Assessment of Corrective Measures Report

Plant McIntosh Former Ash Pond 1, Rincon, Georgia

May 16, 2025

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CERTIFICATION STATEMENT

I, Geoffrey Gay, am a professional engineer and licensed in the State of Georgia. I hereby certify that this *Assessment of Corrective Measures Report, Georgia Power Company – Plant McIntosh Ash Pond 1 (AP-1)* 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 3913-4-.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.

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Acronyms and Abbreviations

ACC	Atlantic Coast Consulting, Inc.
ACM	Assessment of Corrective Measures
AP	ash pond
ASD	Alternative Source Demonstration
CCR	Coal Combustion Residuals
CFR	Code of Federal Regulations
ft bgs	feet below ground surface
GAEPD	Georgia Environmental Protection Division
GWPS	Groundwater Protection Standard
HAR	Hydrogeologic Assessment Report
ISI	in situ injection
ISS	in situ stabilization
ITRC	Interstate Technology Regulatory Council
LDA	large-diameter auger
mg/L	milligram per liter
MNA	monitored natural attenuation
NAVD88	North American Vertical Datum of 1988
O&M	operation and maintenance
PRB	permeable reactive barrier
P&T	pump and treat
SSL	statistically significant level
USGS	U.S. Geological Survey
USEPA	United States Environmental Protection Agency

1 Introduction

In accordance with the United States Environmental Protection Agency (USEPA) Coal Combustion Residuals (CCR) Rule (40 Code of Federal Regulations [CFR] Part 257 Subpart D) and the Georgia Environmental Protection Division (GAEPD) Rules of Solid Waste Management 391-3-4-.10, Arcadis U.S. Inc. (Arcadis) has prepared this assessment of corrective measures (ACM) report for Georgia Power Company's (Georgia Power's) Plant McIntosh Ash Pond (AP)-1 (the Site). As required by 40 CFR § 257.96 and GAEPD Rule 391-3-4-.10(6)(a), this ACM evaluates potential corrective measures to address a statistically significant level (SSL) of lithium in one monitoring well (MGWC-7) associated with the groundwater monitoring network at AP-1 (Atlantic Coast Consulting, Inc. [ACC] 2025).

An Alternate Source Demonstration (ASD) was submitted to GAEPD for Plant McIntosh AP-1 in January 2019 and supplemental information in November 2019, demonstrating that lithium in groundwater was not due to a release from the unit. GAEPD provided a letter of non-concurrence on September 20, 2024. Following this correspondence, Georgia Power initiated the ACM for AP-1 on December 19, 2024. Data from two assessment piezometers show that lithium is both vertically and horizontally delineated and contained within the property boundary (ACC 2025). This ACM Report is the first step in identifying viable corrective measures to address the SSL in groundwater at MGWC-7. Based on the results of the ACM, further evaluation may be performed, site-specific studies completed, and a corrective action plan developed and implemented pursuant to 40 CFR §§ 257.97 and 257.98.

Georgia Power conducted a human health and ecological risk evaluation of lithium (the constituent that exhibits an SSL in groundwater) at former AP-1. The risk evaluation used a conservative, health-protective approach that is consistent with USEPA risk assessment guidance, GAEPD regulations and guidance, and standard practice for risk assessment in the State of Georgia. As part of the risk evaluation, a well survey of potential groundwater wells within a 3-mile radius of former AP-1 was conducted in 2020 and consisted of reviewing federal, state, and county records and online sources in addition to conducting a windshield survey of the area. An updated survey of water wells was conducted in 2025 within a two-mile radius from the site. The findings are consistent with the previous well survey and potable wells identified within the 2-mile radius are shown on Figure 1 of Appendix A of the attached Risk Evaluation Report (Geosyntec 2025). A current Environmental Data Resources (EDR) GeoCheck® Report along with the Risk Evaluation Report (Geosyntec 2025) are included in **Appendix A.** The risk evaluation provided in **Appendix A** relied on groundwater data collected by Georgia Power from 2016 through February 2025 in compliance with the federal and state CCR rules. Based on the results from this risk evaluation, which included multiple conservative assumptions, concentrations of lithium detected in groundwater at former AP-1 are not expected to pose a risk to human health or the environment.

1.1 Purpose

The purpose of this ACM for Plant McIntosh former AP-1 is to begin selecting technically feasible groundwater corrective measure(s) to address SSLs of lithium at the Site. This process is typically iterative and may comprise multiple steps to analyze the effectiveness of corrective measures to address the potential migration of CCR constituents in groundwater at former AP-1.

Once potential corrective measures are identified in this ACM, they are further evaluated using the criteria outlined in 40 CFR § 257.96(c), which state that corrective measures assessments should include an analysis of the effectiveness of potential corrective measures that considers the following:

- Performance;
- Reliability;
- Ease of implementation;
- Potential impacts of the remedy (including safety, cross-media, and exposure);
- Time required to begin and complete the remedy; and
- Any institutional requirements (e.g., permitting or environmental and public health requirements) that could affect implementation of the remedy.

These evaluation criteria are considered for each potential corrective measure. Further evaluation of the technologies will be required for final selection of a corrective measure(s).

1.2 Site Location and Description

Plant McIntosh is an electrical power generation plant located in Effingham County, Georgia, approximately 4 miles northeast of the City of Rincon and 20 miles north of the City of Savannah (**Figure 1**). The physical address of the Site is 981 Old Augusta Road Central, Rincon, GA 31326. The plant property is situated on the west bank of the Savannah River at Big Kiffer Point. AP-1 is located on the eastern portion of the Site, approximately 0.5 mile west of the Savannah River and approximately 0.75 mile south of Lockner Creek.

The facility was originally constructed in the late 1960s and early 1970s and power generation began in 1978. The generation facility consisted of one coal-fired unit and eight simple-cycle combustion turbine generators. In 1982, the steam unit, which was originally designed to burn fuel oil, was converted to burn coal. AP-1 was constructed in conjunction with this conversion and was used to store CCR produced during the electric generating process at the Site until it ceased operations in April 2019. Before closure, AP-1 was subdivided into four cells: three cells that served as storage and settling cells (Cells A, B, and C) and one cell as a clear pond (Cell D). The footprint of AP-1 is shown on **Figure 2.**

1.3 Pond Closure

AP-1 ceased receipt of CCR and all waste streams on April 17, 2019. Georgia Power closed AP-1 by dewatering and removing the CCR material. CCR removal has been certified as complete, and the area has been graded and restored. The closure of AP-1 in this manner provides source control that reduces the potential for migration of CCR constituents to groundwater. In a letter dated October 5, 2021, GA EPD acknowledged that all CCR removal had been completed at the Site. Corrective measures discussed in this ACM Report are being evaluated to address an SSL remaining in groundwater at the compliance boundary of AP-1.

2 Conceptual Site Model

The following section summarizes the geologic and hydrogeologic conditions at Plant McIntosh as described in the Hydrogeologic Assessment Report Revision 01 – Plant McIntosh Ash Pond 1 (AP-1) (HAR Rev 01) submitted to GAEPD in December 2019 to provide information regarding the hydrogeologic conditions and the groundwater monitoring well network (**Figure 2**) associated with AP-1 (GEI 2019). Additional details regarding the hydrogeologic conditions in the vicinity of AP-1 are provided in the HAR Rev 01 (GEI 2019).

2.1 Site Geology

Plant McIntosh is located within the Coastal Plain Physiographic Province of Georgia. Coastal Plain sediments are composed of stratified clay, silt, and sand, resting on much older igneous and metamorphic basement rocks. These older, crystalline rocks dip to the south and east, causing the overlying sediments to form a wedge-shaped deposit, which is thickest to the east and the south. The Coastal Plain deposits crop out at the land surface in bands, from the oldest to the most recent, from the fall line separating it from the Piedmont Region to the coast. Pleistocene-aged deposits are at the surface in this region (GEI 2019).

AP-1 is situated on sediments deposited from the Cretaceous to Pleistocene periods that consist of stratified marine deposits and materials alluvially transported from crystalline rock of the Piedmont Region. Boring logs describe soils at AP-1 as interbedded clay, silt, and sand typical of Coastal Plain sediments and can be seen in the vicinity of MGWC-7 on **Figure 3 – Geologic Cross Section**.

AP-1 is underlain primarily by four lithologic units: (i) Surficial – lean clay with sand and silts with varying degrees of organic material (compacted clay fill material in and around AP-1), (ii) Reddish Clays – with occasional interbedded sands and silts, (iii) Sands – with occasional clay and silt lenses and where site monitoring wells and piezometers are primarily screened, and (iv) Silts – exhibiting slight to moderate plasticity with occasional interbedded sands. The lower limit of the Silt unit has not been established because drilling was terminated within the Silt unit at approximately -18 feet NAVD88 (GEI 2019). The lithologic units in the vicinity of MGWC-7 are shown on **Figure 3**.

2.2 Hydrogeology

The two relevant aquifers in which the Site is located are the surficial and the Floridan aquifers. The aquifers are primarily sand, but these aquifers also contain some beds of gravel and limestone. The surficial aquifer system in the area of the Site is typically less than 50 feet thick, is unconfined, and mostly discharges as baseflow into streams and rivers. Below this surficial aquifer system lies the upper confining unit of the Floridan aquifer system. In the area of the Site, the Floridan aquifer system is confined, and the upper confining unit is generally thicker than 100 feet (GEI 2019).

The shallowest aquifer commonly used for drinking water in the area is the Upper Floridan, which is a confined aquifer and exists at depths of 300 to 400 feet below ground surface (ft bgs) in the Rincon, Georgia area. The Upper Floridan is separated from the surficial aquifer by the Hawthorn Formation, which is an extensive 200- to 250-foot-thick Miocene-aged confining unit. A confining unit below the Upper Floridan extends to depths of around 575 ft bgs. The Lower Floridan aquifer then extends from approximately 575 ft bgs to almost 900 ft bgs (U.S. Geological Survey [USGS] 2015). Recharge to the major aquifers in the area is to the northwest of the Site, where these formations outcrop (Clarke et al. 1999). The uppermost aquifer at the Site is the unconfined surficial aquifer, characterized by silty, sandy clays, clayey silts, silty sands, and fine- to medium-grained sands. The aquifer is regionally recharged from infiltration of precipitation (GEI 2019).

According to the 2024 Annual Groundwater Monitoring and Corrective Action Report (ACC 2025), the groundwater at the Site predominantly flows from west to east with a calculated flow velocity of 0.042 foot per day. **Figure 4** shows the Potentiometric Surface Map for the first half of 2025. Depth to water averages approximately 22 ft bgs, with elevations ranging from 21.48 feet NAVD88 to 47.80 feet NAVD88. The thickness of the surficial aquifer has not been measured in on-site borings but is anticipated to exhibit wide variations in thickness (from 60 to 440 feet) based on studies in the southeastern coastal area. As indicated in the HAR (GEI 2019), the Sand lithological unit would exhibit the greatest groundwater production rates within the site surficial aquifer.

As discussed in Section 1.3, AP-1 ceased operating in April 2019 and was subsequently closed by dewatering and removing the CCR material. Compared to more recent groundwater flow directions, such as those observed during February 2025 shown on **Figure 4**, the groundwater flow was historically more northeasterly from MGWC-7 to MGWC-20 prior to AP-1 closure, as illustrated on Figure 6 of the HAR Rev 01 (GEI 2019), included herein as **Appendix B**.

3 Nature and Extent of Appendix IV Constituents

Monitoring-related field assessment performed in support of delineating the nature and extent of the SSL in groundwater and evaluating potential corrective measures are described below.

3.1 Groundwater Monitoring and Constituents of Concern

3.1.1 Groundwater Monitoring Program

A groundwater monitoring network established for the Site in accordance with 40 CFR § 257.91 was certified by a Professional Engineer on October 17, 2017. The certified compliance monitoring well network for AP-1 consists of a sufficient number of detection monitoring wells (11 total) installed at appropriate locations and depths to yield groundwater samples from the uppermost aquifer to represent the groundwater quality both upgradient of AP-1 (background conditions) and passing the waste boundary of AP-1. The number, spacing, and depths of the groundwater monitoring wells were selected based on the characterization of site-specific hydrogeologic conditions.

As part of the assessment program, assessment monitoring wells and piezometers were installed to characterize the nature and extent of constituents of interest concentrations in groundwater downgradient of AP-1. Pursuant to 40 CFR § 257.95(g)(1)(iv), the monitoring wells will continue to be sampled semiannually as part of the ongoing assessment groundwater monitoring program. The locations of the monitoring wells are shown on **Figure 2**; well and piezometer construction details are listed in **Table 1.**

3.1.2 Statistically Significant Levels of Appendix IV Constituents

Groundwater monitoring data collected from the February 2025 semiannual assessment monitoring event are provided in **Table 2**. Results from this monitoring event will be compared to the Groundwater Protection Standards (GWPSs) for each parameter established under 40 CFR § 257.95(h) and GAEPD Rule 391-3-4-.10(6)(a) (**Table 3**). Lithium at monitoring well MGWC-7 was identified as an SSL in the second half of 2024 statistical evaluation (ACC 2025). This area is also monitored by MGWC-8, which is sampled semiannually, and has never had an SSL of lithium.

3.2 Assessment of SSL Constituents

Pursuant to 40 CFR § 257.96, groundwater in the vicinity of AP-1 continues to be monitored during the ACM phase in accordance with the assessment monitoring program established for the CCR unit in 2018. Assessment monitoring wells MGWC-19 (collocated with MGWC-7) and MGWC-20 were installed in October 2018 to provide additional data for characterizing groundwater flow conditions downgradient of AP-1. Detailed boring and well construction logs for these assessment piezometers were provided in the HAR Rev 01 submitted in December 2019 (GEI 2019). The locations of these assessment wells are shown on **Figure 2,** and well construction details are also provided in **Table 1**.

Groundwater samples were collected from the detection and assessment wells in February 2025 and analyzed for the complete lists of Appendix III and IV parameters per 40 CFR § 257.95(b). The groundwater analytical results from these events are summarized in **Table 2**. Laboratory reports associated with the February 2025 results will be provided in the 2025 Semiannual Groundwater and Corrective Action Monitoring Report. The February 2025 assessment monitoring results horizontally and vertically delineate the SSL for lithium in groundwater proximal to MGWC-7. MGWC-19 was used for vertical delineation, and MGWC-20 was used for horizontal delineation of lithium above the GWPS of 0.04 milligram per liter (mg/L) at detection well MGWC-7. The lithium is confined to the uppermost aquifer and is contained within the property boundary. An iso-concentration map illustrating delineation for the lithium concentration observed in MGWC-7 is provided on **Figure 5**. In addition, a cross-section along the groundwater flow direction in this area of interest are provided on **Figure 3.**

Groundwater samples were collected in December 2024 and February 2025 from MGWC-19 and MGWC-20 to assess delineation of the lithium SSL observed in MGWC-7 at AP-1 and concentrations were below the 0.04 mg/L GWPS.

4 Groundwater Corrective Measures Alternatives

4.1 Objectives of the Corrective Measures

The effectiveness of potential corrective measures was evaluated using the criteria listed in 40 CFR § 257.96(c) including performance, reliability, ease of implementation, potential impacts, time required, and institutional and public health requirements. The following criteria listed in 40 CFR § 257.97(b) must be met by the corrective measure when selected:

- Be protective of human health and the environment;
- Attain applicable GWPSs as specified pursuant to 40 CFR § 257.96(h);
- Control the sources of releases to reduce or eliminate, to the maximum extent feasible, further releases of Appendix IV constituents to the environment;
- Remove from the environment as much of the contaminated material released from the CCR unit as is feasible taking into account factors such as avoiding inappropriate disturbance of sensitive ecosystems;
- Comply with standards for management of CCR as specified in 40 CFR § 257.98(d).

Corrective measures selected for evaluation herein for potential use at AP-1 are anticipated to satisfy the criteria detailed above to varying degrees of effectiveness.

4.2 Summary of Potential Corrective Measures

The closure of AP-1 via removal of CCR materials (as described in Section 1.3) is a source control measure that reduces the potential for migration of CCR constituents to groundwater. Corrective measures discussed in this ACM are being evaluated to address the SSL in groundwater at and downgradient of the compliance boundary.

This section presents potential corrective measures capable of remediating lithium (the Appendix IV groundwater constituent) at AP 1. Each corrective measure is evaluated relative to criteria specified in 40 CFR §§ 257.96(c) and 257.97(b). **Table 4** provides a comparative screening of the corrective measures discussed in Section 4.

The following potential corrective measures are considered in this ACM:

- Geochemical Approaches (In Situ Injection);
- In Situ Stabilization/Solidification (ISS);
- Hydraulic Containment (Pump and Treat or P&T);
- Monitored Natural Attenuation (MNA);
- Permeable Reactive Barrier (PRB);
- Phytoremediation; and
- Subsurface Vertical Barrier Walls.

ISS, also known as deep soil mixing, is a method for solidifying soil, thus immobilizing constituents of interest in the solid matrix. ISS technology was not retained, as it is less effective or not applicable to dilute concentrations of lithium in groundwater beyond the facility boundary compared to other options being evaluated. As such, no detailed evaluation on ISS is provided in **Table 4**.

4.2.1 Geochemical Approaches (In Situ Injection)

In situ injections (ISI) is the application of reagents, in various modes, to the subsurface to influence the solubility, mobility, and/or toxicity of inorganic constituents. Although lithium is generally a conservative inorganic species under many environmental conditions, zero-valent iron and carbonate reagents, among others, could potentially be used to immobilize lithium through adsorption and/or co-precipitation. This would be achieved through the creation of in situ reactive zones in which lithium is immobilized as groundwater passes through.

ISI for lithium is not well understood, and further testing at the bench scale would be required to determine the efficacy of this treatment for lithium removal. The geology in the vicinity of MGWC-7 (composed of sands and silty sands) is amenable to ISI. However, effective delivery of amendment compounds in the subsurface would require field pilot testing. This technology is a potentially viable corrective measure and will be retained for further evaluation.

4.2.2 Hydraulic Containment (Pump and Treat)

Hydraulic control/containment (P&T) uses groundwater extraction to establish a hydraulic gradient to capture and control the migration of groundwater impacted by a constituent of concern. P&T uses extraction wells or trenches to capture groundwater and typically requires a degree of aboveground treatment to remove target analytes and/or prevent constituent migration before water can be discharged to a receiving water body, sewer system, or reinjected to the aquifer. Groundwater P&T can be effective as an interim measure or combined with another measure to provide hydraulic containment to limit constituent migration toward a potential receptor. Groundwater P&T can often take an extended period of continuous operations to restore groundwater quality.

Groundwater extraction for hydraulic control can often effectively address the variety of inorganic constituents encountered at CCR sites including lithium. P&T can be used as a stand-alone remedy, although it is also compatible with the other groundwater corrective actions that are potentially viable for the AP-1. The fact that treatment occurs ex-situ allows for wider control on design components including mixing and contact time with reagents. Space for a treatment building and conveyance need to be considered. This technology is a potentially viable corrective measure and will be retained for further evaluation.

4.2.3 Monitored Natural Attenuation

MNA is defined as the reliance on natural attenuation processes (within the context of a carefully controlled and monitored site cleanup approach) to achieve site-specific remediation objectives within a timeframe that is reasonable compared to that offered by other more active methods (USEPA 2007). The processes by which MNA can occur include physical, chemical, or biological processes that can act without human intervention to reduce the mass, toxicity, mobility, volume, or concentration of contaminants in soil or groundwater. Examples of in situ MNA processes for inorganic constituents such as lithium include sorption, ion exchange, dispersion, and dilution. MNA can be applied both as a stand-alone strategy or as a polishing step coupled with other technologies.

According to USEPA guidance (2015), a four-tiered approach should be used to establish whether MNA can be successfully implemented at a given site. The tiers include the following (USEPA 1999, 2007):

1. Demonstrate that the groundwater plume (area of affected groundwater) is not expanding.
2. Determine that the mechanisms and rates of attenuation are sufficient.
3. Determine whether the capacity of the aquifer is sufficient to attenuate the mass of constituents in groundwater such that the immobilized constituents are stable and will not remobilize.
4. Design a performance monitoring program based on the mechanisms of attenuation and establish contingency remedies (tailored to site-specific conditions) should MNA not perform adequately.

Lithium is characterized as a highly soluble, generally conservative compound, and success of removal via chemical attenuation processes may be limited. Lithium concentrations above GWPS at MGWC-7 potentially result from desorption of lithium caused by the arrival of elevated concentrations of cations (particularly sodium) from AP-1 impacted groundwater. However, even under current conditions, attenuation processes for lithium are already occurring, as evidenced by groundwater data from assessment wells, which indicates reduction in lithium concentrations to below GWPS at a short distance downgradient of MGWC-7 in MGWC-20. This evidence, combined with potential attenuation mechanisms, makes MNA a potentially viable corrective measure, which will be retained for further evaluation.

4.2.4 Permeable Reactive Barriers

PRBs can present a viable alternative for in-situ treatment of many inorganic CCR constituents. PRBs are defined as in situ permeable treatment zones, designed to intercept and remediate a contaminant plume (Interstate Technology Regulatory Council [ITRC] 2011). These permeable zones contain reactive media that can address contaminants by manipulating redox conditions (e.g., zero-valent iron, organic substrates) or promoting ionic exchange/sorption (e.g., clays, zeolites, peat moss). One major advantage with PRBs is that they can be a passive strategy. It has been used successfully in the past to treat CCR-contaminated sites; however, there is limited information and precedent available to show successful removal of lithium. Further research and additional testing would be required to identify if an appropriate PRB material exists for the attenuation of lithium. Thorough site geochemistry characterization, in addition to bench-scale and pilot testing, is required to confirm that effective lithium-selective ion exchange media are identified before implementation.

PRB can be installed using either conventional excavation methods, one-pass trenching method, or trenchless injected emplacement. For trenching methods, the trench must be deep enough to intercept the water table and dissolved-plume contaminants and is typically keyed into a deeper low permeable unit such as clay. Depth of implementation varies with construction method. After excavation, the trenches are then filled with the specified reactive media mixture. Replaceable media cartridges may be considered if replacements are anticipated to be frequently needed due to fouling. Contaminated water is treated by passively flowing through the reactive media based on the natural hydraulic gradient. PRBs can be combined with impermeable slurry walls to direct groundwater through permeable treatment zones, which can save on construction and long-term maintenance. The installation depths of a PRB unit are generally limited to about 90 ft bgs, which is suitable for AP-1, where the SSLs are observed at depths less than 50 ft bgs. Subsurface investigations, reactive media, and compatibility testing would be needed before implementation. However, the measure is potentially viable and will be retained for further evaluation.

4.2.5 Phytoremediation

Phytoremediation uses plants to remove, transfer, or immobilize inorganic contaminants in environmental media. This technique is often more effective when contaminants are at relatively low to moderate concentrations over a large area and at shallow depths that are accessible by plant roots. Given that MGWC-7 is screened at depths between 28.87 and 38.87 ft bgs, traditional plantings for phytoremediation are not expected to be successful. However, the TreeWell® system, a proprietary system developed by Applied Natural Science, allows implementation at depth using a specialized lined planting unit constructed with optimum planting media to promote downward growth to focus extraction on the target depth interval. The effectiveness of groundwater remediation using traditional phytoremediation approaches can be limited by the soil conditions on site, the target depth of treatment, the climate and ambient water quality, and the availability of appropriate vegetation for remediation.

By installing a cased “well” for tree planting using large-diameter auger (LDA) technology, extraction of deeper groundwater zones (i.e., in excess of 50 ft bgs) can be achieved because the surface of the “well” is sealed, and only groundwater from a targeted zone is allowed into the cased-off borehole. This type of system mirrors a traditional mechanical extraction system using the trees as pumps. The TreeWell system can be used for both hydraulic control of groundwater and for treatment of constituents via immobilization/containment mechanisms (for organic and inorganic constituents). With respect to the site-specific conditions, the system would be applied for hydraulic control, but lithium is expected to be either immobilized within the root zone or incidentally taken up into the tree biomass. The layout for a TreeWell remediation system is generally based on groundwater flow modeling assuming a design uptake rate of approximately 40 to 60 gallons per day per tree. Based on the current understanding of groundwater flow velocities downgradient of AP-1 (approximately 15.4 feet/year), a phytoremediation approach with 17 to 25 TreeWells may be feasible.

Phytoremediation has the advantages of minimal long-term operation and maintenance (O&M) requirements and no aboveground water management infrastructure. It also carries relatively low capital costs. Phytoremediation requires space and time to reach remediation goals. Because of limitations, a thorough site assessment and pilot testing must be completed to confirm that such a treatment will reach remedial goals and objectives. This technology is a potentially viable corrective measure and will be retained for further evaluation.

4.2.6 Subsurface Vertical Barrier Walls

Subsurface vertical barrier walls have been used for seep control and groundwater cutoff at impoundments and waste disposal units for more than three decades. In general, barrier walls are designed to provide containment; localized treatment achieved through the sorption or chemical precipitation reactions from construction of the walls are incidental to the design objective.

This approach involves placing a barrier to groundwater flow in the subsurface, frequently around the source area (or the downgradient limits of the source area), to prevent future migration of dissolved constituents in groundwater from beneath the source to downgradient areas. Barrier walls are typically keyed into a lower confining unit. Groundwater pumping is typically needed to prevent mounding behind and overtopping of the barrier. Barrier walls can also be used in downgradient applications to limit discharge to surface water or to reduce aquifer recharge from adjacent surface water features when groundwater extraction wells are placed near a surface water feature. Barrier walls can also be used to direct flow toward remedial components, such as PRBs, through what is called a “funnel and gate” system.

A variety of barrier materials can be used including cement and/or bentonite slurries or various mixtures of soil with cement or bentonite, geomembrane composite materials, or driven materials such as steel or vinyl sheet pile. Slurry walls are typically constructed with a soil, bentonite, and water mixture, which forms a low-permeability and highly chemical-resistant barrier. Other wall compositions can be successful (e.g., cement/bentonite, slurry/geomembrane composites) depending on chemical compatibilities with site contaminants (ITRC 2011).

