
Matrix: Sediment
Analysis Batch: 349633

Client Sample ID: SB-6-S(8-10)
Prep Type: SEM/AVS
Prep Batch: 348972

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic SEM	1.8		63.2	57.4		mg/Kg	☼	88	75 - 125

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic SEM	0.024		0.84	0.766		umol/g	☼	88	75 - 125

Lab Sample ID: 180-117730-1 MSD
Matrix: Sediment
Analysis Batch: 349633

Client Sample ID: SB-6-S(8-10)
Prep Type: SEM/AVS
Prep Batch: 348972

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Arsenic SEM	1.8		63.7	60.8		mg/Kg	☼	93	75 - 125	6	20

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Arsenic SEM	0.024		0.85	0.812		umol/g	☼	93	75 - 125	6	20

Method: EPA 6020B - Metals (ICP/MS)

Lab Sample ID: MB 180-349589/1-A
Matrix: Sediment
Analysis Batch: 349774

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 349589

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		3.0	2.9	mg/Kg		03/16/21 15:11	03/17/21 13:52	1
Arsenic	ND		0.050	0.016	mg/Kg		03/16/21 15:11	03/17/21 13:52	1
Calcium	ND		25	3.8	mg/Kg		03/16/21 15:11	03/17/21 13:52	1
Iron	ND		2.5	2.4	mg/Kg		03/16/21 15:11	03/17/21 13:52	1
Manganese	ND		0.25	0.22	mg/Kg		03/16/21 15:11	03/17/21 13:52	1

Method: EPA 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: LCS 180-349589/2-A
Matrix: Sediment
Analysis Batch: 349774

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 349589

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Aluminum			250	244		mg/Kg		98	80 - 120		
Arsenic			50.0	47.1		mg/Kg		94	80 - 120		
Calcium			1250	1440		mg/Kg		115	80 - 120		
Iron			250	257		mg/Kg		103	80 - 120		
Manganese			25.0	26.1		mg/Kg		104	80 - 120		

Lab Sample ID: 180-117730-5 MS
Matrix: Sediment
Analysis Batch: 349774

Client Sample ID: SB-6-S(8-10)
Prep Type: Total/NA
Prep Batch: 349589

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Aluminum	4000		306	5040	4	mg/Kg	☼	329	75 - 125		
Arsenic	4.6		61.2	56.7		mg/Kg	☼	85	75 - 125		
Calcium	240		1530	1770		mg/Kg	☼	100	75 - 125		
Iron	1800		306	2140	4	mg/Kg	☼	98	75 - 125		
Manganese	16		30.6	41.3		mg/Kg	☼	81	75 - 125		

Lab Sample ID: 180-117730-5 MSD
Matrix: Sediment
Analysis Batch: 349774

Client Sample ID: SB-6-S(8-10)
Prep Type: Total/NA
Prep Batch: 349589

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	4000		307	5410	4	mg/Kg	☼	447	75 - 125	7	20
Arsenic	4.6		61.5	59.3		mg/Kg	☼	89	75 - 125	4	20
Calcium	240		1540	1800		mg/Kg	☼	102	75 - 125	1	20
Iron	1800		307	2400	4	mg/Kg	☼	184	75 - 125	12	20
Manganese	16		30.7	44.5		mg/Kg	☼	91	75 - 125	7	20

Lab Sample ID: MB 180-350053/1-A
Matrix: Sediment
Analysis Batch: 350237

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 350053

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		3.0	2.9	mg/Kg		03/19/21 13:42	03/20/21 17:23	1
Arsenic	ND		0.050	0.016	mg/Kg		03/19/21 13:42	03/20/21 17:23	1
Calcium	ND		25	3.8	mg/Kg		03/19/21 13:42	03/20/21 17:23	1
Iron	ND		2.5	2.4	mg/Kg		03/19/21 13:42	03/20/21 17:23	1
Manganese	ND		0.25	0.22	mg/Kg		03/19/21 13:42	03/20/21 17:23	1

Lab Sample ID: LCS 180-350053/2-A
Matrix: Sediment
Analysis Batch: 350237

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 350053

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Aluminum			250	247		mg/Kg		99	80 - 120		
Arsenic			50.0	46.6		mg/Kg		93	80 - 120		
Calcium			1250	1340		mg/Kg		107	80 - 120		
Iron			250	251		mg/Kg		101	80 - 120		
Manganese			25.0	24.2		mg/Kg		97	80 - 120		

Method: EPA 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: 180-117730-7 MS
Matrix: Sediment
Analysis Batch: 350237

Client Sample ID: SB-6-S(27-29)
Prep Type: Total/NA
Prep Batch: 350053

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	650	F1	295	1240	F1	mg/Kg	☼	201	75 - 125
Arsenic	0.99		59.1	47.9		mg/Kg	☼	79	75 - 125
Calcium	2700		1480	3940		mg/Kg	☼	87	75 - 125
Iron	1100	F1	295	1420		mg/Kg	☼	111	75 - 125
Manganese	18		29.5	42.2		mg/Kg	☼	81	75 - 125

Lab Sample ID: 180-117730-7 MSD
Matrix: Sediment
Analysis Batch: 350237

Client Sample ID: SB-6-S(27-29)
Prep Type: Total/NA
Prep Batch: 350053

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	650	F1	297	1350	F1	mg/Kg	☼	237	75 - 125	9	20
Arsenic	0.99		59.4	47.7		mg/Kg	☼	79	75 - 125	0	20
Calcium	2700		1480	3870		mg/Kg	☼	82	75 - 125	2	20
Iron	1100	F1	297	1500	F1	mg/Kg	☼	135	75 - 125	5	20
Manganese	18		29.7	43.3		mg/Kg	☼	84	75 - 125	2	20

Method: 2540G - SM 2540G

Lab Sample ID: 180-117730-2 DU
Matrix: Sediment
Analysis Batch: 349075

Client Sample ID: SB-6-S(15-17)
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Percent Moisture	18.9		19.1		%		1	10
Percent Solids	81.1		80.9		%		0.3	10

Lab Sample ID: 180-117730-20 DU
Matrix: Sediment
Analysis Batch: 349075

Client Sample ID: SB-14-S(8-10)
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Percent Moisture	20.1		20.6		%		2	10
Percent Solids	79.9		79.4		%		0.6	10

Lab Sample ID: 180-117730-5 DU
Matrix: Sediment
Analysis Batch: 349084

Client Sample ID: SB-6-S(8-10)
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Percent Moisture	19.5		19.5		%		0.1	10
Percent Solids	80.5		80.5		%		0	10

Lab Sample ID: 180-117730-25 DU
Matrix: Sediment
Analysis Batch: 349084

Client Sample ID: SB-32-S(22-24)
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Percent Moisture	15.8		15.6		%		1	10
Percent Solids	84.2		84.4		%		0.3	10

Method: 2540G - SM 2540G

Lab Sample ID: 180-117730-7 DU
Matrix: Sediment
Analysis Batch: 349300

Client Sample ID: SB-6-S(27-29)
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Percent Moisture	16.6			17.7		%				6	10
Percent Solids	83.4			82.3		%				1	10

Method: EPA 9034 - Sulfide, Acid soluble and Insoluble (Titrimetric)

Lab Sample ID: MB 180-349015/1-A
Matrix: Sediment
Analysis Batch: 349062

Client Sample ID: Method Blank
Prep Type: SEM/AVS
Prep Batch: 349015

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acid Volatile Sulfides (AVS)	ND		15	5.0	mg/Kg		03/10/21 17:00	03/10/21 19:54	1

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acid Volatile Sulfides (AVS)	ND		0.47	0.16	umol/g		03/10/21 17:00	03/10/21 19:54	1

Lab Sample ID: LCS 180-349015/2-A
Matrix: Sediment
Analysis Batch: 349062

Client Sample ID: Lab Control Sample
Prep Type: SEM/AVS
Prep Batch: 349015

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Acid Volatile Sulfides (AVS)			67.2	58.4		mg/Kg		87	85 - 115		

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Acid Volatile Sulfides (AVS)			2.1	1.82		umol/g		87	85 - 115		

Lab Sample ID: 180-117730-1 MS
Matrix: Sediment
Analysis Batch: 349062

Client Sample ID: SB-6-S(8-10)
Prep Type: SEM/AVS
Prep Batch: 349015

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Acid Volatile Sulfides (AVS)	ND		85.0	67.2		mg/Kg	☼	79	75 - 125		

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Acid Volatile Sulfides (AVS)	ND		2.7	2.10		umol/g	☼	79	75 - 125		

Lab Sample ID: 180-117730-1 MSD
Matrix: Sediment
Analysis Batch: 349062

Client Sample ID: SB-6-S(8-10)
Prep Type: SEM/AVS
Prep Batch: 349015

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Acid Volatile Sulfides (AVS)	ND		86.0	65.6		mg/Kg	☼	76	75 - 125	2	20

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Acid Volatile Sulfides (AVS)	ND		2.7	2.04		umol/g	☼	76	75 - 125	2	20

Method: EPA-Lloyd Kahn - Organic Carbon, Total (TOC)

Lab Sample ID: MB 180-348486/4
Matrix: Sediment
Analysis Batch: 348486

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon - Duplicates	ND		1000	750	mg/Kg			03/04/21 13:01	1

Lab Sample ID: LCS 180-348486/5
Matrix: Sediment
Analysis Batch: 348486

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Organic Carbon - Duplicates	37800	32200		mg/Kg		85	75 - 125

Lab Sample ID: MB 180-349210/4
Matrix: Sediment
Analysis Batch: 349210

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon - Duplicates	ND		1000	750	mg/Kg			03/11/21 13:01	1

Lab Sample ID: LCS 180-349210/5
Matrix: Sediment
Analysis Batch: 349210

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Organic Carbon - Duplicates	37800	38900		mg/Kg		103	75 - 125

Lab Sample ID: 180-117730-7 MS
Matrix: Sediment
Analysis Batch: 349210

Client Sample ID: SB-6-S(27-29)
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Organic Carbon - Duplicates	990	J	21600	20200		mg/Kg	☼	89	75 - 125

Lab Sample ID: 180-117730-7 MSD
Matrix: Sediment
Analysis Batch: 349210

Client Sample ID: SB-6-S(27-29)
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Organic Carbon - Duplicates	990	J	21900	20900		mg/Kg	☼	91	75 - 125	4	20

Metals

Prep Batch: 348972

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-117730-1	SB-6-S(8-10)	SEM/AVS	Sediment	AVSSEM	
180-117730-2	SB-6-S(15-17)	SEM/AVS	Sediment	AVSSEM	
180-117730-3	SB-6-S(27-29)	SEM/AVS	Sediment	AVSSEM	
180-117730-4	SB-6-S(33.5-35.5)	SEM/AVS	Sediment	AVSSEM	
180-117730-12	SB-18-S(8-10)	SEM/AVS	Sediment	AVSSEM	
180-117730-13	SB-18-S(21-23)	SEM/AVS	Sediment	AVSSEM	
180-117730-14	SB-18-S(26-28)	SEM/AVS	Sediment	AVSSEM	
180-117730-18	SB-14-S(29-31)	SEM/AVS	Sediment	AVSSEM	
180-117730-19	SB-14-S(31-33)	SEM/AVS	Sediment	AVSSEM	
180-117730-20	SB-14-S(8-10)	SEM/AVS	Sediment	AVSSEM	
180-117730-24	SB-32-S(5-10)	SEM/AVS	Sediment	AVSSEM	
180-117730-27	SB-32-S(22-24)	SEM/AVS	Sediment	AVSSEM	
180-117730-28	SB-32-S(28-30)	SEM/AVS	Sediment	AVSSEM	
180-117730-29	SB-26-S(5-10)	SEM/AVS	Sediment	AVSSEM	
180-117730-30	SB-26-S(11-13)	SEM/AVS	Sediment	AVSSEM	
180-117730-31	SB-26-S(26-28)	SEM/AVS	Sediment	AVSSEM	
180-117730-32	SB-26-S(34-36)	SEM/AVS	Sediment	AVSSEM	
MB 180-348972/1-A	Method Blank	SEM/AVS	Sediment	AVSSEM	
LCS 180-348972/2-A	Lab Control Sample	SEM/AVS	Sediment	AVSSEM	
180-117730-1 MS	SB-6-S(8-10)	SEM/AVS	Sediment	AVSSEM	
180-117730-1 MSD	SB-6-S(8-10)	SEM/AVS	Sediment	AVSSEM	

Prep Batch: 349589

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-117730-5	SB-6-S(8-10)	Total/NA	Sediment	3050B	
180-117730-6	SB-6-S(15-17)	Total/NA	Sediment	3050B	
180-117730-8	SB-6-S(33.5-35.5)	Total/NA	Sediment	3050B	
180-117730-9	SB-18-S(8-10)	Total/NA	Sediment	3050B	
180-117730-10	SB-18-S(21-23)	Total/NA	Sediment	3050B	
180-117730-11	SB-18-S(26-28)	Total/NA	Sediment	3050B	
180-117730-15	SB-14-S(8-10)	Total/NA	Sediment	3050B	
180-117730-21	SB-14-S(29-31)	Total/NA	Sediment	3050B	
180-117730-22	SB-14-S(31-33)	Total/NA	Sediment	3050B	
180-117730-23	SB-32-S(5-10)	Total/NA	Sediment	3050B	
180-117730-25	SB-32-S(22-24)	Total/NA	Sediment	3050B	
180-117730-26	SB-32-S(28-30)	Total/NA	Sediment	3050B	
180-117730-33	SB-26-S(5-10)	Total/NA	Sediment	3050B	
180-117730-34	SB-26-S(11-13)	Total/NA	Sediment	3050B	
180-117730-35	SB-26-S(26-28)	Total/NA	Sediment	3050B	
180-117730-36	SB-26-S(34-36)	Total/NA	Sediment	3050B	
MB 180-349589/1-A	Method Blank	Total/NA	Sediment	3050B	
LCS 180-349589/2-A	Lab Control Sample	Total/NA	Sediment	3050B	
180-117730-5 MS	SB-6-S(8-10)	Total/NA	Sediment	3050B	
180-117730-5 MSD	SB-6-S(8-10)	Total/NA	Sediment	3050B	

Analysis Batch: 349633

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-117730-1	SB-6-S(8-10)	SEM/AVS	Sediment	6010D	348972
180-117730-2	SB-6-S(15-17)	SEM/AVS	Sediment	6010D	348972
180-117730-3	SB-6-S(27-29)	SEM/AVS	Sediment	6010D	348972
180-117730-4	SB-6-S(33.5-35.5)	SEM/AVS	Sediment	6010D	348972

Metals (Continued)

Analysis Batch: 349633 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-117730-12	SB-18-S(8-10)	SEM/AVS	Sediment	6010D	348972
180-117730-13	SB-18-S(21-23)	SEM/AVS	Sediment	6010D	348972
180-117730-14	SB-18-S(26-28)	SEM/AVS	Sediment	6010D	348972
180-117730-18	SB-14-S(29-31)	SEM/AVS	Sediment	6010D	348972
180-117730-19	SB-14-S(31-33)	SEM/AVS	Sediment	6010D	348972
180-117730-20	SB-14-S(8-10)	SEM/AVS	Sediment	6010D	348972
180-117730-24	SB-32-S(5-10)	SEM/AVS	Sediment	6010D	348972
180-117730-27	SB-32-S(22-24)	SEM/AVS	Sediment	6010D	348972
180-117730-28	SB-32-S(28-30)	SEM/AVS	Sediment	6010D	348972
180-117730-29	SB-26-S(5-10)	SEM/AVS	Sediment	6010D	348972
180-117730-30	SB-26-S(11-13)	SEM/AVS	Sediment	6010D	348972
180-117730-31	SB-26-S(26-28)	SEM/AVS	Sediment	6010D	348972
180-117730-32	SB-26-S(34-36)	SEM/AVS	Sediment	6010D	348972
MB 180-348972/1-A	Method Blank	SEM/AVS	Sediment	6010D	348972
LCS 180-348972/2-A	Lab Control Sample	SEM/AVS	Sediment	6010D	348972
180-117730-1 MS	SB-6-S(8-10)	SEM/AVS	Sediment	6010D	348972
180-117730-1 MSD	SB-6-S(8-10)	SEM/AVS	Sediment	6010D	348972

Analysis Batch: 349731

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-117730-1	SB-6-S(8-10)	SEM/AVS	Sediment	SEM	
180-117730-2	SB-6-S(15-17)	SEM/AVS	Sediment	SEM	
180-117730-3	SB-6-S(27-29)	SEM/AVS	Sediment	SEM	
180-117730-4	SB-6-S(33.5-35.5)	SEM/AVS	Sediment	SEM	
180-117730-12	SB-18-S(8-10)	SEM/AVS	Sediment	SEM	
180-117730-13	SB-18-S(21-23)	SEM/AVS	Sediment	SEM	
180-117730-14	SB-18-S(26-28)	SEM/AVS	Sediment	SEM	
180-117730-18	SB-14-S(29-31)	SEM/AVS	Sediment	SEM	
180-117730-19	SB-14-S(31-33)	SEM/AVS	Sediment	SEM	
180-117730-20	SB-14-S(8-10)	SEM/AVS	Sediment	SEM	
180-117730-24	SB-32-S(5-10)	SEM/AVS	Sediment	SEM	
180-117730-27	SB-32-S(22-24)	SEM/AVS	Sediment	SEM	
180-117730-28	SB-32-S(28-30)	SEM/AVS	Sediment	SEM	
180-117730-29	SB-26-S(5-10)	SEM/AVS	Sediment	SEM	
180-117730-30	SB-26-S(11-13)	SEM/AVS	Sediment	SEM	
180-117730-31	SB-26-S(26-28)	SEM/AVS	Sediment	SEM	
180-117730-32	SB-26-S(34-36)	SEM/AVS	Sediment	SEM	

Analysis Batch: 349774

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-117730-5	SB-6-S(8-10)	Total/NA	Sediment	EPA 6020B	349589
180-117730-6	SB-6-S(15-17)	Total/NA	Sediment	EPA 6020B	349589
180-117730-8	SB-6-S(33.5-35.5)	Total/NA	Sediment	EPA 6020B	349589
180-117730-9	SB-18-S(8-10)	Total/NA	Sediment	EPA 6020B	349589
180-117730-10	SB-18-S(21-23)	Total/NA	Sediment	EPA 6020B	349589
180-117730-11	SB-18-S(26-28)	Total/NA	Sediment	EPA 6020B	349589
180-117730-15	SB-14-S(8-10)	Total/NA	Sediment	EPA 6020B	349589
180-117730-21	SB-14-S(29-31)	Total/NA	Sediment	EPA 6020B	349589
180-117730-22	SB-14-S(31-33)	Total/NA	Sediment	EPA 6020B	349589
180-117730-23	SB-32-S(5-10)	Total/NA	Sediment	EPA 6020B	349589
180-117730-25	SB-32-S(22-24)	Total/NA	Sediment	EPA 6020B	349589

Metals (Continued)

Analysis Batch: 349774 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-117730-26	SB-32-S(28-30)	Total/NA	Sediment	EPA 6020B	349589
180-117730-33	SB-26-S(5-10)	Total/NA	Sediment	EPA 6020B	349589
180-117730-34	SB-26-S(11-13)	Total/NA	Sediment	EPA 6020B	349589
180-117730-35	SB-26-S(26-28)	Total/NA	Sediment	EPA 6020B	349589
180-117730-36	SB-26-S(34-36)	Total/NA	Sediment	EPA 6020B	349589
MB 180-349589/1-A	Method Blank	Total/NA	Sediment	EPA 6020B	349589
LCS 180-349589/2-A	Lab Control Sample	Total/NA	Sediment	EPA 6020B	349589
180-117730-5 MS	SB-6-S(8-10)	Total/NA	Sediment	EPA 6020B	349589
180-117730-5 MSD	SB-6-S(8-10)	Total/NA	Sediment	EPA 6020B	349589

Prep Batch: 350053

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-117730-7	SB-6-S(27-29)	Total/NA	Sediment	3050B	
MB 180-350053/1-A	Method Blank	Total/NA	Sediment	3050B	
LCS 180-350053/2-A	Lab Control Sample	Total/NA	Sediment	3050B	
180-117730-7 MS	SB-6-S(27-29)	Total/NA	Sediment	3050B	
180-117730-7 MSD	SB-6-S(27-29)	Total/NA	Sediment	3050B	

Analysis Batch: 350237

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-117730-7	SB-6-S(27-29)	Total/NA	Sediment	EPA 6020B	350053
MB 180-350053/1-A	Method Blank	Total/NA	Sediment	EPA 6020B	350053
LCS 180-350053/2-A	Lab Control Sample	Total/NA	Sediment	EPA 6020B	350053
180-117730-7 MS	SB-6-S(27-29)	Total/NA	Sediment	EPA 6020B	350053
180-117730-7 MSD	SB-6-S(27-29)	Total/NA	Sediment	EPA 6020B	350053

General Chemistry

Analysis Batch: 348486

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-117730-5	SB-6-S(8-10)	Total/NA	Sediment	EPA-Lloyd Kahn	
180-117730-6	SB-6-S(15-17)	Total/NA	Sediment	EPA-Lloyd Kahn	
180-117730-8	SB-6-S(33.5-35.5)	Total/NA	Sediment	EPA-Lloyd Kahn	
180-117730-9	SB-18-S(8-10)	Total/NA	Sediment	EPA-Lloyd Kahn	
180-117730-10	SB-18-S(21-23)	Total/NA	Sediment	EPA-Lloyd Kahn	
180-117730-11	SB-18-S(26-28)	Total/NA	Sediment	EPA-Lloyd Kahn	
180-117730-15	SB-14-S(8-10)	Total/NA	Sediment	EPA-Lloyd Kahn	
180-117730-21	SB-14-S(29-31)	Total/NA	Sediment	EPA-Lloyd Kahn	
180-117730-22	SB-14-S(31-33)	Total/NA	Sediment	EPA-Lloyd Kahn	
180-117730-23	SB-32-S(5-10)	Total/NA	Sediment	EPA-Lloyd Kahn	
180-117730-25	SB-32-S(22-24)	Total/NA	Sediment	EPA-Lloyd Kahn	
180-117730-26	SB-32-S(28-30)	Total/NA	Sediment	EPA-Lloyd Kahn	
180-117730-33	SB-26-S(5-10)	Total/NA	Sediment	EPA-Lloyd Kahn	
180-117730-34	SB-26-S(11-13)	Total/NA	Sediment	EPA-Lloyd Kahn	
180-117730-35	SB-26-S(26-28)	Total/NA	Sediment	EPA-Lloyd Kahn	
180-117730-36	SB-26-S(34-36)	Total/NA	Sediment	EPA-Lloyd Kahn	
MB 180-348486/4	Method Blank	Total/NA	Sediment	EPA-Lloyd Kahn	
LCS 180-348486/5	Lab Control Sample	Total/NA	Sediment	EPA-Lloyd Kahn	

General Chemistry

Prep Batch: 349015

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-117730-1	SB-6-S(8-10)	SEM/AVS	Sediment	AVSSEM	
180-117730-2	SB-6-S(15-17)	SEM/AVS	Sediment	AVSSEM	
180-117730-3	SB-6-S(27-29)	SEM/AVS	Sediment	AVSSEM	
180-117730-4	SB-6-S(33.5-35.5)	SEM/AVS	Sediment	AVSSEM	
180-117730-12	SB-18-S(8-10)	SEM/AVS	Sediment	AVSSEM	
180-117730-13	SB-18-S(21-23)	SEM/AVS	Sediment	AVSSEM	
180-117730-14	SB-18-S(26-28)	SEM/AVS	Sediment	AVSSEM	
180-117730-18	SB-14-S(29-31)	SEM/AVS	Sediment	AVSSEM	
180-117730-19	SB-14-S(31-33)	SEM/AVS	Sediment	AVSSEM	
180-117730-20	SB-14-S(8-10)	SEM/AVS	Sediment	AVSSEM	
180-117730-24	SB-32-S(5-10)	SEM/AVS	Sediment	AVSSEM	
180-117730-27	SB-32-S(22-24)	SEM/AVS	Sediment	AVSSEM	
180-117730-28	SB-32-S(28-30)	SEM/AVS	Sediment	AVSSEM	
180-117730-29	SB-26-S(5-10)	SEM/AVS	Sediment	AVSSEM	
180-117730-30	SB-26-S(11-13)	SEM/AVS	Sediment	AVSSEM	
180-117730-31	SB-26-S(26-28)	SEM/AVS	Sediment	AVSSEM	
180-117730-32	SB-26-S(34-36)	SEM/AVS	Sediment	AVSSEM	
MB 180-349015/1-A	Method Blank	SEM/AVS	Sediment	AVSSEM	
LCS 180-349015/2-A	Lab Control Sample	SEM/AVS	Sediment	AVSSEM	
180-117730-1 MS	SB-6-S(8-10)	SEM/AVS	Sediment	AVSSEM	
180-117730-1 MSD	SB-6-S(8-10)	SEM/AVS	Sediment	AVSSEM	

Analysis Batch: 349062

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-117730-1	SB-6-S(8-10)	SEM/AVS	Sediment	EPA 9034	349015
180-117730-2	SB-6-S(15-17)	SEM/AVS	Sediment	EPA 9034	349015
180-117730-3	SB-6-S(27-29)	SEM/AVS	Sediment	EPA 9034	349015
180-117730-4	SB-6-S(33.5-35.5)	SEM/AVS	Sediment	EPA 9034	349015
180-117730-12	SB-18-S(8-10)	SEM/AVS	Sediment	EPA 9034	349015
180-117730-13	SB-18-S(21-23)	SEM/AVS	Sediment	EPA 9034	349015
180-117730-14	SB-18-S(26-28)	SEM/AVS	Sediment	EPA 9034	349015
180-117730-18	SB-14-S(29-31)	SEM/AVS	Sediment	EPA 9034	349015
180-117730-19	SB-14-S(31-33)	SEM/AVS	Sediment	EPA 9034	349015
180-117730-20	SB-14-S(8-10)	SEM/AVS	Sediment	EPA 9034	349015
180-117730-24	SB-32-S(5-10)	SEM/AVS	Sediment	EPA 9034	349015
180-117730-27	SB-32-S(22-24)	SEM/AVS	Sediment	EPA 9034	349015
180-117730-28	SB-32-S(28-30)	SEM/AVS	Sediment	EPA 9034	349015
180-117730-29	SB-26-S(5-10)	SEM/AVS	Sediment	EPA 9034	349015
180-117730-30	SB-26-S(11-13)	SEM/AVS	Sediment	EPA 9034	349015
180-117730-31	SB-26-S(26-28)	SEM/AVS	Sediment	EPA 9034	349015
180-117730-32	SB-26-S(34-36)	SEM/AVS	Sediment	EPA 9034	349015
MB 180-349015/1-A	Method Blank	SEM/AVS	Sediment	EPA 9034	349015
LCS 180-349015/2-A	Lab Control Sample	SEM/AVS	Sediment	EPA 9034	349015
180-117730-1 MS	SB-6-S(8-10)	SEM/AVS	Sediment	EPA 9034	349015
180-117730-1 MSD	SB-6-S(8-10)	SEM/AVS	Sediment	EPA 9034	349015

Analysis Batch: 349075

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-117730-1	SB-6-S(8-10)	Total/NA	Sediment	2540G	
180-117730-2	SB-6-S(15-17)	Total/NA	Sediment	2540G	
180-117730-3	SB-6-S(27-29)	Total/NA	Sediment	2540G	

General Chemistry (Continued)

Analysis Batch: 349075 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-117730-4	SB-6-S(33.5-35.5)	Total/NA	Sediment	2540G	
180-117730-12	SB-18-S(8-10)	Total/NA	Sediment	2540G	
180-117730-13	SB-18-S(21-23)	Total/NA	Sediment	2540G	
180-117730-14	SB-18-S(26-28)	Total/NA	Sediment	2540G	
180-117730-18	SB-14-S(29-31)	Total/NA	Sediment	2540G	
180-117730-19	SB-14-S(31-33)	Total/NA	Sediment	2540G	
180-117730-20	SB-14-S(8-10)	Total/NA	Sediment	2540G	
180-117730-24	SB-32-S(5-10)	Total/NA	Sediment	2540G	
180-117730-27	SB-32-S(22-24)	Total/NA	Sediment	2540G	
180-117730-28	SB-32-S(28-30)	Total/NA	Sediment	2540G	
180-117730-29	SB-26-S(5-10)	Total/NA	Sediment	2540G	
180-117730-30	SB-26-S(11-13)	Total/NA	Sediment	2540G	
180-117730-31	SB-26-S(26-28)	Total/NA	Sediment	2540G	
180-117730-32	SB-26-S(34-36)	Total/NA	Sediment	2540G	
180-117730-2 DU	SB-6-S(15-17)	Total/NA	Sediment	2540G	
180-117730-20 DU	SB-14-S(8-10)	Total/NA	Sediment	2540G	

Analysis Batch: 349084

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-117730-5	SB-6-S(8-10)	Total/NA	Sediment	2540G	
180-117730-6	SB-6-S(15-17)	Total/NA	Sediment	2540G	
180-117730-8	SB-6-S(33.5-35.5)	Total/NA	Sediment	2540G	
180-117730-9	SB-18-S(8-10)	Total/NA	Sediment	2540G	
180-117730-10	SB-18-S(21-23)	Total/NA	Sediment	2540G	
180-117730-11	SB-18-S(26-28)	Total/NA	Sediment	2540G	
180-117730-15	SB-14-S(8-10)	Total/NA	Sediment	2540G	
180-117730-21	SB-14-S(29-31)	Total/NA	Sediment	2540G	
180-117730-22	SB-14-S(31-33)	Total/NA	Sediment	2540G	
180-117730-23	SB-32-S(5-10)	Total/NA	Sediment	2540G	
180-117730-25	SB-32-S(22-24)	Total/NA	Sediment	2540G	
180-117730-26	SB-32-S(28-30)	Total/NA	Sediment	2540G	
180-117730-33	SB-26-S(5-10)	Total/NA	Sediment	2540G	
180-117730-34	SB-26-S(11-13)	Total/NA	Sediment	2540G	
180-117730-35	SB-26-S(26-28)	Total/NA	Sediment	2540G	
180-117730-36	SB-26-S(34-36)	Total/NA	Sediment	2540G	
180-117730-5 DU	SB-6-S(8-10)	Total/NA	Sediment	2540G	
180-117730-25 DU	SB-32-S(22-24)	Total/NA	Sediment	2540G	

Analysis Batch: 349210

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-117730-7	SB-6-S(27-29)	Total/NA	Sediment	EPA-Lloyd Kahn	
MB 180-349210/4	Method Blank	Total/NA	Sediment	EPA-Lloyd Kahn	
LCS 180-349210/5	Lab Control Sample	Total/NA	Sediment	EPA-Lloyd Kahn	
180-117730-7 MS	SB-6-S(27-29)	Total/NA	Sediment	EPA-Lloyd Kahn	
180-117730-7 MSD	SB-6-S(27-29)	Total/NA	Sediment	EPA-Lloyd Kahn	

Analysis Batch: 349300

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-117730-7	SB-6-S(27-29)	Total/NA	Sediment	2540G	
180-117730-7 DU	SB-6-S(27-29)	Total/NA	Sediment	2540G	

ARCADIS

ID#:

CHAIN OF CUSTODY & LABORATORY ANALYSIS REQUEST FORM

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Lab Work Order #

Send Results to:

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City: Raleigh State: NC Zip: 27607
E-mail Address: Matthew.Webb@arcadis.com
Project Name/Location (City, State): McManus - Brunswick, GA
Project #: 30059105.000006
Sampler's Printed Name: Grant Willford
Sampler's Signature:

Sample ID	Collection Date	Collection Time	Type (✓) Comp	Type (✓) Grab	Matrix	Preservative	Filtered (✓)	# of Containers	Container Information	AVS	SEM Acetate Liner	Total Metals/TOC
						E	E	1	1	9	7	
SB-6-S(8-10)	2/27/21	0950		X	S					1		
SB-6-S(15-17)	2/27/21	1000		X	S					1		
SB-6-S(27-29)	2/27/21	1010		X	S					1		
SB-6-S(33.5-35.5)	2/27/21	1023		X	S					1		
SB-6-S(8-10)	2/27/21	1025		X	S						1	
SB-6-S(15-17)	2/27/21	1030		X	S						1	
SB-6-S(27-29)	2/27/21	1035		X	S						1	
SB-6-S(33.5-35.5)	2/27/21	1040		X	S						1	
SB-18-S(8-10)	2/27/21	1245		X	S						1	
SB-18-S(21-23)	2/27/21	1250		X	S						1	
SB-18-S(26-28)	2/27/21	1255		X	S						1	
SB-18-S(8-10)	2/27/21	1420		X	S					1		
SB-18-S(21-23)	2/27/21	1426		X	S					1		
SB-18-S(26-28)	2/27/21	1435		X	S					1		

Keys

Preservation Key:
A. H_2SO_4
B. HCL
C. HNO_3
D. NaOH
E. None
F. Other: _____
G. Other: _____
H. Other: _____

Container Information Key:
1. 40 ml Vial
2. 1 L Amber
3. 250 ml Plastic
4. 500 ml Plastic
5. Encore
6. 2 oz. Glass
7. 4 oz. Glass
8. 8 oz. Glass
9. Other: Acetate Liner
10. Other: _____

Matrix Key:
SO - Soil, SE - Sediment, NL - NAPL/Oil
W - Water, SL - Sludge, SW - Sample Wipe
T - Tissue, A - Air, Other: _____

REMARKS

180-117730 Chain of Custody

Special Instructions/Comment: Total Metals = Arsenic, Fe, Al, Mn, Cu; % moisture
Please correspond w/ Kathryn Farris about AVS/SEM prep @ 518-250-7389

☐ Special QA/QC Instructions(✓):

* Additional sample provided if needed

Laboratory Information and Receipt		Relinquished By	Received By	Relinquished By	Laboratory Received By
Lab Name: Eurofins - Test America	Cooler Custody Seal (✓) ☐ Intact ☐ Not Intact	Printed Name: Grant Willford	Printed Name: FedEx	Printed Name: Ma	Printed Name: Matthew Webb
☒ Cooler packed with ice (✓)		Signature:	Signature: Matt VF 3/2/21	Signature:	Signature:
Specify Turnaround Requirements: Standard TAT	Sample Receipt:	Firm: ANA	Firm/Courier:	Firm/Courier:	Firm: ETA PITA
Shipping Tracking #:	Condition/Cooler Temp: _____	Date/Time: 3/1/2021 1700	Date/Time:	Date/Time:	Date/Time: 3/2/21 1100

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ID#:

CHAIN OF CUSTODY & LABORATORY ANALYSIS REQUEST FORM

Page 2 of 3

Lab Work Order #

Send Results to:

Contact & Company Name: Matt Webb Arcadis	Telephone: 919-415-2284
Address: 5420 Wade Park Blvd Ste 350	Fax: /
City: Raleigh State: NC Zip: 27607	E-mail Address: Mathew.webb@arcadis.com
Project Name/Location (City, State): Plant McManus / Brunswick GA	Project #: 30050105.00006
Sampler's Printed Name: Grant A Willford	Sampler's Signature:

Sample ID	Collection Date	Collection Time	Type (✓) Comp	Type (✓) Grab	Matrix	Preservative	Filtered (✓)	# of Containers	Container Information	AVS/SEM Prep & Acetate Liner	Total Metals/TOC	Total Metals/TOC/AVS/SEM Prep & 2" Liners
						E	E	E				
						1	1	1				
						9	7	9				
SB-14-S(8-10)	2/20/21	0749		X	S						1	
SB-14-S(17-19)		0752		X	S							1
SB-14-S(22-24)		0802		X	S							1
SB-14-S(29-31)		0815		X	S					1		
SB-14-S(31-33)		0830		X	S					1		
SB-14-S(8-10)		0845		X	S					1		
SB-14-S(29-31)		0850	0855	X	S						1	
SB-14-S(31-33)		0910		X	S						1	
~~SB-14~~ SB-32-S(5-10)		1110		X	S						1	
SB-32-S(5-10)		1115		X	S					1		
SB-32-S(22-24)		1120		X	S						1	
SB-32-S(28-30)		1122		X	S						1	
SB-32-S(22-24)		1125		X	S					1		
SB-32-S(28-30)		1140		X	S					1		

Keys

Preservation Key:
A. H_2SO_4
B. HCL
C. HNO_3
D. NaOH
E. None
F. Other: _____
G. Other: _____
H. Other: _____

Container Information Key:
1. 40 ml Vial
2. 1 L Amber
3. 250 ml Plastic
4. 500 ml Plastic
5. Encore
6. 2 oz. Glass
7. 4 oz. Glass
8. 8 oz. Glass
9. Other: Acetate Liner
10. Other: _____

Matrix Key:
SO - Soil
W - Water
T - Tissue
SE - Sediment
SL - Sludge
A - Air
NL - NAPL/Oil
SW - Sample Wipe
Other: _____

REMARKS

Special Instructions/Comments: Total Metals = Arsenic, Fe, Al, Mn, Cu, % moisture
Please correspond w/ Kathryn Farris about AVS/SEM Prep @ 518-250-7389

☐ Special QA/QC Instructions(✓):

Laboratory Information and Receipt

Lab Name: Eurofins - TestAmerica	Cooler Custody Seal (✓) ☐ Intact ☐ Not Intact
☒ Cooler packed with ice (✓)	
Specify Turnaround Requirements: Standard TAT	Sample Receipt:
Shipping Tracking #:	Condition/Cooler Temp: _____

Relinquished By	Received By	Relinquished By	Laboratory Received By
Printed Name: Grant A Willford	Printed Name: FedEx	Printed Name:	Printed Name:
Signature:	Signature:	Signature:	Signature:
Firm: ARA	Firm/Courier:	Firm/Courier:	Firm:
Date/Time: 3/1/2021 / 1700	Date/Time:	Date/Time:	Date/Time:

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ARCADIS

ID#:

CHAIN OF CUSTODY & LABORATORY ANALYSIS REQUEST FORM

Page 3 of 3

Lab Work Order #

Send Results to:

Contact & Company Name: Matt Webb Arcadis

Telephone: 919-415-2284

Address: 5420 Wade Park Blvd. Ste 350

Fax:

City: Raleigh State: NC Zip: 27607

E-mail Address: Matthew.webb@arcadis.com

Project Name/Location (City, State): Plant McManus / Brunswick, GA

Project #: 30050105.000006

Sampler's Printed Name: Grant Willford

Sampler's Signature:

Sample ID	Collection Date	Collection Time	Type (✓) Comp	Type (✓) Grab	Matrix	Preservative	Filtered (✓)	# of Containers	Container Information	AVS/SEM "Acetate Liner	Total Metals/ TOC						
						E		1	9	1							
						E		1	7		1						
						~~E~~ AW											
SB-26-S(5-10)	2/28/21	1509		X	S					1							
SB-26-S(11-13)	2/28/21	1520		X	S					1							
SB-26-S(26-28)	2/28/21	1540		X	S					1							
SB-26-S(34-36)	2/28/21	1550		X	S					1							
SB-26-S(5-10)	2/28/21	1552		X	S						1						
SB-26-S(11-13)	2/28/21	1554		X	S						1						
SB-26-S(26-28)	2/28/21	1556		X	S						1						
SB-26-S(34-36)	2/28/21	1558		X	S						1						

Keys

Preservation Key:
A. H_2SO_4
B. HCL
C. HNO_3
D. NaOH
E. None
F. Other: _____
G. Other: _____
H. Other: _____

Container Information Key:
1. 40 ml Vial
2. 1 L Amber
3. 250 ml Plastic
4. 500 ml Plastic
5. Encore
6. 2 oz. Glass
7. 4 oz. Glass
8. 8 oz. Glass
9. Other: Acetate Liner
10. Other: _____

Matrix Key:
SO - Soil
W - Water
T - Tissue
SE - Sediment
SL - Sludge
A - Air
NL - NAPL/Oil
SW - Sample Wipe
Other: _____

REMARKS

Special Instructions/Comments: Total Metals = Arsenic, Fe, Al, Mn, Cu, % moisture
Please correspond w/ Kathryn Farris about AVS/SEM prep @ 518-520-7389

☐ Special QA/QC Instructions(✓):

Laboratory Information and Receipt		Relinquished By	Received By	Relinquished By	Laboratory Received By
Lab Name: Eurofins - Test America	Cooler Custody Seal (✓) ☐ Intact ☐ Not Intact	Printed Name: Grant A Willford	Printed Name: FedEx	Printed Name:	Printed Name:
☒ Cooler packed with ice (✓)		Signature:	Signature:	Signature:	Signature:
Specify Turnaround Requirements: Standard TAT	Sample Receipt:	Firm: ANA	Firm/Courier:	Firm/Courier:	Firm:
Shipping Tracking #:	Condition/Cooler Temp: _____	Date/Time: 3/1/2021 / 1700	Date/Time:	Date/Time:	Date/Time:

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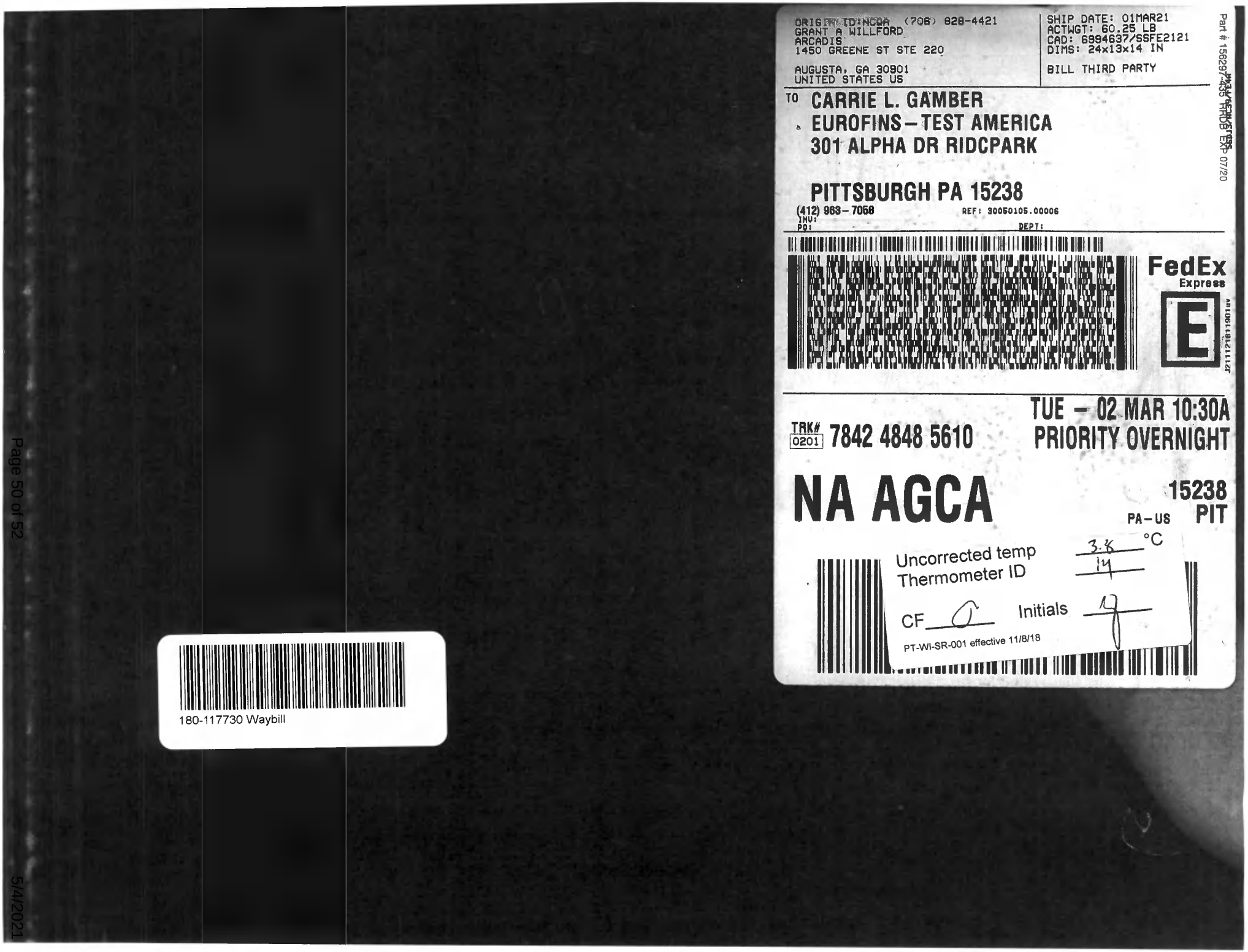
Distribution: WHITE – Laboratory returns with results YELLOW – Lab copy PINK – Retained by Arcadis

5/4/2021



180-117730 Waybill

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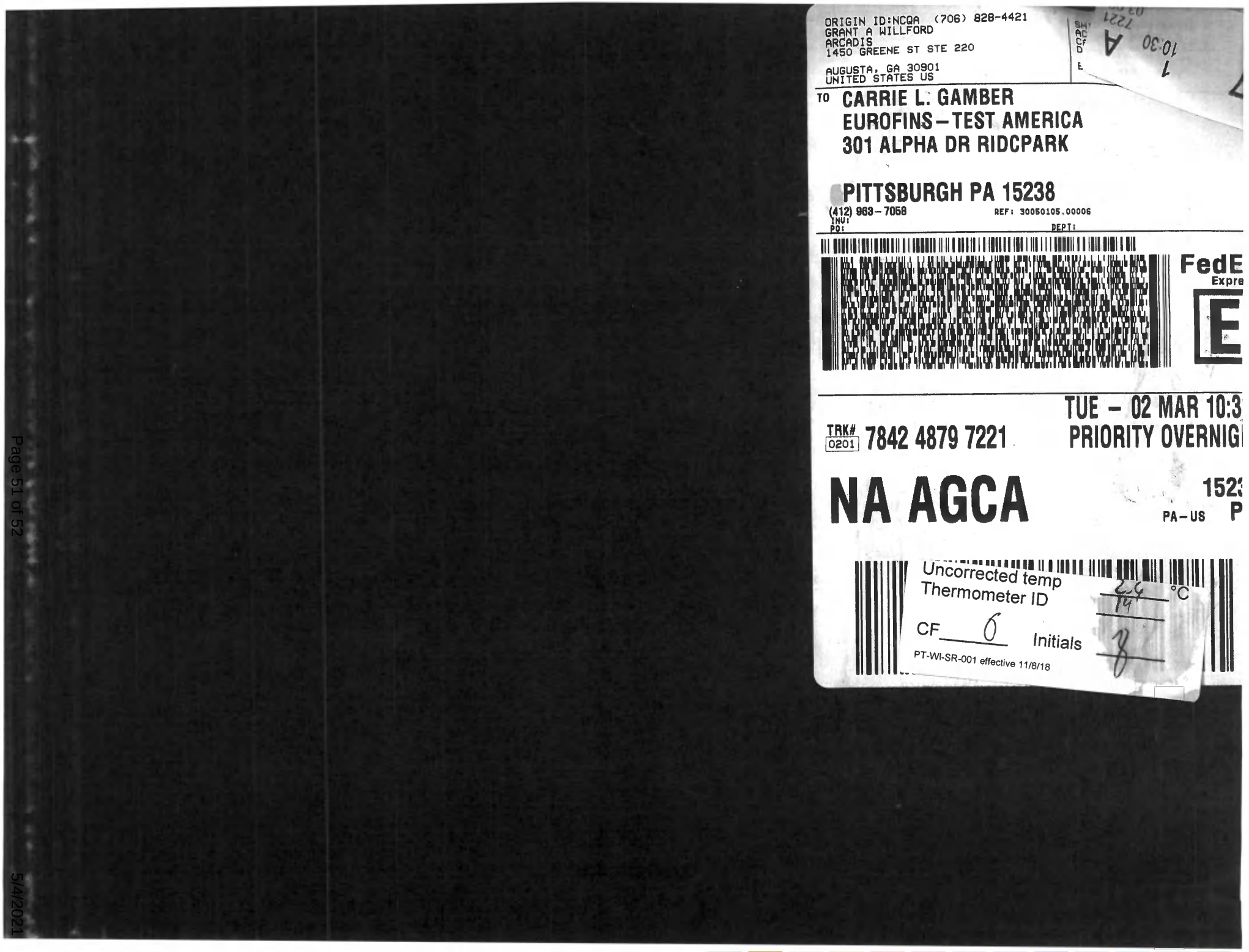
ORIGIN ID:NCQA (706) 828-4421
GRANT A WILLFORD
ARCADIS
1450 GREENE ST STE 220
AUGUSTA, GA 30901
UNITED STATES US
TO CARRIE L. GAMBER
EUROFINS – TEST AMERICA
301 ALPHA DR RIDCPARK
PITTSBURGH PA 15238
(412) 963-7058
REF: 30050105.00006
INV:
PO:
DEPT:
FedE
Expre
TUE – 02 MAR 10:3
TRK# 0201 7842 4879 7221
PRIORITY OVERNIG
NA AGCA
PA-US
Uncorrected temp
Thermometer ID
CF 6
Initials
PT-WI-SR-001 effective 11/8/18
°C

Login Sample Receipt Checklist

Client: ARCADIS U.S. Inc

Job Number: 180-117730-1

Login Number: 117730
List Number: 1
Creator: Abernathy, Eric

List Source: Eurofins TestAmerica, Pittsburgh

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.	True	
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	
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.	N/A	
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").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

eurofins | Environment Testing America

ANALYTICAL REPORT

Eurofins TestAmerica, Pittsburgh
301 Alpha Drive
RIDC Park
Pittsburgh, PA 15238
Tel: (412)963-7058

Laboratory Job ID: 180-117730-2
Client Project/Site: Plant McManus (AVS/SEM)

For:
ARCADIS U.S. Inc
855 Route 146
Suite 210
Clifton Park, New York 12065

Attn: Kathryn Farris

Authorized for release by:
5/4/2021 10:58:30 AM

Carrie Gamber, Senior Project Manager
(412)963-2428
Carrie.Gamber@Eurofinset.com

PA Lab ID: 02-00416

Table of Contents

Job ID: 180-117730-2

Laboratory: Eurofins TestAmerica, Pittsburgh

Narrative

CASE NARRATIVE

Client: ARCADIS U.S. Inc

Project: Plant McManus (AVS/SEM)

Report Number: 180-117730-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

RECEIPT
The samples were received on 03/02/2021; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 3.8 C.

NOTE: These samples were prepared in the GloveBox under Nitrogen conditions.

AVS/SEM
No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

METALS
No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

TOTAL ORGANIC CARBON
The reporting limit for Lloyd Kahn TOC analysis is a nominal value and does not reflect adjustments in sample mass processed on an individual basis.

PERCENT SOLIDS
No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Definitions/Glossary

Client: ARCADIS U.S. Inc
Job ID: 180-117730-2
Project/Site: Plant McManus (AVS/SEM)

Qualifiers

General Chemistry

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Accreditation/Certification Summary

Client: ARCADIS U.S. Inc
Job ID: 180-117730-2
Project/Site: Plant McManus (AVS/SEM)

Laboratory: Eurofins TestAmerica, Pittsburgh

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
Georgia	State	PA 02-00416	04-30-21

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
2540G		Sediment	Percent Moisture
2540G		Sediment	Percent Solids
SEM		Sediment	SEM/AVS Ratio

Sample Summary

Client: ARCADIS U.S. Inc
Project/Site: Plant McManus (AVS/SEM)

Job ID: 180-117730-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
180-117730-16	SB-14-S(17-19)	Sediment	02/28/21 07:52	03/02/21 11:00	
180-117730-17	SB-14-S(22-24)	Sediment	02/28/21 08:02	03/02/21 11:00	

Method Summary

Client: ARCADIS U.S. Inc
Job ID: 180-117730-2
Project/Site: Plant McManus (AVS/SEM)

Method	Method Description	Protocol	Laboratory
6010D	Metals (ICP)	SW846	TAL PIT
EPA 6020B	Metals (ICP/MS)	SW846	TAL PIT
SEM	Metals, Simultaneously Extracted Metals (SEM)	EPA	TAL PIT
2540G	SM 2540G	SM22	TAL PIT
EPA 9034	Sulfide, Acid soluble and Insoluble (Titrimetric)	SW846	TAL PIT
EPA-Lloyd Kahn	Organic Carbon, Total (TOC)	EPA	TAL PIT
3050B	Preparation, Metals	SW846	TAL PIT
AVSSEM	Preparation, Acid Volatile Sulfide (AVS) and Simultaneously Extracted Metals (SE	EPA	TAL PIT

Protocol References:

EPA = US Environmental Protection Agency

SM22 = Standard Methods For The Examination Of Water And Wastewater, 22nd Edition

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL PIT = Eurofins TestAmerica, Pittsburgh, 301 Alpha Drive, RIDC Park, Pittsburgh, PA 15238, TEL (412)963-7058

Lab Chronicle

Client: ARCADIS U.S. Inc
Job ID: 180-117730-2
Project/Site: Plant McManus (AVS/SEM)

Client Sample ID: SB-14-S(17-19)
Lab Sample ID: 180-117730-16
Date Collected: 02/28/21 07:52
Matrix: Sediment
Date Received: 03/02/21 11:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
SEM/AVS	Analysis	SEM		1			349421	03/15/21 08:13	RJR	TAL PIT
	Instrument ID: NOEQUIP									
Total/NA	Analysis	2540G		1			349169	03/11/21 20:16	KMM	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: SB-14-S(17-19)
Lab Sample ID: 180-117730-16
Date Collected: 02/28/21 07:52
Matrix: Sediment
Date Received: 03/02/21 11:00
Percent Solids: 73.3

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
SEM/AVS	Prep	AVSSEM			10.50 g	250 mL	348836	03/09/21 16:00	CMR	TAL PIT
SEM/AVS	Analysis	6010D		1			349074	03/11/21 07:32	RJG	TAL PIT
	Instrument ID: C									
Total/NA	Prep	3050B			2.03 g	100 mL	349589	03/16/21 15:11	TJO	TAL PIT
Total/NA	Analysis	EPA 6020B		1			349774	03/17/21 14:46	RSK	TAL PIT
	Instrument ID: DORY									
SEM/AVS	Prep	AVSSEM			10.50 g	50 mL	348838	03/09/21 16:00	CMR	TAL PIT
SEM/AVS	Analysis	EPA 9034		1			348928	03/09/21 18:17	CMR	TAL PIT
	Instrument ID: NOEQUIP									
Total/NA	Analysis	EPA-Lloyd Kahn		1			349210	03/11/21 14:19	DLF	TAL PIT
	Instrument ID: FLASHEA									

Client Sample ID: SB-14-S(22-24)
Lab Sample ID: 180-117730-17
Date Collected: 02/28/21 08:02
Matrix: Sediment
Date Received: 03/02/21 11:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
SEM/AVS	Analysis	SEM		1			349421	03/15/21 08:13	RJR	TAL PIT
	Instrument ID: NOEQUIP									
Total/NA	Analysis	2540G		1			349169	03/11/21 20:16	KMM	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: SB-14-S(22-24)
Lab Sample ID: 180-117730-17
Date Collected: 02/28/21 08:02
Matrix: Sediment
Date Received: 03/02/21 11:00
Percent Solids: 80.6

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
SEM/AVS	Prep	AVSSEM			11.32 g	250 mL	348836	03/09/21 16:00	CMR	TAL PIT
SEM/AVS	Analysis	6010D		1			349074	03/11/21 07:37	RJG	TAL PIT
	Instrument ID: C									
Total/NA	Prep	3050B			2.01 g	100 mL	349589	03/16/21 15:11	TJO	TAL PIT
Total/NA	Analysis	EPA 6020B		1			349774	03/17/21 14:49	RSK	TAL PIT
	Instrument ID: DORY									
SEM/AVS	Prep	AVSSEM			11.32 g	50 mL	348838	03/09/21 16:00	CMR	TAL PIT
SEM/AVS	Analysis	EPA 9034		1			348928	03/09/21 18:26	CMR	TAL PIT
	Instrument ID: NOEQUIP									

Lab Chronicle

Client: ARCADIS U.S. Inc
Job ID: 180-117730-2
Project/Site: Plant McManus (AVS/SEM)

Client Sample ID: SB-14-S(22-24)
Lab Sample ID: 180-117730-17
Date Collected: 02/28/21 08:02
Matrix: Sediment
Date Received: 03/02/21 11:00
Percent Solids: 80.6

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	EPA-Lloyd Kahn		1			349210	03/11/21 14:36	DLF	TAL PIT

Laboratory References:

TAL PIT = Eurofins TestAmerica, Pittsburgh, 301 Alpha Drive, RIDC Park, Pittsburgh, PA 15238, TEL (412)963-7058

Analyst References:

Lab: TAL PIT

Batch Type: Prep

CMR = Carl Reagle
TJO = Tyler Oliver

Batch Type: Analysis

CMR = Carl Reagle
DLF = Donald Ferguson
KMM = Kendric Moore
RJG = Rob Good
RJR = Ron Rosenbaum
RSK = Robert Kurtz

Client Sample ID: SB-14-S(17-19)
Lab Sample ID: 180-117730-16
Date Collected: 02/28/21 07:52
Matrix: Sediment
Date Received: 03/02/21 11:00
Percent Solids: 73.3

Method: 6010D - Metals (ICP) - SEM/AVS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic SEM	1.4		0.32	0.13	mg/Kg	☼	03/09/21 16:00	03/11/21 07:32	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic SEM	0.019		0.0043	0.0018	umol/g	☼	03/09/21 16:00	03/11/21 07:32	1

Method: EPA 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	2600		4.0	3.9	mg/Kg	☼	03/16/21 15:11	03/17/21 14:46	1
Arsenic	4.6		0.067	0.022	mg/Kg	☼	03/16/21 15:11	03/17/21 14:46	1
Calcium	1900		34	5.1	mg/Kg	☼	03/16/21 15:11	03/17/21 14:46	1
Iron	5200		3.4	3.2	mg/Kg	☼	03/16/21 15:11	03/17/21 14:46	1
Manganese	55		0.34	0.29	mg/Kg	☼	03/16/21 15:11	03/17/21 14:46	1

Method: SEM - Metals, Simultaneously Extracted Metals (SEM) - SEM/AVS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
SEM/AVS Ratio	0.099		0.0010	NaN	NONE			03/15/21 08:13	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	26.7		0.1	0.1	%			03/11/21 20:16	1
Percent Solids	73.3		0.1	0.1	%			03/11/21 20:16	1
Total Organic Carbon - Duplicates	2300		1400	1000	mg/Kg	☼		03/11/21 14:19	1

General Chemistry - SEM/AVS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acid Volatile Sulfides (AVS)	9.1	J	19	6.5	mg/Kg	☼	03/09/21 16:00	03/09/21 18:17	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acid Volatile Sulfides (AVS)	0.28	J	0.61	0.20	umol/g	☼	03/09/21 16:00	03/09/21 18:17	1

Client Sample ID: SB-14-S(22-24)
Lab Sample ID: 180-117730-17
Date Collected: 02/28/21 08:02
Matrix: Sediment
Date Received: 03/02/21 11:00
Percent Solids: 80.6

Method: 6010D - Metals (ICP) - SEM/AVS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic SEM	0.96		0.27	0.11	mg/Kg	☼	03/09/21 16:00	03/11/21 07:37	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic SEM	0.013		0.0037	0.0015	umol/g	☼	03/09/21 16:00	03/11/21 07:37	1

Method: EPA 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	1900		3.7	3.6	mg/Kg	☼	03/16/21 15:11	03/17/21 14:49	1
Arsenic	2.4		0.062	0.020	mg/Kg	☼	03/16/21 15:11	03/17/21 14:49	1
Calcium	2400		31	4.7	mg/Kg	☼	03/16/21 15:11	03/17/21 14:49	1
Iron	3600		3.1	2.9	mg/Kg	☼	03/16/21 15:11	03/17/21 14:49	1
Manganese	30		0.31	0.27	mg/Kg	☼	03/16/21 15:11	03/17/21 14:49	1

Method: SEM - Metals, Simultaneously Extracted Metals (SEM) - SEM/AVS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
SEM/AVS Ratio	NC		0.0010	NaN	NONE			03/15/21 08:13	1

Client Sample Results

Client: ARCADIS U.S. Inc
Job ID: 180-117730-2
Project/Site: Plant McManus (AVS/SEM)

Client Sample ID: SB-14-S(22-24)
Lab Sample ID: 180-117730-17
Date Collected: 02/28/21 08:02
Matrix: Sediment
Date Received: 03/02/21 11:00
Percent Solids: 80.6

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	19.4		0.1	0.1	%			03/11/21 20:16	1
Percent Solids	80.6		0.1	0.1	%			03/11/21 20:16	1
Total Organic Carbon - Duplicates	2000		1200	930	mg/Kg	☼		03/11/21 14:36	1

General Chemistry - SEM/AVS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acid Volatile Sulfides (AVS)	ND		16	5.5	mg/Kg	☼	03/09/21 16:00	03/09/21 18:26	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acid Volatile Sulfides (AVS)	ND		0.51	0.17	umol/g	☼	03/09/21 16:00	03/09/21 18:26	1

Method: 6010D - Metals (ICP)

Lab Sample ID: MB 180-348836/1-A
Matrix: Sediment
Analysis Batch: 349074

Client Sample ID: Method Blank
Prep Type: SEM/AVS
Prep Batch: 348836

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic SEM	ND		0.25	0.10	mg/Kg		03/09/21 16:00	03/11/21 06:34	1

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic SEM	ND		0.0033	0.0014	umol/g		03/09/21 16:00	03/11/21 06:34	1

Lab Sample ID: LCS 180-348836/2-A
Matrix: Sediment
Analysis Batch: 349074

Client Sample ID: Lab Control Sample
Prep Type: SEM/AVS
Prep Batch: 348836

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic SEM	50.0	50.2		mg/Kg		100	80 - 120

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic SEM	0.67	0.670		umol/g		100	80 - 120

Method: EPA 6020B - Metals (ICP/MS)

Lab Sample ID: MB 180-349589/1-A
Matrix: Sediment
Analysis Batch: 349774

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 349589

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		3.0	2.9	mg/Kg		03/16/21 15:11	03/17/21 13:52	1
Arsenic	ND		0.050	0.016	mg/Kg		03/16/21 15:11	03/17/21 13:52	1
Calcium	ND		25	3.8	mg/Kg		03/16/21 15:11	03/17/21 13:52	1
Iron	ND		2.5	2.4	mg/Kg		03/16/21 15:11	03/17/21 13:52	1
Manganese	ND		0.25	0.22	mg/Kg		03/16/21 15:11	03/17/21 13:52	1

Lab Sample ID: LCS 180-349589/2-A
Matrix: Sediment
Analysis Batch: 349774

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 349589

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	250	244		mg/Kg		98	80 - 120
Arsenic	50.0	47.1		mg/Kg		94	80 - 120
Calcium	1250	1440		mg/Kg		115	80 - 120
Iron	250	257		mg/Kg		103	80 - 120
Manganese	25.0	26.1		mg/Kg		104	80 - 120

Method: EPA 9034 - Sulfide, Acid soluble and Insoluble (Titrimetric)

Lab Sample ID: MB 180-348838/1-A
Matrix: Sediment
Analysis Batch: 348928

Client Sample ID: Method Blank
Prep Type: SEM/AVS
Prep Batch: 348838

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acid Volatile Sulfides (AVS)	ND		15	5.0	mg/Kg		03/09/21 16:00	03/09/21 17:50	1

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acid Volatile Sulfides (AVS)	ND		0.47	0.16	umol/g		03/09/21 16:00	03/09/21 17:50	1

Method: EPA 9034 - Sulfide, Acid soluble and Insoluble (Titrimetric)

Lab Sample ID: LCS 180-348838/2-A
Matrix: Sediment
Analysis Batch: 348928

Client Sample ID: Lab Control Sample
Prep Type: SEM/AVS
Prep Batch: 348838

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Acid Volatile Sulfides (AVS)	67.9	59.5		mg/Kg		88	85 - 115

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Acid Volatile Sulfides (AVS)	2.1	1.86		umol/g		88	85 - 115

Method: EPA-Lloyd Kahn - Organic Carbon, Total (TOC)

Lab Sample ID: MB 180-349210/4
Matrix: Sediment
Analysis Batch: 349210

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon - Duplicates	ND		1000	750	mg/Kg			03/11/21 13:01	1

Lab Sample ID: LCS 180-349210/5
Matrix: Sediment
Analysis Batch: 349210

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Organic Carbon - Duplicates	37800	38900		mg/Kg		103	75 - 125

Metals

Prep Batch: 348836

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-117730-16	SB-14-S(17-19)	SEM/AVS	Sediment	AVSSEM	
180-117730-17	SB-14-S(22-24)	SEM/AVS	Sediment	AVSSEM	
MB 180-348836/1-A	Method Blank	SEM/AVS	Sediment	AVSSEM	
LCS 180-348836/2-A	Lab Control Sample	SEM/AVS	Sediment	AVSSEM	

Analysis Batch: 349074

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-117730-16	SB-14-S(17-19)	SEM/AVS	Sediment	6010D	348836
180-117730-17	SB-14-S(22-24)	SEM/AVS	Sediment	6010D	348836
MB 180-348836/1-A	Method Blank	SEM/AVS	Sediment	6010D	348836
LCS 180-348836/2-A	Lab Control Sample	SEM/AVS	Sediment	6010D	348836

Analysis Batch: 349421

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-117730-16	SB-14-S(17-19)	SEM/AVS	Sediment	SEM	
180-117730-17	SB-14-S(22-24)	SEM/AVS	Sediment	SEM	

Prep Batch: 349589

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-117730-16	SB-14-S(17-19)	Total/NA	Sediment	3050B	
180-117730-17	SB-14-S(22-24)	Total/NA	Sediment	3050B	
MB 180-349589/1-A	Method Blank	Total/NA	Sediment	3050B	
LCS 180-349589/2-A	Lab Control Sample	Total/NA	Sediment	3050B	

Analysis Batch: 349774

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-117730-16	SB-14-S(17-19)	Total/NA	Sediment	EPA 6020B	349589
180-117730-17	SB-14-S(22-24)	Total/NA	Sediment	EPA 6020B	349589
MB 180-349589/1-A	Method Blank	Total/NA	Sediment	EPA 6020B	349589
LCS 180-349589/2-A	Lab Control Sample	Total/NA	Sediment	EPA 6020B	349589

General Chemistry

Prep Batch: 348838

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-117730-16	SB-14-S(17-19)	SEM/AVS	Sediment	AVSSEM	
180-117730-17	SB-14-S(22-24)	SEM/AVS	Sediment	AVSSEM	
MB 180-348838/1-A	Method Blank	SEM/AVS	Sediment	AVSSEM	
LCS 180-348838/2-A	Lab Control Sample	SEM/AVS	Sediment	AVSSEM	

Analysis Batch: 348928

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-117730-16	SB-14-S(17-19)	SEM/AVS	Sediment	EPA 9034	348838
180-117730-17	SB-14-S(22-24)	SEM/AVS	Sediment	EPA 9034	348838
MB 180-348838/1-A	Method Blank	SEM/AVS	Sediment	EPA 9034	348838
LCS 180-348838/2-A	Lab Control Sample	SEM/AVS	Sediment	EPA 9034	348838

Analysis Batch: 349169

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-117730-16	SB-14-S(17-19)	Total/NA	Sediment	2540G	
180-117730-17	SB-14-S(22-24)	Total/NA	Sediment	2540G	

QC Association Summary

Client: ARCADIS U.S. Inc
Project/Site: Plant McManus (AVS/SEM)

Job ID: 180-117730-2

General Chemistry

Analysis Batch: 349210

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-117730-16	SB-14-S(17-19)	Total/NA	Sediment	EPA-Lloyd Kahn	
180-117730-17	SB-14-S(22-24)	Total/NA	Sediment	EPA-Lloyd Kahn	
MB 180-349210/4	Method Blank	Total/NA	Sediment	EPA-Lloyd Kahn	
LCS 180-349210/5	Lab Control Sample	Total/NA	Sediment	EPA-Lloyd Kahn	

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ID#:

CHAIN OF CUSTODY & LABORATORY ANALYSIS REQUEST FORM

Page 1 of 3

Lab Work Order #

Send Results to:

Contact & Company Name: Matt Webb / Arcadis	Telephone: 919-415-2284
Address: 5420 Wade Park Blvd Ste 350	Fax: /
City: Raleigh State: NC Zip: 27607	E-mail Address: Matthew.Webb@arcadis.com
Project Name/Location (City, State): McManus - Brunswick, GA	Project #: 30059105.000006
Sampler's Printed Name: Grant Allford	Sampler's Signature:

Sample ID	Collection Date	Collection Time	Type (✓) Comp	Type (✓) Grab	Matrix	Preservative	Filtered (✓)	# of Containers	Container Information	AVS	Acetate Liner	Total Metals	TOC
						E	E	1	1	9	7		
SB-6-S(8-10)	2/27/21	0950		X	S					1			
SB-6-S(15-17)	2/27/21	1000		X	S					1			
SB-6-S(27-29)	2/27/21	1010		X	S					1			
SB-6-S(33.5-35.5)	2/27/21	1023		X	S					1			
SB-6-S(8-10)	2/27/21	1025		X	S							1	
SB-6-S(15-17)	2/27/21	1030		X	S							1	
SB-6-S(27-29)	2/27/21	1035		X	S							1	
SB-6-S(33.5-35.5)	2/27/21	1040		X	S							1	
SB-18-S(8-10)	2/27/21	1245		X	S							1	
SB-18-S(21-23)	2/27/21	1250		X	S							1	
SB-18-S(26-28)	2/27/21	1255		X	S							1	
SB-18-S(8-10)	2/27/21	1420		X	S					1			
SB-18-S(21-23)	2/27/21	1426		X	S					1			
SB-18-S(26-28)	2/27/21	1435		X	S					1			

Keys

Preservation Key:
A. H_2SO_4
B. HCL
C. HNO_3
D. NaOH
E. None
F. Other: _____
G. Other: _____
H. Other: _____

Container Information Key:
1. 40 ml Vial
2. 1 L Amber
3. 250 ml Plastic
4. 500 ml Plastic
5. Encore
6. 2 oz. Glass
7. 4 oz. Glass
8. 8 oz. Glass
9. Other: Acetate Liner
10. Other: _____

Matrix Key:
SO - Soil, SE - Sediment, NL - NAPL/Oil, W - Water, SL - Sludge, SW - Sample Wipe, T - Tissue, A - Air, Other: _____

REMARKS

180-117730 Chain of Custody

Special Instructions/Comment: Total Metals = Arsenic, Fe, Al, Mn, Cu; % moisture
Please correspond w/ Kathryn Farris about AVS/SEM prep @ 518-250-7389 *Additional sample provided if needed

☐ Special QA/QC Instructions(✓):

Laboratory Information and Receipt		Relinquished By	Received By	Relinquished By	Laboratory Received By
Lab Name: Eurofins - Test America	Cooler Custody Seal (✓) ☐ Intact ☐ Not Intact	Printed Name: Grant Allford	Printed Name: FedEx	Printed Name: Ma	Printed Name: Matthew Webb
☒ Cooler packed with ice (✓)		Signature:	Signature: Matthew VF 3/2/21	Signature:	Signature: Mj
Specify Turnaround Requirements: Standard TAT	Sample Receipt:	Firm: ANA	Firm/Courier:	Firm/Courier:	Firm: ETA PITT
Shipping Tracking #:	Condition/Cooler Temp: _____	Date/Time: 3/1/2021 1700	Date/Time:	Date/Time:	Date/Time: 3/2/21 1100

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Lab Work Order #

Send Results to:

Contact & Company Name: Matt Webb Arcadis	Telephone: 919-415-2284
Address: 5420 Wade Park Blvd Ste 350	Fax: /
City: Raleigh State: NC Zip: 27607	E-mail Address: Mathew.webb@arcadis.com
Project Name/Location (City, State): Plant McManus / Brunswick GA	Project #: 30050105.00006
Sampler's Printed Name: Grant A Willford	Sampler's Signature:

Sample ID	Collection Date	Collection Time	Type (✓) Comp	Type (✓) Grab	Matrix	Preservative	Filtered (✓)	# of Containers	Container Information	AVS/SEM Prep & Acetate Liner	Total Metals/TOC	Total Metals/TOC/AVS/SEM Prep & 2" Liners
						E		1	9			
						E		1	7			
						E		1	9			
SB-14-S(8-10)	2/20/21	0749		X	S						1	
SB-14-S(17-19)		0752		X	S							1
SB-14-S(22-24)		0802		X	S							1
SB-14-S(29-31)		0815		X	S	1						
SB-14-S(31-33)		0830		X	S	1						
SB-14-S(8-10)		0845		X	S	1						
SB-14-S(29-31)		0850 0855		X	S						1	
SB-14-S(31-33)		0910		X	S						1	
~~SB-14~~ SB-32-S(5-10)		1110		X	S						1	
SB-32-S(5-10)		1115		X	S	1						
SB-32-S(22-24)		1120		X	S						1	
SB-32-S(28-30)		1122		X	S						1	
SB-32-S(22-24)		1125		X	S	1						
SB-32-S(28-30)		1140		X	S	1						

Keys

Preservation Key:
A. H_2SO_4
B. HCL
C. HNO_3
D. NaOH
E. None
F. Other: _____
G. Other: _____
H. Other: _____

Container Information Key:
1. 40 ml Vial
2. 1 L Amber
3. 250 ml Plastic
4. 500 ml Plastic
5. Encore
6. 2 oz. Glass
7. 4 oz. Glass
8. 8 oz. Glass
9. Other: Acetate Liner
10. Other: _____

Matrix Key:
SO - Soil
W - Water
T - Tissue
SE - Sediment
SL - Sludge
A - Air
NL - NAPL/Oil
SW - Sample Wipe
Other: _____

REMARKS

Special Instructions/Comments: Total Metals = Arsenic, Fe, Al, Mn, Cu, % moisture
Please Correspond w/ Kathryn Farris about AVS/SEM Prep @ 518-250-7389

☐ Special QA/QC Instructions(✓):

Laboratory Information and Receipt		Relinquished By	Received By	Relinquished By	Laboratory Received By
Lab Name: Eurofins - TestAmerica	Cooler Custody Seal (✓) ☐ Intact ☐ Not Intact	Printed Name: Grant A Willford	Printed Name: FedEx	Printed Name:	Printed Name:
☒ Cooler packed with ice (✓)		Signature:	Signature:	Signature:	Signature:
Specify Turnaround Requirements: Standard TAT	Sample Receipt:	Firm: ARA	Firm/Courier:	Firm/Courier:	Firm:
Shipping Tracking #:	Condition/Cooler Temp: _____	Date/Time: 3/1/2021 1700	Date/Time:	Date/Time:	Date/Time:

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Lab Work Order #

Send Results to:

Contact & Company Name: Matt Webb Arcadis

Telephone: 919-415-2284

Address: 5420 Wade Park Blvd. Ste 350

Fax: /

City: Raleigh State: NC Zip: 27607

E-mail Address: Matthew.webb@arcadis.com

Project Name/Location (City, State): Plant McManus / Brunswick, GA

Project #: 30050105.000006

Sampler's Printed Name: Grant Willford

Sampler's Signature:

Preservative	E	E	E/W				
Filtered (✓)							
# of Containers	1	1					
Container Information	9	7					

PARAMETER ANALYSIS & METHOD

Keys

Preservation Key:
A. H_2SO_4
B. HCL
C. HNO_3
D. NaOH
E. None
F. Other: _____
G. Other: _____
H. Other: _____

Container Information Key:
1. 40 ml Vial
2. 1 L Amber
3. 250 ml Plastic
4. 500 ml Plastic
5. Encore
6. 2 oz. Glass
7. 4 oz. Glass
8. 8 oz. Glass
9. Other: Acetate Liner
10. Other: _____

Matrix Key:
SO - Soil, SE - Sediment, NL - NAPL/Oil
W - Water, SL - Sludge, SW - Sample Wipe
T - Tissue, A - Air, Other: _____

Sample ID	Collection Date	Collection Time	Type (✓) Comp	Type (✓) Grab	Matrix	AVS/SEM "Acetate Liner"	Total Metals/TOC	REMARKS
SB-26-S(5-10)	2/28/21	1509		X	S	1		
SB-26-S(11-13)	2/28/21	1520		X	S	1		
SB-26-S(26-28)	2/28/21	1540		X	S	1		
SB-26-S(34-36)	2/28/21	1550		X	S	1		
SB-26-S(5-10)	2/28/21	1552		X	S		1	
SB-26-S(11-13)	2/28/21	1554		X	S		1	
SB-26-S(26-28)	2/28/21	1556		X	S		1	
SB-26-S(34-36)	2/28/21	1558		X	S		1	

Special Instructions/Comments: Total Metals = Arsenic, Fe, Al, Mn, Cu, % moisture
Please correspond w/ Kathryn Farris about AVS/SEM prep @ 518-520-7389

☐ **Special QA/QC Instructions(✓):**

Laboratory Information and Receipt		Relinquished By	Received By	Relinquished By	Laboratory Received By
Lab Name: Eurofins-Test America	Cooler Custody Seal (✓) ☐ Intact ☐ Not Intact	Printed Name: Grant A Willford	Printed Name: FedEx	Printed Name:	Printed Name:
☒ Cooler packed with ice (✓)		Signature:	Signature:	Signature:	Signature:
Specify Turnaround Requirements: Standard TAT	Sample Receipt:	Firm: ANA	Firm/Courier:	Firm/Courier:	Firm:
Shipping Tracking #:	Condition/Cooler Temp: _____	Date/Time: 3/1/2021 / 1700	Date/Time:	Date/Time:	Date/Time:

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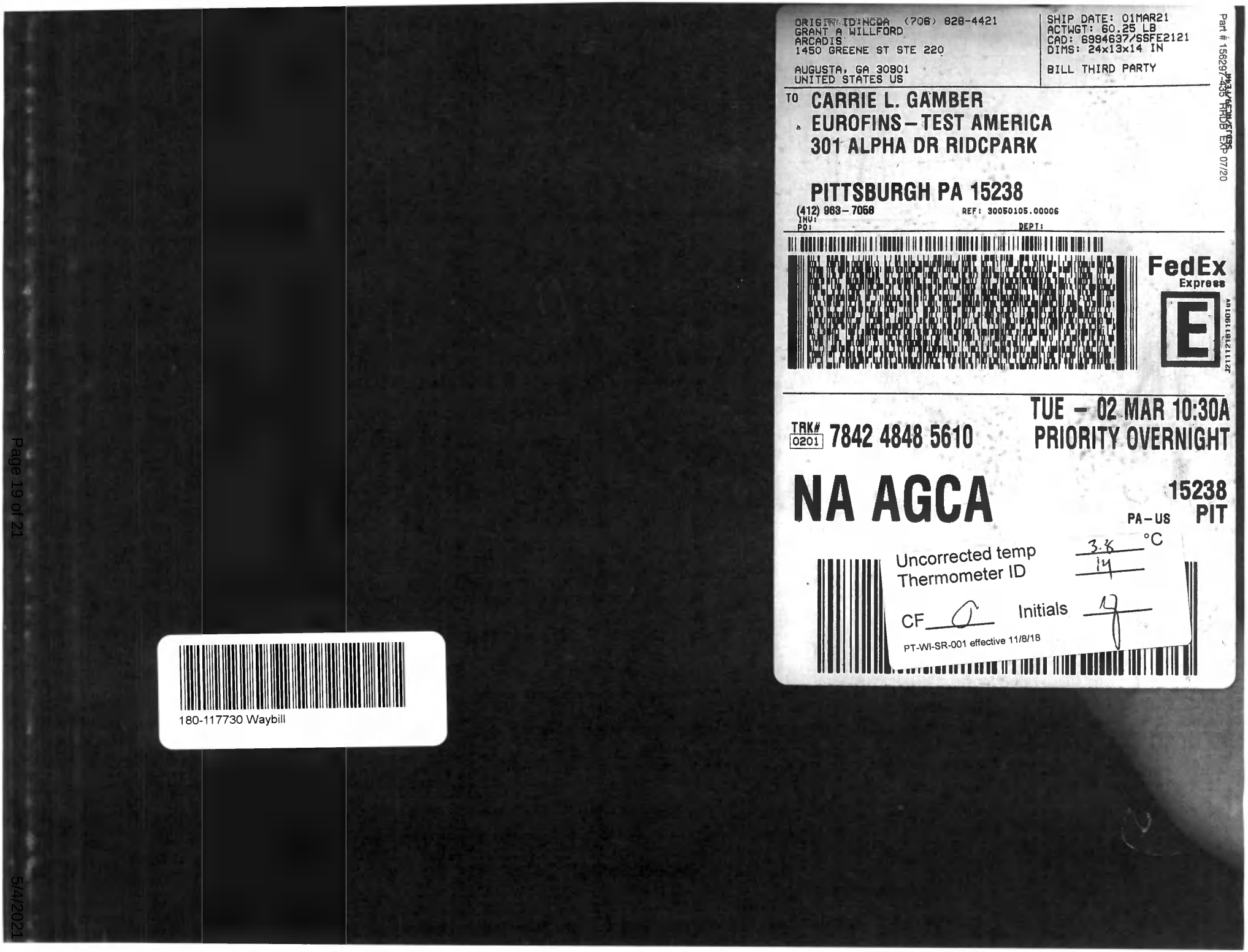
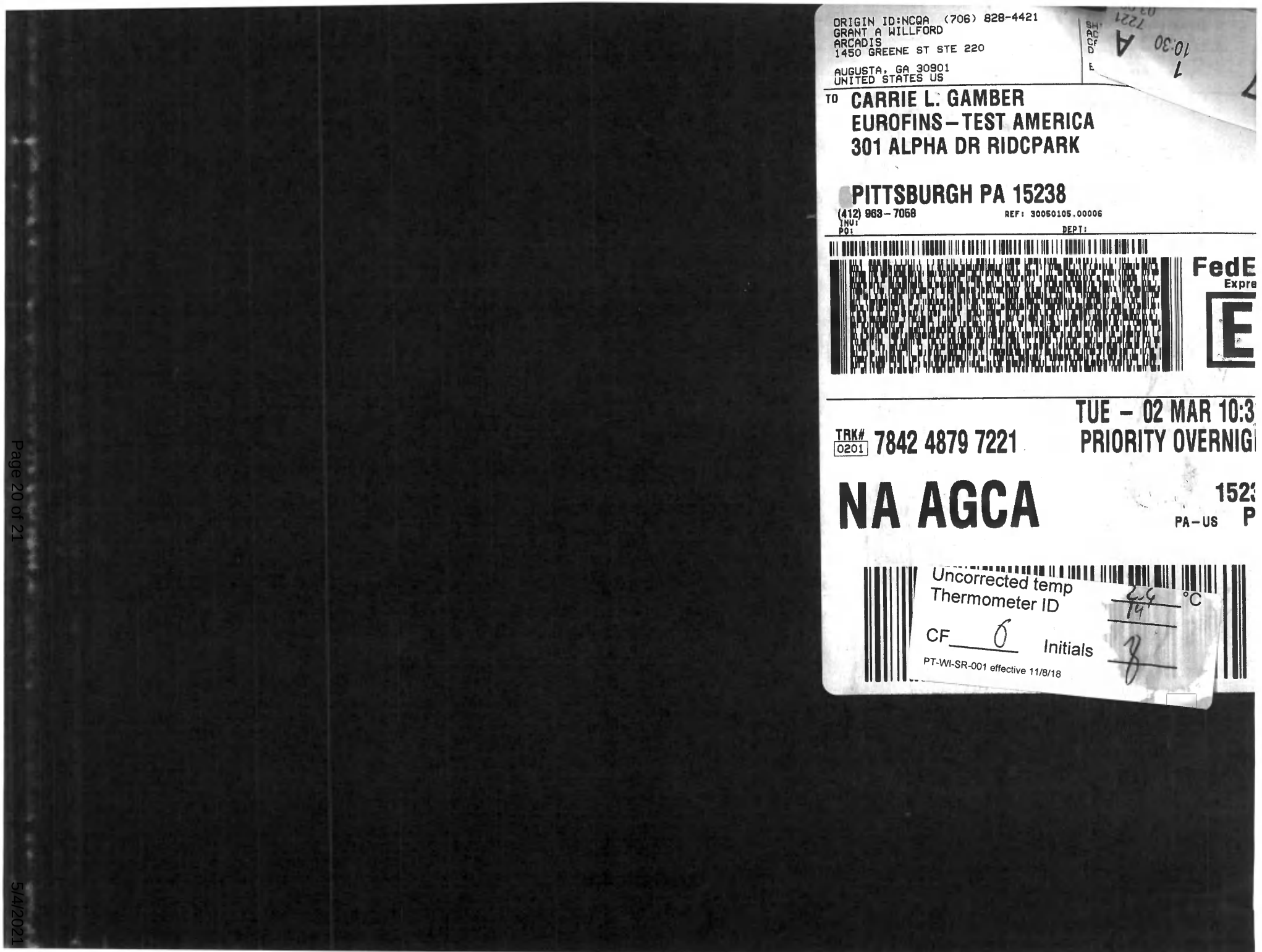

ORIGIN ID:NCGA (706) 828-4421
GRANT A WILLFORD
ARCADIS
1450 GREENE ST STE 220
AUGUSTA, GA 30901
UNITED STATES US
SHIP DATE: 01MAR21
ACTWGT: 60.25 LB
CAD: 6994637/SSFE2121
DIMS: 24x13x14 IN
BILL THIRD PARTY
TO CARRIE L. GAMBER
EUROFINS – TEST AMERICA
301 ALPHA DR RIDCPARK
PITTSBURGH PA 15238
(412) 963-7058
REF: 30050105.00006
INV:
PO:
DEPT:
FedEx
Express
TRK# 0201 7842 4848 5610
TUE – 02 MAR 10:30A
PRIORITY OVERNIGHT
NA AGCA
15238
PA-US
PIT
Uncorrected temp 3.8 °C
Thermometer ID 14
CF 0
Initials
PT-WI-SR-001 effective 11/8/18
180-117730 Waybill
Part # 156297-435 HRDB EXP 07/20
Page 19 of 21
5/4/2021


ORIGIN ID:NCQA (706) 828-4421
GRANT A WILLFORD
ARCADIS
1450 GREENE ST STE 220
AUGUSTA, GA 30901
UNITED STATES US
TO CARRIE L. GAMBER
EUROFINS – TEST AMERICA
301 ALPHA DR RIDCPARK
PITTSBURGH PA 15238
(412) 963-7058
REF: 30050105.00006
INV:
PO:
DEPT:
FedE
Expre
TUE – 02 MAR 10:3
TRK# 0201 7842 4879 7221
PRIORITY OVERNIG
NA AGCA
PA-US
Uncorrected temp
Thermometer ID
CF 6
Initials
°C
PT-WI-SR-001 effective 11/8/18

Login Sample Receipt Checklist

Client: ARCADIS U.S. Inc

Job Number: 180-117730-2

Login Number: 117730
List Number: 1
Creator: Abernathy, Eric

List Source: Eurofins TestAmerica, Pittsburgh

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.	True	
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	
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.	N/A	
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").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

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5755 8th Street East
Tacoma, WA 98424
Phone: (253) 922-2310

12 May 2021

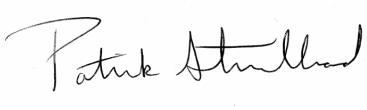
Margaret Gentile, PE, PhD
Arcadis - San Fransisco
100 Montgomery St., Suite 300
San Fransisco, CA 94104

RE: Arsenic SEP

Enclosed are the analytical results for samples received by Eurofins Frontier Global Sciences. All quality control measurements are within established control limits and there were no analytical difficulties encountered with the exception of those listed in the case narrative section of this report.

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

Sincerely,



Patrick Garcia-Strickland
Business Unit Manager

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Tacoma, WA 98424
Phone: (253) 922-2310

Arcadis - San Fransisco	Project: Arsenic SEP	
100 Montgomery St., Suite 300	Project Number: Arsenic SEP	**Reported:**
San Fransisco CA, 94104	Project Manager: Margaret Gentile, PE, PhD	12-May-21 17:33

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SB-14-S(17-19) F1	1C00067-01	Soil/Sediment	28-Feb-21 07:52	10-Mar-21 09:45
SB-14-S(17-19) F2	1C00067-02	Soil/Sediment	28-Feb-21 07:52	10-Mar-21 09:45
SB-14-S(17-19) F3	1C00067-03	Soil/Sediment	28-Feb-21 07:52	10-Mar-21 09:45
SB-14-S(17-19) F4	1C00067-04	Soil/Sediment	28-Feb-21 07:52	10-Mar-21 09:45
SB-14-S(17-19) F5	1C00067-05	Soil/Sediment	28-Feb-21 07:52	10-Mar-21 09:45
SB-14-S(22-24) F1	1C00067-06	Soil/Sediment	28-Feb-21 08:02	10-Mar-21 09:45
SB-14-S(22-24) F2	1C00067-07	Soil/Sediment	28-Feb-21 08:02	10-Mar-21 09:45
SB-14-S(22-24) F3	1C00067-08	Soil/Sediment	28-Feb-21 08:02	10-Mar-21 09:45
SB-14-S(22-24) F4	1C00067-09	Soil/Sediment	28-Feb-21 08:02	10-Mar-21 09:45
SB-14-S(22-24) F5	1C00067-10	Soil/Sediment	28-Feb-21 08:02	10-Mar-21 09:45

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Arcadis - San Fransisco	Project: Arsenic SEP	
100 Montgomery St., Suite 300	Project Number: Arsenic SEP	**Reported:**
San Fransisco CA, 94104	Project Manager: Margaret Gentile, PE, PhD	12-May-21 17:33

SAMPLE RECEIPT

Samples were received at Eurofins Frontier Global Sciences (EFGS) on 10-Mar-21 09:45. The samples were received intact, on-ice within a sealed cooler at

Cooler	Temp C°
Default Cooler	0.5

SAMPLE PREPARATION AND ANALYSIS

Total solids analysis was performed in accordance with method SM2540B. Total solids are prepared at the same time as the preparation for the analyte(s) of interest in order to provide the most accurate dry mass correction which may be outside of the method recommended holding time of 7 days from sample collection.

SSE extractes were prepared according to Paul et al 2008. Arsenic and iron analysis on the extracts was performed by inductively coupled plasma mass spectrometry (ICP-MS) in accordance with EFGS-054, a modified EPA 1638.

ANALYTICAL AND QUALITY CONTROL ISSUES

Method blanks were prepared for every preparation to assess possible blank contribution from the sample preparation procedure. The method blanks were carried through the entire analytical procedure. All blanks fell within the established acceptance criteria with the exception of any items narrated above or flagged and described in the notes and definitions section of the report.

Liquid spikes, certified reference material (CRM) or a quality control samples (QCS) were prepared for every preparation as a measure of accuracy. All liquid spikes, CRMs and/or QCS samples fell within the established acceptance criteria with the exception of any items narrated above or flagged and described in the notes and definitions section of the report.

As an additional measure of the accuracy of the methods used and to check for matrix interference, matrix spikes (MS) and matrix spike duplicates (MSD) were digested and analyzed. All of the matrix spike recoveries fell within the established acceptance criteria with the exception of any items flagged and described in the notes and definitions section of the report.

A reasonable measure of the precision of the analytical methods is the relative percent difference (RPD) between a matrix spike recovery and a matrix spike duplicate recovery and between laboratory control sample recovery and laboratory control sample duplicate recoveries.

Eurofins Frontier Global Sciences, LLC

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Patrick Garcia-Strickland, Business Unit Manager

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Arcadis - San Fransisco	Project:	Arsenic SEP	
100 Montgomery St., Suite 300	Project Number:	Arsenic SEP	**Reported:**
San Fransisco CA, 94104	Project Manager:	Margaret Gentile, PE, PhD	12-May-21 17:33

All of the relative percent differences fell within established acceptance criteria with the exception of any items flagged and described in the notes and definitions section of the report.

Eurofins Frontier Global Sciences, LLC

Patrick Garcia-Strickland, Business Unit Manager

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Sample Receipt Checklist

Client: Arcadis Date & Time Received: 3/10/21 9:45 Date Labeled: 3/10/21 Labeled By: [illegible]

Matrix: Water Soil / Sed Received By: [illegible] Label Verified By: [illegible] 3/10/21

# of Coolers Received: 1 Samples Arrived By: X Shipping Service ____ Courier ____ Hand ____ Other (Specify:__________)

Coolant: ☐ None/Ambient ☒ Loose Ice ☐ Gel Ice ☐ Dry Ice Coolant Required: Y / N Temp Blank Used: Y/N (N circled) for Cooler(s):________

Notify Project Manager if packages/coolers are received without coolant or with thawed coolant and at a temperature in excess of 6°C. PM notified: Y/N (N circled)

Samples from Wisconsin have special requirements. Shipment received includes samples from Wisconsin: Y/N (N circled)

Cooler Information:	Y/N/NA	Comments
The coolers do not appear to be tampered with:	Y	
Custody Seals are present and intact:	Y	
Custody seals signed:	Y	

TID: [illegible] CF: 0.6 °C		Date/time: 3/10/21 9:45 By: [illegible]	
Cooler 1: -0.1 °C	w/ CF: 0.5 °C	Cooler 4: °C	w/ CF: °C
Cooler 2: °C	w/ CF: °C	Cooler 5: °C	w/ CF: °C
Cooler 3: °C	w/ CF: °C	Cooler 6: °C	w/ CF: °C

Chain of Custody:	Y/N/NA	Comments
Sample ID/Description:	Y	
Date and time of collection:	Y	
Sampled by:	N	
Preservation type:	NA	
Requested analyses:	Y	
Required signatures:	Y	
Internal COC required:	NA	

Sample Condition/Integrity:	Y/N/NA	Comments
Sample containers intact/present:	Y	
Sample labels are present and legible:	Y	
Sample ID on container/bag matches COC:	Y	
Correct sample containers used:	Y	
Samples received within holding times:	Y	
Sample volume sufficient for requested analyses:	Y	
Correct preservative used for requested analyses:	Y	

1C00067

Anomalies/Non-conformances (attach additional pages if needed):

Eurofins Frontier
5755 8th St E
Fife, WA 98424
Phone (206) 351-9522

Chain of Custody Record

eurofins Environment Testing America

Client Information	Sampler:	Lab PM: Patrick Garcia-Strickland	Carrier Tracking No(s):	COC No: 180-68312-13475.7
Client Contact: Margaret Gentile	Phone:	E-Mail: Patrick.Garcia-Strickland@eurofinset.com	State of Origin:	Page: Page 1 of 1
Company: ARCADIS U.S. Inc	PWSID:			Job #:
Address: 320 Commerce Suite 200	Due Date Requested:			
City: Irvine	TAT Requested (days):			
State, Zip: CA, 92602	Compliance Project: Δ Yes Δ No			
Phone: 518-250-7389(Tel)	PO #: 30050105.00006			
Email: Margaret.Gentile@arcadis.com	WO #:			
Project Name: Plant McManus (AVS/SEM)	Project #:			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	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 (Yes or No)	Perform MS/MSD (Yes or No)	SEP Metals	Total Number of containers	Special Instructions/Note:
			Preservation Code:						
SB-14-S(17-19)	2/28/21	0752					X		SHIP TO FRONTIER, address above
SB-14-S(22-24)	2/28/21	0802					X		SHIP TO FRONTIER, address above

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: 1689 5707 7585

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	3/9/21 1700			3/10/21 9:45	
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

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Phone: (253) 922-2310

Arcadis - San Fransisco	Project: Arsenic SEP	
100 Montgomery St., Suite 300	Project Number: Arsenic SEP	**Reported:**
San Fransisco CA, 94104	Project Manager: Margaret Gentile, PE, PhD	12-May-21 17:33

% Solids

Sample Name	Lab Number	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
Sample Preparation: EFGS SOP5133 Solids Analysis												
SB-14-S(17-19) F1	**1C00067-01**	**70.6**	-	0.1	% by Weight	1	F105441	10-May-21		11-May-21	SM 2540B	O-04, O-09
SB-14-S(17-19) F2	**1C00067-02**	**70.6**	-	0.1	% by Weight	1	F105441	10-May-21		12-May-21	SM 2540B	O-04, O-09
SB-14-S(17-19) F3	**1C00067-03**	**70.6**	-	0.1	% by Weight	1	F105441	10-May-21		12-May-21	SM 2540B	O-04, O-09
SB-14-S(17-19) F4	**1C00067-04**	**70.6**	-	0.1	% by Weight	1	F105441	10-May-21		12-May-21	SM 2540B	O-04, O-09
SB-14-S(17-19) F5	**1C00067-05**	**70.6**	-	0.1	% by Weight	1	F105441	10-May-21		12-May-21	SM 2540B	O-04, O-09
SB-14-S(22-24) F1	**1C00067-06**	**80.2**	-	0.1	% by Weight	1	F105441	10-May-21		11-May-21	SM 2540B	O-04, O-09
SB-14-S(22-24) F2	**1C00067-07**	**80.2**	-	0.1	% by Weight	1	F105441	10-May-21		12-May-21	SM 2540B	O-04, O-09
SB-14-S(22-24) F3	**1C00067-08**	**80.2**	-	0.1	% by Weight	1	F105441	10-May-21		12-May-21	SM 2540B	O-04, O-09
SB-14-S(22-24) F4	**1C00067-09**	**80.2**	-	0.1	% by Weight	1	F105441	10-May-21		12-May-21	SM 2540B	O-04, O-09
SB-14-S(22-24) F5	**1C00067-10**	**80.2**	-	0.1	% by Weight	1	F105441	10-May-21		12-May-21	SM 2540B	O-04, O-09

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Patrick Garcia-Strickland, Business Unit Manager

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Arcadis - San Fransisco	Project: Arsenic SEP	
100 Montgomery St., Suite 300	Project Number: Arsenic SEP	**Reported:**
San Fransisco CA, 94104	Project Manager: Margaret Gentile, PE, PhD	12-May-21 17:33

Arsenic

Sample Name	Lab Number	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
Sample Preparation: Miscellaneous Preparation ICPMS												
SB-14-S(17-19) F1	**1C00067-01**	**2.22**	-	0.34	mg/kg dry	1	F105424	05-May-21	1E12021	11-May-21	EPA 1638 Mod	
SB-14-S(17-19) F2	**1C00067-02**	**0.89**	-	0.17	mg/kg dry	1	F105425	06-May-21	1E12021	12-May-21	EPA 1638 Mod	
SB-14-S(17-19) F3	1C00067-03	ND	-	1.71	mg/kg dry	1	F105430	07-May-21	1E12021	12-May-21	EPA 1638 Mod	U
SB-14-S(17-19) F4	**1C00067-04**	**0.35**	-	0.34	mg/kg dry	1	F105434	07-May-21	1E12021	12-May-21	EPA 1638 Mod	
SB-14-S(17-19) F5	**1C00067-05**	**0.82**	-	0.17	mg/kg dry	1	F105435	10-May-21	1E12021	12-May-21	EPA 1638 Mod	
SB-14-S(22-24) F1	**1C00067-06**	**1.14**	-	0.30	mg/kg dry	1	F105424	05-May-21	1E12021	12-May-21	EPA 1638 Mod	
SB-14-S(22-24) F2	**1C00067-07**	**0.90**	-	0.15	mg/kg dry	1	F105425	06-May-21	1E12021	12-May-21	EPA 1638 Mod	
SB-14-S(22-24) F3	1C00067-08	ND	-	1.52	mg/kg dry	1	F105430	07-May-21	1E12021	12-May-21	EPA 1638 Mod	U
SB-14-S(22-24) F4	1C00067-09	ND	-	0.30	mg/kg dry	1	F105434	07-May-21	1E12021	12-May-21	EPA 1638 Mod	U
SB-14-S(22-24) F5	**1C00067-10**	**0.57**	-	0.15	mg/kg dry	1	F105435	10-May-21	1E12021	12-May-21	EPA 1638 Mod	

Eurofins Frontier Global Sciences, LLC

Patrick Garcia-Strickland, Business Unit Manager

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Arcadis - San Fransisco	Project: Arsenic SEP	
100 Montgomery St., Suite 300	Project Number: Arsenic SEP	**Reported:**
San Fransisco CA, 94104	Project Manager: Margaret Gentile, PE, PhD	12-May-21 17:33

Iron

Sample Name	Lab Number	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
Sample Preparation: Miscellaneous Preparation ICPMS												
SB-14-S(17-19) F1	**1C00067-01**	**370**	-	17	mg/kg dry	1	F105424	05-May-21	1E12021	11-May-21	EPA 1638 Mod	
SB-14-S(17-19) F2	**1C00067-02**	**773**	-	17	mg/kg dry	1	F105425	06-May-21	1E12021	12-May-21	EPA 1638 Mod	
SB-14-S(17-19) F3	**1C00067-03**	**602**	-	34	mg/kg dry	1	F105430	07-May-21	1E12021	12-May-21	EPA 1638 Mod	
SB-14-S(17-19) F4	**1C00067-04**	**226**	-	17	mg/kg dry	1	F105434	07-May-21	1E12021	12-May-21	EPA 1638 Mod	
SB-14-S(17-19) F5	**1C00067-05**	**1750**	-	86	mg/kg dry	1	F105435	10-May-21	1E12021	12-May-21	EPA 1638 Mod	
SB-14-S(22-24) F1	**1C00067-06**	**51**	-	15	mg/kg dry	1	F105424	05-May-21	1E12021	12-May-21	EPA 1638 Mod	
SB-14-S(22-24) F2	**1C00067-07**	**808**	-	15	mg/kg dry	1	F105425	06-May-21	1E12021	12-May-21	EPA 1638 Mod	
SB-14-S(22-24) F3	**1C00067-08**	**546**	-	30	mg/kg dry	1	F105430	07-May-21	1E12021	12-May-21	EPA 1638 Mod	
SB-14-S(22-24) F4	**1C00067-09**	**197**	-	15	mg/kg dry	1	F105434	07-May-21	1E12021	12-May-21	EPA 1638 Mod	
SB-14-S(22-24) F5	**1C00067-10**	**1360**	-	76	mg/kg dry	1	F105435	10-May-21	1E12021	12-May-21	EPA 1638 Mod	

Eurofins Frontier Global Sciences, LLC

Patrick Garcia-Strickland, Business Unit Manager

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Arcadis - San Fransisco	Project: Arsenic SEP	
100 Montgomery St., Suite 300	Project Number: Arsenic SEP	**Reported:**
San Fransisco CA, 94104	Project Manager: Margaret Gentile, PE, PhD	12-May-21 17:33

Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch F105424 - Miscellaneous Preparation ICPMS											
Blank (F105424-BLK1)					Prepared: 05-May-21 Analyzed: 11-May-21						
Iron	ND	-	10	mg/kg wet							U
Arsenic	ND	-	0.20	mg/kg wet							U
Blank (F105424-BLK2)					Prepared: 05-May-21 Analyzed: 11-May-21						
Iron	ND	-	10	mg/kg wet							U
Arsenic	ND	-	0.20	mg/kg wet							U
Blank (F105424-BLK3)					Prepared: 05-May-21 Analyzed: 11-May-21						
Iron	ND	-	10	mg/kg wet							U
Arsenic	ND	-	0.20	mg/kg wet							U
Batch F105425 - Miscellaneous Preparation ICPMS											
Blank (F105425-BLK1)					Prepared: 06-May-21 Analyzed: 12-May-21						
Iron	ND	-	10	mg/kg wet							U
Arsenic	ND	-	0.10	mg/kg wet							U
Blank (F105425-BLK2)					Prepared: 06-May-21 Analyzed: 12-May-21						
Iron	ND	-	10	mg/kg wet							U
Arsenic	ND	-	0.10	mg/kg wet							U
Blank (F105425-BLK3)					Prepared: 06-May-21 Analyzed: 12-May-21						
Iron	ND	-	10	mg/kg wet							U
Arsenic	ND	-	0.10	mg/kg wet							U
Batch F105430 - Miscellaneous Preparation ICPMS											
Blank (F105430-BLK1)					Prepared: 07-May-21 Analyzed: 12-May-21						
Iron	ND	-	20	mg/kg wet							U
Arsenic	ND	-	1.00	mg/kg wet							U

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100 Montgomery St., Suite 300	Project Number: Arsenic SEP	**Reported:**
San Fransisco CA, 94104	Project Manager: Margaret Gentile, PE, PhD	12-May-21 17:33

Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch F105430 - Miscellaneous Preparation ICPMS											
Blank (F105430-BLK2)					Prepared: 07-May-21 Analyzed: 12-May-21						
Iron	ND	-	20	mg/kg wet							U
Arsenic	ND	-	1.00	mg/kg wet							U
Blank (F105430-BLK3)					Prepared: 07-May-21 Analyzed: 12-May-21						
Iron	ND	-	20	mg/kg wet							U
Arsenic	ND	-	1.00	mg/kg wet							U
Batch F105434 - Miscellaneous Preparation ICPMS											
Blank (F105434-BLK1)					Prepared: 07-May-21 Analyzed: 12-May-21						
Iron	ND	-	10	mg/kg wet							U
Arsenic	ND	-	0.20	mg/kg wet							U
Blank (F105434-BLK2)					Prepared: 07-May-21 Analyzed: 12-May-21						
Iron	ND	-	10	mg/kg wet							U
Arsenic	ND	-	0.20	mg/kg wet							U
Blank (F105434-BLK3)					Prepared: 07-May-21 Analyzed: 12-May-21						
Iron	ND	-	10	mg/kg wet							U
Arsenic	ND	-	0.20	mg/kg wet							U
Batch F105435 - Miscellaneous Preparation ICPMS											
Blank (F105435-BLK1)					Prepared: 10-May-21 Analyzed: 12-May-21						
Iron	ND	-	50	mg/kg wet							U
Arsenic	ND	-	0.10	mg/kg wet							U

Eurofins Frontier Global Sciences, LLC

Patrick Garcia-Strickland, Business Unit Manager

The results in this report only apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

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Tacoma, WA 98424
Phone: (253) 922-2310

Arcadis - San Fransisco	Project: Arsenic SEP	
100 Montgomery St., Suite 300	Project Number: Arsenic SEP	**Reported:**
San Fransisco CA, 94104	Project Manager: Margaret Gentile, PE, PhD	12-May-21 17:33

Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch F105435 - Miscellaneous Preparation ICPMS											
Blank (F105435-BLK2)					Prepared: 10-May-21 Analyzed: 12-May-21						
Iron	ND	-	50	mg/kg wet							U
Arsenic	ND	-	0.10	mg/kg wet							U
Blank (F105435-BLK3)					Prepared: 10-May-21 Analyzed: 12-May-21						
Iron	ND	-	50	mg/kg wet							U
Arsenic	ND	-	0.10	mg/kg wet							U
LCS (F105435-BS1)					Prepared: 10-May-21 Analyzed: 12-May-21						
Iron	162	-	50	mg/kg wet	125.00		130	70-130			
Arsenic	5.11	-	0.10	mg/kg wet	5.0000		102	75-125			
LCS Dup (F105435-BSD1)					Prepared: 10-May-21 Analyzed: 12-May-21						
Iron	117	-	50	mg/kg wet	125.00		93.5	70-130	32.5	35	
Arsenic	5.17	-	0.10	mg/kg wet	5.0000		103	75-125	1.20	20	

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Patrick Garcia-Strickland, Business Unit Manager

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Phone: (253) 922-2310

Arcadis - San Fransisco	Project: Arsenic SEP	
100 Montgomery St., Suite 300	Project Number: Arsenic SEP	**Reported:**
San Fransisco CA, 94104	Project Manager: Margaret Gentile, PE, PhD	12-May-21 17:33

Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch F105441 - EFGS SOP5133 Solids Analysis											
Duplicate (F105441-DUP1)		**Source: 1C00067-01**		Prepared & Analyzed: 11-May-21							
% Solids	76.5	-	0.1	% by Weight		70.6			8.02	10	

Eurofins Frontier Global Sciences, LLC

Patrick Garcia-Strickland, Business Unit Manager

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Phone: (253) 922-2310

Arcadis - San Fransisco	Project: Arsenic SEP	
100 Montgomery St., Suite 300	Project Number: Arsenic SEP	**Reported:**
San Fransisco CA, 94104	Project Manager: Margaret Gentile, PE, PhD	12-May-21 17:33

Notes and Definitions

U	Analyte was not detected and is reported as less than the LOD or as defined by the client. The LOD has been adjusted for any dilution or concentration of the sample.
O-09	Total Solids are prepared at the same time as the preparation for the analyte(s) of interest in order to provide the most accurate dry mass correction.
O-04	This sample was analyzed outside of the recommended holding time.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

Eurofins Frontier Global Sciences, LLC

Patrick Garcia-Strickland, Business Unit Manager

The results in this report only apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Quantitative X-Ray Diffraction by Rietveld Refinement

Report Prepared for:	*Arcadis US Inc*
Project Number/ LIMS No.	*18437-01/MI4524-MAR21*
Sample Receipt:	*March 20, 2021*
Sample Analysis:	*March 25, 2021*
Reporting Date:	*April 8, 2021*

Instrument:	BRUKER AXS D8 Advance Diffractometer
Test Conditions:	Co radiation, 35 kV, 40 mA Regular Scanning: Step: 0.02°, Step time: 1s, 2θ range: 3-80°
Interpretations :	PDF2/PDF4 powder diffraction databases issued by the International Center for Diffraction Data (ICDD). DiffracPlus Eva and Topas software.
Detection Limit :	0.5-2%. Strongly dependent on crystallinity.

Contents:

Kim Gibbs, H.B.Sc., P.Geo.
Senior Mineralogist

Huyun Zhou, Ph.D., P.Geo.
Senior Mineralogist

ACCREDITATION: SGS Minerals Services Lakefield is accredited to the requirements of ISO/IEC 17025 for specific tests as listed on our scope of accreditation, including geochemical, mineralogical and trade mineral tests. To view a list of the accredited methods, please visit the following website and search SGS Canada - Minerals Services - Lakefield: http://palcan.scc.ca/SpecsSearch/GLSearchForm.do.

Method Summary

The Rietveld Method of Mineral Identification by XRD (ME-LR-MIN-MET-MN-D05) method used by SGS Minerals Services is accredited to the requirements of ISO/IEC 17025.

Mineral Identification and Interpretation:

Mineral identification and interpretation involves matching the diffraction pattern of an unknown material to patterns of single-phase reference materials. The reference patterns are compiled by the Joint Committee on Powder Diffraction Standards - International Center for Diffraction Data (JCPDS-ICDD) database and released on software as Powder Diffraction Files (PDF).

Interpretations do not reflect the presence of non-crystalline and/or amorphous compounds, except when internal standards have been added by request. Mineral proportions may be strongly influenced by crystallinity, crystal structure and preferred orientations. Mineral or compound identification and quantitative analysis results should be accompanied by supporting chemical assay data or other additional tests.

Quantitative Rietveld Analysis:

Quantitative Rietveld Analysis is performed by using Topas 4.2 (Bruker AXS), a graphics based profile analysis program built around a non-linear least squares fitting system, to determine the amount of different phases present in a multicomponent sample. Whole pattern analyses are predicated by the fact that the X-ray diffraction pattern is a total sum of both instrumental and specimen factors. Unlike other peak intensity-based methods, the Rietveld method uses a least squares approach to refine a theoretical line profile until it matches the obtained experimental patterns.

Rietveld refinement is completed with a set of minerals specifically identified for the sample. Zero values indicate that the mineral was included in the refinement calculations, but the calculated concentration was less than 0.05wt%. Minerals not identified by the analyst are not included in refinement calculations for specific samples and are indicated with a dash.

Summary of Rietveld Quantitative Analysis X-Ray Diffraction Results

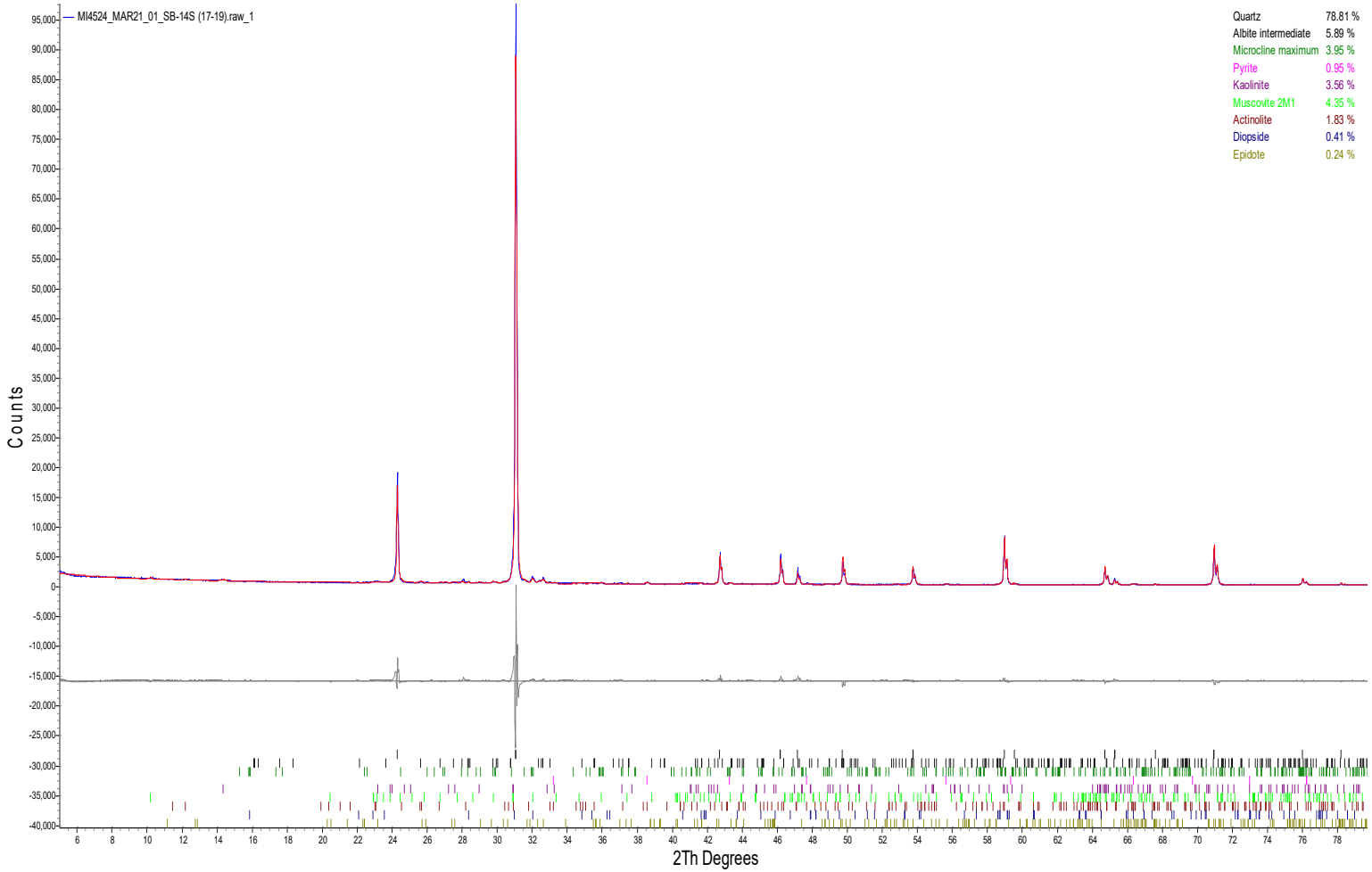
Mineral/Compound	SB-14S (17-19) MAR4524-1 (wt %)	SB-14S (22-24) MAR4524-2 (wt %)
Quartz	78.8	87.9
Plagioclase	5.90	4.40
Potassium-feldspar	3.95	3.02
Pyrite	0.95	0.23
Kaolinite	3.56	0.65
Muscovite	4.35	1.53
Actinolite	1.83	1.52
Diopside	0.41	0.39
Epidote	0.24	0.34
TOTAL	100	100

The weight percent quantities indicated have been normalized to a sum of 100%.

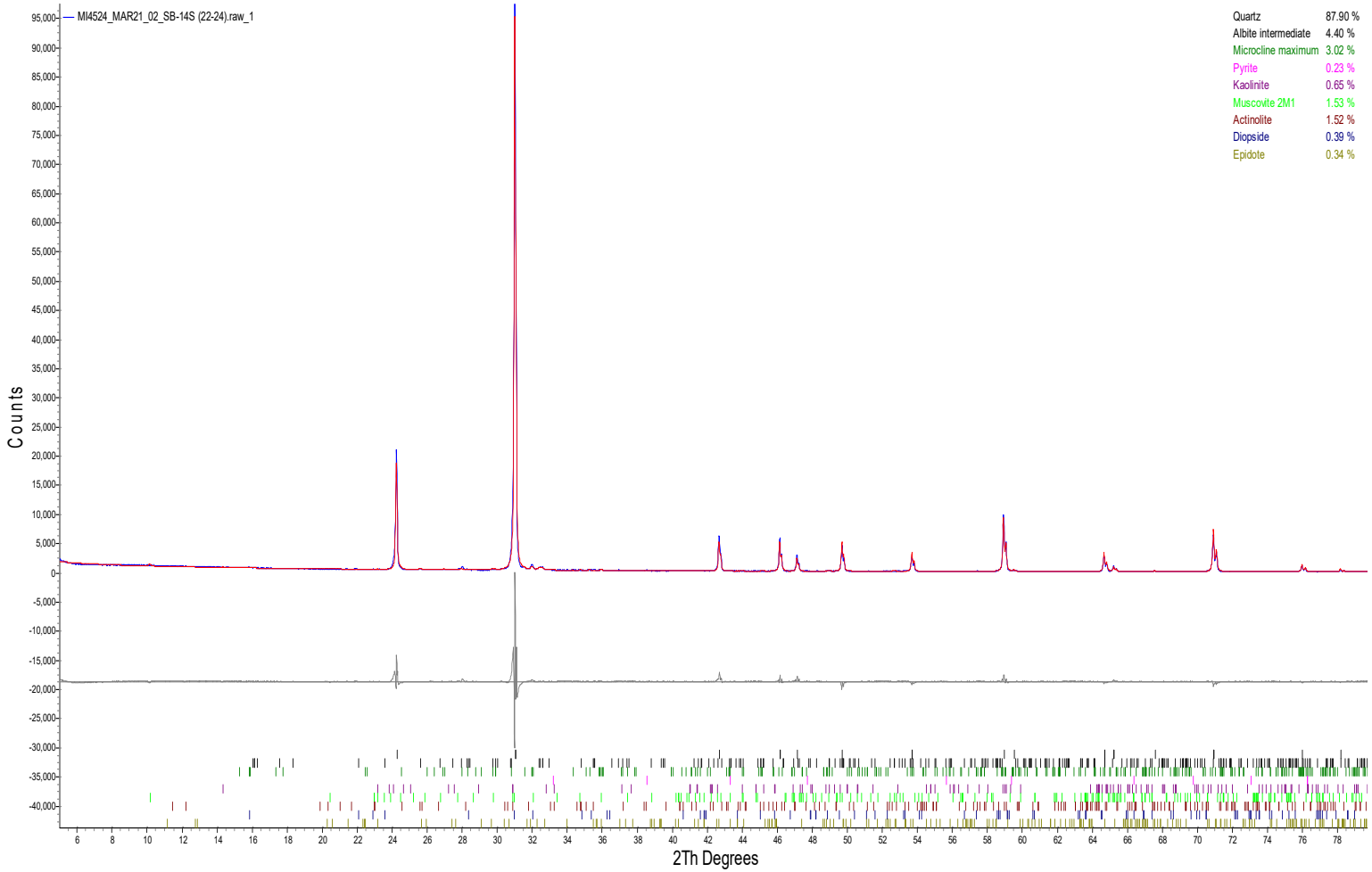
The quantity of amorphous material has not been determined.

Mineral/Compound	Formula
Quartz	SiO_2
Plagioclase	$(NaSi,CaAl)AlSi_2O_8$
Potassium-feldspar	$KAlSi_3O_8$
Pyrite	FeS_2
Kaolinite	$Al_2Si_2O_5(OH)_4$
Muscovite	$KAl_2(AlSi_3O_{10})(OH)_2$
Actinolite	$Ca_2(Mg,Fe)_5Si_8O_{22}(OH)_2$
Diopside	$CaMgSi_2O_6$
Epidote	$Ca_2(Al,Fe)Al_2O(SiO_4)(Si_2O_7)(OH)$

SB-14S (17-19)


MI4524_MAR21_01_SB-14S (17-19).raw_1
Quartz 78.81 %
Albite intermediate 5.89 %
Microcline maximum 3.95 %
Pyrite 0.95 %
Kaolinite 3.56 %
Muscovite 2M1 4.35 %
Actinolite 1.83 %
Diopside 0.41 %
Epidote 0.24 %
Counts
2Th Degrees

SB-14S (22-24)


MI4524_MAR21_02_SB-14S (22-24).raw_1
Counts
2Th Degrees
Quartz 87.90 %
Albite intermediate 4.40 %
Microcline maximum 3.02 %
Pyrite 0.23 %
Kaolinite 0.65 %
Muscovite 2M1 1.53 %
Actinolite 1.52 %
Diopside 0.39 %
Epidote 0.34 %

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

May 06, 2021

Joju Abraham
Georgia Power-CCR
2480 Maner Road
Atlanta, GA 30339

RE: Project: MCMANUS AS SPECIATION
Pace Project No.: 92532216

Dear Joju Abraham:

Enclosed are the analytical results for sample(s) received by the laboratory on April 08, 2021. 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.

Some analyses were subcontracted outside of the Pace Network. The test report from the external subcontractor is attached to this report in its entirety.

The test results provided in this final report were generated by each of the following laboratories within the Pace Network:

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: Joe Booth, Resolute Environmental & Water Resources
Trent Godwin, Resolute Environmental & Water Resources
Kristen Jurinko
Ms. Lauren Petty, Southern Company
Kevin Stephenson, Resolute Environmental & Water Resources Consulting, LLC
Stephen Wilson, Resolute Environmental & Water Resources Consulting, LLC

REPORT OF LABORATORY ANALYSIS

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

SAMPLE SUMMARY

Project: MCMANUS AS SPECIATION
Pace Project No.: 92532216

Lab ID	Sample ID	Matrix	Date Collected	Date Received
92532216001	**MCM-07**	Water	04/06/21 09:44	04/08/21 00:00
92532216002	**RW-9**	Water	04/06/21 09:50	04/08/21 00:00
92532216003	**MCM-06**	Water	04/06/21 11:02	04/08/21 00:00
92532216004	**MCM-05**	Water	04/06/21 12:22	04/08/21 00:00
92532216005	**DUP-1**	Water	04/06/21 00:00	04/08/21 00:00

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: ______ *Date:* ______
Work Order ID: ______ *Time:* ______
Project ID: ______

Client: Pace Labs
Contact: Kevin Herring
Client Project ID: SCS/EPC McManus
Samples Collected By: Trent Godwin/William Lankee/Stephen Wilson Resolute Environmental
PO Number:
Phone: 704-977-0945
Email: Kevin.Herring@pacelabs.com
Mailing Address: 9800 Kincey Ave, Ste 100 Huntersville, NC 28078
Email Receipt Confirmation? (Yes/No) — Yes circled
BAL PM: Amy Goodall
Brooks project ID: PAC-HN2007

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 (10ml Vacutainer)	Field Filtered? (Yes/No)	Preservation Type HCl/HNO3/Other	Total Hg, EPA 1631	Methyl Hg, EPA 1630	ICP-MS Metals (specify)	As Species (specify) InOrg, III, V, MMA, DMA and TAO species	Se Species (specify) Se(IV), Se(VI), SeCN, Uknown	Filtration	Other (specify)	Other (specify)	Comments: Specify Here
1	MCM-07	4/6/21	0944	Groundwater GW	2	Yes					✓					As(III), As(V), MMA, DMA and TAO species
2	RW-9	↓	0950	↓	↓	↓					✓					↓
3	MCM-06	↓	1102	↓	↓	↓					✓					↓
4	MCM-05	↓	1222	↓	↓	↓					✓					↓
5	DUP-1	↓	—	↓	↓	↓					✓					↓
6																
7																
8																
9																
10																
	Temperature ~~Trip~~ Blank	—	—	water	1											

WO#: 92532216
92532216

Relinquished By: [signature]	Date: 4/6/21	Time: 1425	Relinquished By:	Date:	Time:
Received By:	Date:	Time:	Total Number of Packages:		

Page 1 of 1 List Hazardous Contaminants: Arsenic

BROOKS APPLIED LABS
18804 North Creek Parkway, Ste 100, Bothell, WA 98011 • USA • T: 206 632 6206 F: 206 632 6017 • info@brooksapplied.com

May 5, 2021

Pace Analytical Services – Huntersville
ATTN: Kevin Herring
9800 Kincey Ave., Suite 100
Huntersville, NC 28078
Kevin.Herring@pacelabs.com

RE: Project PAC-HN2007-R Client Project: 92532216

Dear Kevin Herring,

On April 7, 2020, Brooks Applied Labs (BAL) received five (5) water samples at a temperature of 4.7°C. The samples were logged-in for the analysis of Arsenic Speciation (arsenite [*As(III)*], arsenate [*As(V)*], monomethylarsonic acid [*MMAs*], dimethylarsinic acid [*DMAs*], and thioarsenicals) per the chain-of-custody (COC). The client directly filtered (0.45µm) each sample into an evacuated container prior to receipt at BAL. All samples were stored according to BAL SOPs and EPA methodology.

Arsenic Speciation by IC-ICP-CRC-MS
Arsenic speciation was performed by ion chromatography inductively coupled plasma collision reaction cell mass spectrometry (IC-ICP-CRC-MS). Arsenic species are first chromatographically separated on an ion exchange column and then quantified using inductively coupled plasma collision reaction cell mass spectrometry (ICP-CRC-MS). For more information on this determinative technique, please visit the Interference Reduction Technology section on our website.

In accordance with the client's request, thioarsenical "standards" were synthesized from MMAs, DMAs, and arsenite and then characterized for their sulfur-to-arsenic (S/As) ratios by IC-ICP-CRC-MS. MMAs and DMAs each yielded only one primary thioarsenical species with S/As ratios of approximately 1, which were designated as ThioMMA and ThioDMA respectively. Arsenite yielded three thioarsenical species – designated as ThioAs1, ThioAs2, and ThioAs3 – that corresponded to S/As ratios of approximately 1, 2, or 3. Traces of a fourth unknown species were also observed in the latter solution, but chromatographic interference precluded its confirmation as a thioarsenical.

The characterized standards were analyzed alongside the submitted samples for identification of thioarsenical species by retention time matching. No traces of the ThioAs2 species were detected in any of the samples so that species was excluded from the report. ThioAs1 and ThioAs3 were detected in several of the samples, as summarized in the Sample Results section. While the current method could not differentiate whether these were trivalent or pentavalent species (i.e., thioarsenites or thioarsenates), the presented results confirm the presence of thioarsenicals in some of these groundwaters.

In instances where the native sample result and/or the associated duplicate (DUP) result were below the MDL the RPD was not calculated (**N/C**).

The 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.

It should be noted that all Brooks Applied Labs, LLC methods, standard operating procedures, inventions, ideas, processes, improvements, designs and techniques included or referred to therein, must be considered and treated as Proprietary Information, protected by the Washington State Trade Secret Act, RCW 19.108 et seq., and other laws. All Proprietary Information, written or implied, will not be distributed, copied, or altered in any fashion without prior written consent from Brooks Applied Labs, LLC. All Proprietary Information (including originals, copies, summaries or other reproductions thereof) shall remain the property of Brooks Applied Labs, LLC at all times and must be returned upon demand. Furthermore, products presented in this document may be protected by Federal Patent laws and infringement will be subject to prosecution in accordance with Title 35 US Code 271.

All data was reported without further qualification and all other 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 us if you have any questions regarding this report.

Sincerely,

Amy Goodall
Project Manager
Brooks Applied Labs
amy@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/> or review Tables 1 and 2 in our Accreditation Information. 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	reference material
T	total fraction
TR	total recoverable fraction

Definition of Data Qualifiers

(Effective 3/23/2020)

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. Please see narrative for explanation.
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.
M	Duplicate precision (RPD) was not within acceptance criteria. Please see narrative for explanation.
N	Spike recovery was not within acceptance criteria. Please see narrative for explanation.
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.
Z	Holding time and/or preservation requirements not established for this method; however, BAL recommendations for holding time were not followed. Please see narrative for explanation.

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.

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Accreditation Information

Table 1. Accredited method/matrix/analytes for TNI

Issued by: State of Florida Dept. of Health (The NELAC Institute 2016 Standard)
Issued on: July 27, 2020; Valid to: June 30, 2021
Certificate Number: E87982-35

Method	Matrix	TNI Accredited Analyte(s)
EPA 1638	Non-Potable Waters	Ag, Cd, Cu, Ni, Pb, Sb, Se, Tl, Zn
EPA 200.8	Non-Potable Waters	Ag, Al, As, Ba, Be, Cd, Co, Cr, Cu, Mn, Mo, Ni, Pb, Sb, Se, Tl, U, V, Zn
EPA 6020	Non-Potable Waters	Ag, Al, As, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Mg, Mn, Mo, Ni, Pb, Sb, Se, Tl, U, V, Zn
	Solids/Chemicals & Biological	Ag, Al, As, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Mg, Mn, Mo, Ni, Pb, Sb, Se, Tl, V, Zn
BAL-5000	Non-Potable Waters	Ag, Al, As, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Mg, Mn, Mo, Ni, Pb, Sb, Se, Sn, Sr, Tl, U, V, Zn, Hardness
	Solids/Chemicals	Ag, As, B, Be, Cd, Co, Cr, Cu, Pb, Mo, Ni, Sb, Se, Sn, Sr, Tl, V, Zn
	Biological	Ag, Al, As, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Mg, Mn, Mo, Ni, Pb, Sb, Se, Sn, Tl, V, Zn
EPA 1640	Non-Potable Waters	Ag, As, Cd, Cu, Pb, Ni, Zn
EPA 1631E	Non-Potable Waters, Solids/Chemicals & Biological	Total Mercury
EPA 1630	Non-Potable Waters	Methyl Mercury
BAL-3200	Solids/Chemicals & Biological	Methyl Mercury
BAL-4100	Non-Potable Waters	As(III), As(V), DMAs, MMAs
BAL-4200	Non-Potable Waters	Se(IV), Se(VI)
BAL-4201	Non-Potable Waters	Se(IV), Se(VI)
BAL-4300	Non-Potable Waters Solid/Chemicals	Cr(VI)
SM2340B	Non-Potable Waters	Hardness

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Accreditation Information

Table 2. Accredited method/matrix/analytes for ISO (1), Non-Governmental TNI (2), and DoD/DOE (3)

Issued by: ANAB

Issued on: November 20, 2020; Valid to: March 20, 2022

Method	Matrix	ISO and Non-Gov. TNI Accredited Analyte(s)	DoD/DOE Accredited Analytes
EPA 1638 Mod EPA 200.8 Mod EPA 6020 Mod	Non-Potable Waters	Ag, Al, As, B, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Mg, Mn, Mo, Ni, Pb, Sb, Se, Sn, Sr, Tl, U, V, Zn	Ag, Al, As, Ba, Ca, Cd, Cr, Cu, Fe, Pb, Mg, Mn, Ni, Sb, Se, V, Zn
BAL-5000	Solids/Chemicals & Biological	Ag, Al, As, B, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Mg, Mn, Mo, Ni, Pb, Sb, Se, Sn, Sr, Tl, V, Zn Hg (Biological Only)	Not Accredited
EPA 1640 Mod	Non-Potable Waters	Ag, As, Cd, Cu, Pb, Ni, Zn Cr, Co, Se, Tl, V (ISO Only)	Not Accredited
EPA 1631E Mod BAL-3100 (waters)	Non-Potable Waters, Solids/Chemicals & Biological/Food	Total Mercury	Total Mercury
EPA 1630 Mod BAL-3200	Non-Potable Waters, Solids/Chemicals Biological	Methyl Mercury	Methyl Mercury (excluding Solids/Chemicals)
EPA 1632A Mod BAL-3300	Non-Potable Waters	Inorganic Arsenic, As(III) (ISO Only)	Not Accredited
	Biological/Food Solids/Chemicals	Inorganic Arsenic (ISO Only)	Not Accredited
AOAC 2015.01 Mod BAL-5000 by BAL-5040	Food	As, Cd, Hg, Pb	Not Accredited
BAL-4100	Non-Potable Waters	As(III), As(V), DMAs, MMAs	Not Accredited
	Biological by BAL-4115	Inorganic Arsenic, DMAs, MMAs (ISO Only)	Not Accredited
BAL-4101	Food by BAL-4116	Inorganic Arsenic, DMAs, MMAs (ISO Only)	Not Accredited
BAL-4201	Non-Potable Waters	Se(IV), Se(VI), SeCN, SeMet	Not Accredited
BAL-4300	Non-Potable Waters, Solid/Chemicals	Cr(VI)	Cr(VI)
SM 3500-Fe BAL-4500	Non-Potable Waters	Fe, Fe(II) (ISO Only)	Not Accredited
SM2340B	Non-Potable Waters	Hardness	Hardness
SM 2540G EPA 160.3 BAL-0501	Solids/Chemicals & Biological	% Dry Weight	% Dry Weight

(1) ISO/IEC 17025:2017 – Certificate Number ADE-1447.2

(2) Non-Governmental NELAC Institute 2016 Standard – Certificate Number ADE-1447.1

(3) Department of Defense/Energy Consolidated Quality Systems Manual v. 5.3 – Certificate Numbers ADE-1447 for DoD, ADE-1447.3 for DOE.

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Sample Information

Sample	Alias	Lab ID	Report Matrix	Type	Sampled	Received
MCM-07	92532216001	2104040-01	Water-D	Sample	04/06/2021	04/07/2021
RW-9	92532216002	2104040-02	Water-D	Sample	04/06/2021	04/07/2021
MCM-06	92532216003	2104040-03	Water-D	Sample	04/06/2021	04/07/2021
MCM-05	92532216004	2104040-04	Water-D	Sample	04/06/2021	04/07/2021
DUP-1	92532216005	2104040-05	Water-D	Sample	04/06/2021	04/07/2021

Batch Summary

Analyte	Lab Matrix	Method	Prepared	Analyzed	Batch	Sequence
As(III)	Water	SOP BAL-4100	04/28/2021	04/29/2021	B211087	S210479
As(V)	Water	SOP BAL-4100	04/28/2021	04/29/2021	B211087	S210479
DMAs	Water	SOP BAL-4100	04/28/2021	04/29/2021	B211087	S210479
MMAs	Water	SOP BAL-4100	04/28/2021	04/29/2021	B211087	S210479
ThioAs1	Water	IC-ICP-MS	04/28/2021	04/29/2021	B211087	S210479
ThioDMA	Water	IC-ICP-MS	04/28/2021	04/29/2021	B211087	S210479
ThioAs3	Water	IC-ICP-MS	04/28/2021	04/29/2021	B211087	S210479
ThioMMA	Water	IC-ICP-MS	04/28/2021	04/29/2021	B211087	S210479

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Sample Results

Sample	Analyte	Report Matrix	Basis	Result	Qualifier	MDL	MRL	Unit	Batch	Sequence
MCM-07, 92532216001										
2104040-01	As(III)	Water-D	D	≤ 0.400	U	0.400	2.10	µg/L	B211087	S210479
2104040-01	As(V)	Water-D	D	≤ 0.400	U	0.400	2.10	µg/L	B211087	S210479
2104040-01	DMAs	Water-D	D	≤ 0.500	U	0.500	2.10	µg/L	B211087	S210479
2104040-01	MMAs	Water-D	D	≤ 0.400	U	0.400	2.10	µg/L	B211087	S210479
2104040-01	ThioAs1	Water-D	D	9.35		0.500	2.10	µg/L	B211087	S210479
2104040-01	ThioDMA	Water-D	D	≤ 0.500	U	0.500	2.10	µg/L	B211087	S210479
2104040-01	ThioAs3	Water-D	D	≤ 0.500	U	0.500	2.10	µg/L	B211087	S210479
2104040-01	ThioMMA	Water-D	D	≤ 0.500	U	0.500	2.10	µg/L	B211087	S210479
RW-9, 92532216002										
2104040-02	As(III)	Water-D	D	≤ 0.400	U	0.400	2.10	µg/L	B211087	S210479
2104040-02	As(V)	Water-D	D	≤ 0.400	U	0.400	2.10	µg/L	B211087	S210479
2104040-02	DMAs	Water-D	D	≤ 0.500	U	0.500	2.10	µg/L	B211087	S210479
2104040-02	MMAs	Water-D	D	≤ 0.400	U	0.400	2.10	µg/L	B211087	S210479
2104040-02	ThioAs1	Water-D	D	21.6		0.500	2.10	µg/L	B211087	S210479
2104040-02	ThioDMA	Water-D	D	≤ 0.500	U	0.500	2.10	µg/L	B211087	S210479
2104040-02	ThioAs3	Water-D	D	≤ 0.500	U	0.500	2.10	µg/L	B211087	S210479
2104040-02	ThioMMA	Water-D	D	≤ 0.500	U	0.500	2.10	µg/L	B211087	S210479
MCM-06, 92532216003										
2104040-03	As(III)	Water-D	D	2.92		0.400	2.10	µg/L	B211087	S210479
2104040-03	As(V)	Water-D	D	0.748	J	0.400	2.10	µg/L	B211087	S210479
2104040-03	DMAs	Water-D	D	≤ 0.500	U	0.500	2.10	µg/L	B211087	S210479
2104040-03	MMAs	Water-D	D	≤ 0.400	U	0.400	2.10	µg/L	B211087	S210479
2104040-03	ThioAs1	Water-D	D	312		0.500	2.10	µg/L	B211087	S210479
2104040-03	ThioDMA	Water-D	D	≤ 0.500	U	0.500	2.10	µg/L	B211087	S210479
2104040-03	ThioAs3	Water-D	D	6.49		0.500	2.10	µg/L	B211087	S210479
2104040-03	ThioMMA	Water-D	D	≤ 0.500	U	0.500	2.10	µg/L	B211087	S210479
MCM-05, 92532216004										
2104040-04	As(III)	Water-D	D	≤ 0.400	U	0.400	2.10	µg/L	B211087	S210479
2104040-04	As(V)	Water-D	D	≤ 0.400	U	0.400	2.10	µg/L	B211087	S210479
2104040-04	DMAs	Water-D	D	≤ 0.500	U	0.500	2.10	µg/L	B211087	S210479
2104040-04	MMAs	Water-D	D	≤ 0.400	U	0.400	2.10	µg/L	B211087	S210479
2104040-04	ThioAs1	Water-D	D	≤ 0.500	U	0.500	2.10	µg/L	B211087	S210479
2104040-04	ThioDMA	Water-D	D	≤ 0.500	U	0.500	2.10	µg/L	B211087	S210479
2104040-04	ThioAs3	Water-D	D	≤ 0.500	U	0.500	2.10	µg/L	B211087	S210479
2104040-04	ThioMMA	Water-D	D	≤ 0.500	U	0.500	2.10	µg/L	B211087	S210479

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Sample Results

Sample	Analyte	Report Matrix	Basis	Result	Qualifier	MDL	MRL	Unit	Batch	Sequence
DUP-1, 92532216005										
2104040-05	As(III)	Water-D	D	3.39		0.400	2.10	µg/L	B211087	S210479
2104040-05	As(V)	Water-D	D	0.503	J	0.400	2.10	µg/L	B211087	S210479
2104040-05	DMAs	Water-D	D	≤ 0.500	U	0.500	2.10	µg/L	B211087	S210479
2104040-05	MMAs	Water-D	D	≤ 0.400	U	0.400	2.10	µg/L	B211087	S210479
2104040-05	ThioAs1	Water-D	D	309		0.500	2.10	µg/L	B211087	S210479
2104040-05	ThioDMA	Water-D	D	≤ 0.500	U	0.500	2.10	µg/L	B211087	S210479
2104040-05	ThioAs3	Water-D	D	6.37		0.500	2.10	µg/L	B211087	S210479
2104040-05	ThioMMA	Water-D	D	≤ 0.500	U	0.500	2.10	µg/L	B211087	S210479

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Accuracy & Precision Summary

Batch: B211087
Lab Matrix: Water
Method: SOP BAL-4100

Sample	Analyte	Native	Spike	Result	Units	REC & Limits	RPD & Limits
B211087-BS1	**Blank Spike, (2104036)**						
	As(III)		5.150	4.580	µg/L	89% 75-125	
	As(V)		5.200	5.096	µg/L	98% 75-125	
	DMAs		5.210	5.102	µg/L	98% 75-125	
B211087-BS2	**Blank Spike, (2107001)**						
	MMAs		5.000	4.683	µg/L	94% 75-125	
B211087-DUP1	**Duplicate, (2104040-05)**						
	As(III)	3.395		3.374	µg/L		0.6% 25
	As(V)	0.503		0.520	µg/L		3% 25
	DMAs	ND		ND	µg/L		N/C 25
	MMAs	ND		ND	µg/L		N/C 25
	ThioAs1	308.8		308.2	µg/L		0.2% 25
	ThioDMA	ND		ND	µg/L		N/C 25
	ThioAs3	6.375		5.989	µg/L		6% 25
	ThioMMA	ND		ND	µg/L		N/C 25
B211087-MS1	**Matrix Spike, (2104040-05)**						
	As(III)	3.395	104.5	104.5	µg/L	97% 75-125	
	As(V)	0.503	97.10	95.72	µg/L	98% 75-125	
	DMAs	ND	100.0	98.27	µg/L	98% 75-125	
	MMAs	ND	100.0	97.17	µg/L	97% 75-125	
B211087-MSD1	**Matrix Spike Duplicate, (2104040-05)**						
	As(III)	3.395	104.5	105.9	µg/L	98% 75-125	1% 25
	As(V)	0.503	97.10	95.00	µg/L	97% 75-125	0.8% 25
	DMAs	ND	100.0	98.58	µg/L	99% 75-125	0.3% 25
	MMAs	ND	100.0	97.78	µg/L	98% 75-125	0.6% 25

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Method Blanks & Reporting Limits

Batch: B211087
Matrix: Water
Method: SOP BAL-4100
Analyte: As(III)

Sample	Result	Units
B211087-BLK1	0.00	µg/L
B211087-BLK2	0.00	µg/L
B211087-BLK3	0.00	µg/L
B211087-BLK4	0.00	µg/L

Average: 0.000
Limit: 0.021

MDL: 0.004
MRL: 0.021

Analyte: As(V)

Sample	Result	Units
B211087-BLK1	0.003	µg/L
B211087-BLK2	0.0003	µg/L
B211087-BLK3	0.0005	µg/L
B211087-BLK4	0.0006	µg/L

Average: 0.001
Limit: 0.021

MDL: 0.004
MRL: 0.021

Analyte: DMAs

Sample	Result	Units
B211087-BLK1	0.00	µg/L
B211087-BLK2	0.00	µg/L
B211087-BLK3	0.00	µg/L
B211087-BLK4	0.00	µg/L

Average: 0.000
Limit: 0.021

MDL: 0.005
MRL: 0.021

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Method Blanks & Reporting Limits

Analyte: MMAs

Sample	Result	Units
B211087-BLK1	0.00	µg/L
B211087-BLK2	0.00	µg/L
B211087-BLK3	0.00	µg/L
B211087-BLK4	0.00	µg/L

Average: 0.000
Limit: 0.021

MDL: 0.004
MRL: 0.021

Analyte: ThioAs1

Sample	Result	Units
B211087-BLK1	0.00	µg/L
B211087-BLK2	0.00	µg/L
B211087-BLK3	0.00	µg/L
B211087-BLK4	0.00	µg/L

Average: 0.000
Limit: 0.021

MDL: 0.005
MRL: 0.021

Analyte: ThioDMA

Sample	Result	Units
B211087-BLK1	0.00	µg/L
B211087-BLK2	0.00	µg/L
B211087-BLK3	0.00	µg/L
B211087-BLK4	0.00	µg/L

Average: 0.000
Limit: 0.021

MDL: 0.005
MRL: 0.021

Analyte: ThioAs3

Sample	Result	Units
B211087-BLK1	0.00	µg/L
B211087-BLK2	0.00	µg/L
B211087-BLK3	0.00	µg/L
B211087-BLK4	0.00	µg/L

Average: 0.000
Limit: 0.021

MDL: 0.005
MRL: 0.021

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Method Blanks & Reporting Limits

Analyte: ThioMMA

Sample	Result	Units
B211087-BLK1	0.00	µg/L
B211087-BLK2	0.00	µg/L
B211087-BLK3	0.00	µg/L
B211087-BLK4	0.00	µg/L

Average: 0.000
Limit: 0.021

MDL: 0.005
MRL: 0.021

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Sample Containers

Lab ID: 2104040-01 **Report Matrix:** Water-D **Collected:** 04/06/2021
Sample: MCM-07 **Sample Type:** Sample **Received:** 04/07/2021

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Vacutainer	10 mL	21-0011	none	na	na	Cooler - 2104040
B	XTRA_VOL	10 mL	21-0011	none	na	na	Cooler - 2104040

Lab ID: 2104040-02 **Report Matrix:** Water-D **Collected:** 04/06/2021
Sample: RW-9 **Sample Type:** Sample **Received:** 04/07/2021

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Vacutainer	10 mL	21-0011	none	na	na	Cooler - 2104040
B	XTRA_VOL	10 mL	21-0011	none	na	na	Cooler - 2104040

Lab ID: 2104040-03 **Report Matrix:** Water-D **Collected:** 04/06/2021
Sample: MCM-06 **Sample Type:** Sample **Received:** 04/07/2021

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Vacutainer	10 mL	21-0011	none	na	na	Cooler - 2104040
B	XTRA_VOL	10 mL	21-0011	none	na	na	Cooler - 2104040

Lab ID: 2104040-04 **Report Matrix:** Water-D **Collected:** 04/06/2021
Sample: MCM-05 **Sample Type:** Sample **Received:** 04/07/2021

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Vacutainer	10 mL	21-0011	none	na	na	Cooler - 2104040
B	XTRA_VOL	10 mL	21-0011	none	na	na	Cooler - 2104040

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Sample Containers

Lab ID: 2104040-05
Sample: DUP-1

Report Matrix: Water-D
Sample Type: Sample

Collected: 04/06/2021
Received: 04/07/2021

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Vacutainer	10 mL	21-0011	none	na	na	Cooler - 2104040
B	XTRA_VOL	10 mL	21-0011	none	na	na	Cooler - 2104040

Shipping Containers

Cooler - 2104040

Received: April 7, 2021 7:48
Tracking No: 785652463648 via
Coolant Type: Ice
Temperature: 4.7 °C

Description: Cooler
Damaged in transit? No
Returned to client? No
Comments: 30

Custody seals present? Yes
Custody seals intact? Yes
COC present? Yes

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Chain-of-Custody Form

BROOKS APPLIED LABS

Ship samples to:
18804 North Creek Parkway, Suite 100
Bothell, WA 98011

For BAL use only
Received by: Sheila Priscilla *Date:* 4/7/21
Work Order ID: _____ *Time:* _____
Project ID: _____

Client: Pace Labs
Contact: Kevin Herring
Client Project ID: SCS/GPC McManus
Samples Collected By: Trent Gochin/William Carter/Stephen Wilson Resolute Environmental

PO Number: _____
Phone: 704-977-0945
Email: Kevin.Herring@pacelabs.com

Mailing Address: 9800 Kincey Ave, Ste 100 Huntersville, NC 28078
Email Receipt Confirmation? (Yes/No)
BAL PM: Amy Goodall
Brooks project ID: PAC-HN2007

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	Client Sample Info: Number of Containers (10mL Vials)	Client Sample Info: Field Filtered? (Yes/No)	Client Sample Info: 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 and THIO species	Se Species (specify) Se(IV), Se(VI), SeCN, Uknown	Filtration	Other (specify)	Other (specify)	Comments: Specify Here
1	MCM-07	4/6/21	0944	Groundwater GW	2	Yes					✓					As(III), (AsV), MMA, DMA and THIO species
2	RW-9	↓	0950	↓	↓	↓					✓					↓
3	MCM-06		1102								✓					
4	MCM-05		1222								✓					
5	DUP-1	↓	—	↓	↓	↓					✓					
6																
7																
8																
9																
10																
	Temperature Trip Blank	#	—	water	1											

Relinquished By:	Date:	Time:	Relinquished By:	Date:	Time:
[signature]	4/6/21	1425			
Received By:	**Date:**	**Time:**	**Total Number of Packages:**		

Page 1 of 1 List Hazardous Contaminants: Arsenic

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Chain of Custody

PASI Charlotte Laboratory

Pace Analytical®
www.pacelabs.com

Workorder: 92532216 **Workorder Name:** MCMANUS AS SPECIATION **Results Requested By:** 4/22/2021

Report / Invoice To	Subcontract To
Kevin Herring Pace Analytical Charlotte 9800 Kincey Ave. Suite 100 Huntersville, NC 28078 Phone 1(704)875-9092 Email: kevin.herring@pacelabs.com State of Sample Origin: GA	P.O. KLH92532216 Brooks Applied Labs 18804 North Creek Pkwy, Suite100 Bothell, WA 98011

Item	Sample ID	Collect Date/Time	Lab ID	Matrix	General	As Speciation	As (III)	As (V)	As (MMA)	As (DMA)	Thio	LAB USE ONLY
1	MCM-07	4/6/2021 09:44	92532216001	Water	2	X						
2	RW-9	4/6/2021 09:50	92532216002	Water	2	X						
3	MCM-06	4/6/2021 11:02	92532216003	Water	2	X						
4	MCM-05	4/6/2021 12:22	92532216004	Water	2	X						
5	DUP-1	4/6/2021 00:00	92532216005	Water	2	X						

Transfers	Released By	Date/Time	Received By	Date/Time
1				
2				
3				

Comments

Cooler Temperature on Receipt °C | **Custody Seal** Y or N | **Received on Ice** Y or N | **Samples Intact** Y or N

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5755 8th Street East
Tacoma, WA 98424
Phone: (253) 922-2310

12 May 2021

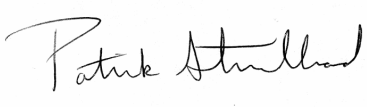
Margaret Gentile, PE, PhD
Arcadis - San Fransisco
100 Montgomery St., Suite 300
San Fransisco, CA 94104

RE: Arsenic SEP

Enclosed are the analytical results for samples received by Eurofins Frontier Global Sciences. All quality control measurements are within established control limits and there were no analytical difficulties encountered with the exception of those listed in the case narrative section of this report.

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

Sincerely,



Patrick Garcia-Strickland
Business Unit Manager

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5755 8th Street East
Tacoma, WA 98424
Phone: (253) 922-2310

Arcadis - San Fransisco	Project: Arsenic SEP	
100 Montgomery St., Suite 300	Project Number: Arsenic SEP	**Reported:**
San Fransisco CA, 94104	Project Manager: Margaret Gentile, PE, PhD	12-May-21 17:33

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SB-14-S(17-19) F1	1C00067-01	Soil/Sediment	28-Feb-21 07:52	10-Mar-21 09:45
SB-14-S(17-19) F2	1C00067-02	Soil/Sediment	28-Feb-21 07:52	10-Mar-21 09:45
SB-14-S(17-19) F3	1C00067-03	Soil/Sediment	28-Feb-21 07:52	10-Mar-21 09:45
SB-14-S(17-19) F4	1C00067-04	Soil/Sediment	28-Feb-21 07:52	10-Mar-21 09:45
SB-14-S(17-19) F5	1C00067-05	Soil/Sediment	28-Feb-21 07:52	10-Mar-21 09:45
SB-14-S(22-24) F1	1C00067-06	Soil/Sediment	28-Feb-21 08:02	10-Mar-21 09:45
SB-14-S(22-24) F2	1C00067-07	Soil/Sediment	28-Feb-21 08:02	10-Mar-21 09:45
SB-14-S(22-24) F3	1C00067-08	Soil/Sediment	28-Feb-21 08:02	10-Mar-21 09:45
SB-14-S(22-24) F4	1C00067-09	Soil/Sediment	28-Feb-21 08:02	10-Mar-21 09:45
SB-14-S(22-24) F5	1C00067-10	Soil/Sediment	28-Feb-21 08:02	10-Mar-21 09:45

Eurofins Frontier Global Sciences, LLC

Patrick Garcia-Strickland, Business Unit Manager

eurofins | Frontier Global Sciences

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Tacoma, WA 98424
Phone: (253) 922-2310

Arcadis - San Fransisco	Project: Arsenic SEP	
100 Montgomery St., Suite 300	Project Number: Arsenic SEP	**Reported:**
San Fransisco CA, 94104	Project Manager: Margaret Gentile, PE, PhD	12-May-21 17:33

SAMPLE RECEIPT

Samples were received at Eurofins Frontier Global Sciences (EFGS) on 10-Mar-21 09:45. The samples were received intact, on-ice within a sealed cooler at

Cooler	Temp C°
Default Cooler	0.5

SAMPLE PREPARATION AND ANALYSIS

Total solids analysis was performed in accordance with method SM2540B. Total solids are prepared at the same time as the preparation for the analyte(s) of interest in order to provide the most accurate dry mass correction which may be outside of the method recommended holding time of 7 days from sample collection.

SSE extractes were prepared according to Paul et al 2008. Arsenic and iron analysis on the extracts was performed by inductively coupled plasma mass spectrometry (ICP-MS) in accordance with EFGS-054, a modified EPA 1638.

ANALYTICAL AND QUALITY CONTROL ISSUES

Method blanks were prepared for every preparation to assess possible blank contribution from the sample preparation procedure. The method blanks were carried through the entire analytical procedure. All blanks fell within the established acceptance criteria with the exception of any items narrated above or flagged and described in the notes and definitions section of the report.

Liquid spikes, certified reference material (CRM) or a quality control samples (QCS) were prepared for every preparation as a measure of accuracy. All liquid spikes, CRMs and/or QCS samples fell within the established acceptance criteria with the exception of any items narrated above or flagged and described in the notes and definitions section of the report.

As an additional measure of the accuracy of the methods used and to check for matrix interference, matrix spikes (MS) and matrix spike duplicates (MSD) were digested and analyzed. All of the matrix spike recoveries fell within the established acceptance criteria with the exception of any items flagged and described in the notes and definitions section of the report.

A reasonable measure of the precision of the analytical methods is the relative percent difference (RPD) between a matrix spike recovery and a matrix spike duplicate recovery and between laboratory control sample recovery and laboratory control sample duplicate recoveries.

Eurofins Frontier Global Sciences, LLC

The results in this report only apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Patrick Garcia-Strickland, Business Unit Manager

eurofins | Frontier Global Sciences

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Tacoma, WA 98424
Phone: (253) 922-2310

Arcadis - San Fransisco	Project:	Arsenic SEP	
100 Montgomery St., Suite 300	Project Number:	Arsenic SEP	**Reported:**
San Fransisco CA, 94104	Project Manager:	Margaret Gentile, PE, PhD	12-May-21 17:33

All of the relative percent differences fell within established acceptance criteria with the exception of any items flagged and described in the notes and definitions section of the report.

Eurofins Frontier Global Sciences, LLC

Patrick Garcia-Strickland, Business Unit Manager

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Sample Receipt Checklist

Client: Arcadis   Date & Time Received: 3/10/21 9:45   Date Labeled: 3/10/21   Labeled By: R

Matrix: water soil / sed   Received By: R   Label Verified By: R 3/10/21

# of Coolers Received: 1   Samples Arrived By: X Shipping Service ___ Courier ___ Hand ___ Other (Specify: ___)

Coolant: ☐ None/Ambient ☒ Loose Ice ☐ Gel Ice ☐ Dry Ice   Coolant Required: Y / N   Temp Blank Used: Y/(N) for Cooler(s): ___

Notify Project Manager if packages/coolers are received without coolant or with thawed coolant and at a temperature in excess of 6°C. PM notified: Y/(N)

Samples from Wisconsin have special requirements. Shipment received includes samples from Wisconsin: Y/(N)

Cooler Information:	Y/N/NA	Comments
The coolers do not appear to be tampered with:	Y	
Custody Seals are present and intact:	Y	
Custody seals signed:	Y	

TID: L8113578	CF: 0.6 °C		Date/time: 3/10/21 9:45	By: R	
Cooler 1: -0.1 °C	w/ CF: 0.5 °C		Cooler 4: °C	w/ CF: °C	
Cooler 2: °C	w/ CF: °C		Cooler 5: °C	w/ CF: °C	
Cooler 3: °C	w/ CF: °C		Cooler 6: °C	w/ CF: °C	

Chain of Custody:	Y/N/NA	Comments
Sample ID/Description:	Y	
Date and time of collection:	Y	
Sampled by:	N	
Preservation type:	NA	
Requested analyses:	Y	
Required signatures:	Y	
Internal COC required:	NA	

Sample Condition/Integrity:	Y/N/NA	Comments
Sample containers intact/present:	Y	
Sample labels are present and legible:	Y	
Sample ID on container/bag matches COC:	Y	
Correct sample containers used:	Y	
Samples received within holding times:	Y	
Sample volume sufficient for requested analyses:	Y	
Correct preservative used for requested analyses:	Y	

1C00067

Anomalies/Non-conformances (attach additional pages if needed):

Eurofins Frontier
5755 8th St E
Fife, WA 98424
Phone (206) 351-9522

Chain of Custody Record

eurofins Environment Testing America

Client Information	Sampler:	Lab PM: Patrick Garcia-Strickland	Carrier Tracking No(s):	COC No: 180-68312-13475.7
Client Contact: Margaret Gentile	Phone:	E-Mail: Patrick.Garcia-Strickland@eurofinset.com	State of Origin:	Page: Page 1 of 1
Company: ARCADIS U.S. Inc	PWSID:			Job #:
Address: 320 Commerce Suite 200	Due Date Requested:			
City: Irvine	TAT Requested (days):			
State, Zip: CA, 92602	Compliance Project: Δ Yes Δ No			
Phone: 518-250-7389(Tel)	PO #: 30050105.00006			
Email: Margaret.Gentile@arcadis.com	WO #:			
Project Name: Plant McManus (AVS/SEM)	Project #:			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	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 (Yes or No)	Perform MS/MSD (Yes or No)	SEP Metals	Total Number of containers	Special Instructions/Note:
			Preservation Code:						
SB-14-S(17-19)	2/28/21	0752					X		SHIP TO FRONTIER, address above
SB-14-S(22-24)	2/28/21	0802					X		SHIP TO FRONTIER, address above

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: 1689 5707 7585

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	3/9/21 1700			3/10/21 9:45	
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

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Tacoma, WA 98424
Phone: (253) 922-2310

Arcadis - San Fransisco	Project: Arsenic SEP	
100 Montgomery St., Suite 300	Project Number: Arsenic SEP	**Reported:**
San Fransisco CA, 94104	Project Manager: Margaret Gentile, PE, PhD	12-May-21 17:33

% Solids

Sample Name	Lab Number	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
Sample Preparation: EFGS SOP5133 Solids Analysis												
SB-14-S(17-19) F1	**1C00067-01**	**70.6**	-	0.1	% by Weight	1	F105441	10-May-21		11-May-21	SM 2540B	O-04, O-09
SB-14-S(17-19) F2	**1C00067-02**	**70.6**	-	0.1	% by Weight	1	F105441	10-May-21		12-May-21	SM 2540B	O-04, O-09
SB-14-S(17-19) F3	**1C00067-03**	**70.6**	-	0.1	% by Weight	1	F105441	10-May-21		12-May-21	SM 2540B	O-04, O-09
SB-14-S(17-19) F4	**1C00067-04**	**70.6**	-	0.1	% by Weight	1	F105441	10-May-21		12-May-21	SM 2540B	O-04, O-09
SB-14-S(17-19) F5	**1C00067-05**	**70.6**	-	0.1	% by Weight	1	F105441	10-May-21		12-May-21	SM 2540B	O-04, O-09
SB-14-S(22-24) F1	**1C00067-06**	**80.2**	-	0.1	% by Weight	1	F105441	10-May-21		11-May-21	SM 2540B	O-04, O-09
SB-14-S(22-24) F2	**1C00067-07**	**80.2**	-	0.1	% by Weight	1	F105441	10-May-21		12-May-21	SM 2540B	O-04, O-09
SB-14-S(22-24) F3	**1C00067-08**	**80.2**	-	0.1	% by Weight	1	F105441	10-May-21		12-May-21	SM 2540B	O-04, O-09
SB-14-S(22-24) F4	**1C00067-09**	**80.2**	-	0.1	% by Weight	1	F105441	10-May-21		12-May-21	SM 2540B	O-04, O-09
SB-14-S(22-24) F5	**1C00067-10**	**80.2**	-	0.1	% by Weight	1	F105441	10-May-21		12-May-21	SM 2540B	O-04, O-09

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Patrick Garcia-Strickland, Business Unit Manager

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Phone: (253) 922-2310

Arcadis - San Fransisco	Project: Arsenic SEP	
100 Montgomery St., Suite 300	Project Number: Arsenic SEP	**Reported:**
San Fransisco CA, 94104	Project Manager: Margaret Gentile, PE, PhD	12-May-21 17:33

Arsenic

Sample Name	Lab Number	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
Sample Preparation: Miscellaneous Preparation ICPMS												
SB-14-S(17-19) F1	**1C00067-01**	**2.22**	-	0.34	mg/kg dry	1	F105424	05-May-21	1E12021	11-May-21	EPA 1638 Mod	
SB-14-S(17-19) F2	**1C00067-02**	**0.89**	-	0.17	mg/kg dry	1	F105425	06-May-21	1E12021	12-May-21	EPA 1638 Mod	
SB-14-S(17-19) F3	1C00067-03	ND	-	1.71	mg/kg dry	1	F105430	07-May-21	1E12021	12-May-21	EPA 1638 Mod	U
SB-14-S(17-19) F4	**1C00067-04**	**0.35**	-	0.34	mg/kg dry	1	F105434	07-May-21	1E12021	12-May-21	EPA 1638 Mod	
SB-14-S(17-19) F5	**1C00067-05**	**0.82**	-	0.17	mg/kg dry	1	F105435	10-May-21	1E12021	12-May-21	EPA 1638 Mod	
SB-14-S(22-24) F1	**1C00067-06**	**1.14**	-	0.30	mg/kg dry	1	F105424	05-May-21	1E12021	12-May-21	EPA 1638 Mod	
SB-14-S(22-24) F2	**1C00067-07**	**0.90**	-	0.15	mg/kg dry	1	F105425	06-May-21	1E12021	12-May-21	EPA 1638 Mod	
SB-14-S(22-24) F3	1C00067-08	ND	-	1.52	mg/kg dry	1	F105430	07-May-21	1E12021	12-May-21	EPA 1638 Mod	U
SB-14-S(22-24) F4	1C00067-09	ND	-	0.30	mg/kg dry	1	F105434	07-May-21	1E12021	12-May-21	EPA 1638 Mod	U
SB-14-S(22-24) F5	**1C00067-10**	**0.57**	-	0.15	mg/kg dry	1	F105435	10-May-21	1E12021	12-May-21	EPA 1638 Mod	

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Arcadis - San Fransisco	Project: Arsenic SEP	
100 Montgomery St., Suite 300	Project Number: Arsenic SEP	**Reported:**
San Fransisco CA, 94104	Project Manager: Margaret Gentile, PE, PhD	12-May-21 17:33

Iron

Sample Name	Lab Number	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
Sample Preparation: Miscellaneous Preparation ICPMS												
SB-14-S(17-19) F1	**1C00067-01**	**370**	-	17	mg/kg dry	1	F105424	05-May-21	1E12021	11-May-21	EPA 1638 Mod	
SB-14-S(17-19) F2	**1C00067-02**	**773**	-	17	mg/kg dry	1	F105425	06-May-21	1E12021	12-May-21	EPA 1638 Mod	
SB-14-S(17-19) F3	**1C00067-03**	**602**	-	34	mg/kg dry	1	F105430	07-May-21	1E12021	12-May-21	EPA 1638 Mod	
SB-14-S(17-19) F4	**1C00067-04**	**226**	-	17	mg/kg dry	1	F105434	07-May-21	1E12021	12-May-21	EPA 1638 Mod	
SB-14-S(17-19) F5	**1C00067-05**	**1750**	-	86	mg/kg dry	1	F105435	10-May-21	1E12021	12-May-21	EPA 1638 Mod	
SB-14-S(22-24) F1	**1C00067-06**	**51**	-	15	mg/kg dry	1	F105424	05-May-21	1E12021	12-May-21	EPA 1638 Mod	
SB-14-S(22-24) F2	**1C00067-07**	**808**	-	15	mg/kg dry	1	F105425	06-May-21	1E12021	12-May-21	EPA 1638 Mod	
SB-14-S(22-24) F3	**1C00067-08**	**546**	-	30	mg/kg dry	1	F105430	07-May-21	1E12021	12-May-21	EPA 1638 Mod	
SB-14-S(22-24) F4	**1C00067-09**	**197**	-	15	mg/kg dry	1	F105434	07-May-21	1E12021	12-May-21	EPA 1638 Mod	
SB-14-S(22-24) F5	**1C00067-10**	**1360**	-	76	mg/kg dry	1	F105435	10-May-21	1E12021	12-May-21	EPA 1638 Mod	

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Arcadis - San Fransisco	Project: Arsenic SEP	
100 Montgomery St., Suite 300	Project Number: Arsenic SEP	**Reported:**
San Fransisco CA, 94104	Project Manager: Margaret Gentile, PE, PhD	12-May-21 17:33

Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch F105424 - Miscellaneous Preparation ICPMS											
Blank (F105424-BLK1)					Prepared: 05-May-21 Analyzed: 11-May-21						
Iron	ND	-	10	mg/kg wet							U
Arsenic	ND	-	0.20	mg/kg wet							U
Blank (F105424-BLK2)					Prepared: 05-May-21 Analyzed: 11-May-21						
Iron	ND	-	10	mg/kg wet							U
Arsenic	ND	-	0.20	mg/kg wet							U
Blank (F105424-BLK3)					Prepared: 05-May-21 Analyzed: 11-May-21						
Iron	ND	-	10	mg/kg wet							U
Arsenic	ND	-	0.20	mg/kg wet							U
Batch F105425 - Miscellaneous Preparation ICPMS											
Blank (F105425-BLK1)					Prepared: 06-May-21 Analyzed: 12-May-21						
Iron	ND	-	10	mg/kg wet							U
Arsenic	ND	-	0.10	mg/kg wet							U
Blank (F105425-BLK2)					Prepared: 06-May-21 Analyzed: 12-May-21						
Iron	ND	-	10	mg/kg wet							U
Arsenic	ND	-	0.10	mg/kg wet							U
Blank (F105425-BLK3)					Prepared: 06-May-21 Analyzed: 12-May-21						
Iron	ND	-	10	mg/kg wet							U
Arsenic	ND	-	0.10	mg/kg wet							U
Batch F105430 - Miscellaneous Preparation ICPMS											
Blank (F105430-BLK1)					Prepared: 07-May-21 Analyzed: 12-May-21						
Iron	ND	-	20	mg/kg wet							U
Arsenic	ND	-	1.00	mg/kg wet							U

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Arcadis - San Fransisco	Project: Arsenic SEP	
100 Montgomery St., Suite 300	Project Number: Arsenic SEP	**Reported:**
San Fransisco CA, 94104	Project Manager: Margaret Gentile, PE, PhD	12-May-21 17:33

Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch F105430 - Miscellaneous Preparation ICPMS											
Blank (F105430-BLK2)					Prepared: 07-May-21 Analyzed: 12-May-21						
Iron	ND	-	20	mg/kg wet							U
Arsenic	ND	-	1.00	mg/kg wet							U
Blank (F105430-BLK3)					Prepared: 07-May-21 Analyzed: 12-May-21						
Iron	ND	-	20	mg/kg wet							U
Arsenic	ND	-	1.00	mg/kg wet							U
Batch F105434 - Miscellaneous Preparation ICPMS											
Blank (F105434-BLK1)					Prepared: 07-May-21 Analyzed: 12-May-21						
Iron	ND	-	10	mg/kg wet							U
Arsenic	ND	-	0.20	mg/kg wet							U
Blank (F105434-BLK2)					Prepared: 07-May-21 Analyzed: 12-May-21						
Iron	ND	-	10	mg/kg wet							U
Arsenic	ND	-	0.20	mg/kg wet							U
Blank (F105434-BLK3)					Prepared: 07-May-21 Analyzed: 12-May-21						
Iron	ND	-	10	mg/kg wet							U
Arsenic	ND	-	0.20	mg/kg wet							U
Batch F105435 - Miscellaneous Preparation ICPMS											
Blank (F105435-BLK1)					Prepared: 10-May-21 Analyzed: 12-May-21						
Iron	ND	-	50	mg/kg wet							U
Arsenic	ND	-	0.10	mg/kg wet							U

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Patrick Garcia-Strickland, Business Unit Manager

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Arcadis - San Fransisco	Project: Arsenic SEP	
100 Montgomery St., Suite 300	Project Number: Arsenic SEP	**Reported:**
San Fransisco CA, 94104	Project Manager: Margaret Gentile, PE, PhD	12-May-21 17:33

Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch F105435 - Miscellaneous Preparation ICPMS											
Blank (F105435-BLK2)					Prepared: 10-May-21 Analyzed: 12-May-21						
Iron	ND	-	50	mg/kg wet							U
Arsenic	ND	-	0.10	mg/kg wet							U
Blank (F105435-BLK3)					Prepared: 10-May-21 Analyzed: 12-May-21						
Iron	ND	-	50	mg/kg wet							U
Arsenic	ND	-	0.10	mg/kg wet							U
LCS (F105435-BS1)					Prepared: 10-May-21 Analyzed: 12-May-21						
Iron	162	-	50	mg/kg wet	125.00		130	70-130			
Arsenic	5.11	-	0.10	mg/kg wet	5.0000		102	75-125			
LCS Dup (F105435-BSD1)					Prepared: 10-May-21 Analyzed: 12-May-21						
Iron	117	-	50	mg/kg wet	125.00		93.5	70-130	32.5	35	
Arsenic	5.17	-	0.10	mg/kg wet	5.0000		103	75-125	1.20	20	

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Patrick Garcia-Strickland, Business Unit Manager

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Phone: (253) 922-2310

Arcadis - San Fransisco	Project: Arsenic SEP	
100 Montgomery St., Suite 300	Project Number: Arsenic SEP	**Reported:**
San Fransisco CA, 94104	Project Manager: Margaret Gentile, PE, PhD	12-May-21 17:33

Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch F105441 - EFGS SOP5133 Solids Analysis											
Duplicate (F105441-DUP1)		**Source: 1C00067-01**		Prepared & Analyzed: 11-May-21							
% Solids	76.5	-	0.1	% by Weight		70.6			8.02	10	

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Patrick Garcia-Strickland, Business Unit Manager

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Tacoma, WA 98424
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Arcadis - San Fransisco	Project: Arsenic SEP	
100 Montgomery St., Suite 300	Project Number: Arsenic SEP	**Reported:**
San Fransisco CA, 94104	Project Manager: Margaret Gentile, PE, PhD	12-May-21 17:33

Notes and Definitions

U	Analyte was not detected and is reported as less than the LOD or as defined by the client. The LOD has been adjusted for any dilution or concentration of the sample.
O-09	Total Solids are prepared at the same time as the preparation for the analyte(s) of interest in order to provide the most accurate dry mass correction.
O-04	This sample was analyzed outside of the recommended holding time.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

Eurofins Frontier Global Sciences, LLC

Patrick Garcia-Strickland, Business Unit Manager

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

October 30, 2020

Joju Abraham
Georgia Power-CCR
2480 Maner Road
Atlanta, GA 30339

RE: Project: MCMANUS AS SPECIATION
Pace Project No.: 92500800

Dear Joju Abraham:

Enclosed are the analytical results for sample(s) received by the laboratory on October 15, 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.

Some analyses were subcontracted outside of the Pace Network. The test report from the external subcontractor is attached to this report in its entirety.

The test results provided in this final report were generated by each of the following laboratories within the Pace Network:

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: Veronica Fay
Trent Godwin, Resolute Environmental & Water Resources
Kristen Jurinko
Ms. Lauren Petty, Southern Co. Services
Kevin Stephenson, Resolute Environmental & Water Resources Consulting, LLC
Stephen Wilson, Resolute Environmental & Water Resources Consulting, LLC

REPORT OF LABORATORY ANALYSIS

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

SAMPLE SUMMARY

Project: MCMANUS AS SPECIATION
Pace Project No.: 92500800

Lab ID	Sample ID	Matrix	Date Collected	Date Received
92500800001	**RW-1**	Water	10/14/20 12:19	10/15/20 00:00
92500800002	**RW-2**	Water	10/14/20 15:04	10/15/20 00:00
92500800003	**RW-3**	Water	10/14/20 17:17	10/15/20 00:00
92500800004	**RW-7**	Water	10/14/20 15:43	10/15/20 00:00
92500800005	**RW-8**	Water	10/14/20 16:30	10/15/20 00:00
92500800006	**RW-9**	Water	10/14/20 13:04	10/15/20 00:00
92500800007	**RW-10**	Water	10/14/20 15:00	10/15/20 00:00
92500800008	**DUP-1**	Water	10/14/20 00:00	10/15/20 00:00
92500800009	**MCM-06**	Water	10/14/20 16:52	10/15/20 00:00
92500800010	**MCM-07**	Water	10/14/20 14:42	10/15/20 00:00
92500800011	**MCM-14**	Water	10/14/20 13:00	10/15/20 00:00

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: ______ *Date:* ______
Work Order ID: ______ *Time:* ______
Project ID: ______

Client: Georgia Power Company
Contact: Kristen Jurinko
Client Project ID: ______
Samples Collected By: Kevin Stephenson, Veronica Fay, Will Ledbetter, [illegible]
PO Number: ______
Phone: 404-506-7116
Email: kjjurink@southernco.com
Mailing Address: 241 Ralph McGill Blvd, Atlanta, GA 30308
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 /HNO3/Other	BAL Analyses Required: Total Hg, EPA 1631	Methyl Hg, EPA 1630	ICP-MS Metals (specify) As Total Rec, Diss.	As Species (specify) InOrg, (III), (V), (MMA), (DMA)	Se Species (specify) Se(IV), Se(VI), SeCN, Uknown	Filtration	Other (specify) Sum of unknown As	Other (specify)	Comments: Specify Here
1	RW-1	10/14/20	1219	GW	2	Y	ICE			X	X			X		
2	RW-2	10/14/20	1504	GW	2	Y	ICE			X	X			X		
3	RW-3	10/14/20	1717	GW	2	Y	ICE			X	X			X		
4	RW-7	10/14/20	1543	GW	2	Y	ICE			X	X			X		
5	RW-8	10/14/20	1630	GW	2	Y	ICE			X	X			X		
6	RW-9	10/14/20	1304	GW	2	Y	ICE			X	X			X		
7	RW-10	10/14/20	1500	GW	2	Y	ICE			X	X			X		
8	Dup-1	10/14/20	—	GW	2	Y	ICE			X	X			X		
9	MCM-06	10/14/20	1652	GW	2	Y	ICE			X	X			X		
10	MCM-07	10/14/20	1442	GW	2	Y	ICE			X	X			X		
	Trip Blank															

Relinquished By: Kevin Stephenson	Date: 10/14/20	Time: 1820	Relinquished By:	Date:	Time:
Received By: FedEx	Date:	Time:	Total Number of Packages:		

Page 1 of 2 List Hazardous Contaminants: ______

WO# : 92500800
92500800

Chain-of-Custody Form

BROOKS APPLIED LABS

Ship samples to:
18804 North Creek Parkway, Suite 100
Bothell, WA 98011

For BAL use only
Received by: Spencer Shibuya Date: 10/15/20
Work Order ID: _____ Time: 1100
Project ID: _____

Client: Georgia Power Company
Contact: Kristen Jurinko
Client Project ID: _____
Samples Collected By: Kristen Jurinko, Veronica Fay, Will Walker, Trent Carlson

PO Number: _____
Phone: 404-506-7116
Email: kmjurinko@southernco.com

Mailing Address: 241 Ralph McGill Blvd
Atlanta, Ga. 30308

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	Client Sample Info: Number of Containers	Client Sample Info: Field Filtered? (Yes/No)	Client Sample Info: Preservation Type HCl / HNO_3 / Other	BAL Analyses Required: Total Hg, EPA 1631	BAL Analyses Required: Methyl Hg, EPA 1630	BAL Analyses Required: ICP-MS Metals (specify) As	BAL Analyses Required: As Species (specify) InOrg (III, V) MMA DMA	BAL Analyses Required: Se Species (specify) Se(IV), Se(VI), SeCN, Uknown	BAL Analyses Required: Filtration	BAL Analyses Required: Other (specify) Sum of Dissolved Hg	BAL Analyses Required: Other (specify) _____	Comments: Specify Here
1	MCM-14	10/14/20	1300	GW	2	Y	HCl			X	X			X		
2																
3																
4																
5																
6																
7																
8																
9																
10																
	Trip Blank															

Relinquished By: Kristen Jurinko	Date: 1520	Time: 10/14/20	Relinquished By:	Date:	Time:
Received By: Fedex	Date:	Time:	Total Number of Packages:		

Page 2 of 2

List Hazardous Contaminants: _____

WO# : 92500800

PM: KLH1 Due Date: 10/29/20
CLIENT: GA-GA Power

BROOKS APPLIED LABS
18804 North Creek Parkway, Ste 100, Bothell, WA 98011 • USA • T: 206 632 6206 F: 206 632 6017 • info@brooksapplied.com

October 29, 2020

Pace Analytical Services – Huntersville
ATTN: Kevin Herring
9800 Kincey Ave., Suite 100
Huntersville, NC 28078
Kevin.Herring@pacelabs.com

RE: Project PAC-HN2007 Client Project: 92500800

Dear Kevin Herring,

On October 15, 2020, Brooks Applied Labs (BAL) received eleven (11) water samples at a temperature of 7.1°C. The samples were logged-in for the analysis of arsenic (As) speciation per the chain-of-custody (COC). The client directly filtered (0.45µm) each sample into an evacuated container prior to receipt at BAL. All samples were stored according to BAL SOPs and EPA methodology.

BAL strongly recommends that all samples submitted for arsenic speciation remain at a temperature of less than or equal to 6° Celsius to maintain sample integrity prior to analysis. Consequently, the As speciation results were qualified (**Z**), indicating that the samples were received above the recommended temperature.

Arsenic Speciation by IC-ICP-CRC-MS

All aqueous samples for As speciation were analyzed using ion chromatography inductively coupled plasma collision reaction cell mass spectrometry (IC-ICP-CRC-MS). In accordance with the project agreement, As speciation was defined as dissolved arsenite [As(III)], arsenate [As(V)], monomethylarsonic acid [MMAs], and dimethylarsinic acid [DMAs]; the total estimated concentration of any unidentified arsenic-containing species detected in each sample has also been reported as Unk As Sp. Arsenic species are chromatographically separated on an ion exchange column and then quantified using inductively coupled plasma collision reaction cell mass spectrometry (ICP-CRC-MS); for more information on this determinative technique, please visit the Interference Reduction Technology section on our website, brooksapplied.com.

In instances where the native sample result and/or the associated duplicate (DUP) result were below the MDL the RPD was not calculated (**N/C**).

The 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.

It should be noted that all Brooks Applied Labs, LLC methods, standard operating procedures, inventions, ideas, processes, improvements, designs and techniques included or referred to therein, must be considered and treated as Proprietary Information, protected by the Washington State Trade Secret Act, RCW 19.108 et seq., and other laws. All Proprietary Information, written or implied, will not be distributed,

All data was reported without further qualification and all other 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 us if you have any questions regarding this report.

Sincerely,

Amy Goodall
Project Manager
Brooks Applied Labs
amy@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/> or review Tables 1 and 2 in our Accreditation Information. 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**	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 3/23/2020)

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. Please see narrative for explanation.

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.

M Duplicate precision (RPD) was not within acceptance criteria. Please see narrative for explanation.

N Spike recovery was not within acceptance criteria. Please see narrative for explanation.

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.

Z Holding time and/or preservation requirements not established for this method; however, BAL recommendations for holding time were not followed. Please see narrative for explanation.

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.

Accreditation Information

Table 1. Accredited method/matrix/analytes for TNI

Issued by: State of Florida Dept. of Health (The NELAC Institute 2016 Standard)
Issued on: July 27, 2020; Valid to: June 30, 2021
Certificate Number: E87982-35

Method	Matrix	TNI Accredited Analyte(s)
EPA 1638	Non-Potable Waters	Ag, Cd, Cu, Ni, Pb, Sb, Se, Tl, Zn
EPA 200.8	Non-Potable Waters	Ag, Al, As, Ba, Be, Cd, Co, Cr, Cu, Mn, Mo, Ni, Pb, Sb, Se, Tl, U, V, Zn
EPA 6020	Non-Potable Waters	Ag, Al, As, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Mg, Mn, Mo, Ni, Pb, Sb, Se, Tl, U, V, Zn
	Solids/Chemicals & Biological	Ag, Al, As, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Mg, Mn, Mo, Ni, Pb, Sb, Se, Tl, V, Zn
BAL-5000	Non-Potable Waters	Ag, Al, As, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Mg, Mn, Mo, Ni, Pb, Sb, Se, Sn, Sr, Tl, U, V, Zn, Hardness
	Solids/Chemicals	Ag, As, B, Be, Cd, Co, Cr, Cu, Pb, Mo, Ni, Sb, Se, Sn, Sr, Tl, V, Zn
	Biological	Ag, Al, As, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Mg, Mn, Mo, Ni, Pb, Sb, Se, Sn, Tl, V, Zn
EPA 1640	Non-Potable Waters	Ag, As, Cd, Cu, Pb, Ni, Zn
EPA 1631E	Non-Potable Waters, Solids/Chemicals & Biological	Total Mercury
EPA 1630	Non-Potable Waters	Methyl Mercury
BAL-3200	Solids/Chemicals & Biological	Methyl Mercury
BAL-4100	Non-Potable Waters	As(III), As(V), DMAs, MMAs
BAL-4200	Non-Potable Waters	Se(IV), Se(VI)
BAL-4201	Non-Potable Waters	Se(IV), Se(VI)
BAL-4300	Non-Potable Waters Solid/Chemicals	Cr(VI)
SM2340B	Non-Potable Waters	Hardness

Accreditation Information

Table 2. Accredited method/matrix/analytes for ISO (1), Non-Governmental TNI (2), and DoD/DOE (3)

Issued by: ANAB

Issued on: January 10, 2020; Valid to: March 30, 2022

Method	Matrix	ISO and Non-Gov. TNI Accredited Analyte(s)	DoD/DOE Accredited Analytes
EPA 1638 Mod EPA 200.8 Mod EPA 6020 Mod BAL-5000	Non-Potable Waters	Ag, Al, As, B, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Mg, Mn, Mo, Ni, Pb, Sb, Se, Sn, Sr, Tl, U, V, Zn	Ag, Al, As, Ba, Ca, Cd, Cr, Cu, Fe, Pb, Mg, Mn, Ni, Sb, Se, V, Zn
	Solids/Chemicals & Biological	Ag, Al, As, B, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Mg, Mn, Mo, Ni, Pb, Sb, Se, Sn, Sr, Tl, V, Zn	Ag, As, Cd, Cr, Cu, Pb, Ni, Se, Zn
EPA 1640 Mod	Non-Potable Waters	Ag, As, Be, Cd, Cr, Co, Cu, Pb, Ni, Se, Tl, V, Zn	Not Accredited
EPA 1631E Mod BAL-3100 (waters) BAL-3101 (solids)	Non-Potable Waters, Solids/Chemicals & Biological/Food	Total Mercury	Total Mercury
EPA 1630 Mod BAL-3200	Non-Potable Waters, Solids/Chemicals Biological	Methyl Mercury	Methyl Mercury (excluding Solids/Chemicals)
EPA 1632A Mod BAL-3300	Non-Potable Waters Solids/Chemicals	Inorganic Arsenic, As(III)	Inorganic Arsenic. As(III) for waters only.
	Biological/Food	Inorganic Arsenic	Inorganic Arsenic (excluding Food)
AOAC 2015.01 Mod BAL-5000 by BAL-5040	Food	As, Cd, Hg, Pb	Not Accredited
BAL-4100	Non-Potable Waters	As(III), As(V), DMAs, MMAs	Not Accredited
	Biological by BAL-4115	Inorganic Arsenic, DMAs, MMAs	Not Accredited
BAL-4101	Food by BAL-4116	Inorganic Arsenic, DMAs, MMAs	Not Accredited
BAL-4200	Non-Potable Waters	Se(IV), Se(VI), SeCN	Not Accredited
BAL-4201	Non-Potable Waters	Se(IV), Se(VI), SeCN, SeMet	Not Accredited
BAL-4300	Non-Potable Waters, Solid/Chemicals	Cr(VI)	Cr(VI)
SM 3500-Fe BAL-4500	Non-Potable Waters	Fe, Fe(II)	Not Accredited
SM2340B	Non-Potable Waters	Hardness	Hardness
SM 2540G EPA 160.3 BAL-0501	Solids/Chemicals & Biological	% Dry Weight	% Dry Weight

(1) ISO/IEC 17025:2017 – Certificate Number ADE-1447.2
(2) Non-Governmental NELAC Institute 2016 Standard – Certificate Number ADE-1447.1
(3) Department of Defense/Energy Consolidated Quality Systems Manual v. 5.3 – Certificate Numbers ADE-1447 for DoD, ADE-1447.3 for DOE.

Sample Information

Sample	Alias	Lab ID	Report Matrix	Type	Sampled	Received
RW-1	92500800001	2042040-01	GW	Sample	10/14/2020	10/15/2020
RW-2	92500800002	2042040-02	GW	Sample	10/14/2020	10/15/2020
RW-3	92500800003	2042040-03	GW	Sample	10/14/2020	10/15/2020
RW-7	92500800004	2042040-04	GW	Sample	10/14/2020	10/15/2020
RW-8	92500800005	2042040-05	GW	Sample	10/14/2020	10/15/2020
RW-9	92500800006	2042040-06	GW	Sample	10/14/2020	10/15/2020
RW-10	92500800007	2042040-07	GW	Sample	10/14/2020	10/15/2020
Dup-1	92500800008	2042040-08	GW	Field Duplicate	10/14/2020	10/15/2020
MCM-06	92500800009	2042040-09	GW	Sample	10/14/2020	10/15/2020
MCM-07	92500800010	2042040-10	GW	Sample	10/14/2020	10/15/2020
MCM-14	92500800011	2042040-11	GW	Sample	10/14/2020	10/15/2020

Batch Summary

Analyte	Lab Matrix	Method	Prepared	Analyzed	Batch	Sequence
As(III)	Water	SOP BAL-4100	10/20/2020	10/21/2020	B202845	2001257
As(V)	Water	SOP BAL-4100	10/20/2020	10/21/2020	B202845	2001257
DMAs	Water	SOP BAL-4100	10/20/2020	10/21/2020	B202845	2001257
MMAs	Water	SOP BAL-4100	10/20/2020	10/21/2020	B202845	2001257
Unk As Sp	Water	SOP BAL-4100	10/20/2020	10/21/2020	B202845	2001257

Sample Results

Sample	Analyte	Report Matrix	Basis	Result	Qualifier	MDL	MRL	Unit	Batch	Sequence
RW-1, 92500800001										
2042040-01	As(III)	GW	D	0.687	Z J	0.400	2.10	µg/L	B202845	2001257
2042040-01	As(V)	GW	D	≤ 0.400	Z U	0.400	2.10	µg/L	B202845	2001257
2042040-01	DMAs	GW	D	≤ 0.500	Z U	0.500	2.10	µg/L	B202845	2001257
2042040-01	MMAs	GW	D	≤ 0.400	Z U	0.400	2.10	µg/L	B202845	2001257
2042040-01	Unk As Sp	GW	D	≤ 0.500	Z U	0.500	2.10	µg/L	B202845	2001257
RW-2, 92500800002										
2042040-02	As(III)	GW	D	≤ 0.400	Z U	0.400	2.10	µg/L	B202845	2001257
2042040-02	As(V)	GW	D	≤ 0.400	Z U	0.400	2.10	µg/L	B202845	2001257
2042040-02	DMAs	GW	D	≤ 0.500	Z U	0.500	2.10	µg/L	B202845	2001257
2042040-02	MMAs	GW	D	≤ 0.400	Z U	0.400	2.10	µg/L	B202845	2001257
2042040-02	Unk As Sp	GW	D	≤ 0.500	Z U	0.500	2.10	µg/L	B202845	2001257
RW-3, 92500800003										
2042040-03	As(III)	GW	D	≤ 0.400	Z U	0.400	2.10	µg/L	B202845	2001257
2042040-03	As(V)	GW	D	≤ 0.400	Z U	0.400	2.10	µg/L	B202845	2001257
2042040-03	DMAs	GW	D	≤ 0.500	Z U	0.500	2.10	µg/L	B202845	2001257
2042040-03	MMAs	GW	D	≤ 0.400	Z U	0.400	2.10	µg/L	B202845	2001257
2042040-03	Unk As Sp	GW	D	≤ 0.500	Z U	0.500	2.10	µg/L	B202845	2001257
RW-7, 92500800004										
2042040-04	As(III)	GW	D	≤ 0.400	Z U	0.400	2.10	µg/L	B202845	2001257
2042040-04	As(V)	GW	D	≤ 0.400	Z U	0.400	2.10	µg/L	B202845	2001257
2042040-04	DMAs	GW	D	≤ 0.500	Z U	0.500	2.10	µg/L	B202845	2001257
2042040-04	MMAs	GW	D	≤ 0.400	Z U	0.400	2.10	µg/L	B202845	2001257
2042040-04	Unk As Sp	GW	D	10.3	Z	0.500	2.10	µg/L	B202845	2001257
RW-8, 92500800005										
2042040-05	As(III)	GW	D	0.541	Z J	0.400	2.10	µg/L	B202845	2001257
2042040-05	As(V)	GW	D	≤ 0.400	Z U	0.400	2.10	µg/L	B202845	2001257
2042040-05	DMAs	GW	D	≤ 0.500	Z U	0.500	2.10	µg/L	B202845	2001257
2042040-05	MMAs	GW	D	≤ 0.400	Z U	0.400	2.10	µg/L	B202845	2001257
2042040-05	Unk As Sp	GW	D	≤ 0.500	Z U	0.500	2.10	µg/L	B202845	2001257

Sample Results

Sample	Analyte	Report Matrix	Basis	Result	Qualifier	MDL	MRL	Unit	Batch	Sequence
RW-9, 92500800006										
2042040-06	As(III)	GW	D	0.460	Z J	0.400	2.10	µg/L	B202845	2001257
2042040-06	As(V)	GW	D	≤ 0.400	Z U	0.400	2.10	µg/L	B202845	2001257
2042040-06	DMAs	GW	D	≤ 0.500	Z U	0.500	2.10	µg/L	B202845	2001257
2042040-06	MMAs	GW	D	≤ 0.400	Z U	0.400	2.10	µg/L	B202845	2001257
2042040-06	Unk As Sp	GW	D	32.5	Z	0.500	2.10	µg/L	B202845	2001257
RW-10, 92500800007										
2042040-07	As(III)	GW	D	≤ 0.400	Z U	0.400	2.10	µg/L	B202845	2001257
2042040-07	As(V)	GW	D	≤ 0.400	Z U	0.400	2.10	µg/L	B202845	2001257
2042040-07	DMAs	GW	D	≤ 0.500	Z U	0.500	2.10	µg/L	B202845	2001257
2042040-07	MMAs	GW	D	≤ 0.400	Z U	0.400	2.10	µg/L	B202845	2001257
2042040-07	Unk As Sp	GW	D	3.92	Z	0.500	2.10	µg/L	B202845	2001257
Dup-1, 92500800008										
2042040-08	As(III)	GW	D	≤ 0.400	Z U	0.400	2.10	µg/L	B202845	2001257
2042040-08	As(V)	GW	D	≤ 0.400	Z U	0.400	2.10	µg/L	B202845	2001257
2042040-08	DMAs	GW	D	≤ 0.500	Z U	0.500	2.10	µg/L	B202845	2001257
2042040-08	MMAs	GW	D	≤ 0.400	Z U	0.400	2.10	µg/L	B202845	2001257
2042040-08	Unk As Sp	GW	D	≤ 0.500	Z U	0.500	2.10	µg/L	B202845	2001257
MCM-06, 92500800009										
2042040-09	As(III)	GW	D	53.6	Z	0.400	2.10	µg/L	B202845	2001257
2042040-09	As(V)	GW	D	1.69	Z J	0.400	2.10	µg/L	B202845	2001257
2042040-09	DMAs	GW	D	≤ 0.500	Z U	0.500	2.10	µg/L	B202845	2001257
2042040-09	MMAs	GW	D	≤ 0.400	Z U	0.400	2.10	µg/L	B202845	2001257
2042040-09	Unk As Sp	GW	D	291	Z	0.500	2.10	µg/L	B202845	2001257
MCM-07, 92500800010										
2042040-10	As(III)	GW	D	≤ 0.400	Z U	0.400	2.10	µg/L	B202845	2001257
2042040-10	As(V)	GW	D	≤ 0.400	Z U	0.400	2.10	µg/L	B202845	2001257
2042040-10	DMAs	GW	D	≤ 0.500	Z U	0.500	2.10	µg/L	B202845	2001257
2042040-10	MMAs	GW	D	≤ 0.400	Z U	0.400	2.10	µg/L	B202845	2001257
2042040-10	Unk As Sp	GW	D	8.98	Z	0.500	2.10	µg/L	B202845	2001257

Sample Results

Sample	Analyte	Report Matrix	Basis	Result	Qualifier	MDL	MRL	Unit	Batch	Sequence
MCM-14, 92500800011										
2042040-11	As(III)	GW	D	≤ 0.400	Z U	0.400	2.10	µg/L	B202845	2001257
2042040-11	As(V)	GW	D	≤ 0.400	Z U	0.400	2.10	µg/L	B202845	2001257
2042040-11	DMAs	GW	D	≤ 0.500	Z U	0.500	2.10	µg/L	B202845	2001257
2042040-11	MMAs	GW	D	≤ 0.400	Z U	0.400	2.10	µg/L	B202845	2001257
2042040-11	Unk As Sp	GW	D	≤ 0.500	Z U	0.500	2.10	µg/L	B202845	2001257

Accuracy & Precision Summary

Batch: B202845
Lab Matrix: Water
Method: SOP BAL-4100

Sample	Analyte	Native	Spike	Result	Units	REC & Limits	RPD & Limits
B202845-BS1	**Blank Spike, (2042031)**						
	As(III)		5.150	4.567	µg/L	89% 75-125	
	As(V)		5.200	5.043	µg/L	97% 75-125	
	DMAs		5.210	4.946	µg/L	95% 75-125	
B202845-BS2	**Blank Spike, (2006012)**						
	MMAs		5.000	4.805	µg/L	96% 75-125	
B202845-DUP1	**Duplicate, (2042040-07)**						
	As(III)	ND		ND	µg/L		N/C 25
	As(V)	ND		ND	µg/L		N/C 25
	DMAs	ND		ND	µg/L		N/C 25
	MMAs	ND		ND	µg/L		N/C 25
	Unk As Sp	3.917		3.872	µg/L		1% 25
B202845-MS1	**Matrix Spike, (2042040-07)**						
	As(III)	ND	104.5	104.4	µg/L	100% 75-125	
	As(V)	ND	97.10	104.3	µg/L	107% 75-125	
	DMAs	ND	100.0	102.3	µg/L	102% 75-125	
	MMAs	ND	97.40	97.33	µg/L	100% 75-125	
B202845-MSD1	**Matrix Spike Duplicate, (2042040-07)**						
	As(III)	ND	104.5	106.3	µg/L	102% 75-125	2% 25
	As(V)	ND	97.10	103.9	µg/L	107% 75-125	0.4% 25
	DMAs	ND	100.0	102.5	µg/L	103% 75-125	0.2% 25
	MMAs	ND	97.40	97.93	µg/L	101% 75-125	0.6% 25
B202845-DUP2	**Duplicate, (2042050-03)**						
	As(III)	1.271		1.264	µg/L		0.6% 25
	As(V)	ND		ND	µg/L		N/C 25
	DMAs	ND		ND	µg/L		N/C 25
	MMAs	ND		ND	µg/L		N/C 25
	Unk As Sp	ND		ND	µg/L		N/C 25

Project ID: PAC-HN2007
PM: Amy Goodall

Client PM: Kevin Herring
Client Project: 92500800

Accuracy & Precision Summary

Batch: B202845
Lab Matrix: Water
Method: SOP BAL-4100

Sample	Analyte	Native	Spike	Result	Units	REC & Limits	RPD & Limits
B202845-MS2	**Matrix Spike, (2042050-03)**						
	As(III)	1.271	104.5	109.1	µg/L	103% 75-125	
	As(V)	ND	97.10	101.7	µg/L	105% 75-125	
	DMAs	ND	100.0	103.8	µg/L	104% 75-125	
	MMAs	ND	97.40	100.4	µg/L	103% 75-125	
B202845-MSD2	**Matrix Spike Duplicate, (2042050-03)**						
	As(III)	1.271	104.5	110.3	µg/L	104% 75-125	1% 25
	As(V)	ND	97.10	101.2	µg/L	104% 75-125	0.5% 25
	DMAs	ND	100.0	104.5	µg/L	104% 75-125	0.7% 25
	MMAs	ND	97.40	100.6	µg/L	103% 75-125	0.3% 25

Method Blanks & Reporting Limits

Batch: B202845
Matrix: Water
Method: SOP BAL-4100
Analyte: As(III)

Sample	Result	Units
B202845-BLK1	0.00	µg/L
B202845-BLK2	0.00	µg/L
B202845-BLK3	0.00	µg/L
B202845-BLK4	0.00	µg/L

Average: 0.000
Limit: 0.021
MDL: 0.004
MRL: 0.021

Analyte: As(V)

Sample	Result	Units
B202845-BLK1	0.004	µg/L
B202845-BLK2	0.002	µg/L
B202845-BLK3	0.003	µg/L
B202845-BLK4	0.004	µg/L

Average: 0.003
Limit: 0.021
MDL: 0.004
MRL: 0.021

Analyte: DMAs

Sample	Result	Units
B202845-BLK1	0.00	µg/L
B202845-BLK2	0.00	µg/L
B202845-BLK3	0.00	µg/L
B202845-BLK4	0.00	µg/L

Average: 0.000
Limit: 0.021
MDL: 0.005
MRL: 0.021

Method Blanks & Reporting Limits

Analyte: MMAs

Sample	Result	Units
B202845-BLK1	0.00	µg/L
B202845-BLK2	0.00	µg/L
B202845-BLK3	0.00	µg/L
B202845-BLK4	0.00	µg/L

Average: 0.000
Limit: 0.021

MDL: 0.004
MRL: 0.021

Analyte: Unk As Sp

Sample	Result	Units
B202845-BLK1	0.00	µg/L
B202845-BLK2	0.00	µg/L
B202845-BLK3	0.00	µg/L
B202845-BLK4	0.00	µg/L

Average: 0.000
Limit: 0.021

MDL: 0.005
MRL: 0.021

Sample Containers

Lab ID: 2042040-01 **Report Matrix:** GW **Collected:** 10/14/2020
Sample: RW-1 **Sample Type:** Sample **Received:** 10/15/2020

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Vacutainer	10 mL	20-0160	EDTA (Vial)	n/a	n/a	Cooler - 2042040
B	XTRA_VOL	10 mL	20-0160	EDTA (Vial)	n/a	n/a	Cooler - 2042040

Lab ID: 2042040-02 **Report Matrix:** GW **Collected:** 10/14/2020
Sample: RW-2 **Sample Type:** Sample **Received:** 10/15/2020

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Vacutainer	10 mL	20-0160	EDTA (Vial)	n/a	n/a	Cooler - 2042040
B	XTRA_VOL	10 mL	20-0160	EDTA (Vial)	n/a	n/a	Cooler - 2042040

Lab ID: 2042040-03 **Report Matrix:** GW **Collected:** 10/14/2020
Sample: RW-3 **Sample Type:** Sample **Received:** 10/15/2020

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Vacutainer	10 mL	20-0160	EDTA (Vial)	n/a	n/a	Cooler - 2042040
B	XTRA_VOL	10 mL	20-0160	EDTA (Vial)	n/a	n/a	Cooler - 2042040

Lab ID: 2042040-04 **Report Matrix:** GW **Collected:** 10/14/2020
Sample: RW-7 **Sample Type:** Sample **Received:** 10/15/2020

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Vacutainer	10 mL	20-0160	EDTA (Vial)	n/a	n/a	Cooler - 2042040
B	XTRA_VOL	10 mL	20-0160	EDTA (Vial)	n/a	n/a	Cooler - 2042040

Sample Containers

Lab ID: 2042040-05
Sample: RW-8
Report Matrix: GW
Sample Type: Sample
Collected: 10/14/2020
Received: 10/15/2020

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Vacutainer	10 mL	20-0160	EDTA (Vial)	n/a	n/a	Cooler - 2042040
B	XTRA_VOL	10 mL	20-0160	EDTA (Vial)	n/a	n/a	Cooler - 2042040

Lab ID: 2042040-06
Sample: RW-9
Report Matrix: GW
Sample Type: Sample
Collected: 10/14/2020
Received: 10/15/2020

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Vacutainer	10 mL	20-0160	EDTA (Vial)	n/a	n/a	Cooler - 2042040
B	XTRA_VOL	10 mL	20-0160	EDTA (Vial)	n/a	n/a	Cooler - 2042040

Lab ID: 2042040-07
Sample: RW-10
Report Matrix: GW
Sample Type: Sample
Collected: 10/14/2020
Received: 10/15/2020

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Vacutainer	10 mL	20-0160	EDTA (Vial)	n/a	n/a	Cooler - 2042040
B	XTRA_VOL	10 mL	20-0160	EDTA (Vial)	n/a	n/a	Cooler - 2042040

Lab ID: 2042040-08
Sample: Dup-1
Report Matrix: GW
Sample Type: Field Duplicate
Collected: 10/14/2020
Received: 10/15/2020

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Vacutainer	10 mL	20-0160	EDTA (Vial)	n/a	n/a	Cooler - 2042040
B	XTRA_VOL	10 mL	20-0160	EDTA (Vial)	n/a	n/a	Cooler - 2042040

Sample Containers

Lab ID: 2042040-09 **Report Matrix:** GW **Collected:** 10/14/2020
Sample: MCM-06 **Sample Type:** Sample **Received:** 10/15/2020

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Vacutainer	10 mL	20-0160	EDTA (Vial)	n/a	n/a	Cooler - 2042040
B	XTRA_VOL	10 mL	20-0160	EDTA (Vial)	n/a	n/a	Cooler - 2042040

Lab ID: 2042040-10 **Report Matrix:** GW **Collected:** 10/14/2020
Sample: MCM-07 **Sample Type:** Sample **Received:** 10/15/2020

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Vacutainer	10 mL	20-0160	EDTA (Vial)	n/a	n/a	Cooler - 2042040
B	XTRA_VOL	10 mL	20-0160	EDTA (Vial)	n/a	n/a	Cooler - 2042040

Lab ID: 2042040-11 **Report Matrix:** GW **Collected:** 10/14/2020
Sample: MCM-14 **Sample Type:** Sample **Received:** 10/15/2020

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Vacutainer	10 mL	20-0160	EDTA (Vial)	n/a	n/a	Cooler - 2042040
B	XTRA_VOL	10 mL	20-0160	EDTA (Vial)	n/a	n/a	Cooler - 2042040

Shipping Containers

Cooler - 2042040

Received: October 15, 2020 11:00
Tracking No: 8126 1269 6086 via FedEx
Coolant Type: Ice
Temperature: 7.1 °C

Description: Cooler
Damaged in transit? No
Returned to client? No
Comments: IR #21

Custody seals present? Yes
Custody seals intact? Yes
COC present? Yes

Chain of Custody

PASI Charlotte Laboratory

Pace Analytical
www.pacelabs.com

Workorder: 92500800 **Workorder Name:** MCMANUS AS SPECIATION **Results Requested By:** 10/29/2020

Report Invoice To:	Subcontract To:
Kevin Herring Pace Analytical Charlotte 9800 Kincey Ave. Suite 100 Huntersville, NC 28078 Phone 1(704)875-9092 Email: kevin.herring@pacelabs.com **State of Sample Origin:** GA	P.O. KLH92500800 Brooks Applied Labs 18804 North Creek Pkwy, Suite 100 Bothell, WA 98011

Item	Sample ID	Collect Date/Time	Lab ID	Matrix	General	As Speciation	As (III)	As (V)	As (MMA)	As (DMA)	LAB USE ONLY
1	RW-1	10/14/2020 12:19	92500800001	Water	2	X					
2	RW-2	10/14/2020 15:04	92500800002	Water	2	X					
3	RW-3	10/14/2020 17:17	92500800003	Water	2	X					
4	RW-7	10/14/2020 15:43	92500800004	Water	2	X					
5	RW-8	10/14/2020 16:30	92500800005	Water	2	X					
6	RW-9	10/14/2020 13:04	92500800006	Water	2	X					
7	RW-10	10/14/2020 15:00	92500800007	Water	2	X					
8	DUP-1	10/14/2020 00:00	92500800008	Water	2	X					
9	MCM-06	10/14/2020 16:52	92500800009	Water	2	X					
10	MCM-07	10/14/2020 14:42	92500800010	Water	2	X					
11	MCM-14	10/14/2020 13:00	92500800011	Water	2	X					
12											
13											
14											
15											

Transfers	Released By	Date/Time	Received By	Date/Time	Comments
1				10/15/20	
2				1700	
3					

Cooler Temperature on Receipt °C	Custody Seal Y or N	Received on Ice Y or N	Samples Intact Y or N

BROOKS APPLIED LABS

Chain-of-Custody Form

Ship samples to:
18804 North Creek Parkway, Suite 100
Bothell, WA 98011

For BAL use only — BAL Report 2042040

Received by: Spencer Shibuya *Date:* 10/15/20
Work Order ID: ______ *Time:* 11:00
Project ID: ______

Client: Georgia Power Company
Contact: Kristen Jurinko
Client Project ID: ______
Samples Collected By: Kevin Stephenson, Veronica Fay, Will Loeber, Trent Gunn
PO Number: ______
Phone: 404-506-7116
Email: kjjurink@southernco.com
Mailing Address: 241 Ralph McGill Blvd, Atlanta, GA 30308
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 /HNO3/Other	BAL Analyses Required: Total Hg, EPA 1631	Methyl Hg, EPA 1630	ICP-MS Metals (specify) As Total Rec, Diss.	As Species (specify) InOrg (III/V), MMA, DMA	Se Species (specify) Se(IV), Se(VI), SeCN, Uknown	Filtration	Other (specify) Sum of unknown As	Other (specify)	Comments: Specify Here
1	RW-1	10/14/20	1219	GW	2	Y	ICE			X	X			X		
2	RW-2	10/14/20	1504	GW	2	Y	ICE			X	X			X		
3	RW-3	10/14/20	1717	GW	2	Y	ICE			X	X			X		
4	RW-7	10/14/20	1543	GW	2	Y	ICE			X	X			X		
5	RW-8	10/14/20	1630	GW	2	Y	ICE			X	X			X		
6	RW-9	10/14/20	1304	GW	2	Y	ICE			X	X			X		
7	RW-10	10/14/20	1500	GW	2	Y	ICE			X	X			X		
8	Dup-1	10/14/20	–	GW	2	Y	ICE			X	X			X		
9	MCM-06	10/14/20	1652	GW	2	Y	ICE			X	X			X		
10	MCM-07	10/14/20	1442	GW	2	Y	ICE			X	X			X		
	Trip Blank															

Relinquished By: Kevin Stephenson	Date: 10/14/20	Time: 1820	Relinquished By:	Date:	Time:
Received By: FedEx	Date:	Time:	Total Number of Packages:		

Page 1 of 2   List Hazardous Contaminants: ______

samples@brooksapplied.com | brooksapplied.com

Chain-of-Custody Form

BROOKS APPLIED LABS

Ship samples to:
18804 North Creek Parkway, Suite 100
Bothell, WA 98011

BAL Report 2042040

For BAL use only

Received by: Spencer Shibuya *Date:* 10/15/20
Work Order ID: *Time:* 1100
Project ID:

Client: Georgia Power Company
Contact: Kristen Jurinko
Client Project ID:
Samples Collected By: [illegible]

PO Number:
Phone: 404-506-7116
Email: kjurinko@southernco.com

Mailing Address: 241 Ralph McGill Blvd
Atlanta, GA 30308
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) Total Rec. Diss As	As Species (specify) InOrg III, V, MMA, DMA	Se Species (specify) Se(IV), Se(VI), SeCN, Uknown	Filtration	Other (specify) Sum of Dissolved As	Other (specify)	Comments: Specify Here
1	MCM-14	10/14/20	1300	GW	2	Y	Ice			X	X			X		
2																
3																
4																
5																
6																
7																
8																
9																
10																
Trip Blank																

Relinquished By: [illegible signature]	Date: 1820	Time: 10/14/20	Relinquished By:	Date:	Time:
Received By: Fedex	Date:	Time:	Total Number of Packages:		

Page 2 of 2 List Hazardous Contaminants:

samples@brooksapplied.com | brooksapplied.com

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

October 30, 2020

Joju Abraham
Georgia Power-CCR
2480 Maner Road
Atlanta, GA 30339

RE: Project: MCMANUS AS SPECIATION
Pace Project No.: 92501055

Dear Joju Abraham:

Enclosed are the analytical results for sample(s) received by the laboratory on October 16, 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.

Some analyses were subcontracted outside of the Pace Network. The test report from the external subcontractor is attached to this report in its entirety.

The test results provided in this final report were generated by each of the following laboratories within the Pace Network:

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: Veronica Fay
Trent Godwin, Resolute Environmental & Water Resources
Kristen Jurinko
Ms. Lauren Petty, Southern Co. Services
Kevin Stephenson, Resolute Environmental & Water Resources Consulting, LLC
Stephen Wilson, Resolute Environmental & Water Resources Consulting, LLC

REPORT OF LABORATORY ANALYSIS

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

SAMPLE SUMMARY

Project: MCMANUS AS SPECIATION
Pace Project No.: 92501055

Lab ID	Sample ID	Matrix	Date Collected	Date Received
92501055001	**MCM-05**	Water	10/15/20 13:48	10/16/20 00:00
92501055002	**DPZ-2**	Water	10/15/20 16:00	10/16/20 00:00
92501055003	**RW-4**	Water	10/15/20 14:46	10/16/20 00:00
92501055004	**RW-5**	Water	10/15/20 15:55	10/16/20 00:00
92501055005	**RW-6**	Water	10/15/20 14:03	10/16/20 00:00
92501055006	**DUP-2**	Water	10/15/20 00:00	10/16/20 00:00
92501055007	**FBL101520**	Water	10/15/20 17:36	10/16/20 00:00

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: [signature] Date: 10/16/20
Work Order ID: _____ Time: 10:25
Project ID: _____

Client: Georgia Power Company
Contact: Kristen Jurinko
Client Project ID: _____
Samples Collected By: Kevin Stephenson, Veronica Fay, Will Lacker, Trent Godwin

PO Number: _____
Phone: 404-506-7116
Email: kajurink@southernco.com

Mailing Address: 241 Ralph McGill Blvd
Atlanta, GA 30308
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 As (specify) Total Rec, Diss	As Species (specify) InOrg, III, V, MMA, DMA	Se Species (specify) Se(IV), Se(VI), SeCN, Uknown	Filtration	Other (specify) sum of unknown As	Other (specify)	Comments: Specify Here
1	MCM-05	10/15/20	1348	GW	2	Y	Ice			X	X			X		
2	DPZ-2	10/15/20	1600	GW	2	Y	Ice			X	X			X		
3	RW-4	10/15/20	1446	GW	2	Y	Ice			X	X			X		
4	RW-5	10/15/20	1555	GW	2	Y	Ice			X	X			X		
5	RW-6	10/15/20	1403	GW	2	Y	Ice			X	X			X		
6	DUP-2	10/15/20	-	GW	2	Y	Ice			X	X			X		
7	FBL101520	10/15/20	1736	GW	2	Y	Ice			X	X			X		
8																
9																
10																
	Trip Blank															

Relinquished By: William Lacker	Date: 10/15/20	Time: 1800	Relinquished By:	Date:	Time:
Received By: Fedex	Date: 10/15/20	Time: 1800	Total Number of Packages:		

Page 1 of 1 List Hazardous Contaminants: _____

WO# : 92501055
92501055

BROOKS APPLIED LABS
18804 North Creek Parkway, Ste 100, Bothell, WA 98011 • USA • T: 206 632 6206 F: 206 632 6017 • info@brooksapplied.com

October 29, 2020

Pace Analytical Services – Huntersville
ATTN: Kevin Herring
9800 Kincey Ave., Suite 100
Huntersville, NC 28078
Kevin.Herring@pacelabs.com

RE: Project PAC-HN2007 Client Project: 92501055

Dear Kevin Herring,

On October 16, 2020, Brooks Applied Labs (BAL) received seven (7) water samples at a temperature of 1.6°C. The samples were logged-in for the analysis of arsenic (As) speciation per the chain-of-custody (COC). The client directly filtered (0.45µm) each sample into an evacuated container prior to receipt at BAL. All samples were stored according to BAL SOPs and EPA methodology.

Arsenic Speciation by IC-ICP-CRC-MS
All aqueous samples for As speciation were analyzed using ion chromatography inductively coupled plasma collision reaction cell mass spectrometry (IC-ICP-CRC-MS). In accordance with the project agreement, As speciation was defined as dissolved arsenite [As(III)], arsenate [As(V)], monomethylarsonic acid [MMAs], and dimethylarsinic acid [DMAs]; the total estimated concentration of any unidentified arsenic-containing species detected in each sample has also been reported as Unk As Sp. Arsenic species are chromatographically separated on an ion exchange column and then quantified using inductively coupled plasma collision reaction cell mass spectrometry (ICP-CRC-MS); for more information on this determinative technique, please visit the Interference Reduction Technology section on our website, brooksapplied.com.

In instances where the native sample result and/or the associated duplicate (DUP) result were below the MDL the RPD was not calculated (**N/C**).

The 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.

All data was reported without further qualification and all other 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 us if you have any questions regarding this report.

Sincerely,

Amy Goodall
Project Manager
Brooks Applied Labs
amy@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/> or review Tables 1 and 2 in our Accreditation Information. 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	reference material
T	total fraction
TR	total recoverable fraction

Definition of Data Qualifiers

(Effective 3/23/2020)

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. Please see narrative for explanation.
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.
M	Duplicate precision (RPD) was not within acceptance criteria. Please see narrative for explanation.
N	Spike recovery was not within acceptance criteria. Please see narrative for explanation.
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.
Z	Holding time and/or preservation requirements not established for this method; however, BAL recommendations for holding time were not followed. Please see narrative for explanation.

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.

Accreditation Information

Table 1. Accredited method/matrix/analytes for TNI

Issued by: State of Florida Dept. of Health (The NELAC Institute 2016 Standard)
Issued on: July 27, 2020; Valid to: June 30, 2021
Certificate Number: E87982-35

Method	Matrix	TNI Accredited Analyte(s)
EPA 1638	Non-Potable Waters	Ag, Cd, Cu, Ni, Pb, Sb, Se, Tl, Zn
EPA 200.8	Non-Potable Waters	Ag, Al, As, Ba, Be, Cd, Co, Cr, Cu, Mn, Mo, Ni, Pb, Sb, Se, Tl, U, V, Zn
EPA 6020	Non-Potable Waters	Ag, Al, As, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Mg, Mn, Mo, Ni, Pb, Sb, Se, Tl, U, V, Zn
	Solids/Chemicals & Biological	Ag, Al, As, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Mg, Mn, Mo, Ni, Pb, Sb, Se, Tl, V, Zn
BAL-5000	Non-Potable Waters	Ag, Al, As, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Mg, Mn, Mo, Ni, Pb, Sb, Se, Sn, Sr, Tl, U, V, Zn, Hardness
	Solids/Chemicals	Ag, As, B, Be, Cd, Co, Cr, Cu, Pb, Mo, Ni, Sb, Se, Sn, Sr, Tl, V, Zn
	Biological	Ag, Al, As, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Mg, Mn, Mo, Ni, Pb, Sb, Se, Sn, Tl, V, Zn
EPA 1640	Non-Potable Waters	Ag, As, Cd, Cu, Pb, Ni, Zn
EPA 1631E	Non-Potable Waters, Solids/Chemicals & Biological	Total Mercury
EPA 1630	Non-Potable Waters	Methyl Mercury
BAL-3200	Solids/Chemicals & Biological	Methyl Mercury
BAL-4100	Non-Potable Waters	As(III), As(V), DMAs, MMAs
BAL-4200	Non-Potable Waters	Se(IV), Se(VI)
BAL-4201	Non-Potable Waters	Se(IV), Se(VI)
BAL-4300	Non-Potable Waters Solid/Chemicals	Cr(VI)
SM2340B	Non-Potable Waters	Hardness

Accreditation Information

Table 2. Accredited method/matrix/analytes for ISO (1), Non-Governmental TNI (2), and DoD/DOE (3)

Issued by: ANAB

Issued on: January 10, 2020; Valid to: March 30, 2022

Method	Matrix	ISO and Non-Gov. TNI Accredited Analyte(s)	DoD/DOE Accredited Analytes
EPA 1638 Mod EPA 200.8 Mod EPA 6020 Mod BAL-5000	Non-Potable Waters	Ag, Al, As, B, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Mg, Mn, Mo, Ni, Pb, Sb, Se, Sn, Sr, Tl, U, V, Zn	Ag, Al, As, Ba, Ca, Cd, Cr, Cu, Fe, Pb, Mg, Mn, Ni, Sb, Se, V, Zn
	Solids/Chemicals & Biological	Ag, Al, As, B, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Mg, Mn, Mo, Ni, Pb, Sb, Se, Sn, Sr, Tl, V, Zn	Ag, As, Cd, Cr, Cu, Pb, Ni, Se, Zn
EPA 1640 Mod	Non-Potable Waters	Ag, As, Be, Cd, Cr, Co, Cu, Pb, Ni, Se, Tl, V, Zn	Not Accredited
EPA 1631E Mod BAL-3100 (waters) BAL-3101 (solids)	Non-Potable Waters, Solids/Chemicals & Biological/Food	Total Mercury	Total Mercury
EPA 1630 Mod BAL-3200	Non-Potable Waters, Solids/Chemicals Biological	Methyl Mercury	Methyl Mercury (excluding Solids/Chemicals)
EPA 1632A Mod BAL-3300	Non-Potable Waters Solids/Chemicals	Inorganic Arsenic, As(III)	Inorganic Arsenic. As(III) for waters only.
	Biological/Food	Inorganic Arsenic	Inorganic Arsenic (excluding Food)
AOAC 2015.01 Mod BAL-5000 by BAL-5040	Food	As, Cd, Hg, Pb	Not Accredited
BAL-4100	Non-Potable Waters	As(III), As(V), DMAs, MMAs	Not Accredited
	Biological by BAL-4115	Inorganic Arsenic, DMAs, MMAs	Not Accredited
BAL-4101	Food by BAL-4116	Inorganic Arsenic, DMAs, MMAs	Not Accredited
BAL-4200	Non-Potable Waters	Se(IV), Se(VI), SeCN	Not Accredited
BAL-4201	Non-Potable Waters	Se(IV), Se(VI), SeCN, SeMet	Not Accredited
BAL-4300	Non-Potable Waters, Solid/Chemicals	Cr(VI)	Cr(VI)
SM 3500-Fe BAL-4500	Non-Potable Waters	Fe, Fe(II)	Not Accredited
SM2340B	Non-Potable Waters	Hardness	Hardness
SM 2540G EPA 160.3 BAL-0501	Solids/Chemicals & Biological	% Dry Weight	% Dry Weight

(1) ISO/IEC 17025:2017 – Certificate Number ADE-1447.2
(2) Non-Governmental NELAC Institute 2016 Standard – Certificate Number ADE-1447.1
(3) Department of Defense/Energy Consolidated Quality Systems Manual v. 5.3 – Certificate Numbers ADE-1447 for DoD, ADE-1447.3 for DOE.