Methods for installation of these low-permeability walls are similar to those described for PRBs in Section 4.2.5. In general, the applicability of slurry walls is limited by the depth of installation, which is approximately 90 ft bgs and therefore possible for AP-1. Groundwater pumping is required upgradient of the barrier wall to maintain an inward hydraulic gradient. The extracted groundwater would likely require treatment in an aboveground treatment system. This technology is a potentially viable corrective measure and will be retained for further evaluation.

5 Remedy Selection Process

The purpose of this ACM is to begin the process of selecting corrective measure(s) for groundwater using the criteria outlined in 40 CFR § 257.96 and Georgia Rule 391-3-4-.10(6)(a). The sections below present the pond closure and site management strategy, additional data gathering, schedule, reporting, and next steps.

5.1 Pond Closure and Site Management Strategy

CCR removal at Plant McIntosh is considered complete as Georgia Power removed all CCR at AP-1 to an on-site permitted landfill (Section 1.3). The current conceptual model may need to be refined and/or updated as more data are collected and analyzed.

Georgia Power plans to proactively use adaptive site management for Plant McIntosh to support the remedial strategy and to address changes in former CCR unit conditions (e.g., successful reduction of constituent concentrations or changing trends) as appropriate. Under an adaptive site management strategy:

- A corrective measure will be installed or implemented to address current conditions.
- The performance of the corrective measure will be monitored, evaluated, and reported at least semi-annually.
- The conceptual model will be updated as more data are collected.
- Adjustments and augmentations will be made to the corrective measure(s) as needed to promote meeting performance criteria and remedial goals.

5.2 Additional Data Gathering

Additional data collection, data analysis and site-specific evaluations are necessary to refine the conceptual site model and to evaluate the feasibility of each corrective measure presented herein with the goal of selecting an appropriate groundwater corrective measure. Some of the data needed to refine the conceptual site model may be collected concurrent with routine groundwater monitoring events under the assessment monitoring program or during supplementary sampling if required. Additional data gathering may include:

- General geochemical conditions (i.e. aquifer matrix composition by x-ray diffraction and elemental assay, groundwater pH and redox conditions, major ion chemistry, and concentration trends);
- Geochemical modeling;
- Laboratory sorption study (i.e. batch tests);
- Laboratory-scale testing of reagent effectiveness for in-situ treatment; and
- Field pilot studies based on results of laboratory treatability studies.

Once sufficient data are available to arrive at a focused number of corrective measures or a combination of corrective measures that would provide an effective groundwater remedy, necessary steps will be taken to implement a remedy at the Site in accordance with 40 CFR § 257.98.

5.3 Schedule, Reporting, and Next Steps

Georgia Power will prepare semi-annual progress reports to document groundwater conditions at Plant McIntosh, results associated with additional data collection identified in Section 5.2, and the progress in selecting and designing the remedy in accordance with 40 CFR § 257.97(a) beginning in January 2026. These reports will be posted to Georgia Power's website.

A draft remedy selection report will be submitted to GAEPD for review and concurrence on the proposed remedy and, at least 30 days before the final selection of remedy or remedies, a public meeting will be held to discuss the results of the corrective measures assessment pursuant to 40 CFR § 257.96(e). The final remedy selection report will be developed as outlined in 40 CFR § 257.97(a). Once the remedy has been selected, the implementation of the remedy will be initiated in accordance with 40 CFR § 257.98.

6 References

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Tables

Table 1
Monitoring Well Network Summary
Assessment of Corrective Measures Report
Georgia Power Company
Plant McIntosh Ash Pond 1
Rincon, Georgia

ARCADIS

Well ID	Compliance Purpose	Location	Northing	Easting	Ground Surface Elevation (ft NAVD88)	Top of Casing Elevation (ft NAVD88)	Top of Screen Elevation (ft NAVD88)	Bottom of Screen Elevation (ft NAVD88)	Total Depth (ft BTOC)	Installation Date
MGWC-1	Detection	Downgradient	856813.08	964287.47	62.20	65.23	19.45	9.45	56.08	11/10/2015
MGWC-2	Detection	Downgradient	856400.69	963958.38	45.32	48.54	21.48	11.48	37.36	11/11/2015
MGWC-3	Detection	Downgradient	856033.79	963658.28	50.09	52.65	24.21	14.21	38.74	11/11/2015
MGWA-5	Detection	Upgradient	855860.82	962763.17	61.42	64.36	11.57	1.57	63.09	11/12/2015
MGWA-6	Detection	Upgradient	856527.73	963130.08	58.24	61.08	29.45	19.45	41.93	11/12/2015
MGWA-6A	Detection	Upgradient	856520.82	963113.65	56.89	59.76	30.36	20.36	39.67	1/16/2019
MGWC-7	Detection	Downgradient	857417.68	964007.53	51.28	54.40	22.41	12.41	42.29	11/13/2015
MGWC-8	Detection	Downgradient	857177.10	964141.67	59.69	62.61	20.35	10.35	52.56	11/10/2015
MGWA-10	Detection	Upgradient	855934.25	961406.49	62.05	65.07	22.28	12.28	53.09	11/17/2015
MGWA-11	Detection	Upgradient	855985.31	962070.22	62.04	64.91	19.30	9.30	55.81	5/27/2016
MGWC-12	Detection	Downgradient	855545.67	963110.24	61.24	64.10	21.40	11.40	52.90	5/26/2016
MGWC-4	Piezometer	Downgradient	855555.05	963139.37	61.05	64.33	7.28	-2.72	67.35	11/18/2015
MGWA-9	Piezometer	Upgradient	857129.70	963164.58	56.25	59.29	26.54	16.54	43.05	11/17/2015
PZ-13	Piezometer	Downgradient	856123.86	964192.52	38.02	40.91	24.55	14.55	26.76	6/3/2016
PZ-14	Piezometer	Downgradient	855727.20	963895.98	43.99	47.11	16.01	6.01	41.50	6/4/2016
PZ-15	Piezometer	Downgradient	856156.03	964192.45	39.07	42.37	23.80	13.80	28.87	6/26/2018
PZ-16	Piezometer	Downgradient	857077.14	964957.28	51.29	54.71	22.62	12.62	42.39	6/26/2018
PZ-17	Piezometer	Downgradient	857655.05	964525.72	54.07	57.51	22.69	12.69	45.12	6/27/2018
PZ-18	Piezometer	Upgradient	857542.34	963505.91	50.26	53.48	22.08	12.08	41.70	6/27/2018
MGWC-19	Assessment	Downgradient	857406.16	963972.44	50.74	53.98	-8.42	-18.42	72.70	10/4/2018
MGWC-20	Assessment	Downgradient	857596.86	964281.59	48.77	51.56	7.09	-2.91	54.77	10/3/2018
MGWC-21	Piezometer	Downgradient	857159.04	964155.30	59.89	62.65	-9.73	-19.73	82.68	11/28/2018
MGWC-22	Piezometer	Downgradient	856381.60	963948.23	45.09	47.53	-9.73	-19.73	67.56	11/29/2018
MGWC-23	Piezometer	Downgradient	856940.45	964617.96	54.84	57.47	24.87	14.87	42.90	11/30/2018
MGWA-24	Piezometer	Upgradient	856600.28	962885.22	57.55	60.53	24.73	14.73	47.00	1/17/2019

Notes:
Elevations shown are in datum NAVD88, which indicates feet in elevation referenced to the North American Vertical Datum 1988.
Well screen elevations are calculated by subtracting the depths to top and bottom of the well screen from the ground surface elevation.
Northings and eastings are feet relative to North American Datum 1983, State Plane Georgia East Zone.

Abbreviations:
NAVD88 = North American Datum of 1988
ft = feet
ft BOTC = feet below top of casing

Table 2
Summary of Groundwater Analytical Data
Assessment of Corrective Measures Report
Georgia Power Company
Plant McIntosh Ash Pond 1
Rincon, Georgia

Analyte	Units	MGWC-1 2/4/2025	MGWC-2 2/5/2025	MGWC-3 2/4/2025	MGWA-5 2/3/2025	MGWA-6 2/3/2025	MGWA-6A 2/4/2025	MGWC-7 2/4/2025	MGWC-8 2/4/2025
Appendix III									
Boron	mg/L	1.6	1.7	0.45	0.081	0.028 J	0.03 J	2.4	5.9
Calcium	mg/L	120	100	110	29	110	110	61	130
Chloride	mg/L	20	12	19	5.4	3.4	3.5	10	11
Fluoride	mg/L	< 0.2 U	< 0.4 U	< 0.2 U	< 0.04 U	< 0.04 U	< 0.04 U	< 0.4 U	< 0.4 U
pH, Field	SU	7.20	7.66	6.90	7.67	7.17	7.42	6.71	7.67
Sulfate	mg/L	140	150	73	3.4	4.6	4	230	380
Total Dissolved Solids	mg/L	400	420	330	150	260	250	330	590
Appendix IV									
Antimony	mg/L	< 0.00034 U	< 0.00034 U	< 0.00034 U	< 0.00034 U	< 0.00034 U	< 0.00034 U	< 0.00034 U	< 0.00034 U
Arsenic	mg/L	0.0014	< 0.00086 U	0.0021	< 0.00086 U	0.011	0.011	0.001	0.0014
Barium	mg/L	0.12	0.057	0.15	0.039	0.03	0.034	0.019	0.065
Beryllium	mg/L	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U
Cadmium	mg/L	< 0.000078 U	0.00021 J	< 0.000078 U	< 0.000078 U	< 0.000078 U	< 0.000078 U	< 0.000078 U	0.0076
Chromium	mg/L	0.0015 J	0.0027	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U
Cobalt	mg/L	< 0.00022 U	0.00085 J	0.00043 J	< 0.00022 U	< 0.00022 U	0.00075 J	0.0029	0.00042 J
Combined Radium 226 + 228	pCi/L	2.50	0.328 U	1.63	0.0354 U	0.957	1.36	1.46	1.46
Fluoride	mg/L	< 0.2 U	< 0.4 U	< 0.2 U	< 0.04 U	< 0.04 U	< 0.04 U	< 0.4 U	< 0.4 U
Lead	mg/L	< 0.00021 U	< 0.00021 U	0.00034 J	< 0.00021 U	< 0.00021 U	< 0.00021 U	< 0.00021 U	< 0.00021 U
Lithium	mg/L	0.016	0.0087 B	0.017	0.014	0.0057	0.0034 J	0.16	0.012
Mercury	mg/L	< 0.00008 U	< 0.00008 U	< 0.00008 U	< 0.00008 U	< 0.00008 U	< 0.00008 U	< 0.00008 U	0.00084
Molybdenum	mg/L	0.0011 J	< 0.00086 U	< 0.00086 U	< 0.00086 U	< 0.00086 U	< 0.00086 U	< 0.00086 U	< 0.00086 U
Selenium	mg/L	< 0.00099 U	< 0.00099 U	< 0.00099 U	< 0.00099 U	< 0.00099 U	< 0.00099 U	< 0.00099 U	< 0.00099 U
Thallium	mg/L	< 0.00026 U	< 0.00026 U	< 0.00026 U	< 0.00026 U	< 0.00026 U	< 0.00026 U	< 0.00026 U	< 0.00026 U

Notes:

Radium data are a combination of radium isotopes 226 and 228. When results are reported below the Minimum Detectable Concentration (MDC), data are displayed with an accompanying U.

The MDC varies depending on the sample amount and elapsed time of the measurement.

Abbreviations:

< indicates that substance was not detected above the method detection limit (MDL). The value displayed is MDL.

B - Compound was found in the blank and sample.

F1 - MS and/or MSD recovery exceeds control limits.

J - The result is an estimated concentration. "J" qualifiers are applied by the laboratory when the concentration reported is above the MDL but below the laborary reporting limt.

mg/L - milligram per liter

NA = Not applicable

ND - Not detected at or above MDC.

pCi/L - picoCurie per liter

SU - Standard Unit

U - Result is below MDC. Value shown is the MDC.

Table 2
Summary of Groundwater Analytical Data
Assessment of Corrective Measures Report
Georgia Power Company
Plant McIntosh Ash Pond 1
Rincon, Georgia

Analyte	Units	MGWA-10 2/4/2025	MGWA-11 2/4/2025	MGWC-12 2/4/2025	MGWC-19 2/3/2025	MGWC-20 2/4/2025
Appendix III						
Boron	mg/L	< 0.022 U	0.035 J	0.03 J	1.4	1.6
Calcium	mg/L	3.2	44	36	110	49
Chloride	mg/L	8.0	3.8	5.7 F1	13	14
Fluoride	mg/L	< 0.04 U	< 0.04 U	0.043 JF1	< 0.4 U	< 0.2 U
pH, Field	SU	5.40	7.61	6.75	7.75	6.42
Sulfate	mg/L	< 0.4 U	< 0.4 U	11 F1	280	160
Total Dissolved Solids	mg/L	54	220	200	500	310
Appendix IV						
Antimony	mg/L	< 0.00034 U	< 0.00034 U	< 0.00034 U	< 0.00034 U	< 0.00034 U
Arsenic	mg/L	0.0011	0.0033	0.0011	0.0014	0.0022
Barium	mg/L	0.019	0.15	0.061	0.025	0.043
Beryllium	mg/L	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U
Cadmium	mg/L	< 0.000078 U	< 0.000078 U	< 0.000078 U	< 0.000078 U	0.0049
Chromium	mg/L	0.0051	0.0014 J	< 0.0012 U	< 0.0012 U	< 0.0012 U
Cobalt	mg/L	< 0.00022 U	< 0.00022 U	< 0.00022 U	< 0.00022 U	0.00056 J
Combined Radium 226 + 228	pCi/L	0.905	0.732	ND	0.859	0.324 U
Fluoride	mg/L	< 0.04 U	< 0.04 U	0.043 JF1	< 0.4 U	< 0.2 U
Lead	mg/L	< 0.00021 U	< 0.00021 U	< 0.00021 U	< 0.00021 U	< 0.00021 U
Lithium	mg/L	0.013	0.033	0.031	0.0045 J	0.01
Mercury	mg/L	< 0.00008 U	< 0.00008 U	< 0.00008 U	< 0.00008 U	< 0.00008 U
Molybdenum	mg/L	< 0.00086 U	0.00086 J	< 0.00086 U	0.00095 J	< 0.00086 U
Selenium	mg/L	< 0.00099 U	< 0.00099 U	< 0.00099 U	< 0.00099 U	< 0.00099 U
Thallium	mg/L	< 0.00026 U	< 0.00026 U	< 0.00026 U	< 0.00026 U	< 0.00026 U

Notes:

Radium data are a combination of radium isotopes 226 and 228. When results are reported below the Minimum Detectable Concentration (MDC), data are displayed with an accompanying U.

The MDC varies depending on the sample amount and elapsed time of the measurement.

Abbreviations:

< indicates that substance was not detected above the method detection limit (MDL). The value displayed is MDL.

B - Compound was found in the blank and sample.

F1 - MS and/or MSD recovery exceeds control limits.

J - The result is an estimated concentration. "J" qualifiers are applied by the laboratory when the concentration reported is above the MDL but below the laborary reporting limt.

mg/L - milligram per liter

NA = Not applicable

ND - Not detected at or above MDC.

pCi/L - picoCurie per liter

SU - Standard Unit

U - Result is below MDC. Value shown is the MDC.

Table 3
Groundwater Protection Standards
Assessment of Corrective Measures Report
Georgia Power Company
Plant McIntosh Ash Pond 1
Rincon, Georgia

ARCADIS

Constituent Name	Units	Federal CCR Rules Specified GWPS	Background February 2025	GWPS February 2025
Antimony	mg/L	N/A	0.002	0.006
Arsenic	mg/L	N/A	0.014	0.014
Barium	mg/L	N/A	0.13	2
Beryllium	mg/L	N/A	0.0025	0.004
Cadmium	mg/L	N/A	0.0025	0.005
Chromium	mg/L	N/A	0.0066	0.1
Cobalt	mg/L	0.006	0.0025	0.006
Combined Radium - 226+228	pCi/L	N/A	1.24	5
Fluoride	mg/L	N/A	0.19	4
Lead	mg/L	0.015	0.001	0.015
Lithium	mg/L	0.04	0.037	0.04
Mercury	mg/L	N/A	0.0002	0.002
Molybdenum	mg/L	0.1	0.015	0.1
Selenium	mg/L	N/A	0.005	0.05
Thallium	mg/L	N/A	0.001	0.002

Notes:

Site-Specific Background = Tolerance limits calculated from pooled upgradient well data through present.

CCR-Rule specified GWPS as stipulated in 40 CFR § 257.95(h)(1-3) and incorporated into Georgia EPD’s CCR Rule 391-3-4-.10(6)(a) on February 22, 2022.

Abbreviations:

CCR = Coal Cumbustion Residuals
EPD = Environmental Protection Division
GWPS = Groundwater Protection Standard
MCL = Maximum Contaminant Level
mg/L - milligram per liter
N/A = Not applicable
pCi/L - picoCurie per liter
USEPA = United States Environmental Protection Agency

Table 4
Evaluation of Remedial Technologies
Assessment of Corrective Measures Report
Georgia Power Company
Plant McIntosh Ash Pond 1
Rincon, Georgia

Technology	Description	Evaluation Criteria		
		Performance 40 CFR 257.96(c)(1)	Reliability 40 CFR 257.96(c)(1)	Ease of Implementation 40 CFR 257.96(c)(1)
Geochemical Manipulation (In Situ Injection)	Injection of a chemical or organic substrate to alter geochemical conditions to those more favorable for immobilization of lithium.	*Moderate*: Lithium is generally a conservative inorganic species under many environmental conditions; however, zero-valent iron or carbonate reagents, among others, could potentially be used to immobilize lithium through adsorption and co-precipitation. The application of in-situ injection treatment for immobilization would need to be further investigated to evaluate efficacy.	*Moderate:* Reliability dependent on permeability of the subsurface and the amount and distribution of reagents. Reliable technology if injected materials can be distributed throughout the impacted aquifer. Bench- and/or pilot-scale treatability testing programs are needed to understand the biogeochemical processes that would effectively reduce migration of lithium in groundwater.	*Moderate:* The installation of an injection well network or placement of reagents via injection would be required. The geology in the vicinity of MGWC-7 is favorable for reagent injection and distribution. An evaluation of the amendment distribution during injections (i.e., radius of influence) is needed to support full-scale design. The potential for clogging of injection well infrastructure is an implementation consideration.
Hydraulic Containment	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.	*High:* Pump and treat (P&T) is an effective, demonstrated technology for hydraulic control. The design of the P&T system requires groundwater modeling for the well network and, potentially, design of an aboveground treatment system. However, this remedy typically is not immediately effective for the treatment of metals at trace levels. There is also a possibility of rebounding when operations cease.	*Moderate to High:* Reliability may also depend on attenuation mechanisms and the operation and performance of an ex-situ treatment system if needed. System downtime for maintenance may impact reliability.	*Difficult:* P&T is a longstanding, proven approach that requires installation of extraction wells/trenches. Ex-situ treatment options for lithium are energy-intensive and could generate waste. The level of effort for construction and operations and maintenance (O&M) is relatively high compared to other options and requires on-site staff.
Monitored Natural Attenuation (MNA)	A remedial solution that takes advantage of natural attenuation processes to reduce constituents in soil and groundwater.	*Moderate:* Physical and chemical MNA mechanisms of lithium, including sorption, ion exchange, dispersion, and dilution, may be effective at achieving groundwater protection standards (GWPS) within a reasonable timeframe. Attenuation processes for lithium are already occurring at the Site, as evidenced by data from assessment well MGWC-20.	*Moderate to High:* The reliability of MNA is moderate to high as long as aquifer attenuation capacity is present and aquifer conditions that result in attenuation remain favorable and/or are being enhanced. A monitoring well network already exists to implement future groundwater monitoring.	*Easy:* A well network for MNA is already in place. Additional data would be needed to show that the existing aquifer attenuation capacity is sufficient to achieve the GWPS within a reasonable timeframe.
Permeable Reactive Barrier (PRB)	Use of reactive material that extends below the water table to intercept and treat groundwater. Can be implemented via permeable subsurface wall or as a “funnel and gate” system where a barrier wall directs groundwater to a smaller “treatment gate” filled with reactive media.	*Moderate:* The PRB approach would be expected to achieve GWPS for lithium as impacted groundwater passes through the reactive barrier if an appropriate reactive barrier can be identified in further evaluations. Additional testing is required to select the appropriate sorptive media mix for lithium.	*Moderate to High:* Reliable groundwater corrective measure, but loss of reactivity over time may require re-installation depending on the duration of the remedy. Additional data collection, including conducting a bench- and/or pilot-scale study, is needed to better characterize current attenuation mechanisms and/or select the appropriate reactive media mix for a PRB.	*Moderate:* Trenching at depth through clayey and sandy lithologic units down to approximately 40 feet would be required to install a mix of reactive materials in the subsurface. Once installed, treatment will be passive, and O&M requirements would be minimal if replacement of the PRB is not necessary.
Phytoremediation	Use of plants to remove, transfer, or stabilize constituents in soil or groundwater. Within the context of AP-1, this corrective measure would likely use an engineered (proprietary) TreeWell phytoremediation system along the point of compliance or downgradient edge of the impacted groundwater for hydraulic control and immobilization and uptake in the root zone.	*Low to Moderate:* Once established (typically at the end of the third growing season), a TreeWell system is effective for providing hydraulic containment of groundwater and potential reduction of lithium concentrations through immobilization and/or uptake and sequestration in the tree biomass; however, the main purpose is to provide hydraulic control. Additional aquifer testing and/or groundwater flow modeling would be needed to confirm the suitability of this technology at MGWC-7.	*Moderate:* Engineered phytoremediation is a proven technology in which hydrogeologic factors are taken into account (e.g., hydraulic conductivity, flow velocity, depth to impacted groundwater zone). This is considered an active remedial approach that uses trees as the "pumps" driving the system. Careful design would be needed to select the proper tree species, which will include consideration of groundwater chemistry, plant uptake of constituents, and groundwater flow modeling to evaluate the required number and placement of TreeWell units.	*Low to Moderate:* Engineered approach has been proven effective, and specific depth zones can be targeted. Trees are installed as "tree wells" in a large-diameter boring to get the roots deep enough to intercept impacted groundwater flow paths. Area must be clear of above- and below-ground structures (i.e., power lines). The system, once established (approximately three growing seasons), is a self-maintaining, sustainable remedial system that has no external energy requirements and little maintenance (i.e., efforts normally associated with landscaping).

Table 4
Evaluation of Remedial Technologies
Assessment of Corrective Measures Report
Georgia Power Company
Plant McIntosh Ash Pond 1
Rincon, Georgia

Technology	Description	Evaluation Criteria		
		Performance 40 CFR 257.96(c)(1)	Reliability 40 CFR 257.96(c)(1)	Ease of Implementation 40 CFR 257.96(c)(1)
Subsurface Barrier Walls	Use of barriers to physically control the migration of impacted groundwater either directly or through manipulation of groundwater flow.	*Low:* Barrier walls are a proven technology for seepage control and/or groundwater cutoff at impoundments. Sheet pile walls are limited by the depth of installation, which is typically approximately up to 90 feet below ground surface (ft bgs). Groundwater impacts at MGWC-7 are observed at depths less than 40 ft bgs. A barrier wall as the sole remedial measure would not likely be effective. A barrier wall could be implemented in conjunction with pumping. An alternative use of this strategy is in a "funnel and gate" system with a PRB. As such, groundwater with lithium concentrations above the GWPS could be directed to "treatment gates" for passive treatment (in a PRB). Additional subsurface investigations and compatibility testing with groundwater from former AP-1 would be needed prior to selection and implementation.	*Moderate – With proper installation*: O&M requirements can range significantly, with groundwater extraction and/or subsequent treatment from inside the wall likely required.	*Moderate:* Trenching would be required to fill in the various slurry mixes; alternatively, sheet pile installations can be accomplished without excavation of trenches. The application of barrier walls is limited by the depth of installation and subsurface geology, which will be a consideration at AP-1. Installation methods and materials are readily available. Once installed, aboveground infrastructure to P&T groundwater may be required. O&M requirements are expected to include upkeep of infrastructure components (pumps, pipes, tanks, instrumentation and controls, aboveground treatment system) and handling of treatment residuals.

Technology	Evaluation Criteria		
	Potential Impact 40 CFR 257.96(c)(1)	**Estimated Time to Begin/Complete Remedy 40 CFR 257.96(c)(2)**	**Institutional Requirements 40 CFR 257.96(c)(3)**
Geochemical Manipulation (In Situ Injection)	*Low:* Low impacts are expected if the remedy works as designed based on a thorough pre-design investigation, geochemical modeling, and bench/pilot study results. Consideration of groundwater flow to nearby sensitive environments may be needed. This remedial alternative may unintentionally alter the geochemistry within the aquifer, which may result in the mobilization of other constituents that require treatment. Short-term risks during remedial activities, such as drilling and operating pressurized injection equipment, can be mitigated through appropriate planning and health and safety (H&S) measures.	A thorough pre-design investigation, geochemical modeling, and/or bench-scale treatability study and/or field-scale pilot testing may take up to 24 months to obtain the design parameters needed for design and construction of the corrective measure. Well construction is relatively quick (i.e., 1 to 2 months; potentially longer depending on the scale of the remedy), and time for an injection event varies. Time to achieve the GWPS for lithium depends on the attenuation process kinetics of the constituent as well as amendment longevity, injection layout, and lithium transport properties. The time for complete distribution of the injected materials throughout the treatment area also varies.	An Underground Injection Control (UIC) Permit may be required to implement this corrective measure.
Hydraulic Containment	*Low:* Potential impacts are anticipated to be low. Short-term impacts during the construction of the remedy and long-term impacts during O&M can be mitigated through appropriate planning and H&S measures. Groundwater extraction may unintentionally alter the geochemistry within the hydraulic capture zone.	A thorough pre-design investigation, flow modeling, bench-scale treatability studies, and/or field-scale pilot testing may be needed. These activities may take 12 to 24 months before design, permitting, and construction of the corrective measure. Installation of extraction wells and/or trenches can be accomplished relatively quickly, while the time until startup is contingent on ex-situ treatment infrastructure. Hydraulic containment can be achieved relatively quickly after startup of the extraction system. However, uncertainty exists with respect to the time to achieve and maintain the GWPS and complete operations; additional data collection may be needed to better understand site mobility and attenuation mechanisms for lithium.	A groundwater extraction permit may be required to withdraw water if high extraction rates are required. Depending on the effluent management strategy, modifications to the existing National Pollutant Discharge Elimination System permit may be required for surface water discharge. Obtaining a UIC permit may be needed if groundwater reinjection is chosen.
Monitored Natural Attenuation (MNA)	*Negligible:* Potential impacts of the remedy will be negligible because MNA relies on natural processes active in the aquifer matrix without significant disturbance to the surface or subsurface.	The infrastructure to initiate MNA is already in place. Demonstrating attenuation mechanisms and capacity can be time-consuming and can take up to 24 months. MNA is expected to be successful within a reasonable timeframe following pond closure. MNA timeframes range from a few years to a few decades.	No institutional requirements are expected.
Permeable Reactive Barrier (PRB)	*Low:* Impacts are expected to be low if the remedy works as designed based on a thorough pre-design investigation, geochemical modeling, and geophysical testing. Short-term impacts during construction of the remedy can be mitigated through appropriate planning and H&S measures. Consideration of groundwater flow to nearby sensitive environments may be needed. This remedial alternative may unintentionally alter the geochemistry within the wall, which may result in the mobilization of other constituents that require treatment.	Installation of a PRB can be accomplished relatively quickly (6 to 12 months) depending on the final location and configuration. However, bench-scale treatability studies and/or compatibility testing would be required to obtain design parameters before design and construction of the remedy. These processes may take up to 24 months. Media may need to be replaced periodically to maintain reactive conditions and/or address additional flux of impacted groundwater into the PRB.	No institutional requirements are expected.
Phytoremediation	*Low:* Phytoremediation typically has low expected impacts. Short-term impacts during the construction of the remedy can be mitigated through appropriate planning and H&S measures.	Installation of a phytoremediation system can be accomplished relatively quickly (within 6 to 12 months) depending on the final location and configuration. However, treatability studies and pilot testing would be required to ensure effective treatment. These studies may take up to 24 months. Hydraulic capture/control is expected approximately 3 years after planting. Once installed, the time to achieve the GWPS downgradient of the phytoremediation system is anticipated to be long and can take multiple years before system is treating at design capacity.	No institutional requirements are expected.
Subsurface Barrier Walls	*Low:* Impacts are expected to be low following construction of the remedy. Short-term impacts during remedy construction can be mitigated through appropriate planning and H&S measures. Changes to groundwater flow patterns due to installation of the barrier wall are expected and may require dewatering. Pumping activity may unintentionally alter the geochemistry within the hydraulic capture zone that may result in the mobilization of other constituents that may require treatment.	Design phase and additional compatibility testing may be required, which may take up to 24 months. Installation of a barrier wall can be accomplished relatively quickly (i.e., 6 to 12 months) depending on the final location and configuration. Once installed, preventing migration of constituents in groundwater is anticipated to be similar to a companion technology (e.g., PRBs or P&T). Because this approach does not treat the downgradient area of impacted groundwater but rather prevents migration from a source area, it will likely have to be maintained in the long term and coupled with other approaches.	No institutional requirements are expected.

Acronyms and Abbreviations:

CFR = Code of Federal Regulations
ft bgs = feet below ground surface
GWPS = Groundwater Protection Standard
H&S = health and safety
MNA = monitored natural attenuation
O&M = operation and maintenance
P&T = pump and treat
PRB = permeable reactive barrier
UIC = Underground Injection Control

Figures

LEGEND

APPROXIMATE PROPERTY BOUNDARY

APPROXIMATE AP-1 BOUNDARY

NOTE:
AERIAL IMAGE SOURCES: DRONE IMAGERY DATED 01/22/2024; ESRI GOOGLE EARTH WEB SERVICE, ACCESSED 3/17/2025.

1,500 750 0 1,500

GRAPHIC SCALE IN FEET

COORDINATE SYSTEM: NAD 1983 STATEPLANE GEORGIA EAST FIPS 1001 FEET

Georgia Power

PLANT MCINTOSH

SITE LOCATION MAP

ARCADIS

FIGURE

1

LEGEND

- APPROXIMATE AP-1 BOUNDARY
- DETECTION WELL
- ASSESSMENT WELL
- PIEZOMETER

NOTE:
AERIAL IMAGE SOURCES: DRONE IMAGERY DATED 01/22/2024; ESRI GOOGLE EARTH WEB SERVICE, ACCESSED 3/17/2025.

350 175 0 350

GRAPHIC SCALE IN FEET

COORDINATE SYSTEM: NAD 1983 STATEPLANE GEORGIA EAST FIPS 1001 FEET

Georgia Power

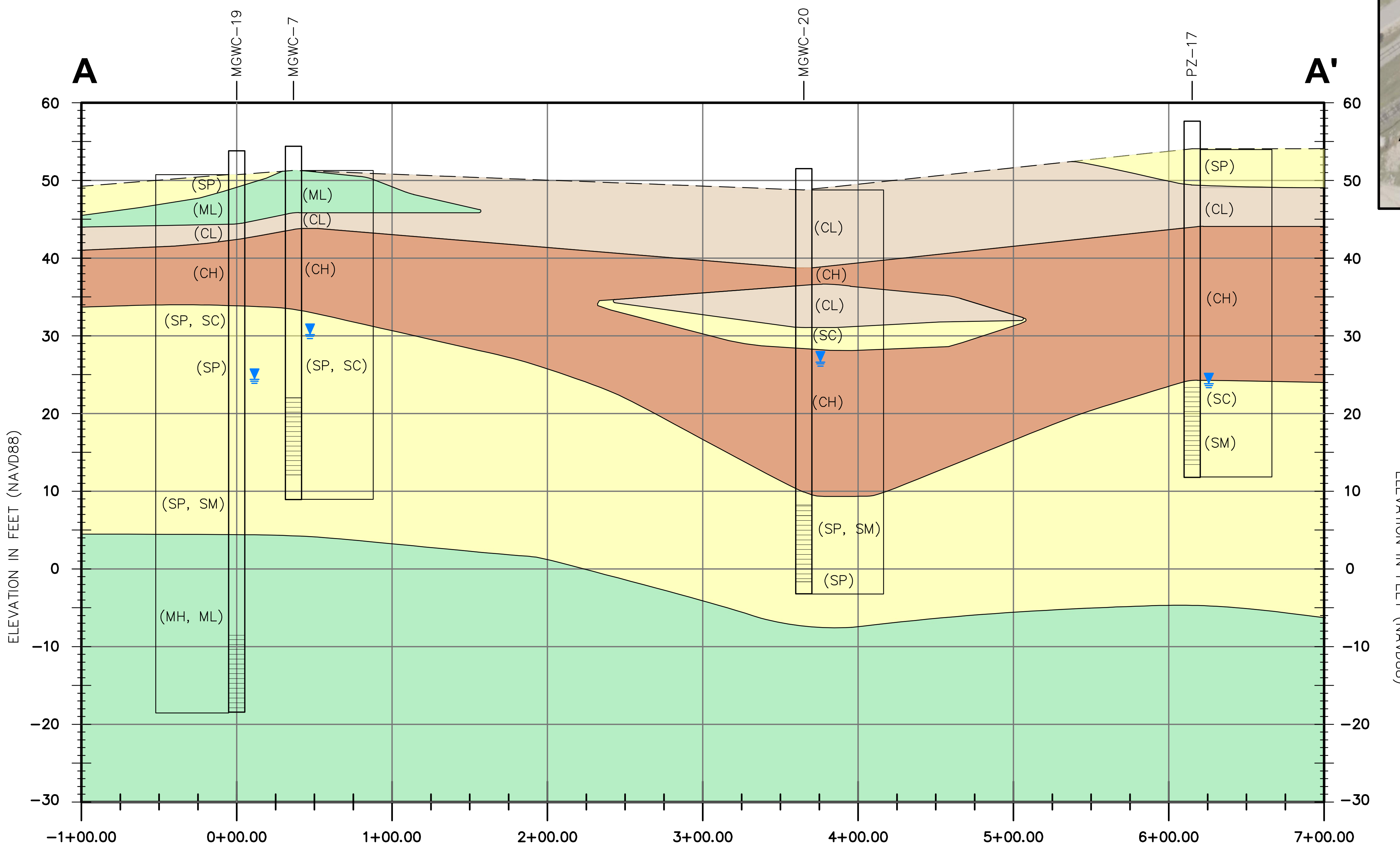
PLANT MCINTOSH

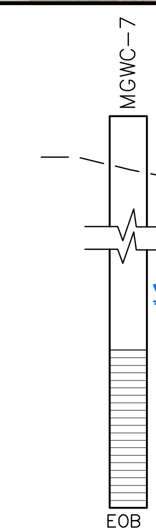
GROUNDWATER MONITORING WELL NETWORK MAP

ARCADIS

FIGURE

2





LEGEND:

PIEZOMETER OR MONITORING WELL

GROUND SURFACE

GROUNDWATER ELEVATION (FEBRUARY 2025)

SCREEN INTERVAL

END OF BORING

LEGEND:

SURFICIAL SOILS: LEAN CLAY WITH SANDS AND SILTS (CL)

REDDISH BROWN FAT CLAY WITH OCCASIONAL INTERBEDDED SANDS (CH)

SANDS WITH VARYING CLAY AND SILT CONTENT, FINE TO COARSE GRAVEL INCLUDING SHELLS (SP, SC, SM, SW)

SILTS WITH CLAY FINE SANDS (MH, ML)

NOTE:

1. GROUNDWATER ELEVATION (FEBRUARY 2025).
2. NAVD88: NORTH AMERICAN VERTICAL DATUM 88.

CROSS SECTION A-A'

0 80' 160'

HORIZONTAL GRAPHIC SCALE

0 16' 32'

VERTICAL GRAPHIC SCALE

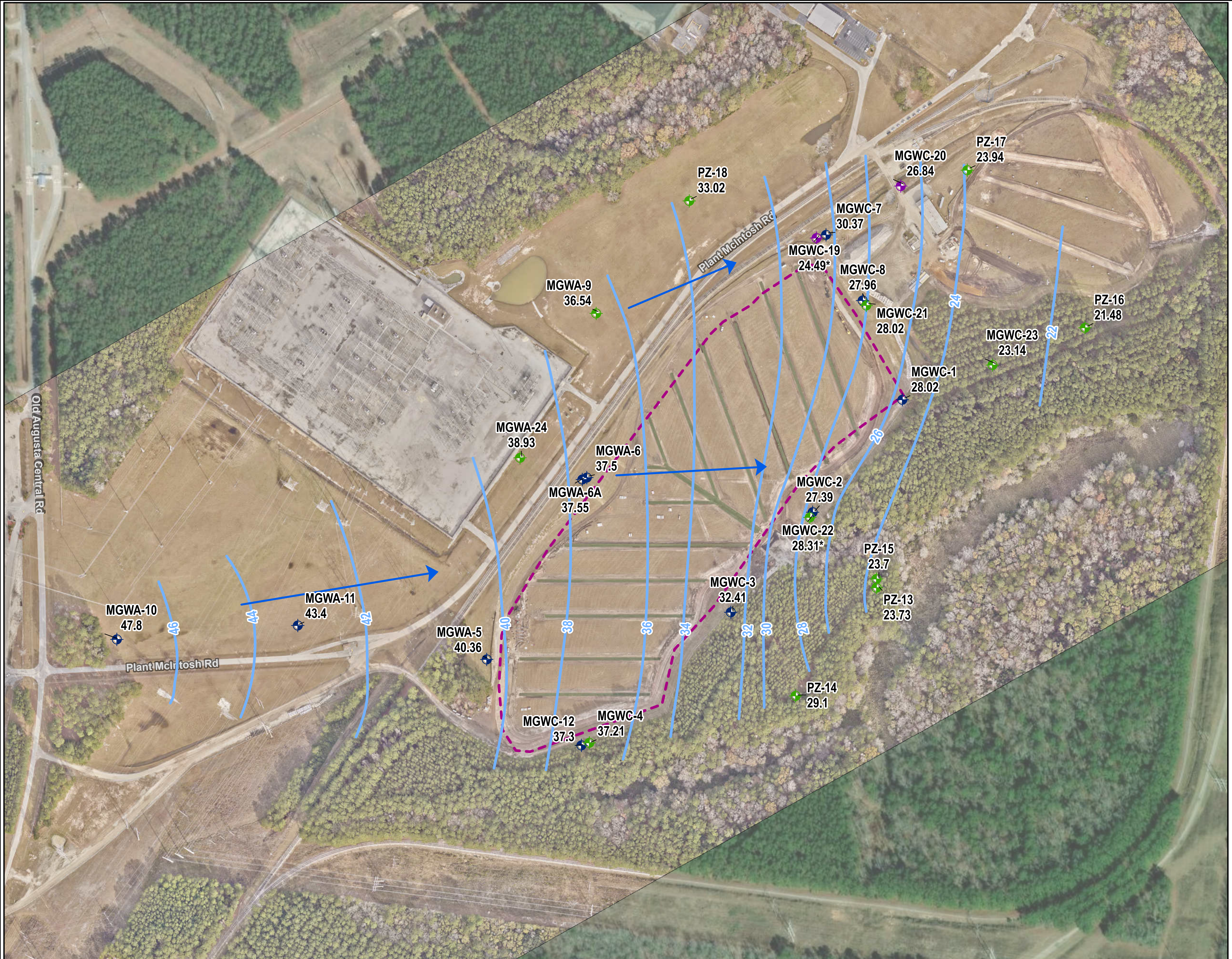
Georgia Power

PLANT MCINTOSH

GEOLOGIC CROSS SECTION

ARCADIS

FIGURE 3



LEGEND

- APPROXIMATE AP-1 BOUNDARY
- GROUNDWATER ELEVATION CONTOUR
- GROUNDWATER FLOW DIRECTION
- DETECTION WELL
- ASSESSMENT WELL
- PIEZOMETER

NOTES:

1. WATER LEVEL ELEVATION MEASURED FEBRUARY 3, 2025.
2. * = ELEVATIONS FOR MGWC-19 AND WGWC-22 ARE NOT USED TO CALCULATE POTENTIOMETRIC CONTOURS.
3. GROUNDWATER DATA AND CONTOUR SOURCE: ATLANTIC COAST CONSULTING, INC. 2025 SEMIANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT
4. AERIAL IMAGE SOURCES: DRONE IMAGERY DATED 01/22/2024; ESRI GOOGLE EARTH WEB SERVICE, ACCESSED 3/18/2025.

350 175 0 350

GRAPHIC SCALE IN FEET

COORDINATE SYSTEM: NAD 1983 STATEPLANE GEORGIA EAST FIPS 1001 FEET

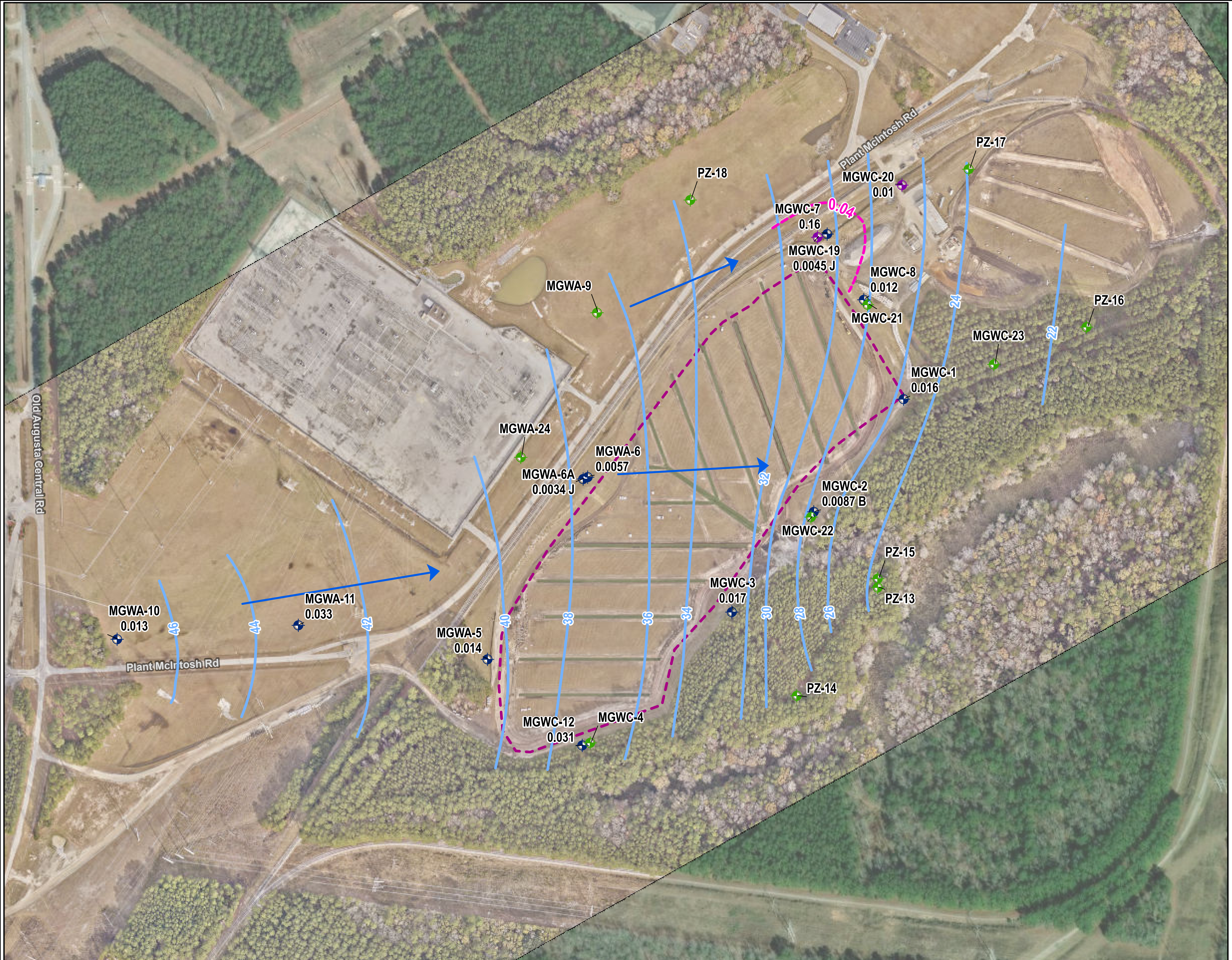
Georgia Power

PLANT MCINTOSH

POTENTIOMETRIC CONTOUR MAP
FEBRUARY 2025

ARCADIS

FIGURE
4



LEGEND

- APPROXIMATE AP-1 BOUNDARY
- LITHIUM ISOCONTOUR (mg/L)
- GROUNDWATER ELEVATION CONTOUR
- GROUNDWATER FLOW DIRECTION
- DETECTION WELL
- ASSESSMENT WELL
- PIEZOMETER

NOTES:

1. GROUNDWATER PROTECTION STANDARD (GWPS) FOR LITHIUM IS 0.04 mg/L.
2. mg/L = MILLIGRAMS PER LITER
3. LITHIUM DATA SOURCE: ATLANTIC COAST CONSULTING, INC. 2025 SEMIANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT
4. GROUNDWATER DATA AND CONTOUR SOURCE: ATLANTIC COAST CONSULTING, INC. 2025 SEMIANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT.
5. LITHIUM CONCENTRATIONS AND GROUNDWATER ELEVATIONS WERE MEASURED IN FEBRUARY 2025.
6. AERIAL IMAGE SOURCES: DRONE IMAGERY DATED 01/22/2024; ESRI GOOGLE EARTH WEB SERVICE, ACCESSED 3/17/2025.

350 175 0 350

GRAPHIC SCALE IN FEET

COORDINATE SYSTEM: NAD 1983 STATEPLANE GEORGIA EAST FIPS 1001 FEET

Georgia Power

PLANT MCINTOSH

ISO-CONCENTRATION MAP, LITHIUM - FEBRUARY 2025

ARCADIS

FIGURE

5

Appendix A

Risk Evaluation Report

RISK EVALUATION REPORT
PLANT MCINTOSH
ASH POND 1
RINCON, EFFINGHAM COUNTY, GEORGIA

Prepared for

Georgia Power
241 Ralph McGill Boulevard
Atlanta, Georgia 30308

Prepared by

Geosyntec Consultants
1255 Roberts Blvd., Suite 200,
Kennesaw, Georgia 30144

May 2025

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LIST OF ACRONYMS AND ABBREVIATIONS

95% UCL	95 Percent Upper Confidence Limit of the Arithmetic Mean
AMSL	Above Mean Sea Level
AP	Ash Pond
ASD	Alternative Source Demonstration
BLS	Below Level 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
HAR	Hydrogeologic Assessment Report
HSRA	Hazardous Site Response Act
mg/L	Milligrams per liter
ProUCL	ProUCL software version 5.2
RAGS	Risk Assessment Guidance for Superfund
RME	Reasonable Maximum Exposure
RRS	Risk Reduction Standards
RSL	Regional Screening Level
SSL	Statistically Significant Level
USEPA	United States Environmental Protection Agency
VRP	Voluntary Remediation Program

EXECUTIVE SUMMARY

Georgia Power's Plant McIntosh (site) is an electric-generating facility located in Effingham County, Georgia, approximately 4 miles northeast of the city of Rincon and 20 miles north-northwest of the city of Savannah. Plant McIntosh commenced operations in 1982 and has 11 generating units, including eight 80-megawatt combustion turbine units, two 660-megawatt combined cycle units, and a former 167-megawatt coal-fired generating unit. Plant McIntosh contains a single ash pond (AP), AP-1, that is located on the eastern portion of the property. All CCR material has been removed from Plant McIntosh AP-1. In a letter dated October 5, 2021, Georgia Environmental Protection Division (EPD) acknowledged that all CCR removal activities had been completed at the site. The site has been graded and restored.

This report presents the results of a risk evaluation for the CCR constituent[1], lithium, which exhibits statistically significant levels (SSLs) in groundwater at AP-1 from samples collected by Georgia Power in compliance with the Federal and State CCR Rules between May 2016 and February 2025. The risk evaluation was performed in support of the *Assessment of Corrective Measures – Plant McIntosh Ash Pond 1* (Arcadis, 2025). A conservative, health-protective approach was used that is consistent with United States Environmental Protection Agency (USEPA) risk assessment guidance, Georgia EPD regulations and guidance, and standard practice for risk assessment in the State of Georgia. Lithium has been identified as SSL-related constituent using the groundwater protection standard (GWPS) established for AP-1 in accordance with the Federal and State CCR Rules in the *2024 Annual Groundwater Monitoring and Corrective Action Report – Plant McIntosh Ash Pond 1* (ACC, 2025). An Alternate Source Demonstration (ASD) completed in January 2019 and a November 2019 supplement presented lines of evidence demonstrating that statistically significant levels (SSL) of lithium in groundwater were not due to a release from the unit. In response to the cobalt and lithium 2018 ASD and Supplemental 2019 ASD, Georgia EPD provided a letter of non-concurrence on September 20, 2024 (Georgia EPD, 2024), which also requested Georgia Power initiate an Assessment of Corrective Measures (ACM).

Consistent with USEPA guidance, this risk evaluation used a tiered approach to evaluate potential risks, which included the following steps:

1. Development of a conceptual exposure model (CEM) for AP-1.
2. Initial groundwater risk screening: Comparison of groundwater concentrations of the SSL-related constituent to conservative, health-protective criterion and/or the background concentration to assess whether they pose a risk to human health.

[1] The constituents included in the risk evaluation also occur naturally in the site geologic setting.

3. Refined groundwater risk evaluation: Perform a more refined analysis of the constituent of potential interest (COPI) that was not screened out in the initial risk screening to assess whether it poses a potential risk to human health.
4. Development of risk conclusions and identification of associated uncertainties.

Using this approach that includes multiple conservative assumptions, the SSL-related constituent evaluated from AP-1 is not expected to pose a risk to human health or the environment. The SSL-related constituent is delineated to concentrations below the applicable health-protective screening level in on-site groundwater monitoring wells. Therefore, no further risk evaluation for groundwater is warranted. In addition, because lithium in groundwater was delineated within the plant property boundary, evaluation of off-site ecological receptors associated with the surface water pathway was not necessary. Compliance monitoring for AP-1 will continue pursuant to the requirements of the Federal and State CCR Rules. Georgia Power will proactively evaluate the data and update this evaluation, if necessary.

1 INTRODUCTION

This report summarizes a risk evaluation of AP-1 at Georgia Power's Plant McIntosh (site) located in Effingham County, 4 miles northeast of the city of Rincon and 20 miles north-northwest of the city of Savannah (**Figure 1**). The risk evaluation was performed in support of the *Assessment of Corrective Measures Report – Plant McIntosh Ash Pond 1* (Arcadis, 2025). AP-1 was closed by removal and relocation of the stored coal combustion residual (CCR) material to a permitted landfill for disposal or off-site for beneficial reuse in accordance with the Federal and State CCR Rules. CCR Unit Solid Waste Handling Permit No. 051-011D (CCR) was issued by Georgia EPD on February 6, 2020. The permit requires post-closure care including semiannual groundwater monitoring and reporting for at least five years following CCR removal. All CCR material has been removed from Plant McIntosh AP-1. In a letter dated October 5, 2021, Georgia Environmental Protection Division (EPD) acknowledged that all CCR removal activities had been completed at the site. The site has been graded and restored.