Project ID: PAC-HN2007
PM: Amy Goodall

Client PM: Kevin Herring
Client Project: 92501055

Sample Information

Sample	Alias	Lab ID	Report Matrix	Type	Sampled	Received
MCM-05	92501055001	2042050-01	Water-D	Sample	10/15/2020	10/16/2020
DPZ-2	92501055002	2042050-02	Water-D	Sample	10/15/2020	10/16/2020
RW-4	92501055003	2042050-03	Water-D	Sample	10/15/2020	10/16/2020
RW-5	92501055004	2042050-04	Water-D	Sample	10/15/2020	10/16/2020
RW-6	92501055005	2042050-05	Water-D	Sample	10/15/2020	10/16/2020
DUP-2	92501055006	2042050-06	Water-D	Sample	10/15/2020	10/16/2020
FBL101520	92501055007	2042050-07	Water-D	Sample	10/15/2020	10/16/2020

Batch Summary

Analyte	Lab Matrix	Method	Prepared	Analyzed	Batch	Sequence
As(III)	Water	SOP BAL-4100	10/20/2020	10/21/2020	B202845	2001257
As(V)	Water	SOP BAL-4100	10/20/2020	10/21/2020	B202845	2001257
DMAs	Water	SOP BAL-4100	10/20/2020	10/21/2020	B202845	2001257
MMAs	Water	SOP BAL-4100	10/20/2020	10/21/2020	B202845	2001257
Unk As Sp	Water	SOP BAL-4100	10/20/2020	10/21/2020	B202845	2001257

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Sample Results

Sample	Analyte	Report Matrix	Basis	Result	Qualifier	MDL	MRL	Unit	Batch	Sequence
MCM-05, 92501055001										
2042050-01	As(III)	Water-D	D	1.13	J	0.400	2.10	µg/L	B202845	2001257
2042050-01	As(V)	Water-D	D	≤ 0.400	U	0.400	2.10	µg/L	B202845	2001257
2042050-01	DMAs	Water-D	D	≤ 0.500	U	0.500	2.10	µg/L	B202845	2001257
2042050-01	MMAs	Water-D	D	≤ 0.400	U	0.400	2.10	µg/L	B202845	2001257
2042050-01	Unk As Sp	Water-D	D	≤ 0.500	U	0.500	2.10	µg/L	B202845	2001257
DPZ-2, 92501055002										
2042050-02	As(III)	Water-D	D	0.461	J	0.400	2.10	µg/L	B202845	2001257
2042050-02	As(V)	Water-D	D	≤ 0.400	U	0.400	2.10	µg/L	B202845	2001257
2042050-02	DMAs	Water-D	D	≤ 0.500	U	0.500	2.10	µg/L	B202845	2001257
2042050-02	MMAs	Water-D	D	≤ 0.400	U	0.400	2.10	µg/L	B202845	2001257
2042050-02	Unk As Sp	Water-D	D	17.3		0.500	2.10	µg/L	B202845	2001257
RW-4, 92501055003										
2042050-03	As(III)	Water-D	D	1.27	J	0.400	2.10	µg/L	B202845	2001257
2042050-03	As(V)	Water-D	D	≤ 0.400	U	0.400	2.10	µg/L	B202845	2001257
2042050-03	DMAs	Water-D	D	≤ 0.500	U	0.500	2.10	µg/L	B202845	2001257
2042050-03	MMAs	Water-D	D	≤ 0.400	U	0.400	2.10	µg/L	B202845	2001257
2042050-03	Unk As Sp	Water-D	D	≤ 0.500	U	0.500	2.10	µg/L	B202845	2001257
RW-5, 92501055004										
2042050-04	As(III)	Water-D	D	0.401	J	0.400	2.10	µg/L	B202845	2001257
2042050-04	As(V)	Water-D	D	≤ 0.400	U	0.400	2.10	µg/L	B202845	2001257
2042050-04	DMAs	Water-D	D	≤ 0.500	U	0.500	2.10	µg/L	B202845	2001257
2042050-04	MMAs	Water-D	D	≤ 0.400	U	0.400	2.10	µg/L	B202845	2001257
2042050-04	Unk As Sp	Water-D	D	≤ 0.500	U	0.500	2.10	µg/L	B202845	2001257
RW-6, 92501055005										
2042050-05	As(III)	Water-D	D	0.714	J	0.400	2.10	µg/L	B202845	2001257
2042050-05	As(V)	Water-D	D	≤ 0.400	U	0.400	2.10	µg/L	B202845	2001257
2042050-05	DMAs	Water-D	D	≤ 0.500	U	0.500	2.10	µg/L	B202845	2001257
2042050-05	MMAs	Water-D	D	≤ 0.400	U	0.400	2.10	µg/L	B202845	2001257
2042050-05	Unk As Sp	Water-D	D	0.946	J	0.500	2.10	µg/L	B202845	2001257

Sample Results

Sample	Analyte	Report Matrix	Basis	Result	Qualifier	MDL	MRL	Unit	Batch	Sequence
DUP-2, 92501055006										
2042050-06	As(III)	Water-D	D	0.412	J	0.400	2.10	µg/L	B202845	2001257
2042050-06	As(V)	Water-D	D	0.572	J	0.400	2.10	µg/L	B202845	2001257
2042050-06	DMAs	Water-D	D	≤ 0.500	U	0.500	2.10	µg/L	B202845	2001257
2042050-06	MMAs	Water-D	D	≤ 0.400	U	0.400	2.10	µg/L	B202845	2001257
2042050-06	Unk As Sp	Water-D	D	≤ 0.500	U	0.500	2.10	µg/L	B202845	2001257
FBL101520, 92501055007										
2042050-07	As(III)	Water-D	D	≤ 0.400	U	0.400	2.10	µg/L	B202845	2001257
2042050-07	As(V)	Water-D	D	≤ 0.400	U	0.400	2.10	µg/L	B202845	2001257
2042050-07	DMAs	Water-D	D	≤ 0.500	U	0.500	2.10	µg/L	B202845	2001257
2042050-07	MMAs	Water-D	D	≤ 0.400	U	0.400	2.10	µg/L	B202845	2001257
2042050-07	Unk As Sp	Water-D	D	≤ 0.500	U	0.500	2.10	µg/L	B202845	2001257

Accuracy & Precision Summary

Batch: B202845
Lab Matrix: Water
Method: SOP BAL-4100

Sample	Analyte	Native	Spike	Result	Units	REC & Limits	RPD & Limits
B202845-BS1	**Blank Spike, (2042031)**						
	As(III)		5.150	4.567	µg/L	89% 75-125	
	As(V)		5.200	5.043	µg/L	97% 75-125	
	DMAs		5.210	4.946	µg/L	95% 75-125	
B202845-BS2	**Blank Spike, (2006012)**						
	MMAs		5.000	4.805	µg/L	96% 75-125	
B202845-DUP1	**Duplicate, (2042040-07)**						
	As(III)	ND		ND	µg/L		N/C 25
	As(V)	ND		ND	µg/L		N/C 25
	DMAs	ND		ND	µg/L		N/C 25
	MMAs	ND		ND	µg/L		N/C 25
	Unk As Sp	3.917		3.872	µg/L		1% 25
B202845-MS1	**Matrix Spike, (2042040-07)**						
	As(III)	ND	104.5	104.4	µg/L	100% 75-125	
	As(V)	ND	97.10	104.3	µg/L	107% 75-125	
	DMAs	ND	100.0	102.3	µg/L	102% 75-125	
	MMAs	ND	97.40	97.33	µg/L	100% 75-125	
B202845-MSD1	**Matrix Spike Duplicate, (2042040-07)**						
	As(III)	ND	104.5	106.3	µg/L	102% 75-125	2% 25
	As(V)	ND	97.10	103.9	µg/L	107% 75-125	0.4% 25
	DMAs	ND	100.0	102.5	µg/L	103% 75-125	0.2% 25
	MMAs	ND	97.40	97.93	µg/L	101% 75-125	0.6% 25
B202845-DUP2	**Duplicate, (2042050-03)**						
	As(III)	1.271		1.264	µg/L		0.6% 25
	As(V)	ND		ND	µg/L		N/C 25
	DMAs	ND		ND	µg/L		N/C 25
	MMAs	ND		ND	µg/L		N/C 25
	Unk As Sp	ND		ND	µg/L		N/C 25

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Accuracy & Precision Summary

Batch: B202845
Lab Matrix: Water
Method: SOP BAL-4100

Sample	Analyte	Native	Spike	Result	Units	REC & Limits	RPD & Limits
B202845-MS2	**Matrix Spike, (2042050-03)**						
	As(III)	1.271	104.5	109.1	µg/L	103% 75-125	
	As(V)	ND	97.10	101.7	µg/L	105% 75-125	
	DMAs	ND	100.0	103.8	µg/L	104% 75-125	
	MMAs	ND	97.40	100.4	µg/L	103% 75-125	
B202845-MSD2	**Matrix Spike Duplicate, (2042050-03)**						
	As(III)	1.271	104.5	110.3	µg/L	104% 75-125	1% 25
	As(V)	ND	97.10	101.2	µg/L	104% 75-125	0.5% 25
	DMAs	ND	100.0	104.5	µg/L	104% 75-125	0.7% 25
	MMAs	ND	97.40	100.6	µg/L	103% 75-125	0.3% 25

Method Blanks & Reporting Limits

Batch: B202845
Matrix: Water
Method: SOP BAL-4100
Analyte: As(III)

Sample	Result	Units
B202845-BLK1	0.00	µg/L
B202845-BLK2	0.00	µg/L
B202845-BLK3	0.00	µg/L
B202845-BLK4	0.00	µg/L

Average: 0.000
Limit: 0.021
MDL: 0.004
MRL: 0.021

Analyte: As(V)

Sample	Result	Units
B202845-BLK1	0.004	µg/L
B202845-BLK2	0.002	µg/L
B202845-BLK3	0.003	µg/L
B202845-BLK4	0.004	µg/L

Average: 0.003
Limit: 0.021
MDL: 0.004
MRL: 0.021

Analyte: DMAs

Sample	Result	Units
B202845-BLK1	0.00	µg/L
B202845-BLK2	0.00	µg/L
B202845-BLK3	0.00	µg/L
B202845-BLK4	0.00	µg/L

Average: 0.000
Limit: 0.021
MDL: 0.005
MRL: 0.021

Method Blanks & Reporting Limits

Analyte: MMAs

Sample	Result	Units
B202845-BLK1	0.00	µg/L
B202845-BLK2	0.00	µg/L
B202845-BLK3	0.00	µg/L
B202845-BLK4	0.00	µg/L

Average: 0.000
Limit: 0.021

MDL: 0.004
MRL: 0.021

Analyte: Unk As Sp

Sample	Result	Units
B202845-BLK1	0.00	µg/L
B202845-BLK2	0.00	µg/L
B202845-BLK3	0.00	µg/L
B202845-BLK4	0.00	µg/L

Average: 0.000
Limit: 0.021

MDL: 0.005
MRL: 0.021

Project ID: PAC-HN2007
PM: Amy Goodall

Client PM: Kevin Herring
Client Project: 92501055

Sample Containers

Lab ID: 2042050-01 **Report Matrix:** Water-D **Collected:** 10/15/2020
Sample: MCM-05 **Sample Type:** Sample **Received:** 10/16/2020

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Vacutainer	10 mL	20-0160	EDTA (Vial)	n/a	n/a	Cooler - 2042050
B	XTRA_VOL	10 mL	20-0160	EDTA (Vial)	n/a	n/a	Cooler - 2042050

Lab ID: 2042050-02 **Report Matrix:** Water-D **Collected:** 10/15/2020
Sample: DPZ-2 **Sample Type:** Sample **Received:** 10/16/2020

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Vacutainer	10 mL	20-0160	EDTA (Vial)	n/a	n/a	Cooler - 2042050
B	XTRA_VOL	10 mL	20-0160	EDTA (Vial)	n/a	n/a	Cooler - 2042050

Lab ID: 2042050-03 **Report Matrix:** Water-D **Collected:** 10/15/2020
Sample: RW-4 **Sample Type:** Sample **Received:** 10/16/2020

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Vacutainer	10 mL	20-0160	EDTA (Vial)	n/a	n/a	Cooler - 2042050
B	XTRA_VOL	10 mL	20-0160	EDTA (Vial)	n/a	n/a	Cooler - 2042050

Lab ID: 2042050-04 **Report Matrix:** Water-D **Collected:** 10/15/2020
Sample: RW-5 **Sample Type:** Sample **Received:** 10/16/2020

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Vacutainer	10 mL	20-0160	EDTA (Vial)	n/a	n/a	Cooler - 2042050
B	XTRA_VOL	10 mL	20-0160	EDTA (Vial)	n/a	n/a	Cooler - 2042050

Sample Containers

Lab ID: 2042050-05 **Report Matrix:** Water-D **Collected:** 10/15/2020
Sample: RW-6 **Sample Type:** Sample **Received:** 10/16/2020

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Vacutainer	10 mL	20-0160	EDTA (Vial)	n/a	n/a	Cooler - 2042050
B	XTRA_VOL	10 mL	20-0160	EDTA (Vial)	n/a	n/a	Cooler - 2042050

Lab ID: 2042050-06 **Report Matrix:** Water-D **Collected:** 10/15/2020
Sample: DUP-2 **Sample Type:** Sample **Received:** 10/16/2020

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Vacutainer	10 mL	20-0160	EDTA (Vial)	n/a	n/a	Cooler - 2042050
B	XTRA_VOL	10 mL	20-0160	EDTA (Vial)	n/a	n/a	Cooler - 2042050

Lab ID: 2042050-07 **Report Matrix:** Water-D **Collected:** 10/15/2020
Sample: FBL101520 **Sample Type:** Sample **Received:** 10/16/2020

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Vacutainer	10 mL	20-0160	EDTA (Vial)	n/a	n/a	Cooler - 2042050
B	XTRA_VOL	10 mL	20-0160	EDTA (Vial)	n/a	n/a	Cooler - 2042050

Shipping Containers

Cooler - 2042050

Received: October 16, 2020 10:25
Tracking No: 8126 1271 3299 via FedEx
Coolant Type: Ice
Temperature: 1.6 °C

Description: Cooler
Damaged in transit? No
Returned to client? No
Comments: IR# 21

Custody seals present? Yes
Custody seals intact? Yes
COC present? Yes

Chain of Custody

PASI Charlotte Laboratory

Pace Analytical®
www.pacelabs.com

Workorder: 92501055 **Workorder Name:** MCMANUS AS SPECIATION **Results Requested By:** 10/30/2020

Report / Invoice To

Kevin Herring
Pace Analytical Charlotte
9800 Kincey Ave. Suite 100
Huntersville, NC 28078
Phone 1(704)875-9092
Email: kevin.herring@pacelabs.com

State of Sample Origin: GA

Subcontract To

P.O. KLH92501055

Brooks Applied Labs
18804 North Creek Pkwy, Suite 100
Bothell, WA 98011

Item	Sample ID	Collect Date/Time	Lab ID	Matrix	General	As Speciation	As (III)	As (V)	As (MMA)	As (DMA)	LAB USE ONLY
1	MCM-05	10/15/2020 13:48	92501055001	Water	2	X					
2	DPZ-2	10/15/2020 16:00	92501055002	Water	2	X					
3	RW-4	10/15/2020 14:46	92501055003	Water	2	X					
4	RW-5	10/15/2020 15:55	92501055004	Water	2	X					
5	RW-6	10/15/2020 14:03	92501055005	Water	2	X					
6	DUP-2	10/15/2020 00:00	92501055006	Water	2	X					
7	FBL101520	10/15/2020 17:36	92501055007	Water	2	X					

Transfers	Released By	Date/Time	Received By	Date/Time
1				
2				
3				

Comments

Cooler Temperature on Receipt °C | **Custody Seal** Y or N | **Received on Ice** Y or N | **Samples Intact** Y or N

BROOKS APPLIED LABS

Chain-of-Custody Form

Ship samples to:
18804 North Creek Parkway, Suite 100
Bothell, WA 98011

For BAL use only — BAL Report 2042050
Received by: [signature] Date: 10/16/20
Work Order ID: _____ Time: 10:25
Project ID: _____

Client: Georgia Power Company
Contact: Kristen Jurinko
Client Project ID: _____
Samples Collected By: Kevin Stephenson, Veronica Fay, Will Looker, Trent Godwin

PO Number: _____
Phone: 404-506-7116
Email: knjurink@southernco.com

Mailing Address: 241 Ralph McGill Blvd
Atlanta, GA 30308
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/HNO3/Other	BAL Analyses Required: Total Hg, EPA 1631	Methyl Hg, EPA 1630	ICP-MS Metals As (specify) Total Rec, Diss	As Species (specify) InOrg, (III), (V), MMA, DMA	Se Species (specify) Se(IV), Se(VI), SeCN, Uknown	Filtration	Other (specify) sum of unknown As	Other (specify)	Comments: Specify Here
1	MCM-05	10/15/20	1348	GW	2	Y	Ice			X	X			X		
2	DPZ-2	10/15/20	1600	GW	2	Y	Ice			X	X			X		
3	RW-4	10/15/20	1446	GW	2	Y	Ice			X	X			X		
4	RW-5	10/15/20	1555	GW	2	Y	Ice			X	X			X		
5	RW-6	10/15/20	1403	GW	2	Y	Ice			X	X			X		
6	DUP-2	10/15/20	-	GW	2	Y	Ice			X	X			X		
7	FBL101520	10/15/20	1736	GW	2	Y	Ice			X	X			X		
8																
9																
10																
	Trip Blank															

Relinquished By: William Looker	Date: 10/15/20	Time: 1800	Relinquished By: / Date: / Time:
Received By: Fedex	Date: 10/15/20	Time: 1800	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

June 13, 2022

Joju Abraham
Georgia Power-CCR
2480 Maner Road
Atlanta, GA 30339

RE: Project: MCMANUS 30050105
Pace Project No.: 92607895

Dear Joju Abraham:

Enclosed are the analytical results for sample(s) received by the laboratory on June 03, 2022. 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 - Green Bay

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

Sincerely,

Nicole D'Oleo

Nicole D'Oleo
nicole.d'oleo@pacelabs.com
(704)875-9092
Project Manager

Enclosures

cc: Joe Booth, Resolute Environmental & Water Resources
Trent Godwin, Resolute Environmental & Water Resources
Kristen Jurinko
Laura Midkiff, Georgia Power
Ms. Lauren Petty, Southern Company
Kevin Stephenson, Resolute Environmental & Water Resources Consulting, LLC
Stephen Wilson, Resolute Environmental & Water Resources Consulting, LLC

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

CERTIFICATIONS

Project: MCMANUS 30050105
Pace Project No.: 92607895

Pace Analytical Services Green Bay
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

REPORT OF LABORATORY ANALYSIS

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

SAMPLE SUMMARY

Project: MCMANUS 30050105
Pace Project No.: 92607895

Lab ID	Sample ID	Matrix	Date Collected	Date Received
92607895001	**PT-04D (28-28.4)**	Solid	05/25/22 16:30	06/03/22 15:00
92607895002	**PT-01 (17-17.5)**	Solid	05/26/22 11:13	06/03/22 15:00
92607895003	**DR-02 (18-18.5)**	Solid	05/26/22 15:13	06/03/22 15:00
92607895004	**PT-02 (18-18.5)**	Solid	05/31/22 14:00	06/03/22 15:00
92607895005	**PT-03 (17-17.4)**	Solid	06/01/22 10:16	06/03/22 15:00
92607895006	**DR-01 (24-26)**	Solid	05/26/22 17:58	06/03/22 15:00
92607895007	**DR-01 (17-19)**	Solid	05/26/22 17:32	06/03/22 15:00
92607895008	**DR-01 (29-31)**	Solid	05/26/22 18:20	06/03/22 15:00

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SAMPLE ANALYTE COUNT

Project: MCMANUS 30050105
Pace Project No.: 92607895

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
92607895001	**PT-04D (28-28.4)**	ASTM D2974-87	MMJ	1	PASI-G
		Lloyd Kahn	TJJ	1	PASI-G
92607895002	**PT-01 (17-17.5)**	ASTM D2974-87	MMJ	1	PASI-G
		Lloyd Kahn	TJJ	1	PASI-G
92607895003	**DR-02 (18-18.5)**	ASTM D2974-87	MMJ	1	PASI-G
		Lloyd Kahn	TJJ	1	PASI-G
92607895004	**PT-02 (18-18.5)**	ASTM D2974-87	MMJ	1	PASI-G
		Lloyd Kahn	TJJ	1	PASI-G
92607895005	**PT-03 (17-17.4)**	ASTM D2974-87	MMJ	1	PASI-G
		Lloyd Kahn	TJJ	1	PASI-G
92607895006	**DR-01 (24-26)**	ASTM D6913	MLR	14	PASI-G
92607895007	**DR-01 (17-19)**	ASTM D6913	MLR	14	PASI-G
92607895008	**DR-01 (29-31)**	ASTM D6913	MLR	14	PASI-G

PASI-G = Pace Analytical Services - Green Bay

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SUMMARY OF DETECTION

Project: MCMANUS 30050105
Pace Project No.: 92607895

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92607895001	**PT-04D (28-28.4)**					
ASTM D2974-87	Percent Moisture	26.8	%	0.10	06/09/22 11:07	
Lloyd Kahn	Total Organic Carbon	3650	mg/kg	1240	06/08/22 06:34	
92607895002	**PT-01 (17-17.5)**					
ASTM D2974-87	Percent Moisture	22.0	%	0.10	06/09/22 11:07	
Lloyd Kahn	Total Organic Carbon	4720	mg/kg	1010	06/08/22 06:55	
92607895003	**DR-02 (18-18.5)**					
ASTM D2974-87	Percent Moisture	25.6	%	0.10	06/09/22 11:07	
Lloyd Kahn	Total Organic Carbon	3820	mg/kg	993	06/08/22 07:12	
92607895004	**PT-02 (18-18.5)**					
ASTM D2974-87	Percent Moisture	28.5	%	0.10	06/09/22 11:08	
Lloyd Kahn	Total Organic Carbon	4670	mg/kg	1080	06/08/22 07:17	
92607895005	**PT-03 (17-17.4)**					
ASTM D2974-87	Percent Moisture	30.2	%	0.10	06/09/22 11:08	
Lloyd Kahn	Total Organic Carbon	4190	mg/kg	791	06/08/22 07:22	
92607895006	**DR-01 (24-26)**					
ASTM D6913	Sieve 3.0"	100.0	%		06/07/22 20:23	
ASTM D6913	Sieve 2.0"	100.0	%		06/07/22 20:23	
ASTM D6913	Sieve 1.5"	100.0	%		06/07/22 20:23	
ASTM D6913	Sieve 1.0"	100.0	%		06/07/22 20:23	
ASTM D6913	Sieve 0.75"	100.0	%		06/07/22 20:23	
ASTM D6913	Sieve 0.375"	100.0	%		06/07/22 20:23	
ASTM D6913	Sieve #4	100.0	%		06/07/22 20:23	
ASTM D6913	Sieve #10	100.0	%		06/07/22 20:23	
ASTM D6913	Sieve #20	96.0	%		06/07/22 20:23	
ASTM D6913	Sieve #40	88.4	%		06/07/22 20:23	
ASTM D6913	Sieve #60	68.1	%		06/07/22 20:23	
ASTM D6913	Sieve #100	39.2	%		06/07/22 20:23	
ASTM D6913	Sieve #140	9.2	%		06/07/22 20:23	
ASTM D6913	Sieve #200	3.5	%		06/07/22 20:23	
92607895007	**DR-01 (17-19)**					
ASTM D6913	Sieve 3.0"	100.0	%		06/07/22 20:23	
ASTM D6913	Sieve 2.0"	100.0	%		06/07/22 20:23	
ASTM D6913	Sieve 1.5"	100.0	%		06/07/22 20:23	
ASTM D6913	Sieve 1.0"	100.0	%		06/07/22 20:23	
ASTM D6913	Sieve 0.75"	100.0	%		06/07/22 20:23	
ASTM D6913	Sieve 0.375"	99.9	%		06/07/22 20:23	
ASTM D6913	Sieve #4	99.9	%		06/07/22 20:23	
ASTM D6913	Sieve #10	99.6	%		06/07/22 20:23	
ASTM D6913	Sieve #20	92.8	%		06/07/22 20:23	
ASTM D6913	Sieve #40	85.9	%		06/07/22 20:23	
ASTM D6913	Sieve #60	66.9	%		06/07/22 20:23	
ASTM D6913	Sieve #100	33.0	%		06/07/22 20:23	
ASTM D6913	Sieve #140	8.0	%		06/07/22 20:23	
ASTM D6913	Sieve #200	3.9	%		06/07/22 20:23	

REPORT OF LABORATORY ANALYSIS

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SUMMARY OF DETECTION

Project: MCMANUS 30050105
Pace Project No.: 92607895

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92607895008	**DR-01 (29-31)**					
ASTM D6913	Sieve 3.0"	100.0	%		06/07/22 20:23	
ASTM D6913	Sieve 2.0"	100.0	%		06/07/22 20:23	
ASTM D6913	Sieve 1.5"	100.0	%		06/07/22 20:23	
ASTM D6913	Sieve 1.0"	100.0	%		06/07/22 20:23	
ASTM D6913	Sieve 0.75"	100.0	%		06/07/22 20:23	
ASTM D6913	Sieve 0.375"	98.6	%		06/07/22 20:23	
ASTM D6913	Sieve #4	98.6	%		06/07/22 20:23	
ASTM D6913	Sieve #10	98.4	%		06/07/22 20:23	
ASTM D6913	Sieve #20	95.7	%		06/07/22 20:23	
ASTM D6913	Sieve #40	76.8	%		06/07/22 20:23	
ASTM D6913	Sieve #60	24.9	%		06/07/22 20:23	
ASTM D6913	Sieve #100	9.8	%		06/07/22 20:23	
ASTM D6913	Sieve #140	4.6	%		06/07/22 20:23	
ASTM D6913	Sieve #200	2.8	%		06/07/22 20:23	

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ANALYTICAL RESULTS

Project: MCMANUS 30050105
Pace Project No.: 92607895

Sample: PT-04D (28-28.4) **Lab ID: 92607895001** Collected: 05/25/22 16:30 Received: 06/03/22 15:00 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
Percent Moisture	Analytical Method: ASTM D2974-87 Pace Analytical Services - Green Bay								
Percent Moisture	**26.8**	%	0.10	0.10	1		06/09/22 11:07		
TOC via Lloyd Kahn	Analytical Method: Lloyd Kahn Pace Analytical Services - Green Bay								
Total Organic Carbon	**3650**	mg/kg	1240	626	1		06/08/22 06:34	7440-44-0	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: MCMANUS 30050105
Pace Project No.: 92607895

Sample: PT-01 (17-17.5) **Lab ID: 92607895002** Collected: 05/26/22 11:13 Received: 06/03/22 15:00 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
Percent Moisture	Analytical Method: ASTM D2974-87 Pace Analytical Services - Green Bay								
Percent Moisture	**22.0**	%	0.10	0.10	1		06/09/22 11:07		
TOC via Lloyd Kahn	Analytical Method: Lloyd Kahn Pace Analytical Services - Green Bay								
Total Organic Carbon	**4720**	mg/kg	1010	512	1		06/08/22 06:55	7440-44-0	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: MCMANUS 30050105
Pace Project No.: 92607895

Sample: DR-02 (18-18.5) **Lab ID: 92607895003** Collected: 05/26/22 15:13 Received: 06/03/22 15:00 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
Percent Moisture	Analytical Method: ASTM D2974-87 Pace Analytical Services - Green Bay								
Percent Moisture	**25.6**	%	0.10	0.10	1		06/09/22 11:07		
TOC via Lloyd Kahn	Analytical Method: Lloyd Kahn Pace Analytical Services - Green Bay								
Total Organic Carbon	**3820**	mg/kg	993	502	1		06/08/22 07:12	7440-44-0	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: MCMANUS 30050105
Pace Project No.: 92607895

Sample: PT-02 (18-18.5) **Lab ID: 92607895004** Collected: 05/31/22 14:00 Received: 06/03/22 15:00 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
Percent Moisture	Analytical Method: ASTM D2974-87 Pace Analytical Services - Green Bay								
Percent Moisture	**28.5**	%	0.10	0.10	1		06/09/22 11:08		
TOC via Lloyd Kahn	Analytical Method: Lloyd Kahn Pace Analytical Services - Green Bay								
Total Organic Carbon	**4670**	mg/kg	1080	544	1		06/08/22 07:17	7440-44-0	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: MCMANUS 30050105
Pace Project No.: 92607895

Sample: PT-03 (17-17.4) **Lab ID: 92607895005** Collected: 06/01/22 10:16 Received: 06/03/22 15:00 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
Percent Moisture	Analytical Method: ASTM D2974-87 Pace Analytical Services - Green Bay								
Percent Moisture	**30.2**	%	0.10	0.10	1		06/09/22 11:08		
TOC via Lloyd Kahn	Analytical Method: Lloyd Kahn Pace Analytical Services - Green Bay								
Total Organic Carbon	**4190**	mg/kg	791	400	1		06/08/22 07:22	7440-44-0	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: MCMANUS 30050105
Pace Project No.: 92607895

Sample: DR-01 (24-26) **Lab ID: 92607895006** Collected: 05/26/22 17:58 Received: 06/03/22 15:00 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
ASTM D6913 Grain Size	Analytical Method: ASTM D6913 Pace Analytical Services - Green Bay								
Sieve 3.0"	**100.0**	%			1		06/07/22 20:23		
Sieve 2.0"	**100.0**	%			1		06/07/22 20:23		
Sieve 1.5"	**100.0**	%			1		06/07/22 20:23		
Sieve 1.0"	**100.0**	%			1		06/07/22 20:23		
Sieve 0.75"	**100.0**	%			1		06/07/22 20:23		
Sieve 0.375"	**100.0**	%			1		06/07/22 20:23		
Sieve #4	**100.0**	%			1		06/07/22 20:23		
Sieve #10	**100.0**	%			1		06/07/22 20:23		
Sieve #20	**96.0**	%			1		06/07/22 20:23		
Sieve #40	**88.4**	%			1		06/07/22 20:23		
Sieve #60	**68.1**	%			1		06/07/22 20:23		
Sieve #100	**39.2**	%			1		06/07/22 20:23		
Sieve #140	**9.2**	%			1		06/07/22 20:23		
Sieve #200	**3.5**	%			1		06/07/22 20:23		

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ANALYTICAL RESULTS

Project: MCMANUS 30050105
Pace Project No.: 92607895

Sample: DR-01 (17-19) **Lab ID: 92607895007** Collected: 05/26/22 17:32 Received: 06/03/22 15:00 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
ASTM D6913 Grain Size	Analytical Method: ASTM D6913 Pace Analytical Services - Green Bay								
Sieve 3.0"	**100.0**	%			1		06/07/22 20:23		
Sieve 2.0"	**100.0**	%			1		06/07/22 20:23		
Sieve 1.5"	**100.0**	%			1		06/07/22 20:23		
Sieve 1.0"	**100.0**	%			1		06/07/22 20:23		
Sieve 0.75"	**100.0**	%			1		06/07/22 20:23		
Sieve 0.375"	**99.9**	%			1		06/07/22 20:23		
Sieve #4	**99.9**	%			1		06/07/22 20:23		
Sieve #10	**99.6**	%			1		06/07/22 20:23		
Sieve #20	**92.8**	%			1		06/07/22 20:23		
Sieve #40	**85.9**	%			1		06/07/22 20:23		
Sieve #60	**66.9**	%			1		06/07/22 20:23		
Sieve #100	**33.0**	%			1		06/07/22 20:23		
Sieve #140	**8.0**	%			1		06/07/22 20:23		
Sieve #200	**3.9**	%			1		06/07/22 20:23		

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: MCMANUS 30050105
Pace Project No.: 92607895

Sample: DR-01 (29-31) **Lab ID: 92607895008** Collected: 05/26/22 18:20 Received: 06/03/22 15:00 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
ASTM D6913 Grain Size	Analytical Method: ASTM D6913 Pace Analytical Services - Green Bay								
Sieve 3.0"	**100.0**	%			1		06/07/22 20:23		
Sieve 2.0"	**100.0**	%			1		06/07/22 20:23		
Sieve 1.5"	**100.0**	%			1		06/07/22 20:23		
Sieve 1.0"	**100.0**	%			1		06/07/22 20:23		
Sieve 0.75"	**100.0**	%			1		06/07/22 20:23		
Sieve 0.375"	**98.6**	%			1		06/07/22 20:23		
Sieve #4	**98.6**	%			1		06/07/22 20:23		
Sieve #10	**98.4**	%			1		06/07/22 20:23		
Sieve #20	**95.7**	%			1		06/07/22 20:23		
Sieve #40	**76.8**	%			1		06/07/22 20:23		
Sieve #60	**24.9**	%			1		06/07/22 20:23		
Sieve #100	**9.8**	%			1		06/07/22 20:23		
Sieve #140	**4.6**	%			1		06/07/22 20:23		
Sieve #200	**2.8**	%			1		06/07/22 20:23		

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: MCMANUS 30050105
Pace Project No.: 92607895

QC Batch: 417877
QC Batch Method: ASTM D2974-87
Analysis Method: ASTM D2974-87
Analysis Description: Dry Weight/Percent Moisture
Laboratory: Pace Analytical Services - Green Bay
Associated Lab Samples: 92607895001, 92607895002, 92607895003, 92607895004, 92607895005

SAMPLE DUPLICATE: 2406527

Parameter	Units	40246139005 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	21.3	21.7	2	10	

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

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: MCMANUS 30050105
Pace Project No.: 92607895

QC Batch: 417698
QC Batch Method: Lloyd Kahn
Analysis Method: Lloyd Kahn
Analysis Description: Lloyd Kahn TOC
Laboratory: Pace Analytical Services - Green Bay
Associated Lab Samples: 92607895001, 92607895002, 92607895003, 92607895004, 92607895005

METHOD BLANK: 2405163 Matrix: Solid
Associated Lab Samples: 92607895001, 92607895002, 92607895003, 92607895004, 92607895005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Organic Carbon	mg/kg	ND	100	50.6	06/08/22 06:23	

LABORATORY CONTROL SAMPLE: 2405164

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Organic Carbon	mg/kg	2000	2210	111	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2405165 2405166

Parameter	Units	92607895002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Total Organic Carbon	mg/kg	4720	5070	5040	9280	9030	90	86	80-120	3	20	

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

REPORT OF LABORATORY ANALYSIS

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QUALIFIERS

Project: MCMANUS 30050105
Pace Project No.: 92607895

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.

Reported results are not rounded until the final step prior to reporting. Therefore, calculated parameters that are typically reported as "Total" may vary slightly from the sum of the reported component parameters.

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

TNI - The NELAC Institute.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: MCMANUS 30050105
Pace Project No.: 92607895

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
92607895001	**PT-04D (28-28.4)**	ASTM D2974-87	417877		
92607895002	**PT-01 (17-17.5)**	ASTM D2974-87	417877		
92607895003	**DR-02 (18-18.5)**	ASTM D2974-87	417877		
92607895004	**PT-02 (18-18.5)**	ASTM D2974-87	417877		
92607895005	**PT-03 (17-17.4)**	ASTM D2974-87	417877		
92607895006	**DR-01 (24-26)**	ASTM D6913	417696		
92607895007	**DR-01 (17-19)**	ASTM D6913	417696		
92607895008	**DR-01 (29-31)**	ASTM D6913	417696		
92607895001	**PT-04D (28-28.4)**	Lloyd Kahn	417698		
92607895002	**PT-01 (17-17.5)**	Lloyd Kahn	417698		
92607895003	**DR-02 (18-18.5)**	Lloyd Kahn	417698		
92607895004	**PT-02 (18-18.5)**	Lloyd Kahn	417698		
92607895005	**PT-03 (17-17.4)**	Lloyd Kahn	417698		

Pace ANALYTICAL SERVICES

Effective Date: 05/12/202205/12/2022

Laboratory receiving samples:

Asheville ☐ Eden ☐ Greenwood ☐ Huntersville ☑ Raleigh ☐ Mechanicsville ☐ Atlanta ☐ Kernersville ☐

Sample Condition Upon Receipt

Client Name: Arcadis

Project #:

WO# : 92607895

92607895

Courier: ☑ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ Other:____

Custody Seal Present? ☐ Yes ☑ No Seals Intact? ☐ Yes ☑ No

Date/Initials Person Examining Contents: CS 6/13/22

Packing Material: ☐ Bubble Wrap ☑ Bubble Bags ☐ None ☑ Other

Biological Tissue Frozen? ☐ Yes ☐ No ☑ N/A

Thermometer: ☐ IR Gun ID: 92T064

Type of Ice: ☑ Wet ☐ Blue ☐ None

Cooler Temp: 3.2 Correction Factor: Add/Subtract (°C) 0

Temp should be above freezing to 6°C

☐ Samples out of temp criteria. Samples on ice, cooling process has begun

Cooler Temp Corrected (°C): 3.2

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: SL				
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

***Check all unpreserved Nitrates for chlorine

Project #

WO# : 92607895

PM: NMG Due Date: 06/17/22

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)	BP4B-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)	DG94-250 mL Amber NH4Cl (N/A)(Cl-)	DG9H-40 mL VOA HCl (N/A)	VG9T-40 mL VOA Na2S2O3 (N/A)	VG9U-40 mL VOA Unpreserved (N/A)	DG9V-40 mL VOA H3PO4 (N/A)	DG9S-40 mL VOA H2SO4 (N/A)	V/GK (3 vials per kit)-VPH/Gas kit (N/A)	SPST-125 mL Sterile Plastic (N/A – lab)	SP2T-250 mL Sterile Plastic (N/A – lab)		BP3R-250 mL Plastic (NH2)2SO4 (9.3-9.7)	AG0U-100 mL Amber Unpreserved (N/A) (Cl-)	VSGU-20 mL Scintillation vials (N/A)	DG9U-40 mL Amber Unpreserved vials (N/A)
1												—																
2												—																
3												—																
4				—																								
5				—																								
6				—																								
7												—																
8												—																
9																												
10																												
11																												
12																												

pH Adjustment Log for Preserved Samples

Sample ID	Type of Preservative	pH upon receipt	Date preservation adjusted	Time preservation adjusted	Amount of Preservative added	Lot #

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

Qualtrax ID: 69614

ARCADIS

ID#:

CHAIN OF CUSTODY & LABORATORY ANALYSIS REQUEST FORM

Page ___ of ___

Lab Work Order #

Send Results to:

Contact & Company Name: CHARLES LAWSON ARCADIS
Telephone: 706-829-4421
Address: 1450 Greene St Ste 220
Fax:
City: AUGUSTA State: GA Zip: 30901
E-mail Address: Charles.Lawson@Arcadis.us
Project Name/Location (City, State): McMANUS BRUNSWICK GA
Project #: 30050105
Sampler's Printed Name: Charles Lawson
Sampler's Signature: CB Lawson

Sample ID	Collection Date	Collection Time	Type (✓) Comp	Type (✓) Grab	Matrix	Preservative	Filtered (✓)	# of Containers	Container Information	Lloyd Kahn TOC		Grain Size					REMARKS
PT-04D (28-28.4)	5/25/22	16:30		X	SO					X							001
PT-01 (17-17.5)	5/26/22	11:13		X	SO					X							002
DR-02 (18-18.5)	5/26/22	15:13		X	SO					X							003
DR-01 (24-26)	5/26/22	17:58		X	SO							X					006
DR-01 (17-18)	5/26/22	17:32		X	SO							X					007
DR-01 (29-31)	5/26/22	19:20		X	SO							X					008
PT-02 (18-18.5)	5/31/22	14:20		X	SO					X							004
PT-03 (17-17.4)	6/1/22	10:16		X	SO					X							005
											SEND LAB REPORT TO:						KATHRYN FARRIS
																	KATHRYN.FARRIS@ARCADIS.COM
																	1-610-739-7960

Keys

Preservation Key:
A. H_2SO_4
B. HCL
C. HNO_3
D. NaOH
E. None
F. Other: _____
G. Other: _____
H. Other: _____

Container Information Key:
1. 40 ml Vial
2. 1 L Amber
3. 250 ml Plastic
4. 500 ml Plastic
5. Encore
6. 2 oz. Glass
7. 4 oz. Glass
8. 8 oz. Glass
9. Other: _____
10. Other: _____

Matrix Key:
SO - Soil
W - Water
T - Tissue
SE - Sediment
SL - Sludge
A - Air
NL - NAPL/Oil
SW - Sample Wipe
Other: _____

Special Instructions/Comments:

☐ Special QA/QC Instructions(✓):

Laboratory Information and Receipt		Relinquished By	Received By	Relinquished By	Laboratory Received By
Lab Name: PACE ANALYTICAL	Cooler Custody Seal (✓)	Printed Name: Charles Lawson	Printed Name: Carolyn Smith	Printed Name:	Printed Name:
☑ Cooler packed with ice (✓)	☐ Intact ☐ Not Intact	Signature: CB Lawson	Signature:	Signature:	Signature:
Specify Turnaround Requirements:	Sample Receipt:	Firm: ARCADIS	Firm/Courier: Pace	Firm/Courier:	Firm:
Shipping Tracking #:	Condition/Cooler Temp: _____	Date/Time: 6-2-2022 11:00	Date/Time: 6/3/22 1580	Date/Time:	Date/Time:

Distribution: WHITE – Laboratory returns with results YELLOW – Lab copy PINK – Retained by Arcadis

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

July 27, 2022

Joju Abraham
Georgia Power-CCR
2480 Maner Road
Atlanta, GA 30339

RE: Project: MCMANUS JUNE 2022
Pace Project No.: 92612546

Dear Joju Abraham:

Enclosed are the analytical results for sample(s) received by the laboratory on June 30, 2022. 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 - Minneapolis

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

Sincerely,

Nicole D'Oleo

Nicole D'Oleo
nicole.d'oleo@pacelabs.com
(704)875-9092
Project Manager

Enclosures

cc: Joe Booth, Resolute Environmental & Water Resources
Trent Godwin, Resolute Environmental & Water Resources
Kristen Jurinko
Laura Midkiff, Georgia Power
Ms. Lauren Petty, Southern Company
Kevin Stephenson, Resolute Environmental & Water Resources Consulting, LLC
Stephen Wilson, Resolute Environmental & Water Resources Consulting, LLC

REPORT OF LABORATORY ANALYSIS

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

CERTIFICATIONS

Project: MCMANUS JUNE 2022
Pace Project No.: 92612546

Pace Analytical Services, LLC - Minneapolis MN

1700 Elm Street SE, Minneapolis, MN 55414
1800 Elm Street SE, Minneapolis, MN 55414--Satellite Air Lab
A2LA Certification #: 2926.01*
Alabama Certification #: 40770
Alaska Contaminated Sites Certification #: 17-009*
Alaska DW Certification #: MN00064
Arizona Certification #: AZ0014*
Arkansas DW Certification #: MN00064
Arkansas WW Certification #: 88-0680
California Certification #: 2929
Colorado Certification #: MN00064
Connecticut Certification #: PH-0256
EPA Region 8 Tribal Water Systems+Wyoming DW Certification #: via MN 027-053-137
Florida Certification #: E87605*
Georgia Certification #: 959
Hawaii Certification #: MN00064
Idaho Certification #: MN00064
Illinois Certification #: 200011
Indiana Certification #: C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky DW Certification #: 90062
Kentucky WW Certification #: 90062
Louisiana DEQ Certification #: AI-03086*
Louisiana DW Certification #: MN00064
Maine Certification #: MN00064*
Maryland Certification #: 322
Michigan Certification #: 9909
Minnesota Certification #: 027-053-137*
Minnesota Dept of Ag Approval: via MN 027-053-137
Minnesota Petrofund Registration #: 1240*
Mississippi Certification #: MN00064
Missouri Certification #: 10100
Montana Certification #: CERT0092
Nebraska Certification #: NE-OS-18-06
Nevada Certification #: MN00064
New Hampshire Certification #: 2081*
New Jersey Certification #: MN002
New York Certification #: 11647*
North Carolina DW Certification #: 27700
North Carolina WW Certification #: 530
North Dakota Certification (A2LA) #: R-036
North Dakota Certification (MN) #: R-036
Ohio DW Certification #: 41244
Ohio VAP Certification (1700) #: CL101
Ohio VAP Certification (1800) #: CL110*
Oklahoma Certification #: 9507*
Oregon Primary Certification #: MN300001
Oregon Secondary Certification #: MN200001*
Pennsylvania Certification #: 68-00563*
Puerto Rico Certification #: MN00064
South Carolina Certification #:74003001
Tennessee Certification #: TN02818
Texas Certification #: T104704192*
Utah Certification #: MN00064*
Vermont Certification #: VT-027053137
Virginia Certification #: 460163*
Washington Certification #: C486*
West Virginia DEP Certification #: 382
West Virginia DW Certification #: 9952 C
Wisconsin Certification #: 999407970
Wyoming UST Certification #: via A2LA 2926.01
USDA Permit #: P330-19-00208
*Please Note: Applicable air certifications are denoted with an asterisk (*).

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 Laboratory ID: 99030
South Carolina Certification #: 99030001
Virginia/VELAP Certification #: 460222

REPORT OF LABORATORY ANALYSIS

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

SAMPLE SUMMARY

Project: MCMANUS JUNE 2022
Pace Project No.: 92612546

Lab ID	Sample ID	Matrix	Date Collected	Date Received
92612546001	**PT-01**	Water	06/28/22 15:55	06/30/22 11:05
92612546002	**PT-02**	Water	06/28/22 10:00	06/30/22 11:05
92612546003	**PT-03**	Water	06/28/22 14:50	06/30/22 11:05
92612546004	**PT-04D**	Water	06/28/22 14:20	06/30/22 11:05
92612546005	**DR-01**	Water	06/28/22 14:52	06/30/22 11:05
92612546006	**DR-02**	Water	06/28/22 16:05	06/30/22 11:05
92612546007	**MCM-06**	Water	06/28/22 16:00	06/30/22 11:05
92612546008	**DPZ-02**	Water	06/28/22 11:45	06/30/22 11:05
92612546009	**DUP-1**	Water	06/28/22 00:00	06/30/22 11:05
92612546010	**FB-1**	Water	06/28/22 10:40	06/30/22 11:05

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

SAMPLE ANALYTE COUNT

Project: MCMANUS JUNE 2022
Pace Project No.: 92612546

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
92612546001	**PT-01**	EPA 6010D	DM	5	PASI-M
		EPA 6010D	IP	5	PASI-M
		EPA 6020B	PW1	1	PASI-M
		EPA 6020B	PW1	1	PASI-M
		SM 2320B-2011	SMS	1	PASI-A
		SM 2540C-2011	MAB2	1	PASI-A
		SM 4500-S2D-2011	JP1	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	1	PASI-A
		SM 4500-Cl-E-2011	ANM	1	PASI-A
92612546002	**PT-02**	EPA 6010D	DM	5	PASI-M
		EPA 6010D	IP	5	PASI-M
		EPA 6020B	PW1	1	PASI-M
		EPA 6020B	PW1	1	PASI-M
		SM 2320B-2011	SMS	1	PASI-A
		SM 2540C-2011	MAB2	1	PASI-A
		SM 4500-S2D-2011	JP1	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	1	PASI-A
		SM 4500-Cl-E-2011	ANM	1	PASI-A
92612546003	**PT-03**	EPA 6010D	DM	5	PASI-M
		EPA 6010D	IP	5	PASI-M
		EPA 6020B	PW1	1	PASI-M
		EPA 6020B	PW1	1	PASI-M
		SM 2320B-2011	SMS	1	PASI-A
		SM 2540C-2011	MAB2	1	PASI-A
		SM 4500-S2D-2011	JP1	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	1	PASI-A
		SM 4500-Cl-E-2011	ANM	1	PASI-A
92612546004	**PT-04D**	EPA 6010D	DM	5	PASI-M
		EPA 6010D	IP	5	PASI-M
		EPA 6020B	PW1	1	PASI-M
		EPA 6020B	PW1	1	PASI-M
		SM 2320B-2011	SMS	1	PASI-A
		SM 2540C-2011	MAB2	1	PASI-A
		SM 4500-S2D-2011	JP1	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	1	PASI-A
		SM 4500-Cl-E-2011	ANM	1	PASI-A
92612546005	**DR-01**	EPA 6010D	DM	5	PASI-M

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

SAMPLE ANALYTE COUNT

Project: MCMANUS JUNE 2022
Pace Project No.: 92612546

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		EPA 6010D	IP	5	PASI-M
		EPA 6020B	PW1	1	PASI-M
		EPA 6020B	PW1	1	PASI-M
		SM 2320B-2011	SMS	1	PASI-A
		SM 2540C-2011	MAB2	1	PASI-A
		SM 4500-S2D-2011	JP1	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	1	PASI-A
		SM 4500-Cl-E-2011	ANM	1	PASI-A
92612546006	**DR-02**	EPA 6010D	DM	5	PASI-M
		EPA 6010D	IP	5	PASI-M
		EPA 6020B	PW1	1	PASI-M
		EPA 6020B	PW1	1	PASI-M
		SM 2320B-2011	SMS	1	PASI-A
		SM 2540C-2011	MAB2	1	PASI-A
		SM 4500-S2D-2011	JP1	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	1	PASI-A
		SM 4500-Cl-E-2011	ANM	1	PASI-A
92612546007	**MCM-06**	EPA 6010D	DM	5	PASI-M
		EPA 6010D	IP	5	PASI-M
		EPA 6020B	PW1	1	PASI-M
		EPA 6020B	PW1	1	PASI-M
		SM 2320B-2011	SMS	1	PASI-A
		SM 2540C-2011	MAB2	1	PASI-A
		SM 4500-S2D-2011	JP1	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	1	PASI-A
		SM 4500-Cl-E-2011	ANM	1	PASI-A
92612546008	**DPZ-02**	EPA 6010D	DM	5	PASI-M
		EPA 6010D	IP	5	PASI-M
		EPA 6020B	PW1	1	PASI-M
		EPA 6020B	PW1	1	PASI-M
		SM 2320B-2011	SMS	1	PASI-A
		SM 2540C-2011	MAB2	1	PASI-A
		SM 4500-S2D-2011	JP1	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	1	PASI-A
		SM 4500-Cl-E-2011	ANM	1	PASI-A
92612546009	**DUP-1**	EPA 6010D	DM	5	PASI-M
		EPA 6010D	IP	5	PASI-M

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

SAMPLE ANALYTE COUNT

Project: MCMANUS JUNE 2022
Pace Project No.: 92612546

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		EPA 6020B	PW1	1	PASI-M
		EPA 6020B	PW1	1	PASI-M
		SM 2320B-2011	SMS	1	PASI-A
		SM 2540C-2011	MAB2	1	PASI-A
		SM 4500-S2D-2011	JP1	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	1	PASI-A
		SM 4500-Cl-E-2011	ANM	1	PASI-A
92612546010	**FB-1**	EPA 6010D	DM	5	PASI-M
		EPA 6010D	IP	5	PASI-M
		EPA 6020B	PW1	1	PASI-M
		EPA 6020B	PW1	1	PASI-M
		SM 2320B-2011	SMS	1	PASI-A
		SM 2540C-2011	MAB2	1	PASI-A
		SM 4500-S2D-2011	JP1	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	1	PASI-A
		SM 4500-Cl-E-2011	ANM	1	PASI-A

PASI-A = Pace Analytical Services - Asheville
PASI-M = Pace Analytical Services - Minneapolis

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

SUMMARY OF DETECTION

Project: MCMANUS JUNE 2022
Pace Project No.: 92612546

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92612546001	**PT-01**					
EPA 6010D	Calcium	81.1	mg/L	0.50	07/07/22 11:32	
EPA 6010D	Iron	0.22	mg/L	0.050	07/07/22 11:32	
EPA 6010D	Magnesium	179	mg/L	0.50	07/07/22 11:32	
EPA 6010D	Potassium	101	mg/L	2.5	07/07/22 11:32	
EPA 6010D	Sodium	1800	mg/L	25.0	07/07/22 12:34	P6
EPA 6010D	Calcium, Dissolved	75.9	mg/L	0.50	07/07/22 13:49	
EPA 6010D	Iron, Dissolved	0.062	mg/L	0.050	07/07/22 13:49	
EPA 6010D	Magnesium, Dissolved	174	mg/L	0.50	07/07/22 13:49	P6
EPA 6010D	Potassium, Dissolved	89.3	mg/L	2.5	07/07/22 13:49	P6
EPA 6010D	Sodium, Dissolved	2100	mg/L	20.0	07/07/22 14:37	P6
EPA 6020B	Arsenic	0.026	mg/L	0.00050	07/15/22 15:39	
EPA 6020B	Arsenic, Dissolved	0.028	mg/L	0.00050	07/15/22 14:22	
SM 2320B-2011	Alkalinity, Total as CaCO3	290	mg/L	5.0	07/05/22 11:39	
SM 2540C-2011	Total Dissolved Solids	6820	mg/L	500	07/01/22 10:53	
SM 4500-S2D-2011	Sulfide	18.7	mg/L	2.5	07/01/22 03:59	
EPA 300.0 Rev 2.1 1993	Sulfate	269	mg/L	50.0	07/01/22 10:48	
SM 4500-Cl-E-2011	Chloride	3950	mg/L	500	07/05/22 14:44	
92612546002	**PT-02**					
EPA 6010D	Calcium	56.7	mg/L	0.50	07/07/22 11:41	
EPA 6010D	Iron	0.22	mg/L	0.050	07/07/22 11:41	
EPA 6010D	Magnesium	124	mg/L	0.50	07/07/22 11:41	
EPA 6010D	Potassium	81.1	mg/L	2.5	07/07/22 11:41	
EPA 6010D	Sodium	1340	mg/L	10.0	07/07/22 12:01	
EPA 6010D	Calcium, Dissolved	54.9	mg/L	0.50	07/07/22 14:19	
EPA 6010D	Iron, Dissolved	0.051	mg/L	0.050	07/07/22 14:19	
EPA 6010D	Magnesium, Dissolved	125	mg/L	0.50	07/07/22 14:19	
EPA 6010D	Potassium, Dissolved	75.6	mg/L	2.5	07/07/22 14:19	
EPA 6010D	Sodium, Dissolved	1460	mg/L	20.0	07/07/22 14:46	
EPA 6020B	Arsenic	0.0019	mg/L	0.00050	07/15/22 15:42	
EPA 6020B	Arsenic, Dissolved	0.0018	mg/L	0.00050	07/15/22 14:26	
SM 2320B-2011	Alkalinity, Total as CaCO3	272	mg/L	5.0	07/05/22 11:49	
SM 2540C-2011	Total Dissolved Solids	5060	mg/L	500	07/01/22 10:53	
SM 4500-S2D-2011	Sulfide	12.7	mg/L	2.5	07/01/22 04:00	
EPA 300.0 Rev 2.1 1993	Sulfate	203	mg/L	50.0	07/01/22 11:04	
SM 4500-Cl-E-2011	Chloride	2870	mg/L	500	07/05/22 14:47	
92612546003	**PT-03**					
EPA 6010D	Calcium	30.1	mg/L	0.50	07/07/22 11:42	
EPA 6010D	Iron	0.24	mg/L	0.050	07/07/22 11:42	
EPA 6010D	Magnesium	80.0	mg/L	0.50	07/07/22 11:42	
EPA 6010D	Potassium	69.4	mg/L	2.5	07/07/22 11:42	
EPA 6010D	Sodium	889	mg/L	10.0	07/07/22 12:03	
EPA 6010D	Calcium, Dissolved	29.2	mg/L	0.50	07/07/22 14:21	
EPA 6010D	Iron, Dissolved	0.044J	mg/L	0.050	07/07/22 14:21	
EPA 6010D	Magnesium, Dissolved	80.9	mg/L	0.50	07/07/22 14:21	
EPA 6010D	Potassium, Dissolved	64.2	mg/L	2.5	07/07/22 14:21	
EPA 6010D	Sodium, Dissolved	1110	mg/L	20.0	07/07/22 14:47	

REPORT OF LABORATORY ANALYSIS

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

SUMMARY OF DETECTION

Project: MCMANUS JUNE 2022
Pace Project No.: 92612546

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92612546003	**PT-03**					
EPA 6020B	Arsenic	0.0011	mg/L	0.00050	07/15/22 16:08	
EPA 6020B	Arsenic, Dissolved	0.0012	mg/L	0.00050	07/15/22 14:52	
SM 2320B-2011	Alkalinity, Total as CaCO3	197	mg/L	5.0	07/05/22 11:58	
SM 2540C-2011	Total Dissolved Solids	3260	mg/L	312	07/01/22 10:53	
SM 4500-S2D-2011	Sulfide	8.2	mg/L	2.5	07/01/22 04:00	
EPA 300.0 Rev 2.1 1993	Sulfate	142	mg/L	20.0	07/01/22 11:20	M1
SM 4500-Cl-E-2011	Chloride	1790	mg/L	500	07/05/22 14:48	
92612546004	**PT-04D**					
EPA 6010D	Calcium	193	mg/L	0.50	07/07/22 11:44	
EPA 6010D	Iron	0.12	mg/L	0.050	07/07/22 11:44	
EPA 6010D	Magnesium	427	mg/L	0.50	07/07/22 11:44	
EPA 6010D	Potassium	183	mg/L	5.0	07/07/22 12:46	
EPA 6010D	Sodium	3360	mg/L	25.0	07/07/22 12:05	
EPA 6010D	Calcium, Dissolved	189	mg/L	0.50	07/07/22 14:22	
EPA 6010D	Iron, Dissolved	0.084	mg/L	0.050	07/07/22 14:22	
EPA 6010D	Magnesium, Dissolved	428	mg/L	0.50	07/07/22 14:22	
EPA 6010D	Potassium, Dissolved	175	mg/L	2.5	07/07/22 14:22	
EPA 6010D	Sodium, Dissolved	3600	mg/L	50.0	07/07/22 15:02	
EPA 6020B	Arsenic	0.0027	mg/L	0.00050	07/15/22 16:12	
EPA 6020B	Arsenic, Dissolved	0.0036	mg/L	0.0025	07/18/22 11:17	
SM 2320B-2011	Alkalinity, Total as CaCO3	451	mg/L	5.0	07/05/22 13:38	
SM 2540C-2011	Total Dissolved Solids	13700	mg/L	2500	07/01/22 10:53	
SM 4500-S2D-2011	Sulfide	18.4	mg/L	2.5	07/01/22 04:00	
EPA 300.0 Rev 2.1 1993	Sulfate	465	mg/L	100	07/01/22 08:20	
SM 4500-Cl-E-2011	Chloride	6670	mg/L	500	07/05/22 14:49	
92612546005	**DR-01**					
EPA 6010D	Calcium	84.1	mg/L	0.50	07/07/22 11:49	
EPA 6010D	Iron	0.12	mg/L	0.050	07/07/22 11:49	
EPA 6010D	Magnesium	184	mg/L	0.50	07/07/22 11:49	
EPA 6010D	Potassium	97.9	mg/L	2.5	07/07/22 11:49	
EPA 6010D	Sodium	1800	mg/L	25.0	07/07/22 12:07	
EPA 6010D	Calcium, Dissolved	79.5	mg/L	0.50	07/07/22 14:24	
EPA 6010D	Iron, Dissolved	0.069	mg/L	0.050	07/07/22 14:24	
EPA 6010D	Magnesium, Dissolved	178	mg/L	0.50	07/07/22 14:24	
EPA 6010D	Potassium, Dissolved	88.0	mg/L	2.5	07/07/22 14:24	
EPA 6010D	Sodium, Dissolved	2070	mg/L	20.0	07/07/22 14:54	
EPA 6020B	Arsenic	0.077	mg/L	0.00050	07/15/22 16:15	
EPA 6020B	Arsenic, Dissolved	0.083	mg/L	0.00050	07/15/22 14:59	
SM 2320B-2011	Alkalinity, Total as CaCO3	271	mg/L	5.0	07/05/22 12:14	
SM 2540C-2011	Total Dissolved Solids	6280	mg/L	500	07/01/22 10:53	
SM 4500-S2D-2011	Sulfide	17.4	mg/L	2.5	07/01/22 04:01	
EPA 300.0 Rev 2.1 1993	Sulfate	238	mg/L	100	07/01/22 08:36	
SM 4500-Cl-E-2011	Chloride	2470	mg/L	500	07/05/22 14:50	
92612546006	**DR-02**					
EPA 6010D	Calcium	107	mg/L	0.50	07/07/22 11:51	
EPA 6010D	Iron	0.21	mg/L	0.050	07/07/22 11:51	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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SUMMARY OF DETECTION

Project: MCMANUS JUNE 2022
Pace Project No.: 92612546

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92612546006	**DR-02**					
EPA 6010D	Magnesium	253	mg/L	0.50	07/07/22 11:51	
EPA 6010D	Potassium	136	mg/L	2.5	07/07/22 11:51	
EPA 6010D	Sodium	2360	mg/L	25.0	07/07/22 12:49	
EPA 6010D	Calcium, Dissolved	106	mg/L	0.50	07/07/22 14:26	
EPA 6010D	Iron, Dissolved	0.13	mg/L	0.050	07/07/22 14:26	
EPA 6010D	Magnesium, Dissolved	258	mg/L	0.50	07/07/22 14:26	
EPA 6010D	Potassium, Dissolved	126	mg/L	2.5	07/07/22 14:26	
EPA 6010D	Sodium, Dissolved	2930	mg/L	20.0	07/07/22 14:56	
EPA 6020B	Arsenic	0.0078	mg/L	0.00050	07/15/22 16:19	
EPA 6020B	Arsenic, Dissolved	0.0075	mg/L	0.00050	07/15/22 15:03	
SM 2320B-2011	Alkalinity, Total as CaCO3	354	mg/L	5.0	07/05/22 12:23	
SM 2540C-2011	Total Dissolved Solids	8220	mg/L	625	07/01/22 10:54	
SM 4500-S2D-2011	Sulfide	23.0	mg/L	2.5	07/01/22 04:01	
EPA 300.0 Rev 2.1 1993	Sulfate	299	mg/L	100	07/01/22 08:51	
SM 4500-Cl-E-2011	Chloride	4540	mg/L	500	07/05/22 14:51	
92612546007	**MCM-06**					
EPA 6010D	Calcium	73.5	mg/L	0.50	07/07/22 11:53	
EPA 6010D	Iron	0.11	mg/L	0.050	07/07/22 11:53	
EPA 6010D	Magnesium	154	mg/L	0.50	07/07/22 11:53	
EPA 6010D	Potassium	94.0	mg/L	2.5	07/07/22 11:53	
EPA 6010D	Sodium	1720	mg/L	25.0	07/07/22 12:51	
EPA 6010D	Calcium, Dissolved	69.6	mg/L	0.50	07/07/22 14:27	
EPA 6010D	Magnesium, Dissolved	151	mg/L	0.50	07/07/22 14:27	
EPA 6010D	Potassium, Dissolved	83.0	mg/L	2.5	07/07/22 14:27	
EPA 6010D	Sodium, Dissolved	2160	mg/L	20.0	07/07/22 14:57	
EPA 6020B	Arsenic	0.17	mg/L	0.00050	07/15/22 16:23	
EPA 6020B	Arsenic, Dissolved	0.20	mg/L	0.00050	07/15/22 15:06	
SM 2320B-2011	Alkalinity, Total as CaCO3	286	mg/L	5.0	07/05/22 12:34	
SM 2540C-2011	Total Dissolved Solids	6140	mg/L	500	07/01/22 10:54	
SM 4500-S2D-2011	Sulfide	23.3	mg/L	2.5	07/01/22 04:01	
EPA 300.0 Rev 2.1 1993	Sulfate	213	mg/L	100	07/01/22 09:07	
SM 4500-Cl-E-2011	Chloride	3520	mg/L	500	07/05/22 14:52	
92612546008	**DPZ-02**					
EPA 6010D	Calcium	225	mg/L	0.50	07/07/22 11:54	
EPA 6010D	Iron	0.022J	mg/L	0.050	07/07/22 11:54	
EPA 6010D	Magnesium	471	mg/L	0.50	07/07/22 11:54	
EPA 6010D	Potassium	184	mg/L	5.0	07/07/22 12:48	
EPA 6010D	Sodium	3610	mg/L	25.0	07/07/22 12:53	
EPA 6010D	Calcium, Dissolved	233	mg/L	0.50	07/07/22 14:29	
EPA 6010D	Magnesium, Dissolved	503	mg/L	0.50	07/07/22 14:29	
EPA 6010D	Potassium, Dissolved	182	mg/L	5.0	07/11/22 15:35	
EPA 6010D	Sodium, Dissolved	4370	mg/L	50.0	07/07/22 15:04	
EPA 6020B	Arsenic	0.025	mg/L	0.0025	07/18/22 11:25	
EPA 6020B	Arsenic, Dissolved	0.032	mg/L	0.0025	07/18/22 11:21	
SM 2320B-2011	Alkalinity, Total as CaCO3	394	mg/L	5.0	07/05/22 12:44	
SM 2540C-2011	Total Dissolved Solids	15400	mg/L	2500	07/01/22 10:54	

REPORT OF LABORATORY ANALYSIS

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SUMMARY OF DETECTION

Project: MCMANUS JUNE 2022
Pace Project No.: 92612546

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92612546008	**DPZ-02**					
SM 4500-S2D-2011	Sulfide	24.3	mg/L	2.5	07/01/22 04:02	
EPA 300.0 Rev 2.1 1993	Sulfate	553	mg/L	100	07/01/22 12:07	
SM 4500-Cl-E-2011	Chloride	9640	mg/L	500	07/05/22 14:53	
92612546009	**DUP-1**					
EPA 6010D	Calcium	32.2	mg/L	0.50	07/07/22 11:56	
EPA 6010D	Iron	0.25	mg/L	0.050	07/07/22 11:56	
EPA 6010D	Magnesium	83.5	mg/L	0.50	07/07/22 11:56	
EPA 6010D	Potassium	72.7	mg/L	2.5	07/07/22 11:56	
EPA 6010D	Sodium	926	mg/L	10.0	07/07/22 12:54	
EPA 6010D	Calcium, Dissolved	29.3	mg/L	0.50	07/07/22 14:34	
EPA 6010D	Iron, Dissolved	0.046J	mg/L	0.050	07/07/22 14:34	
EPA 6010D	Magnesium, Dissolved	80.4	mg/L	0.50	07/07/22 14:34	
EPA 6010D	Potassium, Dissolved	63.6	mg/L	2.5	07/07/22 14:34	
EPA 6010D	Sodium, Dissolved	1070	mg/L	20.0	07/07/22 15:01	
EPA 6020B	Arsenic	0.0011	mg/L	0.00050	07/15/22 16:30	
EPA 6020B	Arsenic, Dissolved	0.0014	mg/L	0.00050	07/15/22 15:14	
SM 2320B-2011	Alkalinity, Total as CaCO3	192	mg/L	5.0	07/05/22 13:05	
SM 2540C-2011	Total Dissolved Solids	3340	mg/L	357	07/01/22 10:54	
SM 4500-S2D-2011	Sulfide	8.2	mg/L	2.5	07/01/22 04:02	
EPA 300.0 Rev 2.1 1993	Sulfate	142	mg/L	20.0	07/01/22 12:22	
SM 4500-Cl-E-2011	Chloride	1390	mg/L	500	07/05/22 14:54	
92612546010	**FB-1**					
EPA 6010D	Potassium, Dissolved	0.34J	mg/L	2.5	07/07/22 14:36	
EPA 6010D	Sodium, Dissolved	0.70J	mg/L	1.0	07/07/22 14:36	
EPA 6020B	Arsenic	0.00013J	mg/L	0.00050	07/15/22 16:34	
EPA 6020B	Arsenic, Dissolved	0.00010J	mg/L	0.00050	07/15/22 15:17	
SM 4500-Cl-E-2011	Chloride	0.86J	mg/L	1.0	07/05/22 14:54	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: MCMANUS JUNE 2022
Pace Project No.: 92612546

Sample: PT-01 **Lab ID: 92612546001** Collected: 06/28/22 15:55 Received: 06/30/22 11:05 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Minneapolis								
Calcium	**81.1**	mg/L	0.50	0.097	1	07/06/22 06:48	07/07/22 11:32	7440-70-2	
Iron	**0.22**	mg/L	0.050	0.022	1	07/06/22 06:48	07/07/22 11:32	7439-89-6	
Magnesium	**179**	mg/L	0.50	0.029	1	07/06/22 06:48	07/07/22 11:32	7439-95-4	
Potassium	**101**	mg/L	2.5	0.22	1	07/06/22 06:48	07/07/22 11:32	7440-09-7	
Sodium	**1800**	mg/L	25.0	5.4	25	07/06/22 06:48	07/07/22 12:34	7440-23-5	P6
6010D MET ICP, Lab Filtered	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Minneapolis								
Calcium, Dissolved	**75.9**	mg/L	0.50	0.097	1	07/07/22 05:20	07/07/22 13:49	7440-70-2	
Iron, Dissolved	**0.062**	mg/L	0.050	0.022	1	07/07/22 05:20	07/07/22 13:49	7439-89-6	
Magnesium, Dissolved	**174**	mg/L	0.50	0.029	1	07/07/22 05:20	07/07/22 13:49	7439-95-4	P6
Potassium, Dissolved	**89.3**	mg/L	2.5	0.22	1	07/07/22 05:20	07/07/22 13:49	7440-09-7	P6
Sodium, Dissolved	**2100**	mg/L	20.0	4.4	20	07/07/22 05:20	07/07/22 14:37	7440-23-5	P6
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3020A Pace Analytical Services - Minneapolis								
Arsenic	**0.026**	mg/L	0.00050	0.000083	1	07/06/22 06:20	07/15/22 15:39	7440-38-2	
6020B MET ICPMS, Lab Filtered	Analytical Method: EPA 6020B Preparation Method: EPA 3020A Pace Analytical Services - Minneapolis								
Arsenic, Dissolved	**0.028**	mg/L	0.00050	0.000083	1	07/07/22 05:39	07/15/22 14:22	7440-38-2	
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity, Total as CaCO3	**290**	mg/L	5.0	5.0	1		07/05/22 11:39		
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**6820**	mg/L	500	500	1		07/01/22 10:53		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	**18.7**	mg/L	2.5	1.2	25		07/01/22 03:59	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Sulfate	**269**	mg/L	50.0	25.0	50		07/01/22 10:48	14808-79-8	
4500 Chloride	Analytical Method: SM 4500-Cl-E-2011 Pace Analytical Services - Asheville								
Chloride	**3950**	mg/L	500	250	500		07/05/22 14:44	16887-00-6	

REPORT OF LABORATORY ANALYSIS

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110 Technology Parkway
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ANALYTICAL RESULTS

Project: MCMANUS JUNE 2022
Pace Project No.: 92612546

Sample: PT-02 **Lab ID: 92612546002** Collected: 06/28/22 10:00 Received: 06/30/22 11:05 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Minneapolis								
Calcium	**56.7**	mg/L	0.50	0.097	1	07/06/22 06:48	07/07/22 11:41	7440-70-2	
Iron	**0.22**	mg/L	0.050	0.022	1	07/06/22 06:48	07/07/22 11:41	7439-89-6	
Magnesium	**124**	mg/L	0.50	0.029	1	07/06/22 06:48	07/07/22 11:41	7439-95-4	
Potassium	**81.1**	mg/L	2.5	0.22	1	07/06/22 06:48	07/07/22 11:41	7440-09-7	
Sodium	**1340**	mg/L	10.0	2.2	10	07/06/22 06:48	07/07/22 12:01	7440-23-5	
6010D MET ICP, Lab Filtered	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Minneapolis								
Calcium, Dissolved	**54.9**	mg/L	0.50	0.097	1	07/07/22 05:20	07/07/22 14:19	7440-70-2	
Iron, Dissolved	**0.051**	mg/L	0.050	0.022	1	07/07/22 05:20	07/07/22 14:19	7439-89-6	
Magnesium, Dissolved	**125**	mg/L	0.50	0.029	1	07/07/22 05:20	07/07/22 14:19	7439-95-4	
Potassium, Dissolved	**75.6**	mg/L	2.5	0.22	1	07/07/22 05:20	07/07/22 14:19	7440-09-7	
Sodium, Dissolved	**1460**	mg/L	20.0	4.4	20	07/07/22 05:20	07/07/22 14:46	7440-23-5	
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3020A Pace Analytical Services - Minneapolis								
Arsenic	**0.0019**	mg/L	0.00050	0.000083	1	07/06/22 06:20	07/15/22 15:42	7440-38-2	
6020B MET ICPMS, Lab Filtered	Analytical Method: EPA 6020B Preparation Method: EPA 3020A Pace Analytical Services - Minneapolis								
Arsenic, Dissolved	**0.0018**	mg/L	0.00050	0.000083	1	07/07/22 05:39	07/15/22 14:26	7440-38-2	
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity, Total as CaCO3	**272**	mg/L	5.0	5.0	1		07/05/22 11:49		
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**5060**	mg/L	500	500	1		07/01/22 10:53		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	**12.7**	mg/L	2.5	1.2	25		07/01/22 04:00	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Sulfate	**203**	mg/L	50.0	25.0	50		07/01/22 11:04	14808-79-8	
4500 Chloride	Analytical Method: SM 4500-Cl-E-2011 Pace Analytical Services - Asheville								
Chloride	**2870**	mg/L	500	250	500		07/05/22 14:47	16887-00-6	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: MCMANUS JUNE 2022
Pace Project No.: 92612546

Sample: PT-03 **Lab ID: 92612546003** Collected: 06/28/22 14:50 Received: 06/30/22 11:05 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Minneapolis								
Calcium	**30.1**	mg/L	0.50	0.097	1	07/06/22 06:48	07/07/22 11:42	7440-70-2	
Iron	**0.24**	mg/L	0.050	0.022	1	07/06/22 06:48	07/07/22 11:42	7439-89-6	
Magnesium	**80.0**	mg/L	0.50	0.029	1	07/06/22 06:48	07/07/22 11:42	7439-95-4	
Potassium	**69.4**	mg/L	2.5	0.22	1	07/06/22 06:48	07/07/22 11:42	7440-09-7	
Sodium	**889**	mg/L	10.0	2.2	10	07/06/22 06:48	07/07/22 12:03	7440-23-5	
6010D MET ICP, Lab Filtered	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Minneapolis								
Calcium, Dissolved	**29.2**	mg/L	0.50	0.097	1	07/07/22 05:20	07/07/22 14:21	7440-70-2	
Iron, Dissolved	**0.044J**	mg/L	0.050	0.022	1	07/07/22 05:20	07/07/22 14:21	7439-89-6	
Magnesium, Dissolved	**80.9**	mg/L	0.50	0.029	1	07/07/22 05:20	07/07/22 14:21	7439-95-4	
Potassium, Dissolved	**64.2**	mg/L	2.5	0.22	1	07/07/22 05:20	07/07/22 14:21	7440-09-7	
Sodium, Dissolved	**1110**	mg/L	20.0	4.4	20	07/07/22 05:20	07/07/22 14:47	7440-23-5	
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3020A Pace Analytical Services - Minneapolis								
Arsenic	**0.0011**	mg/L	0.00050	0.000083	1	07/06/22 06:20	07/15/22 16:08	7440-38-2	
6020B MET ICPMS, Lab Filtered	Analytical Method: EPA 6020B Preparation Method: EPA 3020A Pace Analytical Services - Minneapolis								
Arsenic, Dissolved	**0.0012**	mg/L	0.00050	0.000083	1	07/07/22 05:39	07/15/22 14:52	7440-38-2	
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity, Total as CaCO3	**197**	mg/L	5.0	5.0	1		07/05/22 11:58		
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**3260**	mg/L	312	312	1		07/01/22 10:53		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	**8.2**	mg/L	2.5	1.2	25		07/01/22 04:00	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Sulfate	**142**	mg/L	20.0	10.0	20		07/01/22 11:20	14808-79-8	M1
4500 Chloride	Analytical Method: SM 4500-Cl-E-2011 Pace Analytical Services - Asheville								
Chloride	**1790**	mg/L	500	250	500		07/05/22 14:48	16887-00-6	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: MCMANUS JUNE 2022
Pace Project No.: 92612546

Sample: PT-04D **Lab ID: 92612546004** Collected: 06/28/22 14:20 Received: 06/30/22 11:05 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Minneapolis								
Calcium	**193**	mg/L	0.50	0.097	1	07/06/22 06:48	07/07/22 11:44	7440-70-2	
Iron	**0.12**	mg/L	0.050	0.022	1	07/06/22 06:48	07/07/22 11:44	7439-89-6	
Magnesium	**427**	mg/L	0.50	0.029	1	07/06/22 06:48	07/07/22 11:44	7439-95-4	
Potassium	**183**	mg/L	5.0	0.43	2	07/06/22 06:48	07/07/22 12:46	7440-09-7	
Sodium	**3360**	mg/L	25.0	5.4	25	07/06/22 06:48	07/07/22 12:05	7440-23-5	
6010D MET ICP, Lab Filtered	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Minneapolis								
Calcium, Dissolved	**189**	mg/L	0.50	0.097	1	07/07/22 05:20	07/07/22 14:22	7440-70-2	
Iron, Dissolved	**0.084**	mg/L	0.050	0.022	1	07/07/22 05:20	07/07/22 14:22	7439-89-6	
Magnesium, Dissolved	**428**	mg/L	0.50	0.029	1	07/07/22 05:20	07/07/22 14:22	7439-95-4	
Potassium, Dissolved	**175**	mg/L	2.5	0.22	1	07/07/22 05:20	07/07/22 14:22	7440-09-7	
Sodium, Dissolved	**3600**	mg/L	50.0	10.9	50	07/07/22 05:20	07/07/22 15:02	7440-23-5	
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3020A Pace Analytical Services - Minneapolis								
Arsenic	**0.0027**	mg/L	0.00050	0.000083	1	07/06/22 06:20	07/15/22 16:12	7440-38-2	
6020B MET ICPMS, Lab Filtered	Analytical Method: EPA 6020B Preparation Method: EPA 3020A Pace Analytical Services - Minneapolis								
Arsenic, Dissolved	**0.0036**	mg/L	0.0025	0.00041	5	07/07/22 05:39	07/18/22 11:17	7440-38-2	
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity, Total as CaCO3	**451**	mg/L	5.0	5.0	1		07/05/22 13:38		
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**13700**	mg/L	2500	2500	1		07/01/22 10:53		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	**18.4**	mg/L	2.5	1.2	25		07/01/22 04:00	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Sulfate	**465**	mg/L	100	50.0	100		07/01/22 08:20	14808-79-8	
4500 Chloride	Analytical Method: SM 4500-Cl-E-2011 Pace Analytical Services - Asheville								
Chloride	**6670**	mg/L	500	250	500		07/05/22 14:49	16887-00-6	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: MCMANUS JUNE 2022
Pace Project No.: 92612546

Sample: DR-01 **Lab ID: 92612546005** Collected: 06/28/22 14:52 Received: 06/30/22 11:05 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Minneapolis								
Calcium	**84.1**	mg/L	0.50	0.097	1	07/06/22 06:48	07/07/22 11:49	7440-70-2	
Iron	**0.12**	mg/L	0.050	0.022	1	07/06/22 06:48	07/07/22 11:49	7439-89-6	
Magnesium	**184**	mg/L	0.50	0.029	1	07/06/22 06:48	07/07/22 11:49	7439-95-4	
Potassium	**97.9**	mg/L	2.5	0.22	1	07/06/22 06:48	07/07/22 11:49	7440-09-7	
Sodium	**1800**	mg/L	25.0	5.4	25	07/06/22 06:48	07/07/22 12:07	7440-23-5	
6010D MET ICP, Lab Filtered	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Minneapolis								
Calcium, Dissolved	**79.5**	mg/L	0.50	0.097	1	07/07/22 05:20	07/07/22 14:24	7440-70-2	
Iron, Dissolved	**0.069**	mg/L	0.050	0.022	1	07/07/22 05:20	07/07/22 14:24	7439-89-6	
Magnesium, Dissolved	**178**	mg/L	0.50	0.029	1	07/07/22 05:20	07/07/22 14:24	7439-95-4	
Potassium, Dissolved	**88.0**	mg/L	2.5	0.22	1	07/07/22 05:20	07/07/22 14:24	7440-09-7	
Sodium, Dissolved	**2070**	mg/L	20.0	4.4	20	07/07/22 05:20	07/07/22 14:54	7440-23-5	
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3020A Pace Analytical Services - Minneapolis								
Arsenic	**0.077**	mg/L	0.00050	0.000083	1	07/06/22 06:20	07/15/22 16:15	7440-38-2	
6020B MET ICPMS, Lab Filtered	Analytical Method: EPA 6020B Preparation Method: EPA 3020A Pace Analytical Services - Minneapolis								
Arsenic, Dissolved	**0.083**	mg/L	0.00050	0.000083	1	07/07/22 05:39	07/15/22 14:59	7440-38-2	
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity, Total as CaCO3	**271**	mg/L	5.0	5.0	1		07/05/22 12:14		
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**6280**	mg/L	500	500	1		07/01/22 10:53		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	**17.4**	mg/L	2.5	1.2	25		07/01/22 04:01	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Sulfate	**238**	mg/L	100	50.0	100		07/01/22 08:36	14808-79-8	
4500 Chloride	Analytical Method: SM 4500-Cl-E-2011 Pace Analytical Services - Asheville								
Chloride	**2470**	mg/L	500	250	500		07/05/22 14:50	16887-00-6	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
110 Technology Parkway
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(770)734-4200

ANALYTICAL RESULTS

Project: MCMANUS JUNE 2022
Pace Project No.: 92612546

Sample: DR-02 **Lab ID: 92612546006** Collected: 06/28/22 16:05 Received: 06/30/22 11:05 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Minneapolis								
Calcium	**107**	mg/L	0.50	0.097	1	07/06/22 06:48	07/07/22 11:51	7440-70-2	
Iron	**0.21**	mg/L	0.050	0.022	1	07/06/22 06:48	07/07/22 11:51	7439-89-6	
Magnesium	**253**	mg/L	0.50	0.029	1	07/06/22 06:48	07/07/22 11:51	7439-95-4	
Potassium	**136**	mg/L	2.5	0.22	1	07/06/22 06:48	07/07/22 11:51	7440-09-7	
Sodium	**2360**	mg/L	25.0	5.4	25	07/06/22 06:48	07/07/22 12:49	7440-23-5	
6010D MET ICP, Lab Filtered	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Minneapolis								
Calcium, Dissolved	**106**	mg/L	0.50	0.097	1	07/07/22 05:20	07/07/22 14:26	7440-70-2	
Iron, Dissolved	**0.13**	mg/L	0.050	0.022	1	07/07/22 05:20	07/07/22 14:26	7439-89-6	
Magnesium, Dissolved	**258**	mg/L	0.50	0.029	1	07/07/22 05:20	07/07/22 14:26	7439-95-4	
Potassium, Dissolved	**126**	mg/L	2.5	0.22	1	07/07/22 05:20	07/07/22 14:26	7440-09-7	
Sodium, Dissolved	**2930**	mg/L	20.0	4.4	20	07/07/22 05:20	07/07/22 14:56	7440-23-5	
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3020A Pace Analytical Services - Minneapolis								
Arsenic	**0.0078**	mg/L	0.00050	0.000083	1	07/06/22 06:20	07/15/22 16:19	7440-38-2	
6020B MET ICPMS, Lab Filtered	Analytical Method: EPA 6020B Preparation Method: EPA 3020A Pace Analytical Services - Minneapolis								
Arsenic, Dissolved	**0.0075**	mg/L	0.00050	0.000083	1	07/07/22 05:39	07/15/22 15:03	7440-38-2	
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity, Total as CaCO3	**354**	mg/L	5.0	5.0	1		07/05/22 12:23		
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**8220**	mg/L	625	625	1		07/01/22 10:54		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	**23.0**	mg/L	2.5	1.2	25		07/01/22 04:01	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Sulfate	**299**	mg/L	100	50.0	100		07/01/22 08:51	14808-79-8	
4500 Chloride	Analytical Method: SM 4500-Cl-E-2011 Pace Analytical Services - Asheville								
Chloride	**4540**	mg/L	500	250	500		07/05/22 14:51	16887-00-6	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: MCMANUS JUNE 2022
Pace Project No.: 92612546

Sample: MCM-06 **Lab ID: 92612546007** Collected: 06/28/22 16:00 Received: 06/30/22 11:05 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Minneapolis								
Calcium	**73.5**	mg/L	0.50	0.097	1	07/06/22 06:48	07/07/22 11:53	7440-70-2	
Iron	**0.11**	mg/L	0.050	0.022	1	07/06/22 06:48	07/07/22 11:53	7439-89-6	
Magnesium	**154**	mg/L	0.50	0.029	1	07/06/22 06:48	07/07/22 11:53	7439-95-4	
Potassium	**94.0**	mg/L	2.5	0.22	1	07/06/22 06:48	07/07/22 11:53	7440-09-7	
Sodium	**1720**	mg/L	25.0	5.4	25	07/06/22 06:48	07/07/22 12:51	7440-23-5	
6010D MET ICP, Lab Filtered	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Minneapolis								
Calcium, Dissolved	**69.6**	mg/L	0.50	0.097	1	07/07/22 05:20	07/07/22 14:27	7440-70-2	
Iron, Dissolved	ND	mg/L	0.050	0.022	1	07/07/22 05:20	07/07/22 14:27	7439-89-6	
Magnesium, Dissolved	**151**	mg/L	0.50	0.029	1	07/07/22 05:20	07/07/22 14:27	7439-95-4	
Potassium, Dissolved	**83.0**	mg/L	2.5	0.22	1	07/07/22 05:20	07/07/22 14:27	7440-09-7	
Sodium, Dissolved	**2160**	mg/L	20.0	4.4	20	07/07/22 05:20	07/07/22 14:57	7440-23-5	
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3020A Pace Analytical Services - Minneapolis								
Arsenic	**0.17**	mg/L	0.00050	0.000083	1	07/06/22 06:20	07/15/22 16:23	7440-38-2	
6020B MET ICPMS, Lab Filtered	Analytical Method: EPA 6020B Preparation Method: EPA 3020A Pace Analytical Services - Minneapolis								
Arsenic, Dissolved	**0.20**	mg/L	0.00050	0.000083	1	07/07/22 05:39	07/15/22 15:06	7440-38-2	
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity, Total as CaCO3	**286**	mg/L	5.0	5.0	1		07/05/22 12:34		
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**6140**	mg/L	500	500	1		07/01/22 10:54		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	**23.3**	mg/L	2.5	1.2	25		07/01/22 04:01	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Sulfate	**213**	mg/L	100	50.0	100		07/01/22 09:07	14808-79-8	
4500 Chloride	Analytical Method: SM 4500-Cl-E-2011 Pace Analytical Services - Asheville								
Chloride	**3520**	mg/L	500	250	500		07/05/22 14:52	16887-00-6	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: MCMANUS JUNE 2022
Pace Project No.: 92612546

Sample: DPZ-02 **Lab ID: 92612546008** Collected: 06/28/22 11:45 Received: 06/30/22 11:05 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Minneapolis								
Calcium	**225**	mg/L	0.50	0.097	1	07/06/22 06:48	07/07/22 11:54	7440-70-2	
Iron	**0.022J**	mg/L	0.050	0.022	1	07/06/22 06:48	07/07/22 11:54	7439-89-6	
Magnesium	**471**	mg/L	0.50	0.029	1	07/06/22 06:48	07/07/22 11:54	7439-95-4	
Potassium	**184**	mg/L	5.0	0.43	2	07/06/22 06:48	07/07/22 12:48	7440-09-7	
Sodium	**3610**	mg/L	25.0	5.4	25	07/06/22 06:48	07/07/22 12:53	7440-23-5	
6010D MET ICP, Lab Filtered	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Minneapolis								
Calcium, Dissolved	**233**	mg/L	0.50	0.097	1	07/07/22 05:20	07/07/22 14:29	7440-70-2	
Iron, Dissolved	ND	mg/L	0.050	0.022	1	07/07/22 05:20	07/07/22 14:29	7439-89-6	
Magnesium, Dissolved	**503**	mg/L	0.50	0.029	1	07/07/22 05:20	07/07/22 14:29	7439-95-4	
Potassium, Dissolved	**182**	mg/L	5.0	0.43	2	07/07/22 05:20	07/11/22 15:35	7440-09-7	
Sodium, Dissolved	**4370**	mg/L	50.0	10.9	50	07/07/22 05:20	07/07/22 15:04	7440-23-5	
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3020A Pace Analytical Services - Minneapolis								
Arsenic	**0.025**	mg/L	0.0025	0.00041	5	07/06/22 06:20	07/18/22 11:25	7440-38-2	
6020B MET ICPMS, Lab Filtered	Analytical Method: EPA 6020B Preparation Method: EPA 3020A Pace Analytical Services - Minneapolis								
Arsenic, Dissolved	**0.032**	mg/L	0.0025	0.00041	5	07/07/22 05:39	07/18/22 11:21	7440-38-2	
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity, Total as CaCO3	**394**	mg/L	5.0	5.0	1		07/05/22 12:44		
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**15400**	mg/L	2500	2500	1		07/01/22 10:54		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	**24.3**	mg/L	2.5	1.2	25		07/01/22 04:02	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Sulfate	**553**	mg/L	100	50.0	100		07/01/22 12:07	14808-79-8	
4500 Chloride	Analytical Method: SM 4500-Cl-E-2011 Pace Analytical Services - Asheville								
Chloride	**9640**	mg/L	500	250	500		07/05/22 14:53	16887-00-6	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
110 Technology Parkway
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ANALYTICAL RESULTS

Project: MCMANUS JUNE 2022
Pace Project No.: 92612546

Sample: DUP-1 **Lab ID: 92612546009** Collected: 06/28/22 00:00 Received: 06/30/22 11:05 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Minneapolis								
Calcium	**32.2**	mg/L	0.50	0.097	1	07/06/22 06:48	07/07/22 11:56	7440-70-2	
Iron	**0.25**	mg/L	0.050	0.022	1	07/06/22 06:48	07/07/22 11:56	7439-89-6	
Magnesium	**83.5**	mg/L	0.50	0.029	1	07/06/22 06:48	07/07/22 11:56	7439-95-4	
Potassium	**72.7**	mg/L	2.5	0.22	1	07/06/22 06:48	07/07/22 11:56	7440-09-7	
Sodium	**926**	mg/L	10.0	2.2	10	07/06/22 06:48	07/07/22 12:54	7440-23-5	
6010D MET ICP, Lab Filtered	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Minneapolis								
Calcium, Dissolved	**29.3**	mg/L	0.50	0.097	1	07/07/22 05:20	07/07/22 14:34	7440-70-2	
Iron, Dissolved	**0.046J**	mg/L	0.050	0.022	1	07/07/22 05:20	07/07/22 14:34	7439-89-6	
Magnesium, Dissolved	**80.4**	mg/L	0.50	0.029	1	07/07/22 05:20	07/07/22 14:34	7439-95-4	
Potassium, Dissolved	**63.6**	mg/L	2.5	0.22	1	07/07/22 05:20	07/07/22 14:34	7440-09-7	
Sodium, Dissolved	**1070**	mg/L	20.0	4.4	20	07/07/22 05:20	07/07/22 15:01	7440-23-5	
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3020A Pace Analytical Services - Minneapolis								
Arsenic	**0.0011**	mg/L	0.00050	0.000083	1	07/06/22 06:20	07/15/22 16:30	7440-38-2	
6020B MET ICPMS, Lab Filtered	Analytical Method: EPA 6020B Preparation Method: EPA 3020A Pace Analytical Services - Minneapolis								
Arsenic, Dissolved	**0.0014**	mg/L	0.00050	0.000083	1	07/07/22 05:39	07/15/22 15:14	7440-38-2	
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity, Total as CaCO3	**192**	mg/L	5.0	5.0	1		07/05/22 13:05		
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	**3340**	mg/L	357	357	1		07/01/22 10:54		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	**8.2**	mg/L	2.5	1.2	25		07/01/22 04:02	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Sulfate	**142**	mg/L	20.0	10.0	20		07/01/22 12:22	14808-79-8	
4500 Chloride	Analytical Method: SM 4500-Cl-E-2011 Pace Analytical Services - Asheville								
Chloride	**1390**	mg/L	500	250	500		07/05/22 14:54	16887-00-6	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: MCMANUS JUNE 2022
Pace Project No.: 92612546

Sample: FB-1 **Lab ID: 92612546010** Collected: 06/28/22 10:40 Received: 06/30/22 11:05 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Minneapolis								
Calcium	ND	mg/L	0.50	0.097	1	07/06/22 06:48	07/07/22 12:14	7440-70-2	
Iron	ND	mg/L	0.050	0.022	1	07/06/22 06:48	07/07/22 12:14	7439-89-6	
Magnesium	ND	mg/L	0.50	0.029	1	07/06/22 06:48	07/07/22 12:14	7439-95-4	
Potassium	ND	mg/L	2.5	0.22	1	07/06/22 06:48	07/07/22 12:14	7440-09-7	
Sodium	ND	mg/L	1.0	0.22	1	07/06/22 06:48	07/07/22 12:14	7440-23-5	
6010D MET ICP, Lab Filtered	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Minneapolis								
Calcium, Dissolved	ND	mg/L	0.50	0.097	1	07/07/22 05:20	07/07/22 14:36	7440-70-2	
Iron, Dissolved	ND	mg/L	0.050	0.022	1	07/07/22 05:20	07/07/22 14:36	7439-89-6	
Magnesium, Dissolved	ND	mg/L	0.50	0.029	1	07/07/22 05:20	07/07/22 14:36	7439-95-4	
Potassium, Dissolved	**0.34J**	mg/L	2.5	0.22	1	07/07/22 05:20	07/07/22 14:36	7440-09-7	
Sodium, Dissolved	**0.70J**	mg/L	1.0	0.22	1	07/07/22 05:20	07/07/22 14:36	7440-23-5	
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3020A Pace Analytical Services - Minneapolis								
Arsenic	**0.00013J**	mg/L	0.00050	0.000083	1	07/06/22 06:20	07/15/22 16:34	7440-38-2	
6020B MET ICPMS, Lab Filtered	Analytical Method: EPA 6020B Preparation Method: EPA 3020A Pace Analytical Services - Minneapolis								
Arsenic, Dissolved	**0.00010J**	mg/L	0.00050	0.000083	1	07/07/22 05:39	07/15/22 15:17	7440-38-2	
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity, Total as CaCO3	ND	mg/L	5.0	5.0	1		07/02/22 20:53		
2540C Total Dissolved Solids	Analytical Method: SM 2540C-2011 Pace Analytical Services - Asheville								
Total Dissolved Solids	ND	mg/L	25.0	25.0	1		07/04/22 11:06		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	ND	mg/L	0.10	0.050	1		07/01/22 04:03	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Sulfate	ND	mg/L	1.0	0.50	1		07/01/22 04:08	14808-79-8	
4500 Chloride	Analytical Method: SM 4500-Cl-E-2011 Pace Analytical Services - Asheville								
Chloride	**0.86J**	mg/L	1.0	0.50	1		07/05/22 14:54	16887-00-6	

REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: MCMANUS JUNE 2022
Pace Project No.: 92612546

QC Batch: 825861
QC Batch Method: EPA 3010A
Analysis Method: EPA 6010D
Analysis Description: 6010D Water
Laboratory: Pace Analytical Services - Minneapolis
Associated Lab Samples: 92612546001, 92612546002, 92612546003, 92612546004, 92612546005, 92612546006, 92612546007, 92612546008, 92612546009, 92612546010

METHOD BLANK: 4374763 Matrix: Water
Associated Lab Samples: 92612546001, 92612546002, 92612546003, 92612546004, 92612546005, 92612546006, 92612546007, 92612546008, 92612546009, 92612546010

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Calcium	mg/L	ND	0.50	0.097	07/07/22 11:29	
Iron	mg/L	ND	0.050	0.022	07/07/22 11:29	
Magnesium	mg/L	ND	0.50	0.029	07/07/22 11:29	
Potassium	mg/L	ND	2.5	0.22	07/07/22 11:29	
Sodium	mg/L	ND	1.0	0.22	07/07/22 11:29	

LABORATORY CONTROL SAMPLE: 4374764

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium	mg/L	20	19.3	96	80-120	
Iron	mg/L	20	19.7	98	80-120	
Magnesium	mg/L	20	19.5	98	80-120	
Potassium	mg/L	20	19.6	98	80-120	
Sodium	mg/L	20	19.2	96	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 4374765 4374766

Parameter	Units	92612546001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium	mg/L	81.1	20	20	97.0	99.3	79	91	75-125	2	20	
Iron	mg/L	0.22	20	20	19.6	19.9	97	99	75-125	2	20	
Magnesium	mg/L	179	20	20	196	200	84	101	75-125	2	20	
Potassium	mg/L	101	20	20	122	125	103	119	75-125	3	20	
Sodium	mg/L	1800	20	20	1850	1850	221	223	75-125	0	20	P6

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REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: MCMANUS JUNE 2022
Pace Project No.: 92612546

QC Batch: 826173
QC Batch Method: EPA 3010A
Analysis Method: EPA 6010D
Analysis Description: 6010D Water Dissolved
Laboratory: Pace Analytical Services - Minneapolis
Associated Lab Samples: 92612546001, 92612546002, 92612546003, 92612546004, 92612546005, 92612546006, 92612546007, 92612546008, 92612546009, 92612546010

METHOD BLANK: 4376218 Matrix: Water
Associated Lab Samples: 92612546001, 92612546002, 92612546003, 92612546004, 92612546005, 92612546006, 92612546007, 92612546008, 92612546009, 92612546010

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Calcium, Dissolved	mg/L	ND	0.50	0.097	07/07/22 13:44	
Iron, Dissolved	mg/L	ND	0.050	0.022	07/07/22 13:44	
Magnesium, Dissolved	mg/L	ND	0.50	0.029	07/07/22 13:44	
Potassium, Dissolved	mg/L	ND	2.5	0.22	07/07/22 13:44	
Sodium, Dissolved	mg/L	ND	1.0	0.22	07/07/22 13:44	

LABORATORY CONTROL SAMPLE: 4376219

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium, Dissolved	mg/L	20	17.8	89	80-120	
Iron, Dissolved	mg/L	20	18.5	92	80-120	
Magnesium, Dissolved	mg/L	20	18.0	90	80-120	
Potassium, Dissolved	mg/L	20	18.5	93	80-120	
Sodium, Dissolved	mg/L	20	18.1	90	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 4376220 4376221

Parameter	Units	92612546001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium, Dissolved	mg/L	75.9	20	20	98.9	97.5	115	108	75-125	1	20	
Iron, Dissolved	mg/L	0.062	20	20	19.2	19.5	96	97	75-125	1	20	
Magnesium, Dissolved	mg/L	174	20	20	205	202	158	139	75-125	2	20	P6
Potassium, Dissolved	mg/L	89.3	20	20	118	116	144	134	75-125	2	20	P6
Sodium, Dissolved	mg/L	2100	20	20	2290	2310	927	1060	75-125	1	20	P6

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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(770)734-4200

QUALITY CONTROL DATA

Project: MCMANUS JUNE 2022
Pace Project No.: 92612546

QC Batch: 825866
QC Batch Method: EPA 3020A
Analysis Method: EPA 6020B
Analysis Description: 6020B Water UPD5
Laboratory: Pace Analytical Services - Minneapolis
Associated Lab Samples: 92612546001, 92612546002, 92612546003, 92612546004, 92612546005, 92612546006, 92612546007, 92612546008, 92612546009, 92612546010

METHOD BLANK: 4374788 Matrix: Water
Associated Lab Samples: 92612546001, 92612546002, 92612546003, 92612546004, 92612546005, 92612546006, 92612546007, 92612546008, 92612546009, 92612546010

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Arsenic	mg/L	ND	0.00050	0.000083	07/15/22 15:32	

LABORATORY CONTROL SAMPLE: 4374789

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	0.1	0.10	101	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 4374790 4374791

Parameter	Units	92612546002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	mg/L	0.0019	0.1	0.1	0.11	0.11	109	105	75-125	4	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: MCMANUS JUNE 2022
Pace Project No.: 92612546

QC Batch: 826179 — Analysis Method: EPA 6020B
QC Batch Method: EPA 3020A — Analysis Description: 6020B Water Dissolved UPD5
Laboratory: Pace Analytical Services - Minneapolis
Associated Lab Samples: 92612546001, 92612546002, 92612546003, 92612546004, 92612546005, 92612546006, 92612546007, 92612546008, 92612546009, 92612546010

METHOD BLANK: 4376245 — Matrix: Water
Associated Lab Samples: 92612546001, 92612546002, 92612546003, 92612546004, 92612546005, 92612546006, 92612546007, 92612546008, 92612546009, 92612546010

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Arsenic, Dissolved	mg/L	ND	0.00050	0.000083	07/15/22 14:15	

LABORATORY CONTROL SAMPLE: 4376246

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic, Dissolved	mg/L	0.1	0.098	98	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 4376247 4376248

Parameter	Units	92612546002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic, Dissolved	mg/L	0.0018	0.1	0.1	0.10	0.11	101	104	75-125	3	20	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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(770)734-4200

QUALITY CONTROL DATA

Project: MCMANUS JUNE 2022
Pace Project No.: 92612546

QC Batch: 708484
QC Batch Method: SM 2320B-2011
Analysis Method: SM 2320B-2011
Analysis Description: 2320B Alkalinity
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92612546001, 92612546002

METHOD BLANK: 3695062 Matrix: Water
Associated Lab Samples: 92612546001, 92612546002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	ND	5.0	5.0	07/02/22 16:05	

LABORATORY CONTROL SAMPLE: 3695063

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	50	52.3	105	80-120	

LABORATORY CONTROL SAMPLE: 3695064

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	50	50.8	102	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3695065 3695066

Parameter	Units	92612726001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	ND	50	50	52.7	52.1	105	104	80-120	1	25	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3695067 3695068

Parameter	Units	92612726011 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	ND	50	50	53.4	53.0	105	104	80-120	1	25	

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REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: MCMANUS JUNE 2022
Pace Project No.: 92612546

QC Batch: 708485
QC Batch Method: SM 2320B-2011
Analysis Method: SM 2320B-2011
Analysis Description: 2320B Alkalinity
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92612546003, 92612546004, 92612546005, 92612546006, 92612546007, 92612546008, 92612546009, 92612546010

METHOD BLANK: 3695069 Matrix: Water
Associated Lab Samples: 92612546003, 92612546004, 92612546005, 92612546006, 92612546007, 92612546008, 92612546009, 92612546010

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	ND	5.0	5.0	07/02/22 19:14	

LABORATORY CONTROL SAMPLE: 3695070

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	50	50.6	101	80-120	

LABORATORY CONTROL SAMPLE: 3695071

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	50	50.8	102	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3695072 3695073

Parameter	Units	92612546003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	197	50	50	255	256	117	119	80-120	0	25	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3695074 3695075

Parameter	Units	92612809002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	128000 ug/L	50	50	138	137	20	17	80-120	1	25	M1

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REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: MCMANUS JUNE 2022
Pace Project No.: 92612546

QC Batch: 708223 | Analysis Method: SM 2540C-2011
QC Batch Method: SM 2540C-2011 | Analysis Description: 2540C Total Dissolved Solids
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92612546001, 92612546002, 92612546003, 92612546004, 92612546005, 92612546006, 92612546007, 92612546008, 92612546009

METHOD BLANK: 3693528 Matrix: Water
Associated Lab Samples: 92612546001, 92612546002, 92612546003, 92612546004, 92612546005, 92612546006, 92612546007, 92612546008, 92612546009

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	ND	25.0	25.0	07/01/22 10:52	

LABORATORY CONTROL SAMPLE: 3693529

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	250	246	98	90-110	

SAMPLE DUPLICATE: 3693530

Parameter	Units	92611876001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	81.0	81.0	0	25	

SAMPLE DUPLICATE: 3693531

Parameter	Units	92612546007 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	6140	6080	1	25	

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REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: MCMANUS JUNE 2022
Pace Project No.: 92612546

QC Batch: 708545
QC Batch Method: SM 2540C-2011
Analysis Method: SM 2540C-2011
Analysis Description: 2540C Total Dissolved Solids
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92612546010

METHOD BLANK: 3695257 Matrix: Water
Associated Lab Samples: 92612546010

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	ND	25.0	25.0	07/04/22 11:06	

LABORATORY CONTROL SAMPLE: 3695258

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	250	258	103	90-110	

SAMPLE DUPLICATE: 3695259

Parameter	Units	92612546010 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	ND	ND		25	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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(770)734-4200

QUALITY CONTROL DATA

Project: MCMANUS JUNE 2022
Pace Project No.: 92612546

QC Batch: 708171 — Analysis Method: SM 4500-S2D-2011
QC Batch Method: SM 4500-S2D-2011 — Analysis Description: 4500S2D Sulfide Water
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92612546001, 92612546002, 92612546003, 92612546004, 92612546005, 92612546006, 92612546007, 92612546008, 92612546009, 92612546010

METHOD BLANK: 3693375 — Matrix: Water
Associated Lab Samples: 92612546001, 92612546002, 92612546003, 92612546004, 92612546005, 92612546006, 92612546007, 92612546008, 92612546009, 92612546010

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Sulfide	mg/L	ND	0.10	0.050	07/01/22 03:55	

LABORATORY CONTROL SAMPLE: 3693376

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfide	mg/L	0.5	0.51	102	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3693377 3693378

Parameter	Units	92612399003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfide	mg/L	ND	0.5	0.5	0.52	0.54	102	105	80-120	3	10	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3693379 3693380

Parameter	Units	92612399002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfide	mg/L	ND	0.5	0.5	0.51	0.52	99	102	80-120	3	10	

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REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: MCMANUS JUNE 2022
Pace Project No.: 92612546

QC Batch: 708118
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: 92612546001, 92612546002, 92612546003, 92612546004, 92612546005, 92612546006, 92612546007, 92612546008, 92612546009, 92612546010

METHOD BLANK: 3693181 Matrix: Water
Associated Lab Samples: 92612546001, 92612546002, 92612546003, 92612546004, 92612546005, 92612546006, 92612546007, 92612546008, 92612546009, 92612546010

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Sulfate	mg/L	ND	1.0	0.50	06/30/22 20:58	

LABORATORY CONTROL SAMPLE: 3693182

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	50	52.0	104	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3693183 3693184

Parameter	Units	92610803001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	175	50	50	213	211	77	72	90-110	1	10	M1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3693185 3693186

Parameter	Units	92612546003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	142	50	50	177	178	71	72	90-110	0	10	M1

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REPORT OF LABORATORY ANALYSIS

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110 Technology Parkway
Peachtree Corners, GA 30092
(770)734-4200

QUALITY CONTROL DATA

Project: MCMANUS JUNE 2022
Pace Project No.: 92612546

QC Batch: 708577 — Analysis Method: SM 4500-Cl-E-2011
QC Batch Method: SM 4500-Cl-E-2011 — Analysis Description: 4500 Chloride
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92612546001, 92612546002, 92612546003, 92612546004, 92612546005, 92612546006, 92612546007, 92612546008, 92612546009, 92612546010

METHOD BLANK: 3695347 — Matrix: Water
Associated Lab Samples: 92612546001, 92612546002, 92612546003, 92612546004, 92612546005, 92612546006, 92612546007, 92612546008, 92612546009, 92612546010

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	ND	1.0	0.50	07/05/22 13:55	

LABORATORY CONTROL SAMPLE: 3695348

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	20	20.6	103	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3695349 3695350

Parameter	Units	92612051002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	99.2	10	10	111	109	114	93	90-110	2	10	M1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3695351 3695352

Parameter	Units	92612054001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	56.0	10	10	67.5	66.2	115	102	90-110	2	10	M1

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REPORT OF LABORATORY ANALYSIS

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110 Technology Parkway
Peachtree Corners, GA 30092
(770)734-4200

QUALIFIERS

Project: MCMANUS JUNE 2022
Pace Project No.: 92612546

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.

Reported results are not rounded until the final step prior to reporting. Therefore, calculated parameters that are typically reported as "Total" may vary slightly from the sum of the reported component parameters.

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.
P6	Matrix spike recovery was outside laboratory control limits due to a parent sample concentration notably higher than the spike level.

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

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: MCMANUS JUNE 2022
Pace Project No.: 92612546

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
92612546001	**PT-01**	EPA 3010A	825861	EPA 6010D	826326
92612546002	**PT-02**	EPA 3010A	825861	EPA 6010D	826326
92612546003	**PT-03**	EPA 3010A	825861	EPA 6010D	826326
92612546004	**PT-04D**	EPA 3010A	825861	EPA 6010D	826326
92612546005	**DR-01**	EPA 3010A	825861	EPA 6010D	826326
92612546006	**DR-02**	EPA 3010A	825861	EPA 6010D	826326
92612546007	**MCM-06**	EPA 3010A	825861	EPA 6010D	826326
92612546008	**DPZ-02**	EPA 3010A	825861	EPA 6010D	826326
92612546009	**DUP-1**	EPA 3010A	825861	EPA 6010D	826326
92612546010	**FB-1**	EPA 3010A	825861	EPA 6010D	826326
92612546001	**PT-01**	EPA 3010A	826173	EPA 6010D	826585
92612546002	**PT-02**	EPA 3010A	826173	EPA 6010D	826585
92612546003	**PT-03**	EPA 3010A	826173	EPA 6010D	826585
92612546004	**PT-04D**	EPA 3010A	826173	EPA 6010D	826585
92612546005	**DR-01**	EPA 3010A	826173	EPA 6010D	826585
92612546006	**DR-02**	EPA 3010A	826173	EPA 6010D	826585
92612546007	**MCM-06**	EPA 3010A	826173	EPA 6010D	826585
92612546008	**DPZ-02**	EPA 3010A	826173	EPA 6010D	826585
92612546009	**DUP-1**	EPA 3010A	826173	EPA 6010D	826585
92612546010	**FB-1**	EPA 3010A	826173	EPA 6010D	826585
92612546001	**PT-01**	EPA 3020A	825866	EPA 6020B	826624
92612546002	**PT-02**	EPA 3020A	825866	EPA 6020B	826624
92612546003	**PT-03**	EPA 3020A	825866	EPA 6020B	826624
92612546004	**PT-04D**	EPA 3020A	825866	EPA 6020B	826624
92612546005	**DR-01**	EPA 3020A	825866	EPA 6020B	826624
92612546006	**DR-02**	EPA 3020A	825866	EPA 6020B	826624
92612546007	**MCM-06**	EPA 3020A	825866	EPA 6020B	826624
92612546008	**DPZ-02**	EPA 3020A	825866	EPA 6020B	826624
92612546009	**DUP-1**	EPA 3020A	825866	EPA 6020B	826624
92612546010	**FB-1**	EPA 3020A	825866	EPA 6020B	826624
92612546001	**PT-01**	EPA 3020A	826179	EPA 6020B	826670
92612546002	**PT-02**	EPA 3020A	826179	EPA 6020B	826670
92612546003	**PT-03**	EPA 3020A	826179	EPA 6020B	826670
92612546004	**PT-04D**	EPA 3020A	826179	EPA 6020B	826670
92612546005	**DR-01**	EPA 3020A	826179	EPA 6020B	826670
92612546006	**DR-02**	EPA 3020A	826179	EPA 6020B	826670
92612546007	**MCM-06**	EPA 3020A	826179	EPA 6020B	826670
92612546008	**DPZ-02**	EPA 3020A	826179	EPA 6020B	826670
92612546009	**DUP-1**	EPA 3020A	826179	EPA 6020B	826670
92612546010	**FB-1**	EPA 3020A	826179	EPA 6020B	826670
92612546001	**PT-01**	SM 2320B-2011	708484		
92612546002	**PT-02**	SM 2320B-2011	708484		
92612546003	**PT-03**	SM 2320B-2011	708485		
92612546004	**PT-04D**	SM 2320B-2011	708485		
92612546005	**DR-01**	SM 2320B-2011	708485		
92612546006	**DR-02**	SM 2320B-2011	708485		

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: MCMANUS JUNE 2022
Pace Project No.: 92612546

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
92612546007	**MCM-06**	SM 2320B-2011	708485		
92612546008	**DPZ-02**	SM 2320B-2011	708485		
92612546009	**DUP-1**	SM 2320B-2011	708485		
92612546010	**FB-1**	SM 2320B-2011	708485		
92612546001	**PT-01**	SM 2540C-2011	708223		
92612546002	**PT-02**	SM 2540C-2011	708223		
92612546003	**PT-03**	SM 2540C-2011	708223		
92612546004	**PT-04D**	SM 2540C-2011	708223		
92612546005	**DR-01**	SM 2540C-2011	708223		
92612546006	**DR-02**	SM 2540C-2011	708223		
92612546007	**MCM-06**	SM 2540C-2011	708223		
92612546008	**DPZ-02**	SM 2540C-2011	708223		
92612546009	**DUP-1**	SM 2540C-2011	708223		
92612546010	**FB-1**	SM 2540C-2011	708545		
92612546001	**PT-01**	SM 4500-S2D-2011	708171		
92612546002	**PT-02**	SM 4500-S2D-2011	708171		
92612546003	**PT-03**	SM 4500-S2D-2011	708171		
92612546004	**PT-04D**	SM 4500-S2D-2011	708171		
92612546005	**DR-01**	SM 4500-S2D-2011	708171		
92612546006	**DR-02**	SM 4500-S2D-2011	708171		
92612546007	**MCM-06**	SM 4500-S2D-2011	708171		
92612546008	**DPZ-02**	SM 4500-S2D-2011	708171		
92612546009	**DUP-1**	SM 4500-S2D-2011	708171		
92612546010	**FB-1**	SM 4500-S2D-2011	708171		
92612546001	**PT-01**	EPA 300.0 Rev 2.1 1993	708118		
92612546002	**PT-02**	EPA 300.0 Rev 2.1 1993	708118		
92612546003	**PT-03**	EPA 300.0 Rev 2.1 1993	708118		
92612546004	**PT-04D**	EPA 300.0 Rev 2.1 1993	708118		
92612546005	**DR-01**	EPA 300.0 Rev 2.1 1993	708118		
92612546006	**DR-02**	EPA 300.0 Rev 2.1 1993	708118		
92612546007	**MCM-06**	EPA 300.0 Rev 2.1 1993	708118		
92612546008	**DPZ-02**	EPA 300.0 Rev 2.1 1993	708118		
92612546009	**DUP-1**	EPA 300.0 Rev 2.1 1993	708118		
92612546010	**FB-1**	EPA 300.0 Rev 2.1 1993	708118		
92612546001	**PT-01**	SM 4500-Cl-E-2011	708577		
92612546002	**PT-02**	SM 4500-Cl-E-2011	708577		
92612546003	**PT-03**	SM 4500-Cl-E-2011	708577		
92612546004	**PT-04D**	SM 4500-Cl-E-2011	708577		
92612546005	**DR-01**	SM 4500-Cl-E-2011	708577		
92612546006	**DR-02**	SM 4500-Cl-E-2011	708577		
92612546007	**MCM-06**	SM 4500-Cl-E-2011	708577		
92612546008	**DPZ-02**	SM 4500-Cl-E-2011	708577		
92612546009	**DUP-1**	SM 4500-Cl-E-2011	708577		
92612546010	**FB-1**	SM 4500-Cl-E-2011	708577		

Pace Analytical®

CHAIN-OF-CUSTODY Analytical Request Document

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

LAB USE ONLY- Affix Workorder/Login Label Here

WO# : 92612546

92612546

ALL SHADED AREAS are for LAB USE ONLY

Company: Georgia Power
Address: 1002 Westmoreland Pky, Woodstock, GA 30188
Report To: Stephen.Wilson@ResoluteEnv.com
Copy To: Trent.Godwin@ResoluteEnv.com
Customer Project Name/Number: McManus Semi 2022
Phone: 706-616-0551
Email: Robert.Mull@ResoluteEnv
Collected By (print): Robert Mull
Collected By (signature): [signature]
Sample Disposal: [ ] Dispose as appropriate [ ] Return [ ] Archive: ______ [ ] Hold: ______

Billing Information: Resolute Environmental
Email To: Trent.Godwin@ResoluteEnv.com
Site Collection Info/Address: Plant McManus
State: GA / County/City: Brunswick / Time Zone Collected: [ ] PT [ ] MT [ ] CT [✓] ET
Site/Facility ID #: Plant McManus
Purchase Order #:
Quote #:
Turnaround Date Required: Standard Turnaround
Rush: [ ] Same Day [ ] Next Day [ ] 2 Day [ ] 3 Day [ ] 4 Day [ ] 5 Day (Expedite Charges Apply)

Compliance Monitoring? [ ] Yes [ ] No
DW PWS ID #:
DW Location Code:
Immediately Packed on Ice: [✓] Yes [ ] No
Field Filtered (if applicable): [ ] Yes [ ] No
Analysis: ______

Container Preservative Type **: 2 | U | 5 | U | U | U | U

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

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

Customer Sample ID	Matrix *	Comp / Grab	Collected (or Composite Start) Date	Time	Composite End Date	Time	Res Cl	# of Ctns	Total Metals	Dissolved Metals	Sulfide SM4500	Sulfate EPA 300.0	Alkalinity SM2320B	Chloride SM 4500	TDS
PT-01	GW	G	6/28/22	1555				6	X	X	X	X	X	X	X
PT-02	GW	G	6/29/22	1000				6	X	X	X	X	X	X	X
PT-03	GW	G	6/28/22	1450				6	X	X	X	X	X	X	X
PT-04D	GW	G	6/28/22	1420				6	X	X	X	X	X	X	X
DR-01	GW	G	6/28/22	1452				6	X	X	X	X	X	X	X
DR-02	GW	G	6/28/22	1605				6	X	X	X	X	X	X	X
MCM-06	GW	G	6/28/22	1600				6	X	X	X	X	X	X	X
DPZ-02	GW	G	6/28/22	1145				6	X	X	X	X	X	X	X
DUP-1	GW	G	6/28/22	—				6	X	X	X	X	X	X	X
FB-1	DW	G	6/29/22	1040				6	X	X	X	X	X	X	X

Lab Profile/Line:
Lab Sample Receipt Checklist:
Custody Seals Present/Intact (Y) N NA
Custody Signatures Present (Y) N NA
Collector Signature Present (Y) N NA
Bottles Intact (Y) N NA
Correct Bottles (Y) N NA
Sufficient Volume (Y) N NA
Samples Received on Ice (Y) N NA
VOA - Headspace Acceptable Y N (NA)
USDA Regulated Soils Y N (NA)
Samples in Holding Time (Y) N NA
Residual Chlorine Present Y N (NA)
Cl Strips:
Sample pH Acceptable (Y) N NA
pH Strips: 2238DAU
Sulfide Present Y N (NA)
Lead Acetate Strips: ______

LAB USE ONLY:
Lab Sample # / Comments:

Customer Remarks / Special Conditions / Possible Hazards: Metals - As, Fe, Ca, Mg, Na, K
Lab filtration for dissolved metals (Not Field Filtered)

Type of Ice Used: (Wet) Blue Dry None
Packing Material Used:
Radchem sample(s) screened (<500 cpm): Y N (NA)

SHORT HOLDS PRESENT (<72 hours): Y N N/A
Lab Tracking #: 2655160
Samples received via: (FEDEX) UPS Client Courier Pace Courier

Lab Sample Temperature Info:
Temp Blank Received: Y N (NA)
Therm ID#: 93T071
Cooler 1 Temp Upon Receipt: 1.4 oC 2.3
Cooler 1 Therm Corr. Factor: .6 oC
Cooler 1 Corrected Temp: 1.4 oC 2.3
Comments:

Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:	MTJL LAB USE ONLY
[signature] Resolute	6/29/22 11:30	KBurnleum AVL	6/30/22 1105	Table #:
				Acctnum:
				Template:
				Prelogin:
				PM:
				PB:

Trip Blank Received: Y N NA
HCL MeOH TSP Other

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

*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# : 92612546

PM: NMG Due Date: 07/15/22

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)	BP4B-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 Unpreserved (N/A)	DG9P-40 mL VOA H3PO4 (N/A)	VQAK (3 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)	SR2T-250 mL Sterile Plastic (N/A – lab)		BP3A-250 mL Plastic (NH2)2SO4 (9.3-9.7)	AGDU-100 mL Amber Unpreserved vials (N/A)	VSGU-20 mL Scintillation vials (N/A)	DG9U-40 mL Amber Unpreserved vials (N/A)
1		3	1			1	1																						
2		3	1			1	1																						
3		3	1			1	1																						
4		3	1			1	1																						
5		3	1			1	1																						
6		3	1			1	1																						
7		3	1			1	1																						
8		3	1			1	1																						
9		3	1			1	1																						
10		3	1			1	1																						
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.

eurofins | Environment Testing

ANALYTICAL REPORT

Eurofins Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Tel: (912)354-7858

Laboratory Job ID: 680-221531-1
Client Project/Site: Plant McManus - Arsenic Speciation

For:
Southern Company
241 Ralph McGill Blvd SE
B10185
Atlanta, Georgia 30308

Attn: Kristen N Jurinko

Authorized for release by:
11/8/2022 2:50:13 PM

David Fuller, Project Manager
(770)344-8986
David.Fuller@et.eurofinsus.com

Sample Summary

Client: Southern Company
Project/Site: Plant McManus - Arsenic Speciation

Job ID: 680-221531-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-221531-1	MCM-06	Water	09/20/22 10:14	09/21/22 17:30
680-221531-2	MCM-20	Water	09/20/22 11:22	09/21/22 17:30
680-221531-3	DPZ-2	Water	09/20/22 12:20	09/21/22 17:30
680-221531-4	PT-01	Water	09/20/22 10:15	09/21/22 17:30
680-221531-5	PT-02	Water	09/20/22 16:45	09/21/22 17:30
680-221531-6	DR-01	Water	09/20/22 15:15	09/21/22 17:30
680-221531-7	DR-02	Water	09/20/22 15:05	09/21/22 17:30

Case Narrative

Client: Southern Company
Job ID: 680-221531-1
Project/Site: Plant McManus - Arsenic Speciation

Job ID: 680-221531-1

Laboratory: Eurofins Savannah

Narrative

Job Narrative
680-221531-1

Receipt

The samples were received on 9/21/2022 5:30 PM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 4.7º C.

Subcontract Work

Method Metals Speciation - Brooks Lab Seattle: This method was subcontracted to Brooks Applied Labs LLC. The subcontract laboratory certification is different from that of the facility issuing the final report.

BROOKS APPLIED LABS
13751 Lake City Way NE, Ste 108, Seattle, WA 98125 • USA • T:206-632-6206 • info@brooksapplied.com

November 8, 2022

Eurofins Savannah
ATTN: David Fuller
5102 LaRoche Avenue
Savannah, GA 31404
david.fuller@et.eurofinsus.com

RE: Project EUR-SV2201 Client Project: Job#680-221531-1

Dear David Fuller,

On September 27, 2022, Brooks Applied Labs (BAL) received seven (7) water samples. The samples were logged-in for the analyses of arsenic speciation [As(III), As(V), DMA, MMA, and unknown As species] according to the chain-of-custody form. All samples were received and stored according to BAL SOPs and EPA methodology.

All samples were field filtered.

Arsenic Speciation Quantitation by IC-ICP-CRC-MS
Arsenic speciation was performed by ion chromatography inductively coupled plasma collision reaction cell mass spectrometry (IC-ICP-CRC-MS). Arsenic species are first chromatographically separated on an ion exchange column and then quantified using inductively coupled plasma collision reaction cell mass spectrometry (ICP-CRC-MS). For more information on this determinative technique, please visit the Interference Reduction Technology section on our website.