This risk evaluation provides additional technical review of the human health and environmental protectiveness of constituent concentrations in groundwater identified at statistically significant levels (SSLs) above the groundwater protection standards (GWPS). The United States Environmental Protection Agency (USEPA) revised the Federal CCR Rule on July 30, 2018, updating the GWPS for cobalt, lead, lithium, and molybdenum values. On February 22, 2022, Georgia EPD adopted the federal GWPS for cobalt, lead, lithium, and molybdenum under 40 Code of Federal Regulations (CFR) §257.95(h) (EPD, 2022), which established the GWPS for these constituents as the higher of background concentrations or 0.006 milligrams per liter (mg/L), 0.015 mg/L, 0.040 mg/L, and 0.100 mg/L, respectively, which correspond to the USEPA Regional Screening Levels (RSLs) for tapwater[2].

The risk evaluation relies on a conservative, health-protective approach that is consistent with the risk approaches outlined in Voluntary Remediation Program (VRP) (Georgia Voluntary Remediation Act, O.C.G.A. § 12-8-100) and components of the Risk Assessment Guidance for Superfund (RAGS) as included in the USEPA RSLs User's Guide (USEPA, 2024). 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 lithium, which was identified as an SSL constituent in MGWC-7 under the Federal and State CCR Rules.

The remainder of the report is organized as follows:

[2] Although these GWPS are based on the tapwater RSLs, they are not subject to modification via periodic updates to the USEP RSL tables since the specific values are promulgated under 40 CFR §257.95(h).

- ***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 the SSL-related constituent.
- ***Section 3, Risk Evaluation Screening*** – Describes the process for the initial risk-based screening of the SSL-related constituent to identify a constituent of potential interest (COPI) in groundwater.
- ***Section 4, Refined Risk Evaluation*** – Describes the risk screening process for the COPI identified in groundwater, including calculation of exposure point concentrations (EPCs) and analysis of concentration trends over time.
- ***Section 5, Uncertainty Assessment*** – Describes the uncertainties associated with the risk screening process.
- ***Section 6, Conclusions*** – Presents the conclusions of the risk evaluation.
- ***Section 7, References*** – Provides reference information for the sources cited in this document.

2 BASIS AND BACKGROUND FOR THE DEVELOPMENT OF THE CONCEPTUAL EXPOSURE MODEL

This section provides a brief overview of the site location and operational history, site regulatory status, and geology/hydrogeology. A CEM representing the site-specific processes and conditions that are relevant to the potential migration of groundwater and potential exposure to the SSL-related constituent has been developed based on a review and compilation of information previously presented in site documents, including the *Hydrogeologic Assessment Report (HAR) – Plant McIntosh Ash Pond 1 Revision 1* (GEI, 2019a) and the *2024 Annual Groundwater Monitoring and Corrective Action Report – Plant McIntosh Ash Pond 1* (ACC, 2025). The CEM includes a conservative evaluation of assumed potential transport pathways, exposure pathways and potential human and ecological receptors.

2.1 Site Description

The site is located on approximately 2,300 acres approximately 4 miles northeast of the city of Rincon and 20 miles north-northwest of the city of Savannah. The physical address of and entrance to the plant is 981 Old Augusta Central Road, in Effingham County, Georgia. The plant property is bounded on the north and east by the Savannah River, and sparsely populated, forested, rural, and agricultural land to the north, south, and west. AP-1 was a 22-acre surface impoundment located in the eastern portion of the plant property, which was designed to receive and store CCR materials. A site location map and a detailed site map is included as **Figure 1**. All CCR material has been removed from Plant McIntosh AP-1. In a letter dated October 5, 2021, Georgia EPD acknowledged that all CCR removal activities had been completed at the site. The site has been graded and restored.

The monitoring well network for AP-1 is shown on **Figure 2**. Based on the conceptual site model and the observed hydrogeologic conditions at the site, downgradient well locations are distributed along the eastern and southern perimeter of AP-1 in the direction of groundwater flow.

2.1.1 Topography and Surface Hydrology

The site is located within the Coastal Plain Province of Georgia. The topography of the Coastal Plain is relatively flat and featureless, generally sloping towards the coast. The facility is located on a western bluff of the Savannah River system, with overall slope to the east, towards the river, and intermediate topography sloping towards a tributary that runs north through the approximate center of the site. Ground surface elevations range from a high of approximately 70 feet above mean sea level (AMSL) near the southwest portions of the site to a low of 30 feet AMSL on the eastern portion of the site. Ground surface elevations at AP-1 are approximately 60 feet AMSL with the base of the ponds being at approximately 40 feet AMSL (GEI, 2019a).

2.1.2 Geology and Hydrogeology

The following information is provided in the *2024 Annual Groundwater Monitoring & Corrective Action Report – Plant McIntosh Ash Pond 1* (ACC, 2025) and presented below:

> *Plant McIntosh is located in the Atlantic Coastal Plain Physiographic Province and situated on sediments that were deposited from the Cretaceous to Pleistocene periods. Regional lithology consists of stratified marine deposits and materials eroded from crystalline rock of the Piedmont Physiographic Province. Boring logs describe soils as interbedded clays, silts, and sands typical of Atlantic Coastal Plain sediments.*

The following information is provided in the *Hydrogeologic Assessment Report (HAR) – Plant McIntosh Ash Pond 1 (GEI, 2019a)* and presented below:

> *Recharge to the major aquifers in the area is to the northeast of Plant McIntosh, where these formations outcrop. The uppermost aquifer at Plant McIntosh is the Surficial aquifer, characterized by silty, sandy clays, clayey silts, silty sands, and fine to medium grained sands. Groundwater at Plant McIntosh generally flows from the southwest to the northeast.*
>
> …
>
> *At AP-1, groundwater flows semi-radially with flow being to the southeast on the east sides of the cells and to the east-northeast on the north end of the cells. Depth to water at AP-1 averages 25 feet below level surface (BLS) with elevations ranging from 42-28 feet AMSL. The thickness of Surficial aquifer has not been measured in on-Site borings but is anticipated to be at a depth of 50-100 feet BLS.*
>
> *The shallowest aquifer that is commonly used for drinking water in the area is the Upper Floridan, which exists at depths of 300 to 400 feet BLS in the Rincon, GA area. The Upper Floridan is separated from the Surficial aquifer by an extensive 200 to 250-foot Miocene-aged confining unit. A confining unit exists below the Upper Floridan and extends to depths of around 575 feet BLS. The Lower Floridan aquifer then exists from approximately 575 feet BLS to almost 900 feet BLS.*

Concentrations of the SSL (lithium) have been delineated horizontally and vertically on-site. The impacts associated with lithium are limited to the upper most surficial aquifer and do not extend off-site.

The potentiometric surface contours provided in the *2024 Annual Groundwater Monitoring & Corrective Action Report – Plant McIntosh Ash Pond 1* (ACC, 2025) are provided on **Figure 3.** Historically, groundwater flow has been semi-radial from AP-1, generally to the southeast. After closure, a more eastern to southeastern flow through the eastern cell has been observed.

The monitoring network was originally designed around historical flow patterns but captures potential migration of SSL concentrations in MGWC-7 with the current arrangement.

2.2 Potential Transport Pathways

A variety of geologic, hydrogeologic, and geochemical mechanisms can occur in the subsurface and serve to attenuate constituent concentrations in groundwater such as soil or rock characteristics, the local geology and hydrogeology, and the distance the groundwater must travel before reaching a potential receptor. A summary of the potential transport pathways is shown on the CEM in **Figure 4**.

The Savannah River is located on-site to the north and east of AP-1. The surface water flow of the Savannah River is to the south. A conservative assumption for this assessment was that groundwater on the south and east of AP-1 flows to the Savannah River. In addition, for the purposes of this evaluation, the Savannah River is assumed to represent a hydraulic discharge boundary for groundwater flow in the upper aquifer from the nearby region.

Concentrations of the SSL-related constituent, lithium, were below the respective health-protective screening level in the farthest downgradient wells on-site, as shown by the findings of the risk evaluation in Section 4.1.4. Therefore, evaluation of surface water was not necessary.

2.3 Potential Exposure Pathways and Receptors

The exposure pathways for groundwater were assumed to be complete for purposes of this risk evaluation and were used to identify potential receptors and estimate potential risk. The CEM (**Figure 4**) depicts the conservatively assumed potential exposure pathways and receptors included in the risk evaluation.

The following potential exposure pathways and receptors were considered:

- On-site industrial worker: The groundwater exposure pathway for the on-site industrial worker was considered complete due to the presence of three on-site potable wells (MCPW-01, MCPW-02, and MCPW-3). One on-site potable well (MCPW-03) is located upgradient to the west of AP-1 and two on-site potable wells (MCPW-01 and MCPW-02) are located side/downgradient to the east of AP-1 as shown in **Figure 5**. Water from these wells is used for a central water supply, sanitary facilities, cooling water, and process water (EPD, 2016). 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 are expected to have little to no direct contact with on-site groundwater due to safety procedures outlined in their site-specific health and safety plans.

- On-site resident: The groundwater exposure pathway for on-site residents was considered incomplete because the site is zoned as either Industrial and Manufacturing District or Agricultural District and there is no residential use on-site under current site conditions and future residential use of the site is considered unlikely (Effingham County, 2025).

- Off-site industrial/construction worker: The potential for off-site worker exposure through direct contact with groundwater was addressed qualitatively through the evaluation of hypothetical off-site residential receptors. Health-protective screening levels for residential receptors would be more conservative than industrial and construction worker screening levels.

- Off-site resident: The groundwater exposure pathway for hypothetical off-site residential receptors was conservatively assumed to be potentially complete. Nearby zoning is agricultural to the north, industrial to the south, and a mix of agricultural and residential use to the west (Effingham County, 2025). An off-site well survey of potential groundwater wells within a three-mile radius of the site was conducted and consisted of reviewing federal, state, and county records and online sources, in addition to conducting a windshield survey of the area (Newfields, 2020). The off-site well survey is included as **Appendix A**. An updated desktop potable well survey of potential groundwater wells within a two-mile radius of AP-1 was conducted in March 2025 and consisted of reviewing federal, state, county records, and online sources. The results of the survey and the 2024-2025 update are presented on **Figure 6**. Hypothetical off-site residential receptors in the downgradient groundwater flow direction identified in the well survey are located upgradient of AP-1 and there are no hypothetical off-site residential receptors between AP-1 and the discharge boundaries for AP-1 (i.e., the Savannah River).

  Concentrations of the SSL-related constituent lithium in on-site groundwater monitoring wells and piezometers are below health-protective screening levels in wells on-site and upgradient of surface water bodies at AP-1. As a conservative measure, hypothetical off-site residential exposure to lithium was evaluated using data collected from on-site groundwater wells between May 2016 and February 2025 downgradient of AP-1. This comparison makes the conservative assumption that on-site groundwater has the potential to migrate to off-site drinking water wells through advective transport in groundwater without any attenuation in the aquifer media through factors such as dilution, dispersion, or adsorption, and disregards the presence of the Savannah River which represent assumed hydraulic discharge boundaries for groundwater downgradient of AP-1. Accordingly, the risk evaluation screening assumed the hypothetical off-site residential receptor could be exposed by ingestion and dermal contact with SSL-related constituents in groundwater through its use as a future potable water source.

- Recreational surface water receptors: The surface water exposure pathway for hypothetical recreational receptors was addressed qualitatively through the evaluation of on-site groundwater data. Lithium concentrations are below the health-protective screening criteria in on-site groundwater. Therefore, evaluation of the surface water pathway was not necessary.

- Ecological surface water receptors: The surface water exposure pathway for off-site ecological receptors was addressed qualitatively through the evaluation of on-site groundwater data. Lithium concentrations are below health-protective screening criteria in on-site groundwater. Therefore, evaluation of the surface water pathway was not necessary.

3 RISK EVALUATION SCREENING

The CEM developed in Section 2 was used to identify the potential exposure pathways to human receptors that should be considered in the risk evaluation. The initial step in the risk evaluation is the comparison of SSL-related constituent concentrations from groundwater samples collected between May 2016 and February 2025 to relevant, health-protective levels. The approach used is consistent with the Georgia EPD regulations and guidance, USEPA guidance, and standard practice for risk assessment in the State of Georgia. The Georgia EPD allows for the site-specific evaluation of risk in programs such as the Voluntary Remediation Program (VRP) (EPD, 2009).

The initial risk evaluation screening was performed for the potential groundwater exposure pathway by comparing the concentrations of the SSL-related constituent lithium in groundwater samples from MGWC-7 (the only well with an SSL) to appropriate health-protective screening criteria. These criteria included the risk reduction standards (RRS)[3] established under the Hazardous Site Response Act (HSRA) for drinking water and site-specific background for the protection of human health. If the maximum concentration of the SSL-related constituent exceeded the screening criterion, the constituent was identified as a COPI for further evaluation in the refined risk evaluation. The methodology and screening criteria used were identified in accordance with regulatory guidance and standard risk assessment practices using an approach designed to conservatively overestimate possible exposures and risks, providing an additional level of confidence in the conclusions. The methodology is summarized in **Figure 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

Groundwater data for the three on-site supply wells (MCPW-1, MCPW-2, and MCPW-3) collected in January 2020, March 2021, March 2022, March 2023, March 2024, and March 2025 were used in the risk screening evaluation for on-site industrial worker exposure. One supply well is located to the northeast of AP-1 and two are located to the west of AP-1 (**Figure 5**). The groundwater dataset for the on-site supply wells is presented in **Appendix B**..

For the initial risk screening evaluation for hypothetical residential exposure, groundwater data from samples collected between May 2016 and February 2025 from the on-site Detection

[3] HSRA was amended in 2018 to make the methods used for calculating RRSs consistent with USEPA's RAGS for the calculation of RSLs.

Monitoring well that identified an SSL-related constituent was used in the risk screening evaluation for hypothetical off-site residential exposure.

Monitoring well MGWC-7 was identified in the *2024 Annual Groundwater Monitoring and Corrective Action Report – Plant McIntosh Ash Pond 1* (ACC, 2025) with an SSL for lithium under the Federal and State CCR Rules[4]. The location of MGWC-7 is provided on **Figure 8**.

Groundwater data used in the risk screening level evaluation were collected from the uppermost aquifer and are considered to be representative of groundwater conditions at the site. The groundwater dataset used in the risk evaluation is presented in **Appendix B**.

Reporting limits and method detection limits for the groundwater datasets used in the risk evaluation were reviewed and confirmed to be less than the screening level for lithium.

3.1.2 Background Groundwater Quality

Statistical analysis of groundwater monitoring data is performed at the site pursuant to §257.93-95 following the established statistical method from the Unified Guidance (USEPA, 2009) for AP-1; background values are routinely updated under the program. For the data set presented, five monitoring wells in the certified monitoring well network were designated as upgradient (background) locations for AP-1, MGWA-5, MGWA-6, MGWA-6A, MGWA-10, and MGWA-11. The statistical analyses performed on the groundwater data were described in the *2024 Annual Groundwater Monitoring and Corrective Action Report – Plant McIntosh Ash Pond 1* (ACC, 2025); and is summarized below.

> *The Sanitas groundwater statistical software was used to perform the statistical analyses. Sanitas is a decision-support software package, that incorporates the statistical tests required of Subtitle C and D facilities by USEPA regulations and guidance as recommended in the USEPA document Statistical Analysis of Groundwater Data at RCRA Facilities Unified Guidance (Unified Guidance) (USEPA, 2009). Time series plots generated by Sanitas are used to identify suspected outliers, or extreme values that would result in limits that are not representative of the current background data population. Suspected outliers at all wells for Appendix III and Appendix IV parameters are formally tested using Tukey's box plot method and not used to establish statistical limits. Background well data were updated following the Unified Guidance recommendation, evaluating recent background data using Tukey's*

[4] An Alternate Source Demonstration (ASD) for lithium in MGWC-7 was submitted to EPD in 2019 (GEI, 2019b) and was later supported by the *Supplemental Information for the Ash Pond 1 Alternate Source Demonstration* (Georgia Power, 2019). The ASD provided multiple lines of evidence to show that the source of lithium in groundwater is not due to a release from the unit. Georgia EPD reviewed the ASD and supplemental information and provided a letter of non-concurrence on September 20, 2024 (Georgia EPD, 2024). Therefore, lithium in MGWC-7 was evaluated in the risk evaluation as a conservative measure.

box plot method for outliers and Sen's Slope/Mann-Kendall methods for potential trends.

3.2 On-Site Potable Water Screening Evaluation

The process of screening the SSL-related constituent 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 includes screening levels equivalent to Type 3 and Type 4 (lithium) RRS 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.

- In accordance with standard methodologies approved by the Georgia EPD and because lithium is not a HSRA-regulated substance, a site-specific risk-based screening value was calculated using the default exposure factors for industrial receptors and the methodology found in Appendix III of the HSRA rule (EPD, 2018). Accordingly, the calculated screening value is equivalent to a Type 3 groundwater RRS protective of industrial exposures. Toxicity values for lithium used in the calculations were the USEPA-preferred values contained in the RSL Calculator (USEPA, 2024). The risk-based screening values were calculated using USEPA's RSL calculator assuming a target hazard quotient of 1, consistent with Georgia EPD guidance applicable in other contexts (EPD, 2018). The calculation of risk-based screening values for lithium is presented in **Appendix C-1**.

- 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 GWPSs (USEPA, 2020).The background concentration for lithium is less than the criteria described above. Therefore, the background value was not used as a screening level for lithium in this evaluation.

Table 1 presents the maximum detected concentration for the SSL-related constituent lithium in the identified on-site potable water wells used for comparison to the selected screening level for on-site industrial workers. As presented in **Table 1**, lithium was detected in on-site potable groundwater and was below its respective screening criteria. Further, the maximum laboratory reporting limits for lithium were less 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 constituents detected in groundwater against human health screening levels for groundwater is discussed below and presented in **Figure 7**. The HSRA RRSs evaluated under the VRP approach presented herein includes screening levels equivalent to Type 1 and Type 2 (lithium) RRS for off-site residential receptors. The Hazardous Site Response Act Rule 391-3-19.07(1) notes that "*[a]ll risk reduction standards will, when implemented, provide adequate protection of human health and the environment.*" In addition, Rule 391-3-19-.07(3) notes a corrective action, if needed, may be considered complete when "*a site meets any or a combination of the applicable risk reduction standards described in Rule 391-3-19-.07.*"

In accordance with standard methodologies approved by the Georgia EPD, the screening level hierarchy for the SSL-related constituent is as follows:

- The higher of the Type 1 or Type 2 RRS for hypothetical off-site residential exposure, which are considered protective of human health for those constituents regulated under HSRA.

- In accordance with standard methodologies approved by the Georgia EPD and because lithium is not a HSRA-regulated substance, a site-specific risk-based screening value was calculated using the default exposure factors for residential receptors and the methodology found in Appendix III of the HSRA rule (EPD, 2018). Accordingly, the calculated screening value is equivalent to a Type 2 groundwater RRS protective of residential exposures. Toxicity values for lithium used in the calculations were the USEPA-preferred values contained in the RSL Calculator (USEPA, 2024). The risk-based screening values were calculated using USEPA's RSL calculator assuming a target hazard quotient of 1, consistent with Georgia EPD guidance applicable in other contexts (EPD, 2018). The calculation of risk-based screening values for lithium is presented in **Appendix C-2**. Based on the foregoing, the site-specific residential screening level for lithium was used.

- 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 GWPSs (USEPA, 2020). Background was not used as a screening level in this evaluation.

In summation, based on the hierarchy above, groundwater data collected from the wells identified to have SSL-related constituents were compared to residential screening criterion for groundwater.

Table 2 presents the maximum detected concentration of the SSL-related constituent, lithium 0.17 mg/L, which was used to represent potential off-site groundwater quality for comparison to the selected screening level for lithium (0.04 mg/L), for hypothetical off-site residential receptors. As noted in **Table 2**, lithium was detected at concentrations that exceeded its screening level and was retained as a COPI for further evaluation in a refined risk evaluation.

4 REFINED RISK EVALUATION

A refined risk evaluation was conducted for the groundwater COPI that was detected at concentrations that exceeded the health-protective screening criteria (lithium). The refined risk evaluation identified EPCs for lithium for the purposes of characterizing potential risk to human receptors. A lithium EPC was developed and if the EPC is greater than the screening level, then the constituent is identified as having the potential for risk that warrants additional evaluation (e.g., performing a surface water evaluation). Lithium concentrations in the most downgradient well were below the screening level and a surface water evaluation was not necessary.

4.1 Refined Groundwater Risk Evaluation

Potential risk associated with exposure to lithium by hypothetical off-site residential receptors was refined using the methodology described in HSRA and VRP and other supporting guidance (EPD, 2018; EPD, 2015; EPD, 2009) and is presented in the following section and on **Figure 9**.

For the refined risk evaluation, groundwater data from samples collected between May 2016 and February 2025 from the on-site wells that were identified to have an SSL-related constituent and downgradient monitoring wells/piezometers that represent groundwater flow in the same hydraulically downgradient direction were used to evaluate hypothetical off-site residential exposure.

As noted above, groundwater data used in the risk screening level evaluation were collected from the uppermost aquifer and are considered to be representative of groundwater conditions at the site. The groundwater dataset used in the refined risk evaluation is presented in **Appendix B.**

4.1.1 Groundwater Exposure Point Calculation

The refined risk evaluation for lithium included the development of an EPC. The EPC is a conservative estimate of potential exposure that is selected to address uncertainty and variability in the dataset (USEPA, 2002). Consistent with guidance for developing groundwater EPCs (USEPA, 2014), 95 percent upper confidence limits of the arithmetic mean (95% UCLs) were calculated using USEPA ProUCL 5.2 software (ProUCL) and ProUCL user's guide (USEPA, 2022).

For the refined risk evaluation, the 95% UCLs for the COPIs in groundwater were calculated for datasets with the following characteristics:

- 95% UCLs for the individual well(s) with an SSL-related constituent;
- 95% UCLs based on combined data from the well(s) with an SSL-related constituent and other well(s)/piezometer(s) in the general vicinity to include additional

downgradient monitoring well(s)/piezometer(s) that represent groundwater flow in the same hydraulically downgradient direction; and

- 95% UCLs based on the combined data from the farthest downgradient well(s)/piezometer(s) that are hydraulically downgradient of the well(s) with an SSL-related constituent.

Other assumptions made in the calculation of the 95% UCLs include:

- Primary samples (no duplicates) were used to calculate EPCs as duplicate samples were analyzed for quality assurance purposes.

- If the calculated 95% UCL exceeded the maximum detected concentration or had less than four detections, then the maximum detected concentration was used as the EPC.

ProUCL software calculates multiple 95% UCLs and provides a recommended 95% UCL which was selected as the EPC. If there were multiple 95% UCLs recommended by ProUCL, the maximum 95% UCL value was selected as a conservative assumption. **Appendix D-1** provides a detailed summary of the 95% UCLs calculated using the methods described above, and **Appendix D-2** presents the figure showing the wells used in the calculation of the EPCs for each groundwater COPI. **Appendix D-3** provides the input and output files associated with the ProUCL software.

Table 3 summarizes the groundwater EPCs selected for lithium. This table shows the number of samples, the maximum detected concentration, the 95% 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 lithium. 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 MGWC-7, MGWC-8, MGWC-19, and MGWC-20 for lithium to evaluate the trends in concentrations over time. The tests were conducted using the USEPA ProUCL 5.2 software (USEPA, 2022).

The Mann-Kendall and Thiel-Sen test results are presented on time series graphs in **Appendix D-4** and indicated there is no statistically significant trend in lithium concentrations over time in MGWC-7, MGWC-19, and MGWC-20 and a statistically significant decreasing trend in MGWC-8 over time.

4.1.3 Refined Groundwater Risk Evaluation Results

Lithium was identified as a groundwater COPI in the initial risk screening. In the refined risk evaluation, comparison of the calculated EPC to the screening level was used to identify constituents of interest (COIs) that may pose a potential risk to hypothetical off-site residential receptors exposed through the potential use of groundwater as potable water. If the EPC from the farthest downgradient well(s) 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 Lithium

Lithium concentrations were detected in 28 out of 28 groundwater samples in well MGWC-7 at concentrations that exceeded the off-site groundwater screening level for residential receptors. For the refined risk evaluation, the following EPCs were calculated for lithium using the wells shown in **Appendices D-1** and **D-2**:

- Data from MGWC-7 were combined to determine if the 95% UCL is lower than the screening level (EPC Step 1 in **Appendix D-1**).
- Data from MGWC-7 and the downgradient wells MGWC-8, MGWC-19, and MGWC-20 were combined to represent groundwater potential exposure associated with the SSL well and hydraulically downgradient wells (EPC Step 2 in **Appendix D-1**).
- Data from MGWC-8 and MGWC-20 were used to represent groundwater exposure using the well that is the farthest hydraulically downgradient of well MGWC-7 (EPC Step 3 in **Appendix D-1**).

Although the EPC Step 1 (0.132 mg/L) and the EPC Step 2 (0.079 mg/L) exceeded the screening level, the EPC Step 3 (0.030 mg/L), which includes the farthest downgradient well, was less than the health-protective screening level.

Table 4 presents the results of the refined screening comparing the farthest hydraulically downgradient EPC to the screening criterion. As lithium was not detected above the applicable screening level in the farthest hydraulically downgradient wells on the site, lithium was not identified as a groundwater COI for hypothetical off-site residential receptors and is not expected to pose a risk to human health through potable water use.

4.1.4 Refined Groundwater Risk Evaluation Summary and Conclusions

Detections of the SSL-related constituent lithium were reported at concentrations above the applicable groundwater screening value. However, the results of the refined groundwater risk evaluation indicate that lithium is not expected to pose a risk to hypothetical off-site residential receptors. The individual data points used to calculate the lithium EPCs to represent potential groundwater exposure for hypothetical off-site residential receptors based on the farthest hydrologically downgradient monitoring wells were below the health-protective screening level.