In instances where the native sample result and/or the associated duplicate (DUP) result were below the MDL the RPD was not calculated (**N/C**).

The 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.

All data was reported without further qualification and all other associated quality control sample results met the acceptance criteria.

BAL verifies that the reported results of all analyses for which the laboratory is accredited meet the requirements of the accrediting body, unless otherwise noted in the report narrative. For more information regarding accreditations please see the *Report Information* and *Batch Summary* pages. This report must be used in its entirety for interpretation of results.

Please feel free to contact us if you have any questions regarding this report.

Sincerely,

Amy Goodall
Project Manager
Brooks Applied Labs
amy@brooksapplied.com

Report Information

General Disclaimers

Test results are based solely upon the sample submitted to Brooks Applied Labs in the condition it was received . This report shall not be reproduced or copied, except in full, without written approval of the laboratory. Brooks Applied Labs is not responsible for the consequences arising from the use of a partial report.

Laboratory Accreditation

BAL maintains accreditation with various state and national agencies for select test methods. For a current list of BAL accreditations, please visit our website at <http://www.brooksapplied.com/resources/certificates-permits/>. The reported analyte/matrix/method combination shall be considered outside BAL's scopes of accreditation unless otherwise identified as ISO, TNI, or ISO,TNI in the tables. It is the responsibility of the client to verify whether a specific accreditation is required for the intended data use.

ISO: ISO/IEC 17025:2017 accredited test method. Issued by ANSI National Accreditation Board (ANAB), #ADE-1447.02.

TNI: NELAP accredited test method. Issued by the State of Florida Department of Health, #E87982.

ISO,TNI: Test method is accredited under both the ISO/IEC 17025:2017 and NELAP accreditations referenced above.

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**	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

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. Please see narrative for explanation.
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.
M	Duplicate precision (RPD) was not within acceptance criteria. Please see narrative for explanation.
N	Spike recovery was not within acceptance criteria. Please see narrative for explanation.
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.
Z	Holding time and/or preservation requirements not established for this method; however, BAL recommendations for holding time were not followed. Please see narrative for explanation.

Sample Information

Sample	Lab ID	Report Matrix	Type	Sampled	Received
MCM-06 (680-221531-1)	2209352-01	Water	Sample	09/20/2022	09/27/2022
MCM-20 (680-221531-2)	2209352-02	Water	Sample	09/20/2022	09/27/2022
DPZ-2 (680-221531-3)	2209352-03	Water	Sample	09/20/2022	09/27/2022
PT-01 (680-221531-4)	2209352-04	Water	Sample	09/20/2022	09/27/2022
PT-02 (680-221531-5)	2209352-05	Water	Sample	09/20/2022	09/27/2022
DR-01 (680-221531-6)	2209352-06	Water	Sample	09/20/2022	09/27/2022
DR-02 (680-221531-7)	2209352-07	Water	Sample	09/20/2022	09/27/2022

Batch Summary

Analyte	Lab Matrix	Method	Accred.	Prepared	Analyzed	Batch	Sequence
As(III)	Water	SOP BAL-4100	ISO,TNI	09/26/22	09/27/22	B222176	S220999
As(V)	Water	SOP BAL-4100	ISO,TNI	09/26/22	09/27/22	B222176	S220999
DMAs	Water	SOP BAL-4100	ISO	09/26/22	09/27/22	B222176	S220999
MMAs	Water	SOP BAL-4100	ISO	09/26/22	09/27/22	B222176	S220999
Unk As Sp	Water	SOP BAL-4100		09/26/22	09/27/22	B222176	S220999

Sample Results

Sample	Analyte	Report Matrix	Basis	Result	Qualifier	MDL	MRL	Unit	Batch	Sequence
MCM-06 (680-221531-1)										
2209352-01	As(III)	Water	D	0.625	J	0.200	1.05	µg/L	B222176	S220999
2209352-01	As(V)	Water	D	≤ 0.500	U	0.500	1.05	µg/L	B222176	S220999
2209352-01	DMAs	Water	D	≤ 0.250	U	0.250	1.05	µg/L	B222176	S220999
2209352-01	MMAs	Water	D	≤ 0.200	U	0.200	1.05	µg/L	B222176	S220999
2209352-01	Unk As Sp	Water	D	187		0.250	1.05	µg/L	B222176	S220999
MCM-20 (680-221531-2)										
2209352-02	As(III)	Water	D	10.3		0.200	1.05	µg/L	B222176	S220999
2209352-02	As(V)	Water	D	3.15		0.500	1.05	µg/L	B222176	S220999
2209352-02	DMAs	Water	D	≤ 0.250	U	0.250	1.05	µg/L	B222176	S220999
2209352-02	MMAs	Water	D	≤ 0.200	U	0.200	1.05	µg/L	B222176	S220999
2209352-02	Unk As Sp	Water	D	2.24		0.250	1.05	µg/L	B222176	S220999
DPZ-2 (680-221531-3)										
2209352-03	As(III)	Water	D	0.204	J	0.200	1.05	µg/L	B222176	S220999
2209352-03	As(V)	Water	D	≤ 0.500	U	0.500	1.05	µg/L	B222176	S220999
2209352-03	DMAs	Water	D	≤ 0.250	U	0.250	1.05	µg/L	B222176	S220999
2209352-03	MMAs	Water	D	≤ 0.200	U	0.200	1.05	µg/L	B222176	S220999
2209352-03	Unk As Sp	Water	D	29.8		0.250	1.05	µg/L	B222176	S220999
PT-01 (680-221531-4)										
2209352-04	As(III)	Water	D	0.484	J	0.200	1.05	µg/L	B222176	S220999
2209352-04	As(V)	Water	D	≤ 0.500	U	0.500	1.05	µg/L	B222176	S220999
2209352-04	DMAs	Water	D	≤ 0.250	U	0.250	1.05	µg/L	B222176	S220999
2209352-04	MMAs	Water	D	≤ 0.200	U	0.200	1.05	µg/L	B222176	S220999
2209352-04	Unk As Sp	Water	D	43.2		0.250	1.05	µg/L	B222176	S220999
PT-02 (680-221531-5)										
2209352-05	As(III)	Water	D	≤ 0.200	U	0.200	1.05	µg/L	B222176	S220999
2209352-05	As(V)	Water	D	≤ 0.500	U	0.500	1.05	µg/L	B222176	S220999
2209352-05	DMAs	Water	D	≤ 0.250	U	0.250	1.05	µg/L	B222176	S220999
2209352-05	MMAs	Water	D	≤ 0.200	U	0.200	1.05	µg/L	B222176	S220999
2209352-05	Unk As Sp	Water	D	9.55		0.250	1.05	µg/L	B222176	S220999

Sample Results

Sample	Analyte	Report Matrix	Basis	Result	Qualifier	MDL	MRL	Unit	Batch	Sequence
DR-01 (680-221531-6)										
2209352-06	As(III)	Water	D	≤ 0.200	U	0.200	1.05	µg/L	B222176	S220999
2209352-06	As(V)	Water	D	≤ 0.500	U	0.500	1.05	µg/L	B222176	S220999
2209352-06	DMAs	Water	D	≤ 0.250	U	0.250	1.05	µg/L	B222176	S220999
2209352-06	MMAs	Water	D	≤ 0.200	U	0.200	1.05	µg/L	B222176	S220999
2209352-06	Unk As Sp	Water	D	29.3		0.250	1.05	µg/L	B222176	S220999
DR-02 (680-221531-7)										
2209352-07	As(III)	Water	D	≤ 0.200	U	0.200	1.05	µg/L	B222176	S220999
2209352-07	As(V)	Water	D	≤ 0.500	U	0.500	1.05	µg/L	B222176	S220999
2209352-07	DMAs	Water	D	≤ 0.250	U	0.250	1.05	µg/L	B222176	S220999
2209352-07	MMAs	Water	D	≤ 0.200	U	0.200	1.05	µg/L	B222176	S220999
2209352-07	Unk As Sp	Water	D	34.4		0.250	1.05	µg/L	B222176	S220999

Accuracy & Precision Summary

Batch: B222176
Lab Matrix: Water
Method: SOP BAL-4100

Sample	Analyte	Native	Spike	Result	Units	REC & Limits	RPD & Limits
B222176-BS1	**Blank Spike, (2137025)**						
	As(III)		5.000	5.294	µg/L	106% 75-125	
	As(V)		5.000	5.000	µg/L	100% 75-125	
	DMAs		5.210	5.961	µg/L	114% 75-125	
B222176-BS2	**Blank Spike, (2207028)**						
	MMAs		4.490	4.853	µg/L	108% 75-125	
B222176-DUP3	**Duplicate, (2209352-07)**						
	As(III)	ND		0.211	µg/L		N/C 25
	As(V)	ND		ND	µg/L		N/C 25
	DMAs	ND		ND	µg/L		N/C 25
	MMAs	ND		ND	µg/L		N/C 25
	Unk As Sp	34.39		37.80	µg/L		9% 25
B222176-MS3	**Matrix Spike, (2209352-07)**						
	As(III)	ND	52.25	57.77	µg/L	111% 75-125	
	As(V)	ND	48.55	56.80	µg/L	117% 75-125	
	DMAs	ND	50.00	56.53	µg/L	113% 75-125	
	MMAs	ND	50.00	56.14	µg/L	112% 75-125	
B222176-MSD3	**Matrix Spike Duplicate, (2209352-07)**						
	As(III)	ND	52.25	57.61	µg/L	110% 75-125	0.3% 25
	As(V)	ND	48.55	56.84	µg/L	117% 75-125	0.08% 25
	DMAs	ND	50.00	56.39	µg/L	113% 75-125	0.2% 25
	MMAs	ND	50.00	56.19	µg/L	112% 75-125	0.09% 25

Project ID: EUR-SV2201
PM: Amy Goodall

BAL Report 2209352
Client PM: David Fuller
Client Project: Job#680-221531-1

Method Blanks & Reporting Limits

Batch: B222176
Matrix: Water
Method: SOP BAL-4100
Analyte: As(III)

Sample	Result	Units
B222176-BLK1	0.00	µg/L
B222176-BLK2	0.00	µg/L
B222176-BLK3	0.00	µg/L
B222176-BLK4	0.00	µg/L

Average: 0.000
Limit: 0.021
MDL: 0.004
MRL: 0.021

Analyte: As(V)

Sample	Result	Units
B222176-BLK1	0.00	µg/L
B222176-BLK2	0.00	µg/L
B222176-BLK3	0.00	µg/L
B222176-BLK4	0.00	µg/L

Average: 0.000
Limit: 0.021
MDL: 0.010
MRL: 0.021

Analyte: DMAs

Sample	Result	Units
B222176-BLK1	0.00	µg/L
B222176-BLK2	0.00	µg/L
B222176-BLK3	0.00	µg/L
B222176-BLK4	0.00	µg/L

Average: 0.000
Limit: 0.021
MDL: 0.005
MRL: 0.021

Method Blanks & Reporting Limits

Analyte: MMAs

Sample	Result	Units
B222176-BLK1	0.00	µg/L
B222176-BLK2	0.00	µg/L
B222176-BLK3	0.00	µg/L
B222176-BLK4	0.00	µg/L

Average: 0.000
Limit: 0.021

MDL: 0.004
MRL: 0.021

Analyte: Unk As Sp

Sample	Result	Units
B222176-BLK1	0.00	µg/L
B222176-BLK2	0.00	µg/L
B222176-BLK3	0.00	µg/L
B222176-BLK4	0.00	µg/L

Average: 0.000
Limit: 0.021

MDL: 0.005
MRL: 0.021

Sample Containers

Lab ID: 2209352-01 **Report Matrix:** Water **Collected:** 09/20/2022
Sample: MCM-06 (680-221531-1) **Sample Type:** Sample **Received:** 09/27/2022

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Vacutainer	10mL	22-0080	EDTA (vial)	n/a	n/a	Cooler - 2209352

Lab ID: 2209352-02 **Report Matrix:** Water **Collected:** 09/20/2022
Sample: MCM-20 (680-221531-2) **Sample Type:** Sample **Received:** 09/27/2022

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Vacutainer	10mL	22-0080	EDTA (vial)	n/a	n/a	Cooler - 2209352

Lab ID: 2209352-03 **Report Matrix:** Water **Collected:** 09/20/2022
Sample: DPZ-2 (680-221531-3) **Sample Type:** Sample **Received:** 09/27/2022

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Vacutainer	10mL	22-0080	EDTA (vial)	n/a	n/a	Cooler - 2209352

Lab ID: 2209352-04 **Report Matrix:** Water **Collected:** 09/20/2022
Sample: PT-01 (680-221531-4) **Sample Type:** Sample **Received:** 09/27/2022

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Vacutainer	10mL	22-0080	EDTA (vial)	n/a	n/a	Cooler - 2209352

Lab ID: 2209352-05 **Report Matrix:** Water **Collected:** 09/20/2022
Sample: PT-02 (680-221531-5) **Sample Type:** Sample **Received:** 09/27/2022

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Vacutainer	10mL	22-0080	EDTA (vial)	n/a	n/a	Cooler - 2209352

Lab ID: 2209352-06 **Report Matrix:** Water **Collected:** 09/20/2022
Sample: DR-01 (680-221531-6) **Sample Type:** Sample **Received:** 09/27/2022

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Vacutainer	10mL	22-0080	EDTA (vial)	n/a	n/a	Cooler - 2209352

Sample Containers

Lab ID: 2209352-07
Sample: DR-02 (680-221531-7)

Report Matrix: Water
Sample Type: Sample

Collected: 09/20/2022
Received: 09/27/2022

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Vacutainer	10mL	22-0080	EDTA (vial)	n/a	n/a	Cooler - 2209352

Shipping Containers

Cooler - 2209352

Received: September 27, 2022 10:02
Tracking No: 1864 9070 5384 via FedEx
Coolant Type: Ice
Temperature: 2.6 °C

Description: Cooler
Damaged in transit? No
Returned to client? No
Comments: IR #2

Custody seals present? No
Custody seals intact? No
COC present? Yes

Eurofins Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Phone: 912-354-7858 Fax: 912-352-0165

Chain of Custody Record

eurofins Environment Testing America

BAL Report 2209352

11/8/2022

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Fuller, David	Carrier Tracking No(s):	COC No: 680-709527.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: David.Fuller@et.eurofinsus.com	State of Origin: Georgia	Page: Page 1 of 1
Company: Brooks Applied Labs LLC		Accreditations Required (See note): State - Georgia		Job #: 680-221531-1
Address: 13751 Lake City Way NE, Suite 108,	Due Date Requested: 10/7/2022			
City: Seattle	TAT Requested (days):			
State, Zip: WA, 98125				
Phone:	PO #:			
Email:	WO #:			
Project Name: Plant McManus	Project #: 68027841			
Site:	SSOW#:			

Analysis Requested

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, Y - Trizma, Z - other (specify)

Other:

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)	SUB (Metals Speciation - Brooks Lab Seattle)/ Metals Speciation	Total Number of containers	Special Instructions/Note:
			Preservation Code:						
MCM-06 (680-221531-1)	9/20/22	10:14 Eastern		Water			X	1	
MCM-20 (680-221531-2)	9/20/22	11:22 Eastern		Water			X	1	
DPZ-2 (680-221531-3)	9/20/22	12:20 Eastern		Water			X	1	
PT-01 (680-221531-4)	9/20/22	10:15 Eastern		Water			X	1	
PT-02 (680-221531-5)	9/20/22	16:45 Eastern		Water			X	1	
DR-01 (680-221531-6)	9/20/22	15:15 Eastern		Water			X	1	
DR-02 (680-221531-7)	9/20/22	15:05 Eastern		Water			X	1	

Note: Since laboratory accreditations are subject to change, Eurofins Environment Testing Southeast, LLC 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 Environment Testing Southeast, LLC laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins Environment Testing Southeast, LLC attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to Eurofins Environment Testing Southeast, LLC.

Possible Hazard Identification	***Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)***
Unconfirmed	☐ *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
1	CJ	9/26/22 1600		JK	9/27/22 10:02	
2	CJ					
3						

Custody Seals Intact: ∆ Yes ∆ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

BROOKS APPLIED LABS

Chain-of-Custody Form

Ship samples to:
13751 Lake City Way NE, Suite 108
Seattle, WA 98125

For BAL use only
Received by: ______ *Date:* ______
Work Order ID: ______ *Time:* ______
Project ID: ______

Client: SCS / Eurofins
Contact: David Fuller
Client Project ID: SCS McManus
Samples Collected By: Kevin Stephenson, Will Laaker, Meredith Duncan
PO Number: ______
Phone: 770-344-8986
Email: david.fuller@ET.EurofinsUS.com
Mailing Address: 5102 LaRoche Ave, Savannah, GA
Email Receipt Confirmation? (Yes/No) [Yes circled]
BAL PM: Lydia Greaves / Amy Goodall

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/HNO3/Other	BAL Analyses Required: Total Hg, EPA 1631	Methyl Hg, EPA 1630	ICP-MS Metals (specify)	As Species (specify) + Tri-As; InOrg, III, V, MMA, DMA (circled)	Se Species (specify) Se(IV), Se(VI), SeCN, Uknown	Filtration	Other (specify)	Other (specify)	Comments: Specify Here
1	NCM-06	9/20/22	1014								✓					
2	NCM-20	9/20/22	1122								✓					
3	DPZ-02	9/20/22	1220								✓					
4	PT-01	9/20/22	1015								✓					
5	PT-02	9/20/22	1645								✓					
6	DR-01	9/20/22	1515								✓					
7	DR-02	9/20/22	1505								✓					
8																
9																
10																
	Trip Blank															

680-221531 Chain of Custody

Relinquished By: William Laaker	Date: 9/21/22	Time: 1620	Relinquished By: B	Date:	Time:
Received By: Barbara DiCola	Date: 9/21/22	Time: 1626	Total Number of Packages: 1		

Page 1 of 1 List Hazardous Contaminants: ______

samples@brooksapplied.com | brooksapplied com

9-21-22 1730 TA 4.8/4.7

Login Sample Receipt Checklist

Client: Southern Company

Job Number: 680-221531-1

Login Number: 221531

List Source: Eurofins Savannah

List Number: 1

Creator: Sims, Robert D

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.	True	
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	
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.	N/A	
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	

Attachment 3

Soil Boring Logs - High Resolution Investigation and New Wells

ARCADIS Design & Consultancy for natural and built assets

Soil Boring Log

Boring No.: SB-6

Sheet: 1 of 2

Project Name: Plant McManus
Project Number: 30050105
Project Location: Brunswick, GA

Date Started: 02/27/2021
Date Completed: 02/27/2021

Logger: G. Willford
Editor: B. Mayeux
Weather Conditions: Partly Cloudy

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Photo Log	PID (ppm)	Graphic Log	Description
1–5							(0.0-5.0'): No Recovery
5–10							(5.0-10.0'): Poorly graded Sand with Silt (SP-SM); 10YR 5/2 (grayish brown) with trace 10YR 5/1 (gray); fine-very fine sand; subangular-subround; little silt (10%), trace clay (5%); some organics present; saturated throughout
10–12							(10.0-12.0'): No Recovery
12							(12.0-12.5'): Poorly graded Sand with Silt (SP-SM); Same as above 5.0-10.0' interval
13							(12.5-14.0'): Silt with Clay and Sand (ML-MLT); 10YR 4/1 (dark gray); medium-high plasticity; soft; little-trace very fine-fine sand; moist; slight odor
14–15							(14.0-14.5'): Poorly graded Sand with Silt (SP-SM); 10YR 7/2 (light gray); fine-very fine sand; subangular-subround
15–19							(15.0-19.2'): Poorly Graded Sand (SP); 10YR 7/2 (light gray); very fine-fine grained; subangular-round; trace silt; trace clay; saturated
19							(19.2-19.4'): Clay lense (CL); 10YR 4/1 (dark gray); low-med plasticity, moist, soft
20							(19.4-21.0'): Poorly graded Sand (SP); Same as above 15.0-10.2' intervals

Drilling Co.: Cascade
Driller:
Drilling Method: DPT
Drilling Fluid:
Remarks:

Sampling Method: Macro-Core
Sampling Interval:
Water Level Start:
Water Level Finish:
Converted to Well: ☐ Yes ☒ No
Surface Elev.:
North Coor:
East Coor:

SOIL BORING LOG NO WELL C:\USERS\BMAYEUX\ONEDRIVE - ARCADIS\DESKTOP\PROJECT FILE-2.GPJ ARCADIS.GDT 10/3/21

ARCADIS Design & Consultancy for natural and built assets

Soil Boring Log

Boring No.: SB-6

Sheet: 2 of 2

Project Name: Plant McManus
Project Number: 30050105
Project Location: Brunswick, GA

Date Started: 02/27/2021
Date Completed: 02/27/2021

Logger: G. Willford
Editor: B. Mayeux
Weather Conditions: Partly Cloudy

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Photo Log	PID (ppm)	Graphic Log	Description
21							(19.4-21.0'): Poorly graded Sand (SP); Same as above 15.0-10.2' intervals
22							(21.0-23.5'): Clayey Sand (SC); GLEY1 5/1 (greenish gray); very fine-med sand; subangular-subround; some clay; some silt; moist-saturated; some organics
23							
24							(23.5-24.2'): Silty Clay (CL); GLEY1 5/1 (greenish gray); low-med plasticity, soft-med stiffness; moist; some sandy silt; trace very fine-coarse sand
25							(24.2-25.0'): Clayey Sand (SC); Same as above 21.0-23.5' interval with some shell fragments
26							(25.0-30.0'): Poorly graded Sand with Silt (SP-SM); GLEY1 5/N (gray); very fine-fine sand; subangular-round; little silt; trace clay; moist; some 2.5YR 5/8 (red) mottling
27							
28							
29							
30							
31							(30.0-40.0'): Same as above; no red mottling; saturated-moist
32							
33							
34							
35							
36							
37							
38							
39							
40							
41							

Remarks:

ARCADIS Design & Consultancy for natural and built assets

Boring No.: SB-14

Soil Boring Log

Sheet: 1 of 2

Project Name: Plant McManus
Project Number: 30050105
Project Location: Brunswick, GA

Date Started: 02/16/2021
Date Completed: 02/16/2021

Logger: C. Lawson
Editor: B. Mayeux
Weather Conditions: Cloudy

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Photo Log	PID (ppm)	Graphic Log	Description
1–5							(0.0-5.0'): Gravel and fill material from levee
5–13							(5.0-13.0'): Poorly graded Sand (SP); 7.5YR 6/3 (light brown to tan); fine grained; sub-angular; firm; tightly compacted groungs; saturated at ~7'
13–15							(13.0-15.0'): Silty Clay (CL); 10YR 3.3 (dark brown to black), soft, very little moisture, no visual porosity
15–20							(15.0-25.0'): Poorly graded Sand (SP); GLEY1 3/1 (dark gray); fine grained; sub-angular; saturated; poor visual porosity

Drilling Co.: Cascade
Driller:
Drilling Method: DPT
Drilling Fluid:
Remarks:

Sampling Method: Macro-Core
Sampling Interval:
Water Level Start:
Water Level Finish:
Converted to Well: ☐ Yes ☒ No
Surface Elev.:
North Coor:
East Coor:

SOIL BORING LOG NO WELL C:\USERS\BMAYEUX\ONEDRIVE - ARCADIS\DESKTOP\PROJECT FILE-2.GPJ ARCADIS.GDT 10/3/21

ARCADIS Design & Consultancy for natural and built assets

Soil Boring Log

Boring No.: SB-14

Sheet: 2 of 2

Project Name: Plant McManus
Project Number: 30050105
Project Location: Brunswick, GA

Date Started: 02/16/2021
Date Completed: 02/16/2021

Logger: C. Lawson
Editor: B. Mayeux
Weather Conditions: Cloudy

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Photo Log	PID (ppm)	Graphic Log	Description
21							(15.0-25.0'): Poorly graded Sand (SP); GLEY1 3/1 (dark gray); fine grained; sub-angular; saturated; poor visual porosity
22							
23							
24							
25							
26							(25.0-30.0'): Poorly graded Sand (SP); fine grained; minor shell fragments; firm; saturated; poor visual porosity
27							
28							
29							
30							
31							(30.0-39.0): Well graded Sand (SW); GLEY1 4/1 (dark green to gray); fine-med grained; firm; sub-angular; shell fragments; saturated; poor visual porosity
32							
33							
34							
35							
36							
37							
38							
39							
40							(39.0-40.0'): Poorly grated Sand (SP); black; fine grained; firm; no visual porosity
41							

Remarks:

ARCADIS Design & Consultancy for natural and built assets

Boring No.: SB-18

Soil Boring Log

Sheet: 1 of 2

Project Name: Plant McManus
Project Number: 30050105
Project Location: Brunswick, GA

Date Started: 02/27/2021
Date Completed: 02/27/2021

Logger: G. Willford
Editor: B. Mayeux
Weather Conditions: Partly Cloudy

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Photo Log	PID (ppm)	Graphic Log	Description
1–5							(0.0-5.0'): Gravel and fill material from levee
5–10							(5.0-10.0'): Poorly graded Sand with Silt (SP-SM); 10YR 5/2 (grayish brown) with little 10YR 5/1 (gray); very fine to fine grained; subangular to subround; little silt; trace clay; saturated; some organics
10–12							(10.0-12.5'): No recovery
13–16							(12.5-16.2'): Poorly graded Sand with Silt (SP-SM); 10YR 5/2 (grayish brown) with little 10YR 5/1 (gray); very fine to fine grained; subangular - subround; little silt; trace clay; saturated; some organics
17–18							(16.2-18.7'): Clayey Sand (SC); GLEY1 5/1 (dark gray); very fine-fine sand; moist; subangular-subround; some organics
19–20							(18.7-19.8): Sandy Clay (CL); GLEY1 5/1 (dark gray);low-medium plasticity; soft; moist; little very fine sand; subangular-round;moist; some silt; trace organics

Drilling Co.: Cascade
Driller:
Drilling Method: DPT
Drilling Fluid:
Remarks:

Sampling Method: Macro-Core
Sampling Interval:
Water Level Start:
Water Level Finish:
Converted to Well: ☐ Yes ☒ No
Surface Elev.:
North Coor:
East Coor:

SOIL BORING LOG NO WELL C:\USERS\BMAYEUX\ONEDRIVE - ARCADIS\DESKTOP\PROJECT FILE-2.GPJ ARCADIS.GDT 10/3/21

ARCADIS Design & Consultancy for natural and built assets

Soil Boring Log

Boring No.: SB-18

Sheet: 2 of 2

Project Name: Plant McManus
Project Number: 30050105
Project Location: Brunswick, GA

Date Started: 02/27/2021
Date Completed: 02/27/2021

Logger: G. Willford
Editor: B. Mayeux
Weather Conditions: Partly Cloudy

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Photo Log	PID (ppm)	Graphic Log	Description
21							(19.8-20.0'); Poorly graded Sand with SIlt (SP-SM); GLEY1 5/N (gray); very fine-fine sand; subangular-round; moist; little silt; trace clay
22							(20.0-25.0'): Same as above (SP-SM); very dense
23							
24							
25							
26							(25.0-30.0'): Clayey Sand (SC); GLEY1 5/1 (dark gray); very fine-fine sand; moist; subangular-subround; some organics
27							
28							
29							
30							
31							(30.0-32.0): No recovery
32							
33							(32.5-34.3'): Clayey Sand (SC); GLEY1 5/1 (dark gray); very fine-fine sand; moist; subangular-subround; some organics
34							
35							(34.3-35.0'): Well graded Sand with Silt (SW-SM); GLEY1 5/N (gray) with little GLEY1 1/N (white); very fine-corase grained; subangular-subround; little silt; trace clay; trace granules; subround; some shell fragments
36							(35.0-37.0)': No recovery
37							
38							(37.0-40.0): Well graded Sand with Silt (SW-SM); GLEY1 5/N (gray) with little GLEY1 1/N (white); very fine-corase grained; subangular-subround; little silt; trace clay; trace granules; subround; some shell fragments
39							
40							
41							

Remarks:

ARCADIS Design & Consultancy for natural and built assets

Soil Boring Log

Boring No.: SB-26

Sheet: 1 of 2

Project Name: Plant McManus
Project Number: 30050105
Project Location: Brunswick, GA

Date Started: 02/28/2021
Date Completed: 02/28/2021

Logger: G. Willford
Editor: B. Mayeux
Weather Conditions: Partly Cloudy

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Photo Log	PID (ppm)	Graphic Log	Description
1–5							(0.0-5.0'): Gravel and fill material from levee
6–10							(5.0-10.5'): Poorly graded Sand with Silt (SP-SM); 10YR 5/2 (grayish brown) with little 10YR 6/1 (gray); very fine to fine grained; subangular toround; little silt; trace clay; loose-very loose; saturate; little-some organics
11–14							(10.5-14.2'): Sandy Clay with Silt (CL); low-medium plasticity; soft; some very fine sand; some silt; moist
15							(14.2-15.0'): Poorly graded Sand (SP); 10YR 7/1 (light gray); very fine-fine grained; trace silt; trace clay; dense-medium dense; moist
16–20							(15.0-20.0'): Poorly graded Sand with Clay (SP-SC); GLEY1 4/N (dark gray); very fine-fine sand; little clay; little silt; saturated-moist; 1-2" clay seams integrated throughout

Drilling Co.: Cascade
Driller:
Drilling Method: DPT
Drilling Fluid:
Remarks:

Sampling Method: Macro-Core
Sampling Interval:
Water Level Start:
Water Level Finish:
Converted to Well: ☐ Yes ☒ No
Surface Elev.:
North Coor:
East Coor:

SOIL BORING LOG NO WELL C:\USERS\BMAYEUX\ONEDRIVE - ARCADIS\DESKTOP\PROJECT FILE-2.GPJ ARCADIS.GDT 10/3/21

ARCADIS Design & Consultancy for natural and built assets

Boring No.: SB-26

Soil Boring Log

Sheet: 2 of 2

Project Name: Plant McManus
Project Number: 30050105
Project Location: Brunswick, GA

Date Started: 02/28/2021
Date Completed: 02/28/2021

Logger: G. Willford
Editor: B. Mayeux
Weather Conditions: Partly Cloudy

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Photo Log	PID (ppm)	Graphic Log	Description
21							(20.0-22.0'): No Recovery
22							(22.0-25.0'): Poorly graded Sand with Clay (SP-SC); GLEY1 4/N (dark gray); very fine-fine sand; little clay; little silt; saturated-moist; 1-2" clay seams integrated throughout
23							
24							
25							(25.0-27.5'): No Recovery
26							
27							(27.5-30.0'): Poorly graded Sand with Clay (SP-SC); GLEY1 4/N (dark gray); very fine-fine sand; little clay; little silt; saturated-moist; 1-2" clay seams integrated throughout
28							
29							
30							(30.0-32.0'): No recovery
31							
32							(32.0-35.0'): Poorly graded Sand (SP); GLEY1 6/N (gray); very fine-fine sand; subangular-subround; trace silt; trace clay; moist; dense
33							
34							
35							(35.0-37.0'): No Recovery
36							
37							(37.0-38.0'): Poorly graded Sand (SP); GLEY1 6/N (gray); very fine-fine sand; subangular-subround; trace silt; trace clay; moist; dense
38							(38.0-40.0'): Poorly graded Sand with Clay (SP-SC); GLEY1 4/N (dark gray); very fine-fine sand; little clay; little silt; saturated-moist; 1-2" clay seams integrated throughout
39							
40							
41							

Remarks:

ARCADIS Design & Consultancy for natural and built assets

Boring No.: SB-32

Soil Boring Log

Sheet: 1 of 2

Project Name: Plant McManus
Project Number: 30050105
Project Location: Brunswick, GA

Date Started: 02/28/2021
Date Completed: 02/28/2021
Logger: G. Willford
Editor: B. Mayeux
Weather Conditions: Partly Cloudy

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Photo Log	PID (ppm)	Graphic Log	Description
1–5							(0.0-5.0'): Gravel and fill material from levee
5–7							(5.0-7.5'): No Recovery
8–12							(7.5-12.5'): Poorly graded Sand with Silt (SP-SM); 10YR 5/2 (grayish brown) with little 10YR 6/1 (gray); very fine to fine grained; subangular-subround; little silt; trace clay; saturated; loose; some organics
13–14							(14.2-15.0'): Poorly graded Sand (SP); 10YR 7/1 (light gray); very fine-fine grained; trace silt; trace clay; dense-medium dense; moist
15–18							(15.0-18.7'): Clayey Sand with Silt (SC); GLEY1 4/N (dark gray); very fine-fine grained; subangular-subround; very loose-loose; saturated; some silt; some clay
19–20							(18.7-20.0'): Poorly graded Sand with SIlt (SP-SM); GLEY1 G/N (gray) to GLEY1 7/N (light gray): very fine-fine grained; subangular-round; little silt; trace clay; dense; moist

Drilling Co.: Cascade
Driller:
Drilling Method: DPT
Drilling Fluid:
Remarks:

Sampling Method: Macro-Core
Sampling Interval:
Water Level Start:
Water Level Finish:
Converted to Well: ☐ Yes ☒ No
Surface Elev.:
North Coor:
East Coor:

SOIL BORING LOG NO WELL C:\USERS\BMAYEUX\ONEDRIVE - ARCADIS\DESKTOP\PROJECT FILE-2.GPJ ARCADIS.GDT 10/3/21

ARCADIS Design & Consultancy for natural and built assets

Soil Boring Log

Boring No.: SB-32

Sheet: 2 of 2

Project Name: Plant McManus
Project Number: 30050105
Project Location: Brunswick, GA

Date Started: 02/28/2021
Date Completed: 02/28/2021

Logger: G. Willford
Editor: B. Mayeux
Weather Conditions: Partly Cloudy

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Photo Log	PID (ppm)	Graphic Log	Description
21							(20.0-22.0'): No Recovery
22							(22.0-25.0'): Poorly graded Sand with Sllt (SP-SM); GLEY1 G/N (gray) to GLEY1 7/N (light gray): very fine-fine grained; subangular-round; dense; moist; little silt; trace clay; some shell fragments and trace granules compose of larger shell fragments from 23.5-25.0'
23							
24							
25							(25.0-27.5'): No recovery
26							
27							(27.5-29.0'): Poorly graded Sand with Sllt (SP-SM); GLEY1 G/N (gray) to GLEY1 7/N (light gray): very fine-fine grained; subangular-round; very dense; moist; little silt; trace clay; some shell fragments and trace granules compose of larger shell fragments
28							
29							(29.0-30.0'): Well graded Sand with Silt (SW-SM); GLEY1 4/N (dark gray); very fine-very coarse grained; angular-subround; little granules-medium pebbles composed of shell fragments; angular; little silt; trace clay; moist; very dense
30							(30.0-33.0'): No Recovery
31							
32							
33							(33.0-35.0'): Well graded Sand with Silt (SW-SM); GLEY1 4/N (dark gray); very fine-very coarse grained; angular-subround; little granules-medium pebbles composed of shell fragments; angular; little silt; trace clay; moist; very dense
34							
35							(35-35.5'): No Recovery
36							(35.5-40.0'): Well graded Sand with Silt (SW-SM); GLEY1 4/N (dark gray); very fine-very coarse grained; angular-subround; little granules-medium pebbles composed of shell fragments; angular; little silt; trace clay; moist; very dense
37							
38							
39							
40							
41							

Remarks:

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Soil Boring and Construction Log

Boring No.: DR-01

Sheet: 1 of 2

Client Name: McManus
Project Number: 30050105
Project Name: Brunswick, GA

Date Started: 05-26-2022
Date Completed: 05-26-2022
Total Depth: 31.0 ft bgs

Logger: C. Lawson
Reviewer:

Depth (feet)	Sample ID	Rec. (ft)	Blow Counts	Graphic	Description	Drilling Fluid and Notes	Construction Details
0					(0.0-0.5 ft) Gravel.	(0 ft) Drilling fluid of potable water-used approximately 150 gallons	6-inch Flush steel manhole cover with 2'x2' cement pad
1					(0.5-11 ft) Silty Sand: fine-grained sand (75%), silt (25%), tan to brown; Fill.		Portland Cement
2							
3							
4							
5					(5.0-11 ft) Density soft, no visual porosity.		
6							
7							
8							2" PVC Casing
9							Bentonite Pellets
10							
11					(11-14.5 ft) Clay: 50% clay, 40% fine-grained sand, 10% silt, consistency firm, moist, no visual porosity, dark gray.		
12							
13							
14							Fine Sand 30/65
15					(14.5-17 ft) Silty Sand: 60% silt, 20% fine-grained sand, 20% clay, consistency soft, moist, no visual porosity.		
16					(15-17 ft) Mixture of silty sand to poorly sorted fine-grained sand, density soft, saturated, no shell fragments, dark gray to black.		
17					(17-31 ft) Poorly Sorted Sand: 95% fine-grained sand, density soft, moist, poor visual porosity, no clay, dark gray to black		Filter Sand 20/30
18							2" 10-Slot U Screen
19							
20							

Drilling Company: Cascade Drilling
Driller: J. Reynolds
Drilling Method: Rotosonic
Drill Rig:
Remarks: bgs = below ground surface; ft = feet; PID = photo-ionization detector; ppm = parts per million; Rec. = recovery.

Sampling Method: Sonic Core Barrel
Sampling Dimensions: 5' x 6"
First Encountered Water (ft bgs): NA
Static Water Level (ft bgs):
Top of Casing Elevation: 7.58
Surface Elevation: 7.86
North Coordinate: 444407.62
East Coordinate: 850777.93

SOIL BORING AND CONSTRUCTION LOG C:\USERS\LWOODS\ONEDRIVE - ARCADIS\FULCRUM-GINT PROJECTS\MCMANUS\GINT PROJECT.GPJ GINT DATA TEMPLATE.GDT 7/1/22

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Soil Boring and Construction Log

Boring No.: DR-01

Sheet: 2 of 2

Client Name: McManus
Project Number: 30050105
Project Name: Brunswick, GA

Date Started: 05-26-2022
Date Completed: 05-26-2022
Total Depth: 31.0 ft bgs

Logger: C. Lawson
Reviewer:

Depth (feet)	Sample ID	Rec. (ft)	Blow Counts	Graphic	Description	Drilling Fluid and Notes	Construction Details
21					(17-31 ft) Poorly Sorted Sand: 95% fine-grained sand, density soft, moist, poor visual porosity, no clay, dark gray to black		
22							
23							
24							
25					(25-31 ft) Small shell fragments.		2" 10-Slot U Screen — Filter Sand 20/30
26							
27							
28							
29							
30							
31					31 ft. bgs End of Boring		
32							
33							
34							
35							
36							
37							
38							
39							
40							
41							
42							

Remarks: bgs = below ground surface; ft = feet; PID = photo-ionization detector; ppm = parts per million; Rec. = recovery.

ARCADIS

Soil Boring and Construction Log

Boring No.: DR-02

Sheet: 1 of 2

Client Name: McManus
Project Number: 30050105
Project Name: Brunswick, GA

Date Started: 05-26-2022
Date Completed: 05-26-2022
Total Depth: 31.0 ft bgs

Logger: C. Lawson
Reviewer:

Depth (feet)	Sample ID	Rec. (ft)	Blow Counts	Graphic	Description	Drilling Fluid and Notes	Construction Details
0					(0.0-0.5 ft) Gravel.	(0 ft) Drilling fluid of potable water-used approximately 150 gallons	6-inch Flush steel manhole cover with 2'x2' cement pad
1					(0.5-13 ft) Silty Sand: 75% fine-grained sand, 25% silt, density soft, brown to tan, moist to very moist at 5-6 ft; Fill.		Portland Cement
2							
3							
4							
5							
6							
7							Bentonite Pellets
8							2" PVC Casing
9					(9.0-13 ft) Increase to 10% clay.		
10							
11							
12							Fine Sand 30/65
13					(13-15 ft) Clay: 80% clay, consistency firm, moist, no visual porosity, 2.5YR 3/1 dark gray to black.		
14							
15					(15-18 ft) Silty Sand: 60% silt, 20% fine-grained sand, 20% clay, density soft, very moist, no visual porosity, 2.5YR 3/1 dark gray to black.		
16							Filter Sand 20/30
17							
18					(18-31 ft) Poorly Sorted Sand: 90% fine-grained sand, 10% silt, density firm, no visual porosity, 2.5YR 3/1 dark gray to black.		2" 10-Slot U Screen
19							
20							

Drilling Company: Cascade Drilling
Driller: J. Reynolds
Drilling Method: Rotosonic
Drill Rig:
Remarks: bgs = below ground surface; ft = feet; PID = photo-ionization detector; ppm = parts per million; Rec. = recovery.

Sampling Method: Sonic Core Barrel
Sampling Dimensions: 5' x 6"
First Encountered Water (ft bgs): NA
Static Water Level (ft bgs):
Top of Casing Elevation: 7.49
Surface Elevation: 7.90
North Coordinate: 444411.68
East Coordinate: 850784.46

SOIL BORING AND CONSTRUCTION LOG C:\USERS\LWOODS\ONEDRIVE - ARCADIS\FULCRUM-GINT PROJECTS\MCMANUS\GINT PROJECT.GPJ GINT DATA TEMPLATE.GDT 7/1/22

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Soil Boring and Construction Log

Boring No.: DR-02

Sheet: 2 of 2

Client Name: McManus
Project Number: 30050105
Project Name: Brunswick, GA

Date Started: 05-26-2022
Date Completed: 05-26-2022
Total Depth: 31.0 ft bgs

Logger: C. Lawson
Reviewer:

Depth (feet)	Sample ID	Rec. (ft)	Blow Counts	Graphic	Description	Drilling Fluid and Notes	Construction Details
21					(18-31 ft) Poorly Sorted Sand: 90% fine-grained sand, 10% silt, density firm, no visual porosity, 2.5YR 3/1 dark gray to black. (20-25 ft) Density soft, very moist, poor visual porosity, GLEY2 5/1 blueish gray.		
22							
23							
24							
25					(25-31 ft) Increase to 100% fine-grained sand.		2" 10-Slot U Screen — Filter Sand 20/30
26							
27							
28							
29							
30							
31					31 ft. bgs End of Boring		
32							
33							
34							
35							
36							
37							
38							
39							
40							
41							
42							

Remarks: bgs = below ground surface; ft = feet; PID = photo-ionization detector; ppm = parts per million; Rec. = recovery.

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Soil Boring and Construction Log

Boring No.: PT-01

Sheet: 1 of 2

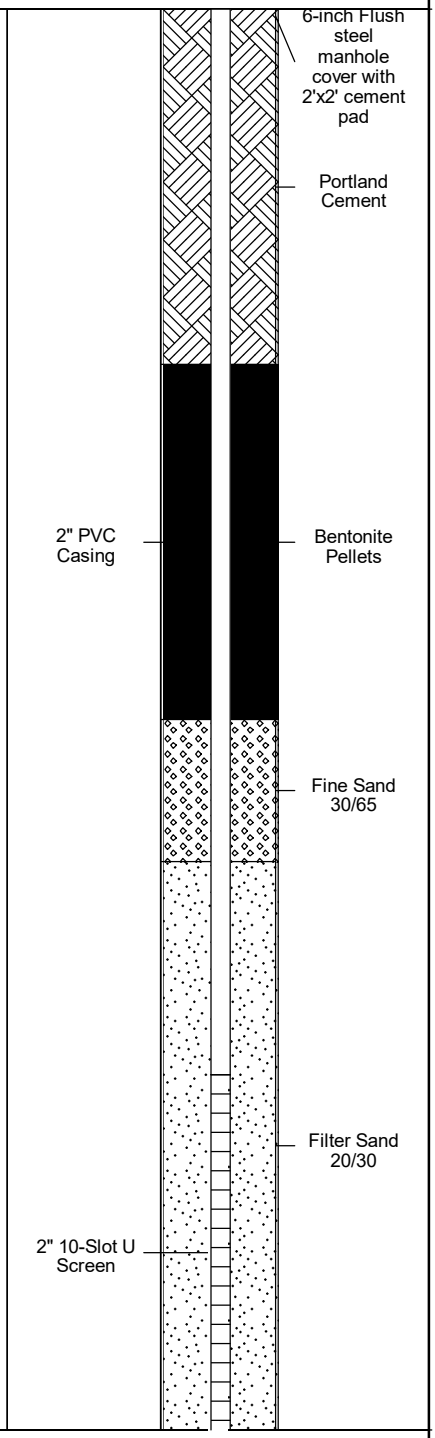
Client Name: McManus
Project Number: 30050105
Project Name: Brunswick, GA

Date Started: 05-26-2022
Date Completed: 05-26-2022
Total Depth: 25.0 ft bgs

Logger: C. Lawson
Reviewer:

Depth (feet)	Sample ID	Rec. (ft)	Blow Counts	Graphic	Description	Drilling Fluid and Notes
0					(0.0-0.5 ft) Gravel.	(0 ft) Drilling fluid of potable water-used approximately 75 gallons
1					(0.5-12 ft) Silty Sand: 75% fine-grained sand, 25% silt, density soft, moist, 2.5YR 5/8 tan to brown; Fill.	
5					(5.0-12 ft) Increase to 5% clay, consistency soft, no visual porosity.	
12					(12-17 ft) Silty Clay: 50% clay, 50% silt, consistency firm, moist, no visual porosity, 5Y 3/1 dark gray to black, no fines, no shell fragments, more of a silty sand at 17 ft with less clay.	
17					(17-25 ft) Poorly Sorted Sand: 90% fine-grained sand, density soft, moist, poor visual porosity, 5Y 3/1 dark gray to black.	

Construction Details



Drilling Company: Cascade Drilling
Driller: J. Reynolds
Drilling Method: Rotosonic
Drill Rig:
Remarks: bgs = below ground surface; ft = feet; PID = photo-ionization detector; ppm = parts per million; Rec. = recovery.

Sampling Method: Sonic Core Barrel
Sampling Dimensions: 5' x 6"
First Encountered Water (ft bgs): NA
Static Water Level (ft bgs):
Top of Casing Elevation: 7.49
Surface Elevation: 7.82
North Coordinate: 444408.70
East Coordinate: 850768.53

SOIL BORING AND CONSTRUCTION LOG C:\USERS\LWOODS\ONEDRIVE - ARCADIS\FULCRUM-GINT PROJECTS\MCMANUS\GINT PROJECT.GPJ GINT DATA TEMPLATE.GDT 7/1/22

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Soil Boring and Construction Log

Boring No.: PT-01

Sheet: 2 of 2

Client Name: McManus
Project Number: 30050105
Project Name: Brunswick, GA

Date Started: 05-26-2022
Date Completed: 05-26-2022
Total Depth: 25.0 ft bgs

Logger: C. Lawson
Reviewer:

Depth (feet)	Sample ID	Rec. (ft)	Blow Counts	Graphic	Description	Drilling Fluid and Notes	Construction Details
21					(17-25 ft) Poorly Sorted Sand: 90% fine-grained sand, density soft, moist, poor visual porosity, 5Y 3/1 dark gray to black.		2" 10-Slot U Screen; Filter Sand 20/30
22							
23							
24							
25					25 ft. bgs End of Boring		
26							
27							
28							
29							
30							
31							
32							
33							
34							
35							
36							
37							
38							
39							
40							
41							
42							

Remarks: bgs = below ground surface; ft = feet; PID = photo-ionization detector; ppm = parts per million; Rec. = recovery.

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Soil Boring and Construction Log

Boring No.: PT-02

Sheet: 1 of 2

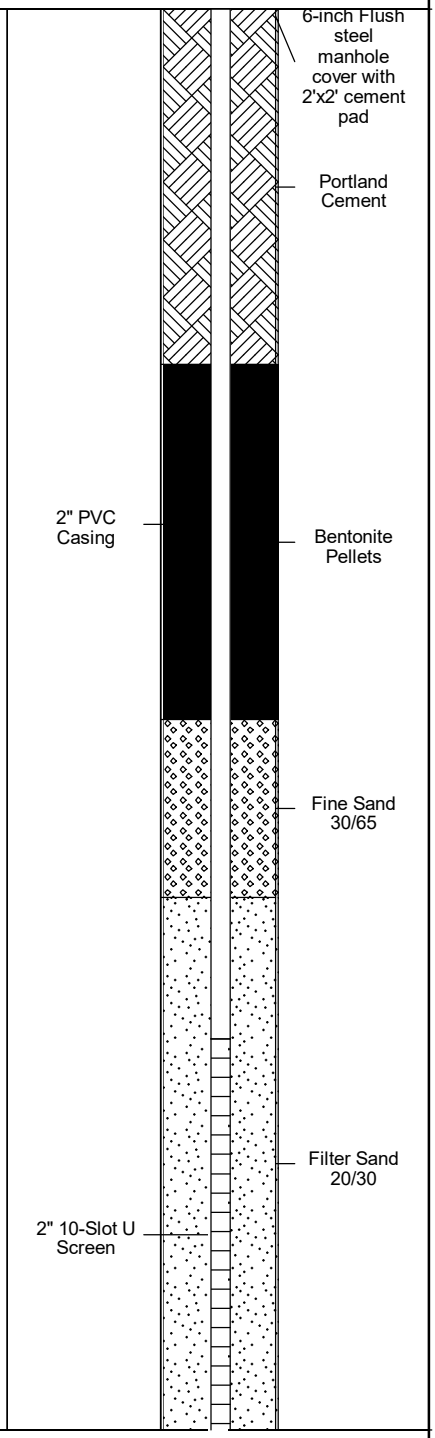
Client Name: McManus
Project Number: 30050105
Project Name: Brunswick, GA

Date Started: 05-27-2022
Date Completed: 05-31-2022
Total Depth: 25.0 ft bgs

Logger: C. Lawson
Reviewer:

Depth (feet)	Sample ID	Rec. (ft)	Blow Counts	Graphic	Description	Drilling Fluid and Notes
0					(0.0-0.5 ft) Gravel.	(0 ft) Drilling fluid of potable water-used approximately 100 gallons
1					(0.5-8.0 ft) Silty Sand: fine-grained sand, tan to brown, moist; Fill.	
8					(8.0-17 ft) Clayey Sand: 40% silt, 30% clay, 30% fine-grained sand, consistency firm, moist, no visual porosity, tan to brown.	
10					(10-17 ft) Clay content slightly higher, no hard clay present.	
17					(17-18 ft) Silty Sand: 75% fine-grained sand, 25% silt, density firm, moist, no visual porosity, dark gray to black.	
18					(18-25 ft) Poorly Sorted Sand: 95% fine-grained sand, density soft, moist, poor visual porosity, dark gray to black.	

Construction Details



Drilling Company: Cascade Drilling
Driller: J. Reynolds
Drilling Method: Rotosonic
Drill Rig:
Remarks: bgs = below ground surface; ft = feet; PID = photo-ionization detector; ppm = parts per million; Rec. = recovery.

Sampling Method: Sonic Core Barrel
Sampling Dimensions: 5' x 6"
First Encountered Water (ft bgs): NA
Static Water Level (ft bgs):
Top of Casing Elevation: 7.64
Surface Elevation: 7.91
North Coordinate: 444414.19
East Coordinate: 850777.91

SOIL BORING AND CONSTRUCTION LOG C:\USERS\LWOODS\ONEDRIVE - ARCADIS\FULCRUM-GINT PROJECTS\MCMANUS\GINT PROJECT.GPJ GINT DATA TEMPLATE.GDT 7/1/22

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Soil Boring and Construction Log

Boring No.: PT-02

Sheet: 2 of 2

Client Name: McManus
Project Number: 30050105
Project Name: Brunswick, GA

Date Started: 05-27-2022
Date Completed: 05-31-2022
Total Depth: 25.0 ft bgs

Logger: C. Lawson
Reviewer:

Depth (feet)	Sample ID	Rec. (ft)	Blow Counts	Graphic	Description	Drilling Fluid and Notes	Construction Details
21					(18-25 ft) Poorly Sorted Sand: 95% fine-grained sand, density soft, moist, poor visual porosity, dark gray to black.		2" 10-Slot U Screen; Filter Sand 20/30
22							
23							
24							
25					25 ft. bgs End of Boring		
26							
27							
28							
29							
30							
31							
32							
33							
34							
35							
36							
37							
38							
39							
40							
41							
42							

Remarks: bgs = below ground surface; ft = feet; PID = photo-ionization detector; ppm = parts per million; Rec. = recovery.

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Soil Boring and Construction Log

Boring No.: PT-03

Sheet: 1 of 2

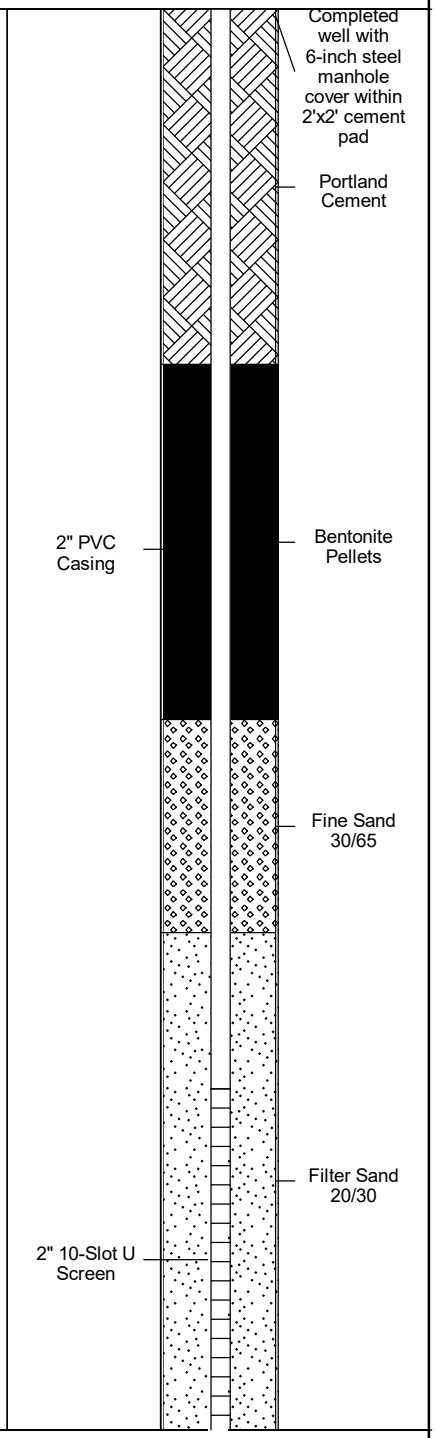
Client Name: McManus
Project Number: 30050105
Project Name: Brunswick, GA

Date Started: 06-01-2022
Date Completed: 06-01-2022
Total Depth: 25.0 ft bgs

Logger: C. Lawson
Reviewer:

Depth (feet)	Sample ID	Rec. (ft)	Blow Counts	Graphic	Description	Drilling Fluid and Notes
0					(0.0-0.5 ft) Gravel.	(0 ft) Drilling fluid of potable water-used approximately 75 gallons
1					(0.5-8.0 ft) Silty Sand: 75% fine-grained sand, 25% silt, density soft, dry; Fill.	
5					(5.0-8.0 ft) Tan to brown.	
8					(8.0-13 ft) Silty Sand with Clay: 50% fine-grained sand, 40% silt, 10% clay, consistency soft, moist, poor visual porosity.	
10					(10-13 ft) Increase to 15% clay.	
13					(13-15.5 ft) Clay: 90% stiff clay, 10% fine-grained sand, consistency firm, moist, no visual porosity, black to dark gray.	
15.5					(15.5-16 ft) Silty Sand: 75% sand, 15% silt, 10% clay, density firm, moist, no visual porosity, dark gray to black.	
16					(16-25 ft) Poorly Sorted Sands: 90% sand, density soft, saturated, dark gray to black. (17-17.3 ft) Small lends of silty sand.	

Construction Details



Drilling Company: Cascade Drilling
Driller: J. Reynolds
Drilling Method: Rotosonic
Drill Rig:
Remarks: bgs = below ground surface; ft = feet; PID = photo-ionization detector; ppm = parts per million; Rec. = recovery.

Sampling Method: Sonic Core Barrel
Sampling Dimensions: 5' x 6"
First Encountered Water (ft bgs): NA
Static Water Level (ft bgs):
Top of Casing Elevation: 7.45
Surface Elevation: 7.93
North Coordinate: 444418.92
East Coordinate: 850785.95

SOIL BORING AND CONSTRUCTION LOG C:\USERS\LWOODS\ONEDRIVE - ARCADIS\FULCRUM-GINT PROJECTS\MCMANUS\GINT PROJECT.GPJ GINT DATA TEMPLATE.GDT 7/1/22

ARCADIS

Soil Boring and Construction Log

Boring No.: PT-03

Sheet: 2 of 2

Client Name: McManus
Project Number: 30050105
Project Name: Brunswick, GA

Date Started: 06-01-2022
Date Completed: 06-01-2022
Total Depth: 25.0 ft bgs

Logger: C. Lawson
Reviewer:

Depth (feet)	Sample ID	Rec. (ft)	Blow Counts	Graphic	Description	Drilling Fluid and Notes	Construction Details
21					(16-25 ft) Poorly Sorted Sands: 90% sand, density soft, saturated, dark gray to black.		2" 10-Slot U Screen; Filter Sand 20/30
22							
23							
24							
25					25 ft. bgs End of Boring		
26							
27							
28							
29							
30							
31							
32							
33							
34							
35							
36							
37							
38							
39							
40							
41							
42							

Remarks: bgs = below ground surface; ft = feet; PID = photo-ionization detector; ppm = parts per million; Rec. = recovery.

ARCADIS

Soil Boring and Construction Log

Boring No.: PT-04D

Sheet: 1 of 2

Client Name: McManus
Project Number: 30050105
Project Name: Brunswick, GA

Date Started: 05-25-2022
Date Completed: 05-25-2022
Total Depth: 41.0 ft bgs

Logger: C. Lawson
Reviewer:

Depth (feet)	Sample ID	Rec. (ft)	Blow Counts	Graphic	Description	Drilling Fluid and Notes	Construction Details
0					(0.0-0.5 ft) Mainly gravel.	(0-5 ft) Hand auger. Drilling fluid of potable water-used approximately 150 gallons.	Completed well with 6-inch steel manhole cover within 2'x2' cement pad
1					(0.5-12 ft) Silty Sand: 75% sand, 20% silt, 5% clay, consistency firm, brown to tan, very moist; Fill.		Portland Cement
2							
3							
4							
5					(5.0-12 ft) Increase to 90% fine-grained sand, density soft, 5YR 6/6 light tan.		
6							
7							
8							
9							
10							2" PVC Casing
11							
12					(12-15.5 ft) Silty Clay: 40% silt, 40% fine-grained sand, 20% clay, consistency soft, no visual porosity, 5YR 2/3 dark gray.		Bentonite Pellets
13							
14							
15							
16					(15.5-19 ft) Silty Sand: 80% fine-grained sand, 10% silt, 10% clay, density firm, no visual porosity, 5YR 2/3 dark gray to black.		
17							
18							
19							
20							

Drilling Company: Cascade Drilling
Driller: J. Reynolds
Drilling Method: Mini Sonic
Drill Rig:
Remarks: bgs = below ground surface; ft = feet; PID = photo-ionization detector; ppm = parts per million; Rec. = recovery.

Sampling Method: Sonic Core Barrel
Sampling Dimensions: 5' x 6"
First Encountered Water (ft bgs): NA
Static Water Level (ft bgs):
Top of Casing Elevation: 7.51
Surface Elevation: 7.80
North Coordinate: 444400.23
East Coordinate: 850753.07

SOIL BORING AND CONSTRUCTION LOG C:\USERS\LWOODS\ONEDRIVE - ARCADIS\FULCRUM-GINT PROJECTS\MCMANUS\GINT PROJECT.GPJ GINT DATA TEMPLATE.GDT 7/1/22

ARCADIS

Soil Boring and Construction Log

Boring No.: PT-04D

Sheet: 2 of 2

Client Name: McManus
Project Number: 30050105
Project Name: Brunswick, GA

Date Started: 05-25-2022
Date Completed: 05-25-2022
Total Depth: 41.0 ft bgs

Logger: C. Lawson
Reviewer:

Depth (feet)	Sample ID	Rec. (ft)	Blow Counts	Graphic	Description	Drilling Fluid and Notes	Construction Details
21					(19-28 ft) Poorly Sorted Sand: 95% fine-grained sand, density soft, poor visual porosity, large piece of woods at depth, top foot of sample has shell fragments ~1/8 to 1/4 inch.		
22					(20-28 ft) Increase to 100% fine-grained sand, moist, GLEY2 0/1 blueish to light brown, no clays.		
23							
24					(24 ft) Shell fragments.		
25							Bentonite Pellets
26							
27							
28					(28-28.4 ft) Silty Sand: minor clay, consistency firm, moist.		2" PVC Casing
29					(28.4-41 ft) Poorly Sorted Sand: 100% sand with shell fragments, density soft, moderate visual porosity, GLEY2 3/1 dark gray to black gray, no clays, shell fragments only at 24 ft.		
30					(30-35 ft) Shell fragments throughout.		
31							
32							Fine Sand 30/65
33							
34							
35					(35-41 ft) Shell fragments are large to ~1 inch, density firm, poor visual porosity.		
36							
37							Filter Sand 20/30
38							
39							2" 10-Slot U Screen
40							
41					41 ft. bgs End of Boring		
42							

Remarks: bgs = below ground surface; ft = feet; PID = photo-ionization detector; ppm = parts per million; Rec. = recovery.

Attachment 4

USGS Redox Indicator Worksheet Output

Attachment 4

An Excel Workbook for Identifying Redox Processes in Ground Water

by Bryant C. Jurgens, Peter B. McMahon, Francis H. Chapelle, and Sandra M. Eberts
U.S. Geological Survey Open-File Report 2009-1004.

This program uses measured dissolved oxygen, nitrate, manganese, iron, sulfate, and sulfide concentrations to classify redox conditions in ground-water samples according to the framework devised by McMahon and Chapelle (2008) and extended by Chapelle and others (in press).

McMahon, P.B., Chapelle, F.H., 2008, Redox Processes and Water Quality of Selected Principal Aquifers, Ground Water, vol. 46(2), 259-271.

Chapelle, F.H., Bradley, P.M., Thomas, M.A. and McMahon, P.B., 2008, Distinguishing iron-reducing from sulfate-reducing conditions in ground-water systems, Ground Water, in press.

	Redox Variables	*Dissolved O_2*	*NO_3^- (as Nitrogen)*	*Mn^{2+}*	*Fe^{2+}*	*SO_4^{2-}*	*Sulfide (sum of H_2S, HS^-, S^{2-})*	***Redox Assignment***		
	Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L			
Sample ID	Threshold values	**0.5**	**0.5**	**0.05**	**0.1**	**0.5**	**none**	Num of Params	General Redox Category	Redox Process	*Fe^{2+} / Sulfide, ratio*
DPZ-02		0.10886	0.06	0.28	0.022	553	24.3	6	Anoxic	SO4	0.00
DR-01		0.07856	0.06	0.28	0.069	238	17.4	6	Anoxic	SO4	0.00
DR-02		0.04369	0.06	0.28	0.13	299	23	6	Anoxic	SO4	0.01
MCM-06		0.03927	0.06	0.28	0.022	213	23.3	6	Anoxic	SO4	0.00
PT-01		0.01915	0.06	0.28	0.062	269	18.7	6	Anoxic	SO4	0.00
PT-02		0.06509	0.06	0.28	0.051	203	12.7	6	Anoxic	SO4	0.00
PT-03		0.08928	0.06	0.28	0.044	142	8.2	6	Anoxic	SO4	0.00
DUP-1 (PT-03)		0.08928	0.06	0.28	0.046	142	8.2	6	Anoxic	SO4	0.00
PT-04D		0.1004	0.06	0.28	0.084	465	18.4	6	Anoxic	SO4	0.00
DPZ-02		0.11	0.01	0.26	0.084	989	41.6	6	Anoxic	SO4	0.00
MCM-05		0.02	0.01	0.29	0.084	682	15.7	6	Anoxic	SO4	0.00
MCM-06		0.04	0.01	0.24	0.099	552	50.8	6	Anoxic	SO4	0.00
MCM-07		0.04	0.01	0.16	0.084	701	1.6	6	Anoxic	SO4	0.00
MCM-14		0.05	0.01	0.13	0.084	938	25.7	6	Anoxic	SO4	0.00
RW-01		0.05	0.01	0.11	0.75	829	0.054	6	Anoxic	Fe(III)	13.89
RW-02		0.09	0.01	0.069	0.41	839	8.3	6	Anoxic	SO4	0.05
RW-03		0.1	0.01	0.069	0.084	148	21	6	Anoxic	SO4	0.00
DUP-1 (RW-03)		0.1	0.01	0.23	1.1	732	0.44	6	Mixed(anoxic)	Fe(III)-SO4	2.50
RW-04		0.11	0.01	0.14	0.32	806	0.95	6	Mixed(anoxic)	Fe(III)-SO4	0.34
RW-05		0.11	0.01	0.14	0.39	805	0.05	6	Mixed(anoxic)	Fe(III)-SO4	7.80
DUP-2 (RW-05)		0.12	0.01	0.13	0.084	310	52.5	6	Anoxic	SO4	0.00
RW-06		0.15	0.01	0.12	0.084	984	0.19	6	Anoxic	SO4	0.00
RW-07		0.15	0.01	0.28	0.084	731	50.8	6	Anoxic	SO4	0.00
RW-08		0.16	0.01	0.18	1.1	836	0.05	6	Anoxic	Fe(III)	22.00
RW-09		0.33	0.01	0.14	0.71	930	2.1	6	Mixed(anoxic)	Fe(III)-SO4	0.34
RW-10		0.33	0.01	0.16	1.2	1050	2.3	6	Mixed(anoxic)	Fe(III)-SO4	0.52

Table 1. Criteria and threshold concentrations for identifying redox processes in ground water.

[Table was modified from McMahon and Chapelle, 2008. Redox process: O2, oxygen reduction; NO3, nitrate reduction; Mn(IV), manganese reduction; Fe(III), iron reduction; SO4, sulfate reduction; CH4gen, methanogenesis. Chemical species: O2, dissolved oxygen; NO3-, dissolved nitrate; MnO2(s), manganese oxide with managanese in 4+ oxidation state; Fe(OH)3(s), iron hydroxide with iron in 3+ oxidation state; FeOOH(s), iron oxyhydroxide with iron in 3+ oxidation state; SO42–, dissolved sulfate; CO2(g), carbon dioxide gas; CH4(g), methane gas. Abbreviations: mg/L, milligram per liter; —, criteria do not apply because the species concentration is not affected by the redox process; ≤, less than or equal to; ≥, greater than or equal to; <, less than; >, greater than]

			Criteria for inferring process from water-quality data					
Redox category	**Redox process**	**Electron acceptor (reduction) half-reaction**	**Dissolved oxygen (mg/L)**	**Nitrate, as Nitrogen (mg/L)**	**Manganese (mg/L)**	**Iron (mg/L)**	**Sulfate (mg/L)**	**Iron/sulfide (mass ratio)**
Oxic	O2	$O_2 + 4H^+ + 4e^- \rightarrow 2H_2O$	≥0.5	—	<0.05	<0.1	—	
Suboxic	Suboxic	Low O2; additional data needed to define redox process	<0.5	<0.5	<0.05	<0.1	—	
Anoxic	NO3	$2NO_3^- + 12H^+ + 10e^- \rightarrow N_{2(g)} + 6\ H_2O$; $NO_3^- + 10H^+ + 8e^- \rightarrow NH_4^+ + 3H_2O$	<0.5	≥0.5	<0.05	<0.1	—	
Anoxic	Mn(IV)	$MnO_{2(s)} + 4H^+ + 2e^- \rightarrow Mn^{2+} + 2H_2O$	<0.5	<0.5	≥0.05	<0.1	—	
Anoxic	Fe(III)/SO4	Fe(III) and (or) $SO4^{2-}$ reactions as described in individual element half reactions	<0.5	<0.5	—	≥0.1	≥0.5	no data
Anoxic	Fe(III)	$Fe(OH)_{3(s)} + H^+ + e^- \rightarrow Fe^{2+} + H_2O$; $FeOOH_{(s)} + 3H^+ + e^- \rightarrow Fe^{2+} + 2H_2O$	<0.5	<0.5	—	≥0.1	≥0.5	>10
Mixed(anoxic)	Fe(III)-SO4	Fe(III) and $SO4^{2-}$ reactions as described in individual element half reactions	<0.5	<0.5	—	≥0.1	≥0.5	≥0.3, ≤10
Anoxic	SO4	$SO_4^{2-} + 9H^+ + 8e^- \rightarrow HS^- + 4H_2O$	<0.5	<0.5	—	≥0.1	≥0.5	<0.3
Anoxic	CH4gen	$CO_{2(g)} + 8H^+ + 8e^- \rightarrow CH_{4(g)} + 2H_2O$	<0.5	<0.5	—	≥0.1	<0.5	

Table 2. Classification of redox categories and processes assigned on the basis of water-quality data

[Redox category: O2 ≥ 0.5 mg/L, dissolved oxygen greater than or equal to 0.5 mg/L; O2 < 0.5 mg/L, dissolved oxygen less than 0.5 mg/L. Redox process: O2, oxygen reduction; NO3, nitrate reduction; Mn(IV), manganese reduction; Fe(III), iron reduction; SO4, sulfate reduction; CH4gen, methanogenesis. Abbreviations: mg/L, milligram per liter; <, less than; ≤, less than or equal to; ≥, greater than or equal to; >, greater than; Y, yes; N, no; —, criteria do not apply because the species concentration is not affected by the redox process; ?, insufficient data to determine whether process is occuring or not; /, and (or); -, and; x, not applicable]

Redox Category	Redox Process	Dissolved oxygen ≥0.5 mg/L	Nitrate, as Nitrogen ≥0.5 mg/L	Manganese ≥0.05 mg/L	Iron ≥0.01 mg/L	Sulfate ≥0.5 mg/L	Iron/sulfide mass ratio >0.3	Iron/sulfide mass ratio >10
Water-quality data complete								
Oxic	O2	Y	—	N	N	—	x	x
Suboxic	Suboxic	N	N	N	N	—	x	x
Anoxic	NO3	N	Y	N	N	—	x	x
Anoxic	Mn(IV)	N	N	Y	N	—	x	x
Anoxic	Fe(III)/SO4	N	N	—	Y	Y	no data	no data
Anoxic	CH4gen	N	N	—	Y	N	x	x
Mixed(oxic-anoxic)	O2-Mn(IV)	Y	—	Y	N	—	x	x
Mixed(oxic-anoxic)	O2-Fe(III)/SO4	Y	N	—	Y	Y	no data	no data
Mixed(oxic-anoxic)	O2-CH4gen	Y	N	—	Y	N	x	x
Mixed(anoxic)	NO3-Mn(IV)	N	Y	Y	N	—	x	x
Mixed(anoxic)	NO3-Fe(III)/SO4	N	Y	—	Y	Y	no data	no data
Mixed(anoxic)	NO3-CH4gen	N	Y	—	Y	N	x	x
Anoxic	SO4	N	N	—	Y	Y	N	N
Mixed(anoxic)	Fe(III)-SO4	N	N	—	Y	Y	Y	N
Anoxic	Fe(III)	N	N	—	Y	Y	Y	Y
Mixed(oxic-anoxic)	O2-SO4	Y	N	—	Y	Y	N	N
Mixed(oxic-anoxic)	O2-Fe(III)-SO4	Y	N	—	Y	Y	Y	N
Mixed(oxic-anoxic)	O2-Fe(III)	Y	N	—	Y	Y	Y	Y
Mixed(anoxic)	NO3-SO4	N	Y	—	Y	Y	N	N
Mixed(anoxic)	NO3-Fe(III)-SO4	N	Y	—	Y	Y	Y	N
Mixed(anoxic)	NO3-Fe(III)	N	Y	—	Y	Y	Y	Y
Water-quality data incomplete								
O2 >= 0.5 mg/L	Unknown	Y	no data	no data	no data	no data	no data	no data
O2 < 0.5 mg/L	Unknown	N	no data	no data	no data	no data	no data	no data
OxicOrAnoxic	O2?OrNO3	no data	Y	N	N	Y	x	x
OxicOrSuboxic	O2?OrSuboxic	no data	N	N	N	N	x	x
AnoxicOrMixed(oxic-anoxic)	Mn(IV)-O2?	no data	N	Y	N	—	x	x
AnoxicOrMixed(oxic-anoxic)	Fe(III)/SO4-O2?	no data	N	—	Y	Y	no data	no data
AnoxicOrMixed(oxic-anoxic)	CH4gen-O2?	no data	N	—	Y	N	x	x
Mixed(anoxic)Or(oxic-anoxic)	Mn(IV)-O2?OrNO3	no data	Y	Y	N	—	x	x
Mixed(anoxic)Or(oxic-anoxic)	Fe(III)/SO4-O2?OrNO3	no data	Y	—	Y	Y	no data	no data
Mixed(anoxic)Or(oxic-anoxic)	CH4gen-O2?OrNO3	no data	Y	—	Y	N	x	x
AnoxicOrMixed(oxic-anoxic)	SO4-O2?	no data	N	Y	Y	Y	N	N
Mixed(anoxic)	Fe(III)-SO4-O2?	no data	N	Y	Y	Y	Y	N
AnoxicOrMixed(oxic-anoxic)	Fe(III)-O2?	no data	N	Y	Y	Y	Y	Y
Indeterminate	Unknown	no data	no data	no data	no data	no data	no data	no data

Attachment 5

PHREEQC Input Script

```
DATABASE C:\Program Files (x86)\USGS\Phreeqc Interactive 3.7.3-15968\database\wateq4f_McManus.dat
TITLE McManus water quality

## BEGIN DATABASE MODIFICATIONS
# Addition of arsenic sulfide species

SOLUTION_SPECIES

# Arsenic sulfide species default in WATEQ database

##As3S4(HS)-2           631
#       3H3AsO3 + 6HS- + 5H+ = As3S4(HS)2- + 9H2O
#       log_k   72.314
#        -gamma  5.0     0.0
#
##AsS(OH)(HS)-          637
#       H3AsO3 + 2HS-  + H+ = AsS(OH)(HS)- + 2H2O
#       log_k   18.038
#        -gamma  5.0     0.0

PHASES

Arsenopyrite
# Log K from Nordstrom and Archer (2002) as reported by Lu and Zhu (2011)
        FeAsS + 3H2O = H2AsO3- + Fe+2 + HS- + 3H+ + 3e-
        log_k   -34.799

END

# END DATABASE MODIFICATIONS


selected_output
      -file                     McManus_08_mackinawite.sel
      -reset                    FALSE
      -solution                 TRUE
      -ph                       TRUE
      -pe                       TRUE
      -temp                     TRUE
      -alkalinity               TRUE
      -ionic_strength           TRUE
      -water                    TRUE
      -charge_balance           TRUE
      -percent_error            TRUE
      -totals                   Ca  S(6)  C(4)
      -molalities               HCO3- CO3-2 CO2
                                H3AsO3  H2AsO3-  H4AsO3+  HAsO3-2  AsO3-3
                                H2AsO4-  HAsO4-2  AsO4-3  H3AsO4
                                As3S4(HS)2-  AsS(OH)(HS)-
                                As(OH)2(SH)  As(OH)2(S)-  As(OH)(S)2-2  AsS3H-2  AsS3-3  As(SH)4-
      -gases                    CO2(g)
      -saturation_indices       orpiment  realgar  calcite  mackinawite  pyrite  arsenopyrite
user_punch
-headings  Alk_ppm  Ox_ppm  Fe_ppm  Mn_ppm  As_ppm  Cl_ppm  Na_ppm  K_ppm  totC_ppm  Ca_ppm  Mg_ppm  Sulfate_ppm
Sulfide_ppm
-start
10    Alk_ppm = ALK * 50.05 * 1000
11    Ox_ppm = TOT("O(0)") * 16.0 * 1000
12    Fe_ppm = TOT("Fe") * 55.847 * 1000
13    Mn_ppm = TOT("Mn") * 54.938 * 1000
14    As_ppm = TOT("As") * 74.9216 * 1000
20    Cl_ppm = TOT("Cl") * 35.453 * 1000
21    Na_ppm = TOT("Na") * 22.9898 * 1000
22    K_ppm = TOT("K") * 39.102 * 1000
30    totC_ppm = TOT("C") * 61.0173 * 1000
40    Ca_ppm = TOT("Ca") * 40.08 * 1000
41    Mg_ppm = TOT("Mg") * 24.312 * 1000
42    Sulfate_ppm = TOT("S(6)") * 96.0616 * 1000
43    Sulfide_ppm = TOT("S(-2)") * 32.064 * 1000
```

```
100   punch alk_ppm
101   punch Ox_ppm
102   punch Fe_ppm
103   punch Mn_ppm
104   punch As_ppm
200   punch Cl_ppm
201   punch Na_ppm
202   punch K_ppm
300   punch totC_ppm
400   punch Ca_ppm
401   punch Mg_ppm
402   punch Sulfate_ppm
403   punch Sulfide_ppm

end

SOLUTION 1
# MCM-6, October 2020
Units           mg/kgw
Temp            25
pH              6.93
redox           S(6)/S(-2)
Alkalinity              532
Ca              193
Mg              445
Na              30.5    charge
K               121
S(6)            552
S(-2)           50.8
Cl              6930
Fe(2)           0.099   mackinawite 0
Mn(2)           0.24
As              0.45
END

SOLUTION 2
# MCM-6, March 2022
# Ion concentrations scaled down where data were not available to match measured TDS
Units           mg/kgw
Temp            25
pH              7.24
redox           S(6)/S(-2)
Alkalinity              377
Ca              131
Mg              254
Na              2440
K               106
S(6)            440
S(-2)           50.8
Cl              4240    charge
Fe(2)           0.099   mackinawite 0
Mn(2)           0.24    # Oct 2020
As              0.24
END

SOLUTION_SPREAD
        -temp           25
        -units          mg/kgw
        -redox          S(6)/S(-2)
        -density        1
        -water          1
Number  pH      Alkalinity      Ca      Mg      Na      K       S(6)    S(-2)   Cl      Fe(2)   Mn(2)   As
                                                                                    mackinawite 0
1       6.93    532     193     445     3868    121     552     0.001   6930    0.099   0.24    0.45
2       6.93    532     193     445     3868    121     552     0.003   6930    0.099   0.24    0.45
3       6.93    532     193     445     3868    121     552     0.01    6930    0.099   0.24    0.45
4       6.93    532     193     445     3868    121     552     0.03    6930    0.099   0.24    0.45
5       6.93    532     193     445     3868    121     552     0.1     6930    0.099   0.24    0.45
6       6.93    532     193     445     3868    121     552     0.3     6930    0.099   0.24    0.45
```

```
7       6.93    532     193     445     3868    121     552     1       6930    0.099   0.24    0.45
8       6.93    532     193     445     3868    121     552     2       6930    0.099   0.24    0.45
9       6.93    532     193     445     3868    121     552     5       6930    0.099   0.24    0.45
10      6.93    532     193     445     3868    121     552     10      6930    0.099   0.24    0.45
11      6.93    532     193     445     3868    121     552     15      6930    0.099   0.24    0.45
12      6.93    532     193     445     3868    121     552     20      6930    0.099   0.24    0.45
13      6.93    532     193     445     3868    121     552     30      6930    0.099   0.24    0.45
14      6.93    532     193     445     3868    121     552     40      6930    0.099   0.24    0.45
15      6.93    532     193     445     3868    121     552     50      6930    0.099   0.24    0.45
END

SOLUTION_SPREAD
        -temp           25
        -units          mg/kgw
        -redox          S(6)/S(-2)
        -density        1
        -water          1
Number  pH      Alkalinity      Ca      Mg      Na      K       S(6)    S(-2)   Cl      Fe(2)   Mn(2)   As
                                                                                mackinawite 0
16      7.24    377     131     254     2440    106     440     0.001   4240    0.099   0.2     0.24
17      7.24    377     131     254     2440    106     440     0.003   4240    0.099   0.2     0.24
18      7.24    377     131     254     2440    106     440     0.01    4240    0.099   0.2     0.24
19      7.24    377     131     254     2440    106     440     0.03    4240    0.099   0.2     0.24
20      7.24    377     131     254     2440    106     440     0.1     4240    0.099   0.2     0.24
21      7.24    377     131     254     2440    106     440     0.3     4240    0.099   0.2     0.24
22      7.24    377     131     254     2440    106     440     1       4240    0.099   0.2     0.24
23      7.24    377     131     254     2440    106     440     2       4240    0.099   0.2     0.24
24      7.24    377     131     254     2440    106     440     5       4240    0.099   0.2     0.24
25      7.24    377     131     254     2440    106     440     10      4240    0.099   0.2     0.24
26      7.24    377     131     254     2440    106     440     15      4240    0.099   0.2     0.24
27      7.24    377     131     254     2440    106     440     20      4240    0.099   0.2     0.24
28      7.24    377     131     254     2440    106     440     30      4240    0.099   0.2     0.24
29      7.24    377     131     254     2440    106     440     40      4240    0.099   0.2     0.24
30      7.24    377     131     254     2440    106     440     50      4240    0.099   0.2     0.24
END
```

```
DATABASE C:\Program Files (x86)\USGS\Phreeqc Interactive 3.7.3-15968\database\wateq4f_McManus.dat
TITLE McManus water quality

## BEGIN DATABASE MODIFICATIONS
# Addition of arsenic sulfide species

SOLUTION_SPECIES

#
# Thioarsenic species from Helz and Tossell, 2008
#

### Sulfidation reactions

# H3AsSO2
# G
        H3AsO3 + H2S = H3AsSO2 + H2O
        log_k   0.4

# H3AsS2O
# H
        H3AsSO2 + H2S = H3AsS2O + H2O
        log_k   3.8

# H3AsS3
# I
        H3AsS2O + H2S = H3AsS3 + H2O
        log_k   5.6

# H3AsSO3
# J
        H3AsO4 + H2S = H3AsSO3 + H2O
        log_k   11.0

# H3AsS2O2
# K
        H3AsSO3 + H2S = H3AsS2O2 + H2O
        log_k   0.1

# H3AsS3O
# L
        H3AsS2O2 + H2S = H3AsS3O + H2O
        log_k   3.5

# H3AsS4
# M
        H3AsS3O + H2S = H3AsS4 + H2O
        log_k   2.6

### Ionization reactions

# H2AsSO2-
# Q
        H3AsSO2 = H2AsSO2- + H+
        log_k   -3.7

# HAsSO2-2
# R
        H2AsSO2- = HAsSO2-2 + H+
        log_k   -14.1

# H2AsS2O-
# S
        H3AsS2O = H2AsS2O- + H+
        log_k   -3.7

# HAsS2O-2
# T
        H2AsS2O- = HAsS2O-2 + H+
```

```
        log_k   -8.6

# H2AsS3-
# U
        H3AsS3 = H2AsS3- + H+
        log_k   -3.7

# HAsS3-2
# V
        H2AsS3- = HAsS3-2 + H+
        log_k   -8.6

# H2AsSO3-
# Z
        H3AsSO3 = H2AsSO3- + H+
        log_k   -3.3

# HAsSO3-2
# AA
        H2AsSO3- = HAsSO3-2 + H+
        log_k   -7.2

# AsSO3-3
# BB
        HAsSO3-2 = AsSO3-3 + H+
        log_k   -11.0

# H2AsS2O2-
# CC
        H3AsS2O2 = H2AsS2O2- + H+
        log_k   2.4

# HAsS2O2-2
# DD
        H2AsS2O2- = HAsS2O2-2 + H+
        log_k   -7.1

# AsS2O2-3
# EE
        HAsS2O2-2 = AsS2O2-3 + H+
        log_k   -10.8

# H2AsS3O-
# FF
        H3AsS3O = H2AsS3O- + H+
        log_k   1.7

# HAsS3O-2
# GG
        H2AsS3O- = HAsS3O-2 + H+
        log_k   -1.5

# AsS3O-3
# HH
        HAsS3O-2 = AsS3O-3 + H+
        log_k   -10.8

# H2AsS4-
# II
        H3AsS4 = H2AsS4- + H+
        log_k   2.3

# HAsS4-2
# JJ
        H2AsS4- = HAsS4-2 + H+
        log_k   -1.5

# AsS4-3
# KK
```

```
        HAsS4-2 = AsS4-3 + H+
        log_k   -5.2

PHASES

Arsenopyrite
# Log K from Nordstrom and Archer (2002) as reported by Lu and Zhu (2011)
        FeAsS + 3H2O = H2AsO3- + Fe+2 + HS- + 3H+ + 3e-
        log_k   -34.799

END

# END DATABASE MODIFICATIONS


selected_output
      -file                     McManus_14_mackinawite.sel
      -reset                    FALSE
      -solution                 TRUE
      -ph                       TRUE
      -pe                       TRUE
      -temp                     TRUE
      -alkalinity               TRUE
      -ionic_strength           TRUE
      -water                    TRUE
      -charge_balance           TRUE
      -percent_error            TRUE
      -totals                   Ca  S(6)  C(4)
      -molalities               HCO3- CO3-2 CO2
                                H3AsO3  H2AsO3-  H4AsO3+  HAsO3-2  AsO3-3
                                H2AsO4-  HAsO4-2  AsO4-3  H3AsO4
                                H3AsSO2 H2AsSO2- HAsSO2-2
                                H3AsS2O H2AsS2O- HAsS2O-2
                                H3AsS3 H2AsS3- HAsS3-2
                                H3AsSO3 H2AsSO3- HAsSO3-2 AsSO3-3
                                H3AsS2O2 H2AsS2O2- HAsS2O2-2 AsS2O2-3
                                H3AsS3O H2AsS3O- HAsS3O-2 AsS3O-3
                                H3AsS4 H2AsS4- HAsS4-2 AsS4-3
      -gases                    CO2(g)
      -saturation_indices       orpiment  realgar  calcite  mackinawite  pyrite  arsenopyrite
user_punch
-headings  Alk_ppm  Ox_ppm  Fe_ppm  Mn_ppm  As_ppm  Cl_ppm  Na_ppm  K_ppm  totC_ppm  Ca_ppm  Mg_ppm  Sulfate_ppm
Sulfide_ppm
-start
10    Alk_ppm = ALK * 50.05 * 1000
11    Ox_ppm = TOT("O(0)") * 16.0 * 1000
12    Fe_ppm = TOT("Fe") * 55.847 * 1000
13    Mn_ppm = TOT("Mn") * 54.938 * 1000
14    As_ppm = TOT("As") * 74.9216 * 1000
20    Cl_ppm = TOT("Cl") * 35.453 * 1000
21    Na_ppm = TOT("Na") * 22.9898 * 1000
22    K_ppm = TOT("K") * 39.102 * 1000
30    totC_ppm = TOT("C") * 61.0173 * 1000
40    Ca_ppm = TOT("Ca") * 40.08 * 1000
41    Mg_ppm = TOT("Mg") * 24.312 * 1000
42    Sulfate_ppm = TOT("S(6)") * 96.0616 * 1000
43    Sulfide_ppm = TOT("S(-2)") * 32.064 * 1000
100   punch alk_ppm
101   punch Ox_ppm
102   punch Fe_ppm
103   punch Mn_ppm
104   punch As_ppm
200   punch Cl_ppm
201   punch Na_ppm
202   punch K_ppm
300   punch totC_ppm
400   punch Ca_ppm
401   punch Mg_ppm
402   punch Sulfate_ppm
```

```
403   punch Sulfide_ppm

end

SOLUTION 1
# MCM-6, October 2020
Units           mg/kgw
Temp            25
pH              6.93
redox           S(6)/S(-2)
Alkalinity              532
Ca              193
Mg              445
Na              30.5    charge
K               121
S(6)            552
S(-2)           50.8
Cl              6930
Fe(2)           0.099   mackinawite 0
Mn(2)           0.24
As              0.45
END

SOLUTION 2
# MCM-6, March 2022
# Ion concentrations scaled down where data were not available to match measured TDS
Units           mg/kgw
Temp            25
pH              7.24
redox           S(6)/S(-2)
Alkalinity              377
Ca              131
Mg              254
Na              2440
K               106
S(6)            440
S(-2)           50.8
Cl              4150    charge
Fe(2)           0.099   mackinawite 0
Mn(2)           0.24    # Oct 2020
As              0.24
END

SOLUTION_SPREAD
        -temp           25
        -units          mg/kgw
        -redox          S(6)/S(-2)
        -density        1
        -water          1
```

Number	pH	Alkalinity	Ca	Mg	Na	K	S(6)	S(-2)	Cl	Fe(2)	Mn(2)	As
									mackinawite 0			
1	6.93	532	193	445	3868	121	552	0.001	6930	0.099	0.24	0.45
2	6.93	532	193	445	3868	121	552	0.003	6930	0.099	0.24	0.45
3	6.93	532	193	445	3868	121	552	0.01	6930	0.099	0.24	0.45
4	6.93	532	193	445	3868	121	552	0.03	6930	0.099	0.24	0.45
5	6.93	532	193	445	3868	121	552	0.1	6930	0.099	0.24	0.45
6	6.93	532	193	445	3868	121	552	0.3	6930	0.099	0.24	0.45
7	6.93	532	193	445	3868	121	552	1	6930	0.099	0.24	0.45
8	6.93	532	193	445	3868	121	552	2	6930	0.099	0.24	0.45
9	6.93	532	193	445	3868	121	552	5	6930	0.099	0.24	0.45
10	6.93	532	193	445	3868	121	552	10	6930	0.099	0.24	0.45
11	6.93	532	193	445	3868	121	552	15	6930	0.099	0.24	0.45
12	6.93	532	193	445	3868	121	552	20	6930	0.099	0.24	0.45
13	6.93	532	193	445	3868	121	552	30	6930	0.099	0.24	0.45
14	6.93	532	193	445	3868	121	552	40	6930	0.099	0.24	0.45
15	6.93	532	193	445	3868	121	552	50	6930	0.099	0.24	0.45

```
END

SOLUTION_SPREAD
```

```
        -temp           25
        -units          mg/kgw
        -redox          S(6)/S(-2)
        -density        1
        -water          1
Number  pH      Alkalinity      Ca      Mg      Na      K       S(6)    S(-2)   Cl      Fe(2)   Mn(2)   As
                                                                                    mackinawite 0
16      7.24    377     131     254     2440    106     440     0.001   4240    0.099   0.2     0.24
17      7.24    377     131     254     2440    106     440     0.003   4240    0.099   0.2     0.24
18      7.24    377     131     254     2440    106     440     0.01    4240    0.099   0.2     0.24
19      7.24    377     131     254     2440    106     440     0.03    4240    0.099   0.2     0.24
20      7.24    377     131     254     2440    106     440     0.1     4240    0.099   0.2     0.24
21      7.24    377     131     254     2440    106     440     0.3     4240    0.099   0.2     0.24
22      7.24    377     131     254     2440    106     440     1       4240    0.099   0.2     0.24
23      7.24    377     131     254     2440    106     440     2       4240    0.099   0.2     0.24
24      7.24    377     131     254     2440    106     440     5       4240    0.099   0.2     0.24
25      7.24    377     131     254     2440    106     440     10      4240    0.099   0.2     0.24
26      7.24    377     131     254     2440    106     440     15      4240    0.099   0.2     0.24
27      7.24    377     131     254     2440    106     440     20      4240    0.099   0.2     0.24
28      7.24    377     131     254     2440    106     440     30      4240    0.099   0.2     0.24
29      7.24    377     131     254     2440    106     440     40      4240    0.099   0.2     0.24
30      7.24    377     131     254     2440    106     440     50      4240    0.099   0.2     0.24
END
```

Attachment 6

Memo: Bench Testing of In Situ and PRB Technologies to Support Remedy Selection – Plant McManus

Attachment 6
Bench Testing of In Situ and PRB Technologies to Support Remedy Selection

An evaluation of potential corrective measures was presented in the Assessment of Corrective Measures report (ACM Report, Arcadis, 2020) and continues to be updated semi-annually in Semiannual Remedy Selection and Design Progress Reports. These reports have retained in situ geochemical manipulation (in situ injection) and permeable reactive barrier (PRB) technologies as potential corrective actions at the Plant McManus facility to address arsenic concentrations in groundwater above the groundwater protection standard (GWPS) at MCM-06. Because both treatment types are sensitive to site geochemistry, uncertainties exist regarding the treatment mechanisms for each of these technologies given the unique species of arsenic present in the highly reducing environment at the site (i.e., thioarsenic species). To address these uncertainties, bench-scale testing for two potential corrective action technologies (in situ injection and PRBs) was completed at the Arcadis Treatability Laboratory (Treatability Laboratory), located in Durham, North Carolina, in August and September 2021 to support ongoing remedy selection. This memo provides a summary of the bench-scale studies and generated data.

Sediment and Groundwater Collection

For the bench-scale tests to best represent site conditions, site sediment and groundwater were collected for use in the tests. Groundwater for the treatability study was collected from monitoring well MCM-06. Groundwater was purged until groundwater quality parameters (oxidation reduction potential [ORP], pH, specific conductivity, temperature, dissolved oxygen, and turbidity) were stable.

To minimize risk for oxidation of the groundwater during sampling, 2.5-liter jugs were filled with three to four volumes of groundwater in order to displace groundwater that unavoidably gets exposed to atmospheric oxygen during sample collection. Each full bottle was sealed and stored on ice immediately after sampling and was shipped overnight to the Treatability Laboratory. Groundwater was homogenized in an anoxic, nitrogen-filled glovebox at the Treatability Laboratory, and a sample was collected for analysis of total and dissolved iron, aluminum, calcium, magnesium and Appendix IV metals (excluding radium), total sulfide, sulfate, alkalinity, total organic carbon, and arsenic speciation.

Sediment for the in situ injection bench test was collected on August 17, 2021 via a direct-push (Geoprobe®) drill rig. Similar lithology was observed in the borehole that was observed in MCM-06. Sediment samples were collected at a depth approximately coinciding with the screened interval of MCM-06 (between 19 and 23 feet below ground surface) at three locations (DPT-LAB1 through DPT-LAB3) near MCM-06 (Figure 1) using 2-inch acetate liners.

Acetate liners were cut, capped, and taped immediately after sampling and placed in a sample cooler on ice to prevent exposure to air and subsequent oxidation. Samples were shipped on ice overnight to the Treatability Laboratory, where they were homogenized in an anoxic, nitrogen-filled glovebox. Following homogenization, a sample was collected for analysis of total organic carbon and arsenic. Analytical data for the homogenized groundwater and sediment are provided as Tables 1a and 1b, respectively.

Bench-Scale Tests for PRB Media

PRBs are defined as in situ permeable treatment zones designed to intercept and remediate a contaminant plume[1]. These permeable zones contain amendments that are chosen based on their ability to sorb, chemically transform, or otherwise address contaminants in groundwater. The objective of the PRB bench-scale test completed in August and September 2021 was to test three potential PRB amendments to see if they successfully provide treatment under the unique geochemical conditions observed in site groundwater. This was achieved through the completion of ten batch tests (three media doses for each amendment and a control). Three media were tested including zero valent iron (ZVI; Connelly-GPM; www.connellygpm.com), granular ferric hydroxide (GFH; Evoqua; www.evoqua.com), and activated alumina (AA; Recofiltration; www.recofiltration.com). Three different doses of each media type were tested as well as a control. The experimental design and sample analyses are summarized in Table 2. The experimental design of this study served to compare reagent performance and provide information over a range of doses to look at capacity and amount of media that may be successful at the field scale. Due to the sensitivity of arsenic speciation to the presence of oxygen, the entire experiment was conducted inside an anoxic, nitrogen gas-filled glovebox and sulfide, sulfate, dissolved oxygen, ORP, and arsenic speciation were specifically monitored as geochemical redox parameters during the tests.

Dosing for PRB media was calculated based on published sorption capacities for arsenic with these reagents[2,3]. Due to lack of published data regarding the specific sorption performance of thioarsenic species in conditions similar to the brackish environment at the site, a logarithmic dosing scheme (0.05 g, 0.5 g, and 5 g) was selected with the objective of capturing the potential treatment range. The media was combined with 1 liter of site groundwater and no aquifer solids for the testing, as summarized in Table 2.

For each testing condition, samples were evaluated for total and dissolved arsenic, iron, aluminum, calcium, and magnesium as well as dissolved sulfide, sulfate, and alkalinity. Dissolved samples were collected by vacuum filtration using a 0.45-micron filter. Tests run at maximum reagent dosage were also evaluated for Appendix IV parameters (excluding radium) to understand if PRB media would influence Appendix IV parameter concentrations. Arsenic speciation was evaluated in the control to confirm that the experimental process maintained reducing conditions. Dissolved arsenic speciation samples were collected from the control sample using syringe filters and syringes supplied by Brooks Applied Laboratory. All samples except arsenic speciation were submitted to Pace Analytical Services, LLC (Pace) located in Huntsville, North Carolina for analysis. The arsenic speciation samples were submitted to Brooks Applied Laboratory located in Bothell, Washington for analysis.

Bench-Scale Tests for In Situ Reagents

In situ injection technology is the application of reagents in the subsurface to influence the solubility, mobility, and/or toxicity of inorganic constituents. Similar to PRBs, the performance of in situ injection technologies is sensitive to the geochemical environment. The potential impact of the presence of the thioarsenic species,

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[1] ITRC. 2011. Permeable Reactive Barrier: Technology Update. Interstate Technology and Regulatory Council. June. Available online at: https://clu-in.org/download/techfocus/prb/PRB-5-ITRC.pdf. Accessed October 8, 2020.

[2] Couture, R., Rose, J., Kumar, N., Mitchell, K., Wallshlager, D., Cappellen, P. 2013. Sorption of Arsenite, Arsenate, and Thioarsenates to Iron Oxides and Iron Sulfides: A kinetic and Spectroscopic Investigation. Environmental Science and Technology. 47. 5652-5659.

3 Gupta, S., Chen, K. 1978. Arsenic Removal by Adsorption. Water Pollution Control Federation. 50. 493-506.

elevated sulfide concentrations, and highly reducing conditions on injected reagent performance needs to be considered. The bench-scale in situ injection tests aimed to better understand the effectiveness of individual reagents under site-comparable conditions and evaluate the potential effect of the in situ injection reagents on the solubility of Appendix IV metals currently being monitored on site.

Four reagents were selected for in situ injection bench testing and included ferrous sulfate heptahydrate (FSH), two separate forms of injectable ZVI (Ferox micron from Hepure and Clean ER-5 from Hoganas), and a colloidal ferric oxide/ferrihydrite mineral species (FH), which was synthesized in house according to published methods[4]. The experimental design consisted of 12 batch tests (three separate timed batch tests for each reagent – 5-hour, 72-hour, and 2-week time points) and one control (2-week/336-hour time point). These timed tests conducted during this study served to compare reagent performance and provide high-level insight on the kinetics of arsenic removal under site-comparable conditions. The experimental design and sample analyses are summarized in Table 2. Generally, an in situ injection reagent and 160 grams of site sediment and 0.8 liters of groundwater were added to each batch reactor and mixed for a specified duration, as summarized in Table 2. Similar to the PRB bench-scale tests, all in situ injection bench-scale tests were completed under anoxic conditions in a glovebox and sulfide, sulfate, dissolved oxygen, ORP, and arsenic speciation were specifically monitored as geochemical redox parameters during the tests. For each time series test, samples were evaluated for total and dissolved arsenic, iron, aluminum, calcium, and magnesium as well as dissolved sulfide, and sulfate. Dissolved samples were collected by vacuum filtration using a 0.45-micron filter. Tests run at maximum time (2 weeks) were also evaluated for Appendix IV parameters (excluding radium), total organic carbon, and alkalinity to understand whether the in situ injection media would influence Appendix IV parameter constituents from the sediments and evaluate the reagent's impact on organic carbon and alkalinity content in the sediment. Similar to the PRB bench-scale test, arsenic speciation was evaluated in the control to confirm that the experimental process maintained reducing conditions. Samples were submitted to Pace and Brooks Applied Laboratories.

PRB Bench-Scale Study Results

As presented in Table 3 and on Figure 2, the total arsenic[5] concentration was successfully reduced to below the arsenic GWPS of 0.032 milligram per liter (mg/L) in the highest dosing conditions for ZVI and GFH (5 grams of reagent per vessel). In those samples, no arsenic was detected at concentrations above the method detection limit of 0.0043 mg/L after 72 hours of mixing. Tests with lower doses of iron PRB reagent (0.05 gram and 0.5 gram of reagent per vessel) and all alumina-based reagent doses failed to provide effective treatment to below the GWPS, but were able to reduce some of the arsenic concentration at the highest dosing. These results demonstrate that all media tested are able to treat arsenic under site-comparable conditions and can be used to inform the amount of reagent needed for a future remedial designs.

Calcium and magnesium concentrations and alkalinity were monitored during PRB testing as a preliminary test for potential precipitation of calcium and magnesium carbonate minerals, which can cause fouling of PRBs. Concentrations of these constituents remained generally stable throughout the 72-hour test (Table 3). Further bench testing of media longevity and fouling potential would be needed prior to full-scale remedy design.

[4] Villacis-Garcia, M. M. Ugalde-Arzate, K. Vaca-Escobar, M. Villalobos, R. Zanella, N. Martinez-Villegas. 2015. Laboratory synthesis of goethite and ferrihydrite of controlled particle sizes. Boletin de la Sociedad Geologica Mexicana. Volume 67. No. 3. pp. 433-446.

[5] Dissolved arsenic concentrations under each treatment condition were below the detection limit, except for the filtered speciation samples, which used a separate filter type (polyethersulfone [PES] vs. polyvinylidene fluoride [PVDF]). Based on this observation, and the potential for PVDF filters to adsorb arsenic, the non-detect results for filtered samples have been identified as a laboratory artifact, and total arsenic was used for performance evaluation. These results are included in the lab report but not presented in the table.

No other Appendix IV constituents were detected in the PRB tests with the exception of barium, which was detected in similar concentrations within the control. This suggests that none of the PRB media options tested produced measurable concentrations of Appendix IV constituents at the dosing tested.
As shown in Table 3, the experimental program successfully maintained anoxic conditions. This is demonstrated by:

- Negative ORP values ranging from -502 to -302 millivolts (mV), low dissolved oxygen concentrations (range of 0.00 to 0.19 mg/L);
- The detection of sulfide in all samples (range of 0.14 to 67.4 mg/L);
- Consistent arsenic speciation results between the baseline and control, which indicated that arsenic was present within these samples as a species that was not arsenite, arsenate, dimethylarsinic acid, or monomethylarsonic acid. Previous testing has shown that these residual unidentified arsenic species in site groundwater are thiospecies.[6]

In Situ Injection Bench-Scale Study Results

As presented in Table 4 and on Figure 3, total arsenic concentrations were successfully reduced to below the detection limit of 0.0043 mg/L for all amendments except for FSH. The reduction of arsenic in the ZVI and FH treatments occurred rapidly, as full treatment to less than the detection limit was observed in the 5-hour sample tests for those amendments.

No Appendix IV constituents were detected in the in situ injection tests at concentrations above their respective detection limits, except for cobalt and trace amounts of mercury in the FSH test (total concentrations of 0.11 mg/L and 0.00022 mg/L, respectively; sample IR-1-2 [336 HOUR]), and trace amounts of mercury in the Hoganas ZVI ER-5 test (0.00068 mg/L; sample IR-1-3 [336 HOUR]). These concentrations were greater than the concentrations from the control test (less than the detection limit).

As shown in Table 4, the experimental program successfully maintained reducing conditions. This is demonstrated by negative ORP values ranging from -675 to -220 mV, low dissolved oxygen concentrations (range of 0.00 to 0.66 mg/L), and consistent arsenic speciation results between the baseline and control. No sulfide was detected in the in situ injection bench-scale tests, except for the FSH 336-hour test (IR-1-2 [336 HOUR]; 45.3 mg/L). The lower sulfide concentrations may be due to a reaction with available reduced iron species, forming iron sulfide minerals such as pyrite.

Additional speciation tests were completed for the in situ injection bench-scale tests (Figure 4). In addition to speciation being analyzed on the control sample (IR-1-1 [336 HOUR]), speciation was completed in the 2-week (336-hour) samples for each additive. Consistent with the speciation tests for the PRB bench-scale study, the baseline and control speciation results were similar with arsenic present within these samples as a species that was not arsenite, arsenate, dimethylarsinic acid, or monomethylarsonic acid and assumed based on previous testing to be thioarsenic species. In addition to a reduction in total arsenic concentrations, tests run with an in situ injection amendment had no detectable thioarsenic species, with arsenite and arsenate being the predominant species where detected.

[6] Arcadis. 2021. Semiannual Remedy Selection and Design Progress Report. Plant McManus Former Ash Pond 1, Brunswick, Georgia. July 30.

Summary

The results of the bench-scale studies for PRB and in situ injection amendments demonstrated successful treatment of arsenic concentrations to below GWPS under site-comparable anoxic conditions for at least two amendment types in each study. AA performed the most poorly of the PRB amendments. GFH and ZVI provided successful treatment at the highest loading (5 grams of reagent). ZVI consistently performed well both as a PRB and in situ injection amendment. FH performed comparably to the injectable ZVI amendments reviewed in this study. The only dissolved-phase injectable amendment (FSH) removed arsenic from groundwater, but not as effectively as injectable ZVI and FH. These results support the retention of PRB and in situ injection as potential corrective measures for arsenic in groundwater at Plant McManus.

Enclosures:

Tables

1a – Bench-Scale Baseline Groundwater Homogenization Results
1b – Bench-Scale Baseline Sediment Homogenization Results
2 – Experimental Design and Analyses Summary PRB and In Situ Injection Bench-Scale Tests
3 – PRB Treatability Study Analytical Results
4 – In Situ Injection Treatability Study Analytical Results

Figures

1 – Bench-Scale Sediment Collection Location
2 – 2021 Treatability Study PRB Bench-Scale Results
3 – 2021 Treatability Study In Situ Injection Bench-Scale Results
4 – 2021 Treatability Study In Situ Injection Bench-Scale Speciation Results

Attachments

1 – Laboratory Analytical Reports

TABLES

Table 1a
Bench-Scale Baseline Groundwater Homogenization Results
Georgia Power Company
Plant McManus Former Ash Pond 1
Brunswick, Georgia

Analyte	Sample ID: / Description: / Sample Date: / Units	HOMOGENATE_W_081921 / Baseline Groundwater / 8/19/2021 / Result
Total Metals		
Aluminum	mg/L	< 0.37
Antimony	mg/L	< 0.010
Arsenic	mg/L	0.32
Barium	mg/L	0.13
Beryllium	mg/L	< 0.0025
Cadmium	mg/L	< 0.0030
Calcium	mg/L	256
Chromium	mg/L	< 0.025
Cobalt	mg/L	< 0.0025
Iron	mg/L	< 1.0
Lead	mg/L	< 0.0038
Lithium	mg/L	0.092 J
Magnesium	mg/L	501
Mercury	mg/L	< 0.12
Molybdenum	mg/L	< 0.0063
Selenium	mg/L	< 0.0036
Thallium	mg/L	< 0.025
Dissolved Metals		
Aluminum	mg/L	< 0.15
Antimony	mg/L	< 0.0040
Arsenic	mg/L	0.12
Barium	mg/L	0.13
Beryllium	mg/L	< 0.0010
Cadmium	mg/L	< 0.0012
Calcium	mg/L	247 J
Chromium	mg/L	< 0.0099
Cobalt	mg/L	< 0.0010
Iron	mg/L	< 0.0012
Lead	mg/L	<0.0015
Lithium	mg/L	0.081
Magnesium	mg/L	506 J
Mercury	µg/L	< 0.12
Molybdenum	mg/L	< 0.0025
Selenium	mg/L	< 0.0014
Thallium	mg/L	< 0.0010
Arsenic Speciation		
As (III)	µg/L	32.6
As (V)	µg/L	0.706 J
DMAs	µg/L	< 0.25
MMAs	µg/L	< 0.20
Unk As Sp/ Arsenic thiospecies*	µg/L	317

Table 1a
Bench-Scale Baseline Groundwater Homogenization Results
Georgia Power Company
Plant McManus Former Ash Pond 1
Brunswick, Georgia

Analyte	Sample ID: / Description: / Sample Date: / Units	HOMOGENATE_W_081921 / Baseline Groundwater / 8/19/2021 / Result
Other Parameters		
Alkalinity, Bicarbonate (CaCO3)	mg/L	494
Alkalinity, Carbonate (CaCO3)	mg/L	< 5.0
Alkalinity, Total as CaCO3	mg/L	494
Sulfide	mg/L	0.86
Sulfate	mg/L	529
Total Organic Carbon	mg/L	10.1

Notes:
* Previous analytical data evaluating the Unk As Sp results have demonstrated that these species are thioarsenic species (Arcadis, 2021)

Data Qualifier:

J - Estimated concentration.

< - Not detected at or above adjusted reporting limit

Acronyms and Abbreviations:
mg/L - milligrams per liter
µg/L - micrograms per liter
As (III) - arsenite
As (V) - arsenate
MMAs - monomethylarsonic acid
DMAs - dimethylarsinic acid
Unk As Sp - total estimated concentration of any unidentified arsenic-containing species
CaCO3 - calcium carbonate

Table 1b
Bench-Scale Basline Sediment Homogenization Results
Georgia Power Company
Plant McManus Former Ash Pond 1
Brunswick, Georgia

Analyte	Units	Sample ID: HOMOGENATE_S_081821 Description: Homogenized Sediment Sample Date: 8/18/2021 Result
Metals		
Arsenic	mg/kg	1.73
Total Organic Carbon		
Mean Total Organic Carbon	mg/kg	< 517

Acronyms and Abbreviations:
mg/kg - milligrams per kilogram

Data Qualifier:
< - Not detected at or above adjusted reporting limit

Table 2
Experimental Design and Analyses Summary PRB and In Situ Injection Bench-Scale Tests
Georgia Power Company
Plant McManus Former Ash Pond 1
Brunswick, Georgia

Permeable Reactive Barrier Experimental Design and Sample Analyses

Condition	Test Description	Sample ID	Reagent Dose (grams)	Groundwater (liters)	Soil (grams)	Timescale (hours)	Analyses Completed
Control	Control	PRB-1-1 (72 HOUR)/ PRB-1-1 (72 HOUR)(F)*	None	1	0	72	T & D Metals (Appendix IV, Fe, Al, Ca, Mg), Sulfide, Sulfate, Alkalinity, Arsenic Speciation
Connelly-GPM Zero Valent Iron (ZVI)	ZVI Dose 1	PRB-1-2 (72 HOUR)/PRB-1-2 (72 HOUR)(F)*	0.05	1	0	72	T & D Metals (As, Fe, Al, Ca, Mg), Sulfide, Sulfate, Alkalinity
	ZVI Dose 2	PRB-1-3 (72 HOUR)/ PRB-1-3 (72 HOUR)(F)*	0.5	1	0	72	T & D Metals (As, Fe, Al, Ca, Mg), Sulfide, Sulfate, Alkalinity
	ZVI Dose 3	PRB-1-4 (72 HOUR)/PRB-1-4 (72 HOUR)(F)*	5	1	0	72	T & D Metals (Appendix IV, Fe, Al, Ca, Mg), Sulfide, Sulfate, Alkalinity
Evoqua Granular Ferric Hydroxide (GFH)	GFH Dose 1	PRB-1-5 (72 HOUR)/PRB-1-5 (72 HOUR)(F)*	0.05	1	0	72	T & D Metals (As, Fe, Al, Ca, Mg), Sulfide, Sulfate, Alkalinity
	GFH Dose 2	PRB-1-6 (72 HOUR)/PRB-1-6 (72 HOUR)(F)*	0.5	1	0	72	T & D Metals (As, Fe, Al, Ca, Mg), Sulfide, Sulfate, Alkalinity
	GFH Dose 3	PRB-1-7 (72 HOUR)/PRB-1-7 (72 HOUR)(F)*	5	1	0	72	T & D Metals (Appendix IV, Fe, Al, Ca, Mg), Sulfide, Sulfate, Alkalinity
Recofiltration Activated Alumina (AA)	AA Dose 1	PRB-1-8 (72 HOUR)/PRB-1-8 (72 HOUR)(F)*	0.05	1	0	72	T & D Metals (As, Fe, Al, Ca, Mg), Sulfide, Sulfate, Alkalinity
	AA Dose 2	PRB-1-9 (72 HOUR)/PRB-1-9 (72 HOUR)(F)*	0.5	1	0	72	T & D Metals (As, Fe, Al, Ca, Mg), Sulfide, Sulfate, Alkalinity
	AA Dose 3	PRB-1-10 (72 HOUR)/PRB-1-10 (72 HOUR)(F)*	5	1	0	72	T & D Metals (Appendix IV, Fe, Al, Ca, Mg), Sulfide, Sulfate, Alkalinity

In Situ Injection Experimental Design and Sample Analyses

Condition	Test Description	Sample ID	Reagent Dose (grams)	Groundwater (liters)	Soil (grams)	Timescale (hours)	Analyses Completed
Control	Control	IR-1-1 (336 HOUR)/IR-1-1 (336 HOUR)(F)*	None	0.8	160	336	T&D Metals (Appendix IV, Fe, Ca, Mg), Sulfide, Sulfate, Alkalinity, TOC, Arsenic Speciation
Ferrous Sulfate Heptahydrate (FSH)	FSH 5	IR-1-2 (5 HOUR) /IR-1-2 (5 HOUR)(F)*	23.6	0.8	160	5	T&D Metals (As, Fe, Ca, Mg), Sulfide, Sulfate
	FSH72	IR-1-2 (72 HOUR)/IR-1-2 (72 HOUR)(F)*				72	T&D Metals (As, Fe, Ca, Mg), Sulfide, Sulfate
	FSH 336	IR-1-2 (336 HOUR)/IR-1-2 (336 HOUR)(F)*				336	T&D Metals (Appendix IV, Fe, Ca, Mg), Sulfide, Sulfate, Alkalinity, TOC, Arsenic Speciation
Hoganas ER-5 ZVI	ZVI ER5 5	IR-1-3 (5 HOUR)/IR-1-3 (5 HOUR)(F)*	5.16	0.8	160	5	T&D Metals (As, Fe, Ca, Mg), Sulfide, Sulfate
	ZVI ER5 72	IR-1-3 (72 HOUR)/IR-1-3 (72 HOUR)(F)*				72	T&D Metals (As, Fe, Ca, Mg), Sulfide, Sulfate
	ZVI ER5 336	IR-1-3 (336 HOUR)/IR-1-3 (336 HOUR)(F)*				336	T&D Metals (Appendix IV, Fe, Ca, Mg), Sulfide, Sulfate, Alkalinity, TOC, Arsenic Speciation
Hepure Ferox Micron ZVI	ZVI Ferox 5	IR-1-4 (5 HOUR)/IR-1-4 (5 HOUR)(F)*	4.80	0.8	160	5	T&D Metals (As, Fe, Ca, Mg), Sulfide, Sulfate
	ZVI Ferox 72	IR-1-4 (72 HOUR)/IR-1-4 (72 HOUR)(F)*				72	T&D Metals (As, Fe, Ca, Mg), Sulfide, Sulfate
	ZVI Ferox 336	IR-1-4 (336 HOUR)/IR-1-4 (336 HOUR)(F)*				336	T&D Metals (Appendix IV, Fe, Ca, Mg), Sulfide, Sulfate, Alkalinity, TOC, Arsenic Speciation
Colloidal Iron Oxide/Ferrihydrite (FH)	FH 5	IR-1-5 (5 HOUR)/IR-1-5 (5 HOUR)(F)*	75.8	0.8	160	5	T&D Metals (As, Fe, Ca, Mg), Sulfide, Sulfate
	FH 72	IR-1-5 (72 HOUR)/IR-1-5 (72 HOUR)(F)*				72	T&D Metals (As, Fe, Ca, Mg), Sulfide, Sulfate
	FH 336	IR-1-5 (336 HOUR)/IR-1-5 (336 HOUR)(F)*				336	T&D Metals (Appendix IV, Fe, Ca, Mg), Sulfide, Sulfate, Alkalinity, TOC, Arsenic Speciation

Notes:

Appendix IV constituents include antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, lead, lithium, mercury, molybdenum, selenium and thallium. Radium was not evaluated.

As - arsenic, Fe - iron, Ca - calcium, Mg- magnesium
T&D - total and dissolved
TOC - total organic carbon

*Filtered PRB and IR samples were submitted under separate sample ID, identified by (F). To simplify data presentation, these are presented in Tables 3 and 4 under one sample ID.

% w/w - percent by weight
IR - injection reagent
PRB - permeable reactive barrier

Table 3
PRB Treatability Study Analytical Results
Georgia Power Company
Plant McManus Former Ash Pond 1
Brunswick, Georgia

Analyte	Sample ID: / Description: / Dose (grams): / Date Sampled: / Units	HOMOGENATE_W_081921 Baseline Groundwater 0 8/19/2021	PRB-1-1 (72 HOUR) Control 0 8/27/2021	PRB-1-2 (72 HOUR) ZVI Dose 1 0.05 8/27/2021	PRB-1-3 (72 HOUR) ZVI Dose 2 0.5 8/27/2021	PRB-1-4 (72 HOUR) ZVI Dose 3 5 8/27/2021	PRB-1-5 (72 HOUR) GFH Dose 1 0.05 8/27/2021	PRB-1-6 (72 HOUR) GFH Dose 2 0.5 8/27/2021	PRB-1-7 (72 HOUR) GFH Dose 3 5 8/27/2021	PRB-1-8 (72 HOUR) AA Dose 1 0.05 8/27/2021	PRB-1-9 (72 HOUR) AA Dose 2 0.5 8/27/2021	PRB-1-10 (72 HOUR) AA Dose 3 5 8/27/2021
Total Metals												
Aluminum	mg/L	< 0.37	< 0.37	< 0.37	< 0.37	< 0.37	< 0.37	< 0.37	< 0.37	< 0.37	< 0.37	2.1
Antimony	mg/L	< 0.010	< 0.010	--	--	< 0.010	--	--	< 0.010	--	--	< 0.010
Arsenic	mg/L	0.32	0.37	0.36	0.18	< 0.0043	0.40	0.34	< 0.0043	0.34	0.34	0.13
Barium	mg/L	0.13	0.16	--	--	0.16	--	--	0.096	--	--	< 0.011
Beryllium	mg/L	< 0.0025	< 0.0025	--	--	< 0.0025	--	--	< 0.0025	--	--	< 0.0025
Cadmium	mg/L	< 0.0030	< 0.0030	--	--	< 0.0030	--	--	< 0.0030	--	--	< 0.0030
Calcium	mg/L	256	262	258	256	256	264	254	253	242	255	243
Chromium	mg/L	< 0.025	< 0.025	--	--	< 0.025	--	--	< 0.025	--	--	< 0.025
Cobalt	mg/L	< 0.0025	< 0.0025	--	--	< 0.0025	--	--	< 0.0025	--	--	< 0.0025
Iron	mg/L	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Lead	mg/L	< 0.0038	< 0.0038	--	--	< 0.0038	--	--	< 0.0038	--	--	< 0.0038
Lithium	mg/L	0.092 J	< 0.025	--	--	< 0.025	--	--	< 0.025	--	--	< 0.025
Magnesium	mg/L	501	509	520	534	539	524	507	499	494	505	520
Mercury	mg/L	< 0.00012	< 0.000078	--	--	< 0.000078	--	--	< 0.00016	--	--	< 0.000078
Molybdenum	mg/L	< 0.0063	< 0.0063	--	--	< 0.0063	--	--	< 0.0063	--	--	< 0.0063
Selenium	mg/L	< 0.0036	< 0.0036	--	--	< 0.0036	--	--	< 0.0036	--	--	< 0.0036
Thallium	mg/L	< 0.0025	< 0.0025	--	--	< 0.0025	--	--	< 0.0025	--	--	< 0.0025
Dissolved Metals*												
Aluminum	mg/L	< 0.15	< 0.37	< 0.37	< 0.37	< 0.37	< 0.37	< 0.37	< 0.37	< 0.37	< 0.37	< 0.37
Antimony	mg/L	< 0.0040	< 0.010	--	--	< 0.010	--	--	0.11	--	--	< 0.010
Barium	mg/L	0.13	0.16	--	--	0.16	--	--	0.10	--	--	< 0.011
Beryllium	mg/L	< 0.0010	< 0.0025	--	--	< 0.0025	--	--	< 0.0025	--	--	< 0.0025
Cadmium	mg/L	< 0.0012	< 0.0030	--	--	< 0.0030	--	--	< 0.0030	--	--	< 0.0030
Calcium	mg/L	247 J	253	244	240	256	248	257	264	249	245	233
Chromium	mg/L	< 0.0099	< 0.025	--	--	< 0.025	--	--	< 0.025	--	--	< 0.025
Cobalt	mg/L	< 0.0010	< 0.0025	--	--	< 0.0025	--	--	< 0.0025	--	--	< 0.0025
Iron	mg/L	< 0.0012	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Lead	mg/L	<0.0015	< 0.0038	--	--	< 0.0038	--	--	< 0.0038	--	--	< 0.0038
Lithium	mg/L	0.081	< 0.025	--	--	< 0.025	--	--	< 0.025	--	--	< 0.025
Magnesium	mg/L	506 J	476	485	480	494	465	472	468	483	491	471
Mercury	mg/L	< 0.00012	< 0.000078	--	--	< 0.000078	--	--	< 0.000078	--	--	< 0.000078
Molybdenum	mg/L	< 0.0025	< 0.0063	--	--	< 0.0063	--	--	< 0.0063	--	--	< 0.0063
Selenium	mg/L	< 0.0014	< 0.0036	--	--	< 0.0036	--	--	< 0.0036	--	--	< 0.0036
Thallium	mg/L	< 0.0010	< 0.0025	--	--	< 0.0025	--	--	< 0.0025	--	--	< 0.0025

Abbreviations are provided on last page

Table 3
PRB Treatability Study Analytical Results
Georgia Power Company
Plant McManus Former Ash Pond 1
Brunswick, Georgia

Analyte	Sample ID: / Description: / Dose (grams): / Date Sampled: / Units	HOMOGENATE_W_081921 Baseline Groundwater 0 8/19/2021	PRB-1-1 (72 HOUR) Control 0 8/27/2021	PRB-1-2 (72 HOUR) ZVI Dose 1 0.05 8/27/2021	PRB-1-3 (72 HOUR) ZVI Dose 2 0.5 8/27/2021	PRB-1-4 (72 HOUR) ZVI Dose 3 5 8/27/2021	PRB-1-5 (72 HOUR) GFH Dose 1 0.05 8/27/2021	PRB-1-6 (72 HOUR) GFH Dose 2 0.5 8/27/2021	PRB-1-7 (72 HOUR) GFH Dose 3 5 8/27/2021	PRB-1-8 (72 HOUR) AA Dose 1 0.05 8/27/2021	PRB-1-9 (72 HOUR) AA Dose 2 0.5 8/27/2021	PRB-1-10 (72 HOUR) AA Dose 3 5 8/27/2021
Arsenic Speciation*												
As (III)	µg/L	32.6	42.4	--	--	--	--	--	--	--	--	--
As (V)	µg/L	0.706 J	0.997 J	--	--	--	--	--	--	--	--	--
DMAs	µg/L	< 0.25	< 0.25	--	--	--	--	--	--	--	--	--
MMAs	µg/L	< 0.20	< 0.20	--	--	--	--	--	--	--	--	--
Unk As Sp/ Arsenic thiospecies**	µg/L	317	303	--	--	--	--	--	--	--	--	--
Other Parameters*												
Total Organic Carbon	mg/L	10.1	--	--	--	--	--	--	--	--	--	--
Alkalinity, Bicarbonate (CaCO3)	mg/L	494	527	532	515	568	569	551	524	532	529	508
Alkalinity, Carbonate (CaCO3)	mg/L	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Alkalinity, Total as CaCO3	mg/L	494	527	532	515	568	569	551	524	532	529	508
Sulfide	mg/L	0.86	66.5	67.4	29.6	2.8	55.5	16.7	0.14	58.4	74.8	64.0
Sulfate	mg/L	529	608	574	583	575	595	605	587	593	639	545
pH	s.u.	7.18	7.21	7.49	7.53	7.99	7.48	7.54	7.51	7.37	7.38	7.49
ORP	mV	-440	-428	-503	-464	-439	-426	-391	-302	-407	-413	-413
DO	mg/L	0.00	0.00	0.00	0.07	0.00	0.00	0.10	0.00	0.10	0.19	0.12

Note:
*Dissolved samples were analyzed separately and are denoted by (F) in the analytical report. Results are combined for ease of interpretation herein. Arsenic speciation, alkalinity, sulfide and sulfate analyses were filtered prior to analysis.

** Previous analytical data evaluating the Unk As Sp results have demonstrated that these species are thioarsenic species (Arcadis, 2021)

Dissolved arsenic concentrations under each treatment condition were below the detection limit, except for the filtered speciation samples, which used a separate filter type (polyethersulfone [PES] vs. polyvinylidene fluoride [PVDF]). Based on this observation, and the potential for PVDF filters to adsorb arsenic, the non-detect results for filtered samples have been identified as a laboratory artifact, and are not presented. Dissolved arsenic results are available in the laboratory analytical report.

Acronyms and Abbreviations:
mg/L - milligrams per liter
µg/L - micrograms per liter
As (III) - arsenite
As (V) - arsenate
MMAs - monomethylarsonic acid
DMAs - dimethylarsinic acid
-- - sample was not analyzed for given constituent
mV - millivolt
s.u. - standard unit
PRB - Permeable Reactive Barrier
CaCO3 - calcium carbonate
Unk As Sp - total estimated concentration of any unidentified arsenic-containing species
ZVI - zero valent iron
GFH - granular ferric hydroxide
AA - activated alumina

Data Qualifier:
J - Estimated concentration.
< - Not detected at or above adjusted reporting limit

Abbreviations are provided on last page

Table 4
In Situ Injection Treatability Study Analytical Results
Georgia Power Company
Plant McManus Former Ash Pond 1
Brunswick, Georgia

Analyte	Units	Sample ID: HOMOGENATE_W_081921	IR-1-1 (336 HOUR)	IR-1-2 (5 HOUR)	IR-1-2 (72 HOUR)	IR-1-2 (336 HOUR)	IR-1-3 (5 HOUR)	IR-1-3 (72 HOUR)	IR-1-3 (336 HOUR)	IR-1-4 (5 HOUR)	IR-1-4 (72 HOUR)	IR-1-4 (336 HOUR)	IR-1-5 (5 HOUR)	IR-1-5 (72 HOUR)	IR-1-5 (336 HOUR)
Description:		Baseline Groundwater	Control	Ferrous Sulfate Heptahydrate (Hepure)			Zero Valent Iron (Hoganas ER-5)			Zero Valent Iron (Hepure Ferox Micron)			Ferrihydrite (synthesized in house)		
Test Duration (hours)		0	336	5	72	336	5	72	336	5	72	336	5	72	336
Date Sampled:		8/19/2021	9/8/2021	8/25/2021	8/28/2021	9/8/2021	8/25/2021	8/28/2021	9/8/2021	8/25/2021	8/28/2021	9/8/2021	8/25/2021	8/28/2021	9/8/2021
Total Metals															
Aluminum	mg/L	< 0.37	1.0	3.5	< 0.74	< 0.37	< 0.37	< 0.37	< 0.37	2.0	< 0.37	< 0.37	< 0.37	< 0.37	< 0.37
Antimony	mg/L	< 0.010	< 0.010	--	--	< 0.010	--	--	< 0.010	--	--	< 0.010	--	--	< 0.010
Arsenic	mg/L	0.32	0.33	0.32	0.32	0.20	< 0.0043	< 0.0043	< 0.0043	< 0.0043	< 0.0043	< 0.0043	< 0.0043	< 0.0043	< 0.0043
Barium	mg/L	0.13	0.11	--	--	0.11	--	--	< 0.011	--	--	< 0.011	--	--	< 0.011
Beryllium	mg/L	< 0.0025	< 0.0025	--	--	< 0.0025	--	--	< 0.0025	--	--	< 0.0025	--	--	< 0.0025
Cadmium	mg/L	< 0.0030	< 0.0030	--	--	< 0.0030	--	--	< 0.0030	--	--	< 0.0030	--	--	< 0.0030
Calcium	mg/L	256	197	257	265	192	241	124	95.5	258	234	100	150	167	166
Chromium	mg/L	< 0.025	< 0.025	--	--	< 0.025	--	--	< 0.025	--	--	< 0.025	--	--	< 0.025
Cobalt	mg/L	< 0.0025	< 0.0025	--	--	0.11	--	--	< 0.0025	--	--	< 0.0025	--	--	< 0.0025
Iron	mg/L	< 1.0	< 1.0	4720	5590	4380	45.5	65.4	9.4	53.0	34.0	12.6	38.8	9.8	9.7
Lead	mg/L	< 0.0038	< 0.0038	--	--	< 0.0038	--	--	< 0.0038	--	--	< 0.0038	--	--	< 0.0038
Lithium	mg/L	0.092 J	< 0.025	--	--	< 0.025	--	--	< 0.025	--	--	< 0.025	--	--	< 0.025
Magnesium	mg/L	501	409	500	552	383	496	479	341	530	523	422	438	471	414
Mercury	mg/L	< 0.00012	< 0.00012	--	--	0.00022	--	--	0.00068	--	--	< 0.00012	--	--	< 0.00012
Molybdenum	mg/L	< 0.0063	< 0.0063	--	--	< 0.0063	--	--	< 0.0063	--	--	< 0.0063	--	--	< 0.0063
Selenium	mg/L	< 0.10	< 0.0036	--	--	< 0.0036	--	--	< 0.0036	--	--	< 0.0036	--	--	< 0.0036
Thallium	mg/L	< 0.0025	< 0.0025	--	--	< 0.0025	--	--	< 0.0025	--	--	< 0.0025	--	--	< 0.0025
Dissolved Metals*															
Aluminum	mg/L	< 0.15	< 0.37	< 0.15	< 0.37	< 0.37	< 0.15	< 0.37	< 0.37	< 0.15	< 0.37	< 0.37	< 0.15	< 0.37	< 0.37
Antimony	mg/L	< 0.0040	< 0.010	--	--	< 0.010	--	--	< 0.010	--	--	< 0.010	--	--	< 0.010
Arsenic	mg/L	0.12	0.081	0.31	0.33	0.20	< 0.0017	< 0.0043	< 0.0043	< 0.0017	< 0.0043	< 0.0043	< 0.0017	< 0.0043	< 0.0043
Barium	mg/L	0.13	0.13	--	--	0.13	--	--	0.011	--	--	0.011	--	--	0.011
Beryllium	mg/L	< 0.0010	< 0.0025	--	--	< 0.0025	--	--	< 0.0025	--	--	< 0.0025	--	--	< 0.0025
Cadmium	mg/L	< 0.0012	< 0.0030	--	--	< 0.0030	--	--	< 0.0030	--	--	< 0.0030	--	--	< 0.0030
Calcium	mg/L	247 J	254	518	266	250	256	129	123	258	227	114	147	175	180
Chromium	mg/L	< 0.0099	< 0.025	--	--	< 0.025	--	--	< 0.025	--	--	< 0.025	--	--	< 0.025
Cobalt	mg/L	< 0.0010	< 0.0025	--	--	0.13	--	--	< 0.0025	--	--	< 0.0025	--	--	< 0.0025
Iron	mg/L	< 0.0012	< 1.0	8750	4810	5810	26.9	8.5	4.2	14.8	22.6	7.1	8.0	8.6	7.2
Lead	mg/L	<0.0015	< 0.0038	--	--	< 0.0038	--	--	< 0.0038	--	--	< 0.0038	--	--	< 0.0038
Lithium	mg/L	0.081	< 0.025	--	--	< 0.025	--	--	< 0.025	--	--	< 0.025	--	--	< 0.025
Magnesium	mg/L	506 J	503	970	486	489	488	478	445	490	522	474	423	461	447
Mercury	mg/L	< 0.00012	< 0.00012	--	--	< 0.0012	--	--	< 0.00012	--	--	< 0.00012	--	--	< 0.00012
Molybdenum	mg/L	< 0.0025	< 0.0063	--	--	< 0.0063	--	--	< 0.0063	--	--	< 0.0063	--	--	< 0.0063
Selenium	mg/L	< 0.0014	< 0.0036	--	--	< 0.0036	--	--	< 0.0036	--	--	< 0.0036	--	--	< 0.0036
Thallium	mg/L	< 0.0010	< 0.0025	--	--	< 0.0025	--	--	< 0.0025	--	--	< 0.0025	--	--	< 0.0025

Abbreviations are provided on last page

Table 4
In Situ Injection Treatability Study Analytical Results
Georgia Power Company
Plant McManus Former Ash Pond 1
Brunswick, Georgia

Analyte	Units	Sample ID: HOMOGENATE_W_081921	IR-1-1 (336 HOUR)	IR-1-2 (5 HOUR)	IR-1-2 (72 HOUR)	IR-1-2 (336 HOUR)	IR-1-3 (5 HOUR)	IR-1-3 (72 HOUR)	IR-1-3 (336 HOUR)	IR-1-4 (5 HOUR)	IR-1-4 (72 HOUR)	IR-1-4 (336 HOUR)	IR-1-5 (5 HOUR)	IR-1-5 (72 HOUR)	IR-1-5 (336 HOUR)
Description:		Baseline Groundwater	Control	Ferrous Sulfate Heptahydrate (Hepure)			Zero Valent Iron (Hoganas ER-5)			Zero Valent Iron (Hepure Ferox Micron)			Ferrihydrite (synthesized in house)		
Test Duration (hours)		0	336	5	72	336	5	72	336	5	72	336	5	72	336
Date Sampled:		8/19/2021	9/8/2021	8/25/2021	8/28/2021	9/8/2021	8/25/2021	8/28/2021	9/8/2021	8/25/2021	8/28/2021	9/8/2021	8/25/2021	8/28/2021	9/8/2021
Arsenic Speciation															
As (III)	µg/L	32.6	29.3	--	--	121	--	--	< 0.2	--	--	0.272 J	--	--	< 0.2
As (V)	µg/L	0.706 J	1.35 J	--	--	44.4	--	--	< 0.2	--	--	1.41	--	--	0.543 J
DMAs	µg/L	< 0.25	< 1.0	--	--	< 0.2	--	--	< 0.25	--	--	< 0.25	--	--	< 0.25
MMAs	µg/L	< 0.20	< 0.8	--	--	< 0.8	--	--	< 0.2	--	--	< 0.2	--	--	< 0.2
Unk As Sp/ Arsenic thiospecies**	µg/L	317	308	--	--	4.05 J	--	--	< 0.25	--	--	< 0.25	--	--	< 0.25
Other Parameters*															
Total Organic Carbon	mg/L	10.1	10.7	--	--	10.0	--	--	4.5	--	--	5.2	--	--	2.0
Alkalinity, Bicarbonate (CaCO3)	mg/L	494	< 5.0	--	--	566	--	--	41.2	--	--	117	--	--	202
Alkalinity, Carbonate (CaCO3)	mg/L	< 5.0	< 5.0	--	--	< 5.0	--	--	< 5.0	--	--	< 5.0	--	--	< 5.0
Alkalinity, Total as CaCO3	mg/L	494	< 5.0	--	--	566	--	--	45.5	--	--	117	--	--	202
Sulfide	mg/L	0.86	< 0.05	< 0.10	< 0.10	45.3	< 0.10	< 0.10	< 0.05	< 0.10	< 0.10	< 0.05	< 0.10	< 0.10	< 0.05
Sulfate	mg/L	529	8710	8870	9120	511	602	609	541	589	572	507	452	460	425
pH	s.u.	7.18	8.51	6.38	6.49	6.87	8.46	8.76	8.29	8.32	8.4	8.42	7.46	7.62	8.06
ORP	mV	-439.6	-391	-223.8	-220	-305	-603	-590	-625	-467.5	-569	-675	-226.3	-261	-471
DO	mg/L	0.00	0.27	0.47	0.66	0.49	0.06	0.04	0.00	0.01	0.05	0.03	0.04	0.08	0.18

Note:
*Dissolved samples were analyzed separately and are denoted by (F) in the analytical report. Results are combined for ease of interpretation herein. Arsenic speciation, alkalinity, sulfide and sulfate analyses were filtered prior to analysis.

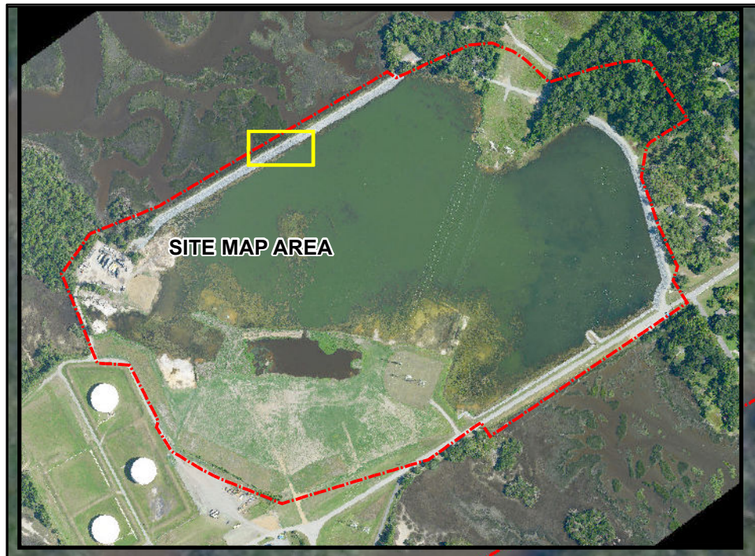
** Previous analytical data evaluating the Unk As Sp results have demonstrated that these species are thioarsenic species (Arcadis, 2021)

Acronyms and Abbreviations:
mg/L - milligrams per liter
µg/L - micrograms per liter
As (III) - arsenite
As (V) - arsenate
MMAs - monomethylarsonic acid
DMAs - dimethylarsinic acid
Unk As Sp - total estimated concentration of any unidentified arsenic-containing species
mV - millivolt
s.u. - standard unit
-- - sample was not analyzed for given constituent

Data Qualifier:
J - Estimated concentration.
< - Not detected at or above adjusted reporting limit

Abbreviations are provided on last page

FIGURES



DPT-LAB2
DPT-LAB1
DPT-LAB3
MCM-06
SAMPLING AREA
DPZ-02

Legend

- DETECTION WELL
- ASSESSMENT WELL
- PERMITTED CCR BOUNDARY
- TREATABILITY STUDY COLLECTION LOCATION

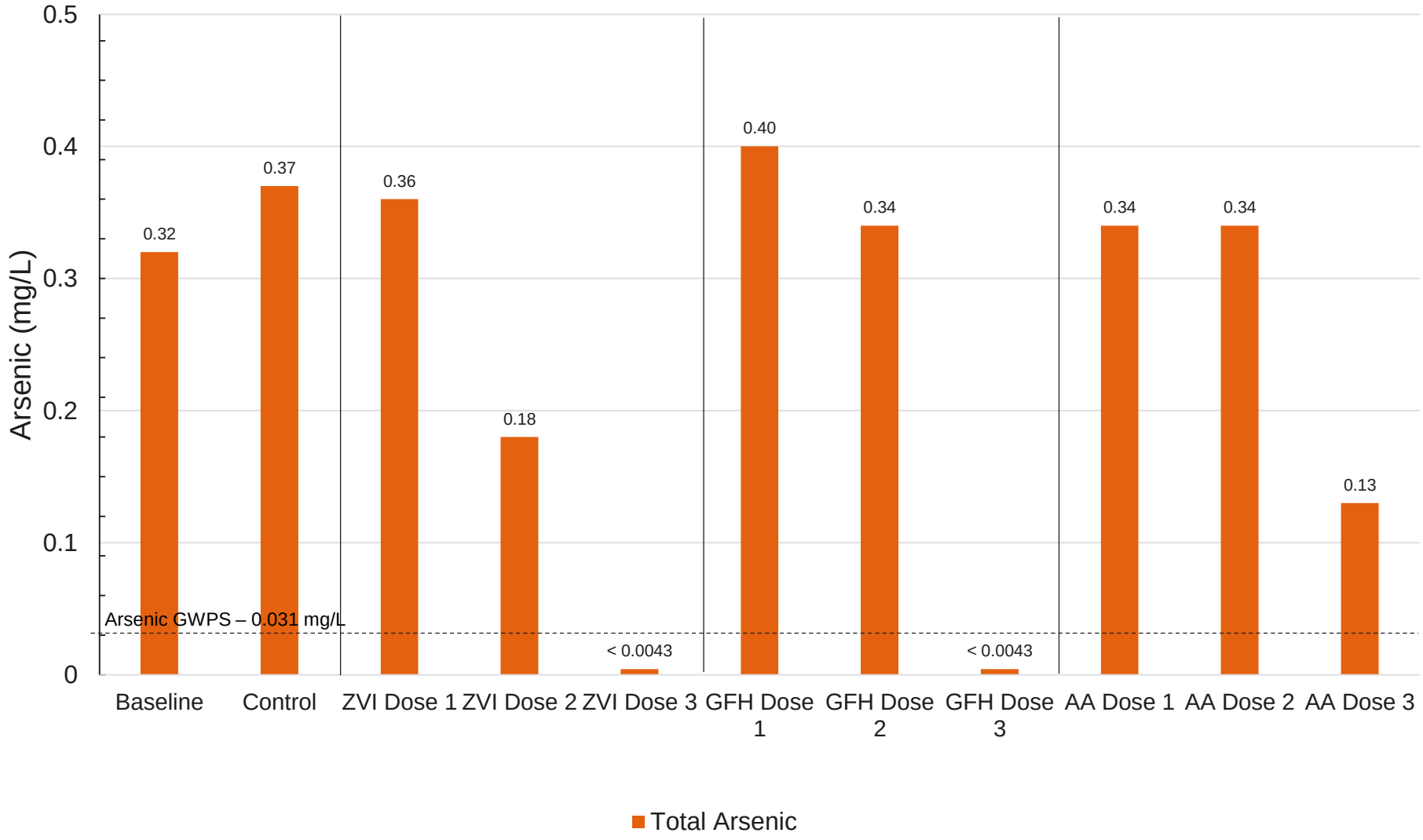
0 20 40
Feet
1 inch = 20 feet

GEORGIA POWER
PLANT MCMANUS FORMER ASH POND 1
BRUNSWICK, GEORGIA

BENCH SCALE SEDIMENT COLLECTION LOCATION

ARCADIS

FIGURE
1



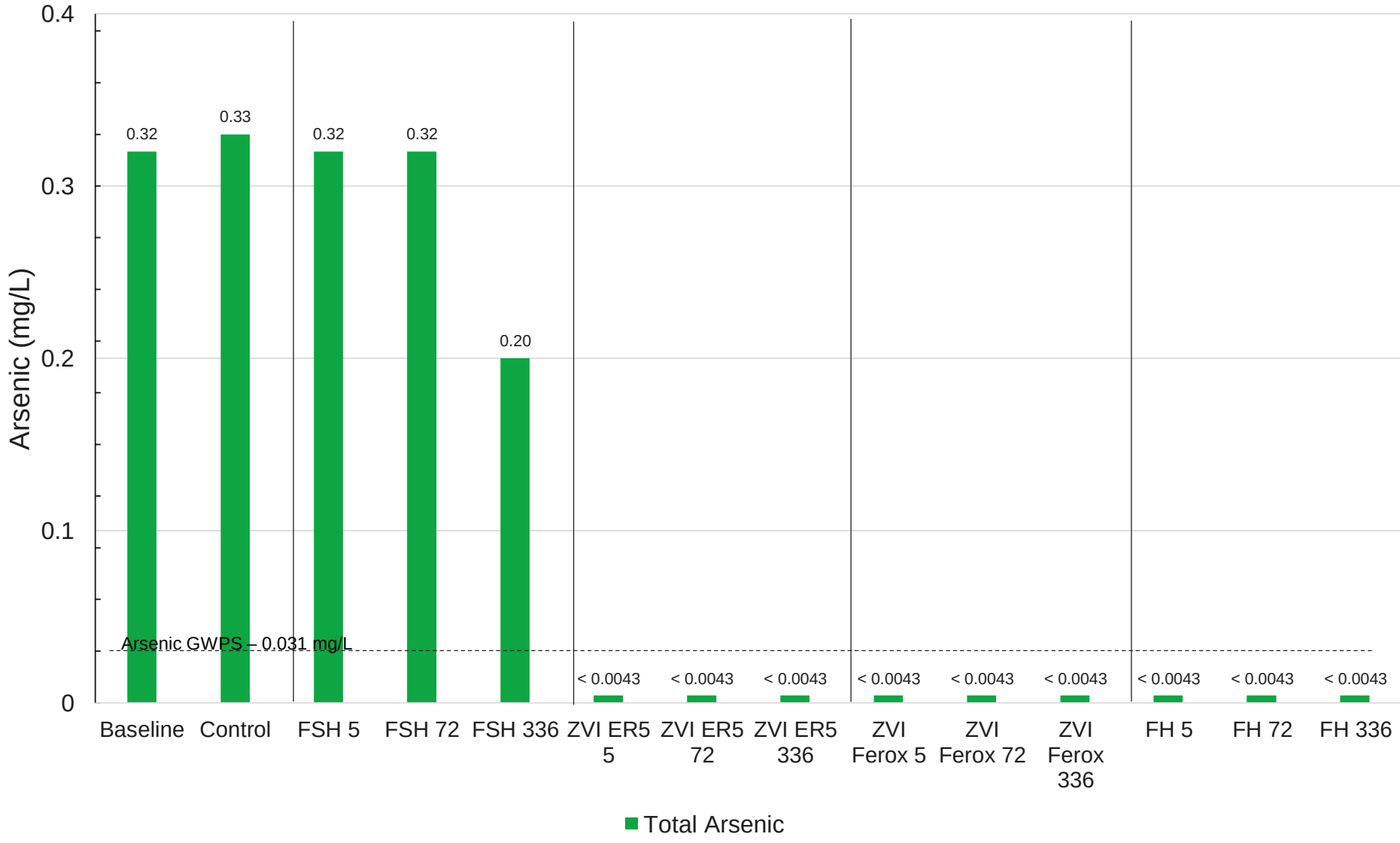
Notes:
PRB – Permeable reactive barrier
ZVI – zero valent iron
GFH – Granular ferric hydroxide
AA – Activated alumina
< - Result was not detected, method detection limit shown
GWPS – groundwater protection standard
Dose 1 – 0.05 grams of reagent per vessel
Dose 2 – 0.5 grams of reagent per vessel
Dose 3 – 5 grams of reagent per vessel

GEORGIA POWER
PLANT MCMANUS FORMER ASH POND 1
BRUNSWICK, GEORGIA

2021 TREATABILITY STUDY
PRB BENCH-SCALE RESULTS

ARCADIS

FIGURE
2



Notes:
FSH – Ferrous Sulfate Heptahydrate
ZVI ER5 – Hoganas Zero Valent Iron Clean ER-5
ZVI Ferox – Hepure Zero Valent Iron Ferox Micron
FH – Lab-synthesized colloidal ferric hydroxide/ferrihydrite
Samples were collected at 5 hours, 72 hours, and 336 hours (2 weeks)
< - Result was not detected, method detection limit shown
GWPS – groundwater protection standard

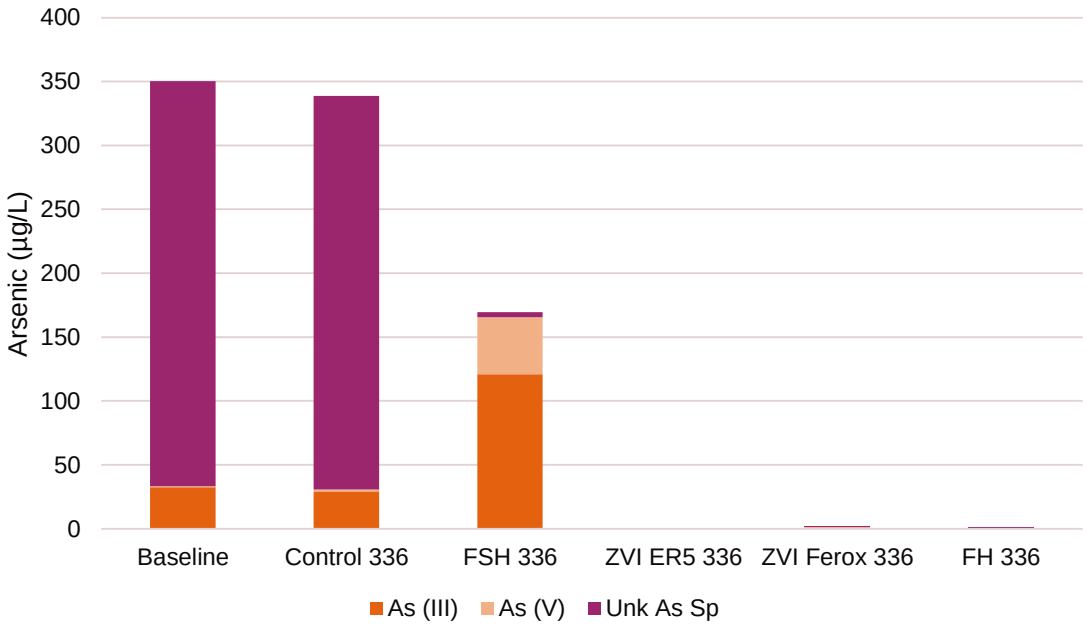
GEORGIA POWER
PLANT MCMANUS FORMER ASH POND 1
BRUNSWICK, GEORGIA

2021 TREATABILITY STUDY
IN SITU INJECTION BENCH-SCALE RESULTS

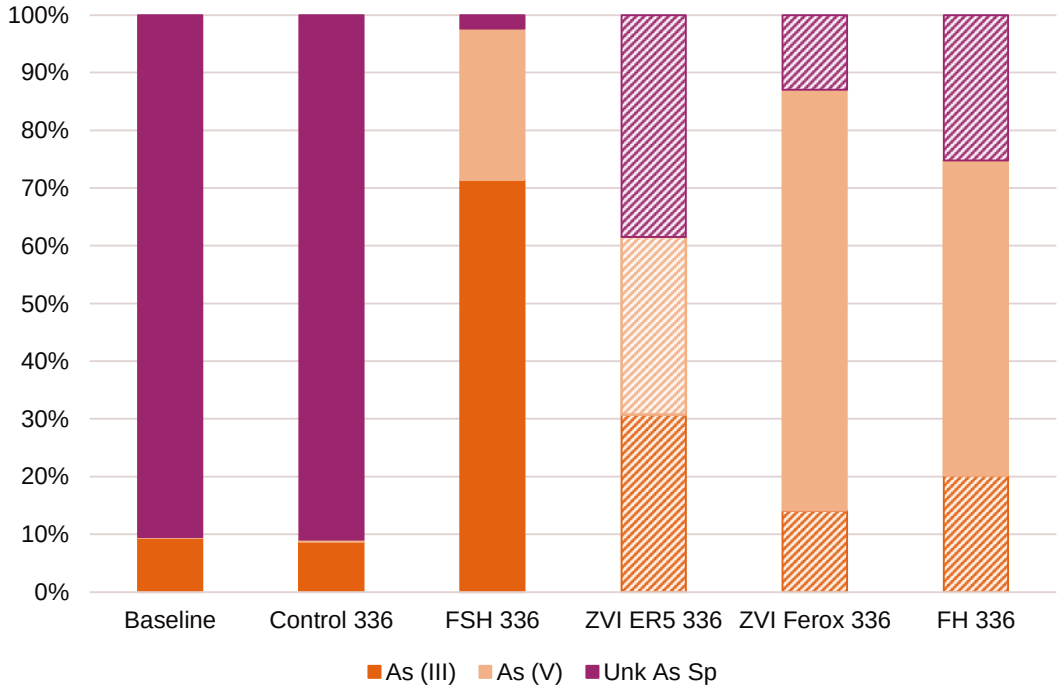
ARCADIS

FIGURE
3

Speciation Results – Total Arsenic



Speciation Results - Percent Contribution



Notes:
Dashed lines indicate non-detect results, method detection limit shown.
µg/L – micrograms per liter
FSH – ferrous sulfate heptahydrate
ZVI – zero valent iron
FH – colloidal iron/ferrihydrite
As (III) - arsenite
As (V) - arsenate
Unk As Sp - total estimated concentration of any unidentified arsenic-containing species, assumed thioarsenic species per previous studies (Arcadis, 2021)
No monomethylarsonic acid and dimethylarsinic acid were detected in any samples and are not included in figure.

GEORGIA POWER
PLANT MCMANUS FORMER ASH POND 1
BRUNSWICK, GEORGIA

2021 TREATABILITY STUDY
IN SITU INJECTION BENCH SCALE
SPECIATION RESULTS

ARCADIS

FIGURE
4

ATTACHMENT 1

Laboratory Analytical Reports

Pace Analytical Services, LLC
9800 Kincey Ave. Suite 100
Huntersville, NC 28078
(704)875-9092

February 17, 2022

Dave Liles
Arcadis
4915 Prospectus Dr
Suite F
Durham, NC 27713

RE: Project: MCMANUS GAPOWER 30050105.00009-Revised Report
Pace Project No.: 92557041

Dear Dave Liles:

Enclosed are the analytical results for sample(s) received by the laboratory on August 20, 2021. 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 National - Mt. Juliet
- Pace Analytical Services - Asheville
- Pace Analytical Services - Charlotte

Revision 1: This revision was issued on 2/17/22 to include dissolved Calcium and Magnesium, and to report data to the MDL, with J-flagged results.

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

Sincerely,

Nicole D'Oleo

Nicole D'Oleo
nicole.d'oleo@pacelabs.com
(704)875-9092
Project Manager

Enclosures

Pace Analytical Services, LLC
9800 Kincey Ave. Suite 100
Huntersville, NC 28078
(704)875-9092

CERTIFICATIONS

Project: MCMANUS GAPOWER 30050105.00009-Revised Report
Pace Project No.: 92557041

Pace Analytical Services National

12065 Lebanon Road, Mt. Juliet, TN 37122
Alabama Certification #: 40660
Alaska Certification 17-026
Arizona Certification #: AZ0612
Arkansas Certification #: 88-0469
California Certification #: 2932
Canada Certification #: 1461.01
Colorado Certification #: TN00003
Connecticut Certification #: PH-0197
DOD Certification: #1461.01
EPA# TN00003
Florida Certification #: E87487
Georgia DW Certification #: 923
Georgia Certification: NELAP
Idaho Certification #: TN00003
Illinois Certification #: 200008
Indiana Certification #: C-TN-01
Iowa Certification #: 364
Kansas Certification #: E-10277
Kentucky UST Certification #: 16
Kentucky Certification #: 90010
Louisiana Certification #: AI30792
Louisiana DW Certification #: LA180010
Maine Certification #: TN0002
Maryland Certification #: 324
Massachusetts Certification #: M-TN003
Michigan Certification #: 9958
Minnesota Certification #: 047-999-395
Mississippi Certification #: TN00003
Missouri Certification #: 340
Montana Certification #: CERT0086
Nebraska Certification #: NE-OS-15-05
Nevada Certification #: TN-03-2002-34
New Hampshire Certification #: 2975
New Jersey Certification #: TN002
New Mexico DW Certification
New York Certification #: 11742
North Carolina Aquatic Toxicity Certification #: 41
North Carolina Drinking Water Certification #: 21704
North Carolina Environmental Certificate #: 375
North Dakota Certification #: R-140
Ohio VAP Certification #: CL0069
Oklahoma Certification #: 9915
Oregon Certification #: TN200002
Pennsylvania Certification #: 68-02979
Rhode Island Certification #: LAO00356
South Carolina Certification #: 84004
South Dakota Certification
Tennessee DW/Chem/Micro Certification #: 2006
Texas Mold Certification #: LAB0152
Texas Certification #: T 104704245-17-14
USDA Soil Permit #: P330-15-00234
Utah Certification #: TN00003
Virginia Certification #: VT2006
Vermont Dept. of Health: ID# VT-2006
Virginia Certification #: 460132
Washington Certification #: C847
West Virginia Certification #: 233
Wisconsin Certification #: 998093910
Wyoming UST Certification #: via A2LA 2926.01
A2LA-ISO 17025 Certification #: 1461.01
A2LA-ISO 17025 Certification #: 1461.02
AIHA-LAP/LLC EMLAP Certification #:100789

Pace Analytical Services Charlotte

South Carolina Laboratory ID: 99006
9800 Kincey Ave. Ste 100, Huntersville, NC 28078
North Carolina Drinking Water Certification #: 37706
North Carolina Field Services Certification #: 5342
North Carolina Wastewater Certification #: 12
South Carolina Laboratory ID: 99006
South Carolina Certification #: 99006001
South Carolina Drinking Water Cert. #: 99006003
Florida/NELAP Certification #: E87627
Kentucky UST Certification #: 84
Louisiana DoH Drinking Water #: LA029
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 Laboratory ID: 99030
South Carolina Certification #: 99030001
Virginia/VELAP Certification #: 460222

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
9800 Kincey Ave. Suite 100
Huntersville, NC 28078
(704)875-9092

SAMPLE SUMMARY

Project: MCMANUS GAPOWER 30050105.00009-Revised Report
Pace Project No.: 92557041

Lab ID	Sample ID	Matrix	Date Collected	Date Received
92557041001	**HOMOGENATE_W_081921**	Water	08/19/21 15:00	08/20/21 12:10
92557041002	**HOMOGENATE_S_081821**	Solid	08/18/21 15:00	08/20/21 12:10

Pace Analytical Services, LLC
9800 Kincey Ave. Suite 100
Huntersville, NC 28078
(704)875-9092

SAMPLE ANALYTE COUNT

Project: MCMANUS GAPOWER 30050105.00009-Revised Report
Pace Project No.: 92557041

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
92557041001	**HOMOGENATE_W_081921**	EPA 6010D	DS	2	PASI-A
		EPA 6020B	CRW, JOR	14	PASI-A
		EPA 6020B	CRW, JOR	16	PASI-A
		EPA 7470A	RDT	1	PASI-A
		EPA 7470A	RDT	1	PASI-A
		SM 2320B-2011	ECH	3	PASI-A
		SM 4500-S2D-2011	JP1	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	1	PASI-A
		SM 5310B-2011	MDW	1	PASI-A
92557041002	**HOMOGENATE_S_081821**	EPA 6020B	LD	1	PAN
		SW-846	KDF	1	PASI-C
		SM 2540G	CMK	1	PAN
		EPA 9060A	MJP	5	PASI-A

PAN = Pace National - Mt. Juliet
PASI-A = Pace Analytical Services - Asheville
PASI-C = Pace Analytical Services - Charlotte

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
9800 Kincey Ave. Suite 100
Huntersville, NC 28078
(704)875-9092

ANALYTICAL RESULTS

Project: MCMANUS GAPOWER 30050105.00009-Revised Report
Pace Project No.: 92557041

Sample: HOMOGENATE_W_081921 **Lab ID: 92557041001** Collected: 08/19/21 15:00 Received: 08/20/21 12:10 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Calcium	**256**	mg/L	1.0	0.94	10	08/26/21 13:52	08/28/21 14:23	7440-70-2	M1
Magnesium	**501**	mg/L	1.0	0.68	10	08/26/21 13:52	08/28/21 14:23	7439-95-4	M1
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Aluminum	ND	mg/L	1.0	0.37	50	09/02/21 13:58	09/14/21 23:51	7429-90-5	
Arsenic	**0.32**	mg/L	0.050	0.0043	50	09/02/21 13:58	09/14/21 23:51	7440-38-2	M1
Beryllium	ND	mg/L	0.0050	0.0025	50	09/02/21 13:58	09/15/21 17:16	7440-41-7	
Barium	**0.13**	mg/L	0.050	0.011	50	09/02/21 13:58	09/14/21 23:51	7440-39-3	M1
Cadmium	ND	mg/L	0.010	0.0030	50	09/02/21 13:58	09/14/21 23:51	7440-43-9	
Cobalt	ND	mg/L	0.050	0.0025	50	09/02/21 13:58	09/14/21 23:51	7440-48-4	
Chromium	ND	mg/L	0.050	0.025	50	09/02/21 13:58	09/14/21 23:51	7440-47-3	
Iron	ND	mg/L	2.5	1.0	50	09/02/21 13:58	09/14/21 23:51	7439-89-6	
Molybdenum	ND	mg/L	0.050	0.0063	50	09/02/21 13:58	09/14/21 23:51	7439-98-7	
Lead	ND	mg/L	0.050	0.0038	50	09/02/21 13:58	09/14/21 23:51	7439-92-1	
Antimony	ND	mg/L	0.050	0.010	50	09/02/21 13:58	09/14/21 23:51	7440-36-0	
Selenium	ND	mg/L	0.10	0.0036	50	09/02/21 13:58	09/14/21 23:51	7782-49-2	M1
Thallium	ND	mg/L	0.024	0.0025	50	09/02/21 13:58	09/14/21 23:51	7440-28-0	
Lithium	**0.092J**	mg/L	0.12	0.025	50	09/02/21 13:58	09/14/21 23:51	7439-93-2	
6020 MET ICPMS, Dissolved	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Aluminum, Dissolved	ND	mg/L	0.40	0.15	20	09/01/21 13:17	09/04/21 02:14	7429-90-5	D3
Antimony, Dissolved	ND	mg/L	0.020	0.0040	20	09/01/21 13:17	09/04/21 02:14	7440-36-0	D3,M1
Arsenic, Dissolved	**0.12**	mg/L	0.020	0.0017	20	09/01/21 13:17	09/04/21 02:14	7440-38-2	M1
Barium, Dissolved	**0.13**	mg/L	0.020	0.0043	20	09/01/21 13:17	09/04/21 02:14	7440-39-3	
Beryllium, Dissolved	ND	mg/L	0.0020	0.0010	20	09/01/21 13:17	09/04/21 02:14	7440-41-7	D3
Cadmium, Dissolved	ND	mg/L	0.0040	0.0012	20	09/01/21 13:17	09/04/21 02:14	7440-43-9	D3
Calcium, Dissolved	**247**	mg/L	4.0	0.70	20	09/01/21 13:17	09/07/21 15:53	7440-70-2	E
Chromium, Dissolved	ND	mg/L	0.020	0.0099	20	09/01/21 13:17	09/04/21 02:14	7440-47-3	D3
Cobalt, Dissolved	ND	mg/L	0.020	0.0010	20	09/01/21 13:17	09/04/21 02:14	7440-48-4	D3
Iron, Dissolved	ND	mg/L	1.0	0.42	20	09/01/21 13:17	09/04/21 02:14	7439-89-6	D3
Lead, Dissolved	ND	mg/L	0.020	0.0015	20	09/01/21 13:17	09/04/21 02:14	7439-92-1	D3
Lithium, Dissolved	**0.081**	mg/L	0.050	0.010	20	09/01/21 13:17	09/04/21 02:14	7439-93-2	
Magnesium, Dissolved	**506**	mg/L	2.0	0.20	20	09/01/21 13:17	09/07/21 15:53	7439-95-4	E
Molybdenum, Dissolved	ND	mg/L	0.020	0.0025	20	09/01/21 13:17	09/04/21 02:14	7439-98-7	D3,M1
Selenium, Dissolved	**0.0045J**	mg/L	0.040	0.0014	20	09/01/21 13:17	09/07/21 15:53	7782-49-2	D3,M1
Thallium, Dissolved	ND	mg/L	0.0094	0.0010	20	09/01/21 13:17	09/04/21 02:14	7440-28-0	D3
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	ug/L	0.20	0.12	1	08/30/21 11:00	09/02/21 16:12	7439-97-6	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
9800 Kincey Ave. Suite 100
Huntersville, NC 28078
(704)875-9092

ANALYTICAL RESULTS

Project: MCMANUS GAPOWER 30050105.00009-Revised Report
Pace Project No.: 92557041

Sample: HOMOGENATE_W_081921 **Lab ID: 92557041001** Collected: 08/19/21 15:00 Received: 08/20/21 12:10 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
7470 Mercury, Dissolved	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury, Dissolved	ND	ug/L	0.20	0.12	1	09/01/21 14:39	09/03/21 12:19	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**494**	mg/L	5.0	5.0	1		08/27/21 16:06		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		08/27/21 16:06		
Alkalinity, Total as CaCO3	**494**	mg/L	5.0	5.0	1		08/27/21 16:06		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	**0.86**	mg/L	0.10	0.050	1		08/26/21 05:09	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Sulfate	**529**	mg/L	12.0	6.0	12		08/25/21 19:29	14808-79-8	
5310B TOC	Analytical Method: SM 5310B-2011 Pace Analytical Services - Asheville								
Total Organic Carbon	**10.1**	mg/L	1.0	0.50	1		08/26/21 14:46	7440-44-0	P4

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
9800 Kincey Ave. Suite 100
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(704)875-9092

ANALYTICAL RESULTS

Project: MCMANUS GAPOWER 30050105.00009-Revised Report
Pace Project No.: 92557041

Sample: HOMOGENATE_S_081821 **Lab ID: 92557041002** Collected: 08/18/21 15:00 Received: 08/20/21 12:10 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
Metals (ICPMS) 6020B	Analytical Method: EPA 6020B Preparation Method: 3050B Pace National - Mt. Juliet								
Arsenic	**1.73**	mg/kg	1.24	0.124	5	08/26/21 10:01	08/26/21 19:57	7440-38-2	
Percent Moisture	Analytical Method: SW-846 Pace Analytical Services - Charlotte								
Percent Moisture	**17.1**	%	0.10	0.10	1		08/24/21 14:16		N2
Total Solids 2540 G-2011	Analytical Method: SM 2540G Preparation Method: SM 2540 G Pace National - Mt. Juliet								
Total Solids	**80.5**	%			1	09/01/21 10:55	09/01/21 11:03		
Total Organic Carbon	Analytical Method: EPA 9060A Pace Analytical Services - Asheville								
Total Organic Carbon	ND	mg/kg	724	517	1		08/29/21 11:43	7440-44-0	
Total Organic Carbon	ND	mg/kg	724	517	1		08/29/21 11:43	7440-44-0	
Total Organic Carbon	**925**	mg/kg	724	517	1		08/29/21 11:43	7440-44-0	
Total Organic Carbon	ND	mg/kg	724	517	1		08/29/21 11:43	7440-44-0	
Mean Total Organic Carbon	ND	mg/kg	724	517	1		08/29/21 11:43	7440-44-0	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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QUALITY CONTROL DATA

Project: MCMANUS GAPOWER 30050105.00009-Revised Report
Pace Project No.: 92557041

QC Batch: 1729533
QC Batch Method: 3050B
Analysis Method: EPA 6020B
Analysis Description: Metals (ICPMS) 6020B
Laboratory: Pace National - Mt. Juliet
Associated Lab Samples: 92557041002

METHOD BLANK: R3697036-1 Matrix: Solid
Associated Lab Samples: 92557041002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Arsenic	mg/kg	ND	1.00	0.100	08/26/21 18:48	

LABORATORY CONTROL SAMPLE: R3697036-2

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/kg	100	87.4	87.4	80.0-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: R3697036-5 R3697036-6

Parameter	Units	L1394939-02 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	mg/kg	4.28	100	100	112	109	87.8	85.3	75.0-125	2.70	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: MCMANUS GAPOWER 30050105.00009-Revised Report
Pace Project No.: 92557041

QC Batch: 643669
QC Batch Method: EPA 7470A
Analysis Method: EPA 7470A
Analysis Description: 7470 Mercury
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92557041001

METHOD BLANK: 3377183 Matrix: Water
Associated Lab Samples: 92557041001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	ug/L	ND	0.20	0.12	09/02/21 15:34	

LABORATORY CONTROL SAMPLE: 3377184

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	2.5	2.4	96	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3377185 3377186

Parameter	Units	92555334016 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	2.8	2.6	110	104	75-125	6	25	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: MCMANUS GAPOWER 30050105.00009-Revised Report
Pace Project No.: 92557041

QC Batch: 643702
QC Batch Method: EPA 7470A
Analysis Method: EPA 7470A
Analysis Description: 7470 Mercury Dissolved
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92557041001

METHOD BLANK: 3377462 Matrix: Water
Associated Lab Samples: 92557041001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury, Dissolved	ug/L	ND	0.20	0.12	09/03/21 12:14	

LABORATORY CONTROL SAMPLE: 3377463

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury, Dissolved	ug/L	2.5	2.5	100	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3377464 3377465

Parameter	Units	92557041001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury, Dissolved	ug/L	ND	2.5	2.5	2.0	2.4	82	94	75-125	14	25	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: MCMANUS GAPOWER 30050105.00009-Revised Report
Pace Project No.: 92557041

QC Batch: 643181
QC Batch Method: EPA 3010A
Analysis Method: EPA 6010D
Analysis Description: 6010 MET
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92557041001

METHOD BLANK: 3374929 Matrix: Water
Associated Lab Samples: 92557041001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Calcium	mg/L	ND	0.10	0.094	08/27/21 15:29	
Magnesium	mg/L	ND	0.10	0.068	08/27/21 15:29	

LABORATORY CONTROL SAMPLE: 3374930

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium	mg/L	5	5.1	102	80-120	
Magnesium	mg/L	5	5.2	104	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3374931 3374932

Parameter	Units	92557041001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium	mg/L	256	5	5	257	258	18	36	75-125	0	20	M1
Magnesium	mg/L	501	5	5	494	497	-136	-84	75-125	1	20	M1

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: MCMANUS GAPOWER 30050105.00009-Revised Report
Pace Project No.: 92557041

QC Batch: 644737
QC Batch Method: EPA 3010A
Analysis Method: EPA 6020B
Analysis Description: 6020 MET
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92557041001

METHOD BLANK: 3382417 Matrix: Water
Associated Lab Samples: 92557041001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Aluminum	mg/L	ND	0.020	0.0074	09/14/21 23:43	
Antimony	mg/L	ND	0.0010	0.00020	09/14/21 23:43	
Arsenic	mg/L	ND	0.0010	0.000087	09/14/21 23:43	
Barium	mg/L	ND	0.0010	0.00021	09/14/21 23:43	
Beryllium	mg/L	ND	0.00010	0.000050	09/15/21 14:51	
Cadmium	mg/L	ND	0.00020	0.000060	09/14/21 23:43	
Chromium	mg/L	ND	0.0010	0.00050	09/14/21 23:43	
Cobalt	mg/L	ND	0.0010	0.000050	09/14/21 23:43	
Iron	mg/L	ND	0.050	0.021	09/14/21 23:43	
Lead	mg/L	ND	0.0010	0.000077	09/14/21 23:43	
Lithium	mg/L	ND	0.0025	0.00050	09/14/21 23:43	
Molybdenum	mg/L	ND	0.0010	0.00013	09/14/21 23:43	
Selenium	mg/L	ND	0.0020	0.000072	09/14/21 23:43	
Thallium	mg/L	ND	0.00047	0.000050	09/14/21 23:43	

LABORATORY CONTROL SAMPLE: 3382418

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	2.5	2.5	101	80-120	
Antimony	mg/L	0.05	0.049	98	80-120	
Arsenic	mg/L	0.05	0.047	94	80-120	
Barium	mg/L	0.05	0.049	97	80-120	
Beryllium	mg/L	0.05	0.048	97	80-120	
Cadmium	mg/L	0.05	0.050	101	80-120	
Chromium	mg/L	0.05	0.052	103	80-120	
Cobalt	mg/L	0.05	0.052	104	80-120	
Iron	mg/L	1.2	1.3	104	80-120	
Lead	mg/L	0.05	0.049	99	80-120	
Lithium	mg/L	0.05	0.048	97	80-120	
Molybdenum	mg/L	0.05	0.050	99	80-120	
Selenium	mg/L	0.05	0.050	100	80-120	
Thallium	mg/L	0.025	0.025	100	80-120	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: MCMANUS GAPOWER 30050105.00009-Revised Report
Pace Project No.: 92557041

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3382419 3382420

Parameter	Units	92557041001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	mg/L	ND	2.5	2.5	2.6	2.9	103	116	75-125	12	20	
Antimony	mg/L	ND	0.05	0.05	0.048J	0.055	96	110	75-125		20	
Arsenic	mg/L	0.32	0.05	0.05	0.41	0.43	168	214	75-125	6	20	M1
Barium	mg/L	0.13	0.05	0.05	0.19	0.20	115	139	75-125	6	20	M1
Beryllium	mg/L	ND	0.05	0.05	0.047	0.048	94	97	75-125	3	20	
Cadmium	mg/L	ND	0.05	0.05	0.051	0.054	101	108	75-125	6	20	
Chromium	mg/L	ND	0.05	0.05	0.046J	0.051	93	102	75-125		20	
Cobalt	mg/L	ND	0.05	0.05	0.052	0.057	104	112	75-125	8	20	
Iron	mg/L	ND	1.2	1.2	1.4J	1.6J	99	117	75-125		20	
Lead	mg/L	ND	0.05	0.05	0.050	0.054	101	108	75-125	7	20	
Lithium	mg/L	0.092J	0.05	0.05	0.14	0.14	105	105	75-125	0	20	
Molybdenum	mg/L	ND	0.05	0.05	0.052	0.059	97	111	75-125	13	20	
Selenium	mg/L	ND	0.05	0.05	0.023J	0.022J	45	43	75-125		20	M1
Thallium	mg/L	ND	0.025	0.025	0.026	0.027	103	108	75-125	5	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: MCMANUS GAPOWER 30050105.00009-Revised Report
Pace Project No.: 92557041

QC Batch: 644504
QC Batch Method: EPA 3010A
Analysis Method: EPA 6020B
Analysis Description: 6020 MET Dissolved
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92557041001

METHOD BLANK: 3381308 Matrix: Water
Associated Lab Samples: 92557041001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Aluminum, Dissolved	mg/L	ND	0.020	0.0074	09/04/21 01:43	
Antimony, Dissolved	mg/L	ND	0.0010	0.00020	09/04/21 01:43	
Arsenic, Dissolved	mg/L	ND	0.0010	0.000087	09/04/21 01:43	
Barium, Dissolved	mg/L	ND	0.0010	0.00021	09/04/21 01:43	
Beryllium, Dissolved	mg/L	ND	0.00010	0.000050	09/04/21 01:43	
Cadmium, Dissolved	mg/L	ND	0.00020	0.000060	09/04/21 01:43	
Chromium, Dissolved	mg/L	ND	0.0010	0.00050	09/04/21 01:43	
Cobalt, Dissolved	mg/L	ND	0.0010	0.000050	09/04/21 01:43	
Iron, Dissolved	mg/L	ND	0.050	0.021	09/04/21 01:43	
Lead, Dissolved	mg/L	ND	0.0010	0.000077	09/04/21 01:43	
Lithium, Dissolved	mg/L	ND	0.0025	0.00050	09/04/21 01:43	
Molybdenum, Dissolved	mg/L	ND	0.0010	0.00013	09/04/21 01:43	
Selenium, Dissolved	mg/L	ND	0.0020	0.000072	09/07/21 15:44	
Thallium, Dissolved	mg/L	ND	0.00047	0.000050	09/04/21 01:43	

LABORATORY CONTROL SAMPLE: 3381309

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum, Dissolved	mg/L	2.5	2.3	92	80-120	
Antimony, Dissolved	mg/L	0.05	0.049	99	80-120	
Arsenic, Dissolved	mg/L	0.05	0.045	90	80-120	
Barium, Dissolved	mg/L	0.05	0.045	91	80-120	
Beryllium, Dissolved	mg/L	0.05	0.049	98	80-120	
Cadmium, Dissolved	mg/L	0.05	0.050	99	80-120	
Chromium, Dissolved	mg/L	0.05	0.047	95	80-120	
Cobalt, Dissolved	mg/L	0.05	0.048	97	80-120	
Iron, Dissolved	mg/L	1.2	1.2	94	80-120	
Lead, Dissolved	mg/L	0.05	0.048	95	80-120	
Lithium, Dissolved	mg/L	0.05	0.046	93	80-120	
Molybdenum, Dissolved	mg/L	0.05	0.048	96	80-120	
Selenium, Dissolved	mg/L	0.05	0.046	91	80-120	
Thallium, Dissolved	mg/L	0.025	0.024	95	80-120	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: MCMANUS GAPOWER 30050105.00009-Revised Report
Pace Project No.: 92557041

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3381310 3381311

Parameter	Units	92557041001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum, Dissolved	mg/L	ND	2.5	2.5	2.4	2.3	95	91	75-125	3	20	
Antimony, Dissolved	mg/L	ND	0.05	0.05	0.025	0.027	49	53	75-125	8	20	M1
Arsenic, Dissolved	mg/L	0.12	0.05	0.05	0.15	0.16	64	87	75-125	7	20	M1
Barium, Dissolved	mg/L	0.13	0.05	0.05	0.17	0.18	95	107	75-125	3	20	
Beryllium, Dissolved	mg/L	ND	0.05	0.05	0.049	0.048	98	97	75-125	1	20	
Cadmium, Dissolved	mg/L	ND	0.05	0.05	0.047	0.048	95	95	75-125	0	20	
Chromium, Dissolved	mg/L	ND	0.05	0.05	0.049	0.050	98	98	75-125	0	20	
Cobalt, Dissolved	mg/L	ND	0.05	0.05	0.049	0.048	98	96	75-125	2	20	
Iron, Dissolved	mg/L	ND	1.2	1.2	1.2	1.2	94	91	75-125	2	20	
Lead, Dissolved	mg/L	ND	0.05	0.05	0.048	0.049	97	97	75-125	1	20	
Lithium, Dissolved	mg/L	0.081	0.05	0.05	0.13	0.13	91	99	75-125	3	20	
Molybdenum, Dissolved	mg/L	ND	0.05	0.05	0.027	0.028	52	54	75-125	4	20	M1
Selenium, Dissolved	mg/L	0.0045J	0.05	0.05	0.0062J	0.0056J	3	2	75-125		20	M1
Thallium, Dissolved	mg/L	ND	0.025	0.025	0.024	0.024	96	95	75-125	1	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: MCMANUS GAPOWER 30050105.00009-Revised Report
Pace Project No.: 92557041

QC Batch: 642570
QC Batch Method: SW-846
Analysis Method: SW-846
Analysis Description: Dry Weight/Percent Moisture
Laboratory: Pace Analytical Services - Charlotte

Associated Lab Samples: 92557041002

SAMPLE DUPLICATE: 3372237

Parameter	Units	92555622002 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	95.3	95.0	0	25	N2

SAMPLE DUPLICATE: 3372259

Parameter	Units	92557035001 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	17.2	16.4	4	25	N2

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: MCMANUS GAPOWER 30050105.00009-Revised Report
Pace Project No.: 92557041

QC Batch: 643496
QC Batch Method: SM 2320B-2011
Analysis Method: SM 2320B-2011
Analysis Description: 2320B Alkalinity
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92557041001

METHOD BLANK: 3376511 Matrix: Water
Associated Lab Samples: 92557041001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	ND	5.0	5.0	08/27/21 15:34	
Alkalinity,Bicarbonate (CaCO3)	mg/L	ND	5.0	5.0	08/27/21 15:34	
Alkalinity,Carbonate (CaCO3)	mg/L	ND	5.0	5.0	08/27/21 15:34	

LABORATORY CONTROL SAMPLE: 3376512

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	50	49.6	99	80-120	

LABORATORY CONTROL SAMPLE: 3376513

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	50	50.7	101	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3376514 3376515

Parameter	Units	92556912005 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	ND	50	50	50.3	49.7	101	99	80-120	1	25	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3376516 3376517

Parameter	Units	92557476002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	15.7	50	50	66.9	67.1	102	103	80-120	0	25	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: MCMANUS GAPOWER 30050105.00009-Revised Report
Pace Project No.: 92557041

QC Batch: 1732469
QC Batch Method: SM 2540 G
Analysis Method: SM 2540G
Analysis Description: Total Solids 2540 G-2011
Laboratory: Pace National - Mt. Juliet
Associated Lab Samples: 92557041002

METHOD BLANK: R3699204-1 Matrix: Solid
Associated Lab Samples: 92557041002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Solids	%	0.00100			09/01/21 11:03	

LABORATORY CONTROL SAMPLE: R3699204-2

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Solids	%	50.0	50.0	100	85.0-115	

SAMPLE DUPLICATE: R3699204-3

Parameter	Units	L1394829-03 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Solids	%	80.7	80.8	0.131	10	

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REPORT OF LABORATORY ANALYSIS

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(704)875-9092

QUALITY CONTROL DATA

Project: MCMANUS GAPOWER 30050105.00009-Revised Report
Pace Project No.: 92557041

QC Batch: 643066
QC Batch Method: SM 4500-S2D-2011
Analysis Method: SM 4500-S2D-2011
Analysis Description: 4500S2D Sulfide Water
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92557041001

METHOD BLANK: 3374601 Matrix: Water
Associated Lab Samples: 92557041001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Sulfide	mg/L	ND	0.10	0.050	08/26/21 05:06	

LABORATORY CONTROL SAMPLE: 3374602

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfide	mg/L	0.5	0.51	102	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3374603 3374604

Parameter	Units	92556913004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfide	mg/L	ND	0.5	0.5	0.48	0.53	95	105	80-120	10	10	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3374605 3374606

Parameter	Units	92557107003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfide	mg/L	ND	0.5	0.5	0.50	0.52	99	103	80-120	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 Services, LLC
9800 Kincey Ave. Suite 100
Huntersville, NC 28078
(704)875-9092

QUALITY CONTROL DATA

Project: MCMANUS GAPOWER 30050105.00009-Revised Report
Pace Project No.: 92557041

QC Batch: 642667
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: 92557041001

METHOD BLANK: 3372760 Matrix: Water
Associated Lab Samples: 92557041001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Sulfate	mg/L	ND	1.0	0.50	08/24/21 21:33	

LABORATORY CONTROL SAMPLE: 3372761

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	50	50.1	100	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3372762 3372763

Parameter	Units	92557183003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	1050	50	50	554	1100	-999	100	90-110	66	10	M1,R1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3372764 3372765

Parameter	Units	92556844010 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	98.0	50	50	141	143	86	90	90-110	1	10	M1

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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(704)875-9092

QUALITY CONTROL DATA

Project: MCMANUS GAPOWER 30050105.00009-Revised Report
Pace Project No.: 92557041

QC Batch: 643056
QC Batch Method: SM 5310B-2011
Analysis Method: SM 5310B-2011
Analysis Description: 5310B TOC
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92557041001

METHOD BLANK: 3374561 Matrix: Water
Associated Lab Samples: 92557041001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Organic Carbon	mg/L	ND	1.0	0.50	08/26/21 02:56	

LABORATORY CONTROL SAMPLE: 3374562

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Organic Carbon	mg/L	25	23.6	94	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3374563 3374564

Parameter	Units	92554680010 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Total Organic Carbon	mg/L	ND	25	25	24.2	24.4	95	96	90-110	1	10	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3374565 3374566

Parameter	Units	92554680011 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Total Organic Carbon	mg/L	0.95J	25	25	24.9	24.8	96	95	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
9800 Kincey Ave. Suite 100
Huntersville, NC 28078
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QUALITY CONTROL DATA

Project: MCMANUS GAPOWER 30050105.00009-Revised Report
Pace Project No.: 92557041

QC Batch: 643596
QC Batch Method: EPA 9060A
Analysis Method: EPA 9060A
Analysis Description: 9060 TOC, AVL
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92557041002

METHOD BLANK: 3376839 Matrix: Water
Associated Lab Samples: 92557041002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mean Total Organic Carbon	mg/kg	ND	600	429	08/29/21 10:55	
Total Organic Carbon	mg/kg	ND	600	429	08/29/21 10:55	
Total Organic Carbon	mg/kg	ND	600	429	08/29/21 10:55	
Total Organic Carbon	mg/kg	ND	600	429	08/29/21 10:55	
Total Organic Carbon	mg/kg	ND	600	429	08/29/21 10:55	

LABORATORY CONTROL SAMPLE & LCSD: 3376840 3376841

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Mean Total Organic Carbon	mg/kg	120000	125000	123000	104	103	80-120	1		
Total Organic Carbon	mg/kg	120000	127000	123000	106	103		3		
Total Organic Carbon	mg/kg	120000	130000	108000	108	90		18		
Total Organic Carbon	mg/kg	120000	121000	128000	101	107		5		
Total Organic Carbon	mg/kg	120000	121000	134000	101	112		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
9800 Kincey Ave. Suite 100
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(704)875-9092

QUALIFIERS

Project: MCMANUS GAPOWER 30050105.00009-Revised Report
Pace Project No.: 92557041

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.

Reported results are not rounded until the final step prior to reporting. Therefore, calculated parameters that are typically reported as "Total" may vary slightly from the sum of the reported component parameters.

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.
E	Analyte concentration exceeded the calibration range. The reported result is estimated.
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 but other accreditations/certifications may apply. A complete list of accreditations/certifications is available upon request.
P4	Sample field preservation does not meet EPA or method recommendations for this analysis.
R1	RPD value was outside control limits.

Pace Analytical Services, LLC
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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: MCMANUS GAPOWER 30050105.00009-Revised Report
Pace Project No.: 92557041

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
92557041001	**HOMOGENATE_W_081921**	EPA 3010A	643181	EPA 6010D	643317
92557041002	**HOMOGENATE_S_081821**	3050B	1729533	EPA 6020B	1729533
92557041001	**HOMOGENATE_W_081921**	EPA 3010A	644737	EPA 6020B	644916
92557041001	**HOMOGENATE_W_081921**	EPA 3010A	644504	EPA 6020B	644536
92557041001	**HOMOGENATE_W_081921**	EPA 7470A	643669	EPA 7470A	644172
92557041001	**HOMOGENATE_W_081921**	EPA 7470A	643702	EPA 7470A	644756
92557041002	**HOMOGENATE_S_081821**	SW-846	642570		
92557041001	**HOMOGENATE_W_081921**	SM 2320B-2011	643496		
92557041002	**HOMOGENATE_S_081821**	SM 2540 G	1732469	SM 2540G	1732469
92557041001	**HOMOGENATE_W_081921**	SM 4500-S2D-2011	643066		
92557041001	**HOMOGENATE_W_081921**	EPA 300.0 Rev 2.1 1993	642667		
92557041001	**HOMOGENATE_W_081921**	SM 5310B-2011	643056		
92557041002	**HOMOGENATE_S_081821**	EPA 9060A	643596		

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# : 92557041

92557041

Sample Condition Upon Receipt

Client Name: Arcadis

Project #:

Courier: ☐ Commercial ☒ Fed Ex ☐ UPS ☐ USPS ☐ Client ☒ Pace ☐ Other:

Custody Seal Present? ☐ Yes ☒ No Seals Intact? ☐ Yes ☐ No

Date/Initials Person Examining Contents: HH 8/20/21

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☐ None ☒ Other

Biological Tissue Frozen? ☐ Yes ☐ No ☒ N/A

Thermometer: ☐ IR Gun ID: 91T005

Type of Ice: ☒ Wet ☐ Blue ☐ None

Cooler Temp: 10.1 Correction Factor: Add/Subtract (°C) 0.0

Temp should be above freezing to 6°C
☒ Samples out of temp criteria. Samples on ice, cooling process has begun

Cooler Temp Corrected (°C): 10.1

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? -Includes Date/Time/ID/Analysis Matrix: WT/SL	☒ Yes	☐ No	☐ N/A	9.
Headspace in VOA Vials (>5-6mm)?	☐ Yes	☐ No	☒ N/A HH	10.
Trip Blank Present?	☐ Yes	☐ No	☒ N/A	11.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☒ N/A	

Field Data Required? ☐ Yes ☐ No

COMMENTS/SAMPLE DISCREPANCY

Dissolved 6020 <100mL

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# : 92557041

PM: NMG Due Date: 08/31/21

CLIENT: 92-ARCADIS

Item#	BP4U-125 mL Plastic Unpreserved (N/A) (Cl-)	BP3U-250 mL Plastic Unpreserved (N/A)	BP2U-500 mL Plastic Unpreserved (N/A)	BP1U-1 liter Plastic Unpreserved (N/A)	BP4S-125 mL Plastic H2SO4 (pH < 2) (Cl-)	BP3N-250 mL plastic HNO3 (pH < 2)	BP4Z-125 mL Plastic ZN Acetate & NaOH (>9)	BP4C-125 mL Plastic NaOH (pH > 12) (Cl-)	WGFU-Wide-mouthed Glass jar Unpreserved	AG1U-1 liter Amber Unpreserved (N/A) (Cl-)	AG1H-1 liter Amber HCl (pH < 2)	AG3U-250 mL Amber Unpreserved (N/A) (Cl-)	AG1S-1 liter Amber H2SO4 (pH < 2)	AG3S-250 mL Amber H2SO4 (pH < 2)	AG3A(DG3A)-250 mL Amber NH4Cl (N/A)(Cl-)	DG9H-40 mL VOA HCl (N/A)	VG9T-40 mL VOA Na2S2O3 (N/A)	VG9U-40 mL VOA Unp (N/A)	DG9P-40 mL VOA H3PO4 (N/A)	VOAK (6 vials per kit)-5035 kit (N/A)	V/GK (3 vials per kit)-VPH/Gas kit (N/A)	SP5T-125 mL Sterile Plastic (N/A – lab)	SP2T-250 mL Sterile Plastic (N/A – lab)		BP3A-250 mL Plastic (NH2)2SO4 (9.3-9.7)	AG0U-100 mL Amber Unpreserved vials (N/A)	VSGU-20 mL Scintillation vials (N/A)	DG8U-40 mL Amber Unpreserved vials (N/A)
1			2			2	1												3									
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.

ARCADIS Design & Consultancy for natural and built assets

CHAIN OF CUSTODY & LABORATORY ANALYSIS REQUEST FORM

Lab Work Order # 848741

Page 37 of 127

PACE Analytical

PROJ. NO.	PROJECT NAME	SDG NUMBER	COC Number
30050105.00009	McManus GA Power		

SAMPLERS: Robert Prigge, Andy Baumeister

SAMPLE ID	DATE	TIME	MATRIX	Composite/ Grab	# Containers	Requested Analyses 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Remarks
Homogenate_W_081921	8/19/2021	1500	W	Composite	8	1	1	1	1	1	3															
Homogenate_S_081821	8/18/2021	1500	W	Composite	2						1	1														

	Requested Analyses
1	Total 6020 *
2	Dissolved 6020 *
3	Sulfide
4	SO4 300.0
5	SM2320 (Alkalinity)
6	TOC
7	Arsenic 6020
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	

Special Instructions/Comments:

* 6010 metals (As, Fe, Al, Ca, Mg, and Appendix IV metals)

☐ **Special QA/QC Instructions**

Laboratory Information and Receipt

Lab Name: PACE Analytical

Shipping Tracking #

Specify Turnaround Requirements: Standard

☐ Cooler packed with ice

☐ Cooler custody seal intact

Sample Receipt:

Condition/Cooler Temp: 10-1

Relinquished by:	DATE	TIME	Received by:	Relinquished by:	DATE	TIME	Received by:
Andy Baumeister	8/20/2021		8-20-21/1130		8-20-21	1210	
Relinquished by:	DATE	TIME	Received by:	Relinquished by:	DATE	TIME	Received by:
Relinquished by:	DATE	TIME	Received by:	Relinquished by:	DATE	TIME	Received by:

Pace Analytical Services, LLC
9800 Kincey Ave. Suite 100
Huntersville, NC 28078
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September 23, 2021

Dave Liles
Arcadis
4915 Prospectus Dr
Suite F
Durham, NC 27713

RE: Project: MCMANUS GAPOWER 30050105.00009
Pace Project No.: 92558347

Dear Dave Liles:

Enclosed are the analytical results for sample(s) received by the laboratory on August 30, 2021. 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 - Peachtree Corners, GA

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

Sincerely,

Nicole D'Oleo

Nicole D'Oleo
nicole.d'oleo@pacelabs.com
(704)875-9092
Project Manager

Enclosures

Pace Analytical Services, LLC
9800 Kincey Ave. Suite 100
Huntersville, NC 28078
(704)875-9092

CERTIFICATIONS

Project: MCMANUS GAPOWER 30050105.00009
Pace Project No.: 92558347

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
9800 Kincey Ave. Suite 100
Huntersville, NC 28078
(704)875-9092

SAMPLE SUMMARY

Project: MCMANUS GAPOWER 30050105.00009
Pace Project No.: 92558347

Lab ID	Sample ID	Matrix	Date Collected	Date Received
92558347001	IR-1-2 (5 HOUR)	Water	08/25/21 16:00	08/30/21 12:00
92558347002	IR-1-3 (5 HOUR)	Water	08/25/21 16:10	08/30/21 12:00
92558347003	IR-1-4 (5 HOUR)	Water	08/25/21 16:20	08/30/21 12:00
92558347004	IR-1-5 (5 HOUR)	Water	08/25/21 16:30	08/30/21 12:00
92558347005	IR-1-2 (72 HOUR)	Water	08/28/21 09:00	08/30/21 12:00
92558347006	IR-1-3 (72 HOUR)	Water	08/28/21 09:10	08/30/21 12:00
92558347007	IR-1-4 (72 HOUR)	Water	08/28/21 09:20	08/30/21 12:00
92558347008	IR-1-5 (72 HOUR)	Water	08/28/21 09:30	08/30/21 12:00
92558347009	PRB-1-2 (72 HOUR)	Water	08/27/21 13:10	08/30/21 12:00
92558347010	PRB-1-3 (72 HOUR)	Water	08/27/21 13:20	08/30/21 12:00
92558347011	PRB-1-5 (72 HOUR)	Water	08/27/21 13:40	08/30/21 12:00
92558347012	PRB-1-6 (72 HOUR)	Water	08/27/21 13:50	08/30/21 12:00
92558347013	PRB-1-8 (72 HOUR)	Water	08/27/21 14:10	08/30/21 12:00
92558347014	PRB-1-9 (72 HOUR)	Water	08/27/21 14:20	08/30/21 12:00
92558347015	IR-1-2 (5 HOUR) (F)	Water	08/25/21 16:00	08/30/21 12:00
92558347016	IR-1-3 (5 HOUR) (F)	Water	08/25/21 16:10	08/30/21 12:00
92558347017	IR-1-4 (5 HOUR) (F)	Water	08/25/21 16:20	08/30/21 12:00
92558347018	IR-1-5 (5 HOUR) (F)	Water	08/25/21 16:30	08/30/21 12:00
92558347019	IR-1-2 (72 HOUR) (F)	Water	08/28/21 09:00	08/30/21 12:00
92558347020	IR-1-3 (72 HOUR) (F)	Water	08/28/21 09:10	08/30/21 12:00
92558347021	IR-1-4 (72 HOUR) (F)	Water	08/28/21 09:20	08/30/21 12:00
92558347022	IR-1-5 (72 HOUR) (F)	Water	08/28/21 09:30	08/30/21 12:00
92558347023	PRB-1-1 (72 HOUR)	Water	08/27/21 13:00	08/30/21 12:00
92558347024	PRB-1-4 (72 HOUR)	Water	08/27/21 13:30	08/30/21 12:00
92558347025	PRB-1-7 (72 HOUR)	Water	08/27/21 14:00	08/30/21 12:00
92558347026	PRB-1-10 (72 HOUR)	Water	08/27/21 14:30	08/30/21 12:00
92558347027	PRB-1-1 (72 HOUR) (F)	Water	08/27/21 13:00	08/30/21 12:00
92558347028	PRB-1-4 (72 HOUR) (F)	Water	08/27/21 13:30	08/30/21 12:00
92558347029	PRB-1-7 (72 HOUR) (F)	Water	08/27/21 14:00	08/30/21 12:00
92558347030	PRB-1-10 (72 HOUR) (F)	Water	08/27/21 14:30	08/30/21 12:00
92558347031	PRB-1-2 (72 HOUR) (F)	Water	08/27/21 13:10	08/30/21 12:00
92558347032	PRB-1-3 (72 HOUR) (F)	Water	08/27/21 13:20	08/30/21 12:00
92558347033	PRB-1-5 (72 HOUR) (F)	Water	08/27/21 13:40	08/30/21 12:00
92558347034	PRB-1-6 (72 HOUR) (F)	Water	08/27/21 13:50	08/30/21 12:00
92558347035	PRB-1-8 (72 HOUR) (F)	Water	08/27/21 14:10	08/30/21 12:00
92558347036	PRB-1-9 (72 HOUR) (F)	Water	08/27/21 14:20	08/30/21 12:00

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
9800 Kincey Ave. Suite 100
Huntersville, NC 28078
(704)875-9092

SAMPLE ANALYTE COUNT

Project: MCMANUS GAPOWER 30050105.00009
Pace Project No.: 92558347

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
92558347001	**IR-1-2 (5 HOUR)**	EPA 6020B	CRW, JOR	5	PASI-A
92558347002	**IR-1-3 (5 HOUR)**	EPA 6020B	JOR	5	PASI-A
92558347003	**IR-1-4 (5 HOUR)**	EPA 6020B	JOR	5	PASI-A
92558347004	**IR-1-5 (5 HOUR)**	EPA 6020B	JOR	5	PASI-A
92558347005	**IR-1-2 (72 HOUR)**	EPA 6020B	CRW, JOR	5	PASI-A
92558347006	**IR-1-3 (72 HOUR)**	EPA 6020B	JOR	5	PASI-A
92558347007	**IR-1-4 (72 HOUR)**	EPA 6020B	JOR	5	PASI-A
92558347008	**IR-1-5 (72 HOUR)**	EPA 6020B	JOR	5	PASI-A
92558347009	**PRB-1-2 (72 HOUR)**	EPA 6020B	JOR	5	PASI-A
92558347010	**PRB-1-3 (72 HOUR)**	EPA 6020B	JOR	5	PASI-A
92558347011	**PRB-1-5 (72 HOUR)**	EPA 6020B	JOR	5	PASI-A
92558347012	**PRB-1-6 (72 HOUR)**	EPA 6020B	JOR	5	PASI-A
92558347013	**PRB-1-8 (72 HOUR)**	EPA 6020B	JOR	5	PASI-A
92558347014	**PRB-1-9 (72 HOUR)**	EPA 6020B	JOR	5	PASI-A
92558347015	**IR-1-2 (5 HOUR) (F)**	EPA 6020B	CRW, JOR	5	PASI-A
		SM 4500-S2D-2011	JP1	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	1	PASI-A
92558347016	**IR-1-3 (5 HOUR) (F)**	EPA 6020B	CRW, JOR	5	PASI-A
		SM 4500-S2D-2011	JP1	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	1	PASI-A
92558347017	**IR-1-4 (5 HOUR) (F)**	EPA 6020B	CRW, JOR	5	PASI-A
		SM 4500-S2D-2011	JP1	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	1	PASI-A
92558347018	**IR-1-5 (5 HOUR) (F)**	EPA 6020B	CRW, JOR	5	PASI-A
		SM 4500-S2D-2011	JP1	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	1	PASI-A
92558347019	**IR-1-2 (72 HOUR) (F)**	EPA 6020B	JOR	5	PASI-A
		SM 4500-S2D-2011	JP1	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	1	PASI-A
92558347020	**IR-1-3 (72 HOUR) (F)**	EPA 6020B	JOR	5	PASI-A
		SM 4500-S2D-2011	JP1	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	1	PASI-A
92558347021	**IR-1-4 (72 HOUR) (F)**	EPA 6020B	JOR	5	PASI-A
		SM 4500-S2D-2011	JP1	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	1	PASI-A
92558347022	**IR-1-5 (72 HOUR) (F)**	EPA 6020B	JOR	5	PASI-A
		SM 4500-S2D-2011	JP1	1	PASI-A

REPORT OF LABORATORY ANALYSIS

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SAMPLE ANALYTE COUNT

Project: MCMANUS GAPOWER 30050105.00009
Pace Project No.: 92558347

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		EPA 300.0 Rev 2.1 1993	CDC	1	PASI-A
92558347023	**PRB-1-1 (72 HOUR)**	EPA 7470A	VB	1	PASI-GA
		EPA 6020B	CRW, JOR	16	PASI-A
		EPA 7470A	DBB1	1	PASI-A
92558347024	**PRB-1-4 (72 HOUR)**	EPA 7470A	VB	1	PASI-GA
		EPA 6020B	CRW, JOR	16	PASI-A
		EPA 7470A	DBB1	1	PASI-A
92558347025	**PRB-1-7 (72 HOUR)**	EPA 7470A	VB	1	PASI-GA
		EPA 6020B	JOR	16	PASI-A
		EPA 7470A	DBB1	1	PASI-A
92558347026	**PRB-1-10 (72 HOUR)**	EPA 7470A	VB	1	PASI-GA
		EPA 6020B	JOR	16	PASI-A
		EPA 7470A	DBB1	1	PASI-A
92558347027	**PRB-1-1 (72 HOUR) (F)**	EPA 7470A	VB	1	PASI-GA
		EPA 6020B	JOR	16	PASI-A
		EPA 7470A	DBB1	1	PASI-A
		SM 2320B-2011	ECH	3	PASI-A
		SM 4500-S2D-2011	JP1	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	1	PASI-A
92558347028	**PRB-1-4 (72 HOUR) (F)**	EPA 7470A	VB	1	PASI-GA
		EPA 6020B	JOR	16	PASI-A
		EPA 7470A	DBB1	1	PASI-A
		SM 2320B-2011	ECH	3	PASI-A
		SM 4500-S2D-2011	JP1	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	1	PASI-A
92558347029	**PRB-1-7 (72 HOUR) (F)**	EPA 7470A	VB	1	PASI-GA
		EPA 6020B	JOR	16	PASI-A
		EPA 7470A	DBB1	1	PASI-A
		SM 2320B-2011	ECH	3	PASI-A
		SM 4500-S2D-2011	JP1	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	1	PASI-A
92558347030	**PRB-1-10 (72 HOUR) (F)**	EPA 7470A	VB	1	PASI-GA
		EPA 6020B	JOR	16	PASI-A
		EPA 7470A	DBB1	1	PASI-A
		SM 2320B-2011	ECH	3	PASI-A
		SM 4500-S2D-2011	JP1	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	1	PASI-A

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SAMPLE ANALYTE COUNT

Project: MCMANUS GAPOWER 30050105.00009
Pace Project No.: 92558347

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
92558347031	**PRB-1-2 (72 HOUR) (F)**	EPA 6020B	JOR	5	PASI-A
		SM 2320B-2011	ECH	3	PASI-A
		SM 4500-S2D-2011	JP1	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	1	PASI-A
92558347032	**PRB-1-3 (72 HOUR) (F)**	EPA 6020B	JOR	5	PASI-A
		SM 2320B-2011	ECH	3	PASI-A
		SM 4500-S2D-2011	JP1	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	1	PASI-A
92558347033	**PRB-1-5 (72 HOUR) (F)**	EPA 6020B	JOR	5	PASI-A
		SM 2320B-2011	ECH	3	PASI-A
		SM 4500-S2D-2011	JP1	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	1	PASI-A
92558347034	**PRB-1-6 (72 HOUR) (F)**	EPA 6020B	JOR	5	PASI-A
		SM 2320B-2011	ECH	3	PASI-A
		SM 4500-S2D-2011	JP1	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	1	PASI-A
92558347035	**PRB-1-8 (72 HOUR) (F)**	EPA 6020B	JOR	5	PASI-A
		SM 2320B-2011	ECH	3	PASI-A
		SM 4500-S2D-2011	JP1	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	1	PASI-A
92558347036	**PRB-1-9 (72 HOUR) (F)**	EPA 6020B	JOR	5	PASI-A
		SM 2320B-2011	ECH	3	PASI-A
		SM 4500-S2D-2011	JP1	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	1	PASI-A

PASI-A = Pace Analytical Services - Asheville
PASI-GA = Pace Analytical Services - Peachtree Corners, GA

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ANALYTICAL RESULTS

Project: MCMANUS GAPOWER 30050105.00009
Pace Project No.: 92558347

Sample: IR-1-2 (5 HOUR) **Lab ID: 92558347001** Collected: 08/25/21 16:00 Received: 08/30/21 12:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Aluminum	**3.5**	mg/L	2.0	0.74	100	09/02/21 13:58	09/15/21 00:08	7429-90-5	
Arsenic	**0.32**	mg/L	0.10	0.0087	100	09/02/21 13:58	09/15/21 00:08	7440-38-2	
Calcium	**257**	mg/L	20.0	3.5	100	09/02/21 13:58	09/15/21 00:08	7440-70-2	
Iron	**4720**	mg/L	100	41.9	2000	09/02/21 13:58	09/15/21 17:27	7439-89-6	
Magnesium	**500**	mg/L	10.0	1.0	100	09/02/21 13:58	09/15/21 00:08	7439-95-4	

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ANALYTICAL RESULTS

Project: MCMANUS GAPOWER 30050105.00009
Pace Project No.: 92558347

Sample: IR-1-3 (5 HOUR) **Lab ID: 92558347002** Collected: 08/25/21 16:10 Received: 08/30/21 12:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Aluminum	ND	mg/L	1.0	0.37	50	09/02/21 13:58	09/15/21 00:12	7429-90-5	
Arsenic	ND	mg/L	0.050	0.0043	50	09/02/21 13:58	09/15/21 00:12	7440-38-2	
Calcium	**241**	mg/L	10.0	1.8	50	09/02/21 13:58	09/15/21 00:12	7440-70-2	
Iron	**45.5**	mg/L	2.5	1.0	50	09/02/21 13:58	09/15/21 00:12	7439-89-6	
Magnesium	**496**	mg/L	20.0	2.0	200	09/02/21 13:58	09/15/21 01:57	7439-95-4	

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ANALYTICAL RESULTS

Project: MCMANUS GAPOWER 30050105.00009
Pace Project No.: 92558347

Sample: IR-1-4 (5 HOUR) **Lab ID: 92558347003** Collected: 08/25/21 16:20 Received: 08/30/21 12:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Aluminum	**2.0**	mg/L	1.0	0.37	50	09/02/21 13:58	09/15/21 00:15	7429-90-5	
Arsenic	ND	mg/L	0.050	0.0043	50	09/02/21 13:58	09/15/21 00:15	7440-38-2	
Calcium	**258**	mg/L	10.0	1.8	50	09/02/21 13:58	09/15/21 00:15	7440-70-2	
Iron	**53.0**	mg/L	2.5	1.0	50	09/02/21 13:58	09/15/21 00:15	7439-89-6	
Magnesium	**530**	mg/L	20.0	2.0	200	09/02/21 13:58	09/15/21 02:01	7439-95-4	

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ANALYTICAL RESULTS

Project: MCMANUS GAPOWER 30050105.00009
Pace Project No.: 92558347

Sample: IR-1-5 (5 HOUR) **Lab ID: 92558347004** Collected: 08/25/21 16:30 Received: 08/30/21 12:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Aluminum	ND	mg/L	1.0	0.37	50	09/02/21 13:58	09/15/21 00:26	7429-90-5	
Arsenic	ND	mg/L	0.050	0.0043	50	09/02/21 13:58	09/15/21 00:26	7440-38-2	
Calcium	**150**	mg/L	10.0	1.8	50	09/02/21 13:58	09/15/21 00:26	7440-70-2	
Iron	**38.8**	mg/L	2.5	1.0	50	09/02/21 13:58	09/15/21 00:26	7439-89-6	
Magnesium	**438**	mg/L	5.0	0.50	50	09/02/21 13:58	09/15/21 00:26	7439-95-4	

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ANALYTICAL RESULTS

Project: MCMANUS GAPOWER 30050105.00009
Pace Project No.: 92558347

Sample: IR-1-2 (72 HOUR) **Lab ID: 92558347005** Collected: 08/28/21 09:00 Received: 08/30/21 12:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Aluminum	ND	mg/L	2.0	0.74	100	09/02/21 13:58	09/15/21 00:29	7429-90-5	
Arsenic	**0.32**	mg/L	0.10	0.0087	100	09/02/21 13:58	09/15/21 00:29	7440-38-2	
Calcium	**265**	mg/L	20.0	3.5	100	09/02/21 13:58	09/15/21 00:29	7440-70-2	
Iron	**5590**	mg/L	100	41.9	2000	09/02/21 13:58	09/15/21 17:30	7439-89-6	
Magnesium	**552**	mg/L	10.0	1.0	100	09/02/21 13:58	09/15/21 00:29	7439-95-4	

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ANALYTICAL RESULTS

Project: MCMANUS GAPOWER 30050105.00009
Pace Project No.: 92558347

Sample: IR-1-3 (72 HOUR) **Lab ID: 92558347006** Collected: 08/28/21 09:10 Received: 08/30/21 12:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Aluminum	ND	mg/L	1.0	0.37	50	09/02/21 13:58	09/15/21 00:33	7429-90-5	
Arsenic	ND	mg/L	0.050	0.0043	50	09/02/21 13:58	09/15/21 00:33	7440-38-2	
Calcium	**124**	mg/L	10.0	1.8	50	09/02/21 13:58	09/15/21 00:33	7440-70-2	
Iron	**65.4**	mg/L	2.5	1.0	50	09/02/21 13:58	09/15/21 00:33	7439-89-6	
Magnesium	**479**	mg/L	5.0	0.50	50	09/02/21 13:58	09/15/21 00:33	7439-95-4	

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ANALYTICAL RESULTS

Project: MCMANUS GAPOWER 30050105.00009
Pace Project No.: 92558347

Sample: IR-1-4 (72 HOUR) **Lab ID: 92558347007** Collected: 08/28/21 09:20 Received: 08/30/21 12:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Aluminum	ND	mg/L	1.0	0.37	50	09/02/21 13:58	09/15/21 00:37	7429-90-5	
Arsenic	ND	mg/L	0.050	0.0043	50	09/02/21 13:58	09/15/21 00:37	7440-38-2	
Calcium	**234**	mg/L	10.0	1.8	50	09/02/21 13:58	09/15/21 00:37	7440-70-2	
Iron	**34.0**	mg/L	2.5	1.0	50	09/02/21 13:58	09/15/21 00:37	7439-89-6	
Magnesium	**523**	mg/L	20.0	2.0	200	09/02/21 13:58	09/15/21 02:22	7439-95-4	

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ANALYTICAL RESULTS

Project: MCMANUS GAPOWER 30050105.00009
Pace Project No.: 92558347

Sample: IR-1-5 (72 HOUR) **Lab ID: 92558347008** Collected: 08/28/21 09:30 Received: 08/30/21 12:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Aluminum	ND	mg/L	1.0	0.37	50	09/02/21 13:58	09/15/21 00:41	7429-90-5	
Arsenic	ND	mg/L	0.050	0.0043	50	09/02/21 13:58	09/15/21 00:41	7440-38-2	
Calcium	**167**	mg/L	10.0	1.8	50	09/02/21 13:58	09/15/21 00:41	7440-70-2	
Iron	**9.8**	mg/L	2.5	1.0	50	09/02/21 13:58	09/15/21 00:41	7439-89-6	
Magnesium	**471**	mg/L	5.0	0.50	50	09/02/21 13:58	09/15/21 00:41	7439-95-4	

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ANALYTICAL RESULTS

Project: MCMANUS GAPOWER 30050105.00009
Pace Project No.: 92558347

Sample: PRB-1-2 (72 HOUR) **Lab ID: 92558347009** Collected: 08/27/21 13:10 Received: 08/30/21 12:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Aluminum	ND	mg/L	1.0	0.37	50	09/02/21 13:58	09/15/21 00:44	7429-90-5	
Arsenic	**0.36**	mg/L	0.050	0.0043	50	09/02/21 13:58	09/15/21 00:44	7440-38-2	
Calcium	**258**	mg/L	10.0	1.8	50	09/02/21 13:58	09/15/21 00:44	7440-70-2	
Iron	ND	mg/L	2.5	1.0	50	09/02/21 13:58	09/15/21 00:44	7439-89-6	
Magnesium	**520**	mg/L	20.0	2.0	200	09/02/21 13:58	09/15/21 02:29	7439-95-4	

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ANALYTICAL RESULTS

Project: MCMANUS GAPOWER 30050105.00009
Pace Project No.: 92558347

Sample: PRB-1-3 (72 HOUR) **Lab ID: 92558347010** Collected: 08/27/21 13:20 Received: 08/30/21 12:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Aluminum	ND	mg/L	1.0	0.37	50	09/02/21 13:58	09/15/21 00:55	7429-90-5	
Arsenic	**0.18**	mg/L	0.050	0.0043	50	09/02/21 13:58	09/15/21 00:55	7440-38-2	
Calcium	**256**	mg/L	10.0	1.8	50	09/02/21 13:58	09/15/21 00:55	7440-70-2	
Iron	ND	mg/L	2.5	1.0	50	09/02/21 13:58	09/15/21 00:55	7439-89-6	
Magnesium	**534**	mg/L	20.0	2.0	200	09/02/21 13:58	09/15/21 02:32	7439-95-4	

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ANALYTICAL RESULTS

Project: MCMANUS GAPOWER 30050105.00009
Pace Project No.: 92558347

Sample: PRB-1-5 (72 HOUR) **Lab ID: 92558347011** Collected: 08/27/21 13:40 Received: 08/30/21 12:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Aluminum	ND	mg/L	1.0	0.37	50	09/02/21 13:58	09/15/21 00:58	7429-90-5	
Arsenic	**0.40**	mg/L	0.050	0.0043	50	09/02/21 13:58	09/15/21 00:58	7440-38-2	
Calcium	**264**	mg/L	10.0	1.8	50	09/02/21 13:58	09/15/21 00:58	7440-70-2	
Iron	ND	mg/L	2.5	1.0	50	09/02/21 13:58	09/15/21 00:58	7439-89-6	
Magnesium	**524**	mg/L	20.0	2.0	200	09/02/21 13:58	09/15/21 02:36	7439-95-4	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: MCMANUS GAPOWER 30050105.00009
Pace Project No.: 92558347

Sample: PRB-1-6 (72 HOUR) **Lab ID: 92558347012** Collected: 08/27/21 13:50 Received: 08/30/21 12:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Aluminum	ND	mg/L	1.0	0.37	50	09/02/21 13:58	09/15/21 01:02	7429-90-5	
Arsenic	**0.34**	mg/L	0.050	0.0043	50	09/02/21 13:58	09/15/21 01:02	7440-38-2	
Calcium	**254**	mg/L	10.0	1.8	50	09/02/21 13:58	09/15/21 01:02	7440-70-2	
Iron	ND	mg/L	2.5	1.0	50	09/02/21 13:58	09/15/21 01:02	7439-89-6	
Magnesium	**507**	mg/L	20.0	2.0	200	09/02/21 13:58	09/15/21 02:46	7439-95-4	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: MCMANUS GAPOWER 30050105.00009
Pace Project No.: 92558347

Sample: PRB-1-8 (72 HOUR) **Lab ID: 92558347013** Collected: 08/27/21 14:10 Received: 08/30/21 12:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Aluminum	ND	mg/L	1.0	0.37	50	09/02/21 13:58	09/15/21 01:05	7429-90-5	
Arsenic	**0.34**	mg/L	0.050	0.0043	50	09/02/21 13:58	09/15/21 01:05	7440-38-2	
Calcium	**242**	mg/L	10.0	1.8	50	09/02/21 13:58	09/15/21 01:05	7440-70-2	
Iron	ND	mg/L	2.5	1.0	50	09/02/21 13:58	09/15/21 01:05	7439-89-6	
Magnesium	**494**	mg/L	20.0	2.0	200	09/02/21 13:58	09/15/21 02:50	7439-95-4	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: MCMANUS GAPOWER 30050105.00009
Pace Project No.: 92558347

Sample: PRB-1-9 (72 HOUR) **Lab ID: 92558347014** Collected: 08/27/21 14:20 Received: 08/30/21 12:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Aluminum	ND	mg/L	1.0	0.37	50	09/02/21 13:58	09/15/21 01:09	7429-90-5	
Arsenic	**0.34**	mg/L	0.050	0.0043	50	09/02/21 13:58	09/15/21 01:09	7440-38-2	
Calcium	**255**	mg/L	10.0	1.8	50	09/02/21 13:58	09/15/21 01:09	7440-70-2	
Iron	ND	mg/L	2.5	1.0	50	09/02/21 13:58	09/15/21 01:09	7439-89-6	
Magnesium	**505**	mg/L	20.0	2.0	200	09/02/21 13:58	09/15/21 02:53	7439-95-4	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: MCMANUS GAPOWER 30050105.00009
Pace Project No.: 92558347

Sample: IR-1-2 (5 HOUR) (F) **Lab ID: 92558347015** Collected: 08/25/21 16:00 Received: 08/30/21 12:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS, Dissolved	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Aluminum, Dissolved	ND	mg/L	0.40	0.15	20	09/03/21 17:46	09/11/21 00:09	7429-90-5	D3
Arsenic, Dissolved	**0.31**	mg/L	0.020	0.0017	20	09/03/21 17:46	09/11/21 00:09	7440-38-2	M1
Calcium, Dissolved	**518**	mg/L	40.0	7.0	200	09/03/21 17:46	09/13/21 07:28	7440-70-2	M1
Iron, Dissolved	**8750**	mg/L	100	41.9	2000	09/03/21 17:46	09/13/21 08:39	7439-89-6	M1
Magnesium, Dissolved	**970**	mg/L	20.0	2.0	200	09/03/21 17:46	09/13/21 07:28	7439-95-4	M1
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	ND	mg/L	0.10	0.050	1		09/01/21 04:35	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Sulfate	**8870**	mg/L	400	200	400		09/01/21 22:29	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: MCMANUS GAPOWER 30050105.00009
Pace Project No.: 92558347

Sample: IR-1-3 (5 HOUR) (F) **Lab ID: 92558347016** Collected: 08/25/21 16:10 Received: 08/30/21 12:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS, Dissolved	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Aluminum, Dissolved	ND	mg/L	0.40	0.15	20	09/03/21 17:46	09/11/21 00:27	7429-90-5	D3
Arsenic, Dissolved	ND	mg/L	0.020	0.0017	20	09/03/21 17:46	09/11/21 00:27	7440-38-2	D3
Calcium, Dissolved	**256**	mg/L	40.0	7.0	200	09/03/21 17:46	09/13/21 07:32	7440-70-2	
Iron, Dissolved	**26.9**	mg/L	1.0	0.42	20	09/03/21 17:46	09/11/21 00:27	7439-89-6	
Magnesium, Dissolved	**488**	mg/L	20.0	2.0	200	09/03/21 17:46	09/13/21 07:32	7439-95-4	
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	ND	mg/L	0.10	0.050	1		09/01/21 04:35	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Sulfate	**602**	mg/L	50.0	25.0	50		09/03/21 11:34	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: MCMANUS GAPOWER 30050105.00009
Pace Project No.: 92558347

Sample: IR-1-4 (5 HOUR) (F) **Lab ID: 92558347017** Collected: 08/25/21 16:20 Received: 08/30/21 12:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS, Dissolved	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Aluminum, Dissolved	ND	mg/L	0.40	0.15	20	09/03/21 17:46	09/11/21 00:31	7429-90-5	D3
Arsenic, Dissolved	ND	mg/L	0.020	0.0017	20	09/03/21 17:46	09/11/21 00:31	7440-38-2	D3
Calcium, Dissolved	**258**	mg/L	40.0	7.0	200	09/03/21 17:46	09/13/21 07:37	7440-70-2	
Iron, Dissolved	**14.8**	mg/L	1.0	0.42	20	09/03/21 17:46	09/11/21 00:31	7439-89-6	
Magnesium, Dissolved	**490**	mg/L	20.0	2.0	200	09/03/21 17:46	09/13/21 07:37	7439-95-4	
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	ND	mg/L	0.10	0.050	1		09/01/21 04:36	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Sulfate	**589**	mg/L	50.0	25.0	50		09/03/21 11:49	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: MCMANUS GAPOWER 30050105.00009
Pace Project No.: 92558347

Sample: IR-1-5 (5 HOUR) (F) **Lab ID: 92558347018** Collected: 08/25/21 16:30 Received: 08/30/21 12:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS, Dissolved	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Aluminum, Dissolved	ND	mg/L	0.40	0.15	20	09/03/21 17:46	09/11/21 00:35	7429-90-5	D3
Arsenic, Dissolved	ND	mg/L	0.020	0.0017	20	09/03/21 17:46	09/11/21 00:35	7440-38-2	D3
Calcium, Dissolved	**147**	mg/L	4.0	0.70	20	09/03/21 17:46	09/11/21 00:35	7440-70-2	
Iron, Dissolved	**8.0**	mg/L	1.0	0.42	20	09/03/21 17:46	09/11/21 00:35	7439-89-6	
Magnesium, Dissolved	**423**	mg/L	20.0	2.0	200	09/03/21 17:46	09/13/21 07:41	7439-95-4	
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	ND	mg/L	0.10	0.050	1		09/01/21 04:36	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Sulfate	**452**	mg/L	50.0	25.0	50		09/03/21 12:04	14808-79-8	

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ANALYTICAL RESULTS

Project: MCMANUS GAPOWER 30050105.00009
Pace Project No.: 92558347

Sample: IR-1-2 (72 HOUR) (F) **Lab ID: 92558347019** Collected: 08/28/21 09:00 Received: 08/30/21 12:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS, Dissolved	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Aluminum, Dissolved	ND	mg/L	1.0	0.37	50	09/03/21 17:46	09/13/21 07:46	7429-90-5	
Arsenic, Dissolved	**0.33**	mg/L	0.050	0.0043	50	09/03/21 17:46	09/13/21 07:46	7440-38-2	
Calcium, Dissolved	**266**	mg/L	10.0	1.8	50	09/03/21 17:46	09/13/21 07:46	7440-70-2	
Iron, Dissolved	**4810**	mg/L	100	41.9	2000	09/03/21 17:46	09/14/21 16:08	7439-89-6	
Magnesium, Dissolved	**486**	mg/L	20.0	2.0	200	09/03/21 17:46	09/13/21 08:44	7439-95-4	
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	ND	mg/L	0.10	0.050	1		09/01/21 04:43	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Sulfate	**9120**	mg/L	400	200	400		09/01/21 23:58	14808-79-8	

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ANALYTICAL RESULTS

Project: MCMANUS GAPOWER 30050105.00009
Pace Project No.: 92558347

Sample: IR-1-3 (72 HOUR) (F) **Lab ID: 92558347020** Collected: 08/28/21 09:10 Received: 08/30/21 12:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS, Dissolved	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Aluminum, Dissolved	ND	mg/L	1.0	0.37	50	09/03/21 17:46	09/13/21 07:50	7429-90-5	
Arsenic, Dissolved	ND	mg/L	0.050	0.0043	50	09/03/21 17:46	09/13/21 07:50	7440-38-2	
Calcium, Dissolved	**129**	mg/L	10.0	1.8	50	09/03/21 17:46	09/13/21 07:50	7440-70-2	
Iron, Dissolved	**8.5**	mg/L	2.5	1.0	50	09/03/21 17:46	09/13/21 07:50	7439-89-6	
Magnesium, Dissolved	**478**	mg/L	20.0	2.0	200	09/03/21 17:46	09/13/21 09:11	7439-95-4	
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	ND	mg/L	0.10	0.050	1		09/01/21 04:43	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Sulfate	**609**	mg/L	100	50.0	100		09/03/21 12:19	14808-79-8	M1

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: MCMANUS GAPOWER 30050105.00009
Pace Project No.: 92558347

Sample: IR-1-4 (72 HOUR) (F) **Lab ID: 92558347021** Collected: 08/28/21 09:20 Received: 08/30/21 12:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS, Dissolved	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Aluminum, Dissolved	ND	mg/L	1.0	0.37	50	09/03/21 17:46	09/13/21 07:55	7429-90-5	
Arsenic, Dissolved	ND	mg/L	0.050	0.0043	50	09/03/21 17:46	09/13/21 07:55	7440-38-2	
Calcium, Dissolved	**227**	mg/L	10.0	1.8	50	09/03/21 17:46	09/13/21 07:55	7440-70-2	
Iron, Dissolved	**22.6**	mg/L	2.5	1.0	50	09/03/21 17:46	09/13/21 07:55	7439-89-6	
Magnesium, Dissolved	**522**	mg/L	20.0	2.0	200	09/03/21 17:46	09/13/21 09:15	7439-95-4	
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	ND	mg/L	0.10	0.050	1		09/01/21 04:44	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Sulfate	**572**	mg/L	50.0	25.0	50		09/03/21 13:51	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: MCMANUS GAPOWER 30050105.00009
Pace Project No.: 92558347

Sample: IR-1-5 (72 HOUR) (F) **Lab ID: 92558347022** Collected: 08/28/21 09:30 Received: 08/30/21 12:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS, Dissolved	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Aluminum, Dissolved	ND	mg/L	1.0	0.37	50	09/03/21 17:46	09/13/21 07:59	7429-90-5	
Arsenic, Dissolved	ND	mg/L	0.050	0.0043	50	09/03/21 17:46	09/13/21 07:59	7440-38-2	
Calcium, Dissolved	**175**	mg/L	10.0	1.8	50	09/03/21 17:46	09/13/21 07:59	7440-70-2	
Iron, Dissolved	**8.6**	mg/L	2.5	1.0	50	09/03/21 17:46	09/13/21 07:59	7439-89-6	
Magnesium, Dissolved	**461**	mg/L	5.0	0.50	50	09/03/21 17:46	09/13/21 07:59	7439-95-4	
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	ND	mg/L	0.10	0.050	1		09/01/21 04:44	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Sulfate	**460**	mg/L	50.0	25.0	50		09/03/21 14:07	14808-79-8	

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ANALYTICAL RESULTS

Project: MCMANUS GAPOWER 30050105.00009
Pace Project No.: 92558347

Sample: PRB-1-1 (72 HOUR) **Lab ID: 92558347023** Collected: 08/27/21 13:00 Received: 08/30/21 12:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Peachtree Corners, GA								
Mercury	ND	ug/L	0.20	0.078	1	09/16/21 09:45	09/16/21 13:20	7439-97-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Aluminum	ND	mg/L	1.0	0.37	50	09/02/21 13:58	09/15/21 01:12	7429-90-5	
Antimony	ND	mg/L	0.050	0.010	50	09/02/21 13:58	09/15/21 01:12	7440-36-0	
Arsenic	**0.37**	mg/L	0.050	0.0043	50	09/02/21 13:58	09/15/21 01:12	7440-38-2	
Barium	**0.16**	mg/L	0.050	0.011	50	09/02/21 13:58	09/15/21 01:12	7440-39-3	
Beryllium	ND	mg/L	0.0050	0.0025	50	09/02/21 13:58	09/15/21 17:20	7440-41-7	
Cadmium	ND	mg/L	0.010	0.0030	50	09/02/21 13:58	09/15/21 01:12	7440-43-9	
Calcium	**262**	mg/L	10.0	1.8	50	09/02/21 13:58	09/15/21 01:12	7440-70-2	
Chromium	ND	mg/L	0.050	0.025	50	09/02/21 13:58	09/15/21 01:12	7440-47-3	
Cobalt	ND	mg/L	0.050	0.0025	50	09/02/21 13:58	09/15/21 01:12	7440-48-4	
Iron	ND	mg/L	2.5	1.0	50	09/02/21 13:58	09/15/21 01:12	7439-89-6	
Lead	ND	mg/L	0.050	0.0038	50	09/02/21 13:58	09/15/21 01:12	7439-92-1	
Lithium	ND	mg/L	0.12	0.025	50	09/02/21 13:58	09/15/21 01:12	7439-93-2	
Magnesium	**509**	mg/L	20.0	2.0	200	09/02/21 13:58	09/15/21 02:57	7439-95-4	
Molybdenum	ND	mg/L	0.050	0.0063	50	09/02/21 13:58	09/15/21 01:12	7439-98-7	
Selenium	ND	mg/L	0.10	0.0036	50	09/02/21 13:58	09/15/21 01:12	7782-49-2	
Thallium	ND	mg/L	0.024	0.0025	50	09/02/21 13:58	09/15/21 01:12	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	mg/L	0.00020	0.00012	1	09/02/21 13:52	09/15/21 11:59	7439-97-6	

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ANALYTICAL RESULTS

Project: MCMANUS GAPOWER 30050105.00009
Pace Project No.: 92558347

Sample: PRB-1-4 (72 HOUR) **Lab ID: 92558347024** Collected: 08/27/21 13:30 Received: 08/30/21 12:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Peachtree Corners, GA								
Mercury	ND	ug/L	0.20	0.078	1	09/16/21 09:45	09/16/21 13:22	7439-97-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Aluminum	ND	mg/L	1.0	0.37	50	09/02/21 13:58	09/15/21 01:15	7429-90-5	
Antimony	ND	mg/L	0.050	0.010	50	09/02/21 13:58	09/15/21 01:15	7440-36-0	
Arsenic	ND	mg/L	0.050	0.0043	50	09/02/21 13:58	09/15/21 01:15	7440-38-2	
Barium	**0.16**	mg/L	0.050	0.011	50	09/02/21 13:58	09/15/21 01:15	7440-39-3	
Beryllium	ND	mg/L	0.0050	0.0025	50	09/02/21 13:58	09/15/21 17:23	7440-41-7	
Cadmium	ND	mg/L	0.010	0.0030	50	09/02/21 13:58	09/15/21 01:15	7440-43-9	
Calcium	**256**	mg/L	10.0	1.8	50	09/02/21 13:58	09/15/21 01:15	7440-70-2	
Chromium	ND	mg/L	0.050	0.025	50	09/02/21 13:58	09/15/21 01:15	7440-47-3	
Cobalt	ND	mg/L	0.050	0.0025	50	09/02/21 13:58	09/15/21 01:15	7440-48-4	
Iron	ND	mg/L	2.5	1.0	50	09/02/21 13:58	09/15/21 01:15	7439-89-6	
Lead	ND	mg/L	0.050	0.0038	50	09/02/21 13:58	09/15/21 01:15	7439-92-1	
Lithium	ND	mg/L	0.12	0.025	50	09/02/21 13:58	09/15/21 01:15	7439-93-2	
Magnesium	**539**	mg/L	20.0	2.0	200	09/02/21 13:58	09/15/21 03:00	7439-95-4	
Molybdenum	ND	mg/L	0.050	0.0063	50	09/02/21 13:58	09/15/21 01:15	7439-98-7	
Selenium	ND	mg/L	0.10	0.0036	50	09/02/21 13:58	09/15/21 01:15	7782-49-2	
Thallium	ND	mg/L	0.024	0.0025	50	09/02/21 13:58	09/15/21 01:15	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	mg/L	0.00020	0.00012	1	09/02/21 13:52	09/15/21 12:02	7439-97-6	