Accordingly, based on the multiple lines of evidence and various conservative assumptions, further risk evaluation for groundwater is not warranted. 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 methodologies approved by the Georgia EPD, the higher of the Type 1 or Type 2 standard was selected for residential screening criteria and the higher of the Type 3 and Type 4 standards were selected as the industrial worker screening criterion. Selection of the screening criteria per industry standards is considered appropriate for risk quantification for Plant McIntosh. 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 hypothetical risks for off-site receptors.

- Screening criteria based on RRSs, represent the reasonable maximum exposure (RME), which are the highest exposures that are reasonably expected to occur at a site. The RME is defined as "*the highest exposure that is reasonably expected to occur at a site but that is still within the range of possible exposures*" (USEPA, 1989). Further, USEPA (1989) states that the "*intent of the RME is to estimate a conservative exposure case (i.e., well above the average case) that is still within the range of possible exposures.*" Potential receptors will likely have lower exposures than those presented in this risk evaluation (i.e., a majority of the site concentrations will be less than the 95% UCL), which overestimates potential exposure.

Exposure Uncertainties:

- The maximum detected concentration of lithium was compared to the conservative risk-based screening criterion 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 may occur naturally in the site geologic setting. Although background concentrations were evaluated, contributions to exposure and risk were assumed to be entirely CCR--related and natural background sources were not quantified. Thus, SSL concentration-related exposures were likely overestimated.

- Hypothetical off-site residential exposure was evaluated using on-site groundwater data from wells around the perimeter and downgradient of AP-1. This comparison makes the conservative assumption that on-site groundwater may potentially migrate to off-site drinking water wells through advective transport in groundwater, but without any attenuation within the aquifer media through factors such as dilution, dispersion, or adsorption. This assumption may overestimate potential exposure and risk to hypothetical off-site receptors.

- EPCs for metals in groundwater were assumed to be 100 percent bioavailable by ingestion and dermal contact. This assumption may tend to overestimate risk.

- An off-site well survey of potential groundwater wells within a three-mile radius of Plant McIntosh was conducted in 2020 (NewFields, 2020) and updated in March 2025. The survey consisted of reviewing publicly available federal, state, and county records as well as a windshield survey of the area (**Appendix A**). Geosyntec relied on the data collected by NewFields.

- As a conservative measure, on-site potable well data were also screened against off-site residential screening criteria. Lithium detected concentrations were below the residential screening level. Residential receptors are not present on-site, and evaluation of this exposure pathway was a conservative measure.

- The evaluation used on-site groundwater data to represent hypothetical off-site exposure, which is a conservative approach that likely results in overestimation of assumed exposure and assumed potential risk. Although off-site potable wells identified in the well survey were not included in the risk evaluation, the presence of these wells does not impact the conclusions of the risk evaluation because concentrations of COPIs are delineated in on-site groundwater.

Toxicity Uncertainties:

- Toxicity factors used to calculate health-protective criteria are established at conservative levels to account for uncertainties and often result in criteria that are many times lower than the levels observed to cause effects in human or animal studies. Therefore, a screening level exceedance does not necessarily equate to an adverse effect.

6 CONCLUSIONS

This risk evaluation for the SSL-related constituent in groundwater at AP-1 was conducted using methods consistent with Georgia EPD and USEPA guidance and included multiple conservative assumptions. Based on this evaluation, the SSL-constituent evaluated from AP-1 (lithium) is not expected to pose a risk to human health or the environment.

Accordingly, no further risk evaluation of groundwater is warranted. Compliance monitoring for AP-1 under the Federal and State CCR Rules will continue. Georgia Power will proactively evaluate the data and update this risk evaluation, if necessary.

7 REFERENCES

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TABLES

Table 1
On-Site Potable Well Groundwater Screening
Plant McIntosh AP-1 Risk Evaluation Report[1]
Plant McIntosh, Effingham County, GA

CCR Rule Designation	Constituent	CAS No.	Detection Frequency	Exceedance Frequency[2]	Maximum Concentration (mg/L)	Screening Level (mg/L)	Source[3]	Site-Specific Background (mg/L)	COPI? (Y/N)	Rationale[4]
Appendix IV	Lithium	7439-93-2	12 / 18	0 / 18	0.0066	0.23	Site-Specific	0.037	N	BSL

Notes:

[1] Evaluation includes January 2020, March 2021, March 2022, March 2023, March 2024, and March 2025 groundwater analytical data from the three onsite potable wells MCPW-01, MCPW-02, and MCPW-03.

[2] The exceedance frequency is based on the number of samples with detected concentrations that exceed the identified screening level.

[3] The screening levels are the maximum value from the following sources:
- Site-Specific values calculated using the EPA RSL calculator with with exposure factors inputs from HSRA Appendix III, Table 3.
- Site-specific background levels for each constituent were calculated as described in ACC, 2025.

[4] Rationale for classification of constituent as a COPI or exclusion as a COPI:
- ASL = Above respective screening level
- BSL = Below respective screening level

Definitions:

Grey shading indicates the constituent exceeded its screening level.
CAS = Chemical Abstract Service
CCR = Coal Combustion Residuals
COPI = Constituent of Potential Concern
GA EPD= Georgia Environmental Protection Division
EPA = United States Environmental Protection Agency
mg/L = milligram(s) per liter
HSRA = [GA EPD] Hazardous Site Response Act
RRS = Risk Reduction Standard
RSL = Regional Screening Level
"<" = detection limit for non-detect result

References:

Atlantic Coast Consulting (ACC). 2025. *2024 Annual Groundwater Moniroting and Corrective Action Report - Plant McIntosh Ash Pond 1* . January.

Table 2
SSL-Related Constituent Groundwater Screening
Plant McIntosh AP-1 Risk Evaluation Report[1]
Plant McIntosh, Effingham County, GA

CCR Rule Designation	Constituent	CAS No.	Detection Frequency	Exceedance Frequency[2]	Maximum Concentration (mg/L)	Screening Level (mg/L)	Source[3]	Site-Specific Background (mg/L)	COPI? (Y/N)	Rationale[4]
Appendix IV	Lithium	7439-93-2	28 / 28	28 / 28	0.17	0.04	Site-Specific	0.037	Y	ASL

Notes:
[1] Evaluation includes May 2016 to February 2025 groundwater analytical data from wells MGWC-7 (lithium).
[2] The exceedance frequency is based on the number of samples with detected concentrations that exceed the identified screening level.
[3] The screening levels are the maximum value from the following sources:
- Type 1 RRSs listed in HSRA Appendix III, Table 1 (HSRA-regulated substances only).
- Type 2 RRSs calculated using the EPA RSL calculator with default residential exposure factors listed in the RSL Users Guide (HSRA-regulated substances only).
- Site-Specific values calculated using the EPA RSL calculator with default residential exposure factors listed in the RSL Users Guide.
- EPA Maximum Contaminant Levels (MCLs).
- Site-specific background levels for each constituent were calculated as described in ACC, 2025.

[4] Rationale for classification of constituent as a COPI or exclusion as a COPI:
- ASL = Above respective screening level
- BSL = Below respective screening level

Definitions:
Grey shading indicates the constituent exceeded its screening level.
CAS = Chemical Abstract Service
CCR = Coal Combustion Residuals
COPI = Constituent of Potential Concern
GA EPD= Georgia Environmental Protection Division
EPA = United States Environmental Protection Agency
mg/L = milligram(s) per liter
HSRA = [GA EPD] Hazardous Site Response Act
RRS = Risk Reduction Standard
RSL = Regional Screening Level

References:
Atlantic Coast Consulting (ACC). 2025. *2024 Annual Groundwater Moniroting and Corrective Action Report - Plant McIntosh Ash Pond 1* . January.

Table 3
Groundwater Exposure Point Concentration Summary
Plant McIntosh AP-1 Risk Evaluation Report
Plant McIntosh, Effingham County, GA

CCR Rule Designation	Constituent	CAS No.	Detection Frequency	Maximum Concentration (mg/L)	Wells Included in 95% UCL Calculation	95% UCL [1] (mg/L)	Recommended 95% UCL Method [1]	Selected EPC (mg/L)
Appendix IV	Lithium	7439-93-2	33 / 33	0.058	MGWC-8 MGWC-20	0.03	95% Student's-t UCL	0.030

Notes:
[1] Groundwater exposure point concentrations (EPCs) calculated in accordance with EPA, 2014. *Memorandum for Determining Groundwater Exposure Point Concentrations, Supplemental Guidance* . OSWER Directive 9283.1-42, February 2014. Located at: https://cfpub.epa.gov/ncea/risk/recordisplay.cfm?deid=236917. For further detail on the selected EPC, refer to Appendix D-1.

Definitions:
CAS = Chemical Abstract Service
CCR = Coal Combustion Residuals
EPC = exposure point concentration
UCL = upper confidence limit on the mean
mg/L = milligram(s) per liter

Table 4
Downgradient Groundwater Residential Refined Evaluation
Plant McIntosh AP-1 Risk Evaluation Report
Plant McIntosh, Effingham County, GA

CCR Rule Designation	Constituent	CAS No.	Detection Frequency	Exceedance Frequency[1]	Selected EPC (mg/L)	Screening Level (mg/L)	SL Source[2]	COI? (Y/N)	Rationale[3]
Appendix IV	Lithium	7439-93-2	33 / 33	5 / 33	0.03	0.04	Site-Specific	N	BSL

Notes:

[1] The exceedance frequency is based on the number of samples with detected concentrations that exceed the identified screening level.

[2] The screening values are the maximum value from the following sources:
- Type 1 RRSs listed in HSRA Appendix III, Table 1 (HSRA-regulated substances only).
- Type 2 RRSs calculated using the USEPA RSL calculator with default residential exposure factor listed in the RSL Users Guide (HSRA-regulated substances only).
- Site-Specific values calculated using the USEPA RSL calculator with default residential exposure factor listed in the RSL Users Guide.
- Site-specific background levels for each constituent were calculated as described in ACC, 2025.

[3] Rationale for classification of constituent as a COI or exclusion as a COI:
- ASL = Above respective screening level
- BSL = Below respective screening level

Definitions:

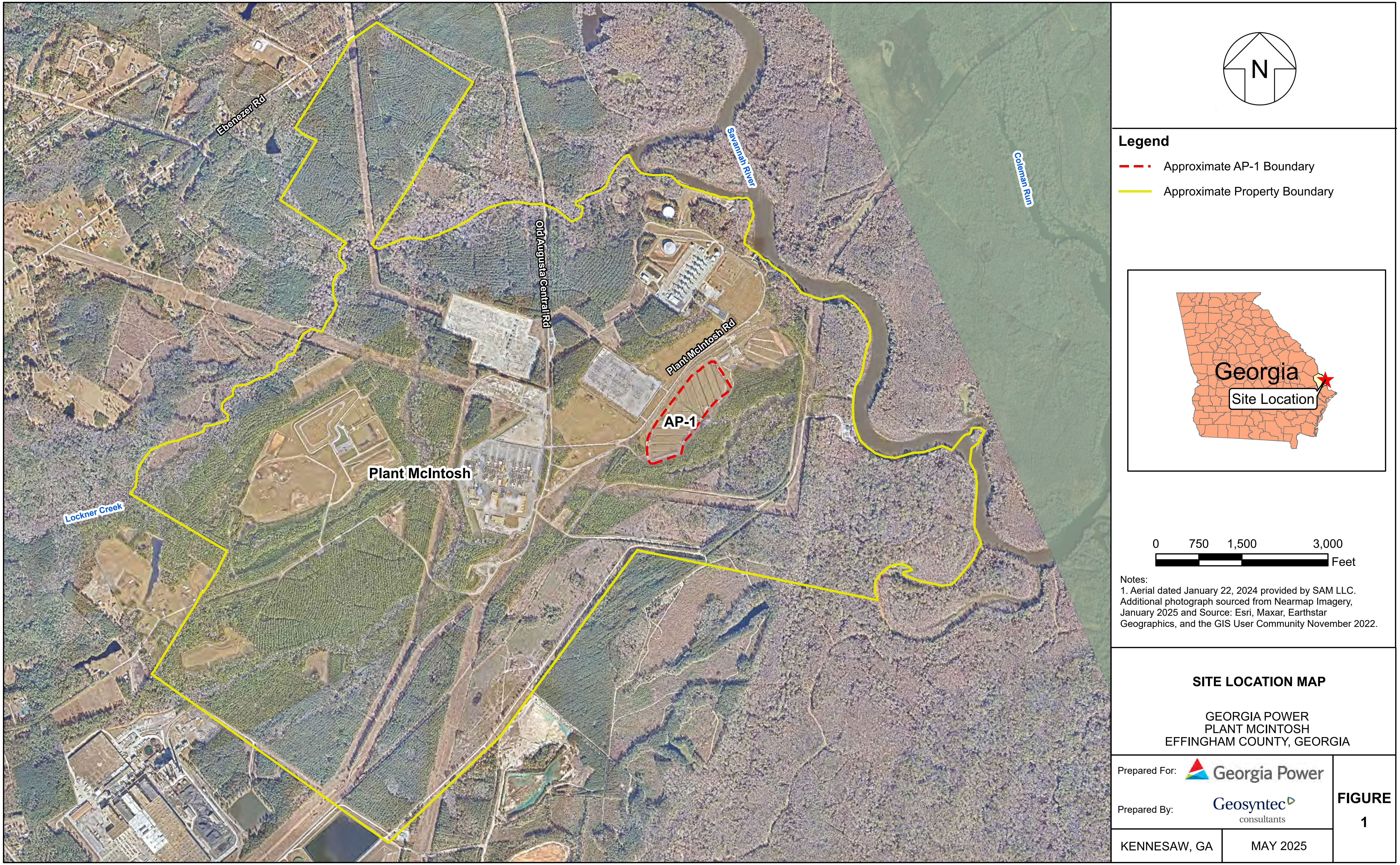
Grey shading indicates the constituent exceeded its screening level.

CAS = Chemical Abstract Service
CCR = Coal Combustion Residuals
COI = Constituent of Interest
EPA = United States Environmental Protection Agency
GA EPD= Georgia Environmental Protection Division
HSRA = [GA EPD] Hazardous Site Response Act
mg/L = milligram(s) per liter
RRS = [GA EPD] Risk Reduction Standard
RSL = [EPA] Regional Screening Level

References:

Atlantic Coast Consulting (ACC). 2025. *2024 Annual Groundwater Moniroting and Corrective Action Report - Plant McIntosh Ash Pond 1* . January.

FIGURES



Legend

- Approximate AP-1 Boundary
- Approximate Property Boundary

Notes:
1. Aerial dated January 22, 2024 provided by SAM LLC. Additional photograph sourced from Nearmap Imagery, January 2025 and Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community November 2022.

SITE LOCATION MAP

GEORGIA POWER
PLANT MCINTOSH
EFFINGHAM COUNTY, GEORGIA

Prepared For: Georgia Power

Prepared By: Geosyntec consultants

KENNESAW, GA | MAY 2025

FIGURE 1

N

Legend

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

0 150 300 600
Feet

Notes:
1. Aerial dated January 22, 2024 provided by SAM LLC. Additional photograph sourced from Nearmap Imagery, January 2025.

SITE LAYOUT AND MONITORING WELL NETWORK

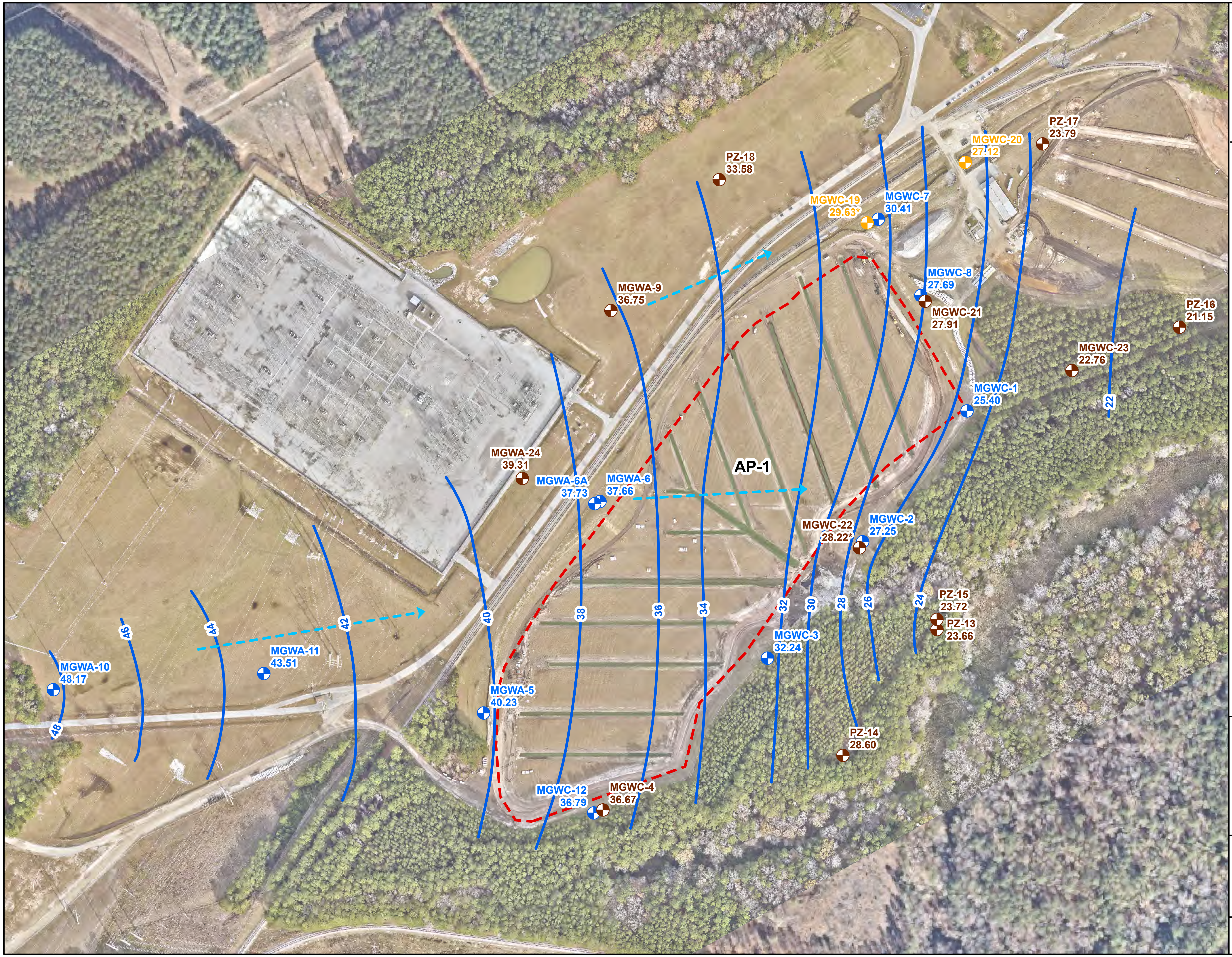
GEORGIA POWER
PLANT MCINTOSH
EFFINGHAM COUNTY, GEORGIA

Prepared For: Georgia Power

Prepared By: Geosyntec consultants

KENNESAW, GA | MAY 2025

FIGURE 2



N

Legend

- Detection Monitoring Well
- Assessment Monitoring Well
- Piezometer
- Groundwater Elevation Iso-Contour
- Approximate Grounwater Flow
- Approximate AP-1 Boundary

0 150 300 600
Feet

Notes:
1. Water level elevation recorded on August 12, 2024, for semiannual groundwater event.
2. Elevation provided in feet (ft) referenced to the North American Vertical Datum of 1988 (NAVD 88).
3. * - Indicates elevations for MGWC-19 and MGWC-22 are not used to calculate potentiometric contours.
4. Aerial dated January 22, 2024 provided by SAM LLC. Additional photograph sourced from Nearmap Imagery, January 2025.

POTENTIOMETRIC SURFACE ELEVATION CONTOURS - AUGUST 2024

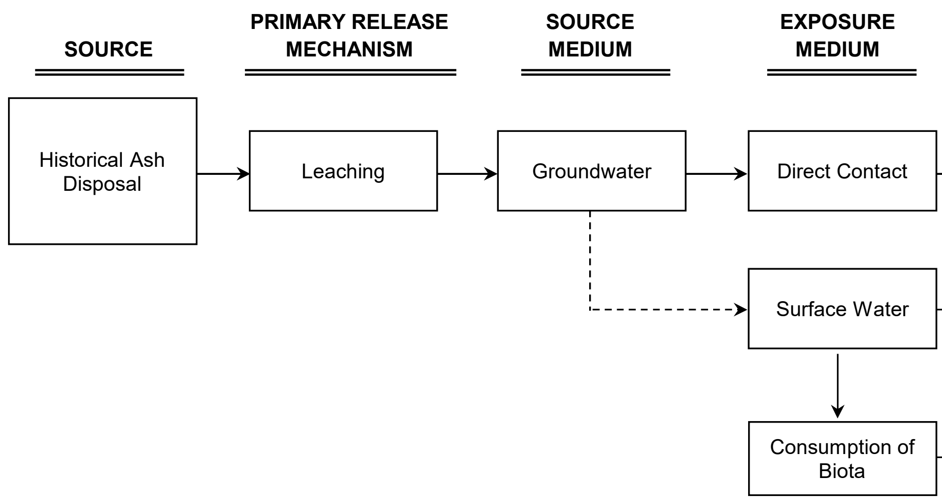
GEORGIA POWER
PLANT MCINTOSH
EFFINGHAM COUNTY, GEORGIA

Prepared For: Georgia Power

Prepared By: Geosyntec consultants

KENNESAW, GA | MAY 2025

FIGURE 3



		HUMAN HEALTH AND ECOLOGICAL RISK EVALUATION RECEPTORS									
		HUMAN									ECOLOGICAL
		Current				Future					Current / Future
		On-Site	Off-Site		On- / Off-Site	On-Site		Off-Site		On- / Off-Site	On- / Off-Site
EXPOSURE MEDIUM	EXPOSURE ROUTE	Worker[1]	Worker[2]	Child and Adult Resident	Child and Adult Recreator	Worker[1]	Child and Adult Resident	Worker[2]	Child and Adult Resident	Child and Adult Recreator	Aquatic Receptors[3]
Direct Contact	Ingestion	●	○	●		●		○	●		
	Dermal Contact	●	○	●		●		○	●		
Surface Water	Ingestion				○					○	○
	Dermal Contact				○					○	○
Consumption of Biota	Ingestion				○					○	

Legend

- - - -▸ A conservative assumption for this assessment was made that groundwater from the site flows to the downgradient surface water.

● Indicates potentially complete pathway to receptors, which are evaluated quantitatively.

○ Indicates potentially complete pathway to receptors, which are evaluated qualitatively.

Footnotes

1. Industrial worker were quantitatively evaluated. On-site construction workers are expected to have little to no direct contact with on-site groundwater due to safety procedures outlined in their site-specific health and safety plans.
2. Off-site industrial/construction worker addressed through the evaluation of hypothetical off-site residential receptors as health-protective screening levels for residential receptors would be more conservative than industrial and construction worker screening levels.
3. Generalized receptor for ecological health risk evaluation.

Conceptual Exposure Model

Georgia Power
Plant McIntosh AP-1

Geosyntec consultants

Kennesaw, GA | May 2025

Figure 4

Legend

- Supply Well Location
- Approximate AP-1 Boundary
- Approximate Property Boundary

0 750 1,500 3,000 Feet

Notes:
1. Aerial dated January 22, 2024 provided by SAM LLC. Additional photograph sourced from Nearmap Imagery, January 2025 and Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community November 2022.

SUPPLY WELL LOCATIONS

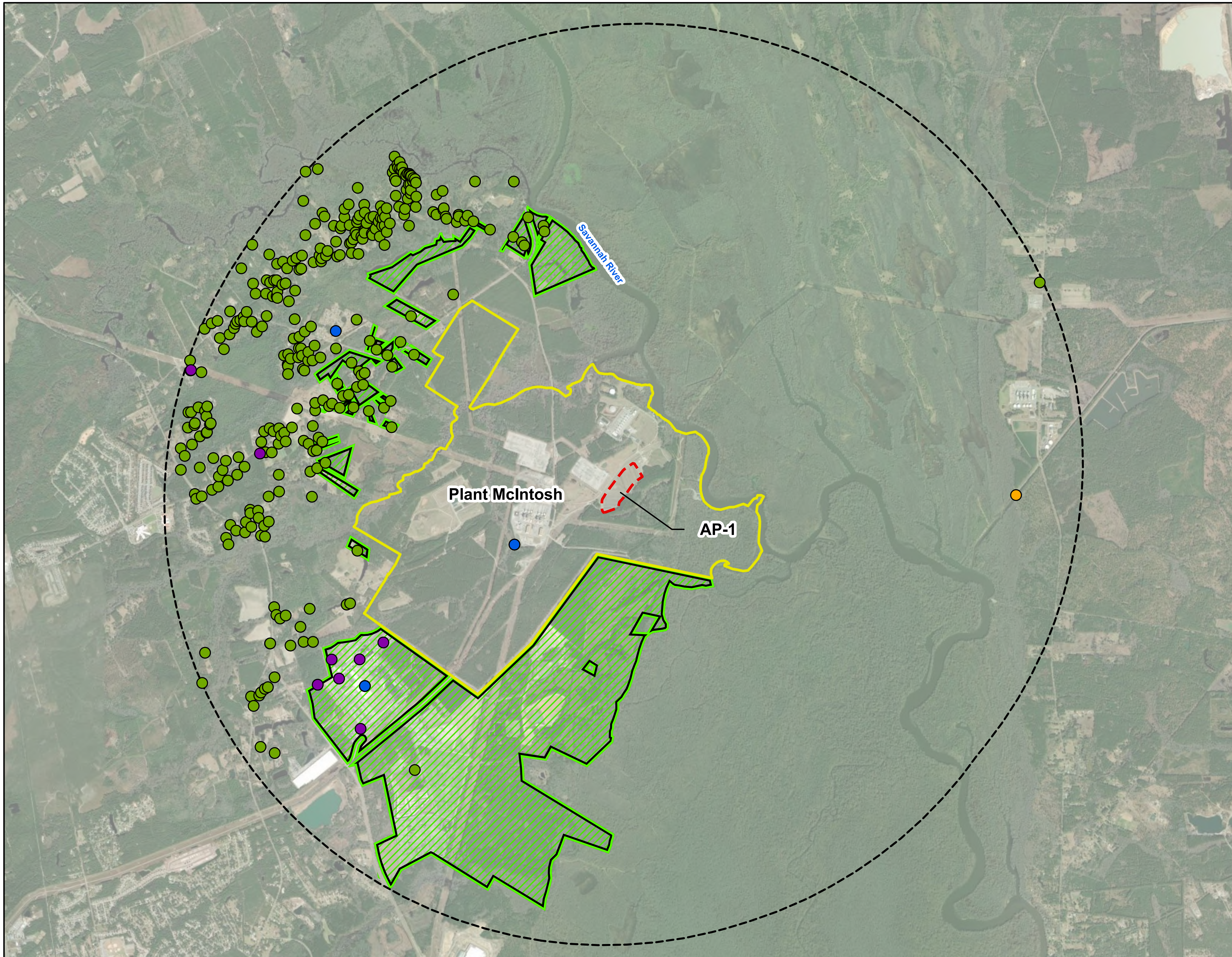
GEORGIA POWER
PLANT MCINTOSH
EFFINGHAM COUNTY, GEORGIA

Prepared For: Georgia Power

Prepared By: Geosyntec consultants

KENNESAW, GA | MAY 2025

FIGURE 5



N

Legend

- Surface Water Intake
- Monitoring Well
- Private Drinking Well
- Public Drinking Well
- Approximate AP-1 Boundary
- Approximate Property Boundary
- 3-Mile Radius
- Parcels Identified as Likely Having Wells

0 1,750 3,500 7,000 Feet

Notes:
1. Aerial dated January 22, 2024 provided by SAM LLC. Additional photograph sourced from Nearmap Imagery, January 2025 and Earthstar Geographics November 2022.
2. Specific locations for the on-site public drinking wells (i.e., the supply wells) is shown on Figure 5 of this report.