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ANALYTICAL RESULTS

Project: MCMANUS GAPOWER 30050105.00009
Pace Project No.: 92558347

Sample: PRB-1-7 (72 HOUR) **Lab ID: 92558347025** Collected: 08/27/21 14:00 Received: 08/30/21 12:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Peachtree Corners, GA								
Mercury	ND	ug/L	0.40	0.16	1	09/16/21 09:45	09/16/21 13:25	7439-97-6	D3
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Aluminum	ND	mg/L	1.0	0.37	50	09/08/21 14:06	09/15/21 06:09	7429-90-5	
Antimony	ND	mg/L	0.050	0.010	50	09/08/21 14:06	09/15/21 06:09	7440-36-0	
Arsenic	ND	mg/L	0.050	0.0043	50	09/08/21 14:06	09/15/21 06:09	7440-38-2	
Barium	**0.096**	mg/L	0.050	0.011	50	09/08/21 14:06	09/15/21 06:09	7440-39-3	
Beryllium	ND	mg/L	0.0050	0.0025	50	09/08/21 14:06	09/15/21 06:09	7440-41-7	
Cadmium	ND	mg/L	0.010	0.0030	50	09/08/21 14:06	09/15/21 06:09	7440-43-9	
Calcium	**253**	mg/L	10.0	1.8	50	09/08/21 14:06	09/15/21 06:09	7440-70-2	M1
Chromium	ND	mg/L	0.050	0.025	50	09/08/21 14:06	09/15/21 06:09	7440-47-3	
Cobalt	ND	mg/L	0.050	0.0025	50	09/08/21 14:06	09/15/21 06:09	7440-48-4	
Iron	ND	mg/L	2.5	1.0	50	09/08/21 14:06	09/15/21 06:09	7439-89-6	
Lead	ND	mg/L	0.050	0.0038	50	09/08/21 14:06	09/15/21 06:09	7439-92-1	
Lithium	ND	mg/L	0.12	0.025	50	09/08/21 14:06	09/15/21 06:09	7439-93-2	
Magnesium	**499**	mg/L	5.0	0.50	50	09/08/21 14:06	09/15/21 06:09	7439-95-4	M1
Molybdenum	ND	mg/L	0.050	0.0063	50	09/08/21 14:06	09/15/21 06:09	7439-98-7	
Selenium	ND	mg/L	0.10	0.0036	50	09/08/21 14:06	09/15/21 06:09	7782-49-2	
Thallium	ND	mg/L	0.024	0.0025	50	09/08/21 14:06	09/15/21 06:09	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	mg/L	0.00020	0.00012	1	09/02/21 13:52	09/15/21 12:09	7439-97-6	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
9800 Kincey Ave. Suite 100
Huntersville, NC 28078
(704)875-9092

ANALYTICAL RESULTS

Project: MCMANUS GAPOWER 30050105.00009
Pace Project No.: 92558347

Sample: PRB-1-10 (72 HOUR) **Lab ID: 92558347026** Collected: 08/27/21 14:30 Received: 08/30/21 12:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Peachtree Corners, GA								
Mercury	ND	ug/L	0.20	0.078	1	09/16/21 09:45	09/16/21 13:28	7439-97-6	
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Aluminum	**2.1**	mg/L	1.0	0.37	50	09/08/21 14:06	09/15/21 06:27	7429-90-5	
Antimony	ND	mg/L	0.050	0.010	50	09/08/21 14:06	09/15/21 06:27	7440-36-0	
Arsenic	**0.13**	mg/L	0.050	0.0043	50	09/08/21 14:06	09/15/21 06:27	7440-38-2	
Barium	ND	mg/L	0.050	0.011	50	09/08/21 14:06	09/15/21 06:27	7440-39-3	
Beryllium	ND	mg/L	0.0050	0.0025	50	09/08/21 14:06	09/15/21 06:27	7440-41-7	
Cadmium	ND	mg/L	0.010	0.0030	50	09/08/21 14:06	09/15/21 06:27	7440-43-9	
Calcium	**243**	mg/L	10.0	1.8	50	09/08/21 14:06	09/15/21 06:27	7440-70-2	
Chromium	ND	mg/L	0.050	0.025	50	09/08/21 14:06	09/15/21 06:27	7440-47-3	
Cobalt	ND	mg/L	0.050	0.0025	50	09/08/21 14:06	09/15/21 06:27	7440-48-4	
Iron	ND	mg/L	2.5	1.0	50	09/08/21 14:06	09/15/21 06:27	7439-89-6	
Lead	ND	mg/L	0.050	0.0038	50	09/08/21 14:06	09/15/21 06:27	7439-92-1	
Lithium	ND	mg/L	0.12	0.025	50	09/08/21 14:06	09/15/21 06:27	7439-93-2	
Magnesium	**520**	mg/L	20.0	2.0	200	09/08/21 14:06	09/15/21 06:55	7439-95-4	
Molybdenum	ND	mg/L	0.050	0.0063	50	09/08/21 14:06	09/15/21 06:27	7439-98-7	
Selenium	ND	mg/L	0.10	0.0036	50	09/08/21 14:06	09/15/21 06:27	7782-49-2	
Thallium	ND	mg/L	0.024	0.0025	50	09/08/21 14:06	09/15/21 06:27	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	mg/L	0.00020	0.00012	1	09/02/21 13:52	09/15/21 12:11	7439-97-6	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
9800 Kincey Ave. Suite 100
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(704)875-9092

ANALYTICAL RESULTS

Project: MCMANUS GAPOWER 30050105.00009
Pace Project No.: 92558347

Sample: PRB-1-1 (72 HOUR) (F) **Lab ID: 92558347027** Collected: 08/27/21 13:00 Received: 08/30/21 12:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
7470 Mercury, Dissolved	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Peachtree Corners, GA								
Mercury, Dissolved	ND	ug/L	0.20	0.078	1	09/23/21 11:05	09/23/21 14:53	7439-97-6	
6020 MET ICPMS, Dissolved	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Aluminum, Dissolved	ND	mg/L	1.0	0.37	50	09/03/21 17:46	09/13/21 08:13	7429-90-5	
Antimony, Dissolved	ND	mg/L	0.050	0.010	50	09/03/21 17:46	09/13/21 08:13	7440-36-0	
Arsenic, Dissolved	ND	mg/L	0.050	0.0043	50	09/03/21 17:46	09/13/21 08:13	7440-38-2	
Barium, Dissolved	**0.16**	mg/L	0.050	0.011	50	09/03/21 17:46	09/13/21 08:13	7440-39-3	
Beryllium, Dissolved	ND	mg/L	0.0050	0.0025	50	09/03/21 17:46	09/13/21 08:13	7440-41-7	
Cadmium, Dissolved	ND	mg/L	0.010	0.0030	50	09/03/21 17:46	09/13/21 08:13	7440-43-9	
Calcium, Dissolved	**253**	mg/L	10.0	1.8	50	09/03/21 17:46	09/13/21 08:13	7440-70-2	
Chromium, Dissolved	ND	mg/L	0.050	0.025	50	09/03/21 17:46	09/13/21 08:13	7440-47-3	
Cobalt, Dissolved	ND	mg/L	0.050	0.0025	50	09/03/21 17:46	09/13/21 08:13	7440-48-4	
Iron, Dissolved	ND	mg/L	2.5	1.0	50	09/03/21 17:46	09/13/21 08:13	7439-89-6	
Lead, Dissolved	ND	mg/L	0.050	0.0038	50	09/03/21 17:46	09/13/21 08:13	7439-92-1	
Lithium, Dissolved	ND	mg/L	0.12	0.025	50	09/03/21 17:46	09/13/21 08:13	7439-93-2	
Magnesium, Dissolved	**476**	mg/L	20.0	2.0	200	09/03/21 17:46	09/13/21 09:46	7439-95-4	
Molybdenum, Dissolved	ND	mg/L	0.050	0.0063	50	09/03/21 17:46	09/13/21 08:13	7439-98-7	
Selenium, Dissolved	ND	mg/L	0.10	0.0036	50	09/03/21 17:46	09/13/21 08:13	7782-49-2	
Thallium, Dissolved	ND	mg/L	0.024	0.0025	50	09/03/21 17:46	09/13/21 08:13	7440-28-0	
7470 Mercury, Dissolved	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury, Dissolved	ND	mg/L	0.00020	0.00012	1	09/09/21 16:50	09/15/21 14:43	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**527**	mg/L	5.0	5.0	1		09/03/21 21:10		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		09/03/21 21:10		
Alkalinity, Total as CaCO3	**527**	mg/L	5.0	5.0	1		09/03/21 21:10		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	**66.5**	mg/L	25.0	12.5	250		09/01/21 04:36	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Sulfate	**608**	mg/L	50.0	25.0	50		09/03/21 14:22	14808-79-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
9800 Kincey Ave. Suite 100
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(704)875-9092

ANALYTICAL RESULTS

Project: MCMANUS GAPOWER 30050105.00009
Pace Project No.: 92558347

Sample: PRB-1-4 (72 HOUR) (F) **Lab ID: 92558347028** Collected: 08/27/21 13:30 Received: 08/30/21 12:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
7470 Mercury, Dissolved	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Peachtree Corners, GA								
Mercury, Dissolved	ND	ug/L	0.20	0.078	1	09/23/21 11:05	09/23/21 14:56	7439-97-6	
6020 MET ICPMS, Dissolved	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Aluminum, Dissolved	ND	mg/L	1.0	0.37	50	09/03/21 17:46	09/13/21 08:17	7429-90-5	
Antimony, Dissolved	ND	mg/L	0.050	0.010	50	09/03/21 17:46	09/13/21 08:17	7440-36-0	
Arsenic, Dissolved	ND	mg/L	0.050	0.0043	50	09/03/21 17:46	09/13/21 08:17	7440-38-2	
Barium, Dissolved	**0.16**	mg/L	0.050	0.011	50	09/03/21 17:46	09/13/21 08:17	7440-39-3	
Beryllium, Dissolved	ND	mg/L	0.0050	0.0025	50	09/03/21 17:46	09/13/21 08:17	7440-41-7	
Cadmium, Dissolved	ND	mg/L	0.010	0.0030	50	09/03/21 17:46	09/13/21 08:17	7440-43-9	
Calcium, Dissolved	**256**	mg/L	10.0	1.8	50	09/03/21 17:46	09/13/21 08:17	7440-70-2	
Chromium, Dissolved	ND	mg/L	0.050	0.025	50	09/03/21 17:46	09/13/21 08:17	7440-47-3	
Cobalt, Dissolved	ND	mg/L	0.050	0.0025	50	09/03/21 17:46	09/13/21 08:17	7440-48-4	
Iron, Dissolved	ND	mg/L	2.5	1.0	50	09/03/21 17:46	09/13/21 08:17	7439-89-6	
Lead, Dissolved	ND	mg/L	0.050	0.0038	50	09/03/21 17:46	09/13/21 08:17	7439-92-1	
Lithium, Dissolved	ND	mg/L	0.12	0.025	50	09/03/21 17:46	09/13/21 08:17	7439-93-2	
Magnesium, Dissolved	**494**	mg/L	20.0	2.0	200	09/03/21 17:46	09/13/21 09:51	7439-95-4	
Molybdenum, Dissolved	ND	mg/L	0.050	0.0063	50	09/03/21 17:46	09/13/21 08:17	7439-98-7	
Selenium, Dissolved	ND	mg/L	0.10	0.0036	50	09/03/21 17:46	09/13/21 08:17	7782-49-2	
Thallium, Dissolved	ND	mg/L	0.024	0.0025	50	09/03/21 17:46	09/13/21 08:17	7440-28-0	
7470 Mercury, Dissolved	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury, Dissolved	ND	mg/L	0.00020	0.00012	1	09/09/21 16:50	09/15/21 14:50	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**568**	mg/L	5.0	5.0	1		09/03/21 20:25		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		09/03/21 20:25		
Alkalinity, Total as CaCO3	**568**	mg/L	5.0	5.0	1		09/03/21 20:25		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	**2.8**	mg/L	0.50	0.25	5		09/01/21 04:37	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Sulfate	**575**	mg/L	50.0	25.0	50		09/03/21 14:37	14808-79-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
9800 Kincey Ave. Suite 100
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(704)875-9092

ANALYTICAL RESULTS

Project: MCMANUS GAPOWER 30050105.00009
Pace Project No.: 92558347

Sample: PRB-1-7 (72 HOUR) (F) **Lab ID: 92558347029** Collected: 08/27/21 14:00 Received: 08/30/21 12:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
7470 Mercury, Dissolved	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Peachtree Corners, GA								
Mercury, Dissolved	ND	ug/L	0.20	0.078	1	09/23/21 11:05	09/23/21 14:58	7439-97-6	
6020 MET ICPMS, Dissolved	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Aluminum, Dissolved	ND	mg/L	1.0	0.37	50	09/03/21 17:46	09/13/21 08:22	7429-90-5	
Antimony, Dissolved	**0.11**	mg/L	0.050	0.010	50	09/03/21 17:46	09/13/21 08:22	7440-36-0	
Arsenic, Dissolved	ND	mg/L	0.050	0.0043	50	09/03/21 17:46	09/13/21 08:22	7440-38-2	
Barium, Dissolved	**0.10**	mg/L	0.050	0.011	50	09/03/21 17:46	09/13/21 08:22	7440-39-3	
Beryllium, Dissolved	ND	mg/L	0.0050	0.0025	50	09/03/21 17:46	09/13/21 08:22	7440-41-7	
Cadmium, Dissolved	ND	mg/L	0.010	0.0030	50	09/03/21 17:46	09/13/21 08:22	7440-43-9	
Calcium, Dissolved	**264**	mg/L	10.0	1.8	50	09/03/21 17:46	09/13/21 08:22	7440-70-2	
Chromium, Dissolved	ND	mg/L	0.050	0.025	50	09/03/21 17:46	09/13/21 08:22	7440-47-3	
Cobalt, Dissolved	ND	mg/L	0.050	0.0025	50	09/03/21 17:46	09/13/21 08:22	7440-48-4	
Iron, Dissolved	ND	mg/L	2.5	1.0	50	09/03/21 17:46	09/13/21 08:22	7439-89-6	
Lead, Dissolved	ND	mg/L	0.050	0.0038	50	09/03/21 17:46	09/13/21 08:22	7439-92-1	
Lithium, Dissolved	ND	mg/L	0.12	0.025	50	09/03/21 17:46	09/13/21 08:22	7439-93-2	
Magnesium, Dissolved	**468**	mg/L	20.0	2.0	200	09/03/21 17:46	09/13/21 09:55	7439-95-4	
Molybdenum, Dissolved	ND	mg/L	0.050	0.0063	50	09/03/21 17:46	09/13/21 08:22	7439-98-7	
Selenium, Dissolved	ND	mg/L	0.10	0.0036	50	09/03/21 17:46	09/13/21 08:22	7782-49-2	
Thallium, Dissolved	ND	mg/L	0.024	0.0025	50	09/03/21 17:46	09/13/21 08:22	7440-28-0	
7470 Mercury, Dissolved	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury, Dissolved	ND	mg/L	0.00020	0.00012	1	09/09/21 16:50	09/15/21 14:53	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**524**	mg/L	5.0	5.0	1		09/03/21 20:34		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		09/03/21 20:34		
Alkalinity, Total as CaCO3	**524**	mg/L	5.0	5.0	1		09/03/21 20:34		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	**0.14**	mg/L	0.10	0.050	1		09/01/21 04:38	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Sulfate	**587**	mg/L	50.0	25.0	50		09/03/21 14:52	14808-79-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
9800 Kincey Ave. Suite 100
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ANALYTICAL RESULTS

Project: MCMANUS GAPOWER 30050105.00009
Pace Project No.: 92558347

Sample: PRB-1-10 (72 HOUR) (F) **Lab ID: 92558347030** Collected: 08/27/21 14:30 Received: 08/30/21 12:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
7470 Mercury, Dissolved	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Peachtree Corners, GA								
Mercury, Dissolved	ND	ug/L	0.20	0.078	1	09/23/21 11:05	09/23/21 15:01	7439-97-6	
6020 MET ICPMS, Dissolved	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Aluminum, Dissolved	ND	mg/L	1.0	0.37	50	09/03/21 17:46	09/13/21 08:26	7429-90-5	
Antimony, Dissolved	ND	mg/L	0.050	0.010	50	09/03/21 17:46	09/13/21 08:26	7440-36-0	
Arsenic, Dissolved	ND	mg/L	0.050	0.0043	50	09/03/21 17:46	09/13/21 08:26	7440-38-2	
Barium, Dissolved	ND	mg/L	0.050	0.011	50	09/03/21 17:46	09/13/21 08:26	7440-39-3	
Beryllium, Dissolved	ND	mg/L	0.0050	0.0025	50	09/03/21 17:46	09/13/21 08:26	7440-41-7	
Cadmium, Dissolved	ND	mg/L	0.010	0.0030	50	09/03/21 17:46	09/13/21 08:26	7440-43-9	
Calcium, Dissolved	**233**	mg/L	10.0	1.8	50	09/03/21 17:46	09/13/21 08:26	7440-70-2	
Chromium, Dissolved	ND	mg/L	0.050	0.025	50	09/03/21 17:46	09/13/21 08:26	7440-47-3	
Cobalt, Dissolved	ND	mg/L	0.050	0.0025	50	09/03/21 17:46	09/13/21 08:26	7440-48-4	
Iron, Dissolved	ND	mg/L	2.5	1.0	50	09/03/21 17:46	09/13/21 08:26	7439-89-6	
Lead, Dissolved	ND	mg/L	0.050	0.0038	50	09/03/21 17:46	09/13/21 08:26	7439-92-1	
Lithium, Dissolved	ND	mg/L	0.12	0.025	50	09/03/21 17:46	09/13/21 08:26	7439-93-2	
Magnesium, Dissolved	**471**	mg/L	5.0	0.50	50	09/03/21 17:46	09/13/21 08:26	7439-95-4	
Molybdenum, Dissolved	ND	mg/L	0.050	0.0063	50	09/03/21 17:46	09/13/21 08:26	7439-98-7	
Selenium, Dissolved	ND	mg/L	0.10	0.0036	50	09/03/21 17:46	09/13/21 08:26	7782-49-2	
Thallium, Dissolved	ND	mg/L	0.024	0.0025	50	09/03/21 17:46	09/13/21 08:26	7440-28-0	
7470 Mercury, Dissolved	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury, Dissolved	ND	mg/L	0.00020	0.00012	1	09/09/21 16:50	09/15/21 14:55	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**508**	mg/L	5.0	5.0	1		09/03/21 21:21		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		09/03/21 21:21		
Alkalinity, Total as CaCO3	**508**	mg/L	5.0	5.0	1		09/03/21 21:21		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	**64.0**	mg/L	25.0	12.5	250		09/01/21 04:38	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Sulfate	**545**	mg/L	50.0	25.0	50		09/03/21 15:07	14808-79-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
9800 Kincey Ave. Suite 100
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ANALYTICAL RESULTS

Project: MCMANUS GAPOWER 30050105.00009
Pace Project No.: 92558347

Sample: PRB-1-2 (72 HOUR) (F) **Lab ID: 92558347031** Collected: 08/27/21 13:10 Received: 08/30/21 12:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS, Dissolved	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Aluminum, Dissolved	ND	mg/L	1.0	0.37	50	09/03/21 17:46	09/13/21 08:57	7429-90-5	
Arsenic, Dissolved	ND	mg/L	0.050	0.0043	50	09/03/21 17:46	09/13/21 08:57	7440-38-2	
Calcium, Dissolved	**244**	mg/L	10.0	1.8	50	09/03/21 17:46	09/13/21 08:57	7440-70-2	
Iron, Dissolved	ND	mg/L	2.5	1.0	50	09/03/21 17:46	09/13/21 08:57	7439-89-6	
Magnesium, Dissolved	**485**	mg/L	20.0	2.0	200	09/03/21 17:46	09/14/21 16:11	7439-95-4	
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**532**	mg/L	5.0	5.0	1		09/07/21 12:18		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		09/07/21 12:18		
Alkalinity, Total as CaCO3	**532**	mg/L	5.0	5.0	1		09/07/21 12:18		M1
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	**67.4**	mg/L	25.0	12.5	250		09/01/21 04:39	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Sulfate	**574**	mg/L	50.0	25.0	50		09/03/21 15:23	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: MCMANUS GAPOWER 30050105.00009
Pace Project No.: 92558347

Sample: PRB-1-3 (72 HOUR) (F) **Lab ID: 92558347032** Collected: 08/27/21 13:20 Received: 08/30/21 12:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS, Dissolved	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Aluminum, Dissolved	ND	mg/L	1.0	0.37	50	09/03/21 17:46	09/13/21 09:02	7429-90-5	
Arsenic, Dissolved	ND	mg/L	0.050	0.0043	50	09/03/21 17:46	09/13/21 09:02	7440-38-2	
Calcium, Dissolved	**240**	mg/L	10.0	1.8	50	09/03/21 17:46	09/13/21 09:02	7440-70-2	
Iron, Dissolved	ND	mg/L	2.5	1.0	50	09/03/21 17:46	09/13/21 09:02	7439-89-6	
Magnesium, Dissolved	**480**	mg/L	20.0	2.0	200	09/03/21 17:46	09/14/21 16:15	7439-95-4	
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**515**	mg/L	5.0	5.0	1		09/07/21 12:48		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		09/07/21 12:48		
Alkalinity, Total as CaCO3	**515**	mg/L	5.0	5.0	1		09/07/21 12:48		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	**29.6**	mg/L	25.0	12.5	250		09/01/21 04:39	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Sulfate	**583**	mg/L	50.0	25.0	50		09/03/21 22:34	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: MCMANUS GAPOWER 30050105.00009
Pace Project No.: 92558347

Sample: PRB-1-5 (72 HOUR) (F) **Lab ID: 92558347033** Collected: 08/27/21 13:40 Received: 08/30/21 12:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS, Dissolved	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Aluminum, Dissolved	ND	mg/L	1.0	0.37	50	09/03/21 17:46	09/13/21 09:06	7429-90-5	
Arsenic, Dissolved	ND	mg/L	0.050	0.0043	50	09/03/21 17:46	09/13/21 09:06	7440-38-2	
Calcium, Dissolved	**248**	mg/L	10.0	1.8	50	09/03/21 17:46	09/13/21 09:06	7440-70-2	
Iron, Dissolved	ND	mg/L	2.5	1.0	50	09/03/21 17:46	09/13/21 09:06	7439-89-6	
Magnesium, Dissolved	**465**	mg/L	20.0	2.0	200	09/03/21 17:46	09/14/21 16:18	7439-95-4	
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**569**	mg/L	5.0	5.0	1		09/07/21 12:58		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		09/07/21 12:58		
Alkalinity, Total as CaCO3	**569**	mg/L	5.0	5.0	1		09/07/21 12:58		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	**55.5**	mg/L	25.0	12.5	250		09/01/21 04:40	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Sulfate	**595**	mg/L	50.0	25.0	50		09/03/21 22:54	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: MCMANUS GAPOWER 30050105.00009
Pace Project No.: 92558347

Sample: PRB-1-6 (72 HOUR) (F) **Lab ID: 92558347034** Collected: 08/27/21 13:50 Received: 08/30/21 12:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS, Dissolved	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Aluminum, Dissolved	ND	mg/L	1.0	0.37	50	09/03/21 17:46	09/13/21 09:33	7429-90-5	
Arsenic, Dissolved	ND	mg/L	0.050	0.0043	50	09/03/21 17:46	09/13/21 09:33	7440-38-2	
Calcium, Dissolved	**257**	mg/L	10.0	1.8	50	09/03/21 17:46	09/13/21 09:33	7440-70-2	
Iron, Dissolved	ND	mg/L	2.5	1.0	50	09/03/21 17:46	09/13/21 09:33	7439-89-6	
Magnesium, Dissolved	**472**	mg/L	20.0	2.0	200	09/03/21 17:46	09/14/21 16:22	7439-95-4	
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**551**	mg/L	5.0	5.0	1		09/07/21 13:08		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		09/07/21 13:08		
Alkalinity, Total as CaCO3	**551**	mg/L	5.0	5.0	1		09/07/21 13:08		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	**16.7**	mg/L	2.5	1.2	25		09/01/21 04:40	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Sulfate	**605**	mg/L	100	50.0	100		09/03/21 23:09	14808-79-8	M1

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: MCMANUS GAPOWER 30050105.00009
Pace Project No.: 92558347

Sample: PRB-1-8 (72 HOUR) (F) **Lab ID: 92558347035** Collected: 08/27/21 14:10 Received: 08/30/21 12:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS, Dissolved	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Aluminum, Dissolved	ND	mg/L	1.0	0.37	50	09/03/21 17:46	09/13/21 09:37	7429-90-5	
Arsenic, Dissolved	ND	mg/L	0.050	0.0043	50	09/03/21 17:46	09/13/21 09:37	7440-38-2	
Calcium, Dissolved	**249**	mg/L	10.0	1.8	50	09/03/21 17:46	09/13/21 09:37	7440-70-2	
Iron, Dissolved	ND	mg/L	2.5	1.0	50	09/03/21 17:46	09/13/21 09:37	7439-89-6	
Magnesium, Dissolved	**483**	mg/L	20.0	2.0	200	09/03/21 17:46	09/14/21 16:25	7439-95-4	
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**532**	mg/L	5.0	5.0	1		09/07/21 13:18		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		09/07/21 13:18		
Alkalinity, Total as CaCO3	**532**	mg/L	5.0	5.0	1		09/07/21 13:18		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	**58.4**	mg/L	25.0	12.5	250		09/01/21 04:40	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Sulfate	**593**	mg/L	50.0	25.0	50		09/03/21 23:55	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: MCMANUS GAPOWER 30050105.00009
Pace Project No.: 92558347

Sample: PRB-1-9 (72 HOUR) (F) **Lab ID: 92558347036** Collected: 08/27/21 14:20 Received: 08/30/21 12:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS, Dissolved	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Aluminum, Dissolved	ND	mg/L	1.0	0.37	50	09/03/21 17:46	09/13/21 09:42	7429-90-5	
Arsenic, Dissolved	ND	mg/L	0.050	0.0043	50	09/03/21 17:46	09/13/21 09:42	7440-38-2	
Calcium, Dissolved	**245**	mg/L	10.0	1.8	50	09/03/21 17:46	09/13/21 09:42	7440-70-2	
Iron, Dissolved	ND	mg/L	2.5	1.0	50	09/03/21 17:46	09/13/21 09:42	7439-89-6	
Magnesium, Dissolved	**491**	mg/L	20.0	2.0	200	09/03/21 17:46	09/14/21 16:29	7439-95-4	
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**529**	mg/L	5.0	5.0	1		09/07/21 13:38		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		09/07/21 13:38		
Alkalinity, Total as CaCO3	**529**	mg/L	5.0	5.0	1		09/07/21 13:38		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	**74.8**	mg/L	25.0	12.5	250		09/01/21 04:41	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Sulfate	**639**	mg/L	50.0	25.0	50		09/04/21 00:10	14808-79-8	

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QUALITY CONTROL DATA

Project: MCMANUS GAPOWER 30050105.00009
Pace Project No.: 92558347

QC Batch: 647630
QC Batch Method: EPA 7470A
Analysis Method: EPA 7470A
Analysis Description: 7470 Mercury
Laboratory: Pace Analytical Services - Peachtree Corners, GA
Associated Lab Samples: 92558347023, 92558347024, 92558347025, 92558347026

METHOD BLANK: 3396744 Matrix: Water
Associated Lab Samples: 92558347023, 92558347024, 92558347025, 92558347026

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	ug/L	ND	0.20	0.078	09/16/21 13:04	

LABORATORY CONTROL SAMPLE: 3396745

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	2.5	2.5	98	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3396746 3396747

Parameter	Units	92558574001 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	2.4	2.4	94	95	75-125	1	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: MCMANUS GAPOWER 30050105.00009
Pace Project No.: 92558347

QC Batch: 649002 | Analysis Method: EPA 7470A
QC Batch Method: EPA 7470A | Analysis Description: 7470 Mercury Dissolved
Laboratory: Pace Analytical Services - Peachtree Corners, GA
Associated Lab Samples: 92558347027, 92558347028, 92558347029, 92558347030

METHOD BLANK: 3403969 Matrix: Water
Associated Lab Samples: 92558347027, 92558347028, 92558347029, 92558347030

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury, Dissolved	ug/L	ND	0.20	0.078	09/23/21 14:48	

LABORATORY CONTROL SAMPLE: 3403970

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury, Dissolved	ug/L	2.5	2.6	105	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3403971 3403972

Parameter	Units	92560522002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury, Dissolved	ug/L	ND	2.5	2.5	2.7	2.7	107	107	75-125	1	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: MCMANUS GAPOWER 30050105.00009
Pace Project No.: 92558347

QC Batch: 647480 | Analysis Method: EPA 7470A
QC Batch Method: EPA 7470A | Analysis Description: 7470 Mercury
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92558347023, 92558347024, 92558347025, 92558347026

METHOD BLANK: 3396243 Matrix: Water
Associated Lab Samples: 92558347023, 92558347024, 92558347025, 92558347026

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00020	0.00012	09/15/21 11:40	

LABORATORY CONTROL SAMPLE: 3396244

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	0.0025	0.0024	95	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3396245 3396246

Parameter	Units	92556719001 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	0.0021	86	85	75-125	1	25	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: MCMANUS GAPOWER 30050105.00009
Pace Project No.: 92558347

QC Batch: 647478 | Analysis Method: EPA 7470A
QC Batch Method: EPA 7470A | Analysis Description: 7470 Mercury Dissolved
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92558347027, 92558347028, 92558347029, 92558347030

METHOD BLANK: 3396234 Matrix: Water
Associated Lab Samples: 92558347027, 92558347028, 92558347029, 92558347030

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury, Dissolved	mg/L	ND	0.00020	0.00012	09/15/21 14:38	

LABORATORY CONTROL SAMPLE: 3396235

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury, Dissolved	mg/L	0.0025	0.0024	95	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3396236 3396237

Parameter	Units	92558347027 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury, Dissolved	mg/L	ND	0.0025	0.0025	0.0025	0.0022	98	89	75-125	10	25	

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QUALITY CONTROL DATA

Project: MCMANUS GAPOWER 30050105.00009
Pace Project No.: 92558347

QC Batch: 644737
QC Batch Method: EPA 3010A
Analysis Method: EPA 6020B
Analysis Description: 6020 MET
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92558347001, 92558347002, 92558347003, 92558347004, 92558347005, 92558347006, 92558347007, 92558347008, 92558347009, 92558347010, 92558347011, 92558347012, 92558347013, 92558347014, 92558347023, 92558347024

METHOD BLANK: 3382417
Matrix: Water
Associated Lab Samples: 92558347001, 92558347002, 92558347003, 92558347004, 92558347005, 92558347006, 92558347007, 92558347008, 92558347009, 92558347010, 92558347011, 92558347012, 92558347013, 92558347014, 92558347023, 92558347024

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Aluminum	mg/L	ND	0.020	0.0074	09/14/21 23:43	
Antimony	mg/L	ND	0.0010	0.00020	09/14/21 23:43	
Arsenic	mg/L	ND	0.0010	0.000087	09/14/21 23:43	
Barium	mg/L	ND	0.0010	0.00021	09/14/21 23:43	
Beryllium	mg/L	ND	0.00010	0.000050	09/15/21 14:51	
Cadmium	mg/L	ND	0.00020	0.000060	09/14/21 23:43	
Calcium	mg/L	ND	0.20	0.035	09/14/21 23:43	
Chromium	mg/L	ND	0.0010	0.00050	09/14/21 23:43	
Cobalt	mg/L	ND	0.0010	0.000050	09/14/21 23:43	
Iron	mg/L	ND	0.050	0.021	09/14/21 23:43	
Lead	mg/L	ND	0.0010	0.000077	09/14/21 23:43	
Lithium	mg/L	ND	0.0025	0.00050	09/14/21 23:43	
Magnesium	mg/L	ND	0.10	0.010	09/14/21 23:43	
Molybdenum	mg/L	ND	0.0010	0.00013	09/14/21 23:43	
Selenium	mg/L	ND	0.0020	0.000072	09/14/21 23:43	
Thallium	mg/L	ND	0.00047	0.000050	09/14/21 23:43	

LABORATORY CONTROL SAMPLE: 3382418

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	2.5	2.5	101	80-120	
Antimony	mg/L	0.05	0.049	98	80-120	
Arsenic	mg/L	0.05	0.047	94	80-120	
Barium	mg/L	0.05	0.049	97	80-120	
Beryllium	mg/L	0.05	0.048	97	80-120	
Cadmium	mg/L	0.05	0.050	101	80-120	
Calcium	mg/L	2.5	2.5	98	80-120	
Chromium	mg/L	0.05	0.052	103	80-120	
Cobalt	mg/L	0.05	0.052	104	80-120	
Iron	mg/L	1.2	1.3	104	80-120	
Lead	mg/L	0.05	0.049	99	80-120	
Lithium	mg/L	0.05	0.048	97	80-120	
Magnesium	mg/L	2.5	2.5	100	80-120	
Molybdenum	mg/L	0.05	0.050	99	80-120	
Selenium	mg/L	0.05	0.050	100	80-120	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: MCMANUS GAPOWER 30050105.00009
Pace Project No.: 92558347

LABORATORY CONTROL SAMPLE: 3382418

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Thallium	mg/L	0.025	0.025	100	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3382419 3382420

Parameter	Units	92557041001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	mg/L	ND	2.5	2.5	2.6	2.9	103	116	75-125	12	20	
Antimony	mg/L	ND	0.05	0.05	.048J	0.055	96	110	75-125		20	
Arsenic	mg/L	0.32	0.05	0.05	0.41	0.43	168	214	75-125	6	20	M1
Barium	mg/L	0.13	0.05	0.05	0.19	0.20	115	139	75-125	6	20	M1
Beryllium	mg/L	ND	0.05	0.05	0.047	0.048	94	97	75-125	3	20	
Cadmium	mg/L	ND	0.05	0.05	0.051	0.054	101	108	75-125	6	20	
Calcium	mg/L	247	2.5	2.5	259	260	472	514	75-125	0	20	M1
Chromium	mg/L	ND	0.05	0.05	.046J	0.051	93	102	75-125		20	
Cobalt	mg/L	ND	0.05	0.05	0.052	0.057	104	112	75-125	8	20	
Iron	mg/L	ND	1.2	1.2	1.4J	1.6J	99	117	75-125		20	
Lead	mg/L	ND	0.05	0.05	0.050	0.054	101	108	75-125	7	20	
Lithium	mg/L	ND	0.05	0.05	0.14	0.14	105	105	75-125	0	20	
Magnesium	mg/L	523	2.5	2.5	524	523	27	12	75-125	0	20	M1
Molybdenum	mg/L	ND	0.05	0.05	0.052	0.059	97	111	75-125	13	20	
Selenium	mg/L	ND	0.05	0.05	.023J	.022J	45	43	75-125		20	M1
Thallium	mg/L	ND	0.025	0.025	0.026	0.027	103	108	75-125	5	20	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
9800 Kincey Ave. Suite 100
Huntersville, NC 28078
(704)875-9092

QUALITY CONTROL DATA

Project: MCMANUS GAPOWER 30050105.00009
Pace Project No.: 92558347

QC Batch: 645527
QC Batch Method: EPA 3010A
Analysis Method: EPA 6020B
Analysis Description: 6020 MET
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92558347025, 92558347026

METHOD BLANK: 3386305 Matrix: Water
Associated Lab Samples: 92558347025, 92558347026

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Aluminum	mg/L	ND	0.020	0.0074	09/15/21 06:03	
Antimony	mg/L	ND	0.0010	0.00020	09/15/21 06:03	
Arsenic	mg/L	ND	0.0010	0.000087	09/15/21 06:03	
Barium	mg/L	ND	0.0010	0.00021	09/15/21 06:03	
Beryllium	mg/L	ND	0.00010	0.000050	09/15/21 06:03	
Cadmium	mg/L	ND	0.00020	0.000060	09/15/21 06:03	
Calcium	mg/L	ND	0.20	0.035	09/15/21 06:03	
Chromium	mg/L	ND	0.0010	0.00050	09/15/21 06:03	
Cobalt	mg/L	ND	0.0010	0.000050	09/15/21 06:03	
Iron	mg/L	ND	0.050	0.021	09/15/21 06:03	
Lead	mg/L	ND	0.0010	0.000077	09/15/21 06:03	
Lithium	mg/L	ND	0.0025	0.00050	09/15/21 06:03	
Magnesium	mg/L	ND	0.10	0.010	09/15/21 06:03	
Molybdenum	mg/L	ND	0.0010	0.00013	09/15/21 06:03	
Selenium	mg/L	ND	0.0020	0.000072	09/15/21 06:03	
Thallium	mg/L	ND	0.00047	0.000050	09/15/21 06:03	

LABORATORY CONTROL SAMPLE: 3386306

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	2.5	2.6	106	80-120	
Antimony	mg/L	0.05	0.052	103	80-120	
Arsenic	mg/L	0.05	0.047	95	80-120	
Barium	mg/L	0.05	0.047	95	80-120	
Beryllium	mg/L	0.05	0.049	97	80-120	
Cadmium	mg/L	0.05	0.051	102	80-120	
Calcium	mg/L	2.5	2.6	104	80-120	
Chromium	mg/L	0.05	0.053	106	80-120	
Cobalt	mg/L	0.05	0.053	105	80-120	
Iron	mg/L	1.2	1.3	107	80-120	
Lead	mg/L	0.05	0.050	99	80-120	
Lithium	mg/L	0.05	0.051	102	80-120	
Magnesium	mg/L	2.5	2.6	105	80-120	
Molybdenum	mg/L	0.05	0.053	105	80-120	
Selenium	mg/L	0.05	0.052	104	80-120	
Thallium	mg/L	0.025	0.025	101	80-120	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
9800 Kincey Ave. Suite 100
Huntersville, NC 28078
(704)875-9092

QUALITY CONTROL DATA

Project: MCMANUS GAPOWER 30050105.00009
Pace Project No.: 92558347

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3386307 3386308

Parameter	Units	92558347025 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	mg/L	ND	2.5	2.5	2.5	2.6	99	103	75-125	4	20	
Antimony	mg/L	ND	0.05	0.05	0.052	0.051	104	102	75-125	2	20	
Arsenic	mg/L	ND	0.05	0.05	.049J	.049J	92	92	75-125		20	
Barium	mg/L	0.096	0.05	0.05	0.14	0.14	93	92	75-125	0	20	
Beryllium	mg/L	ND	0.05	0.05	0.045	0.046	88	92	75-125	4	20	
Cadmium	mg/L	ND	0.05	0.05	0.050	0.048	100	96	75-125	4	20	
Calcium	mg/L	253	2.5	2.5	245	250	-340	-137	75-125	2	20	M1
Chromium	mg/L	ND	0.05	0.05	.04J	.043J	81	86	75-125		20	
Cobalt	mg/L	ND	0.05	0.05	0.053	0.051	104	102	75-125	2	20	
Iron	mg/L	ND	1.2	1.2	2.7	2.8	80	88	75-125	4	20	
Lead	mg/L	ND	0.05	0.05	.047J	.048J	94	96	75-125		20	
Lithium	mg/L	ND	0.05	0.05	0.14	0.14	87	92	75-125	2	20	
Magnesium	mg/L	499	2.5	2.5	491	490	-287	-336	75-125	0	20	M1
Molybdenum	mg/L	ND	0.05	0.05	0.053	0.054	102	102	75-125	1	20	
Selenium	mg/L	ND	0.05	0.05	.047J	.049J	95	98	75-125		20	
Thallium	mg/L	ND	0.025	0.025	0.025	0.024	100	96	75-125	4	20	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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QUALITY CONTROL DATA

Project: MCMANUS GAPOWER 30050105.00009
Pace Project No.: 92558347

QC Batch: 645173
QC Batch Method: EPA 3010A
Analysis Method: EPA 6020B
Analysis Description: 6020 MET Dissolved
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92558347015, 92558347016, 92558347017, 92558347018, 92558347019, 92558347020, 92558347021, 92558347022, 92558347027, 92558347028, 92558347029, 92558347030, 92558347031, 92558347032, 92558347033, 92558347034, 92558347035, 92558347036

METHOD BLANK: 3384692 Matrix: Water
Associated Lab Samples: 92558347015, 92558347016, 92558347017, 92558347018, 92558347019, 92558347020, 92558347021, 92558347022, 92558347027, 92558347028, 92558347029, 92558347030, 92558347031, 92558347032, 92558347033, 92558347034, 92558347035, 92558347036

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Aluminum, Dissolved	mg/L	ND	0.020	0.0074	09/11/21 00:02	
Antimony, Dissolved	mg/L	ND	0.0010	0.00020	09/11/21 00:02	
Arsenic, Dissolved	mg/L	ND	0.0010	0.000087	09/11/21 00:02	
Barium, Dissolved	mg/L	ND	0.0010	0.00021	09/11/21 00:02	
Beryllium, Dissolved	mg/L	ND	0.00010	0.000050	09/11/21 00:02	
Cadmium, Dissolved	mg/L	ND	0.00020	0.000060	09/11/21 00:02	
Calcium, Dissolved	mg/L	ND	0.20	0.035	09/11/21 00:02	
Chromium, Dissolved	mg/L	ND	0.0010	0.00050	09/11/21 00:02	
Cobalt, Dissolved	mg/L	ND	0.0010	0.000050	09/11/21 00:02	
Iron, Dissolved	mg/L	ND	0.050	0.021	09/11/21 00:02	
Lead, Dissolved	mg/L	ND	0.0010	0.000077	09/11/21 00:02	
Lithium, Dissolved	mg/L	ND	0.0025	0.00050	09/11/21 00:02	
Magnesium, Dissolved	mg/L	ND	0.10	0.010	09/11/21 00:02	
Molybdenum, Dissolved	mg/L	ND	0.0010	0.00013	09/11/21 00:02	
Selenium, Dissolved	mg/L	ND	0.0020	0.000072	09/11/21 00:02	
Thallium, Dissolved	mg/L	ND	0.00047	0.000050	09/11/21 00:02	

LABORATORY CONTROL SAMPLE: 3384693

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum, Dissolved	mg/L	2.5	2.4	95	80-120	
Antimony, Dissolved	mg/L	0.05	0.044	88	80-120	
Arsenic, Dissolved	mg/L	0.05	0.043	86	80-120	
Barium, Dissolved	mg/L	0.05	0.044	87	80-120	
Beryllium, Dissolved	mg/L	0.05	0.049	99	80-120	
Cadmium, Dissolved	mg/L	0.05	0.045	91	80-120	
Calcium, Dissolved	mg/L	2.5	2.3	91	80-120	
Chromium, Dissolved	mg/L	0.05	0.046	93	80-120	
Cobalt, Dissolved	mg/L	0.05	0.047	95	80-120	
Iron, Dissolved	mg/L	1.2	1.2	94	80-120	
Lead, Dissolved	mg/L	0.05	0.045	90	80-120	
Lithium, Dissolved	mg/L	0.05	0.049	98	80-120	
Magnesium, Dissolved	mg/L	2.5	2.4	94	80-120	
Molybdenum, Dissolved	mg/L	0.05	0.045	89	80-120	
Selenium, Dissolved	mg/L	0.05	0.047	94	80-120	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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(704)875-9092

QUALITY CONTROL DATA

Project: MCMANUS GAPOWER 30050105.00009
Pace Project No.: 92558347

LABORATORY CONTROL SAMPLE: 3384693

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Thallium, Dissolved	mg/L	0.025	0.022	90	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3384694 3384695

Parameter	Units	92558347015 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum, Dissolved	mg/L	ND	2.5	2.5	2.4	2.6	94	101	75-125	6	20	
Antimony, Dissolved	mg/L	ND	0.05	0.05	0.048	0.050	95	99	75-125	4	20	
Arsenic, Dissolved	mg/L	0.31	0.05	0.05	0.34	0.36	74	106	75-125	4	20	M1
Barium, Dissolved	mg/L	0.14	0.05	0.05	0.18	0.19	93	108	75-125	4	20	
Beryllium, Dissolved	mg/L	ND	0.05	0.05	0.046	0.047	91	93	75-125	2	20	
Cadmium, Dissolved	mg/L	ND	0.05	0.05	0.047	0.049	93	98	75-125	5	20	
Calcium, Dissolved	mg/L	518	2.5	2.5	268	ND	-9980	-20700	75-125		20	M1
Chromium, Dissolved	mg/L	ND	0.05	0.05	0.042	0.046	85	92	75-125	8	20	
Cobalt, Dissolved	mg/L	0.16	0.05	0.05	0.20	0.21	88	107	75-125	5	20	
Iron, Dissolved	mg/L	8750	1.2	1.2	4170	ND	-367000	-700000	75-125		20	M1
Lead, Dissolved	mg/L	ND	0.05	0.05	0.046	0.050	92	100	75-125	8	20	
Lithium, Dissolved	mg/L	0.087	0.05	0.05	0.13	0.13	86	89	75-125	1	20	
Magnesium, Dissolved	mg/L	970	2.5	2.5	497	ND	-18900	-38800	75-125		20	M1
Molybdenum, Dissolved	mg/L	ND	0.05	0.05	0.049	0.051	92	96	75-125	4	20	
Selenium, Dissolved	mg/L	ND	0.05	0.05	0.044	0.044	88	87	75-125	2	20	
Thallium, Dissolved	mg/L	ND	0.025	0.025	0.024	0.024	93	97	75-125	4	20	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
9800 Kincey Ave. Suite 100
Huntersville, NC 28078
(704)875-9092

QUALITY CONTROL DATA

Project: MCMANUS GAPOWER 30050105.00009
Pace Project No.: 92558347

QC Batch: 645064
QC Batch Method: SM 2320B-2011
Analysis Method: SM 2320B-2011
Analysis Description: 2320B Alkalinity
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92558347027, 92558347028, 92558347029, 92558347030

METHOD BLANK: 3384059 Matrix: Water
Associated Lab Samples: 92558347027, 92558347028, 92558347029, 92558347030

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	ND	5.0	5.0	09/03/21 17:19	
Alkalinity,Bicarbonate (CaCO3)	mg/L	ND	5.0	5.0	09/03/21 17:19	
Alkalinity,Carbonate (CaCO3)	mg/L	ND	5.0	5.0	09/03/21 17:19	

LABORATORY CONTROL SAMPLE: 3384060

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	50	53.4	107	80-120	

LABORATORY CONTROL SAMPLE: 3384061

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	50	51.5	103	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3384062 3384063

Parameter	Units	92555948049 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	128	50	50	176	176	97	97	80-120	0	25	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3384064 3384065

Parameter	Units	92557720004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	13.9	50	50	67.2	66.7	107	105	80-120	1	25	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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Huntersville, NC 28078
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QUALITY CONTROL DATA

Project: MCMANUS GAPOWER 30050105.00009
Pace Project No.: 92558347

QC Batch: 645417 | Analysis Method: SM 2320B-2011
QC Batch Method: SM 2320B-2011 | Analysis Description: 2320B Alkalinity
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92558347031, 92558347032, 92558347033, 92558347034, 92558347035, 92558347036

METHOD BLANK: 3385562 Matrix: Water
Associated Lab Samples: 92558347031, 92558347032, 92558347033, 92558347034, 92558347035, 92558347036

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	ND	5.0	5.0	09/07/21 11:59	
Alkalinity,Bicarbonate (CaCO3)	mg/L	ND	5.0	5.0	09/07/21 11:59	
Alkalinity,Carbonate (CaCO3)	mg/L	ND	5.0	5.0	09/07/21 11:59	

LABORATORY CONTROL SAMPLE: 3385563

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	50	48.1	96	80-120	

LABORATORY CONTROL SAMPLE: 3385564

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	50	49.7	99	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3385565 3385566

Parameter	Units	92558347031 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	532	50	50	568	560	73	55	80-120	2	25	M1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3385567 3385568

Parameter	Units	92559263002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	71.2	50	50	121	121	99	99	80-120	0	25	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
9800 Kincey Ave. Suite 100
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QUALITY CONTROL DATA

Project: MCMANUS GAPOWER 30050105.00009
Pace Project No.: 92558347

QC Batch: 644355
QC Batch Method: SM 4500-S2D-2011
Analysis Method: SM 4500-S2D-2011
Analysis Description: 4500S2D Sulfide Water
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92558347015, 92558347016, 92558347017, 92558347018, 92558347019, 92558347020, 92558347021, 92558347022, 92558347027, 92558347028, 92558347029, 92558347030, 92558347031, 92558347032, 92558347033, 92558347034, 92558347035, 92558347036

METHOD BLANK: 3380784 Matrix: Water
Associated Lab Samples: 92558347015, 92558347016, 92558347017, 92558347018, 92558347019, 92558347020, 92558347021, 92558347022, 92558347027, 92558347028, 92558347029, 92558347030, 92558347031, 92558347032, 92558347033, 92558347034, 92558347035, 92558347036

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Sulfide	mg/L	ND	0.10	0.050	09/01/21 04:34	

LABORATORY CONTROL SAMPLE: 3380785

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfide	mg/L	0.5	0.53	106	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3380786 3380787

Parameter	Units	92558484004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfide	mg/L	ND	0.5	0.5	0.51	0.53	100	104	80-120	4	10	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3380788 3380789

Parameter	Units	92558484003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfide	mg/L	ND	0.5	0.5	0.51	0.53	101	105	80-120	4	10	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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QUALITY CONTROL DATA

Project: MCMANUS GAPOWER 30050105.00009
Pace Project No.: 92558347

QC Batch: 644343
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: 92558347015, 92558347016, 92558347017, 92558347018, 92558347019, 92558347020, 92558347021, 92558347022, 92558347027, 92558347028, 92558347029, 92558347030, 92558347031, 92558347032, 92558347033

METHOD BLANK: 3380746 Matrix: Water
Associated Lab Samples: 92558347015, 92558347016, 92558347017, 92558347018, 92558347019, 92558347020, 92558347021, 92558347022, 92558347027, 92558347028, 92558347029, 92558347030, 92558347031, 92558347032, 92558347033

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Sulfate	mg/L	ND	1.0	0.50	09/01/21 20:14	

LABORATORY CONTROL SAMPLE: 3380747

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	50	51.6	103	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3380748 3380749

Parameter	Units	92558521003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	1050	50	50	274J	286J	-1550	-1530	90-110		10	M1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3380750 3380751

Parameter	Units	92558347020 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	609	50	50	666	657	113	96	90-110	1	10	M1

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REPORT OF LABORATORY ANALYSIS

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Huntersville, NC 28078
(704)875-9092

QUALITY CONTROL DATA

Project: MCMANUS GAPOWER 30050105.00009
Pace Project No.: 92558347

QC Batch: 644344
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: 92558347034, 92558347035, 92558347036

METHOD BLANK: 3380752 Matrix: Water
Associated Lab Samples: 92558347034, 92558347035, 92558347036

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Sulfate	mg/L	ND	1.0	0.50	09/02/21 03:43	

LABORATORY CONTROL SAMPLE: 3380753

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	50	53.6	107	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3380754 3380755

Parameter	Units	92558347034 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	605	50	50	643	643	75	76	90-110	0	10	M1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3380756 3380757

Parameter	Units	92556443008 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	187	50	50	229	231	84	88	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.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
9800 Kincey Ave. Suite 100
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QUALIFIERS

Project: MCMANUS GAPOWER 30050105.00009
Pace Project No.: 92558347

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.

Reported results are not rounded until the final step prior to reporting. Therefore, calculated parameters that are typically reported as "Total" may vary slightly from the sum of the reported component parameters.

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.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: MCMANUS GAPOWER 30050105.00009
Pace Project No.: 92558347

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
92558347023	PRB-1-1 (72 HOUR)	EPA 7470A	647630	EPA 7470A	647659
92558347024	PRB-1-4 (72 HOUR)	EPA 7470A	647630	EPA 7470A	647659
92558347025	PRB-1-7 (72 HOUR)	EPA 7470A	647630	EPA 7470A	647659
92558347026	PRB-1-10 (72 HOUR)	EPA 7470A	647630	EPA 7470A	647659
92558347027	PRB-1-1 (72 HOUR) (F)	EPA 7470A	649002	EPA 7470A	649049
92558347028	PRB-1-4 (72 HOUR) (F)	EPA 7470A	649002	EPA 7470A	649049
92558347029	PRB-1-7 (72 HOUR) (F)	EPA 7470A	649002	EPA 7470A	649049
92558347030	PRB-1-10 (72 HOUR) (F)	EPA 7470A	649002	EPA 7470A	649049
92558347001	IR-1-2 (5 HOUR)	EPA 3010A	644737	EPA 6020B	644916
92558347002	IR-1-3 (5 HOUR)	EPA 3010A	644737	EPA 6020B	644916
92558347003	IR-1-4 (5 HOUR)	EPA 3010A	644737	EPA 6020B	644916
92558347004	IR-1-5 (5 HOUR)	EPA 3010A	644737	EPA 6020B	644916
92558347005	IR-1-2 (72 HOUR)	EPA 3010A	644737	EPA 6020B	644916
92558347006	IR-1-3 (72 HOUR)	EPA 3010A	644737	EPA 6020B	644916
92558347007	IR-1-4 (72 HOUR)	EPA 3010A	644737	EPA 6020B	644916
92558347008	IR-1-5 (72 HOUR)	EPA 3010A	644737	EPA 6020B	644916
92558347009	PRB-1-2 (72 HOUR)	EPA 3010A	644737	EPA 6020B	644916
92558347010	PRB-1-3 (72 HOUR)	EPA 3010A	644737	EPA 6020B	644916
92558347011	PRB-1-5 (72 HOUR)	EPA 3010A	644737	EPA 6020B	644916
92558347012	PRB-1-6 (72 HOUR)	EPA 3010A	644737	EPA 6020B	644916
92558347013	PRB-1-8 (72 HOUR)	EPA 3010A	644737	EPA 6020B	644916
92558347014	PRB-1-9 (72 HOUR)	EPA 3010A	644737	EPA 6020B	644916
92558347023	PRB-1-1 (72 HOUR)	EPA 3010A	644737	EPA 6020B	644916
92558347024	PRB-1-4 (72 HOUR)	EPA 3010A	644737	EPA 6020B	644916
92558347025	PRB-1-7 (72 HOUR)	EPA 3010A	645527	EPA 6020B	645913
92558347026	PRB-1-10 (72 HOUR)	EPA 3010A	645527	EPA 6020B	645913
92558347015	IR-1-2 (5 HOUR) (F)	EPA 3010A	645173	EPA 6020B	645262
92558347016	IR-1-3 (5 HOUR) (F)	EPA 3010A	645173	EPA 6020B	645262
92558347017	IR-1-4 (5 HOUR) (F)	EPA 3010A	645173	EPA 6020B	645262
92558347018	IR-1-5 (5 HOUR) (F)	EPA 3010A	645173	EPA 6020B	645262
92558347019	IR-1-2 (72 HOUR) (F)	EPA 3010A	645173	EPA 6020B	645262
92558347020	IR-1-3 (72 HOUR) (F)	EPA 3010A	645173	EPA 6020B	645262
92558347021	IR-1-4 (72 HOUR) (F)	EPA 3010A	645173	EPA 6020B	645262
92558347022	IR-1-5 (72 HOUR) (F)	EPA 3010A	645173	EPA 6020B	645262
92558347027	PRB-1-1 (72 HOUR) (F)	EPA 3010A	645173	EPA 6020B	645262
92558347028	PRB-1-4 (72 HOUR) (F)	EPA 3010A	645173	EPA 6020B	645262
92558347029	PRB-1-7 (72 HOUR) (F)	EPA 3010A	645173	EPA 6020B	645262
92558347030	PRB-1-10 (72 HOUR) (F)	EPA 3010A	645173	EPA 6020B	645262
92558347031	PRB-1-2 (72 HOUR) (F)	EPA 3010A	645173	EPA 6020B	645262
92558347032	PRB-1-3 (72 HOUR) (F)	EPA 3010A	645173	EPA 6020B	645262
92558347033	PRB-1-5 (72 HOUR) (F)	EPA 3010A	645173	EPA 6020B	645262
92558347034	PRB-1-6 (72 HOUR) (F)	EPA 3010A	645173	EPA 6020B	645262
92558347035	PRB-1-8 (72 HOUR) (F)	EPA 3010A	645173	EPA 6020B	645262
92558347036	PRB-1-9 (72 HOUR) (F)	EPA 3010A	645173	EPA 6020B	645262
92558347023	PRB-1-1 (72 HOUR)	EPA 7470A	647480	EPA 7470A	647620
92558347024	PRB-1-4 (72 HOUR)	EPA 7470A	647480	EPA 7470A	647620

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: MCMANUS GAPOWER 30050105.00009
Pace Project No.: 92558347

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
92558347025	**PRB-1-7 (72 HOUR)**	EPA 7470A	647480	EPA 7470A	647620
92558347026	**PRB-1-10 (72 HOUR)**	EPA 7470A	647480	EPA 7470A	647620
92558347027	**PRB-1-1 (72 HOUR) (F)**	EPA 7470A	647478	EPA 7470A	647636
92558347028	**PRB-1-4 (72 HOUR) (F)**	EPA 7470A	647478	EPA 7470A	647636
92558347029	**PRB-1-7 (72 HOUR) (F)**	EPA 7470A	647478	EPA 7470A	647636
92558347030	**PRB-1-10 (72 HOUR) (F)**	EPA 7470A	647478	EPA 7470A	647636
92558347027	**PRB-1-1 (72 HOUR) (F)**	SM 2320B-2011	645064		
92558347028	**PRB-1-4 (72 HOUR) (F)**	SM 2320B-2011	645064		
92558347029	**PRB-1-7 (72 HOUR) (F)**	SM 2320B-2011	645064		
92558347030	**PRB-1-10 (72 HOUR) (F)**	SM 2320B-2011	645064		
92558347031	**PRB-1-2 (72 HOUR) (F)**	SM 2320B-2011	645417		
92558347032	**PRB-1-3 (72 HOUR) (F)**	SM 2320B-2011	645417		
92558347033	**PRB-1-5 (72 HOUR) (F)**	SM 2320B-2011	645417		
92558347034	**PRB-1-6 (72 HOUR) (F)**	SM 2320B-2011	645417		
92558347035	**PRB-1-8 (72 HOUR) (F)**	SM 2320B-2011	645417		
92558347036	**PRB-1-9 (72 HOUR) (F)**	SM 2320B-2011	645417		
92558347015	**IR-1-2 (5 HOUR) (F)**	SM 4500-S2D-2011	644355		
92558347016	**IR-1-3 (5 HOUR) (F)**	SM 4500-S2D-2011	644355		
92558347017	**IR-1-4 (5 HOUR) (F)**	SM 4500-S2D-2011	644355		
92558347018	**IR-1-5 (5 HOUR) (F)**	SM 4500-S2D-2011	644355		
92558347019	**IR-1-2 (72 HOUR) (F)**	SM 4500-S2D-2011	644355		
92558347020	**IR-1-3 (72 HOUR) (F)**	SM 4500-S2D-2011	644355		
92558347021	**IR-1-4 (72 HOUR) (F)**	SM 4500-S2D-2011	644355		
92558347022	**IR-1-5 (72 HOUR) (F)**	SM 4500-S2D-2011	644355		
92558347027	**PRB-1-1 (72 HOUR) (F)**	SM 4500-S2D-2011	644355		
92558347028	**PRB-1-4 (72 HOUR) (F)**	SM 4500-S2D-2011	644355		
92558347029	**PRB-1-7 (72 HOUR) (F)**	SM 4500-S2D-2011	644355		
92558347030	**PRB-1-10 (72 HOUR) (F)**	SM 4500-S2D-2011	644355		
92558347031	**PRB-1-2 (72 HOUR) (F)**	SM 4500-S2D-2011	644355		
92558347032	**PRB-1-3 (72 HOUR) (F)**	SM 4500-S2D-2011	644355		
92558347033	**PRB-1-5 (72 HOUR) (F)**	SM 4500-S2D-2011	644355		
92558347034	**PRB-1-6 (72 HOUR) (F)**	SM 4500-S2D-2011	644355		
92558347035	**PRB-1-8 (72 HOUR) (F)**	SM 4500-S2D-2011	644355		
92558347036	**PRB-1-9 (72 HOUR) (F)**	SM 4500-S2D-2011	644355		
92558347015	**IR-1-2 (5 HOUR) (F)**	EPA 300.0 Rev 2.1 1993	644343		
92558347016	**IR-1-3 (5 HOUR) (F)**	EPA 300.0 Rev 2.1 1993	644343		
92558347017	**IR-1-4 (5 HOUR) (F)**	EPA 300.0 Rev 2.1 1993	644343		
92558347018	**IR-1-5 (5 HOUR) (F)**	EPA 300.0 Rev 2.1 1993	644343		
92558347019	**IR-1-2 (72 HOUR) (F)**	EPA 300.0 Rev 2.1 1993	644343		
92558347020	**IR-1-3 (72 HOUR) (F)**	EPA 300.0 Rev 2.1 1993	644343		
92558347021	**IR-1-4 (72 HOUR) (F)**	EPA 300.0 Rev 2.1 1993	644343		
92558347022	**IR-1-5 (72 HOUR) (F)**	EPA 300.0 Rev 2.1 1993	644343		
92558347027	**PRB-1-1 (72 HOUR) (F)**	EPA 300.0 Rev 2.1 1993	644343		
92558347028	**PRB-1-4 (72 HOUR) (F)**	EPA 300.0 Rev 2.1 1993	644343		
92558347029	**PRB-1-7 (72 HOUR) (F)**	EPA 300.0 Rev 2.1 1993	644343		
92558347030	**PRB-1-10 (72 HOUR) (F)**	EPA 300.0 Rev 2.1 1993	644343		

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: MCMANUS GAPOWER 30050105.00009
Pace Project No.: 92558347

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
92558347031	**PRB-1-2 (72 HOUR) (F)**	EPA 300.0 Rev 2.1 1993	644343		
92558347032	**PRB-1-3 (72 HOUR) (F)**	EPA 300.0 Rev 2.1 1993	644343		
92558347033	**PRB-1-5 (72 HOUR) (F)**	EPA 300.0 Rev 2.1 1993	644343		
92558347034	**PRB-1-6 (72 HOUR) (F)**	EPA 300.0 Rev 2.1 1993	644344		
92558347035	**PRB-1-8 (72 HOUR) (F)**	EPA 300.0 Rev 2.1 1993	644344		
92558347036	**PRB-1-9 (72 HOUR) (F)**	EPA 300.0 Rev 2.1 1993	644344		

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 [X] Eden [ ] Greenwood [ ] Huntersville [ ] Raleigh [ ] Mechanicsville [ ] Atlanta [ ] Kernersville [ ]

Sample Condition Upon Receipt

Client Name: Arcadis

Project #

WO# : 92558347

92558347

Courier: [ ] Commercial [X] Fed Ex [ ] UPS [ ] USPS [ ] Client [ ] Pace [ ] Other:

Custody Seal Present? [ ] Yes [X] No Seals Intact? [ ] Yes [X] No

Date/Initials Person Examining Contents: 8-31-21 AR

Packing Material: [ ] Bubble Wrap [ ] Bubble Bags [X] None [ ] Other

Biological Tissue Frozen? [ ] Yes [ ] No [X] N/A

Thermometer: [X] IR Gun ID: 93T071 Type of Ice: [X] Wet [ ] Blue [ ] None

Cooler Temp: 2.3/3.7 Correction Factor: Add/Subtract (°C) 0

Temp should be above freezing to 6°C
[ ] Samples out of temp criteria. Samples on ice, cooling process has begun

Cooler Temp Corrected (°C): 2.3/3.7

USDA Regulated Soil ([X] N/A, water sample)

Did samples originate in a quarantine zone within the United States: CA, NY, or SC (check maps)? [ ] Yes [X] No

Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? [ ] Yes [X] No

				Comments/Discrepancy:
Chain of Custody Present?	[X] Yes	[ ] No	[ ] N/A	1.
Samples Arrived within Hold Time?	[X] Yes	[ ] No	[ ] N/A	2.
Short Hold Time Analysis (<72 hr.)?	[ ] Yes	[X] No	[ ] N/A	3.
Rush Turn Around Time Requested?	[ ] Yes	[X] No	[ ] N/A	4.
Sufficient Volume?	[X] Yes	[ ] No	[ ] N/A	5.
Correct Containers Used?	[X] Yes	[ ] No	[ ] N/A	6.
-Pace Containers Used?	[X] Yes	[ ] No	[ ] N/A	
Containers Intact?	[X] Yes	[ ] No	[ ] N/A	7.
Dissolved analysis: Samples Field Filtered?	[X] Yes	[ ] No	[ ] N/A	8. Metals
Sample Labels Match COC?	[X] Yes	[ ] No	[ ] N/A	9.
-Includes Date/Time/ID/Analysis Matrix: WT				
Headspace in VOA Vials (>5-6mm)?	[ ] Yes	[ ] No	[X] N/A	10.
Trip Blank Present?	[ ] Yes	[ ] No	[X] N/A	11.
Trip Blank Custody Seals Present?	[ ] Yes	[ ] No	[X] 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# : 92558347

PM: NMG Due Date: 09/09/21

CLIENT: 92-ARCADIS

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)	SPST-125 mL Sterile Plastic (N/A - lab)	SP2T-250 mL Sterile Plastic (N/A - lab)		BP3A-250 mL Plastic (NH2)2SO4 (9.3-9.7)	AG0U-100 mL Amber Unpreserved vials (N/A)	VSGU-20 mL Scintillation vials (N/A)	DG9U-40 mL Amber Unpreserved vials (N/A)
1						1																						
2		1				1	1																					
3						1																						
4		1				1	1																					
5						1																						
6		1				1	1																					
7						1																						
8		1				1	1																					
9						1																						
10		1				1	1																					
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.

*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# : 92558347

PM: NMG Due Date: 09/09/21

CLIENT: 92-ARCADIS

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)	SPST-125 mL Sterile Plastic (N/A – lab)	SP2T-250 mL Sterile Plastic (N/A – lab)		BP3A-250 mL Plastic (NH2)2SO4 (9.3-9.7)	AG0U-100 mL Amber Unpreserved vials (N/A)	VSGU-20 mL Scintillation vials (N/A)	DG9U-40 mL Amber Unpreserved vials (N/A)
1						1																							
2		1				1	1																						
3						1																							
4		1				1	1																						
5						1																							
6		1				1	1																						
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®	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# : 92558347**

PM: NMG Due Date: 09/09/21

CLIENT: 92-ARCADIS

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)	SPST-125 mL Sterile Plastic (N/A – lab)	SP2T-250 mL Sterile Plastic (N/A – lab)		BP3A-250 mL Plastic (NH2)2SO4 (9.3-9.7)	AGOU-100 mL Amber Unpreserved vials (N/A)	VSGU-20 mL Scintillation vials (N/A)	DG9U-40 mL Amber Unpreserved vials (N/A)
1						1																							
2		2				1	1																						
3						1																							
4		2				1	1																						
5						1																							
6		2				1	1																						
7						1																							
8		2				1	1																						
9						1																							
10		2				1	1																						
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®	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:

WO# : 92558347
PM: NMG Due Date: 09/09/21
CLIENT: 92-ARCADIS

*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 #

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)	SPST-125 mL Sterile Plastic (N/A – lab)	SP2T-250 mL Sterile Plastic (N/A – lab)		BP3A-250 mL Plastic (NH2)2SO4 (9.3-9.7)	AG0U-100 mL Amber Unpreserved vials (N/A)	VSGU-20 mL Scintillation vials (N/A)	DG9U-40 mL Amber Unpreserved vials (N/A)
1						1																							
2		2				1	1																						
3						1																							
4		2				1	1																						
5						1																							
6		2				1	1																						
7						1																							
8		2				1	1																						
9						1																							
10		2				1	1																						
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.

ARCADIS Design & Consultancy for natural and built assets

CHAIN OF CUSTODY & LABORATORY ANALYSIS REQUEST FORM

Lab Work Order # 848741

Page 1 of 4

PACE Analytical

PROJ. NO.	PROJECT NAME	SDG NUMBER	COC Number
30050105.00009	McManus GA Power		

SAMPLERS: Robert Prigge, Andy Baumeister

	SAMPLE ID	DATE	TIME	MATRIX	Composite/ Grab	# Containers	Requested Analyses 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Remarks
1	IR-1-2 (5 hour)	8/25/2021	1600	W	Composite	1			1																		
2	IR-1-2 (5 hour) (F)	8/25/2021	1600	W	Composite	3				1	1	1															
3	IR-1-3 (5 hour)	8/25/2021	1610	W	Composite	1			1																		
4	IR-1-3 (5 hour) (F)	8/25/2021	1610	W	Composite	3				1	1	1															
5	IR-1-4 (5 hour)	8/25/2021	1620	W	Composite	1			1																		
6	IR-1-4 (5 hour) (F)	8/25/2021	1620	W	Composite	3				1	1	1															
7	IR-1-5 (5 hour)	8/25/2021	1630	W	Composite	1			1																		
8	IR-1-5 (5 hour) (F)	8/25/2021	1630	W	Composite	3				1	1	1															
9	IR-1-2 (72 hour)	8/28/2021	900	W	Composite	1			1																		
10	IR-1-2 (72 hour) (F)	8/28/2021	900	W	Composite	3				1	1	1															

	Requested Analyses
1	Total 6020 *
2	Dissolved 6020 *
3	Total 6020 **
4	Dissolved 6020 **
5	Sulfide
6	314.0/300.0
7	SM2320 (Alkalinity)
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	

Special Instructions/Comments:

* 6020 metals (As, Fe, Al, Ca, Mg, and Appendix IV metals)

** 6020 metals (As, Fe, Al, Ca, Mg)

(F) in Sample ID refers to sample being filtered through 0.45u filter by ARCADIS

☐ Special QA/QC Instructions

Laboratory Information and Receipt

Lab Name: PACE Analytical

Shipping Tracking #: Courier

Specify Turnaround Requirements: Standard

☐ Cooler packed with ice

☐ Cooler custody seal intact

Sample Receipt

Condition/Cooler Temp

Relinquished by:	DATE	TIME	Received by:	Relinquished by:	DATE	TIME	Received by:
Andy Baumeister DSL	8/30/2021	8-30-21 1125	PACE	PACE	8-30-21	1200	
Relinquished by:	DATE	TIME	Received by:	Relinquished by:	DATE	TIME	Received by:
	8/30/21	1700			8-31-21	1230	PACE/MVL
Relinquished by:	DATE	TIME	Received by:	Relinquished by:	DATE	TIME	Received by:

2.3°C 3.7°C

ARCADIS Design & Consultancy for natural and built assets

CHAIN OF CUSTODY & LABORATORY ANALYSIS REQUEST FORM

Lab Work Order # 8487451

PACE Analytical

PROJ. NO.	PROJECT NAME	SDG NUMBER	COC Number
30050105.00009	McManus GA Power		

SAMPLERS: Robert Prigge, Andy Baumeister

SAMPLE ID	DATE	TIME	MATRIX	Composite/ Grab	# Containers	Requested Analyses 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Remarks
IR-1-3 (72 hour)	8/28/2021	910	W	Composite	1			1																		
IR-1-3 (72 hour) (F)	8/28/2021	910	W	Composite	3				1	1	1															
IR-1-4 (72 hour)	8/28/2021	920	W	Composite	1			1																		
IR-1-4 (72 hour) (F)	8/28/2021	920	W	Composite	3				1	1	1															
IR-1-5 (72 hour)	8/28/2021	930	W	Composite	1			1																		
IR-1-5 (72 hour) (F)	8/28/2021	930	W	Composite	3				1	1	1															

Requested Analyses	Special Instructions/Comments:	☐ Special QA/QC Instructions
1 Total 6020 *	* 6020 metals (As, Fe, Al, Ca, Mg, and Appendix IV metals)	
2 Dissolved 6020 *	** 6020 metals (As, Fe, Al, Ca, Mg)	
3 Total 6020 **	(F) in Sample ID refers to sample being filtered through 0.45u filter by ARCADIS	
4 Dissolved 6020 **		
5 Sulfide	Laboratory Information and Receipt	
6 SO4, 300.0	Lab Name: PACE Analytical	☐ Cooler packed with ice
7 SM2320 (Alkalinity)	Shipping Tracking #: Courier	☐ Cooler custody seal intact
8	Specify Turnaround Requirements: Standard	Sample Receipt Condition/Cooler Temp:
9		

	Relinquished by:	DATE	TIME	Received by:	Relinquished by:	DATE	TIME	Received by:
10	Andy Baumeister	8/30/2021	8-30-21 1125	PACE	PACE	8-30-21	1200	
11								
12	Relinquished by:	DATE	TIME	Received by:	Relinquished by:	DATE	TIME	Received by:
13		8/30/21	1700					
14								
15	Relinquished by:	DATE	TIME	Received by:	Relinquished by:	DATE	TIME	Received by:
16						8-31-21	1230	PACE/FAVL
17								
18								

2.3°C 3.7°C

ARCADIS Design & Consultancy for natural and built assets

CHAIN OF CUSTODY & LABORATORY ANALYSIS REQUEST FORM

Lab Work Order #: 848744

PACE Analytical

PROJ. NO.	PROJECT NAME	SDG NUMBER	COC Number
30050105.00009	McManus GA Power		

SAMPLERS: Robert Prigge, Andy Baumeister

SAMPLE ID	DATE	TIME	MATRIX	Composite/ Grab	# Containers	Requested Analyses 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Remarks
PRB-1-1 (72 hour)	8/27/2021	1300	W	Composite	1	1																				
PRB-1-1 (72 hour) (F)	8/27/2021	1300	W	Composite	4		1			1	1	1														
PRB-1-2 (72 hour)	8/27/2021	1310	W	Composite	1			1																		
PRB-1-2 (72 hour) (F)	8/27/2021	1310	W	Composite	4				1	1	1	1														
PRB-1-3 (72 hour)	8/27/2021	1320	W	Composite	1			1																		
PRB-1-3 (72 hour) (F)	8/27/2021	1320	W	Composite	4				1	1	1	1														
PRB-1-4 (72 hour)	8/27/2021	1330	W	Composite	1	1																				
PRB-1-4 (72 hour) (F)	8/27/2021	1330	W	Composite	4		1			1	1	1														
PRB-1-5 (72 hour)	8/27/2021	1340	W	Composite	1			1																		
PRB-1-5 (72 hour) (F)	8/27/2021	1340	W	Composite	4				1	1	1	1														

Requested Analyses	Special Instructions/Comments:	☐ Special QA/QC Instructions
1 Total 6020 *	* 6020 metals (As, Fe, Al, Ca, Mg, and Appendix IV metals)	
2 Dissolved 6020 *	** 6020 metals (As, Fe, Al, Ca, Mg)	
3 Total 6020 **	(F) in Sample ID refers to sample being filtered through 0.45u filter by ARCADIS	
4 Dissolved 6020 **		
5 Sulfide	Laboratory Information and Receipt	
6 SO4-300.0	Lab Name: PACE Analytical	☐ Cooler packed with ice
7 SM2320 (Alkalinity)	Shipping Tracking #: Courier	☐ Cooler custody seal intact
8	Specify Turnaround Requirements: Standard	Sample Receipt Condition/Cooler Temp
9		

	Relinquished by:	DATE	TIME	Received by:	Relinquished by:	DATE	TIME	Received by:
10	Andy Baumeister	8/30/2021	8-30-21 1125	PACE	PACE	8-30-21	1200	
11	Relinquished by:	DATE	TIME	Received by:	Relinquished by:	DATE	TIME	Received by:
12		8/30/21	1700			8-30-21	1230	Arcadis PACE/AVL
13	Relinquished by:	DATE	TIME	Received by:	Relinquished by:	DATE	TIME	Received by:
14								
15								
16								

2,3°C 3,7°C

ARCADIS Design & Consultancy for natural and built assets

CHAIN OF CUSTODY & LABORATORY ANALYSIS REQUEST FORM

Lab Work Order # 8487411

PACE Analytical

PROJ. NO.	PROJECT NAME	SDG NUMBER	COC Number
30050105.00009	McManus GA Power		

SAMPLERS: Robert Prigge, Andy Baumeister

SAMPLE ID	DATE	TIME	MATRIX	Composite/ Grab	# Containers	Requested Analyses 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Remarks
PRB-1-6 (72 hour)	8/27/2021	1350	W	Composite	1			1																		
PRB-1-6 (72 hour) (F)	8/27/2021	1350	W	Composite	4				1	1	1	1														
PRB-1-7 (72 hour)	8/27/2021	1400	W	Composite	1	1																				
PRB-1-7 (72 hour) (F)	8/27/2021	1400	W	Composite	4		1			1	1	1														
PRB-1-8 (72 hour)	8/27/2021	1410	W	Composite	1			1																		
PRB-1-8 (72 hour) (F)	8/27/2021	1410	W	Composite	4				1	1	1	1														
PRB-1-9 (72 hour)	8/27/2021	1420	W	Composite	1			1																		
PRB-1-9 (72 hour) (F)	8/27/2021	1420	W	Composite	4				1	1	1	1														
PRB-1-10 (72 hour)	8/27/2021	1430	W	Composite	1	1																				
PRB-1-10 (72 hour) (F)	8/27/2021	1430	W	Composite	4		1			1	1	1														

Requested Analyses	Special Instructions/Comments:	☐ Special QA/QC Instructions
1 Total 6020 *	* 6020 metals (As, Fe, Al, Ca, Mg, **and Appendix IV metals)**	
2 Dissolved 6020 **	** 6020 metals (As, Fe, Al, Ca, Mg)	
3 Total 6020 **	(F) in Sample ID refers to sample being filtered through 0.45u filter by ARCADIS	
4 Dissolved 6020 **		
5 Sulfide	Laboratory Information and Receipt	
6 TOC 9060	Lab Name: PACE Analytical	☐ Cooler packed with ice
7 SM 2320 (Alkalinity)	Shipping Tracking #: Courier	Sample Receipt:
8	Specify Turnaround Requirements: Standard	☐ Cooler custody seal intact
9		Condition/Cooler Temp:

	Relinquished by:	DATE	TIME	Received by:	Relinquished by:	DATE	TIME	Received by:
10	Andy Baumeister JSL	8/30/2021	8-30-21 1125	PACE	PACE	8-30-21	1200	
11								
12								
13	Relinquished by:	DATE	TIME	Received by:	Relinquished by:	DATE	TIME	Received by: A. Rucker
14		8/30/21	1700			8-31-21	1230	PACE/PAVL
15								
16	Relinquished by:	DATE	TIME	Received by:	Relinquished by:	DATE	TIME	Received by:
17								
18								

2.3°C 3.7°C

Pace Analytical Services, LLC
9800 Kincey Ave. Suite 100
Huntersville, NC 28078
(704)875-9092

December 14, 2021

Dave Liles
Arcadis
4915 Prospectus Dr
Suite F
Durham, NC 27713

RE: Project: MCMANUS 30050105.00014
Pace Project No.: 92559790

Dear Dave Liles:

Enclosed are the analytical results for sample(s) received by the laboratory on September 03, 2021. 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.

Some analyses were subcontracted outside of the Pace Network. The test report from the external subcontractor is attached to this report in its entirety.

The test results provided in this final report were generated by each of the following laboratories within the Pace Network:

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

Sincerely,

Nicole D'Oleo

Nicole D'Oleo
nicole.d'oleo@pacelabs.com
(704)875-9092
Project Manager

Enclosures

Pace Analytical Services, LLC
9800 Kincey Ave. Suite 100
Huntersville, NC 28078
(704)875-9092

SAMPLE SUMMARY

Project: MCMANUS 30050105.00014
Pace Project No.: 92559790

Lab ID	Sample ID	Matrix	Date Collected	Date Received
92559790001	**HOMOGENATE_W_081921**	Water	08/19/21 15:00	09/03/21 10:32
92559790002	**PRB-1-1 (72 HOUR)**	Water	08/27/21 13:00	09/03/21 10:32

REPORT OF LABORATORY ANALYSIS

CUSTO

WO# : 92559790

92559790

ORIGIN ID:RDUA (919) 328-5574
DAVE LILES
ARCADIS
4915 PROSPECTUS DRIVE
STE G
DURHAM, NC 27713
UNITED STATES US

SHIP DATE: 02SEP21
ACTWGT: 15.50 LB
CAD: 5688756/INET4400

BILL SENDER

TO ATTN: SAMPLE RECEIVING
BROOKS APPLIED LABS
18804 NORTH CREEK PARKWAY
SUITE 100
BOTHELL WA 98011
(202) 632-6206

REF 30050105.00014
INV:
PO: DEPT:

56DJ3/169A/FE4A

FedEx Express

FRI - 03 SEP 10:30A
PRIORITY OVERNIGHT

TRK# 0201 7747 1616 3187

98011
WA-US SEA

NH PAEA

Sample Receipt Checklist:

Container Type:

- [x] Cooler
- [ ] Cardboard box
- [ ] Styrofoam cooler
- [ ] Other (Specify):

- [x] Custody Seal Present?
- Custody Seal Intact? Y / N
- [x] Chain of Custody Present?

Coolant and Temperature

Coolant Type IR#: 30

- [ ] None
- [ ] Blue Ice: °C
- [x] Ice: 4.1 °C
- [ ] Dry Ice: °C
- [ ] Temp Blank: °C

Corrected Temp: °C

Coolant Note:

Bottle Type:

- [x] Client Provided
- [x] Class : As Speciation
  Size / Type: 2x10mL Vacutainer
  Lot: 21-0067
  Preservation: EDTA (Vacutainer
  Preservative Lot: N/A
- [ ] Class :
  Size / Type:
  Lot:
  Preservation:
  Preservative Lot:
- [ ] Class :
  Size / Type:
  Lot:
  Preservation:
  Preservative Lot:

All information accurate
Initial/date: S.Z. 9/3/21

ARCADIS

ID#:

CHAIN OF CUSTODY & LABORATORY ANALYSIS REQUEST FORM

Page 1 of 1

Lab Work Order #: PAC-HN2007

Send Results to:

Contact & Company Name: Dave Liles ARCADIS	Telephone:
Address: 4915 Prospectus Drive STE L	Fax:
City: Durham State: NC Zip: 27713	E-mail Address: david.liles@arcadis.com
Project Name/Location (City, State): McManus	Project #: 30050105.00014
Sampler's Printed Name: Robert Prisse, Andy Barnhardt	Sampler's Signature:

Sample ID	Collection Date	Collection Time	Type (✓) Comp	Type (✓) Grab	Matrix	Preservative	Filtered (✓)	# of Containers	Container Information	As Speciation (HPLC)	REMARKS
Homogenate_W_081921	8/19/21	1500	X		W	NO	Yes	2	10mL VOA	2	Thio Arsenic Speciation expected
PRB-1-1 (72 hour)	8/27/21	1300	X		W	NO	Yes	2	10mL VOA	2	

Keys

Preservation Key:
A H_2SO_4
B HCL
C. HNO_3
D. NaOH
E. None
F Other _____
G. Other: _____
H. Other: _____

Container Information Key:
1. 40 ml Vial
2 1 L Amber
3. 250 ml Plastic
4. 500 ml Plastic
5. Encore
6. 2 oz Glass
7. 4 oz Glass
8. 8 oz Glass
9. Other: _____
10. Other: _____

Matrix Key:
SO - Soil
W - Water
T - Tissue
SE - Sediment
SL - Sludge
A - Air
NL - NAPL/Oil
SW - Sample Wipe
Other: _____

Special Instructions/Comments:

☐ Special QA/QC Instructions(✓):

Laboratory Information and Receipt		Relinquished By	Received By	Relinquished By	Laboratory Received By
Lab Name: Brooks Applied	Cooler Custody Seal (✓)	Printed Name: Robert Prisse	Printed Name:	Printed Name:	Printed Name: S. T. (BAL)
☑ Cooler packed with ice (✓)	☐ Intact ☐ Not Intact	Signature:	Signature: FedEx	Signature:	Signature:
Specify Turnaround Requirements: STD	Sample Receipt:	Firm: ARCADIS	Firm/Courier: FedEx	Firm/Courier:	Firm: (BAL)
Shipping Tracking #:	Condition/Cooler Temp: _____	Date/Time: 9/2/2021 1700	Date/Time: 9/2/2021 1700	Date/Time:	Date/Time: 9/3/21 1032

Distribution: WHITE – Laboratory returns with results YELLOW – Lab copy PINK – Retained by Arcadis

BROOKS APPLIED LABS
18804 North Creek Parkway, Ste 100, Bothell, WA 98011 • USA • T: 206 632 6206 F: 206 632 6017 • info@brooksapplied.com

September 27, 2021

Pace Analytical Services – Huntersville
ATTN: Nicole D'Oleo
9800 Kincey Ave., Suite 100
Huntersville, NC 28078
nicole.d'oleo@pacelabs.com

RE: Project PAC-HN2007 Client Project: 92559790

Dear Nicole D'Oleo,

On August 3, 2021, Brooks Applied Labs (BAL) received two (2) water samples at a temperature of 4.1°C. The samples were logged-in for the analysis of arsenic (As) speciation per the chain-of-custody (COC). The client directly filtered (0.45µm) each sample into an evacuated container prior to receipt at BAL. All samples were stored according to BAL SOPs and EPA methodology.

Arsenic Speciation by IC-ICP-CRC-MS
All aqueous samples for As speciation were analyzed using ion chromatography inductively coupled plasma collision reaction cell mass spectrometry (IC-ICP-CRC-MS). In accordance with the project agreement, As speciation was defined as dissolved arsenite [As(III)], arsenate [As(V)], monomethylarsonic acid [MMAs], and dimethylarsinic acid [DMAs]; the total estimated concentration of any unidentified arsenic-containing species detected in each sample has also been reported as Unk As Sp. Arsenic species are chromatographically separated on an ion exchange column and then quantified using inductively coupled plasma collision reaction cell mass spectrometry (ICP-CRC-MS); for more information on this determinative technique, please visit the Interference Reduction Technology section on our website, brooksapplied.com.

In instances where the native sample result and/or the associated duplicate (DUP) result were below the MDL the RPD was not calculated (**N/C**).

The 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.

All data was reported without further qualification and all other 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 us if you have any questions regarding this report.

Sincerely,

Amy Goodall
Project Manager
Brooks Applied Labs
amy@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/> or review Tables 1 and 2 in our Accreditation Information. 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	reference material
T	total fraction
TR	total recoverable fraction

Definition of Data Qualifiers

(Effective 3/23/2020)

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. Please see narrative for explanation.
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.
M	Duplicate precision (RPD) was not within acceptance criteria. Please see narrative for explanation.
N	Spike recovery was not within acceptance criteria. Please see narrative for explanation.
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.
Z	Holding time and/or preservation requirements not established for this method; however, BAL recommendations for holding time were not followed. Please see narrative for explanation.

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.

Accreditation Information

Table 1. Accredited method/matrix/analytes for TNI

Issued by: State of Florida Dept. of Health (The NELAC Institute 2016 Standard)
Issued on: July 27, 2020; Valid to: June 30, 2021
Certificate Number: E87982-35

Method	Matrix	TNI Accredited Analyte(s)
EPA 1638	Non-Potable Waters	Ag, Cd, Cu, Ni, Pb, Sb, Se, Tl, Zn
EPA 200.8	Non-Potable Waters	Ag, Al, As, Ba, Be, Cd, Co, Cr, Cu, Mn, Mo, Ni, Pb, Sb, Se, Tl, U, V, Zn
EPA 6020	Non-Potable Waters	Ag, Al, As, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Mg, Mn, Mo, Ni, Pb, Sb, Se, Tl, U, V, Zn
	Solids/Chemicals & Biological	Ag, Al, As, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Mg, Mn, Mo, Ni, Pb, Sb, Se, Tl, V, Zn
BAL-5000	Non-Potable Waters	Ag, Al, As, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Mg, Mn, Mo, Ni, Pb, Sb, Se, Sn, Sr, Tl, U, V, Zn, Hardness
	Solids/Chemicals	Ag, As, B, Be, Cd, Co, Cr, Cu, Pb, Mo, Ni, Sb, Se, Sn, Sr, Tl, V, Zn
	Biological	Ag, Al, As, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Mg, Mn, Mo, Ni, Pb, Sb, Se, Sn, Tl, V, Zn
EPA 1640	Non-Potable Waters	Ag, As, Cd, Cu, Pb, Ni, Zn
EPA 1631E	Non-Potable Waters, Solids/Chemicals & Biological	Total Mercury
EPA 1630	Non-Potable Waters	Methyl Mercury
BAL-3200	Solids/Chemicals & Biological	Methyl Mercury
BAL-4100	Non-Potable Waters	As(III), As(V), DMAs, MMAs
BAL-4200	Non-Potable Waters	Se(IV), Se(VI)
BAL-4201	Non-Potable Waters	Se(IV), Se(VI)
BAL-4300	Non-Potable Waters Solid/Chemicals	Cr(VI)
SM2340B	Non-Potable Waters	Hardness

Accreditation Information

Table 2. Accredited method/matrix/analytes for ISO (1), Non-Governmental TNI (2), and DoD/DOE (3)

Issued by: ANAB

Issued on: November 20, 2020; Valid to: March 20, 2022

Method	Matrix	ISO and Non-Gov. TNI Accredited Analyte(s)	DoD/DOE Accredited Analytes
EPA 1638 Mod EPA 200.8 Mod EPA 6020 Mod	Non-Potable Waters	Ag, Al, As, B, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Mg, Mn, Mo, Ni, Pb, Sb, Se, Sn, Sr, Tl, U, V, Zn	Ag, Al, As, Ba, Ca, Cd, Cr, Cu, Fe, Pb, Mg, Mn, Ni, Sb, Se, V, Zn
BAL-5000	Solids/Chemicals & Biological	Ag, Al, As, B, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Mg, Mn, Mo, Ni, Pb, Sb, Se, Sn, Sr, Tl, V, Zn Hg (Biological Only)	Not Accredited
EPA 1640 Mod	Non-Potable Waters	Ag, As, Cd, Cu, Pb, Ni, Zn Cr, Co, Se, Tl, V (ISO Only)	Not Accredited
EPA 1631E Mod BAL-3100 (waters)	Non-Potable Waters, Solids/Chemicals & Biological/Food	Total Mercury	Total Mercury
EPA 1630 Mod BAL-3200	Non-Potable Waters, Solids/Chemicals Biological	Methyl Mercury	Methyl Mercury (excluding Solids/Chemicals)
EPA 1632A Mod BAL-3300	Non-Potable Waters	Inorganic Arsenic, As(III) (ISO Only)	Not Accredited
	Biological/Food Solids/Chemicals	Inorganic Arsenic (ISO Only)	Not Accredited
AOAC 2015.01 Mod BAL-5000 by BAL-5040	Food	As, Cd, Hg, Pb	Not Accredited
BAL-4100	Non-Potable Waters	As(III), As(V), DMAs, MMAs	Not Accredited
	Biological by BAL-4115	Inorganic Arsenic, DMAs, MMAs (ISO Only)	Not Accredited
BAL-4101	Food by BAL-4116	Inorganic Arsenic, DMAs, MMAs (ISO Only)	Not Accredited
BAL-4201	Non-Potable Waters	Se(IV), Se(VI), SeCN, SeMet	Not Accredited
BAL-4300	Non-Potable Waters, Solid/Chemicals	Cr(VI)	Cr(VI)
SM 3500-Fe BAL-4500	Non-Potable Waters	Fe, Fe(II) (ISO Only)	Not Accredited
SM2340B	Non-Potable Waters	Hardness	Hardness
SM 2540G EPA 160.3 BAL-0501	Solids/Chemicals & Biological	% Dry Weight	% Dry Weight

(1) ISO/IEC 17025:2017 – Certificate Number ADE-1447.2

(2) Non-Governmental NELAC Institute 2016 Standard – Certificate Number ADE-1447.1

(3) Department of Defense/Energy Consolidated Quality Systems Manual v. 5.3 – Certificate Numbers ADE-1447 for DoD, ADE-1447.3 for DOE.

Sample Information

Sample	Alias	Lab ID	Report Matrix	Type	Sampled	Received
Homogonate_W_081921	92559790001	2109066-01	W	Sample	08/19/2021	09/03/2021
PRB-1-1 (72 hour)	92559790002	2109066-02	W	Sample	08/27/2021	09/03/2021

Batch Summary

Analyte	Lab Matrix	Method	Prepared	Analyzed	Batch	Sequence
As(III)	Water	SOP BAL-4100	09/13/2021	09/14/2021	B212524	S211047
As(V)	Water	SOP BAL-4100	09/13/2021	09/14/2021	B212524	S211047
DMAs	Water	SOP BAL-4100	09/13/2021	09/14/2021	B212524	S211047
MMAs	Water	SOP BAL-4100	09/13/2021	09/14/2021	B212524	S211047
Unk As Sp	Water	SOP BAL-4100	09/13/2021	09/14/2021	B212524	S211047

Sample Results

Sample	Analyte	Report Matrix	Basis	Result	Qualifier	MDL	MRL	Unit	Batch	Sequence
Homogonate_W_081921, 92559790001										
2109066-01	As(III)	W	D	32.6		0.200	1.05	µg/L	B212524	S211047
2109066-01	As(V)	W	D	0.706	J	0.200	1.05	µg/L	B212524	S211047
2109066-01	DMAs	W	D	≤ 0.250	U	0.250	1.05	µg/L	B212524	S211047
2109066-01	MMAs	W	D	≤ 0.200	U	0.200	1.05	µg/L	B212524	S211047
2109066-01	Unk As Sp	W	D	317		0.250	1.05	µg/L	B212524	S211047
PRB-1-1 (72 hour), 92559790002										
2109066-02	As(III)	W	D	42.4		0.200	1.05	µg/L	B212524	S211047
2109066-02	As(V)	W	D	0.997	J	0.200	1.05	µg/L	B212524	S211047
2109066-02	DMAs	W	D	≤ 0.250	U	0.250	1.05	µg/L	B212524	S211047
2109066-02	MMAs	W	D	≤ 0.200	U	0.200	1.05	µg/L	B212524	S211047
2109066-02	Unk As Sp	W	D	303		0.250	1.05	µg/L	B212524	S211047

Accuracy & Precision Summary

Batch: B212524
Lab Matrix: Water
Method: SOP BAL-4100

Sample	Analyte	Native	Spike	Result	Units	REC & Limits	RPD & Limits
B212524-BS1	**Blank Spike, (2132006)**						
	As(III)		5.000	4.495	µg/L	90% 75-125	
	As(V)		5.000	4.545	µg/L	91% 75-125	
	DMAs		5.210	5.268	µg/L	101% 75-125	
B212524-BS2	**Blank Spike, (2107001)**						
	MMAs		5.000	4.402	µg/L	88% 75-125	
B212524-DUP1	**Duplicate, (2109063-01)**						
	As(III)	ND		ND	µg/L		N/C 25
	As(V)	ND		ND	µg/L		N/C 25
	DMAs	ND		ND	µg/L		N/C 25
	MMAs	ND		ND	µg/L		N/C 25
	Unk As Sp	ND		ND	µg/L		N/C 25
B212524-MS1	**Matrix Spike, (2109063-01)**						
	As(III)	ND	52.25	48.66	µg/L	93% 75-125	
	As(V)	ND	48.55	45.81	µg/L	94% 75-125	
	DMAs	ND	50.00	46.83	µg/L	94% 75-125	
	MMAs	ND	50.00	47.75	µg/L	96% 75-125	
B212524-MSD1	**Matrix Spike Duplicate, (2109063-01)**						
	As(III)	ND	52.25	49.41	µg/L	95% 75-125	2% 25
	As(V)	ND	48.55	46.07	µg/L	95% 75-125	0.6% 25
	DMAs	ND	50.00	46.72	µg/L	93% 75-125	0.2% 25
	MMAs	ND	50.00	48.25	µg/L	96% 75-125	1% 25

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Method Blanks & Reporting Limits

Batch: B212524
Matrix: Water
Method: SOP BAL-4100
Analyte: As(III)

Sample	Result	Units
B212524-BLK1	0.005	µg/L
B212524-BLK2	0.001	µg/L
B212524-BLK3	0.001	µg/L
B212524-BLK4	0.00	µg/L

Average: 0.002
Limit: 0.021
MDL: 0.004
MRL: 0.021

Analyte: As(V)

Sample	Result	Units
B212524-BLK1	0.008	µg/L
B212524-BLK2	0.006	µg/L
B212524-BLK3	0.004	µg/L
B212524-BLK4	0.004	µg/L

Average: 0.006
Limit: 0.021
MDL: 0.004
MRL: 0.021

Analyte: DMAs

Sample	Result	Units
B212524-BLK1	0.00	µg/L
B212524-BLK2	0.00	µg/L
B212524-BLK3	0.00	µg/L
B212524-BLK4	0.00	µg/L

Average: 0.000
Limit: 0.021
MDL: 0.005
MRL: 0.021

Method Blanks & Reporting Limits

Analyte: MMAs

Sample	Result	Units
B212524-BLK1	0.00	µg/L
B212524-BLK2	0.00	µg/L
B212524-BLK3	0.00	µg/L
B212524-BLK4	0.00	µg/L

Average: 0.000
Limit: 0.021

MDL: 0.004
MRL: 0.021

Analyte: Unk As Sp

Sample	Result	Units
B212524-BLK1	0.00	µg/L
B212524-BLK2	0.00	µg/L
B212524-BLK3	0.00	µg/L
B212524-BLK4	0.00	µg/L

Average: 0.000
Limit: 0.021

MDL: 0.005
MRL: 0.021

Project ID: PAC-HN2007
PM: Amy Goodall

Client PM: Nicole D'Oleo
Client Project: 92559790

Sample Containers

Lab ID: 2109066-01
Sample: Homogonate_W_081921
Report Matrix: W
Sample Type: Sample
Collected: 08/19/2021
Received: 09/03/2021

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Vacutainer	N/A	N/A	EDTA (vacutainer)	N/A	N/A	Cooler - 2109066
B	XTRA_VOL	N/A	N/A	EDTA (vacutainer)	N/A	N/A	Cooler - 2109066

Lab ID: 2109066-02
Sample: PRB-1-1 (72 hour)
Report Matrix: W
Sample Type: Sample
Collected: 08/27/2021
Received: 09/03/2021

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Vacutainer	N/A	N/A	EDTA (vacutainer)	N/A	N/A	Cooler - 2109066
B	XTRA_VOL	N/A	N/A	EDTA (vacutainer)	N/A	N/A	Cooler - 2109066

Shipping Containers

Cooler - 2109066

Received: September 3, 2021 10:32
Tracking No: 0201 7747 1616 3187 via
Coolant Type: Ice
Temperature: 4.1 °C

Description: Cooler
Damaged in transit? No
Returned to client? No
Comments: IR#30

Custody seals present? Yes
Custody seals intact? Yes
COC present? Yes

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ARCADIS

ID#:

CHAIN OF CUSTODY & LABORATORY ANALYSIS REQUEST FORM

Page 1 of 1

Lab Work Order # BAL Report 2109066
PAC-HN2007

Send Results to:

Contact & Company Name: Dave Liles ARCADIS
Telephone:
Address: 4915 Prospectus Drive STE G
Fax:
City: Durham State: NC Zip: 27713
E-mail Address: david.liles@arcadis.com
Project Name/Location (City, State): McManus
Project #: 30050105.00014
Sampler's Printed Name: Robert Prince, Andy Bannister
Sampler's Signature:

Sample ID	Collection Date	Collection Time	Type (✓) Comp	Type (✓) Grab	Matrix	Preservative	Filtered (✓)	# of Containers	Container Information	As Speciation (HPLC)	REMARKS
Homogenate_W_081921	8/19/21	1500	X		W	NO	Yes	2	10mL VOA	2	Thio Arsenic Speciation
PRB-1-1 (72 hour)	9/17/21	1300	X		W	NO	Yes	2	10mL VOA	2	expected

Keys

Preservation Key:
A. H_2SO_4
B. HCL
C. HNO_3
D. NaOH
E. None
F. Other: _____
G. Other: _____
H. Other: _____

Container Information Key:
1. 40 ml Vial
2. 1 L Amber
3. 250 ml Plastic
4. 500 ml Plastic
5. Encore
6. 2 oz Glass
7. 4 oz Glass
8. 8 oz Glass
9. Other: _____
10. Other: _____

Matrix Key:
SO - Soil
SE - Sediment
NL - NAPL/Oil
W - Water
SL - Sludge
SW - Sample Wipe
T - Tissue
A - Air
Other: _____

Special Instructions/Comments:

☐ Special QA/QC Instructions(✓):

Laboratory Information and Receipt		Relinquished By	Received By	Relinquished By	Laboratory Received By
Lab Name: Brooks Applied	Cooler Custody Seal (✓)	Printed Name: Robert Prince	Printed Name:	Printed Name:	Printed Name: S.T. (BAL)
☐ Cooler packed with ice (✓)	☐ Intact ☐ Not Intact	Signature:	Signature: FedEx	Signature:	Signature:
Specify Turnaround Requirements: STD	Sample Receipt:	Firm: ARCADIS	Firm/Courier: FedEx	Firm/Courier:	Firm: (BAL)
Shipping Tracking #:	Condition/Cooler Temp: _____	Date/Time: 9/2/2021 1700	Date/Time: 9/2/2021 1700	Date/Time:	Date/Time: 9/3/21 1032

20730826 CofC AR Form 08.27.2015

Distribution: WHITE – Laboratory returns with results YELLOW – Lab copy PINK – Retained by Arcadis

Page 16 of 17

Chain of Custody

BAL Report 2109066

PASI Charlotte Laboratory

Pace Analytical®
www.pacelabs.com

Workorder: 92559790 **Workorder Name:** MCMANUS 30050105.00014 **Results Requested By:** 9/20/2021

Report / Invoice To	Subcontract To
Nicole D'Oleo Pace Analytical Charlotte 9800 Kincey Ave. Suite 100 Huntersville, NC 28078 Phone (704)875-9092 Email: nicole.d'oleo@pacelabs.com State of Sample Origin: GA	P.O. NMD92559790 Brooks Applied Labs 18804 North Creek Pkwy, Suite 100 Bothell, WA 98011

Item	Sample ID	Collect Date/Time	Lab ID	Matrix	Containers: General						Requested Analysis: As Speciation												LAB USE ONLY
1	HOMOGENATE_W_081921	8/19/2021 15:00	92559790001	Water	1						X												
2	PRB-1-1 (72 HOUR)	8/19/2021 13:00	92559790002	Water	1						X												
3																							
4																							
5																							

Transfers	Released By	Date/Time	Received By	Date/Time
1				
2				
3				

Comments

Cooler Temperature on Receipt ____ °C | **Custody Seal** Y or N | **Received on Ice** Y or N | **Samples Intact** Y or N

Pace Analytical Services, LLC
9800 Kincey Ave. Suite 100
Huntersville, NC 28078
(704)875-9092

September 24, 2021

Dave Liles
Arcadis
4915 Prospectus Dr
Suite F
Durham, NC 27713

RE: Project: MCMANUS 30050105.00009
Pace Project No.: 92560727

Dear Dave Liles:

Enclosed are the analytical results for sample(s) received by the laboratory on September 10, 2021. 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

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

Sincerely,

Nicole D'Oleo

Nicole D'Oleo
nicole.d'oleo@pacelabs.com
(704)875-9092
Project Manager

Enclosures

Pace Analytical Services, LLC
9800 Kincey Ave. Suite 100
Huntersville, NC 28078
(704)875-9092

CERTIFICATIONS

Project: MCMANUS 30050105.00009
Pace Project No.: 92560727

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

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
9800 Kincey Ave. Suite 100
Huntersville, NC 28078
(704)875-9092

SAMPLE SUMMARY

Project: MCMANUS 30050105.00009
Pace Project No.: 92560727

Lab ID	Sample ID	Matrix	Date Collected	Date Received
92560727001	**IR-1-1 (336 HOUR)**	Water	09/08/21 09:40	09/10/21 12:45
92560727002	**IR-1-2 (336 HOUR)**	Water	09/08/21 09:00	09/10/21 12:45
92560727003	**IR-1-3 (336 HOUR)**	Water	09/08/21 09:10	09/10/21 12:45
92560727004	**IR-1-4 (336 HOUR)**	Water	09/08/21 09:20	09/10/21 12:45
92560727005	**IR-1-5 (336 HOUR)**	Water	09/08/21 09:30	09/10/21 12:45
92560727006	**IR-1-1 (336 HOUR) (F)**	Water	09/08/21 09:40	09/10/21 12:45
92560727007	**IR-1-2 (336 HOUR) (F)**	Water	09/08/21 09:00	09/10/21 12:45
92560727008	**IR-1-3 (336 HOUR) (F)**	Water	09/08/21 09:10	09/10/21 12:45
92560727009	**IR-1-4 (336 HOUR) (F)**	Water	09/08/21 09:20	09/10/21 12:45
92560727010	**IR-1-5 (336 HOUR) (F)**	Water	09/08/21 09:30	09/10/21 12:45

Pace Analytical Services, LLC
9800 Kincey Ave. Suite 100
Huntersville, NC 28078
(704)875-9092

SAMPLE ANALYTE COUNT

Project: MCMANUS 30050105.00009
Pace Project No.: 92560727

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
92560727001	**IR-1-1 (336 HOUR)**	EPA 6020B	CRW, JOR	16	PASI-A
		EPA 7470A	DBB1	1	PASI-A
		SM 5310B-2011	MDW	1	PASI-A
92560727002	**IR-1-2 (336 HOUR)**	EPA 6020B	CRW, JOR	16	PASI-A
		EPA 7470A	DBB1	1	PASI-A
		SM 5310B-2011	MDW	1	PASI-A
92560727003	**IR-1-3 (336 HOUR)**	EPA 6020B	CRW, JOR	16	PASI-A
		EPA 7470A	DBB1	1	PASI-A
		SM 5310B-2011	MDW	1	PASI-A
92560727004	**IR-1-4 (336 HOUR)**	EPA 6020B	CRW, JOR	16	PASI-A
		EPA 7470A	DBB1	1	PASI-A
		SM 5310B-2011	MDW	1	PASI-A
92560727005	**IR-1-5 (336 HOUR)**	EPA 6020B	CRW, JOR	16	PASI-A
		EPA 7470A	DBB1	1	PASI-A
		SM 5310B-2011	MDW	1	PASI-A
92560727006	**IR-1-1 (336 HOUR) (F)**	EPA 6020B	CRW	16	PASI-A
		EPA 7470A	DBB1	1	PASI-A
		SM 2320B-2011	ECH	3	PASI-A
		SM 4500-S2D-2011	JP1	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	1	PASI-A
92560727007	**IR-1-2 (336 HOUR) (F)**	EPA 6020B	CRW	16	PASI-A
		EPA 7470A	DBB1	1	PASI-A
		SM 2320B-2011	ECH	3	PASI-A
		SM 4500-S2D-2011	JP1	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	1	PASI-A
92560727008	**IR-1-3 (336 HOUR) (F)**	EPA 6020B	CRW	16	PASI-A
		EPA 7470A	DBB1	1	PASI-A
		SM 2320B-2011	ECH	3	PASI-A
		SM 4500-S2D-2011	JP1	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	1	PASI-A
92560727009	**IR-1-4 (336 HOUR) (F)**	EPA 6020B	CRW	16	PASI-A
		EPA 7470A	DBB1	1	PASI-A
		SM 2320B-2011	ECH	3	PASI-A
		SM 4500-S2D-2011	JP1	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	1	PASI-A
92560727010	**IR-1-5 (336 HOUR) (F)**	EPA 6020B	CRW	16	PASI-A
		EPA 7470A	DBB1	1	PASI-A

Pace Analytical Services, LLC
9800 Kincey Ave. Suite 100
Huntersville, NC 28078
(704)875-9092

SAMPLE ANALYTE COUNT

Project: MCMANUS 30050105.00009
Pace Project No.: 92560727

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		SM 2320B-2011	ECH	3	PASI-A
		SM 4500-S2D-2011	JP1	1	PASI-A
		EPA 300.0 Rev 2.1 1993	CDC	1	PASI-A

PASI-A = Pace Analytical Services - Asheville

Pace Analytical Services, LLC
9800 Kincey Ave. Suite 100
Huntersville, NC 28078
(704)875-9092

ANALYTICAL RESULTS

Project: MCMANUS 30050105.00009
Pace Project No.: 92560727

Sample: IR-1-1 (336 HOUR) **Lab ID: 92560727001** Collected: 09/08/21 09:40 Received: 09/10/21 12:45 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Aluminum	**1.0**	mg/L	1.0	0.37	50	09/14/21 10:25	09/16/21 06:26	7429-90-5	M1
Antimony	ND	mg/L	0.050	0.010	50	09/14/21 10:25	09/16/21 06:26	7440-36-0	
Arsenic	**0.33**	mg/L	0.050	0.0043	50	09/14/21 10:25	09/16/21 06:26	7440-38-2	M1
Barium	**0.11**	mg/L	0.050	0.011	50	09/14/21 10:25	09/16/21 06:26	7440-39-3	
Beryllium	ND	mg/L	0.0050	0.0025	50	09/14/21 10:25	09/16/21 12:23	7440-41-7	
Cadmium	ND	mg/L	0.010	0.0030	50	09/14/21 10:25	09/16/21 06:26	7440-43-9	
Calcium	**197**	mg/L	10.0	1.8	50	09/14/21 10:25	09/16/21 06:26	7440-70-2	M1
Chromium	ND	mg/L	0.050	0.025	50	09/14/21 10:25	09/16/21 06:26	7440-47-3	
Cobalt	ND	mg/L	0.050	0.0025	50	09/14/21 10:25	09/16/21 06:26	7440-48-4	
Iron	ND	mg/L	2.5	1.0	50	09/14/21 10:25	09/16/21 06:26	7439-89-6	
Lead	ND	mg/L	0.050	0.0038	50	09/14/21 10:25	09/16/21 06:26	7439-92-1	
Lithium	ND	mg/L	0.12	0.025	50	09/14/21 10:25	09/16/21 12:23	7439-93-2	M1
Magnesium	**409**	mg/L	5.0	0.50	50	09/14/21 10:25	09/16/21 06:26	7439-95-4	M1
Molybdenum	ND	mg/L	0.050	0.0063	50	09/14/21 10:25	09/16/21 06:26	7439-98-7	
Selenium	ND	mg/L	0.10	0.0036	50	09/14/21 10:25	09/16/21 06:26	7782-49-2	M1
Thallium	ND	mg/L	0.024	0.0025	50	09/14/21 10:25	09/16/21 06:26	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	mg/L	0.00020	0.00012	1	09/17/21 09:58	09/23/21 11:34	7439-97-6	
5310B TOC	Analytical Method: SM 5310B-2011 Pace Analytical Services - Asheville								
Total Organic Carbon	**10.7**	mg/L	1.0	0.50	1		09/14/21 23:55	7440-44-0	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
9800 Kincey Ave. Suite 100
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(704)875-9092

ANALYTICAL RESULTS

Project: MCMANUS 30050105.00009
Pace Project No.: 92560727

Sample: IR-1-2 (336 HOUR) **Lab ID: 92560727002** Collected: 09/08/21 09:00 Received: 09/10/21 12:45 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Aluminum	ND	mg/L	1.0	0.37	50	09/14/21 10:25	09/16/21 06:44	7429-90-5	
Antimony	ND	mg/L	0.050	0.010	50	09/14/21 10:25	09/16/21 06:44	7440-36-0	
Arsenic	**0.20**	mg/L	0.050	0.0043	50	09/14/21 10:25	09/16/21 06:44	7440-38-2	
Barium	**0.11**	mg/L	0.050	0.011	50	09/14/21 10:25	09/16/21 06:44	7440-39-3	
Beryllium	ND	mg/L	0.0050	0.0025	50	09/14/21 10:25	09/16/21 12:48	7440-41-7	
Cadmium	ND	mg/L	0.010	0.0030	50	09/14/21 10:25	09/16/21 06:44	7440-43-9	
Calcium	**192**	mg/L	10.0	1.8	50	09/14/21 10:25	09/16/21 06:44	7440-70-2	
Chromium	ND	mg/L	0.050	0.025	50	09/14/21 10:25	09/16/21 06:44	7440-47-3	
Cobalt	**0.11**	mg/L	0.050	0.0025	50	09/14/21 10:25	09/16/21 06:44	7440-48-4	
Iron	**4380**	mg/L	1000	419	20000	09/14/21 10:25	09/16/21 16:42	7439-89-6	
Lead	ND	mg/L	0.050	0.0038	50	09/14/21 10:25	09/16/21 06:44	7439-92-1	
Lithium	ND	mg/L	0.12	0.025	50	09/14/21 10:25	09/16/21 12:48	7439-93-2	
Magnesium	**383**	mg/L	5.0	0.50	50	09/14/21 10:25	09/16/21 06:44	7439-95-4	
Molybdenum	ND	mg/L	0.050	0.0063	50	09/14/21 10:25	09/16/21 06:44	7439-98-7	
Selenium	ND	mg/L	0.10	0.0036	50	09/14/21 10:25	09/16/21 06:44	7782-49-2	
Thallium	ND	mg/L	0.024	0.0025	50	09/14/21 10:25	09/16/21 06:44	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	**0.00022**	mg/L	0.00020	0.00012	1	09/17/21 09:58	09/23/21 11:36	7439-97-6	
5310B TOC	Analytical Method: SM 5310B-2011 Pace Analytical Services - Asheville								
Total Organic Carbon	**10**	mg/L	1.0	0.50	1		09/15/21 00:13	7440-44-0	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: MCMANUS 30050105.00009
Pace Project No.: 92560727

Sample: IR-1-3 (336 HOUR) **Lab ID: 92560727003** Collected: 09/08/21 09:10 Received: 09/10/21 12:45 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Aluminum	ND	mg/L	1.0	0.37	50	09/14/21 10:25	09/16/21 06:47	7429-90-5	
Antimony	ND	mg/L	0.050	0.010	50	09/14/21 10:25	09/16/21 06:47	7440-36-0	
Arsenic	ND	mg/L	0.050	0.0043	50	09/14/21 10:25	09/16/21 06:47	7440-38-2	
Barium	ND	mg/L	0.050	0.011	50	09/14/21 10:25	09/16/21 06:47	7440-39-3	
Beryllium	ND	mg/L	0.0050	0.0025	50	09/14/21 10:25	09/16/21 12:51	7440-41-7	
Cadmium	ND	mg/L	0.010	0.0030	50	09/14/21 10:25	09/16/21 06:47	7440-43-9	
Calcium	**95.5**	mg/L	10.0	1.8	50	09/14/21 10:25	09/16/21 06:47	7440-70-2	
Chromium	ND	mg/L	0.050	0.025	50	09/14/21 10:25	09/16/21 06:47	7440-47-3	
Cobalt	ND	mg/L	0.050	0.0025	50	09/14/21 10:25	09/16/21 06:47	7440-48-4	
Iron	**9.4**	mg/L	2.5	1.0	50	09/14/21 10:25	09/16/21 06:47	7439-89-6	
Lead	ND	mg/L	0.050	0.0038	50	09/14/21 10:25	09/16/21 06:47	7439-92-1	
Lithium	ND	mg/L	0.12	0.025	50	09/14/21 10:25	09/16/21 12:51	7439-93-2	
Magnesium	**341**	mg/L	5.0	0.50	50	09/14/21 10:25	09/16/21 06:47	7439-95-4	
Molybdenum	ND	mg/L	0.050	0.0063	50	09/14/21 10:25	09/16/21 06:47	7439-98-7	
Selenium	ND	mg/L	0.10	0.0036	50	09/14/21 10:25	09/16/21 06:47	7782-49-2	
Thallium	ND	mg/L	0.024	0.0025	50	09/14/21 10:25	09/16/21 06:47	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	**0.00068**	mg/L	0.00020	0.00012	1	09/17/21 09:58	09/23/21 11:38	7439-97-6	
5310B TOC	Analytical Method: SM 5310B-2011 Pace Analytical Services - Asheville								
Total Organic Carbon	**4.5**	mg/L	1.0	0.50	1		09/15/21 00:31	7440-44-0	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: MCMANUS 30050105.00009
Pace Project No.: 92560727

Sample: IR-1-4 (336 HOUR) **Lab ID: 92560727004** Collected: 09/08/21 09:20 Received: 09/10/21 12:45 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Aluminum	ND	mg/L	1.0	0.37	50	09/14/21 10:25	09/16/21 06:51	7429-90-5	
Antimony	ND	mg/L	0.050	0.010	50	09/14/21 10:25	09/16/21 06:51	7440-36-0	
Arsenic	ND	mg/L	0.050	0.0043	50	09/14/21 10:25	09/16/21 06:51	7440-38-2	
Barium	ND	mg/L	0.050	0.011	50	09/14/21 10:25	09/16/21 06:51	7440-39-3	
Beryllium	ND	mg/L	0.0050	0.0025	50	09/14/21 10:25	09/16/21 12:55	7440-41-7	
Cadmium	ND	mg/L	0.010	0.0030	50	09/14/21 10:25	09/16/21 06:51	7440-43-9	
Calcium	**100**	mg/L	10.0	1.8	50	09/14/21 10:25	09/16/21 06:51	7440-70-2	
Chromium	ND	mg/L	0.050	0.025	50	09/14/21 10:25	09/16/21 06:51	7440-47-3	
Cobalt	ND	mg/L	0.050	0.0025	50	09/14/21 10:25	09/16/21 06:51	7440-48-4	
Iron	**12.6**	mg/L	2.5	1.0	50	09/14/21 10:25	09/16/21 06:51	7439-89-6	
Lead	ND	mg/L	0.050	0.0038	50	09/14/21 10:25	09/16/21 06:51	7439-92-1	
Lithium	ND	mg/L	0.12	0.025	50	09/14/21 10:25	09/16/21 12:55	7439-93-2	
Magnesium	**422**	mg/L	5.0	0.50	50	09/14/21 10:25	09/16/21 06:51	7439-95-4	
Molybdenum	ND	mg/L	0.050	0.0063	50	09/14/21 10:25	09/16/21 06:51	7439-98-7	
Selenium	ND	mg/L	0.10	0.0036	50	09/14/21 10:25	09/16/21 06:51	7782-49-2	
Thallium	ND	mg/L	0.024	0.0025	50	09/14/21 10:25	09/16/21 06:51	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	mg/L	0.00020	0.00012	1	09/17/21 09:58	09/23/21 11:41	7439-97-6	
5310B TOC	Analytical Method: SM 5310B-2011 Pace Analytical Services - Asheville								
Total Organic Carbon	**5.2**	mg/L	1.0	0.50	1		09/15/21 00:46	7440-44-0	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: MCMANUS 30050105.00009
Pace Project No.: 92560727

Sample: IR-1-5 (336 HOUR) **Lab ID: 92560727005** Collected: 09/08/21 09:30 Received: 09/10/21 12:45 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Aluminum	ND	mg/L	1.0	0.37	50	09/14/21 10:25	09/16/21 06:54	7429-90-5	
Antimony	ND	mg/L	0.050	0.010	50	09/14/21 10:25	09/16/21 06:54	7440-36-0	
Arsenic	ND	mg/L	0.050	0.0043	50	09/14/21 10:25	09/16/21 06:54	7440-38-2	
Barium	ND	mg/L	0.050	0.011	50	09/14/21 10:25	09/16/21 06:54	7440-39-3	
Beryllium	ND	mg/L	0.0050	0.0025	50	09/14/21 10:25	09/16/21 12:59	7440-41-7	
Cadmium	ND	mg/L	0.010	0.0030	50	09/14/21 10:25	09/16/21 06:54	7440-43-9	
Calcium	**166**	mg/L	10.0	1.8	50	09/14/21 10:25	09/16/21 06:54	7440-70-2	
Chromium	ND	mg/L	0.050	0.025	50	09/14/21 10:25	09/16/21 06:54	7440-47-3	
Cobalt	ND	mg/L	0.050	0.0025	50	09/14/21 10:25	09/16/21 06:54	7440-48-4	
Iron	**9.7**	mg/L	2.5	1.0	50	09/14/21 10:25	09/16/21 06:54	7439-89-6	
Lead	ND	mg/L	0.050	0.0038	50	09/14/21 10:25	09/16/21 06:54	7439-92-1	
Lithium	ND	mg/L	0.12	0.025	50	09/14/21 10:25	09/16/21 12:59	7439-93-2	
Magnesium	**414**	mg/L	5.0	0.50	50	09/14/21 10:25	09/16/21 06:54	7439-95-4	
Molybdenum	ND	mg/L	0.050	0.0063	50	09/14/21 10:25	09/16/21 06:54	7439-98-7	
Selenium	ND	mg/L	0.10	0.0036	50	09/14/21 10:25	09/16/21 06:54	7782-49-2	
Thallium	ND	mg/L	0.024	0.0025	50	09/14/21 10:25	09/16/21 06:54	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury	ND	mg/L	0.00020	0.00012	1	09/17/21 09:58	09/23/21 11:43	7439-97-6	
5310B TOC	Analytical Method: SM 5310B-2011 Pace Analytical Services - Asheville								
Total Organic Carbon	**2.0**	mg/L	1.0	0.50	1		09/15/21 01:01	7440-44-0	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: MCMANUS 30050105.00009
Pace Project No.: 92560727

Sample: IR-1-1 (336 HOUR) (F) **Lab ID: 92560727006** Collected: 09/08/21 09:40 Received: 09/10/21 12:45 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS, Dissolved	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Aluminum, Dissolved	ND	mg/L	1.0	0.37	50	09/13/21 14:58	09/17/21 14:32	7429-90-5	
Antimony, Dissolved	ND	mg/L	0.050	0.010	50	09/13/21 14:58	09/17/21 14:32	7440-36-0	M1
Arsenic, Dissolved	**0.081**	mg/L	0.050	0.0043	50	09/13/21 14:58	09/17/21 14:32	7440-38-2	M1
Barium, Dissolved	**0.13**	mg/L	0.050	0.011	50	09/13/21 14:58	09/17/21 14:32	7440-39-3	M1
Beryllium, Dissolved	ND	mg/L	0.0050	0.0025	50	09/13/21 14:58	09/17/21 14:32	7440-41-7	
Cadmium, Dissolved	ND	mg/L	0.010	0.0030	50	09/13/21 14:58	09/17/21 14:32	7440-43-9	
Calcium, Dissolved	**254**	mg/L	10.0	1.8	50	09/13/21 14:58	09/17/21 14:32	7440-70-2	M1
Chromium, Dissolved	ND	mg/L	0.050	0.025	50	09/13/21 14:58	09/17/21 14:32	7440-47-3	
Cobalt, Dissolved	ND	mg/L	0.050	0.0025	50	09/13/21 14:58	09/17/21 14:32	7440-48-4	
Iron, Dissolved	ND	mg/L	2.5	1.0	50	09/13/21 14:58	09/17/21 14:32	7439-89-6	
Lead, Dissolved	ND	mg/L	0.050	0.0038	50	09/13/21 14:58	09/17/21 14:32	7439-92-1	
Lithium, Dissolved	ND	mg/L	0.12	0.025	50	09/13/21 14:58	09/17/21 14:32	7439-93-2	
Magnesium, Dissolved	**503**	mg/L	20.0	2.0	200	09/13/21 14:58	09/17/21 14:36	7439-95-4	M1
Molybdenum, Dissolved	ND	mg/L	0.050	0.0063	50	09/13/21 14:58	09/17/21 14:32	7439-98-7	M1
Selenium, Dissolved	ND	mg/L	0.10	0.0036	50	09/13/21 14:58	09/17/21 14:32	7782-49-2	M1
Thallium, Dissolved	ND	mg/L	0.024	0.0025	50	09/13/21 14:58	09/17/21 14:32	7440-28-0	
7470 Mercury, Dissolved	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury, Dissolved	ND	mg/L	0.00020	0.00012	1	09/23/21 11:30	09/24/21 12:31	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	ND	mg/L	5.0	5.0	1		09/16/21 15:14		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		09/16/21 15:14		
Alkalinity, Total as CaCO3	ND	mg/L	5.0	5.0	1		09/16/21 15:14		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	ND	mg/L	0.10	0.050	1		09/11/21 06:30	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Sulfate	**8710**	mg/L	200	100	200		09/14/21 17:56	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: MCMANUS 30050105.00009
Pace Project No.: 92560727

Sample: IR-1-2 (336 HOUR) (F) **Lab ID: 92560727007** Collected: 09/08/21 09:00 Received: 09/10/21 12:45 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS, Dissolved	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Aluminum, Dissolved	ND	mg/L	1.0	0.37	50	09/13/21 14:58	09/17/21 16:19	7429-90-5	
Antimony, Dissolved	ND	mg/L	0.050	0.010	50	09/13/21 14:58	09/17/21 16:19	7440-36-0	
Arsenic, Dissolved	**0.20**	mg/L	0.050	0.0043	50	09/13/21 14:58	09/17/21 16:19	7440-38-2	
Barium, Dissolved	**0.13**	mg/L	0.050	0.011	50	09/13/21 14:58	09/17/21 16:19	7440-39-3	
Beryllium, Dissolved	ND	mg/L	0.0050	0.0025	50	09/13/21 14:58	09/17/21 16:19	7440-41-7	
Cadmium, Dissolved	ND	mg/L	0.010	0.0030	50	09/13/21 14:58	09/17/21 16:19	7440-43-9	
Calcium, Dissolved	**250**	mg/L	10.0	1.8	50	09/13/21 14:58	09/17/21 16:19	7440-70-2	
Chromium, Dissolved	ND	mg/L	0.050	0.025	50	09/13/21 14:58	09/17/21 16:19	7440-47-3	
Cobalt, Dissolved	**0.13**	mg/L	0.050	0.0025	50	09/13/21 14:58	09/17/21 16:19	7440-48-4	
Iron, Dissolved	**5810**	mg/L	200	83.8	4000	09/13/21 14:58	09/17/21 16:41	7439-89-6	
Lead, Dissolved	ND	mg/L	0.050	0.0038	50	09/13/21 14:58	09/17/21 16:19	7439-92-1	
Lithium, Dissolved	ND	mg/L	0.12	0.025	50	09/13/21 14:58	09/17/21 16:19	7439-93-2	
Magnesium, Dissolved	**489**	mg/L	5.0	0.50	50	09/13/21 14:58	09/17/21 16:19	7439-95-4	
Molybdenum, Dissolved	ND	mg/L	0.050	0.0063	50	09/13/21 14:58	09/17/21 16:19	7439-98-7	
Selenium, Dissolved	ND	mg/L	0.10	0.0036	50	09/13/21 14:58	09/17/21 16:19	7782-49-2	
Thallium, Dissolved	ND	mg/L	0.024	0.0025	50	09/13/21 14:58	09/17/21 16:19	7440-28-0	
7470 Mercury, Dissolved	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury, Dissolved	ND	mg/L	0.0020	0.0012	10	09/23/21 11:30	09/24/21 12:33	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**566**	mg/L	5.0	5.0	1		09/14/21 20:13		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		09/14/21 20:13		
Alkalinity, Total as CaCO3	**566**	mg/L	5.0	5.0	1		09/14/21 20:13		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	**45.3**	mg/L	25.0	12.5	250		09/11/21 06:31	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Sulfate	**511**	mg/L	12.0	6.0	12		09/12/21 11:28	14808-79-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
9800 Kincey Ave. Suite 100
Huntersville, NC 28078
(704)875-9092

ANALYTICAL RESULTS

Project: MCMANUS 30050105.00009
Pace Project No.: 92560727

Sample: IR-1-3 (336 HOUR) (F) **Lab ID: 92560727008** Collected: 09/08/21 09:10 Received: 09/10/21 12:45 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS, Dissolved	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Aluminum, Dissolved	ND	mg/L	1.0	0.37	50	09/13/21 14:58	09/17/21 16:26	7429-90-5	
Antimony, Dissolved	ND	mg/L	0.050	0.010	50	09/13/21 14:58	09/17/21 16:26	7440-36-0	
Arsenic, Dissolved	ND	mg/L	0.050	0.0043	50	09/13/21 14:58	09/17/21 16:26	7440-38-2	
Barium, Dissolved	ND	mg/L	0.050	0.011	50	09/13/21 14:58	09/17/21 16:26	7440-39-3	
Beryllium, Dissolved	ND	mg/L	0.0050	0.0025	50	09/13/21 14:58	09/17/21 16:26	7440-41-7	
Cadmium, Dissolved	ND	mg/L	0.010	0.0030	50	09/13/21 14:58	09/17/21 16:26	7440-43-9	
Calcium, Dissolved	**123**	mg/L	10.0	1.8	50	09/13/21 14:58	09/17/21 16:26	7440-70-2	
Chromium, Dissolved	ND	mg/L	0.050	0.025	50	09/13/21 14:58	09/17/21 16:26	7440-47-3	
Cobalt, Dissolved	ND	mg/L	0.050	0.0025	50	09/13/21 14:58	09/17/21 16:26	7440-48-4	
Iron, Dissolved	**4.2**	mg/L	2.5	1.0	50	09/13/21 14:58	09/17/21 16:26	7439-89-6	
Lead, Dissolved	ND	mg/L	0.050	0.0038	50	09/13/21 14:58	09/17/21 16:26	7439-92-1	
Lithium, Dissolved	ND	mg/L	0.12	0.025	50	09/13/21 14:58	09/17/21 16:26	7439-93-2	
Magnesium, Dissolved	**445**	mg/L	5.0	0.50	50	09/13/21 14:58	09/17/21 16:26	7439-95-4	
Molybdenum, Dissolved	ND	mg/L	0.050	0.0063	50	09/13/21 14:58	09/17/21 16:26	7439-98-7	
Selenium, Dissolved	ND	mg/L	0.10	0.0036	50	09/13/21 14:58	09/17/21 16:26	7782-49-2	
Thallium, Dissolved	ND	mg/L	0.024	0.0025	50	09/13/21 14:58	09/17/21 16:26	7440-28-0	
7470 Mercury, Dissolved	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury, Dissolved	ND	mg/L	0.00020	0.00012	1	09/23/21 11:30	09/24/21 12:41	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**41.2**	mg/L	5.0	5.0	1		09/14/21 20:22		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		09/14/21 20:22		
Alkalinity, Total as CaCO3	**45.5**	mg/L	5.0	5.0	1		09/14/21 20:22		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	ND	mg/L	0.10	0.050	1		09/11/21 06:31	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Sulfate	**541**	mg/L	13.0	6.5	13		09/12/21 11:44	14808-79-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
9800 Kincey Ave. Suite 100
Huntersville, NC 28078
(704)875-9092

ANALYTICAL RESULTS

Project: MCMANUS 30050105.00009
Pace Project No.: 92560727

Sample: IR-1-4 (336 HOUR) (F) **Lab ID: 92560727009** Collected: 09/08/21 09:20 Received: 09/10/21 12:45 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS, Dissolved	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Aluminum, Dissolved	ND	mg/L	1.0	0.37	50	09/13/21 14:58	09/17/21 16:45	7429-90-5	
Antimony, Dissolved	ND	mg/L	0.050	0.010	50	09/13/21 14:58	09/17/21 16:45	7440-36-0	
Arsenic, Dissolved	ND	mg/L	0.050	0.0043	50	09/13/21 14:58	09/17/21 16:45	7440-38-2	
Barium, Dissolved	ND	mg/L	0.050	0.011	50	09/13/21 14:58	09/17/21 16:45	7440-39-3	
Beryllium, Dissolved	ND	mg/L	0.0050	0.0025	50	09/13/21 14:58	09/17/21 16:45	7440-41-7	
Cadmium, Dissolved	ND	mg/L	0.010	0.0030	50	09/13/21 14:58	09/17/21 16:45	7440-43-9	
Calcium, Dissolved	**114**	mg/L	10.0	1.8	50	09/13/21 14:58	09/17/21 16:45	7440-70-2	
Chromium, Dissolved	ND	mg/L	0.050	0.025	50	09/13/21 14:58	09/17/21 16:45	7440-47-3	
Cobalt, Dissolved	ND	mg/L	0.050	0.0025	50	09/13/21 14:58	09/17/21 16:45	7440-48-4	
Iron, Dissolved	**7.1**	mg/L	2.5	1.0	50	09/13/21 14:58	09/17/21 16:45	7439-89-6	
Lead, Dissolved	ND	mg/L	0.050	0.0038	50	09/13/21 14:58	09/17/21 16:45	7439-92-1	
Lithium, Dissolved	ND	mg/L	0.12	0.025	50	09/13/21 14:58	09/17/21 16:45	7439-93-2	
Magnesium, Dissolved	**474**	mg/L	5.0	0.50	50	09/13/21 14:58	09/17/21 16:45	7439-95-4	
Molybdenum, Dissolved	ND	mg/L	0.050	0.0063	50	09/13/21 14:58	09/17/21 16:45	7439-98-7	
Selenium, Dissolved	ND	mg/L	0.10	0.0036	50	09/13/21 14:58	09/17/21 16:45	7782-49-2	
Thallium, Dissolved	ND	mg/L	0.024	0.0025	50	09/13/21 14:58	09/17/21 16:45	7440-28-0	
7470 Mercury, Dissolved	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury, Dissolved	ND	mg/L	0.00020	0.00012	1	09/23/21 11:30	09/24/21 12:43	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**117**	mg/L	5.0	5.0	1		09/14/21 20:30		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		09/14/21 20:30		
Alkalinity, Total as CaCO3	**117**	mg/L	5.0	5.0	1		09/14/21 20:30		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	ND	mg/L	0.10	0.050	1		09/11/21 06:31	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Sulfate	**507**	mg/L	12.0	6.0	12		09/12/21 12:00	14808-79-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
9800 Kincey Ave. Suite 100
Huntersville, NC 28078
(704)875-9092

ANALYTICAL RESULTS

Project: MCMANUS 30050105.00009
Pace Project No.: 92560727

Sample: IR-1-5 (336 HOUR) (F) **Lab ID: 92560727010** Collected: 09/08/21 09:30 Received: 09/10/21 12:45 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS, Dissolved	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Asheville								
Aluminum, Dissolved	ND	mg/L	1.0	0.37	50	09/13/21 14:58	09/17/21 16:52	7429-90-5	
Antimony, Dissolved	ND	mg/L	0.050	0.010	50	09/13/21 14:58	09/17/21 16:52	7440-36-0	
Arsenic, Dissolved	ND	mg/L	0.050	0.0043	50	09/13/21 14:58	09/17/21 16:52	7440-38-2	
Barium, Dissolved	ND	mg/L	0.050	0.011	50	09/13/21 14:58	09/17/21 16:52	7440-39-3	
Beryllium, Dissolved	ND	mg/L	0.0050	0.0025	50	09/13/21 14:58	09/17/21 16:52	7440-41-7	
Cadmium, Dissolved	ND	mg/L	0.010	0.0030	50	09/13/21 14:58	09/17/21 16:52	7440-43-9	
Calcium, Dissolved	**180**	mg/L	10.0	1.8	50	09/13/21 14:58	09/17/21 16:52	7440-70-2	
Chromium, Dissolved	ND	mg/L	0.050	0.025	50	09/13/21 14:58	09/17/21 16:52	7440-47-3	
Cobalt, Dissolved	ND	mg/L	0.050	0.0025	50	09/13/21 14:58	09/17/21 16:52	7440-48-4	
Iron, Dissolved	**7.2**	mg/L	2.5	1.0	50	09/13/21 14:58	09/17/21 16:52	7439-89-6	
Lead, Dissolved	ND	mg/L	0.050	0.0038	50	09/13/21 14:58	09/17/21 16:52	7439-92-1	
Lithium, Dissolved	ND	mg/L	0.12	0.025	50	09/13/21 14:58	09/17/21 16:52	7439-93-2	
Magnesium, Dissolved	**447**	mg/L	5.0	0.50	50	09/13/21 14:58	09/17/21 16:52	7439-95-4	
Molybdenum, Dissolved	ND	mg/L	0.050	0.0063	50	09/13/21 14:58	09/17/21 16:52	7439-98-7	
Selenium, Dissolved	ND	mg/L	0.10	0.0036	50	09/13/21 14:58	09/17/21 16:52	7782-49-2	
Thallium, Dissolved	ND	mg/L	0.024	0.0025	50	09/13/21 14:58	09/17/21 16:52	7440-28-0	
7470 Mercury, Dissolved	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Asheville								
Mercury, Dissolved	ND	mg/L	0.00020	0.00012	1	09/23/21 11:30	09/24/21 12:45	7439-97-6	
2320B Alkalinity	Analytical Method: SM 2320B-2011 Pace Analytical Services - Asheville								
Alkalinity,Bicarbonate (CaCO3)	**202**	mg/L	5.0	5.0	1		09/14/21 20:48		
Alkalinity,Carbonate (CaCO3)	ND	mg/L	5.0	5.0	1		09/14/21 20:48		
Alkalinity, Total as CaCO3	**202**	mg/L	5.0	5.0	1		09/14/21 20:48		
4500S2D Sulfide Water	Analytical Method: SM 4500-S2D-2011 Pace Analytical Services - Asheville								
Sulfide	ND	mg/L	0.10	0.050	1		09/11/21 06:32	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Rev 2.1 1993 Pace Analytical Services - Asheville								
Sulfate	**425**	mg/L	10.0	5.0	10		09/12/21 12:15	14808-79-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
9800 Kincey Ave. Suite 100
Huntersville, NC 28078
(704)875-9092

QUALITY CONTROL DATA

Project: MCMANUS 30050105.00009
Pace Project No.: 92560727

QC Batch: 647848 | Analysis Method: EPA 7470A
QC Batch Method: EPA 7470A | Analysis Description: 7470 Mercury
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92560727001, 92560727002, 92560727003, 92560727004, 92560727005

METHOD BLANK: 3398336 Matrix: Water
Associated Lab Samples: 92560727001, 92560727002, 92560727003, 92560727004, 92560727005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00020	0.00012	09/23/21 10:59	

LABORATORY CONTROL SAMPLE: 3398337

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

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3398338 3398339

Parameter	Units	92560495001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	ND	0.0025	0.0025	0.0024	0.0021	95	84	75-125	11	25	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
9800 Kincey Ave. Suite 100
Huntersville, NC 28078
(704)875-9092

QUALITY CONTROL DATA

Project: MCMANUS 30050105.00009
Pace Project No.: 92560727

QC Batch: 648840 Analysis Method: EPA 7470A
QC Batch Method: EPA 7470A Analysis Description: 7470 Mercury Dissolved
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92560727006, 92560727007, 92560727008, 92560727009, 92560727010

METHOD BLANK: 3403278 Matrix: Water
Associated Lab Samples: 92560727006, 92560727007, 92560727008, 92560727009, 92560727010

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury, Dissolved	mg/L	ND	0.00020	0.00012	09/24/21 12:26	

LABORATORY CONTROL SAMPLE: 3403279

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury, Dissolved	mg/L	0.0025	0.0024	97	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3403280 3403281

Parameter	Units	92560727007 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury, Dissolved	mg/L	ND	0.0025	0.0025	0.0026	0.0025	96	92	75-125	4	25	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
9800 Kincey Ave. Suite 100
Huntersville, NC 28078
(704)875-9092

QUALITY CONTROL DATA

Project: MCMANUS 30050105.00009
Pace Project No.: 92560727

QC Batch: 646950
QC Batch Method: EPA 3010A
Analysis Method: EPA 6020B
Analysis Description: 6020 MET
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92560727001, 92560727002, 92560727003, 92560727004, 92560727005

METHOD BLANK: 3393444 Matrix: Water
Associated Lab Samples: 92560727001, 92560727002, 92560727003, 92560727004, 92560727005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Aluminum	mg/L	ND	0.020	0.0074	09/16/21 05:47	
Antimony	mg/L	ND	0.0010	0.00020	09/16/21 05:47	
Arsenic	mg/L	ND	0.0010	0.000087	09/16/21 05:47	
Barium	mg/L	ND	0.0010	0.00021	09/16/21 05:47	
Beryllium	mg/L	ND	0.00010	0.000050	09/16/21 12:09	
Cadmium	mg/L	ND	0.00020	0.000060	09/16/21 05:47	
Calcium	mg/L	ND	0.20	0.035	09/16/21 05:47	
Chromium	mg/L	ND	0.0010	0.00050	09/16/21 05:47	
Cobalt	mg/L	ND	0.0010	0.000050	09/16/21 05:47	
Iron	mg/L	ND	0.050	0.021	09/16/21 05:47	
Lead	mg/L	ND	0.0010	0.000077	09/16/21 05:47	
Lithium	mg/L	ND	0.0025	0.00050	09/16/21 12:09	
Magnesium	mg/L	ND	0.10	0.010	09/16/21 05:47	
Molybdenum	mg/L	ND	0.0010	0.00013	09/16/21 05:47	
Selenium	mg/L	ND	0.0020	0.000072	09/16/21 05:47	
Thallium	mg/L	ND	0.00047	0.000050	09/16/21 05:47	

LABORATORY CONTROL SAMPLE: 3393445

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	2.5	2.1	84	80-120	
Antimony	mg/L	0.05	0.043	86	80-120	
Arsenic	mg/L	0.05	0.045	90	80-120	
Barium	mg/L	0.05	0.045	91	80-120	
Beryllium	mg/L	0.05	0.051	103	80-120	
Cadmium	mg/L	0.05	0.045	91	80-120	
Calcium	mg/L	2.5	2.1	83	80-120	
Chromium	mg/L	0.05	0.047	94	80-120	
Cobalt	mg/L	0.05	0.047	93	80-120	
Iron	mg/L	1.2	1.1	88	80-120	
Lead	mg/L	0.05	0.045	90	80-120	
Lithium	mg/L	0.05	0.050	100	80-120	
Magnesium	mg/L	2.5	2.1	84	80-120	
Molybdenum	mg/L	0.05	0.043	85	80-120	
Selenium	mg/L	0.05	0.045	91	80-120	
Thallium	mg/L	0.025	0.023	90	80-120	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
9800 Kincey Ave. Suite 100
Huntersville, NC 28078
(704)875-9092

QUALITY CONTROL DATA

Project: MCMANUS 30050105.00009
Pace Project No.: 92560727

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3393519 3393520

Parameter	Units	92560727001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	mg/L	1.0	2.5	2.5	3.9	4.3	114	132	75-125	11	20	M1
Antimony	mg/L	ND	0.05	0.05	.044J	.047J	86	93	75-125		20	
Arsenic	mg/L	0.33	0.05	0.05	0.36	0.40	66	146	75-125	11	20	M1
Barium	mg/L	0.11	0.05	0.05	0.15	0.17	84	113	75-125	9	20	
Beryllium	mg/L	ND	0.05	0.05	0.044	0.041	88	83	75-125	6	20	
Cadmium	mg/L	ND	0.05	0.05	0.042	0.045	84	90	75-125	7	20	
Calcium	mg/L	197	2.5	2.5	194	211	-117	572	75-125	8	20	M1
Chromium	mg/L	ND	0.05	0.05	.047J	0.052	86	96	75-125		20	
Cobalt	mg/L	ND	0.05	0.05	.046J	ND	87	95	75-125		20	
Iron	mg/L	ND	1.2	1.2	3.5	3.8	98	123	75-125	9	20	
Lead	mg/L	ND	0.05	0.05	.043J	.046J	85	91	75-125		20	
Lithium	mg/L	ND	0.05	0.05	.11J	.11J	84	70	75-125		20	M1
Magnesium	mg/L	409	2.5	2.5	394	452	-616	1730	75-125	14	20	M1
Molybdenum	mg/L	ND	0.05	0.05	.047J	.046J	88	87	75-125		20	
Selenium	mg/L	ND	0.05	0.05	.015J	.014J	29	27	75-125		20	M1
Thallium	mg/L	ND	0.025	0.025	.021J	.022J	83	88	75-125		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
9800 Kincey Ave. Suite 100
Huntersville, NC 28078
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QUALITY CONTROL DATA

Project: MCMANUS 30050105.00009
Pace Project No.: 92560727

QC Batch: 646771
QC Batch Method: EPA 3010A
Analysis Method: EPA 6020B
Analysis Description: 6020 MET Dissolved
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92560727006, 92560727007, 92560727008, 92560727009, 92560727010

METHOD BLANK: 3392676 Matrix: Water
Associated Lab Samples: 92560727006, 92560727007, 92560727008, 92560727009, 92560727010

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Aluminum, Dissolved	mg/L	ND	0.020	0.0074	09/17/21 14:22	
Antimony, Dissolved	mg/L	ND	0.0010	0.00020	09/17/21 14:22	
Arsenic, Dissolved	mg/L	ND	0.0010	0.000087	09/17/21 14:22	
Barium, Dissolved	mg/L	ND	0.0010	0.00021	09/17/21 14:22	
Beryllium, Dissolved	mg/L	ND	0.00010	0.000050	09/17/21 14:22	
Cadmium, Dissolved	mg/L	ND	0.00020	0.000060	09/17/21 14:22	
Calcium, Dissolved	mg/L	ND	0.20	0.035	09/17/21 14:22	
Chromium, Dissolved	mg/L	ND	0.0010	0.00050	09/17/21 14:22	
Cobalt, Dissolved	mg/L	ND	0.0010	0.000050	09/17/21 14:22	
Iron, Dissolved	mg/L	ND	0.050	0.021	09/17/21 14:22	
Lead, Dissolved	mg/L	ND	0.0010	0.000077	09/17/21 14:22	
Lithium, Dissolved	mg/L	ND	0.0025	0.00050	09/17/21 14:22	
Magnesium, Dissolved	mg/L	ND	0.10	0.010	09/17/21 14:22	
Molybdenum, Dissolved	mg/L	ND	0.0010	0.00013	09/17/21 14:22	
Selenium, Dissolved	mg/L	ND	0.0020	0.000072	09/17/21 14:22	
Thallium, Dissolved	mg/L	ND	0.00047	0.000050	09/17/21 14:22	

LABORATORY CONTROL SAMPLE: 3392677

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum, Dissolved	mg/L	2.5	2.5	101	80-120	
Antimony, Dissolved	mg/L	0.05	0.053	106	80-120	
Arsenic, Dissolved	mg/L	0.05	0.046	91	80-120	
Barium, Dissolved	mg/L	0.05	0.046	92	80-120	
Beryllium, Dissolved	mg/L	0.05	0.048	96	80-120	
Cadmium, Dissolved	mg/L	0.05	0.048	97	80-120	
Calcium, Dissolved	mg/L	2.5	2.4	98	80-120	
Chromium, Dissolved	mg/L	0.05	0.048	96	80-120	
Cobalt, Dissolved	mg/L	0.05	0.049	97	80-120	
Iron, Dissolved	mg/L	1.2	1.3	102	80-120	
Lead, Dissolved	mg/L	0.05	0.046	93	80-120	
Lithium, Dissolved	mg/L	0.05	0.047	95	80-120	
Magnesium, Dissolved	mg/L	2.5	2.5	102	80-120	
Molybdenum, Dissolved	mg/L	0.05	0.052	104	80-120	
Selenium, Dissolved	mg/L	0.05	0.046	92	80-120	
Thallium, Dissolved	mg/L	0.025	0.023	93	80-120	

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
9800 Kincey Ave. Suite 100
Huntersville, NC 28078
(704)875-9092

QUALITY CONTROL DATA

Project: MCMANUS 30050105.00009
Pace Project No.: 92560727

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3392678 3392679

Parameter	Units	92560727006 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum, Dissolved	mg/L	ND	2.5	2.5	2.9	2.8	112	107	75-125	4	20	
Antimony, Dissolved	mg/L	ND	0.05	0.05	.012J	.011J	21	20	75-125		20	M1
Arsenic, Dissolved	mg/L	0.081	0.05	0.05	0.083	0.088	4	14	75-125	6	20	M1
Barium, Dissolved	mg/L	0.13	0.05	0.05	0.17	0.16	71	59	75-125	4	20	M1
Beryllium, Dissolved	mg/L	ND	0.05	0.05	0.049	0.050	95	96	75-125	1	20	
Cadmium, Dissolved	mg/L	ND	0.05	0.05	0.048	0.049	95	96	75-125	1	20	
Calcium, Dissolved	mg/L	254	2.5	2.5	248	246	-268	-349	75-125	1	20	M1
Chromium, Dissolved	mg/L	ND	0.05	0.05	0.051	0.051	94	93	75-125	1	20	
Cobalt, Dissolved	mg/L	ND	0.05	0.05	0.051	0.051	100	100	75-125	0	20	
Iron, Dissolved	mg/L	ND	1.2	1.2	1.5J	1.3J	120	102	75-125		20	
Lead, Dissolved	mg/L	ND	0.05	0.05	.048J	.048J	95	96	75-125		20	
Lithium, Dissolved	mg/L	ND	0.05	0.05	0.14	0.14	88	90	75-125	1	20	
Magnesium, Dissolved	mg/L	503	2.5	2.5	494	494	-375	-352	75-125	0	20	M1
Molybdenum, Dissolved	mg/L	ND	0.05	0.05	.018J	.018J	32	32	75-125		20	M1
Selenium, Dissolved	mg/L	ND	0.05	0.05	.006J	.013J	-1	12	75-125		20	M1
Thallium, Dissolved	mg/L	ND	0.025	0.025	0.024	0.024	93	93	75-125	1	20	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
9800 Kincey Ave. Suite 100
Huntersville, NC 28078
(704)875-9092

QUALITY CONTROL DATA

Project: MCMANUS 30050105.00009
Pace Project No.: 92560727

QC Batch: 646966 | Analysis Method: SM 2320B-2011
QC Batch Method: SM 2320B-2011 | Analysis Description: 2320B Alkalinity
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92560727006, 92560727007, 92560727008, 92560727009, 92560727010

METHOD BLANK: 3393491 Matrix: Water
Associated Lab Samples: 92560727006, 92560727007, 92560727008, 92560727009, 92560727010

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	ND	5.0	5.0	09/14/21 19:15	
Alkalinity,Bicarbonate (CaCO3)	mg/L	ND	5.0	5.0	09/14/21 19:15	
Alkalinity,Carbonate (CaCO3)	mg/L	ND	5.0	5.0	09/14/21 19:15	

LABORATORY CONTROL SAMPLE: 3393492

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	50	51.1	102	80-120	

LABORATORY CONTROL SAMPLE: 3393493

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	50	50.9	102	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3393494 3393495

Parameter	Units	92560634001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	240	50	50	303	303	127	126	80-120	0	25	M1

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
9800 Kincey Ave. Suite 100
Huntersville, NC 28078
(704)875-9092

QUALITY CONTROL DATA

Project: MCMANUS 30050105.00009
Pace Project No.: 92560727

QC Batch: 646596 | Analysis Method: SM 4500-S2D-2011
QC Batch Method: SM 4500-S2D-2011 | Analysis Description: 4500S2D Sulfide Water
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92560727006, 92560727007, 92560727008, 92560727009, 92560727010

METHOD BLANK: 3391786 Matrix: Water
Associated Lab Samples: 92560727006, 92560727007, 92560727008, 92560727009, 92560727010

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Sulfide	mg/L	ND	0.10	0.050	09/11/21 06:29	

LABORATORY CONTROL SAMPLE: 3391787

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfide	mg/L	0.5	0.50	100	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3391788 3391789

Parameter	Units	92560503001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfide	mg/L	ND	0.5	0.5	0.47	0.51	91	100	80-120	8	10	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
9800 Kincey Ave. Suite 100
Huntersville, NC 28078
(704)875-9092

QUALITY CONTROL DATA

Project: MCMANUS 30050105.00009
Pace Project No.: 92560727

QC Batch: 646605 | 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: 92560727006, 92560727007, 92560727008, 92560727009, 92560727010

METHOD BLANK: 3391813 Matrix: Water
Associated Lab Samples: 92560727006, 92560727007, 92560727008, 92560727009, 92560727010

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Sulfate	mg/L	ND	1.0	0.50	09/13/21 00:59	

LABORATORY CONTROL SAMPLE: 3391814

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	50	49.2	98	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3391815 3391816

Parameter	Units	92560365001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	11.1	50	50	63.3	63.9	104	106	90-110	1	10	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3391817 3391818

Parameter	Units	92560722009 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	168	50	50	189	190	41	43	90-110	1	10	M1

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
9800 Kincey Ave. Suite 100
Huntersville, NC 28078
(704)875-9092

QUALITY CONTROL DATA

Project: MCMANUS 30050105.00009
Pace Project No.: 92560727

QC Batch: 647087 | Analysis Method: SM 5310B-2011
QC Batch Method: SM 5310B-2011 | Analysis Description: 5310B TOC
Laboratory: Pace Analytical Services - Asheville
Associated Lab Samples: 92560727001, 92560727002, 92560727003, 92560727004, 92560727005

METHOD BLANK: 3394103 Matrix: Water
Associated Lab Samples: 92560727001, 92560727002, 92560727003, 92560727004, 92560727005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Organic Carbon	mg/L	ND	1.0	0.50	09/14/21 16:26	

LABORATORY CONTROL SAMPLE: 3394104

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Organic Carbon	mg/L	25	24.1	96	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3394105 3394106

Parameter	Units	92558869001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Total Organic Carbon	mg/L	ND	25	25	23.9	24.0	96	96	90-110	1	10	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3394107 3394108

Parameter	Units	92558869002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Total Organic Carbon	mg/L	ND	25	25	24.0	24.5	95	98	90-110	2	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
9800 Kincey Ave. Suite 100
Huntersville, NC 28078
(704)875-9092

QUALIFIERS

Project: MCMANUS 30050105.00009
Pace Project No.: 92560727

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.

Reported results are not rounded until the final step prior to reporting. Therefore, calculated parameters that are typically reported as "Total" may vary slightly from the sum of the reported component parameters.

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
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(704)875-9092

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: MCMANUS 30050105.00009
Pace Project No.: 92560727

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
92560727001	**IR-1-1 (336 HOUR)**	EPA 3010A	646950	EPA 6020B	647058
92560727002	**IR-1-2 (336 HOUR)**	EPA 3010A	646950	EPA 6020B	647058
92560727003	**IR-1-3 (336 HOUR)**	EPA 3010A	646950	EPA 6020B	647058
92560727004	**IR-1-4 (336 HOUR)**	EPA 3010A	646950	EPA 6020B	647058
92560727005	**IR-1-5 (336 HOUR)**	EPA 3010A	646950	EPA 6020B	647058
92560727006	**IR-1-1 (336 HOUR) (F)**	EPA 3010A	646771	EPA 6020B	646839
92560727007	**IR-1-2 (336 HOUR) (F)**	EPA 3010A	646771	EPA 6020B	646839
92560727008	**IR-1-3 (336 HOUR) (F)**	EPA 3010A	646771	EPA 6020B	646839
92560727009	**IR-1-4 (336 HOUR) (F)**	EPA 3010A	646771	EPA 6020B	646839
92560727010	**IR-1-5 (336 HOUR) (F)**	EPA 3010A	646771	EPA 6020B	646839
92560727001	**IR-1-1 (336 HOUR)**	EPA 7470A	647848	EPA 7470A	648497
92560727002	**IR-1-2 (336 HOUR)**	EPA 7470A	647848	EPA 7470A	648497
92560727003	**IR-1-3 (336 HOUR)**	EPA 7470A	647848	EPA 7470A	648497
92560727004	**IR-1-4 (336 HOUR)**	EPA 7470A	647848	EPA 7470A	648497
92560727005	**IR-1-5 (336 HOUR)**	EPA 7470A	647848	EPA 7470A	648497
92560727006	**IR-1-1 (336 HOUR) (F)**	EPA 7470A	648840	EPA 7470A	649068
92560727007	**IR-1-2 (336 HOUR) (F)**	EPA 7470A	648840	EPA 7470A	649068
92560727008	**IR-1-3 (336 HOUR) (F)**	EPA 7470A	648840	EPA 7470A	649068
92560727009	**IR-1-4 (336 HOUR) (F)**	EPA 7470A	648840	EPA 7470A	649068
92560727010	**IR-1-5 (336 HOUR) (F)**	EPA 7470A	648840	EPA 7470A	649068
92560727006	**IR-1-1 (336 HOUR) (F)**	SM 2320B-2011	646966		
92560727007	**IR-1-2 (336 HOUR) (F)**	SM 2320B-2011	646966		
92560727008	**IR-1-3 (336 HOUR) (F)**	SM 2320B-2011	646966		
92560727009	**IR-1-4 (336 HOUR) (F)**	SM 2320B-2011	646966		
92560727010	**IR-1-5 (336 HOUR) (F)**	SM 2320B-2011	646966		
92560727006	**IR-1-1 (336 HOUR) (F)**	SM 4500-S2D-2011	646596		
92560727007	**IR-1-2 (336 HOUR) (F)**	SM 4500-S2D-2011	646596		
92560727008	**IR-1-3 (336 HOUR) (F)**	SM 4500-S2D-2011	646596		
92560727009	**IR-1-4 (336 HOUR) (F)**	SM 4500-S2D-2011	646596		
92560727010	**IR-1-5 (336 HOUR) (F)**	SM 4500-S2D-2011	646596		
92560727006	**IR-1-1 (336 HOUR) (F)**	EPA 300.0 Rev 2.1 1993	646605		
92560727007	**IR-1-2 (336 HOUR) (F)**	EPA 300.0 Rev 2.1 1993	646605		
92560727008	**IR-1-3 (336 HOUR) (F)**	EPA 300.0 Rev 2.1 1993	646605		
92560727009	**IR-1-4 (336 HOUR) (F)**	EPA 300.0 Rev 2.1 1993	646605		
92560727010	**IR-1-5 (336 HOUR) (F)**	EPA 300.0 Rev 2.1 1993	646605		
92560727001	**IR-1-1 (336 HOUR)**	SM 5310B-2011	647087		
92560727002	**IR-1-2 (336 HOUR)**	SM 5310B-2011	647087		
92560727003	**IR-1-3 (336 HOUR)**	SM 5310B-2011	647087		
92560727004	**IR-1-4 (336 HOUR)**	SM 5310B-2011	647087		
92560727005	**IR-1-5 (336 HOUR)**	SM 5310B-2011	647087		

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: Arcadis

Project #: WO# : 92560727

92560727

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☑ Pace ☐ Other:____

Custody Seal Present? ☐ Yes ☑ No **Seals Intact?** ☐ Yes ☑ No

Date/Initials Person Examining Contents: DJ 9/1/21

Packing Material: ☐ Bubble Wrap ☑ Bubble Bags ☐ None ☐ Other

Biological Tissue Frozen? ☐ Yes ☐ No ☑ N/A

Thermometer: ☑ IR Gun ID: 92706H ☑ Wet ☐ Blue ☐ None

Type of Ice:

Cooler Temp: 1.6 **Correction Factor:** Add/Subtract (°C) 0

Cooler Temp Corrected (°C): 1.6

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: 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

Received 3 DGGP vials not listed on CoC per Sample. Not marked (F)

Lot ID of split containers:

CLIENT NOTIFICATION/RESOLUTION

Received updated COC that lists TOC

Person contacted: David Liles Date/Time: 9/4/21 13:35

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# : 92560727**

PM: NMG Due Date: 09/21/21

CLIENT: 92-ARCADIS

Item#	BP4U-125 mL Plastic Unpreserved (N/A) (Cl-)	BP3U-250 mL Plastic Unpreserved (N/A)	BP2U-500 mL Plastic Unpreserved (N/A)	BP1U-1 liter Plastic Unpreserved (N/A)	BP4S-125 mL Plastic H2SO4 (pH < 2) (Cl-)	BP3N-250 mL plastic HNO3 (pH < 2)	BP4Z-125 mL Plastic ZN Acetate & NaOH (>9)	BP4C-125 mL Plastic NaOH (pH > 12) (Cl-)	WGFU-Wide-mouthed Glass jar Unpreserved	AG1U-1 liter Amber Unpreserved (N/A) (Cl-)	AG1H-1 liter Amber HCl (pH < 2)	AG3U-250 mL Amber Unpreserved (N/A) (Cl-)	AG1S-1 liter Amber H2SO4 (pH < 2)	AG3S-250 mL Amber H2SO4 (pH < 2)	AG3A(DG3A)-250 mL Amber NH4Cl (N/A)(Cl-)	DG9H-40 mL VOA HCl (N/A)	VG9T-40 mL VOA Na2S2O3 (N/A)	VG9U-40 mL VOA Unp (N/A)	DG9P-40 mL VOA H3PO4 (N/A)	VOAK (6 vials per kit)-5035 kit (N/A)	V/GK (3 vials per kit)-VPH/Gas kit (N/A)	SP5T-125 mL Sterile Plastic (N/A – lab)	SP2T-250 mL Sterile Plastic (N/A – lab)		BP3A-250 mL Plastic (NH2)2SO4 (9.3-9.7)	AG0U-100 mL Amber Unpreserved vials (N/A)	VSGU-20 mL Scintillation vials (N/A)	DG9U-40 mL Amber Unpreserved vials (N/A)
1						1													3										
2		2				1	1																						
3						1													3										
4		2				1	1																						
5						1													3										
6		2				1	1																						
7						1													3										
8		2				1	1																						
9						1													3										
10		2				1	1																						
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.

ARCADIS Design & Consultancy for natural and built assets

CHAIN OF CUSTODY & LABORATORY ANALYSIS REQUEST FORM

Lab Work Order # 848741

PACE Analytical

PROJ. NO.	PROJECT NAME	SDG NUMBER	COC Number
30050105.00009	McManus GA Power		

SAMPLERS: Robert Prigge, Andy Baumeister

SAMPLE ID	DATE	TIME	MATRIX	Composite/ Grab	# Containers	Requested Analyses 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Remarks
IR-1-1 (336 hour)	9/8/2021	0940	W	Composite	4	1					3															001
IR-1-1 (336 hour) (F)	9/8/2021	0940	W	Composite	4		1	1	1	1																006
IR-1-2 (336 hour)	9/8/2021	0900	W	Composite	4	1					3															002
IR-1-2 (336 hour) (F)	9/8/2021	0900	W	Composite	4		1	1	1	1																007
IR-1-3 (336 hour)	9/8/2021	0910	W	Composite	4	1					3															003
IR-1-3 (336 hour) (F)	9/8/2021	0910	W	Composite	4		1	1	1	1																008
IR-1-4 (336 hour)	9/8/2021	0920	W	Composite	4	1					3															004
IR-1-4 (336 hour) (F)	9/8/2021	0920	W	Composite	4		1	1	1	1																009
IR-1-5 (336 hour)	9/8/2021	0930	W	Composite	4	1					3															005
IR-1-5 (336 hour) (F)	9/8/2021	0930	W	Composite	4		1	1	1	1																010

Requested Analyses	
1	Total 6020 *
2	Dissolved 6020 *
3	Sulfide
4	SO4- 300.0
5	SM2320 (Alkalinity)
6	TOC
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	

Special Instructions/Comments:

* 6020 metals (As, Fe, Al, Ca, Mg, **and Appendix IV metals)**

(F) in Sample ID refers to sample being filtered through 0.45u filter by ARCADIS

☐ **Special QA/QC Instructions**

Laboratory Information and Receipt

Lab Name: PACE Analytical

Shipping Tracking # Courrier

Specify Turnaround Requirements: Standard

☐ Cooler packed with ice

☐Cooler custody seal intact

Sample Receipt:

Condition/Cooler Temp:

Relinquished by:	DATE	TIME	Received by:	Relinquished by:	DATE	TIME	Received by:
Dave Lile	9/9/2021	0:00	PACE				
Relinquished by:	DATE	TIME	Received by:	Relinquished by:	DATE	TIME	Received by:
			JB Pace HVL		9/10/21	1245	
Relinquished by:	DATE	TIME	Received by:	Relinquished by:	DATE	TIME	Received by:

Pace Analytical Services, LLC
9800 Kincey Ave. Suite 100
Huntersville, NC 28078
(704)875-9092

September 28, 2021

Dave Liles
Arcadis
4915 Prospectus Dr
Suite F
Durham, NC 27713

RE: Project: MCMANUS GAPOWER 30050105.00009
Pace Project No.: 92563493

Dear Dave Liles:

Enclosed are the analytical results for sample(s) received by the laboratory on September 11, 2021. 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.

Some analyses were subcontracted outside of the Pace Network. The test report from the external subcontractor is attached to this report in its entirety.

The test results provided in this final report were generated by each of the following laboratories within the Pace Network:

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

Sincerely,

Nicole D'Oleo

Nicole D'Oleo
nicole.d'oleo@pacelabs.com
(704)875-9092
Project Manager

Enclosures

Pace Analytical Services, LLC
9800 Kincey Ave. Suite 100
Huntersville, NC 28078
(704)875-9092

SAMPLE SUMMARY

Project: MCMANUS GAPOWER 30050105.00009
Pace Project No.: 92563493

Lab ID	Sample ID	Matrix	Date Collected	Date Received
92563493001	**IR-1-1 (336 HOUR) (F)**	Water	09/08/21 09:40	09/11/21 10:37
92563493002	**IR-1-2 (336 HOUR) (F)**	Water	09/08/21 09:00	09/11/21 10:37
92563493003	**IR-1-3 (336 HOUR) (F)**	Water	09/08/21 09:10	09/11/21 10:37
92563493004	**IR-1-4 (336 HOUR) (F)**	Water	09/08/21 09:20	09/11/21 10:37
92563493005	**IR-1-5 (336 HOUR) (F)**	Water	09/08/21 09:30	09/11/21 10:37

ARCADIS Design & Consultancy for natural and built assets

CHAIN OF CUSTODY & LABORATORY ANALYSIS REQUEST FORM

WO# : 92563493

92563493

PACE Analytical

PROJ. NO.	PROJECT NAME	SDG NUMBER	COC Number
30050105.00009	McManus GA Power		

SAMPLERS: Robert Prigge, Andy Baumeister

SAMPLE ID	DATE	TIME	MATRIX	Composite/ Grab	# Containers	Requested Analyses 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Remarks
IR-1-1 (336 hour) (F)	9/8/2021	0940	W	Composite	2	2																				
IR-1-2 (336 hour) (F)	9/8/2021	0900	W	Composite	2	2																				
IR-1-3 (336 hour) (F)	9/8/2021	0910	W	Composite	2	2																				
IR-1-4 (336 hour) (F)	9/8/2021	0920	W	Composite	2	2																				
IR-1-5 (336 hour) (F)	9/8/2021	0930	W	Composite	2	2																				

Requested Analyses		
1	As Speciation	
2		
3		
4		
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14		
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16		
17		
18		

Special Instructions/Comments:

(F) in Sample ID refers to sample being filtered through the supplied 0.45u filter by ARCADIS

☐ **Special QA/QC Instructions**

Laboratory Information and Receipt

Lab Name: Brooks Applied

Shipping Tracking #

Specify Turnaround Requirements: Standard

☐ Cooler packed with ice

☐ Cooler custody seal intact

Sample Receipt:

Condition/Cooler Temp:

Relinquished by:	DATE	TIME	Received by:	Relinquished by:	DATE	TIME	Received by:
Robert Prigge	9/10/2021	1700	Fed Ex 9/11/21 10:37				
Relinquished by:	DATE	TIME	Received by:	Relinquished by:	DATE	TIME	Received by:
Relinquished by:	DATE	TIME	Received by:	Relinquished by:	DATE	TIME	Received by:

BROOKS APPLIED LABS
18804 North Creek Parkway, Ste 100, Bothell, WA 98011 • USA • T: 206 632 6206 F: 206 632 6017 • info@brooksapplied.com

September 27, 2021

Pace Analytical Services – Huntersville
ATTN: Nicole D'Oleo
9800 Kincey Ave., Suite 100
Huntersville, NC 28078
nicole.d'oleo@pacelabs.com

RE: Project PAC-HN2007

Dear Nicole D'Oleo,

On August 11, 2021, Brooks Applied Labs (BAL) received five (5) water samples at a temperature of 8.0°C. The samples were logged-in for the analysis of arsenic (As) speciation per the chain-of-custody (COC). The client directly filtered (0.45µm) each sample into an evacuated container prior to receipt at BAL. All samples were stored according to BAL SOPs and EPA methodology.

BAL strongly recommends that all samples submitted for arsenic speciation remain at a temperature of ≤ 6°C to maintain sample integrity prior to analysis. Consequently, the As speciation results were qualified (**Z**), indicating that the samples were received above the recommended temperature.

Arsenic Speciation by IC-ICP-CRC-MS
All aqueous samples for As speciation were analyzed using ion chromatography inductively coupled plasma collision reaction cell mass spectrometry (IC-ICP-CRC-MS). In accordance with the project agreement, As speciation was defined as dissolved arsenite [As(III)], arsenate [As(V)], monomethylarsonic acid [MMAs], and dimethylarsinic acid [DMAs]; the total estimated concentration of any unidentified arsenic-containing species detected in each sample has also been reported as Unk As Sp. Arsenic species are chromatographically separated on an ion exchange column and then quantified using inductively coupled plasma collision reaction cell mass spectrometry (ICP-CRC-MS); for more information on this determinative technique, please visit the Interference Reduction Technology section on our website, brooksapplied.com.

Samples 2109165-01 and 2109165-02 were originally analyzed at a 50x dilution. Due to internal standard suppression, these results could not be reported and the samples were reanalyzed at a 200x dilution. The results included in this report for both sample 2109165-01 and 2109165-02 were from the reanalysis with the 200x dilution.

In instances where the native sample result and/or the associated duplicate (DUP) result were below the MDL the RPD was not calculated (**N/C**).

The 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.

It should be noted that all Brooks Applied Labs, LLC methods, standard operating procedures, inventions, ideas, processes, improvements, designs and techniques included or referred to therein, must be considered and treated as Proprietary Information, protected by the Washington State Trade Secret Act, RCW 19.108 et seq., and other laws. All Proprietary Information, written or implied, will not be distributed, copied, or altered in any fashion without prior written consent from Brooks Applied Labs, LLC. All Proprietary Information (including originals, copies, summaries or other reproductions thereof) shall remain the property of Brooks Applied Labs, LLC at all times and must be returned upon demand. Furthermore, products presented in this document may be protected by Federal Patent laws and infringement will be subject to prosecution in accordance with Title 35 US Code 271.

All data was reported without further qualification and all other 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 us if you have any questions regarding this report.

Sincerely,

Amy Goodall
Project Manager
Brooks Applied Labs
amy@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/> or review Tables 1 and 2 in our Accreditation Information. 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	reference material
T	total fraction
TR	total recoverable fraction

Definition of Data Qualifiers

(Effective 3/23/2020)

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. Please see narrative for explanation.
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.
M	Duplicate precision (RPD) was not within acceptance criteria. Please see narrative for explanation.
N	Spike recovery was not within acceptance criteria. Please see narrative for explanation.
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.
Z	Holding time and/or preservation requirements not established for this method; however, BAL recommendations for holding time were not followed. Please see narrative for explanation.

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.

Accreditation Information

Table 1. Accredited method/matrix/analytes for TNI

Issued by: State of Florida Dept. of Health (The NELAC Institute 2016 Standard)
Issued on: July 27, 2020; Valid to: June 30, 2021
Certificate Number: E87982-35

Method	Matrix	TNI Accredited Analyte(s)
EPA 1638	Non-Potable Waters	Ag, Cd, Cu, Ni, Pb, Sb, Se, Tl, Zn
EPA 200.8	Non-Potable Waters	Ag, Al, As, Ba, Be, Cd, Co, Cr, Cu, Mn, Mo, Ni, Pb, Sb, Se, Tl, U, V, Zn
EPA 6020	Non-Potable Waters	Ag, Al, As, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Mg, Mn, Mo, Ni, Pb, Sb, Se, Tl, U, V, Zn
	Solids/Chemicals & Biological	Ag, Al, As, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Mg, Mn, Mo, Ni, Pb, Sb, Se, Tl, V, Zn
BAL-5000	Non-Potable Waters	Ag, Al, As, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Mg, Mn, Mo, Ni, Pb, Sb, Se, Sn, Sr, Tl, U, V, Zn, Hardness
	Solids/Chemicals	Ag, As, B, Be, Cd, Co, Cr, Cu, Pb, Mo, Ni, Sb, Se, Sn, Sr, Tl, V, Zn
	Biological	Ag, Al, As, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Mg, Mn, Mo, Ni, Pb, Sb, Se, Sn, Tl, V, Zn
EPA 1640	Non-Potable Waters	Ag, As, Cd, Cu, Pb, Ni, Zn
EPA 1631E	Non-Potable Waters, Solids/Chemicals & Biological	Total Mercury
EPA 1630	Non-Potable Waters	Methyl Mercury
BAL-3200	Solids/Chemicals & Biological	Methyl Mercury
BAL-4100	Non-Potable Waters	As(III), As(V), DMAs, MMAs
BAL-4200	Non-Potable Waters	Se(IV), Se(VI)
BAL-4201	Non-Potable Waters	Se(IV), Se(VI)
BAL-4300	Non-Potable Waters Solid/Chemicals	Cr(VI)
SM2340B	Non-Potable Waters	Hardness

Accreditation Information

Table 2. Accredited method/matrix/analytes for ISO (1), Non-Governmental TNI (2), and DoD/DOE (3)

Issued by: ANAB

Issued on: November 20, 2020; Valid to: March 20, 2022

Method	Matrix	ISO and Non-Gov. TNI Accredited Analyte(s)	DoD/DOE Accredited Analytes
EPA 1638 Mod EPA 200.8 Mod EPA 6020 Mod	Non-Potable Waters	Ag, Al, As, B, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Mg, Mn, Mo, Ni, Pb, Sb, Se, Sn, Sr, Tl, U, V, Zn	Ag, Al, As, Ba, Ca, Cd, Cr, Cu, Fe, Pb, Mg, Mn, Ni, Sb, Se, V, Zn
BAL-5000	Solids/Chemicals & Biological	Ag, Al, As, B, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Mg, Mn, Mo, Ni, Pb, Sb, Se, Sn, Sr, Tl, V, Zn Hg (Biological Only)	Not Accredited
EPA 1640 Mod	Non-Potable Waters	Ag, As, Cd, Cu, Pb, Ni, Zn Cr, Co, Se, Tl, V (ISO Only)	Not Accredited
EPA 1631E Mod BAL-3100 (waters)	Non-Potable Waters, Solids/Chemicals & Biological/Food	Total Mercury	Total Mercury
EPA 1630 Mod BAL-3200	Non-Potable Waters, Solids/Chemicals Biological	Methyl Mercury	Methyl Mercury (excluding Solids/Chemicals)
EPA 1632A Mod BAL-3300	Non-Potable Waters	Inorganic Arsenic, As(III) (ISO Only)	Not Accredited
	Biological/Food Solids/Chemicals	Inorganic Arsenic (ISO Only)	Not Accredited
AOAC 2015.01 Mod BAL-5000 by BAL-5040	Food	As, Cd, Hg, Pb	Not Accredited
BAL-4100	Non-Potable Waters	As(III), As(V), DMAs, MMAs	Not Accredited
	Biological by BAL-4115	Inorganic Arsenic, DMAs, MMAs (ISO Only)	Not Accredited
BAL-4101	Food by BAL-4116	Inorganic Arsenic, DMAs, MMAs (ISO Only)	Not Accredited
BAL-4201	Non-Potable Waters	Se(IV), Se(VI), SeCN, SeMet	Not Accredited
BAL-4300	Non-Potable Waters, Solid/Chemicals	Cr(VI)	Cr(VI)
SM 3500-Fe BAL-4500	Non-Potable Waters	Fe, Fe(II) (ISO Only)	Not Accredited
SM2340B	Non-Potable Waters	Hardness	Hardness
SM 2540G EPA 160.3 BAL-0501	Solids/Chemicals & Biological	% Dry Weight	% Dry Weight

(1) ISO/IEC 17025:2017 – Certificate Number ADE-1447.2

(2) Non-Governmental NELAC Institute 2016 Standard – Certificate Number ADE-1447.1

(3) Department of Defense/Energy Consolidated Quality Systems Manual v. 5.3 – Certificate Numbers ADE-1447 for DoD, ADE-1447.3 for DOE.

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Sample Information

Sample	Lab ID	Report Matrix	Type	Sampled	Received
IR-1-1 (336 hour) (F)	2109165-01	W	Sample	09/08/2021	09/11/2021
IR-1-2 (336 hour) (F)	2109165-02	W	Sample	09/08/2021	09/11/2021
IR-1-3 (336 hour) (F)	2109165-03	W	Sample	09/08/2021	09/11/2021
IR-1-4 (336 hour) (F)	2109165-04	W	Sample	09/08/2021	09/11/2021
IR-1-5 (336 hour) (F)	2109165-05	W	Sample	09/08/2021	09/11/2021

Batch Summary

Analyte	Lab Matrix	Method	Prepared	Analyzed	Batch	Sequence
As(III)	Water	SOP BAL-4100	09/13/2021	09/14/2021	B212435	S211047
As(V)	Water	SOP BAL-4100	09/13/2021	09/14/2021	B212435	S211047
DMAs	Water	SOP BAL-4100	09/13/2021	09/14/2021	B212435	S211047
MMAs	Water	SOP BAL-4100	09/13/2021	09/14/2021	B212435	S211047
Unk As Sp	Water	SOP BAL-4100	09/13/2021	09/14/2021	B212435	S211047

Sample Results

Sample	Analyte	Report Matrix	Basis	Result	Qualifier	MDL	MRL	Unit	Batch	Sequence
IR-1-1 (336 hour) (F)										
2109165-01	As(III)	W	D	29.3	Z	0.800	4.20	µg/L	B212435	S211047
2109165-01	As(V)	W	D	1.35	Z J	0.800	4.20	µg/L	B212435	S211047
2109165-01	DMAs	W	D	≤ 1.00	Z U	1.00	4.20	µg/L	B212435	S211047
2109165-01	MMAs	W	D	≤ 0.800	Z U	0.800	4.20	µg/L	B212435	S211047
2109165-01	Unk As Sp	W	D	308	Z	1.00	4.20	µg/L	B212435	S211047
IR-1-2 (336 hour) (F)										
2109165-02	As(III)	W	D	121	Z	0.800	4.20	µg/L	B212435	S211047
2109165-02	As(V)	W	D	44.4	Z	0.800	4.20	µg/L	B212435	S211047
2109165-02	DMAs	W	D	≤ 1.00	Z U	1.00	4.20	µg/L	B212435	S211047
2109165-02	MMAs	W	D	≤ 0.800	Z U	0.800	4.20	µg/L	B212435	S211047
2109165-02	Unk As Sp	W	D	4.05	Z J	1.00	4.20	µg/L	B212435	S211047
IR-1-3 (336 hour) (F)										
2109165-03	As(III)	W	D	≤ 0.200	Z U	0.200	1.05	µg/L	B212435	S211047
2109165-03	As(V)	W	D	≤ 0.200	Z U	0.200	1.05	µg/L	B212435	S211047
2109165-03	DMAs	W	D	≤ 0.250	Z U	0.250	1.05	µg/L	B212435	S211047
2109165-03	MMAs	W	D	≤ 0.200	Z U	0.200	1.05	µg/L	B212435	S211047
2109165-03	Unk As Sp	W	D	≤ 0.250	Z U	0.250	1.05	µg/L	B212435	S211047
IR-1-4 (336 hour) (F)										
2109165-04	As(III)	W	D	0.272	Z J	0.200	1.05	µg/L	B212435	S211047
2109165-04	As(V)	W	D	1.41	Z	0.200	1.05	µg/L	B212435	S211047
2109165-04	DMAs	W	D	≤ 0.250	Z U	0.250	1.05	µg/L	B212435	S211047
2109165-04	MMAs	W	D	≤ 0.200	Z U	0.200	1.05	µg/L	B212435	S211047
2109165-04	Unk As Sp	W	D	≤ 0.250	Z U	0.250	1.05	µg/L	B212435	S211047
IR-1-5 (336 hour) (F)										
2109165-05	As(III)	W	D	≤ 0.200	Z U	0.200	1.05	µg/L	B212435	S211047
2109165-05	As(V)	W	D	0.543	Z J	0.200	1.05	µg/L	B212435	S211047
2109165-05	DMAs	W	D	≤ 0.250	Z U	0.250	1.05	µg/L	B212435	S211047
2109165-05	MMAs	W	D	≤ 0.200	Z U	0.200	1.05	µg/L	B212435	S211047
2109165-05	Unk As Sp	W	D	≤ 0.250	Z U	0.250	1.05	µg/L	B212435	S211047

Accuracy & Precision Summary

Batch: B212435
Lab Matrix: Water
Method: SOP BAL-4100

Sample	Analyte	Native	Spike	Result	Units	REC & Limits	RPD & Limits
B212435-BS1	**Blank Spike, (2132006)**						
	As(III)		5.000	4.844	µg/L	97% 75-125	
	As(V)		5.000	4.822	µg/L	96% 75-125	
	DMAs		5.210	5.466	µg/L	105% 75-125	
B212435-BS2	**Blank Spike, (2107001)**						
	MMAs		5.000	4.549	µg/L	91% 75-125	
B212435-DUP4	**Duplicate, (2109165-01)**						
	As(III)	29.31		27.79	µg/L		5% 25
	As(V)	1.353		1.193	µg/L		13% 25
	DMAs	ND		ND	µg/L		N/C 25
	MMAs	ND		ND	µg/L		N/C 25
	Unk As Sp	307.8		321.6	µg/L		4% 25
B212435-MS5	**Matrix Spike, (2109165-01)**						
	As(III)	29.31	209.0	225.6	µg/L	94% 75-125	
	As(V)	1.353	194.2	180.5	µg/L	92% 75-125	
	DMAs	ND	200.0	187.3	µg/L	94% 75-125	
	MMAs	ND	200.0	187.8	µg/L	94% 75-125	
B212435-DUP5	**Duplicate, (2109165-02)**						
	As(III)	120.6		111.6	µg/L		8% 25
	As(V)	44.44		48.90	µg/L		10% 25
	DMAs	ND		ND	µg/L		N/C 25
	MMAs	ND		ND	µg/L		N/C 25
	Unk As Sp	4.052		1.714	µg/L		*81%* 25
B212435-MS6	**Matrix Spike, (2109165-02)**						
	As(III)	120.6	209.0	308.2	µg/L	90% 75-125	
	As(V)	44.44	194.2	241.1	µg/L	101% 75-125	
	DMAs	ND	200.0	192.1	µg/L	96% 75-125	
	MMAs	ND	200.0	190.6	µg/L	95% 75-125	

Accuracy & Precision Summary

Batch: B212435
Lab Matrix: Water
Method: SOP BAL-4100

Sample	Analyte	Native	Spike	Result	Units	REC & Limits	RPD & Limits
B212435-DUP3	**Duplicate, (2109165-05)**						
	As(III)	ND		ND	µg/L		N/C 25
	As(V)	0.543		0.426	µg/L		24% 25
	DMAs	ND		ND	µg/L		N/C 25
	MMAs	ND		ND	µg/L		N/C 25
	Unk As Sp	ND		ND	µg/L		N/C 25
B212435-MS3	**Matrix Spike, (2109165-05)**						
	As(III)	ND	52.25	47.18	µg/L	90% 75-125	
	As(V)	0.543	48.55	45.71	µg/L	93% 75-125	
	DMAs	ND	50.00	46.51	µg/L	93% 75-125	
	MMAs	ND	50.00	47.52	µg/L	95% 75-125	
B212435-MSD3	**Matrix Spike Duplicate, (2109165-05)**						
	As(III)	ND	52.25	47.97	µg/L	92% 75-125	2% 25
	As(V)	0.543	48.55	46.01	µg/L	94% 75-125	0.7% 25
	DMAs	ND	50.00	46.90	µg/L	94% 75-125	0.8% 25
	MMAs	ND	50.00	48.20	µg/L	96% 75-125	1% 25

Method Blanks & Reporting Limits

Batch: B212435
Matrix: Water
Method: SOP BAL-4100
Analyte: As(III)

Sample	Result	Units
B212435-BLK1	0.00	µg/L
B212435-BLK2	0.00	µg/L
B212435-BLK3	0.00	µg/L
B212435-BLK4	0.00	µg/L

Average: 0.000
Limit: 0.021
MDL: 0.004
MRL: 0.021

Analyte: As(V)

Sample	Result	Units
B212435-BLK1	0.003	µg/L
B212435-BLK2	0.003	µg/L
B212435-BLK3	0.003	µg/L
B212435-BLK4	0.003	µg/L

Average: 0.003
Limit: 0.021
MDL: 0.004
MRL: 0.021

Analyte: DMAs

Sample	Result	Units
B212435-BLK1	0.00	µg/L
B212435-BLK2	0.00	µg/L
B212435-BLK3	0.00	µg/L
B212435-BLK4	0.00	µg/L

Average: 0.000
Limit: 0.021
MDL: 0.005
MRL: 0.021

Method Blanks & Reporting Limits

Analyte: MMAs

Sample	Result	Units
B212435-BLK1	0.00	µg/L
B212435-BLK2	0.00	µg/L
B212435-BLK3	0.00	µg/L
B212435-BLK4	0.00	µg/L

Average: 0.000
Limit: 0.021

MDL: 0.004
MRL: 0.021

Analyte: Unk As Sp

Sample	Result	Units
B212435-BLK1	0.00	µg/L
B212435-BLK2	0.00	µg/L
B212435-BLK3	0.00	µg/L
B212435-BLK4	0.00	µg/L

Average: 0.000
Limit: 0.021

MDL: 0.005
MRL: 0.021

Sample Containers

Lab ID: 2109165-01 **Report Matrix:** W **Collected:** 09/08/2021
Sample: IR-1-1 (336 hour) (F) **Sample Type:** Sample **Received:** 09/11/2021

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Client-Provided	N/A	N/A	EDTA (Vacutainer)	N/A	N/A	Cooler - 2109165
B	XTRA_VOL	N/A	N/A	EDTA (Vacutainer)	N/A	N/A	Cooler - 2109165

Lab ID: 2109165-02 **Report Matrix:** W **Collected:** 09/08/2021
Sample: IR-1-2 (336 hour) (F) **Sample Type:** Sample **Received:** 09/11/2021

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Client-Provided	N/A	N/A	EDTA (Vacutainer)	N/A	N/A	Cooler - 2109165
B	XTRA_VOL	N/A	N/A	EDTA (Vacutainer)	N/A	N/A	Cooler - 2109165

Lab ID: 2109165-03 **Report Matrix:** W **Collected:** 09/08/2021
Sample: IR-1-3 (336 hour) (F) **Sample Type:** Sample **Received:** 09/11/2021

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Client-Provided	N/A	N/A	EDTA (Vacutainer)	N/A	N/A	Cooler - 2109165
B	XTRA_VOL	N/A	N/A	EDTA (Vacutainer)	N/A	N/A	Cooler - 2109165

Lab ID: 2109165-04 **Report Matrix:** W **Collected:** 09/08/2021
Sample: IR-1-4 (336 hour) (F) **Sample Type:** Sample **Received:** 09/11/2021

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Client-Provided	N/A	N/A	EDTA (Vacutainer)	N/A	N/A	Cooler - 2109165
B	XTRA_VOL	N/A	N/A	EDTA (Vacutainer)	N/A	N/A	Cooler - 2109165

Sample Containers

Lab ID: 2109165-05
Sample: IR-1-5 (336 hour) (F)
Report Matrix: W
Sample Type: Sample
Collected: 09/08/2021
Received: 09/11/2021

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Client-Provided	N/A	N/A	EDTA (Vacutainer)	N/A	N/A	Cooler - 2109165
B	XTRA_VOL	N/A	N/A	EDTA (Vacutainer)	N/A	N/A	Cooler - 2109165

Shipping Containers

Cooler - 2109165

Received: September 11, 2021 10:37
Tracking No: 7747 7258 0890 via
Coolant Type: Ice
Temperature: 8.0 °C

Description: Cooler
Damaged in transit? No
Returned to client? No
Comments: IR#30

Custody seals present? Yes
Custody seals intact? Yes
COC present? Yes

ARCADIS Design & Consultancy for natural and built assets

BAL Report 2109165
Lab Work Order # PAC-HN2007

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CHAIN OF CUSTODY & LABORATORY ANALYSIS REQUEST FORM

PACE Analytical

PROJ. NO.	PROJECT NAME	SDG NUMBER	COC Number
30050105.00009	McManus GA Power		

SAMPLERS: Robert Prigge, Andy Baumeister

SAMPLE ID	DATE	TIME	MATRIX	Composite/ Grab	# Containers	Requested Analyses 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Remarks
IR-1-1 (336 hour) (F)	9/8/2021	0940	W	Composite	2	2																				
IR-1-2 (336 hour) (F)	9/8/2021	0900	W	Composite	2	2																				
IR-1-3 (336 hour) (F)	9/8/2021	0910	W	Composite	2	2																				
IR-1-4 (336 hour) (F)	9/8/2021	0920	W	Composite	2	2																				
IR-1-5 (336 hour) (F)	9/8/2021	0930	W	Composite	2	2																				

Requested Analyses	Special Instructions/Comments:	☐ Special QA/QC Instructions
1 As Speciation		
2		
3	(F) in Sample ID refers to sample being filtered through the supplied 0.45u filter by ARCADIS	
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		

Laboratory Information and Receipt

Lab Name: Brooks Applied	☐ Cooler packed with ice	Sample Receipt:
Shipping Tracking #		
Specify Turnaround Requirements: Standard	☐Cooler custody seal intact	Condition/Cooler Temp:

Relinquished by:	DATE	TIME	Received by:	Relinquished by:	DATE	TIME	Received by:
Robert Prigge	9/10/2021	1700	S.T. (BAL) Fed Ex 9/11/21 10:37				
Relinquished by:	DATE	TIME	Received by:	Relinquished by:	DATE	TIME	Received by:
Relinquished by:	DATE	TIME	Received by:	Relinquished by:	DATE	TIME	Received by:

Arcadis U.S., Inc.
2839 Paces Ferry Road, Suite 900
Atlanta
Georgia 30339
Phone: 770 431 8666
Fax: 770 435 2666
www.arcadis.com

Appendix B

Risk Evaluation Report

RISK EVALUATION REPORT

PLANT MCMANUS
FORMER ASH POND 1
GLYNN COUNTY, GEORGIA

Prepared for

Georgia Power
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Atlanta, Georgia 30308

Prepared by

WSP USA Environment & Infrastructure Inc.
1075 Big Shanty Road NW, #100
Kennesaw, Georgia 30144

February 2023

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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
COI	Constituent of Interest
COPI	Constituent of Potential Interest
EPC	Exposure Point Concentration
EPD	[Georgia] Environmental Protection Division
GWPS	Groundwater Protection Standard
HSRA	Hazardous Site Response Act
HUC	Hydrologic Unit Code
ISWQC	Instream Water Quality Criteria
MCL	Maximum Contaminant Level
mg/L	Milligrams per liter
PQL	practical quantitation limit
ProUCL	ProUCL software version 5.2
RME	Reasonable Maximum Exposure
RRS	Risk Reduction Standards
RSL	Regional Screening Level
SSL	Statistically Significant Level
UCL	95 Percent Upper Confidence Limit of the Arithmetic Mean
USEPA	United States Environmental Protection Agency
VRP	Voluntary Remediation Program

EXECUTIVE SUMMARY

Georgia Power's Plant McManus (site) is an electric-generating facility approximately 5.37 miles northwest of Brunswick, Georgia in Glynn County that began operations in 1952. The two former steam units were retired and demolished as of 2017, and the facility currently has nine oil-fired combustion turbines on site. In compliance with applicable regulations, coal combustion residual (CCR) material resulting from historical power generation were transferred and stored at the site in the form of a surface impoundment: Ash Pond 1 (AP-1). AP-1 has not received ash since the early 1970's.

The final CCR Permit for the Plant McManus Ash Pond was issued by GA EPD June 18, 2021 (063-030D (CCR)), in accordance with the Federal CCR Rule (USEPA, 2020) and the State CCR Rule (EPD, 2022a). AP-1 is subject to 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. CCR excavation and removal were completed in October 2019. Per the site's permit, semi-annual groundwater monitoring and reporting is required to conclude the closure process for at least 5 years following permit issuance.

This report presents the results of a human health and ecological risk evaluation for CCR constituents[2] that exhibit statistically significant levels (SSLs) in groundwater at the site (arsenic and lithium) and the supporting human health and ecological risk evaluation for the adjacent downgradient surface water body, Burnett Creek. A conservative, health-protective approach for groundwater and surface water concentrations with consideration for background 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-1 in accordance with the Federal and State CCR Rules, arsenic and lithium were previously defined as statistically significant level (SSL)-related constituents (Resolute, 2022). The risk evaluation relies on

[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, 2020a).

[2] The constituents included in the risk evaluation also occur naturally in the site geologic setting. An alternative source demonstration (ASD) was prepared for lithium, one of the SSL-related constituents identified at AP-1, in accordance with 40 CFR §257.95 and approved by Georgia EPD. The ASD demonstrates that concentrations of lithium in MCM-06 and DPZ-02 are naturally occurring. Therefore, lithium was not included in the risk evaluation.

groundwater data collected by Georgia Power from 2015 through September 2022 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 former AP-1.

2. Initial groundwater risk screening: Comparison of groundwater concentrations for SSL-related constituents 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 to human health due to groundwater exposure.

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. Refined surface water risk evaluation: Performance of a more refined surface water analysis for those constituents that were retained in the initial surface water risk screening in order to further evaluate the potential risks to human health and the environment as an additional line of evidence.

6. Development of risk conclusions and identification of associated uncertainties.

Using this approach that includes multiple conservative assumptions, concentrations of the SSL-related constituent arsenic is 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 the former AP-1 under the Federal and State CCR Rules will continue. Georgia Power will proactively evaluate the data and update this evaluation, if necessary.

1 INTRODUCTION

This report summarizes a risk evaluation of the former AP-1 at the Georgia Power Plant McManus located in Glynn County, Georgia (**Figure 1**). The final CCR Permit for the Plant McManus Ash Pond was issued by Georgia EPD June 18, 2021 (063-030D (CCR)) in accordance with the Federal CCR Rule (USEPA, 2020a) and the State CCR Rule (EPD, 2022). CCR excavation and removal at AP-1 were completed in October 2019 (Arcadis, 2019) and acknowledged as complete by Georgia EPD in a letter dated January 10, 2020.

This risk evaluation provides additional technical review of the human health and environmental protectiveness associated with the closure of AP-1 with respect to CCR constituent concentrations in groundwater identified at SSLs above GWPS. The evaluation relies on a conservative, health-protective approach that is consistent with the risk evaluation 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 incorporates principles and assumptions consistent with the Federal and State CCR Rules.

The risk evaluation includes the development of a site-specific CEM and a stepwise risk screening process for the identified SSL-related constituents for the former AP-1. Arsenic was identified as a SSL-related constituent in monitoring well MCM-06 using the GWPS established for AP-1 according to the Federal and State CCR Rules (Resolute, 2022). Based on the results of the risk evaluation for the SSL-related constituents, a site-specific recommended path forward is provided.

Lithium was also identified as a SSL-related constituent in monitoring wells MCM-06 and DPZ-02. In accordance with 40 CFR §257.95, an ASD for lithium was prepared for MCM-06 on November 17, 2020 (Arcadis, 2020) and DPZ-02 on April 29, 2022 (Arcadis, 2022). Georgia EPD approved these ASDs on April 22, 2021 and June 17, 2022, respectively. These ASDs demonstrate that concentrations of lithium detected in MCM-06 and DPZ-02 are not associated with a release from AP-1 but are instead caused by a natural source of lithium in the brackish water (Arcadis US, 2020 and 2022). Accordingly, lithium 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 for groundwater COPIs, 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 containing SSL-related constituents and potential exposure to SSL-related constituents has been developed based on a review and compilation of information previously presented in Plant McManus AP-1 documents, including the *Hydrogeologic Assessment Report– Plant McManus Former Ash Pond 1* (Resolute, 2021) and the *2022 Annual Groundwater Monitoring & Corrective Action Report* (Resolute, 2022). The CEM includes a conservative evaluation of potential transport pathways, potential exposure pathways, and potential human and ecological receptors.

2.1 Site Description

Plant McManus is located approximately 5.37 miles northwest of the city of Brunswick. The site occupies approximately 2,400 acres and is bordered by Turtle River on the west, Burnett Creek to the north, and Gibson Creek to the south (**Figure 2**). Plant McManus was once a two-unit power generation facility. Construction of Unit 1 began in 1951 and the initial startup and commercial operation began in November 1952. Unit 1 was originally designed to operate as an oil-fired generator and was converted to coal in 1960. Construction on Unit 2 began in 1957 and was declared commercial in 1959 with coal as the primary fuel. In 1971, both Units 1 and 2 were converted to oil-fired and the use of coal ceased after 1972. In 1972, nine diesel-fired simple cycle combustion turbines were installed and are currently operating. Units 1 and 2 have been retired and demolished as of 2017. AP-1 was designed to receive and store CCR and process water produced by Units 1 and 2 during the electric power generating process at Plant McManus. AP-1 has not received ash since the early 1970's.

In 2016, Georgia Power began closure of the inactive AP-1 by removal of CCR materials. Former AP-1 encompasses approximately 80 acres and is bounded by the mainland to the northeast, Crispen Island to the southwest, an elevated road (Crispen Island Drive) dike to the southeast, and the former AP-1 northern dike to the northwest (Resolute, 2021).

Semi-annual groundwater monitoring and reporting for Plant McManus former AP-1 is performed in accordance with the monitoring program requirements of the Federal and State CCR Rule. In accordance with 40 CFR § 257.91, a groundwater monitoring network

was installed to monitor groundwater quality both upgradient and downgradient of the former AP-1. The former AP-1 certified monitoring well network consists of 8 upgradient monitoring wells and 8 downgradient monitoring wells. There are 20 piezometers that may be utilized for water level measurements or assessing groundwater conditions. The locations of the certified compliance well network and piezometers included in the risk evaluation are provided on **Figure 2**.

2.1.1 Topography and Surface Hydrology

The site was originally a cluster of one large and several small islands in a tidal marsh between Burnett Creek, Cowpen Creek, Gibson Creek (collectively, the tidal creeks) and Turtle River (**Figure 1**). The River, the salt marsh, and the tidal creeks in the marsh are subject to tidal fluctuations of surface water. The northeastern extent of the former AP-1 is the mainland, and the southwestern extent is the island.

The site is located within the Turtle River – South Brunswick River hydrologic unit code (HUC) 12 watershed, which has a total area of 51,891 acres, and, in turn, is part of the larger Cumberland-St. Simons HUC 8 watershed, which has an area of 609,980 acres.

The surface of the marsh is covered by silt and vegetation, except where it is scoured by tidal creek action. In addition to current and historically recent (pre-ash pond construction) tidal channels, the marsh is also likely to have paleo (pre-historic) tidal channels present throughout the upper portion of the aquifer in the marsh area.

The topography, as suggested by the tidal nature of the surroundings, is quite flat and at relatively low elevations compared to sea level. For example, top of casing elevations for monitoring wells and piezometers at the facility have a maximum elevation of 15.81 feet above mean sea level (Resolute, 2021).

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 former AP-1 *2022 Annual Groundwater Monitoring & Corrective Action Report* (Resolute, 2022):

> *Based on information collected during subsurface investigations, Plant McManus is underlain by very fine sands and clays from land surface (or beneath a shallow fill layer) to depths ranging from 33 to 43 feet below land surface. Very fine sands are predominant, but discontinuous clay layers of varying thickness were encountered during drilling activities. The clay layers*

varied from less than one inch to approximately ten feet in thickness. These very fine sands and discontinuous clay layers are interpreted to be the Upper Satilla Formation (ATC Associates, Inc., 1997).

Underlying the Upper Satilla Formation are fine to medium sands with greater silt content that have lower permeabilities than the sands of the Upper Satilla. These siltier sands, which were interpreted to be the Lower Satilla Formation, were encountered at depths greater than 35 feet below ground surface during the Site investigation performed in the 1990s (ATC Associates Inc., 1997). These sands may also correspond to the Cypresshead Formation of Huddleston (1988). Sands and clays below the Cypresshead and above the confining unit of the Brunswick aquifer system have been described by Weems and Edwards (2001) as two pairs of alternating confining units and water-bearing zones of the Ebenezer Formation, extending from approximately 50 feet bgs to 185 feet bgs in the Brunswick area.

Pertinent hydrogeologic information from the former AP-1 *2022 Annual Groundwater Monitoring & Corrective Action Report* (Resolute, 2022) is presented below:

The regional surficial aquifer that contains the Upper and Lower Satilla Formations is underlain by approximately 90 feet of lower-permeability portions (Miocene Unit A) of the Hawthorn Formation. This stratum forms the upper confining bed for the Brunswick aquifer system.

The surficial aquifer underlying the mainland, marsh, and island is composed of the very fine to fine grain sand with discontinuous clay layers of the Upper and Lower Satilla Formation. In the marsh, the groundwater elevation at low tide is below the top of the marsh surface. The upper portion of the aquifer in the marsh has been cut by tidal creeks, which meander through the marsh. In addition to current and historically recent (pre-ash pond construction) tidal channels, the marsh is also likely to have paleo (pre-historic) tidal channels present throughout the upper portion of the aquifer in the marsh area, which may provide zones of higher hydraulic conductivity or isolated pockets of groundwater. Vertically, the Satilla formation fines downward to a silty fine sand of the Lower Satilla Formation. The aquifer is generally unconfined, with localized clay layers. Groundwater flowing within the surficial aquifer is separated from deeper aquifers by approximately 90 feet of lower-permeability portions of the Hawthorn Formation (Miocene Unit A) that form the upper confining bed for the Brunswick aquifer system (Clarke et al, 1990).

> *Groundwater flows from two directions toward the former AP-1. One groundwater flow component originates on the mainland, northeast of the facility, and flows southwest, while the other flow component originates on Crispen Island and flows north and northeast . . . . Groundwater elevations in the monitoring wells on the mainland (MCM-02, -15, and -16) and on the island (MCM-08, and -11) have consistently exhibited higher groundwater elevations than the monitoring wells and piezometers installed along the dikes, with MCM-01 and -04 exhibiting intermediate elevations between the mainland and dike wells. The potentiometric surface of the surficial aquifer and the resultant groundwater flow direction in the vicinity of the former AP-1 is a reflection of the topography of the mainland, Crispen Island, and the tidal marsh surrounding the area.*

The potentiometric surface elevation contours are presented in **Figure 3** for low tide for September 2022 and **Figure 4** for low tide in the area immediate to wells DPZ-02 and MCM-06 in September 2022. The potentiometric surface maps indicate that groundwater flow from both the mainland and the island continues to be toward the former AP-1. Groundwater and surface water elevations inside and outside of the dikes illustrate that the potentiometric head is higher in the former AP-1 (based on the staff gauge installed in the former AP-1) and lower in the marsh outside of the dikes, indicating an outward flow direction (toward the marsh).

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 characteristics, the local geology and hydrogeology, and the distance the groundwater must travel before reaching a potential receptor. Previously identified potential transport pathways are summarized in this section. A summary of the potential transport pathways is shown on the CEM in **Figure 5**.

2.2.1 Groundwater

Pertinent information regarding groundwater transport from the *Hydrogeologic Assessment Report– Plant McManus Former Ash Pond 1* (Resolute, 2021) is presented below and is largely consistent with historical observations from 2015 through 2022:

> *Groundwater flow directions from the mainland and the island are consistent at both low and high tides. These groundwater elevations and flow patterns make the mainland and the island both hydraulically upgradient of the former*

AP-1. During the 1996-1997 evaluation and evaluations performed prior to the start of excavation, groundwater flow from inside former AP-1 was toward the north. As dewatering and excavation work progressed, the low area extended from the northern dike into the center of the former AP-1. After the completion of excavation, the former AP-1 began to naturally fill with water. With the natural filling of the former AP-1, the groundwater flow direction at high tide remains inward toward former AP-1, while at low tide the groundwater flow direction appears to reverse away from the former AP-1. The net effect of the reversing flow directions is essentially a stagnant system, with a net combined flow slightly inward toward the former AP-1 based on the higher hydraulic gradient at high tide.

Current information based on the September 2022 groundwater elevation data indicates groundwater flow is outward from AP-1 during both high tide and low tide sampling events.

2.2.2 Surface Water

Burnett Creek, Gibson Creek, and Turtle River border the site (**Figure 2**). Burnett Creek and Gibson Creek are sampled as part of the site monitoring program as the adjacent downgradient surface water bodies. A conservative assumption for this assessment was made that all the groundwater from the site flows to the adjacent surface water bodies (i.e., Burnett Creek to the north and Gibson Creek to the south) under both low and high tide conditions. In further support of this assumption, the tidal creeks and Turtle River represent a regional hydraulic discharge boundary for groundwater flow in the upper aquifer from the area.

2.3 Potential Exposure Pathways and Receptors

The exposure pathways for groundwater assumed to be complete based on site-specific information used to identify potential receptors and estimate potential risk. The CEM (**Figure 5)** depicts the conservative potential exposure pathways and receptors included in the risk evaluation.

The following potential exposure pathways and receptors were considered:

- On-site industrial worker: The groundwater exposure pathway for the on-site industrial worker was considered complete due to the presence of a single on-site potable well (MCMPW-01/Well #1 Plant). The on-site potable well is located southwest of the plant as shown on **Figure 2**. Water from this well is used for the

sanitary facilities and for the central water supply at Plant McManus. The risk evaluation screening conservatively assumed that plant workers may have daily exposure to the maximum concentrations of detected constituents in the on-site potable well through potable water use, including ingestion and dermal contact.

- 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. Land use surrounding the site is zoned for Conservation and Preservation with the exception of an area zoned Single Family Residential to the east and northeast of the site (Glynn County, 2017). West of Turtle River, land use is also predominantly zoned for Conservation and Preservation (Glynn County, 2017).

- Off-site industrial/construction worker: The potential for off-site worker exposure through direct contact with groundwater was addressed qualitatively through the evaluation of hypothetical off-site residential receptors. Health-protective screening levels for residential receptors would be more conservative than industrial and construction worker screening levels. Note that there is no downgradient groundwater receptor for industrial/construction worker exposure as the downgradient receptor is the tidal marsh.

- Off-site resident: The groundwater exposure pathway for hypothetical off-site residential receptors was assumed potentially complete. Note that there is no downgradient groundwater receptor for residential exposure as the downgradient receptor is the tidal marsh; however, potential risk for hypothetical off-site residential receptors was quantified as a conservative measure. A well survey of potential groundwater wells within a three-mile radius of the former AP-1 was conducted and consisted of reviewing Federal, State, and County records and online sources, in addition to conducting a windshield survey of the area (NewFields, 2020). The well survey is included as **Appendix A**. Results of the survey are presented on **Figure 6**. As requested by Georgia EPD, a survey of water wells was conducted within a two-mile radius from the site. The survey incorporated records from federal, state, and county sources cited in the previous

well survey; however, no information (e.g., septic tank permit records) was received from the Glynn County Health Department. The results of this evaluation were provided and discussed in the February 2022 Progress Report (Resolute, 2022). The findings with the available data are consistent with the 2020 well survey.

Combining well information from multiple sources with parcel data, 2,361 total parcels likely to be associated with an active or inactive private well within the three-mile radius were identified. Although water lines near the site were constructed in the mid-1990s, there are likely homes near water lines that may still be on wells. Public water is available to many residences in the area; however, a large number of parcels in the immediate vicinity of the site rely on private wells. The survey identified multiple private wells in the vicinity of the site.

Public water systems are operating wells within a 3-mile radius of the former AP-1. This includes wells for the main water provider in the area, the City of Brunswick, as well as 22 other smaller public water systems. Groundwater flow directions from both the mainland and the island are consistent during both high and low tides, making the mainland and the island both hydraulically upgradient of the former AP-1. Therefore, groundwater is flowing away from the private drinking water wells located to the east of the site, and these private drinking water wells are located upgradient from the former AP-1.

No surface water intakes have been identified for public water supplies within three miles downgradient of the site. Surface water at the site is brackish, and therefore, is unsuitable for use as a potable water source. Use of surface water as a potable water source downgradient of the site is an incomplete exposure pathway; therefore, drinking water exposure assumptions for surface water do not apply.

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 the former AP-1. This comparison makes the conservative assumption that on-site groundwater may potentially migrate to off-site drinking water wells, through advective transport in groundwater without any attenuation within the aquifer media through factors such as dilution, dispersion, or adsorption. 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.

- Off-site ecological surface water receptors: The surface water exposure pathway for potential off-site ecological receptors was assumed potentially 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 completed exposure pathways to human receptors that should be considered in the risk evaluation. The initial step in the risk evaluation is the comparison of SSL-related constituent concentrations in groundwater to health-protective levels for these 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 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 concentrations of SSL-related constituents in on-site groundwater 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 a SSL-related constituent exceeded the screening criterion, the constituent was identified as a COPI for further evaluation in the refined risk evaluation. The methodology and screening criteria used were identified in accordance with regulatory guidance and standard risk assessment practices using an approach designed to conservatively overestimate possible exposures and risks, providing an additional level of confidence in the conclusions. The methodology is summarized on **Figure 7** 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 2015 and September 2022 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. Arsenic was previously identified as a SSL-related constituent in monitoring well MCM-06 under the State and Federal CCR Rules. Data from well MCM-06 for arsenic were screened against relevant health-protective screening criteria or background. In addition, for potential on-site groundwater exposure, the identified SSL-related constituents were also evaluated in the on-site potable water well.

The wells with SSL-related constituents and the potable water well are depicted on **Figure 2**. The groundwater datasets used in the risk evaluation are presented in **Appendix B-1** for the on-site potable water well and in **Appendix B-2** for well MCM-06 for arsenic. 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 McManus pursuant to §257.93-95 following the professional engineer-certified Statistical Analysis Method Certification (Rev 01, amended January 2020) (Resolute, 2020b) and the Unified Guidance (USEPA, 2009) for the former AP-1; background values are routinely updated under the program. Eight monitoring wells in the certified monitoring well network are designated as upgradient or background locations, including MCM-01, MCM-02, MCM-11, MCM-15, MCM-16, MCM-18, MCM-19, and MCM-20. Statistical analyses were performed on the groundwater data using Sanitas groundwater statistical software, as described in the *2022 Annual Groundwater Monitoring & Corrective Action Report Statistical Summary* (Resolute, 2022) and text from that document is presented below.

> *First, interwell tolerance limits were used to calculate site-specific background limits from all available pooled upgradient well data through March 2022 for Appendix IV constituents (Figure F). Parametric tolerance limits are used when data follow a normal or transformed-normal distribution. When data contained greater than 50% non-detects or did not follow a normal or transformed-normal distribution, non-parametric tolerance limits were used.*
>
> *The background limits were then used when determining the groundwater protection standard (GWPS) under 40 CFR §257.95(h) and Georgia 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 levels if background concentrations were identified as greater than the groundwater screening values (i.e., arsenic), as further described in Sections 3.2 and 3.3.

3.2 On-Site Potable Water Screening Evaluation

The process of screening SSL-related constituents in on-site potable water against human health screening levels for groundwater is discussed below and presented in **Figure 7**.

The HSRA RRS evaluated under the VRP approach presented herein included Type 3 and Type 4 standards for on-site industrial worker 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 3 or Type 4 RRS for on-site industrial worker exposure, which are considered protective of human health for those constituents regulated under HSRA (i.e., arsenic).

- If site-specific background concentrations are greater than the criteria described above, then the site-specific background concentration is used as the screening level in accordance with the CCR methodology for development of groundwater protection standards (USEPA, 2020a). The background concentration for arsenic is greater than the criteria described above. Therefore, the background value was used as a screening level for arsenic in this evaluation.

Table 1 presents the maximum detected concentration for the SSL-related constituent arsenic in the identified on-site potable water well used for comparison to the selected screening levels for on-site industrial workers. As presented in **Table 1,** arsenic was not detected in on-site potable groundwater above its respective screening criteria. The laboratory practical quantitation limit (PQL) for arsenic is one order of magnitude lower than the screening level. No COPIs were identified in groundwater from the potable water well. Exposure to on-site potable water is not expected to pose a risk to human health, and therefore, no further evaluation is necessary.

3.3 Groundwater Screening Evaluation

The process of screening SSL-related constituents in downgradient groundwater against human health screening levels for groundwater is discussed below and presented in **Figure 7**. The HSRA RRS evaluated under the VRP approach presented herein included Type 1 and Type 2 standards for off-site residential receptors.

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 or Type 2 RRS for hypothetical off-site residential exposures, which are considered protective of human health for those constituents regulated under HSRA.

- If site-specific background concentrations are greater than the criteria described above, then the site-specific background concentration is used as the screening level in accordance with the CCR methodology for development of groundwater protection standards (USEPA, 2020a). The background concentrations for arsenic are higher at the site than the criteria described above. Therefore, background was used as a screening level for arsenic in this evaluation.

Groundwater data collected from well MCM-06, identified to have a SSL-related constituent, were compared to residential screening criteria in order to protect hypothetical off-site receptors. Concentrations of arsenic in MCM-06 were compared to the higher of the HSRA Type 1 RRS, Type 2 RRS (including site-specific screening levels), and background values for groundwater pursuant to standard practice for risk assessment within the State of Georgia.

Table 2 presents the maximum detected concentration of the SSL-related constituent arsenic, 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 2**, arsenic was detected at a maximum concentration (0.51 milligrams per liter [mg/L]) that exceeded its respective screening level (0.032 mg/L) and was retained for further evaluation in the refined risk evaluation.

3.4 Alternate Source Demonstration

In accordance with 40 CFR §257.95, an ASD for lithium was prepared for MCM-06 on November 17, 2020 (Arcadis, 2020) and DPZ-02 on April 29, 2022 (Arcadis, 2022). There are multiple lines of evidence that support the conclusion that the SSL of lithium present in the compliance monitoring wells is attributable to the influx of brackish surface water and is not attributable to CCR storage or a release from the former AP-1. The ASDs demonstrate that concentrations of lithium in groundwater are naturally occurring; and Georgia EPD concurred with the ASDs. Lithium was not carried forward through the remainder of the assessment.

4 REFINED RISK EVALUATION

A refined risk evaluation was conducted for the groundwater COPI that was detected in MCM-06 (arsenic) at concentrations that exceeded health-protective screening criteria or background. The refined risk evaluation identified an EPC for arsenic in groundwater for the purpose of characterizing potential risk to human receptors. If the EPC 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). Arsenic was evaluated in the adjacent downgradient surface water body (i.e., Burnett Creek) because it was identified as a groundwater COI in the refined groundwater risk evaluation.

4.1 Refined Groundwater Risk Evaluation

Potential risk associated with exposure to arsenic by hypothetical off-site residential receptors was refined using the methodology described in the HSRA and VRP guidance (EPD, 2018b; EPD, 2009) and is presented in the following section and on **Figure 8**.

For the refined risk evaluation, groundwater data from samples collected between 2016 and September 2022 from the on-site wells that were identified to have a SSL-related constituent (MCM-06 for arsenic) and the downgradient piezometers that represent groundwater flow in the same hydraulically downgradient direction were used for hypothetical off-site residential exposure. The groundwater monitoring wells included in the risk evaluation are depicted with yellow well labels on **Figure 2**.

Groundwater data used in the refined risk 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-2.**

4.1.1 Groundwater Exposure Point Calculation

The refined risk evaluation of the sole groundwater COPI (arsenic) 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 COPI in groundwater were calculated for the following specific datasets:

- UCL for the individual well with the SSL-related constituent;

- UCL based on combined data from the well with the SSL-related constituent and other well(s) in the general vicinity to include adjacent monitoring well(s) that represent groundwater flow in the same hydraulically downgradient direction during low tide conditions; and

- UCL based on the combined data from the farthest downgradient well(s) that are hydraulically downgradient of the well with the SSL-related constituent during low tide conditions.

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 C-1** provides a detailed summary of the UCLs calculated using the methods described above, and **Appendix C-2** presents figures showing the wells used in the calculation of the EPCs for the groundwater COPI. **Appendix C-3** provides the input and output files associated with the ProUCL software.

Table 3 summarizes the groundwater EPC selected for arsenic. 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 for arsenic. 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 MCM-06 for arsenic 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 C-4** and indicated insufficient evidence of a statistical trend over time for arsenic at MCM-06.

4.1.3 Refined Groundwater Risk Evaluation Results

Arsenic was identified as a groundwater COPI in the initial risk screening. 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) 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 23 of 24 groundwater samples in well MCM-06 at concentrations that exceeded the groundwater screening level for residential receptors. For the refined risk evaluation, the following EPCs were calculated for arsenic using the monitoring wells shown in **Appendices C-1** and **C-2**:

- Data from MCM-06 were used to determine if the UCL complied with the screening level (EPC Step 1 in **Appendix C-1**).

- Based on the low-tide potentiometric surface map from **Figure 2**, the equipotential lines run southwest to northeast. Groundwater flow is perpendicular to these equipotential lines. Wells downgradient from MCM-06 area include DR-01 (5-feet away), DR-02 (5-feet away), PT-01 (13-feet away), PT-02 (8-feet away), and PT-03 (12-feet away). Therefore, data from MCM-06, DR-01, DR-02, PT-01, PT-02, and PT-03 were combined to represent groundwater exposure in the same hydraulically downgradient direction of well MCM-06 during low tide conditions (EPC Step 2 in **Appendix C-1**).

- Data from PT-01, PT-02, and PT-03 were combined to represent groundwater exposure using the wells that are the farthest hydraulically downgradient during low tide conditions (EPC Step 3 in **Appendix C-1**).

The UCL for the combined dataset from PT-01, PT-02, and PT-03 (EPC Step 3) of 0.036 exceeded the background value of 0.032 mg/L. Current information based on the September 2022 groundwater elevation data indicates groundwater flow is outward from AP-1 during both high tide and low tide sampling events.

Table 4 presents the results of the refined screening comparing the farthest hydraulically downgradient EPC to the screening criterion. Arsenic was identified as a groundwater

COI for hypothetical off-site residential receptors to the north, and therefore, arsenic is further evaluated in the surface water risk evaluation (**Section 4.2**).

4.2 Surface Water Risk Evaluation

A surface water screening evaluation was conducted for Burnett Creek, the surface water body bordering the former AP-1 to the north, for the groundwater COI (arsenic) identified in the refined groundwater risk evaluation.

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. Surface water in the tidal marsh is brackish, and therefore, is unsuitable as a source of potable drinking water. Potential routes of exposure for ecological receptors include direct contact to surface water as well as ingestion.

Surface water screening was performed using surface water data for the sole constituent, arsenic, identified as a groundwater COI. The surface water screening process for arsenic is discussed below and presented in **Figure 9**.

4.2.1 Surface Water Data

Surface water sampling was conducted in Burnett Creek (north of the former AP-1) and Gibson Creek (south of the former AP-1). Surface water data from Burnett Creek were compiled for the COI identified in the refined groundwater risk evaluation (arsenic) as Burnett Creek borders the former AP-1 to the north and is hydraulically downgradient of well MCM-06 during low and high tide conditions. Surface water data are available from sampling events conducted between 2016 and 2022 for arsenic. Surface water data used in the evaluation were collected during both low and high tide conditions and are considered to be representative of surface water conditions.

Two background surface water sampling locations have been sampled in the tidal marsh. The low tide background sample location (BG-1LT[3]) is located in Cowpen Creek, at a point which is hydraulically upgradient of both the junction with Burnett Creek and Crispen Island. At low tide, surface water flow is south from Cowpen Creek, toward the junctions with Burnett Creek and Turtle River. During the July 2022 sampling event, an additional high tide background sample was collected at background location BG-1HT.

[3] LT refers to “low tide” and HT refers to “high tide”.

The high tide background sample location (BG-2HT[5]) is located in Turtle River, at a point which is upstream of Crispen Island during the incoming high tide.

The surface water sample locations are shown on **Figure 10**. The surface water datasets, including background, used in the risk evaluation are presented in **Appendix B-3**.

4.2.2 Human Health Screening

Due to the brackish surface water surrounding the site, surface water human health screening values for the COI (applicable to both freshwater and saltwater environments) were selected from the following order of hierarchy:

- Georgia Instream Water Quality Criteria (ISWQC) for human health (EPD, 2022b), when available. The Georgia ISWQC was used as the screening level for arsenic in this evaluation.

- 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 USEPA has issued a Maximum Contaminant Level (MCL) which may be more stringent than the national ambient water quality criteria 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 for the remaining constituents that lack human health surface water screening levels, which is a conservative approach.

- If site-specific surface water background concentrations are greater than the criteria described above, then the site-specific surface water background concentration is used as the screening level.

4.2.3 Ecological Screening

Due to the brackish surface water surrounding the site, concentrations in surface water were compared to both saltwater and freshwater surface water screening levels. The surface water human health screening level was compared to the maximum detected surface water concentration for arsenic, as shown in **Table 5**. Arsenic was not detected at concentrations above the surface water human health screening level of 0.05 mg/L. Therefore, arsenic was not retained as a COI for further evaluation in surface water and is not expected to pose a risk to human health.

4.2.3.1 Saltwater

Surface water screening values for aquatic ecological receptors were selected from the following order of hierarchy for the COI:

- Chronic saltwater Georgia ISWQC (EPD, 2022b), when available. The Georgia ISWQC of 0.036 mg/L was used as the screening level for arsenic in this evaluation.

- USEPA Region 4 chronic saltwater screening levels (USEPA, 2018). The USEPA Region 4 chronic saltwater screening level for arsenic is equivalent to the Georgia ISWQC.

- If site-specific surface water background concentrations were greater than the criteria described above, then the site-specific surface water background concentration was used as the screening level. The background concentration for arsenic (0.004 mg/L) was less than the screening level described above.

The ecological surface water screening level was compared to the maximum detected concentration for arsenic in surface water, as shown in **Table 6**. The maximum arsenic concentration was below the ecological saltwater screening level of 0.036 mg/L. Therefore, arsenic was not retained as a COI for further evaluation in surface water and is not expected to pose a risk to ecological receptors.

4.2.3.2 Freshwater

Surface water screening values for aquatic ecological receptors were selected from the following order of hierarchy for the COI:

- Chronic freshwater Georgia ISWQC (EPD, 2022b), when available. The Georgia ISWQC of 0.15 mg/L was used as the screening level for arsenic in this evaluation.

- USEPA Region 4 chronic freshwater screening levels (USEPA, 2018). The USEPA Region 4 chronic freshwater screening level for arsenic is equivalent to the Georgia ISWQC.

- If site-specific surface water background concentrations were greater than the criteria described above, then the site-specific surface water background concentration was used as the screening level. The background concentration for arsenic (0.004 mg/L) was less than the screening levels described above.

The ecological surface water screening level was compared to the maximum detected concentration for arsenic in surface water, as shown in **Table 7**. The maximum arsenic concentration was below the ecological freshwater screening level of 0.15 mg/L. Therefore, arsenic was not retained as a COI for further evaluation in surface water and is not expected to pose a risk to ecological receptors.

4.3 Refined Groundwater and Surface Water Risk Evaluation Summary and Conclusions

Detections of arsenic were reported at concentrations above the corresponding conservative groundwater screening values. The results of the refined groundwater and surface water risk evaluations indicate the following:

Arsenic

- Arsenic was identified as a groundwater COI for hypothetical off-site residential receptors and was further evaluated in the adjacent downgradient surface water body (Burnett Creek) for potential exposure to human and ecological receptors.

- Surface water arsenic concentrations in Burnett Creek were below health-protective surface water screening criteria for human and ecological receptors. Therefore, arsenic was not retained as a COI 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 the 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 were selected for residential screening criteria and the higher of the Type 3 and Type 4 standards were selected as the industrial worker screening criteria. Selection of the screening criteria per standard practice is considered appropriate for risk quantification for the former AP-1. 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 on-site and hypothetical off-site receptors.

Exposure Uncertainties:

- The maximum detected concentration of the former AP-1 SSL-related constituent was compared to conservative screening criteria to identify the COPI. 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 constituent included in the risk evaluation occurs 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.

- Hypothetical off-site residential exposure was evaluated using on-site groundwater data from wells around the perimeter and downgradient of the former AP-1. This comparison makes the conservative assumption that on-site groundwater may potentially migrate to off-site drinking water wells through advective transport in groundwater, but without any attenuation within the

aquifer media through factors such as dilution, dispersion, or adsorption. This assumption may overestimate exposure and risk to hypothetical off-site receptors.

- The arsenic EPC in groundwater was assumed to be 100 percent bioavailable by ingestion and dermal contact. This assumption may tend to overestimate risk.

- A well survey of potential groundwater wells within a three-mile radius of Plant McManus 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. As requested by EPD, a survey of water wells was conducted within a two-mile radius from the site. The survey incorporated records from federal, state, and county sources cited in the previous well survey; however, no information (e.g., septic tank permit records) was received from the Glynn County Health Department. The results of this evaluation were provided and discussed in the February 2022 Progress Report (Resolute, 2022). The findings with the available data are consistent with the 2020 well survey.

- As a conservative measure, on-site potable well data were also screened against off-site residential screening criteria. Arsenic was non-detect. Residential receptors are not present on-site and evaluation of this exposure pathway was a conservative measure. As such, the uncertainty associated with the method detection limit is not expected to affect the risk evaluation conclusions.

- This risk evaluation used on-site groundwater data to represent hypothetical off-site exposure, which is a conservative approach that likely results in overestimation of assumed exposure and potential risk. Although off-site potable wells identified in the well survey were not included in the risk evaluation, the presence of these wells do not appear to change the conclusions of the risk evaluation. Groundwater flow directions from both the mainland and the island are consistent during both low and high tides, making the mainland and the island both hydraulically upgradient of the former AP-1. Therefore, groundwater is flowing away from the private drinking water wells located to the east of the site, and these private drinking water wells are located upgradient from the former AP-1.

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 arsenic in groundwater at the former AP-1 and the adjacent downgradient surface water body, Burnett Creek, was conducted using methods consistent with Georgia EPD and USEPA guidance and included multiple conservative assumptions. Arsenic was the only CCR constituent identified as a SSL-related constituent during compliance groundwater monitoring. Based on this risk evaluation, arsenic is not expected to pose a risk to human health or the environment.

Accordingly, no further risk evaluation of groundwater and surface water is warranted. Compliance monitoring for the former AP-1 under the Federal and State CCR Rules will continue. Georgia Power will proactively evaluate the data and update this evaluation, if necessary.

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TABLES

Table 1
On-site Potable Well Groundwater Screening
McManus Risk Evaluation Report
McManus Former AP-1
Plant McManus, Glynn County, GA

CCR Rule Designation	Constituent	CAS No.	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	0 / 4	0 / 4	ND (0.005)	0.032	Background [4]	0.032	N	ND/BSL

Notes:

[1] Evaluation includes 2015 through 2022 groundwater analytical data from the on-site potable well MCMPW-01/Well #1 Plant.

[2] Exceedance frequency is for the specific constituent that exceeds the first screening value in the hierarchy of screening values

[3] Rationale for classification or exclusion of constituent as a COPI:

ASL = Above respective screening level

BSL = Equal to or 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

Definitions:

CAS = Chemical Abstract Service

CCR = Coal Combustion Residuals

COPI = Constituent of Potential Interest

mg/L = milligrams per liter

Prepared by/Date: IMR 11/14/22

Checked by/Date: SBM 11/14/22

Table 2
SSL-related Constituent Groundwater Screening
McManus Risk Evaluation Report
McManus Former AP-1
Plant McManus, Glynn County, GA

CCR Rule Designation	Constituent	CAS No.	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	24 / 24	23 / 24	0.51	0.032	Background[4]	0.032	Y	ASL

Notes:

[1] Evaluation includes 2016 through September 2022 groundwater analytical data from wells MCM-06 (arsenic).

[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 = Equal to or 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.

Definitions:

CAS = Chemical Abstract Service
CCR = Coal Combustion Residuals
COPI = Constituent of Potential Interest
mg/L = milligrams per liter

Prepared by/Date: IMR 11/01/22
Checked by/Date: SBM 11/04/22

Table 3
Groundwater Exposure Point Concentration Summary
McManus Risk Evaluation Report
McManus Former AP-1
Plant McManus, Glynn County, GA

Ash Pond	CCR Rule Designation	Constituent	Exposure Unit	CAS No.	Detection Frequency	Maximum Concentration (mg/L)	UCL (mg/L)	Recommended UCL Method	Selected EPC[1] (mg/L)
AP-1	Appendix IV	Arsenic	North	7440-38-2	6 / 6	0.047	0.036	95% Student's-t UCL	0.036

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 E.