OFF-SITE WELL SURVEY RESULTS

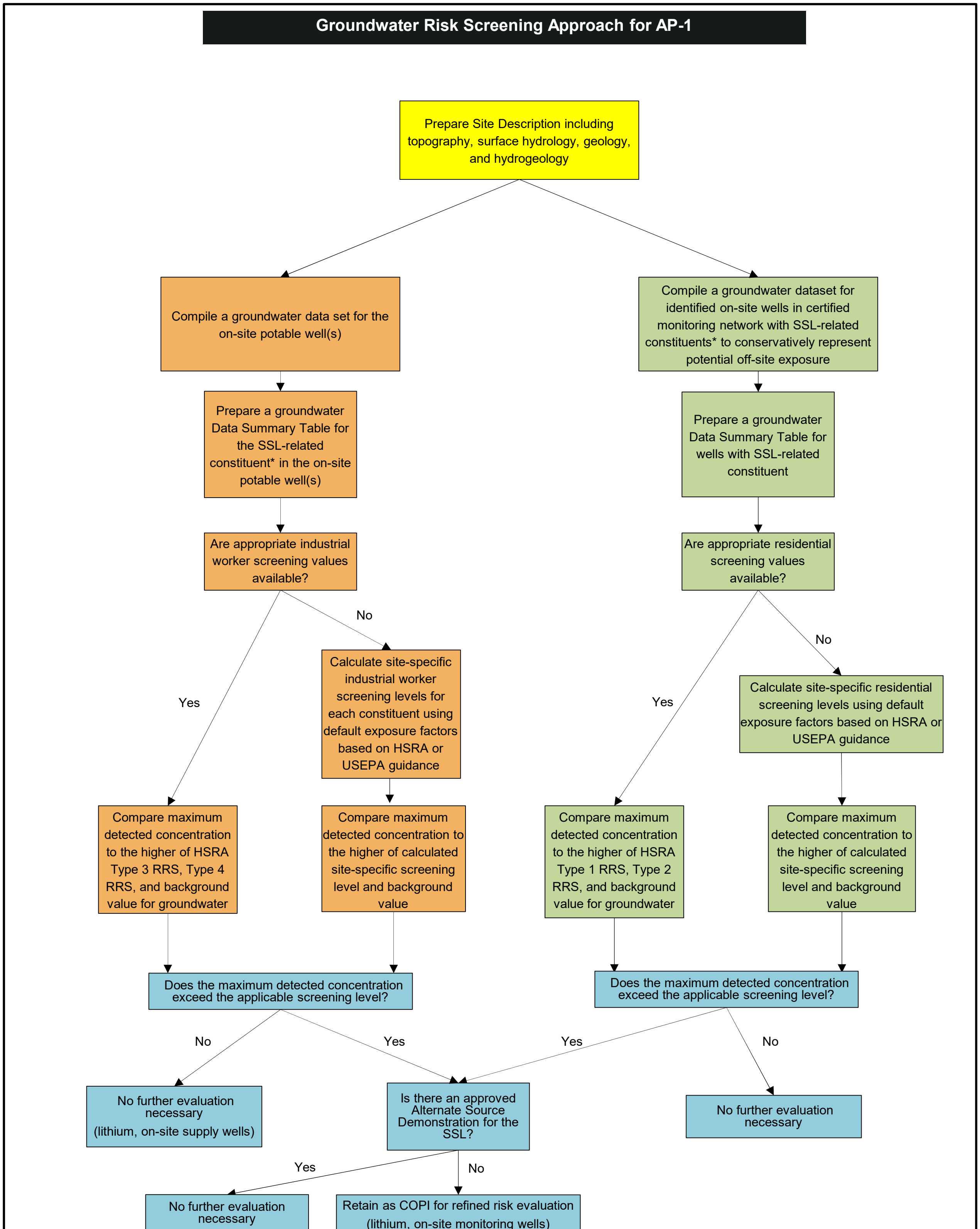
GEORGIA POWER
PLANT MCINTOSH
EFFINGHAM COUNTY, GEORGIA

Prepared For: Georgia Power

Prepared By: Geosyntec consultants

KENNESAW, GA | MAY 2025

FIGURE 6



Notes:
* Initial screen evaluates wells at AP-1 with SSL-related constituents, lithium
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 McIntosh AP-1
Groundwater Risk Screening Approach

Figure 7

May 2025

N

Legend

- Wells with SSL Related Constituents
- Detection Monitoring Well
- Assessment Monitoring Well
- Piezometer
- Approximate AP-1 Boundary

0 150 300 600 Feet

Notes:
1. Lithium State and Federal CCR Rule SSL-Related Constituent: MGWC-7.
2. Aerial dated January 22, 2024 provided by SAM LLC. Additional photograph sourced from Nearmap Imagery, January 2025.

MONITORING WELLS INCLUDED IN RISK SCREEN

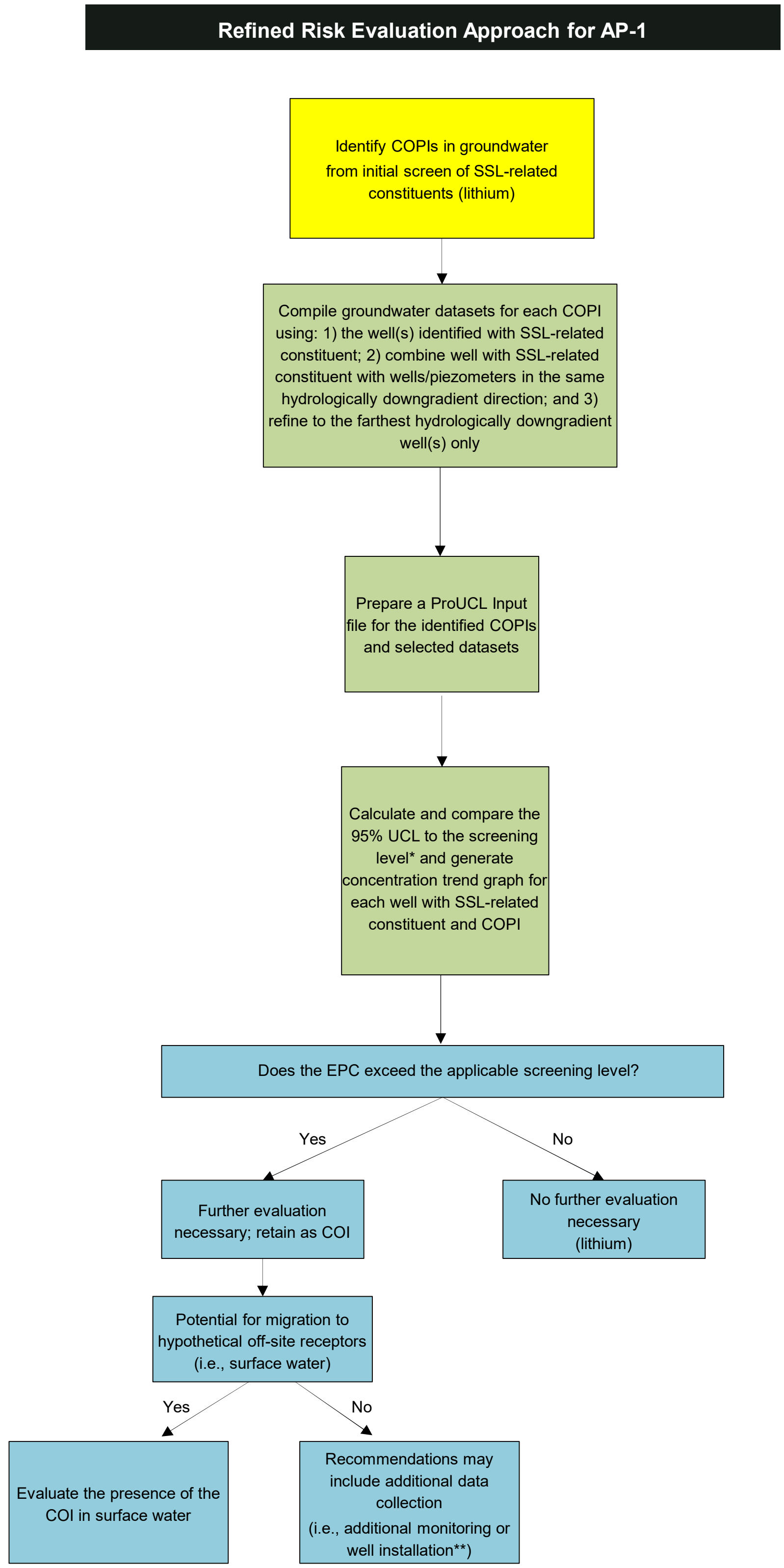
GEORGIA POWER
PLANT MCINTOSH
EFFINGHAM COUNTY, GEORGIA

Prepared For: Georgia Power

Prepared By: Geosyntec consultants

KENNESAW, GA | MAY 2025

FIGURE 8



Notes:
*If the 95% UCL exceeds the maximum concentration, use the maximum as the EPC.
**This step is not necessary for AP-1
SSL = Statistically Significant Level
COPI = Constituent of Potential Interest
EPC = Exposure Point Concentration
UCL = Upper Confidence Limit
COI = Constituent of Interest

Plant McIntosh AP-1
Refined Groundwater Risk Evaluation Approach

Figure 9

May 2025

APPENDIX A

Plant McIntosh Well Survey (Off-Site)

NewFields

Well Survey

Plant McIntosh

Ash Pond 1

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 6, 2020

Introduction

Plant McIntosh is located at 981 Old Augusta Road in Effingham County, Georgia, approximately 4 miles northeast of the city of Rincon.

Newfields conducted a well survey of potential drinking water wells within a three-mile radius of Ash Pond 1 at Plant McIntosh ("Investigated Area"). The Investigated Area is shown on Figure 1. The Investigated Area consists primarily of Effingham County, GA, with some of the radius located in South Carolina.

As part of this survey, NewFields accessed and reviewed information from a number of Federal, State, and County records and online sources, as well as a windshield survey of the Investigated Area. Information from each identified well was then compiled into a geographic information system (GIS) database.

Information Collection

This section summarizes the sources utilized for identifying potential drinking water wells within the Investigated Area.

1. Federal Sources
   a. **United States Geological Survey (USGS).** USGS maintains an inventory database of any well sampled by a USGS-affiliated program for ground-water levels and/or water quality parameters at any time in the past.[1] Well information and coordinates were downloaded for the state of Georgia and compiled into the GIS database. Wells in this database in the Investigated Area are labelled 'human drinking water wells' or 'monitoring wells'. 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.

      In addition, the USGS data contains information about major surface water intakes, including both industrial and municipal drinking water intakes. Specific information about the operator and use of the water is not included, but can be determined using information from other sources. One surface water intake, from a canal from the Savannah River, was identified 2.6 miles to the east of Plant McIntosh.

   b. **Safe Drinking Water Information System (SDWIS).** This EPA database has listings of public water systems but does not have well location information. SDWIS information was used to help identify the suppliers of public water in the vicinity of the facility. The City of Rincon is the only water supplier in the Investigated Area.

[1] http://waterdata.usgs.gov/ga/nwis/inventory?introduction

2. State Sources
   a. **Georgia Environmental Protection Division (EPD)**
      i. **Drinking Water Branch.** EPD maintains records about municipal and industrial wells, whose presence or absence within a radius of a site can be ascertained by contacting the agency. An email was sent to Michael Gillis of EPD on October 23rd, 2019 requesting information about wells in the Investigated Area. The EPD confirmed the presence of six public drinking water wells within the Investigated Area. The exact locations of the wells were not given for the public drinking water wells, but approximate locations were determined using information from parcel data, well information from the Drinking Water Branch Web site, the windshield survey, and aerial photography.

      ii. **Hazardous Site Response Act (HSRA) notifications.** EPD maintains non-HSI HRSA notification reports (i.e., notifications submitted after releases of reportable substances). Reports associated with sites in Effingham County. There were no HSRA notifications within a three-mile radius of Plant McIntosh.

      iii. **EPD Pesticide Sampling Project.** From 2000 to 2004, EPD undertook a project to sample private drinking water wells for pesticides. EPD solicited volunteers state-wide to participate in the well sampling program. The final report includes the list of private water wells sampled, their coordinates, and depths when available.[2] Information about wells within the Investigated Area were compiled into the GIS database.

      iv. **Georgia Department of Health (GDPH).** The Coastal Health District (CHD) the GDPH maintains an online database of over 1,800 well permits from Georgia coastal counties, with most records containing well coordinates. This database was accessed[3] and relevant information about wells were downloaded and compiled into the GIS database.

3. County Sources
   a. **County Health Departments.** County health departments (DOH) maintain records of the permits for "on-site sewage management systems" (septic tanks). NewFields visited the office of Environmental Health in Springfield, where permits were organized by general area in the county. A large number of permits were found which indicated private well use. NewFields obtained copies of these permits, and located the parcels using address information and maps in some of the permits.

   b. **Tax Assessor Records.** NewFields contacted the Effingham County Tax Assessor's office, and determined that complete parcel and improvement data would be cost-prohibitive.

[2] https://epd.georgia.gov/sites/epd.georgia.gov/files/related_files/site_page/PR-55.pdf
[3] CDH provided a temporary access to NewFields.

NewFields was able to obtain parcel shapes and owner information dated the first quarter of 2019 from a third-party vendor, ReportAll.

Almost the entirety of the Jasper County, South Carolina part of the Investigated Area is a single parcel, the Exley Plantation conservation area. Information about the handful of parcels in that area was obtained from the Jasper County Tax Assessor's website.

4. Windshield Surveys

A windshield survey of the area was conducted on December 9, 2019. A large number of wells were seen during the windshield survey; however, due to the rural nature of the areas, many parcels were large and structures were not always visible from the road. The Jasper County, South Carolina portion of the Investigated Area is predominantly private property and was inaccessible.

Summary

The Investigated Area is mostly rural, with a mixture of large residential parcels and undeveloped land. Municipal water is only widely available in the southwestern portion of the Investigated Area near the city of Rincon. Newer developments typically have water supplied by the city.

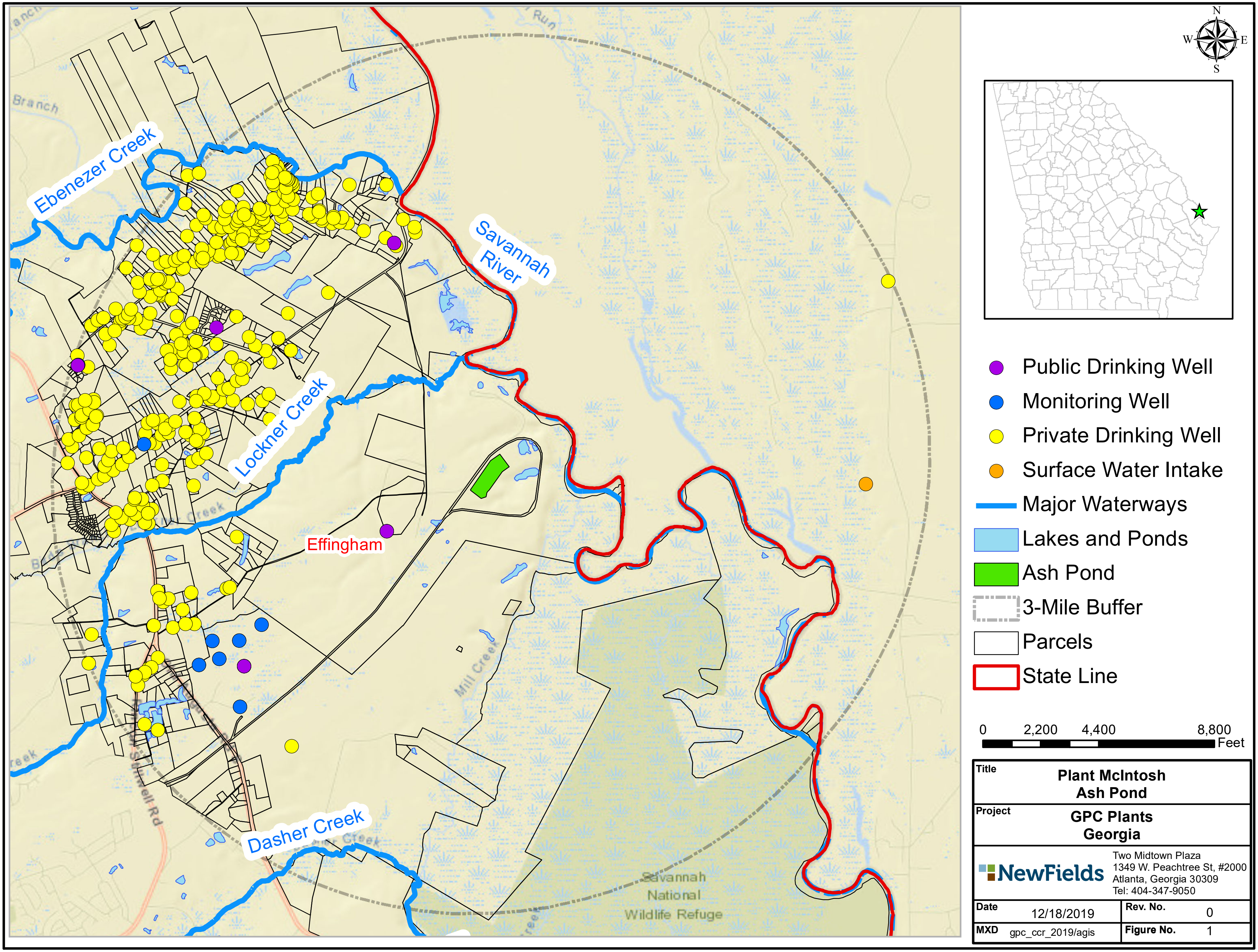
There are five public water systems operating in the area. The closest is the non-transient, non-community water system at Plant McIntosh, which serves 90 people. Non-transient, non-community systems serve stable, non-residential populations at commercial or industrial facilities. Another non-transient, non-community water system is operated by Georgia Pacific, which is located about 1.8 miles to the southwest of Plant McIntosh and serves 1,001 people. The New Ebenezer Retreat Center has two wells serving a transient population of 125 people. These wells are located 1.7 miles to the north of the ash pond.

There are also two community water systems in the Investigated Area, the Long Acres Rd and Sandy Woods subdivision systems. The Long Acres Rd system serves 45 people, and is located 2.1 miles to the northwest of the ash pond. The Sandy Woods subdivision system serves 36 people and is located just under 3 miles to the northwest of the ash pond.

The surface water intake for the Beaufort-Jasper County water system is located 2.6 miles to the east of the ash pond. The intake withdraws from a canal off of the Savannah River downstream of Plant McIntosh.

In total, NewFields identified 248 parcels associated with private drinking water wells. The majority of these parcels (220 parcels) were identified using septic permits. Ten private drinking water wells were identified in the Coastal Health Department database and 43 private drinking water wells were observed during the windshield survey. Seven parcels associated with private wells were found in the USGS database.

Figure 1 shows points for identified wells by type.


Ebenezer Creek
Savannah River
Lockner Creek
Effingham
Dasher Creek
Mill Creek
Savannah National Wildlife Refuge
Branch
Public Drinking Well
Monitoring Well
Private Drinking Well
Surface Water Intake
Major Waterways
Lakes and Ponds
Ash Pond
3-Mile Buffer
Parcels
State Line
0
2,200
4,400
8,800
Feet
Title
Plant McIntosh
Ash Pond
Project
GPC Plants
Georgia
NewFields
Two Midtown Plaza
1349 W. Peachtree St, #2000
Atlanta, Georgia 30309
Tel: 404-347-9050
Date
12/18/2019
Rev. No.
0
MXD
gpc_ccr_2019/agis
Figure No.
1

APPENDIX B

Groundwater Data

Appendix B
Groundwater Data
Plant McIntosh AP-1 Risk Evaluation Report
Plant McIntosh, Effingham County, GA

Well ID		Constituent:	Lithium			
		Units:	mg/L			
	Sample Date	Group	Result	RL	MDL	Qualifier
MGWC-7	5/5/2016	Downgradient	**0.0586**	0.05	0.01	
MGWC-7	6/21/2016	Downgradient	**0.122**	0.05	0.0012	
MGWC-7	8/15/2016	Downgradient	**0.12**	0.005	0.0032	
MGWC-7	9/28/2016	Downgradient	**0.12**	0.005	0.0032	
MGWC-7	11/16/2016	Downgradient	**0.13**	0.005	0.0032	
MGWC-7	1/17/2017	Downgradient	**0.14**	0.005	0.0032	
MGWC-7	3/2/2017	Downgradient	**0.13**	0.005	0.0032	
MGWC-7	4/18/2017	Downgradient	**0.11**	0.005	0.0032	
MGWC-7	3/29/2018	Downgradient	**0.17**	0.005	0.0011	
MGWC-7	6/13/2018	Downgradient	**0.12**	0.005	0.0011	
MGWC-7	10/10/2018	Downgradient	**0.13**	0.005	0.0011	
MGWC-7	12/5/2018	Downgradient	**0.14**	0.005	0.0011	
MGWC-7	1/29/2019	Downgradient	**0.112**	0.002	0.00256	
MGWC-7	3/26/2019	Downgradient	**0.12**	0.002	0.0011	
MGWC-7	9/10/2019	Downgradient	**0.11**	0.005	0.0034	
MGWC-7	1/28/2020	Downgradient	**0.13**	0.005	0.0034	
MGWC-7	3/10/2020	Downgradient	**0.11**	0.005	0.0034	
MGWC-7	9/17/2020	Downgradient	**0.11**	0.005	0.0034	
MGWC-7	1/26/2021	Downgradient	**0.12**	0.005	0.0034	
MGWC-7	3/24/2021	Downgradient	**0.13**	0.005	0.0034	
MGWC-7	8/25/2021	Downgradient	**0.12**	0.005	0.0034	
MGWC-7	2/23/2022	Downgradient	**0.13**	0.005	0.00083	
MGWC-7	8/3/2022	Downgradient	**0.13**	0.005	0.00083	
MGWC-7	2/8/2023	Downgradient	**0.14**	0.005	0.002	
MGWC-7	8/2/2023	Downgradient	**0.13**	0.005	0.002	
MGWC-7	2/6/2024	Downgradient	**0.12**	0.005	0.002	
MGWC-7	8/14/2024	Downgradient	**0.15**	0.005	0.002	
MGWC-7	2/4/2025	Downgradient	**0.16**	0.005	0.002	
MGWC-8	5/5/2016	Downgradient	**0.0252**	0.05	0.01	J
MGWC-8	6/21/2016	Downgradient	**0.0228**	0.05	0.0012	J
MGWC-8	8/15/2016	Downgradient	**0.026**	0.005	0.0032	
MGWC-8	9/28/2016	Downgradient	**0.026**	0.005	0.0032	
MGWC-8	11/16/2016	Downgradient	**0.031**	0.005	0.0032	
MGWC-8	1/17/2017	Downgradient	**0.032**	0.005	0.0032	
MGWC-8	3/2/2017	Downgradient	**0.031**	0.005	0.0032	
MGWC-8	4/18/2017	Downgradient	**0.023**	0.005	0.0032	
MGWC-8	3/30/2018	Downgradient	**0.058**	0.005	0.0011	
MGWC-8	6/13/2018	Downgradient	**0.035**	0.005	0.0011	

Appendix B
Groundwater Data
Plant McIntosh AP-1 Risk Evaluation Report
Plant McIntosh, Effingham County, GA

Well ID		Constituent:	Lithium			
		Units:	mg/L			
	Sample Date	Group	Result	RL	MDL	Qualifier
MGWC-8	10/10/2018	Downgradient	**0.046**	0.005	0.0011	
MGWC-8	12/5/2018	Downgradient	**0.043**	0.005	0.0011	
MGWC-8	1/29/2019	Downgradient	**0.0361**	0.002	0.00256	
MGWC-8	3/26/2019	Downgradient	**0.043**	0.002	0.0011	
MGWC-8	9/10/2019	Downgradient	**0.042**	0.005	0.0034	
MGWC-8	1/29/2020	Downgradient	**0.037**	0.005	0.0034	
MGWC-8	3/10/2020	Downgradient	**0.028**	0.005	0.0034	
MGWC-8	9/17/2020	Downgradient	**0.039**	0.005	0.0034	
MGWC-8	1/26/2021	Downgradient	**0.032**	0.005	0.0034	
MGWC-8	3/24/2021	Downgradient	**0.011**	0.005	0.0034	
MGWC-8	8/25/2021	Downgradient	**0.037**	0.005	0.0034	
MGWC-8	2/23/2022	Downgradient	**0.028**	0.005	0.00083	
MGWC-8	8/4/2022	Downgradient	**0.021**	0.005	0.00083	
MGWC-8	2/8/2023	Downgradient	**0.012**	0.005	0.002	
MGWC-8	8/1/2023	Downgradient	**0.012**	0.005	0.002	
MGWC-8	2/7/2024	Downgradient	**0.0076**	0.005	0.002	
MGWC-8	8/14/2024	Downgradient	**0.007**	0.005	0.002	
MGWC-8	2/4/2025	Downgradient	**0.012**	0.005	0.002	
MGWC-19	12/5/2018	Downgradient	**0.0029**	0.005	0.0011	J
MGWC-19	12/9/2024	Downgradient	**0.0051**	0.005	0.002	
MGWC-19	2/5/2025	Downgradient	**0.0045**	0.005	0.002	J
MGWC-20	12/6/2018	Downgradient	**0.0053**	0.005	0.0011	
MGWC-20	2/23/2022	Downgradient	**0.0066**	0.005	0.00083	
MGWC-20	8/4/2022	Downgradient	**0.011**	0.005	0.00083	
MGWC-20	12/9/2024	Downgradient	**0.0029**	0.005	0.002	J
MGWC-20	2/4/2025	Downgradient	**0.01**	0.005	0.002	
MCPW-01	1/28/2020	Potable Well	< 0.15	0.5	0.15	U
MCPW-01	3/23/2021	Potable Well	**0.0065**	0.0025	--	
MCPW-01	3/29/2022	Potable Well	**0.006**	0.0025	0.0005	
MCPW-01	3/21/2023	Potable Well	< 0.00073	0.03	0.00073	U
MCPW-01	3/6/2024	Potable Well	**0.0055**	0.0025	0.00033	
MCPW-01	3/12/2025	Potable Well	**0.0053**	0.0025	0.0002	
MCPW-02	1/28/2020	Potable Well	< 0.15	0.5	0.15	U
MCPW-02	3/23/2021	Potable Well	**0.0066**	0.0025	--	
MCPW-02	3/29/2022	Potable Well	**0.0059**	0.0025	0.0005	
MCPW-02	3/21/2023	Potable Well	< 0.00073	0.03	0.00073	U
MCPW-02	3/6/2024	Potable Well	**0.0058**	0.0025	0.00033	
MCPW-02	3/12/2025	Potable Well	**0.005**	0.0025	0.0002	

Appendix B
Groundwater Data
Plant McIntosh AP-1 Risk Evaluation Report
Plant McIntosh, Effingham County, GA

Well ID		Constituent:	Lithium			
		Units:	mg/L			
	Sample Date	Group	Result	RL	MDL	Qualifier
MCPW-03	1/28/2020	Potable Well	< 0.15	0.5	0.15	U
MCPW-03	3/23/2021	Potable Well	**0.0047**	0.0025	--	
MCPW-03	3/29/2022	Potable Well	**0.0045**	0.0025	0.0005	
MCPW-03	3/21/2023	Potable Well	< 0.00073	0.03	0.00073	U
MCPW-03	3/6/2024	Potable Well	**0.0045**	0.0025	0.00033	
MCPW-03	3/12/2025	Potable Well	**0.0045**	0.0025	0.0002	

Notes:
-- = A value is not available for presentation
Bold = the constituent was detected in the sample.
< = Non-detect result; the MDL is presented
ID = identification
J = Estimated value; the presented value is below the reporting limit but above the MDL.
MDL = method detection limit
mg/L milligrams(s) per liter
RL = reporting limit
SSL = statistically significant level
U = Non-detect result; the reporting limit is presented

APPENDIX C

RSL Calculator Generated Screening Levels

APPENDIX C-1

Industrial Screening Levels

Appendix C
Appendix C-1
USEPA RSL Calculator Generated Industrial Screening Levels
Plant McIntosh AP-1 Risk Evaluation Report
Plant McIntosh, Effingham County, GA

Variable	Value
BW0-2 (mutagenic body weight) kg	0
BW2-6 (mutagenic body weight) kg	0
BW6-16 (mutagenic body weight) kg	0
BW16-26 (mutagenic body weight) kg	80
BWres-a (body weight - adult) kg	80
BWres-c (body weight - child) kg	0
DFWres-adj (age-adjusted dermal factor) cm2-event/kg	275546.875
DFWMres-adj (mutagenic age-adjusted dermal factor) cm2-event/kg	275546.875
EDres (exposure duration - resident) years	25
ED0-2 (mutagenic exposure duration first phase) years	0
ED2-6 (mutagenic exposure duration second phase) years	0
ED6-16 (mutagenic exposure duration third phase) years	0
ED16-26 (mutagenic exposure duration fourth phase) years	25
EDres-a (exposure duration - adult) years	25
EDres-c (exposure duration - child) years	0
EFres (exposure frequency) days/year	250
EF0-2 (mutagenic exposure frequency first phase) days/year	0
EF2-6 (mutagenic exposure frequency second phase) days/year	0
EF6-16 (mutagenic exposure frequency third phase) days/year	0
EF16-26 (mutagenic exposure frequency fourth phase) days/year	250
EFres-a (exposure frequency - adult) days/year	250
EFres-c (exposure frequency - child) days/year	0
ETres (exposure time) hours/day	8
ETevent-res-adj (age-adjusted exposure time) hours/event	8
ETevent-res-madj (mutagenic age-adjusted exposure time) hours/event	8
ET0-2 (mutagenic dermal exposure time first phase) hours/event	0
ET2-6 (mutagenic dermal exposure time second phase) hours/event	0
ET6-16 (mutagenic dermal exposure time third phase) hours/event	0
ET16-26 (mutagenic dermal exposure time fourth phase) hours/event	8
ETres-a (dermal exposure time - adult) hours/event	8
ETres-c (dermal exposure time - child) hours/event	0
ET0-2 (mutagenic inhalation exposure time first phase) hours/day	0
ET2-6 (mutagenic inhalation exposure time second phase) hours/day	0
ET6-16 (mutagenic inhalation exposure time third phase) hours/day	0
ET16-26 (mutagenic inhalation exposure time fourth phase) hours/day	8
ETres-a (inhalation exposure time - adult) hours/day	8
ETres-c (inhalation exposure time - child) hours/day	0
EV0-2 (mutagenic events) per day	0
EV2-6 (mutagenic events) per day	0
EV6-16 (mutagenic events) per day	0
EV16-26 (mutagenic events) per day	1
EVres-a (events - adult) per day	1
EVres-c (events - child) per day	0
THQ (target hazard quotient) unitless	1
IFWres-adj (adjusted intake factor) L/kg	78.125
IFWMres-adj (mutagenic adjusted intake factor) L/kg	78.125
IRW0-2 (mutagenic water intake rate) L/day	0
IRW2-6 (mutagenic water intake rate) L/day	0
IRW6-16 (mutagenic water intake rate) L/day	0
IRW16-26 (mutagenic water intake rate) L/day	1
IRWres-a (water intake rate - adult) L/day	1
IRWres-c (water intake rate - child) L/day	0
K (volatilization factor of Andelman) L/m3	0.5
LT (lifetime) years	70
SA0-2 (mutagenic skin surface area) cm2	0
SA2-6 (mutagenic skin surface area) cm2	0
SA6-16 (mutagenic skin surface area) cm2	0
SA16-26 (mutagenic skin surface area) cm2	3527
SAres-a (skin surface area - adult) cm2	3527
SAres-c (skin surface area - child) cm2	0
lsc (apparent thickness of stratum corneum) cm	0.001
TR (target risk) unitless	0.00001

Output generated 04MAR2025:10:57:09

Appendix C
Appendix C-1
USEPA RSL Calculator Generated Industrial Screening Levels
Plant McIntosh AP-1 Risk Evaluation Report
Plant McIntosh, Effingham County, GA

Chemical	Lithium
CAS Number	7439-93-2
Mutagen?	No
Volatile?	No
Chemical Type	Inorganics
Sfo (mg/kg-day)-1	-
Sfo Ref	
IUR (ug/m3)-1	-
IUR Ref	
RfD (mg/kg-day)	2.00E-03
RfD Ref	P
RfC (mg/m3)	-
RfC Ref	
GIABS	1.00E+00
Kp (cm/hr)	1.00E-03
MW	6.94E+00
B (unitless)	1.01E-03
t* (hr)	2.76E-01
τevent (hr/event)	1.15E-01
FA (unitless)	1.00E+00
In EPD?	Yes
DAevent (ca)	-
DAevent (nc child)	-
DAevent (nc adult)	6.62E-02
MCL (ug/L)	-
Ingestion SL TR=1E-05 (ug/L)	-
Dermal SL TR=1E-05 (ug/L)	-
Inhalation SL TR=1E-05 (ug/L)	-
Carcinogenic SL TR=1E-05 (ug/L)	-
Ingestion SL Child THQ=1 (ug/L)	-
Dermal SL Child THQ=1 (ug/L)	-
Inhalation SL Child THQ=1 (ug/L)	-
Noncarcinogenic SL Child THI=1 (ug/L)	-
Ingestion SL Adult THQ=1 (ug/L)	2.34E+02
Dermal SL Adult THQ=1 (ug/L)	8.28E+03
Inhalation SL Adult THQ=1 (ug/L)	-
Noncarcinogenic SL Adult THI=1 (ug/L)	2.27E+02
Screening Level (ug/L)	2.27E+02 nc

Notes

I = IRIS; P = PPRTV; O = OPP; A = ATSDR; C = Cal EPA; X = PPRTV Screening Level; H = HEAST; D = DWSHA; W = TEF applied; E = RPF applied; G = see user's guide; U = user provided; ca = cancer; nc = noncancer; * = where: nc SL < 100X ca SL; ** = where nc SL < 10X ca SL; SSL values are based on DAF=1; max = ceiling limit exceeded; sat = Csat exceeded.

APPENDIX C-2

Residential Screening Levels

Appendix C
Appendix C-2
USEPA RSL Calculator Generated Residential Screening Levels
Plant McIntosh AP-1 Risk Evaluation Report
Plant McIntosh, Effingham County, GA

Variable	Value
BW0-2 (mutagenic body weight) kg	15
BW2-6 (mutagenic body weight) kg	15
BW6-16 (mutagenic body weight) kg	80
BW16-26 (mutagenic body weight) kg	80
BWres-a (body weight - adult) kg	80
BWres-c (body weight - child) kg	15
DFWres-adj (age-adjusted dermal factor) cm2-event/kg	2610650
DFWMres-adj (mutagenic age-adjusted dermal factor) cm2-event/kg	8191633
EDres (exposure duration - resident) years	26
ED0-2 (mutagenic exposure duration first phase) years	2
ED2-6 (mutagenic exposure duration second phase) years	4
ED6-16 (mutagenic exposure duration third phase) years	10
ED16-26 (mutagenic exposure duration fourth phase) years	10
EDres-a (exposure duration - adult) years	20
EDres-c (exposure duration - child) years	6
EFres (exposure frequency) days/year	350
EF0-2 (mutagenic exposure frequency first phase) days/year	350
EF2-6 (mutagenic exposure frequency second phase) days/year	350
EF6-16 (mutagenic exposure frequency third phase) days/year	350
EF16-26 (mutagenic exposure frequency fourth phase) days/year	350
EFres-a (exposure frequency - adult) days/year	350
EFres-c (exposure frequency - child) days/year	350
ETres (exposure time) hours/day	24
ETevent-res-adj (age-adjusted exposure time) hours/event	0.67077
ETevent-res-madj (mutagenic age-adjusted exposure time) hours/event	0.67077
ET0-2 (mutagenic dermal exposure time first phase) hours/event	0.54
ET2-6 (mutagenic dermal exposure time second phase) hours/event	0.54
ET6-16 (mutagenic dermal exposure time third phase) hours/event	0.71
ET16-26 (mutagenic dermal exposure time fourth phase) hours/event	0.71
ETres-a (dermal exposure time - adult) hours/event	0.71
ETres-c (dermal exposure time - child) hours/event	0.54
ET0-2 (mutagenic inhalation exposure time first phase) hours/day	24
ET2-6 (mutagenic inhalation exposure time second phase) hours/day	24
ET6-16 (mutagenic inhalation exposure time third phase) hours/day	24
ET16-26 (mutagenic inhalation exposure time fourth phase) hours/day	24
ETres-a (inhalation exposure time - adult) hours/day	24
ETres-c (inhalation exposure time - child) hours/day	24
EV0-2 (mutagenic events) per day	1
EV2-6 (mutagenic events) per day	1
EV6-16 (mutagenic events) per day	1
EV16-26 (mutagenic events) per day	1
EVres-a (events - adult) per day	1
EVres-c (events - child) per day	1
THQ (target hazard quotient) unitless	1
IFWres-adj (adjusted intake factor) L/kg	327.95
IFWMres-adj (mutagenic adjusted intake factor) L/kg	1019.9
IRW0-2 (mutagenic water intake rate) L/day	0.78
IRW2-6 (mutagenic water intake rate) L/day	0.78
IRW6-16 (mutagenic water intake rate) L/day	2.5
IRW16-26 (mutagenic water intake rate) L/day	2.5
IRWres-a (water intake rate - adult) L/day	2.5
IRWres-c (water intake rate - child) L/day	0.78
K (volatilization factor of Andelman) L/m3	0.5
LT (lifetime) years	70
SA0-2 (mutagenic skin surface area) cm2	6365
SA2-6 (mutagenic skin surface area) cm2	6365
SA6-16 (mutagenic skin surface area) cm2	19652
SA16-26 (mutagenic skin surface area) cm2	19652
SAres-a (skin surface area - adult) cm2	19652
SAres-c (skin surface area - child) cm2	6365
lsc (apparent thickness of stratum corneum) cm	0.001
TR (target risk) unitless	0.00001

Output generated 06MAR2025:16:47:36

Appendix C
Appendix C-2
USEPA RSL Calculator Generated Residential Screening Levels
Plant McIntosh AP-1 Risk Evaluation Report
Plant McIntosh, Effingham County, GA

Chemical	**Lithium**
CAS Number	7439-93-2
Mutagen?	No
Volatile?	No
Chemical Type	Inorganics
Sfo (mg/kg-day)-1	-
Sfo Ref	
IUR (ug/m3)-1	-
IUR Ref	
RfD (mg/kg-day)	2.00E-03
RfD Ref	P
RfC (mg/m3)	-
RfC Ref	
GIABS	1.00E+00
Kp (cm/hr)	1.00E-03
MW	6.94E+00
B (unitless)	1.01E-03
t* (hr)	2.76E-01
τevent (hr/event)	1.15E-01
FA (unitless)	1.00E+00
In EPD?	Yes
DAevent (ca)	-
DAevent (nc child)	4.92E-03
DAevent (nc adult)	8.49E-03
MCL (ug/L)	-
Ingestion SL TR=1E-05 (ug/L)	-
Dermal SL TR=1E-05 (ug/L)	-
Inhalation SL TR=1E-05 (ug/L)	-
Carcinogenic SL TR=1E-05 (ug/L)	-
Ingestion SL Child THQ=1 (ug/L)	4.01E+01
Dermal SL Child THQ=1 (ug/L)	9.10E+03
Inhalation SL Child THQ=1 (ug/L)	-
Noncarcinogenic SL Child THI=1 (ug/L)	3.99E+01
Ingestion SL Adult THQ=1 (ug/L)	6.67E+01
Dermal SL Adult THQ=1 (ug/L)	1.20E+04
Inhalation SL Adult THQ=1 (ug/L)	-
Noncarcinogenic SL Adult THI=1 (ug/L)	6.64E+01
Screening Level (ug/L)	3.99E+01 nc

Notes

I = IRIS; P = PPRTV; O = OPP; A = ATSDR; C = Cal EPA; X = PPRTV Screening Level; H = HEAST; D = DWSHA; W = TEF applied; E = RPF applied; G = see user's guide; U = user provided; ca = cancer; nc = noncancer; * = where: nc SL < 100X ca SL; ** = where nc SL < 10X ca SL; SSL values are based on DAF=1; max = ceiling limit exceeded; sat = Csat exceeded.

APPENDIX D

Support for Refined Risk Evaluation

Appendix D-1

Exposure Point Concentration Calculation Results

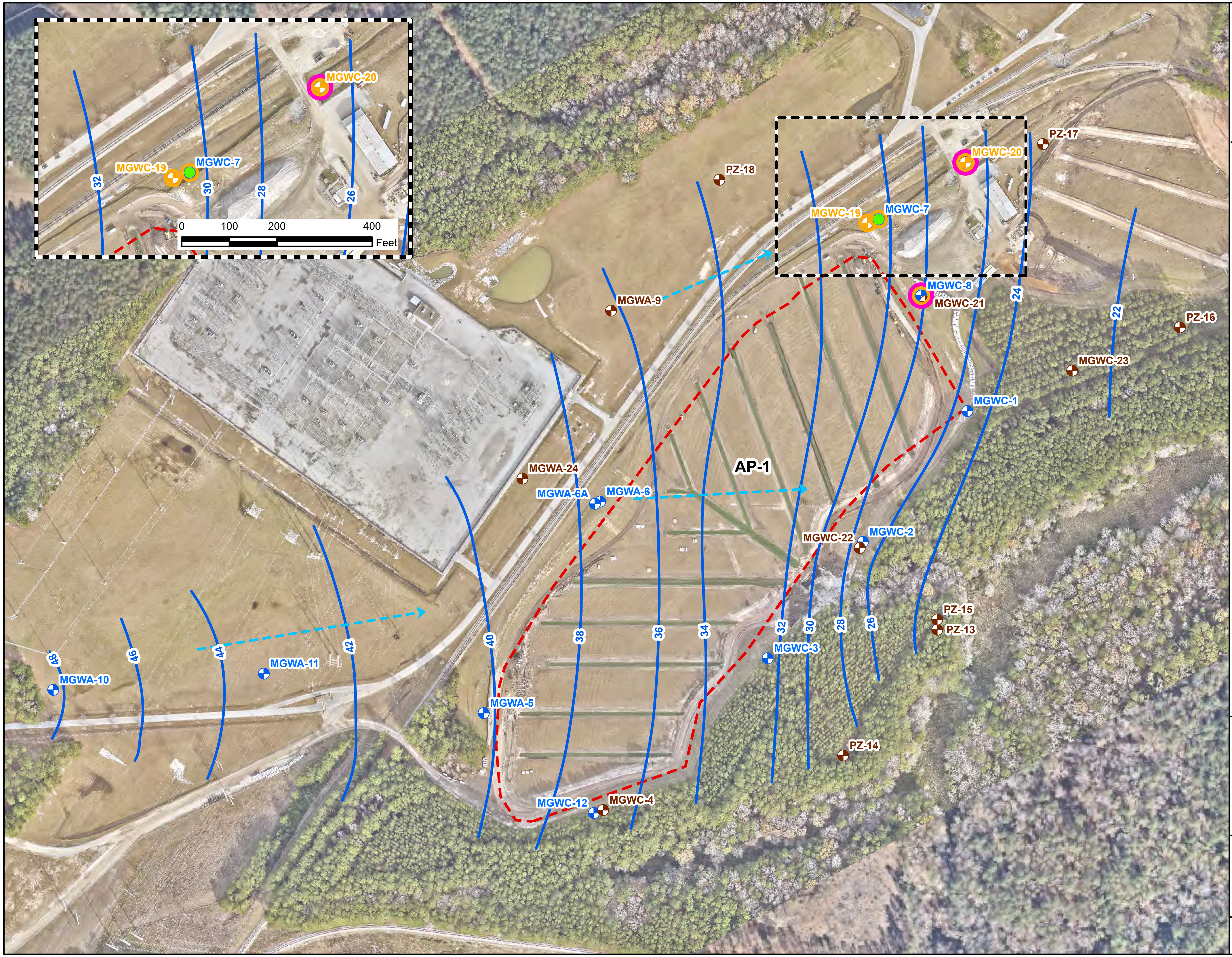
Appendix D
Appendix D-1
Exposure Point Concentration Calculation Results[1]
Plant McIntosh AP-1 Risk Evaluation Report
Plant McIntosh, Effingham County, GA

CCR Rule Designation	Constituent	Well IDs Included	Maximum Concentration	Detection Frequency	Exceedance Frequency	EPC Step 1 Individual Target Well(s) May 2016 - February 2025 (mg/L)	EPC Step 2 Target Well(s) & Downgradient Well(s) May 2016 - February 2025 (mg/L)	EPC Step 3 Farthest Downgradient Well(s) May 2016 - February 2025 (mg/L)
Appendix IV	Lithium	MGWC-7	0.17	28 / 28	28 / 28	0.132		
		MGWC-7 MGWC-8 MGWC-19 MGWC-20	0.17	64 / 64	33 / 64		0.079	
		MGWC-8 MGWC-20	0.058	33 / 33	5 / 33			0.030

Notes:
Yellow highlighted value is the EPC selected for the refined screening.
[1] EPCs calculated in accordance with USEPA, 2014. Memorandum for Determining Groundwater Exposure Point Concentrations, Supplemental Guidance. OSWER Directive 9283.1-42, February 2014. Located at https://cfpub.epa.gov/ncea/risk/recordisplay.cfm?deid=236917

Appendix D-2

Exposure Point Concentration Figure



N

Legend

- Detection Monitoring Well
- Assessment Monitoring Well
- Piezometer
- Groundwater Elevation Iso-Contour
- Approximate Grounwater Flow
- Approximate AP-1 Boundary

Exposure Point Concentration Wells

- Step 1 Well
- Step 2 Well
- Step 3 Well

0 150 300 600
Feet

Notes:
1. Exposure Point Concentration (EPC).
2. EPC Step 1 - Individual Target Well(s) 2016-2025.
3. EPC Step 2 - Target Well(s) & Adjacent Well(s) & Downgradient Well(s) 2016-2025.
4. EPC Step 3 - Farthest Downgradient Well(s) 2016-2025.
5. Water elevation contours are based on measurements shown on Figure 3. Elevation provided in feet (ft) referenced to the North American Vertical Datum of 1988 (NAVD 88).
6. Aerial dated January 22, 2024 provided by SAM LLC. Additional photograph sourced from Nearmap Imagery, January 2025.

EXPOSURE POINT CONCENTRATION MAP LITHIUM

GEORGIA POWER
PLANT MCINTOSH
EFFINGHAM COUNTY, GEORGIA

Prepared For: Georgia Power

Prepared By: Geosyntec consultants

KENNESAW, GA | MAY 2025

APPENDIX
D-2

Appendix D-3

ProUCL Input/Output Files

Appendix D
Appendix D-3
ProUCL Input
Plant McIntosh AP-1 Risk Evaluation Report
Plant McIntosh, Effingham County, GA

Step 1 EPC Calculation Input		Step 2 EPC Calculation Input		Step 3 EPC Calculation Input	
Step1_Lithium	D_Step1_Lithium	Step2_Lithium	D_Step2_Lithium	Step3_Lithium	D_Step3_Lithium
0.0586	1	0.0586	1	0.0252	1
0.122	1	0.122	1	0.0228	1
0.12	1	0.12	1	0.026	1
0.12	1	0.12	1	0.026	1
0.13	1	0.13	1	0.031	1
0.14	1	0.14	1	0.032	1
0.13	1	0.13	1	0.031	1
0.11	1	0.11	1	0.023	1
0.17	1	0.17	1	0.058	1
0.12	1	0.12	1	0.035	1
0.13	1	0.13	1	0.046	1
0.14	1	0.14	1	0.043	1
0.112	1	0.112	1	0.0361	1
0.12	1	0.12	1	0.043	1
0.11	1	0.11	1	0.042	1
0.13	1	0.13	1	0.037	1
0.11	1	0.11	1	0.028	1
0.11	1	0.11	1	0.039	1
0.12	1	0.12	1	0.032	1
0.13	1	0.13	1	0.011	1
0.12	1	0.12	1	0.037	1
0.13	1	0.13	1	0.028	1
0.13	1	0.13	1	0.021	1
0.14	1	0.14	1	0.012	1
0.13	1	0.13	1	0.012	1
0.12	1	0.12	1	0.0076	1
0.15	1	0.15	1	0.007	1
0.16	1	0.16	1	0.012	1
		0.0252	1	0.0053	1
		0.0228	1	0.0066	1
		0.026	1	0.011	1

Appendix D
Appendix D-3
ProUCL Input
Plant McIntosh AP-1 Risk Evaluation Report
Plant McIntosh, Effingham County, GA

Step 1 EPC Calculation Input		**Step 2 EPC Calculation Input**		**Step 3 EPC Calculation Input**	
Step1_Lithium	D_Step1_Lithium	Step2_Lithium	D_Step2_Lithium	Step3_Lithium	D_Step3_Lithium
		0.026	1	0.0029	1
		0.031	1	0.01	1
		0.032	1		
		0.031	1		
		0.023	1		
		0.058	1		
		0.035	1		
		0.046	1		
		0.043	1		
		0.0361	1		
		0.043	1		
		0.042	1		
		0.037	1		
		0.028	1		
		0.039	1		
		0.032	1		
		0.011	1		
		0.037	1		
		0.028	1		
		0.021	1		
		0.012	1		
		0.012	1		
		0.0076	1		
		0.007	1		
		0.012	1		
		0.0029	1		
		0.0051	1		
		0.0045	1		
		0.0053	1		
		0.0066	1		
		0.0110	1		

Appendix D
Appendix D-3
ProUCL Input
Plant McIntosh AP-1 Risk Evaluation Report
Plant McIntosh, Effingham County, GA

Step 1 EPC Calculation Input		**Step 2 EPC Calculation Input**		**Step 3 EPC Calculation Input**	
Step1_Lithium	D_Step1_Lithium	Step2_Lithium	D_Step2_Lithium	Step3_Lithium	D_Step3_Lithium
		0.0029	1		
		0.0100	1		

Definitions:
EPC = exposure point concentration

Appendix D
Appendix D-3
ProUCL Output
Plant McIntosh AP-1 Risk Evaluation Report
Plant McIntosh, Effingham County, GA

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.2 4/28/2025 8:07:46 AM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Step1_Lithium

General Statistics

Total Number of Observations	28	Number of Distinct Observations	10
		Number of Missing Observations	0
Minimum	0.0586	Mean	0.125
Maximum	0.17	Median	0.126
SD	0.0196	Std. Error of Mean	0.00371
Coefficient of Variation	0.156	Skewness	-0.857

Normal GOF Test

Shapiro Wilk Test Statistic	0.873	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.896	Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.194	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.191	Data Not Normal at 1% Significance Level

Data Not Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.132	95% Adjusted-CLT UCL (Chen-1995)	0.131
		95% Modified-t UCL (Johnson-1978)	0.132

Gamma GOF Test

A-D Test Statistic	1.545	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.744	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.204	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.165	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	35.26	k star (bias corrected MLE)	31.5
Theta hat (MLE)	0.00356	Theta star (bias corrected MLE)	0.00398
nu hat (MLE)	1974	nu star (bias corrected)	1764
MLE Mean (bias corrected)	0.125	MLE Sd (bias corrected)	0.0224

		Approximate Chi Square Value (0.05)	1668
Adjusted Level of Significance	0.0404	Adjusted Chi Square Value	1662

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.133	95% Adjusted Gamma UCL	0.133

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.762	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk Critical Value	0.936	Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.225	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.151	Data Not Lognormal at 10% Significance Level

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	-2.837	Mean of logged Data	-2.09
Maximum of Logged Data	-1.772	SD of logged Data	0.183

Assuming Lognormal Distribution

95% H-UCL	0.134	90% Chebyshev (MVUE) UCL	0.139
95% Chebyshev (MVUE) UCL	0.145	97.5% Chebyshev (MVUE) UCL	0.153
99% Chebyshev (MVUE) UCL	0.169		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.132	95% BCA Bootstrap UCL	0.131
95% Standard Bootstrap UCL	0.131	95% Bootstrap-t UCL	0.131
95% Hall's Bootstrap UCL	0.132	95% Percentile Bootstrap UCL	0.131
90% Chebyshev(Mean, Sd) UCL	0.137	95% Chebyshev(Mean, Sd) UCL	0.142
97.5% Chebyshev(Mean, Sd) UCL	0.149	99% Chebyshev(Mean, Sd) UCL	0.162

Suggested UCL to Use

95% Student's-t UCL	0.132

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.