Definitions:
CAS = Chemical Abstract Service
CCR = Coal Combustion Residuals
mg/L = milligrams per liter
UCL = upper confidence limit
EPC = Exposure Point Concentration

Prepared by/Date: IMR 11/01/22
Checked by/Date: SBM 11/04/22

Table 4
Downgradient Groundwater Refined Screening
McManus Risk Evaluation Report
McManus Former AP-1
Plant McManus, Glynn County, GA

Ash Pond	CCR Rule Designation	Constituent	Exposure Unit	CAS No.	Detection Frequency	Exceedance Frequency[1]	Selected EPC[2] (mg/L)	Screening Level (mg/L)	Source	Site-Specific Background (mg/L)	COI? (Y/N)	Rationale[3]
AP-1	Appendix IV	Arsenic	North	7440-38-2	6 / 6	2 / 6	0.036	0.032	Background[4]	0.032	Y	ASL

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 E.

[3] Rationale for classification of constituent as a COI or exclusion as a COI:
ASL = Above respective screening level
BSL = Equal to or 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.

Definitions:

CAS = Chemical Abstract Service
CCR = Coal Combustion Residuals
COI = Constituent of Interest
mg/L = milligrams per liter
EPC = Exposure Point Concentration

Prepared by/Date: IMR 11/01/22
Checked by/Date: SBM 11/04/22

Table 5
Human Health Surface Water Screening - Burnett Creek[1]
McManus Risk Evaluation Report
McManus Former AP-1
Plant McManus, Glynn County, GA

CCR Rule Designation	Constituents	Exposure Unit	CAS No.	Detection Frequency	Exceedance Frequency[2]	Maximum Concentration (mg/L)	Screening Level (mg/L)	Source	Site-Specific Background[3] (mg/L)	COPI? (Y/N)	Rationale[4]
Appendix IV	Arsenic	North	7440-38-2	152 / 278	0 / 278	0.012 J	0.05	GA ISWQC	0.004	N	BSL

Notes:

[1] Surface water evaluation for north exposure unit and includes upstream and downstream dewatering data (2016-2019), CCR boundary location SWNW (2018), and samples from transects T1-1 through T1-4, T2-1 through T2-4, and T3-1 through T3-4 (2020-2022).

[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 is 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] Background locations BG-1LT, BG-1HT, and BG-2HT represent site-specific background.

[4] Rationale for classification of constituent as a COPI or exclusion as a COPI:

ASL = Above respective screening level;
BSL = Equal to or below respective screening level
ND = Not detected (maximum practical quantitation limit [PQL])

Definitions:

CAS = Chemical Abstract Service
CCR = Coal Combustion Residuals
COPI = Constituent of Potential Interest
GA ISWQC = Georgia Instream Water Quality Criteria
NRWQC = National Recommended Water Quality Criteria

Prepared by/Date: IMR 11/03/22
Checked by/Date: SBM 11/04/22

Table 6
Ecological Saltwater Surface Water Screening - Burnett Creek[1]
McManus Risk Evaluation Report
McManus Former AP-1
Plant McManus, Glynn County, GA

CCR Rule Designation	Constituents	Exposure Unit	CAS No.	Detection Frequency	Exceedance Frequency[2]	Maximum Concentration (mg/L)	Screening Value (mg/L) (Total)	Hardness Dependent? (Y/N)	Source	Site-Specific Background[3] (mg/L)	COPI (Y/N)	Rationale[4]
Appendix IV	Arsenic	North	7440-38-2	152 / 278	0 / 278	0.012 J	0.036	N	GA ISWQC	0.004	N	BSL

Notes:

[1] Surface water evaluation for north exposure unit and includes upstream and downstream dewatering data (2016-2019), CCR boundary location SWNW (2018), and samples from transects T1-1 through T1-4, T2-1 through T2-4, and T3-1 through T3-4 (2020-2022).

[2] Exceedance frequency is for the specific constituent that exceeds the first screening value in the hierarchy of screening values.

- The hierarchy of values selected as the screening level is GA ISWQC (Saltwater value)> EPA Region 4 (Saltwater value)> GA ISWQC (Freshwater value)> EPA Region 4 (Freshwater value).
- 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] Background locations BG-1LT, BG-1HT, and BG-2HT represent site-specific background.

[4] Rationale for classification of constituent as a COPI or exclusion as a COPI:

ASL = Above respective screening level;
BSL = Equal to or below respective screening level
ND = Not detected (maximum practical quantitation limit [PQL])

Definitions:

J= Estimated value less than the PQL but greater than the method detection limit
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

Prepared by/Date: IMR 11/03/22
Checked by/Date: SBM 11/04/22

Table 7
Ecological Freshwater Surface Water Screening - Burnett Creek[1]
McManus Risk Evaluation Report
McManus Former AP-1
Plant McManus, Glynn County, GA

CCR Rule Designation	Constituents	Exposure Unit	CAS No.	Detection Frequency	Exceedance Frequency[2]	Maximum Concentration (mg/L)	Screening Value (mg/L) (Total)	Hardness Dependent? (Y/N)	Source	Site-Specific Background[3] (mg/L)	COPI (Y/N)	Rationale[4]
Appendix IV	Arsenic	North	7440-38-2	152 / 278	0 / 278	0.012 J	0.15	N	GA ISWQC	0.004	N	BSL

Notes:

[1] Surface water evaluation for north exposure unit and includes upstream and downstream dewatering data (2016-2019), CCR boundary location SWNW (2018), and samples from transects T1-1 through T1-4, T2-1 through T2-4, and T3-1 through T3-4 (2020-2022).

[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] Background locations BG-1LT, BG-1HT, and BG-2HT represent site-specific background.

[4] Rationale for classification of constituent as a COPI or exclusion as a COPI:

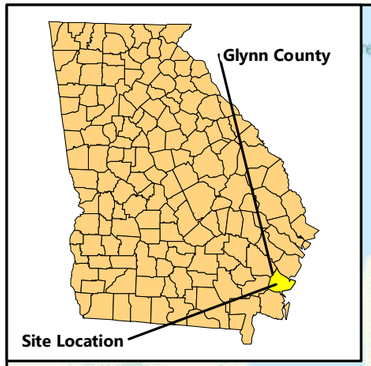
ASL = Above respective screening level;
BSL = Equal to or below respective screening level
ND = Not detected (maximum practical quantitation limit [PQL])

Definitions:

J= Estimated value less than the reporting limit but greater than the method detection limit
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

Prepared by/Date: IMR 11/03/22
Checked by/Date: SBM 11/04/22

FIGURES



N

0 400 800 Feet

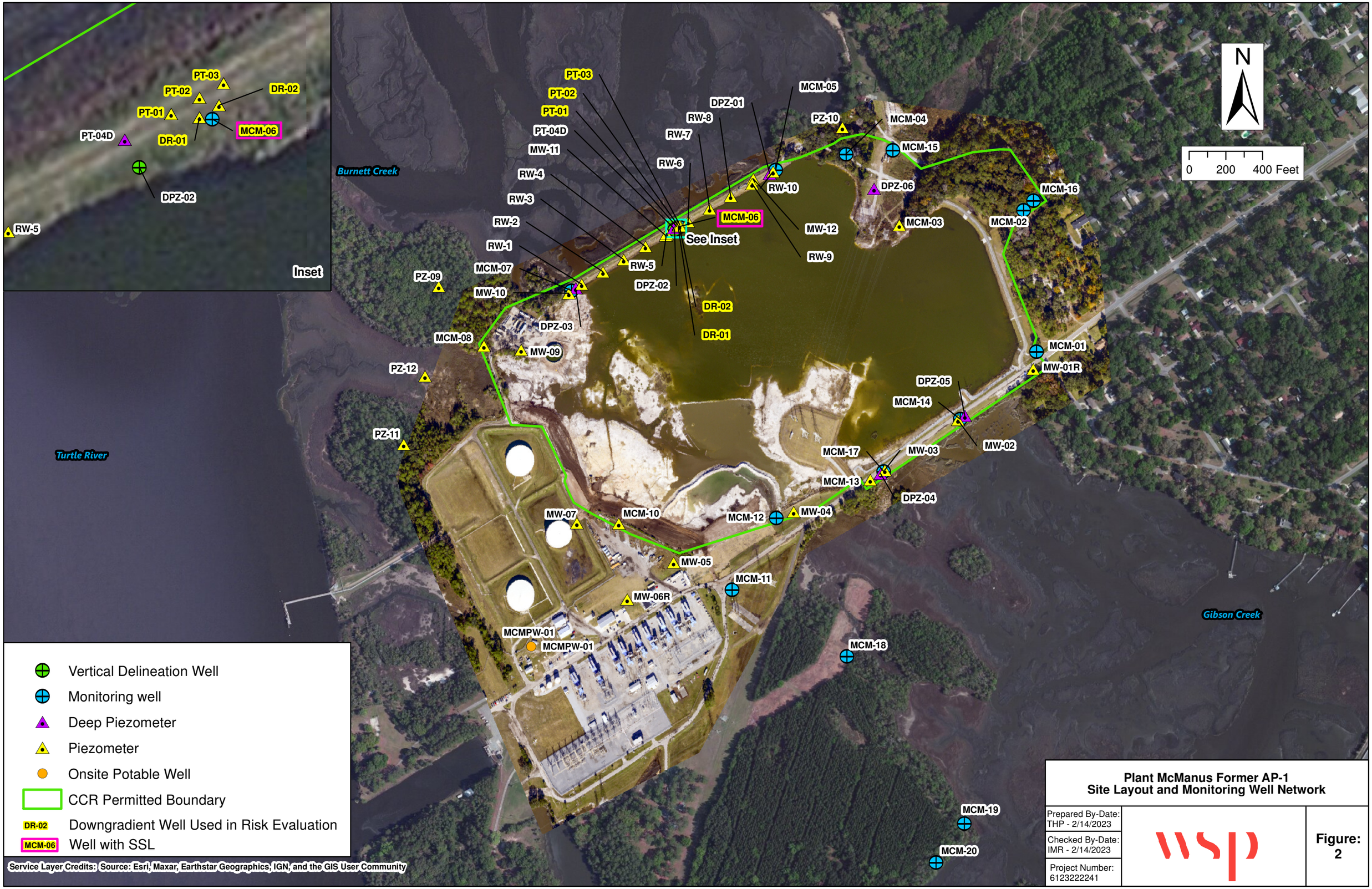
Former AP-1

Plant McManus

CCR Permitted Boundary

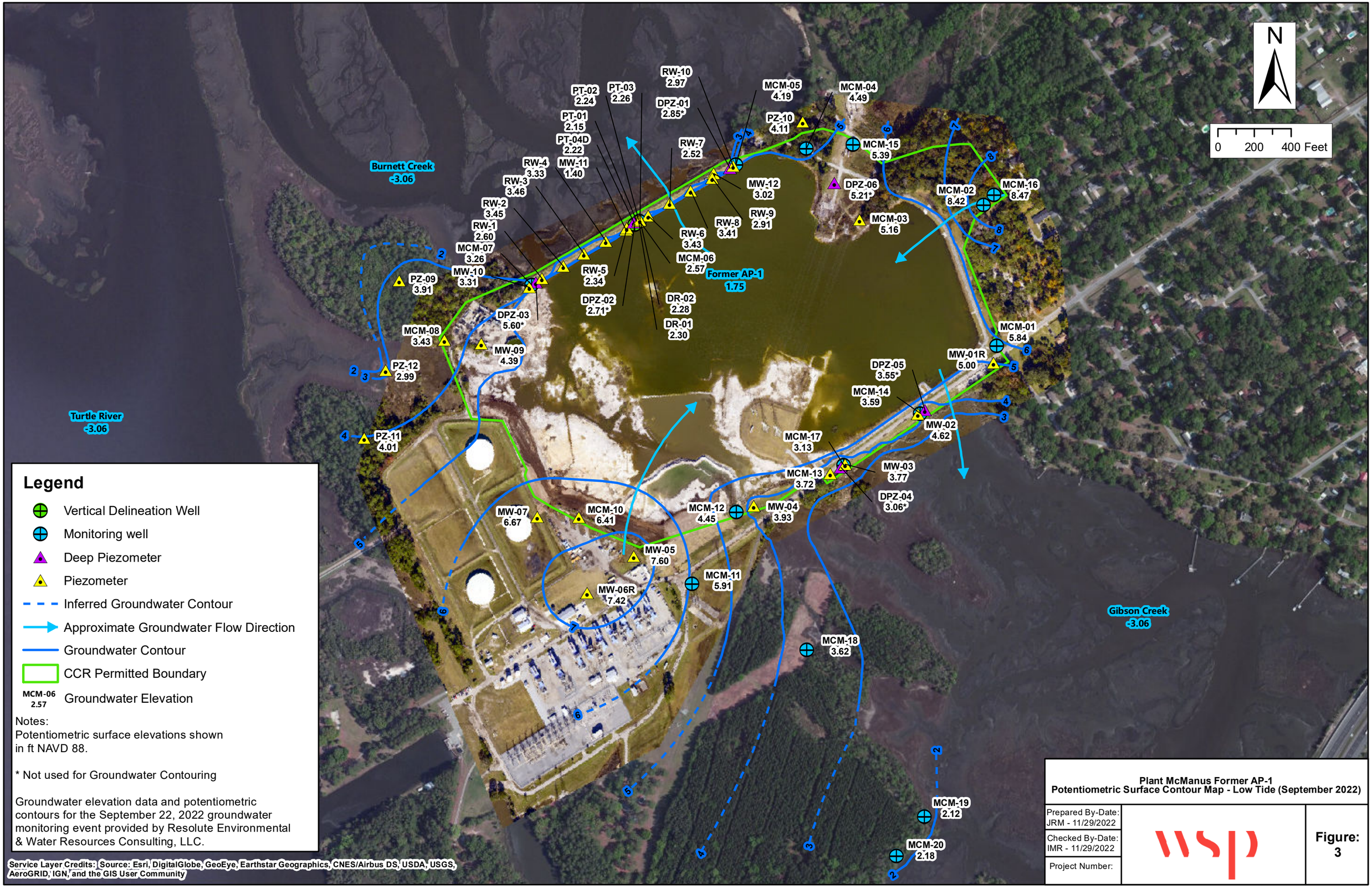
Service Layer Credits: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap

Plant McManus Former AP-1 Site Location		
Prepared By-Date: THP - 11/11/2022	wsp	Figure: 1
Checked By-Date: IR - 11/11/2022		
Project Number:		



Plant McManus Former AP-1
Site Layout and Monitoring Well Network

Prepared By-Date: THP - 2/14/2023	wsp	Figure: 2
Checked By-Date: IMR - 2/14/2023		
Project Number: 6123222241		



Legend

- Vertical Delineation Well
- Monitoring well
- Deep Piezometer
- Piezometer
- Inferred Groundwater Contour
- Approximate Groundwater Flow Direction
- Groundwater Contour
- CCR Permitted Boundary
- MCM-06 2.57 — Groundwater Elevation

Notes:
Potentiometric surface elevations shown in ft NAVD 88.

* Not used for Groundwater Contouring

Groundwater elevation data and potentiometric contours for the September 22, 2022 groundwater monitoring event provided by Resolute Environmental & Water Resources Consulting, LLC.

Plant McManus Former AP-1
Potentiometric Surface Contour Map - Low Tide (September 2022)

Prepared By-Date: JRM - 11/29/2022	wsp	Figure: 3
Checked By-Date: IMR - 11/29/2022		
Project Number:		

Legend

- Vertical Delineation Well
- Monitoring well
- Deep Piezometer
- Piezometer
- Approximate Groundwater Flow Direction
- Groundwater Contour
- CCR Permitted Boundary
- MCM-06 2.57 — Groundwater Elevation

Notes:
Potentiometric surface elevations shown in ft NAVD 88.

* Not used for Groundwater Contouring

Groundwater elevation data and potentiometric contours for the September 22, 2022 groundwater monitoring event provided by Resolute Environmental & Water Resources Consulting, LLC.

N

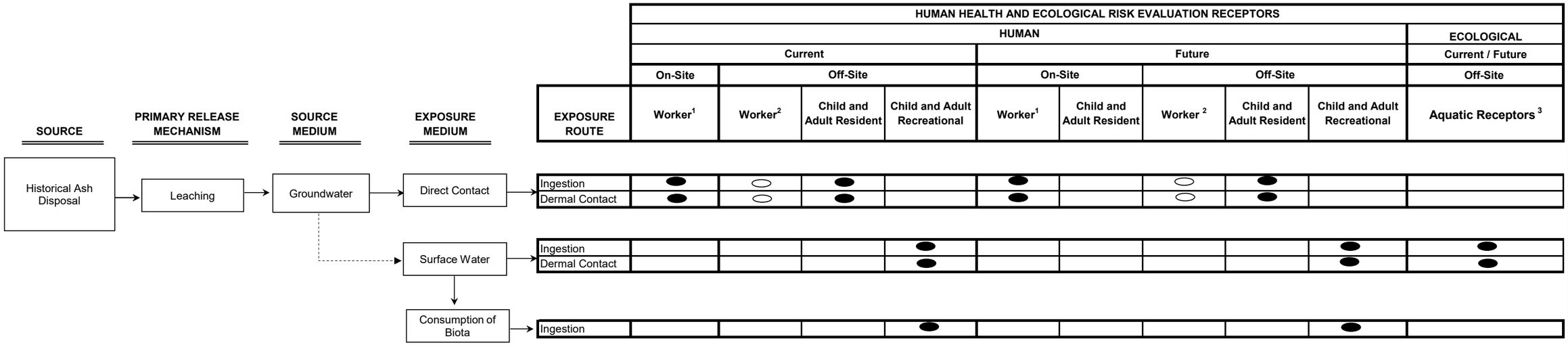
0 50 100 Feet

RW-9 2.91
RW-8 3.41
RW-7 2.52
RW-6 3.43
PT-03 2.26
PT-02 2.24
PT-01 2.15
PT-04D 2.22
DR-02 2.28
MCM-06 2.57
DR-01 2.30
RW-5 2.34
MW-11 1.40
DPZ-02 2.71*
RW-4 3.33
RW-3 3.46
3
4
5

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Plant McManus Former AP-1
Potentiometric Surface Map – SSL Wells Low Tide
(September 2022)

Prepared By-Date: JRM - 11/29/2022	wsp	**Figure: 4**
Checked By-Date: IMR - 11/29/2022		
Project Number:		



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 quantitatively evaluated. 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 McManus Former AP-1
Conceptual Exposure Model

Figure 5

Project Number

Prepared by/Date: RMB 04/06/20
Checked by/Date: LMS 04/06/20

Inactive Private Irrigation/Drinking Well

Inactive Public Drinking Well

Private Drinking Well

Public Drinking Well

CCR Permitted Boundary

N

0 0.5 1 2 Miles

Data source: Newfields, 2020. Well Survey – Plant McManus Ash Pond 1 March 2020.

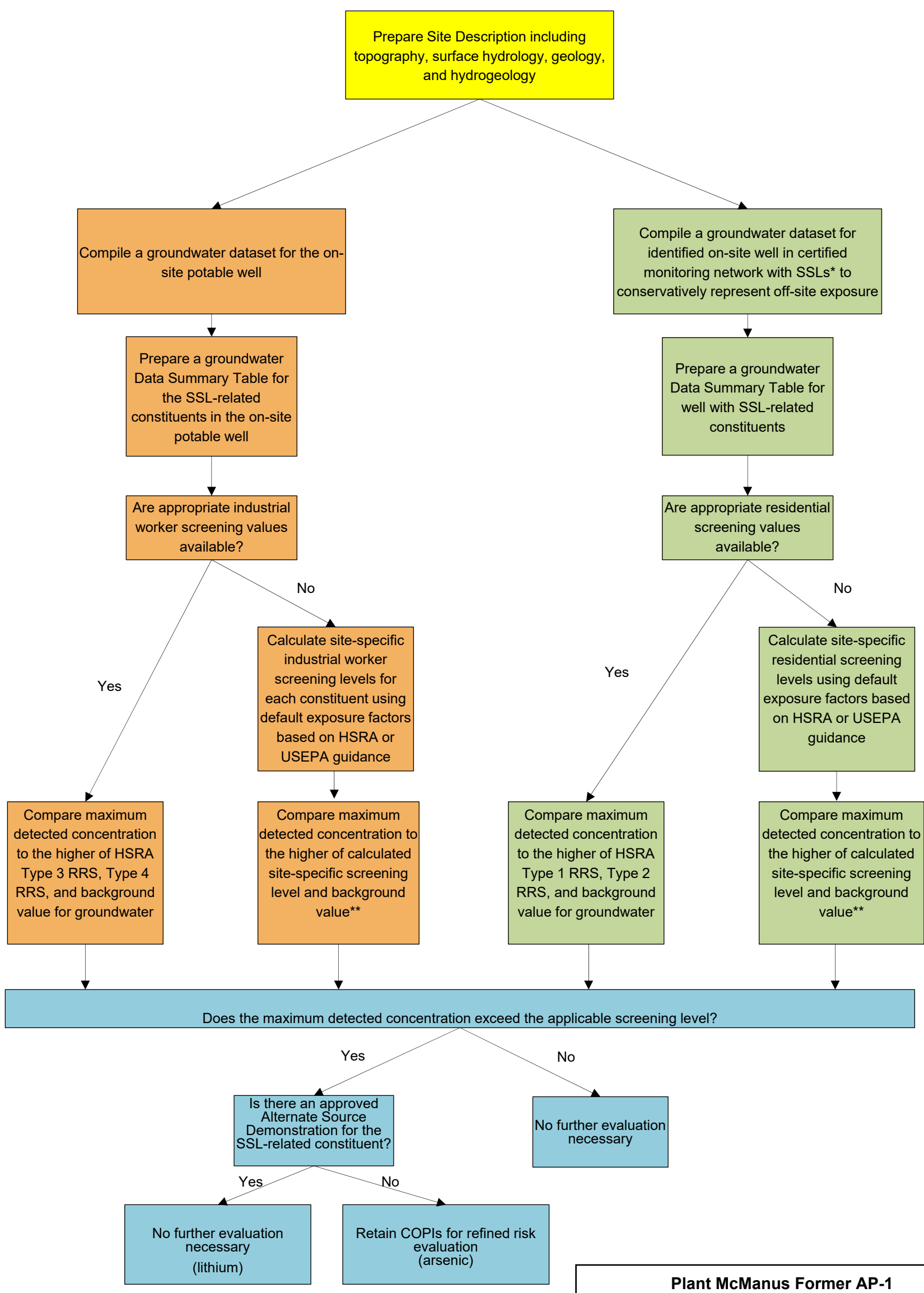
Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Document Path: G:\ProjectEX\McManus\MXDs\2022\Well Survey Locations.mxd

Plant McManus Former AP-1
Well Survey Results

Prepared By-Date: THP - 11/9/2022	wsp	Figure: 6
Checked By-Date: IMR - 11/9/2022		
Project Number:		

Risk Screening Approach (Groundwater) for Former AP-1



Notes:

- Initial screen evaluates AP-1 wells with SSLs: arsenic (MCM-06).

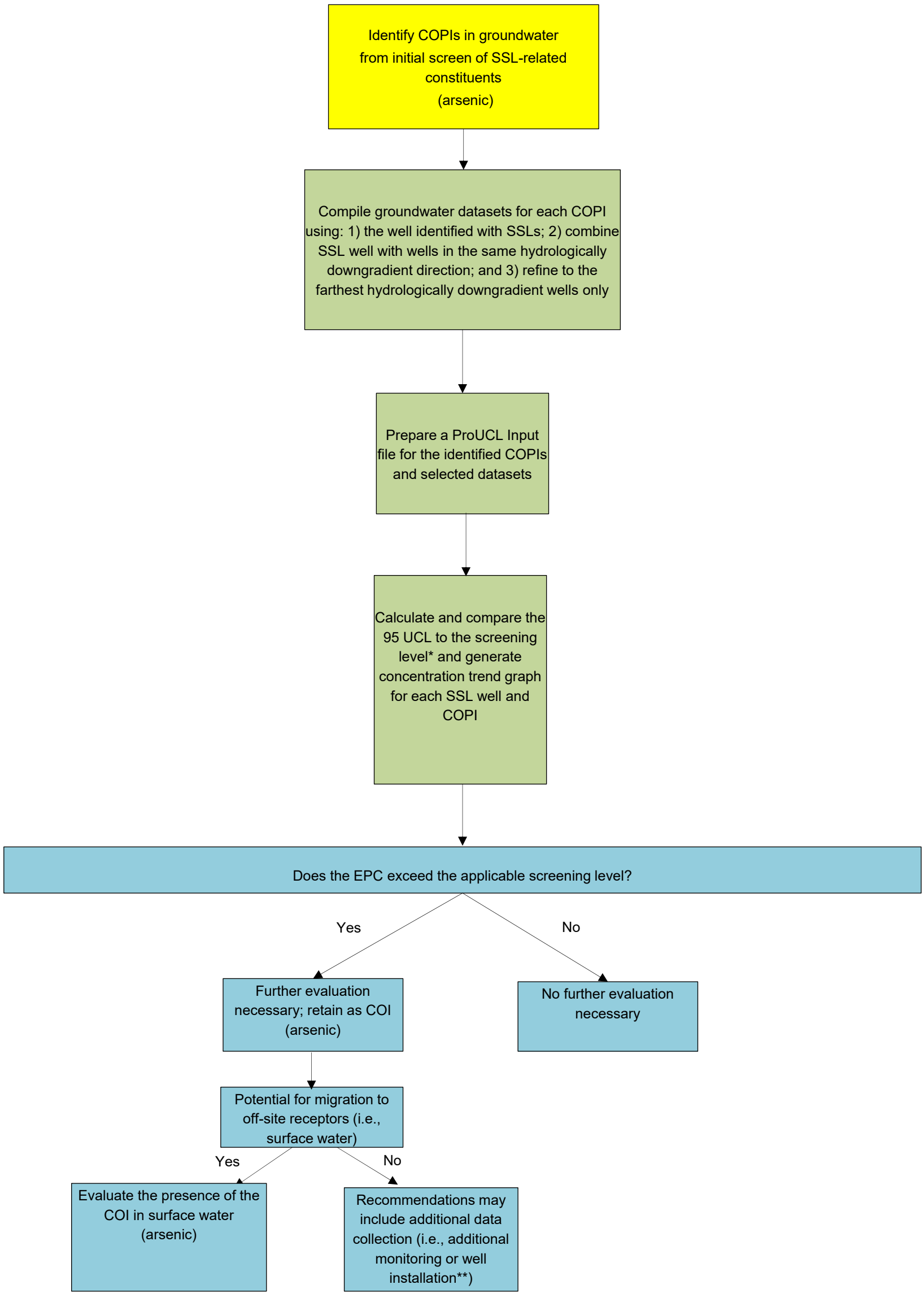
SSL = Statistically Significant Level
COPI = Constituent of Potential Interest
HSRA = Hazardous Site Response Act
RRS = Risk Reduction Standard
USEPA = United States Environmental Protection Agency

Plant McManus Former AP-1
Groundwater Risk
Screening Approach

Figure 7

Project Number	Prepared by/Date: IMR 11/01/22 Checked by/Date: SBM 11/04/22

Refined Risk Screening Approach (Groundwater) for Former AP-1



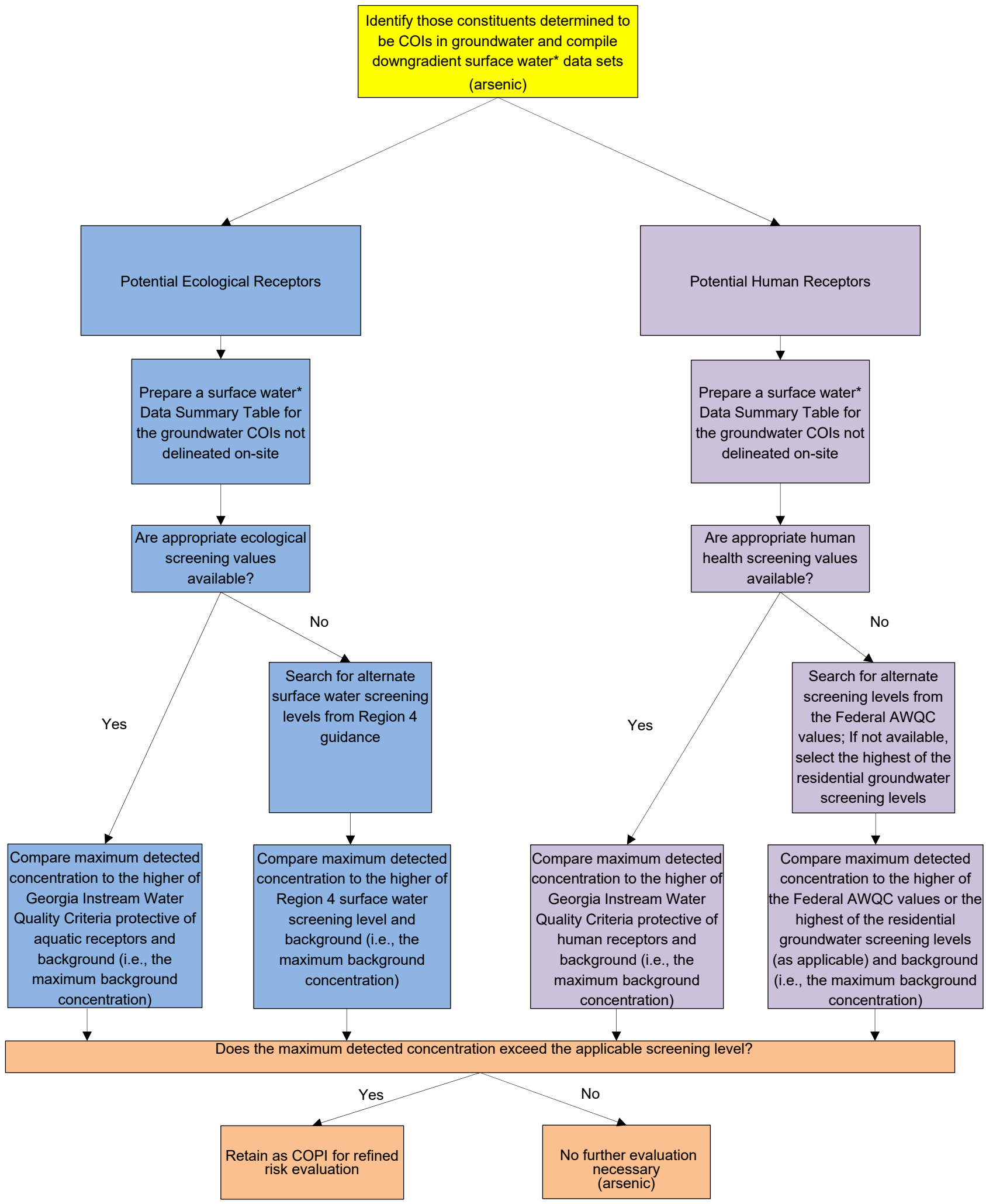
Notes:
*If the 95 UCL exceeds the maximum concentration, use the maximum as the EPC.
**This step is not necessary for Plant McManus AP-1.
SSL = Statistically Significant Level
COPI = Constituent of Potential Interest
EPC = Exposure Point Concentration
COI = Constituent of Interest
UCL = Upper Confidence Limit

Plant McManus Former AP-1
Approach for Refined Groundwater Risk Screening

Figure 8

Project Number	Prepared by/Date: IMR 09/01/20 Checked by/Date: NSR 11/02/20

Risk Screening Approach (Surface Water) for Former AP-1



- Surface water data collected from Burnett Creek and two background locations.

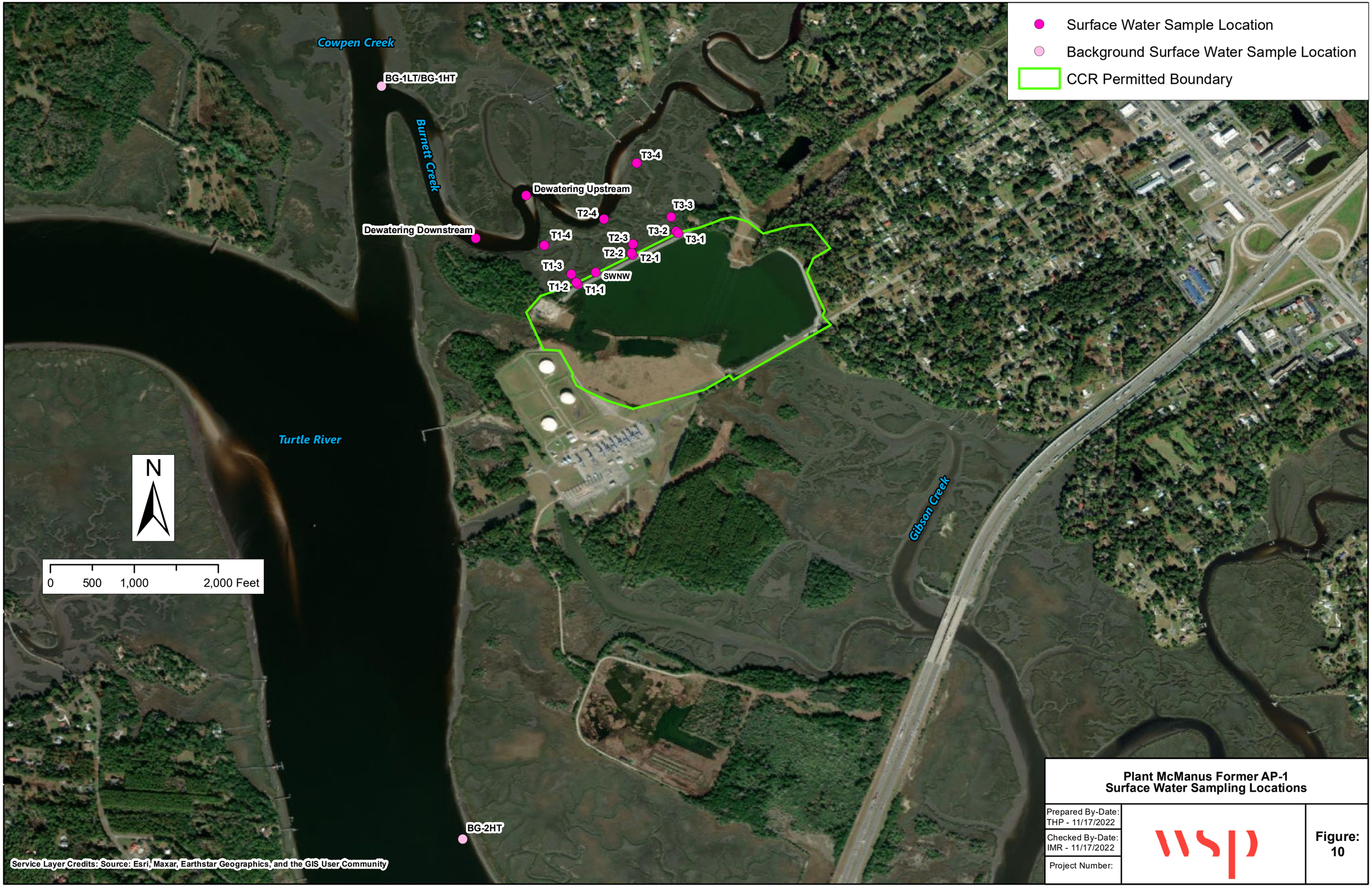
SSL = Statistically Significant Level
AWQC = Ambient Water Quality Criteria
COI = Constituent of Interest
COPI = Constituent of Potential Interest

Plant McManus Former AP-1
Surface Water Risk
Screening Approach

Figure 9

Project Number

Prepared by/Date: IMR 11/01/22
Checked by/Date SBM 11/04/22



Plant McManus Former AP-1
Surface Water Sampling Locations

Prepared By-Date: THP - 11/17/2022	wsp	Figure: 10
Checked By-Date: IMR - 11/17/2022		
Project Number:		

APPENDIX A

Plant McManus Well Survey (Off-Site)

Well Survey

Plant McManus

Ash Pond 1

Brunswick, 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 McManus is located on Crispin Island in Brunswick, Georgia.

NewFields conducted a well survey of potential drinking water wells within the three-mile radius of Ash Pond 1 (AP-1). This radius is referred to in this report as the Investigated Area, and is shown on Figure 1. AP-1 is currently being closed by removal.

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) maintains an inventory database of wells that sampled by a USGS-affiliated program for ground-water levels and/or water quality parameters.[1] Well information and coordinates were downloaded for the state of Georgia and compiled into the GIS database. Wells in this database are labelled 'human drinking water wells' or 'monitoring wells'; however, many of the monitoring wells appear to be co-located with drinking water wells and may in fact be private drinking water wells utilized for monitoring purposes by USGS. Some listings in this database are over 50 years old and may be inactive.

    b. The Safe Drinking Water Information System (SDWIS) 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.

2. State Sources
    a. Georgia Environmental Protection Division (EPD)
        i. 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 with the coordinates of Plant McManus. Mr. Gillis confirmed that there were 21 public water systems operating public wells within the Investigated Area. NewFields used a combination of parcel data, information from the Drinking Water Branch online database, and

[1] http://waterdata.usgs.gov/ga/nwis/inventory?introduction

aerial photography to locate these wells. There is also an inactive public drinking water well located at Plant McManus and an inactive public water system at the I-95 interchange nearly a mile to the northeast of the Ash Pond.

ii. EPD maintains files for Hazardous Site Inventory (HSI) files for site which are undergoing state-led corrective action. These files usually contain groundwater data and well surveys. There are no HSI sites or associated groundwater data or well surveys within the Investigated Area.

iii. EPD maintains non-HSI Hazardous Site Response Act notification reports (i.e., notifications submitted after releases of reportable substances). Reports associated with sites in Glynn County well surveys for sites within a 5-mile radius of Plant McManus were reviewed. A large number of wells within the Investigated Area were identified on the well surveys reviewed.

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 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). In the Coastal Health District region, local health departments use an online system with information about local septic permits. NewFields was able to obtain a guest login to the database to search for and examine septic permits in the area.

   b. **Water Department.** NewFields obtained shapefiles showing the waterlines for the main water provider in the area, the City of Brunswick. NewFields was also able to obtain detailed information about the locations and associated names of water meters connected to the City of Brunswick system. This information allows us to confirm which residences have active service connections and are unlikely to be drinking from a private well (older residences may still have inactive wells or wells used for irrigation).

   c. **Tax Assessor Records.** Parcel data, including improvement data (i.e., information about the structures built on a property), was obtained from the Glynn County Tax Assessor.

[2] http://aesl.ces.uga.edu/water/map/

4. Windshield Surveys
    a. A windshield survey of the area was conducted on October 18 – 20, 2019. During the survey wells were visually identified and compiled into the GIS database.

Summary

Public water systems are operating wells throughout the Investigated Area. This includes wells for the main water provider in the area, the City of Brunswick, as well as 22 other smaller public water systems. Two public water systems that formerly had wells in the area are now inactive.

Public water is available to many residences in the area; however, a large number of parcels in the immediate vicinity of the plant rely on private wells.

For areas with no public water availability, NewFields assumed that all parcels containing structures would be associated with a private well. Many of these parcels may be sharing a well.

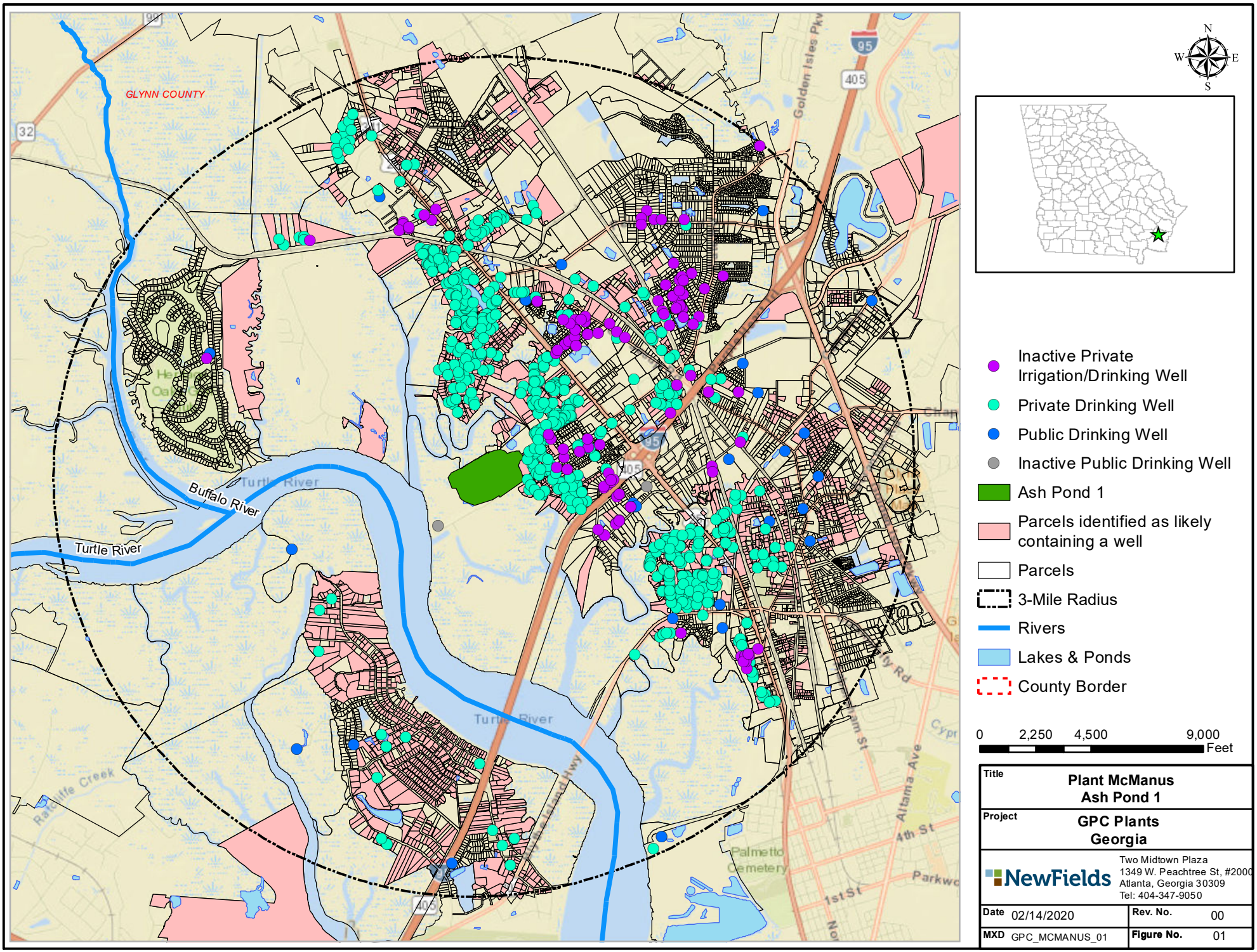
If a well was seen during the windshield survey or identified through older non-HSI well surveys, the USGS database, or septic system permits, but was also associated with a water meter connection, NewFields labelled the well as inactive or potentially an irrigation well.

USGS monitoring wells located on Georgia Power property were also considered not to be drinking water wells and omitted.

Combining well data from all sources with parcel data, NewFields identified 2361 total parcels likely to be associated with an active or inactive private well within the Investigated Area. 2266 parcels were identified using parcel data. 476 wells were seen during windshield survey, with 90 of those wells determined to be inactive or used only for irrigation because of their proximity to an active water connection. Eighteen (18) private wells were identified using other non-HSI well surveys. Four (4) wells were identified from the UGA Environmental Laboratory testing results, although 3 of these wells were determined to be inactive due to their proximity to an active water connection. Three (3) wells were identified using the USGS database, with one of them determined to be inactive due to the proximity to an active water connection.

Many wells were identified by multiple sources.

Figure 1 shows points for identified wells in the Investigated Area. Parcels identified as likely containing a well are shaded. When viewed as a PDF file, the figure is interactive, and wells identified using different sources can be turned on and off.



Title	**Plant McManus Ash Pond 1**
Project	**GPC Plants Georgia**

NewFields
Two Midtown Plaza
1349 W. Peachtree St, #2000
Atlanta, Georgia 30309
Tel: 404-347-9050

Date	02/14/2020	Rev. No.	00
MXD	GPC_MCMANUS_01	Figure No.	01

APPENDIX B
Data Used in Risk Evaluation

APPENDIX B-1
Potable Well Data

Appendix B-1
McManus Risk Evaluation Report
Potable Well Data (2015-2022) for Evaluation of SSLs
McManus Former AP-1
Plant McManus, Glynn County, GA

Well[a]	Date	CAS	Constituent	Unit	Result	Flag	MDL	PQL
Well #1 Plant	04/29/15	7440-38-2	Arsenic	mg/L		ND	n/a	0.005
MCMPW-01	01/28/20	7440-38-2	Arsenic	mg/L		ND	0.0005	0.001
MCMPW-01	03/23/21	7440-38-2	Arsenic	mg/L		ND	n/a	0.001
MCMPW-01	03/29/22	7440-38-2	Arsenic	mg/L		ND	n/a	0.001

Notes:

a) Well MCMPW-01 and Well #1 Plant are the same Plant McManus well just different naming for sampling events
MDL - method detection limit
mg/L - milligrams per liter
n/a - not available
ND - not detected above the laboratory PQL
PQL - practical quantitation limit
CAS - Chemical Abstract Service Number

Prepared by/Date: IMR 11/14/22
Checked by/Date: SBM 11/14/22

APPENDIX B-2
Downgradient Groundwater Data

Appendix B-2
McManus Risk Evaluation Report
Downgradient Groundwater Data (2016-2022) for Evaluation of SSLs
McManus Former AP-1
Plant McManus, Glynn County, GA

Well	Date	CAS	Constituent	Unit	Result	Flag	MDL	PQL
DR-01	06/28/22	7440-38-2	Arsenic	mg/L	0.077		0.000083	0.0005
DR-01	09/20/22	7440-38-2	Arsenic	mg/L	0.029		0.012	0.013
DR-02	06/28/22	7440-38-2	Arsenic	mg/L	0.0078		0.000083	0.0005
DR-02	09/20/22	7440-38-2	Arsenic	mg/L	0.036		0.012	0.013
MCM-06	08/31/16	7440-38-2	Arsenic	mg/L	0.212		0.0016	0.005
MCM-06	11/30/16	7440-38-2	Arsenic	mg/L	0.129		0.0016	0.005
MCM-06	02/16/17	7440-38-2	Arsenic	mg/L	0.257		0.0016	0.005
MCM-06	06/02/17	7440-38-2	Arsenic	mg/L	0.0559		0.0004	0.005
MCM-06	08/17/17	7440-38-2	Arsenic	mg/L	0.458		0.00057	0.005
MCM-06	06/20/18	7440-38-2	Arsenic	mg/L	0.44		0.0011	0.01
MCM-06	09/27/18	7440-38-2	Arsenic	mg/L	0.27		0.00057	0.005
MCM-06	11/07/18	7440-38-2	Arsenic	mg/L	0.5		0.00057	0.005
MCM-06	03/06/19	7440-38-2	Arsenic	mg/L	0.49		0.00035	0.005
MCM-06	03/26/19	7440-38-2	Arsenic	mg/L	0.3		n/a	n/a
MCM-06	07/02/19	7440-38-2	Arsenic	mg/L	0.37		n/a	n/a
MCM-06	08/28/19	7440-38-2	Arsenic	mg/L	0.5		0.00035	0.005
MCM-06	10/17/19	7440-38-2	Arsenic	mg/L	0.34		0.00035	0.005
MCM-06	03/28/20	7440-38-2	Arsenic	mg/L	0.3		0.0012	0.005
MCM-06	06/16/20	7440-38-2	Arsenic	mg/L	0.51		0.0043	0.25
MCM-06	08/26/20	7440-38-2	Arsenic	mg/L	0.46		0.0022	0.12
MCM-06	10/14/20	7440-38-2	Arsenic	mg/L	0.45		0.0026	0.005
MCM-06	03/04/21	7440-38-2	Arsenic	mg/L	0.35		0.0043	0.05
MCM-06	09/14/21	7440-38-2	Arsenic	mg/L	0.51		0.0017	0.02
MCM-06	03/01/22	7440-38-2	Arsenic	mg/L	0.24		0.0017	0.02
MCM-06	06/28/22	7440-38-2	Arsenic	mg/L	0.17		0.000083	0.0005
MCM-06	09/20/22	7440-38-2	Arsenic	mg/L	0.18		0.0012	0.0063
MCM-6HighTide	09/21/16	7440-38-2	Arsenic	mg/L	0.258		n/a	n/a
MCM-6LowTide	09/21/16	7440-38-2	Arsenic	mg/L	0.0168		n/a	n/a
PT-01	06/28/22	7440-38-2	Arsenic	mg/L	0.026		0.000083	0.0005
PT-01	09/20/22	7440-38-2	Arsenic	mg/L	0.035		0.0012	0.0013
PT-02	06/29/22	7440-38-2	Arsenic	mg/L	0.0019		0.000083	0.0005
PT-02	09/20/22	7440-38-2	Arsenic	mg/L	0.0094		0.0012	0.0013
PT-03	06/28/22	7440-38-2	Arsenic	mg/L	0.0011		0.000083	0.0005
PT-03	09/20/22	7440-38-2	Arsenic	mg/L	0.047		0.0012	0.0013

Notes:

1) Highlighted rows indicate constituent identified in the well at a statistically significant level (SSL).

J - indicates an estimated value; detected between the laboratory MDL and PQL.

MDL - method detection limit

mg/L - milligrams per liter

n/a - not available

ND - not detected above the laboratory PQL

PQL - practical quantitation limit

CAS - Chemical Abstract Service Number

Prepared by/Date: IMR 10/31/22

Checked by/Date: SBM 11/03/22

APPENDIX B-3

Surface Water Data

Appendix B-3
Surface Water Data (2016-2022)
McManus Risk Evaluation Report
McManus Former AP-1
Plant McManus, Glynn County, GA

Sample Location	Tide	Sample Designation	Date	CAS	Constituent	Unit	Fraction	Result	Flag	MDL	PQL
BG-1LT	Low	Background	02/02/20	7440-38-2	Arsenic	mg/L	T	0.0019	J	0.0012	0.002
BG-1LT	Low	Background	10/28/20	7440-38-2	Arsenic	mg/L	T	0.0021		0.0017	0.005
BG-1LT	Low	Background	11/18/20	7440-38-2	Arsenic	mg/L	T	0.0026	J	0.0017	0.005
BG-1LT	Low	Background	03/02/21	7440-38-2	Arsenic	mg/L	T		ND	0.0043	0.05
BG-1LT	Low	Background	09/30/21	7440-38-2	Arsenic	mg/L	T	0.0027	J	0.0013	0.015
BG-1LT	Low	Background	12/15/21	7440-38-2	Arsenic	mg/L	T		ND	0.0017	0.02
BG-1LT	Low	Background	03/01/22	7440-38-2	Arsenic	mg/L	T		ND	0.0026	0.03
BG-1LT	Low	Background	06/08/22	7440-38-2	Arsenic	mg/L	T		ND	0.0043	0.05
BG-1LT	Low	Background	09/28/22	7440-38-2	Arsenic	mg/L	T		ND	0.006	0.0063
BG-1LT-B	Low	Background	06/18/20	7440-38-2	Arsenic	mg/L	T		ND	0.0026	0.005
BG-1LT-S	Low	Background	06/18/20	7440-38-2	Arsenic	mg/L	T	0.0026	J	0.0026	0.005
BG-1HT	High	Background	06/07/22	7440-38-2	Arsenic	mg/L	T	0.0023	J	0.02	0.0017
BG-2HT	High	Background	02/02/20	7440-38-2	Arsenic	mg/L	T	0.0023		0.0012	0.002
BG-2HT	High	Background	10/27/20	7440-38-2	Arsenic	mg/L	T	0.0025		0.0017	0.005
BG-2HT	High	Background	11/17/20	7440-38-2	Arsenic	mg/L	T	0.0033	J	0.0017	0.005
BG-2HT	High	Background	03/03/21	7440-38-2	Arsenic	mg/L	T		ND	0.0043	0.05
BG-2HT	High	Background	09/22/21	7440-38-2	Arsenic	mg/L	T	0.004	J	0.0017	0.02
BG-2HT	High	Background	12/15/21	7440-38-2	Arsenic	mg/L	T		ND	0.0017	0.02
BG-2HT	High	Background	03/03/22	7440-38-2	Arsenic	mg/L	T		ND	0.0026	0.03
BG-2HT	High	Background	06/07/22	7440-38-2	Arsenic	mg/L	T		ND	0.0043	0.05
BG-2HT	High	Background	09/22/22	7440-38-2	Arsenic	mg/L	T	0.0026		0.0012	0.0013
BG-2-HT-B	High	Background	06/17/20	7440-38-2	Arsenic	mg/L	T	0.0026	J	0.0017	0.005
BG-2-HT-S	High	Background	06/17/20	7440-38-2	Arsenic	mg/L	T	0.0023	J	0.0017	0.005
Dewatering Downstream	Receding Tide	Downgradient	12/20/16	7440-38-2	Arsenic	mg/L	T		ND	0.003	n/a
Dewatering Downstream	Receding Tide	Downgradient	01/11/17	7440-38-2	Arsenic	mg/L	T		ND	0.003	n/a
Dewatering Downstream	Receding Tide	Downgradient	02/08/17	7440-38-2	Arsenic	mg/L	T	0.0011		0.003	n/a
Dewatering Downstream	Receding Tide	Downgradient	03/06/17	7440-38-2	Arsenic	mg/L	T	0.0011		0.003	n/a
Dewatering Downstream	Receding Tide	Downgradient	04/11/17	7440-38-2	Arsenic	mg/L	T		ND	0.003	n/a
Dewatering Downstream	Receding Tide	Downgradient	05/08/17	7440-38-2	Arsenic	mg/L	T		ND	0.003	n/a
Dewatering Downstream	Receding Tide	Downgradient	06/13/17	7440-38-2	Arsenic	mg/L	T		ND	0.003	n/a
Dewatering Downstream	Receding Tide	Downgradient	07/10/17	7440-38-2	Arsenic	mg/L	T		ND	0.003	n/a
Dewatering Downstream	Receding Tide	Downgradient	08/07/17	7440-38-2	Arsenic	mg/L	T	0.0024		0.003	n/a
Dewatering Downstream	Receding Tide	Downgradient	09/20/17	7440-38-2	Arsenic	mg/L	T	0.0016		0.003	n/a
Dewatering Downstream	Receding Tide	Downgradient	10/09/17	7440-38-2	Arsenic	mg/L	T	0.0013		0.003	n/a
Dewatering Downstream	Receding Tide	Downgradient	11/08/17	7440-38-2	Arsenic	mg/L	T	0.0017		0.003	n/a
Dewatering Downstream	Receding Tide	Downgradient	12/05/17	7440-38-2	Arsenic	mg/L	T		ND	0.003	n/a
Dewatering Downstream	Receding Tide	Downgradient	01/25/18	7440-38-2	Arsenic	mg/L	T		ND	0.003	n/a
Dewatering Downstream	Receding Tide	Downgradient	02/14/18	7440-38-2	Arsenic	mg/L	T	0.0014		0.003	n/a
Dewatering Downstream	Receding Tide	Downgradient	03/06/18	7440-38-2	Arsenic	mg/L	T	0.0013		0.003	n/a
Dewatering Downstream	Receding Tide	Downgradient	04/04/18	7440-38-2	Arsenic	mg/L	T		ND	0.003	n/a
Dewatering Downstream	Receding Tide	Downgradient	05/02/18	7440-38-2	Arsenic	mg/L	T		ND	0.003	n/a
Dewatering Downstream	Receding Tide	Downgradient	06/13/18	7440-38-2	Arsenic	mg/L	T	0.0032		0.003	n/a
Dewatering Downstream	Receding Tide	Downgradient	06/26/18	7440-38-2	Arsenic	mg/L	T	0.0025		0.003	n/a
Dewatering Downstream	Receding Tide	Downgradient	07/10/18	7440-38-2	Arsenic	mg/L	T	0.0036		0.003	n/a
Dewatering Downstream	Receding Tide	Downgradient	07/25/18	7440-38-2	Arsenic	mg/L	T		ND	0.003	n/a
Dewatering Downstream	Receding Tide	Downgradient	08/01/18	7440-38-2	Arsenic	mg/L	T	0.0024		0.003	n/a
Dewatering Downstream	Receding Tide	Downgradient	08/09/18	7440-38-2	Arsenic	mg/L	T	0.0031		0.003	n/a
Dewatering Downstream	Receding Tide	Downgradient	09/10/18	7440-38-2	Arsenic	mg/L	T	0.0032		0.003	n/a
Dewatering Downstream	Receding Tide	Downgradient	09/26/18	7440-38-2	Arsenic	mg/L	T	0.0033		0.003	n/a
Dewatering Downstream	Receding Tide	Downgradient	10/09/18	7440-38-2	Arsenic	mg/L	T	0.0036		0.003	n/a
Dewatering Downstream	Receding Tide	Downgradient	10/24/18	7440-38-2	Arsenic	mg/L	T	0.0052		0.003	n/a
Dewatering Downstream	Receding Tide	Downgradient	11/08/18	7440-38-2	Arsenic	mg/L	T		ND	0.003	n/a
Dewatering Downstream	Receding Tide	Downgradient	11/27/18	7440-38-2	Arsenic	mg/L	T		ND	0.003	n/a
Dewatering Downstream	Receding Tide	Downgradient	12/06/18	7440-38-2	Arsenic	mg/L	T		ND	0.003	n/a
Dewatering Downstream	Receding Tide	Downgradient	12/13/18	7440-38-2	Arsenic	mg/L	T		ND	0.003	n/a
Dewatering Downstream	Receding Tide	Downgradient	01/08/19	7440-38-2	Arsenic	mg/L	T		ND	0.003	n/a
Dewatering Downstream	Receding Tide	Downgradient	01/23/19	7440-38-2	Arsenic	mg/L	T	0.0035		0.003	n/a
Dewatering Downstream	Receding Tide	Downgradient	02/05/19	7440-38-2	Arsenic	mg/L	T	0.0032		0.003	n/a
Dewatering Downstream	Receding Tide	Downgradient	02/19/19	7440-38-2	Arsenic	mg/L	T	0.0053		0.003	n/a
Dewatering Downstream	Receding Tide	Downgradient	03/07/19	7440-38-2	Arsenic	mg/L	T	0.0051		0.003	n/a
Dewatering Downstream	Receding Tide	Downgradient	03/20/19	7440-38-2	Arsenic	mg/L	T		ND	0.003	n/a
Dewatering Downstream	Receding Tide	Downgradient	04/09/19	7440-38-2	Arsenic	mg/L	T	0.0032		0.003	n/a
Dewatering Downstream	Receding Tide	Downgradient	04/18/19	7440-38-2	Arsenic	mg/L	T	0.0034		0.003	n/a
Dewatering Upstream	Receding Tide	Downgradient	12/20/16	7440-38-2	Arsenic	mg/L	T		ND	0.003	n/a
Dewatering Upstream	Receding Tide	Downgradient	01/11/17	7440-38-2	Arsenic	mg/L	T	0.0011		0.003	n/a
Dewatering Upstream	Receding Tide	Downgradient	02/08/17	7440-38-2	Arsenic	mg/L	T	0.0011		0.003	n/a
Dewatering Upstream	Receding Tide	Downgradient	03/06/17	7440-38-2	Arsenic	mg/L	T		ND	0.003	n/a
Dewatering Upstream	Receding Tide	Downgradient	04/11/17	7440-38-2	Arsenic	mg/L	T		ND	0.003	n/a
Dewatering Upstream	Receding Tide	Downgradient	05/08/17	7440-38-2	Arsenic	mg/L	T		ND	0.003	n/a

Appendix B-3
Surface Water Data (2016-2022)
McManus Risk Evaluation Report
McManus Former AP-1
Plant McManus, Glynn County, GA

Sample Location	Tide	Sample Designation	Date	CAS	Constituent	Unit	Fraction	Result	Flag	MDL	PQL
Dewatering Upstream	Receding Tide	Downgradient	06/13/17	7440-38-2	Arsenic	mg/L	T	0.0013		0.003	n/a
Dewatering Upstream	Receding Tide	Downgradient	07/10/17	7440-38-2	Arsenic	mg/L	T	0.0021		0.003	n/a
Dewatering Upstream	Receding Tide	Downgradient	08/07/17	7440-38-2	Arsenic	mg/L	T	0.0023		0.003	n/a
Dewatering Upstream	Receding Tide	Downgradient	09/20/17	7440-38-2	Arsenic	mg/L	T	0.0014		0.003	n/a
Dewatering Upstream	Receding Tide	Downgradient	10/09/17	7440-38-2	Arsenic	mg/L	T	0.0017		0.003	n/a
Dewatering Upstream	Receding Tide	Downgradient	11/08/17	7440-38-2	Arsenic	mg/L	T		ND	0.003	n/a
Dewatering Upstream	Receding Tide	Downgradient	12/05/17	7440-38-2	Arsenic	mg/L	T		ND	0.003	n/a
Dewatering Upstream	Receding Tide	Downgradient	01/25/18	7440-38-2	Arsenic	mg/L	T		ND	0.003	n/a
Dewatering Upstream	Receding Tide	Downgradient	02/14/18	7440-38-2	Arsenic	mg/L	T	0.0012		0.003	n/a
Dewatering Upstream	Receding Tide	Downgradient	03/06/18	7440-38-2	Arsenic	mg/L	T	0.0012		0.003	n/a
Dewatering Upstream	Receding Tide	Downgradient	04/04/18	7440-38-2	Arsenic	mg/L	T		ND	0.003	n/a
Dewatering Upstream	Receding Tide	Downgradient	05/02/18	7440-38-2	Arsenic	mg/L	T	0.001		0.003	n/a
Dewatering Upstream	Receding Tide	Downgradient	06/13/18	7440-38-2	Arsenic	mg/L	T		ND	0.003	n/a
Dewatering Upstream	Receding Tide	Downgradient	06/26/18	7440-38-2	Arsenic	mg/L	T	0.0036		0.003	n/a
Dewatering Upstream	Receding Tide	Downgradient	07/10/18	7440-38-2	Arsenic	mg/L	T		ND	0.003	n/a
Dewatering Upstream	Receding Tide	Downgradient	07/25/18	7440-38-2	Arsenic	mg/L	T		ND	0.003	n/a
Dewatering Upstream	Receding Tide	Downgradient	08/01/18	7440-38-2	Arsenic	mg/L	T	0.0025		0.003	n/a
Dewatering Upstream	Receding Tide	Downgradient	08/09/18	7440-38-2	Arsenic	mg/L	T		ND	0.003	n/a
Dewatering Upstream	Receding Tide	Downgradient	09/10/18	7440-38-2	Arsenic	mg/L	T		ND	0.003	n/a
Dewatering Upstream	Receding Tide	Downgradient	09/26/18	7440-38-2	Arsenic	mg/L	T	0.0033		0.003	n/a
Dewatering Upstream	Receding Tide	Downgradient	10/09/18	7440-38-2	Arsenic	mg/L	T	0.003		0.003	n/a
Dewatering Upstream	Receding Tide	Downgradient	10/24/18	7440-38-2	Arsenic	mg/L	T	0.0048		0.003	n/a
Dewatering Upstream	Receding Tide	Downgradient	11/08/18	7440-38-2	Arsenic	mg/L	T		ND	0.003	n/a
Dewatering Upstream	Receding Tide	Downgradient	11/27/18	7440-38-2	Arsenic	mg/L	T		ND	0.003	n/a
Dewatering Upstream	Receding Tide	Downgradient	12/06/18	7440-38-2	Arsenic	mg/L	T		ND	0.003	n/a
Dewatering Upstream	Receding Tide	Downgradient	12/13/18	7440-38-2	Arsenic	mg/L	T		ND	0.003	n/a
Dewatering Upstream	Receding Tide	Downgradient	01/08/19	7440-38-2	Arsenic	mg/L	T		ND	0.003	n/a
Dewatering Upstream	Receding Tide	Downgradient	01/23/19	7440-38-2	Arsenic	mg/L	T		ND	0.003	n/a
Dewatering Upstream	Receding Tide	Downgradient	02/05/19	7440-38-2	Arsenic	mg/L	T	0.0035		0.003	n/a
Dewatering Upstream	Receding Tide	Downgradient	02/19/19	7440-38-2	Arsenic	mg/L	T	0.0051		0.003	n/a
Dewatering Upstream	Receding Tide	Downgradient	03/07/19	7440-38-2	Arsenic	mg/L	T	0.0052		0.003	n/a
Dewatering Upstream	Receding Tide	Downgradient	03/20/19	7440-38-2	Arsenic	mg/L	T	0.0046		0.003	n/a
Dewatering Upstream	Receding Tide	Downgradient	04/09/19	7440-38-2	Arsenic	mg/L	T		ND	0.003	n/a
Dewatering Upstream	Receding Tide	Downgradient	04/18/19	7440-38-2	Arsenic	mg/L	T	0.0049		0.003	n/a
SWNW		Downgradient	06/29/18	7440-38-2	Arsenic	mg/L	T	0.0097	J	0.0057	0.05
T1-1HT	High	Downgradient	02/01/20	7440-38-2	Arsenic	mg/L	T	0.0016	J	0.0012	0.002
T1-1HT	High	Downstream	10/28/20	7440-38-2	Arsenic	mg/L	T	0.0022		0.0017	0.005
T1-1HT	High	Downstream	03/02/21	7440-38-2	Arsenic	mg/L	T		ND	0.0043	0.05
T1-1HT	High	Downstream	09/23/21	7440-38-2	Arsenic	mg/L	T	0.0027	J	0.0017	0.02
T1-1HT	High	Downstream	03/02/22	7440-38-2	Arsenic	mg/L	T		ND	0.0026	0.03
T1-1LT	Low	Downgradient	02/01/20	7440-38-2	Arsenic	mg/L	T		ND	0.0012	0.002
T1-1LT	Low	Downstream	10/27/20	7440-38-2	Arsenic	mg/L	T	0.0024		0.0017	0.005
T1-1LT	Low	Downstream	03/04/21	7440-38-2	Arsenic	mg/L	T		ND	0.0043	0.05
T1-1LT	Low	Downstream	09/30/21	7440-38-2	Arsenic	mg/L	T	0.0014	J	0.0013	0.015
T1-2HT	High	Downgradient	02/01/20	7440-38-2	Arsenic	mg/L	T		ND	0.0012	0.002
T1-2HT	High	Downstream	10/28/20	7440-38-2	Arsenic	mg/L	T	0.0023		0.0017	0.005
T1-2HT	High	Downstream	03/02/21	7440-38-2	Arsenic	mg/L	T		ND	0.0043	0.05
T1-2HT	High	Downstream	09/23/21	7440-38-2	Arsenic	mg/L	T	0.0025	J	0.0017	0.02
T1-2HT	High	Downstream	03/02/22	7440-38-2	Arsenic	mg/L	T		ND	0.0026	0.03
T1-2HTS	High	Downgradient	02/01/20	7440-38-2	Arsenic	mg/L	T		ND	0.0012	0.002
T1-2HTS	High	Downstream	10/28/20	7440-38-2	Arsenic	mg/L	T	0.0023		0.0017	0.005
T1-2HTS	High	Downstream	03/02/21	7440-38-2	Arsenic	mg/L	T	0.0084	J	0.0043	0.05
T1-2HTS	High	Downstream	09/23/21	7440-38-2	Arsenic	mg/L	T	0.0025	J	0.0017	0.02
T1-2HTS	High	Downstream	03/02/22	7440-38-2	Arsenic	mg/L	T		ND	0.0026	0.03
T1-2LT	Low	Downgradient	02/01/20	7440-38-2	Arsenic	mg/L	T		ND	0.0012	0.002
T1-2LT	Low	Downstream	10/27/20	7440-38-2	Arsenic	mg/L	T	0.0026		0.0017	0.005
T1-2LT	Low	Downstream	03/04/21	7440-38-2	Arsenic	mg/L	T		ND	0.0043	0.05
T1-2LT	Low	Downstream	09/30/21	7440-38-2	Arsenic	mg/L	T	0.0014	J	0.0013	0.015
T1-3HT	High	Downgradient	02/01/20	7440-38-2	Arsenic	mg/L	T		ND	0.0012	0.002
T1-3HT	High	Downstream	10/28/20	7440-38-2	Arsenic	mg/L	T	0.0024		0.0017	0.005
T1-3HT	High	Downstream	03/02/21	7440-38-2	Arsenic	mg/L	T		ND	0.0043	0.05
T1-3HT	High	Downstream	09/23/21	7440-38-2	Arsenic	mg/L	T	0.0021	J	0.0017	0.02
T1-3HT	High	Downstream	03/02/22	7440-38-2	Arsenic	mg/L	T		ND	0.0026	0.03
T1-3HTS	High	Downgradient	02/01/20	7440-38-2	Arsenic	mg/L	T		ND	0.0012	0.002
T1-3HTS	High	Downstream	10/28/20	7440-38-2	Arsenic	mg/L	T	0.0023		0.0017	0.005
T1-3HTS	High	Downstream	03/02/21	7440-38-2	Arsenic	mg/L	T		ND	0.0043	0.05
T1-3HTS	High	Downstream	09/23/21	7440-38-2	Arsenic	mg/L	T	0.0023	J	0.0017	0.02
T1-3HTS	High	Downstream	03/02/22	7440-38-2	Arsenic	mg/L	T		ND	0.0026	0.03
T1-3LT	Low	Downgradient	02/01/20	7440-38-2	Arsenic	mg/L	T		ND	0.0012	0.002

Appendix B-3
Surface Water Data (2016-2022)
McManus Risk Evaluation Report
McManus Former AP-1
Plant McManus, Glynn County, GA

Sample Location	Tide	Sample Designation	Date	CAS	Constituent	Unit	Fraction	Result	Flag	MDL	PQL
T1-3LT	Low	Downstream	10/27/20	7440-38-2	Arsenic	mg/L	T	0.0024		0.0017	0.005
T1-3LT	Low	Downstream	03/04/21	7440-38-2	Arsenic	mg/L	T	0.0068	J	0.0043	0.05
T1-3LT	Low	Downstream	09/30/21	7440-38-2	Arsenic	mg/L	T	0.0016	J	0.0013	0.015
T1-4HLT	High	Downstream	10/27/20	7440-38-2	Arsenic	mg/L	T	0.0026		0.0017	0.005
T1-4HT	High	Downgradient	02/01/20	7440-38-2	Arsenic	mg/L	T		ND	0.0012	0.002
T1-4HT	High	Downstream	10/28/20	7440-38-2	Arsenic	mg/L	T	0.0026		0.0017	0.005
T1-4HT	High	Downstream	03/02/21	7440-38-2	Arsenic	mg/L	T	0.012	J	0.0043	0.05
T1-4HT	High	Downstream	09/23/21	7440-38-2	Arsenic	mg/L	T	0.0022	J	0.0017	0.02
T1-4HT	High	Downstream	12/15/21	7440-38-2	Arsenic	mg/L	T		ND	0.0043	0.05
T1-4HT	High	Downstream	03/02/22	7440-38-2	Arsenic	mg/L	T		ND	0.0026	0.03
T1-4HT	High	Downstream	06/07/22	7440-38-2	Arsenic	mg/L	T	0.0049		0.0043	0.05
T1-4HT	High	Downstream	09/22/22	7440-38-2	Arsenic	mg/L	T	0.0027		0.0012	0.0013
T1-4HTS	High	Downgradient	02/01/20	7440-38-2	Arsenic	mg/L	T	0.0014	J	0.0012	0.002
T1-4HTS	High	Downstream	10/28/20	7440-38-2	Arsenic	mg/L	T	0.0025		0.0017	0.005
T1-4HTS	High	Downstream	03/02/21	7440-38-2	Arsenic	mg/L	T		ND	0.0043	0.05
T1-4HTS	High	Downstream	09/23/21	7440-38-2	Arsenic	mg/L	T	0.0021	J	0.0017	0.02
T1-4HTS	High	Downstream	12/15/21	7440-38-2	Arsenic	mg/L	T		ND	0.0043	0.05
T1-4HTS	High	Downstream	03/02/22	7440-38-2	Arsenic	mg/L	T		ND	0.0026	0.03
T1-4HTS	High	Downstream	06/07/22	7440-38-2	Arsenic	mg/L	T		ND	0.0043	0.05
T1-4HTS	High	Downstream	09/22/22	7440-38-2	Arsenic	mg/L	T	0.0023		0.0012	0.0013
T1-4LT	Low	Downgradient	02/01/20	7440-38-2	Arsenic	mg/L	T	0.0016	J	0.0012	0.002
T1-4LT	Low	Downstream	03/04/21	7440-38-2	Arsenic	mg/L	T		ND	0.0043	0.05
T1-4LT	Low	Downstream	09/30/21	7440-38-2	Arsenic	mg/L	T	0.0019	J	0.0013	0.015
T1-4LT	Low	Downstream	12/15/21	7440-38-2	Arsenic	mg/L	T		ND	0.0043	0.05
T1-4LT	Low	Downstream	03/01/22	7440-38-2	Arsenic	mg/L	T		ND	0.0026	0.03
T1-4LT	Low	Downstream	09/28/22	7440-38-2	Arsenic	mg/L	T		ND	0.006	0.0063
T2-1HT	High	Downgradient	02/01/20	7440-38-2	Arsenic	mg/L	T	0.0014		0.0012	0.002
T2-1HT	High	Downstream	10/28/20	7440-38-2	Arsenic	mg/L	T	0.0024		0.0017	0.005
T2-1HT	High	Downstream	03/02/21	7440-38-2	Arsenic	mg/L	T		ND	0.0043	0.05
T2-1HT	High	Downstream	09/23/21	7440-38-2	Arsenic	mg/L	T	0.002	J	0.0017	0.02
T2-1HT	High	Downstream	12/15/21	7440-38-2	Arsenic	mg/L	T		ND	0.0043	0.05
T2-1HT	High	Downstream	03/02/22	7440-38-2	Arsenic	mg/L	T		ND	0.0026	0.03
T2-1HT	High	Downstream	06/07/22	7440-38-2	Arsenic	mg/L	T		ND	0.0043	0.05
T2-1HT	High	Downstream	09/22/22	7440-38-2	Arsenic	mg/L	T	0.0027		0.0012	0.0013
T2-2HT	High	Downgradient	02/01/20	7440-38-2	Arsenic	mg/L	T	0.0019		0.0012	0.002
T2-2HT	High	Downstream	10/28/20	7440-38-2	Arsenic	mg/L	T	0.0024		0.0017	0.005
T2-2HT	High	Downstream	03/02/21	7440-38-2	Arsenic	mg/L	T		ND	0.0043	0.05
T2-2HT	High	Downstream	09/23/21	7440-38-2	Arsenic	mg/L	T	0.0032	J	0.0017	0.02
T2-2HT	High	Downstream	12/15/21	7440-38-2	Arsenic	mg/L	T		ND	0.0043	0.05
T2-2HT	High	Downstream	03/02/22	7440-38-2	Arsenic	mg/L	T		ND	0.0026	0.03
T2-2HT	High	Downstream	06/07/22	7440-38-2	Arsenic	mg/L	T		ND	0.0043	0.05
T2-2HT	High	Downstream	09/22/22	7440-38-2	Arsenic	mg/L	T	0.0025		0.0012	0.0013
T2-2HTS	High	Downgradient	02/01/20	7440-38-2	Arsenic	mg/L	T	0.0019		0.0006	0.001
T2-2HTS	High	Downstream	10/28/20	7440-38-2	Arsenic	mg/L	T	0.0025		0.0017	0.005
T2-2HTS	High	Downstream	03/02/21	7440-38-2	Arsenic	mg/L	T		ND	0.0043	0.05
T2-2HTS	High	Downstream	09/23/21	7440-38-2	Arsenic	mg/L	T	0.0024	J	0.0017	0.02
T2-2HTS	High	Downstream	12/15/21	7440-38-2	Arsenic	mg/L	T		ND	0.0043	0.05
T2-2HTS	High	Downstream	03/02/22	7440-38-2	Arsenic	mg/L	T		ND	0.0026	0.03
T2-2HTS	High	Downstream	06/07/22	7440-38-2	Arsenic	mg/L	T		ND	0.0043	0.05
T2-2HTS	High	Downstream	09/22/22	7440-38-2	Arsenic	mg/L	T	0.0028		0.0012	0.0013
T2-2LT	Low	Downgradient	02/02/20	7440-38-2	Arsenic	mg/L	T	0.0018		0.0012	0.002
T2-2LT	Low	Downstream	10/27/20	7440-38-2	Arsenic	mg/L	T	0.0033		0.0017	0.005
T2-2LT	Low	Downstream	03/04/21	7440-38-2	Arsenic	mg/L	T		ND	0.0043	0.05
T2-2LT	Low	Downstream	09/30/21	7440-38-2	Arsenic	mg/L	T	0.0016	J	0.0013	0.015
T2-3HT	High	Downgradient	02/01/20	7440-38-2	Arsenic	mg/L	T	0.0016	J	0.0012	0.002
T2-3HT	High	Downstream	10/28/20	7440-38-2	Arsenic	mg/L	T	0.0024		0.0017	0.005
T2-3HT	High	Downstream	03/02/21	7440-38-2	Arsenic	mg/L	T		ND	0.0043	0.05
T2-3HT	High	Downstream	09/23/21	7440-38-2	Arsenic	mg/L	T	0.0026	J	0.0017	0.02
T2-3HT	High	Downstream	12/15/21	7440-38-2	Arsenic	mg/L	T		ND	0.0043	0.05
T2-3HT	High	Downstream	03/02/22	7440-38-2	Arsenic	mg/L	T		ND	0.0026	0.03
T2-3HT	High	Downstream	06/07/22	7440-38-2	Arsenic	mg/L	T		ND	0.0043	0.05
T2-3HT	High	Downstream	09/22/22	7440-38-2	Arsenic	mg/L	T	0.003		0.0012	0.0013
T2-3HTS	High	Downgradient	02/01/20	7440-38-2	Arsenic	mg/L	T	0.0018	J	0.0012	0.002
T2-3HTS	High	Downstream	10/28/20	7440-38-2	Arsenic	mg/L	T	0.0024		0.0017	0.005
T2-3HTS	High	Downstream	03/02/21	7440-38-2	Arsenic	mg/L	T		ND	0.0043	0.05
T2-3HTS	High	Downstream	09/23/21	7440-38-2	Arsenic	mg/L	T	0.0023	J	0.0017	0.02
T2-3HTS	High	Downstream	12/15/21	7440-38-2	Arsenic	mg/L	T		ND	0.0043	0.05
T2-3HTS	High	Downstream	03/02/22	7440-38-2	Arsenic	mg/L	T		ND	0.0026	0.03
T2-3HTS	High	Downstream	06/07/22	7440-38-2	Arsenic	mg/L	T		ND	0.0043	0.05

Appendix B-3
Surface Water Data (2016-2022)
McManus Risk Evaluation Report
McManus Former AP-1
Plant McManus, Glynn County, GA

Sample Location	Tide	Sample Designation	Date	CAS	Constituent	Unit	Fraction	Result	Flag	MDL	PQL
T2-3HTS	High	Downstream	09/22/22	7440-38-2	Arsenic	mg/L	T	0.0024		0.0012	0.0013
T2-3LT	Low	Downgradient	02/02/20	7440-38-2	Arsenic	mg/L	T	0.002		0.0012	0.002
T2-3LT	Low	Downstream	10/27/20	7440-38-2	Arsenic	mg/L	T	0.0029		0.0017	0.005
T2-3LT	Low	Downstream	03/04/21	7440-38-2	Arsenic	mg/L	T		ND	0.0043	0.05
T2-3LT	Low	Downstream	09/30/21	7440-38-2	Arsenic	mg/L	T	0.0016	J	0.0013	0.015
T2-4HT	High	Downgradient	02/01/20	7440-38-2	Arsenic	mg/L	T	0.0016	J	0.0012	0.002
T2-4HT	High	Downstream	10/28/20	7440-38-2	Arsenic	mg/L	T	0.0026		0.0017	0.005
T2-4HT	High	Downstream	03/02/21	7440-38-2	Arsenic	mg/L	T		ND	0.0043	0.05
T2-4HT	High	Downstream	09/23/21	7440-38-2	Arsenic	mg/L	T	0.0019	J	0.0017	0.02
T2-4HT	High	Downstream	12/15/21	7440-38-2	Arsenic	mg/L	T		ND	0.0043	0.05
T2-4HT	High	Downstream	03/02/22	7440-38-2	Arsenic	mg/L	T		ND	0.0026	0.03
T2-4HT	High	Downstream	06/07/22	7440-38-2	Arsenic	mg/L	T		ND	0.0043	0.05
T2-4HT	High	Downstream	09/22/22	7440-38-2	Arsenic	mg/L	T	0.0027		0.0012	0.0013
T2-4HTS	High	Downgradient	02/01/20	7440-38-2	Arsenic	mg/L	T	0.0015	J	0.0012	0.002
T2-4HTS	High	Downstream	10/28/20	7440-38-2	Arsenic	mg/L	T	0.0025		0.0017	0.005
T2-4HTS	High	Downstream	03/02/21	7440-38-2	Arsenic	mg/L	T		ND	0.0043	0.05
T2-4HTS	High	Downstream	09/23/21	7440-38-2	Arsenic	mg/L	T	0.0019	J	0.0017	0.02
T2-4HTS	High	Downstream	12/15/21	7440-38-2	Arsenic	mg/L	T		ND	0.0043	0.05
T2-4HTS	High	Downstream	03/02/22	7440-38-2	Arsenic	mg/L	T		ND	0.0026	0.03
T2-4HTS	High	Downstream	06/07/22	7440-38-2	Arsenic	mg/L	T		ND	0.0043	0.05
T2-4HTS	High	Downstream	09/22/22	7440-38-2	Arsenic	mg/L	T	0.0025		0.0012	0.0013
T2-4LT	Low	Downgradient	02/02/20	7440-38-2	Arsenic	mg/L	T	0.0015	J	0.0012	0.002
T2-4LT	Low	Downstream	10/27/20	7440-38-2	Arsenic	mg/L	T	0.0026		0.0017	0.005
T2-4LT	Low	Downstream	03/04/21	7440-38-2	Arsenic	mg/L	T		ND	0.0043	0.05
T2-4LT	Low	Downstream	09/30/21	7440-38-2	Arsenic	mg/L	T		ND	0.0013	0.015
T2-4LT	Low	Downstream	12/15/21	7440-38-2	Arsenic	mg/L	T		ND	0.0043	0.05
T2-4LT	Low	Downstream	03/01/22	7440-38-2	Arsenic	mg/L	T		ND	0.0026	0.03
T2-4LT	Low	Downstream	09/28/22	7440-38-2	Arsenic	mg/L	T		ND	0.006	0.0063
T3-1HT	High	Downgradient	02/02/20	7440-38-2	Arsenic	mg/L	T	0.0018	J	0.0012	0.002
T3-1HT	High	Downstream	10/28/20	7440-38-2	Arsenic	mg/L	T	0.0021		0.0017	0.005
T3-1HT	High	Downstream	11/17/20	7440-38-2	Arsenic	mg/L	T	0.0019	J	0.0017	0.005
T3-1HT	High	Downstream	03/02/21	7440-38-2	Arsenic	mg/L	T		ND	0.0043	0.05
T3-1HT	High	Downstream	09/23/21	7440-38-2	Arsenic	mg/L	T	0.0022	J	0.0017	0.02
T3-1HT	High	Downstream	03/02/22	7440-38-2	Arsenic	mg/L	T		ND	0.0026	0.03
T3-2HT	High	Downgradient	02/02/20	7440-38-2	Arsenic	mg/L	T	0.0015	J	0.0012	0.002
T3-2HT	High	Downstream	10/28/20	7440-38-2	Arsenic	mg/L	T	0.0024		0.0017	0.005
T3-2HT	High	Downstream	11/17/20	7440-38-2	Arsenic	mg/L	T	0.0022	J	0.0017	0.005
T3-2HT	High	Downstream	03/02/21	7440-38-2	Arsenic	mg/L	T		ND	0.0043	0.05
T3-2HT	High	Downstream	09/23/21	7440-38-2	Arsenic	mg/L	T	0.0034	J	0.0017	0.02
T3-2HT	High	Downstream	03/02/22	7440-38-2	Arsenic	mg/L	T		ND	0.0026	0.03
T3-2HTS	High	Downgradient	02/02/20	7440-38-2	Arsenic	mg/L	T	0.0013	J	0.0012	0.002
T3-2HTS	High	Downstream	10/28/20	7440-38-2	Arsenic	mg/L	T	0.0023		0.0017	0.005
T3-2HTS	High	Downstream	11/17/20	7440-38-2	Arsenic	mg/L	T	0.0026	J	0.0017	0.005
T3-2HTS	High	Downstream	03/02/21	7440-38-2	Arsenic	mg/L	T		ND	0.0043	0.05
T3-2HTS	High	Downstream	09/23/21	7440-38-2	Arsenic	mg/L	T	0.0021	J	0.0017	0.02
T3-2HTS	High	Downstream	03/02/22	7440-38-2	Arsenic	mg/L	T		ND	0.0026	0.03
T3-2LT	Low	Downgradient	02/03/20	7440-38-2	Arsenic	mg/L	T	0.0029		0.0012	0.002
T3-2LT	Low	Downstream	10/27/20	7440-38-2	Arsenic	mg/L	T	0.0029		0.0017	0.005
T3-2LT	Low	Downstream	11/18/20	7440-38-2	Arsenic	mg/L	T	0.0023	J	0.0017	0.005
T3-2LT	Low	Downstream	03/04/21	7440-38-2	Arsenic	mg/L	T		ND	0.0043	0.05
T3-2LT	Low	Downstream	09/30/21	7440-38-2	Arsenic	mg/L	T	0.0015	J	0.0013	0.015
T3-3HT	High	Downgradient	02/02/20	7440-38-2	Arsenic	mg/L	T	0.0021		0.0012	0.002
T3-3HT	High	Downstream	10/28/20	7440-38-2	Arsenic	mg/L	T	0.0026		0.0017	0.005
T3-3HT	High	Downstream	11/17/20	7440-38-2	Arsenic	mg/L	T	0.0022	J	0.0017	0.005
T3-3HT	High	Downstream	03/02/21	7440-38-2	Arsenic	mg/L	T		ND	0.0043	0.05
T3-3HT	High	Downstream	09/23/21	7440-38-2	Arsenic	mg/L	T	0.0024	J	0.0017	0.02
T3-3HT	High	Downstream	03/02/22	7440-38-2	Arsenic	mg/L	T		ND	0.0026	0.03
T3-3HTS	High	Downgradient	02/02/20	7440-38-2	Arsenic	mg/L	T	0.0018	J	0.0012	0.002
T3-3HTS	High	Downstream	10/28/20	7440-38-2	Arsenic	mg/L	T	0.0024		0.0017	0.005
T3-3HTS	High	Downstream	11/17/20	7440-38-2	Arsenic	mg/L	T	0.002	J	0.0017	0.005
T3-3HTS	High	Downstream	03/02/21	7440-38-2	Arsenic	mg/L	T		ND	0.0043	0.05
T3-3HTS	High	Downstream	09/23/21	7440-38-2	Arsenic	mg/L	T	0.002	J	0.0017	0.02
T3-3HTS	High	Downstream	03/02/22	7440-38-2	Arsenic	mg/L	T		ND	0.0026	0.03
T3-3LT	Low	Downgradient	02/03/20	7440-38-2	Arsenic	mg/L	T	0.0018	J	0.0012	0.002
T3-3LT	Low	Downstream	10/27/20	7440-38-2	Arsenic	mg/L	T	0.0022		0.0017	0.005
T3-3LT	Low	Downstream	11/18/20	7440-38-2	Arsenic	mg/L	T	0.002	J	0.0017	0.005
T3-3LT	Low	Downstream	03/04/21	7440-38-2	Arsenic	mg/L	T		ND	0.0043	0.05
T3-3LT	Low	Downstream	09/30/21	7440-38-2	Arsenic	mg/L	T	0.0015	J	0.0013	0.015
T3-4HT	High	Downgradient	02/02/20	7440-38-2	Arsenic	mg/L	T	0.0018	J	0.0012	0.002

Appendix B-3
Surface Water Data (2016-2022)
McManus Risk Evaluation Report
McManus Former AP-1
Plant McManus, Glynn County, GA

Sample Location	Tide	Sample Designation	Date	CAS	Constituent	Unit	Fraction	Result	Flag	MDL	PQL
T3-4HT	High	Downstream	10/28/20	7440-38-2	Arsenic	mg/L	T	0.0025		0.0017	0.005
T3-4HT	High	Downstream	11/17/20	7440-38-2	Arsenic	mg/L	T	0.0024	J	0.0017	0.005
T3-4HT	High	Downstream	03/02/21	7440-38-2	Arsenic	mg/L	T		ND	0.0043	0.05
T3-4HT	High	Downstream	09/23/21	7440-38-2	Arsenic	mg/L	T	0.0022	J	0.0017	0.02
T3-4HT	High	Downstream	12/15/21	7440-38-2	Arsenic	mg/L	T		ND	0.0043	0.05
T3-4HT	High	Downstream	03/02/22	7440-38-2	Arsenic	mg/L	T		ND	0.0026	0.03
T3-4HT	High	Downstream	06/07/22	7440-38-2	Arsenic	mg/L	T		ND	0.0043	0.05
T3-4HT	High	Downstream	09/22/22	7440-38-2	Arsenic	mg/L	T	0.0027		0.0012	0.0013
T3-4HTS	High	Downgradient	02/02/20	7440-38-2	Arsenic	mg/L	T	0.0014	J	0.0012	0.002
T3-4HTS	High	Downstream	10/28/20	7440-38-2	Arsenic	mg/L	T	0.0027		0.0017	0.005
T3-4HTS	High	Downstream	11/17/20	7440-38-2	Arsenic	mg/L	T	0.0025	J	0.0017	0.005
T3-4HTS	High	Downstream	03/02/21	7440-38-2	Arsenic	mg/L	T		ND	0.0043	0.05
T3-4HTS	High	Downstream	09/23/21	7440-38-2	Arsenic	mg/L	T	0.0023	J	0.0017	0.02
T3-4HTS	High	Downstream	12/15/21	7440-38-2	Arsenic	mg/L	T		ND	0.0043	0.05
T3-4HTS	High	Downstream	03/02/22	7440-38-2	Arsenic	mg/L	T		ND	0.0026	0.03
T3-4HTS	High	Downstream	06/07/22	7440-38-2	Arsenic	mg/L	T		ND	0.0043	0.05
T3-4HTS	High	Downstream	09/22/22	7440-38-2	Arsenic	mg/L	T	0.0021		0.0012	0.0013
T3-4LT	Low	Downgradient	02/03/20	7440-38-2	Arsenic	mg/L	T	0.0012	J	0.0012	0.002
T3-4LT	Low	Downstream	10/27/20	7440-38-2	Arsenic	mg/L	T	0.0029		0.0017	0.005
T3-4LT	Low	Downstream	11/18/20	7440-38-2	Arsenic	mg/L	T	0.0026	J	0.0017	0.005
T3-4LT	Low	Downstream	03/04/21	7440-38-2	Arsenic	mg/L	T		ND	0.0043	0.05
T3-4LT	Low	Downstream	09/30/21	7440-38-2	Arsenic	mg/L	T		ND	0.0013	0.015
T3-4LT	Low	Downstream	12/15/21	7440-38-2	Arsenic	mg/L	T		ND	0.0017	0.02
T3-4LT	Low	Downstream	03/01/22	7440-38-2	Arsenic	mg/L	T		ND	0.0026	0.03
T3-4LT	Low	Downstream	09/28/22	7440-38-2	Arsenic	mg/L	T		ND	0.006	0.0063

Notes:

J - indicates an estimated value; detected between the laboratory MDL and PQL.
MDL - method detection limit
mg/L - milligrams per liter
n/a - not available
ND - not detected above the laboratory PQL
PQL - practical quantitation limit
T - Total
CAS - Chemical Abstract Service Number

Prepared by/Date: IMR 11/01/22
Checked by/Date: SBM 11/03/22

APPENDIX C

Support for Refined Groundwater Risk Evaluation

Appendix C-1

Exposure Point Concentration Calculation Results

Appendix C-1
Groundwater Exposure Point Calculation Details[1]
McManus Risk Evaluation Report
McManus Former AP-1
Plant McManus, Glynn County, GA

CCR Rule Designation	Constituent	Exposure Unit	Well IDs Included	Maximum Concentration (mg/L)	Detection Frequency	Exceedance Frequency	EPC Step 1 Individual Target Well(s) 2016-2022 (mg/L)	EPC Step 2 Target Well(s) & Downgradient / Adjacent Well(s) 2016-2022 (mg/L)	EPC Step 3 Farthest Downgradient Well(s) 2016-2022 (mg/L)
Appendix IV	Arsenic	North	MCM-06	0.51	24 / 24	23 / 24	0.38		
			MCM-06 DR-01 DR-02 PT-01 PT-02 PT-03	0.51	34 / 34	27 / 34		0.29	
			PT-01 PT-02 PT-03	0.047	6 / 6	2 / 6			0.036

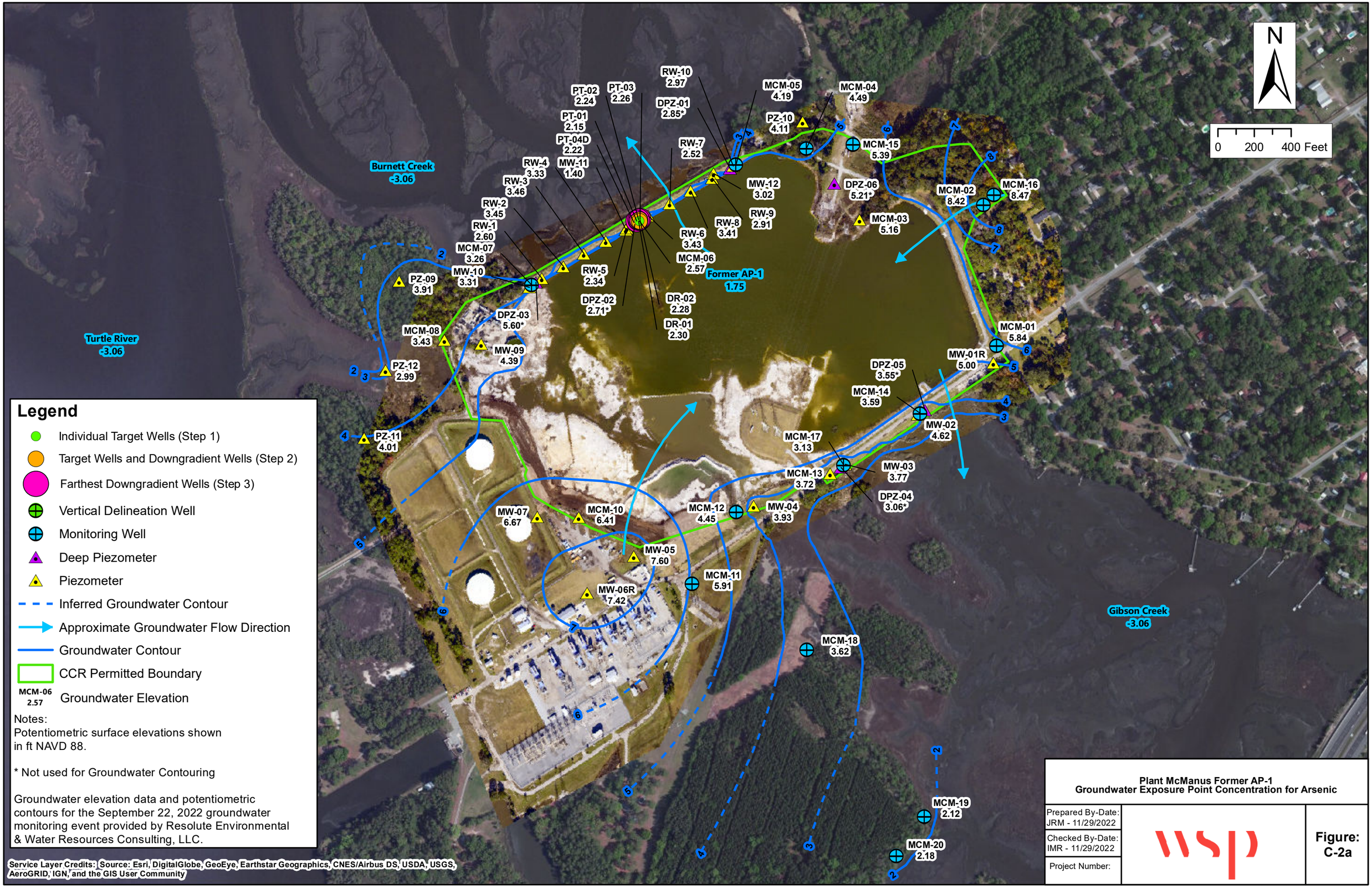
Notes:
Highlighted value is the EPC selected for the refined groundwater screening.
1 - EPCs calculated in accordance with USEPA, 2014. Memorandum for Determining Groundwater Exposure Point Concentrations, Supplemental Guidance. OSWER Directive 9283.1-42, February 2014. Located at https://cfpub.epa.gov/ncea/risk/recordisplay.cfm?deid=236917

Definitions:
EPC = Exposure Point Concentration
mg/L = milligrams per liter
CCR = Coal Combustion Residuals

Prepared by/Date: IMR 11/01/22
Checked by/Date: SBM 11/04/22

Appendix C-2

Groundwater Exposure Point Concentration Figures



Legend

- Individual Target Wells (Step 1)
- Target Wells and Downgradient Wells (Step 2)
- Farthest Downgradient Wells (Step 3)
- Vertical Delineation Well
- Monitoring Well
- Deep Piezometer
- Piezometer
- Inferred Groundwater Contour
- Approximate Groundwater Flow Direction
- Groundwater Contour
- CCR Permitted Boundary
- MCM-06 2.57 Groundwater Elevation

Notes:
Potentiometric surface elevations shown in ft NAVD 88.

* Not used for Groundwater Contouring

Groundwater elevation data and potentiometric contours for the September 22, 2022 groundwater monitoring event provided by Resolute Environmental & Water Resources Consulting, LLC.

Plant McManus Former AP-1
Groundwater Exposure Point Concentration for Arsenic

Prepared By-Date: JRM - 11/29/2022	Figure: C-2a
Checked By-Date: IMR - 11/29/2022	
Project Number:	

wsp

Legend

- Individual Target Wells (Step 1)
- Target Wells and Downgradient Wells (Step 2)
- Farthest Downgradient Wells (Step 3)
- Vertical Delineation Well
- Deep Piezometer
- Piezometer
- Approximate Groundwater Flow Direction
- Groundwater Contour
- CCR Permitted Boundary
- MCM-06 2.57 — Groundwater Elevation

Notes:
Potentiometric surface elevations shown in ft NAVD 88.

* Not used for Groundwater Contouring

Groundwater elevation data and potentiometric contours for the September 22, 2022 groundwater monitoring event provided by Resolute Environmental & Water Resources Consulting, LLC.

N

0 50 100 Feet

RW-9 2.91
RW-8 3.41
RW-7 2.52
RW-6 3.43
PT-03 2.26
PT-02 2.24
PT-01 2.15
PT-04D 2.22
DR-02 2.28
MCM-06 2.57
DR-01 2.30
RW-5 2.34
MW-11 1.40
DPZ-02 2.71*
RW-4 3.33
RW-3 3.46
3
4
5

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Plant McManus Former AP-1
Groundwater Exposure Point Concentration for Arsenic - Area of Interest

Prepared By-Date: JRM - 11/29/2022	wsp	**Figure: C-2b**
Checked By-Date: IMR - 11/29/2022		
Project Number:		

Appendix C-3

Groundwater ProUCL Input/Output Files

Appendix C-3a
Groundwater ProUCL Input - Arsenic
McManus Risk Evaluation Report
McManus Former AP-1
Plant McManus, Glynn County, GA

Step 1

Well(1)	Date(1)	As1	D_As1	
MCM-06	08/31/16	0.212		1
MCM-06	11/30/16	0.129		1
MCM-06	02/16/17	0.257		1
MCM-06	06/02/17	0.0559		1
MCM-06	08/17/17	0.458		1
MCM-06	06/20/18	0.44		1
MCM-06	09/27/18	0.27		1
MCM-06	11/07/18	0.5		1
MCM-06	03/06/19	0.49		1
MCM-06	03/26/19	0.3		1
MCM-06	07/02/19	0.37		1
MCM-06	08/28/19	0.5		1
MCM-06	10/17/19	0.34		1
MCM-06	03/28/20	0.3		1
MCM-06	06/16/20	0.51		1
MCM-06	08/26/20	0.46		1
MCM-06	10/14/20	0.45		1
MCM-06	03/04/21	0.35		1
MCM-06	09/14/21	0.51		1
MCM-06	03/01/22	0.24		1
MCM-06	06/28/22	0.17		1
MCM-06	09/20/22	0.18		1
MCM-6HighTide	09/21/16	0.258		1
MCM-6LowTide	09/21/16	0.0168		1

Step 2

Well(2)	Date(2)	As2	D_As2	
MCM-06	08/31/16	0.212		1
MCM-06	11/30/16	0.129		1
MCM-06	02/16/17	0.257		1
MCM-06	06/02/17	0.0559		1
MCM-06	08/17/17	0.458		1
MCM-06	06/20/18	0.44		1
MCM-06	09/27/18	0.27		1
MCM-06	11/07/18	0.5		1
MCM-06	03/06/19	0.49		1
MCM-06	03/26/19	0.3		1
MCM-06	07/02/19	0.37		1
MCM-06	08/28/19	0.5		1
MCM-06	10/17/19	0.34		1
MCM-06	03/28/20	0.3		1
MCM-06	06/16/20	0.51		1
MCM-06	08/26/20	0.46		1
MCM-06	10/14/20	0.45		1
MCM-06	03/04/21	0.35		1
MCM-06	09/14/21	0.51		1
MCM-06	03/01/22	0.24		1
MCM-06	06/28/22	0.17		1
MCM-06	09/20/22	0.18		1
MCM-6HighTide	09/21/16	0.258		1
MCM-6LowTide	09/21/16	0.0168		1
DR-01	06/28/22	0.077		1
DR-01	09/20/22	0.029		1
DR-02	06/28/22	0.0078		1
DR-02	09/20/22	0.036		1
PT-01	06/28/22	0.026		1
PT-01	09/20/22	0.035		1
PT-02	06/29/22	0.0019		1
PT-02	09/20/22	0.0094		1
PT-03	06/28/22	0.0011		1
PT-03	09/20/22	0.047		1

Step 3

Well(3)	Date(3)	As3	D_As3_MCM-5-6	
PT-01	06/28/22	0.026		1
PT-01	09/20/22	0.035		1
PT-02	06/29/22	0.0019		1
PT-02	09/20/22	0.0094		1
PT-03	06/28/22	0.0011		1
PT-03	09/20/22	0.047		1

Prepared by/Date: IMR 11/01/22
Checked by/Date: SBM 11/04/22

Notes:
1) Concentrations in units of mg/L.

Appendix C-3b
Groundwater ProUCL Output - Arsenic
McManus Risk Evaluation Report
McManus Former AP-1
Plant McManus, Glynn County, GA

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.2 11/2/2022 9:44:47 AM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

As1

General Statistics

Total Number of Observations	24	Number of Distinct Observations	21
		Number of Missing Observations	0
Minimum	0.0168	Mean	0.324
Maximum	0.51	Median	0.32
SD	0.149	Std. Error of Mean	0.0304
Coefficient of Variation	0.46	Skewness	-0.397

Normal GOF Test

Shapiro Wilk Test Statistic	0.933	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.884	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.158	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.205	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.376	95% Adjusted-CLT UCL (Chen-1995)	0.371
		95% Modified-t UCL (Johnson-1978)	0.375

Gamma GOF Test

A-D Test Statistic	1.064	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.752	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.155	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.179	Detected data appear Gamma Distributed at 5% Significance Level

Detected data follow Appr. Gamma Distribution at 5% Significance Level

Appendix C-3b
Groundwater ProUCL Output - Arsenic
McManus Risk Evaluation Report
McManus Former AP-1
Plant McManus, Glynn County, GA

Gamma Statistics

k hat (MLE)	2.774	k star (bias corrected MLE)	2.455
Theta hat (MLE)	0.117	Theta star (bias corrected MLE)	0.132
nu hat (MLE)	133.1	nu star (bias corrected)	117.8
MLE Mean (bias corrected)	0.324	MLE Sd (bias corrected)	0.207
		Approximate Chi Square Value (0.05)	93.76
Adjusted Level of Significance	0.0392	Adjusted Chi Square Value	92.25

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.407	95% Adjusted Gamma UCL	0.413

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.753	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.93	Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.207	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.162	Data Not Lognormal at 10% Significance Level	

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	-4.086	Mean of logged Data	-1.319
Maximum of Logged Data	-0.673	SD of logged Data	0.792

Assuming Lognormal Distribution

95% H-UCL	0.533	90% Chebyshev (MVUE) UCL	0.55
95% Chebyshev (MVUE) UCL	0.636	97.5% Chebyshev (MVUE) UCL	0.756
99% Chebyshev (MVUE) UCL	0.991		

Nonparametric Distribution Free UCL Statistics
Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.374	95% BCA Bootstrap UCL	0.37
95% Standard Bootstrap UCL	0.374	95% Bootstrap-t UCL	0.374
95% Hall's Bootstrap UCL	0.371	95% Percentile Bootstrap UCL	0.373
90% Chebyshev(Mean, Sd) UCL	0.415	95% Chebyshev(Mean, Sd) UCL	0.456
97.5% Chebyshev(Mean, Sd) UCL	0.513	99% Chebyshev(Mean, Sd) UCL	0.626

Suggested UCL to Use

Appendix C-3b
Groundwater ProUCL Output - Arsenic
McManus Risk Evaluation Report
McManus Former AP-1
Plant McManus, Glynn County, GA

95% Student's-t UCL	0.376

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.

As2

General Statistics

Total Number of Observations	34	Number of Distinct Observations	31
		Number of Missing Observations	0
Minimum	0.0011	Mean	0.236
Maximum	0.51	Median	0.249
SD	0.185	Std. Error of Mean	0.0318
Coefficient of Variation	0.784	Skewness	0.135

Normal GOF Test

Shapiro Wilk Test Statistic	0.88	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.908	Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.158	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.175	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	0.29	95% Adjusted-CLT UCL (Chen-1995)	0.289
		95% Modified-t UCL (Johnson-1978)	0.29

Gamma GOF Test

A-D Test Statistic	1.4	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.785	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.18	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.157	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

Appendix C-3b
Groundwater ProUCL Output - Arsenic
McManus Risk Evaluation Report
McManus Former AP-1
Plant McManus, Glynn County, GA

k hat (MLE)	0.815	k star (bias corrected MLE)	0.762
Theta hat (MLE)	0.29	Theta star (bias corrected MLE)	0.31
nu hat (MLE)	55.4	nu star (bias corrected)	51.85
MLE Mean (bias corrected)	0.236	MLE Sd (bias corrected)	0.271
		Approximate Chi Square Value (0.05)	36.31
Adjusted Level of Significance	0.0422	Adjusted Chi Square Value	35.66

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.338	95% Adjusted Gamma UCL	0.344

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.826	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.943	Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.212	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.137	Data Not Lognormal at 10% Significance Level	

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	-6.812	Mean of logged Data	-2.169
Maximum of Logged Data	-0.673	SD of logged Data	1.663

Assuming Lognormal Distribution

95% H-UCL	1.205	90% Chebyshev (MVUE) UCL	0.887
95% Chebyshev (MVUE) UCL	1.1	97.5% Chebyshev (MVUE) UCL	1.396
99% Chebyshev (MVUE) UCL	1.976		

Nonparametric Distribution Free UCL Statistics
Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.289	95% BCA Bootstrap UCL	0.285
95% Standard Bootstrap UCL	0.287	95% Bootstrap-t UCL	0.288
95% Hall's Bootstrap UCL	0.286	95% Percentile Bootstrap UCL	0.288
90% Chebyshev(Mean, Sd) UCL	0.332	95% Chebyshev(Mean, Sd) UCL	0.375
97.5% Chebyshev(Mean, Sd) UCL	0.435	99% Chebyshev(Mean, Sd) UCL	0.553

Suggested UCL to Use

95% Student's-t UCL	0.29

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 C-3b
Groundwater ProUCL Output - Arsenic
McManus Risk Evaluation Report
McManus Former AP-1
Plant McManus, Glynn 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.

As3

General Statistics

Total Number of Observations	6	Number of Distinct Observations	6
		Number of Missing Observations	0
Minimum	0.0011	Mean	0.0201
Maximum	0.047	Median	0.0177
SD	0.0189	Std. Error of Mean	0.00772
Coefficient of Variation	0.942	Skewness	0.402

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	0.907	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.713	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.214	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.373	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	0.0356	95% Adjusted-CLT UCL (Chen-1995)	0.0341
		95% Modified-t UCL (Johnson-1978)	0.0358

Gamma GOF Test

A-D Test Statistic	0.357	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.719	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.229	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.343	Detected data appear Gamma Distributed at 5% Significance Level

Appendix C-3b
Groundwater ProUCL Output - Arsenic
McManus Risk Evaluation Report
McManus Former AP-1
Plant McManus, Glynn County, GA

Detected data appear Gamma Distributed at 5% Significance Level
Note GOF tests may be unreliable for small sample sizes

Gamma Statistics

k hat (MLE)	0.816	k star (bias corrected MLE)	0.519
Theta hat (MLE)	0.0246	Theta star (bias corrected MLE)	0.0387
nu hat (MLE)	9.791	nu star (bias corrected)	6.229
MLE Mean (bias corrected)	0.0201	MLE Sd (bias corrected)	0.0279
		Approximate Chi Square Value (0.05)	1.758
Adjusted Level of Significance	0.0122	Adjusted Chi Square Value	1.033

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.0711	95% Adjusted Gamma UCL	0.121

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.882	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.826	Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.233	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.298	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	-6.812	Mean of logged Data	-4.634
Maximum of Logged Data	-3.058	SD of logged Data	1.582

Assuming Lognormal Distribution

95% H-UCL	2.672	90% Chebyshev (MVUE) UCL	0.0685
95% Chebyshev (MVUE) UCL	0.0885	97.5% Chebyshev (MVUE) UCL	0.116
99% Chebyshev (MVUE) UCL	0.171		

Nonparametric Distribution Free UCL Statistics
Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.0328	95% BCA Bootstrap UCL	0.0332
95% Standard Bootstrap UCL	0.0318	95% Bootstrap-t UCL	0.0379
95% Hall's Bootstrap UCL	0.0316	95% Percentile Bootstrap UCL	0.0319
90% Chebyshev(Mean, Sd) UCL	0.0432	95% Chebyshev(Mean, Sd) UCL	0.0537
97.5% Chebyshev(Mean, Sd) UCL	0.0683	99% Chebyshev(Mean, Sd) UCL	0.0969

Appendix C-3b
Groundwater ProUCL Output - Arsenic
McManus Risk Evaluation Report
McManus Former AP-1
Plant McManus, Glynn County, GA

Suggested UCL to Use

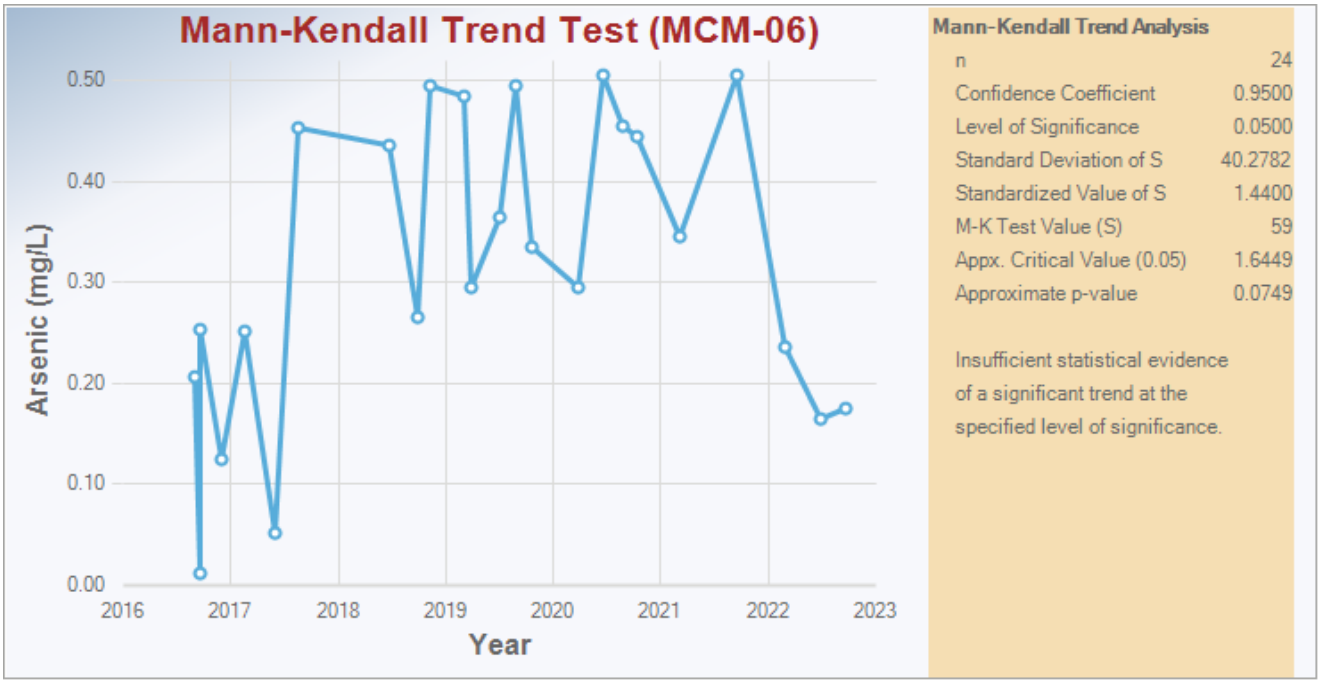
95% Student's-t UCL	0.0356

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.

Appendix C-4

Groundwater Trend Graphs

Appendix C-4
Groundwater Mann-Kendall Trend Graphs
McManus Risk Evaluation Report
McManus Former AP-1
Plant McManus, Glynn County, GA



Mann-Kendall Trend Analysis

n	24
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	40.2782
Standardized Value of S	1.4400
M-K Test Value (S)	59
Appx. Critical Value (0.05)	1.6449
Approximate p-value	0.0749

Insufficient statistical evidence of a significant trend at the specified level of significance.

Prepared by/Date: LO 11/03/22
Checked by/Date: IMR 11/03/22

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