Step2_Lithium

General Statistics

Total Number of Observations	64	Number of Distinct Observations	36
		Number of Missing Observations	0
Minimum	0.0029	Mean	0.0682
Maximum	0.17	Median	0.0425
SD	0.0536	Std. Error of Mean	0.0067
Coefficient of Variation	0.786	Skewness	0.288

Normal GOF Test

Shapiro Wilk Test Statistic	0.834	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk P Value	1.5178E-9	Data Not Normal at 1% Significance Level	
Lilliefors Test Statistic	0.212	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.128	Data Not Normal at 1% Significance Level	

Data Not Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.0794	95% Adjusted-CLT UCL (Chen-1995)	0.0795
		95% Modified-t UCL (Johnson-1978)	0.0794

Gamma GOF Test

A-D Test Statistic	2.467	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.776	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.227	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.114	Data Not Gamma Distributed at 5% Significance Level	

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.161	k star (bias corrected MLE)	1.117
Theta hat (MLE)	0.0588	Theta star (bias corrected MLE)	0.0611
nu hat (MLE)	148.5	nu star (bias corrected)	142.9
MLE Mean (bias corrected)	0.0682	MLE Sd (bias corrected)	0.0645
		Approximate Chi Square Value (0.05)	116.3
Adjusted Level of Significance	0.0463	Adjusted Chi Square Value	115.7

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.0838	95% Adjusted Gamma UCL	0.0842

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.876	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk P Value	5.7323E-7	Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.22	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.101	Data Not Lognormal at 10% Significance Level	

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	-5.843	Mean of logged Data	-3.174
Maximum of Logged Data	-1.772	SD of logged Data	1.157

Assuming Lognormal Distribution

95% H-UCL	0.113	90% Chebyshev (MVUE) UCL	0.123
95% Chebyshev (MVUE) UCL	0.143	97.5% Chebyshev (MVUE) UCL	0.17
99% Chebyshev (MVUE) UCL	0.223		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.0792	95% BCA Bootstrap UCL	0.0793

95% Standard Bootstrap UCL	0.0792	95% Bootstrap-t UCL	0.0794
95% Hall's Bootstrap UCL	0.0791	95% Percentile Bootstrap UCL	0.0794
90% Chebyshev(Mean, Sd) UCL	0.0883	95% Chebyshev(Mean, Sd) UCL	0.0974
97.5% Chebyshev(Mean, Sd) UCL	0.11	99% Chebyshev(Mean, Sd) UCL	0.135

Suggested UCL to Use

95% Student's-t UCL	0.0794

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Step3_Lithium

General Statistics

Total Number of Observations	33	Number of Distinct Observations	24
		Number of Missing Observations	0
Minimum	0.0029	Mean	0.0254
Maximum	0.058	Median	0.026
SD	0.0141	Std. Error of Mean	0.00245
Coefficient of Variation	0.554	Skewness	0.141

Normal GOF Test

Shapiro Wilk Test Statistic	0.952	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.906	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.163	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.177	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	0.0296	95% Adjusted-CLT UCL (Chen-1995)	0.0295
		95% Modified-t UCL (Johnson-1978)	0.0296

Gamma GOF Test

A-D Test Statistic	0.961	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.756	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.154	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.155	Detected data appear Gamma Distributed at 5% Significance Level

Detected data follow Appr. Gamma Distribution at 5% Significance Level

Gamma Statistics

k hat (MLE)	2.524	k star (bias corrected MLE)	2.315
Theta hat (MLE)	0.0101	Theta star (bias corrected MLE)	0.011
nu hat (MLE)	166.6	nu star (bias corrected)	152.8
MLE Mean (bias corrected)	0.0254	MLE Sd (bias corrected)	0.0167
		Approximate Chi Square Value (0.05)	125.2
Adjusted Level of Significance	0.0419	Adjusted Chi Square Value	123.9

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.031	95% Adjusted Gamma UCL	0.0314

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.901	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.942	Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.191	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.139	Data Not Lognormal at 10% Significance Level	

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	-5.843	Mean of logged Data	-3.882
Maximum of Logged Data	-2.847	SD of logged Data	0.738

Assuming Lognormal Distribution

95% H-UCL	0.0358	90% Chebyshev (MVUE) UCL	0.038
95% Chebyshev (MVUE) UCL	0.0431	97.5% Chebyshev (MVUE) UCL	0.0502
99% Chebyshev (MVUE) UCL	0.0641		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.0295	95% BCA Bootstrap UCL	0.0294
95% Standard Bootstrap UCL	0.0294	95% Bootstrap-t UCL	0.0295
95% Hall's Bootstrap UCL	0.0294	95% Percentile Bootstrap UCL	0.0294
90% Chebyshev(Mean, Sd) UCL	0.0328	95% Chebyshev(Mean, Sd) UCL	0.0361
97.5% Chebyshev(Mean, Sd) UCL	0.0408	99% Chebyshev(Mean, Sd) UCL	0.0498

Suggested UCL to Use

95% Student's-t UCL 0.0296

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 D-4

Groundwater Trend Analysis

Appendix D
Appendix D-4
Groundwater Trend Analysis
Plant McIntosh AP-1 Risk Evaluation Report
Plant McIntosh, Effingham County, GA

Mann-Kendall Trend Test Analysis

User Selected Options	
ıte/Time of Computation	ProUCL 5.2 2/25/2025 2:48:41 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

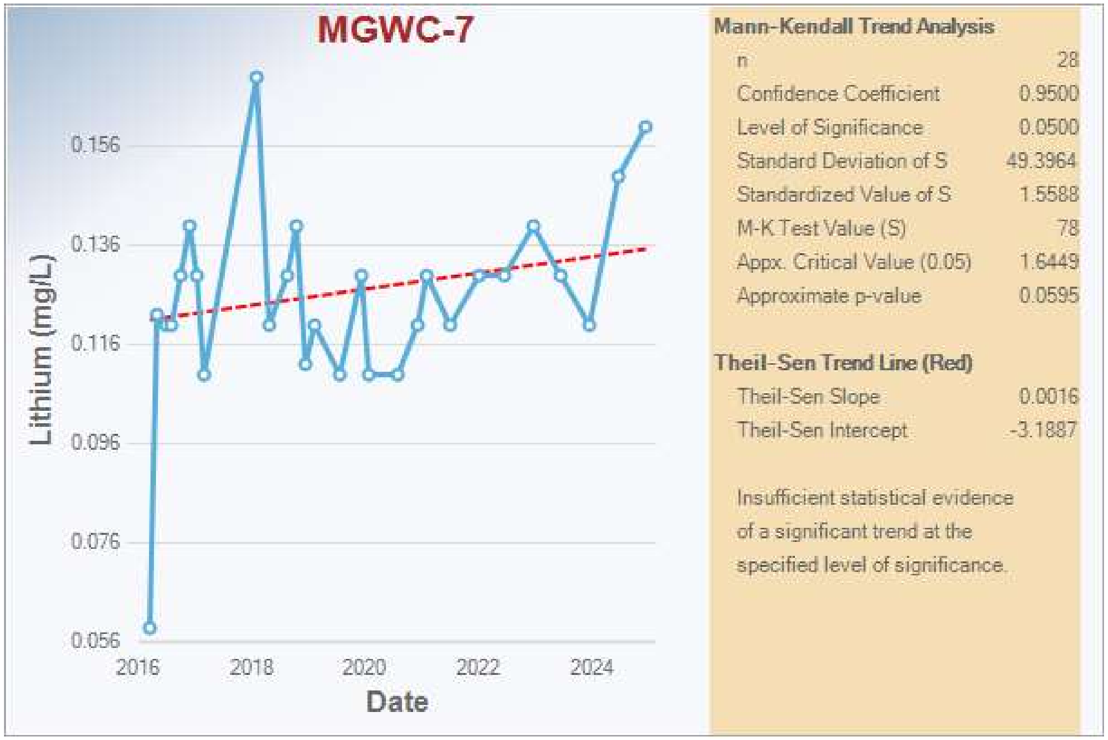
MGWC-7
Lithium (mg/L)
General Statistics

Number of Events Reported (m)	28
Number of Missing Events	0
Number or Reported Events Used	28
Number Values Reported (n)	28
Minimum	0.0586
Maximum	0.17
Mean	0.125
Geometric Mean	0.124
Median	0.126
Standard Deviation	0.0196
Coefficient of Variation	0.156

Mann-Kendall Test

M-K Test Value (S)	78
Critical Value (0.05)	1.645
Standard Deviation of S	49.4
Standardized Value of S	1.559
Approximate p-value	0.0595

Insufficient evidence to identify a significant trend at the specified level of significance.



Mann-Kendall Trend Test Analysis

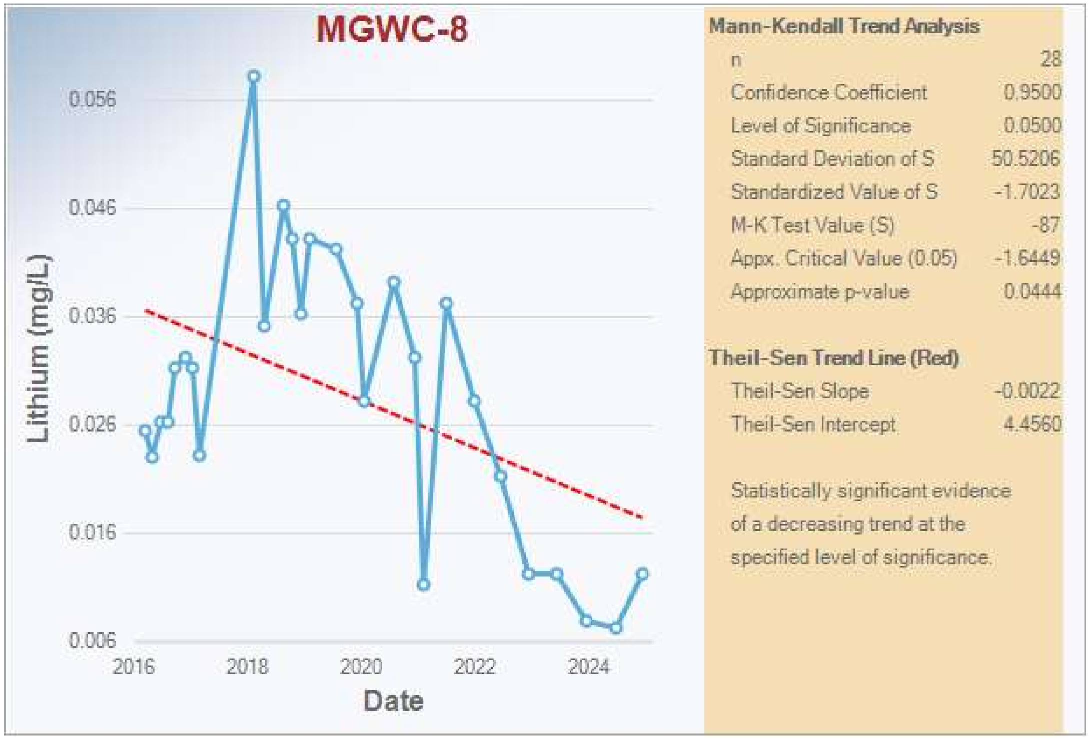
User Selected Options	
ıte/Time of Computation	ProUCL 5.2 4/28/2025 3:50:29 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

MGWC-8
Lithium (mg/L)
General Statistics

Number of Events Reported (m)	28
Number of Missing Events	0
Number or Reported Events Used	28
Number Values Reported (n)	28
Minimum	0.007
Maximum	0.058
Mean	0.0287
Geometric Mean	0.0253
Median	0.0295
Standard Deviation	0.0127
Coefficient of Variation	0.441

Mann-Kendall Test

M-K Test Value (S)	-87
Critical Value (0.05)	-1.645
Standard Deviation of S	50.52
Standardized Value of S	-1.702
Approximate p-value	0.0444



Statistically significant evidence of a decreasing trend at the specified level of significance.

Mann-Kendall Trend Test Analysis

User Selected Options	
te/Time of Computation	ProUCL 5.2 2/25/2025 3:20:28 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

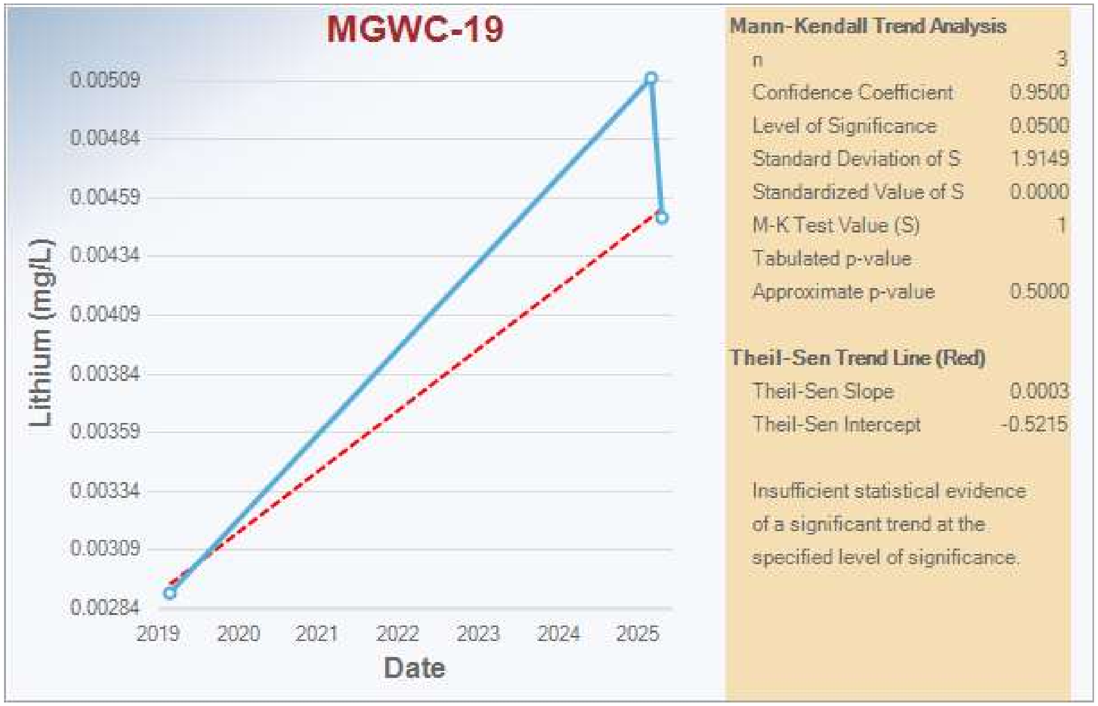
MGWC-19
Lithium (mg/L)
General Statistics

Number of Events Reported (m)	3
Number of Missing Events	0
Number or Reported Events Used	3
Number Values Reported (n)	3
Minimum	0.0029
Maximum	0.0051
Mean	0.00417
Geometric Mean	0.00405
Median	0.0045
Standard Deviation	0.00114
Coefficient of Variation	0.273

Mann-Kendall Test

M-K Test Value (S)	1
Tabulated p-value	N/A
Standard Deviation of S	1.915
Standardized Value of S	0
Approximate p-value	0.5

Insufficient evidence to identify a significant trend at the specified level of significance.



Mann-Kendall Trend Test Analysis

User Selected Options	
ite/Time of Computation	ProUCL 5.2 2/25/2025 2:56:08 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

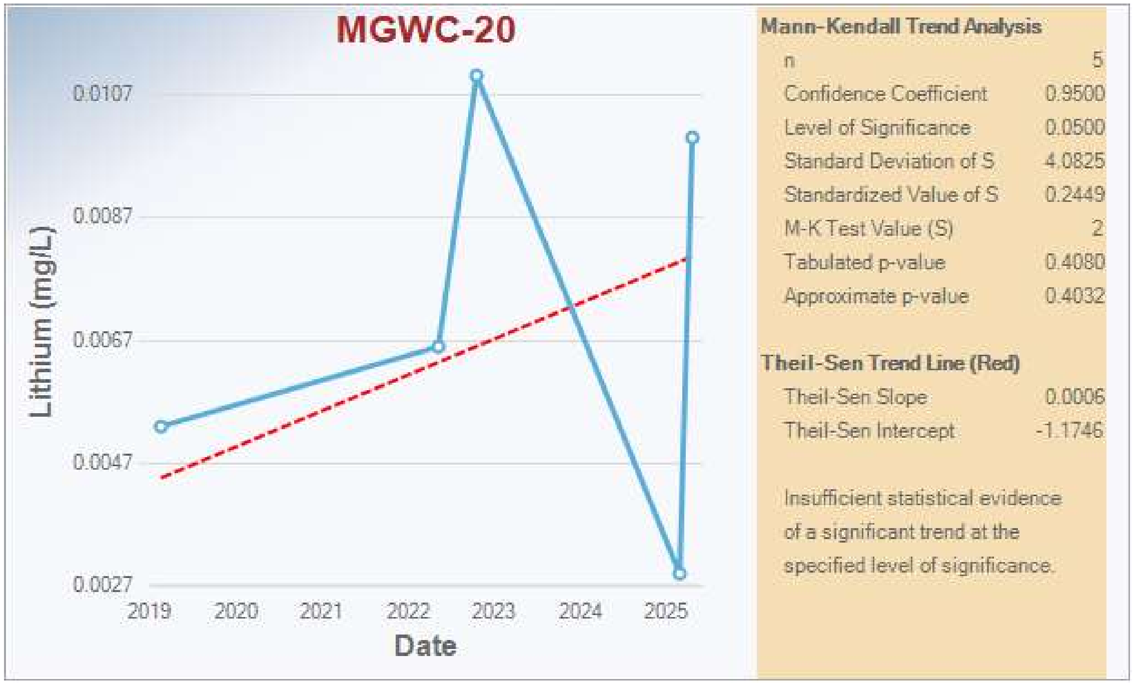
MGWC-20
Lithium (mg/L)
General Statistics

Number of Events Reported (m)	5
Number of Missing Events	0
Number or Reported Events Used	5
Number Values Reported (n)	5
Minimum	0.0029
Maximum	0.011
Mean	0.00716
Geometric Mean	0.00645
Median	0.0066
Standard Deviation	0.00334
Coefficient of Variation	0.467

Mann-Kendall Test

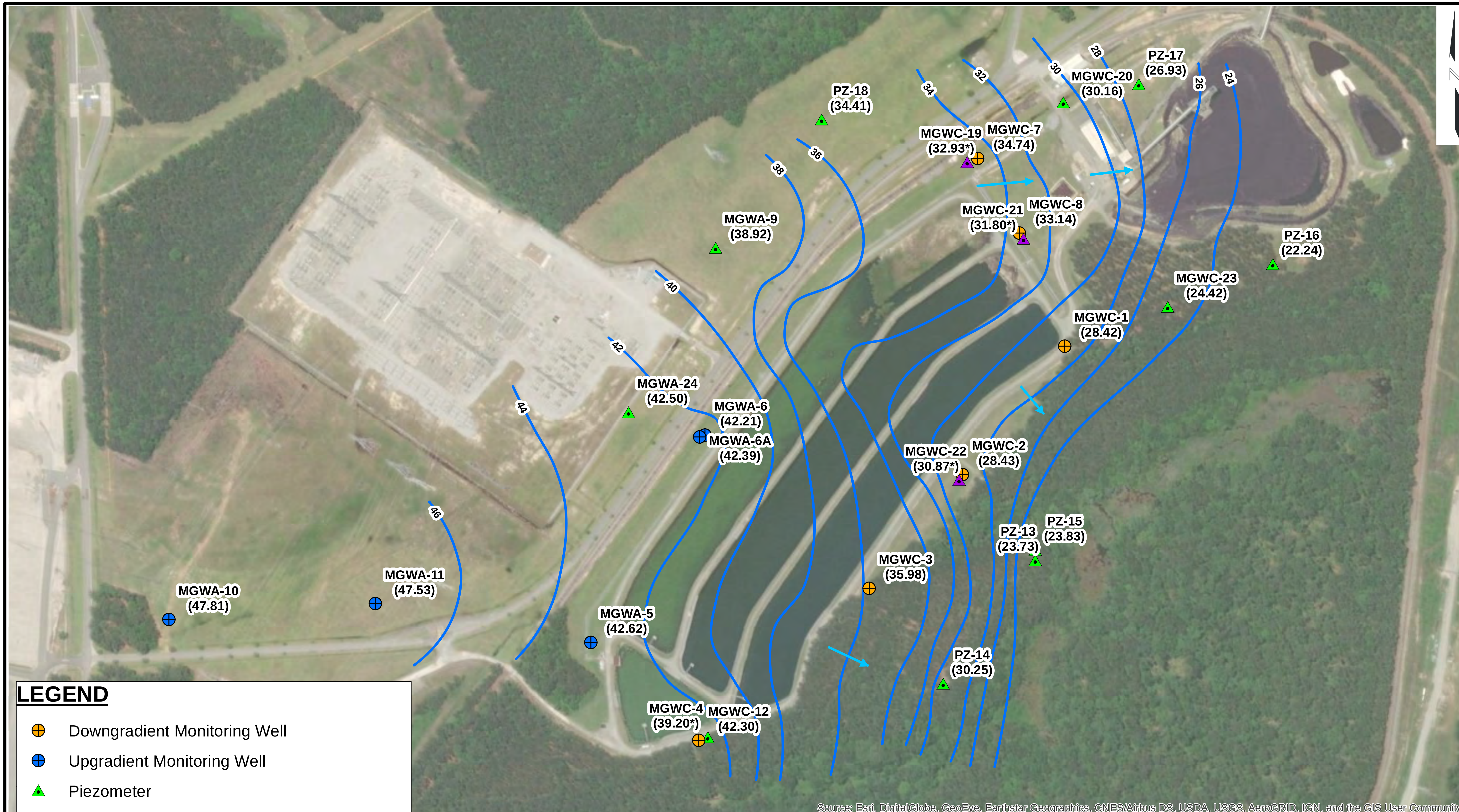
M-K Test Value (S)	2
Tabulated p-value	0.408
Standard Deviation of S	4.082
Standardized Value of S	0.245
Approximate p-value	0.403

Insufficient evidence to identify a significant trend at the specified level of significance.



Appendix B

Potentiometric Surface Contour Map, March 2019 (GEI 2019a)



LEGEND

- Downgradient Monitoring Well
- Upgradient Monitoring Well
- Piezometer
- Deep Piezometer
- Apparent Groundwater Flow
- Apparent Potentiometric Surface Contour (feet)

(47.81) = Groundwater elevations measured in feet relative to NAVD88 on 03/25/19

NOTE:

* MGWC-4, MGWC-19, MGWC-21, and MGWC-22 not used in contouring.

0 300 600

SCALE: 1 inch = 300 feet

Hydrogeologic Assessment Report Plant McIntosh Ash Pond 1 Effingham County, Georgia	GEI Consultants	POTENTIOMETRIC SURFACE CONTOUR MAP MARCH 2019
Georgia Power Company Atlanta, Georgia	Project No. 1901973	Prepared May 2019 Fig. 6

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